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The South American catfish genus *Brochis* Cope, 1872 (Pisces, Siluriformes, Callichthyidae)

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ABSTRACT

Examination of the type specimens of *Callichthys splendens* Castelnau, 1855, *Brochis coeruleus* Cope, 1872 (type species of *Brochis* Cope, 1872), *Brochis dipterus* Cope, 1872, *Corydoras semiscutatus* Cope, 1872, *Chaenothorax bicarinatus* Cope, 1878 (type species of *Chaenothorax* Cope, 1878), and *Chaenothorax eigenmanni* Ellis, 1913, has demonstrated that they represent only one species: *Brochis splendens*. *Callichthys taiosh* Castelnau, 1855, also has to be considered a synonym of *Brochis splendens*. *Chaenothorax multiradiatus* Orcés-Villagomez, 1960, is a second species belonging to the genus *Brochis*.

INTRODUCTION

While working on a review of the callichthyid genus *Corydoras*, the senior author was able to visit several Museums in Europe and the United States of America. Although the study of *Corydoras* is still in progress, the number of preserved specimens belonging to the closely related genus *Brochis* was so limited that it was possible to examine the material available, including the type material of all the species described by previous authors.

Examination of the holotype of *Callichthys splendens* Castelnau, 1855, confirmed the opinion of Regan (1912: 209) that this species belongs to the genus *Brochis* Cope, 1872. Regan did not discuss the validity of the species, neither did he mention a second species, *Callichthys taiosh* Castelnau, 1855, which also belongs to the genus *Brochis*.

Gosline (1940: 24—25) was the second author who placed Castelnau's *Callichthys splendens* in the genus *Brochis*. He was the first author who guessed a synonymy with *Brochis coeruleus* Cope, 1872, but it is evident that he did not examine Castelnau's specimen, as *C. splendens* was listed as a doubtful synonym of *B. coeruleus*.

Brochis coeruleus Cope, 1872, became a well-known species among aquarists. After examination of the seven syntypes of this species it became

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evident that Cope's species has to be regarded a junior synonym of Castelnau's *C. splendens*. The specific name *splendens*, as originally published in the binomen *Callichthys splendens* by Castelnau in 1855, was mentioned in principal zoological nomenclature as a senior synonym, viz., as *Osteogaster splendens* by Eigenmann & Allen (1942: 181), and as *Corydoras splendens* by Fowler (1954: 66—67), and thus has to be conserved as the oldest available name (Article 23b, International Code of Zoological Nomenclature, 1964: 23).

Examination of the type material of *Brochis dipterus* Cope, 1872, *Corydoras semiscutatus* Cope, 1872, *Chaenothorax bicarinatus* Cope, 1878, and *Chaenothorax eigenmanni* Ellis, 1913, showed that they all have to be considered junior synonyms of *Brochis splendens* (Castelnau, 1855). Even Castelnau's *Callichthys taiosh* (1855) belongs to this species. The original description of *C. taiosh* was based on a painting after a living specimen, by Mr. Weddel. According to Castelnau the specimen was not preserved.

The senior author is indebted to the Smithsonian Institution for the financial support to examine callichthyid fishes in Washington, Philadelphia, and Chicago. Thanks are also due to Dr. S. H. Weitzman (United States National Museum, Smithsonian Institution, Washington D.C., USNM), Dr. J. E. Böhlke and Dr. J. C. Tyler (The Academy of Natural Sciences, Philadelphia, ANSP), Dr. G. S. Myers and Dr. W. C. Freihofer (Stanford University, Palo Alto, SU), Dr. L. P. Woods (Field Museum of Natural History, Chicago, FMNH), Mrs. Dr. M. L. Bauchot (Museum National d'Histoire Naturelle, Paris, MNHN), Dr. K. H. Lüling (Zoologisches Forschungsinstitut und Museum Alexander Koenig, Bonn, ZFMK), and to Dr. G. Orcés-Villagomez (Escuela Politecnica Nacional, Quito, EPN), for their permission to examine the material under their care. We are grateful to Mr. M. C. Burns (Cheltenham) for the correction of the English. Figs. 3, 6, 7, 9-11 were made bij Mr. A. L. van der Laan (photographer of Instituut voor Taxonomische Zoölogie (Zoölogisch Museum), Amsterdam, ZMA), figs. 12 and 13 were made by the senior author.

Historical review

Castelnau (1855: 39, pl. 18 fig. 3) described and figured a new species, *Callichthys splendens*, after a single specimen collected by himself in the Río Tocantins, Brazil. Although the number of soft dorsal rays of the badly preserved specimen (fig. 3) was not mentioned, Castelnau's figure shows nine soft dorsal rays (fig. 1). Castelnau (1855: 39, pl. 19 fig. 1) also described and figured another new species, *Callichthys taiosh*, "du pays de Chiquitos", Brazil, based on an artistic picture obtained from a Mr. Weddel. This figure shows eleven soft dorsal rays (fig. 2).

Gill (1858: 403) referred both species of Castelnau to the genus *Hoplosoma* (= *Corydoras*).

Cope (1872: 283) ascribed *Callichthys splendens* to the genus *Corydoras*. He established the genus *Brochis* for his two new species, *B. coeruleus* (figs. 4—6) and *B. dipterus* (fig. 7) and designated the former as type species of

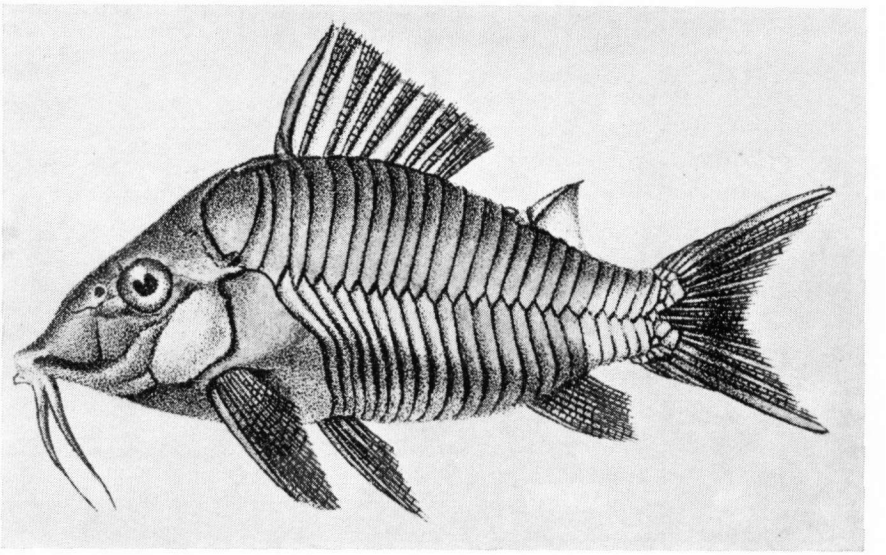

FIG. 1. *Brochis splendens*, reproduction of Castelnau's figure of *Callichthys splendens*.

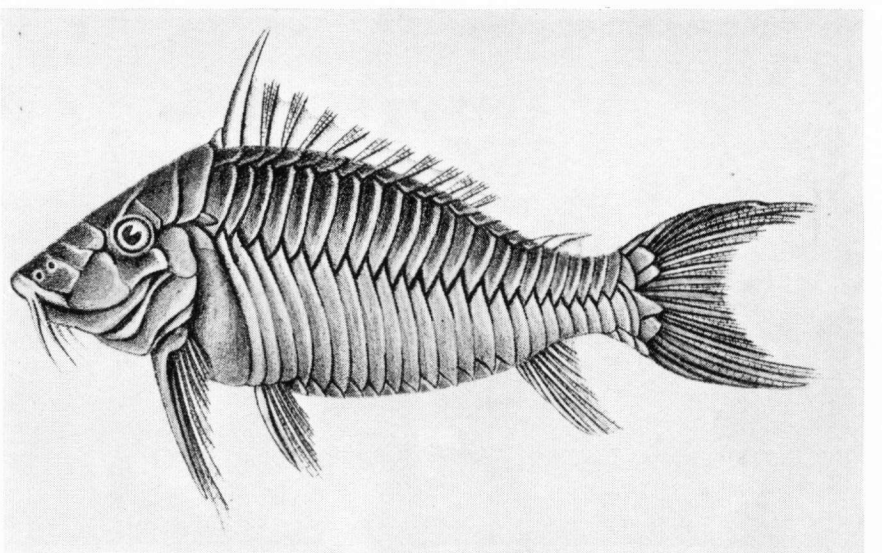

FIG. 2. *Brochis splendens*, reproduction of Castelnau's figure of *Callichthys taiosh*.

Brochis in the description of the latter. Both nominal species came from the Peruvian Ambyiacu [= Ampiyacu] River. A third new species belonging to the genus *Brochis*, described by Cope as *Corydoras semiscutatus* (fig. 8) also came from this river.

Cope (1878: 679—680) described a new genus and a new species, *Chaenothorax bicarinatus* (type species, by original designation: "gen. et sp. nov."), from the Peruvian Amazon. Cope now ascribed *Corydoras semiscutatus* to the genus *Chaenothorax*, while *Callichthys taiosh* was referred to as probably belonging to *Brochis*.

Eigenmann & Eigenmann (1888: 165) divided the genus *Brochis* into three sections, viz., "section ? nov." with *Brochis taiosh*, "section *Chaenothorax*" with *B. bicarinatus* and *B. semiscutatus*, and "section *Brochis*" with *B. coeruleus* and *B. dipterus*.

In 1890 (p. 463) Eigenmann & Eigenmann replaced the term "section" by the term 'subgenus'.

Cope (1894: 102) proposed a new generic name, *Osteogaster*, with *Corydoras eques* Steindachner, 1877, as the type species (by original designation). He stated that the only other species which could be positively assigned to *Osteogaster* was, "according to Eigenmann" [Eigenmann & Eigenmann, 1888, 1890], the *C. splendens* Castelnau.

Eigenmann (1910: 402, 403) recognized the following species: *Osteogaster splendens, Chaenothorax taiosh, Chaenothorax bicarinatus, Chaenothorax semiscutatus, Brochis dipterus*, and *B. coeruleus*.

Regan (1912: 209) ascribed Castelnau's *splendens* to the genus *Brochis*.

Ellis (1913: 392—394, 412) applied the following system: *Chaenothorax* with *C. taiosh, C. bicarinatus, C. semiscutatus*, and the new species *C. eigenmanni* (from Caceres, Brazil), *Brochis* with *B. dipterus* and *B. coeruleus*, and *Osteogaster* with *O. splendens*.

Gosline (1940: 24—26) regarded *Callichthys splendens* a doubtful synonym

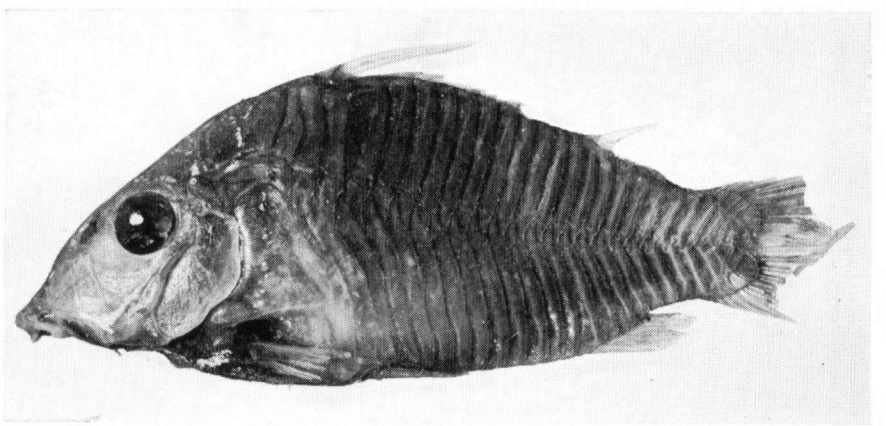

FIG. 3. *Brochis splendens*, holotype, MNHN 4291.

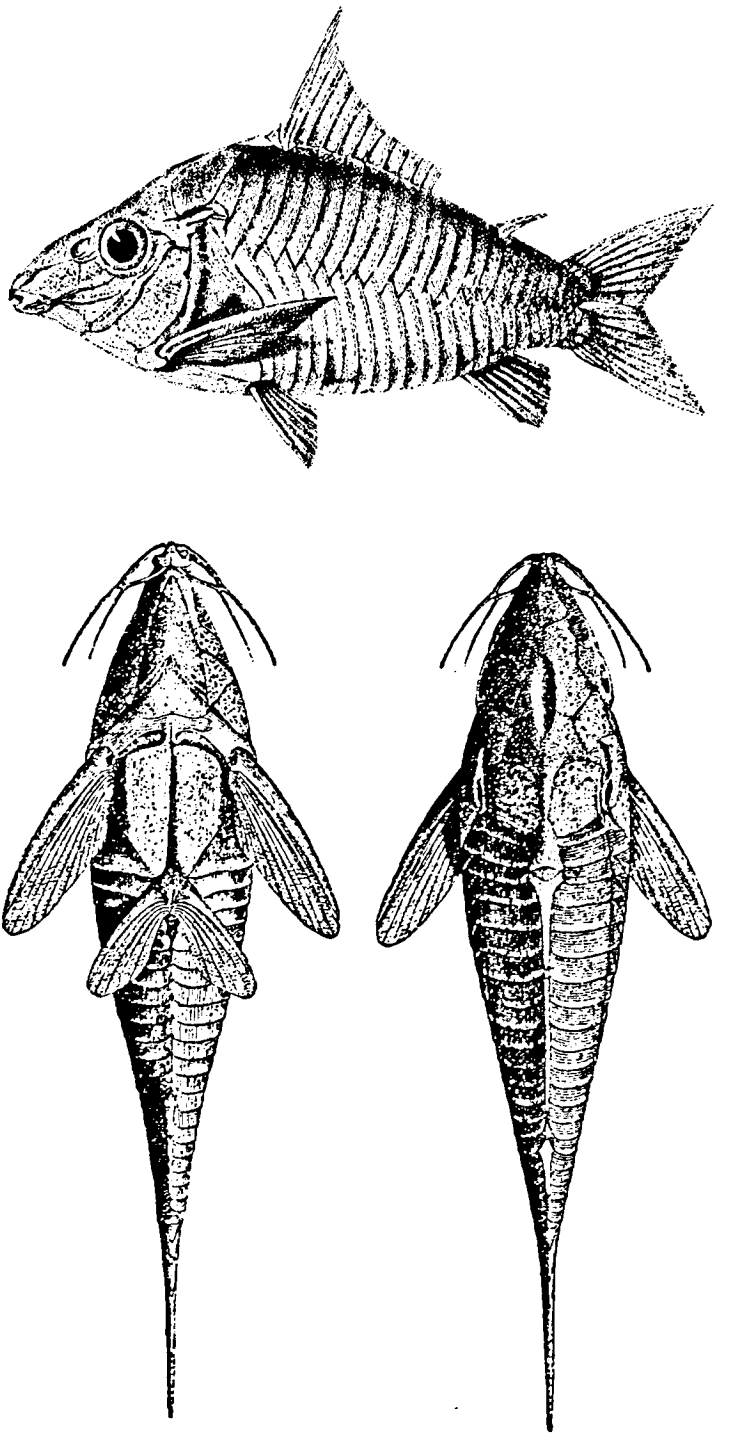

FIG. 4—5. *Brochis splendens*, reproduction of Cope's figures of *Brochis coeruleus*.

of *Brochis coeruleus*. He placed *B. dipterus*, *C. semiscutatus* and *C. bicarinatus* in the synonymy of *Brochis coeruleus* after examination of the type material. Next to this material, Gosline mentioned nine specimens collected in the Rio Ampiyacu (the Ambyiacu River of Cope), Pevas district, Peru. The second species Gosline recognized was *Brochis eigenmanni*, with *Callichthys taiosh* as a doubtful synonym "... because of a general similarity of appearance and contiguity of type localities".

Eigenmann & Allen (1942: 180—181) followed Gosline in regarding *Brochis dipterus* a synonym of *B. coeruleus*. However, the genus *Chaenothorax* was re-established with two species, *C. bicarinatus* and *C. semiscutatus*. Furthermore, *Osteogaster* was represented by *O. splendens*.

Fowler (1954: 46—47, 49—50, 66—67) recognized *Brochis coeruleus*, *B. dipterus*, *Chaenothorax bicarinatus*, *C. eigenmanni*, *C. semiscutatus*, *C. taiosh*, and *Corydoras splendens*.

Orcés-Villagomez (1960: 3—6) described *Chaenothorax multiradiatus* as a new species from the Rio Napo system, Ecuador (figs. 10—11).

Abbreviations used and definitions of terms (fig. 12)

bd — the body depth, the height measured from the anterior edge of the azygous predorsal scute vertically to the lower edge of the coracoid; expressed in sl.
bw — the body width, measured just before the pectoral spine insertion; expressed in sl.
ca — the width of the coracoid area between the lower edges of the first ventrolateral scutes; expressed in hl.
ca' — the least width of the coracoid area; expressed in hl.
dbs — the number of the dorsolateral body scutes, except the small scutes at the end of the caudal peduncle.
dcp — the least depth of the caudal peduncle; expressed in hl.
hl — the head length, measured from the snout tip (ethmoid) to the highest point of the gill opening; expressed in sl.
lbo — the length of the bony orbit, horizontally measured; expressed in hl.
lds — the length of the dorsal spine in vertical position measured from the junction of the bases of the predorsal scute and the dorsal spine to the tip; expressed in sl.
lps — the length of the pectoral spine, pressed along the body, measured from the articulation point to the tip; expressed in sl.
pas — the number of the pre-adipose middorsal scutes (the adipose spine, which is in fact a modified middorsal scute, is not included).
sl — the standard length, measured from the snout tip (ethmoid) to the junction of the posterior edges of the last counted body scutes.
sn — the snout length, measured from the snout tip (ethmoid) to the anterior edge of the bony orbit; expressed in hl.
snp — the distance between the snout tip (ethmoid) and the articulation point of the pectoral spine; expressed in sl.
sop — the distance between the snout tip (ethmoid) and the posterior edge or point of the occipital process; expressed in sl.
vbs — the number of ventrolateral body scutes, except the small scutes at the end of the caudal peduncle.
wi — the least width of the interorbital; expressed in hl.

Brochis Cope

Brochis Cope, 1872: 277 (type species, by original designation, *Brochis coeruleus* Cope, 1872 = *Callichthys splendens* Castelnau, 1855).

Chaenothorax Cope, 1878: 679-680 (type species, by original designation, *Chaenothorax bicarinatus* Cope, 1878 = *Callichthys splendens* Castelnau, 1855).

With the genera *Corydoras* Lacépède, 1803, and *Aspidoras* von Ihering, 1907, the genus *Brochis* is easily distinguished from other genera of the family Callichthyidae by the possession of a laterally compressed head, two pairs of short rictal barbels (not reaching much beyond the gill opening) and a single pair of short mental barbels at the lower lip.

Brochis has 10 to 17 soft dorsal fin rays (D) (there are 7 (6 to 8) in *Corydoras* and *Aspidoras*). There are i-ii, 5 rays in the anal fin (A), i,5 in the pelvic fin (P_1), I,8—11 in the pectoral fin (P_2). There are 7/7 principal caudal fin rays (C).

The coracoids meet or do not meet each other along the midventral line.

Brochis splendens (Castelnau) (figs. 1—9, 13b—d, tables 1—2)

Callichthys splendens Castelnau, 1855: 39, pl. 18 fig. 3 (original description; type locality: Brazil: "Rio Tocantins"; holotype in Muséum d'Histoire naturelle, Paris, MNHN 4291). — Kner, 1858: 347 (listed). — Günther, 1864: 225 (listed; in footnote).

Hoplosoma splendens; Gill, 1858: 403 (name only).

Corydoras splendens; Cope, 1872: 283 (listed). — Eigenmann & Eigenmann, 1888: 165 (listed); 1890: 468 (listed); 1891: 44 (listed). — Eigenmann & Kennedy, 1903: 505 (in key). — Miranda Ribeiro, 1911: 159 (description after Castelnau). — Miranda Ribeiro, 1918: 721 (name only). — Fowler, 1954: 66—67, fig. 663 (listed).

Osteogaster splendens; Cope, 1894: 102 (name only). — Eigenmann, 1910: 403 (listed). — Ellis, 1913: 412 (listed). — Eigenmann & Allen, 1942: 181 (listed; Rio Tocantins and Rio Ambyiacu).

Brochis splendens; Regan, 1912: 209 (name only).

Callichthys taiosh Castelnau, 1855: 39, pl. 19 fig. 1 (original description; type locality: "... du pays des Chiquitos..."; based on a painting provided by Mr. Weddel). — Kner, 1858: 347 (listed; discussion). — Günther, 1864: 225 (listed; in footnote). — Cope, 1878: 680 (discussion: probably a *Brochis*).

Hoplosoma taiosh; Gill, 1858: 403 (name only).

Brochis ("section ? nov.") *taiosh;* Eigenmann & Eigenmann, 1888: 165 (listed).

Brochis ("Sub gen. nov.?") *taiosh*; Eigenmann & Eigenmann, 1890: 463 in key (listed on p. 464); 1891: 44 (listed).

Chaenothorax taiosh; Eigenmann, 1910: 402 (listed). — Ellis, 1913: 392 (listed). Fowler, 1954: 50 (listed).

Brochis coeruleus Cope, 1872: 277—278, pl. 7 figs. 2a-b, and pl. 9 fig. 3 (original description; type locality: Peru: "... in the tributaries of the Ambyiacu"; lectotype in Academy of Natural Sciences, Philadelphia, ANSP 8231). — Cope, 1878: 680 (listed). — Eigenmann, 1910: 402 (listed). — Ellis, 1913: 394 (listed). — Gosline, 1940: 24—25 (description; synonymy; Peru: Pevas district, Rio Ampiyacu). — Eigenmann & Allen, 1942: 180 (listed). — Gosline, 1945: 77 (listed). — Fowler, 1954: 46 (listed). — Miranda Ribeiro, 1959: 8 (listed; Peru: Rio Ampyiacu, próximo a Pévas; Brazil: Ilha do Bananal, rio Araguaia). — Ovchynnyk, 1968: 256 (listed; Ecuador).

Brochis (Brochis) coeruleus; Eigenmann & Eigenmann, 1888: 165 (listed); 1890: 464 (listed); 1891: 44 (listed).

Brochis caeruleus; Fowler, 1915: 232 (listed; types, ANSP 8231/8237).

Brochis dipterus Cope, 1872: 278 (original description; type locality: Peru: "Am-

	sl	bd	bw	lds	lps	sop	snp	hl	sn	lbo	wi	dcp	D	P_2	dbs/vbs	pas
B	58.0	2.3	4.1	4.2	3.0	2.2	3.4	3.0	1.8	3.7	2.1	2.4	I,11	I,10	24/21	1
A	57.3	2.5	4.2	4.5	3.5	2.3	3.7	3.1	1.8	3.8	2.2	2.4	I,11	I,11	25/22	1
C	55.7	2.4	3.9	4.5	3.2	2.2	3.5	2.9	1.8	3.6	2.1	2.4	I,11	I,10	25/22	1
H	53.9	2.3	4.1	4.3	—	2.2	3.4	2.9	1.8	3.8	2.2	2.3	I,11	I,—	25/22	2
D	49.9	2.4	4.3	4.4	3.4	2.1	3.4	2.9	1.8	3.7	2.2	2.5	I,11	I,11	26/23	3
I	49.6	2.4	4.1	4.1	3.0	2.3	3.3	3.0	1.9	3.5	2.1	2.3	I,10	I,10	25/22	1
E	47.8	2.3	4.0	4.1	3.1	2.2	3.3	2.8	1.9	3.7	2.2	2.4	I,11	I,10	25/22	1
F	47.7	2.4	4.0	4.1	3.4	2.2	3.4	3.0	1.9	3.7	2.0	2.3	I,11	I,10	25/22	1
G	44.6	2.2	3.8	4.0	3.4	2.2	3.5	2.8	1.9	3.5	2.1	2.4	I,11	I,10	25/22	1
J	40.8	2.2	4.0	4.0	3.4	2.1	3.4	2.8	1.8	3.6	2.1	2.3	I,11	I,10	25/22	1
L	39.4	2.4	4.2	4.2	3.6	2.2	3.0	2.8	1.8	3.3	2.2	2.4	I,12	I,11	24/22	1
K	± 37.9	2.2	—	3.8	2.9	—	—	—	—	—	—	—	I,11	I,10	24/20	1
M	35.2	2.5	4.2	4.4	3.8	2.3	3.1	2.9	1.9	3.1	2.3	2.4	I,11	I,11	25/22	1

Table I. Morphometric and meristic data of 13 specimens of *Brochis splendens*: A, lectotype, and B—G, paralectotypes of "*Brochis coeruleus*", H, holotype of "*Callichthys splendens*", I, holotype of "*Brochis dipterus*", J, holotype of "*Chaenothorax bicarinatus*", K, holotype of "*Corydoras semiscutatus*", L, paratype, and M, holotype of "*Chaenothorax eigenmanni*". Explanation and definition of the abbreviations are given in the text.

specific name	hl in mm	ca in mm	ca in hl	ca' in mm	ca' in hl
B. splendens	18.5	4.2	4.4	0.0	—
B. "coeruleus" 1	18.5	3.8	4.9	0.0	—
B. "coeruleus" 2	17.2	3.5	4.9	0.0	—
B. "coeruleus" 3	19.6	3.9	5.0	0.0	—
B. "coeruleus" 4	16.8	3.4	4.9	0.0	—
B. "coeruleus" 5	18.9	—	—	0.0	—
B. "coeruleus" 6	16.0	3.3	4.9	0.0	—
B. "coeruleus" 7	16.1	2.9	5.6	0.0	—
B. "dipterus"	16.6	3.9	4.3	0.0	—
B. "semiscutatus"	—	2.6	—	1.1	—
B. "bicarinatus"	14.8	3.4	4.4	2.7	5.5
B. "eigenmanni" 1	12.3	3.5	3.5	2.6	4.7
B. "eigenmanni" 2	13.9	3.8	3.7	3.4	4.1
B. multiradiatus	28.3	6.4	4.4	4.4	6.4

Table II. Comparison of the ca and the ca' in the type specimens of nominal *Brochis* species. *B. "coeruleus"* 1—7 = ANSP 8231—8237, *B. "eigenmanni"* 1—2 = FMNH 54880 and 54881, respectively.

byiacu River"; holotype in Academy of Natural Sciences, Philadelphia, ANSP no number). — Cope, 1878: 680 (listed). — Eigenmann, 1910: 402 (listed). — Ellis, 1913: 394 (listed). — Fowler, 1954: 46—47 (listed).

Brochis (Brochis) dipterus; Eigenmann & Eigenmann, 1888: 165 (listed); 1890: 464 (in key, after Cope; listed); 1891: 44 (listed).

Corydoras semiscutatus Cope, 1872: 280, pl. 6 figs. 1a-b (original description; type locality: Peru: "Rio Ambyiacu"; holotype in Academy of Natural Sciences, Philadelphia, ANSP 8289).

Chaenothorax semiscutatus; Cope, 1878: 680 (listed). — Eigenmann, 1910: 402 (listed). — Ellis, 1913: 393 (listed). — Fowler, 1915: 232 (listed; holotype ANSP 8289). — Eigenmann & Allen, 1942: 180—181 (listed). — Fowler, 1954: 49—50 (listed).

Brochis (Chaenothorax) semiscutatus; Eigenmann & Eigenmann, 1888: 165 (listed); 1890: 464 (listed); 1891: 44 (listed).

Chaenothorax bicarinatus Cope, 1878: 679—680 (original description; type locality: "Peruvian Amazon"; holotype in Academy of Natural Sciences, Philadelphia, ANSP 21447). — Eigenmann, 1910: 402 (listed). — Ellis, 1913: 392 (listed). — Fowler, 1915: 232 (listed; holotype ANSP 21447). — Eigenmann & Allen, 1942: 180 (listed). — Fowler, 1954: 49 (listed).

Brochis (Chaenothorax) bicarinatus; Eigenmann & Eigenmann, 1888: 165 (listed); 1890: 464 (listed); 1891: 44 (listed).

Chaenothorax eigenmanni Ellis, 1913: 393—394, pl. 26 fig. 2 (original description: type locality: Brazil: "Caceres"; holotype in Field Museum of Natural History, Chicago, FMNH 54880). — Fowler, 1954: 49, fig. 646 (listed).

Brochis eigenmanni; Gosline, 1940: 26 (listed); 1945: 77 (listed).

MATERIAL EXAMINED. —

Brazil:

MNHN 4291, holotype, 53.9 mm sl, Río Tocantins, coll. Count Francis de Castelnau, 1843—1847.

FMNH 54880, 1 specimen, 35.2 mm sl, E. de Matto Grosso: Caceres, coll. J. D. Haseman, 26—V—1909 (holotype of *Chaenothorax eigenmanni* Ellis, 1913; ex CM [= Carnegie Museum, Pittsburgh] 3542).

FMNH 54881, 1 specimen, 39.4 mm sl, same locality as FMNH 54880 (paratype of *Chaenothorax eigenmanni* Ellis, 1913; ex CM 3543).

Peru:

ANSP 8231, 1 specimen, 57.3 mm sl, Rio Ambyiacu, coll. John Hauxwell (lectotype, by present designation, of *Brochis coeruleus* Cope, 1872).

ANSP 8232/8237, 6 specimens, 44.6—58.0 mm sl, same locality and collector as ANSP 8231 (paralectotypes of *Brochis coeruleus* Cope, 1872).

ANSP no number, 1 specimen, 49.6 mm sl, Rio Ambyiacu, coll. John Hauxwell (holotype of *Brochis dipterus* Cope, 1872).

ANSP 8289, 1 specimen, ± 37.9 mm sl, Rio Ambyiacu, coll. John Hauxwell, damaged (holotype of *Corydoras semiscutatus* Cope, 1872).

ANSP 21447, 1 specimen, 40.8 mm sl, Peruvian Amazon, coll. Orton, 1877 (holotype of *Chaenothorax bicarinatus* Cope, 1878).

ANSP 115203, 1 specimen, 36.2 mm sl, Loreto, vicinity of Iquitos, Rio Nanay, backwaterpool 4 miles above Amazon, coll. C. C. Chaplin, M. Hohn, and J. Henry (Catherwood Expedition), 12—X—1955.

FMNH 69933, 1 specimen, 59.1 mm sl, Lake Yarina-Cocha, Ucayali River system (08°15′ S, 74°45′ W), coll. J. M. Schunke, 12—IV—1946.

SU 33296, 33297, 33299/33304, 8 specimens, 47.4—60.4 mm sl, Pevas district, Pevas Caño, Rio Ampiyacu, coll. W. G. Scherer, 22—XII—1936 [recorded as *Brochis coeruleus* by Gosline, 1940; SU 33298 now in Museu Nacional, Rio de Janeiro, number 3.984].

ZMA 108.141, 4 specimens, 45.2—58.2 mm sl, tributaries of Rio Ucayali near Pucallpa, coll. K. H. Lüling (KHL 105), VII—1966 (another 5 specimens, 52.5—60.7 mm sl, of the same series, are located in ZFMK I.1745—I.1749).

ZMA 108.142, 3 specimens, 52.1—62.1 mm sl, Rio Ucayali near Pucallpa, coll. K. H. Lüling (KHL 112.74.54), VII/VIII—1966 (another 3 specimens, 61.1—62.8 mm sl, of the same series, are located in ZFMK I.1750—I.1752).

Ecuador:

EPN 4922/4934, 13 specimens, 42.6—64.7 mm sl, E. Napo, Pañayacu, near village Edén (00°30′ S, 76°05′ W), Rio Napo system, alt. 220—230 m, coll. Manuel Olalla, XI—1964 (of this series 6 specimens are deposited in ZMA 110.355).

Locality unknown:

ANSP 115202, 1 specimen, 59.9 mm sl, Iquitos, Mkt. on Amazon, coll. Hugghins, 13—VII—1968.

USNM 205028, 1 specimen, 37.6 mm sl, ? Rio Nanay, don. Norma Chirichigno, I—1964.

ZMA 110.354, 17 specimens, 27.0—43.6 mm sl, said to be from the Loreto district, Peru, aquarium import J. Liet, Amsterdam, IX—1961.

Description. — Morphometric and meristic data based on the holotype: bd 23.3 mm (2.3); bw 13.2 mm (4.1); lds 12.5 mm (4.3); lps damaged; sop 24.5 mm (2.2); snp 15.9 mm (3.4); hl 18.5 mm (2.9); sn 10.6 mm (1.8); lbo 4.9 mm (3.8); wi 8.5 mm (2.2); dcp 8.1 mm (2.3); fontanel length 5.1 mm; dbs/vbs 25/22; pas 2; D I, 11; A i,5; P_1 i,6; P_2 I,— (damaged); C 7/7; two pairs of rictal barbels and one pair of mental barbels.

Morphometric and meristic data based on 23 specimens from Peru, 45.2—62.8 mm sl (SU 33296, 33297, 33299/33304, ZFMK I.1745—I.1752, ZMA 108.141, and ZMA 108.142): bd 2.3—2.5; bw 3.9—4.3; lds 4.1—5.1; lps 3.1—3.6; sop 2.1—2.3; snp 3.1—3.4; hl 2.8—3.1; sn 1.7—1.9; lbo 3.6—4.4; wi

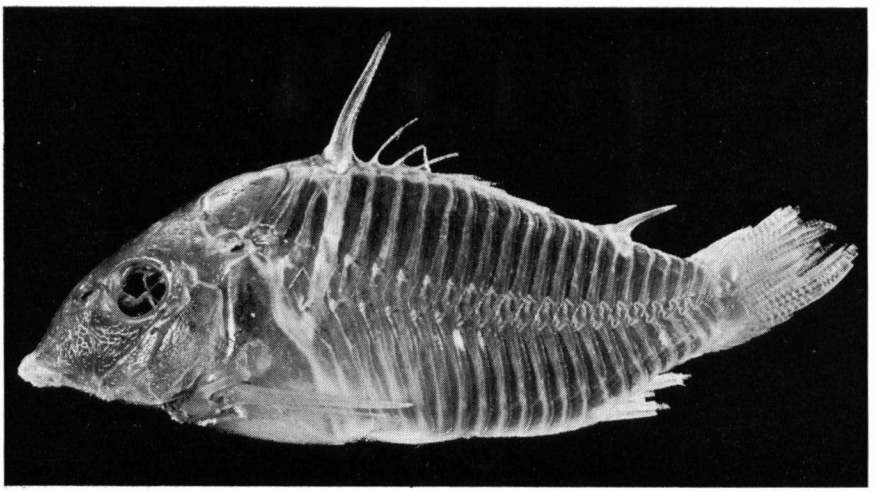

FIG. 6. *Brochis splendens*, lectotype of *Brochis coeruleus*, ANSP 8231.

2.0—2.2; dcp 2.3—2.6; dbs/vbs 22—26/20—23; pas 1—2; D I,10—12; A i-ii,5—6; P_1 i,5; P_2 I,8—10; C 7/7 (8/7 in SU 33303); two pairs of rictal barbels and one pair of mental barbels.

Morphometric and meristic data based on 13 specimens from Ecuador, 42.6—64.7 mm sl (EPN 4922/4934; ZMA 110.355): bd 2.2—2.5; bw 3.8—4.1; lds 3.9—4.9; lps 3.3—3.6; sop 2.0—2.3; snp 3.0—3.4; hl 2.7—3.0; sn 1.7—1.8; lbo 3.6—4.1; wi 2.1—2.3; dcp 2.3—2.5; dbs/vbs 24/22; pas 1—2; D I, 11—12; A i-ii,5; P_1 i,5; P_2 I,8—9; C 7/7; two pairs of rictal barbels and one pair of mental barbels.

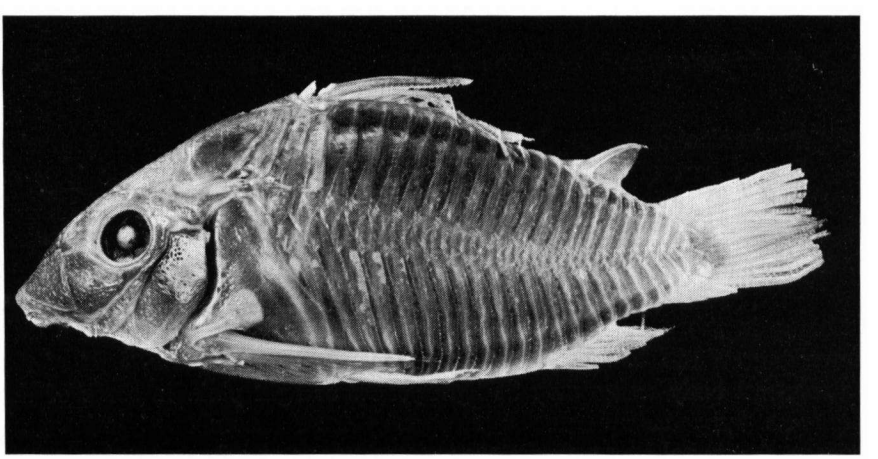

FIG. 7. *Brochis splendens*, holotype of *Brochis dipterus*, ANSP no number.

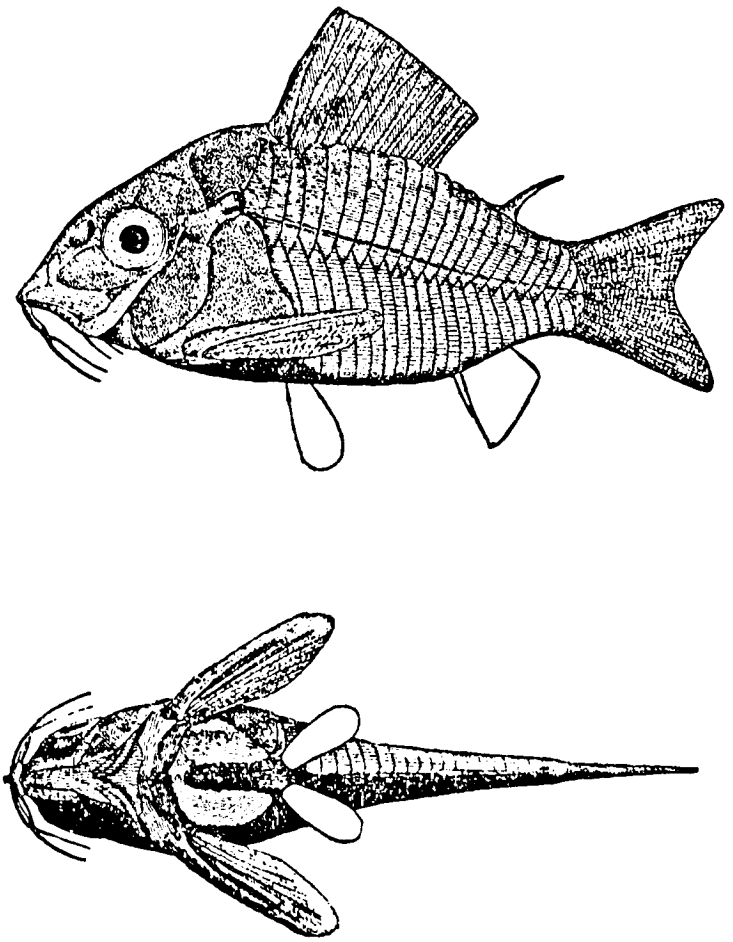

FIG. 8. *Brochis splendens*, reproduction of Cope's figure of *Corydoras semiscutatus*.

Colour in alcohol. — Ground colour pale yellowish brown. Head brownish grey. Dorsal part of body dark bluish grey from nuchal plates to base of caudal fin extending to dorsal parts of ventrolateral body scutes. Dorsal, adipose, and caudal fin, rictal barbels, and pectoral fin spines greyish. Remaining fins without pigmentation, as in ventral region.

Colour in life. — According to condition, the pigmented areas are dull brownish-grey, bluish or greenish metallic coloured. The lower half of the ventrolateral body scutes may be light yellow or light pink. In some of the specimens (imported for aquarial purposes) there is a number of darker grey spots on the dorsal fin rays, sometimes forming one or a few more horizontal rows.

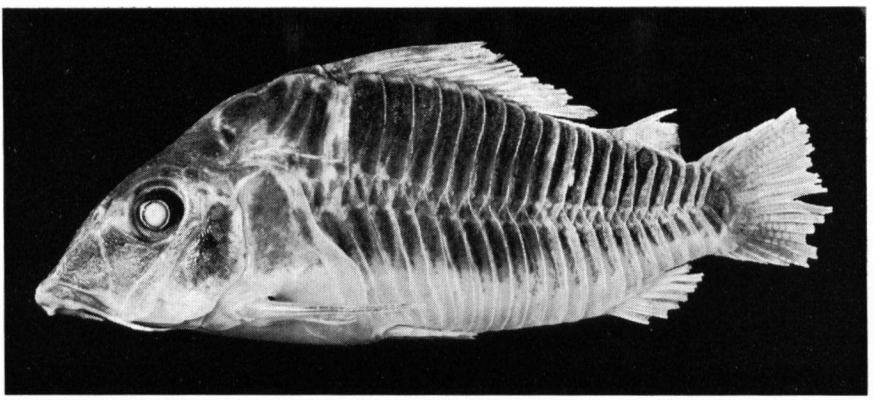

FIG. 9. *Brochis splendens*, 58.9 mm sl, from the Rio Ucayali near Pucallpa, ZMA 108.142.

Discussion. — The genus *Chaenothorax* was established by Cope (1878: 679-680) for his new species *C. bicarinatus*. The existence of an open area between the ventral edges of the coracoids is the only character in which the holotype, the only known specimen of this nominal species, differs from *Brochis splendens*. On this character only the genus *Chaenothorax* was based, but, in our opinion this character is not sufficient to distinguish another genus. It even seems insufficient to distinguish another species, because the width

FIG. 10. *Brochis multiradiatus*, holotype of *Chaenothorax multiradiatus*, USNM 200739.

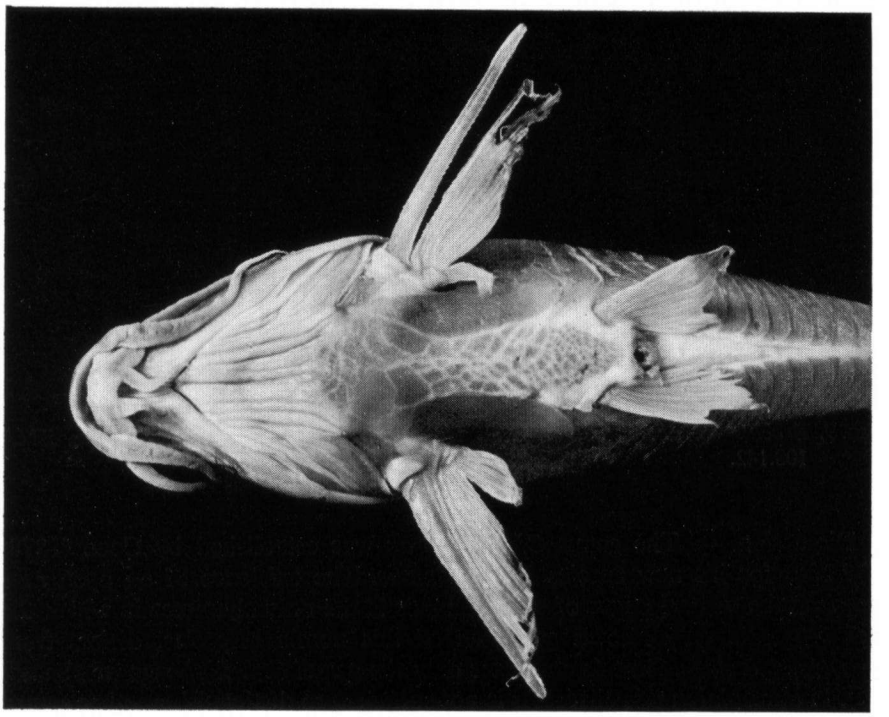

FIG. 11. *Brochis multiradiatus*, holotype in ventral view.

or existence of the coracoid area is variable in the examined material from the Peruvian Amazon. Cope himself (1878: 680) stated about his *C. bicarinatus* specimen: "It might be called *Brochis* without coracoid breast shield". Furthermore he remarked (page 680): "A second species of this genus [*Chaenothorax*] is the *C. semiscutatus*" [*Corydoras semiscutatus* Cope, 1872]. While describing *Corydoras semiscutatus* Cope wrote (1872: 280): "This species shows a marked tendency to the genus *Brochis* in the increased extend of the osseous shields of the thorax and sides of the head. The enlarged number of dorsal fin rays is another indication of such affinity. It represents very closely, I have no doubt, a young stage of *Brochis coeruleus* in the incompleteness of the shield development, and might, by some, be regarded as that animal itself."

In the genus *Corydoras* the width of the coracoid area is also variable. In females the area is broader than in males. In some species the area can be narrow (e.g. in *C. armatus* (Günther, 1868), and in *C. elegans* Steindachner, 1877). In the latter species and in *C. eques* Steindachner, 1877, the coracoids may even meet on the median line. Cope also established two different genera for certain species of the genus *Corydoras* Lacépède, 1803, viz. *Gastrodermus* (1878: 681) for some species, including *C. elegans* [which was subsequently

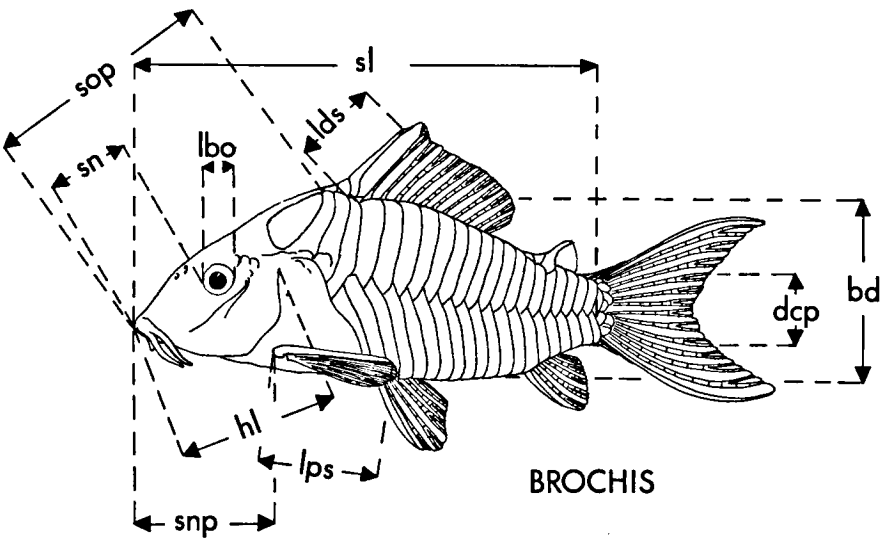

FIG. 12. Diagram of *Brochis*, showing methods of measurement (see text).

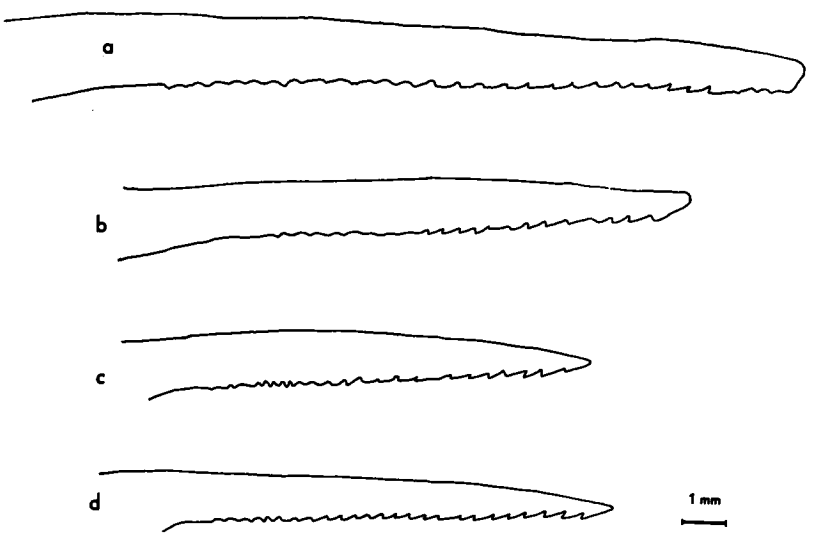

FIG. 13. Profile of left pectoral spines from ventral view in: a, *Brochis multiradiatus*, holotype, 75.8 mm sl, — b, *B. splendens*, 58.9 mm sl, — c, *B. splendens*, holotype of *B. dipterus*, 49.6 mm sl, — d, *B. splendens*, lectotype of *B. coeruleus*, 57.3 mm sl.

designated the type of this genus by Gosline (1940: 10)], and *Osteogaster* (1894: 102) for *C. eques* as the type species.

Gosline (1940: 25) mentioned: "I have examined the types of all the species described by Cope in the above synonymy [of *B. coeruleus*] except *Brochis dipterus*, which I was unable to find in the Philadelphia Academy collection." However, while examining the syntype series of *B. coeruleus*, the senior author found eight specimens, instead of the seven syntypes recorded by Cope (1872: 278, under the chapter on *B. dipterus*). Seven specimens completely agree with Cope's notes on *B. coeruleus*. The eighth specimen differs from the other seven specimens (1) in the existence of an adipose fin membrane, (2) in having the dorsal fin with ten soft rays, and (3) in the presence of two mental barbels. These three details were mentioned by Cope (1872: 278) for his *B. dipterus* specimen. In the seven specimens the adipose fin membrane is absent, and there are eleven soft rays in the dorsal fins (both points were mentioned by Cope, 1872: 278), whereas the mental barbels are missing. Without doubt, the eighth specimen is the holotype of *B. dipterus*, and as such was recently separated from the syntype series of *B. coeruleus* by the senior author.

Brochis multiradiatus (Orcés-Villagomez)
(figs. 10—11, 12a, table 2)

Chaenothorax multiradiatus Orcés-Villagomez, 1960: 3—6, fig. 1 (original description; type locality: Ecuador: "... afluente occidental del río Lagartococha, cerca del poblado de Garza-Cocha, sistema del alto Napo"; holotype in United States national Museum, Washington D.C., USNM 200739). — Ovchynnyk, 1968: 256 (listed).

MATERIAL EXAMINED. —
Ecuador:
USNM 200739, holotype, 75.8 mm sl, eastern tributary of Rio Lagartococha, near the town of Garza-Cocha, in the upper Napo River system, coll. Manuel Olalla, XI—1958.

Description. — Morphometric and meristic data based on the holotype: bd 32.7 mm (2.3); bw 18.9 mm (4.0); lds 17.2 mm (4.4); lps 23.1 mm (3.3); sop 34.5 mm (2.2); snp 25.0 mm (3.0); hl 28.3 mm (2.7); sn 17.9 mm (1.6); lbo 6.6 mm (4.3); wi 11.1 mm (2.6); dcp 10.5 mm (2.7); fontanel length 8.8 mm; dbs/vbs 25/23; pas 1; D I,17; A ii,5; P_1 i,5; P_2 I,11; C 7/7; two pairs of rictal barbels and one pair of mental barbels.

Colour in alcohol. — Same as in *Brochis splendens*.
Skin of intercoracoid area covered by mosaic plates (fig. 11).

Discussion. — *B. multiradiatus* differs from *B. splendens* mainly in having supernumerous soft dorsal fin rays, a longer snout, a narrower interorbital width, and a less deep caudal peduncle. The exact distance between the coracoid edges is given in table II. Unfortunately, *B. multiradiatus* is known from the holotype only, so that no information about variation of characters

of this species is available. On the one hand, *B. multiradiatus* may belong to a new genus (as already suggested by Orcés-Villagomez, 1960:4), on the other hand the specimen might be an aberrant *Brochis splendens*, which occurs in the same river system.

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