

L.—*A Revision of the Fishes of the American Cichlid Genus Cichlosoma and of the Allied Genera.* By C. TATE REGAN, B.A.

[Concluded from p. 340.]

PETENIA.

*Petenia*, Günth. Cat. Fish. iv. p. 391 (1862).

*Petenia* (part.), Eigenm. & Bray, Ann. Ac. N. York, vii. 1894, p. 614; Pellegr. Mém. Soc. Zool. France, xvi. 1903, p. 243 (1904).

Body moderately elongate, compressed; scales rather large, ctenoid. Two lateral lines. Jaws with bands of small conical teeth, the outer series enlarged; canines moderate. Mouth large; præmaxillaries very protractile, their processes as long as the head; maxillary considerably exposed; lower jaw strongly projecting. Upper surface of the head to the level of the orbits, cheeks, and opercular bones scaly; præoperculum narrow, entire, without distinct lower limb. Gill-rakers rather short and few. A single dorsal, with XV–XVI 12–13 rays; anal with V 8–10 rays. Pectoral asymmetrical, with 14 rays; ventrals below the base of the pectoral. Caudal rounded.

A single species from Lake Peten, Guatemala, to be regarded as a specialized form derived from a type similar to *Cichlosoma Dovii*.

*Petenia splendida*.

*Petenia splendida*, Günth. Cat. Fish. iv. p. 301 (1862), and Trans. Zool. Soc. vi. 1869, p. 469, pl. lxxix. fig. 2; Steind. Denkschr. Ak. Wien, xxiii. 1864, p. 73, pl. iv. figs. 3 & 4; Eigenm. & Bray, Ann. Ac. N. York, vii. 1894, p. 615; Jord. & Everm. Bull. U.S. Nat. Mus. xlvii. 1898, p. 1513; Everm. & Goldsb. Bull. U.S. Fish. Comm. xxi. 1902, p. 155, fig.; Pellegr. Mém. Soc. Zool. France, xvi. 1903, p. 243 (1904).

Depth of body about 3 in the length, length of head  $2\frac{3}{5}$ – $2\frac{3}{4}$ . Snout a little shorter than postorbital part of head. Diameter of eye 5–6 in the length of head and  $1-1\frac{1}{3}$  in the interorbital width; depth of præorbital  $\frac{1}{2}$ – $\frac{3}{4}$  the diameter of eye. Lower jaw strongly projecting; maxillary extending to below middle of eye or beyond; præmaxillary processes extending nearly to origin of dorsal. Cheek with 7–10 series of scales; 10 or 11 gill-rakers on the lower part of anterior arch. Scales of the lateral line a little larger than the others; scales above the lateral line a little smaller than those below it, about 45 in a longitudinal series above,

40 below the lateral line. Scales in a transverse series  $\frac{6-7}{16-17}$ . Dorsal XV (XVI) 12-13, the last spine about  $\frac{2}{7}$  the length of head, the soft fin not scaly. Anal V (8) 9-10. Pectoral nearly  $\frac{2}{3}$  the length of head. Caudal rounded. Caudal peduncle longer than deep. Head, body, and vertical fins with dark spots; a series of dark blotches along the middle of the side.

Lake Peten, Guatemala.

1-4. (260-415 mm.) types of Lake Peten. O. Salvin, Esq.  
the species.

### HERICHTHYS.

*Herichthys*, Baird & Girard, Proc. Ac. Philad. 1854, p. 25.

*Heros* (part.), Günth. Cat. Fish. iv. p. 290; Jord. & Everm. Bull. U.S. Nat. Mus. xlvii. 1898, p. 1537; Pellegr. Mém. Soc. Zool. France, xvi. 1903, p. 226 (1904).

*Neetroplus* (part.), Jord. & Snyder, Bull. U.S. Fish. Comm. xix. 1899, p. 146; Pellegr. Mém. Soc. Zool. France, xvi. 1903, p. 245 (1904); Meek, Zool. Pub. Columbian Mus. v. 1904, p. 221.

*Cichlasoma* (part.), Meek, *t. c.* p. 205.

Closely allied to *Cichlasoma* and perhaps most nearly to *C. heterodontus*, differing only in that the anterior teeth of the outer series in each jaw are compressed, pointed in the young, truncate in the adult.

Three species from Mexico and Central America.

### Key to the Species.

I. Anal with 5 (exceptionally 6) spines.

D. XV-XVII 10-12. A. V (VI 7) 8-9. Sc.

27-30  $\frac{4\frac{1}{2}}{12-13}$  ..... 1. *cyanoguttatus*.

D. XVI 13. A. V 10. Sc. 31  $\frac{6}{12}$  ..... 2. *Bocourti*.

II. Anal with 6 or 7 spines.

D. XVI-XVIII 11-12. A. VI-VII 9-10. Sc.

30  $\frac{5}{13-14}$  ..... 3. *Geddesi*.

### 1. *Herichthys cyanoguttatus*.

*Herichthys cyanoguttatus*, Baird & Girard, Proc. Ac. Philad. 1854, p. 25, and Rep. U.S. Mex. Bound. Surv., Zool. p. 30, pl. iv. figs. 9-12 (1859).

*Heros cyanoguttatus*, Günth. Cat. Fish. iv. p. 290 (1862); Jord. & Gilb. Bull. U.S. Nat. Mus. xvi. 1882, p. 608; Jord. & Everm. Bull. U.S. Nat. Mus. xlvii. 1898, p. 1537; Everm. & Goldsborough, Bull. U.S. Fish. Comm. xxi. 1902, p. 157; Pellegr. Mém. Soc. Zool. France, xvi. 1903, p. 231 (1904).

*Neetroplus carpintis*, Jord. & Snyder, Bull. U.S. Fish. Comm. xix. 1899, p. 146, fig. 22; Jord. & Everm. *t. c.* p. 3175; Pellegr. *t. c.* p. 246; Meek, Zool. Pub. Columbian Mus. v. 1904, p. 221.

*Cichlasoma cyanoguttatum*, Meek, *t. c.* p. 215.

Depth of body 2 in the length, length of head  $2\frac{1}{2}$ -3. Snout shorter than postorbital part of head. Diameter of eye  $3-4\frac{1}{3}$  in the length of head, interorbital width  $3-3\frac{1}{2}$ . Depth of præorbital  $\frac{1}{2}-1\frac{1}{6}$  the diameter of eye. Maxillary slightly exposed, not extending to below the eye; præmaxillary processes extending to above anterior  $\frac{1}{4}$  of eye or slightly beyond; jaws equal anteriorly, or the lower slightly projecting; both jaws with the teeth of the outer series regularly increasing in size anteriorly; fold of the lower lip usually more or less distinctly interrupted; cheek with 4 or 5 series of scales; 7 or 8 gill-rakers on the lower part of anterior arch. Scales  $27-30$   $\frac{4\frac{1}{2}}{12-13}$ , 2 between lateral line and base of anterior rays of soft dorsal. Dorsal XV-XVII 10-12, commencing above the extremity of operculum, the spines subequal or slightly decreasing from the sixth to the thirteenth, thence increasing to the last, which is  $\frac{1}{2}$  the length of head; the soft fin scaly at the base. Anal V (VI 7) 8-9. Pectoral  $\frac{4}{5}$  the length of head, extending to above origin of anal; ventral extending nearly to origin of anal. Caudal subtruncate or rounded. Caudal peduncle  $\frac{3}{5}$  as long as deep. Light blue spots on head, body, and vertical fins; young with 7 dark cross-bars, the third bearing a blackish blotch below the lateral line, and with a dark spot on the base of caudal.

North-Eastern Mexico and Texas.

|   |            |                          |
|---|------------|--------------------------|
| 1-2. (65 and 118 mm.)                                 | Matamoros. | Smithsonian Institution. |
| 3-6. (39-62 mm.) co-types<br>of <i>N. carpintis</i> . | Tampico.   | Dr. D. S. Jordan.        |

*Heros teporatus*, Fowler (Proc. Ac. Philad. 1903, p. 321) is based on a single specimen of 38 mm. from Tamaulipas. It appears to differ from *H. cyanoguttatus* only in the more slender body (depth  $2\frac{1}{2}$  in the length).

## 2. *Herichthys Bocourti*.

*Neetroplus Bocourti*, Vaill. & Pellegr. Bull. Mus. Paris, 1902, p. 85; Pellegr. Mém. Soc. Zool. France, xvi. 1903, p. 246 (1904).

Depth of body 2 in the length, length of head  $3\frac{1}{5}$ . Diameter of eye  $3\frac{3}{4}$  in the length of head. Maxillary not extending to below the eye; fold of the lower lip slightly interrupted; cheek with 6 series of scales; 9 gill-rakers on the lower part of anterior arch. Scales  $31\frac{6}{12}$ . Dorsal XVI 13, the spines only slightly increasing in length after the fifth, the last more than  $\frac{1}{2}$  the length of head; soft fin scaly at the base. Anal V 10. Pectoral a little shorter

than the head. Caudal slightly rounded. Caudal peduncle nearly as long as deep. Olivaceous, with obscure darker cross-bars.

Lake Isabel, Guatemala.

The single known example measures 182 mm. in total length.

This species is said to be closely allied to the preceding, differing especially in the larger eye.

### 3. *Herichthys Geddesi*, sp. n.

Depth of body  $2\frac{1}{5}$ – $2\frac{1}{2}$  in the length, length of head  $2\frac{2}{3}$ – $2\frac{4}{5}$ . Snout as long, or nearly as long, as postorbital part of head. Diameter of eye  $2\frac{3}{4}$ – $3\frac{1}{4}$  in the length of head, interorbital width  $3\frac{1}{5}$ – $3\frac{2}{5}$ . Maxillary not extending to below the eye; præmaxillary processes extending to above anterior  $\frac{1}{4}$  of eye; jaws equal anteriorly; both jaws with the teeth of the outer series regularly increasing in size anteriorly; fold of the lower lip not continuous; cheek with 5 or 6 series of scales; 7 or 8 gill-rakers on the lower part of anterior arch. Scales  $30\frac{5}{13-14}$ , 2 between lateral line and base of anterior rays of soft dorsal. Dorsal XVI–XVIII 11–12, commencing above the opercular cleft, the spines subequal or slightly decreasing from the fifth or sixth to the fourteenth or fifteenth, the last  $\frac{2}{5}$  the length of head; the soft fin scaly at the base. Anal VI–VII 9–10. Pectoral  $\frac{3}{4}$ – $\frac{7}{8}$  the length of head, extending to above origin of anal; ventral extending to anterior anal spines. (? Caudal subtruncate.) Caudal peduncle  $\frac{1}{2}$ – $\frac{2}{3}$  as long as deep. Brownish, with 7 or 8 cross-bars bearing a series of blackish blotches below the lateral line; vertical fins spotted.

Southern Mexico.

1–6. (47–65 mm.) types of      Southern Mexico.      P. Geddes, Esq.  
the species.

### PARANEETROPLUS, gen. nov.

Differs from *Cichlosoma* only in the dentition, all the teeth being broad, compressed, and pointed or rounded. The single species, from Mexico, is intermediate between *Cichlosoma nebuliferum* and *Neetroplus nematopus*.

### *Paraneetroplus Bulleri*, sp. n.

Depth of body 3 in the length, length of head nearly 4. Snout a little shorter than postorbital part of head. Diameter of eye  $4\frac{2}{3}$  in the length of head, interorbital width  $2\frac{2}{3}$ . Depth

of præorbital  $1\frac{3}{5}$  the diameter of eye. Maxillary scarcely exposed, not nearly extending to below the eye; præmaxillary processes not extending to above the eye; mouth small, almost transverse, the lower jaw shorter than the upper; upper jaw with about 20 teeth in the outer series, the lateral teeth decreasing in size posteriorly; lower jaw with a transverse series of about 10 teeth, not continued as a lateral series; fold of the lower lip not continuous; cheek with 5 series of scales; 7 gill-rakers on the lower part of anterior arch. Scales  $34\frac{5\frac{1}{2}}{14}$ , 3 between lateral line and base of anterior rays of soft dorsal, those of the thoracic region very small. Dorsal XVIII 12, commencing a little in advance of the axil of pectoral, the spines subequal from the fifth to the fifteenth, thence increasing to the last, which is  $\frac{1}{2}$  the length of head; soft fin, when laid back, extending to base of caudal; posterior part of spinous dorsal and anterior part of soft fin scaly at the base. Anal VI 9. Pectoral a little shorter than the head, not nearly extending to above the anal; ventral extending nearly to origin of anal. Caudal truncate. Caudal peduncle a little longer than deep. Olivaceous, with a series of 5 dark blotches on the side of the body, the last 2 extending upwards as vertical bars on to the base of the soft dorsal; a dark spot at the base of caudal; vertical fins slightly dusky.

Rio de Sarabia, Mexico.

1. (218 mm.) type of the species. Rio de Sarabia. Dr. A. C. Buller.

#### NEETROPLUS.

*Neetroplus*, Günth. Trans. Zool. Soc. vi. 1869, p. 469; Eigenm. & Bray, Ann. Ac. N. York, vii. 1894, p. 613; Jord. & Everm. Bull. U.S. Nat. Mus. xlvii. 1898, p. 1541.

*Neetroplus* (part.), Pellegr. Mém. Soc. Zool. France, xvi. 1903, p. 245 (1904).

Differs from *Paraneetroplus* in that the teeth are not pointed or rounded, but truncate, incisor-like.

A single species from Nicaragua.

#### *Neetroplus nematopus*.

*Neetroplus nematopus*, Günth. Trans. Zool. Soc. vi. 1869, p. 470, pl. lxxiv. fig. 4; Jord. & Everm. Bull. U.S. Nat. Mus. xlvii. 1898, p. 1541; Pellegr. Mém. Soc. Zool. France, xvi. 1903, p. 245 (1904).

*Neetroplus nicaraguensis*, Gill & Bransford, Proc. Ac. Philad. 1877, p. 186.

Depth of body  $2\frac{1}{2}$  in the length, length of head  $3\frac{1}{3}$ . Snout as long as postorbital part of head. Diameter of eye  $3\frac{1}{4}$  in

the length of head, interorbital width  $2\frac{4}{5}$ . Depth of præ-orbital a little greater than diameter of eye. Maxillary extending a little beyond the nostril; præmaxillary processes not extending to above the eye; jaws nearly equal anteriorly; upper jaw with about 14 teeth in the outer series, the lateral teeth decreasing in size posteriorly; lower jaw with a transverse series of 9 teeth; fold of the lower lip not continuous; cheek with 5 series of scales; 6 gill-rakers on the lower part of anterior arch. Scales  $33\frac{6}{13}$ ,  $2\frac{1}{2}$  between lateral line and base of anterior rays of soft dorsal, those of the thoracic region very small. Dorsal XIX 10, the spines subequal from the fifth to the sixteenth, the last  $\frac{3}{5}$  the length of head; soft fin, when laid back, extending to middle of caudal; dorsal scaly at the base posteriorly. Anal VIII 7. Pectoral nearly as long as the head, not extending to above the anal; ventral with the outer ray elongate. Caudal truncate or even slightly emarginate. Caudal peduncle as long as deep. Olivaceous, obscurely spotted or marbled with darker.

Nicaragua.

1. (107 mm.) type of the                      Lake Managua.                      Capt. J. M. Dow.  
species.

#### HEROTILAPIA.

*Herotilapia*, Pellegr. Mém. Soc. Zool. France, xvi. 1903, p. 247 (1904).

Differs from *Cichlosoma* only in the dentition; both jaws with several series of compressed, incisor-like, tricuspid teeth; the outer series enlarged and with the median teeth simple, truncate.

The single species is evidently closely related to *C. nigrofasciatus* and its allies.

#### *Herotilapia multispinosa*.

*Heros multispinosus*, Günth. Trans. Zool. Soc. vi. 1869, p. 453, pl. lxxiv. fig. 2.

*Cichlasoma multispinosum*, Jord. & Everm. Bull. U.S. Nat. Mus. xlvii. 1898, p. 1525.

*Herotilapia multispinosa*, Pellegr. Mém. Soc. Zool. France, xvi. 1903, p. 247 (1904).

Depth of body  $2\frac{1}{8}$  in the length, length of head nearly 3. Snout a little shorter than eye, the diameter of which is  $3\frac{1}{5}$  in the length of head, interorbital width  $2\frac{1}{4}$ . Depth of præ-orbital nearly  $\frac{2}{3}$  the diameter of eye. Maxillary not extending to below the eye; præmaxillary processes extending nearly to above anterior margin of eye; jaws equal

anteriorly; cheek with 3 series of scales; 8 gill-rakers on the lower part of anterior arch. Scales  $28 \frac{4\frac{1}{2}}{12}$ . Dorsal XVIII 9, commencing above the opercular cleft, the spines subequal from the fifth, the last a little more than  $\frac{1}{2}$  the length of head; soft fin scaly at the base, when laid back extending nearly to middle of caudal. Anal XI 8. Pectoral as long as the head, extending to above middle anal spines; ventral extending to sixth anal spine. Caudal rounded. Caudal peduncle  $\frac{2}{3}$  as long as deep. Olivaceous, with darker cross-bars; a dark spot on the middle of the side; a longitudinal band from eye to lateral spot.

Lake Managua.

1. (87 mm.) type of the species. Lake Managua. Capt. J. M. Dow.

### UARU.

*Uaru*, Heck. Ann. Mus. Wien, ii. 1840, p. 330; Günth. Cat. Fish. iv. p. 302 (1862); Eigenm. & Bray, Ann. Ac. N. York, vii. 1894, p. 612; Pellegr. Mém. Soc. Zool. France, xvi. 1903, p. 248 (1904).  
*Acara* (part.), Steind. Sitzb. Ak. Wien, lxxi. 1875, p. 63.

Closely allied to *Cichlosoma*, and especially to *C. psittacum*, differing in the dentition, the rather slender teeth being compressed, pointed in the young and with rounded apices in the adult. Scales rather small, those of the lateral line larger than the rest.

A single species from the Amazon.

### *Uaru amphiacanthoides*.

*Uaru amphiacanthoides*, Heck. Ann. Mus. Wien, ii. 1840, p. 331; Günth. Cat. Fish. iv. p. 302 (1862); Eigenm. & Bray, Ann. Ac. N. York, vii. 1894, p. 612; Pellegr. Mém. Soc. Zool. France, xvi. 1903, p. 248 (1904).

*Uaru obscurum*, Günth. l. c.

*Acara* (*Heros*) *amphiacanthoides*, Steind. Sitzb. Ak. Wien, lxxi. 1875, p. 94.

*Acara* (*Heros*) *imperialis*, Steind. Sitzb. Ak. Wien, lxxx. 1879, p. 161.

*Uaru imperialis*, Pellegr. t. c. p. 249.

Depth of body  $1\frac{1}{2}$ – $1\frac{3}{4}$  in the length, length of head 3– $3\frac{1}{5}$ . Diameter of eye  $3\frac{1}{2}$ – $3\frac{4}{5}$  in the length of head, interorbital width 2– $2\frac{1}{2}$ . Depth of præorbital  $1\frac{1}{4}$ – $1\frac{2}{5}$  the diameter of eye. Jaws equal anteriorly; maxillary not extending to below the eye; fold of the lower lip not continuous; cheek with 9–12 series of scales; 7 or 8 gill-rakers on the lower part of anterior arch. Scales in a longitudinal series, 55–60 above the lateral line, 46–52 below it; scales in a transverse series  $\frac{11-13}{24-28}$ . Lateral line 18–21 + 10–13. Dorsal XV–XVI (13–14)

15-16, the spines subequal from the fifth or sixth, the last  $\frac{1}{2}$ - $\frac{3}{5}$  the length of head, the soft fin scaly at the base. Anal VIII-IX (X 12-13) 14 (15-16). Pectoral a little longer than the head. Caudal rounded. Caudal peduncle  $\frac{1}{4}$ - $\frac{1}{3}$  as long as deep. Brownish, with a broad blackish lateral band, a blackish spot behind the eye and another on the upper part of the base of caudal.

R. Amazon.

- |   |            |                   |
|---|------------|-------------------|
| 1. (145 mm.) type of <i>U. obscurum</i> . | R. Cupai.  |                   |
| 2. (215 mm.)                              | L. Saraca. | Prof. A. Agassiz. |
| 3. (198 mm.)                              | Teffé.     | Paris Museum.     |

### SYMPHYSODON.

*Symphysodon*, Heck. Ann. Mus. Wien, ii. 1840, p. 332; Günth. Cat. Fish. iv. p. 316 (1862); Steind. Sitzb. Ak. Wien, lxxi. 1875, p. 106; Eigenm. & Bray, Ann. Ac. N. York, vii. 1894, p. 623; Pellegr. Mém. Soc. Zool. France, xvi. 1903, p. 249 (1904).

Closely allied to *Cichlosoma*, especially to *C. severum*, differing in having the teeth confined to the anterior part of each jaw and in the structure of the fins, the dorsal having VIII-IX 28-31 rays and the anal VII-IX 26-31. The body is nearly circular in form, compressed; the scales are rather small, those of the lateral line being larger than the rest.

A single species from the Amazon.

### *Symphysodon discus*.

*Symphysodon discus*, Heck. Ann. Mus. Wien, ii. 1840, p. 333; Günth. Cat. Fish. iv. p. 316 (1862); Steind. Sitzb. Ak. Wien, lxxi. 1875, p. 106; Pellegr. Mém. Soc. Zool. France, xvi. 1903, p. 250 (1904).

Depth of body  $1-1\frac{1}{5}$  in the length, length of head  $3\frac{2}{5}-3\frac{3}{5}$ . Snout as long as postorbital part of head. Diameter of eye  $3-3\frac{1}{2}$  in the length of head, interorbital width  $2-2\frac{2}{5}$ . Depth of præorbital  $1-1\frac{1}{4}$  the diameter of eye. Mouth small, oblique; maxillary extending to below the nostril; fold of the lower lip continuous, slightly produced. Cheek with 7 or 8 series of scales; 4 or 5 very short gill-rakers on the lower part of anterior arch. Scales  $65-70$   $\frac{17-18}{33-35}$ , 50-55 in a longitudinal series below the lateral line, 6 between upper and lower lateral lines. Dorsal VIII-IX 30-31 (VII-IX 26-31). Anal VIII 27-30 (VII-IX 26-31). Dorsal and anal spines graduated, the fins covered with scales in their basal halves. Pectoral a little longer than the head. Caudal rounded. Caudal peduncle very short. Body with dark

undulating longitudinal stripes and with 9 dark cross-bars, of which the first, through the eye, the fifth, in the middle of the length of the body, and the ninth, on the base of the caudal, are more strongly marked than the others; soft vertical fins with alternate light and dark spots.

R. Amazon.

|              |           |                   |
|--------------|-----------|-------------------|
| 1. (110 mm.) | R. Cupai. |                   |
| 2. (135 mm.) | R. Negro. | Mr. J. C. Antony. |
| 3. (170 mm.) | Teffé.    | Dr. J. Bach.      |
| 4. (130 mm.) | Manaos.   | Paris Mus.        |

Pellegrin gives the name *aquifasciata* to a variety without longitudinal stripes and with all the cross-bars equally distinct.

### PTEROPHYLLUM.

*Pterophyllum*, Heck. Ann. Mus. Wien, ii. 1840, p. 334; Günth. Cat. Fish. iv. p. 316 (1862); Steind. Sitzb. Ak. Wien, lxxi. 1875, p. 136; Eigenm. & Bray, Ann. Ac. N. York, vii. 1894, p. 624; Pellegr. Mém. Soc. Zool. France, xvi. 1903, p. 251 (1904).

*Plataxoides*, Casteln. Anim. Am. Sud, Poiss. p. 21, pl. xi. fig. 3 (1855).

Very closely allied to *Symphysodon*, which it resembles in the deep nearly circular body and the small scales, but differing in the dentition, the teeth extending on to the sides of the jaws. Dorsal with XI-XIII 24-30 rays, anal with V-VII 24-32.

R. Amazon; R. Orinoco.

Two species.

#### 1. *Pterophyllum scalare*.

*Platax scalaris*, Cuv. & Val. Hist. Nat. Poiss. vii. p. 237 (1831).

*Pterophyllum scalare*, Heck. Ann. Mus. Wien, ii. 1840, p. 335; Günth. Cat. Fish. iv. p. 316 (1862); Steind. Sitzb. Ak. Wien, lxxi. 1875, p. 136; Pellegr. Mém. Soc. Zool. France, xvi. 1903, p. 251 (1904).

*Plataxoides Dumerili*, Casteln. Anim. Am. Sud, Poiss. p. 21, pl. xi. fig. 3 (1855).

Depth of body a little less than the length, which is  $2\frac{2}{3}$ -3 the length of head. Snout not longer than eye, the diameter of which is  $2\frac{2}{3}$ -3 in the length of head and equal to the interorbital width. Depth of præorbital  $\frac{1}{2}$  the diameter of eye or less. Mouth small, oblique; maxillary extending to below the nostril; fold of the lower lip continuous; cheek with 4 or 5 series of scales; 12-14 gill-rakers on the lower part of anterior arch. Scales 40-47  $\frac{8-10}{22-26}$ , 33-38 in a longitudinal series below the lateral line. Lateral line 17-19+9-11. Dorsal XI-XIII 23-27, the spines graduated,

the last about as long as the head; anterior soft rays considerably produced; middle part of the fin scaly at the base. Anal VI 26-29 (V-VII 24-29). Pectoral as long as the head; ventral produced into a long filament. Caudal truncate, the outer rays sometimes produced. Caudal peduncle  $\frac{1}{4}$ - $\frac{1}{3}$  as long as deep. Silvery with 4 well-marked blackish cross-bars, the first through the eye, the second from spinous dorsal to origin of anal, the third from soft dorsal to anal, the fourth on the base of caudal; between these narrower and less distinct intermediate bars; soft vertical fins sometimes with alternate light and dark stripes.

R. Amazon.

|                  |            |                   |
|------------------|------------|-------------------|
| 1. (102 mm.)     | R. Cupai.  |                   |
| 2. (81 mm.)      | Tabatinga. | Mus. Comp. Zool.  |
| 3. (99 mm.)      | Manaos.    | Mr. J. C. Antony. |
| 4. (61 mm.)      | Tonantins. | Paris Mus.        |
| 5-7. (31-60 mm.) | Marajo Id. | Dr. E. A. Göldi.  |

## 2. *Pterophyllum altum*.

*Pterophyllum altum*, Pellegr. Bull. Mus. Paris, 1903, p. 125; Mém. Soc. Zool. France, xvi. 1903, p. 252, pl. iv. fig. 4 (1904).

Depth of body equal to its length. Cheek with 6-7 series of scales; 11 gill-rakers on the lower part of anterior arch. Scales about 55  $\frac{14-16}{31-36}$ , 41-47 in a longitudinal series below the lateral line. Dorsal XII-XIII 27-30. Anal (V) VI 28-32. Caudal peduncle  $\frac{2}{5}$  as long as deep. In other characters similar to the preceding species.

R. Orinoco.

|   |             |               |
|---|-------------|---------------|
| 1-2. (83 and 85 mm.) co-types of the species. | R. Orinoco. | Paris Museum. |
|---|-------------|---------------|

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## APPENDIX.

The British Museum has just received a series of the Mexican Cichlids collected and described by Dr. S. E. Meek. After examination of these it seems useful to make a few additions and corrections.

*Cichlosoma fenestratum* (suprà, p. 227).

To the synonymy add:—

*Cichlasoma melanurum* (part.), Meek, Zool. Pub. Columbian Mus. v. 1904, p. 219.

After the description of *C. melanurum* (p. 231) should be inserted :—

*Cichlosoma labridens*.

*Heros* (*Cichlasoma*) *labridens*, Pellegr. Bull. Mus. Paris, 1903, p. 122.

*Cichlasoma labridens*, Pellegr. Mém. Soc. Zool. France, xvi. 1903, p. 207, pl. vi. fig. 1 (1904).

*Cichlasoma Bartoni* (non Bean), Meek, Zool. Pub. Columbian Mus. v. 1904, p. 211.

*Cichlosoma Bartoni* (part.), Regan, *suprà*, p. 327.

Depth of body  $2\frac{1}{5}$ – $2\frac{2}{5}$  in the length, length of head  $2\frac{4}{5}$ – $3\frac{1}{5}$ . Snout a little shorter than postorbital part of head. Diameter of eye  $4$ – $5\frac{1}{2}$  in the length of head, interorbital width 3. Depth of præorbital  $1$ – $1\frac{3}{5}$  the diameter of eye. Maxillary not extending to below the eye; jaws equal anteriorly; fold of the lower lip subcontinuous or not continuous; cheek with 4–6 series of scales; 6–8 gill-rakers on the lower part of the anterior arch. Scales  $30$ – $32$   $\frac{5-6}{12-14}$ ,  $2\frac{1}{2}$  or 3 between lateral line and base of anterior part of soft dorsal. Dorsal XV–XVI 10–12, commencing above or in advance of the axil of pectoral, the spines subequal from the fifth or sixth to the thirteenth or fourteenth, thence increasing to the last, which is  $\frac{2}{5}$  the length of head. Anal V (VI) 8–9. Pectoral nearly  $\frac{3}{4}$  the length of head, extending about to above the vent; ventral extending nearly to origin of anal. Caudal rounded or subtruncate. Caudal peduncle from  $\frac{3}{4}$  to as long as deep. Olivaceous, sometimes with 4 or 5 dark cross-bars on the posterior part of the body; sometimes the lower part of the head and abdomen blackish and a large dark blotch on the caudal peduncle; upper surface and sides of head often covered with small dark spots; fins greyish or dusky.

Rio Panuco and its tributaries, Mexico.

The above description is based on six specimens, 80–175 mm. in length, from the Rio Verde.

This species is very closely allied to *C. melanurum*.

*Cichlosoma Gadovii* (p. 232).

The synonymy of this species should read :—

*Cichlasoma melanurum* (part.), Meek, Zool. Pub. Columbian Mus. v. 1904, p. 219.

*Cichlosoma aureum* (p. 320).

Specimens have been received under the names of *Thorichthys Helleri* and *T. Elliotti*. The former have the

spots on the cheeks blue, often surrounded by a dark ring ; in the latter the corresponding spots are blackish, many of them with a blue centre. In all other respects these two supposed species are absolutely identical.

*Cichlosoma istlanum* (p. 326).

Several young specimens differ in coloration from examples of *C. Steindachneri* of the same size. They have 7 or 8 dark cross-bars, a dark spot below the origin of the lateral line, another on the middle of the side, and a third at the base of the caudal.

After the description of *C. istlanum* should be inserted :—

*Cichlosoma Steindachneri*.

*Cichlasoma Steindachneri*, Jord. & Snyder, Bull. U.S. Fish. Comm. xix. 1899, p. 143, fig. 20 ; Jord. & Everm. Bull. U.S. Nat. Mus. xlvii. 1900, p. 3173 ; Pellegr. Mém. Soc. Zool. France, xvi. 1903, p. 206 (1904) ; Meek, Zool. Pub. Columbian Mus. v. 1904, p. 211, fig. 67. *Cichlosoma istlanum* (part.), Regan, *suprà*, p. 326.

Depth of body  $2\frac{1}{3}$  in the length, length of head  $2\frac{4}{5}$ . Snout as long as postorbital part of head. Diameter of eye 4 in the length of head and equal to the interorbital width. Depth of præorbital equal to diameter of eye. Maxillary slightly exposed, extending to between nostril and eye ; præmaxillary processes extending to above anterior margin of eye or slightly beyond ; jaws equal anteriorly ; fold of the lower lip subcontinuous ; upper jaw with the two anterior teeth of the outer series the largest, forming canines ; lower jaw with 3 pairs of canines, the anterior pair the smallest ; cheek with 6 series of scales ; 8 gill-rakers on the lower part of the anterior arch. Scales  $31\frac{5\frac{1}{2}}{13}$ ,  $2\frac{1}{2}$  between lateral line and base of anterior rays of soft dorsal. Dorsal XVI 10, the spines subequal from the sixth to the fourteenth, thence increasing to the last, which is a little more than  $\frac{1}{3}$  the length of head ; soft fin, when laid back, extending to anterior  $\frac{1}{3}$  of caudal. Anal V 8. Pectoral  $\frac{3}{4}$  the length of head, extending to above the vent ; ventral extending to the vent. Caudal subtruncate. Caudal peduncle nearly as long as deep. Olivaceous ; sides with about 10 narrow vertical dark bars ; a series of dark blotches forming an interrupted longitudinal band from operculum to base of caudal ; sides of head and lower part of body with small dark spots ;

spinous dorsal blackish ; soft dorsal, anal, and caudal dusky, obscurely spotted at the base.

The above description is based on a single specimen, 104 mm. in total length, from the Rio Verde. Smaller examples (40–55 mm.) have a more slender body (depth  $2\frac{2}{3}$ –3 in the length).

*Cichlosoma Bartoni* (p. 327).

The synonymy of this species should read :—

*Acara Bartoni*, Bean, Proc. U.S. Nat. Mus. 1892, p. 286, pl. xlv. fig. 3.  
*Cichlasoma Bartoni*, Jord. & Everm. Bull. U.S. Nat. Mus. xlvii. 1898, p. 1515, fig. 587 ; Pellegr. Mém. Soc. Zool. France, xvi. 1903, p. 206 (1904) ; Meek, Zool. Pub. Columbian Mus. v. 1904, fig. 68.  
*Cichlosoma Bartoni* (part.), Regan, *suprà*, p. 327.

Three young examples of this species, 53–72 mm. in total length, from the Rio Verde, received as *C. Steindachneri*, differ from that species, which they resemble in coloration, in the larger head ( $2\frac{1}{2}$  in the length), more produced snout, and larger and more oblique mouth. Scales  $32\frac{5-6}{12-14}$ ,  $2\frac{1}{2}$  between lateral line and base of anterior part of soft dorsal. Dorsal XVI 10–11, the last spine  $\frac{1}{3}$  the length of head. Anal V 8. The coloration is similar to that of the adult example figured by Bean, but the body is not so deep.

*Cichlosoma octofasciatum* (p. 331).

A series of specimens received as *C. Hedricki* includes a small example in every way similar to the type of the species.

*Herichthys cyanoguttatus* (p. 434).—

Entirely similar examples have been received under the names *Cichlasoma cyanoguttatum* and *Neetroplus carpintis*. My opinion as to the identity of these species is thus confirmed.

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LI.—A New Explanation of the Red Colour in the Hind Wing of *Catocala*, Schr. By CH. SCHAPOSCHNIKOW\*.

THE question as to how the development of the red colour in the hind wing of *Catocala* is to be explained has not yet, in the literature with which I am acquainted, been dealt with

\* Translated by E. E. Austen from the 'Biologisches Centralblatt,' xxiv. Bd. (1904) pp. 514–520.



Regan, C. Tate. 1905. "L. - A Revision of the Fishes of the American Cichlid Genus Cichlosoma and of the Allied Genera." *The Annals and magazine of natural history; zoology, botany, and geology* 16, 433–445.

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