NOTES ON CHARACOID FISHES COLLECTED IN SURINAM BY Mr. H. P. PIJPERS, WITH DESCRIPTIONS OF NEW FORMS

by

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In the course of a revision of the Guianean characoid Fishes, I had the opportunity to study, thanks to the staff of the Department of Ichthyology, Zoölogisch Museum Amsterdam, an interesting collection secured by Mr. H. P. Pijpers in 1960-62, in Dutch Guiana, from the following localities (fig. 1 and appendix):

(a) Creeks between the Saramacca and Suriname River systems, around the railroad Paramaribo-Dam, chiefly near Brownsweg (oct.-nov., 1960); also creek near Berlijn, Para River (march, 1962)

(b) Creeks in the coastal region between the Cottica and Maroni River systems (sept., 1960, and feb.-march, 1962)

(c) Creeks in the Paru Savannah, near the boundaries with Brazil, into Sipaliwini River, Coeroeni River system (Dr. Geijskes Exp., jan.-feb., 1961).

47 species were identified from nearly a thousand specimens. Most of these species, especially those collected in the formerly unknown southwestern Surinam (c), justify the present account, which completes my papers of 1961 and 1962 (see references) [2].

For brevity, old synonymies have been omitted, and collecting data have been abridged (see Appendix); measurements of specimens refer to the standard length (from snout to end of hypurals).

CHARACIDAE

TETRAGONOPTERINAE

(1) **Hemibrycon surinamensis** Gery, 1962

11 ex. (type and paratypes), Brownscreek, coll. 6/11/1960.

Sympatric with *Moenkhausia surinamensis* (see below).

(2) **Astyanax (Poecilurichthys) polylepis** (Günther, 1864)

2 ex., larger 35,7 mm, Paru Savannah, coll. 25/1-6/2/1961.

A well-known Surinam species. EIGENMANN (1912: 356) did not mention in his redescription the so-called pelvic spines or "innominate bones", which protrude out of the skin in the above specimens, causing a much flattened preventral area. Other species known to have a similar structure are *A. mucronatus, Deuterodon acanthogaster* and two *Astyanax* spp. (still undescribed) from Alto Rio Juruena (Brazil).

(3) **Astyanax (Poecilurichthys) abramoides** Eigenmann, 1909

1 ex., 46,8 mm, surr. Albina, coll. 7/8/1960.
1 ex., 38,5 mm, Brownsweg, coll. 10/11/1960.
1 ex., 58,5 mm, foot of Albina Hills, coll. 3/1962.

These specimens are typical: depth 2,4-2,7 (juv.) in the standard length; anal iv 26 or 27 (i); scales 10 or 11 / 46-51 / 7 or 8; maxillary rather long, with generally 2 teeth; characteristic pattern as follows: a humeral spot, anterior, horizontally elongate, often two vertically elongate spots surimposed on it (following preservation in formalin); caudal spot distal, on the base of the fin, not extending on peduncle nor on tip of middle caudal rays; caudal yellow, as well as throat and adipose fin; anal fin red. Reported from Surinam by BOESEMAN (1952, 1953).

[2] Besides the description of new forms, I thought it worthwhile to review critically some of the other ones, without waiting for the fuller revision of the group mentioned above. For both new and reviewed forms, the records from Mr. Pijpers collections were supplemented by a few other ones, also belonging to the Z.M.A., or collected by me in French Guiana.

Contribution No. 46 to the study of characoid Fishes.

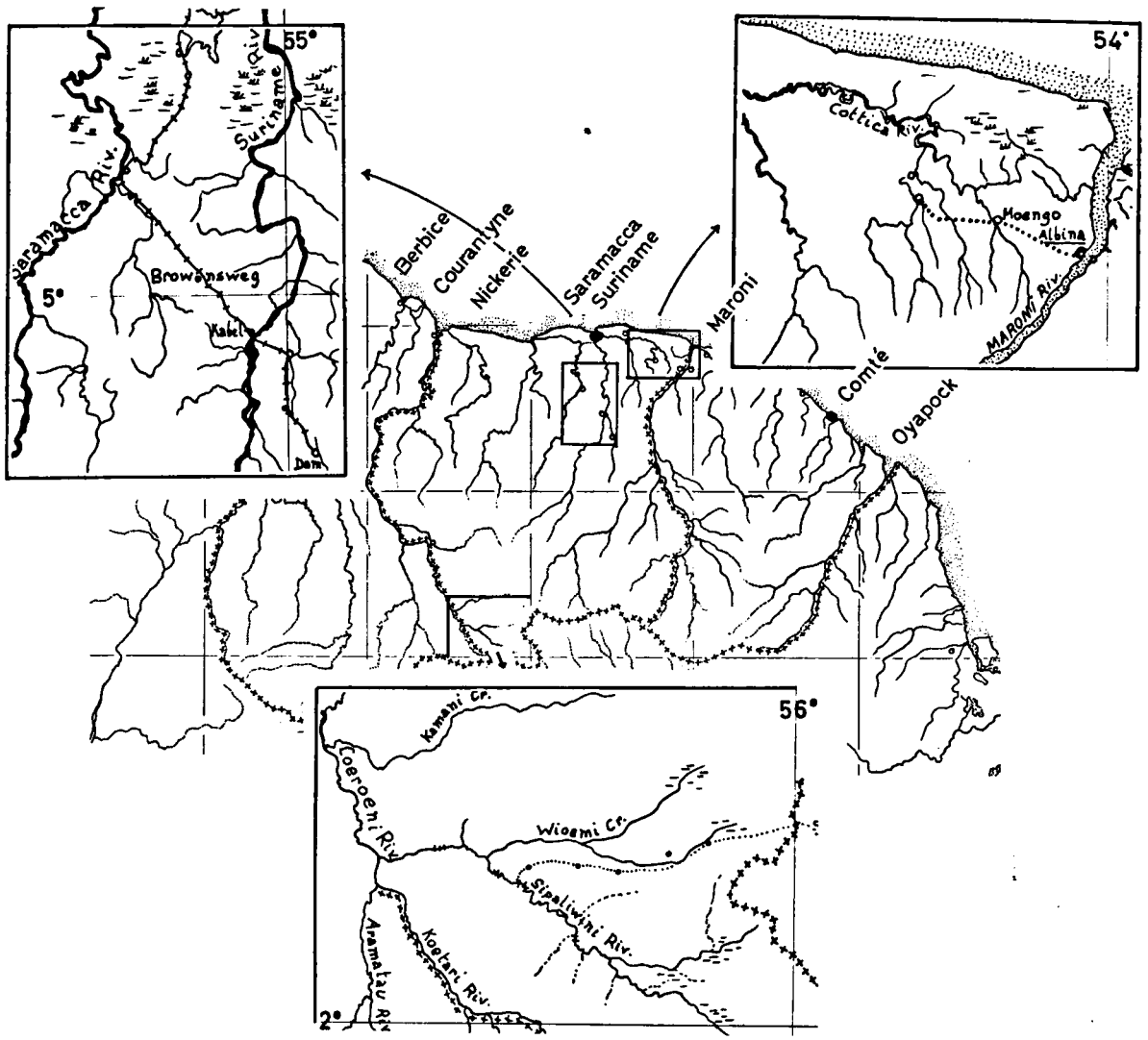

Fig. 1. *Mr. H. P. Pijpers' collecting stations in Surinam, 1960-1962.*

(4) **Moenkhausia grandisquamis** (Müller & Troschel, 1845)

1 ex., 26,6 mm (juv.), surr. Albina, coll. 3/1962.

A well-known Guianean species.

(5) **Moenkhausia surinamensis** sp. nov. (fig. 2)

Holotype: 48,3 mm in standard length (62,1 mm in total length), coll. Mr. H. P. Pijpers at Brownscreek, km 114 from Paramaribo on the Paramaribo-Dam railroad, between Saramacca and Suriname River systems, nov. 6, 1960; ZMA 104.221.

Paratypes: 2, 47,0 and 37,3 mm, collected with the type.

Diagnosis: greatest depth 2,59-2,65 in the standard length; anal iv 25-28(i); scales 7 or 8 / 36-37 / 6; maxillary longer than snout, with 2 or 3 teeth; a conspicuous vertical humeral spot, followed by a much fainter second one; a faint caudal spot.

Description (Table I): aspect of a generalized Tetragonopterine like *Astyanax mucronatus* for example, and also quite resembling *Hemibrycon surinamensis* with which it lives; body rather elongate (as compared with the high number of transverse scales); dorsal well in advance of the middle of the body (snout-to-dorsal 1,08-1,2 in dorsal-to-caudal), rather high, but its longest ray not reaching adipose fin; pectorals reaching ventrals, ventrals just reaching anal; ventrals equidistant from tip of snout and last anal ray; anal sheath of scales reduced; caudal lobes clearly scaled up to their proximal third; predorsal with a rather regular series of scales, moderately keeled; preventral rounded, without modified scales; peduncle slightly longer than deep, ratio of depth to

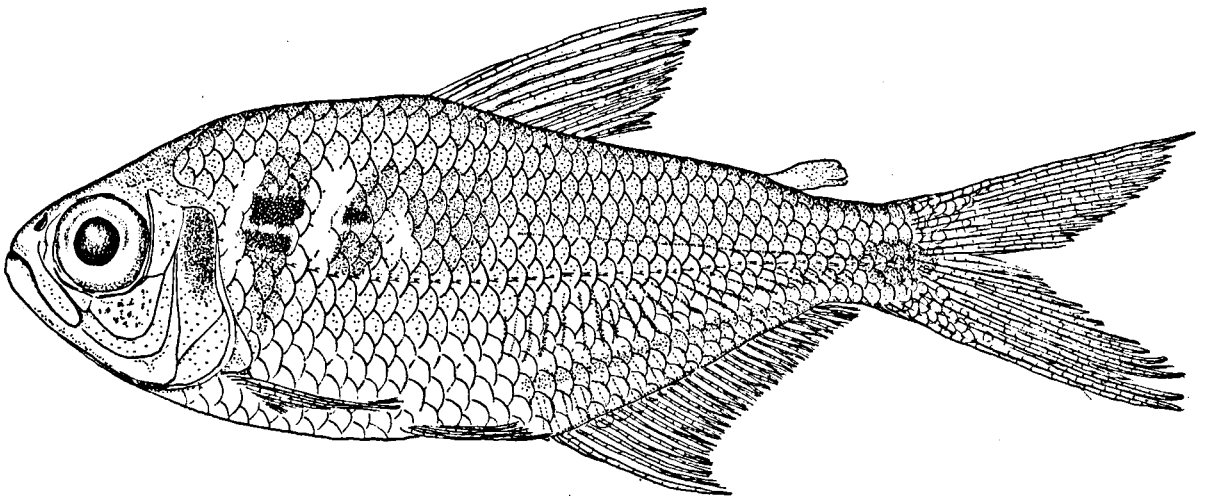

Fig. 2. *Holotype of* Moenkhausia surinamensis *sp. nov., 48,3 mm in standard length (Brownsweg). ZMA 104.221.*

length 1,1 to 1,3. Head moderate, profile straight over eyes, pupil large; mouth strictly terminal; maxillary shorter than one orbital diameter, reaching to level of anterior border of pupil, slightly shorter than distance snout-to-pupil; fontanels narrow; third suborbital covering only ⅔ or ¾ of the cheek; premaxillary with 3-5 tricuspid external teeth, and 5, quincuspid or sevencuspid ones, in the inner row; 2 or 3 quincuspid maxillary teeth; dentary with 4 large, frontal teeth, followed on sides by about 6 or 7 much smaller ones; gill-rakers 10-11/13-14; scales very firm, regular, except just above pelvic fins; radii parallel, longitudinal; 10 scales before dorsal, 3½ or 4 along supra-occipital, 14 around caudal peduncle.

In vivo, body lemon-coloured with some orange-red on beginning of anal, on adipose and on base of dorsal, as well as on caudal lobes; a conspicuous, vertical dark humeral bar, somewhat darker above lateral line, followed, after a light area, by a much fainter, vertical spot; caudal spot roundish, astride on peduncle and base of middle rays, rather faint

Table I. *Proportions and counts of* 3 *ex. of* Moenkhausia surinamensis

No.	ZMA 104.221 (holotype)	ZMA 104.222 a	ZMA 104.222 b	Ranges
Sd.lgth.	48,3	47	37,3	37,3-48,3
Sd.lgth/depth	2,65	2,64	2,59	2,59-2,65
Sd.lgth./head	3,61	3,62	3,36	3,36-3,62
Head/eye	2,58	2,77	2,78	2,58-2,78
Head/interorb.	2,98	3,10	3,08	2,98-3,10
Head/maxill.	2,91	3,10	3,26	2,91-3,26
Head/snout	3,94	3,82	4,11	3,82-4,11
Dors.-caud./snout-dors.	1,17	1,20	1,08	1,08-1,20
Dorsal	ii9	ii9	ii9	ii9
Anal	iv28(i)	iv26(i)	iv25(i)	25-28 br.
Long.scales	37	36-37	37	36-37
Transv.scales	7/6	8/6	8/6	7-8/6
Pmx.teeth	4/5	5/5	3-4/5	3-5/5
Mx.teeth	2	3-2	3-2	2-3
Gill-rakers	10 or 11 / 13 or 14	11/14	/	10-11/13-14

(this black pattern probably exaggerated by the preservation in formalin and not evident in vivo).

Discussion: M. surinamensis can only be distinguished by a combination of characters, being of a very generalized type. It apparently belongs to the group defined by EIGENMANN (1917, key pp. 66-67: *depth less than 2,75* in the length, five or more scales between lateral line and ventrals, at least seven scales between dorsal and lateral line), and including *M. justae, jamesi, doceana, chrysargyrea* and *comma.* All have a deeper body (2 to 2,4 in length), a different pattern and several minor differential characters.

Other species not included in Eigenmann's key, *M. tridentata, pittieri, metae, eigenmanni, naponis* and *miangi,* differ either in the pattern (*tridentata, pittieri,* which have no marks), in the general form (*miangi*), or in the meristics (*eigenmanni, naponis*), as shown in the following key:

Key to the *doceana*-group of the genus *Moenkhausia*

a. Depth 2-2,3, rarely 2,4 in the young
  b. Branched anal rays 28-35
    c. Branched anal rays 31-35; maxillary equals snout-to-pupil; 3 to 8 mx.teeth; sc. 7 or 8/34-36/6 or 7; no caudal spot; humeral spot horizontal ..... *doceana* (East. Brazil)
    cc. Branched anal rays 28-32; maxillary short, equals snout, with 0 or 1 tooth; sc. 7/35-37/5 or 6; a conspicuous caudal spot; humeral spot vertical
      d. Branched anal rays 29-32; maxillary without teeth; third suborbital leaving only a narrow naked area on cheek ..... *jamesi* (Amazon)
      dd. Branched anal rays 28; maxillary with one tooth; third suborbital leaving a broad naked area on cheek; very similar to the preceeding ..... *justae* (Manaus ?)
  bb. Branched anal rays 21-27 (no caudal spot)
    e. No humeral spot (sc. 7/35-37/6; maxillary about 3 in head, with 3 or 4 teeth)
      f. Depth 2,1-2,3; fins elongate; 5 inner premaxillary teeth; 8 gill-rakers on lower arch ..... *pittieri* (Venezuela)
      ff. Depth 2,1; 4 inner premaxillary teeth (?); 12 gill-rakers on lower arch ..... *tridentata* (Amazon)
    ee. One or two humeral spots (sc. 6 or 7/32-36/5 or 6; maxillary 3 or more in head, with 1 to 4 teeth)
      g. Humeral spot horizontally oval or elongate; no conspicuous band on flanks above anal
        h. Humeral spot oval, about equidistant from dorsal and opercle; snout-to-dorsal 1 to 1,1 in dorsal-to-caudal; generally 10 predors. sc.; snout rather pointed, mx. about 4 in head, with 1 or 2 teeth; branched anal rays 26-27, sc. 33-34 .....*chrysargyrea* (Guianas, Upper Amazon)
        hh. Humeral spot elongate, pointed in front behind opercle; snout-to-dorsal about 1,2 in dorsal-to-caudal; generally 9 predorsal scales; snout rounded; mx. about 3,6 head, with 2 or 3 teeth; branched anal rays 22-25; sc. 34-36 ..... *comma* (Amazon)
      gg. Humeral spots vertically elongate; a conspicuous posterior band (dorsal in the middle of the body; sc. 6 or 7/32-34/5 or 6; branched anal rays 21-24; maxillary long and slender, with 2-4 teeth ..... *naponis* (Ecuador)
aa. Depth generally 2,4 or more in adults
  i. Branched anal rays 23-28; a caudal spot
    j. Depth 2,4-2,5; branched anal rays 23-24; sc. about 7/37-39/5; a very faint humeral spot; caudal spot conspicuous ..... *miangi* (Venezuela)
    jj. Depth about 2,6; branched anal rays 25-28; sc. 7 or 8/36-37/6; humeral spot conspicuous; a faint caudal spot ..... *surinamensis* (Surinam)
  ii. Branched anal rays 17-19; sc. 6 or 7/34-36/4 or 5; no caudal spot (humeral spot faint; maxillary with 2 or 3 teeth)
    k. Depth 2,5; dorsal in the middle of the body ..... *metae* (Upper Meta)
    kk. Depth 2,8-3,1; dorsal well anterior to the middle of the body ..... *eigenmanni* (Upper Meta)

(6) **Moenkhausia georgiae** sp. nov. (fig. 3, Pl. I)

Holotype: ♂, 69 mm in standard length, coll. J. Gery between "Saut-Chien" and "Saut-Topi-Topi", middle Mana River, French Guiana, oct. 15, 1957; ZMA 104.223.
Paratypes: 10 ex., largest 57 mm, collected with the type.
1 ex., 26,6 mm, crique Sable, upper Mana River 22/10/1957.
12 ex., largest 44 mm, "Saut-Abattis-Cottica", Maroni River, 25/11/1957.
11 ex., largest 47,5 mm, Aloiké village, Litany (upper Maroni), 27/11/1957.
6 ex., largest 62,2 mm, Tampoc (into Litany), 29/11/1957 (one deposited in ANS Philadelphia).
16 ex., 28,3-39,7 mm, coll. Mr. H. P. Pijpers in a creek of the Paru Savannah, Sipaliwini River basin, 6/2/1961.

Diagnosis: a typical *Moenkhausia,* close to *Tetragonopterus,* pertaining to the group with: depth 2-2,66 in the length and relatively few scales under lateral line, like the type, *M. xinguensis* (and others: *grandisquamis, oligolepis* etc.); resembling *M. shideleri,* with shorter body and more transversal scales.

Counts and proportions of the type: D ii9, A iii-24+1, sc. 6/33/4, predorsal scales 8; teeth:pmx.ext. 5, tricuspid, pmx. int. 5, seven- to quincuspid; mx. 4, tricuspid; dn.5 quincuspid, followed by 7, tricuspid; gill-rakers 10/12; depth 2,19, head 3,57, and length of longest dorsal ray 3,3 in the standard length; eye 2,5, interorbital 3,45, snout 4,83 and maxillary 3,45 in the length of head.

Description (Table II): the French Guiana sample at hand is rather complete (41 specimens), with adult specimens (the type, 69 mm, is a mature male, provided with sexual hooks on the first anal rays), numerous intermediate individuals (30 to 50 mm) and a few juvenile ones (less than 30 mm). Distributed

Table II. *Principal proportions and counts of* 9 *largest ex. of* Moenkhausia georgiae *(above* 50 mm*)*

No. Locality	ZMA 104.223 (Type) Mana	2 Tampoc	3 Tampoc	4 Tampoc	5 Tampoc	6 Mana	7 Mana	7 Tampoc	9 Mana	Ranges
Sd.lgth.	69	62,2	61,8	60	59	57	55	55	53	53-69 mm
Sd.lgth./depth	2,19	2,08	1,97	2,02	2,15	2,0	2,13	2,15	2,18	1,97-2,19
Sd.lgth./head	3,57	3,57	3,53	3,59	3,40	3,31	3,44	3,44	3,37	3,31-3,59
Head/eye	2,5	2,48	2,43	2,38	2,29	2,35	2,32	2,22	2,22	2,22-2,50
Head/interorb.	3,45	3,48	3,50	3,34	3,48	3,74	4,0	3,64	3,88	3,34-4,0
Head/snout	4,83	4,97	4,49	4,28	4,36	5,06	4,71	4,71	5,23	4,28-5,23
Head/maxill.	3,45	3,48	3,25	—	2,9	3,0	3,2	3,02	3,34	2,90-3,48
Sd.Lgth./dors.	3,3	2,97	2,87	3,0	—	3,1	3,25	2,83	3,0	2,83-3,25
Dorsal	ii9	ii9	ii9	ii9	ii9	ii9	ii9	ii9	ii9	ii9
Anal	iii24	24	25	25	24	24	24	26	23	23-26 br.
Scales long.	33	33	32	33	33	33	34	33	33	32-34
Scales transv.	6/4	6/4½	6/4½	6/5	6/4	6/4	6/4½	6/4	6/4	6/4-5

into five classes, they show a rather normal distribution, as follows: less than 30 mm: 2; 30-39 mm: 17; 40-49 mm: 13; 50-59 mm: 5; over 59 mm: 4 specimens.

The characters have *little variability* (at least concerning a Tetragonopterine).

Depth of the body 1,93-2,50 in the standard length, with the following distribution: 2,04 and less: 7; 2,05-2,14: 9; 2,15-2,24: 15; 2,25-2,34: 6; 2,35 and more: 4. The distribution is that of a normal curve, with the mode around 2,15-2,20. The regression line (fig. 4, middle) shows a critical point about the abscissa 40-50 mm sd. lgth.: there is first a positive allometry (depth in the length 2,4-2,5 at 25 mm, to 2,0-2,2 at 50 mm) then an isometry after 50 mm, which may correspond to the sexual maturity.

Other proportions (adults only): head 3,35-3,60 in the standard length; there is a negative allometry, as usual in the Tetragonopterinae (fig. 4, lower); interorbital 3,35-4,0, maxillary 2,9-3,5 and snout 4,3-5,25 in the length of head; the longest dorsal ray does not reach the adipose, when folded along the body; height of peduncle nearly equals its length.

Because the ratio of the diameter of the eye-ball to the length of head is so pertinent in the diagnosis of the closely similar *M. shideleri*, it was also the object of statistical treatment: extreme values 2 to 2,5, distributed as follows: 2,0-2,09: 6; 2,10-2,19: 10; 2,20-2,29: 11; 2,30-2,39: 9; 2,40-2,49: 4; 2,5: 1. The distribution is that of a rather normal curve, with mode at about 2,25. The regression line (fig. 4, upper) confirms the almost general fact that the relative diameter of the orbit decreases with the growth of the fish (in diurnal characoids at least). The largest specimens of *M. georgiae*, (9 ex. above 50 mm), compared with the types of *M. shideleri* (2 ex. about 50-58 mm in standard length), have a smaller eye: 2,2-2,5 instead of 2,1. They are in fact intermediary between the section I and II of Eigenmann's key to the species of *Moenkhausia* (1917: 67): eye "2,4 or more in head", versus "2-2,2 in head".

Meristics: Dorsal ii9; anal iii or iv23-27(i), with the following distribution (branched rays, 56 individuals): 23: 10 ex.; 24: 22 ex.; 25: 20 ex.; 26: 3 ex.; 27: 1 ex. Scales (lateral line, 29 individuals above 35 mm): 80% with 33 scales, 17% with 34, 3% with 32; 6 (rarely 6½) / 4-4½ or 5 in a transverse series, from dorsal to ventral; 7 or 8 in predorsal series, sometimes irregular, with one or two lateral scale(s) overlapping in the middle; 2½ along the occipital process; 13 in preventral series; 14 around peduncle.

Body high and compressed; section of the predorsal region in acute "V" ("keeled"); profile slightly concave at the occipital process, then elevated up to the dorsal, which is somewhat anterior to the middle of the body; ventral profile rounded, descending from the isthmus to the front of ventrals, then horizontal, or even ascending, up to anal; pectorals short, not reaching origin of ventrals; ventrals short, originating at the level of dorsal, their longest rays scarcely reaching first rays of anal; anal falciform, originating at the level of the last dorsal ray; peduncle high and short (about as deep as long); caudal well developed, scaled up to the proximal third of its lobes.

Head relatively short and high, the eye occupying the larger part of its profile; snout short, bony interorbital narrow, maxillary relatively long, reaching to

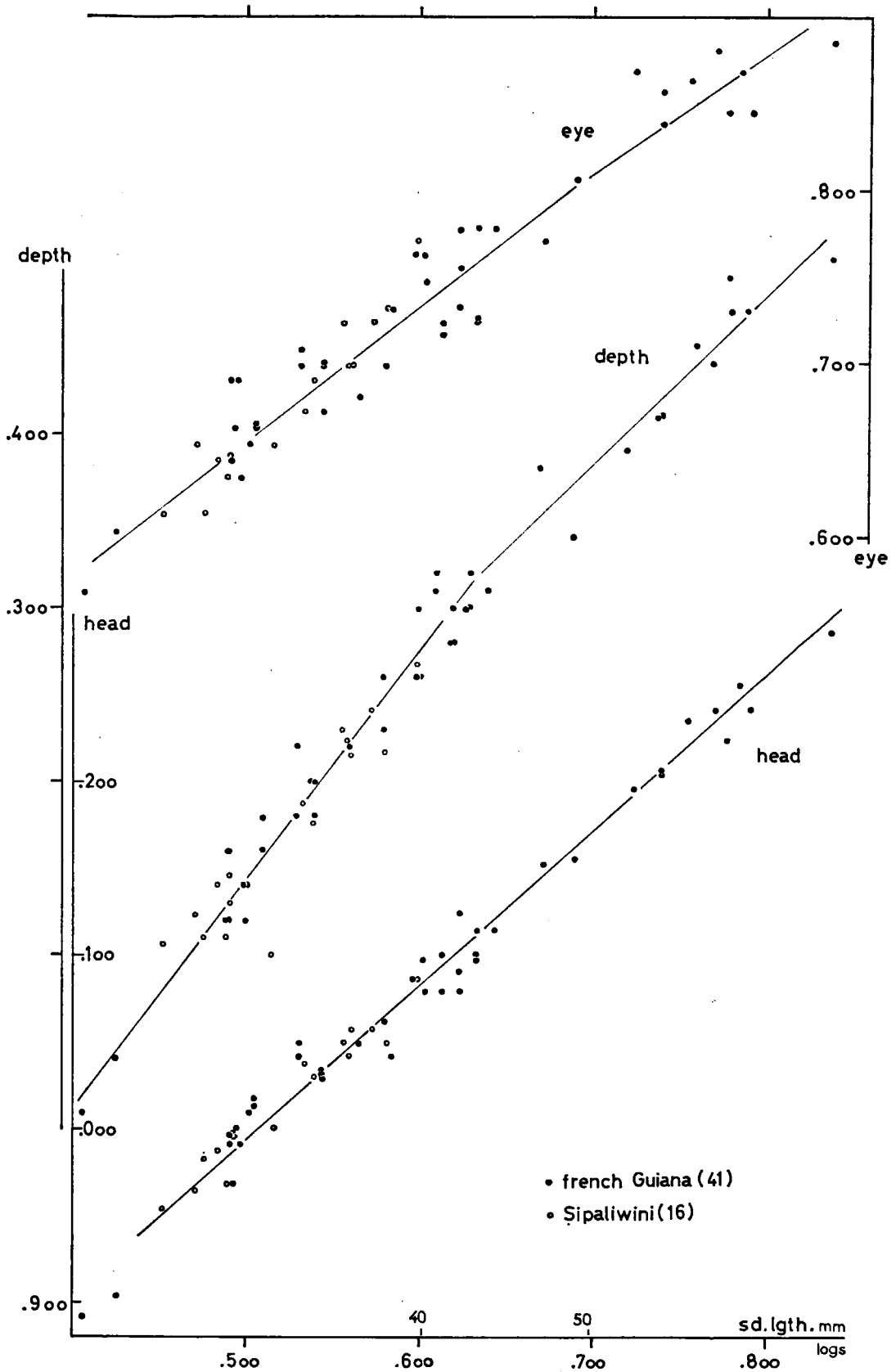

Fig. 4. Moenkhausia georgiae, 57 *ex.: ocular diameter, largest depth and length of head (from top to bottom) plotted against standard length; logarithmic coordinates.*

the level of pupil; third suborbital (SO^3) almost reaching preoperculum below and behind, leaving a naked triangle in front. Teeth relatively numerous: generally 5, tricuspid, in the outer premaxillary row, and 5, sevencuspid in front, quincuspid on sides, in the inner row; maxillary with 4 tricuspid teeth; dentary with 5 large, quincuspid teeth in front, followed by 6-8 smaller, tricuspid to conical ones on the sides.

Lateral line recurved in its anterior part, parallel with the longitudinal series above and below (i.e. not as in *Tetragonopterus*). Nevertheless the structure of the scale itself reminds one strongly of that of *Tetragonopterus*: the scale is relatively large, rather higher than long, with the nucleus reticulated, central, the basal border undulated but without distinct lobes and the apical border smooth, not denticulated; the circuli are very divergent, fading away on the dorsal and ventral border, almost vertical and parallel; there are generally two radii, which divide the scale in two almost equal parts by a vertical line.

The Sipaliwini sample (16 small ex.) does not differ in meristics nor in proportions; at most could it have, statistically, one more branched anal ray.

Coloration: when unpacked, the Sipaliwini specimens had the upper part of eye bright red, and the base of upper lobe of caudal, as well as part of the dorsal, light orange; in alcohol, humeral spot pale grey, scarcely visible in most specimens, far forward, above lateral line; caudal spot jet black, large and very conspicuous, grossly rounded, astride the peduncle and the beginning of caudal; scale iridescent, with a silver-blue shine; dorsal black-tipped, anal black-edged, its first rays whitish.

This is exactly the pattern of *Tetragonopterus chalceus*; both forms are sibling species in the broad sense, the young of *T. chalceus* and *M. georgiae* living in schools on the shore of Guianean rivers. They are then indistinguishable from each other. When adult, the two species are apparently isolated, no longer being caught together. At this stage, *M. georgiae* has the same large eye (which is also evident at the juvenile age, the young fishes having almost always a large eye, see fig. 5), but a much shorter dorsal; that of *T. chalceus* grows in a filament which reaches the caudal, whereas its characteristic dorsal hump continues to grow: as if there was a transient mimicry which would disappear when it is no longer needed.

Discussion: T. chalceus is easy to separate from *M. georgiae*, having the typical "step-like" lateral line in its foremost part, as well as more transverse scales and much longer anal. The structure of the scale would suggest strong phylogenetic affinities, anyhow; if *Tetragonopterus* once originated from *Moenkhausia*, the link could be sought for in some form which evolved on its own into the recent *shideleri* or *georgiae*.

The closest *Moenkhausia* is indeed *M. shideleri* Eigenmann, 1909 (:15), which is known from only two specimens from British Guiana (a third one, mentioned in the first description, apparently disappeared before 1917).

There are five differential characters (and some of lesser value), which are apparently diagnostic if specimens of similar length are compared: *M. georgiae* has a shorter body (depth 1,95-2,5 instead of 2,5-2,7, and head 3,55-3,6 instead of 3,7-3,8), a narrower interorbital (3,35-4,0 instead of 2,4-2,5), more transverse scales (6/4 or 5 instead of 5/3 or 4), and more maxillary teeth (4 instead of 2 "small" ones).

The minor or dubious characters are: a smaller eye (2,2-2,5 instead of 2,1 in specimens of comparable size), more dorsal rays (11 instead of 10), less longitudinal scales (generally 33 instead of 34), more mandibular teeth (5 large in front instead of 4) and a shorter dorsal (2,8-3,3 in the standard length instead of 3,8, as measured on the photograph).

This is summarized in the following table:

	M. shideleri (compiled)	*M. georgiae* (sp. 49-60 mm)
Depth	2,5-2,7	2,0-2,23
Head	3,7-3,8	3,31-3,44
Eye in head	about 2,1	2,22-2,35
Interorb. in head	2,4-2,5	3,48-4,0
Dorsal (tot.)	10	11
Anal (tot.)	26	25 (or 26) to 29 (or 30)
Scales	5/34/3 or 4	6/32-34/4(4½) or 5
Pattern	No humeral spot; a small diffuse, dark spot at base of middle caudal rays	A faint humeral spot; caudal spot large, black, astride peduncle and base of middle caudal rays

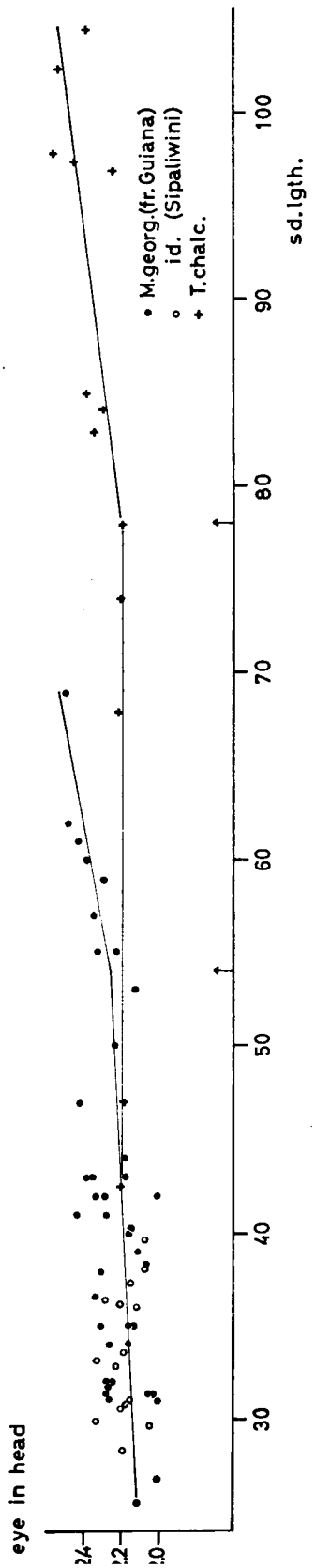

Fig. 5. *Comparison between* Moenkhausia georgiae *(left) and* Tetragonopterus chalceus: *ratio length of head/ocular diameter, plotted against standard length; the regression lines have been estimated.*

From the above comparison, it seems evident that the two forms are not conspecific, even if closely related (one of the two being apparently derived from the other). But *M. shideleri* is poorly known, and a large sample would possibly reveal that *M. georgiae* has only subspecific rank.[3]

(7) **Moenkhausia lepidura** (Kner, 1859), ssp.

1 ex., 33,1 mm, Paru Savannah, coll. 6/2/1961.

Depth about 2,9 in the standard length; anal iii21(i); scales 5/32-33/3½.

The polytypic species *M. lepidura* is a perplexing one; its varieties (described as subspecies) would be only distinguishable by their caudal pattern, which is often faded in collections. The following review will tentatively not insist on the pattern:

Most specimens (Potaro River, upper Amazon, upper Rio Meta, Rio Araguaia, etc.), agree with the characteristics of *M. lepidura lepidura* from Rio Guaporé; they have depth 2,9-3,4, anal iii20-22(i) (rarely 19), and scales 5 (rarely 6)/34-36/4.

In the middle Amazon, there is a form with the same meristics, but with the caudal lobes plain, *M. lepidura hasemani*, whereas another (allopatric?) has both caudal lobes grey or black, *M. lepidura gracilima*: it has a more elongate body, and is probably the same as the Rio Madeira form, *M. lepidura madeirae.*

Other populations have 23-26 branched rays, namely *M. lepidura lata* from Tapajos, which is very deep (about 2,6), and *M. lepidura schulzi* from Venezuela, which is elongate (about 3,5). A third form from the Maroni (still undescribed) appears to be intermediate; it is characterized by 6 transverse scales above lateral line, instead of 5 as usual.

[3] Such a future comparison would be facilitated by as many data as possible. This is why emphasis has been placed on statistics in the preceeding description.

Other species which may also be compared with *M. georgiae* are:

a) species with 5 or more scales between lateral line and ventrals, together with a caudal spot (section b, cc, d, of Eigenmann): these are *jamesi* and *justae* (see preceeding key); to note that *affinis*, which may be rather close to them, has no caudal spot;

b) species with 3½ or 4 scales between lateral line and ventrals (section bb): besides *M. shideleri*, already discussed, only *oligolepis* and *sanctae-filomenae* have a caudal spot; they are quite different in their form and in their scale-structure.

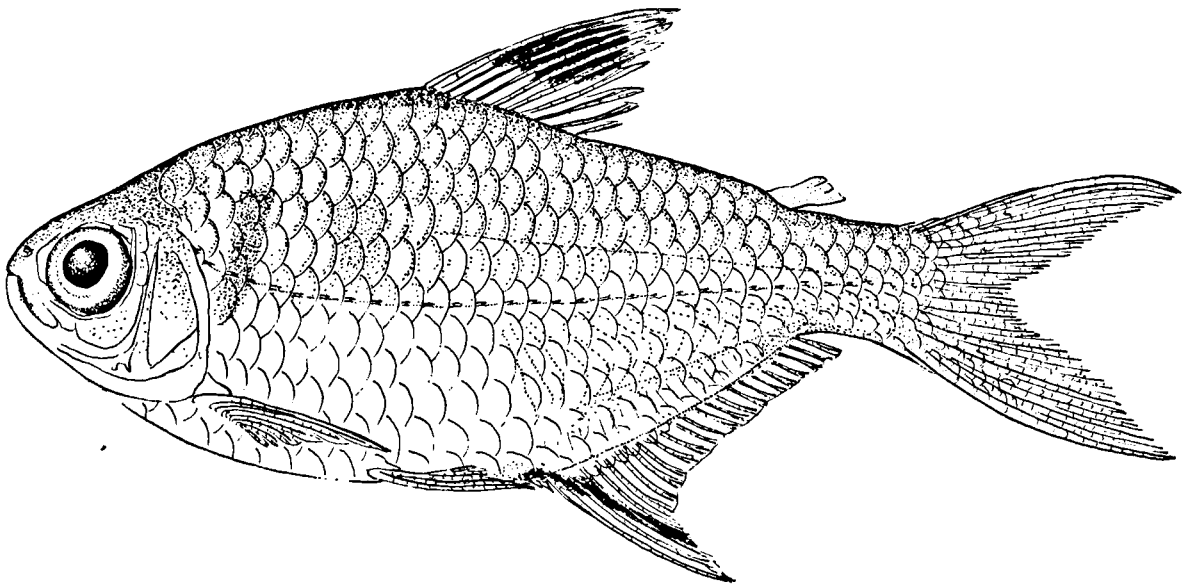

Fig. 6. *Holotype of* Moenkhausia hemigrammoides *sp. nov., 40,4 mm in standard length (Cottica River). ZMA 104.227.*

The present specimen belongs to still another form, which has less lateral line scales (32-33) than the types of *lepidura* (34-36); it may be known by the name *M. lepidura icae*, although its checkboard distribution in the Guianas, upper Rio Meta, as well as Rio Iça, gives some doubt about its taxonomic validity; *M. lepidura ocoae*, from Rio Meta drainage, may be synonymous.

(8) **Moenkhausia colletti** (Steindachner, 1882)

2 ex., largest 33 mm, Paru Savannah, coll. 6/2/1961.

Reported from Surinam by BOESEMAN (1952).

(9) **Moenkhausia hemigrammoides** sp. nov. (fig. 6)

Holotype: 40,4 mm in standard length (52,3 mm in total length), coll. Mr. H. P. Pijpers at Weyne, Matoekasie creek, on the road Albina-Moengo, Cottica River basin, march, 1962; ZMA 104.227.

Paratypes: 6, 19,4-27,4 mm, collected with the type.

1, 29,2 mm, coll. J. Gery, between "Saut-Cariacou" and "Saut-Couleuvre", Mana River, French Guiana, 13/10/1957.

2, 28,6 and 22, 8 mm, same coll., creek near Gaa Kaba, Maroni River, 22/11/1957.

1, 18,5 m, same coll., coastal creek 5 km before Sinnamary on the road Cayenne-St. Laurent, 5/11/1957.

9, about 25-29 mm (dry specimens), coll. Dr. Fernandes (Surinam Exp. Stahel), in the Lucie River, 1926.

Diagnosis: a perplexing species, so strongly resembling the type-species of *Hemigrammus* (*unilineatus*), that it would only merit a mention if not for the following differential characters: lateral line complete in specimens above 20 mm (genus *Moenkhausia*); reduced number of maxillary teeth (1-3) and of branched anal rays (22-25); slightly reduced scalation, different dorsal-position, etc.

Description (table III): same aspect as *Hemigrammus unilineatus*: greatest depth 2,46-3,06 (juv.), length of head 3,25-3,92 (adult) and depth of peduncle 9,2-10,7 in the standard length; eye 2,32-2,83, bony interorbital 2,82-3,35 (juv.), maxillary 3,0-3,42 and snout (measured in oblique) about 4,3-5,0 in the length of head; snout-to-dorsal 1,06-1,18 in dorsal-to-caudal; depth of body and interorbital width with a positive allometry, length of head with a negative one, with respect to the length of body. Dorsal ii9; anal iii or iv 22-25(i) (fig. 7), no visible hooks; scales in lateral line 31-33, rarely 34; lateral line complete in most specimens above 20 mm, somewhat "stuttering" (as Eigenmann expressed it: in this case only lacking a pore or two in the middle) in some of the smaller ones; transverse scales 5/4 or 4½ (once 6/4½); predorsal scales 9, circumpeduncular 14; teeth 4 or 5 (rarely 3), tricuspid, in outer premaxillary row, and 5 (rarely 6), quincuspid, in inner row; 2 or 3 (rarely 1) maxillary teeth (fig. 8), generally tricuspid; 4 quincuspid, frontal ones on dentary, followed on the sides by 7-11 much smaller ones; third suborbital leaving on cheek a relatively narrow naked zone all around; gill-rakers 7-8/11-12; caudal scaled up to its proximal half; beginning of anal-base covered by a short series

Table III. *Proportions and counts of* 11 *ex. of* Moenkhausia hemigrammoides

No. / Locality	ZMA 104.227 (Type) Sur.	2 Mana	3 Mar.	4 Sur.	5 Sur.	6 Sur.	7 Sur.	8 Mar.	9 Sur.	10 Sur.	11 Sinn.
Sd.lgth.	40,4	29,2	28,6	27,4	25,7	24,9	24,6	22,8	19,6	19,4	18,5
Sd.lgth./depth	2,46	2,75	2,55	2,71	2,82	2,80	2,83	2,81	3,06	3,03	2,93
Sd.lgth./head	3,92	3,79	3,48	3,71	3,62	3,56	3,56	3,25	3,44	3,40	3,25
Head/eye	2,74	2,66	2,83	2,32	2,45	2,50	2,47	2,50	2,38	2,59	2,28
Head/interorb.	2,82	2,85	3,04	2,96	3,23	3,34	3,29	3,04	3,0	3,35	3,0
Head/maxillary	3,25	3,21	3,42	3,08	3,09	3,18	3,0	3,04	3,0	3,35	3,16
Head/snout	4,33	—	4,3	4,35	4,44	4,67	4,93	4,13?	4,38	4,75	—
Sd.lgth./peduncle	9,2	9,7	9,5	9,8	10,3	10,4	10,7	10,3	10,3	10,2	9,7
Dors.-caud./snout-dors.	1,18	1,14	1,13	1,18	1,06	1,15	1,10	1,11	1,16	1,12	1,16
Br.anal rays	24	23	23	25	24	24	25	24	23	24	22
Longit.scales	23	34	33	31	32	33	32	33	33	—	—
Transv.scales	5/4½	6/4½	5/4	5/4½	5/4	5/4½	5/4	5/4	5/4	5/4	5/4
Predors.scales	9	9	9	8	9	9	9	9	9	—	9
Pmx.ext.teeth	4-4	3-4	3-4	4-4	4-4	5-4	4-4	3-4	5-5	4-4	3-3
Pmx.int.teeth	5	6	5	5	5	5	5	5	5	5	5
Mx.teeth	2-2	2-2	2-2	2-3	2-2	3-3	2-2	2-2	2-3	3-2	1-2
Dn.teeth	4+10	4+11	4+9	—	—	4+7	—	4+10	—	—	4+?
Gill-rakers	7/12	—	—	8/12	7/12	8/11	8/11	—	7/11	7/11	—

of scales; pectoral and ventrals of normal length, just reaching next fin, respectively.

Almost same pattern as *H. unilineatus*: a black distal spot on dorsal, (on second simple ray and on first to fourth branched rays, except on their tips); a black, oblique line beginning behind the anus and finishing on tip of third branched anal ray (instead of fourth one in *H. unilineatus*); no markings on tips of anal rays, nor on internal caudal rays (as in *H. unilineatus*); a faint longitudinal line on body, a scarcely visible, vertically elongate humeral spot (in formalin). In vivo, dorsal fin yellow above and below the black spot; adipose fin yellow; outer caudal rays red-brown; body olive-yellow.

Discussion: *Moenkhausia hemigrammoides* sp. nov. has been carefully compared with several samples of *Hemigrammus unilineatus* (to note that it is nowhere sympatric with it).

To compare the proportions, the *unilineatus* sample "Albina-hills" (see infra) was chosen, being in good condition; it is also close to *M. hemigrammoides*, geographically speaking. The relative length of the maxillary is significantly shorter in the new form, at the .01 level; the dorsal fin is significantly more for-

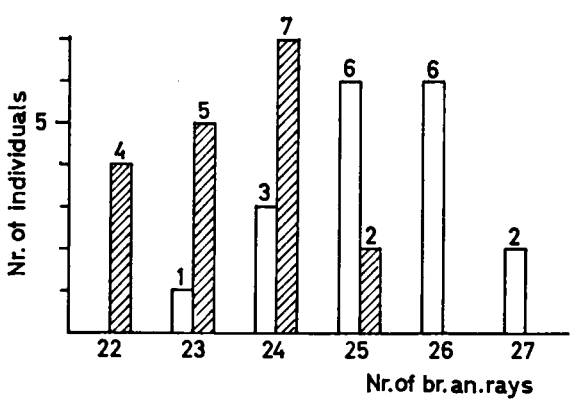

Fig. 7. *Histogramm of the distribution of the branched anal rays in 18 specimens of* Moenkhausia hemigrammoides *(crosshatched) and 18 specimens of* Hemigrammus unilineatus *(clear).*

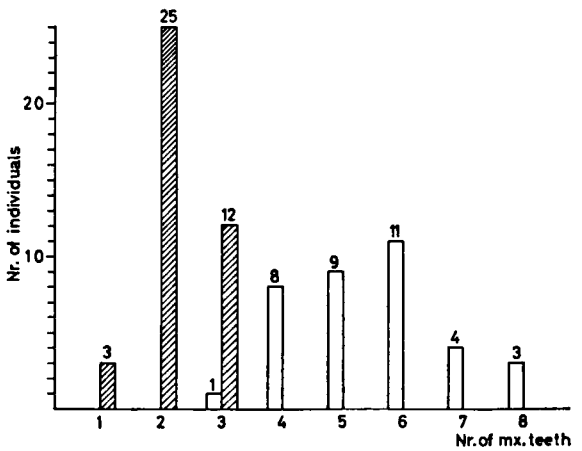

Fig. 8. *Histogramm of the distribution of the maxillary teeth (both sides) in 20 specimens of* Moenkhausia hemigrammoides *(crosshatched) and 18 specimens of* Hemigrammus unilineatus *(clear).*

ward in the new form at the .001 level (Wilcoxon test); *M. hemigrammoides* may also be somewhat less deep than *H. unilineatus*.

The meristics were compared with 18 ex. of *unilineatus* (see infra), using all available data for *M. hemigrammoides*, including the Lucie River individuals which were not reliable for proportions. The differences may be summarized in the following table:

	Hemigrammus unilineatus cayennensis	*Moen khausia hemigrammoides* sp. nov.
Pores of the lateral line	9-13 (generally 10-12)	all scales (ex. above 20 mm)
Longit. scales	33-34	31-33 (rarely 34)
Transv. scales	6/5-5½	5 (rarely 6)/4-4½
Predors. scales	10, rarely 9	9
Branched anal rays	23-27, mode 25 or 26	22-25, mode 24
Maxillary teeth	4-8 (once 3), mode 6	1-3, mode 2
Third suborb.	large naked area in front and behind	rather narrow area all around
Gill-rakers	7-9/12-14	7-8/11-12

Most of the above characters clearly overlap, except the number of lateral line scales, the number of transverse scales and, approximately, the number of maxillary teeth. In some of those characters, *M. hemigrammoides* seems closer to the nominal *H. unilineatus* than to its Guianean subspecies *H. unilineatus cayennensis*.

We are thus faced with a form which differs from *H. unilineatus cayennensis*: (a) at the subspecific level (scarcely at the specific one) by a number of characters, and (b) at the generic level by one character, the completeness of the lateral line. This creates a paradoxical problem which is not far from that of, for example, *Hyphessobrycon inconstans* versus *Astyanax ruberrimus*.

The validity of the genus *Moenkhausia* (established in 1903 by Eigenmann for *Tetragonopterus xinguensis*) may even be questioned, if the present form is considered as a mere variety of *H. unilineatus* (for which Gill established in 1858 the sub-genus *Hemigrammus*, now widely accepted as a "full" genus). That is to say that if the type-species of *Hemigrammus* may have a complete and constant lateral line in different, allopatric populations from Lucie, Cottica, Maroni, Mana and Sinnamary River basins, the genus *Moenkhausia* has no differential character to be based on; at least, I could find none.

Mutations, generally regressive, of the lateral line amongst Tetragonopterinae, have been discussed several times: for instance by EIGENMANN (1917: 45-46), BÖHLKE (1953), GERY (1964b), and most generally by PUMPHREY (1950). Many species do not have a "fixed" lateral line: these have been distributed into genera on a subjective basis. *Moenkhausia cotinho, australe* and *sanctaefilomenae*, as well as *Astyanax mutator, Phenacogaster beni* etc., are classified within genera "with complete lateral line", whereas *Hemigrammus barrigonae* and *gracilis*, as well as *Hyphessobrycon panamensis, inconstans, anisitzi, luetkeni, balbus* etc., within genera "with incomplete lateral line", depending on the ratio: number of specimens (or samples) with / number without, complete lateral line. Two genera at least (*Bryconacidnus* and *Microschemobrycon*) are known to have, rather constantly, an "almost complete" lateral line, lacking only a few pores on the caudal peduncle.

As the small Tetragonopterines are actually actively radiating, and as many neotenic forms have probably appeared, in different phylogenetic lines, since the late Tertiary, this situation is not surprising, if embarrassing from a practical point of view. It is supposed that the effectiveness of the lateral line is correlated with the length of the body: an evolutionary reduction in body size would be accompanied by all intermediate stages in the pores of the sides, rending impossible any classification based on such structure in such actively changing groups. This is also true for other "generic" characters, like caudal scalation (discussed for instance by BÖHLKE, 1935: 230, and 1958: 28) or the number of premaxillary teeth rows (discussed for instance by GERY & BOUTIÈRE, 1964). A great amount of generic character-overlap can be found in the Tetragonopterine groups under discussion, which have the greatest number of species of all Characids.

The taxonomic status of such a group will be provisional until: (1) another reliable character is found to separate *Hemigrammus* from *Moenkhausia* or from *Hyphessobrycon*, *Moenkhausia* from *Astyanax*, etc.; this remains problematic; (2) all species

are compared, without a priori accounting for their genera, in a numerical taxonomic study which would highlight major lines of evolution. This formidable task involves the comparison of no less than 60 verified characters in 200 or 300 species; it would be comparable, for instance, to the revision of all African barbs.

The stability of the nomenclature of Characids therefore demands that the form here described as *Moenkhausia hemigrammoides* be considered as generically distinct from *Hemigrammus unilineatus*, even though the latter is probably derived from it by regression. This is supported by the fact that the form is not restricted to a small area, but widely spread amongst several river-basins, as well as by the differential characters already pointed out above. Needless to say, this is a compromise.

(10) **Hemigrammus unilineatus cayennensis** Gery, 1959

8 ex., surr. Albina, coll. 21/8/1960.
11 ex., largest 32,4 mm, foot of Albina-hills, coll. 3/1962.

This subspecies was described from French Guiana; it differs mostly in the scales count from the nominal form: 6 above lateral line instead of 5, and about 9-18 perforated scales instead of about 5-8.

The above specimens have depth 2,38-2,83, head 3,48-3,75 and depth of peduncle 8,8-10,2 in the standard length; eye 2,45-2,84, interorbital 2,76-3,21, maxillary 2,87-3,14 and snout about 4,0-5,0 in the length of head; snout-to-dorsal 1,01-1,10 in dorsal-to-caudal; dorsal ii9, anal iii or iv 23-27(i) (fig. 7), with numerous, distal hooks in mature males (on last unbranched and first to third branched rays); scales 6/(9-13)33-34/5-5½, generally 10 in predorsal line; caudal scaled up to the proximal third, or half, of its lobes; 4-8 maxillary teeth, rarely 3 (fig. 8); gill-rakers 7-9/12-14.

(11) **Hemigrammus rodwayi** Durbin, 1909

51 ex., surr. Albina; coll. 8/8/1960.
34 ex., on the road to airport of Albina, and 54 ex., over camp Princess Margriet, also lower Maroni basin, coll. 3/1962.

(12) **Hemigrammus micropterus boesemani** Gery, 1959

5 ex., surr. Albina, coll. 21/8/1960.
1 ex., on the road to airport of Albina, and 1 ex., foot of Albina-hills, coll. 3/1962.
31 ex., Matoekasie creek at Weyne, coll. 3/1962.

These specimens have the caudal spot up to the tips of the middle caudal rays, as figured by BOESEMAN (1948), whereas the individuals from French Guiana have the caudal spot shorter, as figured by GERY (1959a).

The sibling species *rodwayi* and *micropterus* (at least the subspecies *boesemani*) have about the same meristics (anal iv 19-21(i), scales 30-32), same depth (about 3,2) and same, long maxillary as well as a large third suborbital. They may be distinguished as follows:

a. Caudal scaled up to the distal third of the lobes; generally 9 perforated scales, 13 lower gill-rakers and 2 or 3 maxillary teeth; base of anal *with a few chromatophores* ..... *rodwayi*
aa. Caudal scaled up to the proximal third of the lobes; generally 6 perforated scales, 11 lower gill-rakers and 1 maxillary tooth; base of anal with a dark band, consisting of *many chromatophores* in a series of parallel, transverse lines ..... *micropterus boesemani*

Differences in coloration may be seen in comparing two recently published color photographs by Dr. Axelrod (GERY, 1964c).

(13) **Hemigrammus lunatus** Durbin, in Eigenmann, 1918

2 ex., largest 30,2 mm, Paru Savannah, coll. 2/2/1961.

This species, apparently not yet reported from Surinam, has been recently redescribed and figured (GERY, 1964b: 9-10).

When freshly unpacked, the specimens were lemon-colored, mostly along a longitudinal band on body.

(14) **Hemigrammus ocellifer ocellifer** (Steindachner, 1882)

1 ex., Matoekasie creek at Weyne, coll. 3/1962.
3 ex., Paru Savannah, coll. 1-2/1961.

A well-known Guianean species, but till now considered as a typical coastal form in the Guinanas. The inland specimens (Paru Savannah) seem to have less branched anal rays (21-22).

(15) **Hyphessobrycon bellotti** (Steindachner, 1883)
(*Hemigrammus orthus* Durbin, 1909 ?)

4 ex., Mooi Wana creek, coll. 3/1962.
3 ex., largest 27,6 mm, Matoekasie creek at Weyne, coll. 3/1962.
32 ex., Mosten creek at Berlijn (Para River system), coll. 3/1962.

BOESEMAN (1953, 1954) identifies as *H. orthus* his material from Surinam, with a question mark. I have seen a number of specimens, including part of Boe-

seman's specimens, as well as topotypes of *H. bellotti* (upper Amazon, see GERY, 1963b and 1965a) and types of *H. orthus* (Essequibo and Potaro Rivers). There is apparently no essential difference between both species. The caudal scalation of *orthus*, which would be diagnostic for the genus *Hemigrammus*, is indeed scarcely visible; it has not the characteristic *small* scales along the border of the lobes, and it could well be considered as a *Hyphessobrycon*. The anal-base pattern of *orthus*, consisting of two unwedged lines, is the same as that of *bellotti*, although in the latter it was not described by Steindachner (see figure of *bellotti* in GERY, 1963b). Moreover the taxonomic characters (depth, scales, anal rays, teeth, etc.) are largely overlapping.

A formal synonymisation could only be valid after re-examination of the types of *bellotti*, and not only of "topotypes" which are without nomenclatorial value.

(16) **Hyphessobrycon rosaceus** Durbin, 1909
12 ex., juv., Paru Savannah, coll. 24/2/1961.

Reported from Sipaliwini River basin by GERY (1961).

(17) **Hyphessobrycon georgettae** Gery, 1961

(*Hyphessobrycon georgetti* -error- Gery, 1961).
15 ex., Type and paratypes, Paru Savannah, coll. feb. 24, 1961; ZMA 103.269.
Also several ex. (topotypes), in the ZMA.

(18) **cf. Deuterodon pinnatus** Eigenmann, 1909
13 ex., largest 39,6 mm, Paru Savannah, coll. 1/1961.

These specimens agree fairly well with topotypes of *D. pinnatus* from British Guiana, except that the profile is less typical, the mandibulary teeth narrower, the peduncle somewhat higher, and the pinnate black markings much less conspicuous (depending on the preservation?). EIGENMANN (1909: 26) had already mentioned the polymorphism of the species.

Once recorded from Surinam (BOESEMAN, 1952).

(19) **Creatochanes melanurus** (Bloch, 1795)
3 ex., largest 33,7 mm (juv.), Paru Savannah, coll. 1/1961.

(20) **Creatochanes affinis** Günther, 1864
2 ex., largest 52 mm, surr. Albina, coll. 21/8/1960 and 1, over camp Princess Margriet, coll. 3/1962.
1 ex., at Weyne, coll. 3/1962.
3 ex., largest 40,6 mm, Paru Savannah, coll. 1-2/1961 [4].

These two sympatric species of *Creatochanes* have the same meristics, and their young would be indistinguishable, if not for some differences in caudal-pattern: both lobes black in *affinis*, a black band on lower rays of upper lobe in *melanurus*.

As EIGENMANN's (1912) and EIGENMANN & MYERS' (1929) keys and figures are not quite consistent with each other, the following key may help to identify adults (90-140 mm) of the three Guianean species:

a. Maxillary reaching to the suture between 2nd and 3rd suborbital, or to a vertical through middle of pupil; 7 or 8 scales above lateral line; anal iv 23-27
  b. Head more than 4 in the sd.lgth.; depth generally less than 3,5 in the sd.lgth.; pectorals short, not reaching ventrals; caudal generally yellow, with black on both lobes ..... *affinis* Günther, 1864
  bb. Head less than 4 in the sd.lgth.; depth generally more than 3,5 in the sd.lgth.; pectorals reaching ventrals; caudal with a red upper lobe, underlined by a black band; lower lobe plain
..... *melanurus* (Bloch, 1795), type-species
aa. Maxillary not reaching to the suture between 2nd and 3rd suborbital, or not quite to a vertical through front of pupil; 6 scales above lateral line, rarely 7; anal generally iv 27-31 (head more than 4 and depth more than 3,5 in the sd.lgth.; pectorals not reaching ventrals; caudal with a red spot on upper lobe, surrounded by a black area not reaching tip of rays)
..... *caudomaculatus* Günther, 1864

PRISTELLIDI

(21) **Pristella riddlei** (Meek, 1907)
1 ex., 26,5 mm, trenches along road to airport of Albina, coll. 3/1962.
13 ex., largest 25,8 mm, foot of Albina-hills, coll. 6/3/1962.
15 ex., over camp Princess Margriet, also Maroni system, coll. 3/1962.
5 ex., Matoekasie creek at Weyne, coll. 3/1962.

Already recorded from Surinam (BOESEMAN, 1952, 1954 and 1956).

STETHAPRIONIDI

This small tribe of the Tetragonopterinae, which is linked with *Moenkhausia* and *Gymnocorymbus*, on the one side, and the Serrasalminae on the other side, is characterized by a discoid body and the possession of a predorsal spine. The three parallel genera may be recognized as follows:

a. Predorsal spine long, pointed forwards
..... *Stethaprion*
aa. Predorsal spine short
  b. Predorsal spine pointed forwards and backwards, some preanal spines present ..... *Brachychalcinus*

[4] Two had the dorsal and caudal fins bright red, with some additionnal red on base of anal and adipose. A similar, unusual coloration was mentioned by Eigenmann (1912: 345) in specimens from the Ireng.

bb. Predorsal spine blunt, hooked forwards, no preanal spines ..... *Poptella*[5]

(22) **Poptella orbicularis** (Valenciennes in Cuv. & Val., 1848)

10 ex., 39,6-50,7 mm, Rikanau (Cottica River ?), coll. 4/9/1960 (No. 4).
2 ex., Matoekasie creek at Weyne, and 2 ex., Mosten creek at Berlijn, coll. 3/1962 (not biometrically studied).
4 ex., 37,9-60 mm, Paru Savannah, coll. 1/1961, and 2 ex. (juv.), Coeroni River (side creek, 8 km from the Lucie River) coll. 18/8/1959 (No. 8).

I have also studied various samples as follows:
1, upper Rio Meta, Colombia (No. 1).
3, Potaro River, British Guiana (No. 2).
1, Republiek, Surinam (No. 3).
7, Cottica River, Surinam (No. 4).
6, Surinam (unknown locality, No. 9).
6, Litany, upper Maroni basin (No. 10).
5, Mana River, French Guiana (No. 7).
13, Sinnamary River, French Guiana (No. 5)
3, surr. of Cayenne, French Guiana (No. 6).

Study of the meristics permits the recognition of two general "populations":

(1) A number of specimens (Nos. 1 to 7) have 12-14 gill-rakers on the lower arch (rarely 15), and generally 7-8/7-8 (occasionnally 8/9 or 9/9) transverse scales.

(2) Other, smaller specimens from samples 8 and 9 have 15-17 gill-rakers and 9-10/9-10 transverse scales, together with 31-34 branched anal rays and 36-38 lateral line scales (instead of 34-37 in the former ones). Some specimens have filamentous first dorsal and anal branched rays; all have probably a slightly smaller head (3,65-3,62 in the standard length), and a deeper body with a positive allometry for the depth ($\alpha\#$ 1,3).

These populations may represent what is actually known as *P. orbicularis*, loc. typ. Essequibo River in British Guiana, and *P. longipinnis* (Popta, 1901), loc. typ. Nickerie River, probably near the mouth of the Courantyne River, Surinam, respectively. Some characters clearly overlap. Moreover, the form of the predorsal spine, used by Fraser-Brunner to separate *orbicularis* from *longipinnis*, does not seem to be a reliable character. In the same sample, the spine may be more or less elongate, with the hooks directed backwards or more or less downwards, apparently at random (but perhaps in correlation with age). One abnormal specimen from the Cottica system has even a very short "spine", approaching the structure found in *Moenkhausia bondi*, where only, as in the other Tetragonopterine, a small remnant is to be seen after dissection.

(3) Finally the sample 10, from the Litany, has intermediate characters, with 12-15 gill-rakers, 8-9/35-36/8-9 scales and partly filamentous rays, as if the specimens were hybrids of the two forms.

For the present it is wise to consider *orbicularis* and *longipinnis* as geographical subspecies whose pattern of distribution (clearly in checkboard) is shown in fig. 9.

Returning to the first samples (*Poptella orbicularis orbicularis*), they may be split into still smaller "populations" which are probably geographical races:

(a) The specimen from upper Rio Meta in Colombia has dorsal Iii9 and anal iv 28(i): it is distinct from all others, and more specimens of this interesting form are awaited.

(b) 4 specimens from the lower Mana in French Guiana are characterized by dorsal Iii 11, anal iv 30-34(i), a relatively deep body (1,48-1,68 in the sd. lgth.) and a small head (3,65-3,82 in the sd. lgth.), accounting for the allometries (fig. 10).

(c) The British Guiana, Surinam and, in part, French Guiana representatives of subspecies *orbicularis* have dorsal Iii 10 and anal iii or iv 30-32(i) (rarely 29 or 33); the growth of the head shows in the diagram (fig. 10) a negative allometry (α less than 0,8), whereas the study of the relative growth of the depth (same fig.) reveals a polymorphism (likely ecophenotypic, in part): typical specimens, those from Potaro River (nearest the typical locality) and Sinnamary, are almost isometric (α 1,0 to 1,1); those from Rikanau, and perhaps Cayenne, have a positive allometry, with $\alpha\#$ 1,2; this is correlated with a deeper body in the latter ones (1,51-1,73 instead of 1,68-1,87) as can be seen in the diagram. The *longipinnis* samples (fig. 11), including the intermediary specimens from Litany, are less polymorphic, concerning the allometries; the head (below) is more negatively allometric, and the depth more positively allometric.

This is suggestive of a relatively high variability, whose causes could only be revealed by factor analysis of larger samples.

The following key would resume what can be extracted from the samples at hand:

a. Gill-rakers 12-14 (rarely 15); size up to 92 mm; scales generally 7 or 8/34-37/7-8 (rarely 9 above or below

[5] *Poptella* has priority over *Ephippicharax:* see synonymy in GERY, 1964b: 21.

The endemic species of the Rio San Francisco *Ephippicharax franciscoensis* Eigenmann was said to have the body-shape of a *Poptella*, together with a pointed spine. A recent examination of the types has convinced me that it belongs to *Brachychalcinus*.

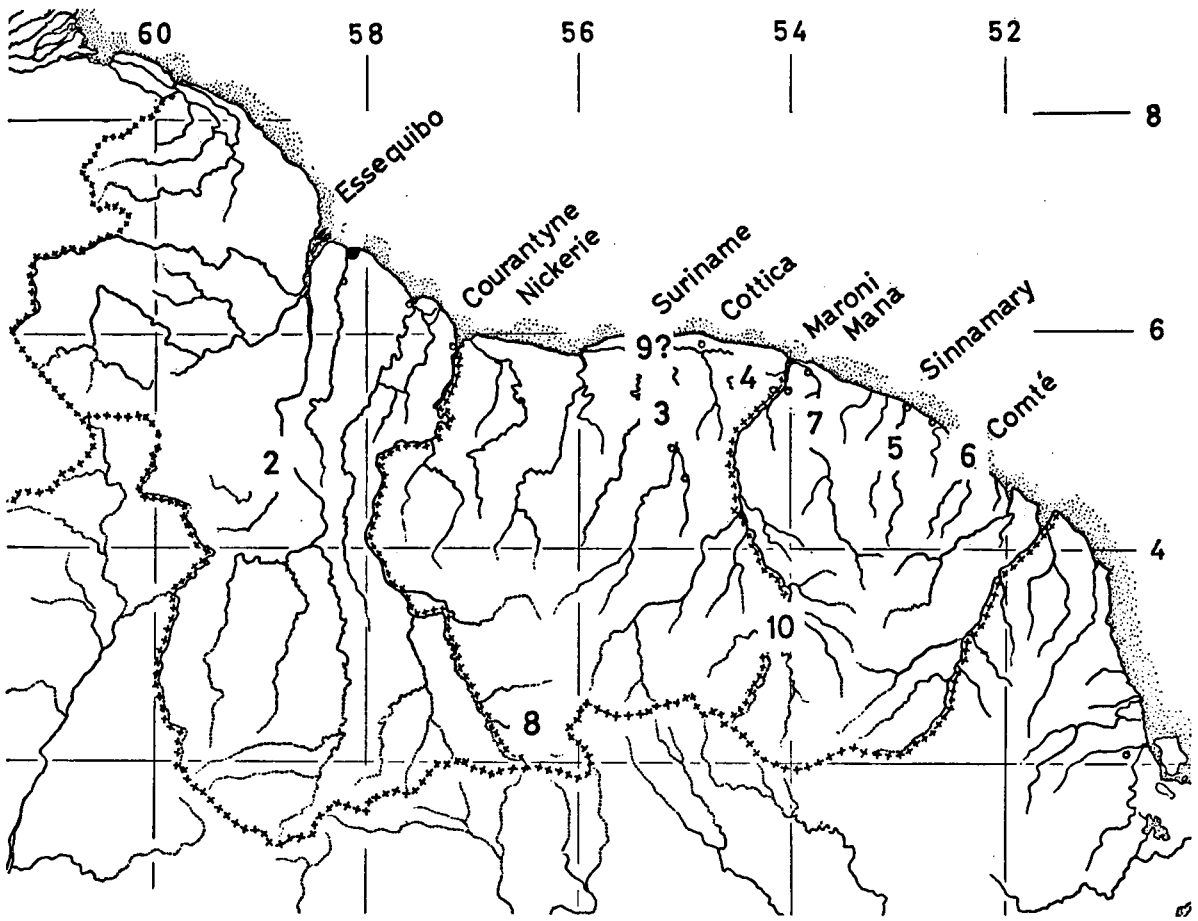

Fig. 9. *Distribution-pattern of the* Poptella orbicularis *populations in the Guianas; No. 1 to 7 concern* P. orbicularis orbicularis *(Val.), No. 8 and 9 concern* P. orbicularis longipinnis *(Popta); No. 10 is intermediate (see text for localities).*

lateral line) ..... *P. orbicularis orbicularis*

b. Dorsal I ii 9; anal iv 28(i)
..... Pop. from Colombia?

bb. Br. D. rays more than 9; br. A. rays more than 28 (Pop. from Guiana)

c. Dorsal I ii 10; anal iii or iv 30-32(i), rarely 29 or 33; head 3,09(juv.)-3,96

d. Depth almost isometric, at least in last stages; about 1,65 in full-grown specimens
..... "Typical" populations from Potaro River and Sinnamary

dd. Depth with a positive allometry, about 1,5 in adults, but sometimes more
..... Pop. from Cottica River and ? Cayenne

cc. Dorsal I ii 11; anal iv 30-34(i); body rather deep (1,48-1,68), with a relatively small head (3,65-3,82)
.... "Pop." from Mana River

aa. Gill-rakers generally 15-17; size up to 60 mm (?); scales more often 9 or 10/36-38/9 or 10 (dorsal I ii 9-11, more frequently 10; anal iv 31-34(i); depth with a positive allometry; head rather short, 3,65-3,82; dorsal and anal often filamentous) ..... *P. orbicularis longipinnis,* lower and upper Courantyne River, Maroni ???, and, probably, some locality(ies) on the coast of Guiana [6]

(23) **Brachychalcinus guianensis** Boeseman, 1952 (fig. 12, Pl. I)

7 ex., largest 43 mm, Paru Savannah, coll. 25/1-6/2/1961.

This interesting species was not figured by Boeseman. Depth 1,39-1,51 in the standard length (half-grown specimens); there is a positive allometry for the ratio sd. lgth./greatest depth, but apparently less

[6] Based on the above mentionned samples, as well as on reexamination by J. J. Hoedeman (Ms., pers. comm.) of 8 types of *Tetragonopterus longipinnis* Popta. The intriguing sample from upper Maroni, being intermediate, is not included in the key.

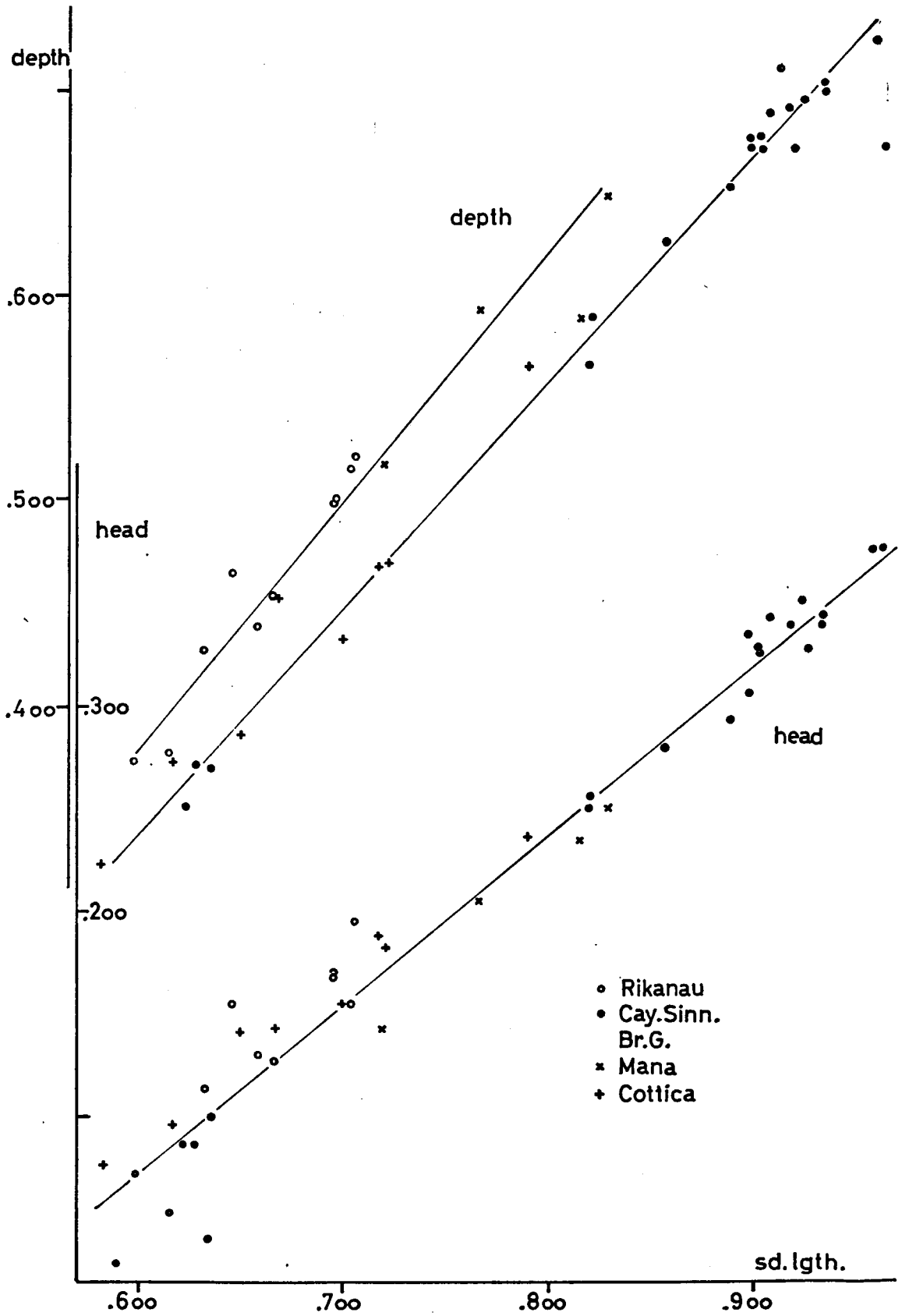

Fig. 10. Poptella orbicularis orbicularis: *largest depth (above) and length of head plotted against standard length; logarithmic coordinates. Regression lines for the depth allow two groups of samples to be distinguished (see text).*

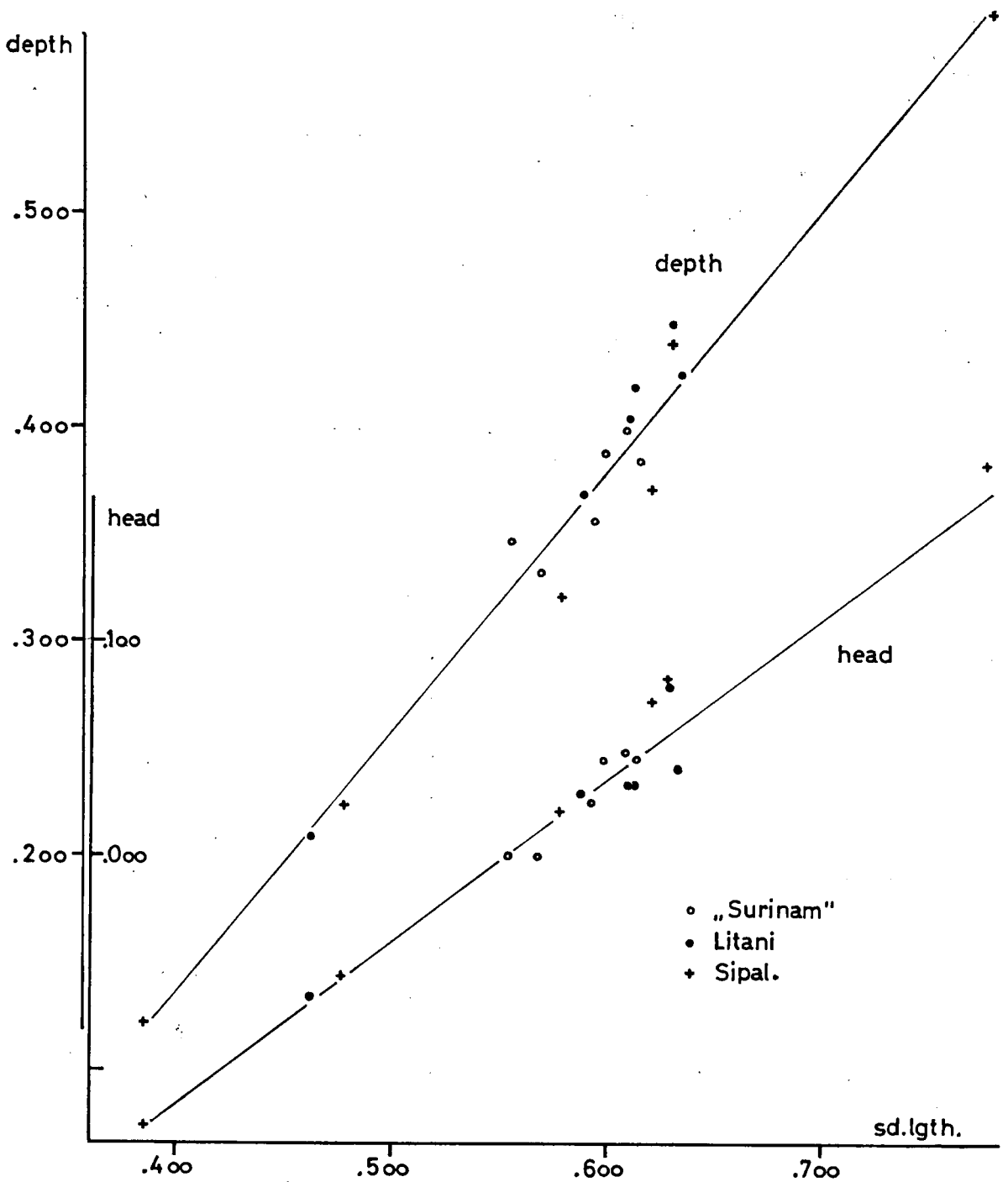

Fig. 11. Poptella orbicularis longipinnis: *same coordinates as in fig. 10.*

than that suggested in the first description. Altogether, as this ratio is one of the characters proposed by BÖHLKE (1958) to separate his species *nummus* from *guianensis*, it must be used with care, especially if the individuals under comparison are not of the same length.

The second character, i.e. the number of transverse scales (correlated with the first one in most characid species), is more reliable because it does not vary with age; the present specimens, smaller than the types, have 23-26 tr. scales, mean 25 ± 0,42, which is approximately the same number as that given by Böhlke for the types of *guianensis*, whereas *nummus* is said to have 18-22 tr. scales.

SERRASALMINAE

(24) **Myleus (Myleus) pacu** (Schomburgk, 1841)

7 ex., largest 34,5 mm (juv.), Paru Savannah, coll. 25/1-6/2/1961

(25) **Myleus rhomboidalis** (Cuvier, 1818)

19 ex., largest 33,8 mm (juv.), Paru Savannah, Coll. 6/2/1961.

The species would be the type of a subgenus characterized by its teeth.

(26) **Myleus (Paramyloplus) sp.**

1 ex., 32,9 mm (juv.), Paru Savannah, coll. 25/1-6/2/1961, ZMA 104286.

This specimen probably belongs to a new species close to *M. ternetzi* (Norman).

(27) **Metynnis altidorsalis** Ahl, 1924 (fig. 13, Pl. 1)

1 ex. (juv.), Rikanau (Cottica River?), coll. 4/9/1960.

Formerly recorded from Surinam by BOESEMAN (1953 and 1956) under the name *M. maculatus*, which is synonymous.

CHARACINAE

(28) **Acestrorhynchus falcatus falcatus** (Bloch, 1794)

1 ex., 51,5 mm (juv.), Mosten creek at Berlijn, coll. 3/1962.

CHARACIDIINAE

(29) **Jobertina eleotrioides** Gery, 1960b

1 ex., about 20 mm, Brownsweg, coll. 10/11/1960.

Formerly known from French Guiana.

GASTEROPELECINAE

(30) **Gasteropelecus sternicla** (Linné, 1758)

3 ex., largest about 41 mm, Albina, coll. 7/8/1960.

50 ex., largest about 45 mm, Rikanau (Cottica River?), coll. 4/9/1960.

5 ex., largest about 42 mm, surr. of Moengo, Cottica River, coll. 2/1962.

6 ex., Mosten creek at Berlijn, coll. 3/1962.

A study of some Guianean samples (GERY, 1960a) revealed the existence of four probable populations;

(1) Topotypical populations from Paramaribo

(2) Population from Demerara (British Guiana)

(3) Coastal form from French Guiana.

These three forms have a relatively elongated body; the anal count varies from 30,12 (mean) in Paramaribo, to 31,5 (mean) on the coast of French Guiana.

(4) Middle Maroni population; it has a deep body with great coracoid expansion.

The 50 specimens from Rikanau range from 27,3 mm to 44,9 mm in standard length: it is a "good" sample from the biometrician's point of view. As regards the depth of the body, the individuals are

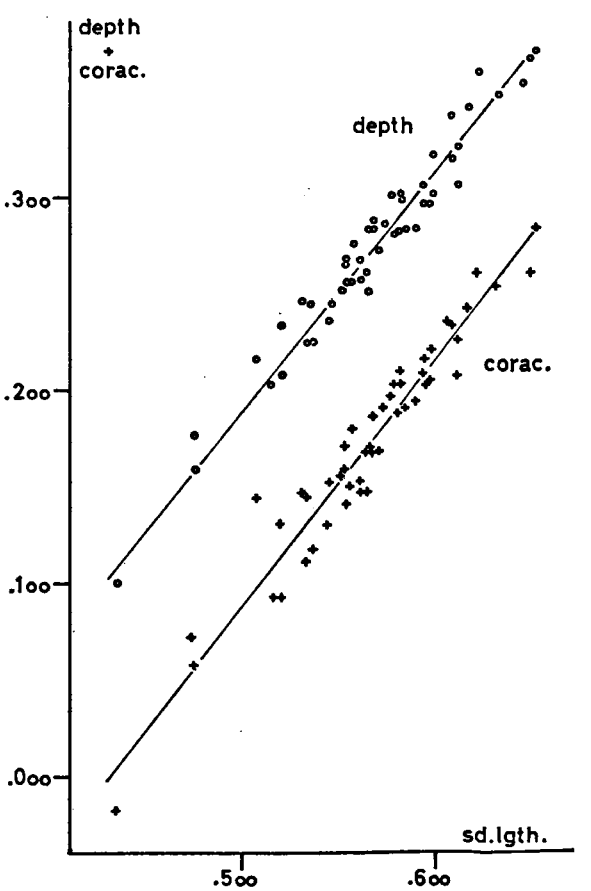

Fig. 14. Gasteropelecus sternicla: *Depth (above) and coracoid-radius plotted against standard length; logarithmic coordinates.*

somewhat intermediate between the coastal populations and the middle Maroni population Nr. 4.

But a study of the relative growth of the depth, as well as coracoid radius, plotted against standard length (fig. 14) reveals a positive allometry, whose constant is approximately 1,25, as computed by Bartlett's simplified method. Consequently the larger specimens are comparatively deeper than the smaller ones, which suggests that care is needed in comparing samples of individuals of unequal size. In the present case, the whole sample has an average depth of 509,8 ± 2,0; the 13 ex. above 38 mm have an average depth of 522,8 ± 4,5, closest to that of the Maroni form; whereas the smaller ex., under 38 mm, have an average depth of 505,2 ± 2,5, close to that of the coastal forms. The latter confirms, and even reinforces, the conclusion of 1960, namely that it is statistically impossible to recognize any subspecies in *G. sternicla,* at least in the Guianas. There is apparently a cline in the relative depth, from coast to inland (fig. 15).

(31) **Carnegiella strigata** (Günther, 1864), *vesca* type

1 ex., about 28 mm, Albina, coll. 7/8/1960.
15 ex., largest about 33 mm, Rikanau, coll. 4/9/1960.
7 ex., largest about 36 mm, surr. of Moengo, coll. 2/1962.
9 ex., largest about 37 mm, Mosten creek at Berlijn, coll. 3/1962.
(also 38 ex., largest about 30 mm, Coropina creek at Republiek, coll. Mr. J. v. d. Kamp, 10/1956).

All Guianean populations of *Carnegiella strigata,* including the above specimens, have the pattern known as *C. vesca* Fraser-Brunner, i.e. with the third thoracic brown band clearly split. For reasons which

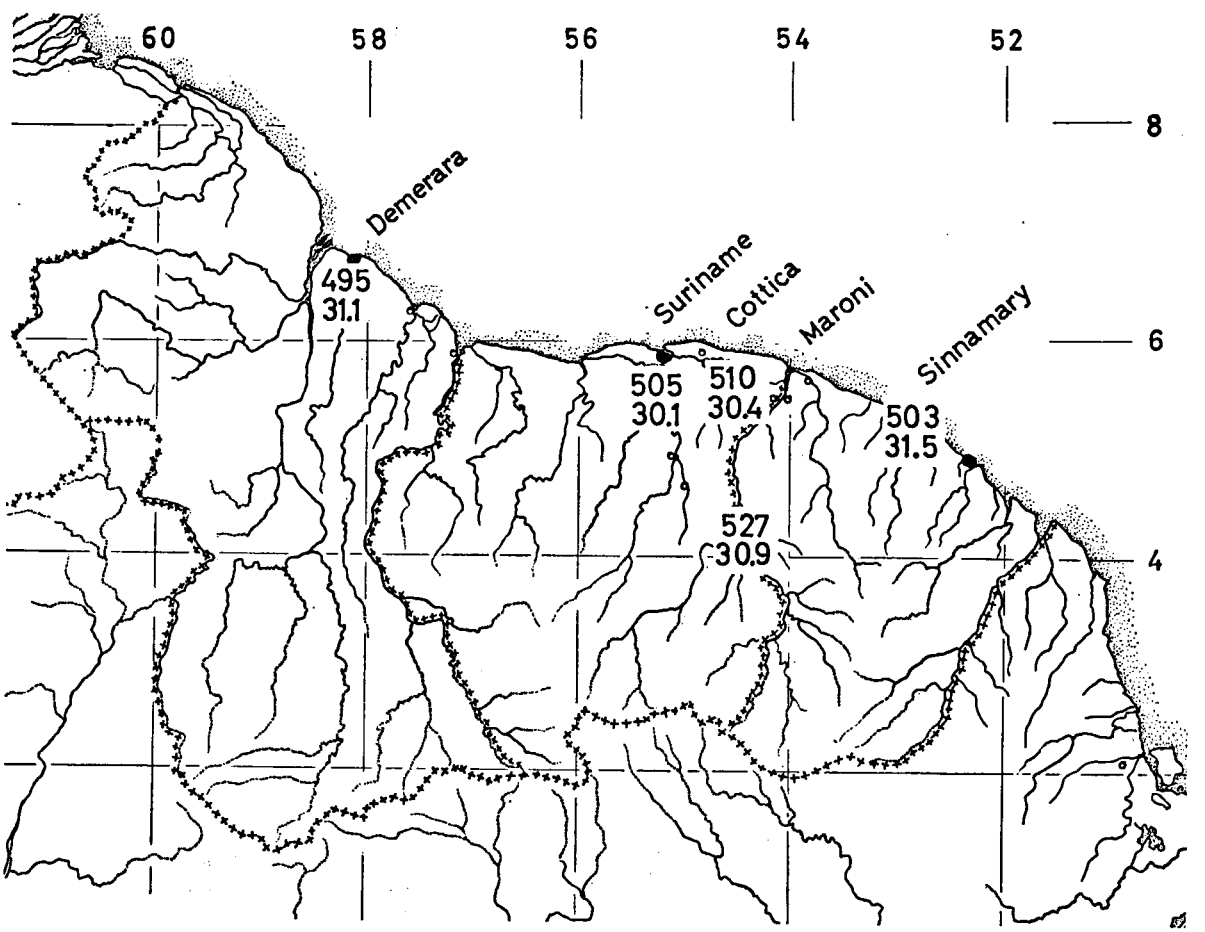

Fig. 15. Gasteropelecus sternicla: *Depth (‰ standard length) and number of branched anal rays from five samples obtained in the Guianas. For each locality the average depth for the sample is given above and the average number of anal rays, below.*

will be given in another paper, there is a strong probability that *C. strigata* is a polymorphic species, and that the name *vesca* is not valid.

The 38 ex. from Republiek have been biometrically studied, supplemented by 16 ex. from Albina (1) and Rikanau (15); they constitute a homogeneous sample. Important characters are as follows:
(a) 29-31 scales along a longitudinal line, from opercular upper angle to end of peduncle.
(b) Total anal rays (53 ex. only): 25: 3 ex.; 26: 2 ex.; 27: 21 ex.; 28: 22 ex.; 29: 5 ex.; mean 27,45 ± 0,13.
(c) % depth in the standard length: 473,5 ± 1,97, range 420-507 %.
(d) Coracoid radius in the standard length (x 100): 261,88 ± 1,93, range 243-292; the mean-ratio corac./depth is about 1,24.

There is a slight positive allometry in the depth, as well as in the coracoid-radius, with regard to the standard length (fig. 16). As computed by the simplified Bartlett's method, on logarithms, the constant a is approximately 1,14.

HOEDEMAN's subspecies *marowini* and *surinamensis* (1952), from "Maroni River" and Suriname River respectively, do not agree with the so-called 75% rule for subspecies in their alledged differential characters, i.e. anal rays count, median and predorsal scales count, depth of body and length of head, mandibular teeth etc. All data very largely overlap. It was found impossible to refer the above cited samples to either subspecies. But the Surinam sample *as a whole* differs significantly from a similar sample of 44 specimens from Demerara, at least in the depth of the body (see GERY, 1965b).

CRENUCHIDAE

(32) **Crenuchus spilurus** Günther, 1864

12 ex., Mooi Wana, coll. 3/1962.

A well-known Guianean species, which is remarkable in having a paired sense organ on top of the head, included into frontal foramina (GERY, 1963a).

ERYTHRINIDAE

ERYTHRININAE

(33) **Hoplias malabaricus** (Bloch, 1794)

1 ex., 47 mm (juv.), Brownscreek, coll. 6/11/1960.

(34) **Erythrinus erythrinus** (Schneider, 1801)

1 ex., 110 mm, Mooi Wana, coll. 3/1962.

LEBIASININAE

PYRRHULINIDI

(35) **Pyrrhulina filamentosa** Valenciennes in Cuv. & Val., 1846

29 ex., largest 66,1 mm, Brownsweg, coll. 23/10/ and 10/11/1960.
8 ex., largest, 46,5 mm, Mooi Wana, coll. 3/1962.
6 ex., largest 45 mm, foot of Albina-hills, coll. 6/3/1962.
8 ex., largest 59,3 mm, surr. of Albina, coll. 21/8/1960.
1 ex., 50 mm, Rikanau, coll. 4/9/1960.

(36) **Copella carsevennensis** (Regan, 1912)

51 ex., largest 40,8 mm, Mooi Wana, coll. 3/1962.
60 ex., largest 33,4 mm, foot of Albina-hills, coll. 3/1962.

A revision of the Pyrrhulinids from the Guianas will be published elsewhere.

NANNOSTOMIDI

(37) **Nannostomus beckfordi beckfordi** Günther, 1872

2 ex., 13 and 29 mm, Mooi Wana, coll. 3/1962.
1 ex., 13 mm, Matoekasie creek at Weyne, coll. 3/1962.
1 ex., 12 mm, Mosten creek at Berlijn, coll. 24/3/1962.

(38) **Nannostomus marginatus** Eigenmann, 1909

183 ex., about 20-23 mm, surr. of Moengo, coll. 2/1962.
Two well-known Guianean species.

HEMIODINAE

HEMIODIDI

(39) **Hemiodopsis sp.** (fig. 17, Pl. II)

1 ex., 48.3 mm in standard length, coll. Mr. H. P. Pijpers in an innominate creek in the Paru Savannah, Sipaliwini River basin, jan. 25, 1961; ZMA 104.280.

Diagnosis: depth 3,75 and head 3,87 in the standard length; eye 3,47, bony interorbital 3,38 and snout 3,21 in the length of head; snout-to-dorsal 1,185 in dorsal-to-caudal; ventral fins just under median dorsal rays; depth of peduncle 1,39 in its length; dorsal (i)ii9(i), anal iii 8 or 9, the sixth branched ray being split up to its base; pectorals i 19; ventrals (i)i 9i; scales 24-25/96-100/17-18; teeth 26 (total); pattern as in the other species of the *microlepis*-group (*Hemiodopsis* nominal), i.e. with a rather large, round ocellus at the 54th to 62nd scales of the lateral line, followed by a narrow, black longitudinal band, which spreads up on the internal rays of the lower caudal lobe.

Description: relatively compressed, not very elongate, laterally spindle-shaped; head rather short, the snout scarcely longer than the eye; adipose eyelid moderate, uncovering almost all pupil; teeth with 7

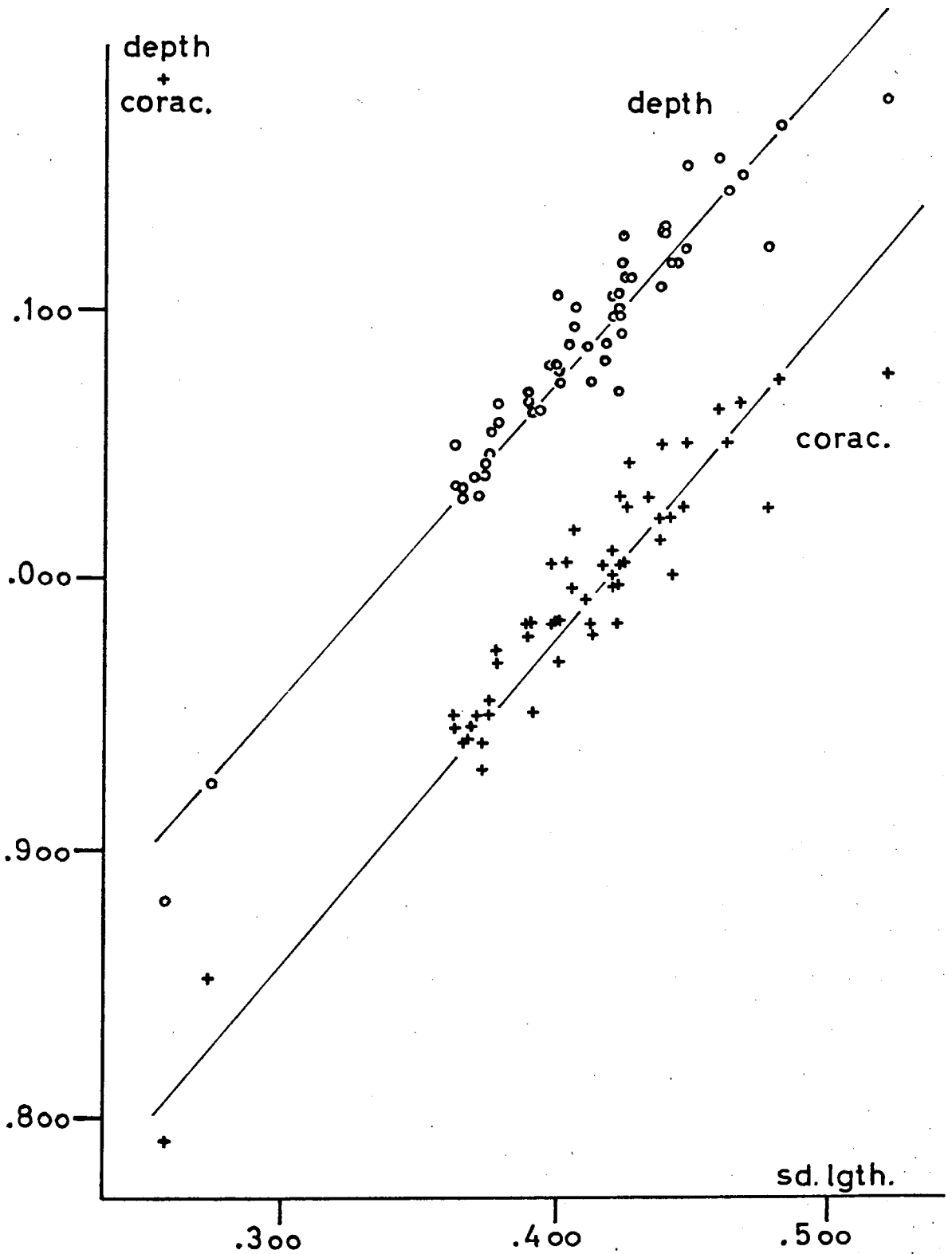

Fig. 16. Carnegiella strigata: *depth (above) and coracoid-radius plotted against standard length; logarithmic coordinates.*

or 8 cusps, regularly parallel with the curve of the premaxillary; four branchiostegials; lower gill-rakers 25, tapering, not bifurcated; dorsal scarcely longer than the head, not reaching adipose fin, when folded along the body; pectorals and ventrals short; scales small, cycloid, about 28 around peduncle, 26 along paramedian predorsal line (the predorsal itself irregularly scaled, and feebly keeled); the scales of the flanks are relatively large just behind operculum, then smaller along the lateral line, then again larger on peduncle; transversely, the ratio in height between the dorsal scales and the abdominal ones does not exceed 1,4. Pattern described above; in life, dorsal, upper caudal lobe and anal base, pink (the colour was noted at the moment of the transfer from formalin to alcohol).

Discussion: the small-scaled species of the subgenus *Hemiodopsis* nominal, which have 90-130 scales in lateral line, and which are probably derived from each other, may be enumerated as follows (for bibliography, see FOWLER, 1950):

(1) *Hemiodopsis microlepis* (Kner); it is characterized by a rather elongate body (depth about 4 in the sd. lgth.), scales 24-25/110-115/14-15, and teeth 30 or 32 (total). Besides Kner's types (in part, restricted to Rio Guaporé), some specimens of Cope ("between Manaus and Peruvian Amazon"), Ulrey (those referred to "Braret", inc. loc.), and probably the Paraguay Basin specimens reported by Boulenger and Bertoni, belong to this form. I have seen three examplars in the Hamburg Museum (Nr 1577, coll. W. Scholtz, 1909, Manaus upstream) which correspond well to this species.

(2) *Hemiodopsis argenteus* (Pellegrin); this form has a less elongate body (depth about 3,5-3,8 in the sd. lgth.), scales 30-32/120-130/18-19, and teeth about 40 (total). As a working hypothesis, I would refer to it, besides the types (Orinoco), Kner's specimens from the Rio Negro, Cope's examples from Peru and Fowler's from Contamana; very likely, specimens referred to by Starks and by Ulrey (those labeled "Brazil") also belong to this species, which could perhaps be restricted to upper Amazon and all parts of South-America north of the Amazon.

(3) A third form, still undescribed, has a much more compact, higher body (depth about 3,0-3,2 in the sd. lgth.), with more scales under lateral line (which is evidently correlated—scales 27-28/112/21-23), but the same teeth-count as that of *microlepis*. I have seen a big specimen from Rio Yacuma, Rio Mamoré basin (Bolivia), and a second one from an uncertain locality. It is apparently sympatric with *microlepis*.

(4) Finally the present form, judging from the preceeding short review, stands rather apart from the group, having only 96-100 longitudinal scales and 26 teeth (total). Even if Fowler described *Hemiodopsis* with "at least 100 or more (scales in lateral count)", it would nevertheless belong to it: all other known Hemiodin species have less than 83 lateral line scales. Just as the present paper was going to press, I had the opportunity to study several more specimens which belong to the same species. Its formal description will appear later on.

PARODONTIDI

(40) **Parodon guyanensis** Gery, 1959

2 ex., larger 72 mm, Paru Savannah, coll. 25/1-6/2/1961.

Formerly known from French Guiana (upper Mana River).

The larger specimen is larger than the type; otherwise they do not differ from the typical specimens.

CHILODINAE

(41) **Chilodus punctatus punctatus** Müller & Troschel, 1844

5 ex., largest 39,7 mm, Rikanau, coll. 4/9/1960.
4 ex. (juv.), surr. of Moengo, coll. 2/1962.
12 ex. (juv.), over camp "Princess Margriet", coll. 3/1962.

See GERY (1964a) for a review of the Chilodinae. Freshly preserved specimens had the following coloration: dorsal, adipose fin and caudal-lobes orange-red; pectorals and ventrals orange-yellow; snout and eye wine-coloured.

ANOSTOMIDAE

(42) **Leporinus (Leporinus) friderici friderici** (Bloch, 1794)

1 ex., 74 mm, surr. of Albina, coll. 7/8/1960.

One of the oldest-known Surinam species.

(43) **Leporinus (Leporinus) maculatus** Müller & Troschel, 1844

1 ex., 95,2 mm, Rikanau, coll. 4/9/1960.

A well-known Guianean form.

(44) **Leporinus (Leporinus) arcus** Eigenmann, 1912

1 ex., 141 mm, Cottica River (locality not stated), coll. 11/1961.

Once recorded from Surinam in aquarium literature (J. J. Hoedeman); recently reviewed and compared with *striatus*, a close species (GERY, 1964c).

Table IV. *Proportions and counts of* 11 *ex. of* Curimatus (Hemicurimata) esperanzae pijpersi *(40,7-32 mm in standard length)*

No.	ZMA 104.283 (Type)	2	3	4	5	6	7	8	9	10	11
Sd.lgth.	40,7	38,3	36,6	36,1	35,6	35,5	34,2	33,8	32,6	32,2	32,0
Sd.lgth./depth	2,61	2,52	2,63	2,65	2,64	2,61	2,77	2,72	2,65	2,80	2,78
Sd.lgth./head	3,36	3,30	3,24	3,26	3,24	3,41	3,35	3,10	3,36	3,25	3,33
Head/eye	3,36	3,22	3,14	3,26	3,14	3,15	3,40	3,52	3,24	3,20	3,20
Head/interorb.	2,63	2,76	2,75	3,00	2,68	2,74	2,62	2,95	2,85	2,92	2,91
Head/snout	2,75	3,22	3,42	3,47	3,44	3,59	3,40	3,89	3,34	3,81	3,43
Sd.lgth./ped.	7,40	7,81	7,47	7,67	7,90	7,89	8,14	7,68	7,40	8,04	7,80
Dors.-caud./snout-dors.	1,14	1,15	1,14	1,22	1,11	1,13	1,21	1,13	1,16	1,14	1,17
Long.scales	34	35	33	34	33	33	35	33	34	34	34
Pores lat.line	16	16	14	15	9	10	10	8	9	8	10

CURIMATIDAE

(45) **Curimatella alburna alburna** (Müller & Troschel, 1844)

1 ex., 54,7 mm, surr. Albina, coll. 21/8/1960.

Recorded from Surinam by Eigenmann, by Fowler, and by Boeseman (1952, 1953, 1956).

(46) **Curimatus (Cyphocharax) spilurus spilurus** Günther, 1864

2 ex., larger 36,5 mm (juv.), Rikanau, coll. 4/9/1960.

Depth 2,9-3,0 and head 2,2-2,4 in the standard length; mouth sub-inferior; predorsal scarcely keeled; caudal spot as large as pupil's diameter; scales 5/33 or 34/5, those of the posterior half of the lateral line with a furrow rather than with a tube, and a bilobed apical border, thus grading into the dubious subgenus *Hemicurimata* (see discussion concerning next species).

(47) **Curimatus (Hemicurimata) esperanzae pijpersi** ssp. nov. (fig. 18, Pl. 2)

Holotype: ♂ (?), 40,7 mm in standard length, coll. by Mr. H. P. Pijpers jan. 25, 1961 in the "Vier Gebroeders Creek", Paru Savannah, Sipaliwini River basin; ZMA 104.283.
Paratypes: 12 ex., 28,7-38,3 mm, collected with the type 4 ex., 28,8-32,6 mm, coll. 7/2/1961, in a nearby creek.

Diagnosis and description (Table IV): depth 2,52-2,90, head 3,10-3,41 and depth of peduncle 7,40-8,37 in the standard length; eye 3,0-3,52, bony interorbital 2,62-3,0 and snout (measured in oblique) 2,75-4,33 in the length of head; snout-to-dorsal 1,12-1,22 in dorsal-to-caudal; dorsal iii 8(i)-9(i); anal iii 7(i); pectorals i 13; ventrals (i)i 7i; longitudinal scales 33-35, cycloid, only the first 8th-16th with a well developed tube, the other ones bilobed; transverse scales 5½/5; predorsal scales 9-9½, the predorsal region rather flat behind the head; circumpeduncular scales 16; mouth terminal, with the dentary slightly included, and a relatively long maxillary approaching that found in *Curimatopsis*; two palatine folds inside the mouth, and a third, median feeble one; tongue small, posterior, with a short free border; gill-rakers rudimentary; probably no pseudo-branchiospina; pectorals short, not reaching ventrals; ventrals reaching anal orifice; a large, conspicuous caudal spot on the greater part of peduncle, as large as or larger than eye; no other spot on flanks or on fins. When freshly unpacked, the specimens had the caudal-lobes base rose-coloured, as well as the operculum, which was translucent, thus letting appear the tint of the gilis.

Regression-coefficients may be estimated as follows: 1,25 or 1,30 for the depth and for the peduncle, 0,9 for the length of head, 1,15 for the interorbital and 1,75 (a very strong positive allometry) for the length of snout (fig. 19).

Discussion: *C.* (*Hemicurimata*) *esperanzae*, from Rio Beni in Bolivia, was succinctly described by Myers (1929) as having depth 3,50 and head 3,66 in the standard length, scales 33 lateral, with lateral-line tubes developed on 4 to 8 scales ("the rest of the scales of the lateral line bilobed to a greater or lesser degree"), and a very small black caudal spot. The present subspecies *pijpersi* is higher, with a slightly longer head, and with more lateral-line tubes; the peduncular spot is much more conspicuous and larger.

The sub-genus *Hemicurimata* may be not more than a juvenile stage of *Curimatus*; Myers pointed

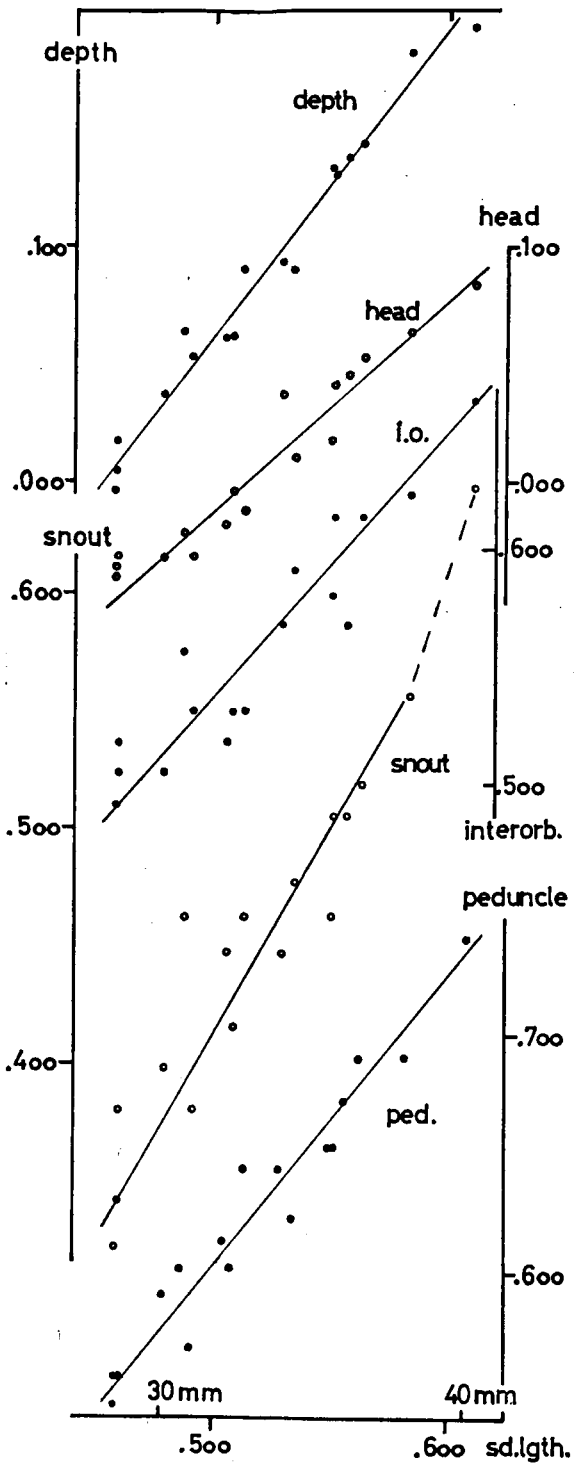

Fig. 19. Curimatus esperanzae pijpersi, *17 specimens: greatest depth, length of head, bony interorbital, length of snout and depth of peduncle (from top to bottom), plotted against standard length: logarithmic coordinates. To note the great allometry (positive) of the snout.*

out that his specimens were juvenile ("pectorals are fleshy flaps with radiating striae, indicating juvenile specimens"); indeed, the number of pores in the lateral line seems correlated with the age (or, more simply, the standard length), as can be seen in fig. 20. The correlation-coefficient is about + .70 (Spearman rank correlation). Other samples of small Curimatins from the Guianas with irregular lateral line present apparently the same phenomenon. One, at least, may be referred with some probability to *spilurus* (see above), whereas the other ones, including the ssp. *pijpersi*, have not the meristics of the *spilurus*-like species of the three Guianas, namely *spilurus* with two or three geographical forms, and *helleri*. The new subspecies *pijpersi* seems closest to *surinamensis* Steindachner (probabaly a subspecies of *spilurus*), which would be altogether more elongate and possesses a complete lateral line.

APPENDIX: LIST OF STATIONS

I am indebted to Mr. H. Nijssen, Z.M.A., for the tedious task of making up the following list of collecting localities. Stations (Nr. 31-54) were probably numbered as soon as the material was received, approximately in chronological order, but some of the records are now found to be somewhat incomplete or even inconsistent. They have been re-established at the best by cross-checking.

North Surinam. (District Suriname)

St. 33: Bushcreek at Zanderij-airport; 8/1959.

St. 34: Surroundings Paramaribo, pool with Lotus on the road to Kwatta; 8/1959.

St. 35 and 36: Brownsweg, small creek at foot of hill, km 116,5 of the railroad; clear running water, 10-100 cm depth; temp. 02.00-13.00 h = 23-33 °C; 21-23/3/1960.

St. 41a: Brownsweg, on the km 114; 23/10/1960.

St. 41b to d: Brownsberg, creeks near that of St. 35-36; 6 and 10/11/1960.

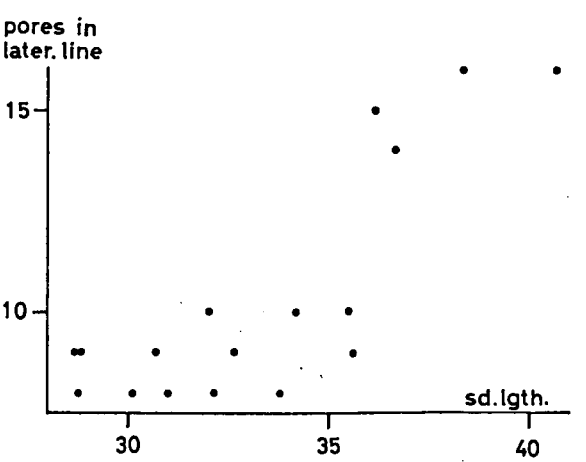

Fig. 20. Curimatus esperanzae pijpersi. *17 specimens: number of pores of the lateral line plotted against standard length. There is an apparent correlation.*

St. 54: Mosten creek (into Saramacca creek?) near Berlijn, Para River system, ca. 60 km south of Paramaribo; 24/3/1962.

North-East Surinam. (District Marowijne)
St. 37: Oelemarie (system?); 20/6/1960.
St. 38 a to c: Albina, lower Maroni; 7 to 21/8/1960.
St. 39a to d, and 40: Rikanau creek; 7 to 28/8/1960 and 4/9/1960 (although some of the labels bear the mention "Maroni system", the Rikanau creek, according to the maps, pertains to the Cottica River system; both system are anyhow communicating).
St. 47: Trenches from surrounding swamps and rice fields at foot of Albina-hills, lower Maroni; 6/3/1962.
St. 48 (dubious): surr. of Albina, probably small creeks on the road to airport and (?) creek at woodcutter camp; 3/1962.
St. 50 and 53: over camp Princess Margriet, lower Maroni; 3/1962.
St. 49: Mooi Wana creek, near bridge over Albina-Moengo road, Cottica River basin; 3/1962.
St. 51 (dubious): surr. of Moengo, Cottica River; 3/1962.
St. 52: Matoekasie creek at Weyne, on the Albina-Moengo road, Cottica River system; 3/1962.

South-West Surinam. (District Nickeri, Coeroeni and Sipaliwini Exp., leader Dr. Geijskes)
St. 31: creek emptying into Coeroeni River, about 8 km from Lucie River; 18/8/1959.
St. 32: Coeroeni River; 20/8/1959.
St. 42: Coeroeni River, "Sunday-Falls", second big fall south-east of Maliwini creek; 29/1/1961.
St. 43: Sipaliwini falls, 20 km from frontier with Brazil; 30/1/1961.
St. 44: Sipaliwini River, bordering Paru Savannah; 25/1 to 6/2/1961.
St. 44a and 46: pools and creeks in Paru Savannah, near foot of hills; same period and 7/2/1961.
St. 45 (not 48 as recorded in Gery, 1961): swamp creek near side-branch of Sipaliwini River ("Vier Gebroeders Creek"); 7/2/1961.

RÉSUMÉ

L'A. décrit ou cite 47 espèces de Poissons characoïdes récemment récoltés par M. H. P. Pijpers au Surinam.

Quatre formes nouvelles pour la science sont décrites: *Moenkhausia surinamensis, Moenkhausia georgiae, Moenkhausia hemigrammoides* et *Curimatus esperanzae pijpersi*; deux autres avaient été décrites dans des notes antérieures: *Hemibrycon surinamensis* et *Hyphessobrycon georgettae*; deux enfin sont signalées comme étant des formes nouvelles qui seront nommées à partir d'un matériel plus abondant: elles appartiennent respectivement aux genres *Myleus* et *Hemiodopsis* (*Hemiodus* auct.).

Hemigrammus lunatus, Jobertina eleotrioides et *Parodon guyanensis* sont nouveaux pour la faune du Surinam.

La synonymie *Hemigrammus orthus* = *Hyphessobrycon bellotti* est suggérée.

Des clés de détermination sont proposées pour les groupes suivants: groupe *doceana* du genre *Moenkhausia*, espèces des Guyanes du genre *Creatochanes*, Stethaprionidi et ssp. de *Poptella orbicularis*.

Certains sujets sont plus particulièrement discutés: valeur taxonomique et évolution de la ligne latérale, ssp. de *Moenkhausia lepidura* et de *Poptella orbicularis*, biométrie et écotaxonomie de *Gasteropelecus sternicla* et de *Carnegiella strigata*, et revue du sous-genre *Hemiodopsis*.

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PLATE I

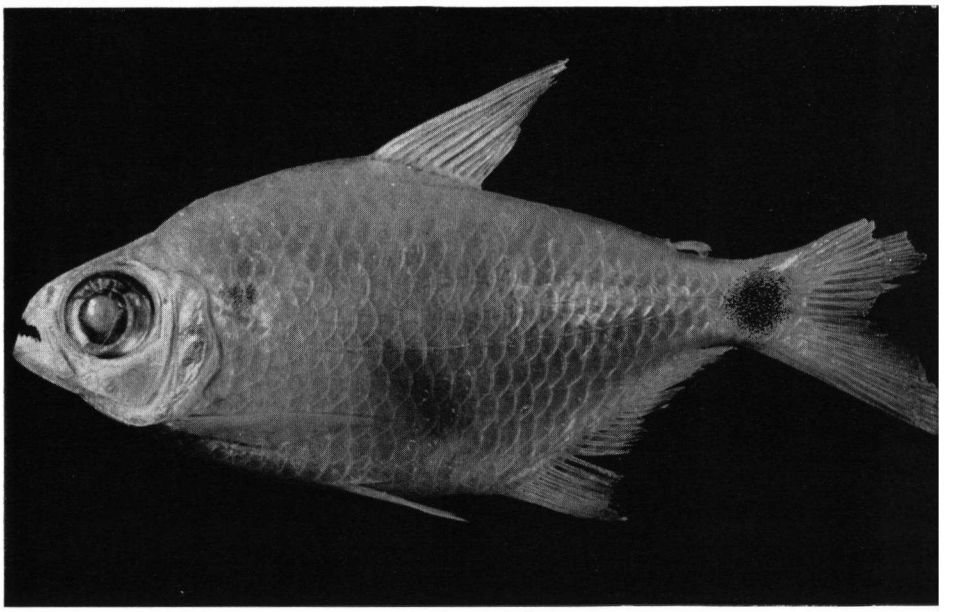

Fig. 3. *Holotype of* Moenkhausia georgiae *sp. nov., 69 mm in standard length (Middle Mana River, French Guiana). ZMA 104.223.*

Fig. 12. Brachychalcinus guianensis *Boeseman, 43 mm in standard length (Paru Savannah).*

Fig. 13. Metynnis altidorsalis *Ahl, half-grown specimen from Suriname River. ZMA 104.268.*

PLATE II

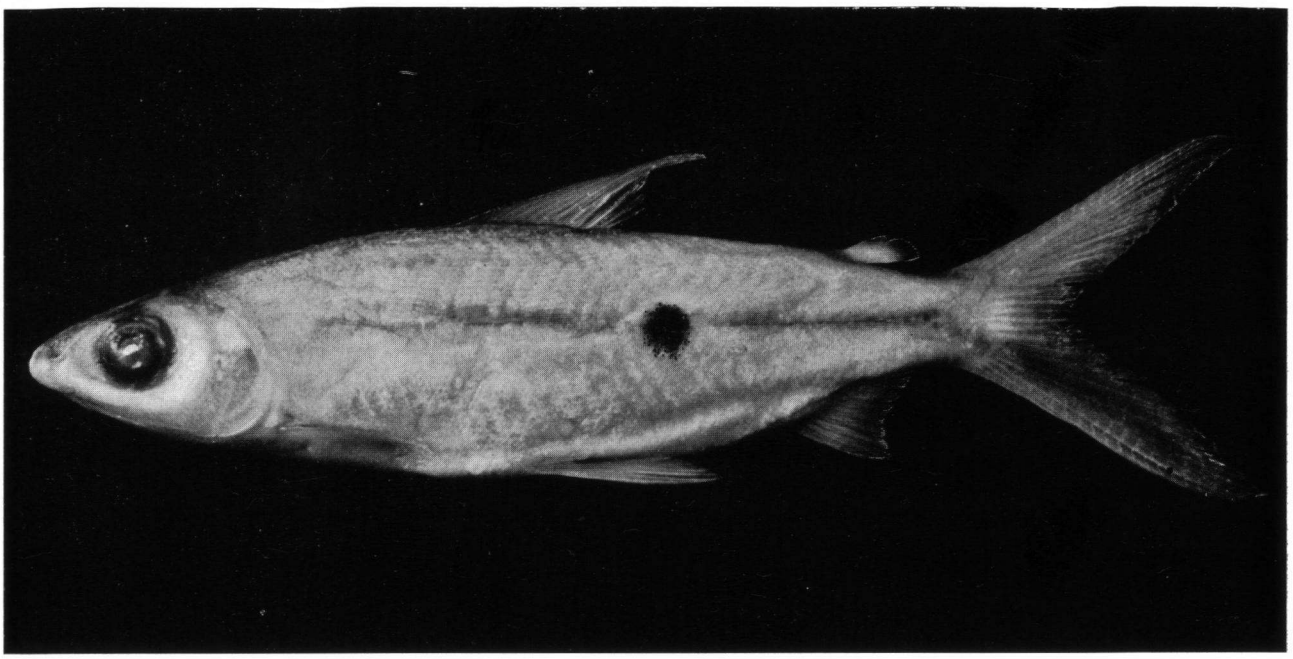

Fig. 17. Hemiodopsis *sp., 48,3 mm in standard length (Paru Savannah). ZMA 104.280.*

Fig. 18. *Holotype of* Curimatus (Hemicurimata) esperanzae pijpersi *ssp. nov., 40,7 mm in standard length (Paru Savannah). ZMA 104.283.*