THE "COMB-TOOTHED" LORICARIINAE OF SURINAM, WITH REFLECTIONS ON THE PHYLOGENETIC TENDENCIES WITHIN THE FAMILY LORICARIIDAE (SILURIFORMES, SILUROIDEI)

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With 5 text-figures, 8 plates, 11 tables and 26 diagrams

Contents

Introduction

The present paper is the third in a series intended to present a review of the Surinam representatives of the Loricariid armoured catfishes (Loricariidae), of which the previous two dealt with the Surinam species belonging to the genus *Hypostomus* Lacépède (Boeseman, 1968, 1969). Like these, the review now presented is mainly based on the extensive material assembled during the period 1963 to 1967 by the zoologists carrying out the Biological Brokopondo Research Project, sponsored by the Netherlands Foundation for the Advancement of Research in Surinam and the Netherlands Antilles (WOSUNA), the Netherlands Foundation for the Advancement of Tropical Research (WOTRO), the Rijksmuseum van Natuurlijke Historie at Leiden, and the Zoölogisch Museum at Amsterdam. Besides these specimens, now included in the collections of the Museums at Amsterdam (ZMA) and Leiden (RMNH), additional material was provided by the British Museum (Natural History) (BM), the Chicago Museum of Natural History (FMNH), and the Muséum National d'Histoire Naturelle (MNHN). Detailed information and photographs were obtained from the Academy of Natural Sciences at Philadelphia (ANSP).

The nominal genera and their evaluation

In the most recent review of the Loricariid catfishes available, Gosline (1948: 79-134) reconsidered the classification and phylogeny within the family, basing his final opinion on a large number of morphological and anatomical characters. Though these characters will be discussed in the next paragraph, it may here be pointed out that Gosline was right in stating (p. 95): "The Loricariinae shows some indication, ..., of being biphyletic. The subfamily can, at least, be split into two apparently distinct groups on the basis of gill raker structure, pharyngeal teeth development, number of teeth, and possibly the presence or absence of an orbital notch". Only it may be wondered why Gosline hesitated to accept the consequences and did not split the Loricariinae as then understood into two subfamilies, especially as these characters provide a much better argument for a separation than the allegedly discriminating characters that have been advanced to distinguish between the Neoplecostominae and the Hypostominae (or Plecostominae cf. Gosline), both accepted by Gosline.

It is true that in various other characters, and in general aspect, both groups of Loricariinae show a remarkable agreement, while in others the scarce-toothed forms seem to continue the evolutionary lines found in the apparently less advanced comb-toothed forms, but it is striking that in some characters the scarce-toothed forms present a much wider range of variation within the group, comparable to that found in the whole series of the comb-toothed genera. This gives the impression of a parallel development rather than of a direct derivation of one group from the other, and also gives support to the suggestion, already expressed by Gosline (p. 90, footnote; p. 95), that the scarce-toothed genus *Loricaria* Linnaeus, as hitherto understood, will have to be split up into several genera.

In the present paper, the name Loricariinae has been restricted to include only the scarce-toothed genera (*Loricaria* Linnaeus s. lat., *Spatuloricaria* Schultz, *Hemiodontichthys* Bleeker, *Reganella* Eigenmann), while the comb-toothed genera are referred to a new subfamily, Harttiinae, type-genus *Harttia* Steindachner, 1876.

The subfamily Harttiinae as here delimited comprises seven (or eight) nominal genera:

Sturisoma Swainson, 1838: 337; 1839: 304 (type species *Loricaria rostrata*

Spix in Agassiz, 1829, by monotypy). — Though the original diagnosis leaves much to be desired, Swainson's reference to *Loricaria rostrata* precludes any misinterpretation; only the correct delimitation of the genus has remained problematical.

Oxyloricaria Bleeker, 1862: 4; 1863: 81 (type species *Loricaria barbata* Kner, 1854, by original designation). — A comparison of the original diagnosis with Bleeker's diagnosis of *Sturisoma* Swainson (l.c.: 4) shows *Oxyloricaria* to differ only in a few minor characters. The occurrence of setae on the cheek in *Oxyloricaria,* presumed not to occur in *Sturisoma,* is a sexual rather than a generic character. The occurrence of dentate ridges on the body in *Oxyloricaria,* presumed lacking in *Sturisoma,* is a character actually occurring in a series of intermediate stages, from more or less obsolete to well developed. The situation of the origin of the dorsal fin, above the ventrals in *Oxyloricaria* and before the ventrals in *Sturisoma,* is also a variable character and, for *Loricaria barbata,* is belied by Kner's figure (1854, pl. 5 fig. 2). And finally, he presumed a more elevated body in *Sturisoma,* evidently based on an incorrect presumption.

As will be shown further on in the present paper, there is no doubt that *Loricaria rostrata* and *L. barbata,* the two type species, are congeneric and, as a consequence, that *Oxyloricaria* Bleeker is a subjective synonym of *Sturisoma* Swainson.

Harttia Steindachner, 1876: 668 (type species *Harttia loricariformis* Steindachner, 1876, by monotypy). — This reasonably diagnosed genus has suffered only few misinterpretations, all the result of a hitherto uncertain delimitation of the genus.

Farlowella Eigenmann & Eigenmann, 1889: 32 (type species *Acestra acus* Kner, 1854; substitute name for *Acestra* Kner, 1854, type species *Acestra acus* Kner, 1854, by subsequent designation of Bleeker, 1862: 4; preoccupied by *Acestra* Dallas, 1852, in Hemiptera). — The interpretation and delimitation of this very characteristic genus have never posed any serious problems.

?*Acestridium* Haseman, 1911: 319 (type species *Acestridium discus* Haseman, 1911, by monotypy). — I am at a loss where to place this genus. The available descriptions by Haseman and Ribeiro (1912: 8) provide insufficient information on the crucial characters; Ribeiro states that there is no orbital notch in the type species, but judging by Haseman's figure (l.c., pl. 51) the number of teeth appears to be restricted. Not having access to any material of *Acestridium,* I have preferred to omit this genus from the further discussion.

Parasturisoma Ribeiro, 1911: 109 (type species *Loricaria brevirostris*

Eigenmann & Eigenmann, 1889, by monotypy). — This genus has been insufficiently diagnosed and in my opinion should include a number of species hitherto referred to *Sturisoma* and *Harttia*, as will be demonstrated further on.

Lamontichthys Ribeiro, 1939: 12 (type species *Harttia filamentosa* La Monte, 1935, by original designation). — In the original diagnosis I find no reasons for separating this genus from *Parasturisoma*. Most of the characters given are rather specific than generic.

Harttiella nov. gen. (type species *Harttia crassicauda* Boeseman, 1953, by original designation). — This new genus, presumed to be intermediate between *Harttia* and the Neoplecostominae, is discussed further on in the present paper.

After relegating *Oxyloricaria* Bleeker and *Lamontichthys* Ribeiro to the synonymy of *Sturisoma* Swainson and *Parasturisoma* Ribeiro respectively, and omitting *Acestridium* Haseman as a problematical genus, we may state that judging by our present knowledge the subfamily Harttiinae consists of five genera. Of these, four proved to be represented in Surinam.

Considering the difficulties hitherto experienced in correctly interpreting and delimiting the genera and, in the present case, the Surinam species, the rather extensive material now available was used to search for additional key characters. To that end, a large number of measurements and counts were taken and reproduced with the usual ratios in the tables 2-8, presented on the following pages. Only the genus *Farlowella* Eigenmann & Eigenmann, with three representatives in Surinam, a well defined genus but containing many badly or insufficiently described species, was considered to need a different, still more extensive approach, and is not dealt with in the following discussion. On the other hand, a few extralimital species were included: *Canthopomus montebelloi* Fowler (on account of its close resemblance with my *Harttia crassicauda*), *Harttia loricariformis* Steindachner (because it has been recorded from Surinam by Van der Stigchel, 1946; 1947), *Oxyloricaria fowleri* Pellegrin (being recorded from nearby French Guyana), and *Harttia platystoma* (Günther) (recorded from Surinam and (British) Guyana). To provide a more convenient overall picture of the variability of each character in the available species, most ratios from the tables were incorporated in a series of diagrams, in which two size (or age) groups were indicated (1 and 2) to facilitate comparison.

This method proved most enlightening, as the diagrams conclusively show the examined material to include three distinctly separable groups of species or, in my opinion, three genera: *Harttiella* nov. gen. (species 1, 2 in table 1), *Harttia* Steindachner (species 3-5), and *Parasturisoma* Ribeiro (species 6, 7). The separation between *Harttiella* and *Harttia* may be found in the diagrams 3 (head width in head length), 4 (head depth in head length), 5 (body depth in standard length), 7 (width at D-origin in standard length), 8 (width at D-origin in head length), 11 (pre-D length in standard length), 12 (post-D length in standard length), 13 (post-A length in standard length), 14 (minimum depth of caudal peduncle in standard length), 15 (minimum depth of caudal peduncle in head length), and 24 (eye diameter in head length). The separation between *Harttia* and *Parasturisoma* is evident in the diagrams 2 (head in standard length), 3 (head width in head length), 7 (width at D-origin in standard length), 9 (width at A-origin in standard length), 11 (pre-D length in standard length), 12 (post-D length in standard length), 13 (post-A length in standard length), 14 (minimum depth of caudal peduncle in standard length), 17 (length of D-spine in head length), and 23 (longest anal ray in head length). In several of these characters there seems to be some overlap, but as this disappears when only considering either age group 1 or 2, this merely indicates a certain amount of allometry in these characters.

A few interesting deductions may be based on these results. First, we may observe that wherever a character provides a possibility to distinctly separate all three genera (diagrams 3, 7, 11, 12, 13, 14), the values of the ratios found for the species referred to *Harttia* are always intermediate between those found for the species presumed to represent either *Harttiella* or *Parasturisoma*. This strongly supports the assumption that there may be an evolutionary line leading from a Neoplecostomine ancestor, via *Harttiella, Harttia, Parasturisoma*, and presumably *Sturisoma*, to *Farlowella*, as in principle already suggested by Gosline (1948: 95).

It also becomes clear that the tendency towards flattening, previously observed by Gosline (1948: 95) for his Loricariinae (= Harttiinae + Loricariinae in the present sense), while rather moderate in *Harttiella*, is increased in *Harttia* but apparently not continued in *Parasturisoma* (diagrams 4, 5), with the exception of the minimum peduncular depth. Another obvious tendency, towards a reduction of the width of the body, continues through all three genera, evidently to reach its limits in *Farlowella* (diagrams 3, 7, 8), though at the level of the origin of the anal fin it seems to start only in *Parasturisoma* (fig. 1; diagram 9), resulting in a notably more slender aspect in the last named genus. Still another tendency, recorded by Gosline (l.c.), is the elongation of the caudal peduncle (diagrams 12, 13), correlated with a relative shortening of the predorsal length (diagram 11). It is remarkable that the diagrams do not indicate a perceptible lengthening of the snout (diagram 26), so this character appears to originate only in *Sturisoma*, not represented in our collections, to reach its extreme in *Farlowella*.

A comparison of the available species of *Harttia* and *Parasturisoma* gives the impression that in *Parasturisoma* the relative height of the body is slightly larger than in *Harttia*, which would mean a reversal of the tendency towards flattening. Actually, this impression is at least partly caused by the narrower body, possibly together with its relative shortening as a result of the elongation of the peduncle. Also, such a reversal may well be caused by a dominating tendency towards a more narrow body, as the capacity of the

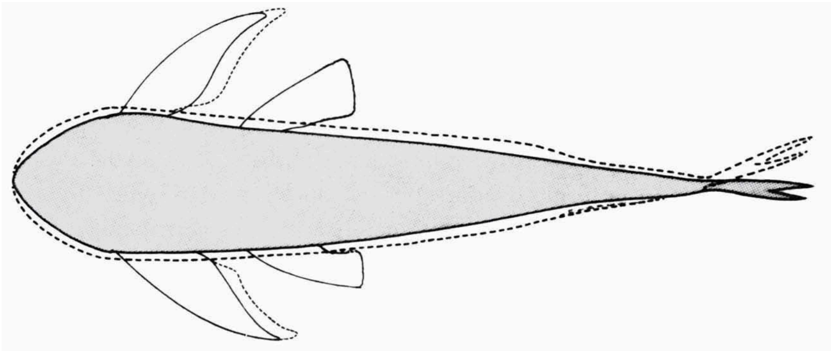

Fig. 1. Superimposed schematic outline figures of *Harttia surinamensis* nov. spec. (broken line) and *Parasturisoma maculata* nov. spec., illustrating the (usually) more rounded shape of the snout and the distinctly wider anterior part of the caudal peduncle in *Harttia*.

body cavity can not drop below a certain limit without endangering the chances of survival of the species.

As it seemed possible that these considerations, and especially the proposed delimitation of the genera, based on a moderate number of species, would not hold when also considering other representatives of the subfamily, an attempt was made to assemble comparable information on all nominal forms hitherto described, with the exception of those belonging to *Farlowella*. For convenience' sake, this was restricted to the ratios head width in head length (as in diagram 3), and predorsal, postdorsal, and postanal length in standard length (as in diagrams 11, 12, 13). The results are given in table 1.

The table appears to support a subdivision as suggested by the limited number of species represented in the diagrams, especially if we take into account the following considerations.

The data provided in the table are mostly taken from the literature, usually from the original descriptions, and in several cases could only be obtained by measuring the accompanying illustrations. This means that the

TABLE 1

The ratios of head width in length of head (A) and predorsal, postdorsal and postanal length in standard length (B-D), in the nominal species of Harttiinae; for the genus *Farlowella* restricted to the Surinam forms.

	A	B	C	D
+ *Harttiella crassicauda* (1)	1.00	2.65	2.05	2.80
Harttiella montebelloi (2)	1.00	2.50	2.10	2.65
Harttia carvalhoi	1.05	2.95	1.80	?
Harttia fowleri (3)	1.10	3.05	1.75	2.10
Harttia kronei	1.00	2.75	1.80	2.35
+ *Harttia loricariformis* (4)	1.05	2.90	1.85	2.35
Harttia rhombocephala	1.05	2.90	1.80	2.30
Harttia surinamensis (5)	1.10	3.00	1.80	2.15
+ *Parasturisoma brevirostris*	?	3+	?	?
Parasturisoma citurense	?	?	?	2.00
Parasturisoma filamentissima	?	?	?	?
Parasturisoma filamentosa	?	3.25	1.65	2.00
Parasturisoma leightoni	?	3.10	1.70	1.85
Parasturisoma maculata (6)	1.25	3.20	1.65	2.00
Parasturisoma microps	1.20	3.15	1.70	1.90
Parasturisoma platystoma (7)	1.25	3.45	1.60	1.95
Parasturisoma tamanae	1.25	3.25	1.60	1.85
Sturisoma aurea	1.45	3.40	1.60	1.70
Sturisoma barbata	1.40	3.00	1.70	2.00
Sturisoma dariensis	?	?	?	?
Sturisoma festivum	1.40	3.40	1.60	1.75
Sturisoma frenata	1.40	3.00	1.70	1.90
Sturisoma guentheri	1.60	3.20	1.80	2.10
Sturisoma lyra	1.65	3.00	1.70	2.00
Sturisoma monopelte	1.65	2.95	1.70	2.10
Sturisoma nigrirostrum	1.80	2.75	1.85	2.30
Sturisoma panamense	?	?	?	?
Sturisoma robusta	1.50	2.90	1.80	2.10
+ *Sturisoma rostrata*	1.50	2.80	1.85	2.30
Sturisoma tenuirostris	?	?	?	?
Farlowella reticulata	4.00	2.20	2.00	2.00
Farlowella rugosa	4.75	2.15	2.00	2.00
Farlowella parvicarinata	4.60	2.10	2.00	2.05

\+ = type species.

values given for the considered ratios are only approximative, and that some apparent discrepancies seem to be the result of inaccuracies in the descriptions, possibly caused by different methods of measuring, or rather by inaccuracies in figures.

While the given values show distinct tendencies, towards a lengthening of the head and the peduncle, and a (relative) shortening of the predorsal region, especially from *Harttiella* via *Harttia* to *Parasturisoma,* but in column A even continued via *Sturisoma* to *Farlowella,* these tendencies seem to be discontinued or even reversed in columns B-D for the genera *Sturisoma* and *Farlowella.* Actually, here the tendencies must be obscured by the development of an elongated snout and, in *Farlowella,* by the shifting backwards of the dorsal fin. The influence of the rostral elongation is also found in column A, but there it results in a widening of the gap between *Parasturisoma* and *Sturisoma,* and between *Sturisoma* and *Farlowella.*

As was to be expected, the type species of the genera are properly situated, only the allocation of *Parasturisoma brevirostris,* the type species of *Parasturisoma,* appearing to be less well founded, as a ratio of 3 for the predorsal length also occurs in *Sturisoma.* But this is merely the result of the inadequacy of the descriptions of the species hitherto published with regard to the ratios chosen for the present table, and the given position here is amply sustained by other characters: snout triangular, acute, not prolonged, without cover on lower surface.

Corroborative evidence for the subdivision of the Harttiinae as proposed here, and for the presumed phylogenetic sequence, may be drawn from various other characters: the shape of the snout and the development of a covered lower surface; the development of the carinae and of filamentous rays; the numbers of scutes in transversal series, across the abdomen, and in the predorsal series; a reduction of the number of dorsal rays in the most specialised genus, *Farlowella,* occasionally also found in pectorals and ventrals; or the vertebral counts. Most of these show a very gradual development, and often there is an overlap. There can be little doubt that the most primitive forms have the belly naked, the next stage being a cover consisting of a multitude of small scutes, after which follows a gradual reduction and an arrangement in longitudinal series, finding its ultimate limit in *Farlowella* one to nil, with the lateral scutes meeting along the midventral line).

Resuming, the subfamiliy Harttiinae and its genera may be diagnosed as follows:

Subfamily **Hartiinae** nov.

Diagnosis: teeth numerous (15-125), evidently increasing in number with age, not minute, bilobed, forming a comb; gill rakers little developed, filamentous (cf. Gosline, 1948); pharyngeal teeth small, villiform, or possibly lacking; no orbital notch; no adipose dorsal fin; usually strongly depressed, in dorsal view varying from rather broad to extremely slender.

Harttiella nov. gen.

Diagnosis: moderately depressed, broad; carinae rounded, indistinct, even along sides of peduncle; snout in dorsal view rounded, broad, not projecting, without covered lower surface; head about as wide as long; predorsal length about 2.5-2.7 in standard length; postdorsal length 2 or slightly more in standard length; postanal length 2.6-2.9 in standard length; scutes in longitudinal lateral series 27-28; predorsal scutes 3; belly naked; D I.7, situated rather above ventrals; vertebrae (*H. crassicauda)* 5 + 9 + 16 (30).

Type species: *Harttia crassicauda* Boeseman, 1953.

Harttia Steindachner, 1876

Diagnosis: strongly depressed, broad; carinae weak; snout in dorsal view rounded-triangular, not projecting and without covered lower surface; head slightly longer than wide; predorsal length 2.7-3.0 in standard length; postdorsal length about 1.8 in standard length; postanal length 2.1-2.4 in standard length; scutes in longitudinal series 27-31; predorsal scutes 3; belly naked or with several scutes in a transverse series (apparently 6 or more), irregularly arranged; D I.7, situated rather above ventrals; no filamentous finrays; vertebrae (*H. surinamensis*) 5 + 7 + 20 (32).

Parasturisoma Ribeiro, 1911

Diagnosis: depression of body not obvious, obscured by strong reduction of body width; carinae moderate; snout rather pointed, triangular or subovate, not projecting or with cover on lower surface; width of head distinctly surpassing its length; predorsal length about 3.0-3.5 in standard length; postdorsal length 1.6-1.7 in standard length; postanal length usually less than 2 in standard length; scutes in longitudinal series 28-35; predorsal scutes 3; scutes on belly 3-8 in transverse series; D I.7, situated rather above ventrals; usually with more or less developed filamentous finrays (but these easily break off); vertebrae (*P. maculata*) 5 + 7 + 20 (32).

Sturisoma Swainson, 1838

Diagnosis: slender, peduncle elongate; carinae usually distinct, sharp; snout pointed, produced, with covered lower surface; width of head 1.4-1.8 in its length; predorsal length 2.7-3.4 in standard length; postdorsal length 1.6-1.85 in standard length; postanal length 1.7-2.3 in standard length; scutes in longitudinal series 31-37; predorsal scutes 3-4; scutes on belly 2-5 in transverse series; D I.7, situated rather above ventrals; adults always with filamentous finrays; vertebrae (*S. lyra*) 5 + 7 + 25 (37).

Farlowella Eigenmann & Eigenmann, 1889

Diagnosis: extremely elongate; carinae variable, but usually distinct; snout strongly prolonged, projecting, with covered ventral surface; width of head 3.75-4.75 in its length; predorsal length slightly more than 2 in standard length; postdorsal length and postanal length about 2 in standard length; scutes in longitudinal series about 33-35; predorsal scutes 7-9; scutes on belly in 0-1 median longitudinal rows; D I.6, situated rather above anal; P I.5-6; V i.4-5; usually with filamentous rays, which easily break off; vertebrae (*F. kneri*) 5 + 7 + 23 (35).

It should be noted that the given diagnostic characters are to a certain extent approximative, being for a considerable part based on the data available in the literature and therefore liable to occasionally needing corrections. But on the whole eventual corrections are expected to remain restricted to limited deviations and not to interfere with the principles of the generic subdivision of the Harttiinae as presented here.

THE PHYLOGENY OF THE HIGHER LORICARIIDAE

The literature on this subject is scanty, the pertinent data are mostly restricted to the first half of the present century. We may here reconsider the principal contributions on the subject.

The first, and possibly still the most important publication to be discussed here is "A Monograph of the Fishes of the Family Loricariidae" by Regan (1904), supplemented by the same author in 1906, 1908, and 1912. In this monograph Regan distinguishes five subfamilies: Plecostominae, Hypoptopomatinae, Loricariinae, Neoplecostominae, and Argiinae (= Astroblepinae). In a phylogenetic diagram, Regan appears to consider the first two subfamilies the most primitive, the last two the most specialized. The subfamily Loricariinae is understood to comprise the genera *Loricaria, Hemiodontichthys, Oxyloricaria,* and *Farlowella.* The genus *Oxyloricaria* (or *Sturisoma,* a name that Regan for unknown reasons dismissed as a "nomen hybridum") comprises my genera *Harttia, Parasturisoma,* and *Sturisoma*; the species that I refer to the new genus *Harttiella* were still unknown at the time. The phylogenetic information provided by Regan has been amply discussed by Gosline (1948).

A few years later, Eigenmann (1910) published an emendation, mostly resulting in a larger number of genera, but also differing by relegating the Astroblepinae to a separate family, Cyclopidae. The subfamily Loricariinae was subdivided into six genera: *Loricaria, Hemiodontichthys, Reganella, Harttia, Sturisoma,* and *Farlowella.* The genus *Harttia,* as understood by

Eigenmann, comprises the genera *Harttia* and *Parasturisoma* as interpreted by me.

In a paper discussing the classification of the Ostariophysi, Regan (1911) again diagnosed and subdivided the Loricariidae, but added little to our knowledge of the phylogeny of the group except by his statement that "if the Argiidae are to be separated off as a distinct family, the Plecostomidae also should be recognized, as they differ quite as much from the Loricariidae", probably as a reaction to Eigenmann's opinion as stated above.

In the same year, Ribeiro published his extensive volume on the catfishes of Brazil in the Fauna Brasiliense. Though no discussion of the phylogeny of the Loricariidae is given, this work is interesting as Ribeiro seems to have listed the various species in phylogenetic order. From his key (1911, opposite p. 28) it seems evident that the genera *Harttia, Parasturisoma, Sturisoma,* and *Farlowella* form a separable group, and these are listed in the text (pp. 102-111) in the same order, though inversely. But neither the text nor the key does reflect the relationships of this group.

In 1917, Eigenmann & Vance resumed the knowledge on the genus *Farlowella,* but they abstained from discussion of the phylogenetic affinities.

Gosline (1945) published a catalogue of the South American catfishes, chiefly based on Eigenmann's enumeration (1910) and the Zoological Records. This apparently uncritical compilation unfortunately does not contain any species descriptions or diagnoses of the higher categories. The subfamily Loricariinae sensu Gosline includes the same genera as relegated to it by Eigenmann, but there are three additions: *Spatuloricaria* Schultz, 1944, *Lamontichthys* Ribeiro, 1939, and *Parasturisoma* Ribeiro, 1911, while also the problematical genus *Acestridium* Haseman, 1911, is included. Eigenmann's separate family Cyclopidae is now correctly named Astroblepidae. No phylogenetic information is provided, unless perhaps suggested by the sequence of the listed genera. In this case, it is interesting to note that Gosline placed *Sturisoma* between *Harttia* and *Parasturisoma,* while there can be little doubt that *Parasturisoma* actually is intermediate between *Harttia* and *Sturisoma,* as correctly suggested by Ribeiro's listing (1911). The difficulty of adequately delimiting the genera is shown by the fact that *Parasturisoma platystoma* is listed twice, in *Harttia* and *Sturisoma,* in my opinion both erroneous; moreover, *Harttia fowleri* is listed in *Sturisoma,* together with *Parasturisoma citurense, P. leightoni,* and *P. tamanae.*

Subsequently, Gosline (1948) published a detailed account on the classification of the Loricariid catfishes. Though unfortunately the material he had at hand was limited, he was able to provide a well documented new approach to the various phylogenetic problems posed by the group. His conclusions (p. 80) were that the Astroblepinae should be situated near the base of the evolutionary line which, via the Lithogeninae and the Neoplecostominae, led to the Plecostominae (= Hypostominae). The Loricariinae and Hypoptopomatinae were considered to represent "specialized offshoots of the central Loricariid stock" (presumably Neoplecostomine).

The information found in Gosline's account, together with the results of the examination of an extensive material mostly assembled in Surinam, enabled me to prepare a tentative phylogenetic diagram covering most of the higher subfamilies and genera of the Loricariidae. Only the problems still existing around the correct phylogenetic situation of the Astroblepinae and the Lithogenidae, as well as the delimitation of the Neoplecostominae, are not considered here on account of lack of material. For the same reason, the necessary information on *Rhinelepis, Corymbophanes,* and *Sturisoma* had to be taken from the literature. Finally, a thorough investigation of the newly acquired material of the Loricariinae, of *Ancistrus* and related genera, and of *Hypoptopomus,* still has to take place, and the Ancistrinae, primarily separated from the Hypostominae on account of their movable interopercular cushion, and Hypoptomatinae are only provisionally included in the diagram (fig. 2), which is mostly restricted to the groups occurring in Surinam.

Considering Gosline's account, the available material, and the diagram partly based on Gosline's information, a few remarks should be made.

As has already been stated before, one of the principal reasons for

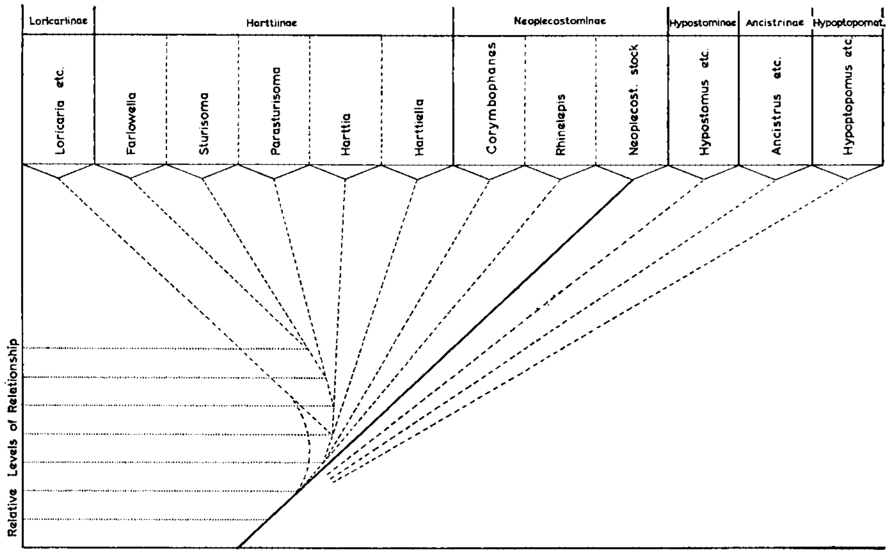

Fig. 2. Tentative phylogenetic diagram of the higher Loricariidae.

separating the Harttiinae from the Loricariinae is the characteristic dentition. In the Harttiinae, the teeth are well developed and occurring in a usually much larger number, forming a comb on each side of both jaws, while in the Loricariinae the teeth are more or less reduced, both in number and size, especially on the upper jaw. There appears to occur a slight amount of overlap, but I found the number in the Surinam representatives of the Harttiinae to increase with age wherever a large size range was available. Presuming the examined specimens of *Harttiella* being not fully grown, there apparently remains a possible overlap only between *Farlowella* (ca. 20-26) and the Loricariinae (0-25, but usually not more than 12-15). In this character, the Loricariinae seem to continue the evolutionary line presented in the Harttiinae.

I agree with Gosline (1948: 85) when he describes the gill rakers in *Harttia* as similar to the gill filaments; the same fleshy folds I found in the available representatives of *Harttiella* and *Parasturisoma*. But for the Loricariinae Gosline described the rakers as "normal, if somewhat rudimentary", while in *Loricaria cataphracta* I found well separated, thick, fleshy papillae.

The pharyngeal teeth are recorded by Gosline to be replaced by filaments in *Harttia*, a feature that I can confirm for *Harttiella, Harttia*, and with some doubt for *Parasturisoma*, and which I presume to be characteristic for the subfamily. According to Gosline, these villiform pharyngeal teeth also occur in some Loricariinae (molariform in others) and Neoplecostominae (in others granular, or minute, or lacking). The same author states (p. 86) that "the best that can be done with the pharyngeal teeth is to say that they are absent in the Plecostominae (— = Hypostominae + Ancistrinae here —) and usually present in other groups. They are significantly better developed in *Loricaria* (particularly *L. cataphracta*) and *Hemiodontichthys* than in any of the other genera studied". This again seems to indicate a continuation of the Harttiine evolutionary line by the Loricariidae.

In the available material belonging to the Harttiinae I found the length of the digestive tract to be considerable, the intestine lying in all genera in at least fifteen coils, apparently more than in the Neoplecostominae as defined by Gosline (one to twelve) or in the Loricariinae, and thereby supporting a separation between Harttiinae and Loricariinae.

The position of the anus, recorded as variable in the Neoplecostominae by Gosline, is well forward in all Harttiinae and Loricariinae.

The development of an evertible cushion in the interopercular region is only found in my Ancistrinae. This very specialized and complicated structure I considered of sufficient importance to provisionally separate the Ancistrinae from the Hypostominae, awaiting a thorough study of the Surinam material of the Ancistrinae.

The numbers of vertebrae found in the Harttiinae show a distinct tendency: Neoplecostominae 13-15 + 14-18, *Harttiella* 14 + 16, *Harttia* and *Parasturisoma* 12 + 20, *Sturisoma* 12 + 25, *Farlowella* 12 + 23; *Loricaria* 10-11 + 23-25 seems to continue this trend. Through these numbers, partly taken from the literature, are mostly based on a single species in each genus, they must be approximately representative. Especially the gradual lengthening of the caudal peduncle is evident.

The squamation also provides interesting information. In a longitudinal lateral series there appears to be a gradual increase in number in the Harttiinae: *Harttiella* 27-28, *Harttia* 27-31, *Parasturisoma* 28-35, *Sturisoma* 31-37, *Farlowella* 33-35 (mostly taken from the literature). Here the information provided for the Loricariinae exactly covers the whole range found among the five genera of Harttiinae, viz., 25-37, supporting the idea of a separate evolutionary line for the Loricariinae. For the Neoplecostominae, the subfamily from which both the Harttiinae and the Loricariinae are presumed to be derived, Gosline (p. 88) records 22-32 scutes.

In a series between the occipital and the dorsal fin, the number of scutes in the Harttiinae increases from 3 (*Harttiella, Harttia, Parasturisoma*) via 3-4 (*Sturisoma*) to 7-9 (*Farlowella*). A number of only three in the Loricariinae supports the idea of a separate development.

Attention may also be drawn to the gradual development of the abdominal cover. In *Harttiella,* at least in the available specimens (which may still be juvenile), the belly is naked; in *Harttia* the belly is in adults either naked or covered with numerous small scutes; in *Parasturisoma* the belly is covered with scutes, about 3-8 in a transverse series; in *Sturisoma* the number of scutes in a transverse series is about 2-5; and in *Farlowella* the lateral scutes meet across the belly or are separated by only a single row of scutes. In the Loricariinae this whole series occurs, from a naked belly, via disconnected granules or numerous scutes, down to only a single median row, illustrating in this character a parallel development.

The number of postanal scutes also shows an increase from *Harttiella* (13) via *Harttia* (about 14-17), *Parasturisoma* (about 16-19), *Sturisoma* (16-20), to *Farlowella* (about 20), while again in the Loricariinae almost the whole of this series is repeated: 16-20.

In the same way, there is a distinct development among the genera belonging to the Harttiinae towards sharper ridges on body and peduncle, towards a filamentous elongation of finrays, especially in the caudal fin, and towards a more pointed shape of the snout or, ultimately, towards a strongly prolonged snout. All these developments are more or less repeated among the Loricariinae.

The numbers of soft finrays are rather constant both among the Harttiinae and the Loricariidae, with the exception of a slight reduction (6) in the dorsal fin, and occasionally in the pectoral (5-6) and ventral (4-5) fins, in *Farlowella* (versus 7, 6, and 5 respectively in the other genera).

The occurrence of an orbital notch is wholly restricted to the Loricariinae.

For further evidence supporting my claim that the Harttiinae and Loricariinae as here understood should be separated on subfamily level, I draw attention to Gosline's remarks on the articulation between the cleithral expansion and the supracleithral plate (1948: 88), and on the pectoral and pelvic girdles (p. 90), features I have not been able to verify.

Resuming, in my opinion there can be little doubt that the Harttiinae and the Loricariinae represent two separate lines of development, in several characters apparently running parallel. And the same may be stated concerning the proposed phylogenetic sequence of the genera within the Harttiinae. Only the accurate source from which both lines must have risen remains mostly a guess.

Gosline (1948: 81) convincingly argues why the common ancestor of the Harttiinae and Loricariinae, together forming the Loricariinae sensu Gosline, should be looked for among the genera included in his Neoplecosominae, a subfamily for which he proposes a quite new conception, but which is evidently polyphyletic.

Assuming that the ancestor probably already showed a tendency towards flattening, had 27 or less scutes in a longitudinal series, about three between supraoccipital and dorsal, a moderate number of teeth, a cleithrum extending backwards above and beyond the pectoral spine base, and (perhaps) no adipose fin and no scutes on the abdomen, the genera *Corymbophanes* Eigenmann, 1909 (differing only in having four predorsal scutes), or *Rhinelepis* Agassiz, 1829 (though with a covered abdomen), are the most likely choices of forms from which the Harttiinae and Loricariinae may have evolved. For this reason they are tentatively included in the phylogenetic diagram.

Another possibility might have been *Canthopomus* Eigenmann, 1910. Actually, *Harttiella montebelloi* (Fowler) has originally been referred to *Canthopomus,* a view first adopted by Gosline (1945), but afterwards questioned by him (1948: 108): "*Canthopomus montebelloi* Fowler... appears to belong to the Loricariinae". Evidently, Gosline was on the right track, but Fowler (1954: 145) retained the species in *Canthopomus.* Fowler

(1940: 54) added to his description of *Canthopomus montebelloi* a diagnosis of the genus, stating that Eigenmann had only named it but omitted a description. This may be verbally true, but Eigenmann (1910: 404) proposed the name in a key to the Loricariidae, and the data contained therein may be considered to represent a valid description. Also it is interesting that in the diagnosis Fowler describes the (lower) head and belly as naked, while it has been described as "garnis de très-nombreuses pièces irrégulières" in Valenciennes' original description of the type species, *Rhinelepis genibarbus* Valenciennes, 1840. But *Canthopomus* is omitted in the above discussion on account of the fact that the principal character provided by Eigenmann, the occurrence of well-developed marginal bristles on operculum and "interoperculum", seems more indicative for sex and/or age than for phylogenetic affinities, with the consequence that *Canthopomus* may well prove to be a synonym of *Rhinelepis* Agassiz, 1829.

Measurements and methods (figs. 3, 4)

In general, the methods employed and the terminology used are the same as those expounded in my previous review of the Surinam Hypostomidae (Boeseman, 1968: 26 et seq.). Only, the difficulties encountered when trying to delimit the genera or to define the various species, and the hope to discover more indications towards the phylogeny of the group, induced me to take more measurements and to verify more characters than was thought necessary for the *Hypostomus* species. All the principal measurements taken are indicated on fig. 3 or, for the genus *Farlowella,* on fig. 4. A dialled caliper was used, while the ratios were obtained with a slide-rule.

All measurements are given in the tables to the nearest 0.1 mm.

In the explanatory figures, the measurements are indicated with the characters B-T, in *Farlowella* B-Y, while the same are used, for identical purposes, in the tables and the diagrams. In the tables, the characters U and V are added, for the scute number in lateral longitudinal series and for the number of teeth, or, in *Farlowella,* the characters Z-EE to indicate the lateral scute number, the number of scutes between the supraoccipital and the dorsal fin, the number of scutes between dorsal and caudal fin, the number between anal and caudal fin, the number of longitudinal abdominal scute rows [1]), and the number of teeth on each half jaw, respectively. In the column of the tables indicated with an A, the register numbers are listed.

Moreover, in the tables the usual ratios are indicated behind the actual measurements, in comparison with standard length without brackets, and in comparison with head length between brackets.

1) Excluding the ventro-lateral series.

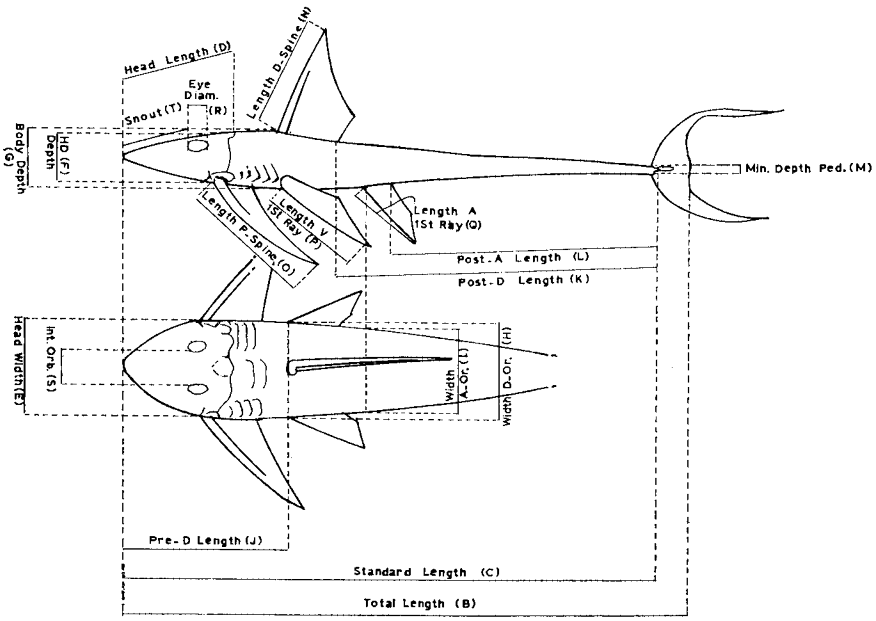

Fig. 3. Measurements and terminology in Harttiinae (excluding *Farlowella*). (A — register number); B — total length; C — standard length; D — head length; E — head width; F — head depth; G — body depth at dorsal origin; H — width of body at dorsal origin; I — width of body at anal origin; J — predorsal length; K — postdorsal length; L — postanal length; M — minimum depth of caudal peduncle; N — length of dorsal spine; O — length of pectoral spine; P — length of first ventral ray; Q — length of first anal ray; R — maximum eye diameter; S — interorbital width; T — length of snout; (U — number of scutes in longitudinal series; V — teeth number on each side of both jaws).

All ratios have been used to prepare the diagrams, which are explained in the short final chapter. In these diagrams, the approximate values for the ratios in two limited size groups have been indicated with the numbers 1 and 2, to facilitate comparison between the species and also to illustrate allometric growth in several of the characters concerned. Therefore, I abstained from indicating allometric trends in the tables.

Collecting localities (fig. 5)

Though most of the material under consideration has been assembled in the course of the Brokopondo Lake survey, the zoologists attached to the survey occasionally found opportunities to also visit several other parts of Surinam, where they collected additional material. Moreover, data on some

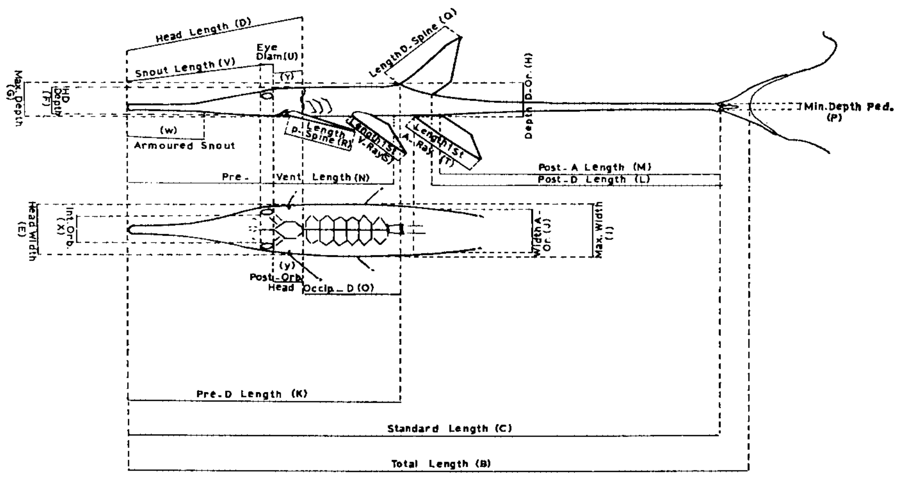

Fig. 4. Measurements and terminology in *Farlowella*. (A — register number); B — total length; C — standard length; D — head length; E — head width; F — head depth; G — maximum depth of body; H — depth at dorsal origin; I — maximum width of body; J — width of body at anal origin; K — predorsal length; L — postdorsal length; M — postanal length; N — pre-vent length; O — distance from supraoccipital to dorsal fin; P — minimum depth of caudal peduncle; Q — length of dorsal spine; R — length of pectoral spine; S — length of first ventral ray; T — length of first anal ray; U — maximum eye diameter; V — length of snout; W — length of lower armoured snout; X — interorbital width; Y — length of postorbital head; (Z — number of scutes in longitudinal series; AA — number of scutes between supraoccipital and dorsal fin; BB — number of scutes between dorsal and caudal fins; CC — number of scutes between anal and caudal fins; DD — number of longitudinal abdominal scute rows (excluding the ventro-lateral series); EE — teeth number on each side of both jaws).

material from other sources have been included in the present investigations.

As a result, the collecting localities as presented on the accompanying map (fig. 5) and listed below cover most of the Surinam territory, but it should be kept in mind that, excepting the Brokopondo area (or the Suriname River basin), collecting at most places has been rather haphazardly while the assembled collections were limited as a result of lack of time or facilities. Therefore, we may assume that additional forms still await discovery, and even with regard to the species now known to occur in Surinam the available information on the actual distribution generally still leaves much to be desired.

In the following enumeration of the collecting localities, the intended sequence has been strictly from east to west. Unfortunately, a late arrival of additional material from the Amsterdam Museum and two overlooked specimens in the Leiden Museum necessitated the addition of the localities

19, 20 and 21, both to the list and on the map. To each locality I have added the names of the species collected there.

1. Kamaloea or Saloea Creek, right tributary of the Marowijne River, about 9 km SE of the outlet of the Gran Creek. Actually, this locality is situated on French Guyane territory, but as it seems extremely unlikely that the species found there should not occur in the nearby creeks along the opposite bank of the Marowijne River, both the locality and the species

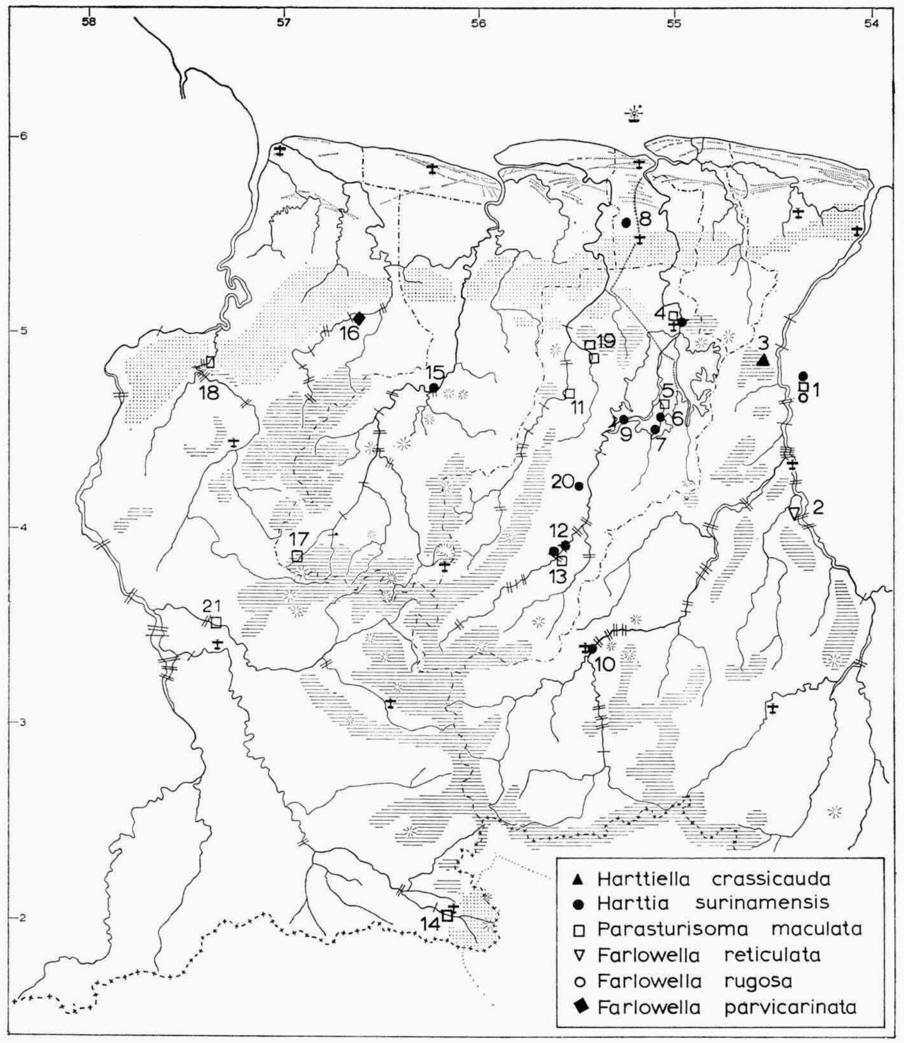

Fig. 5. Map showing the collecting localities and the known distribution of the recorded Surinam Harttiine species.

occurring there are included in the present review. — *Harttia surinamensis*; *Parasturisoma maculata*; *Farlowella rugosa*.

2. Maka Creek, on the left shore of the Lawa River, about 10 km S of Stoelmans Island. — *Farlowella reticulata*.

3. Creek in the Nassau Mountains, presumably a tributary of the Marowijne River. — *Harttiella crassicauda*.

4. Suriname River near Brokopondo. — *Harttia surinamensis*; *Parasturisoma maculata*.

5. Lower Gran (or Marowijne) Creek, about 4 km from outlet into Suriname River. — *Parasturisoma maculata*.

6. Pool near rapids in middle course of Gran (or Marowijne) Creek. — *Harttia surinamensis*.

7. Rapids in middle course of Gran (or Marowijne) Creek. — *Harttia surinamensis*.

8. Coropina Creek, tributary of the Suriname River near Paramaribo. — *Harttia surinamensis*.

9. Suriname River around Mamadam Falls. — *Harttia surinamensis*.

10. Tapanahoni River, near airstrip. — *Harttia surinamensis*.

11. Feddiprati, pool below rapids, middle course of Saramacca River. — *Parasturisoma maculata*.

12. Grandam rapids in Gran Rio, upper Suriname River. — *Harttia surinamensis*.

13. Awaradam, rapids in Gran Rio, upper Suriname River. — *Harttia surinamensis*; *Parasturisoma maculata*.

14. Sipaliwini River, Corantijn River basin, near airstrip. — *Parasturisoma maculata*.

15. Coppename River at Raleigh Falls. — *Harttia surinamensis*.

16. Right tributary of the Nickerie River, 12 km WSW of Stondansie Falls. — *Farlowella parvicarinata*.

17. Left tributary of Coppename River, at 03°52'N, 56°55'W. — *Parasturisoma maculata*.

18. Zandvallen, Avanavero River, Corantijn River basin. — *Parasturisoma maculata*.

19. Right tributary of Kleine Saramacca River, about 11 km ESE of outlet into Saramacca River; and Kleine Saramacca River, about 14 km ESE of the same outlet. — *Parasturisoma maculata*.

20. Parwapa (Paba) Creek, left tributary of the Suriname River, about 2½ km N of Botopasi; and Suriname River about 1 km S of Botopasi. — *Harttia surinamensis*.

21. Lucie River, Corantijn River basin. — *Parasturisoma maculata*.

MISCELLANEOUS REMARKS

The relationship and the origin of the Surinam genera of the subfamily Harttiinae have already been discussed in the initial chapters, while the principal information on the hydrography of Surinam has been presented in my previous paper on the Surinam representatives of *Hypostomus* (Boeseman, 1968: 21; for "physiological" in title of chapter, read "physiographical"); in the same paper, the pertinent information on collecting and collections has been presented (p. 26).

In the following chapters, six Surinam species are described and discussed, while in the tables comparative data are added on species erroneously recorded from Surinam (*Harttia loricariformis* Steindachner, from SE Brazil) or presumably so (*Parasturisoma platystoma* (Günther), probably restricted to (formerly British) Guyana), from nearby areas (*Harttia fowleri* (Pellegrin), from French Guyane), or merely to illustrate a close relationship (*Harttiella montebelloi* (Fowler), from Bolivia). The descriptions are restricted in extent because, on account of the considerable allometry found in various characters, often much more precise information may be gained by consulting the accompanying tables.

THE SURINAM SPECIES

The Surinam representatives of the subfamily Harttiinae, which have already repeatedly been referred to on previous pages, are listed below in the same sequence as in which they are described and discussed in one of the following chapters. To the list are added (between brackets) the numbers of specimens now available, and their ranges of standard lengths.

Harttiella crassicauda (Boeseman) — (15, 12.0-48.5 mm)
Harttia surinamensis nov. spec. — (275, 36.8-188.0 mm)
Parasturisoma maculata nov. spec. — (56, 36.0-170.0 mm)
Farlowella reticulata nov. spec. — (3, 95.5-118.5 mm)
Farlowella rugosa nov. spec. — (2, 80.2-99.5 mm)
Farlowella parvicarinata nov. spec. — (2, 98.4-115.7 mm)

Only a part of this material has been used for the preparation of the tables and diagrams.

DISTRIBUTION AND HABITAT (FIG. 5)

As yet, little is known about the distribution of most of the species, four out of the six here recorded having been collected only at the type localities: *Harttiella crassicauda* (Boeseman) and the three new *Farlowella* species.

More information is available on the distribution of *Harttia surinamensis* and *Parasturisoma maculata*. *Harttia surinamensis* is known to occur in the basins of the Marowijne, Suriname, and Coppename Rivers. It is surprising that no examples of this species were found among the 29 Harttiine specimens examined which were collected in the Saramacca River basin, a phenomenon for which the scanty information on the habitat may provide an explanation.

Parasturisoma maculata appears to inhabit an area covering at least the whole of the Surinam territory and to an unknown extent French Guyane. It seems not unlikely that to the west, in Guyana, it is replaced by the closely related species *Parasturisoma platystoma* (Günther), with which it has occasionally been confused (Van der Stigchel, 1946: 181; 1947: 181).

The distribution of the localities on the map gives a much better impression of the collecting activities in the various parts of Surinam than of the actual distribution of the species, and considering this it seems beyond doubt that the Suriname River basin has up to the present been by far the best explored from an ichthyological point of view. Therefore, it appears of importance that from this area no specimens were acquired belonging to *Harttiella crassicauda* or to any of the *Farlowella* species. It remains possible that *Harttiella crassicauda* also occurs in nearby French Guyane, but for the Surinam species of *Farlowella* the available information seems to indicate a very restricted distribution, confirming an impression gained from the literature on other species pertaining to this genus as well as from consideration of the morphology and the limited swimming abilities.

The habitat in which the various Surinam species were collected shows little variation. All were found to occur in rather shallow flowing water (depth not more than 200 cm), with a rocky or sandy bottom, and usually in or near cataracts, or in almost stagnant water of pools between or below cataracts, and in all cases in well aerated water. All species occur in moderate or small creeks running through the forest, but *Harttia surinamensis* and *Parasturisoma maculata* are also found in similar habitats in the main rivers. The *Farlowella* species were all found in rather small creeks (width less than 8 m) with a sandy bottom, occasionally with gravel.

In contrast with the apparent preference of adult *Hypostomus* for the more open water of the main streams, the evidence provided by the present material of *Harttia surinamensis* and *Parasturisoma maculata* indicates no such preference, the larger examples having been collected both in the open rivers and in small forest creeks. The same seems to apply to the juvenile examples, though in the large rivers these may prefer the more tranquil water of the pools in or around the cataracts.

Key to the Surinam species

The Surinam species of Harttiinae here recorded may be identified with the following key:

1. Dorsal fin about opposite to ventral fins; head width 1.0-1.8 in its length . . . 2
   Dorsal fin about opposite to anal fin; extremely slender and elongate in shape; snout strongly produced, with covered lower surface; head width about 4-5 in its length 5
2. Snout rounded, ovate or pointed, not produced, without cover on lower surface; head width about 1.0-1.3 in its length 3
   [Snout produced, with covered lower surface; head width about 1.4-1.8 in its length; not yet reported from Surinam . . . . *Sturisoma* spec.]
3. Body rather flattened, broad; without evident lateral keels on body or peduncle; scutes spinose; belly naked; postanal length about 2.7-2.9 in standard length . . . . *Harttiella crassicauda*
   Body strongly flattened and rather broad or flattening obscured by narrowness of body and peduncle; with distinct lateral keels; scutes not spinose, slightly rough; belly naked or covered; postanal length about 1.95-2.25 in standard length 4
4. Body flattened, rather broad; width at level of dorsal origin 4.6-6.0, at level of anal origin 6.0-8.0 in standard length; head length 3.7-4.45 in standard length, head width about 1.0-1.25 in own length; snout broadly rounded or rounded-triangular; more than half of the postanal peduncle strongly widened; often with transverse bands . . . . *Harttia surinamensis*
   Body apparently less flattened on account of slender body, cross-section rather roundish; width at level of dorsal fin about 6.0-7.4, at level of anal origin 7.3-8.8 in standard length; head length about 4.5-5.0 in standard length, head width 1.2-1.35 in own length; snout rather pointed, ogival; less than half of the postanal peduncle distinctly widened; no transverse bands . . . *Parasturisoma maculata*
5. Eight scutes between supraoccipital and dorsal fin origin; belly covered with a single median scute row . . . . *Farlowella reticulata*
   Seven scutes between supraoccipital and dorsal fin origin; no median scutes along belly 6
6. Scutes distinctly spinose; keels rather distinct; length of dorsal spine 2 or more in head, of pectoral spine more than 3 in head; large postocular scute with pits and ridges and with about three irregular longitudinal series of spinules . . . . *Farlowella rugosa*
   Scutes smooth or slightly pitted; keels feeble and rounded; length of dorsal spine less than 2 in head, of pectoral spine less than 3 in head; large postocular scute rough with vermiculate ridges, without spinules . . . *Farlowella parvicarinata*

Descriptions of the Surinam species

Harttiella nov. gen.

Harttiella nov. gen. (type species *Harttia crassicauda* Boeseman, 1953).

A diagnosis of this genus, as well as a discussion on its phylogenetic relationships and position, have already been presented in a previous chapter.

Harttiella crassicauda (Boeseman)

(plate 1; table 2)

Harttia crassicauda Boeseman, 1953: 10 (Nassau Mountains, in creek, Surinam).

Material. — RMNH 19418, creek in Nassau Mountains, Marowijne River basin, Surinam, 15 March 1949, leg. D. C. Geijskes & P. Creutzberg (Surinam Expedition 1948/49), 15 ex., 12.0-48.5 mm (holotype and paratypes of the species).

Diagnostic characters. — A distinctly depressed species, with head, body, and the greater part of the caudal peduncle broad; no lateral keels and no distinct keels on head or upper body; scutes strongly spinose; belly naked; minimum depth of caudal peduncle still considerable, though most of the peduncle shows the tendency towards flattening characteristic for the subfamily.

Description. — D I.7; A i.5; P I.6; V i.5.

Presumably a small species, moderately depressed, with body and head rather wide, the peduncle slightly tapering backwards, more strongly towards the end. Lower surface about flat, with belly and head naked with the exception of a small triangular plate before the gill apertures, lacking in juveniles. Upper surface convex, wholly covered with spinose scutes except at the small naked tip of the snout, without any conspicuous keels. Lateral margins also without keels, rather narrowly rounded along peduncle. Scutes in lateral series 27, exceptionally 28. Three (or four) preanal pairs of plates.

Width of head about equal to its length or, in juveniles, slightly less; length of head 3.75-4.3 in standard length; depth of head about 2 in its length. Width of body at origin of dorsal fin about 1.2, at origin of anal fin about 1.5 (in larger examples; in juveniles more than 2) in length of head; or about 4.75 and 6.5(-8) in standard length, respectively. Depth of body at origin of dorsal fin 1.85(-2.3) in length of head, about 8(-8.65) in standard length. Minimum depth of caudal peduncle 4(-6) in length of head, 18-22 in standard length.

Predorsal length about 2.6-2.7, postdorsal length 2.0-2.15, postanal length 2.7-2.9, in standard length.

The broad snout is about rounded-triangular in dorsal view but more ovate in juveniles, its length 1.8-2.0 in head length; the maximum (horizontal) diameter of eye 6-7, the interorbital width 2.75-2.9, in length of head. The lips of the inferiorly situated mouth are indistinctly fringed, the barbels are short and broad. The slender bilobed teeth form a comb consisting of about 30-40 teeth on each side of the upper jaw, and about 25-35 on each mandible.

The dorsal fin originates slightly in front of the ventrals, the length of the spine is about equal to or slightly surpassing head length. The pectoral

TABLE 2

Tabulated morphological data on *Harttiella crassicauda* (Boeseman).

	A	B	C	D	E	F	G	H	I	J	K	L
1.	RMNH 19418	337	285	76-3.75	70(1.10)	37(2.05)	33-8.65(2.30)	58-4.95(1.30)	36-7.95(2.10)	110-2.60	137-2.10	105-2.70
2.	RMNH 19418	351	293	78-3.75	75(1.05)	38(2.05)	36-8.15(2.15)	59-5.00(1.30)	38-7.70(2.05)	115-2.55	136-2.15	101-2.90
3.	RMNH 19418	423	346	86-4.00	86(1.00)	43(2.00)	41-8.45(2.10)	77-4.50(1.10)	48-7.20(1.80)	130-2.65	162-2.15	127-2.70
4.	RMNH 19418	450	368	92-4.00	92(1.00)	45(2.05)	46-8.00(2.00)	83-4.45(1.10)	52-7.10(1.75)	137-2.70	175-2.00	135-2.75
5.	RMNH 19418	463	384	96-4.00	97(1.00)	48(2.00)	49-7.85(1.95)	89-4.30(1.10)	55-7.00(1.75)	145-2.65	186-2.05	136-2.80
6.	RMNH 19418	465	385	96-4.00	98(1.00)	45(2.15)	48-8.00(2.00)	84-4.60(1.15)	55-7.00(1.75)	148-2.60	195-2.00	138-2.80
7.	RMNH 19418	490	411	100-4.10	100(1.00)	50(2.00)	50-8.20(2.00)	85-4.75(1.20)	62-6.55(1.60)	154-2.65	205-2.00	145-2.85
8.	RMNH 19418	585	485	112-4.30	115(1.00)	55(2.05)	60-8.10(1.85)	100-4.85(1.10)	75-6.50(1.50)	179-2.70	240-2.00	175-2.75

	M	N	O	P	Q	R	S	T	U	V
1.	13-22(5.85)	74-3.90(1.00)	76-3.75(1.00)	67-4.25(1.15)	50-5.70(1.50)	12.5(6.00)	26(2.90)	40(1.90)	27	35/30
2.	15-20(5.20)	70-4.20(1.10)	84-3.50(0.95)	71-4.15(1.10)	55-5.35(1.40)	12.5(6.35)	28(2.80)	40(1.95)	27	35/30
3.	17-20(5.10)	91-3.80(0.95)	95-3.65(0.90)	85-4.05(1.00)	60-5.75(1.45)	14 (6.15)	31(2.80)	46(1.85)	27	35/30
4.	19-19(4.85)	102-3.60(0.90)	100-3.70(0.90)	90-4.10(1.00)	63-5.85(1.45)	14.5(6.35)	33(2.80)	49(1.90)	27	35/35
5.	20-19(4.80)	98-3.95(1.00)	104-3.70(0.90)	95-4.05(1.00)	68-5.65(1.40)	15 (6.40)	33(2.90)	48(2.00)	27	30/25
6.	10-19(4.80)	100-3.85(0.95)	110-3.50(0.85)	97-3.95(1.00)	65-5.95(1.45)	15 (6.40)	33(2.90)	52(1.85)	27/28	30/30
7.	22-19(4.55)	?	105-3.85(0.95)	100-4.10(1.00)	67-6.05(1.50)	15 (6.65)	35(2.85)	53(1.90)	27	40/40
8.	27-18(4.15)	125-3.90(0.90)	130-3.70(0.85)	125-3.90(0.90)	83-5.85(1.35)	16 (7.00)	41(2.75)	62(1.80)	27	35/35

spine is of about the same length, more or less S-shaped in dorsal view, and in the two largest examples covered with many, rather long, recurved spines, possibly an indication that these specimens (males?) are adult; in the smaller examples, the pectoral spines are covered with short spinulae, which also occur on the other rays of all fins, often in a single row. The caudal fin is hardly emarginate, subtruncate, with the tips slightly prolonged.

Additional morphological characters may be found in the accompanying table, or may be observed in plate 1.

The specimens are now rather dark brownish, with a lighter ventral surface. Especially the lower snout tip is intensely dark, and there appear to be some slight indications of transverse bands and a dusky caudal base.

Habitat and distribution. — The species has hitherto only been found in a small creek on the top of the Nassau Mountains, apparently a tributary of the Marowijne River. According to Dr. D. C. Geijskes, one of the collectors, the creek flowed through a mostly wooded area, and had a rocky bottom, covered with sand and stones, and some cataracts. It seems evident that the species does not occur in the Suriname River basin, but eastward it may well occur in the nearby and hitherto hardly explored area of French Guyane.

Remarks. — In the original description the species has tentatively been considered closely related to *Harttia kronei* Ribeiro, 1911, and considering table 1 this seems correct: among the six species here relegated to the genus *Harttia*, *H. kronei* comes closest to the present species in the ratios head width in head length, A; predorsal length in standard length, B; and (with *Harttia loricariformis* Steindachner) postanal length in standard length, D. At the time, I was not aware of the existence of *Harttiella monte-*

belloi (Fowler), as it had been referred to an entirely different genus, *Canthopomus* Eigenmann.

The second species here included in *Harttiella, H. montebelloi* (Fowler), closely resembles *H. crassicauda* in many respects, as may be seen by comparing the tables 2 and 3. Still there are also some evident differences between the two species, though probably not of generic importance: in *H. montebelloi* the shape is more elongate (see pl. 2), with especially the peduncle more slender and, relatively, longer; the fins are smaller (see tables and diagrams 16-22); and the number of teeth is more reduced. With some other characters, these seem to indicate a more close relationship with the Loricariinae, as has already been suggested by Gosline (1948: 108). Therefore, it may well be that *H. montebelloi* represents a form near the root of the evolutionary line leading to the Loricariinae (see fig. 2).

Etymology. — Crassus (lat.), stout; cauda (lat.), tail.

TABLE 3

Tabulated morphological data on *Harttiella montebelloi* (Fowler).

	A	B	C	D	E	F	G	H	I	J	K	L
1.	ANSP 68832	850	723	198-3.65	200(1.00)	$85^{+}(2.30^{-})$	71^{+}-$10.20^{-}(2.80^{-})$	156-4.65(1.25)	103-7.00(1.90)	293-2.50	346-2.10	276-2.65

	M	N	O	P	Q	R	S	T	U	V
1.	23-32(8.60)	138-5.30(1.45)	134-5.45(1.50)	120-6.10(1.65)	10.6-6.90(1.85)	35(5.70)	48(4.15)	101(1.95)	27 or 28	ca.15/15

Harttia Steindachner

Harttia Steindachner, 1876: 668 (type species *Harttia loricariformis* Steindachner, 1876, by monotypy).

Harttia surinamensis nov. spec.

(plate 3; table 4)

Harttia loricariformis nec Steindachner, Van der Stigchel, 1946: 180; 1947: 180 (upper Coppename River); —, Boeseman, 1952: 182 (Coropina Creek, near Paramaribo).

Material. — Holotype, RMNH 26388, Grandam, Gran Rio, upper Suriname River, Surinam, 18 July 1965, leg. Dr. G. F. Mees (Brokopondo Research 1965/6), 1 ex., 188 mm; — Paratypes, ZMA 101.726, Kamaloea (or Saloea) Creek, right tributary of the Marowijne River 9 km SE of the outlet of the Gran Creek, French Guyane, 24 April 1967, leg. Dr. H. Nijssen (Brokopondo Research 1966/67), 1 ex., 148 mm; — RMNH 26387, rapids in Suriname River near Brokopondo, Surinam, 14 February 1964, leg. Dr. M. Boeseman (Brokopondo Research 1963/64), 1 ex., 77.7 mm; — RMNH 26386, pools near rapids in middle course of Gran (or Marowijne) Creek, Suriname River basin, Surinam, 29 July 1964, leg. Dr. M. Boeseman (Brokopondo Research 1963/64), 1 ex., 109 mm; — RMNH 26389, rapids near bivouac at middle course of Gran (or Marowijne) Creek, Surinam River basin, Surinam, 31 July 1964, leg. Dr. M. Boeseman (Brokopondo Research 1963/64), 20 ex., 68.5-186.5 mm; — RMNH 18206, Coropina Creek, near Paramaribo, Surinam, ? Oct. 1946, leg. Dr. D. C. Geijskes, 1 ex., 130 mm (previously recorded as *H. loricariformis* Steindachner); — ZMA 106.516, Mamadam (Sopo Falls), Suriname River, Surinam, 22 November 1966, leg. Dr. H. Nijssen

(Brokopondo Research 1966/67), 33 ex., 36-82 mm; — RMNH 26390, below Mamadam (falls), Surinam River, 16 January 1964, leg. Dr. M. Boeseman (Brokopondo Research 1963/64), 1 ex., 100 mm; — RMNH 26391, upper Tapanahoni, about 2 km below Paloemeu airstrip, Marowijne River basin, Surinam, 17 November 1965, leg. Dr. G. F. Mees (Brokopondo Research 1965/66), 2 ex., 103.5-109.5 mm; — RMNH 26393, upper Tapanahoni, near Paloemeu airstrip, Marowijne River basin, Surinam, 27 November 1965, leg. Dr. G. F. Mees (Brokopondo Research 1965/66), 6 ex., 96.5-122.5 mm; — RMNH 26388, Grandam, Gran Rio, upper Suriname River, Surinam, 18 July 1965, leg. Dr. G. F. Mees (Brokopondo Research 1965/66), 5 ex., 137-167 mm; — RMNH 26384, below main falls of Mamadam, Suriname River, Surinam, 16/17 January 1964, leg. Dr. M. Boeseman (Brokopondo Research 1963/64), 2 ex., 68.5-132 mm; — RMNH 26385, pools in Grandam, Gran Rio, upper Suriname River, Surinam, 14 August 1964, leg. Dr. M. Boeseman (Brokopondo Research 1963/64), 1 ex., 36.8 mm; — ZMA 106.517, Gran Rio at NE part of Awaradam (falls), upper Suriname River basin, Surinam, 31 January 1967, leg. Dr. H. Nijssen (Brokopondo Research 1966/67), 2 ex., 110 & 137 mm; — RMNH 26395, Awaradam, Gran Rio, upper Suriname River, Surinam, 17 July 1965, leg. Dr. G. F. Mees (Brokopondo Research 1965/66), 113 ex., 56-152 mm; — RMNH 11001, upper Coppename River, Surinam, August-September 1901, leg. Dr. H. A. Boon (Coppename Expedition 1901), 1 ex., 71.5 mm (previously recorded as *H. loricariformis* Steindachner); — RMNH 26394, Raleigh Falls, Coppename River, Surinam, October 1957, leg. Dr. D. C. Geijskes, 2 ex., 141.5-144 mm; — RMNH 26392, Raleigh Falls, Coppename River, Surinam, 8-16 July 1962, leg. Dr. P. H. van Doesburg, 1 ex., 98 mm; ZMA 106.521, Suriname River, rapids 1 km S of Botopasi, Surinam, 22 March 1967, leg. Dr. H. Nijssen (Brokopondo Research 1966/67), 66 ex., 43-180 mm; — ZMA 106.520, Parwapa (or Paba) Creek, left tributary of the Suriname River at about 2½ km N of Botopasi (near Foetoenakaba), Suriname River basin, Surinam, 20 March 1967, leg. Dr. H. Nijssen (Brokopondo Research 1966/67), 1 ex., 165 mm; — RMNH 26396, no data but presumably from the Suriname River basin, Surinam, March-July 1965, leg. Dr. G. F. Mees (Brokopondo Research 1965/66), 9 ex., 80-113 mm.

Diagnostic characters. — A rather broad, depressed species, with only the posterior third or two-fifths of the peduncle much narrower; scutes rough but not distinctly spinose; with moderate, though not sharp, lateral keels; belly naked in juveniles, a cover of numerous small scutes gradually developing with age (7-14 cm standard length), forming a more or less complete cover at a size of more than 14 or 15 cm; no filamentous rays.

Description. — D I.7; A i.5; P I.6; V i.5.

A robust species, presumably not reaching a size of over 20 cm, with head, body, and caudal peduncle strongly depressed and, with the exception of the ultimate third or two-fifths of the peduncle, conspicuously broad. The more narrow final portion of the peduncle is still distinctly lower than wide. The ventral surface is wholly flattened, the lower head and the belly being naked in juveniles, with a few scattered scutes on the abdominal region in specimens with a length of about 75 mm, the number increasing with age and attaining an almost complete cover at a size of approximately 14 or 15 cm. A wide area on the throat remains naked, but large triangular covers are formed before the gill apertures, while before these the lateral scutes of the head are somewhat curved onto the lower surface. Dorsally, the specimens are wholly covered with slightly rough scutes, which are never distinctly spinous. There are no distinct dorsal keels on head or body, but there is a rounded lateral keel along the peduncle. The whole dorsal surface is rather moderately convex. Scutes in longitudinal lateral series usually 21+9, less frequently 20+10 or 22+8, exceptionally 22+9, the ridges coalescing completely on the posterior part of the peduncle. There are three preanal plates, between anal fin and vent.

Width of head 1-1.25 in head length, increasing with age; length of head 3.7-4.4 in standard length, decreasing with age; depth of head 2.6-2.9 in head length. Width of body at origin of dorsal fin 1.10-1.65 in head length, increasing with age, at origin of anal fin 1.4-2.2, the highest ratio in juveniles; in standard length, the ratios are 4.65-6.0, decreasing with age, and 6-8, also decreasing with age; therefore, the young specimens are more slender than the adults. Depth of body at origin of dorsal fin 2.35-3.2 in head length, 10-12 in standard length. Minimum depth of caudal peduncle 14.5-18.5 in head length, about 60-80 in standard length, with possibly a slight decrease with age of the first ratio.

Predorsal length 2.8-3.10, postdorsal length 1.75-1.85, postanal length 2.05-2.25, in standard length.

The snout is triangular or rounded triangular, with a blunt apex, or rounded ogival in younger specimens, its length 1.75-2.0 in head length, the ratio slightly decreasing with age; the maximum diameter of the hardly oblong eye 4.1-5.25, the interorbital width 4.10-4.85 in head length, the eye diameter relatively decreasing, the interorbital width increasing with age. The semicircular lower lip, which may have a median emargination, is papillose, with papillae also along the margins and on the short triangular barbels; the upper lip also margined with papillae. The usual slender bilobed teeth form a dense comb on each half of the jaw, consisting of 45-125 on each side of the upper jaw and 50-120 on each mandible, with a distinct increase in number with age.

The dorsal fin originates above the insertions of the ventrals, and has the spine and the anterior rays hardly prolonged, not filamentous; the length of the dorsal spine 0.85-1.3 in head, with the highest ratio in juveniles. The pectoral spine is strong, slightly curved, in all specimens but one merely slightly rough, but in the single exception, presumably a male, with long stiff bristles on the outer apical two-thirds, the bristles reaching a length almost equal to eye diameter. All spines and rays are roughened, with very fine spinules. The caudal fin is slightly emarginate, but the outer rays are

TABLE 4

Tabulated morphological data on *Harttia surinamensis* nov. spec.

	A	B	C	D	E	F	G	H	I	J	K	L
1.	RMNH 26385	392	368	102-3.70	80(1.25)	38(2.70)	32-11.50(3.20)	61-6.00(1.65)	46-8.00(2.20)	132-2.80	205-1.80	170-2.15
2.	RMNH 26384	510	475	125-3.80	105(1.15)	47(2.65)	41-11.60(3.05)	80-5.95(1.55)	62-7.70(2.00)	165-2.90	258-1.80	218-2.20
3.	RMNH 26389	745	685	172-4.00	147(1.15)	63(2.70)	62-11.00(2.75)	124-5.55(1.40)	103-6.65(1.65)	237-2.85	380-1.80	315-2.25
4.	RMNH 26389	765	702	175-4.00	152(1.15)	64(2.75)	60-11.70(2.90)	126-5,60(1.40)	104-6.75(1.65)	240-2.95	390-1.80	325-2.15
5.	RMNH 11001	770	715	180-4.00	150(1.15)	63(2.80)	65-11.00(2.70)	128-5.60(1.35)	106-6.75(1.65)	247-2.90	395-1.80	325-2.20
6.	RMNH 26387	835	777	184-4.20	163(1.15)	71(2.60)	75-10.40(2.45)	140-5.55(1.30)	118-6.60(1.55)	255-3.05	435-1.80	365-2.10
7.	RMNH 26389	840	780	197-4.00	170(1.15)	74(2.65)	75-10.60(2.60)	141-5.60(1.40)	120-6.60(1.65)	267-2.95	425-1.85	362-2.20
8.	RMNH 26389	910	840	204-4.15	180(1.15)	75(2.70)	74-11.40(2.75)	158-5.35(1.30)	127-6.60(1.60)	282-3.00	467-1.80	395-2.15
9.	RMNH 26389	913	845	208-4.05	186(1.10)	78(2.65)	78-10.80(2.65)	161-5.25(1.30)	130-6.50(1.60)	288-2.95	465-1.80	395-2.15
10.	RMNH 26393	1030	965	220-4.35	200(1.10)	77(2.85)	83-11.60(2.65)	170-5.65(1.30)	142-6.80(1.55)	315-3.05	545-1.80	470-2.05
11.	RMNH 26392	1055	980	230-4.25	200(1.15)	89(2.60)	97-10.00(2.40)	182-5.35(1.25)	146-6.70(1.55)	325-3.00	545-1.80	460-2.15
12.	RMNH 26390	1066	1000	240-4.15	214(1.10)	90(2.65)	92-10.85(2.60)	190-5.25(1.25)	156-6.40(1.55)	326-3.05	560-1.80	480-2.10
13.	RMNH 26389	1110	1035	245-4.20	221(1.10)	94(2.60)	95-10.90(2.55)	195-5.30(1.25)	160-6.45(1.55)	346-2.90	575-1.80	485-2.15
14.	RMNH 26391	1120	1035	240-4.30	218(1.10)	83(2.90)	88-11.80 (2.75)	200-5.15(1.20)	160-6.45(1.50)	343-3.00	590-1.75	490-2.10
15.	RMNH 26389	1120	1035	247-4.15	228(1.10)	90(2.75)	92-11.30(2.70)	195-5.30(1.25)	158-6.50(1.55)	352-2.95	580-1.80	492-2.10
16.	RMNH 26393	1145	1060	238-4.45	215(1.10)	87(2.75)	90-11.80(2.65)	195-5.45(1.20)	163-6.50(1.45)	345-3.05	590-1.80	510-2.10
17.	RMNH 26393	1160	1065	246-4.35	240(1.05)	95(2.60)	100-11.60(2.45)	230-4.65(1.10)	175-6.10(1.40)	365-2.90	585-1.80	495-2.15
18.	RMNH 26393	1160	1065	248-4.30	233(1.05)	95(2.60)	100-11.65(2.50)	220-4.85(1.15)	170-6.30(1.45)	350-3.05	605-1.75	510-2.10
19.	RMNH 26393	1170	1075	243-4.40	230(1.05)	85(2.85)	90-12.00(2.70)	203-5.30(1.20)	160-6.70(1.50)	347-3.10	610-1.75	525-2.05
20.	RMNH 26386	1175	1090	260-4.20	235(1.10)	100(2.60)	102-10.70(2.55)	210-5.20(1.25)	172-6.35(1.50)	362-3.00	610-1.80	515-2.10
21.	RMNH 26391	1195	1095	250-4.35	235(1.05)	96(2.60)	107-10.10(2.35)	218-5.00(1.15)	178-6.15(1.45)	370-2.95	615-1.80	510-2.15
22.	RMNH 26389	1250	1150	272-4.20	258(1.05)	105(2.60)	102-11.20(2.65)	225-5.10(1.20)	178-6.45(1.55)	380-3.00	646-1.80	540-2.10
23.	RMNH 26389	1255	1170	280-4.20	256(1.10)	107(2.60)	109-10.80(2.55)	220-5.30(1.25)	180-6.50(1.55)	384-3.05	660-1.80	545-2.15
24.	RMNH 26389	1290	1205	283-4.35	271(1.05)	105(2.70)	105-11.50(2.70)	237-5.10(1.20)	192-6.30(1.50)	398-3.00	670-1.80	565-2.15
25.	RMNH 26393	1325	1225	275-4.45	273(1.05)	98(2.80)	105-11.70(2.60)	243-5.10(1.15)	200-6.15(1.40)	397-3.10	685-1.80	580-2.10
26.	RMNH 26389	1350	1265	295-4.30	275(1.05)	112(2.65)	112-11.30(2.65)	246-5.15(1.20)	192-6.60(1.55)	414-3.05	710-1.80	600-2.10
27.	RMNH 26389	1395	1290	305-4.25	290(1.05)	115(2.65)	122-10.60(2.50)	258-5.00(1.20)	207-6.25(1.50)	425-3.05	715-1.80	605-2.15
28.	RMNH 18206	1400	1300	310-4.20	295(1.05)	117(2.65)	123-10.60(2.50)	280-4.65(1.10)	216-6.10(1.45)	430-3.05	720-1.80	605-2.15
29.	RMNH 26389	1410	1300	305-4.25	295(1.05)	114(2.70)	114-11.40(2.70)	247-5.25(1.25)	207-6.25(1.50)	426-3.05	730-1.80	600-2.15
30.	RMNH 26389	1430	1310	305-4.35	288(1.05)	117(2.60)	120-11.00(2.55)	260-5.10(1.15)	212-6.20(1.45)	436-3.05	730-1.80	620-2.10
31.	RMNH 26384	1450	1320	310-4.25	277(1.10)	113(2.75)	113-11.50(2.75)	248-5.30(1.25)	214-6.15(1.45)	435-2.95	752-1.80	618-2.15
32.	RMNH 26389	1465	1340	312-4.30	285(1.10)	120(2.60)	125-10.70(2.50)	267-5.00(1.15)	212-6.35(1.50)	440-3.05	750-1.80	620-2.15
33.	RMNH 26388	1490	1370	327-4.20	294(1.10)	125(2.60)	128-10.70(2.55)	267-5.15(1.20)	227-6.10(1.45)	450-3.05	765-1.80	625-2.20
34.	RMNH 26388	1505	1390	320-4.30	285(1.10)	120(2.65)	126-11.05(2.55)	265-5.20(1.20)	224-6.20(1.45)	442-3.10	790-1.75	655-2.10
35.	RMNH 26389	1510	1400	330-4.25	310(1.05)	120(2.75)	124-11.10(2.65)	277-5.10(1.20)	223-6.00(1.50)	465-3.00	780-1.80	660-2.10
36.	RMNH 26394	1520	1415	325-4.35	315(1.05)	128(2.60)	135-10.50(2.40)	290-4.90(1.10)	230-6.15(1.45)	460-3.05	775-1.80	650-2.20
37.	RMNH 26394	1550	1440	335-4.30	320(1.05)	130(2.60)	130-11.10(2.60)	305-4.75(1.10)	235-6.10(1.45)	480-3.00	795-1.80	670-2.15
38.	RMNH 26389	1590	1485	350-4.20	348(1.00)	134(2.60)	138-10.70(2.55)	302-4.90(1.15)	239-6.20(1.45)	495-2.95	810-1.80	670-2.20
39.	RMNH 26388	1655	1530	365-4.20	340(1.05)	140(2.60)	145-10.60(2.50)	315-4.85(1.15)	250-6.15(1.45)	508-3.00	850-1.80	700-2.20
40.	RMNH 26388	1700	1560	368-4.25	350(1.05)	143(2.60)	145-10.80(2.55)	330-4.75(1.10)	260-6.00(1.40)	507-3.10	875-1.80	730-2.15
41.	RMNH 26389	1745	1615	375-4.35	358(1.05)	145(2.60)	148-11.00(2.55)	313-5.20(1.20)	260-6.25(1.45)	530-3.05	900-1.80	750-2.15
42.	RMNH 26388	1820	1670	384-4.35	365(1.05)	140(2.75)	145-11.50(2.65)	325-5.15(1.20)	270-6.20(1.40)	545-3.05	950-1.75	800-2.10
43.	RMNH 26389	1930	1770	415-4.35	400(1.05)	155(2.70)	151-11.75(2.75)	346-5.10(1.20)	291-6.10(1.40)	567-3.10	975-1.80	810-2.20
44.	RMNH 26389	2030	1865	424-4.40	415(1.00)	156(2.70)	157-11.85(2.70)	365-5.10(1.15)	305-6.10(1.40)	615-3.05	1040-1.80	880-2.10
45.	RMNH 26388	2065	1880	447-4.20	440(1.00)	165(2.70)	167-11.30(2.65)	395-4.75(1.15)	308-6.15(1.45)	635-2.95	1050-1.80	870-2.15

	M	N	O	P	Q	R	S	T	U	V
1.	6-61(17.0)	79-4.65(1.30)	80-4.60(1.30)	73-5.05(1.40)	50-7.35(2.05)	25(4.10)	21(4.85)	54(1.90)	22+8	45/ 50
2.	7-68(18.0)	100-4.75(1.25)	102-4.65(1.20)	93-5.10(1.35)	60-7.90(2.10)	30(4.15)	26.5(4.70)	65(1.90)	21+9	60/ 50
3.	10-68(17.0)	160-4.60(1.05)	160-4.60(1.05)	147-4.65(1.15)	88-7.80(1.95)	38(4.50)	36(4.75)	93(1.85)	22+8	70/ 60
4.	10-70(17.5)	170-4.15(1.05)	156-4.50(1.10)	135-5.20(1.30)	89-7.90(1.95)	39(4.50)	38(4.60)	93(1.90)	21+9	70/ 60
5.	11-65(16.5)	172-4.15(1.00)	165-4.35(1.05)	144-5.00(1.25)	90-7.95(1.95)	40(4.40)	38(4.75)	95(1.85)	22+9	75/ 60
6.	11-71(17.0)	205-3.90(0.90)	180-4.30(1.00)	158-4.90(1.15)	96-8.10(1.90)	42(4.40)	41(4.50)	97(1.90)	21+9	75/ 65
7.	12-66(16.5)	187-4.20(1.05)	183-4.35(1.10)	160-4.95(1.25)	98-8.10(2.00)	44(4.45)	42(4.70)	103(1.90)	21+9	75/ 70
8.	12-70(17.0)	221-3.85(0.90)	201-4.20(1.00)	175-4.80(1.15)	110-7.65(1.85)	46(4.40)	45(4.55)	110(1.85)	21+9	80/ 75
9.	12-70(17.5)	220-3.85(0.95)	200-4.20(1.05)	165-5.10(1.25)	107-7.90(1.95)	47(4.45)	44(4.70)	110(1.90)	21+9	85/ 75
10.	12-80(18.5)	230-4.20(0.95)	235-4.10(0.95)	190-5.05(1.15)	120-8.00(1.85)	50(4.40)	48(4.60)	110(2.00)	20+10	90/ 85
11.	14-70(16.5)	238-4.10(0.95)	240-4.10(0.95)	190-5.15(1.20)	120-8.15(1.90)	50(4.60)	54(4.25)	125(1.85)	21+9	90/ 80
12.	14-71(17.0)	270-3.70(0.90)	235-4.25(1.00)	202-4.95(1.20)	123-8.10(1.95)	52(4.60)	52(4.60)	127(1.90)	20+10 / 21+9	95/ 85
13.	15-69(16.5)	271-3.80(0.90)	250-4.15(1.00)	195-5.30(1.25)	132-7.85(1.85)	56(4.35)	58(4.20)	132(1.85)	21+9 / 22+8	90/ 85
14.	15-69(16.0)	250-4.10(0.95)	259-4.00(0.95)	200-5.15(1.20)	130-7.95(1.85)	53(4.50)	52(4.60)	127(1.90)	21+9	90/ 85
15.	15-68(16.5)	262-3.90(0.95)	257-4.00(0.95)	200-5.20(1.25)	128-8.05(1.95)	54(4.60)	55(4.50)	132(1.90)	21+9	95/ 85

TABLE 4 (continued)

M	N	O	P	Q	R	S	T	U	V
16. 15-71(16.0)	245-4.40(0.95)	253-4.20(0.95)	200-5.30(1.20)	140-7.60(1.70)	54(4.45)	55(4.35)	122(1.95)	$\frac{20}{21}+\frac{10}{9}$	100/95
17. 16-67(15.5)	237-4.50(1.05)	285-3.75(0.85)	220-4.85(1.10)	150-7.10(1.65)	55(4.50)	58(4.20)	132(1.90)	21+9	95/95
18. 15-71(16.5)	260-4.10(0.95)	260-4.10(0.95)	220-4.85(1.10)	140-7.60(1.75)	54(4.60)	54(4.60)	128(1.95)	$\frac{20}{21}+\frac{10}{9}$	100/95
19. 15-72(16.0)	240-4.50(1.00)	250-4.30(0.95)	195-5.50(1.25)	130-8.25(1.85)	54(4.50)	54(4.50)	125(1.95)	21+9	95/90
20. 16-68(16.0)	285-3.85(0.90)	270-4.05(0.95)	220-4.95(1.20)	140-7.80(1.85)	55(4.75)	59(4.40)	135(1.95)	21+9	100/95
21. 17-65(14.5)	252-4.35(1.00)	278-3.95(0.90)	210-5.20(1.20)	143-7.65(1.75)	55(4.55)	56(4.45)	128(1.95)	20+10	100/95
22. 17-66(16.0)	317-3.65(0.85)	300-3.85(0.90)	230-5.00(1.20)	152-7.55(1.80)	61(4.45)	64(4.25)	150(1.80)	21+9	95/85
23. 17-68(16.5)	300-3.90(0.95)	294-4.00(0.95)	223-5.25(1.25)	151-7.75(1.85)	61(4.60)	64(4.35)	153(1.85)	21+9	100/85
24. 17-71(16.5)	320-3.75(0.90)	303-4.00(0.95)	236-5.10(1.20)	163-7.45(1.75)	63(4.50)	66(4.30)	148(1.90)	21+9	100/90
25. 17-73(16.0)	270-4.55(1.00)	355-3.45(0.80)	235-5.20(1.15)	170-7.20(1.60)	60(4.60)	65(4.25)	142(1.95)	20+10	100/95
26. 17-74(17.5)	320-3.95(0.90)	305-4.15(0.95)	244-5.20(1.20)	160-7.95(1.85)	65(4.55)	69(4.30)	160(1.85)	21+9	95/85
27. 18-72(17.0)	345-3.75(0.90)	325-4.00(0.95)	250-5.15(1.20)	170-7.60(1.80)	66(4.65)	68(4.50)	165(1.85)	21+9	95/85
28. 20-65(15.5)	340-3.85(0.90)	357-3.65(0.85)	260-5.05(1.20)	178-7.30(1.75)	67(4.60)	75(4.15)	165(1.85)	$\frac{21}{22}+\frac{9}{8}$	100/90
29. 18-72(17.0)	345-3.80(0.90)	335-3.90(0.90)	260-5.00(1.20)	170-7.65(1.80)	65(4.70)	74(4.10)	170(1.80)	21+9	95/90
30. 19-69(16.0)	340-3.90(0.85)	335-3.95(0.90)	253-5.20(1.20)	170-7.75(1.80)	67(4.55)	73(4.20)	175(1.75)	$\frac{21}{22}+\frac{9}{8}$	100/90
31. 20-66(15.5)	345-3.85(0.90)	327-4.05(0.95)	252-5.25(1.20)	166-7.95(1.85)	65(4.75)	72(4.30)	170(1.80)	22+8	105/95
32. 19-71(16.5)	345-3.90(0.85)	335-4.00(0.90)	260-5.15(1.20)	179-7.50(1.65)	68(4.60)	71(4.40)	170(1.85)	$\frac{21}{22}+\frac{9}{8}$	100/90
33. 21-65(15.5)	367-3.75(0.90)	350-3.95(0.95)	270-5.10(1.20)	180-7.65(1.80)	68(4.80)	72(4.45)	180(1.80)	21+9	105/95
34. 21-66(15.5)	363-3.80(0.90)	345-4.05(0.95)	260-5.35(1.25)	170-8.20(1.90)	67(4.80)	72(4.45)	178(1.80)	$\frac{20}{21}+\frac{10}{9}$	105/95
35. 20-70(16.5)	370-3.80(0.90)	354-3.95(0.95)	265-5.30(1.25)	187-7.50(1.75)	73(4.55)	76(4.35)	185(1.80)	21+9	105/95
36. 22-65(15.0)	364-3.90(0.90)	390-3.65(0.85)	275-5.15(1.20)	195-7.25(1.70)	70(4.75)	77(4.25)	180(1.85)	21+9	100/85
37. 22-66(15.0)	360-4.00(0.95)	415-3.50(0.80)	290-5.00(1.15)	195-7.40(1.75)	70(4.80)	82(4.10)	190(1.80)	$\frac{20}{21}+\frac{10}{9}$	100/90
38. 22-67(16.0)	400-3.70(0.90)	380-3.90(0.95)	300-4.90(1.15)	195-7.75(1.75)	77(4.55)	80(4.40)	190(1.85)	$\frac{21}{22}+\frac{9}{8}$	115/95
39. 23-67(16.0)	395-3.90(0.95)	395-3.90(0.95)	290-5.25(1.25)	200-7.65(1.80)	75(4.85)	80(4.55)	205(1.80)	21+9	105/100
40. 24-65(15.5)	395-3.95(0.95)	390-4.05(0.95)	290-5.35(1.25)	200-7.80(1.85)	77(4.80)	82(4.50)	205(1.80)	21+9	110/100
41. 24-68(15.5)	420-3.90(0.90)	445-3.70(0.85)	310-5.25(1.20)	215-7.60(1.75)	77(4.90)	89(4.20)	210(1.80)	$\frac{21}{22}+\frac{9}{8}$	110/90
42. 25-67(15.5)	410-4.10(0.95)	440-3.80(0.85)	310-5.40(1.20)	215-7.75(1.80)	76(5.00)	88(4.35)	220(1.75)	21+9	110/100
43. 26-68(16.0)	415-4.25(1.00)	515-3.45(0.80)	340-5.20(1.20)	237-7.50(1.75)	79(5.25)	100(4.15)	238(1.75)	21+9	125/120
44. 27-69(15.5)	450-4.15(0.95)	535-3.50(0.80)	355-5.25(1.20)	250-7.50(1.70)	81(5.25)	97(4.35)	245(1.75)	$\frac{20}{21}+\frac{10}{9}$	120/110
45. 30-63(15.0)	493-3.85(0.90)	550-3.45(0.85)	360-5.25(1.25)	270-7.00(1.65)	86(5.20)	106(4.20)	258(1.75)	21+9	125/120

not markedly prolonged or only moderately so, and without filaments.

For additional morphological information I refer to the accompanying table and plate.

The specimens are rather brownish with dark brown, irregularly distributed blotches, which on the upper surface may be arranged in rather fragmentary transverse bands especially in small examples; the lower surface is pale, yellowish. The spines and most of the finrays are covered with series of dark blotches, on the dorsal fin distinctly situated in transverse series, less regular on pectorals and ventrals, but lacking on the yellowish anal fin. The caudal fin has a dark triangular patch at the basal centre, followed by a dark crossband and dark fin tips.

Habitat and distribution. — Most specimens were collected in shallow water, in or around rapids, usually in pools among the rocks, and occasionally in creeks with a bottom of sand and gravel, and a few rocks. They appear to need well aerated water, and therefore probably are not able to subsist in the Brokopondo Lake. The species has been found in the Coppename River and occurs from there eastwards at least unto the Marowijne River basin. It is remarkable that the species was not found in the Saramacca River, but collecting there has not by far been exhaustive.

Remarks. — Two specimens listed among the available material have

TABLE 5

Tabulated morphological data on *Harttia loricariformis* Steindachner.

	A	B	C	D	E	F	G	H	I	J	K
1.	BM 89-11-14-63	1480	1330	328-4.05	306(1.05)	115(2.85)	110-12.00(3.00)	280-4.75(1.20)	22.0-6.05(1.50)	460-2.90	720-1.85

	L	M	N	O	P	Q	R	S	T	U	V
1.	566-2.35	25-53(13.0)	304-4.40(1.20)	338-3.95(0.95)	270-4.95(1.20)	185-7.20(1.80)	57(5.80)	84(3.90)	180(1.85)	23+6	80/70

already previously been reported from Surinam, but were erroneously identified as *Harttia loricariformis* Steindachner (Van der Stigchel, 1946: 180; 1947: 180; and Boeseman, 1952: 182). Both (RMNH 11001 & 18206) evidently belong to the present species, as may be seen by consulting the accompanying table. *H. loricariformis* is quite a different species, as becomes apparent when comparing table 5 with table 4; especially the point where the two lateral ridges meet is situated much more backward in *H. loricariformis,* which moreover seems to be restricted to SE Brazil.

The only other species of the genus *Harttia*, as here delimited, recorded from the Guyanas appears to be *H. fowleri* (Pellegrin, 1908), of which species I examined the single known specimen (MNHN 01-372, holotype). The data for this specimen are given in table 6, and show it to be closely related with the present species but slightly more slender, with a somewhat larger eye diameter, a smaller interorbital width, a slightly shorter snout, and a different meeting point of the lateral ridges. See also plate 4.

TABLE 6

Tabulated morphological data on *Harttia fowleri* (Pellegrin).

	A	B	C	D	E	F	G	H	I	J	K	L
1.	MNHN 01-372	1575	1440	330-4.35	300(1.10)	130(2.55)	135-10.65(2.45)	268-5.30(1.25)	215-6.65(1.55)	468-3.05	823-1.75	687-2.10

	M	N	O	P	Q	R	S	T	U	V
1.	20-71(16.5)	370-3.85(0.89)	398-3.65(0.85)	305-4.65(1.10)	217-6.60(1.50)	73(4.50)	70(4.70)	176(1.90)	19+11	90/85

Etymology. — Named after Surinam, the territory which seems to represent its main area of distribution.

Parasturisoma Ribeiro

Parasturisoma Ribeiro, 1911: 109 (type species *Loricaria brevirostris* Eigenmann & Eigenmann, 1889, by monotypy).

Lamontichthys Ribeiro, 1939: 12 (type species *Harttia filamentosa* La Monte, 1935, by original designation).

Parasturisoma maculata nov. spec.

(plate 5; table 7)

Harttia platystoma nec Eigenmann, Van der Stigchel, 1946: 181, 1947: 181 (Lucie River, Surinam).

Material. — Holotype, RMNH 26381, Sipaliwini, near airstrip, upper Corantijn River basin, Surinam, 23 January 1966, leg. Dr. G. F. Mees (Brokopondo Research 1965/66), 1 ex., 170 mm; — Paratypes, ZMA 106.522, Kamaloea (or Saloea) Creek, right tributary of the Marowijne River 9 km SE of the outlet of the Gran Creek, French Guyane, 24 April 1967, leg. Dr. H. Nijssen (Brokopondo Research 1966/67), 14 ex., 125-165 mm; — RMNH 25063, Suriname River near Brokopondo, Surinam, 20 March 1965, leg. Dr. G. F. Mees (Brokopondo Research 1965/66), 1 ex., 102 mm; — RMNH 25342, rapids in Gran (or Marowijne) Creek, about 4 km from outlet into Suriname River, Surinam, 6 May 1964, leg. Dr. M. Boeseman (Brokopondo Research 1963/64), 1 ex., 73 mm; — RMNH 26382, pool below Feddiprati (rapids), middle Saramacca River, Surinam, 9 April 1964, leg. Dr. M. Boeseman (Brokopondo Research 1963/64), 5 ex., 85.5-101.5 mm; — ZMA 106.345, right tributary of the Gran Rio, 4 km NE of Awaradam, upper Suriname River basin, Surinam, 31 January 1967, leg. Dr. H. Nijssen (Brokopondo Research 1966/67), 2 ex., 110 & 137 mm; — RMNH 26381, Sipaliwini, near airstrip, upper Corantijn River basin, Surinam, 23 January 1966, leg. Dr. G. F. Mees (Brokopondo Research 1965/66), 4 ex., 86-141.5 mm; — ZMA 106.390, left tributary of Coppename River (03°52'N, 56°55'W), Surinam, 18 May 1967, leg. Dr. H. Nijssen (Brokopondo Research 1966/67), 1 ex., 80 mm; — RMNH 26383, Zandvallen, Kabalebo River, Corantijn River basin, Surinam, 23 September 1965, leg. Dr. G. F. Mees (Brokopondo Research 1965/66), 1 ex., 44.5 mm; — ZMA 106.519, rapids in Kleine Saramacca, about 14 km ESE of outlet into Saramacca River, Surinam, 28 February 1967, leg. Dr. H. Nijssen (Brokopondo Research 1966/67), 10 ex., 126-163 mm; — ZMA 106.518, right tributary of Kleine Saramacca, about 11 km ESE of outlet into Saramacca River, Surinam, 27 February 1967, leg. Dr. H. Nijssen (Brokopondo Research 1966/67), 14 ex., 124-152 mm; — RMNH 17332, Lucie River, Corantijn River basin, Surinam, 1 December 1910, leg. J. F. Hulk (Corantijn Expedition 1910/11), 2 ex., 90 & 156 mm (previously recorded as *Harttia platystoma* (Günther)).

Diagnostic characters. — A slender, elongate species, with moderate but distinct lateral keels; the scutes are slightly rough but not distinctly spinose, covering the whole of the rather convex dorsal surface and the flat belly, the abdominal cover being incomplete at a size of 44.5 mm and probably lacking in smaller examples; peduncle distinctly depressed. Outer caudal rays and dorsal spine occasionally with a slight tendency towards becoming filamentous.

Description. — D I.7; A i.5; P I.6; V i.5.

A moderately sized species, presumably not reaching a size of more than perhaps 20 cm, with a narrow body and peduncle increasing the impression of its elongation. The upper surface of the anterior parts is rather convex, but the flattening is evident behind the dorsal fin, from where the caudal peduncle also gradually becomes more narrow, the lateral margins of the final third or quarter of the peduncle being almost parallel. The lower surface is rather flat and, like the upper parts, is covered with roughened scutes, appearing smooth to the naked eye; only the throat is widely naked between two large triangular covered parts before both gill apertures. Only in the smallest example available (44.5 mm) the belly is partly covered, making it likely that still smaller specimens have a naked belly. There are no distinct keels on body and head, but there is a variably developed median blunt ridge on the snout; the lateral keels are distinct and narrowly rounded, completely coalescing on the posterior part of the peduncle. The number of scutes in a longitudinal lateral series is usually 20+10, less frequently 19+11 or 21+9, seldom 19+10 or 20+11. There are three preanal scutes between anal fin and vent.

TABLE 7

Tabulated morphological data on *Parasturisoma maculata* nov. spec.

	A	B	C	D	E	F	G	H	I	J	K	L
1.	RMNH 26383	475	445	98-4.50	79(1.25)	38(2.60)	40-11.00(2.45)	60-7.40(1.40)	50-8.80(1.95)	145-3.10	260-1.70	215-2.05
2.	RMNH 25342	760	730	155-4.70	115(1.35)	64(2.40)	61-12.00(2.55)	104-7.00(1.50)	90-8.10(1.70)	225-3.25	430-1.70	360-2.05
3.	ZMA 106.390	840	790	170-4.70	130(1.30)	74(2.30)	75-10.60(2.25)	115-6.85(1.45)	93-8.50(1.80)	250-3.15	483-1.65	400-2.00
4.	RMNH 26382	915	855	185-4.65	140(1.30)	77(2.40)	86-10.00(2.15)	133-6.50(1.40)	114-7.55(1.65)	260-3.30	510-1.70	430-2.00
5.	RMNH 26381	930	860	184-4.70	140(1.30)	80(2.30)	85-10.10(2.15)	130-6.60(1.40)	110-7.80(1.70)	270-3.20	510-1.65	430-2.00
6.	RMNH 26382	985	935	195-4.80	150(1.30)	84(2.35)	92-10.10(2.10)	140-6.65(1.40)	120-7.75(1.65)	282-3.30	560-1.65	470-2.00
7.	RMNH 26382	990	955	195-4.90	150(1.30)	83(2.35)	92-10.30(2.10)	143-6.65(1.35)	123-7.70(1.60)	280-3.40	565-1.70	470-2.00
8.	RMNH 26382	1075	1015	210-4.85	165(1.25)	90(2.35)	103- 9.85(2.05)	160-6.35(1.30)	140-7.30(1.50)	300-3.40	610-1.65	510-2.00
9.	RMNH 26382	1075	1015	210-4.85	165(1.25)	90(2.35)	100-10.15(2.10)	160-6.35(1.30)	140-7.30(1.50)	310-3.30	605-1.70	510-2.00
10.	RMNH 25063	1090	1020	212-4.80	167(1.25)	96(2.20)	110- 9.30(1.90)	160-6.35(1.30)	135-7.55(1.55)	310-3.30	620-1.65	505-2.00
11.	ZMA 106.345	1155	1075	220-4.90	170(1.30)	95(2.30)	108- 9.95(2.05)	163-6.60(1.35)	136-7.90(1.60)	320-3.35	645-1.65	545-2.00
12.	RMNH 26381	1430	1345	280-4.80	230(1.20)	122(2.35)	145- 9.30(1.95)	210-6.40(1.35)	175-7.65(1.60)	405-3.30	815-1.65	680-2.00
13.	ZMA 106.345	1435	1355	280-4.85	230(1.20)	125(2.25)	150- 9.05(1.90)	228-5.95(1.25)	180-7.50(1.55)	412-3.30	800-1.70	660-2.05
14.	RMNH 26381	1495	1390	295-4.70	250(1.20)	125(2.35)	145- 9.50(2.05)	220-6.30(1.35)	185-7.50(1.60)	435-3.20	840-1.65	695-2.00
15.	RMNH 26381	1510	1415	285-4.95	230(1.20)	120(2.35)	142-10.00(2.00)	220-6.40(1.30)	180-7.90(1.55)	410-3.45	880-1.60	730-1.95
16.	RMNH 26381	1820	1700	360-4.75	305(1.20)	165(2.20)	190- 8.95(1.90)	280-6.10(1.30)	230-7.40(1.55)	520-3.25	1030-1.65	845-2.00

	M	N	O	P	Q	R	S	T	U	V
1.	5 -89(19.5)	100 -4.45(1.00)	97-4.60(1.00)	84-5.30(1.15)	62-7.20(1.60)	23(4.25)	23(4.25)	50(1.95)	21+9	35/35
2.	8 -91(19.5)	155 -4.70(1.00)	143-5.10(1.10)	130-5.60(1.20)	105-6.95(1.45)	35(4.45)	34(4.55)	75(2.05)	20+10	45/40
3.	9 -88(19.0)	180 -4.40(0.95)	155-5.10(1.10)	146-5.40(1.15)	108-7.30(1.55)	39(4.35)	40(4.25)	85(2.00)	20+10	45/40
4.	10 -86(18.5)	210 -4.10(0.90)	190-4.50(0.95)	165-5.20(1.10)	130-6.60(1.40)	42(4.40)	43(4.30)	95(1.95)	20+10	45/40
5.	10 -86(18.5)	$200^{+}-4.3^{-}(0.9^{-})$	190-4.50(1.00)	165-5.20(1.15)	125-6.85(1.50)	42(4.45)	43(4.35)	95(2.00)	20+10	45/40
6.	11 -85(17.5)	225 -4.15(0.85)	215-4.45(0.90)	180-5.20(1.10)	135-6.90(1.45)	44(4.45)	44(4.45)	100(1.95)	20+10	45/40
7.	11 -86(17.5)	210 -4.50(0.95)	200-4.75(0.95)	170-5.60(1.15)	135-7.05(1.45)	44(4.45)	45(4.35)	100(1.95)	19+10	45/40
8.	11.5-88(18.5)	255 -3.95(0.85)	230-4.40(0.90)	205-4.95(1.00)	150-6.75(1.40)	47(4.50)	48(4.40)	110(1.90)	19+11	50/45
9.	11.5-88(18.5)	265 -3.85(0.80)	240-4.25(0.85)	200-5.10(1.05)	160-6.35(1.30)	45(4.70)	49(4.30)	105(2.00)	20+10	60/50
10.	12 -85(17.5)	250 -4.10(0.85)	230-4.45(0.90)	195-5.25(1.10)	155-6.60(1.35)	45(4.65)	49(4.30)	110(1.90)	$\frac{19}{20}+\frac{11}{10}$	50/45
11.	13 -83(17.0)	260 -4.15(0.85)	240-4.45(0.90)	200-5.35(1.10)	160-6.75(1.35)	46(4.85)	51(4.30)	115(1.90)	21+9	50/50
12.	16 -84(17.5)	395 -3.40(0.70)	365-3.70(0.75)	265-5.10(1.05)	220-6.10(1.25)	60(4.65)	62(4.50)	150(1.85)	20+10	65/60
13.	16 -85(17.5)	345 -3.95(0.80)	335-4.05(0.85)	265-5.10(1.05)	205-6.60(1.35)	58(4.85)	64(4.40)	150(1.85)	20+10	55/50
14.	17 -82(17.5)	360 -3.90(0.80)	360-3.90(0.80)	280-4.95(1.05)	225-6.20(1.30)	60(4.90)	65(4.55)	155(1.90)	$\frac{19}{20}+\frac{11}{10}$	65/55
15.	17 -83(16.5)	$335^{+}-4.2^{-}(0.8^{-})$	330-4.30(0.85)	265-5.30(1.05)	195-7.25(1.45)	60(4.70)	62(4.60)	145 (1.95)	20+11	65/60
16.	21 -81(17.0)	$445^{+}-3.8^{-}(0.8^{-})$	430-3.95(0.85)	315-5.40(1.15)	255-6.70(1.40)	73(4.95)	80(4.50)	190(1.90)	$\frac{19}{20}+\frac{11}{10}$	65/60

Length of head 4.5-4.95 in standard length, decreasing with age; width and depth of head 1.2-1.35 and 2.2-2.6 in head length, increasing with age. Width of body at origin of dorsal fin 1.25-1.5, at origin of anal fin 1.5-1.95 in head length, both increasing with age; or 5.95-7.4 and 7.3-8.8 in standard length, respectively, illustrating the same allometry. Depth of body at origin of dorsal fin 1.9-2.55 in head length, 9-12 in standard length, increasing with age. Minimum depth of caudal peduncle 16.5-19.5 in head length, 81-91 in standard length, apparently slightly increasing with age (see diagrams 14 and 15).

Predorsal length 3.1-3.45, postdorsal length 1.6-1.7, postanal length 1.95-2.05, in standard length, with the anterior part of the body slightly decreasing and the posterior part increasing with age.

The head is rather narrow, with the snout pointed, the outline in dorsal view about ogival. Snout length 1.85-2.05 in head length; maximum (horizontal) eye diameter 4.25-4.95; interorbital width 4.25-4.6 in head length; the snout length increasing and the eye diameter decreasing with age. The inferiorly situated mouth has a densely papillose, semi-ovate lower lip, with very short triangular barbels; the margins of both lips too are papillose. The slender bilobed teeth form a comb composed of about 35-65 teeth on each side of the upper jaw, and 35-60 on each mandible, the numbers evidently increasing with age.

The dorsal fin originates above or slightly before the insertion of the ventrals, the dorsal spine is about equal to head length in juveniles but distinctly surpassing head length in adults: its length being 0.7 or 0.8 in head length and the dorsal strongly falcate in shape. The pectoral spine is of the same size as the dorsal spine or slightly shorter, and shows the same tendency towards relative lengthening; it is slightly curved inwards, but the tip may be straight or even slightly curved outwards; the pectoral fin is strongly falcate in shape. The caudal fin is lunate in shape with both lobes subequal or, usually, with the upper lobe somewhat longer. All rays and especially the spines are rough to the touch, being covered with small spinules hardly or not perceptible to the naked eye. Especially the dorsal spine and the upper ray of the caudal fin show a distinct tendency towards becoming filamentous in the adults; possibly they are slightly filamentous already, but in all larger examples the tips appear to be mutilated.

Additional morphological characters are given in the accompanying table or may be observed in plate 5.

The specimens are yellowish brown or light brown with many small, rather poorly defined spots on the dorsal surface, the ventral surface being pale yellowish. The spots may form dark wavy lines or bands on the head, and on the posterior body and the peduncle usually form two dorso-lateral bands, and a single median band between dorsal and caudal fins. Excepting the anal fin in young specimens, all fins are more or less spotted, especially the spines and, in anal and ventral fins, the first rays. In young specimens the spots may form cross bands, but in larger examples these become obscure, being only more or less retained on the dorsal fin. The caudal fin usually has a lunate basal spot, followed by numerous small spots, and one or a few cross bands on the upper lobe; the lower lobe less regularly marked, with a dark blotch or band often connected with the lunate basal spot.

Habitat and distribution. — As the previous species, the present has been collected mostly in rapids or in pools around rapids, both in the main rivers and in smaller tributaries, in shallow flowing water over a bottom of rock, sand or gravel. There appear to be no differences in habitat between juveniles and adult specimens, and all seem to need well aerated water, making it unlikely that the species survives in the semi-stagnant Brokopondo Lake. The species has been found from the Marowijne to the Corantijn River basin, and its distributional area may well extend into French Guyane and, possibly, Guyana, though in the last named country it seems to be replaced by the closely related species *P. platystoma* (Günther, 1868), recorded from the Essequibo River and, erroneously?, from "Surinam".

TABLE 8

Tabulated morphological data on *Parasturisoma platystoma* (Günther).

	A	B	C	D	E	F	G	H	I	J	K	L
1.	FMNH 53081	629	592	136-4.35	102(1.35)	50(2.70)	47-12.60(2.90)	85-7.00(1.60)	69-8.60(2.00)	179-3.30	349-1.70	293-2.00
2.	FMNH 53081	851	790	164-4.85	131(1.25)	68(2.40)	63-12.55(2.60)	111-7.15(1.50)	95-8.35(1.70)	229-3.50	486-1.65	405-1.95
3.	FMNH 53082	1160	1090	215-5.10	180(1.20)	88(2.45)	92-11.85(2.35)	158-6.90(1.35)	131-8.30(1.65)	315-3.45	678-1.60	576-1.90
4.	FMNH 53081	1577	1475	282-5.20	230(1.25)	113(2.50)	129-11.45(2.20)	215-6.85(1.30)	187-7.90(1.50)	417-3.55	936-1.60	780-1.90
5.	BM 66.8.14. 124.8	1650	1550	300-5.15	236(1.25)	125(2.40)	145-10.70(2.10)	235-6.60(1.30)	195-7.95(1.55)	458-3.40	975-1.50	820-1.90

	M	N	O	P	Q	R	S	T	U	V
1.	6.5- 91(21.0)	128 -4.65(1.05)	126-4.70(1.10)	105-5.65(1.30)	79-7.50(1.70)	28(4.85)	29(4.70)	70 (1.95)	$\frac{20+10}{21+9}$	45/40
2.	8 -100(20.5)	190 -4.20(0.85)	173-4.60(0.95)	141-5.65(1.15)	105-7.60(1.55)	34(4.85)	37(4.45)	83 (2.00)	19+11	45/42
3.	11 -100(19.5)	289 -3.80(0.75)	247-4.40(0.85)	205-5.35(1.05)	157-7.00(1.40)	46(4.70)	47(4.60)	115(1.90)	21+9	45/45
4.	17 - 87(16.5)	402 -3.65(0.70)	387-3.80(0.75)	284-5.20(1.00)	212-6.95(1.35)	56(5.00)	60(4.70)	148(1.90)	21+9	70/60
5.	18 - 86(17.0)	470^{+}-3.3^{-}(0.64^{-})	425-3.65(0.70)	290-5.35(1.05)	240-6.45(1.25)	60(5.00)	67(4.50)	163(1.85)	20+10	70/55

Remarks. — The present species has occasionally been confused with *P. platystoma* (Günther) (Van der Stigchel, 1946: 181; 1947: 181, record based on RMNH 17332). Both the data included in table 8 and the plate (6) of the syntype of *P. platystoma*, when compared with the table and plate concerning *P. maculata*, show several differences between these species: *P. platystoma* has a smaller head, a slightly lower and more slender body, smaller eyes, and considerably longer dorsal and pectoral spines and (upper) caudal lobes, with filamentous prolongations.

Etymology. — Macula (lat.), spot.

Farlowella Eigenmann & Eigenmann

Acestra Kner, 1853: 75 (type species *Acestra acus* Kner, 1853, by subsequent designation of Bleeker, 1862; preoccupied by *Acestra* (Jardine MS.) Bonaparte, 1846, in Pisces; and by *Acestra* Dallas, 1852, in Hemiptera).

Farlowella Eigenmann & Eigenmann, 1889: 32 (type species *Acestra acus* Kner, 1853; substitute name for *Acestra* Kner, 1853).

Farlowella reticulata nov. spec.

(plates 7 & 8; table 9)

Material. — Syntypes, ZMA 106.174, Maka Creek, left tributary of the Lawa River 10 km S of Stoelmanseiland, Marowijne River basin, Surinam, 21 April 1967, leg. Dr. H. Nijssen (Brokopondo Research 1966/67), 3 ex., 95.5-118.5 mm.

Diagnostic characters. — In general morphology only slightly differing from the other Surinam species by a somewhat more robust body, wider and shorter head, and larger fins, but in squamation easily to be distinguished by its single median row of scutes on the abdomen; the scutes on head and anterior part of the body present a reticulation, the borders being distinctly darker than the ground colour.

Description. — D I.6; A i.5; P I.5; V i.4.

A slender, elongate species, rather roundish in cross-section, but with most of the abdomen flattened, wholly covered with slightly rough scutes, also on the lower surface of the projecting snout, only the area covered by the lower lip naked. The large postocular scute covered with spinose reticulate ridges, the interspaces smooth. The keels on the body and along the caudal peduncle are moderate and rounded, those on the peduncle coalescing. Scute number in longitudinal lateral series 14+20 or 15+19, the point of coalescence being situated more backwards than in the other Surinam species of *Farlowella*. Eight scutes between supraoccipital and dorsal fin. Three (pairs of) preanal scutes, but the second pair hardly or not meeting at the median line, the first before the anal fin single and projecting between those situated immediately before it.

The body depth is 4.35-5.85, at dorsal origin 5.1-6.5 in head length, in standard length 16-22 and 19-24.5, respectively. Body width 3.35-4.7, at anal origin 5.05-6.2 in head length, in standard length 12.5-17.5 and 18.5-23.5, respectively. Minimum depth of peduncle 27-30 in head length.

Predorsal length 2.15-2.2, postdorsal length 2.0-2.05, postanal length 1.95-2.1, in standard length; length before vent 2.4-2.5 in standard length.

Head length 3.6-3.75 in standard length; head width 3.75-4.3, head depth 4.9-6.0, in head length. Distance between supraoccipital and dorsal fin 1.45-1.5 in head length. The oral disc, situated well backward on the lower surface, is circular or ovate in shape, the lower lip and all margins are

TABLE 9

Tabulated morphological data on *Farlowella reticulata* nov. spec.

	A	B	C	D	E	F	G	H	I	J	K
1.	ZMA 106.174	1015	955	265-3.60	67(3.95)	48(5.50)	48-20.0(5.50)	44-21.5(6.00)	61-15.5(4.35)	47-20.5(5.65)	440-2.15
2.	ZMA 106.174	1180	1115	305-3.75	71(4.30)	51(6.00)	52-22.0(5.85)	47-24.5(6.50)	65-17.5(4.70)	49-23.5(6.20)	517-2.20
3.	ZMA 106.174	1260	1185	317-3.70	85(3.75)	65(4.90)	75-16.0(4.35)	62-19.0(5.10)	95-12.5(3.35)	63-18.5(5.05)	537-2.20

	L	M	N	O	P	Q	R	S	T
1.	476-2.00	477-2.00	395-2.40	176-5.40(1.50)	9-106(29)	141-6.75(1.90)	98- 9.75(2.70)	72-13.20(3.70)	129-7.40(2.05)
2.	556-2.05	555-2.10	464-2.50	212-5.40(1.45)	10-112(30)	-	107-10.75(2.85)	80-14.40(3.80)	144-8.00(2.10)
3.	596-2.00	597-1.95	485-2.45	220-5.35(1.45)	12- 98(27)	195-6.00(1.65)	140- 8.40(2.25)	100-11.85(3.15)	165-7.20(1.90)

	U	V	W	X	Y	Z	AA	BB	CC	DD	EE
1.	17 -56(15.5)	200-4.75(1.30)	123-7.80(2.15)	43-22(6.15)	46-20.5(5.75)	15+19	8	21+1	21+1	1	25/20
2.	19+-60(15.5)	231-5.00(1.30)	150-7.70(2.05)	48-24(6.35)	55-21.0(5.50)	14+20 / 15+19	8	21+1	21+1	1	26/21
3.	24 -49(13.0)	228-5.15(1.40)	127-9.20(2.50)	59-20(5.40)	66-18.0(4.80)	14+20 / 15+19	8	21+1	21+1	1	26/22

provided with small papillae, and with very small triangular barbels. The teeth are very fine, bilobed, and form combs on each half of the jaws: upper jaw 25-26, lower jaw 20-22 teeth on each half. Eye diameter 13.0-15.5, snout length 1.3-1.4, interorbital width 5.4-6.35, in head length, or in standard length 49-60, 4.75-5.15, and 20-24, respectively. Length of lower snout cover 2.05, 2.15, 2.50 in head.

The dorsal fin originates slightly before the anal fin; the length of the dorsal spine is considerable, 1.65(-1.9) in head length, but not really filamentous at the top; the subsequent rays rapidly diminish in length, the fin being falcate in shape. Pectoral spines rather weak, 2.25-2.85 in head length; the anal rays rather long, the first about 2 in head length. The caudal fin deeply emarginate, with the upper and lower rays strongly elongated and filamentous, their total length surpassing head length in the single example with an undamaged caudal fin.

For additional morphological information I refer to the accompanying table and plates 7 and 8.

The available specimens are wholly brownish, with the lower surface hardly lighter, the oral disc is pale. Especially on the head and anterior body the scutes have narrow dark margins, presenting a reticulate pattern, evident also on plate 8. There are distinct remains of a dark lateral band reaching (at least) from the eye to the anterior peduncle. The spines and most of the finrays have spots, irregularly distributed or more or less in transverse rows, and of variable intensity; the caudal fin has the greater part of the dorsal half (except the filament) dark, the lower half has only the basal and distal parts dark while the lower ray shows a series of blotches.

Habitat and distribution. — The species is only known from a single locality, where it was found in a creek with a depth of 30-120 cm, 4 m wide. Considering the poor swimming abilities and the known distribution of other species of the genus *Farlowella*, it seems likely that the present form will be found to occur only in a limited area in Surinam and, probably, in French Guyane.

Remarks. — Some of the characters show quite a large range of variation, but this seems merely the result of the fact that the largest specimen available has a distinctly shorter snout, which seems aberrant. Therefore, this specimen does not seem fit for selection as a holotype.

Gosline (1945) lists 26 nominal species in the genus *Farlowella*, while Salazar (1964) added another five species; the specimens of my three Surinam species were compared with descriptions and, whenever available, figures of all of these, but each showed various differences. Considering the apparently limited extent of the distributional areas, *Farlowella hargreavesi* Eigenmann (1912), from Guyana, seemed to be the only species that could be expected to occur in Surinam. It appears to differ from the present species by having a distinctly expanded snout tip and a series of seven scutes between supraoccipital and dorsal fin, as well as by some proportional differences.

Etymology. — Reticulatus (lat.), net-like.

Farlowella rugosa nov. spec.

(plates 7 & 8; table 10)

Material. — Syntypes, ZMA 106.208, Kamaloea (or Saloea) Creek, right tributary of the Marowijne River, 9 km SE of the outlet of the Gran Creek, French Guyane, 24 April 1967, leg. Dr. H. Nijssen (Brokopondo Research 1966/67), 2 ex., 80.2 & 99.5 mm.

Diagnostic characters. — Body slightly more slender, dorsal, pectoral and ventral fins smaller, than in the other species here recorded; abdomen without median scute series; body with rather distinct keels; scutes very rough, covered with numerous small spinules, but the large postocular scute with smooth areas.

Description. — A slender, elongate species, neglecting the flattened belly and oral region oval in cross-section, wholly covered with very rough scutes, which are densely set with numerous small spinules more or less arranged in longitudinal rows, with the exception of an oval naked area around the oral disc. The latero-ventral scutes meet along the abdominal median line. The surface structure of the scutes gives the impression of being wrinkled (see plate 8). The large postorbital scute is smooth, with only a few irregular series of spinules. The keels on head, body and peduncle are rather distinct, less rounded than in the preceding species, the lateral keels becoming very close at the 13th or 14th scute of the lateral series, but coalescing only close before the end of the peduncle. Scute number in longitudinal lateral series 12+22 or 23, or 13+22. Seven scutes between supraoccipital and dorsal fin. Three scutes (or pairs) between anal fin and vent, the single scute immediately before the anal fin projecting forwards between the next pair, which do not meet at the median line.

The body depth is 6.7-6.9, at dorsal origin 7.1 in head length, in standard length 23-24.5 and 24.5-25, respectively. Body width 5.1-5.15, at anal origin 6.7-6.8 in head length, in standard length 17.5-18 and 23-23.5, respectively. Minimum depth of peduncle 36 in head length.

Predorsal length 2.15, postdorsal length 2.0, postanal length 2.0, in standard length; length before vent 2.35-2.4 in standard length.

Head length 3.4-3.5 in standard length; head width 4.7-4.75, head depth

TABLE 10

Tabulated morphological data on *Farlowella rugosa* nov. spec.

	A	B	C	D	E	F	G	H	I	J	K
1.	ZMA 106.208	855	802	235-3.40	50(4.70)	39(6.05)	35-23.0(6.70)	33-24.5(7.10)	46-17.5(5.10)	35-23.0(6.70)	374-2.15
2.	ZMA 106.208	1060	995	284-3.50	60(4.75)	46(6.20)	41-24.5(6.90)	40-25.0(7.10)	55-18.0(5.15)	42-23.5(6.80)	464-2.15

	L	M	N	O	P	Q	R	S	T
1.	400-2.00	400-2.00	342-2.35	141-5.70(1.65)	6.5-120(36)	115-7.00(2.05)	75-10.70(3.15)	51-15.70(4.60)	104-7.70(2.25)
2.	498-2.00	498-2.00	416-2.40	178-5.60(1.60)	8 -125(36)	142-7.00(2.00)	88-11.50(3.25)	63-15.80(4.50)	126-7.80(2.25)

	U	V	W	X	Y	Z	AA	BB	CC	DD	EE
1.	15.5-52(15.0)	176-4.55(1.35)	114-7.05(2.05)	33-24(7.10)	44-18.2(5.35)	$\frac{12}{13}+\frac{23}{22}$	7	22+1	22+1	0	22/20
2.	18 -55(16.0)	214-4.65(1.35)	141-7.05(2.00)	39-26(7.30)	52-19.0(5.45)	$\frac{12}{13}+22$	7	22+1	22+1	0	23/20

6.05-6.2, in head length. Distance between supraoccipital and dorsal fin 1.6-1.65 in head length. The roundish oral disc has small papillae along the lip margins and on the moderately developed lower lip, which covers only part of the naked throat area; the barbels are very small, broadly triangular in shape. The fine, bilobed teeth form combs consisting on each half of the upper jaw of about 22 or 23 teeth, on each mandible of about 20. Eye diameter 15-16, snout length 1.35, and interorbital width 7.1-7.3, in head length, or in standard length 52-55, 4.55-4.65, and 24-26, respectively. Length of lower snout cover 2.0-2.05 in head length.

The dorsal fin originates distinctly before the anal fin; the dorsal spine is slender, about 2 in head length, and flexible, but not filamentous at the end, the rays are shorter and rapidly decrease in length towards the small final ray. The pectoral spine too is slender and rather flexible, its length very moderate, 3.15-3.25 in head length. The first anal ray is relatively shorter than in the two other species, 2.25 in head length. The caudal fin is emarginate, with pointed lobes, broken off in the two syntypes but probably ending filamentous. The rays and especially the spines are covered with spinules.

Additional morphological data may be found in the accompanying table, and by consulting the plates 7 and 8.

The specimens are brown, the ventral surface somewhat lighter and especially the abdomen and lower surface of the head rather pale. Variably distinct spots or blotches occur on the (anterior) rays or spines, not forming regular series, while on the caudal there are two longitudinal dark bands, one on each lobe, the outer and about four median rays being pale. There are no distinct indications of a dark longitudinal band along lateral body and peduncle.

Habitat and distribution. — The present species is only known from the type locality, in French Guyane, but so near to the bordering Marowijne River that it may be expected to occur also in the adjacent part of Surinam.

It was collected in a forest creek, 4-8 m wide and with a depth of 30-200 cm, with a sandy or gravel bottom, in flowing water.

Remarks. — The two specimens have been compared with the descriptions and available figures of all recorded species, but appear to differ from each. From *F. hargreavesi* Eigenmann, from Guyana, it is easily distinguishable by its lacking a median abdominal scute row.

Etymology. — Rugosus (lat.), wrinkled.

Farlowella parvicarinata nov. spec.

(plates 7 & 8; table 11)

Material. — Syntypes, ZMA 105.823, right tributary of the Nickerie River, 12 km WSW of the Stondansie Falls, Surinam, 5 April 1967, leg. Dr. H. Nijssen (Brokopondo Research 1966/67), 2 ex., 98.4 & 115.7 mm.

Diagnostic characters. — Moderately slender, without a median abdominal scute row; scutes all smooth, the keels very feeble or lacking; the large postocular scute with irregular wavy ridges, but without evident asperities.

Description. — The species is moderately slender, elongate, oval in cross-section, but with a flattened belly and oral region, completely covered with scutes showing only some fine texture or minute asperities, being rather smooth even to the touch; the scutes covering the throat reach about the margin of the lower lip. The latero-ventral scutes meet along the abdominal median line. The large postocular scute is covered with many irregular and wavy ridges, but without distinct spinules, as smooth to the touch as the further scutes. The keels on head, body and peduncle are very feeble and rounded, those laterally on the peduncle meeting at the 14th or 15th scute, but entirely coalescing only near the end of the peduncle. Scutes in longitudinal lateral series 13+21 or 22, or 14+20 or 21. Seven scutes between supraoccipital and dorsal fin. A single median scute immediately before the anal fin reaches the scutes bordering the vent, separating a second pair as found in the other Surinam species.

The body depth is 6.6-6.8, at dorsal origin 6.9-7.3 in head length, in standard length 22.5-23.0 and 23.5-24.5, respectively. Body width 4.8-4.95, at anal origin 6.0-6.5 in head length, in standard length 16.5 and 20.5-22.0, respectively. Minimum depth of peduncle 32-34 in head length.

Predorsal length 2.1, postdorsal length 2.0-2.05, postanal length 2.05, in standard length; length before vent 2.3 in standard length.

Head length 3.35-3.4 in standard length; head width 4.45-4.75, head depth 6.0-6.05, in head length. Distance between supraoccipital and dorsal fin 1.55-1.7 in head length. The oral area is oval, the actual oral disc circular in shape; the semicircular lower lip and all lip margins are covered with distinct papillae, the barbels are short, broadly triangular, and small. The teeth are situated in combs, on the upper jaw in a series of about 22 or 23 on each side, on each mandible about 19 or 20. Eye diameter 16, snout length 1.35, interorbital width 6.7-6.8, in head length, or in standard length 55, 4.5-4.55, and 23, respectively. Length of lower snout cover 2.0 in head length.

TABLE II

Tabulated morphological data on *Farlowella parvicarinata* nov. spec.

	A	B	C	D	E	F	G	H	I	J	K
1.	ZMA 105.823	1057	984	291-3.40	61(4.75)	48(6.05)	43-23.0(6.80)	40-24.5(7.30)	59-16.5(4.95)	45-22.0(6.50)	469-2.10
2.	ZMA 105.823	1218	1157	336-3.35	75(4.45)	56(6.00)	51-22.5(6.60)	49-23.5(6.90)	70-16.5(4.80)	56-20.5(6.00)	550-2.10

	L	M	N	O	P	Q	R	S	T
1.	487-2.00	484-2.05	431-2.30	174-5.65(1.70)	9-110(32)	151-6.50(1.95)	98-10.05(2.95)	71-13.80(4.10)	136-7.20(2.15)
2.	562-2.05	562-2.05	503-2.30	215-5.40(1.55)	10-116(34)	190-6.10(1.75)	120- 9.65(2.80)	87-12.30(3.90)	159-6.85(2.10)

	U	V	W	X	Y	Z	AA	BB	CC	DD	EE
1.	18-55(16.0)	219-4.50(1.35)	145-6.80(2.00)	43-23(6.80)	53-18.5(5.50)	$\frac{13}{14}+\frac{22}{21}$	7	22+1	22+1	0	22/20
2.	21-55(16.0)	253-4.55(1.35)	169-6.85(2.00)	50-23(6.70)	60-19.5(5.60)	$\frac{13}{14}+\frac{21}{20}$	7	21+1	21+1	0	23/19

The dorsal fin originates distinctly before the anal fin; the slender dorsal spine is 1.75-1.95 in head length, the end not filamentous, the following rays rapidly decrease in length. The pectoral spine is slender and rather flexible, 2.8-2.95 in head length. First anal ray 2.1-2.15 in head length, the following rays hardly diminishing in length. The caudal fin is deeply emarginate, the pointed lobes ending in filaments, the total length of the upper ray considerably surpassing head length. All spines and rays are covered with minute asperities, but are smooth to the touch.

For additional morphological data, the accompanying table and plates 7 and 8 may be consulted.

The available specimens are rather dark brown, hardly lighter on the lower surface of the peduncle, distinctly lighter on the belly; the oral disc is pale. There seems to have been a darker lateral band along the body, but now this is not evident. All spines and rays are covered with spots or blotches, usually in rather irregular transverse series, vague on the caudal fin, which moreover has a dark band on each lobe, meeting on the dark base of the fin.

Habitat and distribution. — The species is only known from the type locality, a creek with a width of 5 m and a depth of 50-100 cm, flowing over a sandy bottom.

Remarks. The type locality is rather close to that of the Guyana species, *F. hargreavesi* Eigenmann, of which the exact type locality is unknown, but which distinctly differs from the present species by having a median row of scutes along the abdomen.

Etymology. — Parvus (lat.), little; carina (lat.), keel.

Acknowledgements

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Summary

A review is given of the Surinam representatives of the many-toothed Loricariinae. A discussion is provided of the diverse phylogenetical aspects of the group, and a restriction of the subfamily Loricariinae is proposed by referring the many-toothed (or "comb-toothed") forms to the new subfamily Harttiinae. A new genus, *Harttiella*, is proposed for the species *crassicauda* Boeseman and *montebelloi* Fowler, while the further Harttiine genera: *Harttia, Parasturisoma, Sturisoma,* and *Farlowella* are defined. A new species is described for each of the genera *Harttia* and *Parasturisoma,* and three for *Farlowella.*

Diagrams

The block diagrams given on the following pages are intended to facilitate a correct interpretation of the data provided in the tables 1-7, mainly concerning the Guyana species belonging to the genera *Harttiella, Harttia,* and *Parasturisoma.* The genus *Sturisoma* is not included as it has not yet been recorded from the Guyanas. Also, it was not considered necessary to include here any representatives of the already well defined genus *Farlowella*, of which the Surinam representatives show a remarkable mutual agreement in their morphological features.

Along the ordinate, the considered species are indicated by the numbers 1-7:

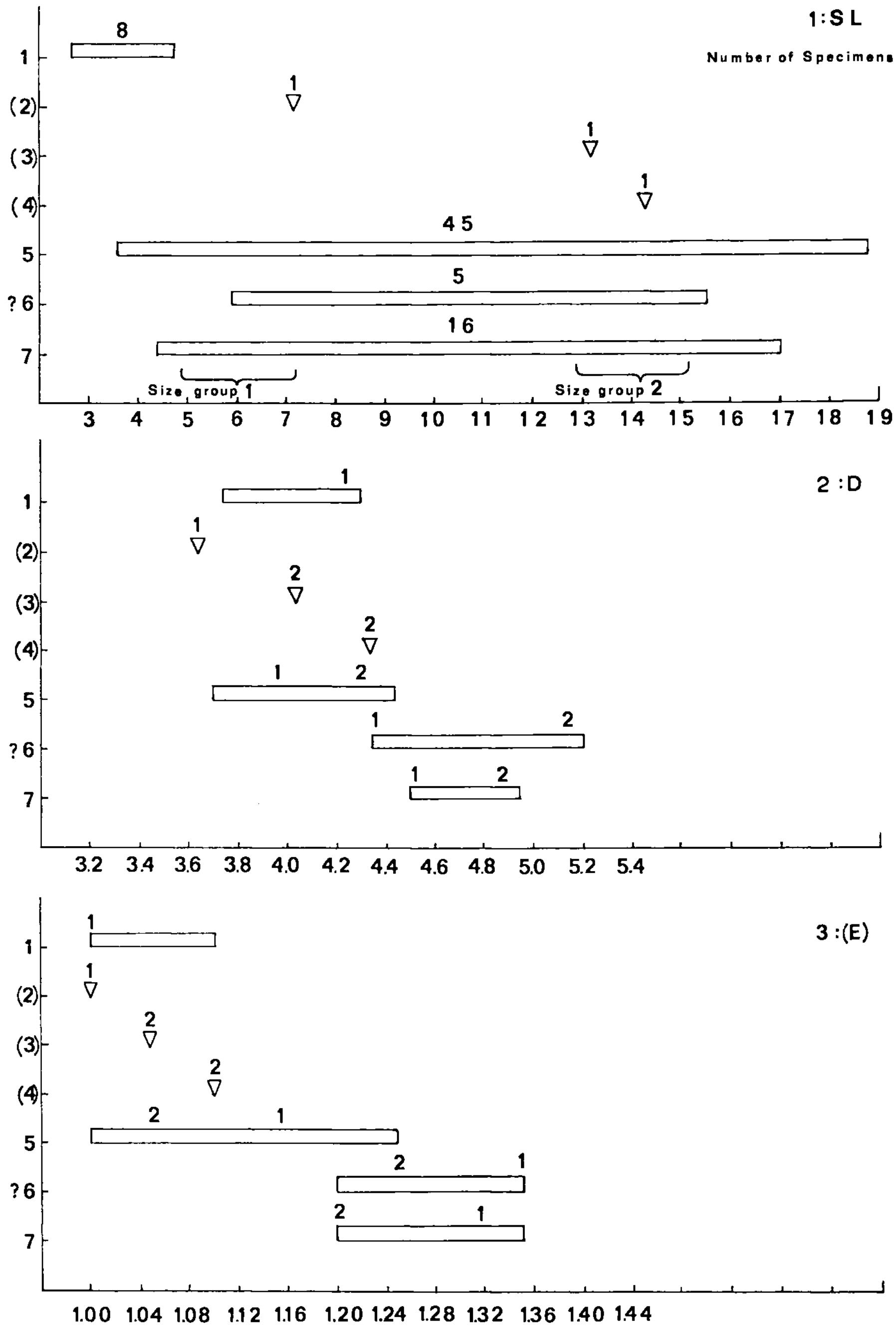
1 *Harttiella crassicauda* (Boeseman)
2 *Harttiella montebelloi* (Fowler)
3 *Harttia loricariformis* Steindachner
4 *Harttia fowleri* (Pellegrin)
5 *Harttia surinamensis* nov. spec.
6 *Parasturisoma platystoma* (Günther)
7 *Parasturisoma maculata* nov. spec.

The species 2, 3 and 4 are extralimital, and therefore put between brackets; species 6 has originally been reported from Surinam but, not being represented in the present extensive collections, may well be restricted to (formerly British) Guyana, and a mark of interrogation has been added to the number.

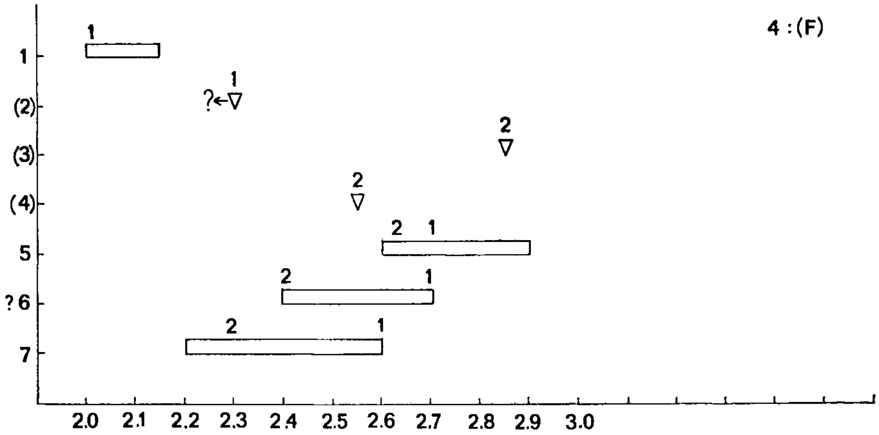
The numbers along the abscissa indicate the ratios for the various measurements, each indicated with the same character (letters D-T) as used in the tables, and as explained in fig. 3. Without brackets, the added ratios are in comparison with the standard length, between brackets in comparison with the head length. The variation of the ratios for each character is indicated by the extent of the blocks; in case of single specimens, the downward point of a triangle indicates the exact ratio.

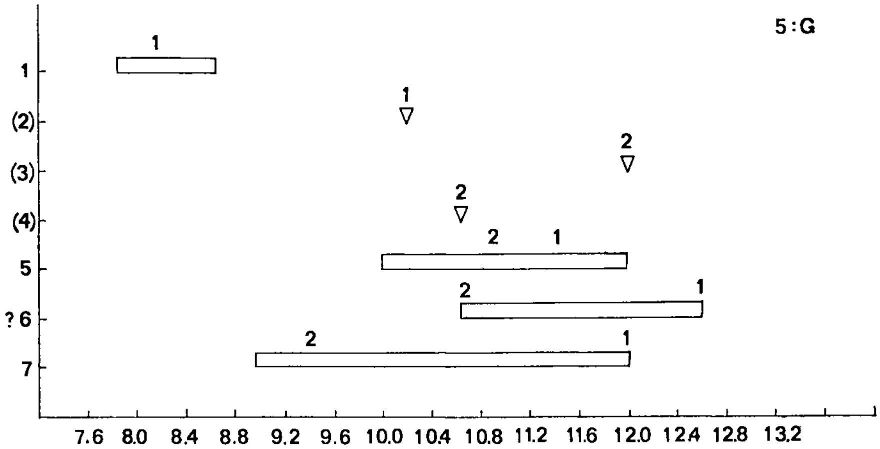
Only diagram 1 is slightly different. It indicates for the various species the numbers of specimens consulted (above the blocks) and their range of standard lengths. Also are indicated two size (or age) groups numbered 1 and 2. In the other diagrams, the values of the ratios for the same groups are indicated by the situation of the same numbers above the blocks. It may be evident that, wherever the ratio moves in the same direction from group 1 to group 2 in the three species where both are represented (species 5, 6, and 7), we may assume the occurrence of an allometric trend in the concerned character, probably also occurring in the species not represented with a size range covering both groups.

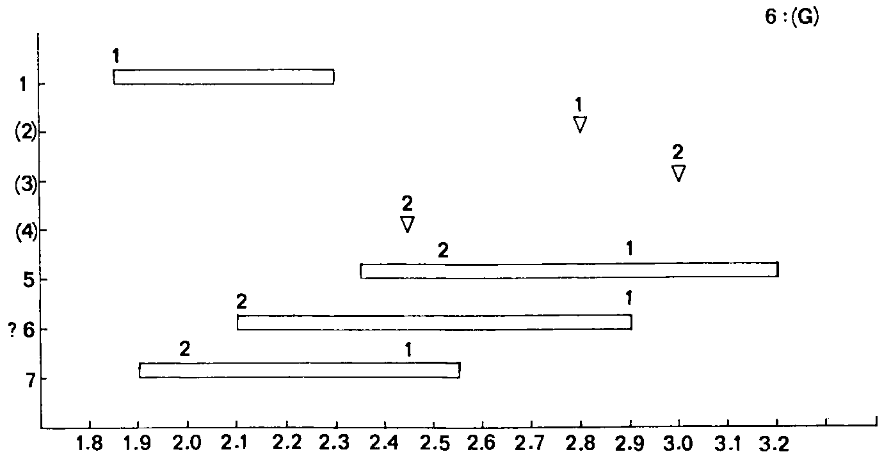
Attention may be drawn to the circumstance that the measurements on the single known specimen of *Harttiella montebelloi* were not personally made, which may, though probably not wholly, account for a few apparently aberrant ratios.


1:SL
Number of Specimens
8
1
1
1
45
5
16
1
(2)
(3)
(4)
5
?6
7
Size group 1
Size group 2
3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19
2:D
1
1
2
2
1 2
1 2
1 2
3.2 3.4 3.6 3.8 4.0 4.2 4.4 4.6 4.8 5.0 5.2 5.4
3:(E)
1
1
2
2
2 1
2 1
2 1
1.00 1.04 1.08 1.12 1.16 1.20 1.24 1.28 1.32 1.36 1.40 1.44

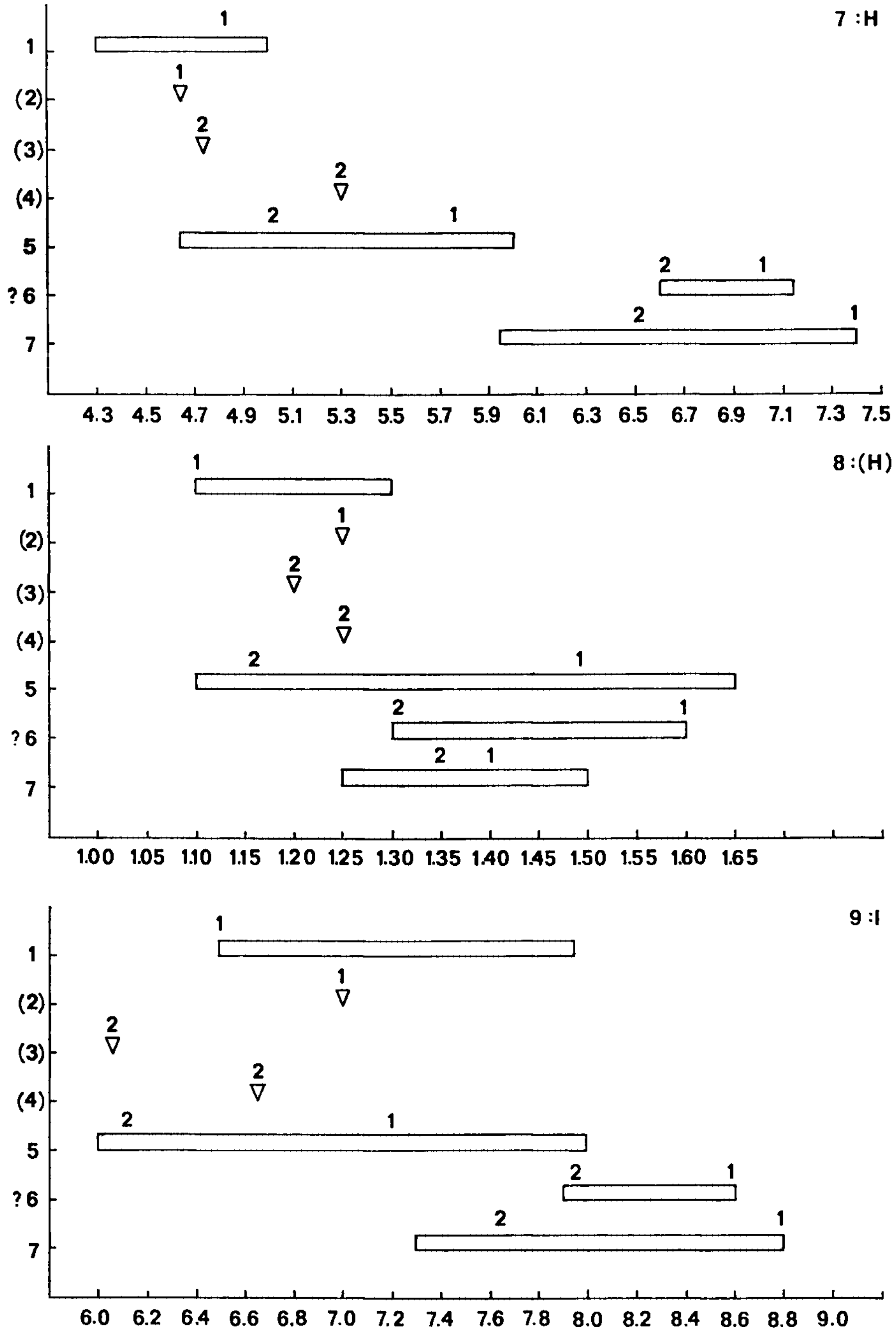
Diagrams 1-3


4 :(F)
1
(2)
(3)
(4)
5
? 6
7
?←
2.0 2.1 2.2 2.3 2.4 2.5 2.6 2.7 2.8 2.9 3.0

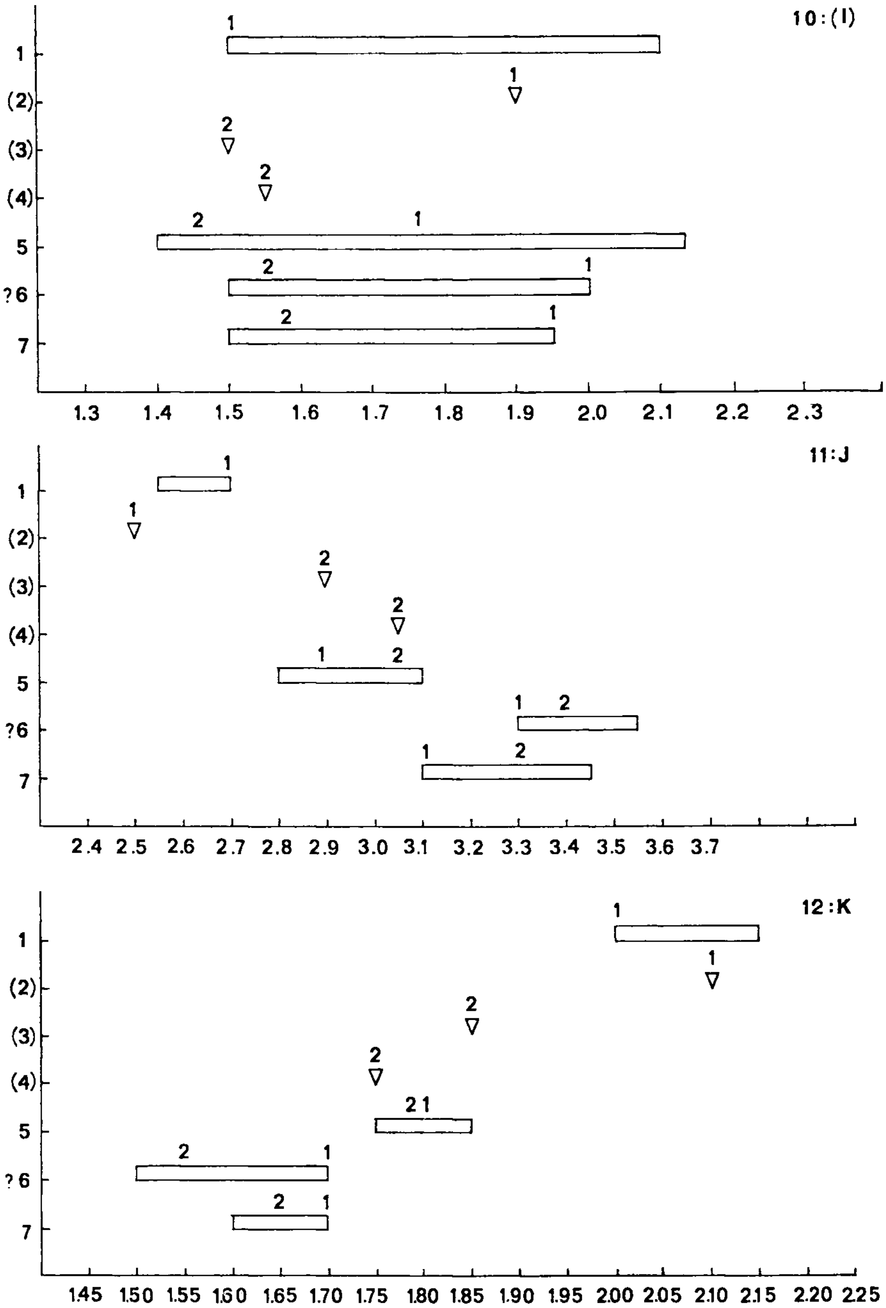

5 : G
1
(2)
(3)
(4)
5
? 6
7
7.6 8.0 8.4 8.8 9.2 9.6 10.0 10.4 10.8 11.2 11.6 12.0 12.4 12.8 13.2


6 :(G)
1
(2)
(3)
(4)
5
? 6
7
1.8 1.9 2.0 2.1 2.2 2.3 2.4 2.5 2.6 2.7 2.8 2.9 3.0 3.1 3.2

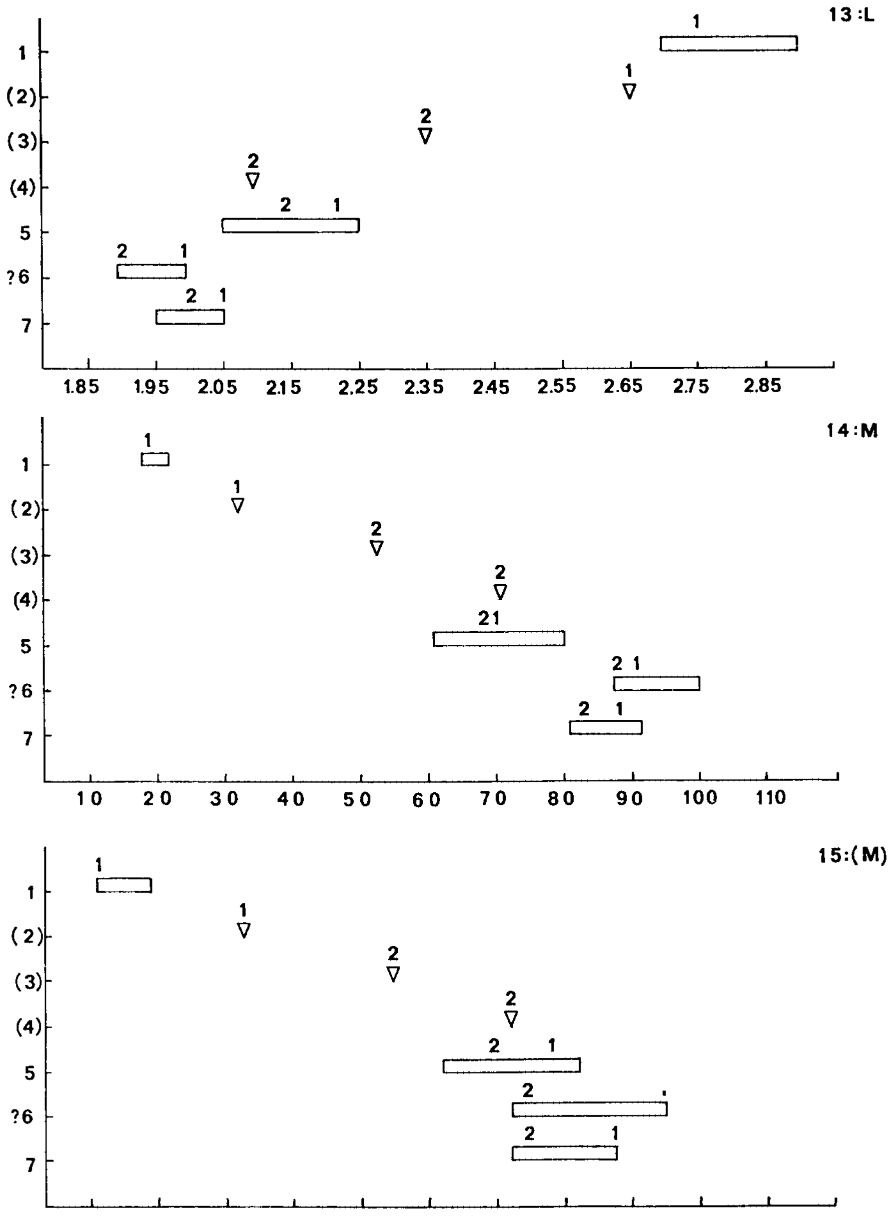
Diagrams 4-6


7 :H
1
(2)
(3)
(4)
5
? 6
7
4.3 4.5 4.7 4.9 5.1 5.3 5.5 5.7 5.9 6.1 6.3 6.5 6.7 6.9 7.1 7.3 7.5
8 :(H)
1.00 1.05 1.10 1.15 1.20 1.25 1.30 1.35 1.40 1.45 1.50 1.55 1.60 1.65
9 :I
6.0 6.2 6.4 6.6 6.8 7.0 7.2 7.4 7.6 7.8 8.0 8.2 8.4 8.6 8.8 9.0

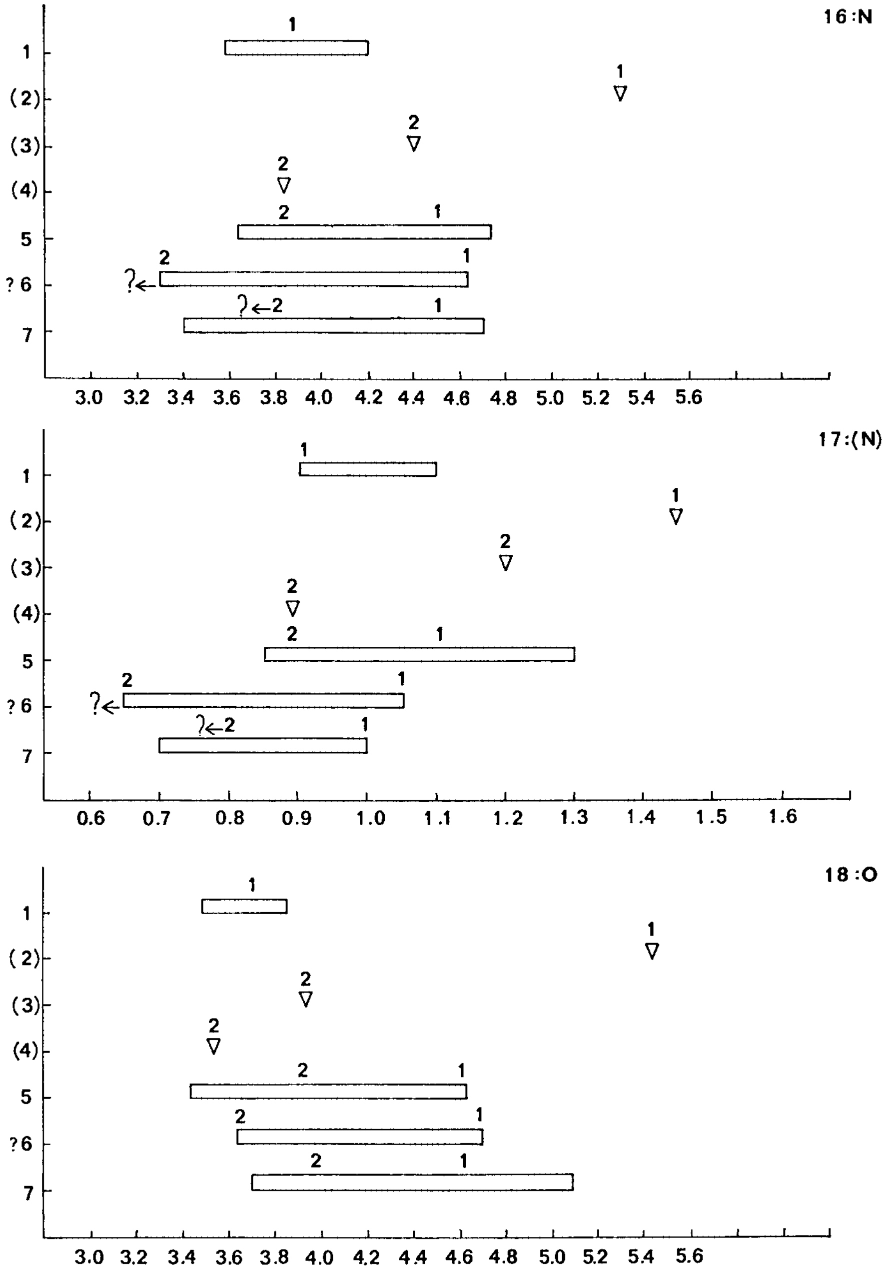
Diagrams 7-9



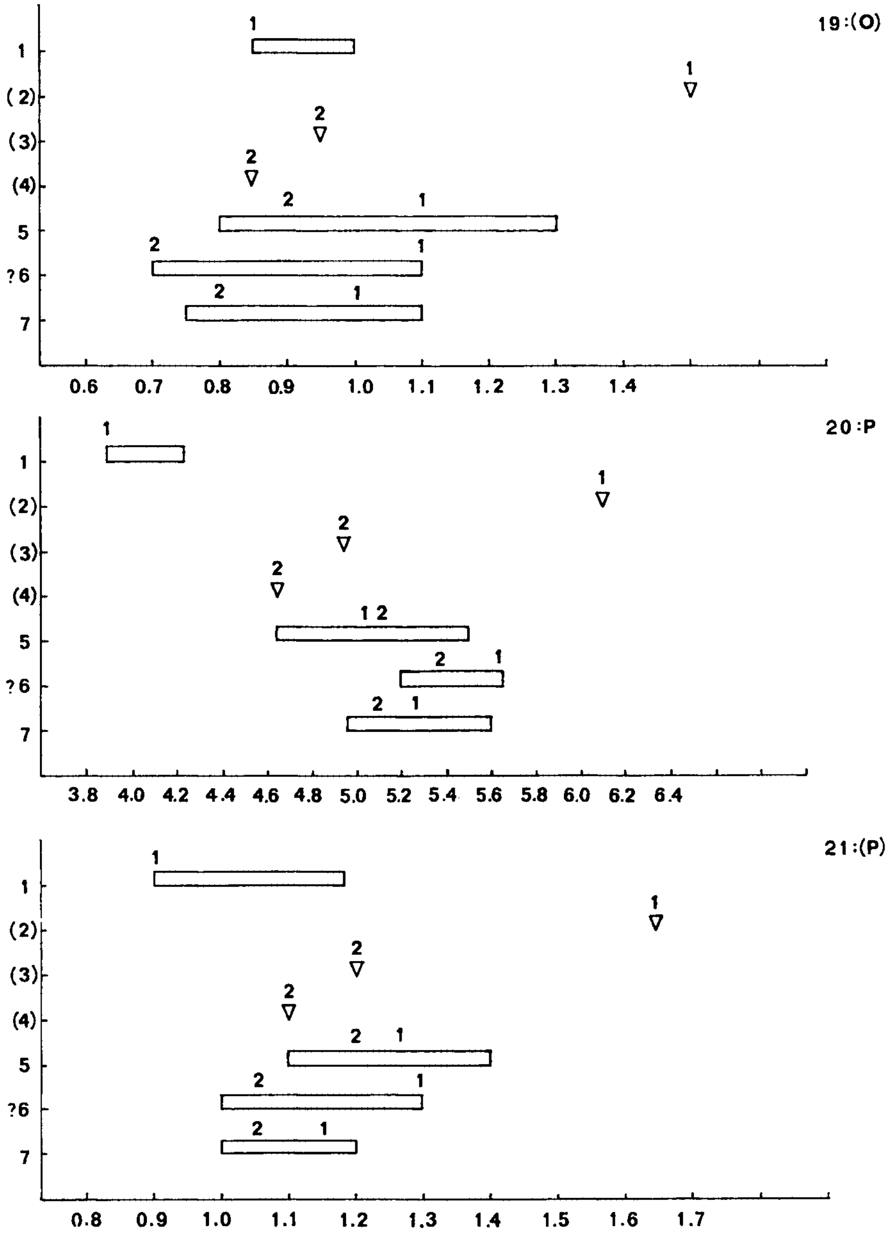
Diagrams 10-12



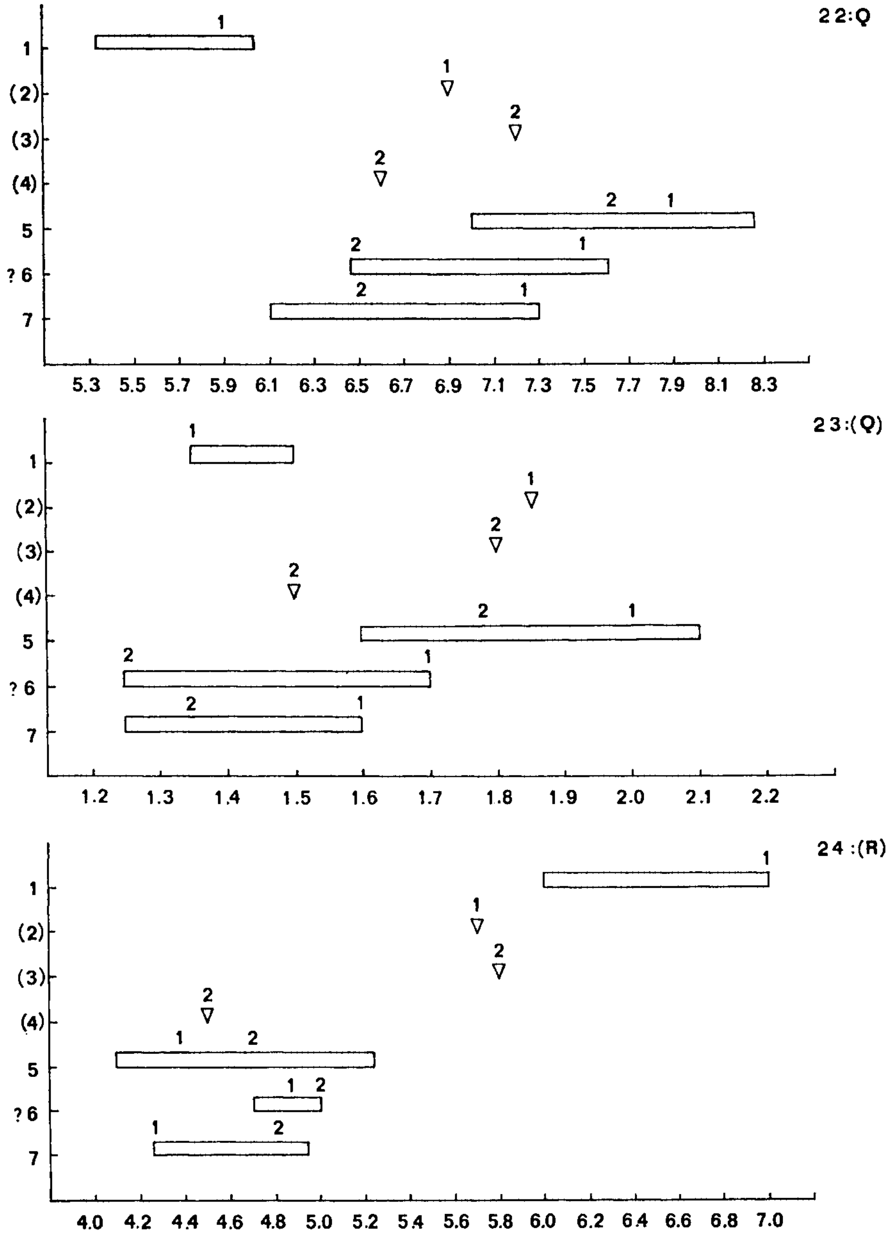
Diagrams 13-15



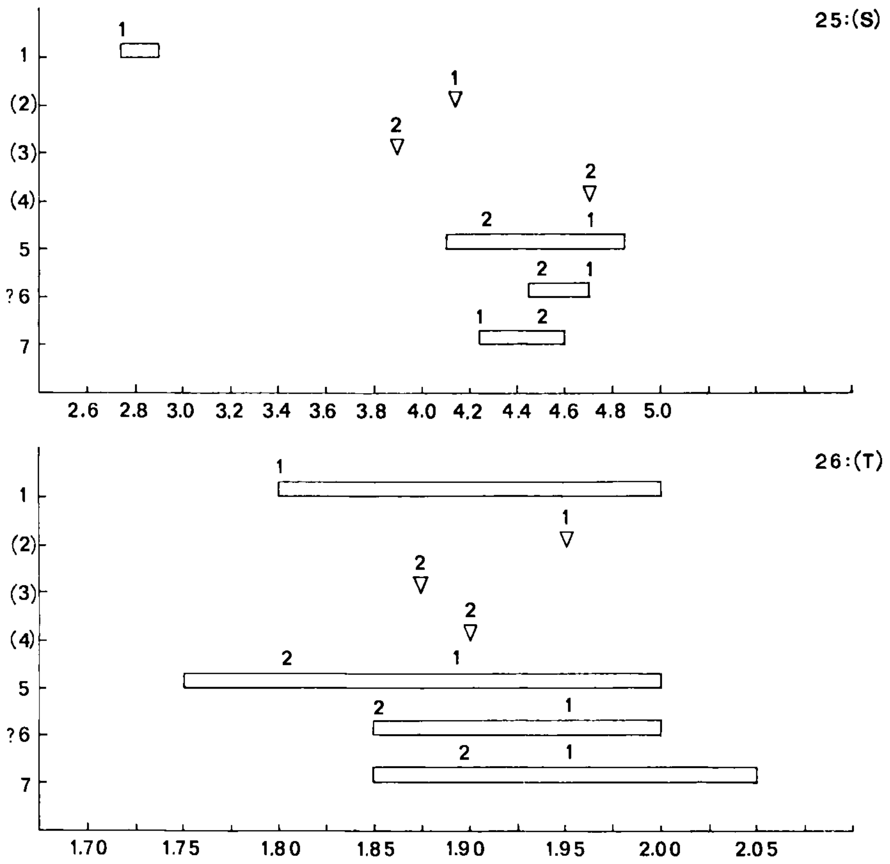
Diagrams 16-18



Diagrams 19-21



Diagrams 22-24



Diagrams 25-26

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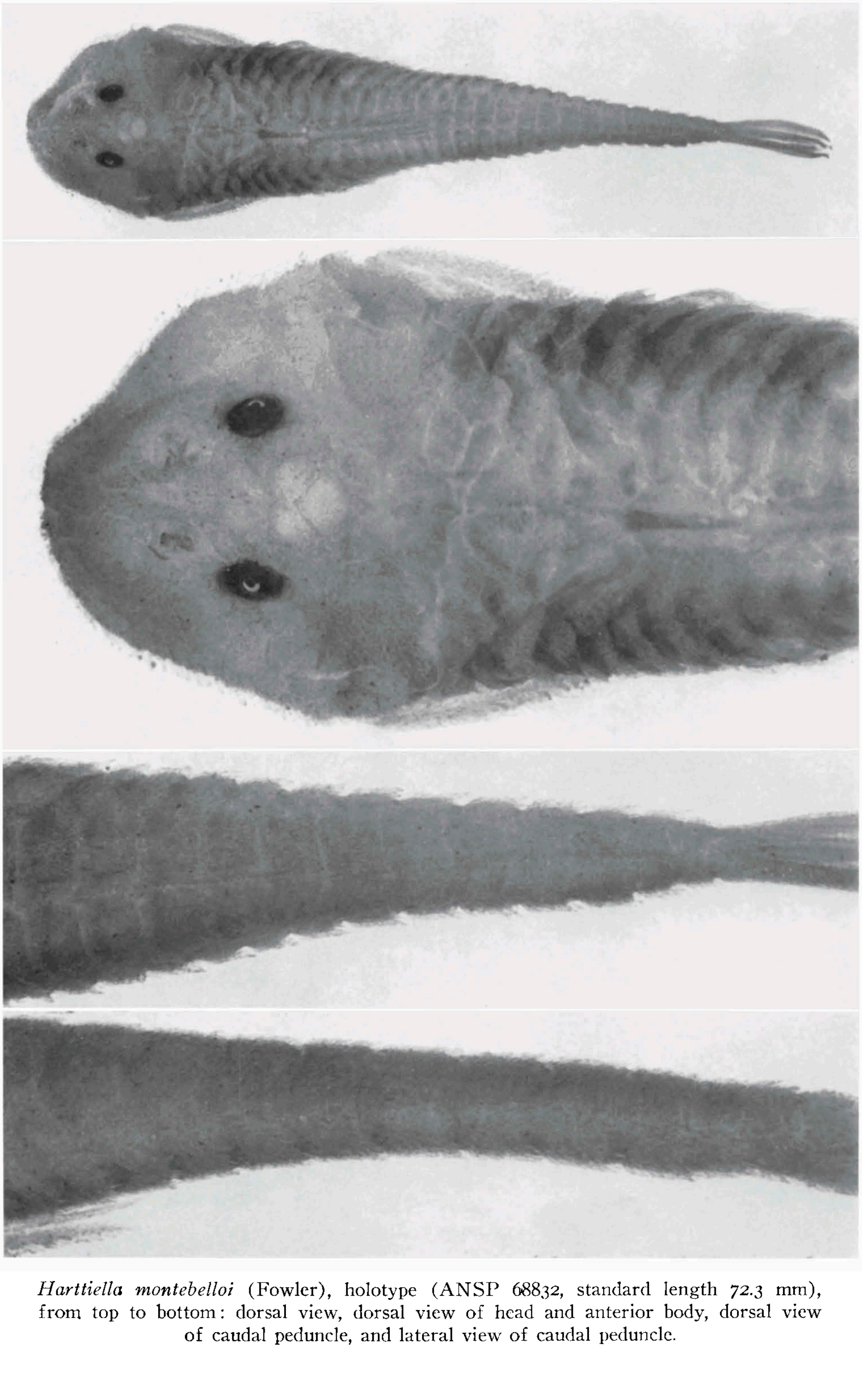
ADDENDUM

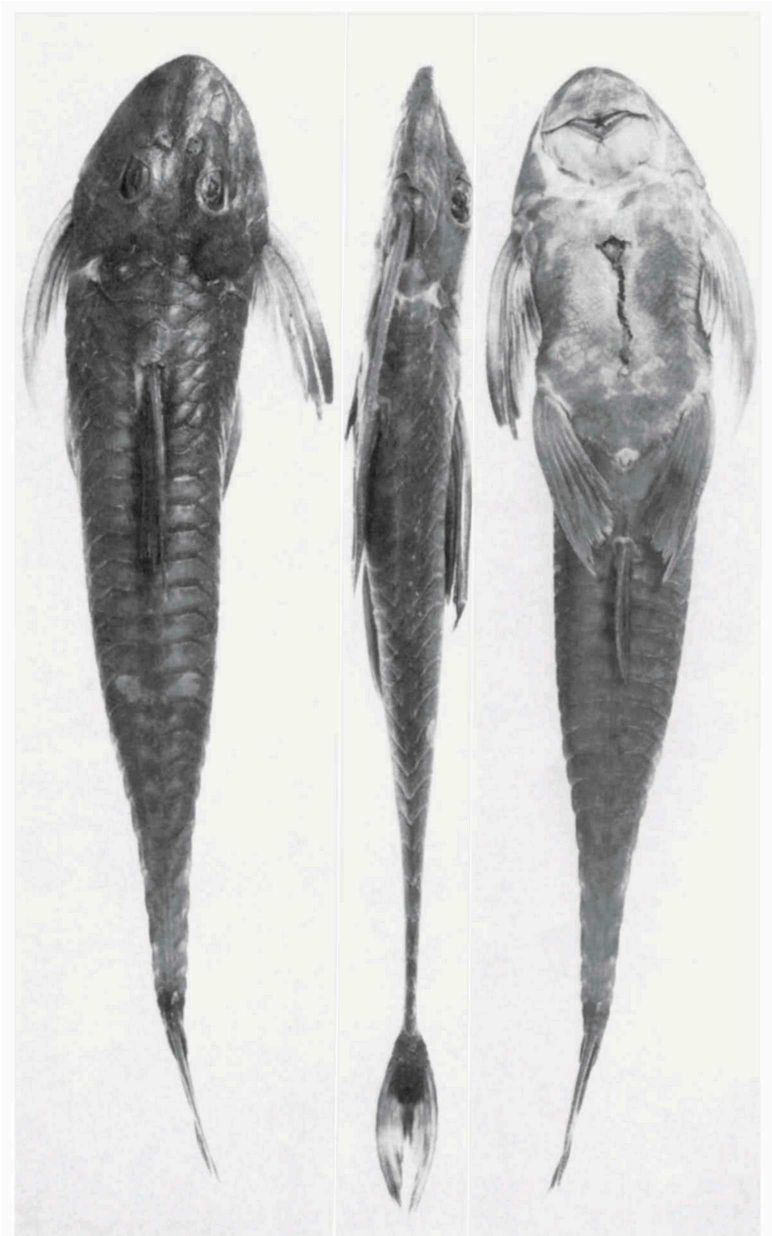
I inadvertently omitted to record the finformulae of *Farlowella rugosa* (p. 40) and *Farlowella parvicarinata* (p. 42). These are respectively D I.6; A i.5; P I.5; V i.4; and D I.6; A i.5; P I.6; V i.4.

Harttiella crassicauda (Boeseman), holotype (RMNH 19418, standard length 48.5 mm), in dorsal, lateral, and ventral view.

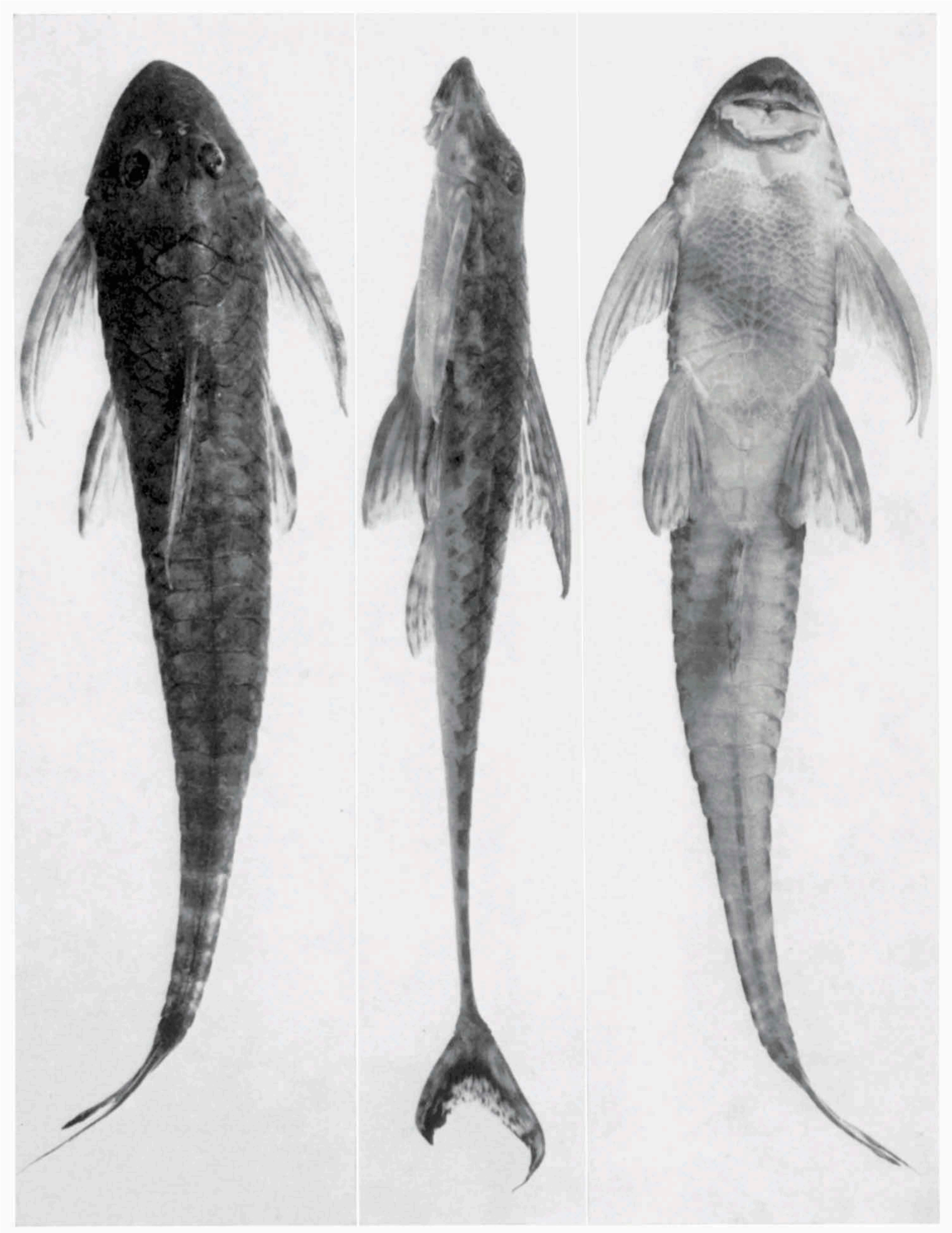


Harttiella montebelloi (Fowler), holotype (ANSP 68832, standard length 72.3 mm), from top to bottom: dorsal view, dorsal view of head and anterior body, dorsal view of caudal peduncle, and lateral view of caudal peduncle.

Harttia surinamensis nov. spec., holotype (RMNH 26388, standard length 188 mm), in dorsal, lateral, and ventral view.



Harttia fowleri (Pellegrin), holotype (MNHN 01-372, standard length 144 mm), in dorsal, lateral, and ventral view.



Parasturisoma maculata nov. spec., holotype (RMNH 26381, standard length 170 mm), in dorsal, lateral, and ventral view.

Parasturisoma platystoma (Günther), syntype (BM 1866.8.14.124-8, standard length 155 mm), in dorsal, lateral, and ventral view.

From right to left: *Farlowella reticulata* nov. spec. (ZMA 106.174, standard length 118.5 mm), *Farlowella rugosa* nov. spec. (ZMA 106.208, standard length 99.5 mm), and *Farlowella parvicarinata* nov. spec. (ZMA 105.823, standard length 115.7 mm), syntypes, all in dorsal view.

From right to left: *Farlowella reticulata* nov. spec. (ZMA 106.174, standard length 118.5 mm), *Farlowella rugosa* nov. spec. (ZMA 106.208, standard length 99.5 mm), and *Farlowella parvicarinata* nov. spec. (ZMA 105.823, standard length 115.7 mm), syntypes, enlarged lateral view of head and anterior body.