



Drawing reproduced from Valenciennes' manuscripts, basis of *Pimelodus charus* Valenciennes.

**THE AUCHENIPTERIDAE AND PIMELODIDAE
OF SURINAME
(PISCES, NEMATOGNATHI)**

by

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With 41 text-figures and 15 plates

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INTRODUCTION

This paper purports to give a review of the species of Auchenipteridae and Pimelodidae known from Suriname. It is based on the large material collected in recent years by M. Boeseman (1963/64), G. F. Mees (1965/66), and H. Nijssen (1966/67), to which smaller collections from other sources have been added.

Suriname, of course, is only a small part of tropical South America, probably no more distinctive in its ichthyofauna than many other regions of a similar size in this huge continent. Although I realized this from the beginning, and was well aware that a serious study of the ichthyofauna of Suriname would necessitate the examination of a lot of extra-limital material, I hoped originally to confine this paper to descriptions and discussions of the species actually known to occur in Suriname. Gradually, however, it became apparent that such a restriction was difficult to adhere to, as the solutions to some of the problems encountered in Suriname could be found only as far away as Venezuela or south-eastern Brazil (if at all). Finally, so much information on extra-limital material was collected, that it seemed a pity not to publish it. Whereas, admittedly, the inclusion of all this material has made the paper less conveniently arranged, I believe that these additions have increased its value. To reduce the danger that the species actually known from Suriname are drowned in the discussions of extra-limital species, a list with their names is appended.

Where so much revisional work had to be done anyway, one could justifiably ask why I have not taken the logical next step and attempted complete revisions of the families Auchenipteridae and Pimelodidae. The reply to this question is in the first place that this would be a task of a magnitude very probably beyond my powers: of some of the genera (*Pimelodella*, *Rhamdia*) over fifty species have been described (many of them only known from their type-material, which it would often be difficult to obtain for examination), and in the second place that even if it was possible to bring all extant material together, this would probably not suffice for a proper understanding of certain genera (for example *Pimelodus*). Even in the genera which I have studied, it was often impossible to obtain the necessary material, either because not enough specimens exist, or because of regulations which forbade loaning type-specimens, or, especially in the case of certain South American institutions, because my letters of enquiry remained unanswered.

If this paper contributes only a little to the understanding of the groups treated, it will have fulfilled its purpose.

In the keys and generic diagnoses I have tried to be comprehensive, so that the characters are also valid for species not treated in this paper. In many

instances, however, I was unable to attain this (for example in the key to the Pimelodidae, which would have become much more complicated, had all extralimital variation been considered). Keys and descriptions published by others, for example in the paper by Schultz (1944a), suffer from the same shortcomings, but nevertheless are widely used.

The material collected during the first three months of 1971 in the Nickerie District, north-western Suriname, by M. Boeseman and D. C. Geijskes (cf. Geijskes, 1973) has become available too late for comprehensive inclusion in this report, but I have looked part of it through, and take this opportunity to mention the more interesting species. The collection contains a series of *Tatia creutzbergi* from the Nickerie Rivier, and one from a tributary of the Maratakka (locality indicated in fig. 19); two samples of *Pimelodella macturki* from the Bigi Birri Kreek, a tributary of the Maratakka, a very welcome confirmation of the occurrence of this species in Suriname, and, perhaps most interesting of all, three specimens of *Pseudopimelodus raninus villosus* from the Winanna Kreek, a tributary of the Kaboeri Kreek, which in its turn flows into the Corantijn. This record extends the range of the subspecies from the Demerara River eastwards to the Corantijn, and into Suriname.

Except for the introductory chapters, this paper was completed around the middle of 1971, and no attempt has been made to add references to literature and material received since then, with a few exceptions, most of which have been added as footnotes.

ZOOGEOGRAPHY

A zoogeography of the freshwater fishes of Suriname must be based on its whole ichthyofauna. Nevertheless, a short discussion of the two families here dealt with, will contribute to an understanding of the whole.

For an analysis I have divided the 30 species into three groups: species which on present evidence are endemic to one river system; species confined to the Guianas, and species also occurring in the Amazon basin.

The first group contains: *Tatia concolor*, *Glanidium leopardus*, *Heptapterus tapanahoniensis*, *Heptapterus surinamensis*.

The second group contains: *Tatia brunnea*, *Pimelodella macturki*, *Heptapterus brevior*, *Heptapterus bleekeri*, *Pseudopimelodus nigricauda*, *Microglanis secundus*.

The third group contains all other species; thus of the 30 species, 20 are known also to occur in Amazonia (the position of *P. blochii* needs clarification, it may have to be excluded). Probably the species *Pseudopimelodus nigricauda* and *Microglanis secundus*, the first of which has been found throughout Suriname, the second in Suriname as well as in British Guiana, are much

more widely distributed, as it is unlikely that they would stop at the artificial political boundaries. Several species which were hitherto believed to be confined to the Guianas, are in this paper recorded for the first time from Amazonia (*Tatia creutzbergi*, *Microglanis poecilus*)¹), and it is very likely that further ichthyological investigations in northern Brazil would increase this number. In other words, the first two lists (endemics of one river system, and endemics of the Guianas) are probably much flattered. It looks as if only *Heptapterus* has some species which are genuinely endemic to a single river system: *H. surinamensis* being confined to the Suriname Rivier basin, *H. tapanahoniensis* to tributaries of the Marowijne.

The close affinity between the Guianas and the Amazon basin has been stressed by several workers, notably Eigenmann (1912: 73), and in recent years by Myers.

The fact that species inhabiting the lower courses of the great rivers are widely distributed, will surprise nobody, but it is interesting to observe that small species which normally appear to be confined to rapids, may also have a very wide distribution. *Imparfinis minutus* is an example of this.

It is remarkable that of some other groups of nematognathous fishes a high degree of local endemism appears to exist in Suriname, see the works of Nijssen & Isbrücker (1967) and Nijssen (1970) on *Corydoras* (fam. Callichthyidae) and of Boeseman (1968, 1969) on *Hypostomus* (fam. Loricariidae). *Hypostomus* constitutes an extreme example of this as not only each river system appears to have its own species, but there are even differences between the tributaries of one river (viz., Kabalebo and Sipaliwini, tributaries of the Corantijn). This difference between Auchenipteridae and Pimelodidae on one side, *Corydoras* and *Hypostomus* on the other, can probably be ascribed to two factors. One is an ecological one: most species of *Hypostomus* are confined to rapids, which would restrict their chances of colonising other river systems (when other species might make use of temporary flooded areas, estuaries, etc.), and the species of *Corydoras* are small bottom-fishes, presumably somewhat sedentary in habits. In this connection it may be significant that *Heptapterus*, which in its preference for rapids shows an ecological resemblance to *Hypostomus*, is the only pimelodid genus in which endemism is found in Suriname. The second factor is morphological: both *Hypostomus* and *Corydoras* are armoured with heavy bony plates, and usually have black spots or bands, and other complicated pigment-patterns. Small differences in proportions and in pigmentation would be easily noticed and measured. In the soft-bodied

1) Admittedly *Microglanis poecilus* had been recorded from the "Amazon basin" by Gomes (1946: 15), but the specimens are *M. parahybae*, and probably from south-eastern Brazil.

Auchenipteridae and Pimelodidae, on the other hand, differences in proportions would have to be much greater to be measurable, whereas at least in some genera (*Pimelodella*, *Heptapterus*) the pigmentation is so uniform, that geographical variation of a kind useful for systematic distinction, is less likely to occur.

In this connection it is also necessary to state that in this paper I have been more concerned with arriving at a synthesis: placing together what belongs together, than with analytical work. Moreover, whereas of some widely distributed species large series from Suriname were available, usually few specimens, from scattered localities in other parts of their ranges, could be examined, so that small but constant differences in measurements and proportions between various populations would for that reason have remained undetected. It is very likely, therefore, that future analytical work will show that certain widely-ranging species, for example *Parauchenipterus galeatus*, *Rhamdia quelen*, etc., can be divided into subspecies. In a few instances, in *Pseudopimelodus zungaro* and *Pseudopimelodus raninus*, I have already attempted (perhaps not too successfully) to express the geographical variation which undoubtedly exists, with the application of trinomials.

BIBLIOGRAPHY

Bibliographies of South American Nematognathi have been published repeatedly, notably by Eigenmann & Eigenmann (1890), and more recently by Fowler (1951). Such bibliographies are tremendously useful to anybody wanting to orient himself quickly in the literature of a particular species. In view of the comparatively recent date of Fowler's compilations one might, however, wonder whether it was necessary for me to list again all those references. Apart from the fact that Fowler's bibliography is confined to the Amazon basin, and does not include the Guianas, my excuse is that Fowler's work was largely uncritical: in most cases he has just accepted published records as being based on correct identification. I, on the other hand, have re-examined a large proportion of the material on which records of the species here dealt with were based, and have attempted to assign them correctly. How much difference that makes will be seen in the cases of the two *Centromochlus*-species, *Tatia intermedia*, *Glanidium melanopterum*, etc., where a majority of references proved erroneous.

Of course, not all references could be verified by an examination of the material on which they were based; when I believed such references to be acceptable, I have included them without comment. When I did not trust them, a discussion is given. Undoubtedly, there remain references incorrectly

placed, just as several of my systematic conclusions will probably prove to be mistaken.

It has not been possible to make complete bibliographies: for example the comprehensive work of Ringuelet, Arámburu & de Arámburu (1967) contains references to a number of South American publications which have not been available to me.

COLLECTING LOCALITIES

This is not the place for an extensive treatment of the topography of Suriname, but for a good understanding of the zoogeography and composition of its ichthyofauna a few facts have to be mentioned. Suriname, part of Guianas, has an area of 161900 km² (including disputed territories: 13583 km² in the South-West and 3441 km² in the South-East); like all tropical countries it is well watered. All rivers flow in a northerly direction into the Atlantic Ocean. As the southern (Brazilian) border follows the watershed between the northern (Atlantic) and Amazon drainages, no part of the Amazon basin is included in the country, and there is no direct connection between the rivers from Suriname and those of the Amazon basin. This situation differs from that of Guyana (British Guiana) and Venezuela: in the south-western part of British Guiana the Ireng and Tacutu rivers, tributaries of the Rio Branco, belong to the Amazon basin, and it is of course generally known that the upper course of the Orinoco in Venezuela is, through the Casiquiare, broadly connected with the Rio Negro. Although a direct connection with the Amazon does not exist in Suriname, it is nevertheless likely that fishes are able to cross the border. In 1972 I spent the middle of the wet season (May-July) at Sipaliwini near the southern border, and found large areas of forest and savanna flooded, with various species of fish plentiful in such temporarily flooded areas. From the report of the boundary commission (van Lynden, 1939) it is apparent that the watershed between the Sipaliwini and the Rio Paru del Oeste (which forms the boundary between Suriname and Brazil) is scarcely above the level of the surrounding swamps, and in the wet season would not form a very formidable barrier to aquatic animals.

Although we have tried to make our collections comprehensive, and material from all major river systems has been obtained (for general orientation, see fig 1), our ichthyological studies took place in the framework of the "Brokopondo project", which aimed at investigating the changes in flora, fauna, and physical properties of habitat, resulting from the damming of the Suriname Rivier (for general information on the project, see van der Heide, 1966, and Westermann, 1971). We were stationed at Brokopondo on the Suriname Rivier, about 10 km downstream from the dam, and the intensity of our

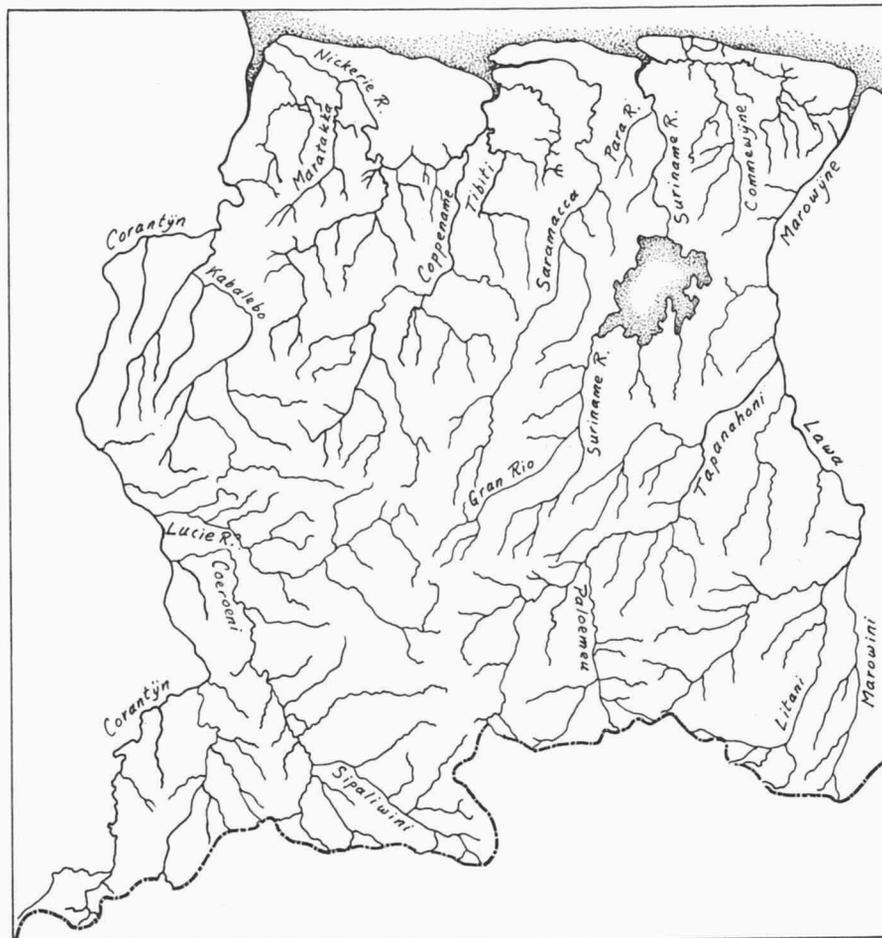


Fig. 1. Map of Suriname, showing the main rivers.

activities in the Suriname Rivier basin (including the lake, as it gradually filled) was much greater than anywhere else in Suriname. Fig. 2 shows the Suriname Rivier, on a larger scale than in fig. 1, with many localities which could not be crowded into the general map.

As our investigations took place before and during the filling of the lake, it has been necessary to indicate on the map several localities now submerged.

The majority of the localities of the old material re-examined by me can be found on the maps published by Agassiz & Agassiz (1869) and Eigenmann & Eigenmann (1890), and in Eigenmann (1911).

As this is not a treatise on geography, I have not attempted to attain uniformity in spelling of geographical names, and have usually copied the spelling

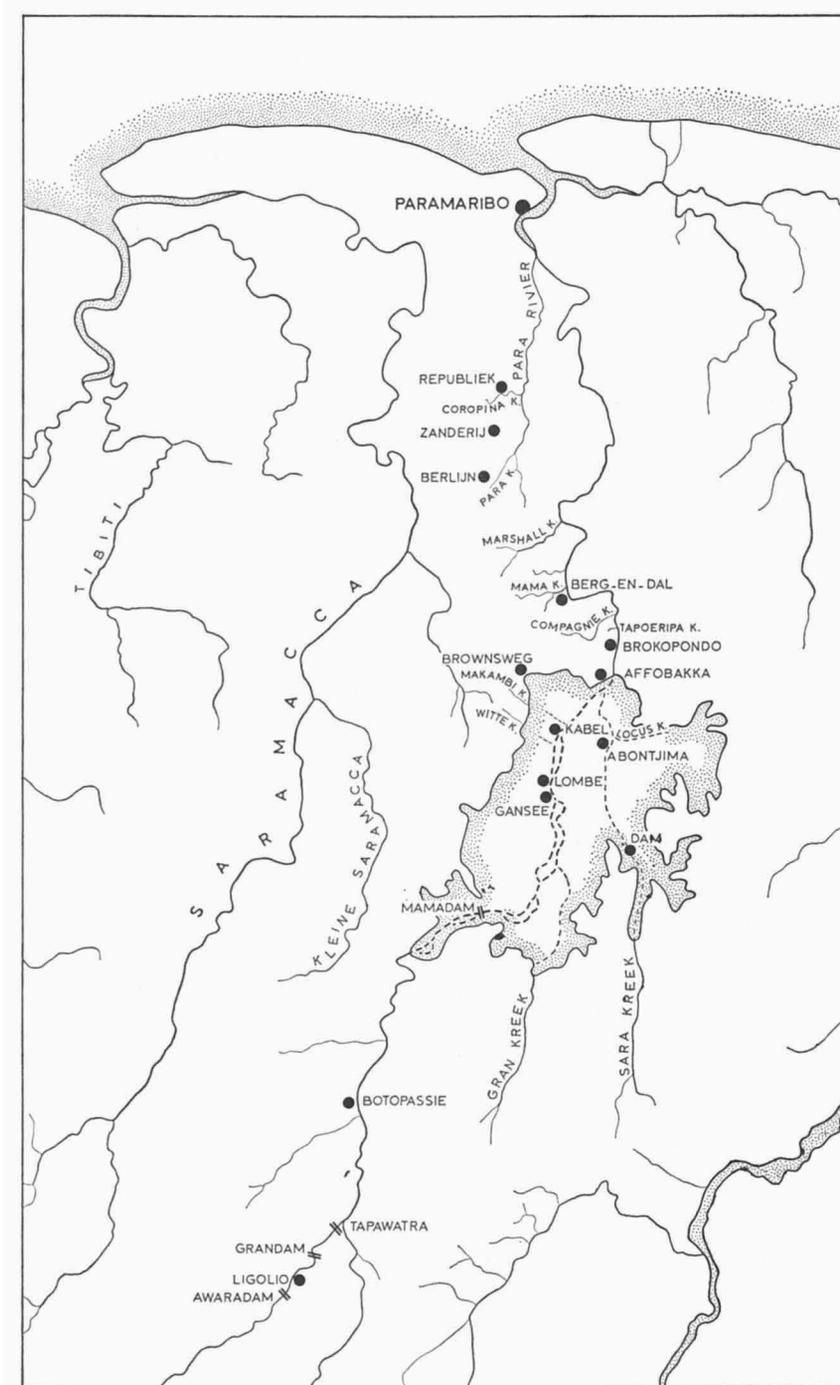


Fig. 2. The Suriname Rivier.

as it appeared on labels or in publications. Also, I have preferred to use the former name of British Guiana for what is now the State of Guyana, as the name Guyana could be misleading, being applicable to the whole area between the deltas of Orinoco and Amazon.

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The institutions from which material was borrowed, with the abbreviations used for them, are listed below. To all the persons named I am indebted for the generous way in which they have placed material at my disposal.

- AMNH American Museum of Natural History, New York (Dr. D. E. Rosen, Mr. J. N. Baskin).
 ANSP Academy of Natural Sciences, Philadelphia (Dr. J. E. Böhlke).
 BM British Museum (Natural History), London (Dr. Rosemary H. McConnell, Mr. G. Howes).
 CAS California Academy of Sciences, San Francisco (Dr. W. N. Eschmeyer, Dr. W. I. Follett).
 FM Field Museum of Natural History, Chicago (Dr. L. P. Woods, Mr. R. Schoknecht).
 KBIN Koninklijk Belgisch Instituut voor Natuurwetenschappen, Brussel (Dr. J. P. Gosse).
 MACN Museo Argentino de Ciencias Naturales "B. Rivadavia", Buenos Aires (Dr. H. P. Castello).
 MCG Museo Civico di Storia Naturale "Giacomo Doria", Genova (Prof. Dr. E. Tortonese).
 MCZ Museum of Comparative Zoölogy, Cambridge, Mass. (Miss M. M. Dick).
 MLP Museo, Universidad Nacional de la Plata, La Plata (Dr. R. H. Arámburu).
 MNP Muséum National d'Histoire Naturelle, Paris (Mme M. L. Bauchot).
 MRJ Museu Nacional, Rio de Janeiro (Dr. H. Sick).
 MTD Staatliches Museum für Tierkunde, Dresden (Mr. W. Hebig).
 MV Naturhistorisches Museum (Museum Vinogradensis), Wien (Dr. P. Kähsbauer).
 MZSP Museu de Zoologia da Universidade de São Paulo, São Paulo (Dr. H. A. Britski).
 NMB Naturhistorisches Museum, Basel (Dr. E. Sutter).
 RMNH Rijksmuseum van Natuurlijke Historie, Leiden (Dr. M. Boeseman).

- SMF Natur-Museum und Forschungs-Institut, Senckenbergische Naturforschende Gesellschaft, Frankfurt a. M. (Dr. W. Klauswitz, Dr. F. Rössel).
- SU Stanford University, Stanford, California (Prof. G. S. Myers, Dr. W. C. Frehofer).
- UMMZ University of Michigan Museum of Zoology, Ann Arbor (Mr. G. R. Smith).
- USNM United States National Museum, Washington, D.C. (Dr. R. H. Gibbs, Dr. V. C. Springer).
- UZMK Universitetets Zoologiske Museum, København (Dr. J. Nielsen).
- ZMA Zoologisch Museum, Amsterdam (Dr. H. Nijssen).
- ZMB Zoologisches Museum der Humboldt-Universität, Berlin (Prof. Dr. K. Deckert).

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AUCHENIPTERIDAE

The Auchenipteridae form a possibly heterogeneous assemblage of naked catfishes. Teeth in bands in both jaws, none on vomer and palatines, except in *Asterophysus* and occasionally in large specimens of *Tatia intermedia*; nuchal bones exposed or covered with skin only, reaching to the dorsal spine and partly embracing it with processes which in the species descriptions will be referred to as "horns"; three pairs of barbels, well-developed but not large, the largest pair, that of the maxillary barbels, not reaching much beyond middle of body (usually shorter), an exception is *Tetranematichthys quadrifilis* which has only a single pair of very small mandibular barbels; no free eye-rim although the eyes are often large; gill-openings restricted, reaching to just in front of cleithrum, membranes broadly attached to the isthmus (except in two

little-known monotypic genera, *Wertheimeria* and *Taunayia*, which have the gill-openings extended forwards along the isthmus; these genera require further study); pectoral pore present in all species studied, but often very inconspicuous¹); strong pectoral and dorsal spines; long or short anal fin, and a usually small adipose fin, which is entirely lacking in some genera. Most genera show a certain degree of sexual dimorphism, mainly in the shape of the anal fin.

Some authors, beginning with A. de Miranda Ribeiro (1911: 352, 394) have divided the Auchenipteridae as here understood in two families, the Auchenipteridae (s.s.) and the Trachycorystidae. Others (Gosline, 1945) on the other hand, have treated them as a subfamily of the Doradidae. The latest reviser is P. de Miranda Ribeiro (1968b) who has split the Auchenipteridae in no less than four families: Auchenipteridae (s.s.), Trachycoristidae, Centromochlidae, and Asterophysidae.

My personal opinion is that with the possible exception of some small genera which I have not yet studied (*Asterophysus*, *Wertheimeria*, *Taunayia*, and perhaps *Tetranematichthys*), the Auchenipteridae form a natural group. Also in view of the comparatively small size of the family as a whole (no more than 60 species in 19 genera), the differences between P. de Miranda Ribeiro's four families would be adequately expressed by retaining them as tribes, or subfamilies at most. Admittedly, it is likely that many more species remain to be described but even if its number of species were doubled, the group would not become too unwieldy to be retained as a single family. As I have not yet studied the Doradidae, I postpone giving an opinion on the affinities between this family and the Auchenipteridae, but wish to draw attention to *Liosomadoras*, discussed below, which appears difficult to place. Indeed it was the intermediate position of this genus which induced Gosline (1942) to combine the Doradidae and the Auchenipteridae.

Rössel (1962) has suggested that the species *Liosomadoras morrowi* Fowler (1940a: 226-228), described in the Doradidae, belongs to the Auchenipteridae, and that *Liosomadoras* may be a synonym of *Centromochlus* (i.e. *Tatia*). I have not examined the species, but, whereas Rössel may possibly be right in

1) Steindachner (1876b) and Eigenmann & Eigenmann (1890) have described several species of Auchenipteridae as lacking a porus pectoralis. I have not studied all these species but in those which I did examine, a pore was invariably present; as this pore is, however, often very small and difficult to find, especially in species in which it is placed just above the pectoral base, I venture to suggest that the above-mentioned authors overlooked it in the other species. The porus pectoralis may be of considerable systematic and phylogenetic significance, and certainly deserves to be carefully studied, but is too easily overlooked to be of much use in routine identification. In many descriptions it has not even been mentioned.

the familial allocation, Fowler's description and figures show that the species is certainly sufficiently distinct from both *Tatia* and *Centromochlus* to be retained in a separate genus. From both these genera, *Liosomadoras* differs by its short body with very broad flat head, small eyes, superior mouth, large adipose fin, large anal fin with 13 rays, and very long spiny humeral process; from *Tatia* moreover in the long dorsal and pectoral spines and a well-developed caudal peduncle, from *Centromochlus* in having dorsal and particularly pectoral spines provided on both sides with strong teeth.

The fish described as *Trachymochlus cupido* by Hoedeman (1961), and referred by him to the Auchenipteridae, does certainly not belong to this family. Apart from the characters already given by Hoedeman: the presence of nasal barbels and of palatal teeth, it differs from the Auchenipteridae by: free orbital rim, gill-membranes free from isthmus, large adipose fin, occipital process without horns, reaching to the tip of the well-developed triangular predorsal plate, etc. On external morphological characters the species would appear to be well-placed in the Bagridae, a family not known from South America; it is possible that an anatomical examination would reveal its true affinities, but this must await the collecting of additional material. For the present it must go as genus incertae sedis. As, however, the species was described in the Auchenipteridae, mention of it had to be made here, to justify its omission¹⁾.

From Suriname, nine species of Auchenipteridae are known, divided over five genera: *Auchenipterus* (one species), *Pseudauchenipterus* (one species), *Parauchenipterus* (one species), *Tatia* (five species) and *Glanidium* (one species). To arrive at a proper understanding of these genera I have also had to study many extra-limital species and genera, whereas it was thought that a simple key to the known genera would be considered useful.

1) The Cupido Kreek is a tributary of the lower Maratakka and the type-locality of *Trachymochlus cupido* is supposed to be the mouth of the Cupido Kreek, at the place where it joins the Maratakka. In the first half of 1971, Boeseman and Geijskes collected fish at several localities in the Maratakka basin, although not in the Cupido Kreek itself, and found no trace of *Trachymochlus cupido*. Dr. Nijssen has informed me that, as far as he can see, the provenance of the specimen is above suspicion: the collector, J. van der Kamp, is known to have visited the Cupido Kreek on the date indicated, and has presented two specimens of fish from there to the Zoölogisch Museum. On the other hand, Nijssen observed that in those days, after the specimens had been received, "anything might have happened".

In the circumstances, and in view of the improbability that a fish unlike any South American family, but obviously close to a family known from the Old World, would have remained undiscovered except for this single specimen, I believe that I can be more positive than as expressed in the text above, and that on present evidence it is justified to remove *Trachymochlus cupido* from the South American fauna.

Key to the genera of Auchenipteridae 1)

- 1a — Gill-openings restricted, reaching to just in front of cleithrum 2
 b — Gill-openings continued well forward along the isthmus 16
 2a — An adipose fin present (sometimes small) 3
 b — No adipose fin 13
 3a — Ventrals with 9-13 rays, anal with 57-59 rays *Pseudepapterus*
 b — Ventrals with 12-15 rays, anal with (32-)37-49 rays *Auchenipterus*
 c — Ventrals with 6-10 rays, anal with less than 50 rays 4
 4a — Ventrals with 10 rays, anal with ca. 13 rays *Asterophysus*
 b — Ventrals with 9 or 10 rays, anal with 20-26 rays 5
 c — Ventrals with less than 9 rays 7
 5a — Caudal fin obliquely truncate or shallowly forked 6
 b — Caudal fin deeply forked: aberrant specimen of *Pseudauchenipterus*
 6a — Head strongly depressed, with bones exposed and granular; fontanel
 small, roundish-oval; eyes small, more than six times in head . . .
 *Trachycorystes*
 b — Head only anteriorly depressed, its posterior part almost as high as
 wide; fontanel elongate, over three times as long as wide; eyes large,
 less than four times in head *Auchenipterichthys*
 7a — Ventrals with 8 rays, anal with ca. 20 (17-25) rays
 *Pseudauchenipterus*
 b — Ventrals with less than 8 rays 8
 8a — Ventrals with 7 rays 9
 b — Ventrals with 6 rays 10
 9a — Anal with 12 rays, head depressed, its depth twice in its width . . .
 *Tocantinsia*
 b — Anal with 15-16 rays, head not depressed, its width measured between
 the cleithra only a little more than its depth at the same place . . .
 *Pseudotatia*
 10a — Anal with 17-41 rays 11
 b — Anal with 7-13 rays 12
 11a — Maxillary barbels long, reaching to base of anal fin, inner mandibular
 barbels reaching to pectoral base, anal with 18-21 rays, caudal forked
 with pointed lobes, body moderately slender *Entomocorus*
 b — Maxillary barbels at most to below dorsal fin, inner mandibular
 barbels not nearly reaching to pectoral base, anal with 17-41 (usually
 20-30) rays, caudal fin obliquely truncate or obliquely rounded, some-

1) *Tetranematichthys*, easily recognised by having only one pair of mental barbels, is regarded as a generic synonym of *Parauchenipterus* by P. de Miranda Ribeiro (1968c).

- times shallowly emarginate, but never forked, body short and heavy
 *Parauchenipterus*
- 12a — Pectorals with one strong spine and 7-12 rays, predorsal length 2.7 to
 3.25 times in standard length *Centromochlus*
- b — Pectorals with one spine and 4 or 5 rays, predorsal length 3.25 to
 3.7 times in standard length *Tatia*
- c — Pectorals with one spine and 5 or 6 rays; predorsal length 3.2 to
 3.7 times in standard length; very similar to *Tatia*, for differences
 see generic diagnosis *Glanidium*
- 13a — Ventrals with 6-10 rays, anal with less than 40 rays 14
- b — Ventrals with 14-16 rays, anal with over 50 rays 15
- 14a — Ventrals with 6 rays, anal with ca. 32 rays, eyes small, 6 times
 in head *Trachelyopterus*
- b — Ventrals with 10 rays, anal with 35 rays, eyes large, less than 4
 times in head *Trachelyichthys*
- 15a — Ventrals with 15 or 16 rays, anal with ca. 53 rays, dorsal with a spine
 and four rays, teeth present *Trachelyopterichthys*
- b — Ventrals with 14 rays, anal with ca. 61 rays, dorsal with a spine and
 three rays, no teeth *Epapterus*
- 16a — Anal with 11 rays *Taunayia*
- b — Anal with 15-16 rays *Wertheimeria*

Genus **Auchenipterus** Valenciennes

Auchenipterus Valenciennes, 1840, in Cuvier & Valenciennes, Hist. Nat. Poiss. (4° ed.), 15: 154 — type by original designation *Hypophthalmus nuchalis* Spix.

Euanemus Müller, 1842, Ber. Verh. Akad. Wiss. Berlin: 203 — type by original designation and monotypy *Euanemus colymbetes* Müller = *Auchenipterus nuchalis* (Spix).

Ceratocheilus A. de Miranda Ribeiro, 1918, Rev. Mus. Paul., 10: 644 — type by monotypy *Ceratocheilus osteomystax* A. de Miranda Ribeiro = *Auchenipterus nuchalis* (Spix), ♂.

Osteomystax Whitley, 1940, Austr. Nat., 10: 242 — nomen novum for *Ceratocheilus* Ribeiro, preoccupied by *Ceratocheilus* Wesché, 1910.

Generic diagnosis. — Slender, body compressed, much deeper than wide, except for the head which is almost round in circumference; eyes large, their position lateral, but with a distinct downward direction; pectoral pore over middle of pectoral base; dorsal and pectoral spines thin and pungent; ventrals with 12-15 rays, broadly attached to the body; anal fin long, with (32-)37-49 rays; adipose fin very small; lateral line complete, consisting of a number of loops, and giving off branches. At least one species shows sexual dimorphism in shape of maxillary barbels and anal fin, and length of dorsal spine.

Colour plain brownish or grey above, unpigmented below, with or without a silvery lateral band.

Distribution. — Eastern South America, from British Guiana to Uruguay, including the Amazon basin.

Discussion. — Not counting six names which I regard as synonyms, and which will be dealt with in the discussion of *A. nuchalis*, the genus contains the following five species: *A. nuchalis* (Spix, 1829); *A. brachyurus* (Cope, 1878); *A. fordicei* Eigenmann & Eigenmann, 1888; *A. nigripinnis* (Boulenger, 1895); *A. paysanduanus* Devincenzi, 1933. It is doubtful whether all these species are valid: whereas the descriptions of *A. nigripinnis* and *A. paysanduanus* look convincing, *A. brachyurus* and *A. fordicei*, each known from a single specimen collected over a century ago, should be re-studied in the light of present knowledge¹). P. de Miranda Ribeiro (1968a) has suggested that *A. brachyurus*, *A. fordicei*, *A. nigripinnis* and *A. paysanduanus* are all synonyms of *A. nuchalis*: if this is confirmed, the genus *Auchenipterus* would be monospecific. *A. paysanduanus* was described as having only 32 or 33 and rays (Devincenzi, 1933), which is below the normal variation of *A. nuchalis*, and suggests its validity.

***Auchenipterus nuchalis* (Spix) (fig. 3)**

Hypopthalmus nuchalis Spix, 1829, Gen. Sp. Pisc. Bras.: 17, pl. XVII — Brasilia aequatoriali.

Auchenipterus dentatus Valenciennes, 1840, in Cuvier & Valenciennes, Hist. Nat. Poiss. (4° ed.), 15: 156 — Cayenne.

Euanemus colymbetes Müller, 1842, Ber. Verh. Akad. Wiss. Berlin: 203 — Surinam.

Auchenipterus demerarae Eigenmann, 1912, Mem. Carnegie Mus., 5: 202, pl. 21 fig. 1 — Wismar, Demerara, British Guiana.

Auchenipterus brevior Eigenmann, 1912, Mem. Carnegie Mus., 5: 202 — Tumatumari, Lower Potaro River, British Guiana.

Auchenipterus ambyiacus Fowler, 1915, Proc. Acad. Nat. Sci. Philad., 67: 222, fig. — Ambyiacu River, Ecuador.

Ceratocheilus osteomystax A. de Miranda Ribeiro, 1918, Rev. Mus. Paul., 10: 644 — Santa Rita das Antas, Rio Vermelho, Goyaz.

Auchenipterus nuchalis; Valenciennes, 1840, in Cuvier & Valenciennes, Hist. Nat. Poiss. (4° ed.), 15: 155 (Brésil); Filippi, 1853, Rev. Mag. Zool., (2) 5: 167 (no locality, ex Spix); Castelnau, 1855, Anim. Nouv. l'Amér. Sud, Poiss.: 47 (la rivière des Amazones); Kner, 1858, Sitzb. Akad. Wiss. Wien, Mathem.-Naturw. Cl., 26 (1857): 422 (no locality); Bleeker, 1864, Nat. Verh. Holl. Maatsch. Wetensch., (2) 20: 86 (no locality); Eigenmann & Eigenmann, 1888, Proc. Calif. Acad. Sci., (2) 1: 151 (Villa Bella); Eigenmann & Eigenmann, 1891, Proc. U.S. Nat. Mus., 14: 35 (Amazonas,

¹) Certainly Fowler's (1941b, fig. 27) figure of the type of *Auchenipterus brachyurus* looks very much like an ordinary *A. nuchalis* ♀. It contradicts Eigenmann & Eigenmann's (1890: 298) key character that in *A. brachyurus* the ventrals do not reach the anal, and the lengths of maxillary as well as mental barbels agree nicely with specimens of *A. nuchalis* from Suriname.

Surinam); Perugia, 1897, Ann. Mus. Genova, 38: 20 (Alto Beni, Bolivia); Goeldi, 1898, Bol. Mus. Paraense, 2: 461, 479 (Marajó); Eigenmann, 1910, Rep. Princeton Univ. Exp. Patagonia, 3: 397 (Amazonas, Surinam); A. de Miranda Ribeiro, 1911, Arch. Mus. Nac. Rio de Janeiro, 16: 397, 478, pl. 54 fig. 1 (Amazonas, Caldeirão, Rio Capin e Paraguay); Eigenmann, 1912, Mem. Carnegie Mus., 5: 65 (Dutch Guiana, French Guiana); Starks, 1913, Stanford Publ. Univ. Ser.: 32 (Pará); A. de Miranda Ribeiro, 1914, Comm. Linh. Telegr. Estr. Matto-Grosso ao Amazonas, Anexo 5: 11 (Manáos); Fowler, 1915, Proc. Acad. Nat. Sci. Philad., 67: 222 (Peruvian Amazon); Fisher, 1917, Ann. Carnegie Mus., 11: 425 (Pará; San Antonio, Rio Madeira; Lagoa de Parnagua); Pearson, 1924, Indiana Univ. Stud., 11 (64): 15 (Penã Colorado, Huachi, Bolivia); Pearson, 1937, Proc. Calif. Acad. Sci., (4) 23: 110 (Beni-Mamoré); Fowler, 1939, Proc. Acad. Nat. Sci. Philad., 91: 231 (Contamana, Ucayali River basin, Peru); Fowler, 1940, Proc. Acad. Nat. Sci. Philad., 92: 96 (Alto Beni, Peña Colorado, Huachi, Bolivia); Fowler, 1941, Proc. Acad. Nat. Sci. Philad., 93: 143 (Rio Parnahyba, Therezina, Piauhy); Fowler, 1941, Bol. Mus. "Javier Prado", 5: 468 (Perú: Nauta, Contamáná); Eigenmann & Allen, 1942, Fish. W. South America: 121 (Peru: Rio Morona; Iquitos; Gosulimcocha, Rio Morona; Rio Huallaga, Yurimaguas; Manaos); Gosline, 1945, Bol. Mus. Nac. Rio de Janeiro, Zool., 33: 14 (do Paraguai ao Surinam); Menezes, 1949, Rev. Brasil Biol., 9: 489-495, fig. 1-3 (bacia do Rio Parnaíba, Piauí); Bertin & Estève, 1950, Cat. Types Poiss. Mus. Paris, 5: 16 (Cayenne); Fowler, 1951, Arq. Zool. S. Paulo, 6: 461 (Amazônia, Peru, Bolivia, Rio Parnaíba, Paraguay, Surinam, Guiana Francesa); P. de Miranda Ribeiro, 1962, Publ. Avuls. Mus. Nac. Rio de Janeiro, 45: 5 (Manáos, Rio Amazonas; Eiaurupé, Rio Jurua; Rio Amazonas); Ringuelet, Arámburu & de Arámburu, 1967, Los Peces Argentinos de Agua Dulce: 274, 319, fig. 18A (distribution in Argentina); P. de Miranda Ribeiro, 1968, Bol. Mus. Nac. Rio de Janeiro, Zool., 261: 5-7, 9, fig. 9 (no locality).

Euanemus colymbetes; Müller, 1842, Arch. Anat.: 320 (Surinam); Müller & Troschel, 1849, Horae Ichth., 3: 11, pl. 1 fig. 2 (Surinam); Bleeker, 1858, Visschen Ind. Arch., 1: 206 (Surinam).

Euanemus columbetes; Müller, 1843, Arch. Naturg., 9 (1): 318 (Surinam).

Euanemus nuchalis; Bleeker, 1858, Visschen Ind. Arch., 1: 206 (Brasilía); Günther, 1864, Cat. Fish. Brit. Mus., 5: 193 (River Capin, Para); Cope, 1878, Proc. Amer. Philos. Soc., 17: 676, 677 (head streams of the Amazon); Vaillant, 1880, Bull. Soc. Philomat., (7) 4: 154 (Caldéron (Haute-Amazone)); Kappler, 1881, Holländisch-Guiana: 167 (Holländisch-Guiana); Kappler, 1885, Das Ausland, 58: 919 (Holländisch Guiana); Kappler, 1887, Surinam: 152 (Surinam).

Euanemus dentatus; Bleeker, 1858, Visschen Ind. Arch., 1: 206 (Guyana).

Auchenipterus dentatus; Bleeker, 1864, Nat. Verh. Holl. Maatsch. Wetensch., (2) 20: 86, pl. XVI fig. 1 (Surinama).

Auchenipterus nuchalis; Berg, 1901, Com. Mus. Nac. Buenos Aires, 1: 301 (Rio de la Plata, cerca de Buenos Aires; Alto Paraguay (Curumbá)).

Auchenipterus demerarae; Fowler, 1914, Proc. Acad. Nat. Sci. Philad., 66: 266 (Rupununi River, British Guiana); Caporiacco, 1935, Monit. Zool. Ital., 46: 57 (Great Falls of Mabura (Demerara)); Gosline, 1945, Bol. Mus. Nac. Rio de Janeiro, Zool., 33: 14 (Guiana Inglesa); van der Stigchel, 1946, South American Nematognathi: 103 (no locality); van der Stigchel, 1947, Zool. Meded., 27: 103 (no locality); Boeseman, 1952, Zool. Meded., 31: 181 (Suriname River near Joden savanna); P. de Miranda Ribeiro, 1968, Bol. Mus. Nac. Rio de Janeiro, Zool., 261: 5, 7, 9, fig. 7 (no locality); Lundberg & Baskin, 1969, Amer. Mus. Novit., 2398: 6, 26 (no locality).

Auchenipterus ambyiacus; Fowler, 1941, Bol. Mus. "Javier Prado", 5: 468 (Perú: Rio Ampiyaco); Gosline, 1945, Bol. Mus. Nac. Rio de Janeiro, Zool., 33: 14 (rio Ampiyacu); Fowler, 1945, Los Peces del Peru: 66 (Perú: Rio Ampiyaco); Fowler, 1951, Arq. Zool. S. Paulo, 6: 459 (Alto Amazonas, Peru).

Auchenipterus osteomystax; Gosline, 1945, Bol. Mus. Nac. Rio de Janeiro, Zool. 33:

14 (Rio Vermelho, Goiaz); Fowler, 1951, Arq. Zool. S. Paulo, 6: 461 (Goias); P. de Miranda-Ribeiro, 1962, Publ. Avuls. Mus. Nac. Rio de Janeiro, 45: 5 (Mato-Grosso); Britski, 1969, Pap. Avuls. Zool., 22: 205 (Rio Vermelho, Santa Rita das Antas, Estado de Goias).

Auchenipterus brevior; Gosline, 1945, Bol. Mus. Nac. Rio de Janeiro, Zool., 33: 15 (Guiana Inglesa); van der Stigchel, 1946, South American Nematognathi: 104 (Tumatumari, Lower Potaro, British Guiana); van der Stigchel, 1947, Zool. Meded., 27: 104 (Tumatumari, Lower Potaro, British Guiana); Grey, 1947, Fieldiana, Zool., 32: 124 (British Guiana: Tumatumari, lower Potaro River); Böhlke, 1953, Stanford Ichth. Bull., 5: 42 (Tumatumari, Lower Potaro River, British Guiana).

Auchenipterus nuchalis; Fowler, 1945, Los Peces del Peru: 66 (Perú: Nauta, Contamana).

Ceratocheilus osteomystax; P. de Miranda Ribeiro, 1953, Arq. Mus. Nac. Rio de Janeiro, 42: 391 (no locality).

Material. — One specimen (♀), label illegible (RMNH no. 4824), standard length 121 mm, figured as *Auchenipterus dentatus* by Bleeker (1864), and undoubtedly collected between the years 1824-1836, near Paramaribo, by H. H. Dieperink. Four specimens (1 ♂, 3 ♀), January 1946, Suriname Rivier near Jodensavanne (D. C. Geijskes, RMNH no. 18125), standard length 97, 101, 104 (♂), 110 mm. Eight specimens (2 ♂, 6 ♀), 3 January 1964, Suriname Rivier near Brokopondo (Boeseman, RMNH no. 25588), standard length 87 (♂), 98, 108 (♂), 114, 115, 116, 117, 135 mm. Four specimens (all ♀), 7 April 1966, Marowijne near Albina (Mees, RMNH no. 25589), standard length 82, 83, 86, 86 mm. One specimen (♂), 18 April 1967, Loka Loka tabbetje, Marowijne (Nijssen, ZMA no. 106025), standard length 115 mm. One specimen (♂), 24 April 1967, Kamaloea or Saloea Kreek, French Guiana (Nijssen, ZMA no. 110679), standard length 119 mm.

Characters. — D I.6 or I.7, A 39-45, P I.12, V 13 (i.12), C i.15.i and rudiments, gill-rakers 32-39 (8-11 + 1 + 23-27). For a general impression of the appearance of this species, see the generic diagnosis and fig. 3.

There is a clear sexual dimorphism in the species (fig. 3). Males differ from females in having the maxillary barbels thick and ossified almost to their tips; these barbels can be moved sideways only, vertical movements appear to be almost impossible; the first four fully-grown anal rays are modified and coalescent, supporting the urogenital tube which runs along their anterior border to the tip of these rays; the dorsal spine is longer, about 1.5 in predorsal length, as against 1.8 to 2.0 in females; the body appears to be slightly more slender.

Habitat. — The lower courses of the great rivers (see under the heading Distribution), where the species appears to be common. It is a free-swimming species, usually found not far below the surface.

Distribution. — Eastern South America from the Essequibo River south to the Paraguay-Paraná-La Plata basin.

Discussion. — This species was originally described from Brazil. Besides creating a genus for it, Valenciennes (1840) described a new species, said to come from Cayenne, as *A. dentatus*. Very soon afterwards, without reference to the works of Spix and Valenciennes, Müller (1842) based *Euanemus*

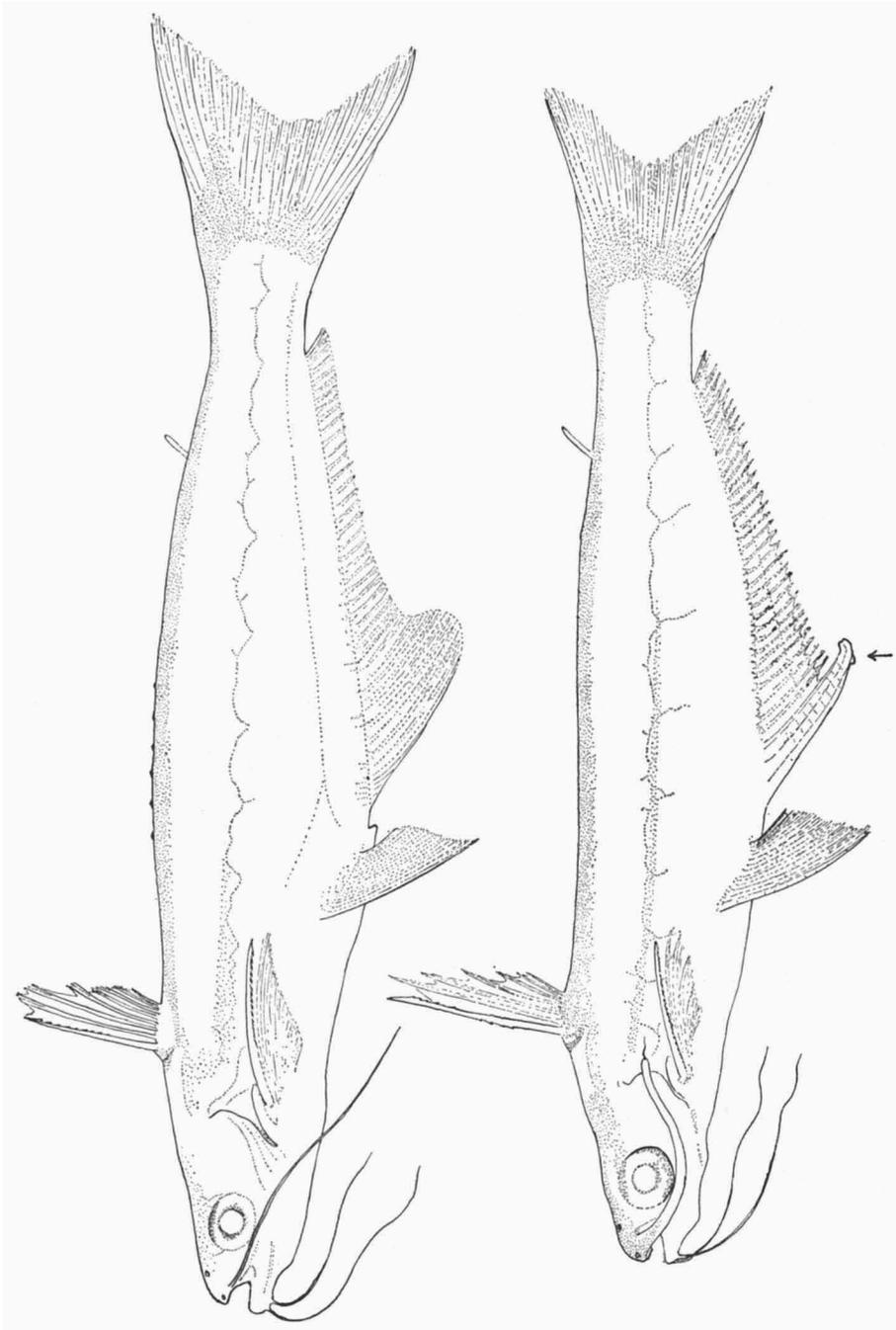


Fig. 3. *Auchenipterus nuchalis* ♀ and ♂, showing sexual differences (RMNH from no. 25588). 1.2 X. The arrow indicates the position of the genital pore of the male.

colymbetes on a specimen from Suriname. Bleeker (1864) gave a redescription and a coloured plate of *A. dentatus* based on a specimen in Leiden; as locality he gave Suriname. In the same year Günther (1864) placed both *A. dentatus* and *E. colymbetes* in the synonymy of *A. nuchalis*, where they have remained ever since.

It is perhaps good to mention here that the inclusion of Cayenne and Suriname in the range of *A. nuchalis* was exclusively based on the type specimens of *A. dentatus* and *E. colymbetes*, the fish figured by Bleeker, and the material which Kappler (1881) states to have sent to the Stuttgart Museum, no later material having been recorded from these countries under any of the three names. Moreover, the locality Cayenne was almost certainly given in error for Suriname, which means that specimen ZMA no. 110679 constitutes the first certain record of the genus *Auchenipterus* for French Guiana.

The first record of the genus from British Guiana was by Eigenmann (1912) who described *A. demerarae*, giving as only differential character a lateral band which, by inference, would not be present in *A. nuchalis*. There are not many subsequent records, but *A. demerarae* appears to have become accepted as a valid species. Van der Stigchel (1946) brought the Leiden specimen no. 4824 to *A. demerarae*, and observed: "The character of the dark lateral band, given by Eigenmann as the only striking difference between *Auchenipterus nuchalis* (Spix) and *Auchenipterus demerarae* Eigenm., is very obvious in the here described specimen". The lateral band is certainly not obvious now, and I doubt that it was very obvious when van der Stigchel examined it, as even then it had been in preservative for over a century. There is, however, some pigment on the flanks, indicative of such a band. Van der Stigchel, of course, was not aware that the specimen he ascribed to *A. demerarae* was the specimen previously described and figured by Bleeker (1864) under the name *A. dentatus*, and is probably a topotype of that name.

In the same paper, Eigenmann (1912) described a second new species from British Guiana, *A. brevior*, based on the single character of having mandibular barbels extending to the gill-opening only, as against to the tip of the pectoral in *A. demerarae*.

Chronologically the next name was *A. ambyiacus* Fowler (1915); one specimen of a lot previously identified by Cope (1878) as *A. nuchalis*, but distinguished by greater depth of body. In the description Fowler gives as body-depth of *A. nuchalis* $4\frac{3}{4}$ to 5, for *A. ambyiacus* $4\frac{1}{4}$, but the illustration shows a body depth of about $4\frac{1}{3}$ in standard length. It is interesting to note that in the type and only known specimen there was: "From shoulder towards middle of upper caudal lobe [a] pale dusky-gray streak", as this is the character on which *A. demerarae* was based.

A. de Miranda Ribeiro (1918a) differentiated *Ceratocheilus osteomystax* as a new genus and species related to *Auchenipterus*, mainly on the basis of having: "... barbilhões maxillares osseos, comprimidos, longos, erecteis ... Anal falcada, longa, com os raios anteriores muito desenvolvidos, provavelmente portadores da papilla genital". Gosline (1945) synonymized the genus *Ceratocheilus* with *Auchenipterus*, but the species has continued to be recognised.

This historical review leaves us with the present situation, that *A. dentatus* and *E. colymbetes* are considered synonyms of *A. nuchalis*, and that *A. demerarae*, *A. brevior*, *A. ambyiacus* and *A. osteomystax* are accepted as valid species.

It has already been mentioned that *A. dentatus* agrees with *A. demerarae*, and therefore the last-mentioned name is certainly a synonym of the former. This means that no more than one species is known from Suriname and Cayenne.

Van der Stigchel (1946) expressed doubt about the validity of *A. brevior*. In my specimens of *A. nuchalis* from Suriname, there is some individual variation in the length of the mandibular barbels, from only a little beyond the base of the pectorals, to nearly the tip of the pectorals; this makes me suspect that *A. brevior* also falls within the normal range of variation of *A. nuchalis*. Therefore I am of the opinion that *A. brevior* too, can best be synonymized with *A. nuchalis*, although the possibility that it is valid cannot be entirely dismissed.

A. ambyiacus was exclusively based on body-depth. Subsequently Fowler (1941a) himself recorded in *A. nuchalis* a body-depth of from $4\frac{1}{5}$ to 5, and in Suriname specimens I found a variation of from 4 to 5. As therefore the only differential character ever claimed for *A. ambyiacus* is not valid, there is no ground for maintaining the species.

The characters of *Ceratocheilus osteomystax* are sexual; it is peculiar that the existence of sexual dimorphism has not hitherto been recognised in the species, though Boeseman (1952) made a suggestion in this direction¹).

There remains the possibility that Guiana specimens are differentiated from Amazonian specimens, and as the only available material is from the Guianas, I have been unable to make a direct comparison. Judging by

1) This section was written before I received P. de Miranda Ribeiro's (1968a) paper in which the sexual dimorphism of *Auchenipterus* is excellently described. Subsequently I found an even earlier reference: "the males of *Auchenipterus* have one pair of whiskers, ossified into great bony horns which swivel forward and upward to remind one of the horns of an Assyrian bull" (Myers, 1947). This observation, made in a popular article, does not appear to have penetrated scientific literature.

descriptions, Amazon individuals have slightly higher anal counts. In Suriname specimens the number of anal rays is 39-45, whereas in Amazonia counts of 45-49 (Fowler, 1940a) and 48 (type of *C. osteomystax*) have been recorded. On the other hand, Fisher (1917) gave for three Amazonian specimens 42, 45 and 47, and Berg (1901) mentioned for the extreme south of the range (Alto Paraguay and Rio de la Plata), 42-47. In Spix's (1829) figure I count 44 rays. It is apparent therefore that, though there appears to be a slight difference in average number of anal rays, the overlap is too great to use it as a specific, or even as a subspecific character.

Fowler (1915, in the description of *A. ambyiacus*, and 1940a) is the only author ever to have mentioned gill-rakers. His counts (10 + 23 and 14 + 22) agree with my counts of Suriname specimens.

Genus **Pseudauchenipterus** Bleeker

Pseudauchenipterus Bleeker, 1862, Atlas Ichth., 2: 6 — type by original designation and monotypy *Silurus nodosus* Bloch.

Generic diagnosis. — Rather heavily-bodied fishes; head and anterior part of body roundish in circumference, posterior part compressed; eyes of moderate size, lateral in position; head with thick skin, covering the remarkably swollen, "honeycomb-like" frontal bones; nuchal bones hard, covered with thin skin only, leaving the bone-structure clearly visible; spines strong, pungent, smooth along their anterior border, serrated behind; barbels well-developed, longer than in most genera, even inner mandibular barbels reaching at least to pectoral base (as otherwise only found in *Entomocorus*); pectoral pore far behind pectoral base; ventrals with 8 rays, anal with 20-24 rays, caudal fin well-developed, long, deeply forked. Lateral line complete, with moderate zig-zags in its anterior part, straight in its posterior part. Sexual dimorphism exists in the position of the urogenital pore and the shape of the anal fin, as described under *P. nodosus*.

Distribution. — Widely distributed in northern and eastern South America.

Discussion. — The diagnosis given above is based on *P. nodosus* only. Three other species have been included in the genus: *Auchenipterus jequitinhonhae* Steindachner, 1876; *Auchenipterus affinis* Steindachner, 1876, and *Felichthys flavescens* Eigenmann & Eigenmann, 1888. I have not examined any of these little-known species and doubt that they should really be regarded as congeneric with *P. nodosus*. None of them appears to have the "honeycomb-like" bone-structure which is such a peculiar feature of *P. nodosus*. On the other hand they have similar numbers of dorsal, ventral and anal rays, and that may be significant.

Gosline (1945: 14) included two further nominal species in the genus. *Pseudauchenipterus guppyi* Regan and *Pseudauchenipterus paseae* Regan, but the first of these has been generally recognised as a synonym of *P. nodosus* (cf. Eigenmann, 1912: 201; Boeseman, 1960: 104), and the second is an evident lapsus for *Parauchenipterus paseae* Regan, a synonym of *Parauchenipterus galeatus*, no *Pseudauchenipterus paseae* ever having been described by that author (cf. Regan, 1906).

***Pseudauchenipterus nodosus* (Bloch)**

Silurus nodosus Bloch, 1794, Naturgesch. Ausl. Fische, 8: 35, pl. 368 fig. 1 — Tranquebar (errore!) = South America [reference not verified].

Auchenipterus furcatus Valenciennes, 1840, in Cuvier & Valenciennes, Hist. Nat. Poiss. (4° ed.), 15: 157 — de Cayenne ou de Surinam.

Pseudauchenipterus guppyi Regan, 1906, Proc. Zool. Soc. Lond.: 387, pl. XXIII — Caroni River, Trinidad.

Pseudauchenipterus nigrolineatus Fowler, 1911, Proc. Acad. Nat. Sci. Philad., 63: 434, fig. 5 — Pedernales, Venezuela.

Silurus nodosus; Bloch, 1797, Ichth. Hist. Nat. Poiss., 11: 26, pl. 368 fig. 1 (Tranquebar); Bloch & Schneider, 1801, Syst. Ichth.: 383 (ad Tranquebariam).

Arius nodosus; Valenciennes, 1840, in Cuvier & Valenciennes, Hist. Nat. Poiss. (4° ed.), 15: 53 (Tranquebar).

Auchenipterus nodosus; Müller & Troschel, 1849, Horae Ichth., 3: 11 (no locality); Kner, 1858, Sitzb. Akad. Wiss. Wien, Mathem.-Naturw. Cl., 26 (1857): 424 (Surinam); Bleeker, 1858, Visschen Ind. Arch., 1: 208 (Amer. merid.); Günther, 1864, Cat. Fish. Brit. Mus., 5: 194 (British Guiana; Dutch Guiana; French Guiana; Demerara); Goeldi, 1898, Bol. Mus. Paraense, 2: 457, 479 (Magoary (Marajó)).

Pseudauchenipterus nodosus; Bleeker, 1862, Atlas Ichth., 2: 6 (name only); Bleeker, 1863, Ned. Tijdschr. Dierk., 1: 88 (name only); Bleeker, 1864, Nat. Verh. Holl. Maatsch. Wetensch., (2) 20: 91, pl. XI fig. 1, pl. XIII fig. 6 (Surinama); Eigenmann & Eigenmann, 1891, Proc. U.S. Nat. Mus., 14: 34 (Bahia, Para, Guiana); Eigenmann & Bean, 1907, Proc. U.S. Nat. Mus., 31: 663 (Amazon River between Para and Manaos); Eigenmann, 1910, Rep. Princeton Univ. Exp. Patagonia, 3: 396 (Bahia; Para; Guiana); A. de Miranda Ribeiro, 1911, Arch. Mus. Nac. Rio de Janeiro, 16: 354 (Bahia, Pará, Guyanas); Eigenmann, 1912, Mem. Carnegie Mus., 5: 201, pl. XX fig. 2 (British Guiana: Mahaica; mud-flats of Demerara River, near Wismar); Starks, 1913, Stanford Publ. Univ. Ser.: 32 (Pará); Fowler, 1915, Proc. Acad. Nat. Sci. Philad., 67: 222 (Surinam); Fowler, 1915, Proc. Acad. Nat. Sci. Philad., 67: 529 (Caroni River, Trinidad); Fisher, 1917, Ann. Carnegie Mus., 11: 424 (Pará; Penedo; Alcobaça; Rio Coité); A. de Miranda Ribeiro, 1918, Rev. Mus. Paul., 10: 734 (no locality); Fowler, 1940, Proc. Acad. Nat. Sci. Philad., 91: 231 (Contamana, Peru); Fowler, 1941, Bol. Mus. "Javier Prado", 5: 468 (Perú (Contamana)); Eigenmann & Allen, 1942, Fish. W. South America: 122 (Contamana, Peru); Roth, 1943, Fish Life in Brit. Guiana: 118 (British Guiana); Schultz, 1944, Proc. U.S. Nat. Mus., 94: 239 (Venezuela); Gosline, 1945, Bol. Mus. Nac. Rio de Janeiro, Zool., 33: 13 (Bahia; Pará; Guiana; Peru); Fowler, 1945, Los Peces del Peru: 64 (Perú (Contamana)); van der Stigchel, 1946, South American Nematognathi: 101 (Surinam; River Paramaribo; River Demerara; Caribbean Sea); van der Stigchel, 1947, Zool. Meded., 27: 101 (Surinam; River Paramaribo; River Demerara; Caribbean Sea); Puyo, 1949, Poiss. Guyane Fr.: 94, fig. 52 (Guyane Française); Fowler, 1951, Arq. Zool. S. Paulo, 6: 469 (Amazônia, Peru, Pará, Rio São Francisco, Bahia, São Paulo, Guiana); Price, 1955, J. Agric. Soc. Trinidad & Tobago, Soc. Pap., 863: 14 (Trinidad:

Caroni river near Piarco); Boeseman, 1956, Zool. Meded., 34: 189 (10 miles above outlet of Suriname River); Boeseman, 1960, Studies Fauna Curaçao, 10: 104 (Caroni River, Trinidad); Mago-Leccia, 1967, Soc. Venez. Cienc. Nat. Bol., 27: 255 (Venezuela); Bacon, 1970, The Ecology of Caroni Swamp, Trinidad: 57 (Caroni Swamp, Trinidad).

Euanemus nodosus; Kappler, 1881, Holländisch-Guiana: 167 (Holländisch-Guiana); Kappler, 1885, Das Ausland, 58: 919 (Holländisch-Guiana); Kappler, 1887, Surinam: 152 (Surinam).

Felichthys nodosus; Eigenmann & Eigenmann, 1888, Proc. Calif. Acad. Sci., (2) 1: 154 (Para; Bahia); Eigenmann & Eigenmann, 1890, Occ. Pap. Calif. Acad. Sci., 1: 290 (Para; Bahia).

Pseudauchenipterus guppyi; Fowler, 1911, Proc. Acad. Nat. Sci. Philad., 63: 433 (Pedernales, Venezuela).

Pseudauchomipterus nodosus; Roth, 1943, Fish Life in Brit. Guiana: 69 (British Guiana).

Material. — Forty specimens from Suriname and Demerara as follows. Two specimens, 11 February 1954, ten miles upstream from mouth of Suriname Rivier (H. W. Lijding, RMNH no. 21485), standard length 66, 71 mm. Two specimens, 31 March 1966, Suriname Rivier near Paramaribo (W. Vervoort, RMNH no. 26486), standard length 40, 41 mm. One specimen (♀), 10 April 1966, Suriname Rivier near Paramaribo (W. Vervoort, RMNH no. 26487), standard length 225 mm. 17 specimens (10 ♂, 7 ♀), 6 September 1970, Demerara River near Georgetown (J. van der Land, RMNH no. 26488), standard length 99-157 mm. 11 specimens (6 ♂, 5 ♀), same data (RMNH no. 26489), standard length 117-183 mm. Nine specimens (3 ♂, 5 ♀, 1?), same data (RMNH no. 26490), standard length 128-193 mm¹).

Characters. — D I.6, A 20-25, P I.7 (occasionally I.6 or I.8), V 8 (i.7), C i.15.i, gill-rakers short but fairly numerous, ca. 16 on outer branchial arch²). The main distinguishing characters have been given in the generic diagnosis, but a few more will here be added.

Head 3.7-4.5 (usually 3.8-4.0) times in standard length, greatest width of body (between the cleithra) 4.3-5.2 times in standard length, depth of body 3.6-4.7 times in standard length, predorsal length 2.8-3.35 times in standard length. Head nearly cylindrical, about as wide as deep; body compressed, deeper than wide. Eyes comparatively large, about equal in length to snout and 3.8-4.5 (usually about 4.0) times in head; barbels long, the maxillary barbels reaching at least to the base of the dorsal fin and occasionally as far back as a vertical through the origin of the anal fin; the outer pair of mental barbels usually reaches to the tip of the well-developed postcleithral process; the inner pair of mental barbels is almost or fully as long as the outer pair, but

1) The old material in our collection was listed and described by van der Stigchel (1946). As adequate fresh material was available, I have only superficially examined the old specimens.

2) In the forty examined specimens the following aberrant counts were found: D I.5 (one); P I.8, I.8 (one); P I.7, I.8 (one); P I.7, I.6 (two); P I.6, I.6 (one, the same specimen that has D I.5); V i.8, i.8 (two), V i.7, i.5 (one); C i.14.i (one), C i.19.i, divided as follows: i.7.i.11.i (1, one).

does not reach as far backwards as it is implanted in a more anterior position; even so it reaches at least to the base of the pectoral fin, and often beyond; the dorsal and pectoral spines are well-developed; the dorsal spine measures 1.0-1.6 times in predorsal length, the pectoral spines are equal in length to the dorsal spine or up to 10% longer or shorter; the dorsal spine has a smooth anterior edge; its posterior edge is either smooth or almost smooth or is provided with small teeth over most of its length; the pectoral spines have a smooth anterior edge, whereas the posterior edge is provided with a series of from (11-) 20-36 (-39) well-developed antrorse teeth (there is evidently an irregular increase in number of teeth with size: the lowest number, 11, was found in a specimen of 40 mm s.l., the highest, 39, in a specimen of 225 mm s.l.); caudal fin deeply-forked with pointed lobes; pectoral pore just under the middle of the postcleithral process, well behind the implantation of the pectorals; lateral line well-developed, complete, with irregular arcs or zig-zags.

Colour. Dark blue-grey above, with yellow or orange flanks and fins; small and medium-sized specimens have a blackish border to the caudal fin, which is faint or absent in the largest individuals; on the sides of the body there are some eight or ten inconspicuous vertical rows of small white spots.

Sexual dimorphism. In males the anterior anal rays are long and the urogenital pore is at the end of a canal which runs along the anterior edge of the anal fin and widens into a vesicle towards the tip of the rays. In females the urogenital pore is situated on the belly, just in advance of the anal origin and the anterior anal rays are a little shorter, giving the anal fin an almost straight rather than a falcate outline. The ventral fins tend to be rounded in females, slightly more pointed in males, but the difference is one of averages only. I have found no other secondary sexual characters. Fisher (1917: 424-425) appears to have been the first to note and describe the sexual dimorphism of this species.

Habitat. — Evidently an inhabitant of the lower courses and estuaries of the great rivers, presumably adapted to life in brackish and even salt water.

Distribution. — In Suriname only known from the mouth of the Suriname Rivier, upstream to Paramaribo, but almost certainly occurring in the estuaries of all major rivers. Elsewhere recorded from Venezuela, Trinidad, British and French Guiana, Amazonia, and along the east coast of Brazil south to Penedo (Fisher, 1917) and Bahia (Eigenmann & Eigenmann, 1890).

Fowler (1951: 460) has recorded this species from as far south as the State of São Paulo, a record apparently based on A. de Miranda Ribeiro, for in the bibliography of the species Fowler states that A. de Miranda Ribeiro (1918b: 734) had material from Santos (and São João da Barra). However, Fowler

must have misunderstood A. de Miranda Ribeiro's paper which is a numbered list of species. No. 158 of this list is *Felichthys bagre*, of which two specimens are mentioned, one from Santos and one from S. João da Barra. No. 159 is *Pseudachenipterus nodosus*; a single specimen is listed, without locality, but with the words: "já determinado porém sem procedencia". Fowler has apparently interpreted this a meaning that this specimen was from the same locality as the preceding one (*Felichthys bagre*), whereas actually it means that it was without a locality.

Discussion. — The small specimens do not yet have the spongy bone of the large individuals: the shields of their heads are hard.

Genus **Trachycorystes** Bleeker

Trachycorystes Bleeker, 1858, Visschen Ind. Arch., 1: 200 — type by original designation and monotypy, *Auchenipterus trachycorystes* Valenciennes¹).

Generic diagnosis. — Head broad and depressed, width between the cleithra almost twice its depth at the same place; bones of head and nape fused to form one single, heavy and strongly rugose casque, entirely exposed, without skin; a single small oval fontanel; a wide, horizontal mouth, with the lower jaw clearly protruding; each jaw with a band of small teeth, none on vomer and palatines; eyes rather small, lateral; dorsal spine strong, with teeth along its anterior edge only, the posterior edge smooth; pectoral spines stronger and much longer than dorsal spine, with teeth along both edges; ventrals with 9 or 10 rays; anal fin of moderate length (ca. 20 rays); posterior part of body comparatively slender, with a well-developed caudal peduncle and a slightly forked tail. Lateral line complete, wavy, especially in its anterior part. No sexual dimorphism has been recorded.

Distribution. — The distribution of this genus is very insufficiently known; there are records from the Essequibo, and Mato Grosso (without exact locality).

Discussion. — Only two of the many species currently placed in *Trachycorystes*, appear to belong to the genus; they are *T. trachycorystes*, the type of the genus, and *T. obscurus*. I believe that the one is a synonym of the other so that the genus, which is extremely little-known, may consist of a single species. This species is probably widely distributed but rare. The habitat is presumably the bottom of the large rivers.

Except in a few species with many-rayed ventral fins (genera *Auchenipterus* and *Pseudepapterus*), the number of ventral rays is a good generic character

¹) This is the correct reference; in literature, the genus is usually ascribed to Bleeker (1862) or even Bleeker (1863).

in the Auchenipteridae. In view of the constancy of this character in the majority of genera, I was surprised to find that in *Trachycorystes* a variation of from six to ten ventral rays has been recorded. The question arose of whether some of the published counts might not be erroneous. Therefore I tabulated all species currently recognized, with the number of ventral rays as given in their original descriptions (Table). Whereas species have been described with 6, 7, 8, 9 and 10 ventral rays, I established through correspondence and personal examination that in the genus *Trachycorystes* as hitherto defined, the ventral ray numbers actually known to occur, are either 6, or 9 to 10. A priori one would expect this difference to be of generic value, and examination of material revealed that indeed the 10-rayed species differ in numerous characters from the 6-rayed species.

List of species currently recognized in the genus *Trachycorystes*, with their finray-numbers

name	number of ventral rays as published	number of anal rays as published	recounted number of ventral rays
<i>T. galeatus</i> (Linnaeus, 1766)	6	24	
<i>T. trachycorystes</i> (Valenciennes, 1840)	9—10	20	10 ¹⁾
<i>T. ceratophysus</i> (Kner, 1858)	6	20	
<i>T. obscurus</i> (Günther, 1863)	9	19—20	(9—) 10 ²⁾
<i>T. striatulus</i> (Steindachner, 1876)	6	25—27	
<i>T. glaber</i> (Steindachner, 1876)	7—8	23	3)
<i>T. magdalenae</i> Steindachner, 1878	6	27—30	
<i>T. insignis</i> Steindachner, 1878	6	26	
<i>T. isacanthus</i> Cope, 1878	7	22	6 ⁴⁾
<i>T. brevibarbus</i> Cope, 1878	7	22—23	6 ⁵⁾
<i>T. porosus</i> Eigenmann & Eigenmann, 1888	6	24—25	
<i>T. analis</i> Eigenmann & Eigenmann, 1888	6	41	
<i>T. albicrux</i> Berg, 1901	6—7	32	
<i>T. amblops</i> (Meek & Hildebrand, 1913)	6	17—20	
<i>T. fisheri</i> Eigenmann, 1916	—	21—25	6 ⁶⁾
<i>T. leopardinus</i> Borodin, 1927	8	17—18	6 ⁷⁾
<i>T. cratensis</i> P. de Miranda Ribeiro, 1937	8	24	8)
<i>T. teaguei</i> Devincenzi, 1942	6	23	
<i>T. coracoideus</i> Eigenmann & Allen, 1942	—	—	9—10 ⁹⁾
<i>T. insignis peloichthys</i> Schultz, 1944	6	26—28	
<i>T. jokeannae</i> Hoedeman, 1961	6	20	

1) Personal recount from holotype. 2) Personal recount from syntype. 3) Type (or types?) lost (Kähsbauer, in litt.). 4) Böhlke, in litt. 5) Fowler (1915: 222). 6) Eigenmann (1922, pl. V). 7) Baskin, in litt. 8) Type not traced; position not clear: by its describer stated to be near *T. trachycorystes*. 9) Personal recount from syntypes; judged a synonym of *Aucheniptichthys thoracatus*.

Type of the genus *Trachycorystes* is *T. trachycorystes*, a species with 9-10 ventral rays. For the species with 6-rayed ventrals, the generic name *Parauchenipterus* is available, of which *P. galeatus* is the type. It is unfortunate but inevitable that the familiar binomen *Trachycorystes galeatus*, in use since (as it now appears mistakenly) the Eigenmanns (1888) synonymized *Parauchenipterus* with *Trachycorystes*, has to be abandoned, and that the generic name *Trachycorystes* becomes restricted to a single little-known species.

Possibly, *Trachycorystes cratensis* A. de Miranda Ribeiro (1937) is a second member of this genus, as it was described as "muito proximo de *T. trachycoristes*". According to P. de Miranda Ribeiro (1953: 407), the type was in the Museu Nacional, reg. no. 947, but curiously, in the catalogue (P. de Miranda Ribeiro, 1962b) it is not mentioned. For reasons explained in the introduction, I have made no further attempts to trace this specimen.

Trachycorystes trachycorystes (Valenciennes) (fig. 4, pl. 1)

Auchenipterus trachycorystes Valenciennes, 1840, in Cuvier & Valenciennes, Hist. Nat. Poiss. (4° ed.), 15: 159, pl. 437 — no locality ("nous le croyons de Brésil").

Trachycorystes typus Bleeker, 1862, Atlas Ichth., 2: 6 — nomen novum for *Auchenipterus trachycorystes* Valenciennes, given to avoid tautonomy.

Auchenipterus obscurus Günther, 1863, Ann. Mag. Nat. Hist., (3) 12: 442 — the Essequibo.

Trachycorystes trachycorystes; Bleeker, 1858, Visschen Ind. Arch., 1: 208 (Amer. merid.); Eigenmann & Eigenmann, 1888, Proc. Calif. Acad. Sci., (2) 1: 154 (no locality); Eigenmann & Eigenmann, 1890, Occ. Pap. Calif. Acad. Sci., 1: 276 (habitat: ?); Eigenmann & Eigenmann, 1891, Proc. U.S. Nat. Mus., 14: 34 (no locality); Eigenmann, 1910, Rep. Princeton Univ. Exp. Patagonia, 3: 396 (Brazil); Gosline, 1945, Bol. Mus. Nac. Rio de Janeiro, Zool., 33: 12 (Brasil); Fowler, 1951, Arq. Zool. S. Paulo, 6: 476 (Brasil?).

Auchenipterus trachycorystes; Günther, 1864, Cat. Fish. Brit. Mus., 5: 195 (Brazil).

Auchenipterus obscurus; Günther, 1864, Cat. Fish. Brit. Mus., 5: 195 (Essequibo).

Trachycorystes obscurus; Eigenmann & Eigenmann, 1888, Proc. Calif. Acad. Sci., (2) 1: 154 (no locality); Eigenmann & Eigenmann, 1890, Occ. Pap. Calif. Acad. Sci., 1: 275 (Essequibo); Eigenmann & Eigenmann, 1891, Proc. U.S. Nat. Mus., 14: 34 (Essequibo); Eigenmann, 1910, Rep. Princeton Univ. Exp. Patagonia, 3: 396 (Essequibo); Eigenmann, 1912, Mem. Carnegie Mus., 5: 200, pl. XVII fig. 2 (no locality = Essequibo); Beebe, 1925, Zoologica, 6: 120 (Kartabo); Gosline, 1945, Bol. Mus. Nac. Rio de Janeiro, Zool., 33: 12 (Essequibo); Alexander, 1964, Proc. Zool. Soc. Lond., 142: 420 (British Guiana); Alexander, 1966, Proc. Zool. Soc. Lond., 148: 90 (British Guiana).

Trachycorystes trachycoristes; A. de Miranda Ribeiro, 1911, Arch. Mus. Nac. Rio de Janeiro, 16: 366 Pará ou Matto Grosso).

Trachycoristes trachycoristes; P. de Miranda Ribeiro, 1962, Publ. Avuls. Mus. Nac. Rio de Janeiro, 45: 11 (Estado de Mato-Grosso).

Material. — One stuffed specimen without data (MNP no. A 9422), standard length ca. 310 mm, holotype of the species. One specimen, no date, Essequibo River (Ehrhardt, BM no. 1864-1-21: 13-14), standard length 164 mm, syntype of *Auchenipterus obscurus*.

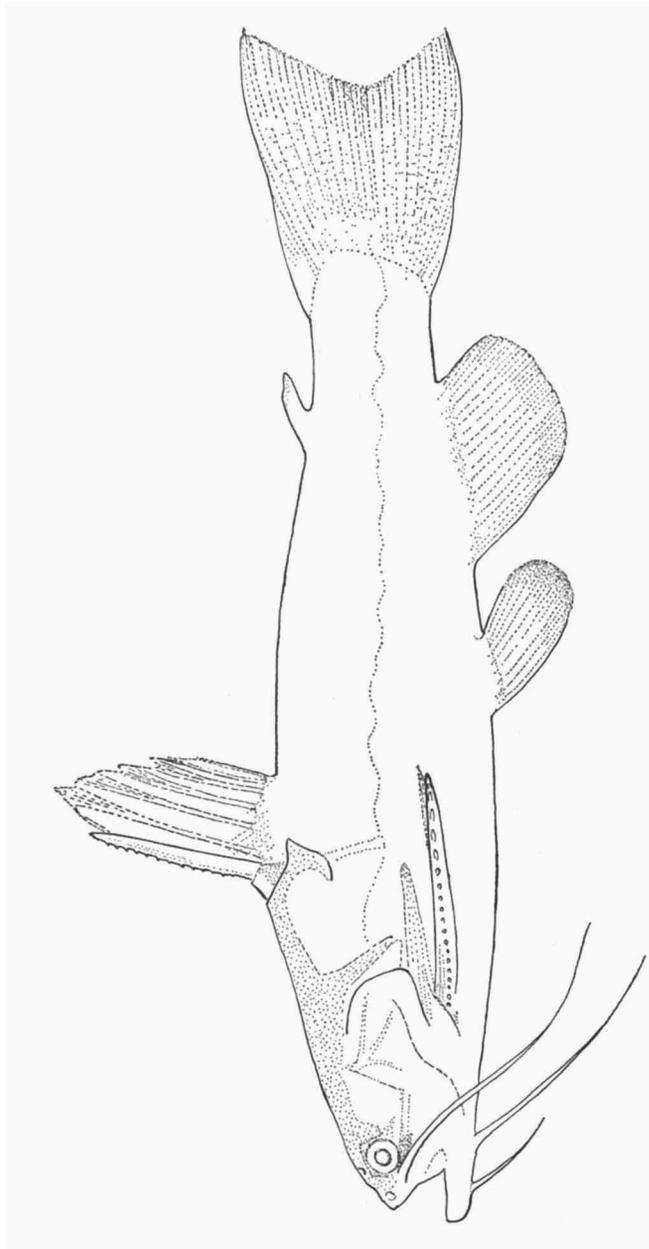


Fig. 4. *Trachycorystes trachycorystes* (BM no. 1864-1-21: 13-14). $\frac{1}{4}$ X.

One specimen, undated, Estado de Mato-Grosso, without exact locality (L. Travassos, MRJ no. 1501), standard length ca. 70 mm.

Characters. — D I.6, A 20, P I.6 or I.7, V 9-10, C i.15.i and rudiments. The main characters of this species have been given in the generic diagnosis and additional characters are listed in the discussion. A general impression of its appearance may be obtained from fig. 4 and pl. 1.

Distribution. — The only exact localities are the Essequibo River with its tributaries the Cuyuni and the Maraballi, but the species is probably widely distributed in Amazonia. The type of the species is a mounted individual, taken by the French Armies from the Royal Cabinet in Lisbon, and therefore presumed by Valenciennes to have come from Brazil. According to A. de Miranda Ribeiro (1911: 367): "...a região de procedencia sejam os estados do Pará ou Matto Grosso, ambos visitados por Alexandre Rodrigues Ferreira, o fornecedor do Museu de Lisboa, de animaes do Brasil". Specimen MRJ no. 1501 confirms this provenance.

Discussion. — In the original description of *Auchenipterus obscurus*, no reference was made to *T. trachycorystes* (cf. Günther, 1863), but differential characters between the former and the latter were given by Günther (1864) as follows:

<i>T. obscurus</i>	<i>T. trachycorystes</i>
D I.5, P I.7 or I.8	D I.6, P I.6
bones of head and neck rather coarsely granulated	bones of head and neck finely granulated
the maxillary barbels extend to, or somewhat beyond, the extremity of the humeral process	the maxillary barbels are not longer than the head
the humeral process extends backwards beyond the middle of the pectoral spine	the humeral process extends backwards to, or a little beyond, the extremity of the pectoral spine
the dorsal spine is considerably shorter than the pectoral spine	the dorsal spine is nearly as long as the pectoral spine
caudal fin slightly emarginate	caudal fin truncate

In their key to the species of *Trachycorystes*, Eigenmann & Eigenmann (1890: 273-274) separated *T. obscurus* and *T. trachycorystes* widely on the basis of the shape of the tail, ascribing to the former a "caudal emarginate", to the latter a "caudal obliquely truncate or rounded; lower jaw longer". It

should be noted that the Eigenmanns had not examined material, their descriptions were copied from those given by Valenciennes and Günther, and that Günther had examined *T. obscurus* only and not the unique type of *T. trachycorystes* in Paris. A direct comparison between the types of the two nominal species had therefore not previously been made. The results of such a comparison, made by me, will be summarized here.

The dorsal fin of *T. obscurus* has six rays, not five. The sixth ray is small and weak; it is only half as long as the fifth ray but appears to be clearly separated from it and is not just a branch of the fifth. The posterior part of the dorsal fin of *T. trachycorystes* is broken off, but it looks as if there have been six rays, as already described by Valenciennes. In the pectoral fins I count I.7½ and I.6 respectively, but the last rays are fine, and in *T. trachycorystes* the fins are partly broken, and further covered with a thick layer of paint and varnish, which may well conceal one ray. There is certainly no argument here for retention of two different species.

Both *T. obscurus* and *T. trachycorystes* have the casque without skin and coarsely granular. Even though some of the coarseness has been smoothed over by varnish in *T. trachycorystes*, there is hardly any difference between the two.

The maxillary barbels of *T. trachycorystes* reach to the base of the pectorals, but their tips are broken. The barbels of *T. obscurus* are very slender distally and if broken at the level of the pectoral base, would offer about the same aspect as those of *T. trachycorystes*. Anyway, proof that any difference in this character exists cannot be given.

In both specimens the tip of the humeral process extends to below the horn of the nuchal plate; in *T. obscurus* the pectoral spine reaches to well beyond the tip of the humeral process, in *T. trachycorystes* only a little beyond the tip of the humeral process.

Even though its tip is broken off and missing, it can be seen that the dorsal spine of *T. trachycorystes* is considerably shorter and weaker than the pectoral spine; adding the estimated length of the missing part it would have been about three-quarters the length of the pectoral spine, exactly the same proportion as found in *T. obscurus*.

T. trachycorystes has the tips of the caudal fin broken off, and it is clear that the median rays, which are almost entire, have been shorter than the outer rays; it is likely therefore that *T. trachycorystes* had the same shape of caudal fin as *T. obscurus*. The small specimen MRJ no. 1501 has the caudal fin obliquely truncate rather than emarginate.

Both specimens have a broad and somewhat protruding lower jaw, with identical dentition.

Apart from the characters already discussed, the figure in Valenciennes (1840: pl. 437), which represents the specimen very well, suggests that *T. trachycorystes* has a much lower anal fin than *T. obscurus*, but here again, the explanation is that in the former the rays are broken.

Finally, in *T. trachycorystes* the body is larger and heavier, compared with the head, fins, and other solid or semi-solid structures.

The general agreement between *T. trachycorystes* and *T. obscurus* is such that I have little hesitation in uniting them. Such differences in proportions as exist can easily be explained, partly by the fact that the specimen of *T. trachycorystes* is twice the size (standard length) of the specimen of *T. obscurus*, partly by the fact that the specimen of *T. trachycorystes* has evidently been stuffed very well: the body is almost certainly much heavier, and perhaps also longer, than it would have been if it had been preserved in alcohol, and other proportions also appear to have been distorted. This leaves *Trachycorystes* with a single species.

The species appears to be rare: except for the specimen in the Museu Nacional, Rio de Janeiro, listed by P. de Miranda Ribeiro (1962b), and also examined by me, the species had been recorded from its type only, collected probably before the end of the eighteenth century. The nominal species *Auchenipterus obscurus* was based on two syntypes, collected before 1863. Not much additional material had been mentioned in literature, for the specimen recorded by Steindachner (1915) under the name of *Trachycorystes obscurus* belongs to a different species, *Auchenipterichthys longimanus*. Actually, however, the British Museum collection contains some further specimens: two from the R. Cuyuni, British Guiana (Carter, BM no. 1934.9.12: 375-376), standard length ca. 250-300 mm, and one from the Maraballi River, a tributary of the lower Essequibo (R. M. Alexander, BM no. 1961.1.23.1), standard length ca. 100 mm (information received from Mr. G. Howes). From this it looks as if in the Essequibo basin the species is not excessively rare. It is fortunate that Alexander has deposited one of his specimens in the British Museum, as otherwise the identity of the material he used for his anatomical studies might have been queried. I have failed to trace Beebe's (1925) ichthyological material from Kartabo (it is not in AMNH), but see no reason to doubt his record.

Genus *Auchenipterichthys* Bleeker

Auchenipterichthys Bleeker, 1862, Atlas Ichth., 2: 7 — type by original designation and monotypy, *Auchenipterus thoracatus* Kner.

Generic diagnosis. — Moderately heavy-bodied; head not depressed, almost as high as wide; bones of head and nape exposed or covered with very thin

skin; fontanel large, elongate; eyes large, lateral in position; mouth not particularly wide; jaws equal, each jaw with a comparatively narrow band of teeth, none on vomer and palatines; pectoral pore on, or a little behind, a vertical through the posterior end of the pectoral base, just below the well-developed postcleithral process; ventrals with 9 or 10 rays; anal fin of moderate length (20-25 rays), caudal peduncle not slender, but not so short and compact as in *Parauchenipterus*. Lateral line complete, wavy, giving off short branches. Sexual dimorphism in shape of the anal fin and the caudal fin has been described from one species.

An exposed coracoid process, forming a bony plate below each pectoral spine, has sometimes been regarded as an important generic character, but it is found in only one of the two species (which otherwise are extremely similar), and therefore can have no place in the generic diagnosis.

This genus is close to *Parauchenipterus*, but differs by its slightly more slender body, larger fontanel, larger eyes, and by having nine or ten ventral rays.

Distribution. — Confined to the Amazon basin, where widely distributed.

Discussion. — The genus contains two very similar species.

***Auchenipterichthys thoracatus* (Kner)**

Auch[emipterus] thoracatus Kner, 1858, Sitzb. Akad. Wiss. Wien, Mathem.-Naturw. Cl., 26 (1857): 425, pl. VII fig. 22 — Rio Guaporé.

Auchenipterus thoracicus Günther, 1864, Cat. Fish. Brit. Mus., 5: 194 — emendation of *A. thoracatus*.

Trachycorystes coracoideus Eigenmann & Allen, 1942, Fish. W. South America: 120 — Iquitos.

Auchenipterichthys thoracatus; Bleeker, 1862, Atlas Ichth., 2: 7 (name only); Bleeker, 1863, Ned. Tijdschr. Dierk., 1: 89 (name only); Eigenmann & Eigenmann, 1888, Proc. Calif. Acad. Sci., (2) 1: 154 (Coary; Hyavary); Eigenmann & Eigenmann, 1890, Occ. Pap. Calif. Acad. Sci., 1: 282 (Coary; Hyavary); Eigenmann & Eigenmann, 1891, Proc. U.S. Nat. Mus., 14: 34 (Solimoens and tributaries); Eigenmann, 1910, Rep. Princeton Univ. Exp. Patagonia, 3: 396 (Solimoens and tributaries (Coary; Hyarary; Guaporé)); A. de Miranda Ribeiro, 1911, Arch. Mus. Nac. Rio de Janeiro, 16: 373, fig. 140 (Guaporé, Javary, Coary); (pt.) Fisher, 1917, Ann. Carnegie Mus., 11: 424 (Maciél, Rio Guaporé; San Joaquin; Bastos, Rio Alegre, into R. Guaporé); Pearson, 1937, Proc. Calif. Acad. Sci. (4) 23: 110 (Mamoré basin); Fowler, 1940, Proc. Acad. Nat. Sci. Philad., 92: 96 (Bolivia: San Joaquin); Gosline, 1945, Bol. Mus. Nac. Rio de Janeiro, Zool., 33: 13 (Solimões e afluentes); Fowler, 1951, Arq. Zool. S. Paulo, 6: 458, fig. 486 (Amazônia, Bolivia); P. de Miranda Ribeiro, 1962, Pap. Avuls. Mus. Nac. Rio de Janeiro, 45: 4 (Uypiranga, Rio Negro, Estado do Amazonas; Rio Quixito, embocadura do Javary, Estado do Amazonas); P. de Miranda Ribeiro, 1968, Bol. Mus. Nac. Rio de Janeiro, 263: 8, pl. VII (no locality).

Trachycorystes coracoideus; Gosline, 1945, Bol. Mus. Nac. Rio de Janeiro, Zool., 33: 13 (Iquitos); Fowler, 1945, Los Peces del Peru: 64 (Perú (Iquitos)); Fowler, 1951, Arq. Zool. S. Paulo, 6: 473 (Alto Amazonas, Peru).

Material. — Two specimens, 1922, Iquitos (Morris, CAS ex IUM no. 15974), standard length 103, 106 mm, syntypes of *Trachycorystes coracoideus*. One specimen, 23 July 1943, Yahnas Yacu, near Pebas, Peru (W. G. Scherer, SU no. 58656), standard length 67 mm.

Characters. — D I.6, A 23-25, P I.8, V 9 (i.8), C i.i5.i and rudiments. Head 3.6-3.85 times in standard length, greatest width of body (between the cleithra) 4.0-4.3 times in standard length, height of head at the same place 0.8 times its width, depth of body 3.8-4.2 times in standard length, predorsal length 2.75-2.95 times in standard length, dorsal spine 1.4-1.45 in predorsal length, pectoral spine 1.1-1.3 in predorsal length.

This species is extremely similar to the next one, but has a slightly more slender (more compressed) head, a greater predorsal length, the horns of the nuchal plate are much broader, the postcleithral process is thicker with a blunter tip, the pectoral spines, when pressed against the body reach to or a little beyond the ventral origin, the number of anal rays is higher, and finally there is the conspicuous character of the exposed bone-plates below the pectorals.

Kner (1858) described a sexual difference in shape of the caudal fin, which is obliquely truncate in females, and with an elongated upper lobe in males. He also mentioned that the majority of his specimens consisted of females. Eigenmann & Eigenmann (1890: 284) described the anal fin as rounded or truncate in females, concavo-convex in males. Judging by these characters, the three specimens examined by me are females.

Colours. Preserved specimens are dark brown above, pale below. On the upper part of the body, beginning on the opercles, and continued to below the adipose fin, there are ten to twelve vertical rows of pale dots, two to four to a row. These dots have no connection with the lateral line system; they are also higher up on the body, differently arranged and larger than the spots of *A. longimanus*, and provide an additional character to distinguish between the two species.

Distribution. — Upper course of the Amazon and its southern tributaries. The most eastern locality from where this species has been recorded is Coary = Rio Coari (Eigenmann & Eigenmann, 1890).

Discussion. — As a matter of routine, to complete the table on page 28, I checked up on the number of ventral rays of *Trachycorystes coracoideus* Eigenmann & Allen, and to my surprise was informed by Dr. Eschmeyer that they are 9-10. In the description of *T. coracoideus*, Eigenmann & Allen failed to give a single finray-count, but as they stressed its close relationship with *T. galeatus*, I had assumed that *T. coracoideus* belonged to the group with

6-rayed ventrals. Examination of two syntypes subsequently revealed the synonymy here indicated.

***Auchenipterichthys longimanus* (Günther)**

Auchenipterus longimanus Günther, 1864, Cat. Fish. Brit. Mus., 5: 195 — River Capin. *Auchenipterichthys longimanus*; Eigenmann & Eigenmann, 1888, Proc. Calif. Acad. Sci., (2) 1: 154 (Manes, Rio Madeira; Cameta); Eigenmann & Eigenmann, 1890, Occ. Pap. Calif. Acad. Sci., 1: 284 (Maues, Rio Madeira; Cameta); Eigenmann & Eigenmann, 1891, Proc. U.S. Nat. Mus., 14: 34 (Southern tributaries of the Amazon); Eigenmann, 1910, Rep. Princeton Univ. Exp. Patagonia, 3: 396 (Southern tributaries of the Amazon); A. de Miranda Ribeiro, 1911, Arch. Mus. Nac. Rio de Janeiro, 16: 372 (Rio Capim, Maues, Madeira, Cametá); Gosline, 1945, Bol. Mus. Nac. Rio de Janeiro, Zool., 33: 13 (afluentes do Amazonas); Fowler, 1951, Arq. Zool. S. Paulo, 6: 458 (Pará, Rio Madeira).

Trachycorystes obscurus; Steindachner, 1915, Denkschr. Akad. Wiss. Wien, Mathem.-Naturw. Kl., 93: 80 (Mündung des Rio Negro); (pt.) Fowler, 1951, Arq. Zool. S. Paulo, 6: 474 (Amazonas).

Auchenipterichthys thoracatus; (pt.) Fisher, 1917, Ann. Carnegie Mus., 11: 424 (Manáos).

Material. — One specimen, no date, River Capin, Para (pres. Stevens, BM no. 1849-11-8: ?), standard length 135 mm, syntype of the species. One specimen, 1913, Mündung des Rio Negro (J. D. Haseman, MV no. 43371), standard length 129 mm.

Characters. — D I.6 or I.7, A 20-22, P I.6 to I.8, V 9-10 (i.8-i.9), C i.15.i and rudiments. Differential characters from *A. thoracatus* have been given under that species. There is no trace of exposed bone-plates below the pectorals.

Description. — A normally-shaped member of the family; snout depressed, posterior part of head almost as high as deep; body compressed, especially the caudal peduncle which is much deeper than wide.

Head 3.75-4.2 times in standard length, greatest width of body (between the cleithra) 4.2-4.5 times in standard length, height of head at the same place 0.8-0.9 times width, depth of body 3.8-3.9 times in standard length, predorsal length 3.2-3.35 times in standard length.

Snout depressed, much wider than high, but height of head increasing backwards, to almost as high as wide at the level of the cleithra; profile from snout to base of dorsal fin ascending, almost straight; bones of head and nape covered with very thin but strongly pigmented skin, through which the bone structure is clearly visible; depression containing the fontanel elongate, more than three times as long as wide, reaching to very near the tip of the snout; horns of nuchal plate thin, strongly bent outwards and downwards; width of mouth about half width of body; each jaw with a band of about five irregular rows of small teeth; no teeth on vomer or palatines; eyes large, their greatest diameter no more than 3.5-3.8 times in head, and 2.4-2.7 times in bony inter-

orbital; nostrils placed in a rectangle, the distance separating the two of each pair about 2.4 times the distance separating the anterior from the posterior ones; anterior nostrils placed on the vertical part of the snout, posterior nostrils placed horizontally, between the eyes; maxillary barbels thin, reaching to the end of the well-developed postcleithral process, which is to half-way along the pectoral spines, or a little shorter, reaching to half-way along the process; outer pair of mental barbels about half their length, not quite to base of pectoral spine; inner pair, which is placed in a far more anterior position, only about one-fourth of the length of the outer pair, and no more than half an eye's diameter in length.

Dorsal fin with one spine and six or seven rays; the spine strong, slightly curved backwards, its length 1.4-1.5 times in predorsal length, finely serrated along its entire anterior border, the small teeth becoming sparse towards its tip and appearing in a double row towards its base, and with about 25 slightly larger teeth, diminishing in size towards the base, along its posterior border; spine with a soft tip or filament; spine with filament 1.2-1.3 times in predorsal length; the first ray scarcely shorter than spine with filament, the following ones successively smaller, and the last ray weak and no more than one-third of the length of the first ray.

Anal fin with 20-22 rays, its base about as long as the head and 1.2-1.5 times in predorsal length; the anterior rays equal to postorbital part of head, the last ones much shorter, no more than one-third of the anterior ones, and less than an eye's diameter; the anterior rays concealed in thick skin; urogenital pore at about two-thirds from the base on the anterior border of the fin.

Pectoral fins with one strong spine and six to eight rather weak rays; the slightly curved spine is serrated along both sides over its whole length, along the anterior edge there are ca. 35 fairly small teeth, directed outwards, along the posterior edge there are ca. 30 somewhat larger teeth, directed inwards; the spine measures about 1.15-1.2 times in the predorsal length, one-fourth longer than the dorsal spine, and equal in length to dorsal spine with filament; when pressed against the body it falls just short of the ventral origin. The first ray is almost as long as the spine, but the succeeding rays diminish rapidly.

The ventrals have one simple and eight or nine divided rays; they are implanted entirely behind the dorsal fin, rounded in outline with the third, fourth and fifth rays longest; they measure about 2.2 times in predorsal length, and fall a little short of the fleshy base of the anal fin.

The caudal fin is shallowly emarginate, with fifteen divided rays, flanked on each side by one fully developed simple ray, and some shorter simple rays and rudiments.

The adipose fin is well-developed, rounded, opposite the posterior section of the anal fin and reaching about as far backwards as the anal fin.

The lateral line consists of small irregular arcs giving off short branches; it is complete, continued on to the base of the caudal fin.

Colour. Body and fins of MV no. 43371, which appears to have retained much of its natural colour, entirely blackish grey without markings, except the ventral surface from chin to anus which is white, unpigmented. In the older specimen, the black has been replaced by dull-brown. Both specimens show the pores of the lateral line system, which are unpigmented, as an irregular series of small but by no means inconspicuous white dots.

Distribution. — Mainly middle- and lower course of the Amazon and its southern tributaries from the Rio Purus (Cameta) to the Rio Capim (rather than Capin), near Pará. There is one record from Nazareth, Peru (see discussion). Although *A. thoracatus* and *A. longimanus* have clearly different ranges, there appears to be a large area of co-occurrence in the upper-middle Amazon.

Discussion. — The Vienna specimen (MV no. 43371) agrees very well with the syntype of *A. longimanus*, a species which was evidently unknown to Steindachner (1915), who reported his specimen under the name *Trachycorystes obscurus*, but nevertheless he observed already some of its characters: "Das uns vorliegende Exemplar aus dem Amazonasgebiete unterscheidet sich nur unbedeutend von den typischen Exemplaren des britischen Museums, und zwar durch die schlankere, längliche (nicht runde) Form der Stirnfontanelle, die viel geringere Länge der vorderen Mentalbarteln und das Vorkommen von 10 Strahlen in der Ventrals sowie von 7 Gliederstrahlen in der 1. Dorsale".

Fisher (1917) listed under the name *A. thoracatus* a fish from Manaus. As all other records of that species are from farther upstream, and as *A. longimanus* was already known to occur near Manaus, I considered that the record required verification. From Mr. Schoknecht I received the following information: "I checked the specimen of *Auchenipterichthys* ... This was CM 6782 and is now FM 57799. As you suspected, the specimen was not identified correctly. From the information that you sent, it appears that it is *A. longimanus*. The only other *A. longimanus* that we have in our collection is one lot of two small (40-50 mm s.l.) specimens from Nazareth, Peru (Osgood, 10 Sept. 1912)".

Genus **Parauchenipterus** Bleeker

Parauchenipterus Bleeker, 1862, Atlas Ichth., 2: 7 — type by original designation, *Silurus galeatus* Bloch = *Silurus galeatus* Linnaeus.

Generic diagnosis. — A genus of generally short, heavy, round-bodied fishes; the head not much depressed, only a little wider than deep; bones of head and nape covered with skin which is thin and often transparent in small specimens, but thick and heavily pigmented in large individuals; pectoral pore above middle of pectoral base; fontanel small, smaller than eyes, oval, behind the middle of the eyes; a moderate to long anal fin (17 to 40 rays), 6 ventral rays, caudal peduncle short, caudal fin obliquely truncate, obliquely rounded, or slightly emarginate; eyes small; lower jaw slightly protruding. Sexual dimorphism in this genus, first mentioned by Eigenmann & Eigenmann (1890: 272) and fully described by R. von Ihering (1937), is usually slight, but *P. insignis* and *P. fisheri* show a pronounced sexual dimorphism in shape of head, maxillary barbels, dorsal and anal fins (Miles, 1947: 74; Eigenmann, 1922: pl. V). Except for the first one, these are the same sexual characters as found in *Auchenipterus nuchalis*; they support the opinion that the genera *Auchenipterus* and *Parauchenipterus* are related, and should certainly not be placed in different families.

Distribution. — Northern South America from Panama eastwards, and the whole of eastern South America east of the Andes, south to the Uruguay-Parana-La Plata basin.

Discussion. — On a previous page I have given a list of nominal species hitherto included in *Trachycorystes*; with the exception of *T. trachycorystes*, *T. obscurus*, *T. coracoideus* and possibly *T. cratensis*, all these species are referable to *Parauchenipterus*. This would make *Parauchenipterus* a fair-sized genus (16 species and one subspecies), but it is unlikely that all described species are valid: on the following pages evidence will be given that *T. glaber* and *T. jokeannae* are synonyms of *P. galeatus*, and Fisher (1917) considered *T. striatulus* to be "undoubtedly identical" with the same species. A revision based on adequate material would probably lead to a reduction of the number of species to four or five, with in addition perhaps a few valid subspecies.

From Suriname only a single species is known, which is common and widely distributed in the country, and has a wide range in eastern South America.

***Parauchenipterus galeatus* (Linnaeus)**

Silurus galeatus Linnaeus, 1766, Syst. Nat., ed. 12, 1: 503 — in America australi, here restricted to Suriname (see Discussion).

Auchenipterus maculosus Valenciennes, 1840, in Cuvier & Valenciennes, Hist. Nat. Poiss. (4° ed.), 15: 161 — Cayenne (but probably Suriname).

Auchenipterus immaculatus Valenciennes, 1840, in Cuvier & Valenciennes, Hist. Nat. Poiss. (4° ed.), 15: 162 — Cayenne (but probably Suriname).

Auchenipterus punctatus Valenciennes, 1840, in Cuvier & Valenciennes, Hist. Nat. Poiss. (4° ed.), 15: 163 — probablement du Brésil.

- Auchenipterus robustus* Günther, 1864, Cat. Fish. Brit. Mus., 5: 197 — Demerara.
- Auchenipterus glaber* Steindachner, 1876, Sitzb. Akad. Wiss. Wien, Mathem.-Naturw. Cl., 74 (1): 655 — Demerara.
- Parauchenipterus paseae* Regan, 1906, Proc. Zool. Soc. Lond.: 387, pl. 24 (not 23) — Caroni River, Trinidad.
- Trachycorystes jokeannae* Hoedeman, 1961, Bull. Aquatic Biol., 2: 138 — French Guiana: Ile de Cayenne, ruisseaux du Rorota.
- Silurus galeatus*; Gmelin, 1789, Syst. Nat., ed. 13, 1 (3): 1397 (in America australi); Bloch, 1797, Ichth. Hist. Nat. Poiss., 11: 30, pl. 369 fig. 1 (l'Amérique méridionale); Bloch & Schneider, 1801, Syst. Ichth.: 384 (in America australi).
- Pimelodus galeatus*; La Cepède, 1803, Hist. Nat. Poiss., 5: 97, 114 (l'Amérique méridionale).
- Auchenipterus maculosus*; Kner, 1858, Sitzb. Akad. Wiss. Wien, Mathem.-Naturw. Cl., 26 (1857): 425 (Marabitanos); Günther, 1864, Cat. Fish. Brit. Mus., 5: 196 (Surinam, Essequibo); Vaillant, 1880, Bull. Soc. Philomat., (7) 4: 154 (Caldéron (Haute-Amazone)); Kappler, 1885, Das Ausland, 58: 918 (Holländisch Guiana); Kappler, 1887, Surinam: 151 (Surinam); Pellegrin, 1899, Bull. Mus. Hist. Nat. Paris, 5: 158 (l'Apuré et ses affluents, Vénézuéla).
- Parauchenipterus galeatus*; Bleeker, 1862, Atlas Ichth., 2: 7 (name only); Bleeker, 1863, Ned. Tijdschr. Dierk., 1: 88 (name only); Bleeker, 1864, Nat. Verh. Holl. Maatsch. Wetensch., (2) 20: 45 (Surinama).
- Auchenipterus galeatus*; Günther, 1864, Cat. Fish. Brit. Mus., 5: 196 (British Guiana, Guiana); Boulenger, 1896, Trans. Zool. Soc. Lond., 14: 28 (Matto Grosso).
- Auchenipterus galeatus*; Peters, 1877, Mber. Akad. Wiss. Berlin: 470 (Calabozo, Venezuela).
- Euanemus maculosus*; Kappler, 1881, Holländisch-Guiana: 167 (Holländisch-Guiana).
- Trachycorystes glaber*; Eigenmann & Eigenmann, 1888, Proc. Calif. Acad. Sci., (2) 1: 154 (no locality); Eigenmann & Eigenmann, 1890, Occ. Pap. Calif. Acad. Sci., 1: 275 (Demarara); Eigenmann & Eigenmann, 1891, Proc. U.S. Nat. Mus., 14: 34 (Demarara); Eigenmann, 1910, Rep. Princeton Univ. Exp. Patagonia, 3: 395 (Demarara); Eigenmann, 1912, Mem. Carnegie Mus., 5: 198 (Demerara); Gosline, 1945, Bol. Mus. Nac. Rio de Janeiro, Zool., 33: 11 (Demerara); Hoedeman, 1961, Bull. Aquatic Biol., 2: 138 (no locality).
- Trachycorystes galeatus*; Eigenmann & Eigenmann, 1888, Proc. Calif. Acad. Sci., (2) 1: 155 (Pernambuco; San Gonçallo; Rio San Francisco, below the Falls; Tabatinga; Rio Puty); Eigenmann & Eigenmann, 1890, Occ. Pap. Calif. Acad. Sci., 1: 279 (Pernambuco; San Gonçallo, Rio San Francisco, below the falls; Tabatinga; Teffé; Rio Puty); Eigenmann & Eigenmann, 1891, Proc. U.S. Nat. Mus., 15: 34 (Rio das Velhas to the Orinoco); Eigenmann & Bean, 1907, Proc. U.S. Nat. Mus., 31: 663 (Amazon River between Para and Manaos); Eigenmann, 1910, Rep. Princeton Univ. Exp. Patagonia, 3: 396 (Rio Velhas to the Orinoco and Paraguay); Eigenmann, 1912, Mem. Carnegie Mus., 5: 198 (various localities in British Guiana); Starks, 1913, Stanford Publ. Univ. Ser.: 31 (Pará); A. de Miranda Ribeiro, 1914, Comm. Linh. Telegr. Estr. Matto-Grosso ao Amazonas, 15, Anexo 5: 10 (Manáos); Fowler, 1914, Proc. Acad. Nat. Sci. Philad., 66: 266 (Rupununi); Bertoni, 1914, Fauna Paraguaya: 8 (Paraguay); Fowler, 1915, Proc. Acad. Nat. Sci. Philad., 67: 222 (Surinam; Rupununi River); Fowler, 1915, Proc. Acad. Nat. Sci. Philad., 67: 529 (Caroni River, Trinidad); Popta in Benjamins & Snelleman, 1914-1917, Enc. Ned. West-Indië: 685 (Suriname; Rio Velhas tot de Orinoco en Paraguay); Fisher, 1917, Ann. Carnegie Mus., 17: 423 (Pará; Manáos; Santarem; Maciél, Rio Guaporé; Rio San Francisco, Bolivia; San Joaquin, Bolivia; Rio Jaurú, into R. Paraguay; Puerto Suarez, Rio Paraguay; Arequa, Paraguay; Uruguayana; Penedo; Barreiras, Rio São Francisco; Joazeiro; Rio das Velhas; Munez Freire, Rio Itapemerin; Campos; Lagoa Feia; São João da Barra; Rio Itapicurú, Queimadas; Rio

Itapicurú, Timbo); A. de Miranda Ribeiro, 1918, Rev. Mus. Paul., 10: 734 (Rio S. Francisco; Itaqui, Rio Grande do Sul); Pearson, 1924, Indiana Univ. Stud., 11 (64): 15, 54 (Lake Rogoagua, Rio Beni basin, Bolivia); Pearson, 1937, Proc. Calif. Acad. Sci., (4) 23: 110 (Beni and Mamoré basins; Paraguay basin); Fowler, 1940, Proc. Acad. Nat. Sci. Philad., 92: 96 (Bolivia: San Joaquin, Puerto Suarez, L. Rogoagua); Fowler, 1941, Proc. Acad. Nat. Sci. Philad., 93: 143 (Lago Papary, Rio Grande do Norte; Guaramiranga, Ceará; Piancó, Parahyba; Forteleza, Ceará); Schultz, 1944, Proc. U.S. Nat. Mus., 94: 239 (Venezuela: no original material); Gosline, 1945, Bol. Mus. Nac. Rio de Janeiro, Zool., 33: 12 (do Rio das Velhas ao Orinoco e Paraguai); van der Stigchel, 1946, South American Nematognathi: 99 (Surinam; Brazil; Lama Stop-off, British Guiana); van der Stigchel, 1947, Zool. Meded., 27: 99 (Surinam; Brazil; Lama Stop-off, British Guiana); Puyo, 1949, Poiss. Guyane Fr.: 98 (Cayenne?); Bertin & Estève, 1950, Cat. Types Poiss. Mus. Paris, 5: 17 (Cayenne (Guyane)); Fowler, 1951, Arq. Zool. S. Paulo, 6: 473 (Amazônia, Peru, Bolivia, Ceará, Rio São Francisco, Rio Paraná, Uruguay, Guiana, Venezuela, Trinidad); Boeseman, 1952, Zool. Meded., 31: 181 (Nanni creek, Doksen savanna; Coropina creek, Republiek); Boeseman, 1953, Zool. Meded., 32: 9 (Vierkinderen, Republiek); Lijding, 1959, Surinaamse Landb., 7: 73 (Suriname); Boeseman, 1960, Studies Fauna Curaçao, 10: 103 (Trinidad); Lowe, 1964, J. Linn. Soc. Lond., Zool., 45: 110, 112, 119, 121, 141, 143 (Rupununi District, British Guiana); Ringuelet, Arámburu & de Arámburu, 1967, Los Peces Argentinos de Agua Dulce: 278 (distr. in Argentina); McConnell, 1967, Timehri, 43: 67 (Rupununi); Ovchynnyk, 1968, Zool. Anz., 181: 253 (Ecuador: Rio Pana Yacu, upper Rio Napo, Prov. Napo-Pastaza); Marlier, 1968, Cad. Amazônia, 11: 53, 55 (lac du Rio Preto da Eva); Lundberg & Baskin, 1969, Amer. Mus. Novit., 2398: 6, 27 (no locality).

Trachycorystes robustus; Eigenmann & Eigenmann, 1888, Proc. Calif. Acad. Sci., (2) 1: 156 (no locality); Eigenmann & Eigenmann, 1890, Occ. Pap. Calif. Acad. Sci., 1: 274, 281 (Demarara); Eigenmann & Eigenmann, 1891, Proc. U.S. Nat. Mus., 14: 34 (Demarara); Eigenmann, 1910, Rep. Princeton Univ. Exp. Patagonia, 3: 396 (Demarara).

Trachycoristes galeatus; A. de Miranda Ribeiro, 1911, Arch. Mus. Nac. Rio de Janeiro, 16: 370 (Rio S. Francisco, Amazonas e tributarios, Marajó, Orenoco e ilha da Trindade, Matto Grosso); Magalhães, 1931, Monogr. Braz. Peix. Fluviat.: 102, fig. 39 (Pará, Rio S. Francisco, Amazonas e Matto-Grosso).

Material. — 195 specimens from Suriname as follows. Three specimens, 27 February 1964, rapids Suriname Rivier near Brokopoondo (Boeseman, RMNH no. 25590), standard length 67, 113, 139 mm. One specimen, about 20 April 1964, Suriname Rivier near Aloesobanji (P. Leentvaar, RMNH no. 25658), standard length 36 mm. One specimen, early May 1964, lower course Sara Kreek (P. Leentvaar, RMNH no. 25653), standard length 115 mm. Four specimens, 23 June 1964, Suriname Rivier near Aloesobanji (Boeseman, RMNH no. 25655), standard length 25, 37, 38, 39 mm. Two specimens, 9 July 1964, Soekroewatra, Brokopoondo Meer (P. Leentvaar, RMNH no. 25591), standard length 52, 67 mm. 24 specimens, 10 July 1964, Brokopoondo Meer, ca. 2 km E. of Kabel along railway to Abontjima (Boeseman, RMNH no. 25592), standard length 32-46 mm. 84 specimens, same data (Boeseman, RMNH no. 26530), standard length 36-110 mm. Three specimens, 21 July 1964, tributary of Gran Kreek ca. 12 km from its mouth (Boeseman, RMNH no. 25593), standard length 32, 32, 40 mm. Three specimens, 20 March 1965, Suriname Rivier near Brokopoondo (Mees, RMNH no. 25659), standard length 155, 156, 160 mm. Two specimens, 24 March 1965, Brokopoondo Meer, along railway from Kabel to Abontjima (Mees, RMNH no. 25594), standard length 114, 136 mm. Two specimens, 2 April 1965, Gansee, Brokopoondo Meer (Mees, RMNH no. 25595), standard length 139, 147 mm. One specimen, 7 April 1965, Para Kreek (Mees, RMNH no. 25596), standard length 39 mm. Five specimens, 8 April 1965, Gansee, Brokopoondo

Meer (Mees, RMNH no. 25597), standard length 142, 145, 145, 147, 154 mm. Four specimens, same data (Mees, RMNH no. 25598), standard length 111, 117, 125, 143 mm. One specimen, 20 April 1965, Para Kreek (Mees, RMNH no. 25599), standard length 39 mm. One specimen, 24 April 1965, Para Kreek (Mees, RMNH no. 25600), standard length 173 mm. One specimen, 27 April 1965, Para Kreek (Mees, RMNH no. 25651), standard length 44 mm. Three specimens, 22 June 1965, Gansee, Brokopondo Meer (Mees, RMNH no. 25764), standard length 128, 133, 146 mm. Twelve specimens, 24 June 1965, Brokopondo Meer, along railway between Kabel and Abontjima (Mees, RMNH no. 25643), standard length 109-157 mm. Five specimens, 1 November 1965, Brokopondo Meer, along railway between Kabel and Brownsweg (Mees, RMNH no. 25644), standard length 118, 119, 122, 129, 134 mm. Four specimens, 19 December 1965, Compagnie Kreek (Mees, RMNH no. 25645), standard length 59, 67, 81, 96 mm. Four specimens, same data (Mees, RMNH no. 25656), standard length 87, 106, 107, 129 mm. Nine specimens, same data (Mees, RMNH no. 25660), standard length 61-104 mm. One specimen, 3 March 1966, creek near Zanderij (Mees, RMNH no. 25646), standard length 144 mm. One specimen, 6 March 1966, Brokopondo Meer, along railway between Kabel and Brownsweg (Mees, RMNH no. 25647), standard length 166 mm. Six specimens, 12 March 1966, tributary of Mama Kreek near Berg-en-Dal (Mees, RMNH no. 25648), standard length 94, 94, 96, 102, 102, 104 mm. Five specimens, 15 March 1966, Compagnie Kreek (Mees, RMNH no. 25649), standard length 79, 95, 104, 109, 139 mm. Two specimens, same data (Mees, RMNH no. 25657), standard length 27, 52 mm. One specimen, 8 June 1966, Gran Kreek, 41 km S. of Affobakka (W. Vervoort, RMNH no. 26531), standard length 72 mm.

Extra-limital material. One specimen, received in 1911. Ipú, Ceara (MV no. 43372, ex Mus. Goeldi), standard length 129 mm. One specimen, 3 November 1957, ruisseaux du Rorota, Ile de Cayenne, French Guiana (J. Géry, ZMA no. 102371), standard length 90 mm, holotype of *Trachycorystes jokeannae*.

Characters. — D I.6, A 20-25, P I.6 to I.8, V 6 (i.5), C 14-15 (divided rays only). The main characters have been given in the generic diagnosis; in this species the caudal fin is obliquely truncate, with the upper portion the longer. No sexual dimorphism.

Colours of small specimens mottled brown or blackish on a pale brown or cream coloured background, or with more or less clearly defined longitudinally elongated blackish dots. Large specimens very dark, blackish brown, irregularly mottled with black. Caudal fin usually with a black cross-bar.

Distribution. — Northern South America from the Orinoco basin eastwards, the whole Amazon basin, and eastern South America south to the Parana-La Plata basin.

Discussion. — Linnaeus (1766: 503) based this species entirely on the description and figure given by Seba (1758: 85, pl. 29, fig. 7). Unfortunately, Seba did not provide his specimen, which was well-described and reasonably well-figured, with a locality. *Parauchenipterus galeatus* is widely distributed in South America, but as about the middle of the eighteenth century, because of monopolies, the Spanish and Portuguese possessions in South America would have been difficult of access for Dutch traders, it is likely that Seba, who lived in Amsterdam, received his specimen from one of the Dutch pos-

sessions: Essequibo, Demerara, Berbice, and Suriname (see also Valenciennes, 1840: 380). As *Parauchenipterus galeatus* may show geographical variation in its huge range, I regard it as desirable to restrict its type-locality. A restriction to Suriname ensures not only that my material is correctly named, but appears also fully justified on the basis of the historical considerations given above. I regard specimens from the lower course of the Suriname Rivier and its tributaries as topotypical.

Auchenipterus maculosus Valenciennes, generally accepted as a synonym of *Parauchenipterus galeatus*, lastly by Bertin & Estève (1950: 17) who examined the type-specimen, was based on a specimen received from Leiden; as type-locality Valenciennes gave Cayenne, but at the time there was little zoological material from Cayenne in Leiden. There were, and are, on the other hand several specimens of *Parauchenipterus galeatus* from Suriname in our collection, received from H. H. Dieperink who lived in Suriname from ca. 1816-1836. I note that Bertin & Estève (1950) give as locality of the type of *Auchenipterus maculosus*: "Cayenne (Guyane)". Therefore it is likely that the specimen was originally labelled as from Guyane, and that Valenciennes has changed this to Cayenne, not realising that with Guyane actually Suriname was meant. In this connection I want to draw attention to Valenciennes' statement (in Cuvier & Valenciennes, 1840: 128) that the Leiden museum has received specimens of *Pimelodus sebae* (= *Rhamdia quelen*) from Cayenne, for actually all our old specimens are from Suriname. Van der Stigchel (1946: 50) lists nine specimens received from Dieperink, they, or at least some of them, are syntypes of *Rhamdia sebae*. For more extensive notes on this subject, see Boeseman (1972).

As briefly mentioned on a previous page, Dr. Kähnsbauer has been unable to trace the type (or types?: Steindachner did not state on how many specimens his description was based) of *Auchenipterus glaber* in the Vienna museum. The reasons why I have, nevertheless, ventured to place the name in the synonymy of *P. galeatus* are the following: 1° except for the high ventral ray count, Steindachner's description fits large specimens of *P. galeatus*; 2° ventral rays have often been miscounted in descriptions (cf. table on p. 28); 3° a specimen of *P. galeatus* from Ceara, received on loan from Vienna (MV no. 43372) bore the identification *Trachycorystes glaber*, an identification presumably made by Steindachner himself; 4° Demerara is ichthyologically reasonably well known, and *P. galeatus* is the only member of its genus that has ever been found there, or anywhere else in the Guianas.

The type of *Trachycorystes jokeannae* is a normal specimen of *P. galeatus*, a species not mentioned in its description. The number of anal rays is 21 (i.20), not 20 (i.19) as Hoedeman wrote, and comes within the normal range

of variation of *P. galeatus*. In view of the presumed synonymy of *A. glaber* with *P. galeatus* it is significant that Hoedeman did regard his *T. jokeannae* as closely related to *A. glaber*, and also that he failed to comment on the discrepancy in ventral ray numbers.

Genus **Centromochlus** Kner

Centromochlus Kner, 1858, Sitzb. Akad. Wiss. Wien, Mathem.-Naturw. Cl., 26 (1857): 430 — based on *Centromochlus megalops* Kner and *Centromochlus aulopygius* Kner; type by subsequent selection, *Centromochlus megalops* Kner (Bleeker, 1862: 7).

Generic diagnosis. — D 1.5 or 1.5½, A 7 or 8, P 1.7 to 1.12, V 6 (1.5), C 1.15.1, plus rudiments. In general appearance not unlike *Tatia*; mouth inferior and narrow, its lower jaw longer than broad; teeth smaller than in *Tatia*, in each jaw in a narrow band, bending backwards to follow the shape of the jaw, the premaxillary band in the middle very narrow or interrupted (fig. 5); fontanels situated in a longitudinal depression reaching from the tip of the snout backwards; eyes large to very large; barbels of variable length, the maxillary barbels either longer or shorter than in *Tatia*; anterior part of the body relatively long, distance from tip of snout to base of dorsal spine 2.7-3.25 times in standard length; horns of nuchal plate bent upwards and inwards; pectoral pore over middle of pectoral base; dorsal and pectoral spines strong and very long, pungent, either without teeth and hooks, and only slightly rough, or the pectoral spines serrated on the inside only, pectoral spines reaching to ventrals or nearly so, 2.6-3.2 times in standard length; lateral line consisting of small arcs; anal fin normal, without a sexual difference in shape; ventrals implanted from just behind the middle of the body to as far backwards as about two-thirds of the body length from the tip of the snout; caudal fin forked, its lobes with acute tips; caudal peduncle very distinct. No sexual dimorphism, except in position of the urogenital pore, as indicated in the discussion of *C. existimatus*.

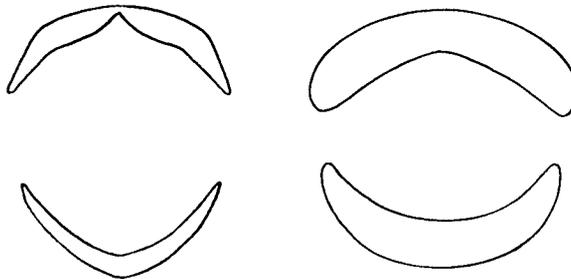


Fig. 5. Shape of bands of teeth in *Centromochlus heckelii* (left, specimen of 68 mm s.l.) and *Tatia intermedia* (right, specimen of 68 mm s.l.). 6 X.

All specimens examined, of both species, are in alcohol light brown above, pale below, usually without any trace of markings or a pattern, but sometimes with oblique dark bands; fins hyaline.

The most conspicuous characters by which *Centromochlus* may be separated from *Tatia*, are the long pungent spines, and the distinct caudal peduncle.

Distribution. — The genus *Centromochlus* is widely distributed in Amazonia and occurs also in the Orinoco basin, but is not yet known from the Guianas.

Discussion. — The genus *Centromochlus* as here defined contains only two, possibly three, species. All other species hitherto placed in *Centromochlus* are referable to *Tatia*. For further particulars, see the discussion of the genus *Tatia*.

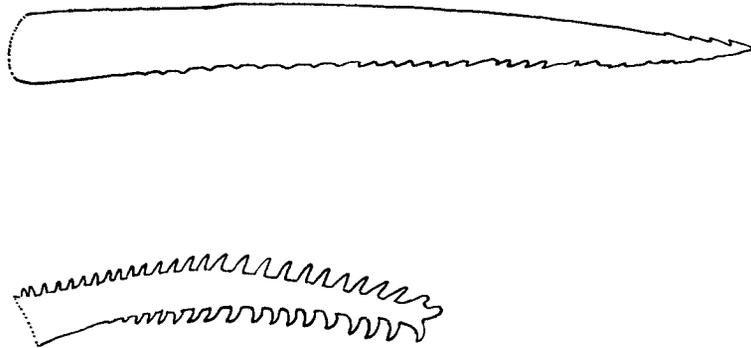


Fig. 6. Right hand pectoral spines seen from above. *Centromochlus heckelii* (top, specimen of 68 mm s.l.), and *Tatia intermedia* (bottom, specimen of 68 mm s.l.). 4 X.

***Centromochlus heckelii* (Filippi) (figs. 5-8, pl. 2)**

- Auchenipterus Heckelii* Filippi, 1853, Rev. Mag. Zool., (2) 5: 167 — Rio Napo.
Centromochlus megalops Kner, 1858, Sitzb. Akad. Wiss. Wien, Mathem.-Naturw. Cl., 26 (1857): 430 — Bogota.
Centromochlus Steindachneri Gill, 1871, Proc. Acad. Nat. Sci. Philad., 1870: 95 — no locality given, but perhaps from the Marañon or Napo Rivers, Peru (see discussion).
Centromochlus megalops; Kner, 1858 (1859?), Arch. Naturg., 24 (1): 350 (no locality); Bleeker, 1863, Ned. Tijdschr. Dierk., 1: 89 (name only).
Centromochlus heckelii; Günther, 1864, Cat. Fish. Brit. Mus., 5: 197 (Bogota; Rio Napo); Cope, 1878, Proc. Amer. Philos. Soc., 17: 677 (Peruvian Amazon); (pt.) Eigenmann & Eigenmann, 1888, Proc. Calif. Acad. Sci., (2) 1: 156 (Villa Bella; Obidos; Para; Tabatinga; Lago Alexo; Hyavary); (pt.) Eigenmann & Eigenmann, 1890, Occ. Pap. Calif. Acad. Sci., 1: 267 (Villa Bella; Obidos; Para; Tabatinga; Lago Alexo; Hyavary); (pt.) Eigenmann & Eigenmann, 1891, Proc. U.S. Nat. Mus., 14: 34 (Amazonas and tributaries); Boulenger, 1898, Trans. Zool. Soc. Lond., 14: 422 (Rio Jurua, Brazil); Regan, 1905, Proc. Zool. Soc. Lond.: 190 (Rio Negro and its tributaries); Eigenmann, 1910, Rep. Princeton Univ. Exp. Patagonia, 3: 395 (Amazons and tributaries); (pt.) A. de Miranda Ribeiro, 1911, Arch. Mus. Nac. Rio de Janeiro, 16: 359, 472, pl. 52 fig. 2

(Villa-Bella, Obidos, Pará, Tabatinga, Lago Aleixo, Javary, Caldeirão, (Amazonas), Juruá); Starks, 1913, Stanford Publ. Univ. Ser.: 31 (Pará); (pt.) Fowler, 1915, Proc. Acad. Nat. Sci. Philad., 67: 221 (Manaos harbor, Brazil); Arnold & Ahl, 1936, Fremdl. Süßwasserfische: 248, fig. (der Amazonenstrom und seine Nebenflüsse sowie die nördlichen Zuflüsse des Parana); Pearson, 1937, Proc. Calif. Acad. Sci., (4) 23: 110 (Mamoré basin); Fowler, 1940, Proc. Acad. Nat. Sci. Philad., 92: 96 (Bolivia: Rio Mamoré, San Joaquin); (pt.) Fowler, 1941, Bol. Mus. "Javier Prado", 5: 466 (Pebas); Eigenmann & Allen, 1942, Fish. W. South America: 117 (Amazon system: Rio Morona; Rio Huallaga, Yurimaguas; mouth Rio Pacaya; Iquitos; Rio Ucayali, near Orellana); Schultz, 1944, Proc. U.S. Nat. Mus., 94: 240 (Venezuela); Gosline, 1945, Bol. Mus. Nac. Rio de Janeiro, Zool., 33: 10 (Amazonas e tributários; rio Apuré, Venezuela); (pt.) Fowler, 1945, Los Peces del Peru: 62 (Pebas); Myers, 1947, Aquarium J., 18: 14 (the Amazon); (pt.) Fowler, 1951, Arq. Zool. S. Paulo, 6: 463 (Amazônia, Bolivia, Peru, Venezuela); (pt.) P. de Miranda Ribeiro, 1962, Publ. Avuls. Mus. Nac. Rio de Janeiro, 45: 9 (Manaos, Rio Amazonas, Estado do Amazonas; Mercado de "Vêr-o-Peso", Belem, Estado do Pará; Belem, Estado do Pará; Rio Juruá, Municipio de Eiaurupé, Estado do Amazonas; Bórba, Estado do Amazonas); Mago-Leccia, 1967, Soc. Venez. Cienc. Nat. Bol., 27: 255 (Venezuela); Marlier, 1968, Cad. Amazônia, 11: 56 (Rio Preto).

Centromochlus Heckelii; Vaillant, 1880, Bull. Soc. Philomat, (7) 4: 154 (Caldéron (Haute-Amazone)); Pellegrin, 1899, Bull. Mus. Hist. Nat. Paris, 5: 158 (l'Apuré et ses affluents); Tortonese, 1940, Bol. Mus. Torino, 48: 136 (Rio Napo).

Centromochlus steindachneri; Eigenmann & Eigenmann, 1888, Proc. Calif. Acad. Sci., (2) 1: 156 (no locality); Eigenmann & Eigenmann, 1890, Occ. Pap. Calif. Acad. Sci., 1: 268 (Upper Amazon); Eigenmann & Eigenmann, 1891, Proc. U.S. Nat. Mus., 14: 34 (Marañón); Fowler, 1941, Bol. Mus. "Javier Prado", 5: 466 (Pebas); Eigenmann & Allen, 1942, Fish. W. South America: 118 (Pebas); Gosline, 1945, Bol. Mus. Nac. Rio de Janeiro, Zool., 33: 10 (Marañón); Fowler, 1945, Los Peces del Peru: 62 (Perú (Rio Marañón)); Fowler, 1951, Arq. Zool. S. Paulo, 6: 464 (Alto Amazonas, Rio Marañón).

Centromochlus heckeli; Fisher, 1917, Ann. Carnegie Mus., 11: 422 (Santarem; San Joaquin, Bolivia; Pará; Rio Mamoré; Manaos).

Centromochlus hekelii; A. de Miranda Ribeiro, 1914, Comm. Linh. Telegr. Estr. Matto-Grosso ao Amazonas, Anexo 5: 10 (Manaos).

Centromochlas steindachneri; Lundberg & Baskin, 1969, Amer. Mus. Novit., 2398: 6, 26 (no locality).

Material. — One specimen, 1847, Bogota (MV no. 47360), standard length 63½ mm, syntype of *C. megalops*. One specimen, no date, Villa Bella (received from Steindachner in 1874, presumably Thayer Exp., MV no. 47342), standard length 55 mm. One specimen, 1865/1866, Jatuarana (Navez, Thayer Exp., MCZ no. 7635), standard length 65 mm. One specimen, Pará (MCZ no. 7636), standard length 44 mm¹⁾. One specimen, Hyavary (MCZ no. 7623), standard length 69 mm. One specimen, Tabatinga (MCZ no. 7632), standard length 68 mm. One specimen, Obidos (MCZ no. 7627), standard length 55 mm. Three specimens, Lago Alexo near Manaos (S. V. R. Thayer, Thayer Exp., MCZ no. 7634), standard length 62, 64, 67 mm. Two specimens, 1865/1866, Teffé (L. Agassiz, Thayer Exp., MCZ no. 36188), standard length 60, 63 mm. Eight specimens, Villa Bella (MCZ no. 7730), standard length 57½-62 mm. Ten specimens, Villa Bella (MCZ no. 7630), standard length 51-66 mm. One specimen, Villa Bella (presumably Thayer Exp., ZMK no. 16, ex MCZ), standard length 62 mm. One specimen, 1893/1895, l'Apuré, Venezuela (F. Geay, MNP no. 98-33), standard length 70 mm. One specimen, 1908, Para (Göldi, MV no. 47350), standard length 56 mm. One specimen, 1908, Manaos (Comissão Rondon, MRJ no. 979), standard length 70½ mm. Two specimens, 19 September 1909,

1) There is little doubt that this and following specimens which bear no date or collector's name, originate from the Thayer Expedition, 1865/1866.

Rio Mamoré, Brazil-Bolivia (J. D. Haseman, FM no. 57804), standard length 60, 76 mm. Two specimens, no date = December 1909, Santarem (J. D. Haseman, CAS no. 24799), standard length 54, 56 mm. Five specimens, April 1913, harbour of Manaus (E. A. Smith, ANSP no. 73154), standard length 63, 65, 65, 68, 68 mm. Two specimens, August 1920, Rio Ucayali near Orellana, Peru (W. R. Allen, CAS no. 24804), standard length 54½, 86 mm. Two specimens, August 1920, mouth of Rio Pacaya, Peru (W. R. Allen, CAS no. 24802), standard length 57, 65 mm. Two specimens, September 1920, Iquitos, Peru (W. R. Allen, CAS no. 24803), standard length 71, 76½ mm. Two specimens, October 1920, Rio Morona, Peru (W. R. Allen, CAS no. 24800), standard length 61, 90 mm. One specimen, November 1920, Rio Huallaga, Yurimaguas, Peru (W. R. Allen, CAS no. 24801), standard length 75 mm. Two specimens, 22 April 1924, Tocantins R. near Arumatheua (C. Ternetz, CAS no. 6687), standard length 85, 85 mm. One specimen, 2 June 1924, Tapajos (C. Ternetz, CAS no. 6686), standard length 72 mm. Five specimens, June 1924, Santarem, Rio Tapajos (C. Ternetz, CAS no. 6676), standard length 59, 60, 61, 63, 64 mm. One specimen, no date = ca. June 1924, Amazon below Santarem (C. Ternetz, CAS no. 6683), standard length 68 mm. Five specimens, 1943, Bórba (A. Parko, MRJ no. 9413), standard length 68, 72, 73, 73, 75 mm. One specimen, 1944, Bórba (A. Parko, MRJ no. 9414), standard length 68 mm. Seven specimens, 1951, Município de Eiaurupé, Rio Juruá (J. C. de Melo Carvalho, MRJ no. 5884), standard length 48-60 mm. Three specimens, 1958, Mercado do "Vêr-o-Peso", Belem (L. Travassos and F. Pires, MRJ no. 9029), standard length 64, 65, 70 mm. One specimen, 24 October 1963, Parana da Eva, Amazonas (G. Marlier, KBIN no. 16429), standard length 60 mm. Two specimens, no date, South America (Beal and Steare, UMMZ no. 56134: "*C. steindachneri*"), standard length 66, 66 mm. Two specimens, no date, Pebas, Peru (no collector, CAS no. 24805: "*C. Steindachneri*"), standard length 66½, 70 mm. One specimen, no date, Belem (C. Estevão de Oliveira, MRJ no. 955), standard length 86 mm.

Characters. — D I.5, A 7 or 8, P I.7 to I.9, V 6, C i.15.i and rudiments (once i.14.i); predorsal length 2.7-3.0 times in standard length; distance from tip of snout to base of ventrals 1.65-1.8 times in standard length; maxillary barbels long, reaching to well beyond origin of dorsal fin; the shallow depression containing the fontanels does not reach to the supraoccipital; horns of nuchal plate laterally rounded; posterior edge of pectoral spine rough, but only in the distal part of the spine do the protuberances assume the shape of antrorse teeth; adpressed pectoral spines reaching ventrals, the length of these spines about equal to predorsal length; adipose fin implanted before a vertical through the posterior border of the adpressed anal fin.

Colour. Preserved specimens are plain light brownish on the dorsal, yellowish white on the ventral surface. According to Arnold & Ahl (1936) the species is in life dark grey to greenish grey above, the flanks olive green, belly yellowish white, evidently without any markings.

Distribution (fig. 7). — The species is widely distributed in the Amazon basin, from the mouth of the Amazon (Pará) to Peru (many localities) and Bolivia (San Joaquin). Also known from Venezuela (Orinoco drainage) and Colombia. The only record from Colombia concerns the two syntypes of *C. megalops* which are supposed to be from Bogotá. But Bogotá is a town high in the Andes, in the immediate surroundings of which *Centromochlus* is

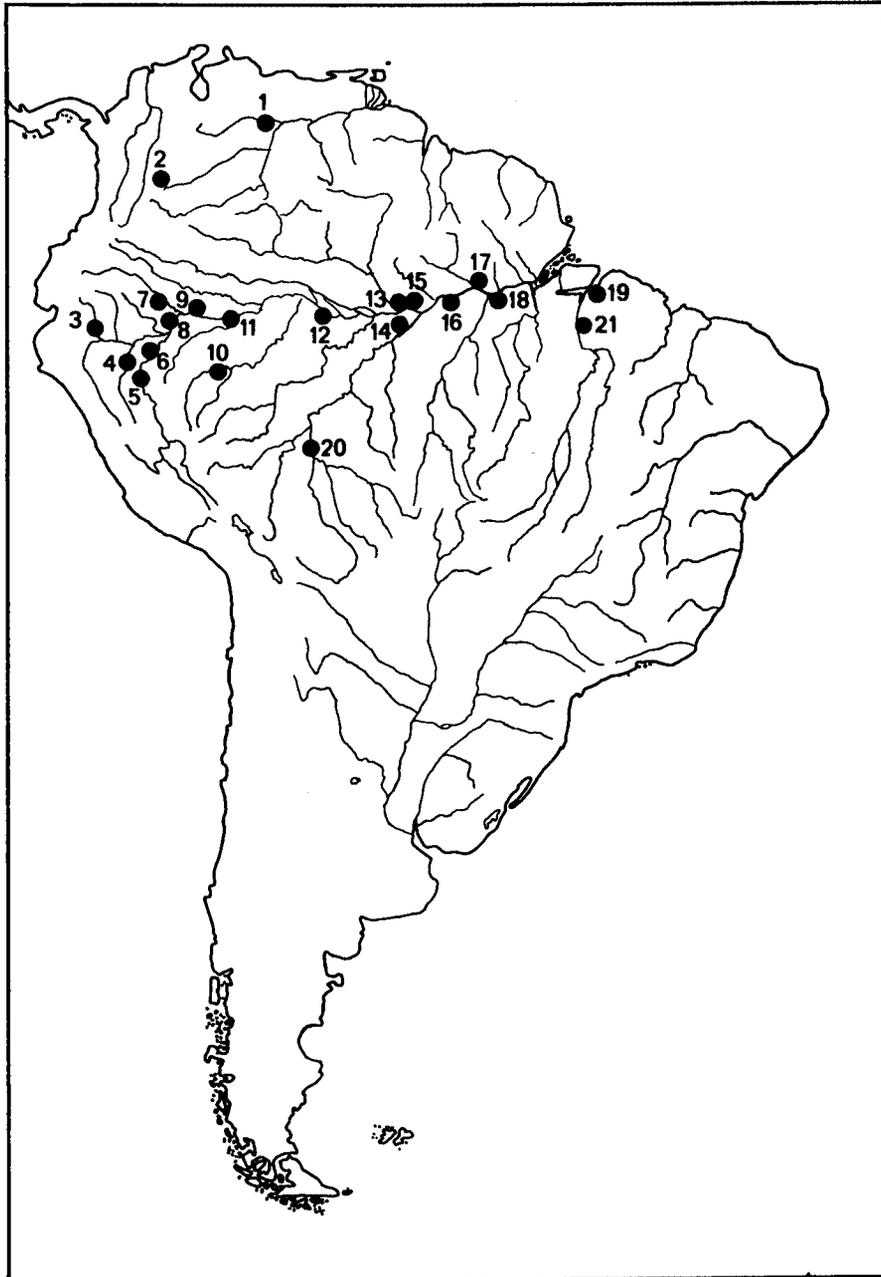


Fig. 7. The distribution of *Centromochlus heckelii*, from material examined (except for the type-locality, Rio Napo, which is from literature). 1, Apuré. 2, Bogota. 3, Rio Morona. 4, Yurimagas. 5, Orellana. 6, Rio Pacaya. 7, Rio Napo. 8, Iquitos. 9, Pebas. 10, Eiaurupé. 11, Tabatinga (and mouth of Hyavary). 12, Teffé. 13, Manaus. 14, Bórba. 15, Rio Prêta da Eva. 16, Villa Bella. 17, Obidos. 18, Santarem. 19, Pará (Belem). 20, Mamoré. 21, Arumatheua.

unlikely to occur, and about the middle of last century it was also an important trade-centre for natural history specimens. The nearest rivers, the Magdalena and Meta, flow north and north-east respectively, and ultimately into the Caribbean, but it is very well possible that the specimens were obtained in one of the rivers of the upper Amazon drainage. Although the ichthyofauna of the Magdalena and Meta rivers has been studied (Eigenmann, 1922; Miles, 1947), *C. heckelii* has not been recorded from them. On the other hand, the species is already known from the Rio Apuré, a tributary of the Orinoco (as is the Meta), and therefore it is likely that the species also occurs in the Meta (cf. Eigenmann, 1922: 220).

Discussion. — Of the two names here listed as synonyms, *C. megalops* has been generally recognized as such, but *C. steindachneri* requires some discussion.

First about the type-locality of *C. steindachneri*. In the original description, Gill (1871) did not give a locality for his specimen, but because of the caption of the article in which it was described: "fishes ... from the Marañon, or Upper Amazon, and Napo Rivers", later authors have made the Marañon the type-locality of the species. It is very doubtful that this is correct, for in the introduction to his paper, Gill writes: "In an expedition to the Andes of Ecuador and Peru, and thence across the continent of South America, under the command of Prof. James Orton, a considerable zoological collection was formed, and the fishes being submitted to the writer for determination, the following appeared to be undescribed". The fact that with the majority of the described species no locality is given, and in one instance a specimen was: "taken in the river Napo or Marañon", suggests strongly that the specimens were not labelled, and as according to the sentence just quoted, the Orton expedition crossed the continent of South America, the material of *Centromochlus steindachneri* may have been taken anywhere in the Amazon basin (see also Fowler, 1940a: 219).

As in the original description no characters are given which would distinguish this species from *C. heckelii* (indeed, Gill states that it is most nearly related to *C. megalops*, a synonym of *C. heckelii*), I have tried to trace the type, but have been unsuccessful. Neither in the Academy of Natural Sciences, nor in the United States National Museum could it be found (Böhlke, in litt.; Gibbs, in litt.).

Since its description, only Eigenmann & Allen (1942) appear to have recorded material under the name *C. steindachneri*, all other mention in literature being just references to the original description. I have examined Eigenmann & Allen's specimens (now CAS) and two more examples, originally apparently belonging to the same lot, from UMMZ. These speci-

mens tend to have the groove containing the fontanel rather short, and the ventrals are placed far backwards (distance from tip of snout to base of ventrals 1.6-1.65 times in standard length as against 1.65-1.8 in the other material), but in every other respect they agree with *C. heckelii*, and it is my opinion that they fall within the normal range of variation of *C. heckelii*.

Centromochlus existimatus species nova (figs. 8, 9)

Centromochlus heckelii; (pt.) Eigenmann & Eigenmann, 1888, Proc. Calif. Acad. Sci., (2) 1: 156 (Villa Bella; Obidos; Gurupa; Manacapuru); (pt.) Eigenmann & Eigenmann, 1890, Occ. Pap. Calif. Acad. Sci., 1: 267 (Villa Bella, Obidos; Gurupa; Manacapuru); (pt.) Eigenmann & Eigenmann, 1891, Proc. U.S. Nat. Mus., 14: 34 (Amazonas and tributaries); (pt.) Eigenmann, 1910, Rep. Princeton Univ. Exp. Patagonia, 3: 395 (Amazonas and tributaries); (pt.) A. de Miranda Ribeiro, 1911, Arch. Mus. Nac. Rio de Janeiro, 16: 359 (Villa-Bella, Obidos, Gurupa, Manacapuru); (pt.) Fowler, 1915, Proc. Acad. Nat. Sci. Philad., 67: 221 (Manaos harbor); Fowler, 1940, Proc. Acad. Nat. Sci. Philad., 91: 231 (Contamana, Ucayali River); (pt.) Fowler, 1941, Bol. Mus. "Javier Prado", 5: 466, 467, fig. 23 (Contamana); (pt.) Fowler, 1945, Los Peces del Peru: 62, 63, fig. 23 (Contamana); (pt.) P. de Miranda Ribeiro, 1962, Publ. Avuls. Mus. Nac. Rio de Janeiro, 42: 9 (Bórba, Estado do Amazonas).

Material. — Six specimens, 1865/1866, Gurupa (L. Agassiz, Thayer Exp., MCZ no. 7631), standard length 44-55 mm. Two specimens, 1865/1866, Obidos (Thayer Exp., MCZ no. 7628), standard length 53, 57 mm. One specimen, 1865/1866, Manacapuru (Thayer Exp., MCZ no. 7629), standard length 54 mm. Five specimens, 1865/1866, Villa Bella (Thayer Exp., MCZ no. 7630), standard length 52, 53, 55, 57, 57 mm. Seven specimens, 1865/1866, Villa Bella (Thayer Exp., MCZ no. 7730), standard length 55-60 mm. One specimen, presumably 1865/1866, Villa Bella (presumably Thayer Exp., BM 1889-11-14: 39-40, ex MCZ), standard length 57 mm. Two specimens, 1865/1866, Jatuarana (Navez, Thayer Exp., MCZ no. 7635), standard length 63, 63 mm. One specimen, presumably 1865/1866, Villa Bella (presumably Thayer Exp., UZMK, ex MCZ), standard length 55 mm. One specimen, no date = December 1909, Santarem (J. D. Haseman, CAS no. 24799), standard length 57 mm. One specimen (♀), April 1913, harbour of Manaus (E. A. Smith, ANSP no. 73154), standard length 66½ mm, holotype of the species. One specimen, 3 June 1924, Turuté, Amazonas (C. Ternetz, CAS no. 6689), standard length 39 mm. One specimen, June 1924, Tapajos near Santarem (C. Ternetz, CAS no. 6676), standard length 64 mm. One specimen, July-August 1937, Contamana, Ucayali R. basin, Peru (W. C. Morrow, ANSP no. 108489), standard length 60 mm. Two specimens, 1943, Bórba, Estado do Amazonas (A. Parko, MRJ no. 9413), standard length 64, 66 mm. One specimen, no data (MRJ no. 9415), standard length 56 mm.

Characters. — D 1.5½, A 7 or 8 (mostly iii.5), P I.10 to I.12, V 6 (i.5), C i.15.i and rudiments (once i.16.i), predorsal length 2.9-3.1 times in standard length, distance from tip of snout to base of ventrals 1.8-1.95 times in standard length, hence ventrals slightly more anterior in position than in *C. heckelii*; maxillary barbels short, reaching from a little beyond base of P to just to a vertical through origin of D; the shallow depression containing the fontanels reaches the supraoccipital; horns of dorsal plate laterally with a

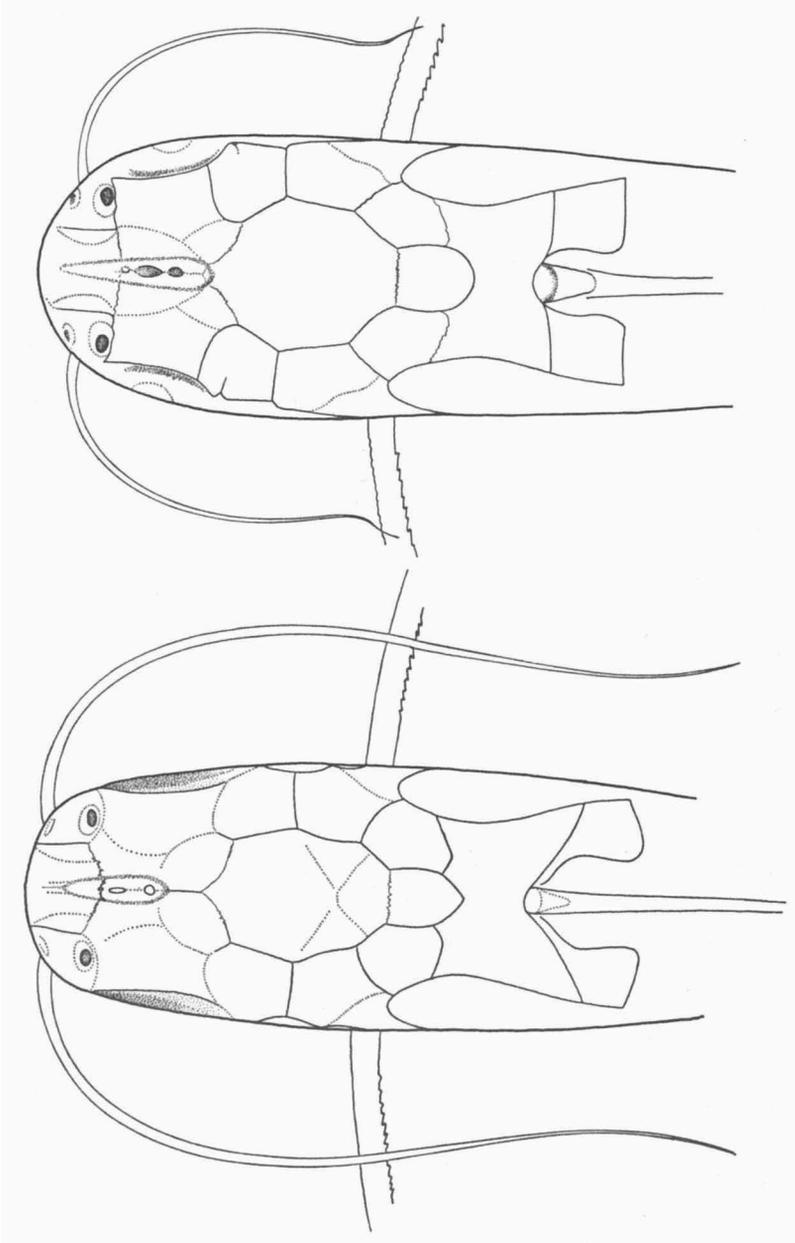


Fig. 8. *Centromochlus heckelii* (left, s.l. 61 mm) and *Centromochlus exstigmatus* (right, s.l. 63 mm), predorsal part of body viewed from above. Note the difference in extent of the depression containing the fontanel, and the difference in length of the maxillary barbels. 3 X.

sharp angle; posterior edge of the pectoral spines with about 30 well-developed antrorse serrae; adpressed pectoral spines just reaching ventrals, the spines shorter than the distance from tip of snout to origin of D (about four-fifths of this distance); adipose fin implanted on or behind a vertical through the posterior border of the adpressed anal fin.

The shallow central groove containing the fontanels is continued to the supraoccipital. In both species, *C. heckelii* and *C. existimatus*, there are two small round fontanels, separated by a bridge, and behind the posterior fontanel the frontals are broadly joined, but whereas in *C. heckelii* this area is not depressed and on a level with the bones forming the outer aspect of the cranium, in *C. existimatus* it continues as a shallow depression to the supraoccipital. When the skin is in place, in *C. heckelii* it still looks as if the frontals are broadly connected in front of the supraoccipital, but in *C. existimatus* it looks as if they are not connected, as the joint is sunk in and covered by skin. I do not understand Eigenmann & Eigenmann's (1890: 267) description: "Fontanel elongate, widest behind", as in all specimens examined by me (and these include the material studied by Eigenmann & Eigenmann), there are two fontanels as described above. In some large specimens, however, the anterior fontanel is somewhat elongated and the posterior one reduced in size. The Eigenmanns may have examined such a specimen and have overlooked the small posterior fontanel, or they may have described the shape of the skin-covered depression, and not that of the actual fontanels.

The difference in number of pectoral rays between this species and the preceding one is obvious, but the difference in dorsal rays is also diagnostic: *C. heckelii* has five evenly spaced rays, whereas *C. existimatus* has six rays, of which the fifth and the sixth originate very close together on the same pterygiophore; in the material studied this difference was without exception. The anal fin has two or three simple and five divided rays; as the first simple ray is small and very slender it may have been present in some specimens in which I failed to find it, making A 8 the normal formula.

Colour. For a description of colour and pattern I refer to the generic description.

Distribution (fig. 9). — On present evidence this species is widely distributed along the main stream of the Amazon, from Gurupa to Contamana. Doubtless its actual distribution embraces most of the Amazon basin.

Discussion. — The specimen described and figured by Fowler (1940a, 1941b, 1945b) under the name *C. heckelii* actually is *C. existimatus* (specimen ANSP no. 108489, examined). Fowler's figure is a reasonable presentation, showing well the short maxillary barbel and many-rayed pectoral fin, but it does not bring out the shape of the dorsal projection (horn) which in this



Fig. 9. The distribution of *Centromochlus existimatus*, from material examined. 1, Contamana. 2, Manacapuru. 3, Manaus. 4, Jatuarana. 5, Borba. 6, Villa Bella. 7, Obidos. 8, Santarem. 9, Gurupa.

specimen has a sharp angle; does not show the double fifth dorsal ray; the anal fin is shown too far backward, reaching to well below the adipose fin; the lateral line is shown too high on the flanks, and it looks as if the pectoral spine is serrated on its outside.

I have considered the possibility that the differences between *C. heckelii* and *C. existimatus* are not specific but sexual, a possibility that appears to be strengthened by the fact that the two have so often been collected together (as evidenced by mixed samples in collections). The obvious way to solve this problem was dissection of a few specimens. Unfortunately practically all material examined was old and not very well preserved; only sample ANSP no. 73154 (5 *C. heckelii*, 1 *C. existimatus*) appeared to be in a good condition and after having obtained Dr. Böhlke's consent, I attempted internal sexing. This, however, was inconclusive as even in these specimens the internal tissues had disintegrated too far for positive results. Nevertheless, I believe to be able to distinguish between the sexes on the basis of the position of the urogenital pore. This is placed either against the origin of the anal fin, or well in advance of it, about half-way between the anus and the origin of the anal fin; when considering the position in related genera, it is a reasonable assumption that specimens of the first kind are males, of the second females. On this character, the examined material of both species *C. heckelii* and *C. existimatus*, consists of males and females. In addition, whereas some of the characters which distinguish the two species are of a kind that could be sexual (for example length of barbels), others (shape of fontanel, number of pectoral rays, position of adipose fin) are not anywhere in the Auchenipteridae known to show sexual dimorphism.

Centromochlus sp.

Material. — One specimen (♀?), 1865/66, Lago Alexo, Brazil (S. V. R. Thayer, Thayer Exp., MCZ no. 7634), standard length 54 mm. Three specimens (all ♀), 19 September 1909, Rio Mamoré, Brazil-Bolivia (J. D. Haseman, FM no. 57804), standard length 58½, 61, 62 mm.

Characters. — D 1.5, A 7 or 8, P 1.7 or 1.8, V 6 (i. 5), C i.15.i and rudiments, predorsal length 3.0-3.25 times in standard length, distance from tip of snout to base of ventrals 1.8-1.85 times in standard length, maxillary barbels reaching only a little beyond a vertical through the origin of D, pectoral spines short, when adpressed reaching from three-quarters to four-fifths of the distance from their base to the ventral base, and much shorter than the predorsal length (1.2-1.3 times in this distance), the anterior edge of the pectoral spines perfectly smooth, dorsal spine short, about four-fifths of pectoral spines, when depressed falling just short of a vertical through the origin of V.

In all characters, including fin-formula, shape of the depression containing the fontanels, position of adipose fin, and lateral line, the specimens are similar to *C. heckelii*, but they differ by their lesser predorsal length (3.0-3.25 times in standard length, against 2.7-3.0 in *C. heckelii*), short maxillary barbels and short spines.

Colour. In the specimen from Lago Alexo, there remains a colour-pattern as described in the generic diagnosis.

Discussion. — These specimens are either underdeveloped *C. heckelii*, or a distinct, undescribed species. I have also considered the possibility that they would be a cross between *C. heckelii* and *C. existimatus*, but except for the length of the maxillary barbels, there is not a single character in which they are intermediate. The spines are smaller than in either species, and in the shorter predorsal length they differ also from both other species.

Genus **Tatia** A. de Miranda Ribeiro

Tatia A. de Miranda Ribeiro, 1911, Arch. Mus. Nac. Rio de Janeiro, 16: 360 — based on *Centromochlus intermedius* Steindachner and *Centromochlus aulopygius* Kner, type by subsequent designation, *Centromochlus intermedius* Steindachner (Gosline, 1945: 10).

Generic diagnosis. — D I.4 or I.5, A 7-11, P I.4 or I.5, V (i.5), C i.15.i and rudiments. A genus of small catfishes with naked body, and with the upper surface of the head (except the orbits and a small interorbital fontanel) and the nuchal region entirely covered with bony plates; fontanel or fontanels forming a deep oval hole between the eyes, without skull depression either forwards or backwards; nuchal plate reaching to, and laterally beyond, the basis of the dorsal spine; dorsal and pectoral spines strong, nearly always with well-developed teeth and hooks, the pectoral spines thus armed on both sides, the dorsal spine along its anterior edge only, the posterior border being smooth; anal fin short; adipose fin small; eyes moderately large, covered with skin; barbels of moderate length, the longest pair reaching to or just beyond the origin of D; maximum size not over 120 mm standard length (the largest example actually examined had a standard length of 117 mm).

Mouth terminal, not visible from below; teeth of moderate size, in a band in each jaw, without backward projections; no teeth on vomer and palatines, except in some large specimens of *T. intermedia*, which have an irregular patch of vomerine teeth; head not very long, distance from tip of snout to base of dorsal spine 3.25-3.7 times in standard length; horns of nuchal plate bent outwards and downwards, sometimes bent very little, but never bent inwards (fig. 10); humeral spine (postcleithral process) usually well-developed, varying in length from rather less to much over half the length of the pectoral spine (the size of this process can vary even on both sides of one

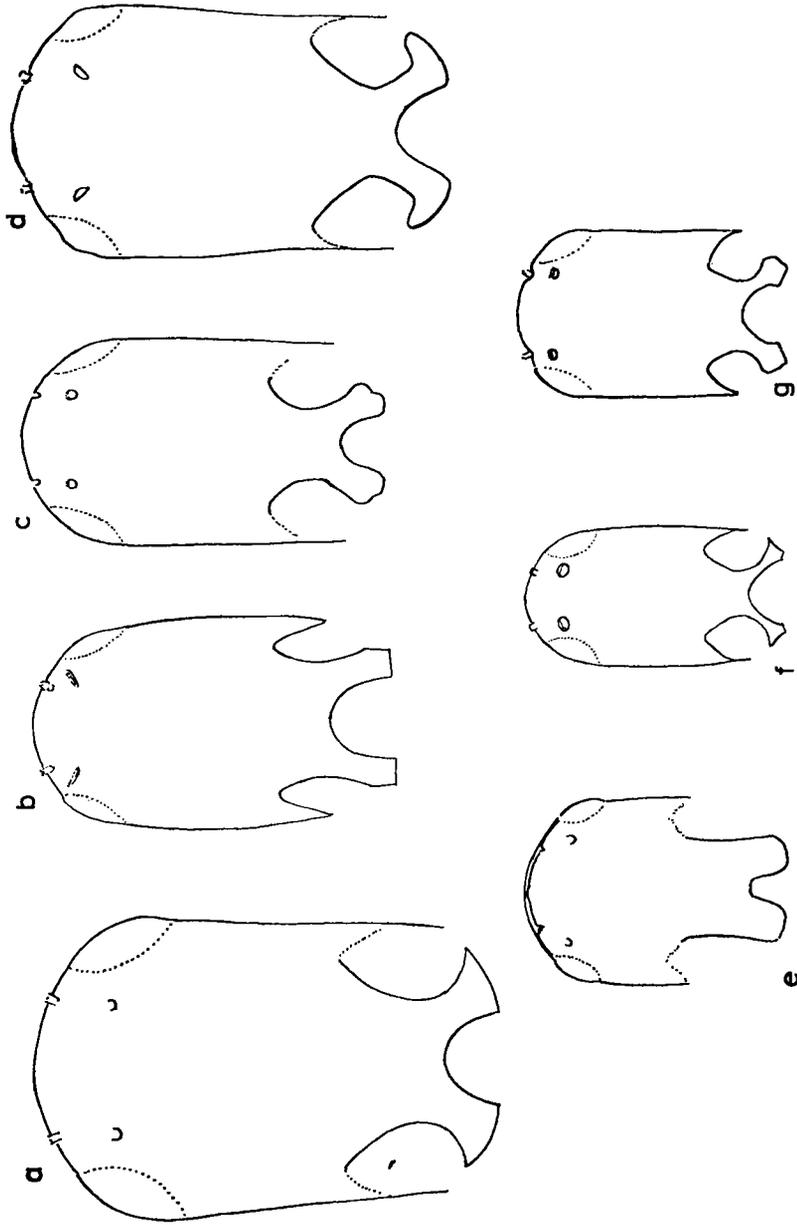


Fig. 10. Heads of *Tatia*-species seen from above, to show differences in shape of nuchal plates and horns. (a) *T. intermedia*, (b) *T. perugiae*, (c) *T. punctata*, (d) *T. brunnea*, (e) *T. creutzbergi*, (f) *T. schultzei*, (g) *T. concolor*. 3 X.

individual, and although there is certainly a tendency for it to be small in the species of the *T. aulopygia*-group, and large in *T. perugiae* and *T. altae*, I found it to be too variable to be useful as a specific character in the genus); pectoral pore over middle of pectoral base; dorsal and pectoral spines comparatively short, pectoral spines in all species with teeth and small hooks, 4.3-4.9 times in standard length, not nearly reaching to ventrals (the pectoral spines are more fully described in the next paragraph); lateral line more or less straight; anal fin with a pronounced sexual dimorphism in shape and structure; ventrals implanted at about the middle of the body, or slightly farther backwards; caudal fin shallowly to deeply forked, the tips of its lobes usually more or less rounded; the caudal fin not clearly separated from the body, hence no distinct caudal peduncle, many rudimentary rays above and below, extending some distance forward.

Pectoral spines comparatively short, generally no more than two-thirds of distance from tip of snout to base of dorsal spine, with a slight curve backwards; on the anterior edge some 18-26 teeth, the distal ones largest, and progressively smaller towards the body, directed outwards, at least the distal ones clearly so; along the posterior edge some 13-18 teeth, also largest towards the tip of the spine, and all directed inwards; on the outer edge the teeth continue practically to the base of the spine, along the inner edge they usually do not come up so far (fig. 6). Exceptions: *Tatia schultzi* in which the teeth along the anterior edge of the pectorals are rather smaller than in the other species, and directed inwards, and *Tatia perugiae* and *T. altae* which have 25-40 small teeth along the anterior edge of the pectoral spine, and only 7-10 along its posterior border (fig. 15).

The number of rays in the anal fin is not a character of diagnostic value in the majority of species; the variation being only from seven to eleven, and at least one species, *T. creutzbergi*, covers a range of from eight to eleven. Also, the rays are not always easy to count as some rays are small and embedded in skin, hence easily overlooked.

Most species have a distinctive and diagnostic pattern of pigmentation, making reasonably fresh specimens easy to identify, notwithstanding a lack of morphological characters.

Lateral line complete, but not very conspicuous, straight, with evenly spaced pores.

Sexual dimorphism is pronounced in one character. Females have the anal fin normal, albeit with a slightly fleshy base, and the anal opening and papilla are situated just in advance of the fin. In males, on the other hand, the anal fin is transformed into what one may assume is a copulatory organ; the basal part is encased in skin, and the rays protruding from this skin form together

a hard, more or less leaf-shaped organ, the first or second rays being thick and long, the last rays fine and almost degenerated. At the end of the fleshy part, hence at the base of the visible part of the first ray, is the genital opening, widely separated from the anal opening.

There are no evident additional secondary sexual characters, and as of all Suriname species both males and females have been available, I can state definitely that the sexes agree in colour and pattern, as well as in the few other specific characters I have been able to find in the genus.

Distribution. — The whole of tropical South America east of the Andes, from Venezuela and Columbia to southern Brazil (Rio Piracicaba, Paraná drainage), but not known from the Paraguay-La Plata rivers. Not known from Paraguay, and in Bolivia only from the Rio Guaporé, the river forming the boundary with Brazil.

Discussion. — The majority of species here placed in *Tatia*, are better known under the generic name of *Centromochlus*, which has gained wide acceptance in ichthyological literature. The name *Centromochlus* Kner (1858) was based on two species, *C. megalops* Kner and *C. aulopygius* Kner. *C. megalops* Kner, which by subjective judgement is a junior synonym of *C. heckelii* (Filippi), has become the type of *Centromochlus* by subsequent selection (Bleeker, 1862: 7).

I have examined a number of specimens of *C. heckelii*, including the holotype of *C. megalops*, and found that this species differs in numerous characters from *C. aulopygius* (type examined) and all other species currently placed in *Centromochlus* and *Tatia*. Although I am well aware that the genus is the most subjective of all systematic categories, even adherents of a wide genus-concept, to which I belong, would not regard *C. heckelii* as congeneric with the other members of the group, which are morphologically extremely uniform. Therefore the generic name *Centromochlus* has to be restricted to *C. heckelii* and *C. existimatus*.

The main character on which A. de Miranda Ribeiro (1911: 353) separated *Tatia* from *Centromochlus* was the following. "*Centromochlus*: papilla genital anterior aos raios anaes; *Tatia*: papilla genital sobre os raios anteriores da anal". The genus was based on two species, *T. intermedia* and *T. aulopygia*. The major character on which *Tatia* was based is one of sexual dimorphism, as will be further discussed below, but the separation in itself was in my opinion correct — see the supporting evidence given above.

As *Tatia* has never been satisfactorily defined, it is not surprising that there has been uncertainty and confusion over which species it includes. As an example, Gosline's (1945) list may be mentioned, in which *Tatia* only contains the two species originally placed in it by Ribeiro, and the other

species known at the time (*C. oncinus*, *C. heckelii*, *C. steindachneri*, *C. perugiae*, *C. gyrinus*), are retained in *Centromochlus*¹). Later Boeseman (1953) followed Gosline in referring the *Centromochlus aulopygius* of Eigenmann (1912) to *Tatia*, and described a new species as *Centromochlus creutzbergi*. Other species described in recent years, have been placed in *Centromochlus* without reference to *Tatia* (cf. Fowler, 1945a; Rössel, 1962). P. Ribeiro (1962b: 9, 10) listed one of the species twice, on one page as *Centromochlus aulopygius*, on the next page as *Tatia aulopygia*.

The genus *Tatia* as here defined consists of a group of small fishes of extremely uniform morphology. At present it appears possible to distinguish fourteen species in it, five of which are known to occur in Suriname. Of the five Suriname species, three are described here for the first time and another three new species were found in collections from other countries. This suggests that the genus is by no means well known, and that many more species remain to be discovered in various parts of its range.

The time is not ripe, in my opinion, for the application of ternary nomenclature in this still very insufficiently known genus, but I regard it as likely that some of these forms can be grouped as follows:

- T. aulopygia aulopygia*
- T. aulopygia intermedia*
- T. aulopygia neivai*
- T. aulopygia galaxias*
- T. perugiae perugiae*
- T. perugiae altae*

On the basis of present knowledge, no further grouping together of forms appears possible. The co-occurrence of four species of this very uniform genus in the Suriname Rivier basin is a warning against oversimplification.

***Tatia aulopygia* (Kner) (figs. 11, 13, pl. 2)**

Cent[romochlus] aulopygius Kner, 1858, Sitzb. Akad. Wiss. Wien, Mathem.-Naturw. Cl., 26 (1857): 432, pl. 8 fig. 25 — Rio Guaporé.

Centromochlus aulopygius; Steindachner, 1876, Sitzb. Akad. Wiss. Wien, Mathem.-Naturw. Cl., 74 (1): 664, 665 (no locality); Pearson, 1937, Proc. Calif. Acad. Sci., (4) 23: 110 (Mamoré basin).

1) *Arius oncina* R. H. Schomburgk (1841) included in *Centromochlus* by Gosline, is a doubtful species. R. Schomburgk (1848: 618) has stated concerning his brother's book that: "...die dem Buche beigefügten Abbildungen nur in wenigen Fällen auf Treue Anspruch machen können". The peculiar serrated scapular spine, the shape of the caudal fin, and its maximum length of ten inches, are all unlike any known species of *Tatia*.

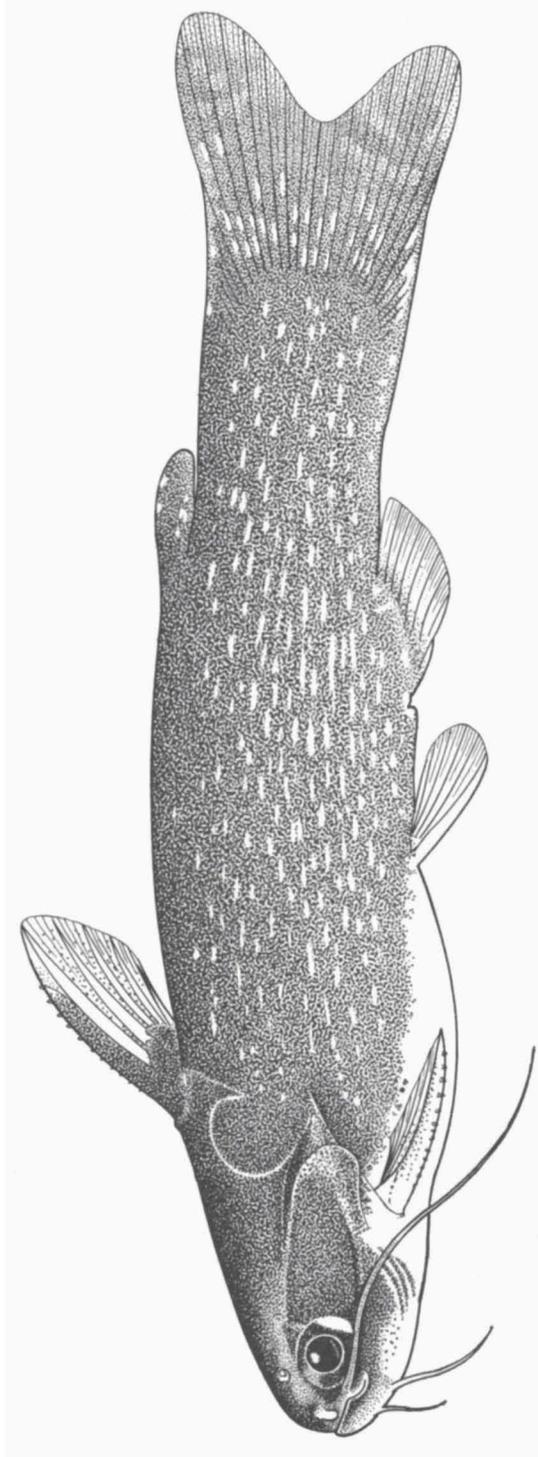


Fig. 11. *Tañia aulopygia* (BM from no. 1971.7.29: 6-12, s.l. 31 mm).

Tatia aulopygia; (pt.) A. de Miranda Ribeiro, 1911, Arch. Mus. Nac. Rio de Janeiro, 16: 361 (Guaporé); (pt.) Gosline, 1945, Bol. Mus. Nac. Rio de Janeiro, Zool., 33: 10 (Guaporé).

Centromochlus intermedius; (pt.) Fisher, 1917, Ann. Carnegie Mus., 11: 422 (Maciel, Rio Guaporé); Pearson, 1937, Proc. Calif. Acad. Sci., (4) 23: 110 (Mamoré basin).

Material. — One specimen, "1817", Rio Guaporé (Natterer, MV no. 47332), total length 52, standard length 41 mm, syntype of the species¹). Three specimens, 3 August 1909, Maciel, Rio Guaporé (J. D. Haseman, FM no. 58015), standard length 23, 35, 41½ mm. Nine specimens, 13 May 1968, Suia Missu, Mato Grosso (R. H. McConnell, BM no. 1971.7.29: 6-12, and two specimens RMNH no. 26491), standard length 19-31 mm.

Characters. — Of medium size (standard length 19-14½ mm); nuchal plate with horns well flung outwards, pointed; hind-border of adpressed anal fin opposite hind-border of adipose fin, or not reaching that far; usual number of rays in the anal fin 10; colours and colour-pattern diagnostic.

Colour. Head and body entirely dark grey-brown; the head and predorsal part of the body darkest, blackish grey; under parts from lower chin to anus unpigmented, white; body with numerous small whitish, short longitudinal stripes, which are distinct only when viewed at close quarters; seen from some distance the colour is even blackish-brown; dorsal fin with the skin covering the spine, and the basal area dark brown, remainder hyaline; pectorals with scattered pigment over the spines, further hyaline; anal with a brownish basal half, the distal part hyaline; ventrals hyaline; caudal base pigmented as the body, caudal fin pigmented with the same pattern, but much more lightly, the pigment being most conspicuous in the upper part of the upper lobe, and in the lower part of the lower lobe; adipose fin with irregular brownish pigment.

Distribution (fig. 13). — Probably widely distributed in the centre of South America, but at present only known from the Rio Guaporé and the Suia Missu.

Discussion. — In recent years the name *Tatia aulopygia* or *Centromochlus aulopygius* has been universally applied to the species with a pattern of large round and elliptical white (unpigmented) spots on an earth brown or grey background. Being interested to know if the type specimens would still show remnants of this characteristic, and for the species diagnostic, pattern, I applied for a loan of a syntype, a request that was most kindly granted. The specimen did not appear to have had the pattern with large white spots but is more or less evenly pigmented, with the belly pigmentless. The pigmentation of the chin differs conspicuously from that of "*aulopygia*" auct. by

1) There is no original label and the year 1817 cannot be correct, as Natterer's visit to the Rio Guaporé took place in 1828/29 (cf. Pelzeln, 1868-1871: Itinerarium).

consisting of more or less evenly spaced large melanophores, whereas in the latter species there is a distinct pattern: usually a large pigmented V separated from the pigment along the edge of the mandible by an almost pigmentless area; this pigmented area varies in extent, and is sometimes entirely absent (pl. 2). Whereas I can imagine that in a specimen as old as the type of *T. aulopygia* pigment has worn off or been lost in some other way (this evidently happens in old material), it is unlikely that pigment could appear where originally it was not present. Notwithstanding the close morphological resemblance (shared by most other species of the genus), I believe therefore that *T. aulopygia* is a species (or subspecies) different from the one that over the past sixty years has been called by that name, and that the latter must bear the name *T. intermedia*.

Besides the evidence presented above, it should be noted that Kner (1858), who described *T. aulopygia* less than thirty years after the specimen had been collected, did not mention a distinctive pattern. Some specimens of *T. intermedia* examined by me, collected well over thirty years ago, even several taken over a century ago, still show its diagnostic pattern.

In this connection it is significant that the only specimens of *Tatia* that have since been collected in the Rio Guaporé, at a time that specimens with a grey-and-white pattern were generally called *C. aulopygius*, were listed not under that name, but as *C. intermedius* (cf. Fisher, 1917). I have examined Fisher's specimens; they are dull brown, with small longitudinal pale streaks and the largest has its chin pigmented just as the type of *T. aulopygia*. It is likely therefore that these specimens actually represent *T. aulopygia*, although certain identification of this old material is no longer possible.

I was very uncertain about the characters of this species until I received Mrs. McConnell's sample from the Suia Missu river: these specimens have, as described in the paragraph "Colour" which is based on them, a pattern of small pale streaks, different from all other known species, but similar to that of Fisher's Guaporé specimens. Of course the distance separating the Suia Missu (a tributary of the Xingu) from the Guaporé (the upper course of the Madeira) is considerable, and geographically the identity of the populations inhabiting these two rivers does not suggest itself as obvious, but the agreement in colour pattern between specimens from the two rivers, which is supported by such morphological evidence as exists, causes me to assign them to one species with some confidence.

A specimen of uncertain provenance which died in the aquarium of "Artis", Amsterdam, on 12 November 1970, and was forwarded to me a few days later, belongs either to this species, or to a form extremely close to it. It differs from the material discussed by its larger size (standard length

64 mm), and this may account for some or all of the other differences: body black, without any trace of paler markings, except for the ventral region, from an arc bent forwards between the bases of the pectorals to just before the ventrals, which is pigmentless, white; caudal fin rather deeply forked, with the upper lobe the longer; basal third of ventral fins pigmented, black; posterior border of adipose fin reaching farther backwards than posterior border of anal fin; there appears to be a suggestion of vomerine teeth. The specimen is now ZMA no. 110698.

Tatia intermedia (Steindachner) (figs. 5, 6, 10a, 12, 13, pl. 2)

Centromochlus intermedius Steindachner, 1876, Sitzb. Akad. Wiss. Wien, Mathem.-Naturw. Cl., 74 (1): 664, footnote 1 — Marabitanos, Pará.

Centromochlus dunni Fowler, 1945, Proc. Acad. Nat. Sci. Philad., 97: 111 — Morelia, Rio Caquetá drainage, Colombia.

Centromochlus aulopygius; Günther, 1864, Cat. Fish. Brit. Mus., 5: 198 (Essequibo); (pt.) Eigenmann & Eigenmann, 1891, Proc. U.S. Nat. Mus., 14: 34 (Essequibo); (pt.) Eigenmann, 1910, Rep. Princeton Univ. Exp. Patagonia, 3: 395 (Essequibo); Eigenmann, 1912, Mem. Carnegie Mus., 5: 197, pl. XX fig. 1 (Creek below Potaro Landing; Wismar); Arnold & Ahl, 1936, Fremdl. Süswasserfische: 255, fig. (das östliche tropische Südamerika von Guyana bis zum Stromgebiet des Amazonas); Puyo, 1949, Poiss. Guyane Fr.: 97 (les criques de la région de l'Approuage); Sterba, 1959, Süswasserfische aus aller Welt: 267, fig. 539 (Östliches Südamerika nördlich des Amazonas); P. de Miranda Ribeiro, 1962, Publ. Avuls. Mus. Rio de Janeiro, 45: 9 (Rio Araguaya, Aruaná (antiga Leopoldina), Estado de Goiaz)¹).

Centromochlus Perugiae; Vaillant, 1899, Bull. Mus. Hist. Nat. Paris, 5: 155 (le haut du fleuve Carsevenne: la rivière Lunier ou la rivière Carnot); Vaillant, 1900, Nouv. Arch. Mus. Paris, (4) 2: 124, 127 (la rivière Carnot).

Centromochlus intermedius; Steindachner, 1882, Denkschr. Akad. Wiss. Wien, Mathem.-Naturw. Cl., 44 (1): 4 (Hyutahy und Jatuarana); Eigenmann & Eigenmann, 1888, Proc. Calif. Acad. Sci., (2) 1: 156 (Tajapurú, Teffé, Jatuarana, Iça, Jutahy, Lago Alexo); Eigenmann & Eigenmann, 1890, Occ. Pap. Calif. Acad. Sci., 1: 269 (Tajapurú, Teffé, Jatuarana, Iça, Jutahy, Lago Alexo); Eigenmann & Eigenmann, 1891, Proc. U.S. Nat. Mus., 14: 34 (Amazon, Solimoens and tributaries); (pt.) Fisher, 1917, Ann. Carnegie Mus., 11: 422 (Rio Tapajos at Santarem).

Tatia intermedia; A. de Miranda Ribeiro, 1911, Arch. Mus. Nac. Rio de Janeiro, 16: 360 (Maribitanos, Jutahy, Jutuarana, Tajapurú, Iça, Lago Aleixo); Gosline, 1945, Bol. Mus. Nac. Rio de Janeiro, Zool., 33: 10 (Amazonas; Solimões e tributários).

Tatia aulopygia; (pt.) Gosline, 1945, Bol. Mus. Nac. Rio de Janeiro, Zool., 33: 10 (Essequibo); (pt.) Fowler, 1951, Arq. Zool. S. Paulo, 6: 470 (Guiana); P. de Miranda Ribeiro, 1962, Publ. Avuls. Mus. Nac. Rio de Janeiro, 45: 10 (Amazonas); Lowe (McConnell), 1964, J. Linn. Soc. Lond., Zool., 45: 116, 141 (Simoni Creek, Rupununi District); McConnell, 1967, Timehri, 43: 69, 70 (Rupununi); P. de Miranda Ribeiro, 1968, Bol. Mus. Nac. Rio de Janeiro, Zool., 263: 10, fig. IX (no locality = Amazonas).

Centromochlus dunni; Fowler, 1951, Arq. Zool. S. Paulo, 6: 462 (Alto Amazonas, Colombia); Rössel, 1962, Senckenb. Biol., 43: 20 (no locality); Lüling, 1963, Beitr. Neotr. Fauna, 3: 50, fig. 15 (Quisto Cocha, Iquitos).

1) Hoedeman's (1968: 150) coloured figure, captioned *Centromochlus aulopygius*, does not resemble either *Tatia aulopygia* or *Tatia intermedia*; I have no idea what it is.

Material. — Three specimens (♂, 2 ♀), before 1864, Essequibo (Ehrhardt, BM no. 64.1.21.19-21), standard length 66 (♂), 86, 89 mm. One specimen, Jutahy (no collector, presumably Thayer Exp., MCZ no. 8171), standard length 22½ mm. One specimen, Iça (no collector, presumably Thayer Exp., MCZ no. 7344), standard length 27½ mm. One specimen, ca. 1866, Lago Alexo, Brazil (S. V. R. Thayer, Thayer Exp., MCZ no. 8176), standard length 31 mm. One specimen (♀), 1866, Tajapura (L. Agassiz, Thayer Exp., MCZ no. 7333), standard length 117 mm. One specimen (♂), 1866, Teffé (L. Agassiz, Thayer Exp., MCZ no. 7375), standard length 97 mm. One specimen, same data (L. Agassiz, Thayer Exp., MCZ no. 8154), standard length 26½ mm. One specimen, before 1874, Pará (MV no. 47335), standard length 73 mm, syntype of the species. One specimen, before 1875, Hyutahy (MV no. 47356), standard length 42 mm. One specimen (♀), May-September 1898, Carnot, tributary of the Carsevenne, now Calçoene, State of Amapá, Brazil (F. Geay, MNP no. 99-99), standard length 47 mm. One specimen (♂), no date or collector, but undoubtedly from Eigenmann's collection, 1908/1909, Wismar, British Guiana (CAS no. 24798), standard length 47½ mm. One specimen (♂), 1912, Amazonas (Steindachner, MV no. 47334 Z), standard length 64 mm. One specimen (♀), not dated, ca. 1913, Serra de Melle, Rio Surumu (Haseman, MV no. 47335), standard length 41 mm. One specimen (♀), August 1924, Santarem (C. Ternetz, CAS no. 6678), standard length 74 mm. One specimen (♂), not dated, creek below Potaro Landing, British Guiana (Shideler, FM no. 53261), standard length 49 mm. One specimen (♀?), April 1937, Rockstone, Essequibo River (E. R. Blake, FM no. 42858), standard length 36 mm. One specimen (♂), 1945, Morelia, Caquetá drainage, Colombia (Kjell von Sneidern, ANSP no. 71706), standard length 52 mm, paratype of *Centromochlus dummi*. 16 specimens, 4 May 1961, Simoni Tacuba, Rupununi (R. H. Lowe, no. 655), standard length 32-78 mm. Four specimens (4 ♀), July 1965, Igarapé, Paracuri, Belém near Icoaraci, Pará, Brazil (N. Menezes, MCZ no. 46130, one specimen now RMNH no. 26492), standard length 36, 41, 41, 41 mm. One specimen, July 1965, Rio Arari, Cachoeira do Arari, Ilhas de Marajó, Pará, Brazil (N. Menezes, MCZ no. 46032), standard length 20 mm. 11 specimens (8 ♂, 3 ♀), 23 January 1966, Sipilawini (Mees, RMNH no. 26199), standard length 38½-50 mm. One specimen (♀), 26 January 1966, Sipaliwini (Mees, RMNH no. 26200), standard length 45 mm. Two specimens (♂, ♀), 2 February 1966, Sipaliwini (Mees, RMNH no. 26195), standard length 50, 54 mm. One specimen (♀), 30 January 1967, Gran Mau Kreek, tributary of the Gran Rio near Dombaai (Nijssen, ZMA no. 105523), standard length 38½ mm. One specimen (♀), 31 January 1967, tributary of Gran Rio 4 km N. of Awaradam (Nijssen, ZMA no. 105524), standard length 35 mm. Eight specimens (6 ♂, 2 ♀), 20 March 1967, Parwapa Kreek, tributary of the Suriname Rivier near Botopassie (Nijssen, ZMA no. 105791), standard length 50-74 mm. Three specimens (2 ♂, ♀), 5 April 1967, tributary of the Nickerie Rivier ca. 12 km S. of Stondansie Vallen (Nijssen, ZMA no. 105831), standard length 34, 54 (♀), 60 mm. One specimen, 10 August 1968, creek near aerodrome Käysergebergte (M. S. Hoogmoed, RMNH no. 26201), standard length 27 mm. Two specimens (♀ and ?), undated, Rio Araguaya, Aruaná (antiga Leopoldina), Estado de Goiaz (C. Griem (Aquario Rio), MRJ no. 5896), standard length 28, 65 mm.

Characters. — Size large (standard length 20-117 mm); nuchal plate with blunt horns, moderately bent outwards; hind-border of anal fin opposite hind-border of adipose fin; usual number of rays in the anal fin 10 (iii.7); male anal fin pointed, with its third and fourth rays longest; colour and colour pattern diagnostic.

The male anal fin develops at a standard length of 35 to 40 mm.

Colour. Ground colour dark earth brown or grey-brown, with many large

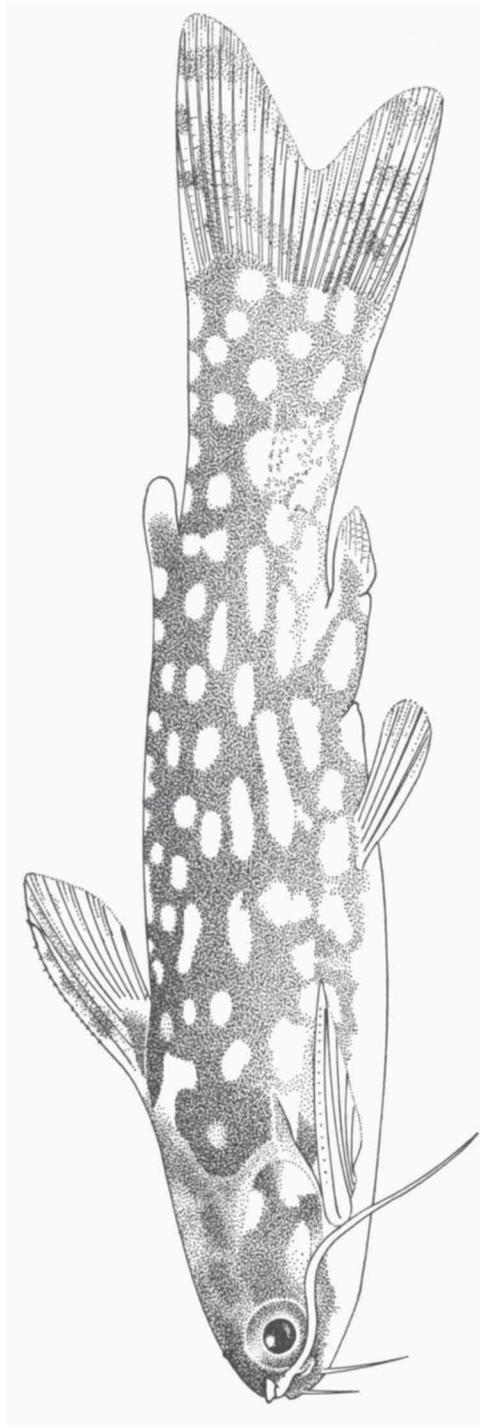


Fig. 12. *Tatia intermedia* (RMNH no. 26195, s.l. 54 mm).

roundish to elliptical (with a longitudinal direction) white dots; in large specimens these dots tend to be relatively smaller. Under parts from chin to anus white, not pigmented, except along the edge of the lower jaw, and often a V-shaped band of pigment across the lower jaw; the development of this band is variable, and it may be irregular or practically absent. Our preserved specimens have retained their colour well, but in old material, collected from sixty to over a hundred years ago, the ground colour has changed to light brown, and I have felt it justified to include in the species some old specimens in which no pattern or original colour is now visible.

Distribution (fig. 13). — This is on the basis of present evidence certainly by far the commonest and probably the most widely distributed member of its genus. It ranges throughout the northern and western part of the Amazon basin, from Colombia and Peru to the mouth of the Amazon (Pará = Belem), and into the Guianas: Amapa, French Guiana (Puyo, 1949), Suriname and British Guiana. Not known from Venezuela (see discussion). It is unlikely that the specimens from São Paulo, listed by A. de Miranda Ribeiro 1918b: 734) and P. de Miranda Ribeiro (1962b: 10) under the name *Tatia intermedia* were correctly identified; a discussion of these specimens is given under *T. neivai*.

Discussion. — From the syntype from Pará, the colour and pattern had entirely rubbed off, and could therefore not assist in its proper allocation. A specimen from Hyutahy (= Jutahy = Jutai), however, which is non-typical but belongs to the material identified and described by Steindachner (1882) very soon after the establishment of the species, does still show the characteristic colour pattern. See also the description of colour and pattern given by Steindachner (l.c.). Further support for the identification of *T. intermedia* with the spotted species is that several collectors have obtained it, and no other member of the genus, at Pará.

Most specimens from the Thayer collection, although now over a century old, still show at least traces of the diagnostic colour pattern. It is evident in the very large specimen of 117 mm. This is surprising inasmuch as Eigenmann & Eigenmann (1890), whose description was based on the MCZ-material, stated: "Young with short whitish streaks along the sides", thus implying that these streaks do not occur in large specimens.

In two of the examined specimens I found vomerine teeth present: a very small patch in a female from Essequibo (standard length 89 mm; BM no. 64.1.21. 19-21), a quite distinctive patch of well-developed teeth in a female from Tajapura (standard length 117 mm, MCZ no. 7333). I have not found palatal teeth in any other species of the genus, but no specimens of other species of a similar size were available — likely no other species reaches such

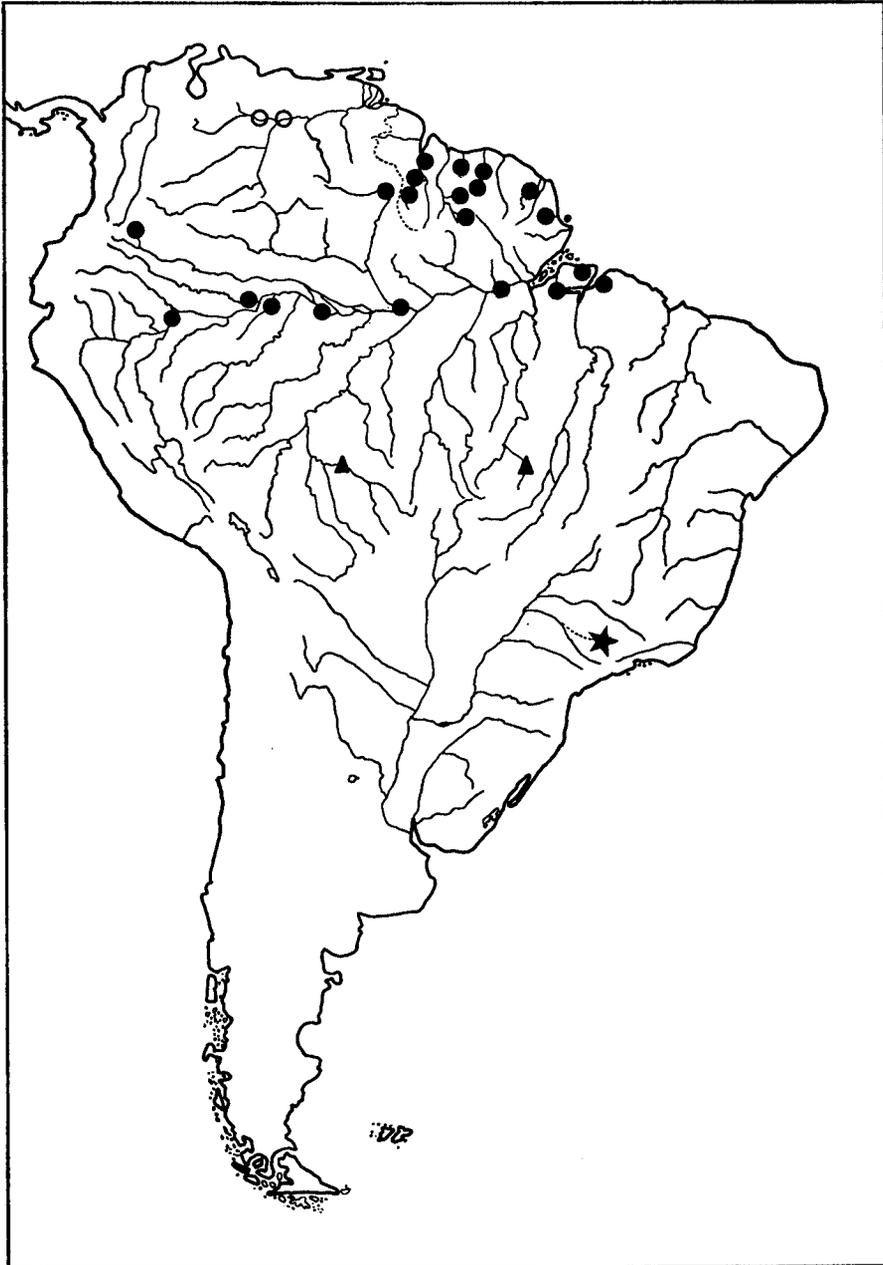


Fig. 13. The distribution of *Tatia intermedia* (dots), *T. aulopygia* (triangles), *T. neivai* (star), and *T. galaxias* (circles).

a large size. On the other hand, the presence of these teeth may not be exclusively a matter of size, as the second largest specimen of the series examined (♂, standard length 97 mm, MCZ no. 7375) has none.

In the description of *C. dunni*, Fowler (1945a) mentioned as differential character from "*C. aulopygius*" (= *Tatia intermedia*), the following: "The photographic figure published by Eigenmann as *Centromochlus aulopygius* Kner is from a specimen 65 mm long showing a different color pattern, with much smaller white spots short in size, besides the anal fin of different shape". The difference in shape of the anal fin is of no consequence, being sexual: Eigenmann figured a female, whereas type and paratypes of *C. dunni* are males. This reduces the difference between *T. intermedia* and *C. dunni* to one of size and intensity of the markings. I have examined the paratype of *C. dunni* and found that, as stated by Fowler, the white markings are larger and less well-defined than in fresh material from Suriname. Originally this difference appeared to me sufficient to keep *C. dunni* provisionally separate from *T. intermedia*, but on reconsideration I have decided, albeit with some hesitation, that the difference is probably within the limits of individual variation. There is, within the diagnostic basic pattern, a lot of individual variation in shape and extent of the white markings, and amongst others a specimen from the Carcevenne, Amapa, has also large white markings, similar to *C. dunni*, although the geographical distance separating the two populations is enormous.

The specimen from the Carcevenne, just mentioned, is the one listed by Vaillant (1899, 1900) under the name *Centromochlus Perugiae*. Examination revealed that it belongs to *T. intermedia*, but its spots are larger and more horizontally elongated than in our specimens from Suriname, and the posterior border of the adipose fin is definitely farther backwards than the posterior border of the anal fin.

I have not examined the fish recorded by Lüling (1963) under the name *Centromochlus dunni*, but his figure shows a typical individual of *T. intermedia*, with smallish white spots.

The largest specimen of sample MRJ no. 5896 looks like a typical example of *T. intermedia*, although on geographical grounds I would have expected *T. aulopygia* in the Rio Araguaya. Note that the specimen was received from a dealer (Aquario Rio), so that its provenance may be not above suspicion; for that reason I have not indicated Aruaná on the distributional map. About the second specimen of this sample I am in doubt, it may belong to a different species.

The specimens of sample MCZ no. 46130 from near Belém have the white dots remarkably well-defined, each with a very narrow dark edge, which is absent in specimens collected in Suriname in the same year. Also, the white

dots do not extend to the back as they do in other material. For the moment I assume that this difference falls within the range of individual variation.

Venezuela has been included in the range of "*Centromochlus aulopygius*" (= *Tatia intermedia*) on the basis of a specimen recorded by Pellegrin (1899). The specimen does not belong to this species and will be discussed under *Tatia galaxias*.

I have examined the specimen listed as *Centromochlus intermedius* by Marlier (1968: 53): ♂, 28 January 1964, Rio Prato da Eva, Amazonas (G. Marlier, KBIN no. 23156), standard length 30 mm. The specimen does not appear to belong to *T. intermedia*; it is (in a preserved condition), light brown, with many (about 18 on each side) narrow longitudinal white bands over the whole length of the body; the caudal fin is forked with, apparently, acute tips; the adipose fin is comparatively well-developed, and reaches farther backwards than the anal fin. In shape of the nuchal horns and in number of anal rays (10) it agrees with *T. intermedia*. Probably the specimen represents another undescribed species, mainly characterized by colour-pattern, but as the colours are faded, the caudal fin is somewhat frayed, and both pectoral spines are damaged, there remains an element of doubt which causes that I prefer to leave the specimen unnamed.

***Tatia perugiae* (Steindachner) (figs. 10b, 14, 15)**

Centromochlus Perugiae Steindachner, 1883, Denkschr. Akad. Wiss. Wien, Mathem.-Naturw. Cl., 46 (1): 29, pl. VII fig. 2, 2a — Canelos, Ecuador.

Centromochlus perugiae; Eigenmann & Eigenmann, 1888, Proc. Calif. Acad. Sci., (2) 1: 157 (name only); Eigenmann & Eigenmann, 1890, Occ. Pap. Calif. Acad. Sci., 1: 270 (Canelos); Eigenmann & Eigenmann, 1891, Proc. U.S. Nat. Mus., 14: 34 (Canelos); Eigenmann, 1910, Rep. Princeton Univ. Exp. Patagonia, 3: 395 (Canelos); Eigenmann & Allen, 1942, Fish. W. South America: 118 (Canelos); Gosline, 1945, Bol. Mus. Nac. Rio de Janeiro, Zool., 33: 10 (Canelos); Fowler, 1951, Arq. Zool. S. Paulo, 6: 464 (Alto Amazonas, Ecuador); Rössel, 1962, Senckenb. Biol., 43: 27-30 (discussion of types); Ovchynnyk, 1968, Zool. Anz., 181: 243 (Ecuador: Canelos on Rio Bobonaza, tributary of Rio Pastaza, Amazon basin, Prov. Napo-Pastaza); P. de Miranda Ribeiro, 1968, Bol. Mus. Nac. Rio de Janeiro, Zool., 263: Est. VIII fig. 2 (no locality, figure only, after Fowler).

Centromochlas; Lundberg & Baskin, 1969, Amer. Mus. Novit., 2398: 6, 26 (no locality).

Material. — One specimen (♂), Canelos, Ecuador (received from Steindachner in 1882, MV no. 47358), standard length 39 mm, syntype of the species. One specimen (♂ im.), November 1938, Sarayacu, Ecuador (W. Clarke-MacInture, UMMZ no. 173420), standard length 31 mm. Two specimens (both ♂), summer 1967, Rio Aguarico near Santa Cecilia (W. G. Saul, UMMZ on loan from Kansas Mus., no number), standard length 38, 40 mm.

Characters. — Of medium size (standard length 31-40 mm, the larger sizes of to 48 and 54 mm given by Fowler and Steindachner refer to total length);

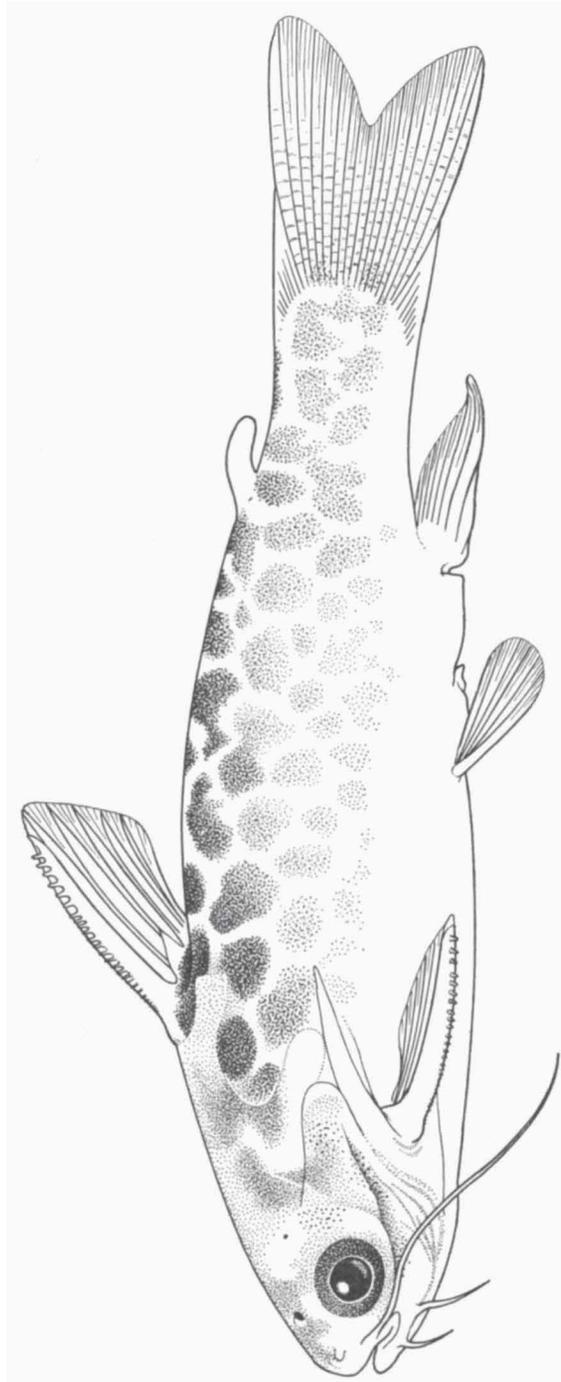


Fig. 14. *Tatia perugiae* (UMMZ, no number, s.l. 40 mm).

nuchal plate broad, not constricted in advance of D, and its horns also broad, hardly bent outwards; pectoral spine different from that of all other species except *T. altae*, with along its anterior edge 25-40 small teeth, and only 7-10 along its posterior border (fig. 15); hind-border of the addressed anal fin reaching to beyond the hind-border of the adipose fin; number of rays in the anal fin 7 or 8; male anal fin strongly modified, slender and pointed, its second ray by far the longest and strongest; caudal fin forked with apparently almost acute tips to the lobes; colour and colour pattern diagnostic.

Colours. There is a very distinctive pattern of large blackish-brown blotches on a creamy-white unpigmented background; these dots are most pronounced on the back, less so on the dorsal surface of head and nape, much vaguer on the sides, and absent from the lower flanks and underparts, which are unpigmented. Even under very low magnification it can be seen that the blotches are made up of groups of melanophores; where these are closer together, the dots become darker. Although Steindachner's syntype has been in preservative for close on a century, it fully retains its characteristic colour-pattern.

Distribution. — Known from Canelos and Sarayacu, Rio Bobonaza, Marañón drainage, Ecuador, and Santa Cecelia, Rio Aguarico, Rio Napo drainage, Ecuador.

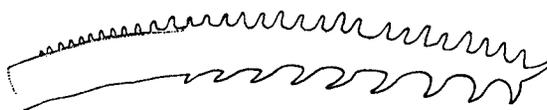


Fig. 15. Right hand pectoral spine of *Tatia perugiae*. 6 X. Compare with fig. 6 (*T. intermedia*).

Tatia neivai (R. von Ihering) (figs. 13, 16)

Glanidium neivai R. von Ihering, 1930, Arch. Inst. Biol. S. Paulo, 3: 99, pl. 13 fig. 1 — Piracicaba, rio Piracicaba, Est. de S. Paulo.

Tatia intermedia; A. de Miranda Ribeiro, 1918, Rev. Mus. Paul., 10: 734 (Piquete, S. Paulo; Piracicaba); (pt.) Fowler, 1951, Arq. Zool. S. Paulo, 6: 470 (São Paulo); P. de Miranda Ribeiro, 1962, Publ. Avuls. Mus. Nac. Rio de Janeiro, 45: 10 (Piquete, Estado de São Paulo).

Glanidium neivai; Gosline, 1945, Bol. Mus. Nac. Rio de Janeiro, Zool., 33: 11 (São Paulo); P. de Miranda Ribeiro, 1962, Bol. Mus. Nac. Rio de Janeiro, Zool., 240: 3 (sudeste do Brasil).

Material. — One specimen (♂), undated, Rio Piracicaba near Piracicaba, State of São Paulo (Escola Superior de Agricultura Luiz de Queiroz, MZSP), standard length 57 mm.

Characters. — Size large (standard length 57-58 mm); nuchal plate with horns well flung outwards, pointed, as in *T. aulopygia*; hind-border of

adpressed anal fin opposite hind-border of adipose fin, or not quite reaching that far; number of rays in the anal fin 10; caudal fin forked with rounded lobes, the upper lobe somewhat larger than the lower lobe; colour-pattern diagnostic.

Colour of specimen preserved for an uncertain time. Head and body dull brown, except for the underparts from lower chin to anus, which are unpigmented whitish; body with not very numerous and rather small whitish dots, the ones situated most dorsally almost round, those on the flanks horizontally elongated; dorsal fin with the skin covering the spine, and the basal area dull brown, the first and second rays with their basal halves dull brown, remainder of the fin hyaline; anal base dull brown as the body, the small, modified fin hyaline; pectorals with scattered pigment on the spines, and a few dispersed melanophores elsewhere, further hyaline; ventrals hyaline; caudal fin with alternating irregular dull brown and whitish vertical bands of equal width, five of each; adipose fin with dull brown base and centre, its edges hyaline.

This description was based on the single available specimen, a male with fully modified anal fin, but I have also compared R. von Ihering's (1930) description and figure of the holotype, a female of 58 mm standard length. The present location of the type is unknown and it may be lost.

Distribution (fig. 13). — With certainty only known from the type-locality, the Rio Piracicaba, a tributary of the Rio Tieté, Paraná drainage, State of São Paulo. Specimens from Piquete listed as *Tatia intermedia* by A. de Miranda Ribeiro (1918b) and P. de Miranda Ribeiro (1962b) may belong here, as tentatively suggested by their inclusion in the bibliography above, but this is doubtful, for, although Piquete is geographically not far from Piracicaba, it is on the Rio Parahyba, which flows to the north-east, remote from the Paraná. I have examined two of the specimens from Piquete (MRJ no. 940), standard length 36 and 38 mm, but they are in such a poor condition that a certain identification appears impossible. Such morphological characters as they have, do not contradict the suggested identification. The specimens appear to have been stained, and are more or less transparent; they seem also to have been dry; bones and spines are decalcified and soft, and have lost much of their structure.

Discussion. — Although it was originally described in *Glanidium*, this species definitely belongs to the genus *Tatia*, as proved by the thin skin of the head, through which the bone is clearly visible, the shape of the horns of the nuchal plate, the dorsal and pectoral spines which have teeth along the whole length of their anterior edges, the four-rayed pectoral fins, and the low number of rays in the anal fin. The dorsal spine has 13 teeth along its anterior edge; the right pectoral spine (the other one is broken near its base),

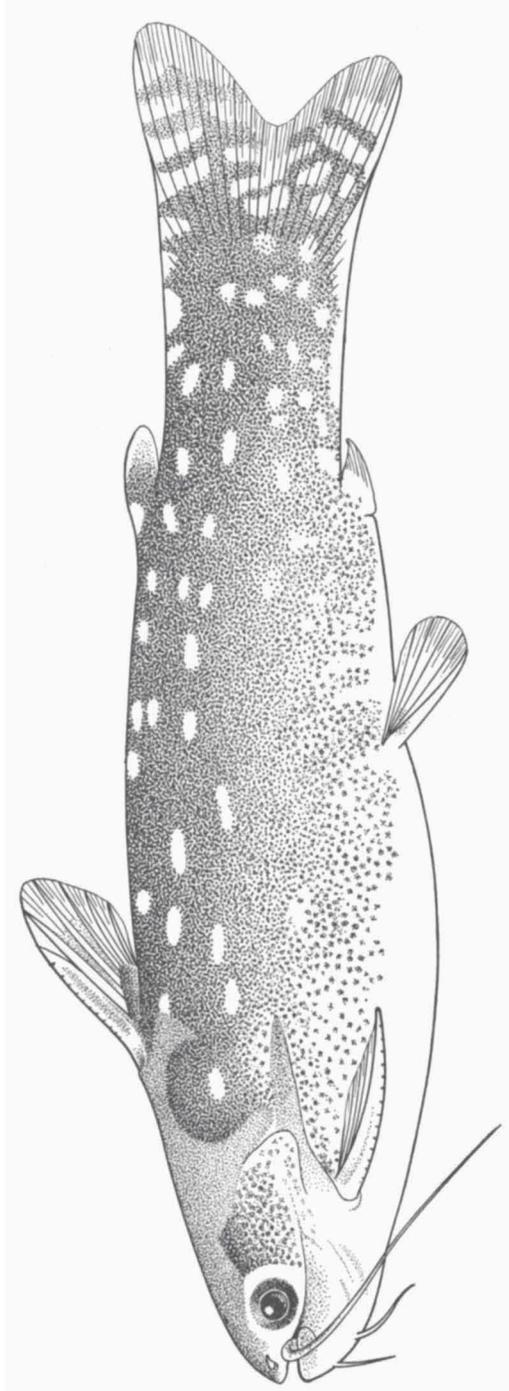


Fig. 16. *Tatia neivai* (MZSP, no number, s.l. 57 mm).

has 18 teeth along its anterior edge, 11 larger ones along its posterior edge: counts which are normal for the genus.

This species agrees morphologically with *T. aulopygia*, *T. intermedia* and *T. galaxias*, but differs from each of these in colour-pattern as follows: from *T. aulopygia* by its distinct and not numerous white spots, from *T. intermedia* by its much smaller and more sparse white spots, from *T. galaxias* by much sparser spots and (probably also in fresh material) less dark body.

Tatia gyrina (Eigenmann & Allen)

Centromochlus gyrinus Eigenmann & Allen, 1942, Fish. W. South America: 118, pl. 5 fig. 4 — brook near Rio Itaya, Iquitos.

Centromochlus gyrinus; Gosline, 1945, Bol. Mus. Nac. Rio de Janeiro, Zool., 33: 10 (Iquitos); Fowler, 1945, Los Peces del Peru: 62 (Iquitos); Fowler, 1945, Proc. Acad. Nat. Sci. Philad., 97: 112 (no locality); Fowler, 1951, Arq. Zool. S. Paulo, 6: 462, fig. 491 (Alto Amazonas, Peru).

Material. — None. Some notes on the holotype, additional to the published ones, were taken at my request by Dr. Eschmeyer, and will be given below.

Characters. — Probably of medium size (standard length of only known specimen ca. 42 mm); nuchal shield broad, hardly constricted, its horns small and hardly bent outwards; hind-border of anal fin clearly in advance of hind-border of adipose fin; anal fin with 9 rays; colour pattern diagnostic.

On illustrations (Eigenmann & Allen's photograph, and Fowler's figure which was copied from it), it looks as if the adipose fin is very long, originating not far behind the dorsal fin, anteriorly low and increasing in height backwards; in the description the adipose fin is referred to as "well-marked, merging forward"; this would be unlike any other member of the genus, but information received from Dr. Eschmeyer is that the adipose fin is in fact short, and originates about opposite the end of the anal base.

In the original description the size of the eye is given as a character of some importance: eye 3.3 in head, 2.5 in interorbital, 5 in snout (an obvious misprint for 0.5), and: "near to *C. intermedius*, and differing in ... larger eye ...". However, on the illustrations the eye does not look large but, on the contrary, smaller than in other species. Measuring from the photograph, I find that the eye is fully six times in the head. Dr. Eschmeyer has confirmed that the size of the eye has been illustrated correctly. The reason why I have not used the size of the eye in the study of the genus, is in the first place that there did not appear to be much difference between the species, and secondly that it is difficult to measure. Not only is the eye entirely covered by skin, but also it is imbedded in transparent connective tissue and fluid, which may or may not be included when measuring it. In the figures illustrating mem-

bers of the genus, incidentally the larger outline of the eyes has been shown. Even taking the smaller outline, however, the eye of *T. intermedia* is only about four times in the head, hence definitely larger, not smaller than the eye of *T. gyrina*.

The fin-ray numbers given in the original description are D I.6, A 12. For both dorsal and anal fin these numbers are higher than in any other species of the genus; Dr. Eschmeyer wrote, however: "I believe the dorsal rays are I + 4, and the anal rays appear to be about 9 and almost certainly not 12". An X-ray photograph received from Dr. Eschmeyer shows clearly D I.4, A 9 (perhaps 10).

Distribution. — Known from the type-locality only.

Discussion. — With the corrected information on fin-ray numbers and shape of the adipose fin, it will be clear that *T. gyrina* is a normal representative of its genus. A direct comparison with its congeners remains to be made.

Tatia altae (Fowler) (fig. 17)

Centromochlus altae Fowler, 1945, Proc. Acad. Nat. Sci. Philad., 97: 109 — Morelia, Rio Caquetá drainage, Colombia.

Centromochlus altae; Fowler, 1951, Arq. Zool. S. Paulo, 6: 462 (Alto Amazonas, Colombia); Rössel, 1962, Senckenb. Biol., 43: 30 (no locality).

Material. — Two specimens (♂, ♀), undated, Morelia, Rio Caquetá drainage, Colombia (Kjell von Sneidern, ANSP from nos. 71701-71704), standard length 30 (♀), 35 (♂) mm, paratypes of the species.

Characters. — Morphologically in every respect similar to *P. perugiae*, except perhaps body somewhat deeper, but colour pattern distinct and diagnostic.

Colours. Dorsal surface and flanks blackish-brown, with narrow white reticulations.

Distribution. — Known from the type-locality only.

Discussion. — In every respect: the broad nuchal plate with horns hardly bent outwards, the pectoral spines, shape and length of the male anal fin, low number of rays (7 or 8) in the anal fin, and shape of the caudal fin, this form agrees with *T. perugiae*, but its colour pattern is different although clearly related. Compared with *T. perugiae* the dark dots have increased in size and intensity, and are separated only by narrow white lines, giving the fish a reticulated appearance. Whereas in *T. perugiae* there is near the base of each caudal lobe an ill-defined roundish grey dot, in *T. altae* these dots are well marked and tapering backwards to very near the tail tips.

There is no doubt in my mind that *T. altae* is very closely related to *T. perugiae*, of which in future it will probably have to be regarded as a sub-

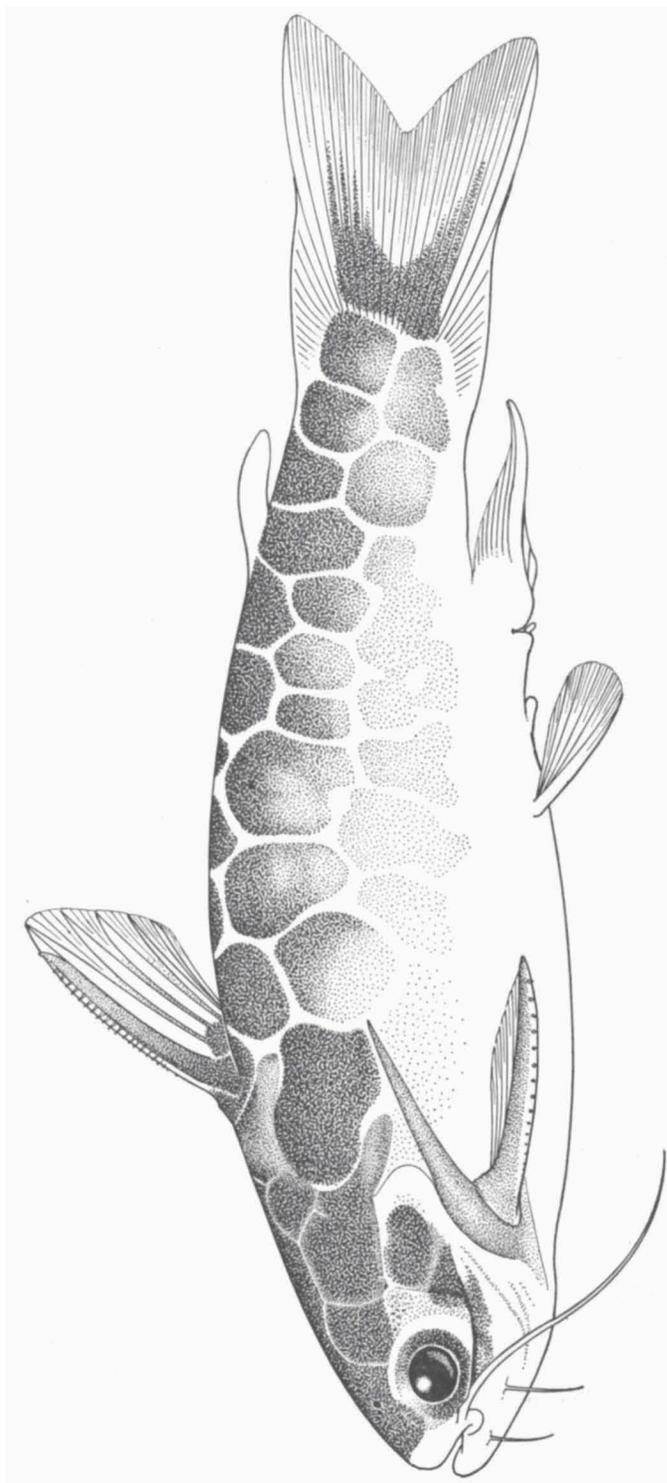


Fig. 17. *Tatia aliae* (ANSP from nos 71701-71704, s.l. 35 mm).

species, but at the same time the differences in colour-pattern are so marked that *T. altae* is certainly a valid form.

Fowler (1954a) described this species as having seven ventral rays, a number different from all other members of the genus, but both paratypes examined by me have six (i.5) ventral rays.

Tatia creutzbergi (Boeseman) (figs. 10e, 18, 19)

Centromochlus creutzbergi Boeseman, 1953, Zool. Meded., 32: 7, fig. 1c — Djaijkreek. *Centromochlus aulopygius*; Eigenmann & Eigenmann, 1888, Proc. Calif. Acad. Sci., (2) 1: 157 (Cudajas); Eigenmann & Eigenmann, 1890, Occ. Pap. Calif. Acad. Sci., 1: 270 (Cudajas); (pt.) Eigenmann & Eigenmann, 1891, Proc. U.S. Nat. Mus., 14: 34 (Cudajas).

Centromochlus creutzbergi; Hoedeman, 1957, Beaufortia, 6: 151, fig. 8 (Coropina creek, near Republik); Rössel, 1962, Senckenb. Biol., 43: 30 (no locality); Hoedeman, 1968, Elseviers Aquariumvissen Encycl., 1: 148 and fig. (Suriname).

Material. — One specimen (♀), 1865/66, Cudajas (Thayer Exp., MCZ no. 8182), standard length 32½ mm. One specimen (♀), 8 October 1948, Djaijkreek (D. C. Geijskes and P. Creutzberg, RMNH no. 19440), standard length 26 mm, holotype of the species. One specimen (♀), 20 October 1956, Coropina Kreek near Republik (J. van der Kamp, ZMA no. 102006), standard length 30½ mm. One specimen (♂), 27 February 1967, tributary of Kleine Saramacca Rivier, ca. 11 km E.S.E. of its mouth (Nijssen, ZMA no. 105657), standard length 33 mm. Four specimens (all ♀), 5 April 1967, tributary of Nickerie Rivier, ca. 12 km W.S.W. of Stondansie (Nijssen, ZMA no. 105832), standard length 27, 29, 31, 32 mm. 49 specimens (♂, ♀), 14 December 1966, Carolina Kreek (Nijssen, ZMA no. 105859), standard length 21-33 mm.

Characters. — Size small (standard length 21-33 mm), nuchal shield broad and hardly constricted laterally, with horns which are blunt and hardly curved outwards; teeth along anterior edge of dorsal spine only weakly developed; hind-border of anal fin clearly in advance of hind-border of adipose fin; number of rays in the anal fin 8 to 11; caudal fin forked shallowly; body relatively heavy; colour and colour pattern diagnostic.

Colours. Upper surface of head and back dull brown, sides longitudinally marbled brown and white, a broad blackish longitudinal band on the sides; chin, underparts of opercles and isthmus marbled brown and white, breast down to anus white (devoid of pigment). Dorsal fin dull blackish brown, distally hyaline, caudal fin hyaline lightly spotted with brown, above and below a fairly distinct brown streak. The most conspicuous character of this species is the dark lateral band.

Note. Of the largest lot of 49 specimens, at least 20 are males. They show that the male character develops at a standard length of ca. 25 mm. Smaller specimens cannot be certainly sexed on external morphology.

I do not know why Hoedeman (1957) regarded ZMA no. 102006 as a male: his opinion cannot have been based on examination of its gonads, as

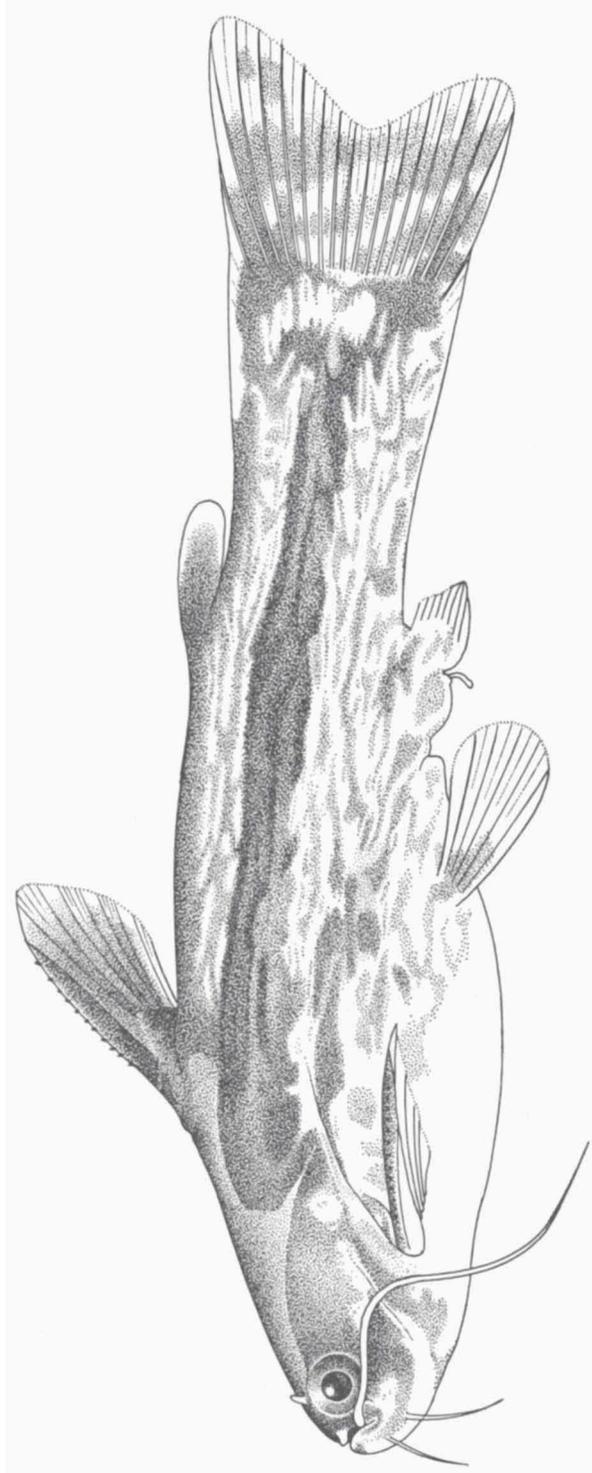


Fig. 18. *Taia kreuzbergi* (ZMA from no. 105859, s.l. 33 mm).

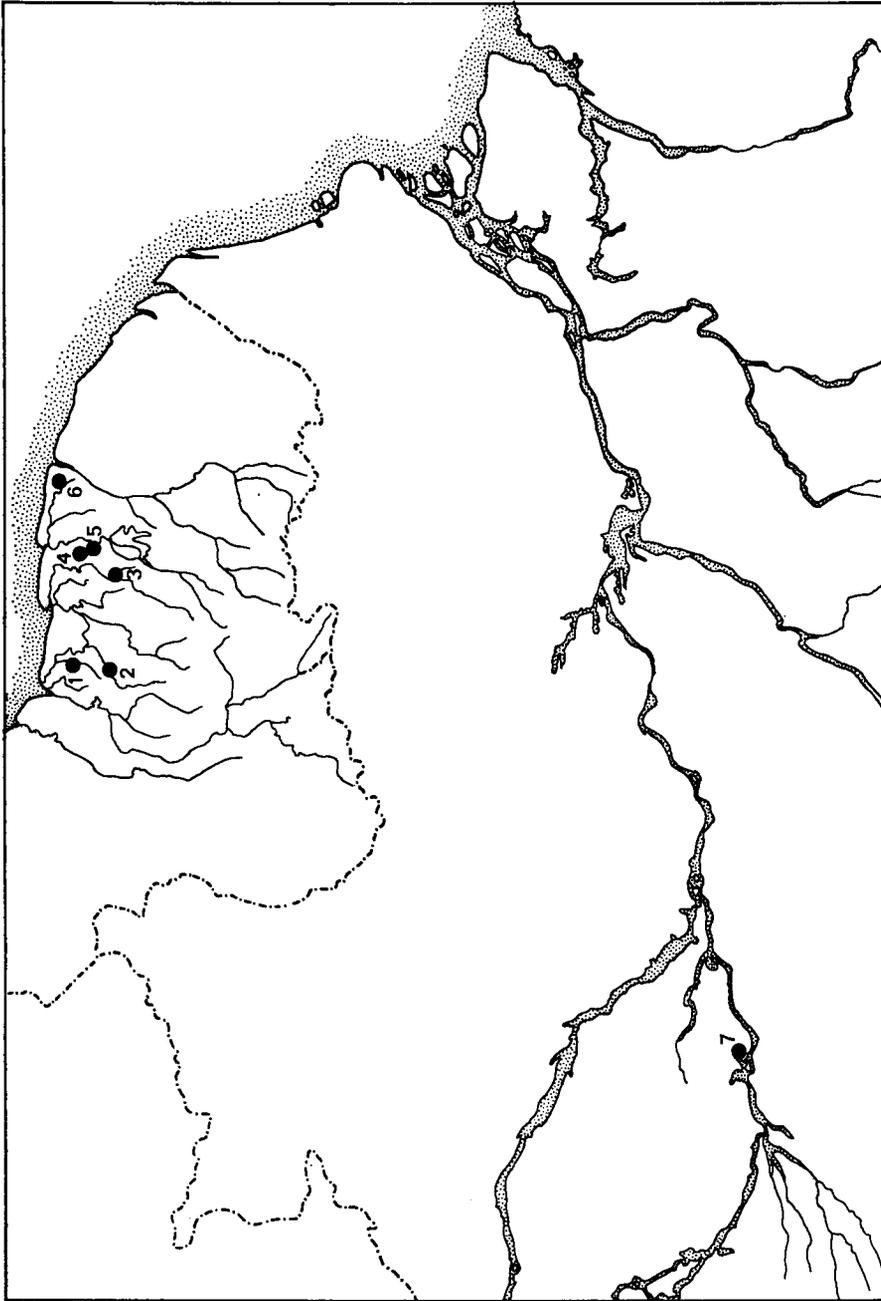


Fig. 19. The distribution of *Tatia creuzbergi*, from material examined. 1, Maratukka (recently collected material, not mentioned in the text). 2, Nickerie Rivier near Stondansie. 3, Kleine Saramacca. 4, Coropina Kreek. 5, Carolina Kreek. 6, Djaikreek. 7, Cudajas.

the specimen has not been dissected. On external characters it is a female.

Distribution (fig. 19). — Suriname, where known only from creeks in the northern lowlands, but in this area widely distributed (see list of material), and Brazil, where known from a single specimen collected at Cudajas, over a century ago.

Discussion. — The colour description of *Centromochlus aulopygius* from Cudajas (= Codajas) by Eigenmann & Eigenmann (1890: 270): "Light brownish, mottled with darker; a dark lateral band; dorsal fin dark brown; caudal mottled with darker, a dark longitudinal line on the upper and lower lobe", does certainly not suggest *Tatia intermedia*, the species called *C. aulopygius* by Eigenmann (1912), nor does it resemble any other known species of the Amazon basin. The only species which this description fits is *Tatia creutzbergi*. In addition the statements: "the backward-projecting process of the dorsal plate simple, not turned outward or inward behind", and "caudal emarginate", are also applicable to *T. creutzbergi*, and not to any of the other known species of the genus.

Originally I was informed that the specimen had disappeared, but fortunately it was subsequently found and forwarded. I found my suspicions of its identity fully confirmed: in the eighty years that have passed since the Eigenmanns studied the specimen, it has certainly become somewhat decolourized, but even now there is a broad longitudinal band on each side, brownish in colour, and also some brown pigment along the upper and lower edges of the caudal fin and on the dorsal spine. The broad nuchal shield, and the short anal fin (with only eight rays), as well as the fairly large adipose fin, reaching to beyond the anal fin, are all characteristic of *T. creutzbergi*. The caudal fin, however, now gives an impression of being forked, but that is evidently because the membrane is damaged, for the Eigenmanns described it as emarginate. All in all, I have no hesitation in referring this specimen to *T. creutzbergi*, although fresh material from the region where it was obtained is desired. This specimen constitutes a remarkable extension of range of the species, which was hitherto known from streams in the northern part of Suriname only.

The variation in numbers of anal fin rays is remarkable; in the females it is normally 8, but in several males I definitely counted 11, the posterior ones very thin, but perfectly discernible. The sexes agree in having eight supporting bones (actinosts).

***Tatia schultzi* (Rössel) (figs. 10f, 20)**

Centromochlus schultzi Rössel, 1962, Senckenb. Biol., 43: 27 — oberer Rio Xingu, Brasilien.

Centromochlus perugiae; P. de Miranda Ribeiro, 1962, Publ. Avuls. Mus. Nac. Rio

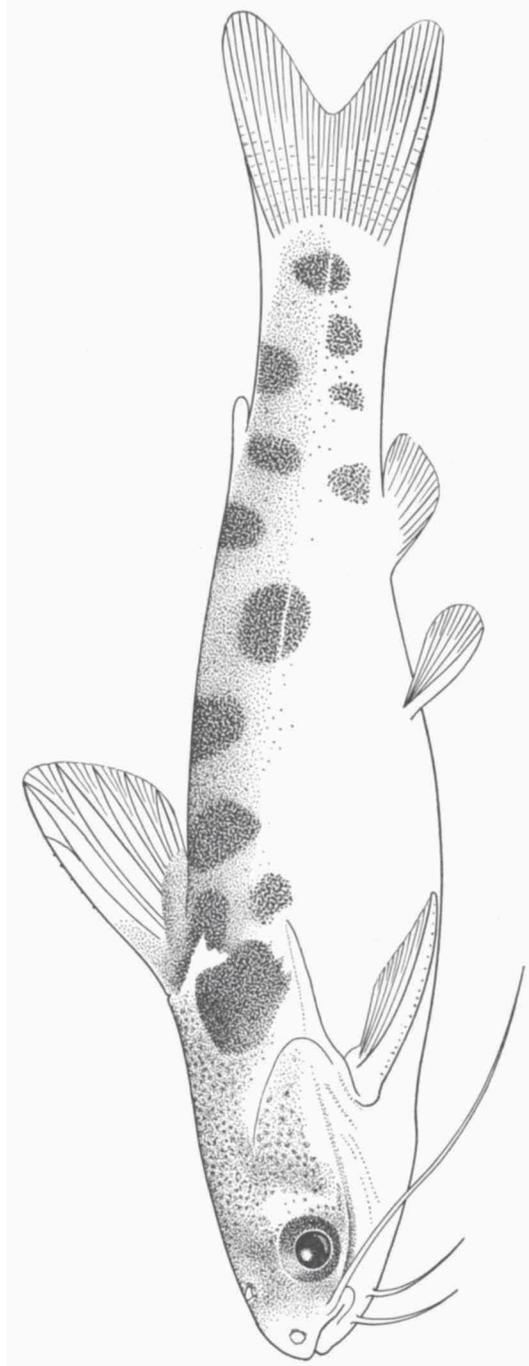


Fig. 20. *Tatia schultzi* (BM no. 1971.7.29: 3, s.l. 28 mm).

de Janeiro, 45: 9 (Rio Araguaya, Estado de Goyaz; Alto rio Xingú); P. de Miranda Ribeiro, 1964, Bol. Mus. Nac. Rio de Janeiro, Zool., 246: 4 (Rio Araguaya; Alto rio Xingú).

Material. — One specimen (♀), 1960, Rio Xingu (H. Schultz, SMF no. 5462), standard length 60½ mm, holotype of the species. Four specimens, 1960, Rio Araguaya, Estado de Goiaz (H. Schultz, MRJ no. 9416), standard length 27, 28, 33, 46 mm. Two specimens, 1960, Alto Rio Xingú (H. Schultz, MRJ no. 9417), standard length 33, 62½ mm. One specimen, 30 April 1968, Xaventina, Rio das Mortes (R. H. McConnell, BM no. 1971.7.29: 3), standard length 28 mm.

Characters. — Size large (standard length 28-60½ mm); nuchal plate with thin, almost stalked horns, which are curved outwards; number of teeth on both edges of the pectoral spine similar to that found in the other species, but especially towards the distal end of the spine these teeth are smaller than in the majority of species, and along the anterior edge all teeth are antrorse, whereas in most other species these teeth are retrorse; hind-border of adpressed anal fin about opposite hind-border of adipose fin; number of rays in the anal fin 9 or 10; colour and colour pattern diagnostic.

Colours. Upper half of head and body lightly pigmented, light brown, the upper part of the body, and the caudal region also lower down, with not very numerous round to oval, mostly rather large dark brown blotches.

Distribution. — The upper course of the Rio Xingu, the Rio Araguaia and its tributary the Rio das Mortes.

Discussion. — As Rössel (1962), who had eight specimens, made no mention of variation in shape of the anal fin, it appears that all his specimens were females. The specimens examined by me have also unmodified anal fins. Unless this species differs from all its congeners by having no sexual dimorphism in shape of the anal fin, the adult male remains to be described.

Rössel has drawn attention to a number of morphological differences between this species and the superficially somewhat similar *T. perugiae*. The most conspicuous differences are in the shape of nuchal shield and horns, and pectoral spine. Even in colour and pattern there is a clear difference: *T. perugiae* has the dark blotches closer together; they are pronounced dorsally, but become vague on the flanks. In *T. schultzi* on the other hand, the less numerous dark blotches are all equally dark, those on the lower part of the caudal peduncle being of the same intensity as those of the back.

Inasmuch as part of the material listed by P. de Miranda Ribeiro (1962b, 1964a) as *Centromochlus perugiae* is from the type-locality of *T. schultzi*, and was obtained by the same collector, I considered it a safe assumption that it belonged to this species, an assumption that proved right when subsequently I had an opportunity to examine the specimens in question.

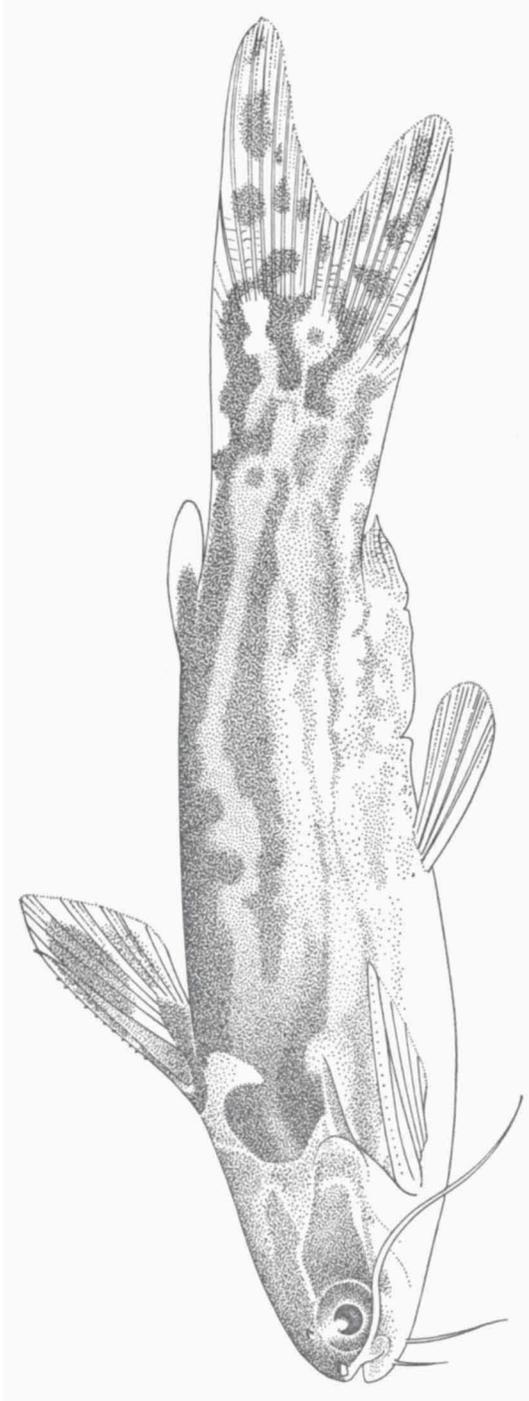


Fig. 21. *Tatia brumea* (RMNH from no. 26197, s.l. 47½ mm).

Tatia brunnea species nova (figs. 10d, 21)

Material. — Four specimens (4 ♂), 28 December 1963, Kwambaolo Kreek, near Dam (Boeseman, RMNH no. 26198), standard length 36, 36½, 40, 42½ mm. One specimen (♂), 15 March 1966, Compagnie Kreek (Mees, RMNH no. 26196), standard length 57 mm, holotype of the species. Three specimens (1 ♂, 2 ♀), same data (Mees, RMNH no. 26197), standard length 47½ (♂), 55, 60 mm. One specimen (♀ ?), 14 October 1966, Sara Kreek, 27 km S. of Dam (Nijssen, ZMA no. 105860), standard length 39 mm. Four specimens (sex?), 20 October 1966, Gran Kreek, 63 km S. of Affobakka (Nijssen, ZMA no. 105526), standard length 25, 28, 28, 35 mm. Seven specimens (5 ♂, 2 ?), 21 April 1967, Maka Kreek, tributary of Lawa Rivier 10 km S. of Stoelman Eiland (Nijssen, ZMA no. 105849), standard length 26½, 33, 39, 41, 42, 48, 51 mm. Five specimens (5 ♂), 22 April 1967, Soea Kissi Kreek, tributary of the Tapanahoni Rivier, 12 km S. of Stoelman Eiland (Nijssen, ZMA no. 105847), standard length 41, 51, 52, 54, 55 mm. 16 specimens (4 ♂, 7 ♀, 5 ?), 24 April 1967, Kamaloe or Saloea Kreek, eastern tributary of the Marowijne, French Guiana (Nijssen, ZMA no. 105851), standard length 28-57 mm.

Characters. — Size large (standard length 25-60 mm); nuchal plate with horns which are strongly curved outwards, usually club-shaped; hind-border of anal fin in advance of hind-border of adipose fin; usual number of rays in the anal fin 8 or 9; male anal fin pointed, with its third and fourth rays longest; caudal fin more deeply forked than in any other species, when individuals of similar size are compared; colour and colour pattern diagnostic.

The male anal fin develops at a standard length of 35 to 40 mm.

Colour. Fresh specimens are dark earth brown in colour, with only vague paler areas; pectorals, dorsal and adipose fins spotted with brown, the dorsal fin largely dark brown; ventrals and anal fin hyaline, caudal fin hyaline with large irregular blackish brown dots. Under surface from chin to ventrals unpigmented, white. The dorsal shield is usually distinctly paler than the body. In older specimens some of the colour has gone, and instead of more or less even brown, the body shows wavy longitudinal bands and dots of dark brown, alternating with pale brown areas.

Distribution. — Known from the Suriname Rivier and Marowijne basins, in Suriname and adjacent French Guiana (Kamaloe or Saloea Kreek, see list of material).

Tatia concolor species nova (figs. 10g, 22)

Material. One specimen (♂), 17 May 1967, headwaters of Coppename Rivier (3°49'N, 56°57'W), Suriname (Nijssen, ZMA no. 106210), standard length 33 mm, holotype of the species. Two specimens (♂, ♀), same data (Nijssen, ZMA no. 106209), standard length 29, 30 mm.

Characters. — Size small (standard length 29-33 mm), dorsal shield with horns which are more or less diamond-shaped at the tip; anal fin with 8 rays; hind-border of male anal fin rounded, reaching to clearly behind hind-border of adipose fin; colours as described below.

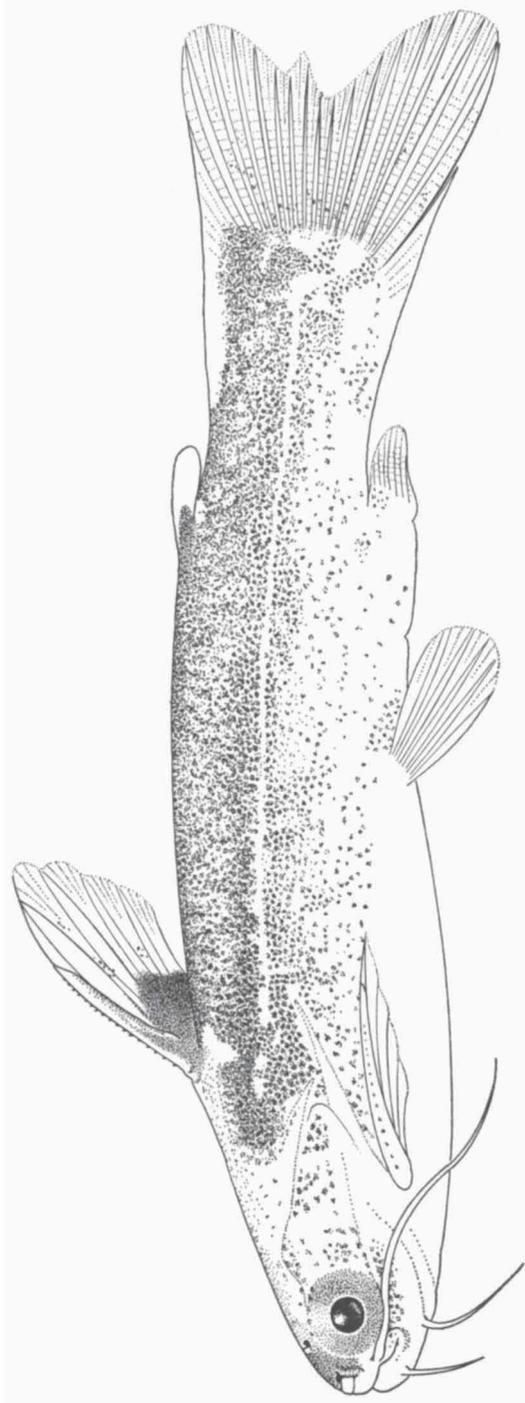


Fig. 22. *Taitia concolor* (ZMA no. 106210, s.l. 33 mm).

The two males, at standard lengths of 30 and 33 mm, already have a fully developed male anal fin, and this has led me to the conclusion that it is, indeed, a small species, and that the small size of the available material is not due to immaturity.

Colours. The plainest of all species, dark grey above, white below; some pigment spots on the chin, but none farther back on the under surface of the head. The melanophores are very large and everywhere except on the back widely spaced, giving, even to the naked eye, a mottled appearance to the fish. Fins hyaline, except for the dark base of D. On D, P, A and C a few scattered melanophores.

Discussion. The point in the middle of the caudal fork shown by the type specimen is an individual aberration, as the other two specimens, one of which is of the same sex as the type, do not have it. The figure does not bring out sufficiently the fact that the anal fin reaches farther backwards than the adipose fin.

Tatia galaxias species nova (figs. 13, 23)

Centromochlus aulopygius; Pellegrin, 1899, Bull. Mus. Hist. Nat. Paris, 5: 188 (l'Apuré, Vénézuéla); Schultz, 1944, Proc. U.S. Nat. Mus., 94: 240 (Venezuela).

Tatia aulopygia; (pt.) Gosline, 1945, Bol. Mus. Nac. Rio de Janeiro, Zool., 33: 10 (Apuré); Mago-Leccia, 1967, Soc. Venez. Cienc. Nat. Bol., 27: 225 (Venezuela).

Material. — One specimen, 1893/1895, l'Apuré, Venezuela (G. Geay, MNP no. 98-34), standard length 31 mm. One specimen (♀), May 1925, Caño de Quiribana into Rio Orinoco, Venezuela (C. Ternetz, CAS no. 6567), standard length 61 mm, holotype of the species. Six specimens (all ♂), same data (C. Ternetz, CAS no. 6568), standard length 48½-55½ mm (two specimens of this sample now RMNH no. 26493).

Characters. — Size large (standard length 31-61 mm); nuchal plate with horns which are almost as strongly curved outwards as, and approach in shape those of *T. brunnea*; hind-border of adipose fin slightly more posterior in position than hind-border of adpressed anal fin; usual number of rays in the anal fin 10 (iii.7); male anal fin in the available material only moderately modified; caudal fin shallowly forked; colour and colour-pattern diagnostic.

The male anal fin presumably develops at a standard length of about 45 mm since one of the males, of 49 mm standard length, does not yet have it completely modified.

Colour. Whole body, including the unpaired fins, dark brown with evenly spaced small white dots; chin with scattered pigment, underparts from chin to anus, and ventrals unpigmented, pectorals pigmented lightly.

The old MNP-specimen does not show this pattern; its pigment is brown, with only on the caudal fin remains of some ill-defined pale spots.

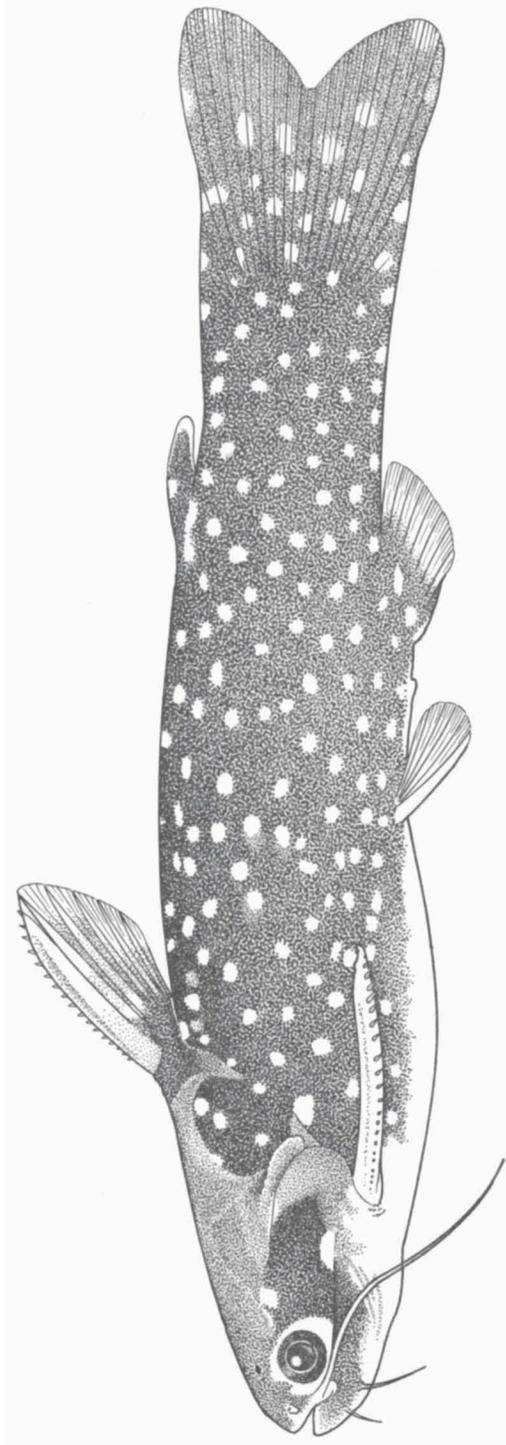


Fig. 23. *Taia galaxias* (CAS no. 6567, s.l. 61 mm).

Distribution (fig. 13). — Orinoco basin, Venezuela, where known from the type-locality, Caño de Quiribana, and from the Rio Apure — without exact locality, but quite likely very near Caño de Quiribana.

Discussion. — The colour-pattern of this species is reminiscent of that of *T. intermedia*, but the body is darker, and the spots are much smaller; also the tail is dark with white spots, whereas the tail of *T. intermedia* can better be described as pale with dark spots and cross-bars. Moreover the horns of the nuchal plate appear to be slightly thinner and more strongly curved than those of *T. intermedia*, and I am therefore of the opinion that the two forms are definitely different.

The MNP-specimen is too decolourized for a certain identification, but even before the fresh material was received, I had decided that it could not be identified with any known species, whereas in such morphological characters as are available it appears to agree with the fresh material. In addition its locality Apure is in the same river system as the locality Caño de Quiribana.

T. galaxias is the only species of its genus at present known from Venezuela.

***Tatia punctata* species nova (figs. 10c, 24)**

Material. — Two specimens (♂, ♀), 20 April 1962, Igarape Kumadueni Fittkau, Rio Paru de Oeste (= Erepecuru), Brazil near border of Suriname (J. Géry, RMNH no. 26494), standard length 34 (♀), 41 mm. One specimen (♂), 17/18 February 1964, creeks between Kabel and Lombé (Boeseman, RMNH no. 26495), standard length 45 mm, holotype of the species. Three specimens (♂, 2 ♀), same data (Boeseman, RMNH no. 26496), standard length 36, 39, 39 mm. One specimen (♂), 27 November 1965, Tapanahoni Rivier about 2 km upstream from its confluence with the Paloemeu (Mees, RMNH no. 26497), standard length 34 mm. Three specimens (2 ♂, ♀), 20 October 1966, Gran Kreek ca. 63 km S. of Afobakka (Nijssen, ZMA no. 105525), standard length 35 (♀), 38, 42 mm.

Characters. — Of medium size (standard length 34-45 mm); nuchal plate with blunt horns, moderately bent outwards, about the same as in *T. intermedia*; hind-border of adpressed anal fin behind hind-border of adipose fin, or almost opposite it; usual number of rays in the anal fin 10 (iii.7); male anal fin rather thinner than in the other species from Suriname, its tip rounded, with the third ray longest and strongest; colour and colour-pattern diagnostic.

A specimen with a standard length of 34 mm already has a well-developed male anal fin.

Colour. Densely mottled and dotted with dark grey on a pale (unpigmented) background: the upper surface of the head, from snout to dorsal fin is almost uniform dark grey; underparts from chin to anus white, unpigmented. In

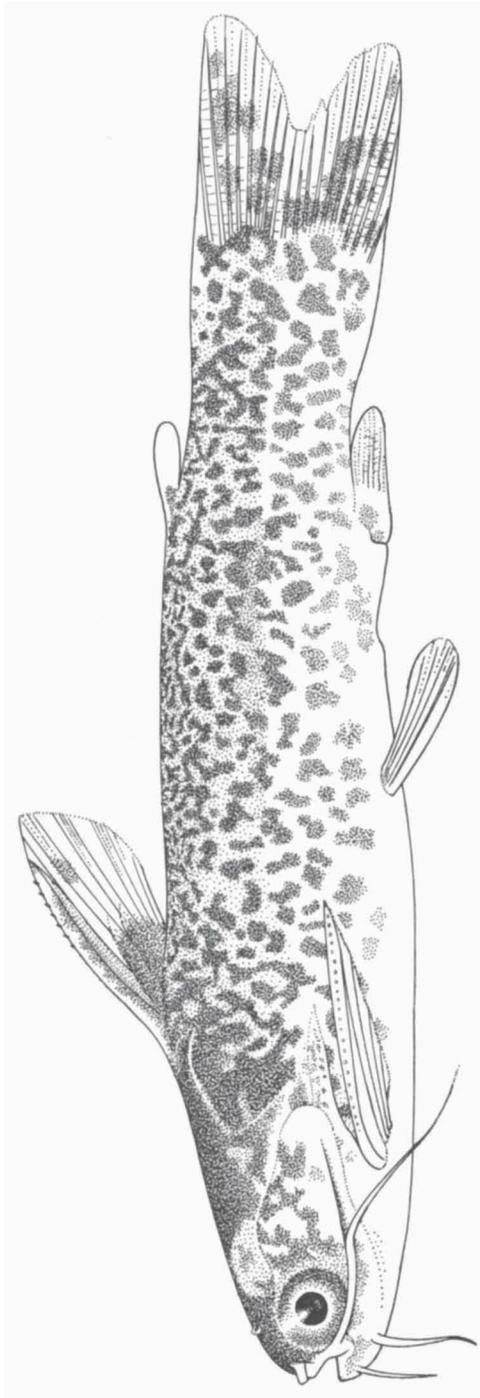


Fig. 24. *Tatia punctata* (RMNH no. 26497, s.l. 34 mm).

preserved material the spots tend to become brown, and will probably disappear entirely in another ten years or so, which would make old material very difficult to identify.

Distribution. — Suriname: Suriname Rivier basin; Tapanahoni; Brazil: Upper Paru near Suriname border. It is interesting to know that this species occurs in the Rio Paru del Oeste, hence in the Amazon basin. Whether it is widely distributed in Amazonia, or is an originally Guianan species that has only recently penetrated southwards, remains to be seen.

***Tatia reticulata* species nova (fig. 25)**

Material. — Five specimens, November 1958, Karanambo, Rupununi, British Guiana (R. H. McConnell), standard length 19, 20, 21, 22, 27 mm, the largest specimen is holotype of the species (holotype BM no. 1972.7.27: 702, two paratypes BM no. 1972.7.27: 703-704, and two RMNH no. 26744).

Characters. — Size variation unknown (standard length 19-27 mm, but probably all specimens are immature); nuchal plate with horns curved outwards as in *T. intermedia*; hind-border of adpressed anal fin opposite hind-border of adipose fin; number of rays in the anal fin 7 or 8; colour and colour-pattern diagnostic.

All specimens have a normal, unmodified anal fin, but this does not prove anything about their sex as they are probably immature.

Colours after twelve years of preservation, light pinkish brown, with a network of white (unpigmented) lines; under surface from chin to anus white; dorsal spine and basal part of caudal fin lightly pigmented, fins otherwise hyaline.

Distribution. — Known from the type-locality only.

Discussion. — Morphologically this species is extremely close to *T. intermedia* and *T. punctata*, but differs by the lower number of anal rays, and entirely different colour-pattern.

***Tatia simplex* species nova (fig. 26)**

Material. — One specimen (♀?), 30 April 1968, Xaventina house beach, Rio das Mortes, Mato Grosso, Brazil (R. H. McConnell, BM no. 1971.7.29: 5), total length 36½ mm, standard length 28½ mm, holotype of the species.

Characters. Size variation unknown (only specimen standard length 28½ mm); dorsal shield with horns curved strongly outwards and ending in points; pectoral spines with along the outer edge 19, along the inner edge 14 teeth; except for the most distal two or three, which are directed very slightly outwards, all teeth on the anterior edge are implanted perpendicularly to the spine, smaller and more widely spaced than is usual in the genus; adipose fin

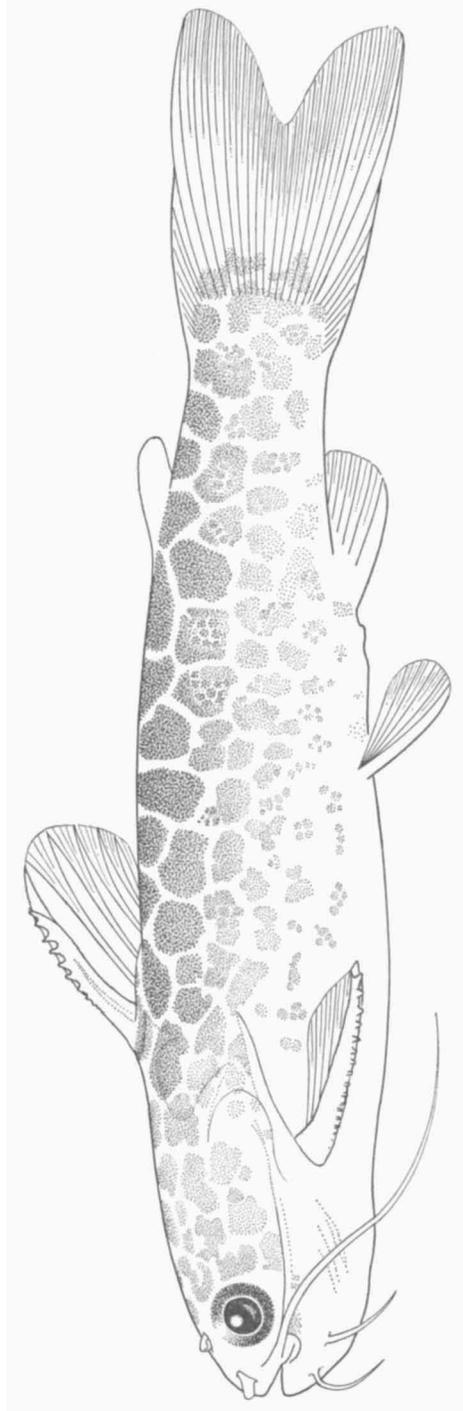


Fig. 25. *Tatia reticulata* (BM no. 1972.7.27: 702).

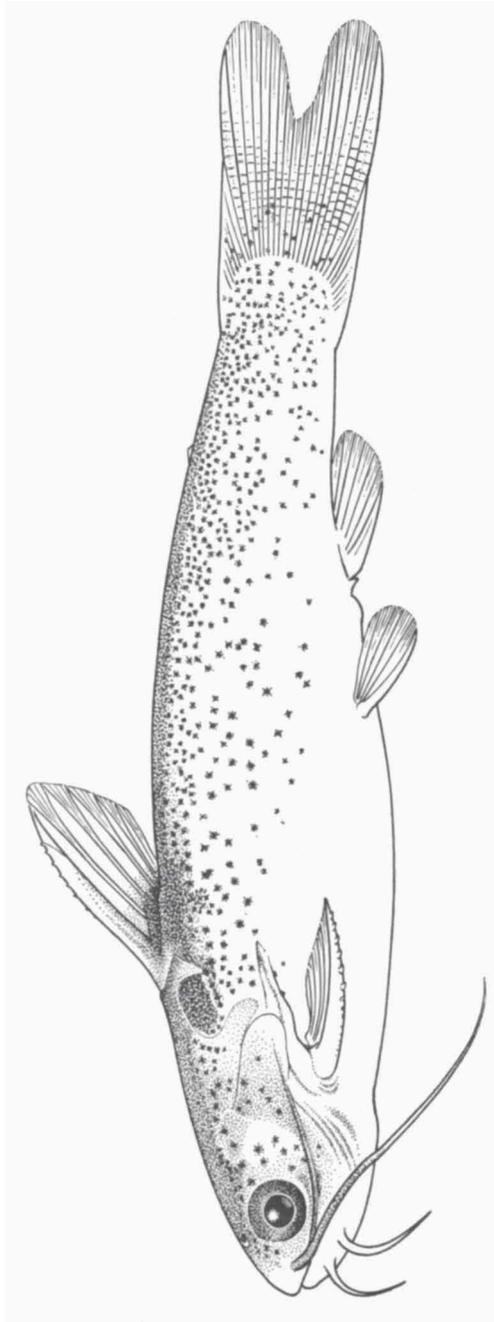


Fig. 26. *Tatia simplex* (BM no. 1971.7.29: 5, s.l. 36½ mm).

extremely small, much smaller than in all other species; hind-border of adpressed anal fin behind hind-border of adipose fin; number of rays in the anal fin 10; colour and colour-pattern as described below.

The available specimen has an entirely unmodified anal fin, but whether it is a female or a juvenile I cannot say.

Colours. In pigmentation and colour this species is close to *T. concolor*, but the dots of pigment are larger, darker (black), and fewer in number.

Distribution. — Known from the type-locality only.

Discussion. — This is a well-differentiated species so that, although only a single specimen was available, I have felt no hesitation in describing it as new. Even in pigmentation there are clear differences from *T. concolor*, and in addition there are morphological differences which make it unlikely that the two are closely related. Whether the exceptionally small adipose fin is a specific character or an individual aberration must remain uncertain until more specimens become available.

Genus **Glanidium** Lütken

Glanidium Lütken, 1874, Oversigt K. Danske Vidensk. Selsk. Forh.: 31 — type by monotypy, *Glanidium albescens* Lütken.

Gephyromochlus Hoedeman, 1961, Bull. Aquatic Biol., 2: 135 — subgenus, type by monotypy *Centromochlus* (*Gephyromochlus*) *leopardus* Hoedeman. Raised without comment to a full genus by Hoedeman (1968).

Generic diagnosis. — D I.5 (I.4½), in one species apparently I.6, A 10-13, P I.5 or I.6, V 6, C i.15.i plus rudiments. This genus is very close to *Tatia*, but its members attain a distinctly larger size; the anterior borders of the spines in D and P are either smooth, or provided with small teeth only; the upper surface of the head is covered with thick skin; the horns of the nuchal plate are very slender, almost stalked; the number of rays in the pectoral and anal fins tends to be higher than in *Tatia*. Lateral line complete, but especially on the anterior part of the body inconspicuous, almost straight. Pectoral pore as in *Tatia*. Sexual dimorphism of the anal fin as in *Tatia*. The differences between *Glanidium* and *Tatia* are slight and some are not absolute (for example *T. schultzi* has the teeth along the anterior edge of the pectoral spine poorly developed, whereas *G. albescens* and *G. ribeiroi* have them fairly well-developed); nevertheless, I regard it as justified to maintain *Glanidium* as a separate genus, in a group so compact and homogeneous.

Distribution (fig. 28). — The genus is widely distributed in eastern South America, with its point of gravity in south-eastern Brazil.

Discussion. — There have been few previous attempts to define *Glanidium*. The first of these was made by Eigenmann & Eigenmann (1890: 266), who

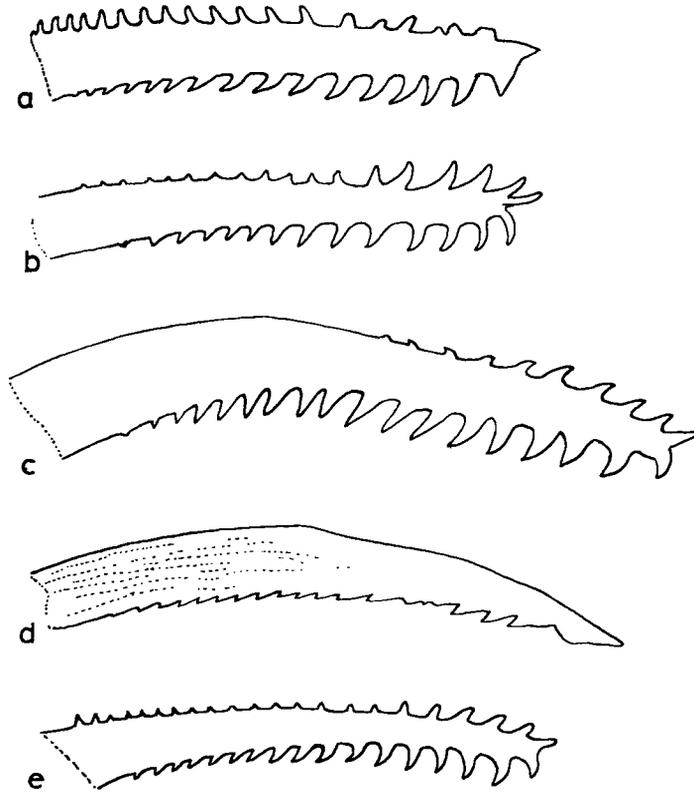


Fig. 27. Right hand pectoral spines of *Glanidium*-species, viewed from above: (a) *G. albescens* (UZMK no. 335, s.l. 100 mm), (b) *G. ribeiroi* (FM no. 54234, paratype, s.l. 101 mm), (c) *G. melanopterum* (RMNH no. 17294, s.l. 103 mm), (d) *G. leopardus* (ZMA no. 105854, s.l. 109 mm), (e) *G. catharinensis* (MRJ no. 5169, s.l. 88 mm). 4 X.

recognized it as a subgenus only, as follows: "head granular above, *Centromochlus*; head covered with skin, *Glanidium*". Haseman (1911) used *Glanidium* without comment. A. de Miranda Ribeiro (1911) gave a generic diagnosis, but mentioned no characters which would differentiate *Glanidium* from *Tatia*.

Seven species have been described, but there are indications that one of them, *G. cesarpintoii*, is a synonym of *G. ribeiroi*, or alternately, that it may be referable to the genus *Tatia*, which leaves the genus with six species, one of which (*G. catharinensis*) is doubtful. One species occurs in Suriname.

***Glanidium albescens* Lütken (figs. 27a, 28)**

Glanidium albescens Lütken, 1874, Oversigt K. Danske Vidensk. Selsk. Forh.: 31 — flumina Rio des Velhas cum affluentibus.

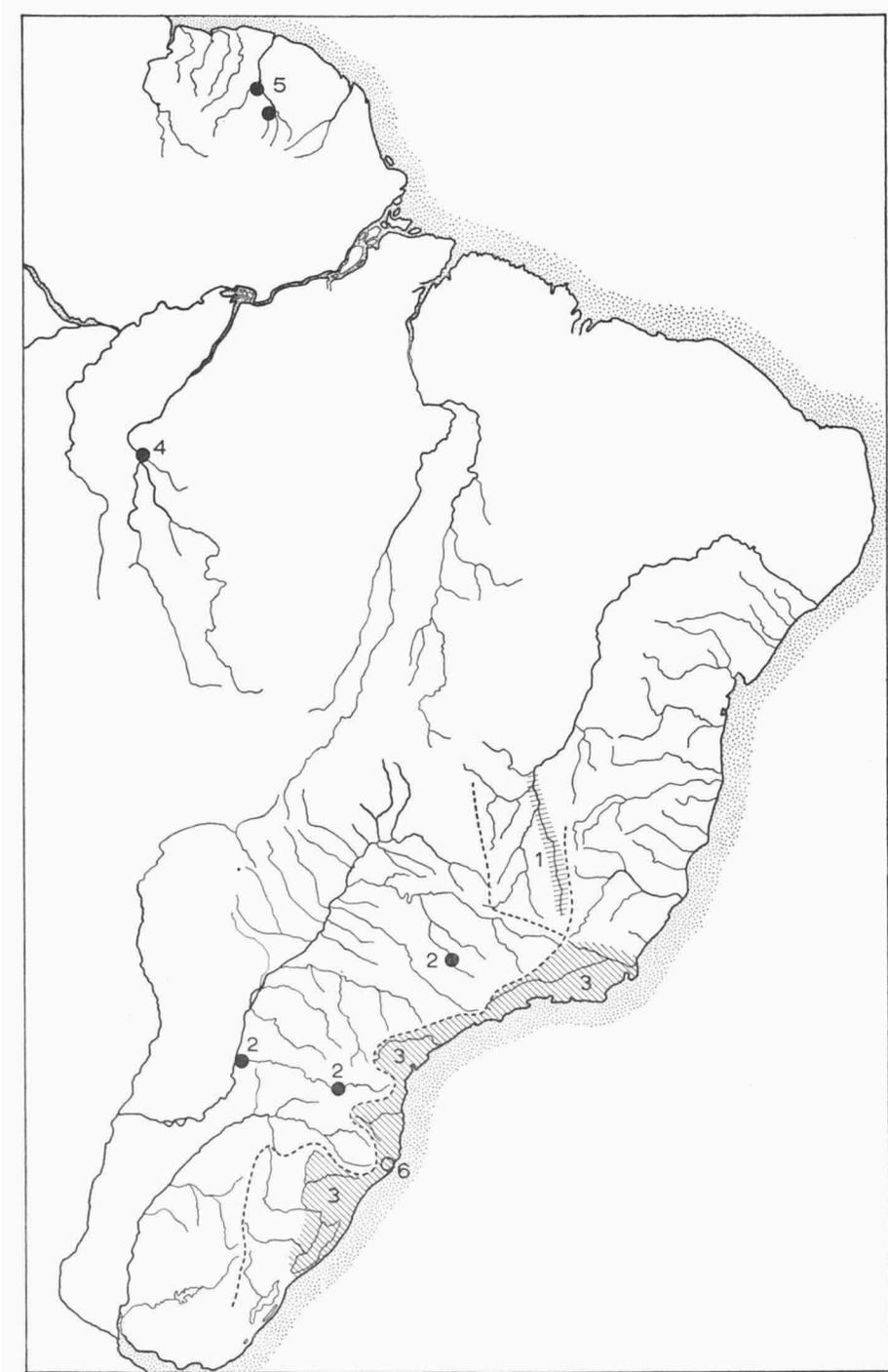


Fig. 28. The distribution of the genus *Glanidium*. 1, *G. albescens*. 2, *G. ribeiroi*. 3, *G. melanopterus*. 4, *G. piresi*. 5, *G. leopardus*. 6, *G. catharinensis*.

Glanidium albescens; Lütken, 1875, K. Danske Vidensk. Selsk. Skr., (5) 12: 150, pl. III fig. 5 (Rio das Velhas).

Material. — Six specimens (4 ♂, 2 ♀), 1850-1856, Rio das Velhas (J. Reinhardt, UZMK nos. 335, 336, 337, 338, 341, 342), standard length 61½, 78 (♀), 93 (♀), 95, 99, 100 mm, syntypes of the species.

Characters. — D. I.5, A 11-12 (iii.8 to iii.9), P I.5 or I.6, V 6, C i.15.i and rudiments. Dorsal spine short, 2.5 to 2.6 times in predorsal length, its anterior edge with some eight to ten small and inconspicuous teeth; pectoral spines about 1.6 times in predorsal length, with teeth along the whole length of the anterior and the posterior edges (fig. 27a), see also Lütken's (1875) plate.

Male anal fin well-modified: the smallest male (of 61½ mm standard length) has it only partly modified.

Colour. The specimens which are not entirely decolourized show irregularly distributed brown dots of various sizes against a light brown background. See further Lütken (1875: 151).

Distribution (fig. 28). — At present only known from the type-locality, the Rio das Velhas, a tributary of the Rio São Francisco, Minas Gerais, Brazil. 1)

Discussion. — The name *Glanidium albescens* has been applied widely to a species inhabiting rivers flowing east and south-east in the states of Rio de Janeiro and São Paulo. I found, however, that all specimens examined from this area differ from the type-material in the character of the pectoral spine, as described and figured, and my impression is that this is a specific difference.

Geographical evidence supports the opinion expressed above, for whereas on the east coast the species hitherto identified with *G. albescens* is not known to occur further north than the Rio Paraíba (= Rio Parahyba), the mouth of the Rio São Francisco, of which the Rio das Velhas is a tributary, lies over 1300 km away to the north.

Subsequent to the description, the only record of presumed *G. albescens* from the São Francisco basin was by Fisher (1917: 423), who listed under this name three specimens from Joazeiro. I asked for a loan and to my surprise the sample (27-29 November 1907, leg. J. D. Haseman, FM no. 57807) contained not three, but 17 specimens, standard length 32½-47 mm, which differ from *G. albescens* in numerous characters. On a later page these specimens will be described as representing a new species and a new genus.

1) If Pelzeln (1868-1871: VII and map) is right, Natterer's Rio das Velhas is an entirely different river, an affluent of the Parahyba, and ultimately of the Parana. Although I am not aware that Natterer collected any fishes in his Rio das Velhas, where he stayed only one day, I mention it as a possible source of confusion.

***Glanidium ribeiroi* Haseman (figs. 27b, 28)**

Glanidium ribeiroi Haseman, 1911, Ann. Carnegie Mus., 7: 381, pl. 78 — Porto União da Victoria, Paraná, Brazil, from the Rio Iguassú.

Glanidium cesarpinto R. von Ihering, 1928, Bol. Biol. S. Paulo, 12: 46 — Cachoeira de Emas (Pirassununga), rio Mogy-guassú, Est. de S. Paulo.

Glanidium ribeiroi; R. von Ihering, 1928, Bol. Biol. S. Paulo, 12: 47 (Rio Iguassú); Gosline, 1945, Bol. Mus. Nac. Rio de Janeiro, Zool., 33: 11 (rio Iguaçú); Fowler, 1951, Arq. Zool. S. Paulo, 6: 467, fig. 495 (Iguaçú); P. de Miranda Ribeiro, 1962, Bol. Mus. Nac. Rio de Janeiro, Zool., 240: 3, 5, fig. 1 (no locality).

Glanidium albescens; de Arámburu, Arámburu & Ringuelet, 1962, Physis, 23: 229, fig. 1 (Arroyo Los Dos Hermanos, Iguazú, Misiones); Ringuelet, Arámburu & de Arámburu, 1967, Los Peces Argentinos de Agua Dulce: 275, fig. 15 B (Los dos Hermanos, Iguazú, Misiones).

Material. — Two specimens (both ♀), 1909, Porto União da Victoria, Rio Iguaçú (J. D. Haseman, FM no. 54243), standard length 101, 102 mm, paratypes of the species. One specimen (♀ or imm.), undated, Arroyo Los Dos Hermanos, Iguazú, Misiones (collector unknown, MLP no. 1-II-61-6), standard length 67 mm.

Characters. — D I.5, A 10, P I.5 or I.6, V 6, C i.15.i and rudiments. Predorsal length 3.2 to 3.25 times in standard length, dorsal spine 2.5, 2.8 and 3.0 times in predorsal length, with some ten small knob-like teeth along most of its anterior edge in two specimens, almost smooth in the third specimen; pectoral spines short, 1.7 to 2.0 times in predorsal length, with teeth along their whole anterior and posterior edges, as in *G. albescens*, but along the anterior edge the proximal teeth much smaller, the distal teeth larger than in that species (fig. 27b). Head and body apparently heavier than in *G. albescens*.

Colour. The two paratypes examined show some irregular dots of different sizes, as figured by Haseman (1911: pl. 78); see also the colour description given by that author. The more recently collected specimen from Misiones has the same irregular pattern of grey spots on a pale brownish-yellow background, and there is a concentration of spots on the distal part of the caudal fin, giving its tips a mottled blackish appearance.

Distribution (fig. 28). — At present only known from the Rio Iguaçú (= Rio Iguassú), and the Rio Mogi Guaçu (assuming that I am right in synonymizing *G. cesarpinto* with *G. ribeiroi*).

Discussion. — As only three specimens, all females, were examined, and one should allow for some individual variation, it is possible that some characters are not as clear-cut as presented in the diagnosis. The broad and heavy head and body were also observed by Haseman, this character shows clearly in the distance between the posterior pair of nostrils, which is 11 mm in the two paratypes of *G. ribeiroi*, and only 6 mm in a syntype of *G. albescens* of comparable size (no. 338, standard length 99 mm).

On geographical grounds I expected the specimens from Argentina recorded by de Arámburu, Arámburu & Ringuelet (1962) to belong to this species.

Their figure shows a rather heavy-bodied fish, and therefore supports this identification. Admittedly in the description one finds: "Espina pectoral fuerte, con el borde posterior dentado y el anterior denticulado en *el tercio distal*", but in this species the whole pectoral spine is encased in thick pigmented skin, through which only the tips of the large teeth of its distal third protrude. Without removing this skin, only the distal teeth are visible. I have examined one of the specimens and found my suspicions concerning its identity confirmed.

P. de Miranda Ribeiro (1962a) has suggested that *G. cesarpinto* does not differ from *G. ribeiroi*, and also that both may be synonyms of *G. albes-cens* Auct. (= *G. melanopterum*). Although, as mentioned in the discussion of the following species, P. de Miranda Ribeiro has to a certain extent confused the species, his argument for synonymizing *G. cesarpinto* with *G. ribeiroi* is reasonably convincing, and is supported by geographical evidence, as the type-localities of both are in the Paraná basin (fig. 28). A direct comparison between the two, however, remains to be made. The types of *G. cesarpinto* are lost (Britski, in litt.), and attempts by Professor de Godoy to obtain material for me from the type-locality, where the species appears to be very rare, have not yet met with success.

My confidence in the synonymy indicated above has been somewhat shaken by further information received from Professor de Godoy (in litt.), who describes the colours of *G. cesarpinto* in the living fish as blackish brown, with many small white spots. This colour pattern suggests *Tatia* rather than *Glanidium*, and I wondered if perhaps two species, a *Tatia* and a *Glanidium*, might occur in the Rio Mogi Guassu, of which the former could be related to, or identical with, *T. neivai*. This, however, appears to be not so, and Professor de Godoy has summarized the differences between *G. cesarpinto* and *T. neivai* as follows:

<i>G. cesarpinto</i>	<i>T. neivai</i>
maxillary barbel 1.5 × the length of the pectoral spine	maxillary barbel 2 × the length of the pectoral spine
length of pectoral spine greater than the distance from its basis to the tip of the snout	length of pectoral spine equal to the distance from its basis to the tip of the snout
lobes of caudal fin pointed	lobes of caudal fin rounded
P, V and A light, almost hyaline	P indistinctly maculated black; V and A with plumbeous base
body with more and smaller white dots	body with fewer and larger white dots

Until adequate material becomes available, it appears pointless to speculate further about the identity and affinities of *G. cesarpintoi*.

***Glanidium melanopterum* A. de Miranda Ribeiro (figs. 27c, 28)**

(*Glanidium albescens* Auct., nec Lütken)

Glanidium melanopterum A. de Miranda Ribeiro, 1918, Rev. Mus. Paul., 10: 643 — Piquete, S. Paulo.

Centromochlus (Glanidium) albescens; Steindachner, 1876, Sitzb. Akad. Wiss. Wien, Mathem.-Naturw. Cl., 74 (1): 664 (Rio Parahyba bei Campos).

Centromochlus albescens; Eigenmann & Eigenmann, 1888, Proc. Calif. Acad. Sci., (2) 1: 157 (Rio Parahyba, Rio Janeiro, Macacos); Eigenmann & Eigenmann, 1890, Occ. Pap. Calif. Acad. Sci., 1: 270 (coast streams from Rio Janeiro to the Amazon); Chranilov, 1929, Zool. Jahrb. Anat., 51: 332, 376, 377 fig. 11, 427 fig. 23a (no locality, presumed to refer to this species); van der Stigchel, 1946, South American Nematognathi: 98 (Port Real, Rio de Janeiro); van der Stigchel, 1947, Zool. Meded., 27: 98 (Port Real, Rio de Janeiro).

Glanidium albescens; Eigenmann & Eigenmann, 1891, Proc. U.S. Nat. Mus., 14: 34 (coast streams from Rio Janeiro to the Amazon); A. de Miranda Ribeiro, 1907, A Lavoura, 11: 186 (Iporanga); (pt.) A. de Miranda Ribeiro, 1911, Arch. Mus. Nac. Rio de Janeiro, 16: 358 (Rio Parahyba, Macacos (Rio de Janeiro), Iporanga (S. Paulo)); Haseman, 1911, Ann. Carnegie Mus., 7: 382 (Rio Paranhãya (Entre Rios); Porto Alegre, Rio Grande do Sul; Rio Ribeiro da Iguapé); (pt.) Fisher, 1917, Ann. Carnegie Mus., 11: 423 (Rio Ribeira da Iguapé; Serraria Minas, Rio Parahybuna, into Parahyba; Entre Rios, Rio Parahyba; Porto Alegre); R. von Ihering, 1928, Bol. Biol. S. Paulo, 12: 47 (da vertente atlantica, do Rio de Janeiro ao Amazonas); Fowler, 1951, Arq. Zool. S. Paulo, 6: 466 (distribution compiled, no original information); P. de Miranda Ribeiro, 1962, Bol. Mus. Nac. Rio de Janeiro, Zool., 240: 3 (Lagoa Feio, Campos, Ilha das Pombas, Rio Paraíba no Estado do Rio de Janeiro, Rio Pomba, Cataguazes, no Estado de Minas Gerais e Lagôa dos Quadros no Estado do Rio Grande do Sul); P. de Miranda Ribeiro, 1962, Publ. Avuls. Mus. Nac. Rio de Janeiro, 45: 9 (Lagôa Feia, Campos, Estado do Rio de Janeiro; Ilha das Pombas, Rio Parahyba, Estado do Rio de Janeiro; Rio de Janeiro (Sepitiba?); Rio Parahyba, Estado do Rio de Janeiro; Humboldt, Estado de Santa Catharina; Rio Pomba, Cachoeira Vista-Alegre, Municipio de Cataguazes, Estado de Minas-Gerais; Lagôa dos Quadros, Estado do Rio Grande do Sul).

Glanidium ribeiroi; A. de Miranda Ribeiro, 1918, Rev. Mus. Paul., 10: 734 (Iporanga, Rio Ribeiro); P. de Miranda Ribeiro, 1962, Publ. Avuls. Mus. Rio de Janeiro, 45: 10 (Rio Itapocú, Município Guará-Mirim, Estado de Santa Catharina).

Glanidium melanopterum; R. von Ihering, 1928, Bol. Biol. S. Paulo, 12: 47 (Piquete, vertente do rio Parahyba); Gosline, 1945, Bol. Mus. Nac. Rio de Janeiro, Zool., 33: 11 (São Paulo); Fowler, 1951, Arq. Zool. S. Paulo 6: 467 (São Paulo); P. de Miranda Ribeiro, 1953, Arq. Mus. Nac. Rio de Janeiro, 42: 391 (no locality); P. de Miranda Ribeiro, 1962, Bol. Mus. Nac. Rio de Janeiro, Zool., 240: 3 (no locality); Britski, 1969, Pap. Avuls. Zool., 22: 204 (Piquete, Cachoeira, Estado de São Paulo).

Glanidium cesarpintoi; P. de Miranda Ribeiro, 1962, Publ. Avuls. Mus. Rio de Janeiro, 45: 10 (Rio de Janeiro).

Material. — Seven specimens (5 ♂, 2 ♀), 1864, Macacos (Wm. M. Roberts, MCZ no. 7626), standard length 91-120 mm. One specimen (♀), 1865, Rio Parahyba (Thayer Exp., MCZ no. 7366), standard length 120 mm. One specimen (♀), same data (Thayer Exp., MCZ no. 7367), standard length 93 mm. One specimen (♀?), same data (Thayer Exp., MCZ no. 8192), standard length 60 mm. One specimen, 1872, Rio de Janeiro (Hassler Exp., MCZ no. 7348), standard length 77 mm. Seven specimens, 1890, Port

Real, Rio de Janeiro (Hardy du Dréneuf, RMNH no. 17294), standard length 56½-103 mm. One specimen (♂?), January 1902, Piquete, Estado de São Paulo (H. Silva, MZSP no. 345), standard length 128 mm, lectotype of the species (cf. Britski, 1969). One specimen (♀), 22 May 1908, Serraria Minas, Rio Parahybuna, an affluent of Rio Parahyba (J. D. Haseman, FM no. 57808), standard length 88 mm. Two specimens, 2 June 1908, Entre Rios, Rio Parahyba (J. D. Haseman, FM no. 57809), standard length 105, 111 mm. One specimen, 19 January 1909, Porto Alegre (J. D. Haseman, FM no. 57810), standard length 137 mm. 19 specimens, no date, Rio Parahyba (no collector, MCZ no. 7378), standard length 52-128 mm. Three specimens (2 ♂, ♀) without data (MCZ no. 36187), standard length 140, 145, 151 (♀) mm. One specimen, "Brazilie", without further data (RMNH no. 17246), standard length 105 mm.

Characters. — D I.5, A 10-11 (usually iii.7 or iii.8), P I.5 or I.6, V i.5, C i.15.i and rudiments. Dorsal spine 1.8 to 2.4 times in predorsal length, its anterior edge smooth, or distally with three or four rudimentary teeth; pectoral spines long, 1.25 to 1.4 times in predorsal length, more distinctly curved backwards than in the other species, with on their anterior edge teeth on the distal half only (fig. 27c).

Male anal fin perhaps only moderately modified, and only its anterior rays; its posterior border lunate.

Colour. All specimens were collected long ago, and had been in preservative for at least sixty years when I examined them. Several had become entirely decolourized, but those which still showed some colour and pattern were light earth-brown above, mottled with irregular larger and smaller dark brown dots. The dorsal fin was well-pigmented, and the posterior half of the caudal fin appears to have been entirely black, at least in some specimens; the other fins are largely hyaline, with at most some small dark blotches and scattered melanophores. Ventral surface, from chin to anal fin, white, unpigmented.

Distribution (fig. 28). — Occurs in rivers of south-eastern Brazil, running east, from the Rio Parahyba and its tributaries in the north, to Porto Alegre and Lagôa dos Quadros in the south; this range includes the extreme south of the state of Minas Gerais, and (the eastern parts of) the states of Rio de Janeiro, São Paulo, Santa Catarina and Rio Grande do Sul. I know of no records yet from the state of Paraná, but the species is certain to occur there as it has already been found in the Rio Ribeira, which originates in Paraná.

Fowler (1951: 466-467) records the species from the Rio Mucuri, Rio Doce and Rio Jequitinhona, quoting Steindachner (1876b: 664) as his reference. On the place indicated, Steindachner wrote, however: "Diese zuerst von Dr. Lütken nach Exemplaren aus dem Rio das Velhas beschriebene Art kommt im Rio Parahyba bei Campos sehr häufig vor; aus dem Rio Mucury, Rio doce, Rio Jequitinhonha, etc. ist sie derzeit noch nicht bekannt, dürfte aber höchst wahrscheinlich daselbst nicht fehlen". These three rivers must therefore be excluded from the known range of the species.

The inclusion of the Amazon in the range of this species, first by Eigenmann & Eigenmann (1890), followed by nearly all later authors who gave its range, was based on the specimens from Macacos. The Eigenmanns (1890: 490, and map) identified Macacos with the stream connecting the Rio Pará with the Amazon, in the delta of the Amazon. A. de Miranda Ribeiro (1911), however, who was in a better position to know the geography of south-eastern Brazil than workers living in other continents, expressly listed Macacos as being in the state of Rio de Janeiro. For this reason I feel justified in eliminating the Amazon from the range of the species¹).

In the discussion of *G. albescens* I have demonstrated that the locality Joazeiro must also be rejected for this species, being based on a different species. This leaves the species with a limited range in south-eastern Brazil, defined above.

Discussion. — As indicated in the discussion of *G. albescens*, this is the species which in literature has been widely misidentified as *G. albescens*, a species known from its type-material only.

The lectotype of *G. melanopterum*, examined by me, is now entirely decolorized, except for some dark central rays in the caudal fin: just as in specimens of various other samples. The pectoral spines are rather short, 1.5 times in predorsal length, but both spines have their extreme tips broken off.

P. de Miranda Ribeiro (1962a) himself indicated that the specimen from Rio de Janeiro which he had catalogued as *G. cesarpinto* (cf. P. de Miranda Ribeiro, 1962b), is referable to the present species, and as he expressed doubt about the validity of *G. ribeiroi*, it is apparent that he held the same opinion on the specimen catalogued under that name. On geographical evidence both specimens must be *G. melanopterum*.

Glanidium piresi A. de Miranda Ribeiro (fig. 28)

Glanidium piresi A. de Miranda Ribeiro, 1920, Comm. Linh. Telegr. Estr. Matto-Grosso ao Amazonas, 58, Anexo 5: 14 — Rio S. Manoel.

1) The correction of the locality Macacos from the Amazon delta to Rio de Janeiro affects the distribution of a number of other species of which the range had been extended to the Amazon delta on the basis of this locality only. Eigenmann & Eigenmann (1890) listed the following species from Macacos: *Rhamdia quelen*, *Rhamdella minuta*, *Pimelodella buckleyi* (?), *Centromochlus albescens*, *Pygidium maculatum* (?), *Loricaria lima*, *Plecostomus commersonii*, *Plecostomus vermicularis*, *Callichthys callichthys*.

Two of these species, marked with a query, were probably misidentified; all other species are well-known to occur in south-eastern Brazil, but with the exception of *Rhamdia quelen*, *Rhamdella minuta*, and *Callichthys callichthys*, which have a very wide distribution, can no longer be accepted as occurring in Amazonia. The fact that all Macacos species are typical of the fauna of south-eastern Brazil, further supports A. de Miranda Ribeiro's statement that this locality is in the state of Rio de Janeiro.

Glanidium piresi; R. von Ihering, 1928, Bol. Biol. S. Paulo, 12: 47 (Rio S. Manuel); Gosline, 1945, Bol. Mus. Nac. Rio de Janeiro, Zool., 33: 11 (Mato Grosso); Fowler, 1951, Arq. Zool. S. Paulo, 6: 467 (Mato Grosso); P. de Miranda Ribeiro, 1953, Arq. Mus. Nac. Rio de Janeiro, 42: 391 (name only); P. de Miranda Ribeiro, 1962, Bol. Mus. Nac. Rio de Janeiro, Zool., 240: 3 (name only).

Material. — None.

Characters. — D I.6, A 10. In the first place characterized by its enormous size (the type was reported to have a length, presumably total length, of 49 cm), also by pectoral spines with teeth on both anterior and posterior borders, six dorsal rays, and plain coloration¹).

Discussion. — This species is known to me only from the original description, based on a single dry specimen of 49 cm length. No additional material has been recorded. One would expect the type to be in the museum of Rio de Janeiro (A. de Miranda Ribeiro, 1920: 3), but neither in his list of types, nor in the catalogue did P. de Miranda Ribeiro (1953, 1962b) mention it and Britski (in litt., 3.VIII.1970) has vainly searched for it in the Museu Nacional do Rio de Janeiro. Anyway, enough characters are given in description and figures to show that this species is not particularly close to *G. leopardus*, the geographically nearest member of its genus.

***Glanidium leopardus* (Hoedeman) (figs. 27d, 28, pl. 3)**

Centromochlus (*Gephyromochlus*) *leopardus* Hoedeman, 1961, Bull. Aquatic Biol., 2: 135 — French Guiana: mainland, Litany river, village Aloiké.

Gephyromochlus leopardus; Hoedeman, 1968, Elseviers Aquariumvissen Encycl., 1: 147 (Frans-Guyana).

Material. — One specimen (♂), 27 November 1957, Aloiké, Litani Rivier (J. Géry, ZMA no. 102233), standard length 98 mm, holotype of the species. Twelve specimens, 24 April 1967, Makakreek, left shore Lawa Rivier, 10 km south of Stoelmanseiland (Nijssen, ZMA no. 105854), standard length 53-109 mm.

Characters. — D I.4, A 12-14 (of which 9 or 10 branched), P I.5, V 6, C 15-16 (divided rays). Dorsal spine 2.0 to 2.4 times in predorsal length, its anterior edge smooth; pectoral spines 1.4 to 1.65 in predorsal length, with their tip pungent, entirely smooth along their anterior edge, 12-18 (mostly 15-18) teeth on the posterior edge (fig. 27d); tail shallowly forked, its lobes rounded; male anal fin strongly modified; colour and colour pattern diagnostic.

1) In the drawings of dorsal and ventral aspects of the type, the anterior borders of the pectoral spines are shown smooth, without teeth, but they are shown in the drawing of the lateral aspect, and are definitely mentioned in the description.

Colour. Very large and often confluent dark brown blotches on a brownish-white to white background.

Distribution (fig. 28). — The material listed above represents all that is known of the species. Both localities are in the Marowijne basin. Hoedeman listed his specimen as being from French Guiana, but the village of "Aloiké", recte Alowike, is on the western shore of the Litani Rivier. As the Lawa is the boundary river, it is obvious that *G. leopardus* occurs also in French Guiana, but at present it is not known from outside Suriname.

Discussion. — Its describer (Hoedeman, 1961) realised that this species is not quite typical of "*Centromochlus*" (= *Tatia*), in which he placed it. He commented as follows: "Despite its rather elongate appearance, quite unlike other members of the genus, it agrees in most characters with those species, and I provisionally want to include *leopardus* in the genus *Centromochlus* until larger samples have become available (including females and juveniles). Though this species is, however, intermediate in a way between *Centromochlus* and *Auchenipterus*, showing resemblances with members of the family *Trichomycteridae* (= *Pygiidae*), I found justification for establishing the new subgeneric name *Gephyromochlus*".

As Hoedeman did not explain what his opinion quoted here was based on, I cannot very well discuss it, except to state that I fail to see any close affinity of *G. leopardus* to either *Auchenipterus* or the *Trichomycteridae*, and that it appears to be a very normal representative of *Glanidium*, a genus not mentioned by Hoedeman, and possibly overlooked by him. *Gephyromochlus* Hoedeman is a synonym of *Glanidium* Lütken.

Glanidium leopardus, contrary to statements in its original description, is not very slender; in body-shape and proportions it does not differ appreciably from *Tatia*. The type, and only specimen available to Hoedeman, is in a poor condition; it is strongly shrivelled and may have been dry, or alternately may have been kept in far too strong spirits. This gives it an appearance of slenderness, not shared by the recent and well-preserved material (compare Hoedeman's figure with the one given here!).

Glanidium catharinensis P. de Miranda Ribeiro (figs. 27e, 28)

Glanidium catharinensis P. de Miranda Ribeiro, 1962 (22 March), Bol. Mus. Nac. Rio de Janeiro, Zool., 240: 3, fig. 2 — Rio do Braço do Norte, São Ludgero, Município de Tubarão, Estado de Santa Catarina.

Glanidium catharinensis; P. de Miranda Ribeiro, 1962 (28 Aug.), Publ. Avuls. Mus. Nac. Rio de Janeiro, 45: 10 (Rio do Braço do Norte, São Ludgero, Município de Tubarão, Estado de Santa Catarina).

Material. — One specimen (♂), 1940, Rio do Braço do Norte, Município de Tubarão, Estado de Santa Catharina (Padre A. Nihnes, MRJ no. 5169), standard length 88 mm, holotype of the species.

Characters. — D I.5, A 10, P I.6, V 6, C i.15.i and rudiments. Predorsal length 3.25 times in standard length, dorsal spine 2.6 times in predorsal length, along its anterior edge five very small teeth, otherwise smooth; pectoral spines 1.75 times in predorsal length, only slightly curved, with teeth along the whole length of the anterior and posterior edges, but along the anterior edge the proximal teeth are small (fig. 27e); allowing for a certain amount of individual variation, the pectoral spine agrees with that of *G. ribeiroi*; anal fin (♂) strongly modified; the distance between the posterior nostrils is 9 mm.

Colour. The preserved specimen is yellowish-brown, with a number of larger and smaller blackish spots on the body; on the caudal fin these spots are smaller and rather more numerous.

Distribution (fig. 28). — This species is known from its single type-specimen, collected in the Rio do Braço do Norte, Santa Catarina.

Discussion. — Before I had examined the specimen on which *G. catharinensis* was based, I considered it a possibility that it would belong to *G. melanopterum*, as the type-locality is a river flowing east, entirely within the known range of *G. melanopterum*. In this opinion, however, I was mistaken; the specimen does definitely not belong to *G. melanopterum*, but is very close to *G. ribeiroi* and if only it had been collected in the Paraná-La Plata basin, I would not have hesitated to synonymise it with that species. As it is, the specimen presents a zoogeographical problem, for elsewhere the three closely related species *G. albescens*, *G. ribeiroi* and *G. melanopterum* are clearly allopatric. On the other hand, I realise very well that the geographical element has to be used with caution: from the Suriname Rivier basin four very similar species of the closely related genus *Tatia* are known, and therefore the possibility that in Santa Catarina two very similar species of *Glanidium* occur in one river system, cannot be dismissed (*G. melanopterum* has not actually been recorded from the Rio do Braço do Norte, but is known from rivers to the north as well as to the south). Evidently more field-work and collecting is required before the status of *G. catharinensis* can be properly evaluated, and therefore I prefer to recognize it tentatively, although I suspect strongly that it is a synonym of *G. ribeiroi*. When P. de Miranda Ribeiro (1962a) described *G. catharinensis*, he had no material of *G. ribeiroi*, for the specimen which he believed to be referable to it, was actually *G. melanopterum*, and on the basis of this misidentified specimen he concluded that *G. ribeiroi* does not differ from *G. albescens* (auct., nec Lütken = *G. melanopterum*).

Pseudotatia genus novum

Generic diagnosis. — Close to *Tatia* and *Glanidium*, and of the same general body-shape, but all fins except caudal with more rays; there is a distinct, slender caudal peduncle; the anal fin is emarginate in outline; males do not have a modified anal fin; pectoral pore distinct, behind pectoral base.

Type and only known species: *Pseudotatia parva* n. sp.

Distribution. — Known from the type-locality only: the lower course of the Rio São Francisco, on the border of Pernambuco and Bahia, Brazil.

Discussion. — In the group of genera to which *Pseudotatia* belongs, differences in fin-ray numbers, as well as the presence or absence of a distinct caudal peduncle, are in my opinion clearly of generic value. To force this species into the genus *Tatia*, of which the known species show no differentiation in fin-ray numbers (except for a slight variation in anal rays), would disrupt that extremely uniform genus.

Pseudotatia parva species nova (fig. 29)

Glanidium albescens; (pt.) Fisher, 1917, Ann. Carnegie Mus., 11: 423 (Joazeiro, Rio São Francisco).

Material. — One specimen, 27 to 29 November 1907, Joazeiro, Brazil (J. D. Haseman, FM no. 70580), standard length 46 mm, holotype of the species. 16 specimens, same data (FM no. 57803), standard length 32½-46 mm (three specimens of this sample now RMNH no. 26600).

Diagnostic characters. — D I.6, A 15-16, P I.6, V 7, C i.15.i and rudiments. Differential characters have been given in the generic diagnosis.

Description. — An apparently small species (standard length 32½-46 mm) of normal, subcylindrical body-shape. Head of moderate size, 3.5-3.7 times in standard length, greatest width of body, between the cleithra, 4.25-4.8 times in standard length, height of head at the same place about 0.8 times its width, depth of body 4.0-5.2 times in standard length, predorsal length 2.95-3.1 times in standard length, distance from tip of snout to base of ventrals 1.85-2.0 times in standard length.

Snout blunt, rounded, anterior profile of head convex, postoccipital outline very slightly concave; bones of head and nape covered with thin skin; depression containing the fontanel a large oval between the eyes; fontanel elongate, almost slit-like; horns of nuchal plate flung outwards and downwards, pointed; each jaw with a single broad band of teeth, no teeth on vomer and palatines; eyes large, their greatest diameter 2.8-3.6 times in head, 0.5 to 0.75 in snout, and about 1.0 in bony interorbital; posterior pair of nostrils in a dorsal position, over the anterior halves of the eyes, anterior pair in front of the middle of the eyes, on the vertical part of the snout; maxillary barbels

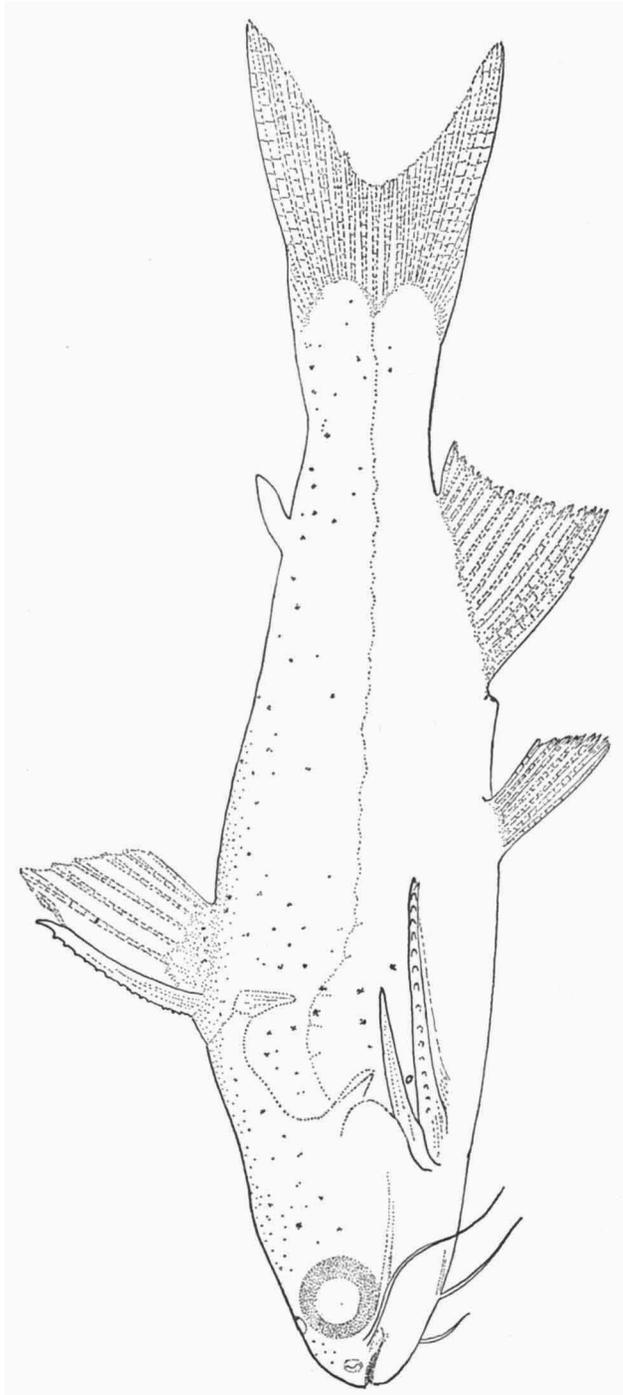


Fig. 29. *Pseudotatitia parva* (FM no. 70580). 3 X.

reaching to the end of the head (posterior border of operculum), outer pair of mandibular barbels about 0.5 to 0.7 times their length, not reaching or only just reaching to base of pectorals; inner pair of mandibular barbels short, only about half the length of the outer pair; postcleithral process well-developed, long and slender; just below this process the pectoral pore.

Dorsal fin with one spine and six rays; the spine of moderate length, 1.7-1.95 times in predorsal length, its posterior border smooth, its anterior border with some 15-20 small teeth which are reasonably well-developed and well-spaced on the distal part, but become smaller, irregularly placed and difficult to count towards the base; a filament of about one-fourth its length is attached to the spine; the first ray equals in length the spine with filament; the following rays are successively smaller, and the last one measures from one-third to two-fifths of the length of the first one.

Anal fin well-developed, with fifteen or sixteen rays, the first two or more often three rays simple, the others divided; the anterior rays are equal in length to the longest dorsal ray, or only a little shorter, the posterior rays are much shorter, and the outline of the fin is more or less concave.

Pectoral fins with one strong spine and six rays; the spine measures 1.25-1.5 times in predorsal length, it is slightly curved backwards, with along its anterior border some 15-20 small teeth, which become indistinct towards its base, along the posterior border 10-14 much larger teeth, curved inwards; the first ray is only a little shorter than the spine, but the succeeding rays diminish rapidly.

The ventrals have one simple and six divided rays; they are bluntly pointed rather than rounded in outline when spread. One specimen (out of 17) has the ventrals with eight rays: the last ray is rudimentary, but perfectly discernible, and clearly separate from the penultimate one.

The caudal fin is deeply forked, with acute lobes; it consists of fifteen divided rays, with above and below one fully developed simple ray, and some shorter simple rays and rudiments.

The small adipose fin is implanted over the posterior part of the base of the anal fin.

The lateral line is well developed, almost straight, with a clear arc in its anterior part.

Sexual dimorphism is almost absent, but in presumed females the urogenital opening is just before the origin of the anal fin, whereas in presumed males it is at the end of a tube along the anterior edge of the anal fin.

Colour. The material is old and undoubtedly bleached out; it is whitish in colour, the dorsal surface light brownish, with dispersed large melanophores, not forming a pattern; all fins hyaline.

Tocantinsia genus novum

Generic diagnosis. — Similar to other genera of Auchenipteridae, but head broad and depressed, width between the cleithra about twice its depth at the same place; mouth very wide; whole anterior part of body flattened; pectoral pore fairly large, over posterior half of pectoral base; six rays in the dorsal fin, seven rays in the ventral fins, caudal peduncle slender, deeper than wide, caudal fin deeply forked, with acute tips. Type and only known species: *Tocantinsia depressa* n. sp.

Distribution. — Only known from the upper course of the Rio Tocantins.

Discussion. — The species on which this genus is based, is evidently close to the other genera of Auchenipteridae here treated, but differs in a remarkable way from all known members of its family as indicated above.

Tocantinsia depressa species nova (fig. 30)

Material. — One specimen, 31 January 1924, Tocantins near Piexa, Goyaz, Brazil (C. Ternetz, CAS no. 6590), standard length 71 mm. One specimen, 11 February 1924, Tocantins near Porto Nacional, Goyaz, Brazil (C. Ternetz, CAS no. 6573), standard length 101 mm, holotype of the species. Two specimens, same sample, standard length 75, 80 mm (one of these now RMNH no. 26498, the other re-registered as CAS no. 13398).

Characters. — D I.6, A 12, P I.6 or I.7, V 7, C i.15.i and rudiments. Differential characters from *Tatia* and other genera have been given in the generic diagnosis.

Description. — A presumably fairly small species (standard length of the four known specimens 71-101 mm), distinguished from *Tatia* and other related genera by the broad and flattened anterior part of the body. Pre-dorsal length 2.6-2.75 times in standard length; greatest width of body, between cleithra, 3.4-3.6 times in standard length; depth of head at the same place half its width; distance from tip of snout to base of ventrals 1.5 times in standard length.

Head large, depressed; greatest width between the cleithra; the depth of the head at that place is exactly half its width; under surface of the head flat; its profile on the snout slightly convex, but almost straight from above the eye to the base of the dorsal fin. Whole upper surface of head and nuchal region bony, with the exception of an oval depression, containing the fontanel, between the eyes; horns of nuchal plate reaching to beyond the origin of the dorsal fin, and flung outwards, club-shaped; the bony part of head and nuchal region covered by skin. Mouth terminal, the jaws evenly rounded, the wide gape reaching to below the anterior rim of the eyes; each jaw with a band of well-developed depressible teeth; no teeth on vomer or palatines;

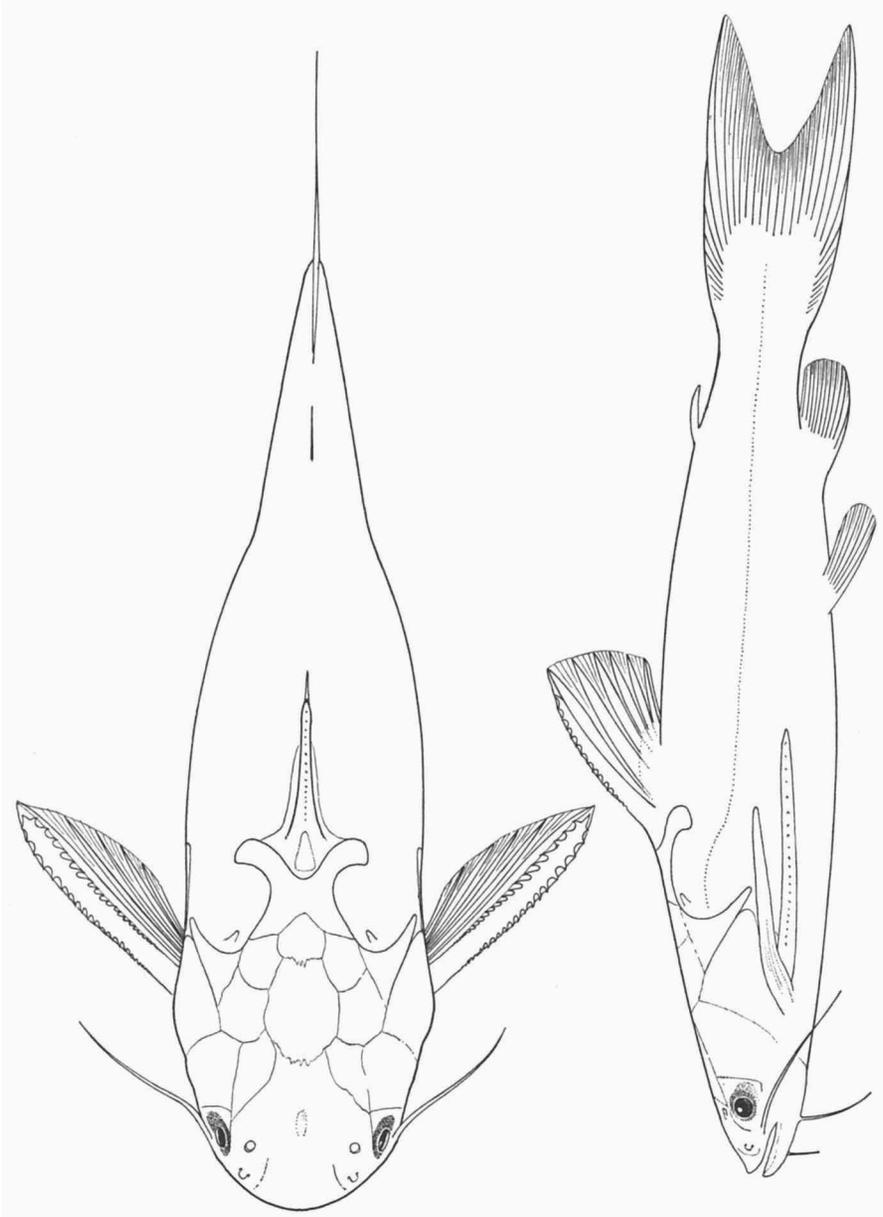


Fig. 30. *Tocantinsia depressa* (CAS no. 6573, s.l. 101 mm).

tongue broad, not free. Eyes small, lateral in position, entirely covered by skin, their longest diameter 5.5-6.5 times in head (measured from tip of snout to hind-border of opercle); eyes about 1.5 times in snout (the eyes being entirely covered by skin, exact measuring is not possible). Nostrils well separated; the posterior one dorsal in position, above and median from the anterior part of the eye, large, roundish, with a velum which is well-developed along the anterior rim, and is interrupted over a short distance along the posterior rim; anterior nostril straight in front of the posterior one so that the shortest lines connecting the four nostrils form, viewed from above, a rectangle; the distance separating anterior and posterior nostril is half the distance separating anterior from anterior and posterior from posterior nostril; the anterior nostril tubular, a little behind the upper lip. Maxillary barbels originating below and just in front of the anterior border of the eye, and reaching to the pectoral base or a little beyond; outer pair of mandibular barbels reaching to the end of the mandibular bone (which is continued much behind the gape), the inner and anterior pair not reaching to the base of the outer pair. Gill-opening restricted, membranes attached to the cleithrum, branchiostegals present, opercle moderately developed, with soft hind-border, as in *Tatia* and *Glanidium*.

Lateral line complete, straight or almost straight, continued to the caudal base.

Dorsal fin with one spine and six rays; the distances between the rays decrease backwards. The spine is strong and comparatively thick, its length half the predorsal length of the fish or a little less, with along its anterior edge a series of about a dozen small antrorse teeth, its posterior border smooth. A soft filament of about one-fourth of its length is attached to the tip of the spine; the first soft ray attains about the same length as the spine with filament, the succeeding rays become progressively shorter, the last one being about two-fifths the length of the first. On its basal part the fin is covered with thick skin.

Anal fin more or less square in outline, with twelve rays, the first three of which are simple, the other nine divided.

Pectorals with one spine and six or seven rays. The spine is long and strong, with a slight curve backwards; its length 1.5-1.7 times in predorsal length; along both its anterior and its posterior border, over practically its whole length, a series of antrorse teeth, numbering 15 to 20 in each series, usually one or two more along the anterior than along the posterior border. Compared with the spine, the rays are inconspicuous; the first one is almost as long as the spine, the succeeding ones very much shorter.

Ventral fins well-developed, reaching to the base of the anal fin, with

seven rays, the first one of which is simple, the others divided; the fins rounded-lanceolate, with the second and third rays longest.

Caudal fin deeply forked with pointed lobes, the central rays about half the length of the outer rays, with fifteen divided rays, on each side one fully developed simple ray, and a number of smaller and rudimentary simple rays.

Adipose fin present, small, opposite the anal fin.

All four specimens are similar, and show no differences which could be interpreted as sexual dimorphism. Although the largest specimen was dissected and its intestines proved to be in a fair condition, I was unable to find its gonads, and it remains possible that either all my specimens are of one sex, or they are immature and for that reason not differentiated.

Colours. Evidently nothing can be said about colours in life; the preserved specimens are light brown above, and white, unpigmented on the under surface. The sides of the head and the flanks have a peppered appearance caused by numerous spots of pigment on a pale background. It is likely that also in life the coloration is plain, as there remains no indication of any kind of pattern.

Habitat. — Unknown, but the flat under surface suggests a bottom fish.

Trachelyichthys genus novum

Generic diagnosis. — No adipose fin. In general appearance, with its short head, compressed body, and long anal fin, close to *Trachelyopterus*, but differs by having 10-rayed ventrals, a truncate caudal fin, and much larger eyes. Pectoral pore distinctly behind pectoral base. Type and only known species: *Trachelyichthys decaradiatus* n. sp.

Distribution. — At present known from the unique type-specimen only, collected in the Rupununi River, British Guiana.

Discussion. — The family Auchenipteridae contains but very few species without an adipose fin. Previously, three or four species were known, divided over three genera as follows: *Trachelyopterus* (two species of which one very doubtful: *T. coriaceus* Valenciennes, 1840, and *T. maculosus* Eigenmann & Eigenmann, 1888), *Trachelyopterichthys* (monotypic: *T. taeniatus* (Kner, 1858)), and *Epapterus* (monotypic: *E. dispilurus* Cope, 1878). Although from the nomenclatural and systematic point of view I am not in favour of a proliferation of monotypic genera, the new species presents such characters that I consider the creation of an own genus for its reception as the only sound solution. As indicated in the diagnosis, I believe *Trachelyopterus* to be its closest relative, but in view of the value I have attached elsewhere in the Auchenipteridae to the number of ventral rays, it would be inconsistent to force *T. decaradiatus* into that genus.

It is to the point to mention here that, within the Auchenipteridae, the genera lacking an adipose fin are probably not a natural group. I consider it likely that *Epapterus* is closely related to *Auchenipterus* and *Pseudepapterus*; the adipose fin in those two genera is so small that it could with some justification be called rudimentary.

Trachelyichthys decaradiatus species nova (fig. 31)

Material. — One specimen, 10/11 April 1957, Karanambo area, Rupununi, British Guiana (R. H. McConnell, BM no. 1971.7.29: 30), standard length 56½ mm, total length 71 mm, holotype of the species.

Characters. — D I.4, A 35 (ii. 33), P I.6, V 10 (i.9), C i.15.i and rudiments. Differential characters have been given in the key to the genera and in the generic diagnosis.

Description. — A presumably small species with a short head, about as wide as deep, and for a member of the Auchenipteridae a comparatively deep, but strongly compressed body. Head 3.9 times in standard length, greatest width of body, between the cleithra, 3.75 times in standard length, height of the head at the same place about 0.8 times its width, depth of body 3.4 times in standard length, depth of body above the ventral base three times its width at the same place, predorsal length 3.45 times in standard length, distance from tip of snout to origin of ventrals 2.4 times in standard length.

Snout blunt, profile of head ascending to the dorsal spine; bones of head and nape covered with very thin skin, not concealing the underlying rugosity; depression containing the fontanel a large oval between the eyes, with the blunter end backwards, the narrower end reaching to the premaxillaries; fontanel in the middle of the depression, comparatively large, roundish; horns of nuchal plate rather small, scarcely bent downwards; mouth terminal, gape about half the body width, upper and lower jaw each with a band of small teeth of even width throughout, without backward projections, no teeth on vomer and palatines; eyes large, lateral in position, their greatest diameter about 3.3 times in head, 0.6 times in snout and 1.7 times in bony interorbital; posterior pair of nostrils in a dorsal position, over the anterior halves of the eyes, anterior pair in front of the middle of the eyes, on the vertical part of the snout; maxillary barbels reaching to a vertical through the dorsal origin and not quite to the end of the postcleithrum; outer pair of mandibular barbels reaching almost as far backwards as the maxillary barbels, inner pair of mandibular barbels about 0.4 times the length of the outer pair; postcleithral process well-developed, remarkably broad (see figure); pectoral pore below it, well behind pectoral base.

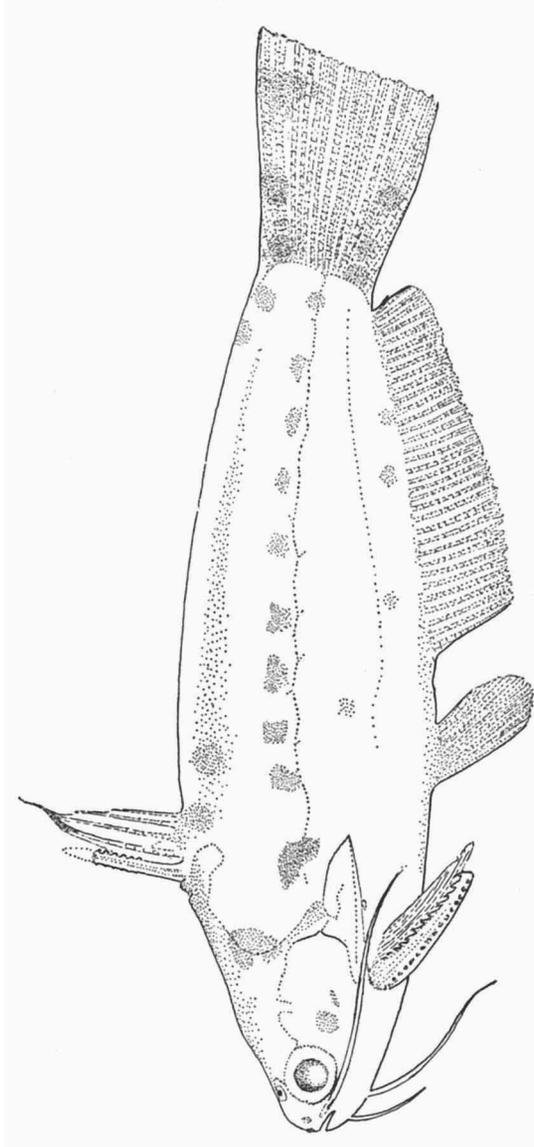


Fig. 31. *Trachelyichthys decaradatus* (BM no. 1971.7.29: 30). 2 X.

Dorsal fin with one spine and four rays; the tip of the spine is missing, but it appears to have been of moderate length and certainly shorter than the pectoral spines; its anterior edge is rough, its posterior edge carries small teeth; the first ray is about two-thirds of the predorsal length, the last one less than half the length of the first one.

Anal fin long, its base about 2.5 times in standard length, with 35 rays, the first two of which are simple, the others divided; with the exception of the short first one, all rays are very much of the same length.

Pectoral fins with one strong spine and six rays, the spine measures 1.6 times in predorsal length, it is very slightly curved, with along its anterior edge 15 small retrorse teeth, along its posterior border 13 larger antrorse ones; the first ray is a little longer than the spine, the following rays are successively shorter.

Ventrals with one simple and nine divided rays, distally rounded, with the central rays longest, and reaching to just beyond the anal origin; the longest rays 2.3 times in predorsal length.

The caudal fin has fifteen divided rays, with above and below a fully developed simple ray and a number of rudiments; it is obliquely truncate with the upper part slightly the longer.

The lateral line is developed over its whole length, but not conspicuous, slightly wavy in its course and giving off short branches.

Colour in preservative (14 years after collecting), pinkish brown, darker on head and back, with an irregular longitudinal series of ill-defined blackish or brownish blotches on the sides, and some fainter ones scattered elsewhere on head and body and on the tail.

PIMELODIDAE

The Pimelodidae form by far the largest and most diversified family of Neotropical catfishes. Gosline (1945) listed no less than 56 genera, and although not all of these are valid, additional genera have been described since, and doubtlessly more remain to be discovered; the number of known species is over 300. It is debatable whether the family as at present understood is a natural one, and its large number of often very distinctive genera makes it difficult to define, but Regan (1911: 572) stated: "This family ... includes a number of diverse types, but is undoubtedly a natural group", and I agree. It is also likely, as Gosline (1941: 83) has pointed out, that within this family the genera without a free eye-rim are not a monophyletic group. Usually several subfamilies are recognised: Calophysinae, Luciopimelodinae, Pimelodinae, Sorubiminae. However, as Gomes (1956) pointed out, the characters on which one of these subfamilies, the Luciopimelodinae, was based,

are also found in a number of genera currently placed in the Pimelodinae. Clearly the family as a whole has to be known much better, anatomically and in other respects, before a meaningful division into subfamilies can be attempted.

Naked catfishes, with the anterior and posterior nares well separated (as opposed to approximate in the Ariidae, which family includes some superficially rather similar species); three pairs of barbels: one pair of maxillary barbels, varying in length from not reaching the base of the pectorals to reaching well beyond the tip of the tail, and two pairs of mandibular barbels; occipital process either present and meeting the dorsal plate, or not meeting the dorsal plate, or absent, never with horns beyond the origin of the dorsal fin as in the Auchenipteridae; bones forming the upper part of the skull either clearly visible, covered with thin skin only, or entirely concealed by thick skin; teeth in bands in both jaws; teeth on vomer and palatines either present or absent (present in only three of the genera occurring in Suriname: *Hemisorubim*, *Pseudoplatystoma*, and *Brachyplatystoma*); eyes varying from large to small, either with a free rim or, especially in the small-eyed forms, without a free rim; eyes absent in some extra-limital forms, one of which will be discussed in this paper; gill-openings large, membranes free from the isthmus and from each other, or only narrowly connected; pectoral pore present in some genera, absent in others: occasionally there is even variation within one genus; dorsal and pectoral spines present or absent, if present strong or weak, strongly serrated or almost smooth; adipose fin present, well-developed and often large; dorsal fin usually with one spine or simple ray and five to seven divided rays; ventral fins with six rays, of which the first one is simple, the others divided; anal fin varying from having no more than eight to over thirty rays; caudal fin of any shape. Lateral line generally complete, and functional over its whole length, slightly curved anteriorly or almost straight; in one genus, *Microglanis*, its posterior half is more or less rudimentary.

In this family the pectoral pore is of even less systematic significance than in the Auchenipteridae, for even amongst members of one genus (which by other morphological characters are closely related), it may be present in one species, lacking in another (cf. *Pimelodus*, *Pseudopimelodus*). If in the generic diagnoses no mention is made of a pectoral pore, it means that I have been unable to find one.

From Suriname, 21 species are known, divided over ten genera as follows: *Hemisorubim* (one species), *Brachyplatystoma* (two species), *Pseudoplatystoma* (one species), *Pimelodus* (three species), *Pimelodella* (two species), *Rhamdia* (one species), *Imparfinis* (one species), *Heptapterus* (five species),

Pseudopimelodus (three species, one of which occurs in two subspecies) and *Microglanis* (two species).

Hoedeman (1961: 135) listed a species of yet another genus from Alowike: *Pinirampus pinirampu* (Spix). Reasons for including specimens collected in the Litani Rivier near Alowike in the fauna of Suriname have been given under the heading Distribution of *Glanidium leopardus*. As *Pinirampus pinirampu* is known from the Amazon basin as well as from British Guiana and Venezuela, its occurrence in Suriname can be expected; nevertheless I cannot accept Hoedeman's record, for examination of his specimen revealed that it is not *Pinirampus pinirampu*, but *Rhamdia quelen*. For some additional particulars see under that species.

Key to the genera of Pimelodidae known from Suriname 1)

- 1a — Large patches of teeth on vomer and palatines, large species 2
 b — No teeth on vomer and palatines 4
 2a — Head strongly depressed; width between the cleithra twice the depth at the same place; lower jaw strongly protruding; eyes large, less than seven times in head, less than three times in snout, maxillary barbels well-developed, but not reaching caudal base; gill-rakers on outer branchial arch not numerous (8 or 9); predorsal length about 2.1-2.3 times in standard length; caudal fin scalloped or slightly forked, with rounded lobes; body plain with along the flanks a few conspicuous black dots, or with round brownish dots of various sizes all over *Hemisorubim*
 b — Head moderately depressed; width between the cleithra no more than one-and-a-half times the depth at the same place; upper jaw protruding; eyes small, over four times in snout, over ten times in head 3
 3a — Maxillary barbels long, reaching beyond caudal base (an excellent character in specimens of up to at least 40 cm standard length, but in very large specimens the barbels are relatively much shorter); gill-rakers on outer branchial arch numerous (17-31); predorsal length 2.5-2.8 times in standard length; caudal fin deeply forked, both outer rays (above and below) elongated into a filament; body plain, without markings, or with some vague brown spots *Brachyplatystoma*

1) This key is made for the identification of species known from Suriname; extra-limital members of the same genera would not necessarily key out. For example, some extra-limital species of *Imparfinis* have maxillary barbels and adipose fin much longer than here indicated, and at least one species of *Pimelodus* (*P. albicans*) has vomerine teeth.

- b — Maxillary barbels of moderate length, not reaching beyond anal origin; gill-rakers on outer branchial arch few (about 4 and a few rudiments); predorsal length 2.4 times in standard length; caudal fin scalloped or shallowly forked, with rounded lobes; body with a striking pattern of black loops and cross-bands *Pseudoplatystoma*
- 4a — Orbital rim free 5
- b — No free orbital rim 8
- 5a — Postoccipital process distinctly connected with the predorsal plate 6
- b — Postoccipital process not meeting the predorsal plate 7
- 6a — Postoccipital process more or less triangular, with a broad base and tapering towards the heart-shaped predorsal plate, which it meets *Pimelodus*
- b — Postoccipital process narrow, of equal width throughout *Pimelodella*
- 7a — Postoccipital process well-developed, covering about two-thirds of the distance from occiput to predorsal plate; maxillary barbels long, reaching at least to below the dorsal fin and usually much farther backwards; pectoral spines well-developed and pungent; ventrals implanted below or behind posterior border of dorsal base, adipose fin long, less than 3.5 times in standard length *Rhamdia*
- b — Postoccipital process rudimentary; maxillary barbels short, reaching to pectoral base or a little beyond; pectoral spines weak and inconspicuous; ventrals implanted in advance of posterior border of dorsal base; adipose fin short, over 4.5 times in standard length *Imparfinis*
- 8a — Long, slender species, without spines in D and P *Heptapterus*
- b — Species usually with blunt, heavy, more or less depressed heads, spines of D and P strong 9
- c — In small specimens of *Imparfinis* the free eye-rim may be indistinct; the spines are weak and short, continued as soft rays, and may be overlooked, so that they might key out with *Heptapterus*; check description of *Imparfinis*.
- 9a — Maxillary teeth laterally with a backward projection, species often large *Pseudopimelodus*
- b — Maxillary teeth laterally without a backward projection, species small (maximum standard length in Suriname 38 mm; extra-limital species to about 70 mm) *Microglanis*

Genus **Hemisorubim** Bleeker

Hemisorubim Bleeker, 1862, Atlas Ichth., 2: 10 — type by original designation, *Platy-stoma platyrhynchos* Valenciennes.

Generic diagnosis. — This monotypic genus is characterized by the strongly depressed head and body; width between the cleithra twice the depth at the same place; under surface from snout to anus flat; eyes large, dorsal in position, with a free rim; snout long, broad, strongly depressed, with a wide mouth; lower jaw protruding; teeth small, a band in each jaw, and patches on the palatine (fig. 32a); postoccipital process well-developed, tapering, its length about twice its width at the base, and meeting the slender predorsal plate, which is slightly longer than the postoccipital process; dorsal and pectoral spines well-developed; maxillary barbels reaching to adipose fin; pectoral pore above implantation of pectoral rays.

Distribution. — Northern and eastern South America from the Orinoco to the La Plata basin.

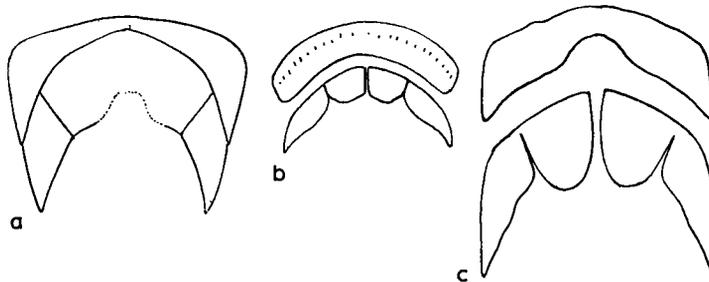


Fig. 32. Shape of tooth-patches in the roof of the mouth of (a) *Hemisorubim platyrhynchos*, (b) *Brachyplatystoma vaillantii*, (c) *Pseudoplatystoma fasciatum*.

***Hemisorubim platyrhynchos* (Valenciennes) (fig. 32a)**

Platystoma platyrhynchos Valenciennes, 1840, in Cuvier & Valenciennes, Hist. Nat. Poiss. (4° ed.), 15: 20 — no locality = Brazil.

Platystoma platyrhynchos; Castelnau, 1855, Anim. Nouv. l'Amér. Sud, Poiss.: 40 (l'Amazone).

Platystoma platyrhynchus; Kner, 1858, Sitzb. Akad. Wiss. Wien, Mathem.-Naturw. Cl., 26 (1857): 398 (Barra do Rio negro); Kappler, 1885, Das Ausland, 58: 919 (Holländisch Guiana); Kappler, 1887, Surinam: 152 (Surinam).

Hemisorubim platyrhynchos; Bleeker, 1862, Atlas Ichth., 2: 10 (name only); Bleeker, 1863, Ned. Tijdschr. Dierk., 1: 97 (name only); Eigenmann & Eigenmann, 1888, Proc. Calif. Acad. Sci., (2) 1: 138 (Manacapuru; Rio Negro; Montalegre; Rio Puty; Lago Alexo; Obidos; Coary; Tabatinga; Hyavary; Tonantins; Sao Paolo); Eigenmann & Eigenmann, 1890, Occ. Pap. Calif. Acad. Sci., 1: 206 (Orinoco, Amazons, Paranahyba and their tributaries); Eigenmann & Eigenmann, 1891, Proc. U.S. Nat. Mus., 14: 31 (Orinoco; Amazons; Paranahyba); Eigenmann & Kennedy, 1903, Proc. Acad. Nat. Sci. Philad., 55: 499 (Asuncion, Rio Paraguay); Eigenmann, McAtee & Ward, 1907, Ann. Carnegie Mus., 4: 116 (Paraguay: Corumba); Eigenmann, 1910, Rep. Princeton Univ. Exp. Patagonia, 3: 391 (Orinoco; Amazons; Paranahyba; Paraguay); Eigenmann, 1912, Mem. Carnegie Mus., 5: 181 (British Guiana); Bertoni, 1914, Fauna Paraguaya: 7 (Alto Paraná); Fowler, 1914, Proc. Acad. Nat. Sci. Philad., 66: 263 (Rupununi River); Fowler, 1915, Proc. Acad. Nat. Sci. Philad., 67: 218 (Peruvian Amazon);

Fisher, 1917, Ann. Carnegie Mus., 11: 418 (Santarem; Laguna near Rio Mamoré, Berlin, Bolivia; Lagoa de Paranagua; Caceres); La Monte, 1935, Amer. Mus. Novit., 784: 6 (Rio Purus and Rio Jurua); Fowler, 1940, Proc. Acad. Nat. Sci. Philad., 91: 224 (Ucayali River basin, Peru); Fowler, 1940, Proc. Acad. Nat. Sci. Philad., 92: 95 (Laguna near Rio Mamoré, Berlin); Fowler, 1941, Proc. Acad. Nat. Sci. Philad., 93: 139 (Therezina, Piauh); Fowler, 1941, Bol. Mus. "Javier Prado", 5: 380, 381 fig. 19 (Perú: Pebas, Contamáná); Eigenmann & Allen, 1942, Fish. W. South America: 114 (Iquitos; Manaos; Contamana; Lago Cashiboya); Schultz, 1944, Proc. U.S. Nat. Mus., 94: 228 (Venezuela); Gosline, 1945, Bol. Mus. Nac. Rio de Janeiro, Zool., 33: 51 (Orinoco; Amazonas; Paraguai; Paranaiba); Fowler, 1945, Los Peces del Peru: 48 (Perú; Contamana); Bertin & Estève, 1950, Cat. Types Poiss. Mus. Paris, 5: 58 (no locality); Fowler, 1951, Arq. Zool. S. Paulo, 6: 588 (Amazônia, Peru, Rio Paranaiba, São Paulo, Paraguay, Venezuela); Boeseman, 1952, Zool. Meded., 31: 181 (Surinam River, near Joden savanna); Lowe, 1964, J. Linn. Soc. Lond., Zool., 45: 110, 141 (Rupununi District of British Guiana); Ringuelet, Arámburu & de Arámburu, 1967, Los Peces Argentinos de Agua Dulce: 335 (Argentina: Rosario; Estancia Laguna Oca, Fsa.; Riacho Formosa; Arroyo El Manantial, Tucumán; Laguna Salada, Fsa.; Riacho Inglés, Fsa.).

Hemisorubim platyrhynchus, Günther, 1864, Cat. Fish. Brit. Mus., 5: 109 (Brazil); Peters, 1877, Mber. Akad. Wiss. Berlin: 470 (Venezuela; Calabozo); Cope, 1878, Proc. Amer. Philos. Soc., 17: 674 (Peruvian Amazon); Vaillant, 1880, Bull. Soc. Philomat., (7) 4: 152 (Caldéron (Haute-Amazone)); Boulenger, 1896, Trans. Zool. Soc. Lond., 14: 27 (Paraguay); A. de Miranda Ribeiro, 1911, Arch. Mus. Nac. Rio de Janeiro, 16: 333 (distribution); A. de Miranda Ribeiro, 1918, Rev. Mus. Paul., 10: 733 (Rio Jurua; Piracicaba); Pearson, 1937, Proc. Calif. Acad. Sci., (4) 23: 111 (Mamoré and Paraguay basins); P. de Miranda Ribeiro, 1964, Bol. Mus. Nac. Rio de Janeiro, Zool., 246: 3 (Rio Araguaya); Lundberg & Baskin, 1969, Amer. Mus. Novit., 2398: 6, 28 (no locality).

Hemisorubim platyrrhynchus; A. de Miranda Ribeiro, 1914, Comm. Linh. Telegr. Estr. Matto-Grosso ao Amazonas, 15, Anexo 5: 7 (Manaos).

Hemisorubim platyrhynchus; Mago-Leccia, 1967, Soc. Venez. Cienc. Nat. Bol., 27: 255 (Venezuela).

Material. — One specimen, 29 December 1963, Sarakreek near Locus (Boeseman, RMNH no. 25767), standard length 112 mm. One specimen, 7 February 1964, Suriname Rivier near Brokopondo (Boeseman, RMNH no. 26521), standard length 151 mm. One specimen, 27 February 1964, Suriname Rivier near Brokopondo (Boeseman, RMNH no. 26522), standard length 314 mm. One specimen, 20 March 1965, Suriname Rivier near Brokopondo (Mees, RMNH no. 26586), standard length 420 mm. One specimen, 20 March 1965, Suriname Rivier near Brokopondo (Mees, RMNH no. 26587), standard length 341 mm. One specimen, 20 March 1965, Suriname Rivier near Brokopondo (Mees, RMNH no. 26846), standard length 225 mm. One specimen, 15 February 1967, Brokopondo Meer near Affobakka (Nijssen, ZMA no. 106845), standard length 190 mm.

Characters. — D I,6, A 10-11 (iii or iv.7), P I,9, V 6 (i.5), C 16-18 (branched rays only), branchiostegals 10-11, gill-rakers 2 + 1 + 5 to 7. Further characters are given in the generic diagnosis.

Colours highly diagnostic. Body light brownish, whitish below, with on each side from three to five moderately large roundish black dots, the first one usually just behind the head, the last one on the caudal base.

Distribution. — The species ranges from the Orinoco basin through eastern South America to the Paraná-Paraguay basin. In Suriname we have

only obtained it in the Suriname Rivier near Brokopondo and in its tributary the Sara Kreek, but it is probably widely distributed.

Habitat. — As far as can be said from our few specimens, this large species is confined to the deeper parts of the large rivers. This habitat preference probably accounts for the fact that we failed to secure more specimens (remarks made in the discussion of *Pseudoplatystoma fasciatum* would also apply to the present species), but the species appears to be uncommon.

Genus **Brachyplatystoma** Bleeker

Brachyplatystoma Bleeker, 1862, Atlas Ichth., 2: 10 — type by original designation, *Platystoma Vaillantii* Valenciennes.

Piratinga Bleeker, 1862, Atlas Ichth., 2: 11 — type by original designation, *Bagrus reticulatus* Kner.

Malacobagrus Bleeker, 1862, Atlas Ichth., 2: 11 — type by original designation, *Pimelodes filamentosus* Lichtenstein.

Generic diagnosis. — Large species with strongly depressed snout, but the profile ascending and the posterior part of the head less depressed: its depth at the level of the cleithra 0.6-0.75 times its width at the same place; eyes small, dorsolateral in position, over five times in snout, over eleven times in head, with a free rim; snout depressed, broadly rounded, upper jaw protruding; teeth in a band in upper and lower jaw, those in the upper jaw slightly larger than is usual in the family, not contiguous with a band of smaller teeth covering vomer and palatines (fig. 32b); postoccipital process long, comparatively narrow, of even width throughout, ending in a deep fork, into which fits the slender tip of the predorsal plate, these bones, however, are not fused, but remain narrowly separated; postoccipital process almost twice the length of the predorsal plate¹⁾; dorsal and pectoral spines not encased in skin, well-developed but not very strong; maxillary barbels very long, reaching to caudal peduncle or much beyond, sometimes over twice the body length in *B. filamentosum* but much shorter in some other species and apparently in very large specimens, of sizes which have not been available; no pectoral pore; caudal fin in all species deeply forked, the outer rays filamentous, sometimes very long; colour plain or with indistinct cross-bars, or with dark dots on the flanks.

Distribution. — Eastern Colombia, Venezuela, the Guianas, Amazonia

1) In *B. flavicans* the postoccipital process has been described as triangular, short, not reaching the predorsal plate and in *B. juruense* as slender but not reaching the predorsal plate. The Eigenmanns (1890: 196) observed that in small specimens of *B. vaillantii* the postoccipital process reaches to the predorsal plate, but that in large specimens it does not. Apparently the shape and length of the occipital process is not a good specific character in the genus *Brachyplatystoma*.

inland to Peru and Bolivia, the Rio Parnaíba, and eastern Brazil, south to the Rio Paraíba in south-eastern Brazil (cf. Eigenmann & Eigenmann, 1890: 197).

Discussion. — The genus is, like so many genera of the two families here dealt with, in need of a critical revision. It appears reasonably certain that there are more names available than valid species, but in the most recent lists (Gosline, 1945; Fowler, 1951) the allocation of names appears to have been an arbitrary process, not based on personal study. Gosline admits seven species, with synonyms as follows: *B. filamentosum* (Lichtenstein) (syn. *Bagrus reticulatus* Kner, *Piratinga pira-aiba* Goeldi, *Platystoma verrucosum* Boulenger, *Bagrus rousseauxii* Castelnau), *B. vaillanti* (Cuvier & Valenciennes) (syn. *B. parnahybae* Steindachner), *B. flavicans* Castelnau (syn.: *Bagrus goliath* Kner), *B. paraense* Steindachner, *B. affine* (Cuvier & Valenciennes), *B. juruense* Boulenger, and *B. parnahybae* Steindachner (syn.: *B. affine* Steindachner, nec Cuvier & Valenciennes). Note that Gosline has listed the name *B. parnahybae* twice, once as a synonym of *B. vaillantii*, once as a valid species.

Fowler (1951) recognizes eight species: *B. affine* (Valenciennes), *B. filamentosum* (Lichtenstein) (syn.: *Bagrus rousseauxii* Castelnau, *Bagrus reticulatus* Kner, *Platystoma mucosa* Vaillant, *Platystoma verrucosum* Boulenger, *Piratinga pira-aiba* Goeldi), *B. flavicans* (Castelnau) (syn.: *Bagrus goliath* Kner), *B. goeldii* Eigenmann & Bean, *B. juruense* (Boulenger), *B. paraense* Steindachner, and *B. vaillantii* (Valenciennes). The difference from Gosline is that Fowler has definitely accepted *B. parnahybae*, and has added *B. goeldii*, a name overlooked by Gosline.

I have not attempted to sort out all these names, mainly because many of the type-specimens are very large, for which reason I have been reluctant to ask for loans, but I have followed Bertin & Estève (1950), who placed *B. affine* in the synonymy of *B. vaillantii*, as, indeed, Eigenmann & Eigenmann (1890: 196) had done many years earlier, whereas on the following pages evidence will be presented that *B. goeldii* is another synonym of *B. filamentosum*. This leaves the genus with six nominal species.

Two species occur in Suriname; these species can easily be told apart although they have been confused by van der Stigchel (1946, 1947) whose description was based on mixed samples.

Brachyplatystoma filamentosum (Lichtenstein)

Pimelodes filamentosus Lichtenstein, 1819, Zool. Mag. (Wiedemann), 1 (3): 60 — Südamerika.

Bagrus rousseauxii Castelnau, 1855, Anim. Nouv. l'Amér. Sud, Poiss.: 32, pl. 14 fig. 1 — la rivière des Amazones.

B[agrus] reticulatus Kner, 1858, Sitzb. Akad. Wiss. Wien, Mathem.-Naturw. Cl., 26 (1857): 376 — Salto Theotônio am Flusse Araguay, Forte do Rio branco und Rio Madeira.

Platystoma mucosa Vaillant, 1880, Bull. Soc. Philomat., (7) 4: 151 — Caldéron (Haute-Amazonie).

Platystoma verrucosum Boulenger, 1881 (?), Zool. Rec. Pisces, (1880): 19 — lapsus only for *P. mucosa* Vaillant.

Piratinga pirá-áiba Goeldi, 1898, Bol. Mus. Paraense, 2: 467, 477, pl. Novos Peixes de Amazonia, fig. 4 — Pará.

Brachyplatystoma goeldii Eigenmann & Bean, 1907, Proc. U.S. Nat. Mus., 31: 661, fig. 1 — Amazon River between Para and Manaos.

Piratinga reticulata; Bleeker, 1862, Atlas Ichth., 2: 11 (name only); Bleeker, 1863, Ned. Tijdschr. Dierk., 1: 99 (name only); Günther, 1864, Cat. Fish. Brit. Mus., 5: 113 (Salto Theotônio on the River Araguay, Forte de Rio Branco, Rio Madeira).

Malacobagrus filamentosus; Bleeker, 1862, Atlas Ichth., 2: 11 (name only); Bleeker, 1863, Ned. Tijdschr. Dierk., 1: 100 (name only).

Piratinga filamentosa; Günther, 1864, Cat. Fish. Brit. Mus., 5: 112 (Brazil); Goeldi, 1901, Bol. Mus. Paraense, 3: 181-194, pl. 1, 2 (Amazonas).

Brachyplatystoma filamentosum; Eigenmann & Eigenmann, 1888, Proc. Calif. Acad. Sci., (2) 1: 136 (name only); Eigenmann & Eigenmann, 1890, Occ. Pap. Calif. Acad. Sci., 1: 195 (discussion of generic allocation; no material); Eigenmann, 1910, Rep. Princeton Univ. Exp. Patagonia, 3: 390 (Brazil; Para); A. de Miranda Ribeiro, 1911, Arch. Mus. Nac. Rio de Janeiro, 16: 329 (Araguaya, Salto Theotônio, Forte do Rio Branco, Rio Madeira, Tocantins, Amazonas); Starks, 1913, Stanford Publ. Univ. Ser.: 27 (Pará); A. de Miranda Ribeiro, 1914, Comm. Linh. Telegr. Estr. Matto-Grosso ao Amazonas, 15, Anexo 5: 8 (Manáos); A. de Miranda Ribeiro, 1920, Comm. Linh. Telegr. Estr. Matto-Grosso ao Amazonas, 58, Anexo 5: 12 (Aripuanan); Gosline, 1945, Bol. Mus. Nac. Rio de Janeiro, Zool., 33: 49 (Brasil); Fowler, 1951, Arq. Zool. S. Paulo, 6: 584 (Amazônia, Rio Parnaíba, Guiana, Venezuela).

Brachyplatystoma reticulata; Eigenmann & Eigenmann, 1888, Proc. Calif. Acad. Sci., (2) 1: 136 (name only).

Brachyplatystoma rousseauxii; Eigenmann & Eigenmann, 1888, Proc. Calif. Acad. Sci., (2) 1: 136 (Para); Eigenmann & Eigenmann, 1890, Occ. Pap. Calif. Acad. Sci., 1: 198 (Para); Eigenmann & Eigenmann, 1891, Proc. U.S. Nat. Mus., 14: 31 (Amazon); Eigenmann & Bean, 1907, Proc. U.S. Nat. Mus., 31: 662 (Amazon River between Para and Manaos); Eigenmann, 1910, Rep. Princeton Univ. Exp. Patagonia, 3: 390 (Amazon and its tributaries); A. de Miranda Ribeiro, 1911, Arch. Mus. Nac. Rio de Janeiro, 16: 327, fig. 128 (Amazonas e tributarios); Starks, 1913, Stanford Publ. Univ. Ser.: 27 (Pará).

Brachyplatystoma reticulatum; Eigenmann & Eigenmann, 1890, Occ. Pap. Calif. Acad. Sci., 1: 198 (Rio Tocantins, Amazon and its tributaries; Rio Madeira); Eigenmann & Eigenmann, 1891, Proc. U.S. Nat. Mus., 14: 31 (Rio Tocantins; Amazon and tributaries; Rio Madeira); Eigenmann, 1910, Rep. Princeton Univ. Exp. Patagonia, 3: 390 (Rio Tocantins; Amazon; Rio Madeira).

Piratinga Rousseauxii; Goeldi, 1898, Bol. Mus. Paraense, 2: 457, 477 (Magoary).

Brachyplatystoma rousseauxi; A. de Miranda Ribeiro, 1914, Comm. Linh. Telegr. Estr. Matto-Grosso ao Amazonas, Anexo 5: 8 (Manáos); Fisher, 1917, Ann. Carnegie Mus., 11: 418 (Pará).

Brachyplatystoma goeldii; Eigenmann & Allen, 1942, Fish. W. South America: 112 (Iquitos, Peruvian Amazon); Fowler, 1945, Los Peces del Peru: 50 (Perú: Iquitos); Fowler, 1951, Arq. Zool. S. Paulo, 6: 585 (Amazônia, Peru).

Brachyplatystoma vaillanti; (pt.) van der Stigchel, 1946, South American Nematognathi: 65 (Surinam); (pt.) van der Stigchel, 1947, Zool. Meded., 27: 65 (Surinam).

Material. One specimen, before 1819, Südamerika (Wustlandt and Graf von Hoffmannsegg, ZMB no. 2973), standard length ca. 165 mm, holotype of the species. One specimen, June 1911, Suriname (Jhr. W. C. van Heurn, RMNH no. 17291), standard length 405 mm. Two specimens, summer 1911, Suriname (Jhr. W. C. van Heurn, RMNH no. 11060), standard length 224, 229 mm. Two specimens, 1911, Paramaribo, Suriname (Jhr. W. C. van Heurn, RMNH, removed from sample no. 17324 and re-registered under no. 26585), standard length 213, 226 mm. One specimen, 6 July 1961, Georgetown fish-market, British Guiana (R. H. McConnell, BM no. 1971.7.29: 95), standard length 260 mm. One specimen, 27 June 1966, mouth of Coppename and Saramacca Rivier (W. Vervoort, RMNH no. 25650), standard length 176 mm.

Characters. — D I.6, A 12-13, P I.8 or I.9, V 6 (i.5), C i.15.i to i.17.i and rudiments, branchiostegals 11, gill-rakers 17-21.

Upper jaw strongly protruding over lower jaw; depth of head at level of cleithra 0.6-0.7 times its width at the same place; maxillary barbels excessively long, more than twice the standard length¹); outer pair of mental barbels comparatively short, reaching to pectoral base or at most to half-way along pectoral spine; gill-rakers shorter and less numerous than in the following species, 17-21 on outer branchial arch; pectoral fins with one spine and 8 or 9 rays; ventral fins distally more or less rounded with little difference in length between the first and the last ray; adipose fin comparatively short, its base opposite of, and of the same length as, the anal base, 7.2-8.2 times in standard length.

Colours of preserved material: dull brown above the lateral line, whitish below, on the body above the lateral line some eight vague roundish dark dots, the last one on the caudal peduncle, near the base of the upper lobe of the caudal fin. The Georgetown specimen is plain, without dots; as the dots are still definitely present in material collected sixty years ago and the Georgetown fish is otherwise well-pigmented, it is likely that it has never had spots; more material must show if this is an individual aberration, or perhaps a permanent character of specimens from British Guiana; I note that the large fish from Pará figured in colour by Goeldi (1901) is also plain.

Distribution. — Widely distributed in Amazonia where, however, only known from the larger rivers, upstream to Iquitos. Here recorded for the

1) It is generally known that large specimens (the species can attain a length of two metres) have relatively much shorter maxillary barbels. An excellent illustrated account of differences between specimens of various sizes was given by Goeldi (1901), to whose paper I refer for further information on this subject. No large specimens have been available to me and in the largest one examined (RMNH no. 17291) the maxillary barbels are broken; even so the longest barbel reaches to beyond the anal origin, and would have amply exceeded the standard length, but might not have attained twice the standard length. In the specimen from British Guiana the right maxillary barbel is over twice the standard length, but the left one, which appears to be complete and not obviously damaged, only ca. 1.5 times the standard length.

first time from the Guianas (Suriname and Demerara), where confined to the lower courses and mouths of the large rivers. No apparent ecological difference from *B. vaillantii*. I have failed to find on what Fowler's (1951) inclusion of Guiana and Venezuela into the range of this species was based, and presume that he made an error, although now it has been found in the Guianas, and may conceivably occur in Venezuela. As mentioned on a later page I believe Puyo's *B. rousseauxii* to be referable to *B. vaillantii*.

Discussion. — Lichtenstein's (1819) description of *Pimelodes filamentosus* is by modern standards inadequate, and I am not aware that the type had ever been re-examined, so that its status remained somewhat doubtful. Fortunately the type still exists in Berlin, and was made available to me. Although it is in a very poor condition it still shows the following diagnostic characters, leaving no doubt about its identity: D 1.6, A 12, P 1.9, gill-rakers 18 (6 + 1 + 11), ventrals rounded, upper jaw strongly protruding, maxillary barbels very long, adipose fin 7.4 times in standard length.

Almost immediately after its description, Eigenmann & Eigenmann (1888: 136) relegated *Platystoma mucosa* to the synonymy of *Brachyplatystoma vaillantii* but certainly in error, for in the description of *P. mucosa* several characters are given which show that it belongs without question to the present species: the long barbels (more than twice the standard length), the number of rays in the pectoral fin (1.8), and the coloration: "La coloration sur l'animal conservé dans la liqueur paraît uniforme; on distingue une ou deux taches noires sur les flancs au niveau de la dorsale, et une tache arrondie, petite, plus nette, de même couleur, à l'extrémité du pédoncule caudal" (Vaillant, 1880). Later authors, like Gosline (1945) and finally Bertin & Estève (1950), who examined the type-specimen, have correctly synonymized *P. mucosa* with *B. filamentosum*.

The synonymy of *Bagrus rousseauxii* Castelnau with *B. filamentosum* has been confirmed by Bertin & Estève (1950: 58), who examined its type-specimen. Only four years after its description, A. de Miranda Ribeiro (1911: 326) questioned the validity of *B. goeldii*, suggesting that it was only a variety of *B. vaillantii*. Of later authors, van der Stigchel (1946) placed *B. goeldii* in the synonymy of *B. vaillantii*, Fowler (1945b, 1951) accepted it as valid, and Gosline (1945) ignored the name altogether. Although one may assume that Eigenmann & Allen (1942), who listed material, regarded *B. goeldii* as a valid species, they did not discuss it in any way, so that the latest published opinion on its status is that of A. de Miranda Ribeiro referred to above. The rather scanty description and the good figure of *B. goeldii* published by Eigenmann & Bean (1907) agree perfectly with my material of *B. filamentosum*.

Brachyplatystoma vaillantii (Valenciennes) (fig. 32b, pl. 15)

Platystoma Vaillantii Valenciennes, 1840, in Cuvier & Valenciennes, Hist. Nat. Poiss. (4° ed.), 15: 16, pl. 423 — de Cayenne et de Surinam.

Platystoma affine Valenciennes, 1840, in Cuvier & Valenciennes, Hist. Nat. Poiss. (4° ed.), 15: 18 — no locality = Rio de Janeiro (cf. Bertin & Estève, 1950: 57).

Platystoma affine; Castelnau, 1855, Anim. Nouv. l'Amér. Sud. Poiss.: 40 (l'Araguay); Günther, 1864, Cat. Fish. Brit. Mus., 5: 109 (no locality).

Platystoma Vaillantii; Kner, 1858, Sitzb. Akad. Wiss. Wien, Mathem.-Naturw. Cl., 26 (1857): 397, pl. V fig. 10 (Pará); Peters, 1877, Mber. Akad. Wiss. Berlin: 469 (Cala-bozo, Venezuela); Goeldi, 1898, Bol. Mus. Paraense, 2: 464, 476 (Magoary; Coumany).

Brachyplatystoma Vaillanti; Bleeker, 1862, Atlas Ichth., 2: 10 (name only); Bleeker, 1863, Ned. Tijdschr. Dierk., 1: 97 (name only); Bleeker, 1864, Nat. Verh. Holl. Maatsch. Wetensch., (2) 20: 70 (Surinama).

Platystoma vaillantii; Günther, 1864, Cat. Fish. Brit. Mus., 5: 108 (Demerara).

Brachyplatystoma vaillanti; Eigenmann & Eigenmann, 1888, Proc. Calif. Acad. Sci., (2) 1: 136 (Tabatinga; Para; Porto do Moz; Avary; Rio Puty; Juiz de Fora on the Parahyba); Eigenmann & Eigenmann, 1890, Occ. Pap. Calif. Acad. Sci., 1: 196 (Tabatinga; Para; Porto do Moz; Avary; Rio Puty; Juiz de Fora, on the Parahyba; Serpa, Rio Negro); Eigenmann & Eigenmann, 1891, Proc. U.S. Nat. Mus., 14: 30 (Eastern slopes of South America north of Rio Parahyba); Eigenmann & Bean, 1907, Proc. U.S. Nat. Mus., 31: 662 (Amazon River between Para and Manaos); Eigenmann, 1910, Rep. Princeton Univ. Exp. Patagonia, 3: 390 (Eastern slopes north of Rio Parahyba); A. de Miranda Ribeiro, 1911, Arch. Mus. Nac. Rio de Janeiro, 16: 323, fig. 124 (distribution); Eigenmann, 1912, Mem. Carnegie Mus., 5: 180 (British Guiana: Rockstone; Georgetown market); Starks, 1913, Stanford Publ. Univ. Ser.: 27 (Pará); A. de Miranda Ribeiro, 1914, Comm. Linh. Telegr. Estr. Matto-Grosso ao Amazonas, 15, Anexo 5: 8 (Manáos); Steindachner, 1915, Denkschr. Akad. Wiss. Wien, Mathem.-Naturw. Kl., 93: 64 (Pará); Fisher, 1917, Ann. Carnegie Mus., 11: 418 (Pará; Santarem; Manáos); Delsman, 1941, Verh. Kon. Natuurh. Mus. België, (2) 21 (3): 79 (Trombetas-river, near Obidos; Manaos (in the harbour)); Schultz, 1944, Proc. U.S. Nat. Mus., 94: 232 (Venezuela); Gosline, 1945, Bol. Mus. Nac. Rio de Janeiro, Zool., 33: 49 (Amazonas; Parnaíba); (pt.) van der Stigchel, 1946, South American Nematognathi: 65 (Surinam; Pará, Brazil; Georgetown market, British Guiana); (pt.) van der Stigchel, 1947, Zool. Meded., 27: 65 (Surinam; Pará, Brazil; Georgetown market, British Guiana); Puyo, 1949, Poiss. Guyane Fr.: 85-87, fig. 48 (Guyane Française); Bertin & Estève, 1950, Cat. Types Poiss. Mus. Paris, 5: 57 (Fl. Surinam ou Cayenne (Guyane); Fl. Surinam (Guyane); Rio de Janeiro (Brésil)); Lundberg & Baskin, 1969, Amer. Mus. Novit., 2398: 6, 28 (no locality).

Brachyplatystoma vaillanti; Beebe, 1925, Zoologica, 6: 121 (Kartabo).

Brachyplatysoma vaillanti; Roth, 1943, Fish Life in British Guiana: 17 (British Guiana).

Hypophthalmus Dawalla, or *Piratinga Reticulata*, *Brachyplatysoma vaillante*; Roth, 1943, Fish Life in British Guiana: 74 (British Guiana: Mazaruni above Kapashi Island).

Brachyplatystoma rousseauxii; (?) Puyo, 1949, Poiss. Guyane Fr.: 82-85, fig. 45, 46 (Guyane Française).

Brachyplatystoma vaillantii; Fowler, 1951, Arq. Zool. S. Paulo, 6: 586 (Amazonas, Rio Parnaíba, Guiana, Venezuela); Dahl, 1961, Noved. Colomb., 1: 509 (Guayabero River, Colombia).

Material. — One specimen, 1908, Georgetown market, British Guiana (C. H. Eigenmann, ZMA no. 110702), standard length 169 mm. Two specimens, 1911, Paramaribo, Suriname (Jhr. W. C. van Heurn, RMNH no. 17324), standard length 186, 188 mm. One specimen, 6 July 1961, Bourda fish market, Georgetown (R. H. McConnell, BM

no. 1971.7.29: 96), standard length 185 mm. One specimen, 10 September 1961, W. bank Demerara River, Georgetown (R. H. McConnell, BM no. 1971.7.29: 97), standard length 167 mm. Five specimens, 12 September 1961, Bourda fish market, Georgetown (R. H. McConnell, BM no. 1971.7.29: 98-102), standard length 148, 162, 170, 188, 197 mm. Twelve specimens, 27 October 1961, Bourda fish market, Georgetown (R. H. McConnell, BM no. 1972.7.27: 679-690), standard length 125-152 mm. One specimen, 22 June 1966, mouth of Coppename near Coppename Punt, Suriname (Nijssen, ZMA no. 106843), standard length 242 mm. One specimen, 27 June 1966, mouth of Coppename and Saracca Rivier, Suriname (W. Vervoort, RMNH no. 26590), standard length 284 mm. Our collection further contains some old specimens from Suriname (leg. Dieperink) and elsewhere, which were correctly identified by van der Stigchel, and therefore have not been re-studied (RMNH nos. 3016, 3017, 3018, 14762, 16051).

Characters. — D I. 6, A 13-15 (iv or v.9½ to 11), P I.10 or I.11, V 6 (i.5), C i.15.i and rudiments, branchiostegals 11, gill-rakers 25-31.

Upper jaw only slightly protruding over lower jaw; depth of head at level of cleithra 0.7-0.75 times width at the same place; maxillary barbels very long, reaching to the caudal tip; outer pair of mental barbels long, reaching to beyond ventral origin or even to beyond anal origin; gill-rakers numerous, 25-31 on outer branchial arch; pectoral fins with one spine and 10 or 11 rays; ventral fins pointed, the inner ray no more than 0.6 times the length of the outer ray; adipose fin comparatively long, its base distinctly longer than the anal base, 4.25-4.8 in standard length.

Colours of preserved material: dorsal surface plain light brown, without any markings, ventral surface whitish.

Size. Dahl (1961: 509) reported from Colombia: "The biggest specimen seen by the author had a weight of about 90 kilogrammes, but it is told that specimens up to and even above 200 kilogrammes are not rare in the lower parts of the Guaviare River. Shark hooks and manila rope are sometimes used to catch the larger ones. Professor Medem on one occasion saw a rather big shark hook that had been almost completely straightened by a giant "valentón". Such monsters have not, to my knowledge, been recorded in Suriname 1).

Distribution. — Tropical South America east of the Andes, from Colombia (Guayabero River) and Venezuela (Calabozo), through the Guianas and Amazonia to the Parahyba. Although in the Amazon basin the species has been found upstream to Tabatinga, in Suriname it appears to be confined to

1) From Dr. Boeseman I received a colour slide of a specimen of about 170 cm total length, captured at Brokopondo in February 1964, before the dam was closed. This proves that large individuals do occur in Suriname and that, at least in the larger rivers, the species may be found some distance upstream. The picture shows the fish with blue (near to Neropalim Blue of Ridgway, 1912: pl. xxii) upper parts, white below. A black-and white photograph, made from the slide, although not quite sharp, appears to be of sufficient interest to be reproduced here (plate 15).

the river mouths, the only certain localities being Paramaribo (Suriname Rivier), and the Coppename-Saramacca mouth. The same is true for French Guiana (Puyo, 1949: 87), and for British Guiana, for although Eigenmann (1912: 180) mentioned a specimen from Rockstone ("head only"), all other records are from coastal areas and there is nothing to support Eigenmann's (1912: 76 footnote 34) contention that: "This species certainly occurs generally inland".

Discussion. — Puyo's (1949) description and figures of "*Brachyplatystoma rousseauxii*" appear to be referable to large individuals of *B. vaillantii* rather than to *B. filamentosum* (cf. adipose base longer than anal base, upper jaw only a little longer than lower jaw, no spots on the body).

Genus **Pseudoplatystoma** Bleeker

Pseudoplatystoma Bleeker, 1862, Atlas Ichth., 2: 10 — type by original designation, *Silurus fasciatus* Bloch = *Silurus fasciatus* Linnaeus.

Hemiplatystoma Bleeker, 1862, Atlas Ichth., 2: 10 — type by original designation, *Platystoma tigrinum* Valenciennes.

Generic diagnosis. — Very large species with big, moderately depressed head; width between the cleithra about 1.3 times depth at the same place; eyes comparatively small, not quite dorsal in position, with a free rim; snout long, depressed, upper jaw protruding; teeth smallish, in a band in each jaw and patches on vomer and palatines (fig. 32c); postoccipital process well-developed, much longer than wide, meeting the slender predorsal plate; dorsal and pectoral spines well-developed, but encased in thick skin and therefore not conspicuous; maxillary barbels not very long, varying from reaching to half-way along the pectorals, to just reaching anal origin. Further characters have been given in the key.

Distribution. — Northern and eastern South America, east of the Andes, south to the Paraná-La Plata basin.

Discussion. — Three species are currently recognised: *P. fasciatum* (Linnaeus), *P. coruscans* (Agassiz) and *P. tigrinum* (Valenciennes). Besides, *P. fasciatum* has been divided into a number of subspecies, about which more will be said in the discussion of that species. The validity of *P. tigrinum* requires confirmation, it may be a synonym of *P. fasciatum*.

Pseudoplatystoma fasciatum (Linnaeus) (fig. 32c)

[*Silurus*] *fasciatus* Linnaeus, 1766, Syst. Nat. (ed. 12), 1: 505 — Habitat in Brasilia, Surinami, coenis expetita.

Silurus fasciatus; Gmelin, 1789, Syst. Nat. (ed. 13), 1 (3): 1359 (Habitat Surinami, in Brasilia); Bloch, 1797, Ichth. Hist. Nat. Poiss., 11: 22, pl. 366 (Surinam).

Silurus Fasciatus; Bloch & Schneider, 1801, Syst. Ichth.: 382 (Habitat in Surinamo).

- Pimelodus fasciatus*; La Cepède, 1803, Hist. Nat. Poiss., 5: 94, 99-101 (Surinam).
Platystoma fasciatum; Valenciennes, 1840, in Cuvier & Valenciennes, Hist. Nat. Poiss. (4° ed.), 15: 11 (Surinam); Kner, 1858, Sitzb. Akad. Wiss. Wien, Mathem.-Naturw. Cl., 26 (1857): 401 (Surinam); Günther, 1864, Cat. Fish. Brit. Mus., 5: 107 (Essequibo; Surinam; River Capin, Para); Kappler, 1885, Das Ausland, 58: 899 (Holländisch Guiana; Armina Fall); Kappler, 1887, Surinam: 150 (Surinam; Arminafall).
Pseudoplatystoma fasciatum; Bleeker, 1862, Atlas Ichth., 2: 10 (name only); Bleeker, 1863, Ned. Tijdschr. Dierk., 1: 97 (name only); Bleeker, 1864, Nat. Verh. Holl. Maatsch. Wetensch., (2) 20: 72 (Surinama); Eigenmann, 1912, Mem. Carnegie Mus., 5: 182 (British Guiana: Rupununi Pan, Wismar); Popta in Benjamins & Snelleman, 1914-1917, Encycl. Ned. West-Indië: 592 (Suriname); van der Stigchel, 1946, South American Nematognathi: 68 (Surinam); van der Stigchel, 1947, Zool. Meded., 27: 68 (Surinam); Boeseman, 1953, Zool. Meded., 32: 7 (Leonsberg); Lowe, 1964, J. Linn. Soc. Lond., Zool., 45: 110, 111, 114, 119, 141, 143 (Rupununi district); McConnell, 1967, Timehri, 43: 67 (Rupununi).
Pseudoplatystoma fasciatus; McConnell, 1967, Timehri, 43: 65 (Pirara creek, Rupununi).
pseudoplatystoma fasciatum; Nijssen, 1970, Schakels, S 76: 3, 4, pl. (Suriname).

Note. — In view of the uncertainty concerning the validity of subspecies, the bibliography is limited to references concerning occurrence in the Guianas.

Material. — One specimen, 20 March 1965, Suriname Rivier near Brokopondo (Mees, RMNH no. 26588), standard length 715 mm. One specimen, head only, 20 February 1966, Sipaliwini (Mees, RMNH 26589), head slightly smaller than that of the first specimen. In addition there are 19 specimens, mostly in the size-range 45-60 cm standard length, in ZMA (leg. Nijssen), which I have not studied.

Characters. — D I.6, A 14 (v.9), P I.10, V 6 (i.5), C i.15.i and rudiments, branchiostegals 14, gill-rakers less than 10 (1 + 1 + 1 or 2 and several rudimentary ones).

Distribution and habitat. — The species has been recorded from a very wide area in eastern South America, but until its synonymy has been sorted out, there remains an element of uncertainty in many records. In Suriname it appears to be widely distributed in the large rivers, but also in deeper parts of the smaller rivers quite far upstream, as proved by the example from Sipaliwini and one I saw in the upper course of the Sara Kreek. The population density of a species of this size is presumably much less than that of the smaller species, and it would also be more difficult to catch. There is no reason, however, to believe that it is uncommon, and Kappler (1885) described it as: "im inneren Lande sehr häufig". Lowe (1964) found it common in the Rupununi District of British Guiana.

Discussion. — Next to *Brachyplatystoma*, this is the largest of the freshwater inhabiting Nematognathi known from Suriname. The tiger-stripes on the body further make it easy to identify.

The Eigenmanns (1888, 1889) have described and named several varieties,

based mainly on length of barbels and differences in markings. These varieties have later become accepted as subspecies (Eigenmann & Eigenmann 1890; Gosline, 1945; Fowler, 1951).

Pseudoplatystoma fasciatum being such a large species, captured individuals are more likely to end up in the frying pan or in the cooking pot than in the collector's bin, and the various supposed subspecies remain known from very few individuals, so that the possibility that some of them are based on individual variants cannot be excluded. Anyway, these subspecies have never been considered in the light of the modern subspecies-concept, according to which a subspecies is a geographical race; consequently (excluding exceptions which to this general discussion are irrelevant) no two subspecies can occur together. However, *P. fasciatum intermedium* was described from Obidos, whence the Eigenmanns also recorded specimens of the nominate race. Indeed, the distribution of the nominate race as given in recent literature, includes the ranges of all the subspecies, an impossible situation.

When a species is divided into geographical races, the first obvious thing to do is restrict its type-locality, so that one knows what the nominate race is, but even this has never been done. Linnaeus (1766: 505) gave: "Habitat in Brasilia, Surinami, coenis expetitia", and his references show that the locality Suriname was based on Seba (1758: 84, pl. 29 fig. 67), whereas the reference to Brasil was derived, through Seba, from Marcgrav. I here restrict the type-locality to Suriname, which makes my Brokopondo specimen topotypical.

Until the position of the various subspecies has been clarified, there does not appear to be any point in using a trinomial. A study of *P. fasciatum* should also include *P. tigrinum*, which appears very doubtfully distinct, and several names given to individuals from Amazonia, which have been placed in the synonymy of nominate *P. fasciatum*, and have never been re-evaluated when subspecies were later described from the same region.

P. fasciatum is a fish of excellent edible quality; the flesh is firm, and best when fried or grilled. As mentioned above, this fact, together with a size which makes conservation difficult, has certainly contributed to its being somewhat scarce in collections.

Van der Stigchel (1946: 68, 69) states in the generic diagnosis of *Pseudoplatystoma* "barbels short", but in the description of the species *P. fasciatum*, the only member of the genus which he examined: "maxillary barbels reaching the tip of the caudal". I have checked this character in the three specimens in Leiden on which his description was based and found that all three have the maxillary barbels just reaching the base of the anal fin.

Genus **Pimelodus** La Cepède

Pimelodus La Cepède, 1803, Hist. Nat. Poiss., 5: 93 — based on a whole series of species, now placed in several families; type by subsequent selection, *Pimelodus maculatus* La Cepède.

Generic diagnosis. — D I.6, A 10-14, P I.9 or I.10, V 6, C i.15.i and rudiments. Sturdy fishes of moderate to fairly large size; skull and nuchal bones covered with thin skin only; postoccipital process with a broad base, tapering backwards to meet the small dorsal plate; teeth in a band in each jaw, none on vomer and palatines (some extra-limital species have teeth on vomer and pterygoids); barbels long, maxillary barbels usually reaching to caudal base or beyond (in *P. ortmanni* the maxillary barbels reach only just beyond the ventral base); a minute pore above the posterior part of the pectoral base (*P. blochii*, *P. albofasciatus*), or no pore (*P. ornatus*); dorsal and pectoral spines strong, pungent, more or less serrated; adipose fin well-developed; caudal fin large, forked.

In the species occurring in Suriname, the adipose fin is short and high, almost triangular in shape, but some members of the genus, in particular *P. altissimus*, have a long adipose fin.

Discussion. — The genus is widely distributed in tropical South America, from Panama to the Rio de la Plata. Over twenty species have been described, some of which are of doubtful validity.

In Suriname, the genus is represented by three species: *P. ornatus* is a well-differentiated species with a wide distribution in South America, and unlikely to be confused with any other species. The other two species, *P. blochii* and *P. albofasciatus* are not only extremely similar to each other, but belong to a group of confusingly similar forms which for purposes of discussion may be referred to as the *P. maculatus*-group after the first-described species. A revision of this group, however desirable, goes beyond the scope of this contribution, and could, I believe, only be carried out successfully on the basis of systematic collecting of fresh material in all parts of its extensive range (under the names *P. maculatus*, *P. clarias*, etc., members of the group have been recorded from Uruguay and Bolivia to Venezuela and Panama) 1). How many described forms belong to the group is not certain; of the species and subspecies currently recognized at least the following can be placed in

1) Such a study would certainly be very rewarding, and is also urgent, as in Brazil experiments of transplantation of *Pimelodus "clarias"* have begun (cf. Schubart, 1964: 19). If these ill-advised experiments are "successful", they will not fail to foul up the zoogeography of this interesting group of fishes. These introductions appear particularly unnecessary, if at the places of introduction very closely related forms do occur naturally.

it: *P. maculatus* La Cèpède, 1803, *P. argenteus* Perugia, 1891, *P. ortmanni* Haseman, 1911, *P. blochii* Valenciennes, 1840, *P. coprophagus* Schultz, 1944, *P. punctatus* (Meek & Hildebrand, 1913), *P. albofasciatus* n. sp. and probably *P. garcia-barrigai* Dahl, 1961. I consider it likely that varieties or forms as described by Eigenmann (1912) and Devincenzi & Teague (1942: 44-45) are also at least valid subspecies. Anyway, the new information gained from the material collected in Suriname is that two forms which formerly would have been dismissed as varieties, are morphologically and ecologically differentiated and apparently geographically separated. Therefore, they should be recognised nomenclaturally, either as subspecies or as species. The reason why I am treating both forms from Suriname as species (and not for example as subspecies of *P. maculatus*), is because the arbitrary application of trinomials to some forms is meaningless, and quite likely erroneous, until the whole group has been revised.

Key to the species of *Pimelodus* known from Suriname

- 1a — A large black blotch present on the dorsal fin; gill-rakers on outer branchial arch 14-21 (usually 15-18) *P. ornatus*
 1b — Dorsal fin without markings; gill-rakers on outer branchial arch 21-30 (usually 23-27) 2
 2a — Colour plain, light liver-brown; eye smaller, 1.0-1.7 in bony interorbital *P. blochii*
 2b — Colour dark greyish with a conspicuous broad white longitudinal band along the sides; eye larger, 0.7-1.0 in bony interorbital *P. albofasciatus*

***Pimelodus ornatus* Kner**

Pimel[odus] ornatus Kner, 1858, Sitzb. Akad. Wiss. Wien, Mathem.-Naturw. Cl., 26 (1857): 411, pl. VI fig. 18 — von Surinam, dem Rio Negro und Cujaba.

Megalonema rhabdostigma Fowler, 1914, Proc. Acad. Nat. Sci. Philad., 66: 256, fig. 10 — Rupununi River, British Guiana.

Pimelodus ornatus; Günther, 1864, Cat. Fish. Brit. Mus., 5: 116 (River Capin, Para); Peters, 1877, Mber. Akad. Wiss. Berlin: 470 (Venezuela: Calabozo); Kappler, 1881, Holländisch-Guiana: 167 (Holländisch-Guiana); Kappler, 1885, Das Ausland, 58: 919 (Holländisch Guiana); Kappler, 1887, Surinam: 152 (Surinam); Eigenmann & Eigenmann, 1888, Proc. Calif. Acad. Sci., (2) 1: 134 (Goyaz); Eigenmann & Eigenmann, 1891, Proc. U.S. Nat. Mus., 14: 29 (Amazon, Solimoens, and northward); Goeldi, 1898, Bol. Mus. Paraense, 2: 456, 461 (Rio Negro, ex Kner; Igarapé-mirim); Regan, 1905, Proc. Zool. Soc. Lond.: 190 (Rio Negro); Eigenmann, 1910, Rep. Princeton Univ. Exp. Patagonia, 3: 388 (Paraguay; Brazilian Amazons and northward); A. de Miranda Ribeiro, 1911, Arch. Mus. Nac. Rio de Janeiro, 16: 287, fig. 113 (description, distribution); Eigenmann, 1912, Mem. Carnegie Mus., 5: 175 (British Guiana: Creek below Potaro Landing, Tumatumari, Rockstone, Crab Falls); A. de Miranda Ribeiro, 1914, Comm. Linh. Telegr. Estr. Matto-Grosso ao Amazonas, 15, Anexo 5: 6 (Caceras, Rio Paraguay, M. Grosso); Bertoni, 1914, Fauna Paraguaya: 7 (Alto Paraná); Fisher, 1917,

Ann. Carnegie Mus., 11: 412 (Asunción, Rio Jaurú); A. de Miranda Ribeiro, 1920, Comm. Linh. Telegr. Estr. Matto-Grosso ao Amazonas, 58, annexo 5: 12 (Jamary?); Beebe, 1925, Zoologica, 6: 117, 118 (Kartabo); Pearson, 1937, Proc. Calif. Acad. Sci., (4) 23: 92 (Balsas, Peru; Tingo de Pauca, Rio Marañon, Peru); Pearson, 1937, Proc. Calif. Acad. Sci., (4) 23: 111 (Paraguay basin); Fowler, 1941, Bol. Mus. "Javier Prado", 5: 375 (Perú (Rio Marañón)); Eigenmann & Allen, 1942, Fish. W. South America: 48, 53, 103 (Rio Paranapura, Yurimaguas); Schultz, 1944, Proc. U.S. Nat. Mus., 94: 203 (Venezuela); Gosline, 1945, Bol. Mus. Nac. Rio de Janeiro, Zool., 33: 40 (Paraguay; Amazonas e para o norte); Fowler, 1945, Los Peces del Peru: 41 (Perú (Rio Marañón)); van der Stigchel, 1946, South American Nematognathi: 62 (Surinam; Lower Potaro River, British Guiana); van der Stigchel, 1947, Zool. Meded., 27: 62 (Surinam; Lower Potaro River, British Guiana); Fowler, 1951, Arq. Zool. S. Paulo, 6: 557 (Amazônia, Peru, Bolivia, Rio Paraná, Paraguay, Guiana, Venezuela); Boeseman, 1953, Zool. Meded., 32: 7 (Marowini Basin, Nassau Mountains); Dahl, 1961, Noved. Colomb., 1: 494 (Colombia: the Guayabero River and several of its larger tributaries, such as Caño Morrocoy and Caño Lozada); Luengo, 1963, Acta Biol. Venez., 3: 336 (Lago de Valencia, Venezuela, introduced); Lowe, 1964, J. Linn. Soc. Lond., Zool., 45: 110, 140, 143 (Rupununi District); Mago-Leccia, 1967, Soc. Venez. Cienc. Nat. Bol., 27: 255 (Venezuela); McConnell, 1967, Timehri, 43: 67 (Rupununi); Lundberg & Baskin, 1969, Amer. Mus. Novit., 2398: 6, 29 (no locality).

Pseudorhamdia ornata; Bleeker, 1864, Nat. Verh. Holl. Maatsch. Wetensch., (2) 20: 77 (Surinama).

Pimelodus ornata; Eigenmann & Eigenmann, 1890, Occ. Pap. Calif. Acad. Sci., 1: 168 (Goyaz); Eigenmann & Kennedy, 1903, Proc. Acad. Nat. Sci. Philad., 55: 499 (Paraguay: Asuncion, Arroyo Trementina); Eigenmann, McAtee & Ward, 1907, Ann. Carnegie Mus., 4: 115 (Corumba, Matto Grosso).

Material. — 87 specimens as follows. One specimen, ca. 1824-1828, Cuyaba, Brazil (J. Natterer, MV no. 45832), standard length 277 mm, syntype of the species. One specimen, 1909, Suriname (Heller, MV no. 45841), standard length 195 mm. Five specimens, 22 December 1963, Tapoeripa Kreek near Brokopondo (Boeseman, RMNH nr. 25563), standard length 139, 163, 203, 222, 230 mm. Four specimens, 3 January 1964, Affobakka, below dam (Boeseman, RMNH no. 25564), standard length 230, 254, 256, 283 mm. Four specimens, 4 January 1964, Suriname Rivier and creeks near Brokopondo (Boeseman, RMNH no. 25565), standard length 142, 145, 163, 170 mm. One specimen, 10 January 1964, near Brokopondo (Boeseman, RMNH no. 25566), standard length 130 mm. Four specimens, 11 January 1964, creek near Brokopondo (Boeseman, RMNH no. 25567), standard length 112, 122, 124, 138 mm. Four specimens, 12 January 1964, creek near Brokopondo (Boeseman, RMNH no. 25568), standard length 114, 115, 138, 150 mm. One specimen, 25 January 1964, Suriname Rivier near Brokopondo (Boeseman, RMNH no. 25569), standard length 229 mm. Two specimens, 28 January 1964, creek near Brokopondo (Boeseman, RMNH no. 25570), standard length 177, 245 mm. One specimen, 30 January 1964, Ceder Kreek near Brokopondo (Boeseman, RMNH no. 25571), standard length 145 mm. One specimen 3/4 February 1964, Suriname Rivier near Brokopondo (Boeseman, RMNH no. 25572), standard length 150 mm. Five specimens, 5 February 1964, Suriname Rivier near Brokopondo (Boeseman, RMNH no. 25573), standard length 128, 128, 130, 156, 191 mm. Eight specimens, 6 February 1964, Suriname Rivier near Brokopondo (Boeseman, RMNH no. 25574), standard length 114-194 mm. Two specimens, 7 February 1964, Suriname Rivier near Brokopondo (Boeseman, RMNH no. 25575), standard length 114, 192 mm. Seven specimens, same data (Boeseman, RMNH no. 25576), standard length 144-256 mm. Eight specimens, 8 February 1964, Suriname Rivier near

Brokopondo (Boeseman, RMNH no. 25577), standard length 129-251 mm. One specimen, 14 February 1964, Suriname Rivier near Brokopondo (Boeseman, RMNH no. 25578), standard length 201 mm. Three specimens, 21 February 1964, Suriname Rivier near Brokopondo (Boeseman RMNH no. 25579), standard length 140, 149, 153 mm. Five specimens, 21 February 1964, Suriname Rivier near Brokopondo (Boeseman, RMNH no. 25580), standard length 124, 126, 139, 141, 190 mm. One specimen, 27 February 1964, Suriname Rivier near Brokopondo (Boeseman, RMNH no. 25581), standard length 155 mm. One specimen, 20 March 1965, Suriname Rivier near Brokopondo (Mees, RMNH no. 25582), standard length 154 mm. One specimen, same data (Mees, RMNH no. 26512), standard length 173 mm. One specimen, 13 May 1965, Suriname Rivier near Botopassie (Mees, RMNH no. 25670), standard length 61 mm. Five specimens, 13 August 1965, Mamadam (Mees, RMNH no. 25583), standard length 113, 133, 177, 179, 254 mm. One specimen, 2 September 1965, Suriname Rivier near Brokopondo (Mees, RMNH no. 25584), standard length 207 mm. Five specimens, 23 January 1966, Sipaliwini (Mees, RMNH no. 25585), standard length 156, 158, 170, 174, 242 mm. Two specimens, 6 February 1966, Sipaliwini (Mees, RMNH no. 25586), standard length 144, 157 mm. Two specimens, 9 February 1966, Sipaliwini (Mees, RMNH no. 25587), standard length 180, 225 mm.

Characters. — D I.6, A II-14 (iii or iv.8½ to 10), P I.9 or I.10, V 6 (i.5), C i.15.i and rudiments, branchiostegals 10, gill-rakers 14-21, usually 15 to 18 (3 to 5 + 11 to 17). This species differs from *P. blochii* and *P. albofasciatus* by its more slender appearance, longer and anteriorly more depressed head, wider mouth with upper jaw protruding much farther, different number of gill-rakers, and most conspicuously by its colours as described below.

Colour. Upper surface of head, and back blackish-grey; a yellow band above the lateral line, its anterior part curved upwards to the origin of the dorsal fin; a broad blackish-grey band along the lateral line; remainder of body pale, tinged yellowish; dorsal fin yellow, with a broad black median band from the spine to the fourth or fifth ray; caudal fin yellow with on each lobe a broad longitudinal blackish band; paired fins, anal and adipose fins yellowish.

Whereas the yellow fades comparatively rapidly in preserved specimens (which is undoubtedly the reason that it has not, to my knowledge, been mentioned in literature), the black pigment remains, so that even specimens collected over a century ago can readily be identified by it; especially the black band or patch on the dorsal fin is an easy character.

Habitat. — A common inhabitant of greater and smaller rivers, not often found in creeks.

Distribution. — This species is widely distributed in tropical South America from Colombia (Guayabero basin) and Venezuela (Calabozo, Orinoco basin), through the Guianas and the whole Amazon basin to the Rio Paraguay.

Discussion. — Its characteristic colour pattern, well described and illustrated by Kner (1858), causes this to be an easily-recognized species, which has for this reason remained largely clear of synonyms and misidentifications.

The one synonym, *Megalonema rhabdostigma*, has long since been recognized as such (cf. Schultz, 1944a: 215).

***Pimelodus blochii* Valenciennes**

(*Pimelodus clarias* Auct.)

Pimelodus Blochii Valenciennes, 1840, in Cuvier & Valenciennes, Hist. Nat. Poiss. (4° ed.), 15: 139 — Cayenne, Surinam, Colombie; here restricted to Suriname.

Pseudorhamdia macronema Bleeker, 1864, Nat. Verh. Holl. Maatsch. Wetensch., (2) 20: 79, pl. 14 (Surinama).

Silurus Clarias; (pt.) Bloch, 1785, Ichthyologie, 1: 198, pl. 35 fig. 1 (du Brésil & de Surinam).

Silurus Callarias; (pt.) Bloch & Schneider, 1801, Syst. Ichth.: 379 (in fluviis Americae australis).

Pimelodus clarias; (pt.) La Cepède, 1803, Hist. Nat. Poiss., 5: 93, 100 (eaux douces du Brésil et dans celles de Surinam).

Pimelodus clarias; (pt.) van der Stigchel, 1946, South American Nematognathi: 59 (Surinam, Paramaribo); (pt.) van der Stigchel, 1947, Zool. Meded., 27: 59 (Surinam, Paramaribo); Boeseman, 1953, Zool. Meded., 32: 7 (Sommelsdijkse Kreek, near Wolfenbottel (asylum), Paramaribo; Paramaribo, Surinam River; Surinam River, near plantation Peperpot; Surinam River, near Jodensavanne).

Piramutana Blochii; Kappler, 1881, Holländisch-Guiana: 167 (Holländisch-Guiana); Kappler, 1885, Das Ausland, 58: 919 (Holländisch Guiana); Kappler, 1887, Surinam: 152 (Surinam).

Pimelodes clarias; Lijding, 1959, Surinaamse Landb., 7: 73 (Suriname).

Material. — One specimen, 1824-1836, Suriname, presumably Suriname Rivier near Paramaribo (H. H. Dieperink, RMNH no. 3069), standard length 177 mm, figured syntype of *Pseudorhamdia macronema* Bleeker. One specimen, same data (H. H. Dieperink, RMNH no. 3070), standard length 128 mm, syntype of *Pseudorhamdia macronema*. One specimen, same data (H. H. Dieperink, RMNH no. 3071), standard length 147 mm, syntype of *Pseudorhamdia macronema*. One specimen, same data (H. H. Dieperink, RMNH no. 3072), standard length 97 mm, syntype of *Pseudorhamdia macronema*. One specimen, same data (H. H. Dieperink, MNP no. 72), standard length 216 mm, very likely syntype of *Pimelodus Blochii*. Two specimens, 5 January 1964, Suriname Rivier and creeks near Brokopondo (Boeseman, RMNH no. 26503), standard length 103, 139 mm. One specimen, 12 January 1964, tributary of Suriname Rivier near Brokopondo (Boeseman, RMNH no. 26504), standard length 97 mm. Three specimens, 3/4 February 1964, Suriname Rivier near Brokopondo (Boeseman, RMNH no. 26499), standard length 170, 175, 195 mm. 20 specimens, 5 February 1964, Suriname Rivier near Brokopondo (Boeseman, RMNH no. 26500), standard length 84-168 mm. One specimen, 7 February 1964, Suriname Rivier near Brokopondo (Boeseman, RMNH no. 26502), standard length 154 mm. Two specimens, 8 February 1964, Suriname Rivier near Brokopondo (Boeseman, RMNH no. 26501), standard length 172, 172 mm. One specimen, 14 February 1964, Suriname Rivier near Brokopondo (Boeseman, RMNH no. 26507), standard length 125 mm. Two specimens, 21 February 1964, Suriname Rivier near Brokopondo (Boeseman, RMNH no. 26506), standard length 104, 134 mm. Three specimens, 27 February 1964, Suriname Rivier near Brokopondo (Boeseman, RMNH no. 26505), standard length 155, 156, 165 mm. One specimen, same data (Boeseman, RMNH no. 26508), standard length 128 mm. One specimen, 29 May 1964, Suriname Rivier near Brokopondo (Boeseman, RMNH no. 26510), standard length 89 mm. One specimen, 3 June 1964, Suriname Rivier near Brokopondo (Boeseman, RMNH no. 26509), standard length 76 mm. Four specimens, 20 March 1965, Suriname Rivier near Brokopondo (Mees, RMNH no. 26513),

standard length 104, 115, 116, 178 mm. One specimen, 18 April 1967, Lokka-Lokka tabbetje, Marowijne, 6 km S. of mouth Gran Kreek (Nijssen, ZMA no. 106837), standard length 113 mm. Four specimens, 23 June 1966, mouth of Coppename and Saramacca (Nijssen, ZMA no. 106838), standard length 94, 116, 119, 168 mm. Two specimens, Saramacca Rivier near Coppename Punt, 23 Juni 1966 (Nijssen, ZMA no. 106840), standard length 84, 88 mm. Five specimens, 23 June 1966, mouth of Coppename and Saramacca (W. Vervoort, RMNH no. 26511), standard length 92, 129, 135, 137, 181 mm.

Characters. — D I.6, A 12-13 (usually iv.8, also v.8, iv.9, and twice iv.10), P I. 9, occasionally I.10¹), V 6 (i.5), C i.15.i¹) and rudiments, branchiostegals 8, gill-rakers 24-27, once 30 (5 to 7, once 9, + 1 + 18 to 20). Diameter of eye 1.0-1.7 times in bony interorbital²).

Colour. Dorsal surface uniform light liver-brown, under parts white, unpigmented, the flanks usually with a silvery gloss, a narrow white streak along the lateral line, base of dorsal spine blackish. See Bleeker's (1864) excellent coloured plate.

Distribution and habitat. — A species of the lower courses of the great rivers and the river mouths, where it is evidently common. The species occurs probably in all large rivers of Suriname, but is at present known only from the Marowijne, the lower course of the Suriname Rivier and the mouth of the Saramacca-Coppename. One would expect a species with this kind of habitat to have a wide distribution in adjacent parts of South America, and such is probably the case, but because of insufficiently known geographical variation, published records cannot be accepted without a renewed study of the material they are based on. Eigenmann's (1912: 174) variety A from coastal British Guiana is almost certainly this species; this was also Eigenmann's own opinion, for he wrote under variety A: "Here belongs also the *macronema* of Bleeker". The situation in British Guiana is, however, extremely complicated, as discussed under the following species.

Discussion. — Valenciennes (in Cuvier & Valenciennes, 1840: 125-128, 139-140) has stated clearly why the specific name *clarias* is not applicable to this species, and it is surprising that its use has been continued right up to the present time. The name *Pimelodus maculatus* has also been used for fishes from Suriname, but the type-locality is the Rio de la Plata, and individuals from there differ from Suriname fishes, if by nothing else, at least by having black blotches on the sides, as clearly described by La Cepède (1803:

1) One specimen (RMNH no. 26506, 134 mm) has the right pectoral ray I.9, the left one I.7; one specimen (RMNH no. 26511, 92 mm) has C i.14.i.

2) The longest, horizontal diameter of the externally visible eye was measured, hence from the soft rim, and this taken in the bony interorbital. Only two specimens in the series measured have the eye as large as 1.0 (a specimen of 156 mm standard length, RMNH no. 26505, and one of 84 mm standard length, RMNH no. 26500).

Unexpectedly, there is no clear relation between body-size and relative size of the eye.

94, 107), and also present in a specimen from La Plata in Leiden (van der Stigchel, 1946: 62). The two La Plata specimens in Leiden (RMNH no. 17302) also differ by their small and narrow dorsal plate; the eyes are small, but variable: the spotted fish has them 1.4 times in interorbital, the other one, which has much smaller eyes as well as a broader head, 2.0. Perhaps a sexual difference, as the small-eyed immaculate specimen has also a slightly heavier body, but possibly specific or subspecific differences are involved (cf. Devincenzi & Teague, 1942: 44-45).

The first name definitely applicable to the Suriname species is *Pimelodus blochii*; this name was partly based on Bloch (1785, pl. 35), partly on material personally examined by Valenciennes. Bloch mentioned material from Brazil and Suriname, Valenciennes wrote: "Ce poisson ... est de l'Amérique équinoxiale, et particulièrement de la Guiane. Nos échantillons viennent tous ou de Cayenne, ou de Surinam, et nous en avons vu dans les mains de M. de docteur Roulin des figures faites en Colombie". In order to eliminate a possible source of confusion, I restrict the type-locality of *Pimelodus blochii* to Suriname. It is likely that the locality Suriname was based on material collected by Dieperink, and as Dieperink lived in Paramaribo, the type-locality can further be restricted to the lower course of the Suriname Rivier. Therefore I treat material from the Suriname Rivier as topotypical, and base upon it comparisons with material from other river systems.

I do not think that in restricting the type-locality of *P. blochii*, I need be concerned about Schultz (1944a: 206), who stated that he selected the Magdalena River, Colombia, as representing the type-locality of "*Pimelodus clarias clarias* (Bloch)". Apart from the fact that the name has no status, as it was only a misapplication of *Silurus clarias* Hasselquist, Colombia was not included in the range of the species as given by Bloch. In the discussion of the following species, evidence will be presented that the population inhabiting the Rio Magdalena is not identical with that of Suriname.

Boeseman's (1953: 7) remark that his specimens, which I re-examined: "In several characters ... seem to be intermediate between Bloch's *clarias* and the subspecies *coprophagus* Schultz", is puzzling inasmuch as these specimens are topotypical of "Bloch's *clarias*", and the material from the Suriname Rivier is homogeneous in appearance. Dr. Boeseman (pers. comm.) meant to express doubt of the validity of the characters given by Schultz, and in this he was certainly justified. It is not impossible that *Pimelodus rigidus* Spix (1829: 19, pl. VII fig. 2) from "Brasilia aequatoriali" is the same as *P. blochii*, but in view of the apparently pronounced geographical variation occurring in this group of forms, I believe that this question could only be solved by a study of fresh topotypical material.

Note. — In the mouth-cavity of one specimen (RMNH no. 26511, 92 mm), a crustacean, *Telotha henselii* (von Martens), of the family Cymathoidae was found (RMNH no. Isop. 1703), provisionally identified by Dr. L. B. Holt-huis.

***Pimelodus albofasciatus* species nova (pl. 4)**

Material. — One specimen, 6 March 1961, Sipaliwini (H. P. Pijpers, ZMA no. 106839), standard length 122 mm. Two specimens, 2 February 1966, Sipaliwini (Mees, RMNH no. 26520), standard length 110, 112 mm. One specimen, 4 February 1966, Sipaliwini (Mees RMNH no. 26516), standard length 128 mm, holotype of the species. Seven specimens, same data (Mees, RMNH no. 26519), standard length 99-114 mm. Ten specimens, same data (Mees, RMNH no. 26518), standard length 103-121 mm. 35 specimens, 6 February 1966, Sipaliwini (Mees, RMNH no. 26514), standard length 92-137 mm. 13 specimens, 9 February 1966, Sipaliwini (Mees, RMNH no. 26517), standard length 96-131 mm. One specimen, 21 June 1968, Coeroeni (M. S. Hoogmoed, RMNH no. 26515), standard length 123 mm.

Characters. — D I.6, A 11-13 (iii to v.8), P I.9, less often I.10 (once I.8 on one side), V 6 (i.5), C i.15.i and rudiments, branchiostegals 8, sometimes 9 (once 7 on one side, 8 on the other), gill-rakers 21-26, usually 23 or 24 (4 to 6 + 1 + 15 to 19). Morphologically extremely close to *P. blochii*, but eye larger: diameter of eye greater than width of bony interorbital, 0.7-1.0 times in its width; the number of gill-rakers averages one or two lower; serrations along anterior edge of pectoral spine usually weaker, to almost absent (this is an average difference only). Moreover there is a highly characteristic colour pattern of dark and pale bands, as described in the following paragraph.

Colour. Upper parts dark grey, with some slightly paler, indistinct, wavy longitudinal lines; a broad white longitudinal band from head to tail, which includes the lateral line over its whole length; below this white band is a slightly broader dark grey band of equal length; a short grey band from the posterior edge of the scapula, narrowing backwards and ending above and just behind the ventral base; base of dorsal spine blackish; all fins slightly pigmented, dusky, the dorsal spine more strongly pigmented, and the adipose fin usually with some roundish grey dots; dorsal surface of maxillary barbels grey.

Distribution. — Known from the upper course of the Sipaliwini, where the species was common during my stay in February 1966, from the Coeroeni near the aerodrome, where a single specimen has been obtained, and from the upper Corantijn (or New River).

Discussion. — Apart from the slight differences in morphology and colour mentioned above, in Suriname there is also a distinct ecological difference between the species *P. blochii* and *P. albofasciatus*. The former occurs in the

lower courses and the mouths of the great rivers: there are many records from the coastal area, but in the now reasonably well-known Suriname Rivier we found it inland only to Brokopondo. Although in some of the large rivers it may go farther upstream, it appears definitely to keep to large bodies of water. *P. albofasciatus*, on the other hand, occurs in a river where the largest pools were rarely more than ten metres wide, after a few days of dry weather one could jump over the Sipaliwini in several places. The Coeroeni specimen was not taken in the river but in a shallow little pool near it. To what extent this ecological difference exists also in adjacent countries remains to be seen, but it looks as if in Essequibo the situation is more complicated than in Suriname. Eigenmann (1912: 172-175) already distinguished several "varieties". Specimens have been recorded from the Rupununi under the name *P. clarias* by Fowler (1914: 263) and Lowe (1964: 110, 111, 113); these records were not accompanied by descriptions, but Mrs. McConnell has sent me her material from British Guiana: two specimens, September 1957, Manari Creek (Amazon drainage), standard length 66, 90 mm. — One specimen, 9 December 1957, Dadanawa, Rupununi South Savanna, standard length 156 mm. — One specimen, 1957, Rupununi, standard length 134 mm. — Two specimens, 22 April 1961, sandcreek road crossing, Rupununi River, standard length 87, 108 mm. These fishes have the same colour pattern as *P. albofasciatus*, to which they are extremely similar in all characters except that the eyes are smaller, 0.8-1.65 times in interorbital, and the spines tend to be longer (dorsal spine equal to head or longer, against usually equal to head or shorter in *P. albofasciatus*). Eigenmann's (1912: 175) two Rupununi specimens, which he described as "especially bright" were evidently similar.

Different from anything I have seen from Suriname is a specimen collected on 9 July 1958, Lama conservancy, Lamaha Canal behind Georgetown (R. H. McConnell), standard length 176 mm. This fish is spotted all over, with small spots on the head; larger spots in five irregular rows above the lateral line, and irregular and less distinct ones below it; lateral line narrow white. This corresponds with Eigenmann's description of specimens from Lama Stop-Off and the Botanic Gardens. The colour-photograph published by Hoedeman (1954) shows a fish of similar appearance. Hoedeman wrote that this fish came from Suriname, and he may be right, but it appears preferable not to admit this "variety" to the ichthyofauna of Suriname on the basis of an aquarium-fish.

Two specimens from Bartica, Essequibo River (C. H. Eigenmann, BM no. 1911.10.31: 44-48), standard length 81, 97 mm, are very similar to *P. blochii*, but above the lateral line there are some vague and wavy vertical pale lines, not quite sufficiently pronounced to give the fishes a marbled appear-

ance. Mrs. McConnell suggested that these might be intermediate between *P. blochii* and the Rupununi specimens. This, however, is doubtful: the dorsal spines are shorter than the head, strongly serrated along their anterior border (much stronger than in the Rupununi specimens), and the colour-pattern just described cannot be called intermediate either. On the other hand Eigenmann's (1912: pl. 74) map does suggest that in the Essequibo basin the distribution of *Pimelodus "clarias"* is continuous from the coast to the Rupununi, and intermediate populations may well occur. Compare the situation as it is now known to exist in Suriname and may exist in Essequibo, with that described by Haseman (1911: 380) for the Rio Iguassú, where *Pimelodus ortmanni* occurs in the headwaters, *Pimelodus "clarias"* in the lower course.

Its description indicated that *P. clarias coprophagus* Schultz from western Venezuela has a colour-pattern not unlike *P. albofasciatus*, and for that reason a direct comparison was desirable. Two paratypes of this form were available to me for this purpose, standard length 135, 169 mm (L. P. Schultz, 6 March 1942, Lago Maracaibo, ZMA no. 102124, ex USNM no. 121154). Their colour-pattern is indeed fairly close to that of *P. albofasciatus*, but it is less regular, the white band along the lateral line is neither so wide nor so regular, and the pigmented areas tend to break up in blotches and dots. Also the eyes are remarkably smaller, 1.6 and 2.0 times in interorbital, and there are more gill-rakers. Ecologically *P. c. coprophagus* differs from *P. albofasciatus* in that it is a coastal form; in this it agrees with *P. blochii*.

The number of gill-rakers deserves further discussion. In the specimens of *P. c. coprophagus* it is 8 + 1 + 22 and 7 + 1 + 22, total number on the outer branchial arch 31 and 30. This tallies with the figures given by Schultz (1944a, table 2) for a much larger number of individuals. The number agrees also with the counts given by Schultz for specimens ascribed by him to *P. clarias clarias* (= *P. blochii*), from the Rio Magdalena, Colombia. Topotypical *P. blochii* from Suriname, on the other hand, normally has 24-26 gill-rakers, although in one specimen I counted as many as 30. In *P. albofasciatus* also, 24-25 is the commonest number. From this I deduce that Schultz's specimens from the Rio Magdalena are not identical with topotypical *P. blochii*. Lacking material from the Rio Magdalena, I have to leave the matter at this.

Eigenmann (1912: 176, pl. XVI fig. 2) described *Pimelodus heteropleurus* from Rupununi Pan as a: "Form of *Pimelodus clarias*". The type specimen, of only 46 mm standard length, remains unique, but judging by its description and plate, it differs clearly from Mrs. McConnell's Rupununi specimens of *Pimelodus* cf. *albofasciatus*. As the latter is evidently the local represen-

tative of the *P. maculatus* (= *P. clarias* auct.) group, *P. heteropleurus* cannot belong to the same group.

***Pimelodus* sp.**

Material. — One specimen, 21 March 1968, Xaventina, Rio das Mortes, Mato Grosso (R. H. McConnell, BM no. 1971.7.29: 72), standard length 147 mm. One specimen, 23 March 1968, same locality (R. H. McConnell, BM no. 1971.7.29: 73), standard length 121 mm. Two specimens, 12 May 1968, Suia Missu, Mato Grosso (R. H. McConnell, one BM no. 1971.7.29: 74, the other RMNH no. 26601), standard length 142, 170 mm.

Characters. — D I.6, A 11-12 (iii or iv.8 or 9), P I.9, V 6 (i.5), C i.15.i and rudiments, gill-rakers 20-21 (4 or 5 + 1 + 15). Predorsal length 2.6 times in standard length; eye 3.8-4.0 times in head, 0.95-1.0 in interorbital; maxillary barbels reaching at least to base of caudal fin or to beyond tip of tail; outer pair of mandibular barbels variable in length, from not reaching tip of pectorals to almost reaching tip of ventrals; spines long, dorsal spine 0.8-0.9 in head; anterior edge of pectoral with moderate serrations, its distal third smooth; base of adipose fin 4.75-5.5 in standard length. Morphologically this form is very close to the two preceding species, but the number of gill-rakers is distinctly lower, the spines are longer (dorsal spine longer than head, against equal to head or shorter in the other species), and the colour and colour-pattern are different, as described in the next paragraph.

Colour. Dark bronze-brown; under surface white, unpigmented; a narrow but very distinct white streak along the lateral line; the smallest specimen but none of the others has a pale brown streak between the lateral line and the back, following the dorsal profile; a black spot at the base of the dorsal spine as in the other species; fins only lightly pigmented, except for the spine and first ray of the dorsal fin which are dark.

Distribution. — Known from the Rio das Mortes (a tributary of the Araguaia) and the Suia Missu (a tributary of the Xingu), Mato Grosso, Brazil. It is interesting that these rivers appear to have the same form.

Discussion. — Only two of the fishes have spines; in the other two, from Xaventina, dorsal as well as pectoral spines have been chopped off near their bases. These specimens have evidently been collected by Indians, and they also show cutlass-damage. One had been cut across the head in such a way that the orbit could not be measured.

It may appear inconsistent that I have named *P. albofasciatus*, but refrain from giving this form, which is as well differentiated from other known members of this group, a name. The reason is that whereas in Suriname the position is now reasonably clear, with a coastal and an interior form, the naming of a single form in this complex group from the middle of Amazo-

nia would in my opinion be premature before material collected over a wide area becomes available.

***Pimelodus altissimus* Eigenmann & Pearson**

(*Pimelodus altipinnis* Auct., nec Steindachner, 1864)

Pimelodus altissimus Eigenmann & Pearson, 1942, in Eigenmann & Allen, Fish. W. South America: 106, pl. V fig. 5 — Rio Ucayali, near Orellana.

Pimelodus eigenmanni van der Stigchel, 1946, South American Nematognathi: 64 — Brazil.

Pimelodus altipinnis; Steindachner, 1876, Sitzb. Akad. Wiss. Wien, Mathem.-Naturw. Cl., 72 (1): 605, pl. XI (Amazonenstrom bei Pará, Santarem und Cameta); Eigenmann & Eigenmann, 1888, Proc. Calif. Acad. Sci., (2) 1: 135 (Para); Eigenmann & Eigenmann, 1890, Occ. Pap. Calif. Acad. Sci., 1: 180 (Para); (pt.) Eigenmann & Eigenmann, 1891, Proc. U.S. Nat. Mus., 14: 30 (Amazon); Perugia, 1897, Ann. Mus. Genova, 38: 18 (Alto Beni, Bolivia); Goeldi, 1898, Bol. Mus. Paraense, 2: 461, 476 (Magoary); Eigenmann & Bean, 1907, Proc. U.S. Nat. Mus., 31: 660 (Amazon River between Para and Manaos); Eigenmann, 1910, Rep. Princeton Univ. Exp. Patagonia, 3: 388 (Amazon and northward); A. de Miranda Ribeiro, 1911, Arch. Mus. Nac. Rio de Janeiro, 16: 293, fig. 114 (Amazonas); Starks, 1913, Stanford Publ. Univ. Ser.: 27 (Pará); A. de Miranda Ribeiro, 1914, Comm. Linh. Telegr. Estr. Matto-Grosso ao Amazonas, 15, Anexo 5: 6 (Manáos); Fisher, 1917, Ann. Carnegie Mus., 11: 415 (Belem, Pará, San Joaquin, Santarem); Pearson, 1924, Indiana Univ. Stud., 11 (64): 7 (Beni basin); Pearson, 1937, Proc. Calif. Acad. Sci., (4) 23: 111 (Mamoré basin); Fowler, 1940, Proc. Acad. Nat. Sci. Philad., 92: 95 (Bolivia: R. Beni; San Joaquin); Delsman, 1941, Verh. Kon. Natuurhist. Mus. België, (2) 21 (3): 79 (Trombetas-river, near Obidos); Gosline, 1945, Bol. Mus. Nac. Rio de Janeiro, Zool., 33: 41 (Amazonas e para o norte); Fowler, 1951, Arq. Zool. S. Paulo, 6: 553, fig. 568 (Amazônia, Peru, Bolivia, Guiana).

Pimelodus altissimus; Gosline, 1945, Bol. Mus. Nac. Rio de Janeiro, Zool., 33: 42 (rio Ucayali); Fowler, 1945, Los Peces del Peru: 41 (Perú (Cerca de Orellana)); Fowler, 1951, Arq. Zool. S. Paulo 6: 554 (Alto Amazonas, Peru).

Material. — One specimen, 1893, Rio Beni, Bolivia (L. Balzan, MCG no. 8122), standard length 194 mm. One specimen, no date, Brazil (RMNH no. 15465, ex Mus. Rio de Janeiro), standard length 140 mm, virtual holotype of *Pimelodus eigenmanni*.

Discussion. — Van der Stigchel (1946: 64) described *Pimelodus eigenmanni* "nom. nov.", ending his description with the words: "... and therefore I have introduced the new name *Pimelodus eigenmanni*". To the casual reader this obviously suggests that a new name was introduced, to replace one previously given to the same species, that was for some reason unavailable. Closer scrutiny reveals however, that *Pimelodus eigenmanni* is a new species, based on a specimen in Leiden, with which van der Stigchel subjectively identified a number of references in literature to *Pimelodus altipinnis* Steindachner. Van der Stigchel was of the opinion that previous authors had misidentified specimens as *P. altipinnis*, which actually belonged to his new species. Van der Stigchel's specimen is indeed a *Pimelodus*, and it differs clearly from

Pimelodus altipinnis which, as I shall indicate on a later page, is a synonym of *Pimelodella cristata*.

Van der Stigchel (1946) probably took the incorrect procedure of indicating his new species by the name "nom. nov." from Eigenmann (1917: 237), who named *Pimelodella steindachneri* in a similar way.

Pimelodus eigenmanni van der Stigchel is a primary homonym of *Pimelodus (Pimelodella) eigenmanni* Boulenger (1891: 232, footnote 3), and therefore is not an available name for this species. I do not consider that a new name is required, as *Pimelodus altissimus* Eigenmann & Pearson is obviously the same species. Admittedly its describers differentiated *P. altissimus* as being: "Closely related to *P. altipinnis*, from which it differs by possessing a much higher dorsal spine, longer pectoral spines, and a steeper predorsal profile", but it is likely that these rather insignificant differences are within the limits of individual variation. *P. altissimus* was based on a single specimen, and it is not clear whether a comparison was made with actual specimens of "*P. altipinnis*", or only descriptions and Steindachner's (1876a: pl. XI) plate were consulted.

Genus **Pimelodella** Eigenmann & Eigenmann

Pimelodella Eigenmann & Eigenmann, 1888, Proc. Calif. Acad. Sci., (2) 1: 131 — type by original designation, *Pimelodus cristatus* Müller & Troschel.

Generic diagnosis. — The main character on which this genus was founded is a narrow occipital process, of uniform width throughout, meeting the dorsal plate (fig. 33). In addition the species are slender, with a not very large head, the bones of which are covered with skin; long maxillary barbels; well-developed eyes with free rim; teeth in a band in each jaw, without backward projections; pungent pectoral spines; well-developed, usually very long, adipose fin, and forked tail.

Discussion. — *Pimelodella* appears to be one of the largest genera known; Eigenmann (1917) recognized 34 species, Gosline (1945) listed no fewer than 54 species, and more have been described since. Eigenmann (1912) recorded three species from British Guiana. In this connection it is surprising that in Suriname we have been unable to find more than one, *P. cristata*, which belongs to the commonest and most widely distributed species of the country. A second species, *C. macturki* is known in Suriname from a single specimen, without exact locality. Kappler's (1885, 1887) record of "*Pimelodus lateristriga*" from Suriname is evidently based on a misidentification of *P. cristata*, which he did not mention. *P. lateristriga* is not known to occur in the Guianas.

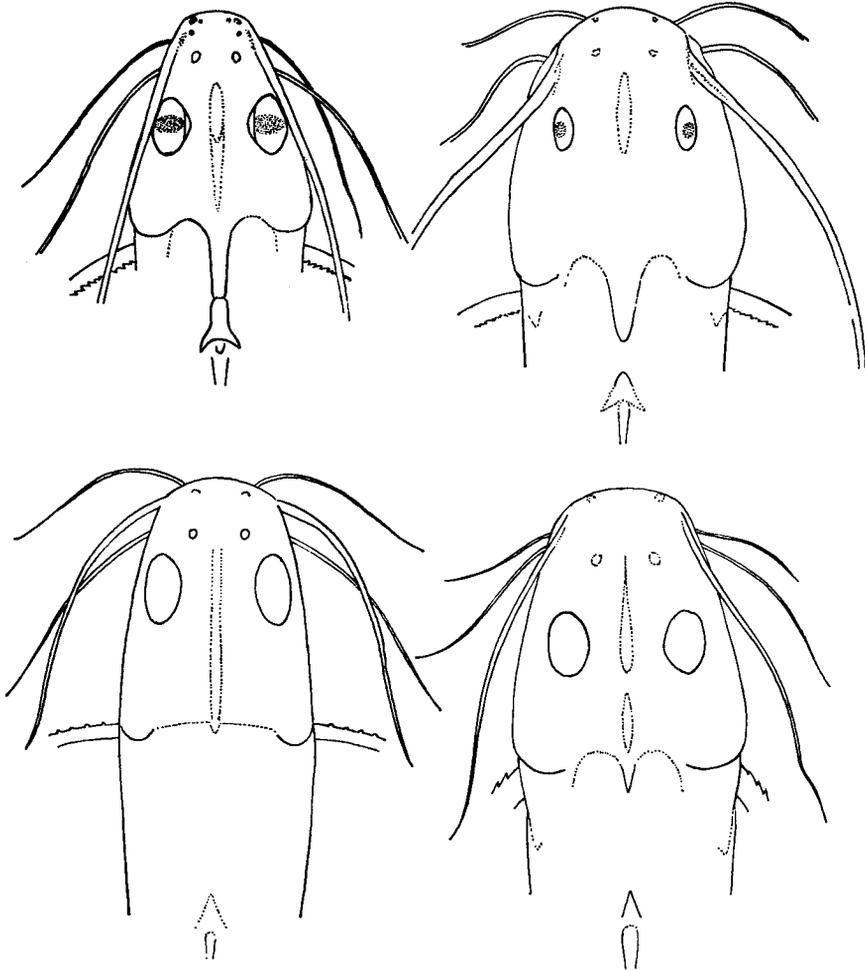


Fig. 33. Heads viewed from above to show occipital process and extent of fontanel. *Pimelodella cristata* (top left), *Imparfinis minutus* (bottom left), *Rhamdia quelen* (top right) and *Rhamdia foina* (bottom right). *Imparfinis* 2 X, the others natural size.

A review of the many described species is out of place here, but I would like to draw attention to the fact that in some instances pairs of species have been described from one river, differing mainly in size of the eye (e.g., Fowler, 1940b: 75-77; 1941a: 127-135). The discovery of a sexual difference in eye-size in *P. cristata*, makes me suspect that at least some of such pairs are based on the two sexes of one species. The only sexual difference previously described in the genus is in the dorsal fin which in the males of some species has a filament, not found in females and juveniles (cf. Dahl, 1961: 498; van der Stigchel, 1964).

Pimelodella cristata (Müller & Troschel) (fig. 33)

P[imelodus] cristatus Müller & Troschel, 1848, in Schomburgk, Reisen in Britisch-Guiana, 3: 628 — Takutu und Mahu.

Pimelodus altipinnis Steindachner, 1864, Sitzb. Akad. Wiss. Wien, Mathem.-Naturw. Cl., 49 (1): 213, pl. II fig. 3, 4 — Demerara.

Pimelodus (Pseudorhamdia) Wesselii Steindachner, 1876, Sitzb. Akad. Wiss. Wien, Mathem.-Naturw. Cl., 74 (1): 614, footnote 1 — Essequibo.

Pimelodella geryi Hoedeman, 1961, Bull. Aquatic Biol., 2: 134 — French Guiana: mainland, Litany river, village Aloiké = Alowike, Suriname.

Pimelodus cristatus; Müller & Troschel, 1849, Horae Ichth., 3: 4 (Guiana im Essequibo); Günther, 1864, Cat. Fish. Brit. Mus., 5: 117 (Guiana; River Capin, Para; Essequibo River); Puyo, 1949, Poiss. Guyane Fr.: 88, fig. 49 (les "criques" ... du cours supérieur de l'Itany).

Pimelodus lateristriga; Kappler, 1885, Das Ausland, 58: 919 (Holländisch Guiana); Kappler, 1887, Surinam: 152 (Surinam).

Pimelodus gracilis; Vaillant, 1899, Bull. Mus. Hist. Nat. Paris, 5: 155 (le haut du fleuve Carcevenne: rivière Lunier, rivière Carnot); Vaillant, 1900, Nouv. Arch. Mus. Paris, (4) 2: 124, 127 (rivière Carnot).

Pimelodella cristata; Eigenmann, 1912, Mem. Carnegie Mus., 5: 168 (British Guiana: Tumatumari, Below Packeoo Falls, Rockstone, Konawaruk, Creek below Potaro Landing, Twoca Pan); Fowler, 1914, Proc. Acad. Nat. Sci. Philad., 66: 263 (Rupununi River); Eigenmann, 1917, Mem. Carnegie Mus., 7: 236 (synonymy and distribution); Beebe, 1925, Zoologica, 6: 118, 120 (Kartabo); van der Stigchel, 1946, South American Nematognathi: 54 (upstream from Gran Rio; Pikien River, Tresling; Potaro Landing, Lower Potaro River); van der Stigchel, 1947, Zool. Meded., 27: 54 (upstream from Gran Rio; Pikien River, Tresling; Potaro Landing, Lower Potaro River); Boeseman, 1953, Zool. Meded., 32: 2, 6 (Moengo Tapoe, Djaikreek).

Pimelodus altipinnis; Eigenmann, 1912, Mem. Carnegie Mus., 5: 177 (Demerara).

Pimelodella gracile; Fowler, 1914, Proc. Acad. Nat. Sci. Philad., 66: 263, fig. 13 (Rupununi River).

Pimelodella sp.; Lowe, 1964, J. Linn. Soc. Lond., Zool., 45: 110, 115, 140, 143 (Rupununi District).

Material. — 974 specimens from Suriname as follows. One specimen, 27 November 1957, Alowike, Litani, Suriname (J. Géry, ZMA no. 102235), standard length 59 mm, holotype of *Pimelodella geryi*. Three specimens, 12 December 1963, creek near Drepada, ca. 8 km N. of Brokopondo (Boeseman, RMNH no. 25672), standard length 83, 89, 91 mm. One specimen, 26 December 1963, Sarakreek near Dam (Boeseman, RMNH no. 25673), standard length 85 mm. 70 specimens, 28 December 1963, Kwambaolo Kreek near Dam (Boeseman, RMNH no. 25674), standard length 69-176 mm. 53 specimens, same data (Boeseman, RMNH no. 25675), standard length 68-136 mm. 51 specimens same data (Boeseman, RMNH no. 25676), standard length 77-173 mm. One specimen, 25 December 1963, Sara Kreek between Locus and Dam (Boeseman, RMNH no. 25677), standard length 108 mm. One specimen, 4 January 1964, Suriname Rivier near Brokopondo (Boeseman, RMNH no. 25678), standard length 103 mm. One specimen, 5 January 1964, creek near Brokopondo (Boeseman, RMNH no. 25679), standard length 92 mm. Three specimens, 7 January 1964, Suriname Rivier, rapids at Brokopondo (Boeseman, RMNH no. 25680), standard length 105, 106, 112 mm. One specimen, 9 January 1964, Suriname Rivier near Brokopondo (Boeseman, RMNH no. 25681), standard length 88 mm. Four specimens, 10 January 1964, near Brokopondo (Boeseman, RMNH no. 25682), standard length 80, 83, 87, 95 mm. Three specimens, 11 January 1964, tributary of Suriname Rivier near Brokopondo (Boeseman, RMNH no. 25683), standard

length 91, 102, 114 mm. Three specimens, 12 January 1964, tributary of Suriname Rivier near Brokopondo (Boeseman, RMNH no. 25684), standard length 80, 96, 142 mm. Three specimens, 16-17 January 1964, Mamadam (rapids), Suriname Rivier (Boeseman, RMNH no. 25685), standard length 109, 110, 113 mm. Four specimens, 16-17 January 1964, Suriname Rivier below Mamadam (Boeseman, RMNH no. 25686), standard length 91, 96, 102, 140 mm. Three specimens, 28 January 1964, creek near Brokopondo (Boeseman, RMNH no. 25687), standard length 93, 112, 116 mm. Four specimens, 29 January 1964, Ceder Kreek near Brokopondo (Boeseman, RMNH no. 25688), standard length 114, 114, 115, 117 mm. Two specimens, 30 January 1964, Ceder Kreek near Brokopondo (Boeseman, RMNH no. 25689), standard length 111, 115 mm. Seven specimens, 3-4 February 1964, Suriname Rivier near Brokopondo (Boeseman, RMNH no. 25690), standard length 82-132 mm. 27 specimens, 5 February 1964, Suriname Rivier near Brokopondo (Boeseman, RMNH no. 25691), standard length 62½-120 mm. 43 specimens, 6 February 1964, Suriname Rivier downstream from Brokopondo (Boeseman, RMNH no. 25692), standard length 67-139 mm. 27 specimens, 7 February 1964, Suriname Rivier near Brokopondo (Boeseman, RMNH no. 25693), standard length 76-139 mm. 30 specimens, 8 February 1964, Suriname Rivier near Brokopondo (Boeseman, RMNH no. 25694), standard length 79-136 mm. Ten specimens, 12 February 1964, rapids Suriname Rivier near Brokopondo (Boeseman, RMNH no. 25695), standard length 60-122 mm. Two specimens, 14 February 1964, Suriname Rivier near Brokopondo (Boeseman, RMNH no. 25696), standard length 85, 86½ mm. Seven specimens, 18 February 1964, Jabocai Kreek and Witte Kreek, tributaries of the Suriname Rivier between Kabel und Lombe (Boeseman, RMNH no. 25697), standard length 75-92 mm. 16 specimens, 21 February 1964, Suriname Rivier near Brokopondo (Boeseman, RMNH no. 25698), standard length 73-125 mm. Five specimens, 27 February 1964, Suriname Rivier near Brokopondo (Boeseman, RMNH no. 25699), standard length 85-113 mm. Three specimens, 5 March 1964, Gran Kreek near Bofroedédé (Boeseman, RMNH no. 25700), standard length 87, 107, 119 mm. One specimen, 6 March 1964, Gran Kreek near its mouth (Boeseman, RMNH no. 25701), standard length 82 mm. 21 specimens, 6 March 1964, rapids in Gran Kreek near mouth (Boeseman, RMNH no. 25702), standard length 66-120 mm. 16 specimens, 9 April 1964, pools downstream from Feddiprati rapids, Saramacca Rivier (Boeseman, RMNH no. 25703), standard length 69-104 mm. 11 specimens, 12 May 1964, Suriname Rivier near Brokopondo (Boeseman, RMNH no. 25704), standard length 87-118 mm. Four specimens, 3 June 1964, Suriname Rivier near Brokopondo (Boeseman, RMNH no. 25705), standard length 75, 77, 78, 97 mm. One specimen, 5 June 1964, Brokopondo Meer near mouth Sara Kreek (Boeseman, RMNH no. 25706), standard length 102 mm. One specimen, 23 June 1964, Suriname Rivier near Aloesoebanjivallen (Boeseman, RMNH no. 25707), standard length 37 mm. 35 specimens, 21 July 1964, tributary of the Gran Kreek, ca. 12 km above its mouth (Boeseman, RMNH no. 25708), standard length 25-46 mm. One specimen, same data (Boeseman, RMNH no. 25709), standard length 151 mm. Eight specimens, 29 July 1964, pool at middle course Gran Kreek (Boeseman, RMNH no. 25710), standard length 81-89 mm. 95 specimens, 30 July 1964, Gran Kreek, near future shore of lake (Boeseman, RMNH no. 25711), standard length 25-57 (93 ex.), 118, 118 mm. 13 specimens, 31 July 1964, rapids in middle course Gran Kreek (Boeseman, RMNH no. 25712), standard length 46-133 mm. Three specimens, 15 August 1964, tributary of Gran Rio between Ligolio and Awaradam (Boeseman, RMNH no. 25713), standard length 49, 56, 143 mm. 34 specimens, 21 August 1964, creek below Moesoembaprat, Suriname Rivier (Boeseman, RMNH no. 25714), standard length 47-166 mm. Four specimens, 20 March 1965, Suriname Rivier near Brokopondo (Mees, RMNH no. 25715), standard length 56, 132, 144, 160 mm. Two specimens, 10 May 1965, Mamadam, Suriname Rivier (Mees, RMNH no. 25763), standard length 113, 137 mm. Three specimens, 12 May 1965, Suriname Rivier near Botopassie (Mees, RMNH no. 25716), standard length 94, 100, 133 mm. Eight specimens, 13 May 1965, Suriname Rivier near Botopassie (Mees, RMNH

no. 25717), standard length 46-125 mm. Two specimens, 14 May 1965, Mamadam, Suriname Rivier (Mees, RMNH no. 25718), standard length 106, 125 mm. Six specimens, 16 July 1965, creek near Kajana, Gran Rio (Mees, RMNH no. 25719), standard length 35-44 mm. Two specimens, 18 July 1965, Grandam, Gran Rio (Mees, RMNH no. 25720), standard length 62, 64 mm. One specimen, Gran Rio near Ligolio (Mees, RMNH no. 25721), standard length 114 mm. Two specimens, 13 August 1965, Mamadam, Suriname Rivier (Mees, RMNH no. 25722), standard length 80½, 106 mm. Five specimens, 23 September 1965, Zandvallen, Kabalebo (Mees, RMNH no. 25723), standard length 102, 113, 118, 122, 130 mm. Eight specimens, 18 October 1965, Compagnie Kreek (Mees, RMNH no. 25724), standard length 54-112 mm. One specimen, 17 November 1965, Tapanahoni, ca. 2 km downstream from mouth of Paloemeu (Mees, RMNH no. 25725), standard length 125 mm. Four specimens, 19 November 1965, Tapanahoni near mouth of Paloemeu (Mees, RMNH no. 25726), standard length 57, 105, 107, 112 mm. Five specimens, 27 November 1965, Tapanahoni, ca. 2 km upstream from mouth of Paloemeu (Mees, RMNH no. 25727), standard length 49, 53, 56, 57, 57 mm. 30 specimens, same data (Mees, RMNH no. 25728), standard length 62-143 mm. One specimen, 30 November 1965, Tapanahoni, ca. 2 km downstream from mouth Paloemeu (Mees, RMNH no. 25729), standard length 119 mm. Eight specimens, 12-14 December 1965, Langetabbetje, upper course of Sara Kreek (Mees, RMNH no. 25730), standard length 55-82 mm. 73 specimens, 19 December 1965, Compagnie Kreek (Mees, RMNH no. 25731), standard length 44-121 mm. 49 specimens, 28 December 1965, Marshall Kreek (Mees, RMNH no. 25732), standard length 50-117 mm. 20 specimens, 23 January 1966, Sipaliwini (Mees, RMNH no. 25733), standard length 81-142 mm. Six specimens, same data (Mees, RMNH no. 25734), standard length 52½-67 mm. One specimen, 26 January 1966, Sipaliwini (Mees, RMNH no. 25735), standard length 95 mm. Seven specimens, 6 February 1966, Sipaliwini (Mees, RMNH no. 25736), standard length 73-137 mm. Eight specimens, 9 February 1966, Sipaliwini (Mees, RMNH no. 25737), standard length 66-138 mm. One specimen, 5 March 1966, creek near Brokopoondo (Mees, RMNH no. 25738), standard length 75 mm. 65 specimens, 12 March 1966, tributary of Mama Kreek near Berg-en-Dal (Mees, RMNH no. 25739), standard length 36-123 mm. 21 specimens, 15 March 1966, Compagnie Kreek (Mees, RMNH no. 25740), standard length 63-122 mm.

Extra-limital material. One specimen (♀), April 1864, Demerara (MV no. 45601), standard length 61 mm, holotype of *Pimelodus altipinnis*.

Characters. — D I.6 (once I.7), A 11-14 (iii-iv.8-10), P I.9 or I.10, V 6 (i.5), C i.15.i and rudiments (rarely only 13 or 14 divided rays), branchiostegals 6 or 7, gill-rakers 11-14 (2-3 + 1 + 7-10). Head 4.2-4.8, predorsal length 3.35-3.4, depth of body 6.0-6.8, greatest width of body 5.7-6.8, base of adipose fin 2.25-3.0 times in standard length; eye moderately large (depending on sex as explained below), 1.5-2.0 times in snout, 0.7-1.0 times in bony interorbital, 3.5-4.5 times in head; maxillary barbels long, usually reaching at least to the end of the adipose base, or to the caudal base, and frequently to the tip of the caudal fin; dorsal spine not very strong, thin, weakly serrated, its length 2.1-2.5 times in the predorsal length; pectoral spines longer and stronger than the dorsal spine, along the anterior edge weakly serrated, along the posterior edge with a series of strong recurved hooks, placed close together and varying in number (very small specimens may have no more than six or seven; in large individuals this number may

increase to about 30), and not continued on the distal fourth of the spine which is only weakly serrated or more or less smooth, their length 1.55-2.0 times in predorsal length.

There is a difference in relative size of the eyes between males and females (confirmed by internal sexing); in some samples this is more distinct than in others, but it may be said that generally speaking, in fishes of the size-range here studied, specimens with eyes measuring less than four times in the head are males, and specimens with eyes measuring over four times in the head are females.

Colour remarkably pale, greyish-yellow, perhaps best described as sand-colour, with on the flanks, following the lateral-line, a narrow black line which varies geographically in development (see Discussion).

Size. Specimens of ca. 130 mm standard length and larger are sexually mature. Eigenmann (1917: 231) gave: "a recorded length of 340 mm" (probably total length). For a description of a large specimen from British Guiana, see the Discussion.

Habitat and status. — This is easily the most abundant and most widely distributed catfish of Suriname. Locally, in specialised habitats, it may occasionally be outnumbered by other species, but on the whole no other species approaches it in numbers. It is a bottom-fish, found in creeks as well as in the rivers.

Distribution. — Found throughout Suriname. If my surmise that *P. cristata* and *P. gracilis* are one species is correct, the range includes the whole of tropical South America east of the Andes, from Venezuela to the La Plata basin.

Discussion. — Specimens from the Marowijne basin (Tapanahoni) have on an average the black lateral stripe wider than material from the Suriname basin and more western localities. Eigenmann & Eigenmann (1890: 147, key) mistakenly state that *P. cristata* has no dark lateral band: in fresh material it is always present, but it may become indistinct in preservation. Whether the Amazonian specimens on which the mentioned authors based their description of *P. cristata* really belong to that species, remains to be verified.

Mrs. McConnell has forwarded a single specimen from Karanambo, British Guiana, June 1961, collected by Mr. McTurk, which is aberrant. Standard length ca. 250 mm, D I.6, A iv.12, P I.8, V 1.5, C 7 + 8 (divided rays), branchiostegals 6, gill-rakers 3 + 1 + 7; adipose fin 89 mm, predorsal length 58 mm, eye 9 mm, 2.5 times in snout, 1.3 times in bony interorbital, and 5.2 times in head; maxillary barbels reaching to anal base; D-spine 1.5 times in predorsal length; P-spines both with damaged tips, but probably they had been

a little shorter than D-spine; fins fleshy. The specimen is distorted, which makes it impracticable to supply other proportions. The collector described the colour of this fish as: "dark electric blue (almost black)". This fish is considerably larger than any other specimen I have seen (the maximum size found in almost a thousand specimens from Suriname is 176 mm standard length), and its characters: the small eye, the fleshy fins, the slightly increased number of anal rays, and even the dark colour, may well be factors of size. I do not believe that this specimen represents a different species, although the possibility cannot be dismissed. Therefore it has not been included in the list of material examined.

Van der Stigchel (1946: 64) pointed out that the fishes which Eigenmann & Eigenmann (1890) described under the name *Pimelodus altipinnis*, do not belong to that species as described by Steindachner (1864). He also suggested, following an observation made by Eigenmann (1912: 177), that the type of *Pimelodus altipinnis* might be a *Pimelodella* and not a *Pimelodus*, but made no further attempt to identify it. I have examined the holotype of *P. altipinnis*, and found that van der Stigchel's surmise is perfectly correct: the specimen is a typical *Pimelodella*, with a narrow occipital process meeting the equally narrow dorsal plate, and I identify it as a female of *P. cristata*. The specimen is from Demerara, April 1864, standard length 64 mm, total length 78 mm, D 1.6, A 12, P 1.9, V 6, branchiostegals 7, adipose fin ca. 2.5 times in standard length, eye small, ca. 4.5 times in head, maxillary barbels reaching to a little beyond base of caudal fin. On the accompanying label the specimen was marked "Typus??", but there is no need at all to doubt that this is the type of *P. altipinnis*, as it agrees exactly with Steindachner's (1864) figure and description.

When Hoedeman (1961) described *Pimelodella geryi*, he compared it with *P. megalops* only and made no mention of the common *P. cristata*. Evidently he was misguided by Eigenmann's (1912: 168) key, which gives for *P. cristata* an adipose fin of 2.33-2.5 in the length, for *P. megalops* and *P. macturki* an adipose fin of 3 or more in the length. In my large material of *P. cristata* the length of the adipose fin varies from 2.25-3.0 times in standard length (admittedly with the majority of specimens in the range 2.3-2.5). The type of *P. geryi*, a specimen that, incidentally, is in a very poor condition, has an adipose fin which measures 3.0 times in standard length. It falls therefore just in the established range of variation of *P. cristata*, and as I have been unable to find other differences, I regard *P. geryi* as a synonym of *P. cristata*. The type of *P. geryi* has a conspicuous black lateral stripe, as one would expect in *P. cristata* from the Marowijne basin.

Although I am not aware that this has ever been suggested, I consider

it very likely that *P. cristata* does not differ from *P. gracilis* (Valenciennes, 1840), which has nine years priority. This would also explain the great confusion between these names which one finds in the literature. The main difference between the two nominal species appears to be in the shape of the caudal fin, which is supposed to be much prolonged in *P. gracilis*, and not produced in *P. cristata*.

From Eigenmann (1917: 231-232), the only author to have seriously studied the genus in this century, I quote the following diagnoses as given in his key:

“Lower caudal lobe much broader than the upper, upper lobe not produced, the lower frequently the longer; lateral band if present narrow, linear; 13-14 teeth on the posterior face of the pectoral in specimens 83 mm long, about 20-30 much more feeble ones in large specimens, the more distal thorns sometimes with a broad base and a long free outer edge; maxillary barbels reaching origin, or beyond tip of adipose
 2. *cristata* (Müller & Troschel)”.

“Upper caudal lobe normally greatly prolonged, but subequal in the young, not much narrower than the lower lobe; maxillary barbel always extending at least beyond base of anal; lateral band, if present, broad; pectoral spine a little longer or a little shorter than the dorsal spine with a variable number of strong teeth on over half its posterior margin
 4. *gracilis* (Cuvier & Valenciennes)”.

The variation in length of the maxillary barbel in *P. cristata* is considerable, many specimens having it reaching to or beyond the tip of the caudal fin. Eigenmann's (1917: pl. XXXV, fig. 37-41) own figures show that there is a lot of individual variation in the pectoral spines, and that in general appearance those of *P. gracilis* and *P. cristata* agree. Variation in width of the lateral band in *P. cristata* has already been discussed. As far as the shape of the caudal fin is concerned, Eigenmann himself made qualifications (“subequal in the young”), and my large material of *P. cristata* shows that there is a lot of variation in this character. The normal condition in *P. cristata* is that the upper lobe of the caudal fin is a little longer, but more slender than the lower lobe (the usual number of developed caudal rays is 8 + 9, or branched rays 7 + 8), and in a few specimens the upper lobe is considerably elongated, although in others the lower lobe is actually the longer. From Uruguay, where *P. cristata* is not known to occur, Devincenzi & Teague (1942) and Devincenzi & Barrattini (1926-1940: pl. XLV) describe and figure under the name of *P. gracilis* a fish with symmetrically forked tail. Ringuelet, Arámburu & de Arámburu (1967: 306) believe to have found another character to differentiate the two species: adipose fin 2.2 in standard length (*P.*

cristata) and adipose fin 2.3-3.0 in standard length (*P. gracilis*)¹⁾. In specimens of *P. cristata* from Suriname the adipose fin is 2.25-3.0 in standard length.

Whatever the identity of *P. gracilis*, there is little doubt that specimens recorded under this name from British Guiana (Fowler, 1914) and the Orinoco (Steindachner, 1879; Schultz, 1944a), are the same as *P. cristata* (note that the fish figured by Fowler, 1914, fig. 13, under the name *P. gracile* shows an ordinary forked tail, without produced upper lobe). If *P. gracilis* does differ from *P. cristata*, the former may be confined to the Uruguay-Paraná-La Plata basins, as suggested by Eigenmann (1917), who provided all localities outside that region with a query. For Amazonian specimens a third name is available, *P. steindachneri*, launched with much hesitation by Eigenmann (1917).

In view of existing uncertainties, I have limited the synonymy and bibliography to records from the Guianas, which are the only ones certainly referable to *P. cristata*.

I take this opportunity to point out that as type-locality of *P. gracilis*, Buenos Aires is usually quoted (cf. Fowler, 1951: 540), but that this is an error, as reference to the original description (Valenciennes in Cuvier & Valenciennes, 1840: 134-135) shows; I quote:

“M. d’Orbigny a encore envoyé de Buénos-Aires une espèce assez voisine des trois précédentes, et qui a la même longue adipeuse, ... M. d’Orbigny les a pris dans la province de Corrientes dans le Parana et les autres rivières au-dessus de 28° de latitude sud, toujours au milieu des courans dans les lieux pierreux”.

From this it is evident that Buenos Aires was only the place of dispatch of the specimens, and that the actual type-locality is the Rio Paraná in Corrientes, the only locality definitely mentioned by Valenciennes.

***Pimelodella macturki* Eigenmann**

Pimelodella macturki Eigenmann, 1912, Mem. Carnegie Mus., 5: 170, pl. XVI fig. 1 — Creek in Mora Passage, British Guiana.

Pimelodella macturkii Eigenmann, 1910, Rep. Princeton Univ. Exp. Patagonia, 3: 389 — nomen nudum (Coastal streams of British Guiana).

Pimelodella macturki; Eigenmann, 1917, Mem. Carnegie Mus., 7: 248 (British Guiana near the coast); Gosline, 1945, Bol. Mus. Nac. Rio de Janeiro, Zool., 33: 45 (Guiana Inglesa); Böhlke, 1953, Stanford Ichth. Bull., 5: 44 (Choca trenches, British Guiana); Lundberg & Baskin, 1969, Amer. Mus. Novit., 2398: 6, 29 (no locality).

Pimelodella macturkii; Henn, 1928, Ann. Carnegie Mus. 19: 77 (Creek in Mora Passage); van der Stigchel, 1946, South American Nematognathi: 57 (Surinam; Morawhana,

1) In the key in this book, under no. 2, clearly “cuerpo” should be read for “cabeza”.

British Guiana); van der Stigchel, 1947, Zool. Meded., 27: 57 (Surinam; Morawhana, British Guiana); Grey, 1947, Fieldiana, Zool., 32: 174 (British Guiana: Mora Passage).

Material. — One specimen, 1902/1910, Suriname (D. G. J. Bolten, RMNH no. 17254), standard length 70 mm¹).

Characters. — D I.6, A 14 (v.9), P I.8, V 6 (i.5), C i.15.i and rudiments, branchiostegals 8, gill rakers 3 + 1 + 8. Head 4.1, predorsal length 2.95, depth of body 4.1, greatest width of body (between the cleithra) 5.3, base of adipose fin 3.8 times in standard length; eye large, 1.1 times in snout, 0.8 times in bony interorbital, 3.5 times in head; maxillary barbels relatively short, reaching to a vertical through the anus; dorsal spine not very strong, weakly serrated on both edges, its length 2.5 times in the predorsal length; pectoral spines along the anterior edge with weak serrations, along the posterior edge with 12 strong recurved hooks, not continued on the distal fourth of the spine, which is smooth, its length 2.1 times in predorsal length. *P. macturki* differs from *P. cristata* mainly by the much shorter adipose fin, and the shorter maxillary barbels.

Distribution. — On present evidence the range of this species is very restricted; it occurs in the coastal region from Demerara east to, probably, the vicinity of Paramaribo.

Discussion. — The inclusion of *C. macturki* in the fauna of Suriname rests on the single specimen listed above, which had previously been studied and recorded by van der Stigchel (1946). In view of the faunistic importance of this specimen and its somewhat unsatisfactory label, I have checked if its provenance is above suspicion. This appears to be the case: the collector, Dr. D. G. J. Bolten (born 's Gravenhage, 5 April 1871 — deceased Zeist, 29 Aug. 1960) lived in Paramaribo for a considerable time (Oct. 1902-May 1910) and he presented to our museum a collection of 186 fishes, besides other zoological specimens, in 1910 (cf. Jentink, 1910: 15). The date given on the label (not an original one) and published by van der Stigchel, June 1910, is, however, undoubtedly not the date of collecting, but the month in which the specimen was received in Leiden. Bolten has personally collected his material, and this was done in eastern coastal Suriname (cf. Holthuis, 1959: 27), throughout the period of his stay. In the light of this evidence, there is in my opinion no reason to query the authenticity of the record.

Eigenmann's (1912: 91, 170) experience in British Guiana was that this species is confined to coastal streams, where it takes the place of *P. cristata*, which occurs more inland. Undoubtedly the situation in Suriname is similar,

1) In March and April 1971, Boeseman and Geijskes collected two samples of *Pimelodella macturki* in tributaries of the Maratakka, Nickerie District: a welcome confirmation of the occurrence of the species in Suriname.

and this explains why *P. macturki* was not obtained by us, as our collecting activities were almost confined to inland localities.

Pimelodella boschmai van der Stigchel

Pimelodella boschmai van der Stigchel, 1964 (17 Jan.), Zool. Meded., 39: 327 — Mogi-Guassu (river) below the Cachoeira de Emas (Emas falls).

Pimelodella insignis Schubart, 1964 (21 May), Bol. Mus. Nac. Rio de Janeiro, Zool., 244: 6 — Rio Mogi Guaçu.

Discussion. — Notwithstanding a single discrepancy — van der Stigchel (1964) stressed the fact that it is not the filament of the dorsal spine, but the first dorsal ray which is elongated, whereas Schubart (1964) described and figured an elongated filament to the spine, and a first ray which is not produced — *P. boschmai* and *P. insignis* are clearly one species. Van der Stigchel mentioned that he received his specimens from Schubart, and it is apparent that the two nominal species were based on material originally belonging to the same samples.

The type-material of *P. boschmai* (RMNH nos. 23248, 23250, 23251) shows a dorsal fin as described by its author, with the first ray, and not the spine, produced. A plausible solution of this discrepancy might be that both the filament of the spine and the first ray can sometimes be elongated; note that Schubart shows in his table that several of his specimens had a first ray nearly as long, in one case out of ten even longer, than the “bandeira”.

As *P. boschmai* was published a few months before *P. insignis*, the former name has priority. The species appears to be very close to *P. griffini* Eigenmann.

Genus ***Rhamdia*** Bleeker

Rhamdia Bleeker, 1858, Visschen Ind. Arch., 1: 197 — type by original designation, *Pimelodus sebae* Valenciennes.

Pimelenotus Gill, 1858, Ann. Lyc. Nat. Hist. New York, 6: 387 — based on a series of species now placed in the genera *Rhamdia* and *Pimelodella*; type by subsequent selection (Eigenmann & Eigenmann, 1890: 116), *Pimelenotus Vilsoni* Gill (= *Rhamdia quelen*)¹⁾.

Caecorhamdia Norman, 1926, Ann. Mag. Nat. Hist., (9) 18: 325 — type by original designation and monotypy, *Caecorhamdia urichi* Norman.

Generic diagnosis. — In general appearance very close to *Pimelodella*, but the occipital process, although in most species well developed, does not reach the dorsal plate.

1) *Rhamdia* Bleeker, 1858, is generally accepted as having priority over *Pimelenotus* Gill, 1858, but I do not know on what this is based. Eigenmann & Eigenmann (1890: 116) give 1859 as year of publication of the genus *Pimelenotus* but on page 126 quote *P. Vilsoni* as having been published in 1858.

Distribution. — A very widely-distributed genus, occurring throughout Central America to as far north as Mexico, and in northern and eastern South America to the Rio de la Plata; in western South America even high in the Andes (Lake Titicaca), but apparently not found in rivers draining into the Pacific. From Suriname only one, widely distributed, species is known, which is common.

Discussion. — The genus is assumed to be a large one: Gosline (1945) listed 66 forms (57 species and 9 subspecies), not all of these valid, and several additional species have been described in more recent years.

The grounds for not recognizing *Caecorhamdia* will be given in the discussion of *Rhamdia quelen urichi*.

Rhamdia quelen (Quoy & Gaimard) (fig. 33)

Pimelodus quelen Quoy & Gaimard, 1824, Voy. Uranie, Zool.: 228, pl. 49, fig. 3, 4 — Montevideo (reference not verified).

Heterobranchus sextentaculatus Spix, 1829, Gen. Spec. Piscium: 28, pl. XI — in Brasiliae aequatorialis fluvii.

Pimelodus Sebae Valenciennes, 1840, in Cuvier & Valenciennes, Hist. Nat. Poiss. (4° ed.), 15: 125 — Surinam, Cayenne, Rio-Janéiro, Buénos-Ayres.

Pimelodus Sellonis Müller & Troschel, 1849, Horae Ichth., 3: 2 — Brasilien.

Pimelodus Stegeliichii Müller & Troschel, 1849, Horae Ichth., 3: 3 — Surinam.

Pimelodus musculus Müller & Troschel, 1849, Horae Ichth., 3: 4 — America.

Pimelotus (misprint for *Pimelenotus*, see errata at end of volume) *Vilsoni* Gill, 1858, Ann. Lyc. Nat. Hist. New York, 6: 391 — Trinidad.

Pimelodus holomelas Günther, 1863, Ann. Mag. Nat. Hist., (3) 12: 442 — the Essequibo.

Pimelodus mülleri Günther, 1864, Cat. Fish. Brit. Mus., 5: 119 — River Capin, Para; Para; Surinam.

Pimelodus wuchereri Günther, 1864, Cat. Fish. Brit. Mus., 5: 123 — Bahia.

[*Pimelodus (Rhamdia) Queleni*] var. *cuprea* Steindachner, 1876, Sitzb. Akad. Wiss. Wien, Mathem.-Naturw. Cl., 74 (1): 623 — Parahyba.

Pimelodus (Rhamdia) Knerii Steindachner, 1876, Sitzb. Akad. Wiss. Wien, Mathem.-Naturw. Cl., 74 (1): 631, Note — Marabitanos.

Pim[elodus] Cuyabae Steindachner, 1876, Sitzb. Akad. Wiss. Wien, Mathem.-Naturw. Cl., 74 (1): 633, Note — Cuyaba.

Pimelodus Sebae; Kner, 1858, Sitzb. Akad. Wiss. Wien, Mathem.-Naturw. Cl., 26 (1857): 417 (Marabitanos); Hyrtl, 1859, Denkschr. Akad. Wiss. Wien, Mathem.-Naturw. Cl., 16 (1): 5, 15, 16 (no locality); Goeldi, 1898, Bol. Mus. Paraense, 2: 461 (Rio Branco).

Rhamdia Sebae; Bleeker, 1858, Visschen Ind. Arch., 1: 207 (Amer. merid.).

Rhamdia Queleni; Bleeker, 1862, Atlas Ichth., 2: 11 (name only); Bleeker, 1863, Ned. Tijdschr. Dierk., 1: 101 (name only); Bleeker, 1864, Nat. Verh. Holl. Maatsch. Wetensch., (2) 20: 75 (Surinama).

Pimelodus sebae; Günther, 1864, Cat. Fish. Brit. Mus., 5: 119 (Demerara; British Guiana; Brazils; South America); Boulenger, 1900, Bol. Mus. Torino, 15 (370): 1 (Urucum et Carandasiñho, près de Corumbà); Regan, 1905, Proc. Zool. Soc. Lond.: 190 (Rio Negro); Puyo, 1949, Poiss. Guyane Fr.: 90 (Guyane Française: les criques vaseuses tributaires de la Mana et du fleuve Kourou).

Pimelodus holomelas; Günther, 1864, Cat. Fish. Brit. Mus., 5: 120 (Essequibo); Vaillant, 1898, Notes Leyden Mus., 20: 3, 5 (New Amsterdam, Berbice).

Pimelodus steglichii; Günther, 1864, Cat. Fish. Brit. Mus., 5: 121 (Demerara; Surinam).

Pimelodus queleui; Günther, 1864, Cat. Fish. Brit. Mus., 5: 123 (Brazil); Boulenger, 1900, Bol. Mus. Torino, 15 (370): 1 (Urucum et Carandasifinho, près de Corumbá).

Pimelodus (Rhamdia) Queleui; Steindachner, 1876, Sitzb. Akad. Wiss. Wien, Mathem.-Naturw. Cl., 74 (1): 622 (Rio Parahyba bei Iuiz de Fora, Campos; Rio doce, Porto alegre, Cannavierias; Amazonenstrom bei Para; Bahia).

Pimelodus (Rhamdia) Sebae; Steindachner, 1876, Sitzb. Akad. Wiss. Wien, Mathem.-Naturw. Cl., 74 (1): 626 (vom Demerara, aus dem Essequibo und von St. Martha zunächst der Mündung des Magdalenenstromes); Steindachner, 1879, Denkschr. Akad. Wiss. Wien, Mathem.-Naturw. Cl., 39 (1): 32 (Magdalenen-Strom); Steindachner, 1880, Denkschr. Akad. Wiss. Wien, Mathem.-Naturw. Cl., 42 (1): 59 (Cauca).

Pimelodus Mulleri; Kappler, 1887, Surinam: 152 (Surinam).

Rhamdia sebae; Eigenmann & Eigenmann, 1888, Proc. Calif. Acad. Sci., (2) 1: 126 (Tonatins; Gurupa; Rio de Janeiro; Bahia; Xingu; Santa Cruz; Cudajas; Sao Matheos; Rio Doce; Serpa; Tabatinga; Goyaz; Para; Teffé; Surinam; Villa Bella); Eigenmann & Eigenmann, 1890, Occ. Pap. Calif. Acad. Sci., 1: 123 (localities as before); Eigenmann, 1891, Proc. U.S. Nat. Mus., 14: 28 (Rio de Janeiro to Rio Magdalena; Amazon; Solimoens); A. de Miranda Ribeiro, 1907, A Lavoura, 11: 186 (Barra de Pariqueraçú, Rio da Ribeira); Eigenmann, 1910, Rep. Princeton Univ. Exp. Patagonia, 3: 385 (Rio de Janeiro and Paraguay to Rio Magdalena and Tabatinga); A. de Miranda Ribeiro, 1911, Arch. Mus. Nac. Rio de Janeiro, 16: 279 (many localities); Eigenmann, 1912, Mem. Carnegie Mus., 5: 164 (several localities in British Guiana); Starks, 1913, Stanford Publ. Univ. Ser.: 27 (Para); A. de Miranda Ribeiro, 1914, Comm. Linh. Telegr. Estr. Matto-Grosso ao Amazonas, 15, Anexo 5: 5 (Rio Manso; S. Manoel; Manãos); Fowler, 1914, Proc. Acad. Nat. Sci. Philad., 66: 258 (Rupununi River, British Guiana); Bertoni, 1914, Fauna Paraguaya: 8 (Paraguay); Fowler, 1915, Proc. Acad. Nat. Sci. Philad., 67: 209 (Surinam and Peruvian Amazon); Popta in Benjamins & Snelleman, 1914-1917, Encycl. Ned. West-Indië: 607 (Suriname); Eigenmann & Fisher, 1917, Ann. Carnegie Mus., 11: 396 (Entre Rios, Rio Parahyba; Campos, Rio Parahyba; Barra da Pirahy, Rio Parahyba; Jacarehy, Rio Parahyba; Rio das Velhas; San Joaquin; Pará); A. de Miranda Ribeiro, 1918, Rev. Mus. Paul., 10: 729 (Taubaté; Rio Grande do Sul; Rio Doce, E. Santo; Iguape; Itaborahy); Beebe, 1925, Zoologica, 6: 118 (Kartabo); Pearson, 1937, Proc. Calif. Acad. Sci., (4) 23: 111 (Mamoré and Paraguay basins); Fowler, 1940, Proc. Acad. Nat. Sci. Philad., 91: 222 (Ucayali River basin, Peru); Fowler, 1940, Proc. Acad. Nat. Sci. Philad., 92: 95 (San Joaquin, Bolivia); Fowler, 1941, Bol. Mus. "Javier Prado", 5: 370 (Contamana, Perú); Güntert, 1942, Zool. Anz., 138: 31 (Nariva River auf Trinidad; Rio Tocuyo bei Boca Tocuya in Venezuela); Eigenmann & Allen, 1942, Fish. W. South America: 94 (Magdalena basin to that of Rio Janeiro; throughout the Amazon); Fowler, 1943, Proc. Acad. Nat. Sci. Philad., 95: 244 (Villavicencio and Rio Ocoá, Colombia); Schultz, 1944, Proc. U.S. Nat. Mus., 94: 194 (many localities in the Maracaibo Basin of Venezuela); Gosline, 1945, Bol. Mus. Nac. Rio de Janeiro, Zool., 33: 36 (do Rio de Janeiro ao rio Madalena e Tabatinga); Fowler, 1945, Les Peces del Peru: 38 (Contamana, Perú); Sterba, 1959, Süßwasserfische aus aller Welt: 306, fig. 647 (Im ganzen nördlichen und mittleren Südamerika östlich der Anden); Boeseman, 1960, Studies Fauna Curaçao, 10: 100 (along Talparo Road, Trinidad); Vogt, 1970, Grzimeks Tierleben, 4: 403 (Südamerika).

Rhamdia sebae kneri; Eigenmann & Eigenmann, 1888, Proc. Calif. Acad. Sci., (2) 1: 126 (Tabatinga, Jutahy); Eigenmann & Eigenmann, 1890, Occ. Pap. Calif. Acad. Sci., 1: 126 (Tabatinga and Jutahy); Eigenmann & Eigenmann, 1891, Proc. U.S. Nat. Mus., 14: 28 (Amazon, Solimoens, and northward); Eigenmann, 1910, Rep. Princeton Univ. Exp. Patagonia, 3: 385 (Upper Paraguay and northward); Pearson, 1937, Proc. Calif. Acad. Sci., (4) 23: 111 (Paraguay basin); Güntert, 1942, Zool. Anz., 138: 32 (Nariva

River auf Trinidad); Gosline, 1945, Bol. Mus. Nac. Rio de Janeiro, Zool., 33: 36 (alto Paraguai e para o norte).

Rhamdia quelen; Eigenmann & Eigenmann, 1888, Proc. Calif. Acad. Sci., (2) 1: 126 (Santa Clara; Rio Mucuri; Iuiz de Fora; Campos; Rio Jequitinhonha; Mendez; Rio de Janeiro; Macacos; Sao Matheos; Rio Parahyba; Cannavieras; Rio Grande do Sul); Eigenmann & Eigenmann, 1890, Occ. Pap. Calif. Acad. Sci., 1: 127 (localities as preceding reference); Eigenmann & Eigenmann, 1891, Proc. U.S. Nat. Mus., 14: 28 (La Plata to Amazon); Eigenmann & Norris, 1900, Rev. Mus. Paul., 4: 350 (Taubaté); Eigenmann & Kennedy, 1903, Proc. Acad. Nat. Sci. Philad., 55: 499 (Estancia La Armonia; Asuncion and Campo Grande, Paraguay); Eigenmann & Bean, 1907, Proc. U.S. Nat. Mus., 31: 660 (Amazon River between Para and Manaos); Eigenmann, 1907, Proc. Wash. Acad. Sci., 8: 450 (near Buenos Aires); Eigenmann, McAtee & Ward, 1907, Ann. Carnegie Mus., 4: 113 (Corumba, Paraguay); Eigenmann, 1910, Rep. Princeton Univ. Exp. Patagonia, 3: 386 (Rio de la Plata to the Amazon and Guiana); A. de Miranda Ribeiro, 1911, Arch. Mus. Nac. Rio de Janeiro, 16: 278 (lagos da Quinta Boa Vista em S. Christovão); Eigenmann, 1912, Mem. Carnegie Mus., 5: 163 (several localities in British Guiana); Starks, 1913, Stanford Publ. Univ. Ser.: 27 (Ceara Mirim); A. de Miranda Ribeiro, 1914, Comm. Linh. Telegr. Estr. Matto-Grosso ao Amazonas, 15, Anexo 5: 4 (Coxipó da Ponte); Bertoni, 1914, Fauna Paraguaya: 8 (Alto Paraná); Fowler, 1915, Proc. Acad. Nat. Sci. Philad., 67: 211 (eastern Brazil and the La Plata); Eigenmann & Fisher, 1917, Ann. Carnegie Mus., 11: 396 (many localities in south-eastern Brazil and the Paraguay basin); A. de Miranda Ribeiro, 1918, Rev. Mus. Paul., 10: 729 (Rio Parahytinga; Hansa; Sorocaba; Mercado de S. Paulo; S. Paulo; Lagôa Feia, Rio de Janeiro; Itanhaem do Bananal, Paraná Mirim); Devincenzi, 1924, An. Mus. Nac. Montevideo, (2) 1: 149 (Uruguay: several localities); Pearson, 1924, Indiana Univ. Stud., 11 (64): 11 (Rio Beni basin, Bolivia: Tumupasa, Lake Rogoagua, Espia); Myers, 1930, Proc. Biol. Soc. Wash., 43: 69 (Rio Meta, Colombia); Magalhães, 1931, Mon. Brazil. Peix. Fluv.: 130, fig. 58 (rios do Estado de S. Paulo, Rio de Janeiro e Paraná); Pearson, 1937, Proc. Calif. Acad. Sci., (4) 23: 111 (Beni-Mamoré and Paraguay basins); Fowler, 1940, Proc. Acad. Nat. Sci. Philad., 92: 95 (Bolivia: Puerto Suarez; Tumpasa; L. Rogoagua; Espia); Eigenmann & Allen, 1942, Fish. W. South America: 93 (Yurimaguas; Iquitos; La Merced; Puerto Melendez, Pongo de Manseriche); Fowler, 1943, Proc. Acad. Nat. Sci. Philad., 95: 318 (Cerro Largo, Montevideo); Schultz, 1944, Proc. U.S. Nat. Mus., 94: 194, 196 (British Guiana; Valencia Basin of Venezuela); Gosline, 1945, Bol. Mus. Nac. Rio de Janeiro, Zool., 33: 36 (do Rio da Prata à Guiana e Venezuela); Fowler, 1945, Los Peces del Peru: 39 (Peru: Yurimangas, Iquitos, La Merced, Puerto Meléndes, Pongo de Manseriche); van der Stigchel, 1946, South American Nematognathi: 48 (Surinam; Berbice River, New Amsterdam, British Guiana; Rio de Janeiro; Brazil; swamps behind the Botanic Garden, Lower Surinam River; Upper Saramacca; Port Real, Rio de Janeiro; Aruka River, British Guiana; Aruataima Falls, Upper Potaro River, British Guiana); van der Stigchel, 1947, Zool. Meded., 27: 50 (as preceding reference); de Buen, 1950, Publ. Cient. S.O.Y.P., 2: 71 (Uruguay); Bertin & Estève, 1950, Cat. Types Poiss. Mus. Paris, 5: 56 (Cayenne (Guyane)); Buenos-Ayres (Argentina); Fl. Guyayaquil (Equateur)); Boeseman, 1952, Zool. Meded., 31: 181 (Surinam: Coropina creek, Republiek; Nanni creek, Doksen savanna; Surinam River, Paramaribo); Boeseman, 1953, Zool. Meded., 32: 6 (Surinam: Sommelsdijkse Kreek, near Wolfenbuttel (asylum), Paramaribo; Langaman kondré (near Albina); Wanekreek; Djaikreek; Taproepa Creek; Marowini Basin, Nassau Mountains); Inger, 1956, Fiel-diana, Zool., 34: 425, 428 (Rio Abácapa, Venezuela); Boeseman, 1960, Studies Fauna Curaçao, 10: 100 (along Talparo Road, Trinidad); Luengo, 1963, Acta Biol. Venez., 3: 330 (references only); Fernández-Yépez, 1967, Acta Biol. Venez., 5: 161 (Venezuela: rio Uruyén medio); Ringuelet, Arámburu & de Arámburu, 1967, Los Peces Argentinos de Agua Dulce: 322 (distribution).

Rhamdia Quelen; Berg, 1895, An. Mus. Nac. Buenos Aires, 4: 133 (Argentina: Arroyo del Tala de Catamarca; Rio Paraná, cerca de San Nicolás).

Pimelodus Mülleri; Goeldi, 1898, Bol. Mus. Paraense, 2: 459 (Magoary-Marajó; Counany).

Pimelodus Muelleri; Goeldi, 1898, Bol. Mus. Paraense, 2: 476 (Counany; Marajó).

Pimelodus muelleri; Regan, 1905, Proc. Zool. Soc. Lond.: 190 (Rio Negro).

Pimelodus (Rhamdia) wilsoni; Regan, 1906, Proc. Zool. Soc. Lond.: 386 (Trinidad).

Rhamdia vilsoni; Eigenmann, 1910, Rep. Princeton Univ. Exp. Patagonia, 3: 385 (Trinidad); Fowler, 1915, Proc. Acad. Nat. Sci. Philad., 67: 209 (Trinidad); Fowler, 1915, Proc. Acad. Nat. Sci. Philad., 67: 529 (Trinidad); Gosline, 1945, Bol. Mus. Nac. Rio de Janeiro, Zool., 33: 36 (Trinidad).

Rhamdia holomelas; (?) Eigenmann, 1912, Mem. Carnegie Mus., 5: 166 (Lama Stop-Off, British Guiana); Gosline, 1945, Bol. Mus. Nac. Rio de Janeiro, Zool., 33: 36 (Essequibo).

Rhamdia queleeni; Norman, 1926, Ann. Mag. Nat. Hist., (9) 18: 325, 326, 327 fig. 2 (eastern South America north of the Rio Plata); Arnold & Ahl, 1936, Fremdl. Süßwasserfische: 252, fig. (im südlichen Brasilien); Devincenzi & Teague, 1942, An. Mus. Montevideo, (2) 5 (4): 43 (Uruguay); Sterba, 1959, Süßwasserfische aus aller Welt: 306, fig. 644 (Südliches Brasilien, La-Plata-Gebiet).

Rhamdia queleeni; Campos, 1944, Pap. Avuls. Zool., 4: 172 (Est. de São Paulo); Schubart, 1964, Bol. Mus. Nac. Rio de Janeiro Zool., 244: 18 (Rio Mogi Guaçu).

Rhamdia sapo; (pt.) van der Stigchel, 1946, South American Nematognathi: 52 (Paramaribo, Surinam); (pt.) van der Stigchel, 1947, Zool. Meded., 27: 52 (Paramaribo, Surinam).

Pimelodus seboe; Puyo, 1949, Poiss. Guyane Fr.: 87, 90 (Guyane Française: dans les criques vaseuses tributaires de la Mana et du fleuve Kourou).

Rhamdia sebae knerii; Fowler, 1951, Arq. Zool. S. Paulo, 6: 576 (Amazonas, Alto Paraguay, Paraguay, Guiana).

Rhamdia sebae sebae; Fowler, 1951, Arq. Zool. S. Paulo, 6: 577 (distribution).

Pimelodella gracilis; Price, 1955, J. Agric. Soc. Trinidad & Tobago, Soc. Pap., 863: 14 (Trinidad).

Pimelodella chagresi; Price, 1955, J. Agric. Soc. Trinidad & Tobago, Soc. Pap., 863: 14 (Trinidad).

Pinirampus pinirampu; Hoedeman, 1961, Bull. Aquatic Biol., 2: 135 (French Guiana: Litany river, village Aloiké).

Material. — 88 specimens as follows. One specimen, 27 November 1957, Litani R. near Alowike (J. Géry, ZMA no. 102234), standard length ca. 127 mm. One specimen, 29 January 1964, Cederkreek near Brokopondo (Boeseman, RMNH no. 25741), standard length 162 mm. One specimen, 24 February 1964, Amanipani Kreek, a tributary of the Sara Kreek between Locus and Dam (Boeseman, RMNH no. 25742), standard length 161 mm. One specimen, 6 March 1964, Gran Kreek, ca. 4 km from its mouth (Boeseman, RMNH no. 25743), standard length 147 mm. Four specimens, 10 July 1964, shore of Brokopondo Meer, between Kabel and Abontjima (Boeseman, RMNH no. 25762), standard length 47, 99, 137, 156 mm. 20 specimens, 21 July 1964, tributary of Gran Kreek, ca. 12 km from its mouth (Boeseman, RMNH no. 25744), standard length 28-62½ mm. One specimen, 27 July 1964, shore of Brokopondo Meer between Kabel and Brownsweg (Boeseman, RMNH no. 25745), standard length 76 mm. Four specimens, 30 July 1964, tributary of middle course Gran Kreek (Boeseman, RMNH no. 25746), standard length 53, 67, 69, 74 mm. Three specimens, 15 August 1964, tributary of Gran Rio between Ligolio and Awaradam (Boeseman, RMNH no. 25766), standard length 53, 74, 88 mm. Two specimens, 30 March 1965, Brokopondo Meer between Kabel and Brownsweg (Mees, RMNH no. 25747), standard length 76, 93 mm. One specimen, 2 April 1965, Gansee,

Brokopondo Meer (Mees, RMNH no. 25748), standard length 196 mm. One specimen, same data (Mees, RMNH no. 25749), standard length 120 mm. One specimen, 8 April 1965, Gansee, Brokopondo Meer (Mees, RMNH no. 25749), standard length 212 mm. One specimen, 5 September 1965, Compagnie Kreek (Mees, RMNH no. 25750), standard length 78 mm. One specimen, 27 November 1965, Tapanahoni, ca. 2 km upstream from Paloemeu mouth (Mees, RMNH no. 25761), standard length 101 mm. Three specimens, 12-14 December 1965, Langetabbetje, upper course Sara Kreek (Mees, RMNH no. 25751), standard length 118, 121, 185 mm. 13 specimens, 19 December 1965, Compagnie Kreek (Mees, RMNH no. 25752), standard length 102-211 mm. Six specimens, 28 December 1965, Marshall Kreek (Mees, RMNH no. 25753), standard length 87, 92, 106, 122, 128, 137 mm. Three specimens, 26 January 1966, Sipaliwini (Mees, RMNH no. 25754), standard length 54, 55, 100 mm. One specimen, 28 February 1966, Makambie Kreek near Brownsweg (Mees, RMNH no. 25755), standard length 143 mm. Two specimens, 5 March 1966, creek behind Hermansdorp, Brokopondo (Mees, RMNH no. 25756), standard length 150, 157 mm. One specimen, 8 March 1966, Tapoeripa Kreek near Brokopondo (Mees, RMNH no. 25757), standard length 157 mm. 16 specimens, tributary of the Mama Kreek near Berg-en-Dal (Mees, RMNH no. 25758), standard length 104-150 mm.

Characters. — D I.6, A 10-13 (usually iii.8), P I.8 or I.9, V 6 (i.5), C 15 or 16 (branched rays only), branchiostegals 7, gill-rakers 8-12 (2 or 3 + 1 + 5-8), adipose fin long, 2.4-2.7 in standard length. Superficially this species is very similar to *Pimelodella cristata*; besides the difference in development of the processus occipitalis it can be distinguished by its smaller eyes (5.6-7.4, but usually 6 or more times in head), more depressed snout, and colour which is dark brown in life and in freshly preserved material, against pale yellowish in *P. cristata*.

Distribution. — In Suriname found throughout the country, in the same habitat as *Pimelodella cristata*, but less numerous, although still a very common species. Widely distributed in tropical South America, including Trinidad; closely related forms in Central America.

Discussion. — There has been much uncertainty about the validity of *R. sebae*. Valenciennes (1840: 128) himself suggested the synonymy of *R. sebae* with *R. quelen*, and he was followed by Bleeker (1862). Steindachner (1876b: 626), however, disagreed and came with the character of the barbel-length, that has since been widely used to distinguish *R. sebae* from *R. quelen*, amongst others by the Eigenmanns (1890). Starks (1913: 27), although he listed the two as different species, did not believe in the mentioned character and considered it probable that they represented only one species. No progress was made until van der Stigchel (1946) measured a number of specimens on the basis of which he concluded definitely that *R. sebae* is a synonym of *R. quelen*. He was followed "provisionally" by Boeseman (1952, 1953), but later the same author (Boeseman, 1960) reverted to the use of both names. Boeseman's argument when making this change of stand was that van der Stigchel had expressed "an opinion not yet shared by any other authors",

but I am not aware that anybody since van der Stigchel has seriously studied the species.

The position appears to be very much the same as that of *Pimelodella gracilis* and *P. cristata*. Both the names *R. quelen* and *R. sebae* have been applied widely over the whole of eastern and northern South America. In Suriname, however, certainly no more than one species of *Rhamdia* occurs, which in its individual variation includes all the characters ever used to distinguish two species.

Therefore I agree with van der Stigchel that *R. sebae* is not specifically different from *R. quelen*. I want to leave open the possibility that careful measurement of large series from the La Plata and from Suriname would reveal slight differences that in future could be used for the recognition of subspecies within the huge range of the species.

In this connection I want to point out that subspecific names have been applied in the species (viz., *Rhamdia sebae kneri*), with a complete lack of understanding of the nature of subspecies, a matter I have discussed at some length under *Pseudoplatystoma fasciatum*.

The reason that in this case I go further than in that of *Pimelodella gracilis* and *P. cristata*, is that van der Stigchel's conclusion was based on an actual comparison of material, whereas I have been unable to examine adequate topotypical material of *P. gracilis*.

It is likely that several other nominal species belong in the synonymy of *R. quelen*. As an example I can mention *Rhamdia lehmanni* Dahl (1961), which was described without any reference to other members of its genus, whereas in its description no characters are given that would differentiate it from *R. quelen*.

In the original description of *P. holomelas* no mention is made of *R. quelen* (or its synonym *R. sebae*), and no distinguishing characters from *R. quelen* are given. The name was placed in the synonymy of *Rhamdia sebae* by Eigenmann & Eigenmann (1890) but resurrected without reference to his earlier opinion by Eigenmann (1912), who distinguished *R. holomelas* from *R. quelen* and *R. sebae* by having "Premaxillary band of teeth with a backward projecting angle laterally. Maxillary barbel not extending to middle of adipose; space between the eyes 3 in the head; caudal cleft, both lobes rounded, the third or fourth ray from the cleft in the upper lobe longest; adipose dorsal 2-2.4 in the length". Eigenmann's material consisted of seven specimens from Lama Stop-Off, British Guiana, whereas he stated also to have examined the types in the British Museum. In the description he further states: "maxillary barbel extending beyond the base of the pectoral, but not to its tip" — which is surprising as in the original description Günther wrote: "Maxillary barbels

extending beyond the commencement or to the middle of the adipous fin." Subsequently van der Stigchel (1946: 52) commented on Eigenmann's (1912) work, and once more synonymized *P. holomelas* with *R. quelen*. I follow van der Stigchel, but want to leave open the possibility that the specimens described by Eigenmann (1912) are referable to a different species, as their maxillary barbels appear to be remarkably short. On the other hand, the specimens which Eigenmann identified as *Rhamdia holomelas* were rather large (275-345 mm) and there are indications that in *R. quelen* larger individuals have relatively shorter barbels than smaller individuals (cf. the large specimens discussed in the following paragraph).

Van der Stigchel (1946: 52-53) has listed another member of the genus from Suriname, *Rhamdia sapo* (Valenciennes). As all previous records of that species are confined to the Uruguay-Paraná-Paraguay river systems, this means an enormous extension of range. Although the examples of several other species show that such a wide range is not impossible, it appeared nevertheless desirable to verify the record, especially as van der Stigchel did not comment on it, and does not appear to have realised that it was unusual¹).

The specimens (ZMA no. 100065) are distinguishable from the available material of *R. quelen* mainly by their large size (standard length 313, 348 mm, against a maximum of 212 mm in *R. quelen*). The maxillary barbels are rather short, reaching a little beyond a vertical through the dorsal origin.

Information on the labels says that these specimens came from Paramaribo, Suriname, and were presented to "Artis" by Bolten (obviously Dr. D. G. J. Bolten, who has been mentioned on a previous page) under the name of *Pimelodus stegelichii* Müller & Troschel, which is, significantly, a synonym of *Rhamdia quelen*. Further, that they died in the aquarium of "Artis" on 20 June 1929. Although the registers of the "Artis" aquarium are incomplete, so that the date on which the specimens were received cannot now be ascertained, it may perhaps be assumed that they were presented by Dr. Bolten on his return from Suriname in 1910, and lived to a ripe old age in the aquarium, which would account for their unusually large size.

In view of the evidence that the two specimens just described are close to the maximum size the species can attain, I was surprised to see that McConnell (1967: 65) has recorded specimens of over 12 lb, caught when trawling in the Rupununi River, and asked for more information. From the reply received from Mrs. McConnell, I quote: "I ... write to you to confirm your doubts about identification of "12 lb" *Rhamdia quelen*. I agree that this

¹ Lack of material has prevented me from investigating the validity of *R. sapo* as such; I consider it a distinct possibility that it is a synonym of *R. quelen*.

does seem much too large, and cannot at this stage see how this crept in (possibly it was an undetected typing or proof error)".

Specimen ZMA no. 102234 was recorded by Hoedeman (1961) under the name of *Pinirampus pinirampu*. Notwithstanding its somewhat poor and shrivelled condition, this fish is clearly a perfectly normal specimen of *Rhamdia quelen*.

I am of course aware that, as a subspecies *R. q. urichi* is here recognized, correct nomenclatural procedure requires the use of a trinomial for *Rhamdia quelen*. The reason why this has not been done is that I have dealt with the species as a whole, and want to leave open the possibility of geographical variation within its extensive range. The application of a trinomial would, I believe, give a false impression of exactness and uniformity.

***Rhamdia quelen urichi* (Norman)**

Caecorhamdia urichi Norman, 1926, Ann. Mag. Nat. Hist., (9) 18: 325, fig. 1 — Guacharo Cave, Trinidad.

Caecorhamdia urichi; Borodin, 1927, Amer. Mus. Novit., 263: 2, 3 fig. 13, 5 (Guacharo Cave, Trinidad); Reichel, 1927, Rev. Suisse Zool., 34: 386, 390 (une grotte de l'île de la Trinité); Guppy, 1934, Trop. Agricult. 11: 117 (Trinidad); Hubbs, 1938, Carnegie Inst. Wash. Publ., 491: 267 (a Trinidad cave); Gosline, 1941, Stanford Ichth. Bull., 2: 84 (Trinidad); Gosline, 1945, Bol. Mus. Nac. Rio de Janeiro, Zool., 33: 41 (Trinidad); Thinès 1955, mn. Soc. Roy. Zool. Belg., 86: 40, 61 fig. 10 (l'intérieur de la grotte de Guacharo (Trinité)); Boeseman, 1960, Studies Fauna Curaçao, 10: 103 (Trinidad); Vandel, 1964, Biospéologie: 264 (Cueva del Guacharo, dans l'île de Trinidad); Thinès, 1969, L'Evol. Régr. Poiss. Cavernic. Abyss.: 28, 106 (la grotte de Guacharo (Trinité)).

Caecohamdia urichi; Wolf, 1934-1937, Anim. Cavern. Cat., 2: 486 (Trinidad: Guacharo Cave); Wolf, 1934-1938, Anim. Cavern. Cat., 3: 697 (Trinidad: Guacharo Cave).

Caecorhamdella urichi; Hubbs, 1938, Carnegie Inst. Wash. Publ., 491: 264 (Trinidad).

Material. — One specimen, 16 April 1966, Guacharo Cave, Oropuche River, Trinidad (RMNH no. 26733), standard length 135 mm.

Characters. — Except for the degenerated eyes, described in more detail below, identical with *Rhamdia quelen*.

The left orbit is filled with connective tissue, and it is entirely closed by skin; externally it is merely indicated by a fold of the skin. The right orbit, however, shows a small hole, less than a millimetre across, in the skin which covers it. This hole is relatively deep, it appears to be the last vestige of an open orbit. There is no trace of an eye. Histological studies of the optic region might yield interesting results, but must await the collecting of more material.

When this specimen was fresh, I noted that it was "normally pigmented"; in preservative it looks somewhat paler than two specimens of *R. quelen* we captured at the same time and place. Norman (1926: 325) described his specimens as "uniform pale yellowish brown", which also describes my pre-

served specimen very well. However, some of the individuals we observed did appear to be white (see Discussion); they must have had a strongly reduced pigmentation.

Norman (1926), as quoted in the Discussion, observed that the mandibular barbels in the blind fish are somewhat longer than in specimens with developed eyes. Obviously the idea behind this remark is that in blind individuals tactile orientation would be more important than in individuals with eyes.

It would be interesting to have this character confirmed on the basis of more adequate material. Unfortunately I cannot contribute much of a constructive nature as the two specimens of *R. quelen* captured in the Oropuche Cave are much larger than the specimen of *R. q. urichi*. Nevertheless the measurements of the barbels of these fishes are here given:

R. q. urichi, standard length 135, left maxillary barbel 52, right maxillary barbel 62, left outer mental barbel 33, right outer mental barbel 40, left inner mental barbel 25, right inner mental barbel 23 mm. Longest maxillary barbel 46%, longest outer mental barbel 30%, longest inner mental barbel 19% of standard length.

R. quelen (1), standard length 200, maxillary barbels ca. 72, right outer mental barbel 44 (left has been damaged and healed), left inner mental barbel 24, right inner mental barbel 33 mm. Longest maxillary barbel 36%, longest outer mental barbel 22%, longest inner mental barbel 16½% of standard length.

R. quelen (2), standard length 240, left maxillary barbel 43, right maxillary barbel 74, left outer mental barbel 45, right outer mental barbel 39, inner mental barbels 30 mm. Longest maxillary barbel 31%, longest outer mental barbel 19%, inner mental barbels 12½% in standard length.

These measurements illustrate only two points: the great differences that can exist even between the two sides of one individual, and the relative decrease in size of the barbels in larger individuals. In view of the considerable individual variation, very large series would be needed to confirm the difference suggested by Norman; at present it is no more than speculation. Obviously there is no point in taking these measurements from specimens collected in Suriname or elsewhere outside Trinidad, as the means might vary geographically. There is the added difficulty that barbels can break and regenerate, and on the whole I consider it unlikely that there is anything in this character.

Distribution. — Confined to Guacharo Cave or Oropuche Cave, Trinidad.

Discussion. — The genus *Caecorhamdia* was introduced for an eyeless species from Trinidad, with the comment; "Apart from the absence of eyes, this fish appears almost identical with *Rhamdia queleni*, Quoy and Gaimard ...

When species of equal size are compared, however, the mandibular barbels appear to be somewhat longer in the blind fish ... In order to draw attention to this interesting fish, and following convention, I have erected a new genus for its reception. I realize, however, that this procedure is somewhat unsatisfactory, for, were the eyes developed, the specimens from the Guacharo Cave would probably be identified with the species *Rhamdia queleni*".

Notwithstanding this somewhat conditional introduction, the genus has continued to be recognized in subsequent literature (Gosline, 1941: 84, 1945: 40; Thinès, 1955: 61; Boeseman, 1960: 103)¹⁾. The last-mentioned author pointed out that the species *C. urichi* remained known from the original three specimens only, and that is probably the main reason why subsequent to its description so few authors have discussed it.

As cave fauna in general has always intrigued me, and as I was eager to learn more of *Caecorhamdia urichi*, I spent, on my way home from Suriname, a few days on Trinidad, where a visit to the Oropuche Cave was arranged by Dr. V. C. Quesnel. Our party consisted of Dr. V. C. Quesnel and his two sons, Dr. J. Price, my wife and I. As the cave is on private property (the Léotaud Estate), we had to obtain a permit to visit it. With this we went to the house of the overseer, who showed us the way. We walked upstream along the Oropuche River (here a creek of a few metres wide) for about ten minutes, until we reached a high mountain wall, from which the river flowed through a comparatively narrow but high slit or tunnel. This we entered, wading through the water. After about twenty metres the slit widened out to a large chamber, where we were greeted by the loud and eery cries of the Guacharo's, *Steatornis caripensis*, from which the cave takes its name. Through a narrower part we reached a second, smaller, chamber, also inhabited by Guacharo's and finally, through a tunnel in which the ceiling came down so low that we had to bend to go through, to a third, much smaller chamber, with a length of no more than twelve to fifteen metres, at the end of which the wall reached to below water level. Over a bed of pale sand the water of the Oropuche, no more than two metres wide at this place, welled up from under the rocks. I estimated that at this place we were about 150 m inside the mountain.

In this deepest part of the cave there were no birds or bats, but by the light of our torches we could see several individuals of *Rhamdia* swimming about. It was interesting to see that some of the fishes observed appeared to be white, whereas others were normally pigmented. Contrary to expectation we found that the white fishes, which we presumed to be eyeless, were by no

¹⁾ Hubbs' (1938: 264) use of the name *Caecorhamdella urichi* is clearly only a lapsus, as on another page he uses the name *Caecorhamdia urichi*.

means easy to catch. Our total catch during an hour's work consisted of two perfectly normal specimens of *R. quelen*, and only the one individual listed above which lacks eyes, but is normally pigmented.

Although the material collected is admittedly insufficient, our impression was definitely that in the cave the whole scala of intermediates, varying from normal *R. quelen* to unpigmented and eyeless individuals ("pure" *Caecorhamdia urichi*) was present. In addition, Dr. Price informed us that at one time there had been a series of specimens, showing this whole range of variation, in the Zoology Department of the University. During our visit he searched in vain for this material, but even without it the observations mentioned and the specimen captured make it clear that according to modern principles of systematic zoology, *Caecorhamdia urichi* is neither a valid genus, nor a valid species, but must be regarded at most as a subspecies freely hybridizing with normal *R. quelen*, or perhaps as not even that. In the next paragraph arguments will be given for regarding it as a valid subspecies, rather than as a local aberration.

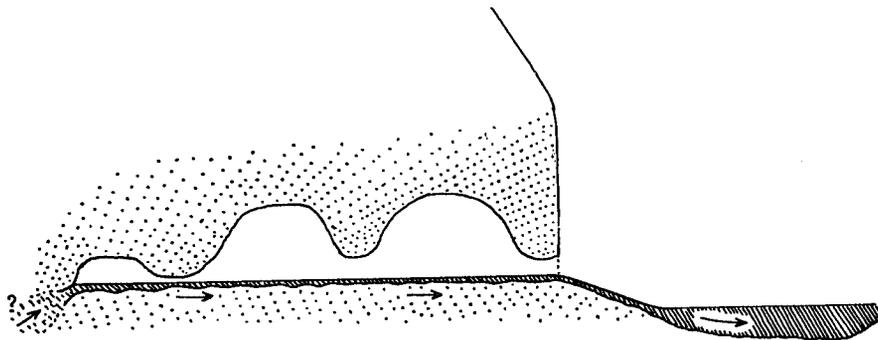


Fig. 34. Section through the Oropuche Cave, Trinidad. This is a rough sketch only, to assist in obtaining a general idea of the situation; it does not pretend to any degree of accuracy.

My reasoning in ascribing subspecific status to these fishes is as follows. In the deepest part of the cave, and only there, *R. q. urichi* appeared to be not uncommon, probably more common than *R. quelen* (the latter would be less visible as they are always fully pigmented and better able to conceal themselves). The incidence of blind fishes appears definitely too high to regard them as accidental freaks of the normal population. On the other hand the apparent, although at present still insufficiently documented, occurrence of intermediates makes it clear that *R. q. urichi* cannot be considered a species. Per definition, a subspecies must be to a certain extent geographically separated from other subspecies of the same species. In the cave visited this condition does not, at first sight, appear to be fulfilled, for that the handful

of individuals of *urichi* inhabiting the deepest part of the cave would be able to maintain their characters against a presumably frequent immigration of normal individuals, is out of the question. Therefore I consider it likely that deeper in the mountain, and inaccessible to man, there is a considerable body of water, in which *urichi* has originally developed, and that the accessible part of the cave, the upper course of the Oropuche River, is only the outlet of this large body of water. This means that contact between the eyeless and the normal populations would remain restricted to the comparatively narrow outlet, where we found them mixing.

The opinion here expressed finds some support in the large flow of water appearing from under the rock in the deepest part of the cave. In this connection it is relevant to record that about two years before our visit two young men had made an attempt, with diving equipment, to follow the Oropuche upstream below the rock. Working their way down, they became stuck and drowned. One of the bodies was salvaged by a professional diver, the other was never found but some six months after the accident a human skull was picked up downstream outside the cave. This tragedy had caused an understandable reluctance to resume underwater exploration in the cave.

It may be noted that the situation as we found it is somewhat different from that described by Norman (1926), according to whom the type material was taken: "... from a pool in the interior of the Guacharo Cave, Trinidad ... this pool is always in complete darkness; very occasionally, in times of heavy rains, the pool becomes connected with a rivulet running out of the cave". During our visit we did not find any pools not connected with the rivulet, but it is possible that periodically there is less water and the rivulet ceases to run. Thus the free contact between populations in the cave and outside may be periodically broken. Carriker (1931), in his picturesque description of the cave, recorded a considerable flow of water in June.

The relation between *Rhamdia quelen urichi* and *Rhamdia quelen* has an evident parallel in that between *Pimelodella kronei* and *Pimelodella transitoria* in south-eastern Brazil as described by Pavan (1946). There also, the eyeless form was originally described as a separate genus, subsequently reduced to a "variety" by Haseman (1911), but finally treated as a separate species by Pavan. In the case of *Pimelodella*, Pavan provided evidence (but inconclusive) that hybridisation between *P. kronei* and *P. transitoria* does not normally occur.

An exhaustive discussion of the problems relating to cave faunae falls outside the scope of this paper; for more information on the subject reference may be made to Thinès' (1969) excellent work, but I would like to give my opinion on the development of cave fishes in three points.

1° Caves will for certain species form an attractive habitat, mainly because of the absence of predation, but also because of diminished interspecific competition. Several authors have stressed the need for "preadaptation": it is obvious that generally only those species can carry out a successful initial colonisation of cave habitats, which are (for finding food and other primary functions) to a large extent independent of sight. 2° The eyes, as well as the pigment, or rather the melanophores, are highly evolved systems which can only be maintained by a rigid selection pressure for their retention. Where this selection pressure falls away, a comparatively rapid degeneration, going initially through a stage of great variability, is predictable. In a previous paper I referred to this process as "a loss of characters as a consequence of the absence of selective pressure for their retention" (Mees, 1962: 32). I consider therefore that the degeneration of eyes and melanophores is an inevitable consequence of life in darkness where these organs are not needed. 3° In the case of the eyes there may well be selection pressure for their loss, as in total darkness eyes would probably be easily injured; once the eyes have degenerated and the sockets closed by strong skin, a possible source of injury and infection has been eliminated. Following this line of reasoning, it is clear why the degeneration of the eyes precedes the loss of melanin (admittedly Hubbs, 1936: 168, 182, recorded that *Rhamdia guatemalensis decolor* from caves near Motul in Yucatan, shows depigmentation without reduction in eye-size). Indeed, most blind fishes possess some pigment; this is also as could be expected: I have on purpose distinguished between the melanophores, which are specialized structures, and the pigment itself, the production of which is only one of the functions of the melanophores. Therefore it is not surprising that certain eyeless species are still able to form pigment (cf. Thinès, 1969: 234), but appear unable to manipulate it. Actually, as Thinès (1969: 235) has suggested, the absence of pigment may also have selective value in cave fishes.

***Rhamdia foina* (Müller & Troschel) (fig. 33)**

Pimelodus foina Müller & Troschel, 1848, in R. Schomburgk, Reisen in Britisch-Guiana, 3: 628 — besonders an den felsreichen Stellen des Takutu.

Rhamdia holomelas rupununi Fowler, 1914, Proc. Acad. Nat. Sci. Philad., 66: 258, fig. 11 — Rupununi River, British Guiana.

Pimelodus foina; Müller & Troschel, 1849, Horae Ichth., 3: 5 (Guiana); Günther, 1864, Cat. Fish. Brit. Mus., 5: 130 (Guiana).

Rhamdia foina; Eigenmann & Eigenmann, 1888, Proc. Calif. Acad. Sci., (2) 1: 126 (name only); Eigenmann & Eigenmann, 1890, Occ. Pap. Calif. Acad. Sci., 1: 126 (Guiana); Eigenmann & Eigenmann, 1891, Proc. U.S. Nat. Mus., 14: 28 (Takutu, Guiana); Eigenmann, 1910, Rep. Princeton Univ. Exp. Patagonia, 3: 386 (Guiana).

Rhamdella foina; Eigenmann, 1912, Mem. Carnegie Mus., 5: 167 (Warraputa Catar-

act); Gosline, 1945, Bol. Mus. Nac. Rio de Janeiro, Zool., 33: 34 (Guiana); Alexander, 1966, Proc. Zool. Soc. Lond., 148: 90 (British Guiana).

Rhamdia holomelas rupununi; Gosline, 1945, Bol. Mus. Nac. Rio de Janeiro, Zool., 33: 36 (rio Rupununi).

Material. — One specimen, 1842, Takutu (R. Schomburgk, ZMB no. 3039), standard length 163 mm, holotype of the species. One specimen, 1908, Warraputa Cataract, British Guiana (C. H. Eigenmann, CAS no. 13468, ex IUM no. 12007), standard length 110 mm.

Characters. — D I.6, A 10-11 (iv.6 and iv.7), P I.8 and I.9, V 6 (i.5), C i.14.i and i.15.i, excluding rudiments, branchiostegals 6, gill-rakers 17-19 (4 + 1 + 12 and 4 + 1 + 14), well-developed, long and slender. Head 4.0-4.2 in standard length, greatest width of body, between the cleithra, 5.2-5.35 times in standard length, depth of head at the same place 0.6-0.7 times its width, depth of body 6.5-6.7 times in standard length, predorsal length 2.9-3.0 times in standard length, adipose base 3.4-3.7 times in standard length, eyes 1.7-2.0 times in snout and 4.4-4.8 times in head, the maxillary barbels reach to below the dorsal fin, dorsal and pectoral spines well-developed, the former (broken in the type) 2.8, the latter 2.3 and 2.3 times in predorsal length. This species differs from *R. quelen* by its conspicuously larger eyes, more depressed snout, rather stronger spines, shorter adipose fin and higher number of gill-rakers. For shape of fontanel and occipital process, see fig. 33.

Distribution. — On present evidence confined to British Guiana, where known from the Takutu and Rupununi Rivers, and the Warraputa Cataract, Essequibo River. As the Takutu River belongs to the Amazon basin, a much wider distribution is likely.

Discussion. — The reason I studied this species, is that Eigenmann (1912) had placed it in *Rhamdella*, hence in the same genus as *Imparfinis minutus*. As at the same time it seemed unlikely that *I. minutus*, which is distributed throughout Suriname and has an enormous range in eastern South America, would not occur in British Guiana, I suspected that *R. foina* might be the same as *I. minutus*, over which it has ample priority. On examination I found, however, that *R. foina* is an entirely different species, which appears to be well-placed in the genus *Rhamdia*. If, however, a separate genus *Rhamdella* is recognized, exclusively based on the shape of the fontanel, *R. foina* would probably belong to it.

The species described by Fowler (1914) under the name of *Rhamdia holomelas rupununi* had puzzled me considerably. *R. holomelas* has been generally regarded as a synonym of *R. quelen*, and *R. h. rupununi* could have been expected to belong in the same relationship. Nevertheless, Fowler's description and illustration made me very reluctant to unite *R. h. rupununi* with *R. quelen*, as there were too many obvious discrepancies. This problem

was solved when I received specimens of *R. foina*, and found that Fowler's description fits them perfectly.

Genus *Imparfinis* Eigenmann & Norris

Imparfinis Eigenmann & Norris, 1900, Rev. Mus. Paul., 4: 351 — type by monotypy, *Imparfinis piperatus* Eigenmann & Norris.

Rhamdioglanis R. von Ihering, 1907, Not. Prel. Mus. Paul., 1 (1): 16 — type by monotypy, *Rhamdioglanis frenatus* R. von Ihering.

Nannorhamdia Regan, 1913, Ann. Mag. Nat. Hist., (8) 12: 467 — type by monotypy, *Nannorhamdia spurrellii* Regan.

Generic diagnosis. — Resembling *Rhamdia*, but posterior border of skull as if cut off straight, with but a rudimentary postoccipital process; fontanel a long slit, reaching to the occiput; dorsal and pectoral spines present but very inconspicuous, continued as soft rays, the soft part usually longer than the bony part; maxillary barbels short to moderate in length, varying from scarcely reaching pectoral base, to reaching to the end of the anal fin; eye-rim free¹⁾; no pectoral pore; adipose fin comparatively short.

Distribution. — Throughout tropical South America, east and west of the Andes, and Central America, reaching Costa Rica (Pacific drainage).

Discussion. — The first attempt to separate fishes belonging here generically from *Rhamdia*, was made by Eigenmann & Eigenmann (1888), who introduced a subgenus *Rhamdella* (raised to generic rank in a postscript to the same paper), in which they included several species previously referred to *Rhamdia*, one of these being *Rhamdia minuta* Lütken.

In the original description of *Rhamdella*, the Eigenmanns (1888) mentioned only a single character to differentiate it from *Rhamdia*; "fontanel continued to the occiput, a bridge across it behind the orbit". In their next publication the Eigenmanns (1890: 137) expanded the description as follows: "Fontanel continued to the occipital process, a bridge behind the eyes. Dorsal and pectoral fins with strong spines. Ventrals placed below or behind the dorsal. A free orbital margin". Although *Rhamdia minuta* does certainly not have strong dorsal and pectoral spines, Eigenmann & Eigenmann (1890) retained this species in *Rhamdella* without comment. There is even a discrepancy between the diagnosis of *Rhamdella* and the description of its type-species, *R. eriarcha*, where we find: "the first ray of the dorsal scarcely spine-like, smooth".

1) In small specimens (less than 40 mm in standard length), the eye-rim is little developed, especially above the eye; in poorly preserved material, showing the "pop-eyed" condition, the eye may appear to have no free rim, and has sometimes been described as such. Well-preserved material, if not too small, rarely gives any trouble.

A re-diagnosis of *Rhamdella*, as well as a renewed study of the species currently placed in it, was evidently required. To arrive at a satisfactory classification, three questions had to be answered: (1) are *Rhamdella eriarcha* and *Rhamdia minuta* congeneric; (2) if not, which genus does *Rhamdia minuta* belong to; (3) is *Rhamdella eriarcha* sufficiently distinct from *Rhamdia* to be retained in an own genus, when (1) has been answered in the negative.

Unfortunately, regulations forbade that the type specimen of *Rhamdella eriarcha*, which remains an unicum, was sent on loan to me, but Miss Dick has provided me with a description and measurements from which I consider it justified to deduce that it is much closer to typical *Rhamdia* than to *Rhamdia minuta*; these characters are: well-developed, sturdy pectoral spines; a weak dorsal spine; a long adipose fin, less than three times in standard length (actual measurements: standard length 191 mm, adipose fin 69 mm), and a well-developed postoccipital process. Against this I consider the short maxillary barbels of *Rhamdella eriarcha* as less important; the presence of a well-developed postoccipital process causes the fontanel, which admittedly is an elongated slit, to be not directly comparable to that of *R. minuta*.

The conclusion is that, unless the currently accepted generic limits are broadened and all these forms are united with *Rhamdia*, *R. minuta* is not congeneric with *Rhamdella eriarcha*. Further, it seems to me that *Rhamdella eriarcha* is so close to *Rhamdia*, that its retention in a separate genus is hardly justified; this question, however, can better be left open until such time as a direct comparison between *Rhamdella eriarcha* and the many species currently placed in *Rhamdia* and *Rhamdella* can be made.

Remains the second question, which genus *R. minuta* belongs to. The oldest name that seemed likely was *Imparfinis* Eigenmann & Norris, as the authors of that genus described its type-species, *I. piperatus*, as being very similar to *Rhamdia minuta*. There are, however, two discrepancies in the description, which would preclude the inclusion of *R. minuta* in the genus *Imparfinis*; the first is that *Imparfinis* was described as having no free eye-rim, the second that it was supposed to have a patch of teeth on the vomer (a most unusual character for any species of the *Rhamdia*-group). The holotype of *Imparfinis piperatus* is in the California Academy of Sciences, where Dr. Eschmeyer has examined it; he informed me as follows: "in the type it would appear that maybe ventrally the eye-rim is present, but dorsally the eye is more or less tightly covered by continuous skin, i.e., skin from outside eye continues on about the same plane over the eye", and: "I see small teeth in the jaws but cannot locate any on the vomer or palatines. Someone has removed much of the skin on the roof of the mouth. If this did not rub off the teeth, then

no vomerine teeth were present". The type is a specimen of only 40 mm total length. In specimens of this size the eye-rim is usually little-developed, and as Dr. Eschmeyer has also informed me that the type has a rudimentary postoccipital process, similar to that of *R. minuta*, I accept this as evidence that *Imparfinis piperatus* is closely related to, and certainly congeneric with, *Rhamdia minuta*. The last-mentioned species has, therefore, to be known as *Imparfinis minutus*.

I have not tried to study all members of the genus *Imparfinis* as here defined, but at least the following species appear to belong to it: *Rhamdia microcephala* Lütken, 1874; *Rhamdia minuta* Lütken, 1874; *Imparfinis piperatus* Eigenmann & Norris, 1900; *Nannorhamdia spurrellii* Regan, 1913; *Nannoglanis hoehnei* A. de Miranda Ribeiro, 1914; *Nannorhamdia nema-cheir* Eigenmann & Fisher, 1916; *Nannorhamdia guttatus* Pearson, 1924; *Nannorhamdia stictonotus* Fowler, 1940; *Pimelodella cochabambae* Fowler, 1940; *Nannorhamdia macrocephala* Miles, 1943; *Nannorhamdia benedettii* Fernandez & Martin, 1952; *Nannorhamdia schubarti* Gomes, 1956; and *Nannorhamdia lineata* Bussing, 1970.

On the other hand, several species described as *Imparfinis*, clearly do not belong to the genus. *Imparfinis tenebrosus* Schubart (1964) has very small eyes, evidently without free rim, and in the description no mention is made of the presence of spines in D and P. *Imparfinis bolivianus* Pearson (1924) was described as having small eyes without free rim, and there is no mention of spines. Both these species are probably referable to the genus *Heptapterus*; they should be known as *Heptapterus bolivianus* (Pearson) and *Heptapterus tenebrosus* (Schubart).

The generic allocation of *Rhamdella schultzi* P. de Miranda Ribeiro (1964b) is doubtful. It was described as having the eyes entirely subcutaneous and very small (2 mm diameter in a specimen of 94 mm standard length), and therefore can belong neither to *Rhamdia-Rhamdella*, nor to *Imparfinis*. It may be another member of the genus *Heptapterus*, but illustration and description indicate a heavier body than is usual for that genus.

Haseman (1911: 318) stated: "*Imparfinis transfasciatus* (Ribeiro) and *Rhamdiaglanis frenatus* (R. Von Ihering) are synonyms of *Imparfinis piperatus*. I have examined the types of all these species". The specimen described and figured by A. de Miranda Ribeiro (1911: 260, pl. 44 fig. 1, not pl. 39) had a total length of 34 cm, and the figure shows a heavy-bodied fish, entirely different from *Rhamdia minuta* with which Eigenmann & Norris (1900) compared *Imparfinis piperatus*. Although *R. transfasciatus* has for sixty years been almost universally regarded as a synonym of *I. piperatus*, I doubt that this is correct. Alternately, a mix-up may have occurred in A. de

Miranda Ribeiro's illustrations, and the fish captioned *Rhamdioglanis transfasciatus* may not be that species; indeed the figure would suggest *Pseudopimelodus zungaro* to me, were it not that the ventral fins appear to originate well in front of the dorsal origin, a character not found in either *Pseudopimelodus* or the supposed specimen of *R. transfasciatus* discussed in the next paragraph. I have to leave the solution of these problems to a future reviser.

The specimen listed under the name *Rhamdioglanis transfasciatus* by van der Stigchel (1946: 47) is very similar to *I. minutus* but has smaller eyes and a more elongated body; the markings are as in the more strongly marked specimens of *I. minutus*, it is longer than any specimen of that species I examined, and rather more slender (which is significant in connection with the remarks made above about A. de Miranda Ribeiro's specimen). For comparison with *I. minutus* I give here some particulars on the specimen: it is undated, from Joinville, Est. Sta. Catarina, ex Mus. Vienna (1909), det. Steindachner, ZMA no. 110696. Standard length 107 mm, predorsal length 3.0, head 4.7, body width between cleithra 6.05, depth of body 7.5, distance from snout to origin of ventrals 2.5, adipose fin 3.75 times in standard length, maxillary barbels reaching to just beyond pectoral base, eye-rim only just free, eye 2.2 times in snout, 5.5 times in head, 1.0 times in bony interorbital, 1.7 times in entire interorbital. D 1.6, A 12 (iv. 8½), P 1.9, V 1.5, ventral origin below third or fourth dorsal ray, branchiostegals 8, gill-rakers 11 (2 + 1 + 8).

Imparfinis minutus (Lütken) (fig. 33)

Rhamdia minuta Lütken, 1874, Oversigt K. Danske Vidensk. Selsk. Forh.: 35 — no locality = Rio das Velhas.

Imparfinis hasemani Steindachner, 1915, Denkschr. Akad. Wiss. Wien, Mathem.-Naturw. Kl., 93: 59, fig. 1-3 — aus dem Rio Surumú bei Serra do Mello, dem Rio branco bei Bem Querer und dem Rio Tapajos bei Santarem.

Cetopsorhamdia pijpersi Hoedeman, 1961, Bull. Aquatic Biol., 2: 132 — Sipaliwini.

Rhamdia minuta; Lütken, 1875, K. Danske Vidensk. Selsk. Skr., (5) 12: 179, pl. 3 fig. 6 (Rio das Velhas); Eigenmann & Eigenmann, 1888, Proc. Calif. Acad. Sci., (2) 1: 131 (Rio Janeiro, Macacos); Eigenmann, 1910, Rep. Princeton Univ. Exp. Patagonia, 3: 387 (Rio de Janeiro; Macacos); A. de Miranda Ribeiro, 1911, Arch. Mus. Nac. Rio de Janeiro, 16: 264, fig. 108 (Rio das Velhas, Rio de Janeiro — Ribeirão das Lages?, Macacos).

Rhamdella minuta; Eigenmann & Eigenmann, 1890, Occ. Pap. Calif. Acad. Sci., 1: 142 (Rio Janeiro; Macacos); Eigenmann & Eigenmann, 1891, Proc. U.S. Nat. Mus., 14: 28 (Macacos; Rio das Velhas; Rio de Janeiro); Fowler, 1940, Proc. Acad. Nat. Sci. Philad., 92: 80 (Rio das Velhas); Gosline, 1945, Bol. Mus. Nac. Rio de Janeiro, Zool., 33: 35 (Rio de Janeiro, Macacos); Fowler, 1951, Arq. Zool. S. Paulo, 6: 565 (Rio São Francisco, Rio de Janeiro, Macacos, São Paulo).

Cetopsorhamdia hasemani; Gosline, 1941, Stanford Ichth. Bull., 2: 87 (Rio Branco

basin, State of Amazonas, Brazil); Gosline, 1945, Bol. Mus. Nac. Rio de Janeiro, Zool., 33: 31 (bacia do Rio Branco); Hoedeman, 1961, Bull. Aquatic Biol., 2: 132 (the Rio Branco system).

Imparfinis hasemani; Fowler, 1951, Arq. Zool. S. Paulo, 6: 527 (Amazonas).

Material. — 72 specimens from Suriname as follows. One specimen, 6 February 1961, Sipaliwini (H. P. Pijpers, ZMA no. 102230), standard length 91 mm, holotype of *Cetopsorhamdia pijpersi*. Three specimens, 6 March 1964, rapids in the Gran Rio not far from its mouth (Boeseman, RMNH no. 25768), standard length 67, 82 and 89 mm. One specimen, 21 July 1964, from a tributary of the Gran Kreek, about twelve kilometres upstream of the mouth of the latter (Boeseman, RMNH no. 25769), standard length 60 mm. Three specimens, 31 July 1964, rapids in the middle course of the Gran Kreek (Boeseman, RMNH no. 25770), standard length 53½, 60 and 70 mm. 15 specimens, 13 August 1965, Mamadam, Suriname Rivier (Mees, RMNH no. 25771), standard length 32-71 mm. Three specimens, 13 September 1965, Avanavero Vallen, Kabalebo Rivier (Mees, RMNH no. 25772), standard length 49½, 50, 54 mm. Two specimens, 17 November 1965, Tapanahoni Rivier, about two kilometres downstream of its confluence with the Paloemeu (Mees, RMNH no. 25773), standard length 49, 72 mm. Five specimens, 20 October 1966, Gran Kreek, 63 km S. of Affobakka (Nijssen, ZMA no. 106250), standard length 48, 51, 52, 53, 54 mm. 21 specimens, 5 April 1967, Stondansie Vallen, Nickerie Rivier (Nijssen, ZMA no. 106249), standard length 43-80 mm. Six specimens, 5 April 1967, tributary of Nickerie Rivier, ca. 12 km S. of Stondansie (Nijssen, ZMA no. 106261), standard length 62-68½ mm. 14 specimens, 6 April 1967, Fallawatra Rivier, 5 km S. of Stondansie (Nijssen, ZMA no. 106248), standard length 62-84 mm. Four specimens, 10 August 1968, Käysergebergte (M. S. Hoogmoed, RMNH no. 25774), standard length 21, 22, 22, 22 mm.

Extra-limital material. Two specimens, no date, Rio das Velhas (J. Reinhardt, UZMK nos. 325, 328), standard length 63, 71 mm, syntypes of the species. One specimen, 1864, Macacos (W. M. Roberts, MCZ no. 7626), standard length 90 mm. One specimen, December 1909, Santarem (J. D. Haseman, MV no. 46090), standard length 66 mm, syntype of *Imparfinis hasemani*. One specimen, ca. 1909, Bem Querer, Rio Branco (J. D. Haseman, MV no. 46091), standard length 63 mm, syntype of *Imparfinis hasemani*. One specimen, ca. 1909, Bem Querer, Rio Branco (J. D. Haseman, MV no. 46093), standard length 89 mm, syntype of *Imparfinis hasemani*. One specimen, 25 March 1968, Sangadina stream at its confluence with the Rio das Mortes, Mato Grosso (R. H. McConnell, BM no 1971.7.20: 1), standard length 38 mm. One specimen, 19 April 1968, stream near Xaventina, Rio das Mortes (R. H. McConnell log 95), standard length 73 mm. One specimen, 1 May 1968, Xaventina Island, Rio das Mortes (R. H. McConnell log 120), standard length 48 mm. Two specimens, same data, standard length 44, 44 mm. One specimen, no date, Rio Negro (E. Goeldi, MCZ no. 27274), standard length 63 mm.

Diagnosis. — A typical member of the genus. The bony part of the head cuts off straight at the nape, with but a very short or vestigial occipital process, and the distance from the tip of the snout to the posterior edge of the occiput is the same or only a little more than the distance from the occiput to the origin of the dorsal fin. Further characterized by its very weak spines in dorsal and pectoral fins. Adipose fin short, barbels short, maxillary barbels not reaching to the tips of the pectoral fins.

Description. — D I.6, A 9-11 (iii.6-iv.7½), P I.9 or I.10, V 6 (i.5), C i.15.i and rudiments, gill-rakers on outer branchial arch 13 to 16 (1-2 + 1 + 11-13), branchiostegals 7 or 8, vertebrae 38.

A fairly small (21-91 mm in standard length) and slender species. The body is more or less cylindrical, its anterior part on an average slightly wider than deep, its posterior part compressed. Width of body (between the pectorals) 5.6-7.0 in standard length, depth of body 5.8-8.2 in standard length, distance from the tip of snout to origin of dorsal fin 2.75-3.0 in standard length.

Head, measured from tip of snout to posterior border of operculum, 4.45-5.9 in standard length, the bony structure only covered by thin skin, occipital process vestigial, fontanel long and narrow, continued to the occiput. Eyes large, 3.8-4.5 in head, with a free rim; width of bony interorbital about three-quarters of eye diameter. Mouth inferior; upper and lower jaw each with a band of teeth; the band of teeth in the upper jaw not clearly interrupted at the median, and without backward extensions; the band in the lower jaw narrower, distinctly interrupted at the median, no teeth on vomer or palatines. The posterior pair of nostrils slightly less than half an eye's diameter in front of the eyes, and a distance apart which is similar to the width of the bony interorbital, roundish, without rim or flap; the anterior pair of nostrils is placed behind the upper lip, at the end of small thin tubes; the shortest lines connecting the four nostrils, viewed from above, make almost a square. There are three pairs of barbels; the maxillary pair of barbels is implanted laterally from the anterior nostrils, and reaches to the posterior half of the pectorals (usually about two-thirds or three-quarters along the pectorals when these are pressed against the body), and never as far as the vertical through the origin of the dorsal fin; the outer pair of mental barbels reaches to the origin of the pectorals or very little beyond; the inner pair of mental barbels is about two-thirds the length of the outer pair. Gill-rakers well-developed, slender and fairly long, the longest about half an eye's diameter; 13 to 16 on the outer branchial arch, usually divided as follows: 1 or 2 + 1 + 11 to 13 (in one specimen I counted only twelve gill-rakers, 2 + 1 + 9, but as the gills were a bit slimy and not very well-preserved, one or two might have been missing).

Lateral line complete, almost straight, its anterior part slightly arched.

Dorsal fin with a very weak spine, continued as a simple ray, the soft part being of the same length, or a little longer, than the spine, and six divided rays, the first two rays (one simple and one divided) of equal length, the following progressively shorter, and the last ray half or just over half the length of the first ray; length of base of dorsal equal to snout and eye; longest rays of dorsal equal to head.

Anal fin with three or four simple and six or seven divided rays, the last one of which is usually split right down to its base; it is inserted well back-

wards, the distance from its origin to the tip of the snout being more than twice the distance from its origin to the base of the caudal fin; the length of its base is about the same as the length of the dorsal base, or a trifle less; outline of fin rounded, longest rays equal to snout and eye.

Pectorals with one spine and nine or ten divided rays; spine weak, with along its anterior margin about 15 antrorse hooks, which become smaller distally; length of spine equal to distance from tip of snout to anterior margin of pupil; the spine is continued as a simple ray, and this part is about three-fifths to three-fourths of the length of the spine, or equals it, whereas both parts together are equal in length to the distance from tip of snout to occiput, hence almost as long as the head; the following rays are successively shorter, giving the fins a pointed and even slightly falcate appearance; pressed against the body the pectorals cover about three-fourths of the distance from their implantation to the ventrals.

Ventrals with one simple and five divided rays, obliquely rounded with the second and third rays longest; the ventrals are only a little shorter than the pectorals, and pressed against the body they cover two-thirds of the distance from their origin to the origin of the anal fin, or slightly less.

Caudal fin long and deeply forked, with acute lobes, usually with 15 divided rays, of which seven in the upper lobe, seven in the lower lobe, and one exactly symmetrical ray in the middle. Above and below, the fin has one simple ray which is of the same length as the longest divided ray, outside that one a simple ray of about half its length, and subsequently several progressively smaller rays.

Adipose fin well-developed, but not very long, its base 4.9-6.6 (usually 5.3-5.8) in standard length, rounded, or bluntly triangular, its height about half the depth of the body below it, or a little less. Its origin is over the origin of the anal fin or perhaps very slightly in advance of it.

Colour in life light grey-yellow, pale below. In a preserved condition the colour is light greyish brown; the largest specimens have on the nape, at the origin of the dorsal fin, and very faintly farther backwards, concentrations of blackish pigment which can be seen as very faint dark cross-bars. Large specimens have also pigment concentrations on the lateral line and on the middle of the back between dorsal and adipose fin. The smallest specimens have a narrow dark stripe from the middle of each eye over the snout to the upper lip; in larger specimens this stripe becomes indistinct.

Habitat. — In Suriname this species is on present evidence confined to the rivers and large creeks, on places with a strong current. The specimens from the Mamadam were taken in growths of Podostemaceae on rocks in a strong current; they were associated in this place with *Heptapterus longior*.

The specimens from the Tapanahoni and the Avanavero Vallen were similarly taken in rapids. Ecologically the species appears to agree with *Heptapterus longior* and *Heptapterus tapanahoniensis*, but is less common.

Distribution. — The species is probably distributed throughout Suriname, as indicated by the fact that it was found in a number of widely separated localities, in four different river systems. It has not yet been recorded from French and British Guiana, but almost certainly occurs there as it is known from the basins of both boundary rivers, the Corantijn in the west, and the Marowijne in the east.

In Brazil known from the Amazon and several of its major tributaries, the Rio das Velhas (Rio São Francisco basin); Rio de Janeiro. Records from the State of São Paulo are doubtful (see Discussion).

The species is unknown from the comparatively well-studied Essequibo River, or from anywhere farther west, so that the Corantijn may constitute its limit of distribution in northern South America. Venezuela and Colombia have different species (*I. nemacheir*, *I. benedetti*), easily distinguished by their longer maxillary barbels (reaching to well beyond ventral base), and longer adipose fin.

Discussion. — It is difficult to understand why Hoedeman (1961) placed his specimen in the genus *Cetopsorhamdia*, with the statement that it: "agrees with the generic diagnosis for the genus *Cetopsorhamdia* as defined by Eigenmann & Fisher (1916) and criticized by Gosline (1941) and Schultz (1944)". The genus was expressly diagnosed as having no free orbital rim, a character usually given much weight in the classification of the Pimelodidae. Though the value of this single character has possibly been overestimated, it should certainly not be altogether ignored.

The description given here was based on specimens from Suriname; two syntypes of the species (from the Rio das Velhas) differ in that the base of the adipose fin is slightly longer, 4.7 and 4.7 times in standard length, and the caudal peduncle more slender (about four-fifths of the depth of Suriname specimens of similar size); one of these specimens has D I.5 instead of the usual I.6. A specimen from Macacos has the base of the adipose fin 4.9 times in standard length; specimens from the Rio das Mortes have it 5.35-5.6 in standard length, and three syntypes of *I. hasemani* 4.7, 4.7 and 5.0. A specimen from the Rio Negro (MCZ no. 27274) has the maxillary barbels very long, reaching to beyond the ventral base, gill-rakers 1 + 1 + 8, and adipose fin 4.5 times in standard length. It is also possible that Amazonian specimens are slightly more strongly pigmented than specimens from Suriname, but it is my opinion that none of the mentioned differences is enough to justify expression in nomenclature, so that I refer them all to *I. minutus*.

The specimens from the Rio das Velhas which Fisher (1917: 409) referred "without question" to this species, under the name of *Imparfinis minuta*, were described as having the maxillary barbels reaching to near the tips of the ventrals. In the two syntypes of *R. minuta*, one had the maxillary barbels reaching to near the tips of the pectorals, the other to the tips of the pectorals, and no specimen examined by me has them to the tips of the ventrals.

Judging by its description and figure, *Pimelodella cochabambae* Fowler (1940b: 80) is extremely close to *I. minutus*, from which it appears to differ only in the more forward position of the dorsal fin (in the figure I measure a predorsal length of about 3.4 times in standard length, as against no more than 3.0 in *I. minutus*), the slightly longer maxillary barbels, somewhat smaller eyes (about 5 times in head), and perhaps by having larger fins, including a rather long adipose base. *P. cochabambae* is known from a single small specimen only (Fowler gives a length, evidently total length, of 79 mm, but measuring from the figure the standard length would be no more than 50 mm), and additional material might well show that it is only a subspecies of *I. minutus* and perhaps not even that.

Fowler (l.c.) described *P. cochabambae* as: "... intermediate between *Nannorhamdia* and *Rhamdella*. It largely agrees with the former in the short supraoccipital and humeral extensions, but differs in the distinct dorsal and pectoral spine. Apparently closest to *Rhamdella minuta* (Lütken) ...". On the basis of this opinion of its affinities, it is not obvious to me why Fowler should have described *P. cochabambae* in the genus *Pimelodella*.

***Imparfinis spurrellii* (Regan)**

Nannorhamdia spurrellii Regan, 1913, Ann. Mag. Nat. Hist., (8) 12: 467 — R. Condoto.

Nannorhamdia spurrellii; Eigenmann, 1922, Mem. Carnegie Mus., 9: 40 (Isthmia, San Juan Basin).

Nannorhamdia spurrellii; Gosline, 1945, Bol. Mus. Nac. Rio de Janeiro, Zool., 33: 40 (bacia do San Juan, Colômbia); Bussing, 1970, Contrib. Sci. Los Angeles County Mus., 196: 2-7 (Rio San Juan drainage, Colombia).

Material. — One specimen, undated, Rio Condoto (Spurrell, BM no. 1913.10.1: 41), standard length 62 mm, holotype of *Nannorhamdia spurrellii*.

Characters. — Very similar to *I. minutus*, but eyes smaller, ca. 5.5 in head, 2.0 in snout, 1.5 in entire interorbital and 1.0 in bony interorbital.

A few additional counts and measurements are given here for comparison with *I. minutus*. D. I.6, A 10 (iii.7), P I.9, V 6 (i.5), C 16 (only counting well-developed rays; as both tips were broken and missing, it was not possible to distinguish between simple and divided rays), gill-rakers on outer bran-

chial arch (2 + 1 + 10 or perhaps more correct 3 + 10)¹), branchiostegals 9. Width of body 5.75 times in standard length; depth of body 6.0 in standard length, distance from tip of snout to origin of dorsal fin 3.0 in standard length; head 4.5 in standard length, predorsal length 3.0 in standard length, adipose base 5.0 in standard length; maxillary barbels just reaching to a vertical through origin of D, outer mental barbels reaching to a little beyond origin of P, inner mental barbels about two-thirds length of outer mental barbels; origin of V opposite third divided ray of D, length of pectoral spine about 0.4 times length of spine and ray together; caudal base slender as in the types of *I. minutus*; a dark lateral band exactly as in specimens of *I. minutus* from Suriname; no clear indication of cross-bands. All these characters fall in the range of variation of *I. minutus*, except that the pectoral spines tend to be proportionally a little shorter, and that the number of branchiostegals is high. Series would be required to evaluate these points, and I am disinclined to attach much value to them.

Distribution. — Known from two specimens, the type from the Rio Condoto, and a specimen from Istmina, very near Condoto, and both San Juan basin.

Discussion. — This species is very close to *I. minutus* and one would be inclined to give it no more than subspecific status.

***Imparfinis hoehnei* (A. de Miranda Ribeiro)**

Nannoglanis hoehnei A. de Miranda Ribeiro, 1914, Comm. Linh. Telegr. Estr. Matto-Grosso ao Amazonas, 15, Anexo 5: 3, pl. 1 fig. 1 — Rio Taquary, Matto Grosso.

Imparfinis hoehnei; Gosline, 1941, Stanford Ichth. Bull., 2: 87 (Rio Taquary, State of Mato Grosso, Brazil); Gosline, 1945, Bol. Mus. Nac. Rio de Janeiro, Zool., 33: 31 (Mato Grosso); Fowler, 1951, Arq. Zool. S. Paulo, 6: 527 (Rio Paraguai).

Nannoglanis hoehnei; P. de Miranda Ribeiro, 1953, Arq. Mus. Nac. Rio de Janeiro, 42: 403 (Rio Taquari, Mato-Grosso); Schubart, 1964, Bol. Mus. Nac. Rio de Janeiro, Zool., 244: 10 (Rio Taquari, Mato Grosso).

Material. — None.

Characters. — A. de Miranda Ribeiro's (1914) plate shows a fish very similar to *I. minutus*, but easily distinguished by longer head and anterior part of the body; from the figure I measured: head 4.2 times in standard length, predorsal length 2.5 times in standard length.

Distribution. — Only known from the two syntypes from the Rio Taquari, Matto-Grosso, Paraguay-La Plata drainage.

¹) Bussing (1970) gives 2 + 10 for this same specimen, counted for him by Mr. Wheeler. The first raker on the epibranchial is somewhat rudimentary, it has been included by me, but has apparently not been counted by Mr. Wheeler.

Genus **Heptapterus** Bleeker

Heptapterus Bleeker, 1858, *Visschen Ind. Arch.*, 1: 197 — type by monotypy, *Pimelodus mustelinus* Valenciennes.

Pariolius Cope, 1872, *Proc. Acad. Nat. Sci. Philad.*, (1871): 289 — type by monotypy, *Pariolius armillatus* Cope.

Nannoglanis Boulenger, 1887, *Proc. Zool. Soc. Lond.*: 278 — type by monotypy, *Nannoglanis fasciatus* Boulenger.

Acentronichthys Eigenmann & Eigenmann, 1889, *Proc. Calif. Acad. Sci.*, (2) 2: 28 — type by original designation, *Acentronichthys leptos* Eigenmann & Eigenmann.

Chasmocranus Eigenmann, 1912, *Mem. Carnegie Mus.*, 5: 131 (in key), 160 — type by original designation, *Chasmocranus longior* Eigenmann.

Imparales Schultz, 1944, *J. Wash. Acad. Sci.*, 34: 93 — type by original designation, *Imparales mariaii* Schultz.

Medemichthys Dahl, 1961, *Noved. Colomb.*, 1: 490 — type by original designation, *Medemichthys guayaberensis* Dahl.

Phenacorhamdia Dahl, 1961, *Noved. Colomb.*, 1: 504 — type by original designation, *Phenacorhamdia macarenensis* Dahl.

Generic diagnosis. — Long and slender species with depressed head, lacking spines in D and P, and with the upper surface of the head entirely covered with a layer of connective tissue and thick skin, showing no exposed bone; barbels short or moderate in length, reaching at most to base of ventrals, and usually much shorter; eyes small, dorsal in position, without free orbital rim; teeth in bands in both jaws, with or without backward projections laterally, none on vomer and palatines; dorsal fin short, with seven rays (eight in one species); anal fin varying from 8 to over 30 rays; ventrals six-rayed, implanted opposite, or a little behind, or a little in advance of dorsal origin; adipose fin long, either broadly or narrowly connected with the caudal fin, or clearly separated from it; caudal fin of any shape. Colour usually earth brown, sometimes with a few whitish markings or with some ill-defined blackish cross-bands.

Discussion. — The limits of this genus remain to be defined; besides those listed (the non-recognition of which will be justified below), several other nominal genera may have to be united with it (see also Myers, 1928: 83). Moreover, a number of species which evidently belong in this same group have been randomly scattered by their describers over various genera with which they do not appear to have any close relationship, and even if corrections have been published, as in the case of *Rhamdella montana* Eigenmann, 1913, which, as Steindachner (1915) quite correctly pointed out, belongs in the relationship of *Chasmocranus* = *Heptapterus*, this has been overlooked by later compilers (Gosline, 1945; Fowler, 1951).

The genus ranges throughout the northern part of South America, to at least as far south as the Rio de la Plata, but because of its uncertain limits

neither its range nor the number of described species (presumably about 30) can be given with any accuracy.

Pariolius was re-described by Gosline (1940), who supplied it with the following comparative diagnosis: "Of the five pimelodid genera besides *Pariolius* without a free orbital rim and without dorsal or pectoral spines, *Pariolius* may at once be separated from *Heptapterus* Bleeker, 1858, *Acentronichthys* Eigenmann & Eigenmann, 1889, and *Rhamdiopsis* Haseman, 1911, by the longer anal fin (18 to 28 rays) in the last three genera. From *Chasmocranus* Eigenmann, 1912, *Pariolius* differs in having a narrower series of premaxillary teeth without backwardly projecting angles at the sides and from *Cetopsorhamdia* Eigenmann, 1916, in lacking a forked caudal and in having the ventral fins placed forward of the dorsal. *Nannoglanis* is here considered a synonym of *Pariolius*."

In a previous paper I have shown that neither the number of anal rays, nor the shape of the premaxillary tooth patch are useful as generic characters in this group, to which comes that in coloration and general appearance *Pariolius armillatus* is a thoroughly typical *Heptapterus*. In my opinion, therefore the species should be known as *Heptapterus armillatus* (Cope).

Nannoglanis was united with *Pariolius* by Gosline (1940), and therefore also enters the synonymy of *Heptapterus*. *Acentronichthys* and *Chasmocranus* were synonymized with *Heptapterus* by me (Mees, 1967).

Schultz (1944b) gave as characters of *Imparales*, compared with several previously described nominal genera: "Among those pimelodid genera without a free orbital rim, lacking spines in dorsal and pectoral fins, and with as few as 12 anal rays, this new genus differs in having a forked caudal fin with the upper lobe greatly elongate and the adipose fin confluent with caudal fin. *Rhamdiopsis* Haseman, *Acentronichthys* Eigenmann & Eigenmann, and *Heptapterus* Bleeker all have 18 to 28 anal rays, while the new genus has but 12. *Chasmocranus* Eigenmann has the premaxillary band of teeth with backwardly projecting angles and the caudal fin not deeply incised. *Pariolius* Cope has the caudal fin rounded and the pelvics inserted well in advance of the dorsal origin, instead of a deeply incised caudal fin and pelvics inserted under front of dorsal fin base as in *Imparales*."

Here again the main characters given, premaxillary band without backwardly projecting angles and shape of caudal fin, are amongst the most variable found in the genus *Heptapterus*, and the two species currently placed in *Imparales* should be known as *Heptapterus mariaei* (Schultz) and *Heptapterus panamensis* (Bussing).

The only character in which *Medemichthys* differs from sundry species of *Heptapterus* is the very long upper caudal lobe; in view of the great varia-

tion in the shape of the caudal fin in *Heptapterus*, I do not consider it sufficient to maintain a monotypic genus for this single character. The species therefore becomes *Heptapterus guayaberensis* (Dahl).

In describing *Phenacorhamdia*, Dahl (1961) stated that: "this new genus would seem to be somehow related to *Chasmocranus* Eigenmann but differs in the projecting lower jaw, the pelvics inserted in front of the dorsal, and the prolonged caudal lobe". However, a slightly projecting lower jaw, as described and figured by Dahl for *P. macarenensis*, occurs widely in *Heptapterus*, and pelvics implanted before the dorsal is a normal condition in that genus. The one species described in *Phenacorhamdia* must therefore be known as *Heptapterus macarenensis* (Dahl).

For a key to the five species known from Suriname, and their descriptions and bibliographies, I refer to a previous publication (Mees, 1967); here only such information will be given, as is additional to my earlier paper.

Heptapterus brevior (Eigenmann)

Chasmocranus brevior Eigenmann, 1912, Mem. Carnegie Mus., 5: 162, pl. 15 fig. 1 — Waratuk, British Guiana.

Chasmocranus brevior; Steindachner, 1915, Denkschr. Akad. Wiss. Wien, Math.-Naturw. Kl., 93: 63 (no locality); Henn, 1928, Ann. Carnegie Mus., 19: 75 (Waratuk); P. de Miranda Ribeiro, 1968, Bol. Mus. Nac. Rio de Janeiro, Zool., 262: 6 (no locality).

Heptapterus brevior; Mees, 1967, Zool. Meded., 42: 217 (description and discussion).

Distribution. — No additional material has become available and the species remains known from two localities only: Waratuk, Potaro River, British Guiana (Eigenmann, 1912) and Nassau Gebergte, Suriname (Boeseman, 1953; Mees, 1967).

Discussion. — In my previous paper (Mees, 1967: 219) I mentioned a specimen recorded as *Chasmocranus brevior* by Borodin (1927) from França, Prov. São Paulo, Brazil. At the time I had not studied the specimen, but on geographical grounds was inclined to reject the record as based on misidentification. Through courtesy of Mr. J. N. Baskin, of the American Museum of Natural History, I have now been able to examine the specimen, and found my doubts of its identity confirmed. The specimen (AMNH no. 9090), with a standard length of 29 mm, is superficially very similar to *H. brevior* but differs in the characters listed on the next page.

I am unable to assign the AMNH specimen to any known species: it may possibly belong to the recently described *Heptapterus lopezi* (P. de Miranda Ribeiro, 1968b), but in that case the character mentioned under (1) must be variable, as the published figure shows a fish in which the adipose fin reaches clearly farther back than the anal fin. Also *H. lopezi* was described

as having eight dorsal rays. *Heptapterus brachynema* (Gomes & Schubart, 1958) differs in the characters (1) and (2). Anyway, the supposed occurrence of *H. brevior* in south-eastern Brazil can now be definitely dismissed.

AMNH no. 9090	<i>H. brevior</i>
1) depressed A reaches nearer to caudal base than does the adipose fin.	depressed A reaches not so far backwards as the adipose fin.
2) V reaches nearly to A.	V reaches only about half way (0.5 to 0.6) to A.
3) distance from tip of snout to implantation of V: distance from V to caudal base = 1:1.1.	distance from tip of snout to implantation of V: distance from V to caudal base = 1:1.5.
4) there are apparently more vertebrae, but the vertebral column is somewhat disintegrated, making an exact count impossible; ca 42 (?).	vertebrae 37.

Heptapterus longior (Eigenmann) (fig. 35)

Chasmocranus longior Eigenmann, 1912, Mem. Carnegie Mus., 5: 160, pl. 14 fig. 2 — Amatuk, British Guiana.

Chasmocranus longior; Steindachner, 1915, Denkschr. Akad. Wiss. Wien, Math.-Naturw. Kl., 93: 63 (Rupununi); Henn, 1928, Ann. Carnegie Mus., 19: 76 (Amatuk); Grey, 1947, Fieldiana, Zool., 32: 130 (British Guiana: Amatuk, lower Potaro River); Böhlke, 1953, Stanford Ichth. Bull., 5: 44 (Amatuk, Lower Potaro River, British Guiana); P. de Miranda Ribeiro, 1968, Bol. Mus. Nac. Rio de Janeiro, Zool., 262: 6 (no locality); Lundberg & Baskin, 1969, Amer. Mus. Novit., 2398: 6, 28 (no locality).

Heptapterus longior; Mees, 1967, Zool. Meded., 42: 220 (description and discussion).

Additional material. — Three specimens, 31 January 1925, São Gabriel Rapids, Rio Negro, Brazil (C. Ternetz, SU no. 58582), standard length 32, 32, 37 mm. One specimen, 11 December 1957, Awai Creek, a tributary of the upper Rupununi River near Isherton, British Guiana (R. H. McConnell, BM no. 1971.7.29: 26), standard length 67½ mm. Four specimens, 15 December 1957, Arakwai Creek, just above inflow into the Rupununi River, British Guiana (R. H. McConnell, BM no. 1971.7.29: 15-18), standard length 27, 36, 40, 64½ mm. Seven specimens, 1 December 1958, Rupununi, British Guiana (R. H. McConnell, BM no. 1971.7.29: 19-25), standard length 43-76 mm. Two specimens, 30 April 1961, Rupununi, British Guiana (R. H. McConnell, BM no. 1971.7.29: 13-14), standard length 65, 72 mm. Two specimens, 6 March 1964, Gran Kreek 1-2 km from mouth (Boeseman, RMNH no. 26190), standard length 49, 92 mm. Three specimens, 6 March 1964, Gran Creek 4 km from mouth (Boeseman, RMNH no. 25562), standard length 38, 40, 40 mm. One specimen, 13 August 1965, Mamadam, Suriname Rivier (Mees, RMNH no. 26191), standard length 91 mm. One specimen, 18 October 1965, Compagnie Kreek (Mees, RMNH no. 25765), standard length 54 mm. Six specimens, 6 February

1966, Sipaliwini (Mees, RMNH no. 26153), standard length 31-61 mm. One specimen, 12 October 1966, Sara Kreek, ca. 3 km S. from Dam (Nijssen, ZMA no. 105510), standard length 43 mm. Five specimens, 14 October 1966, Sara Kreek, ca. 27 km S. from Dam (Nijssen, ZMA no. 105295), standard length 38, 42, 54, 84, 95 mm, 17 specimens, 20 October 1966, Gran Kreek, 63 km S. from Affobakka (Nijssen, ZMA no. 105285), standard length 31-74 mm. 32 specimens, 22 November 1966, Witte Kreek, 12 km S. from Brownsweg (Nijssen, ZMA no. 105278), standard length 38-94 mm. 21 specimens, 8 December 1966, Marshall Kreek (Nijssen, ZMA no. 105371), standard length 29-74 mm. One specimen, 31 January 1967, tributary of Gran Rio, 4 km N. of Awaradam (Nijssen, ZMA no. 105420), standard length 50 mm. One specimen, 1 February 1967, tributary of Gran Rio, 3 km N. of Awaradam (Nijssen, ZMA no. 105546), standard length 60 mm. 13 specimens, 27 February 1967, tributary of Kleine Saramacca, 11 km from mouth of the latter (Nijssen, ZMA no. 105666), standard length 40-74 mm. 14 specimens, 28 February 1967, Kleine Saramacca, 14 km from mouth (Nijssen, ZMA no. 105587), standard length 39-79 mm. Five specimens Suriname Rivier, ca. 7½ km N. from Botopassie (Nijssen, ZMA no. 105937), standard length 43, 66, 75, 79, 83 mm. Two specimens, 20 March 1967, Parwapa Kreek near Botopassie (Nijssen, ZMA no. 105794), standard length 58, 62 mm. Two specimens, 22 March 1967, Suriname Rivier near Botopassie (Nijssen, ZMA no. 105788), standard length 68, 84 mm. 36 specimens, 5 April 1967, Stondansie, Nickerie Rivier (Nijssen, ZMA no. 105773), standard length 26½-112 mm. Nine specimens, 5 April 1967, tributary of Nickerie Rivier, ca. 12 km S. of Stondansie (Nijssen, ZMA no. 105825), standard length 38-56 mm. 74 specimens, 6 April 1967, rapids in the Fallawatra Rivier, 5 km S. of Stondansie (Nijssen, ZMA no. 105768), standard length 29-100 mm. 11 specimens, 21 April 1967, Maka Kreek, tributary of the Lawa Rivier near its mouth (Nijssen, ZMA no. 105939), standard length 51-91 mm. Seven specimens, 22 April 1967, Soeakisi Kreek, tributary of the Tapanahoni near its mouth (Nijssen, ZMA no. 105940), standard length 50-117 mm. One specimen, 24 April 1967, Kamaloea or Saloea Kreek, eastern tributary of the Marowijne, French Guiana (Nijssen, ZMA no. 105942), standard length 57 mm. Four specimens, 10 May 1967, upper course of Coppename Rivier, at 3°51'N, 56°45'W (Nijssen, ZMA no. 105943), standard length 37, 47, 48, 49 mm. Three specimens, 17 May 1967, upper course of Coppename Rivier, at 3°49'N, 56°57'W (Nijssen, ZMA no. 105938), standard length 58, 69, 87 mm.

Distribution (fig. 35). — French Guiana: Kamaloea or Saloea Kreek, eastern tributary of the Marowijne (first record for the country, see list of material). Suriname: generally distributed, except the area inhabited by the following species. British Guiana: known at present only from the Essequibo River and its major tributaries, Potaro and Rupununi (cf. Eigenmann, 1912, pl. LXXIII). Brazil: São Gabriel Rapids, Rio Negro.

Correction. — In my previous paper an error occurs in the list of material of this species (Mees, 1967: 221). Through a printer's error, the 15th line from the bottom is duplicated from the 6th line from the bottom. It should read: "(no. 25531), standard length 46-90 mm. Four specimens, same data (no.)."

Heptapterus tapanahoniensis Mees (fig. 35)

Heptapterus tapanahoniensis Mees, 1967, Zool. Meded., 42: 223 — Tapanahoni, about two kilometres downstream of its confluence with the Paloemeu.



Fig. 35. The distribution of *Heptapterus longior* (dots) and *Heptapterus tapanahoniensis* (crosses). 1, São Gabriel Rapids, Rio Negro. 2, Amatuk. 3, Warraputa Falls. 4, Rupununi (several localities). 5, Avanavero Vallen, Kabalebo. 6, Sipaliwini. 7, Stondanie, Nickerie Rivier. 8, upper course of Coppename. 9, Kleine Saramacca. 10, Suriname Rivier basin (many localities throughout the shaded area). 11, Kamaloea or Saloea Kreek, 12, confluence of Tapanahoni and Lawa. 13, Tapanahoni near mouth of Palomeu. 14, Apadron Soela, Palomeu. 15, Ana Paiké Kondre, Lawa.

Additional material. — Seven specimens, 1 November 1966, Apadron Soela, Paloemeu (J. P. Gosse, ZMA no. 109367), standard length 67-123 mm. 13 specimens, 18 November 1966, Lawa Rivier, downstream from Ana Paiké Kondre (J. P. Gosse, ZMA no. 109371), standard length 49-103 mm.

Distribution (fig. 35). — The species is known from the type series, collected in the Tapanahoni, from about two kilometres below to two kilometres upstream of its confluence with the Paloemeu, and from Paloemeu and Lawa as listed above.

Discussion. — When I stated that *H. tapanahoniensis* replaces *H. longior* in the Tapanahoni Rivier (Mees, 1967: 229), I expected that *H. tapanahoniensis* would be more widely distributed in the Marowijne basin, and although my previous statement remains correct, it came as a surprise to me that Nijssen found in the Marowijne and in the lower course of the Tapanahoni only *H. longior* and not *H. tapanahoniensis*. The fact that the two occur in the same river system, confirms my earlier view that *H. tapanahoniensis* is a separate species and not a subspecies of *H. longior*. In this connection I should perhaps have drawn more attention to the difference in number of vertebrae between the two species (39 in *H. longior*, 43 in *H. tapanahoniensis*). The situation as it appears to be now, with *H. longior* occurring in the lower reaches of the Marowijne basin and *H. tapanahoniensis* higher up, is most interesting and would merit a thorough ecological investigation. Note that in those rivers where *H. tapanahoniensis* is not known to occur, *H. longior* ranges upstream almost to the sources.

Heptapterus surinamensis Bleeker

Heptapterus surinamensis Bleeker, 1862, Versl. Meded. Kon. Akad. Wetensch., 14: 387 — Surinama.

Pimelodus mustelinus; (pt.) Valenciennes, 1840, in Cuvier & Valenciennes, Hist. Nat. Poiss. (4^o ed.), 15: 123, 125 (Surinam).

Heptapterus surinamensis; Steindachner, 1882, Denkschr. Akad. Wiss. Wien, Mathem.-Naturw. Cl., 44 (1): 8 (discussion of type); Mees, 1967, Zool. Meded., 42: 225 (description and discussion).

Additional material. — Three specimens, 21 March 1967, rapids in the Suriname Rivier 7½ km north of Botopassie (Nijssen, ZMA no. 105935), standard length 68, 75, 79 mm. 14 specimens, 22 March 1967, Suriname Rivier near Botopassie (Nijssen, ZMA no. 105936), standard length 54-128 mm.

Distribution. — Confined to the Suriname River basin; exact localities are restricted to the main river between Mamadam and Awaradam, and the Gran Kreek, but it is likely that the type-specimen, merely labelled "Suriname", was obtained farther downstream.

Heptapterus bleekeri Boeseman

Heptapterus bleekeri Boeseman, 1953, Zool. Meded., 32: 3 — Marowini Basin, Nassau Mountains.

Heptapterus mustelinus; Vaillant, 1899, Bull. Mus. Hist. Nat. Paris, 5: 155 (le haut de fleuve Carsevenne: la rivière Lunier ou la rivière Carnot = Lunier); Vaillant, 1900, Nouv. Arch. Mus. Paris, (4) 2: 124, 127 (la rivière Lunier); Eigenmann, 1912, Mem. Carnegie Mus., 5: 64 (French Guiana).

Heptapterus bleekeri; Mees, 1967, Zool. Meded., 42: 227 (description and discussion).

Additional material. — One specimen, June-September 1897, la rivière Lunier, Contesté franco-brésilien = Amapa, Brazil (F. Geay, MP no. 98-55), standard length 89 mm.

Distribution. — This species is now known from a creek in the Nassau Gebergte, Marowijne basin, Suriname; the Tapoeripa Kreek near Brokondo, Suriname Rivier basin, Suriname, and the Lunier, a northern tributary of the Carsevenne or Calçoene, State of Amapa, Brazil.

Discussion. — Vaillant's (1899, 1900) record of *Heptapterus mustelinus* from Amapa, Brazil, far outside the accepted range of that species, appeared to require verification, and examination of the specimen in question revealed that it belongs to *H. bleekeri*. Vaillant may be excused for this misidentification, for *H. mustelinus* and *H. bleekeri* are very similar. Two specimens of *H. mustelinus* which I have examined, and which differ rather distinctly from each other, can be distinguished from *H. bleekeri* by the following characters: D 19 against D 20-22, P 9 (i.8) against P 8 (i.7), gill-rakers 10-14 against 6-8, predorsal length 2.85-3.0 times in standard length against 2.5-2.8, and origin of ventrals a little behind origin of dorsal (about opposite 2nd ray of dorsal), against slightly but distinctly in advance of dorsal origin.

Some characters of the specimen from Amapa slightly expand the range of variation of *H. bleekeri* as given in my earlier publication; measurements and counts of this specimen are: D 7 (i.6), A 20, P 8 (i.7), V 6 (i.5), C 13 (branched rays only), gill-rakers 8, branchiostegals 8, predorsal length 2.5 times in standard length, distance of origin of A to tip of snout 1.55 times distance of origin of A to caudal base, adipose base 3.0 times in standard length. In my previous publication I mistakenly gave the number of divided caudal rays as 20 to 22; this should read developed caudal rays: the number of divided rays is only 13 or 14.

Heptapterus somnians species nova (fig. 36)

Material. — One specimen, 2 May 1968, Sangadina, a tributary of the Rio das Mortes 2 km from Xaventina, Mato Grosso, Brazil (R. H. McConnell, BM no. 1971.7.29: 4), standard length 55 mm, holotype of the species.

Characters. — A typical member of its genus, characterized by a short anal fin, deeply forked caudal fin, a remarkably broad band of teeth in the lower jaw, and uniform coloration.

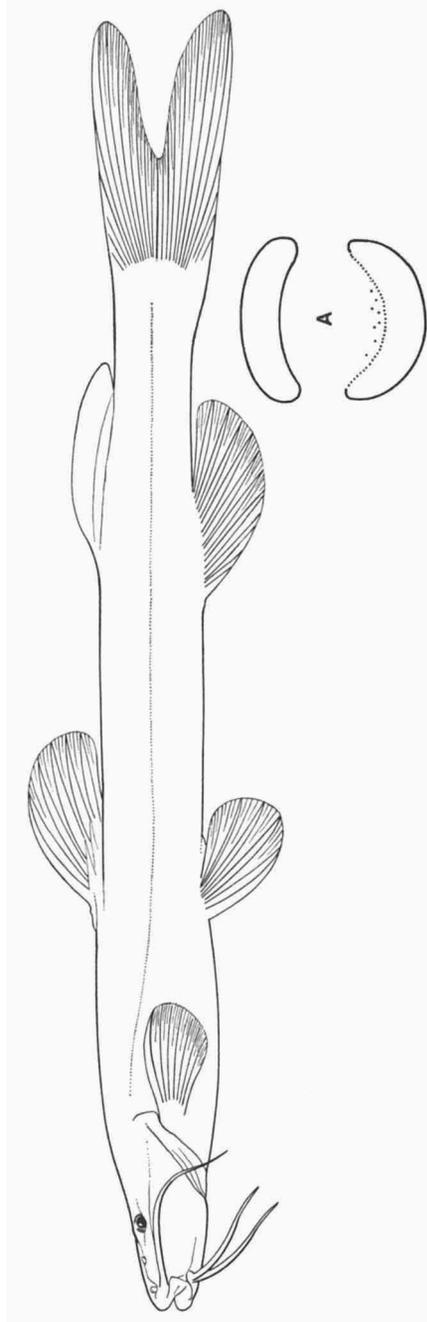


Fig. 36. *Heptapterus somnians* (BM no. 1971.7.29: 4, s.l. 55 mm), (a) dentition.

Description. — D 7, A 10, P 8, V 6, C i.15.i, besides shorter simple rays and rudiments; number of vertebrae 39; gill-rakers on the outer branchial arch 6, rather close together on the upper half of the hypobranchial, well-developed, but decreasing in size downwards, and the last one small; branchiostegals 7, well-developed; mouth terminal; lips fleshy, the lower lip with 8 pores; teeth villiform, depressible, in the upper jaw in a single broad band, without backward projections, in the lower jaw in a band which is quite as broad as that of the upper jaw (fig. 36a); eyes small, difficult to measure, but their greatest diameter about 4 times in snout, 2.5 in interorbital, and 11 in head; the two pairs of nostrils forming a square; the upper surface of the head is covered with numerous minute papillae; the maxillary barbels reach to the end of the opercle; both pairs of mandibular barbels are of almost identical length, and attain about two-thirds of the length of the maxillary barbels.

Head 4.8 times in standard length, greatest width of body 7.5 in standard length, depth of body 10.2 in standard length, predorsal length 2.7 in standard length, distance from tip of snout to base of ventrals 2.8 in standard length.

Dorsal fin with one simple and five divided rays, and one rudiment, its base 9.4 in standard length, longest dorsal ray about two-thirds length of head, or equal to head without snout¹). Anal fin with ten rays, the first three of which are simple, the others divided; distance of origin of A to tip of snout 2.0 times its distance to base of caudal fin. Pectorals more or less rounded, with one simple and seven divided rays, their second and third rays longest, equal to head without snout, also equal in length to longest dorsal rays. Ventrals rounded, with one simple and five divided rays, their origin slightly in advance of origin of D; ventrals equal in length to the pectorals. Adipose fin originating opposite the fifth ray of A, its height about half the depth of the body below it, not nearly reaching to, and widely separated from, the caudal fin; length of its base 5.6 in standard length. Caudal fin deeply forked, its lobes narrow, but rounded at the tips, the lower lobe slightly the larger and longer; longest rays twice the length of the longest pectoral rays, central rays two-fifths of the length of the longest rays; there are 15 divided rays, flanked above and below by a fully developed simple ray, and by many smaller and rudimentary simple rays.

1) The usual number of dorsal rays in the genus is seven (i.6). In the present specimen I counted originally i.5 only, but the X-ray photograph showed clearly seven rays, of which the fifth, however, was shorter than the others and simple. By removing the thick skin covering the base of the fin, beyond which it did not protrude, I found the missing ray. It is evident that this situation is aberrant and that the normal fin-formula is i.6 (and not i.3.i.2 as in this specimen).

Colour. Even earth brown, the upper surface of the head darker, blackish brown, the fins lighter, with the pigment moreover restricted to the rays, the membranes being hyaline, except in the adipose fin which has especially its basal part well-pigmented.

Genus **Pseudopimelodus** Bleeker

Pseudopimelodus Bleeker, 1858, Visschen Ind. Arch., 1: 196, 204 — type by subsequent selection (Bleeker, 1862, Atlas Ichth., 2: 11), *Pimelodus raninus* Valenciennes.

Zungaro Bleeker, 1858, Visschen Ind. Arch., 1: 196, 204 — type by original designation and monotypy, *Pimelodus zungaro* Humboldt.

Batrachoglanis Gill, 1858, Ann. Lyc. Nat. Hist. New York, 6: 389 — type by original designation, *Pimelodus raninus* Valenciennes.

Cephalosilurus Haseman, 1911, Ann. Carnegie Mus., 7: 317 — type by monotypy, *Cephalosilurus fowleri* Haseman.

Diagnosis. — A genus of probably rather sluggish bottom fishes with large and heavy depressed heads, entirely covered with thick skin; the head is broadest between the opercles, and from there the body tapers towards the tail; eyes small, covered with skin, situated on the dorsal surface of the head, hence looking upwards, not sideways; teeth in each jaw in a band, in the upper jaw with lateral projections backwards, no teeth on vomer and palatines; postoccipital process well-developed, meeting or almost meeting the predorsal plate; barbels short or of moderate length, the maxillary barbels vary from not quite reaching the base of the pectorals, to reaching just beyond the base of the dorsal spine; pectoral pore present, below the middle of the postcleithral process, in one species (*P. zungaro*), absent in the other members of the genus; dorsal spine short, either with teeth or smooth; pectoral spines longer (but less than half the length of the head in the species here dealt with), with well-developed teeth or hooks on both margins (rarely along the posterior margin only); anal fin short, with seven to nine divided rays; adipose fin short but well-developed, rounded; caudal fin variable in shape: forked with pointed or with rounded lobes, truncate or lanceolate. Lateral line complete, but usually inconspicuous, arched in its anterior part or almost straight. Colour dark brown to blackish, with a pattern of pale, light brown or white bands and streaks, most distinctive in small specimens; fins often largely black, usually with white bands.

Distribution. — The genus has a wide distribution in South America, from Colombia and Venezuela through the Amazon basin to Uruguay; one species occurs in western Colombia and Ecuador, on the Pacific side of the Andes.

Discussion. — The genus *Zungaro* was established for *Pimelodus zungaro* Humboldt. This species was based on a description and plate only, the type

was not preserved, and as mentioned below and in the discussion of *P. bufonius*, the name *Zungaro zungaro* has often been misapplied.

For an identification of *Z. zungaro* we have to rely entirely on Humboldt's description and plate (pl. 5). Consulting these, one finds that neither its colour and colour pattern (blackish olive with numerous small black ocellus), nor its fin-ray formula (D 7, P 13, V 10, A 10, branchiostegals 4), comes anywhere near a known species of *Pseudopimelodus*. Its size (3 pieds 4 pouces) is also larger than any member of *Pseudopimelodus* except *P. mangurus* which was supposed to attain a length of over six feet (Valenciennes, 1840: 117), although Steindachner (1880) recorded under the name *P. bufonius* a specimen of 55 cm. Valenciennes (1840: 119) wrote: "M. de Humboldt ... dit toutes les nageoires sans piquans; mais il n'a probablement pas disséqué les membranes épaisses qui (ajoute-t-il) recouvrent ces parties au point que l'on a peine à en sentir les os". Even though Valenciennes was probably right in his criticism, the number of discrepancies remains such that *Z. zungaro* cannot be easily identified with any species now known.

Eigenmann (1922: 32) stated that the name "Zungaro" is applied to various large silurids in the Peruvian Amazon, so that this does not help either.

It is apparent that much confusion exists about the validity and characters of *Zungaro*. In this connection I want especially to mention the discrepancies in the description of the genus and its type species by various authors (tail rounded or forked, teeth along the anterior edge of the pectoral spine present or absent, or present in small specimens, but disappearing with age). From Gosline's review *Zungaro* has been omitted. Evidently several species have been confused under this name and from descriptions alone these cannot always be identified. The validity of *Zungaro* depends clearly on the correct identification of its type-species. For a considerable time I have held the opinion that *Pimelodus zungaro* Humboldt was unidentifiable, and should for that reason be placed as a species inquirendae. Gradually, however, I have come round to the opinion that the species can be identified, for, however poor Humboldt's description is by modern standards, it does agree much better with the species here listed under the specific name *zungaro*, than with any other fish known from the Amazon basin. The absence of strong armature, combined with the huge size, appears to rule out any other known species and it is also unlikely (although possible) that Humboldt's specimen would have belonged to a species never since recorded. With the identity of *P. zungaro* settled, the question of the validity of the genus *Zungaro* as different from *Pseudopimelodus* remains. Recognition of genera has always a subjective element, but it is my opinion that when defining genera, similarities rather

than differences should be stressed. In the following pages evidence will be presented that if *Zungaro* is recognized, this genus will be monospecific. The genus *Pseudopimelodus* as defined by me, including *Zungaro* and *Cephalosilurus*, counts only five species, and within this group, the resemblances between the species are much greater than their differences. *P. zungaro* fits well in the genus *Pseudopimelodus*, although, admittedly, certain characters stamp it as the most distinctive of its genus.

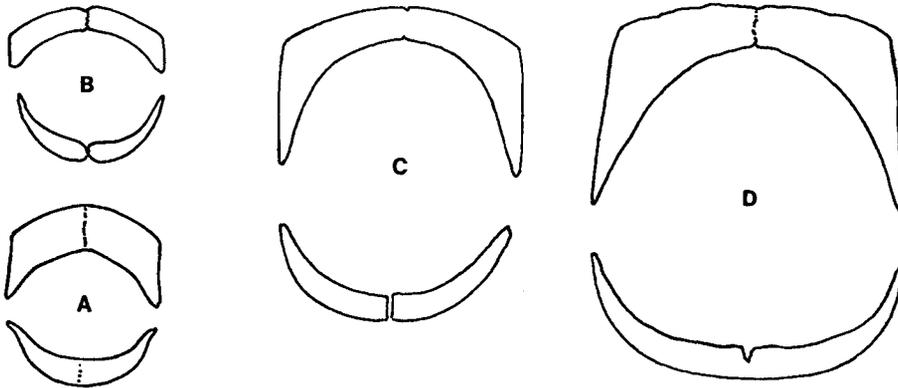


Fig. 37. Dentition of *Pseudopimelodus*. (a) *P. zungaro bufonius*, (b) *P. r. raninus*, (c) *P. albomarginatus*, (d) *P. nigricauda*.

When Haseman (1911) described *Cephalosilurus*, he compared it with *Lophosilurus*, but made no mention of *Pseudopimelodus*. There is nothing in the description of *Cephalosilurus fowleri* that would preclude its being placed as a normal representative of the genus *Pseudopimelodus*. The only difference given by Gosline (1941) to distinguish between *Cephalosilurus* and *Pseudopimelodus* is that the former has: "Lower jaw projecting beyond upper; fore-part of head broad and greatly flattened", and the latter: "Lower jaw not projecting beyond upper; fore-part of head not excessively flattened". However, the head of *P. raninus*, the type species of *Pseudopimelodus*, is also flattened. On the basis of Gosline's diagnosis, the species described on a later page as *Pseudopimelodus nigricauda* would belong to the genus *Cephalosilurus*. Moreover, *P. bufonius*, placed in *Cephalosilurus* by Gosline (1941, 1945), has an only slightly projecting lower jaw, and its head is no more flattened than that of *P. raninus* (incidentally, *P. bufonius* is conspecific with *P. zungaro*, type of the genus *Zungaro* which antedates *Cephalosilurus* by over fifty years). It is evident that both characters on which Gosline relied for the distinction of genera, vary from species to species, and the same can be said of the dentition which has also been used for generic discrimination (fig. 37).

When *P. parahybae* is removed to the genus *Microglanis*, as first proposed by Gosline (1941), there remain fourteen nominal species and one subspecies. Various authors have, from time to time, expressed doubt about the validity of several of these species, and the situation has become somewhat confused, for which reason it appeared worth while to attempt a revision based on as much material as it was possible to borrow and beg together. Nevertheless, the results are in many respects unsatisfactory. I have had to leave several problems unsolved, and in other instances the solutions offered will probably have to be modified when more material becomes available.

Thus I have arrived at the following tentative arrangement.

1. *Pseudopimelodus zungaro*, with the subspecies :
 - P. zungaro bufonius* (synonym : *P. charus*).
 - P. zungaro mangurus* (synonym : *P. roosevelti*).
 - P. zungaro zungaro* (synonyms : *P. pulcher*, *P. variolosus*).
 - P. zungaro* subsp.
2. *Pseudopimelodus raninus*, with the subspecies :
 - P. raninus raninus* (synonym : *P. acanthochirus*)¹).
 - P. raninus villosus*.
 - P. raninus acanthochiroides* (synonym : *P. villosus butcheri*).
 - P. raninus transmontanus*.
3. *Pseudopimelodus fowleri*.
4. *Pseudopimelodus albomarginatus*
5. *Pseudopimelodus nigricauda*.

Hitherto four nominal species of the genus *Pseudopimelodus* had been recorded from the Guianas: *P. raninus* from the Mana, Cayenne (Valenciennes, 1840) and Litani, Suriname (Hoedeman, 1961), *P. bufonius* from Cayenne (but see discussion of its type-locality), *P. albomarginatus* and *P. villosus* from British Guiana (Eigenmann, 1912: 154; Lowe, 1964: 116, 140). Hoedeman (1961) stated that his specimens of *P. raninus* were from French Guiana, "Litany river, village Aloiké", but the village Alowike (as it is spelled on our maps) is definitely in Suriname, not French Guiana. Eigenmann (1912: 154) mentioned that specimens from the Essequibo recorded by Günther (1864) under the name *Pimelodus raninus* do not belong to that species, but he failed to give an opinion on their identity. I have examined these specimens and found them referable to *P. villosus*; they had already been labelled with that name, presumably by Regan.

¹) This name has been changed to *Pseudopimelodus acanthochira*, or even *P. acanthocheira* by subsequent authors, beginning with Eigenmann & Eigenmann (1890: 114) themselves. No reason for this change has been given, and none is obvious.

Our recent collections from Suriname contain four forms (three species) of the genus *Pseudopimelodus*, and obviously these had to be compared with the species already known from the Guianas. One of the species agrees well with the description and especially the plate given by Valenciennes of *P. raninus*, with which it can be identified; the second appears to be referable to *P. bufonius*; the third is *P. villosus* (here regarded as a subspecies of *P. raninus*), and the fourth is new.

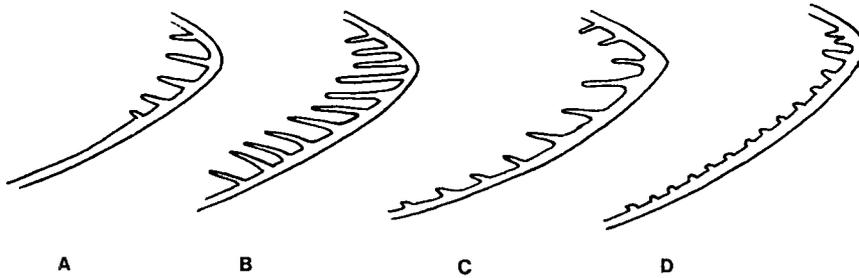


Fig. 38. Gill-rakers on outer branchial arch of *Pseudopimelodus*. (a) *P. zungaro bufonius*, (b) *P. r. raninus*, (c) *P. albomarginatus*, (d) *P. nigricauda*.

Key to the species of *Pseudopimelodus* 1)

- 1a — Pectoral fins usually with seven rays (sometimes six in small specimens), pectoral spine entirely encased in thick skin, anal fin with six or seven divided rays, maxillary barbels reaching to base of pectoral fin or a little beyond, dorsal fin when pressed backwards reaching no more than about half way to adipose fin, occipital process and dorsal plate in broad contact, caudal fin falcate, white or dusky with a black cross band and a black base, or mostly dark, gill-rakers little developed, 1 + 1 + 1 to 5, anterior nostril some distance behind the upper lip *P. zungaro*
- b — Pectoral fins with six rays, pectoral spine covered with thin skin only, which leaves the spine and its teeth clearly visible, dorsal fin when pressed backwards usually reaching well beyond half way to the adipose fin, occipital process and predorsal plate separated or in contact, caudal fin scalloped, rounded, or lanceolate, never falcate, gill-rakers on outer branchial arch at least 10, long or short (or rudimentary), anterior nostril on upper lip 2

1) It deserves mention that the gill-rakers are implanted not in a single series but often in a double series; this is particularly conspicuous in *P. albomarginatus*, in which the inner series is as well-developed as the outer series. In *P. nigricauda* there are even a few papillae carrying three rakers. In the figures as well as in the counts, only the outer series has been considered.

- 2a — Only three or four gill-rakers on the outer branchial arch well-developed, all others, some ten in a row on the hypobranchial, extremely short, rudimentary (fig. 38d), caudal fin rounded or lanceolate 3
- b — At least ten gill-rakers on the outer branchial arch well-developed, and only the last one or two rudimentary (fig. 38b and c), caudal fin scalloped, rounded or more or less truncate 4
- 3a — Fins not very long: the dorsal fin when depressed covers only about three-fifths of its distance from the adipose base, pectoral spine 2.9 times in predorsal length, ventrals not reaching to anal origin, caudal fin rounded, its greatest length about 4.5 times in standard length, caudal fin spotted, not black *P. fowleri*
- b — Fins long: the dorsal fin when pressed backwards reaches, or almost reaches the adipose fin, pectoral spine 2.5-2.6 times in predorsal length, ventrals reaching or almost reaching to anal origin, caudal fin rounded to lanceolate, its greatest length less than four times in standard length, caudal fin black, with a very narrow white margin *P. nigricauda*
- 4a — Head large, 2.5-2.7 times in standard length, predorsal length 2.2-2.35 times in standard length, the maxillary barbels do not reach, or only just reach to the pectoral base, premaxillary band of teeth with large backward projections laterally, caudal fin rounded-lanceolate *P. albomarginatus*
- b — Head moderate, 2.9-3.0 times in standard length, predorsal length 2.4-2.5 times in standard length, the maxillary barbels usually reach beyond the pectoral base, premaxillary band of teeth with moderate backward projections laterally, caudal fin scalloped, in large specimens often more or less truncate *P. raninus*

***Pseudopimelodus zungaro* (Humboldt)**

The main characters of this species appear in the key, and descriptions are given under the subspecies *P. z. bufonius* and *P. z. mangurus*.

The presence of teeth on the anterior margins of the pectoral spines appears to be a matter of size; teeth are conspicuous in all small specimens, but become obsolete in individuals with a standard length of 200 mm and over. Schultz's (1944a: 197) generalisation that: "*Zungaro* ... differs from the related genera, *Pseudopimelodus* and *Microglanis*, in having ... the anterior margin of the pectoral spine smooth" is only partially true in his own material as from sample USNM 121283 only the two larger specimens lack the teeth; in the two smaller ones they are clearly present. In Schultz's (1944a:

186) key the first difference between *Pseudopimelodus* and *Zungaro* is "anterior edge of pectoral spine serrated", against "anterior edge of pectoral spine smooth", so that one is bound to come to grief.

P. zungaro can attain a very large size. Although the largest specimen I examined had a standard length of only 257 mm, in literature measurements of up to six feet have been recorded. Possibly these were exaggerated, and reliable measurements and weights of large individuals remain to be taken.

The species is widely distributed in northern and eastern South America, from the Magdalena basin in Colombia, through Venezuela and the Guianas, the whole Amazon basin, the Rio São Francisco and the Paraná- La Plata basin.

Within its huge range, *P. zungaro* shows some slight geographical variation in colour-pattern, on the basis of which I have recognized four subspecies. It should be noted that these subspecies are not very satisfactory, and the main reason why I accept them is that they have been described and named long ago. If this had not been the case, I would probably have described the variation, without applying trinomials. For the same reason I have also left the subspecies from the Rio Magdalena without a name, although it appears to be the most isolated and a reasonably distinctive one.

***Pseudopimelodus zungaro bufonius* (Valenciennes)**

(figs. 37a, 38a, frontispiece, pls. 6, 7)

Pimelodus bufonius Valenciennes, 1840, in Cuvier & Valenciennes, Hist. Nat. Poiss. (4° ed.), 15: 115 — Cayenne (but probably Suriname).

Pimelodus charus Valenciennes, 1840, in Cuvier & Valenciennes, Hist. Nat. Poiss. (4° ed.), 15: 118 — Rio Sabara.

Pseudopimelodus bufonius; Bleeker, 1858, Visschen Ind. Arch., 1: 207 (Guyana); Lütken, 1875, Vidensk Selsk. Skr., (5) 12: 180 (Cayenne); (pt.) Steindachner, 1880, Denkschr. Akad. Wiss. Wien, Mathem.-Naturw. Cl., 42 (1): 59 (Rio das Velhas); Eigenmann, 1912, Mem. Carnegie Mus., 5: 151, 152 (no locality).

Pimelodus bufonius; Günther, 1864, Cat. Fish. Brit. Mus., 5: 133 (Rio Cipo, a tributary of the Rio das Velhas, Minas Geraës).

Pseudopimelodus charus; Bleeker, 1858, Visschen Ind. Arch., 1: 207 (Amer. merid.); Lütken, 1875, K. Danske Vidensk. Selsk. Skr., (5) 12: 118 (Rio das Velhas).

Pseudopimelodus zungaro; Eigenmann & Eigenmann, 1888, Proc. Calif. Acad. Sci., (2) 1: 122 (Goyaz); Eigenmann & Eigenmann, 1890, Occ. Pap. Calif. Acad. Sci., 1: 112 (Goyaz); A. de Miranda Ribeiro, 1911, Arch. Mus. Nac. Rio de Janeiro, 16: 254, fig. 105, pl. 43 fig. 1 (rio S. Francisco).

Pseudopimelodus zungaro; (pt.) Eigenmann & Eigenmann, 1891, Proc. U.S. Nat. Mus., 14: 28 (Rio Plata to Rio Magdalena).

Cephalosilurus bufonius; Gosline, 1941, Stanford Ichth. Bull., 2: 85 (Cayenne); Gosline, 1945, Bol. Mus. Nac. Rio de Janeiro, Zool., 33: 27 (Caiena).

Zungaro zungaro; Schultz, 1944, Proc. U.S. Nat. Mus., 94: 197 (Rio San Juan at the bridge south of Mene Grande, tributary Rio Motatán and Rio Negro below mouth Rio Yasa, Maracaibo Basin of Venezuela); (pt.) Gosline, 1945, Bol. Mus. Nac. Rio de Janeiro,

Zool., 33: 33 (Venezuela); Dahl, 1961, Noved. Colomb., 1: 490 (Guaybero River, Orinoco System, Colombia); Mago-Leccia, 1967, Bol. Soc. Venez. Cienc. Nat., 27: 255 (Venezuela).

Zungaro charus; Gosline, 1945, Bol. Mus. Nac. Rio de Janeiro, Zool., 33: 33 (Brasil).

Zungaro bufonius; Gosline, 1945, Bol. Mus. Nac. Rio de Janeiro, Zool., 33: 33 (Caïena).

Material. Eight specimens from Suriname as follows. One specimen, 3/4 February 1964, Suriname Rivier at Brokopoondo (Boeseman, RMNH no. 26604), standard length 73 mm. One specimen, 17 July 1965, Awaradam, Gran Rio (Mees, RMNH no. 26605), standard length 102 mm. Three specimens, 23 January 1966, Sipaliwini (Mees, RMNH no. 26606), standard length 120, 133, 205 mm. One specimen, 6 February 1966, Sipaliwini (Mees, RMNH no. 26607), standard length 104 mm. One specimen, 5 April 1967, Stondansie, Nickerie Rivier (Nijssen, ZMA no. 105945), standard length 243 mm. One specimen, same data (Nijssen, ZMA no. 105946), standard length 76 mm.

Extra-limital material. — One specimen, 1850-1856, Rio das Velhas, Brazil (J. Reinhardt, UZMK no. 330), standard length 202 mm. Two specimens, same data (UZMK nos. 333, 334), standard length 119, 131 mm. Four specimens, no date, Goyaz (Honario, MCZ no. 8196), standard length 116, 132, 187, 202 mm. Four specimens, 20 March 1942, Rio San Juan at bridge, Maracaibo basin, Venezuela (L. P. Schultz, USNM no. 121283), standard length 152, 173, 197, 257 mm. One specimen, 1942, Pirapora, in rapids of Rio São Francisco, Minas Gerais, Brazil (G. S. Myers, Carvalho, and P. de Miranda Ribeiro, SU no. 64100), standard length 135 mm. One specimen, 25 April 1961, Rupununi near Arakwa mouth, British Guiana (R. H. McConnell log 616), standard length 119 mm. One specimen, 28 April 1961, Sandcreek pools, Rupununi District (R. H. McConnell log 630-633), standard length 87 mm. One specimen, 30 April 1961, Sandcreek, Rupununi District (R. H. McConnell log 649), standard length 90 mm. Two specimens, May 1961, Wichabai, Rupununi River (S. Singh, Mrs. McConnell's collection), standard length 66, 76 mm.

Diagnostic characters. — Head not so broad and depressed as in the other species, rounded at the gape, its colour dark, mottled, with a broad pale nuchal band, pectoral fins with seven rays (different from all other species of the genus), maxillary barbels reaching to base of P or a little distance beyond, the dorsal fin when depressed reaches only about half way to the adipose fin; the caudal fin is falcate, pale with a blackish base and one blackish cross-bar; occipital process and dorsal plate are in contact.

Description. — D I. 6, A iii to iv.6 to 7, P I.7 (sometimes I.6), V i.5, C with 14 or 15 divided rays (one specimen has only 11 divided rays; this is evidently aberrant); gill-rakers very few 1 + 1 + 1 to 3; branchiostegals 8 or 9; teeth in both jaws in a broad band, the band of premaxillary teeth with acute projections laterally, which, however, do not reach far backwards (fig. 37a); eyes small, their greatest diameter 2.5-3.5 times in snout, 2.5-5.2 times in bony interorbital, and 9-12 times in head; the maxillary barbels reach to the base of the pectoral fins, or beyond, almost to halfway along the pectoral fins; the outer pair of mental barbels is about half their length, and the inner pair is about half the length of the outer pair.

Head 3.3-3.7 times in standard length, greatest width of body 3.5-3.8 times in standard length; greatest depth of body 4.6-5.7 times in standard length;

predorsal length 2.8-3.0 times in standard length (one specimen of sample USNM no. 121283, has head 3.9, width 4.0, predorsal length 3.15 times in standard length).

Dorsal fin with one spine and six divided rays, the spine moderately strong and not very long, though always longer than snout with eye, encased in leathery skin, which conceals the strong antrorse serrations it has on both sides; soft rays comparatively short, when pressed down they reach only about half way to the origin of the adipose fin. Anal fin with three or four simple and six or seven divided rays, rounded, its longest rays about half the length of the head. Pectorals with one spine and seven rays; the spine is strong, in small specimens it is on each side and over its whole length provided with about a dozen strong antrorse hooks, which are not so long as the width of the spine, so that the spine as a whole is more slender than that of *P. nigricauda*; in specimens of over 200 mm standard length, the teeth along the anterior edge may be obsolete; the spine is encased in very thick leathery skin, which is continued beyond its tip; it is most peculiar that also in the leathery part, knobs appear on the posterior surface corresponding with the hooks of the bony part; the spine with its protruding soft part, is longer than any of the rays; the length of the spine is slightly more than snout with eye; the length of spine with soft part equals the head without snout or head without snout and eye; the rays become gradually shorter, and the last one equals snout with eye. Ventrals rounded, with six rays, of which the first one is simple, the others divided, reaching from two-thirds to three-fourths of the distance to the anal fin, the longest rays equal in length to the longest rays of the anal fin. Caudal fin well-developed, forked to falcate, always with acute tips, with 11-15 divided rays besides several developed simple rays and some rudiments, the longest rays very slightly shorter than the head. Adipose fin of moderate length, its origin opposite of or slightly in advance of the origin of the anal fin, and its base reaching backwards as far as the base of the anal fin or very little beyond, its height about half the depth of the caudal peduncle below it.

Colour. The colours are whitish to pale brownish and black or brownish black. The head is fairly dark, mottled; there is a broad dark band across the nape followed by an even broader pale band, which comes to just in advance of the origin of the dorsal fin; the body has three broad, irregular black bands; one in which the dorsal fin is placed; one in which the adipose fin and the anterior part of the anal fin are placed, this band dorsally narrowly connected with the anterior one; and one on the caudal base. The dorsal fin is black, with the skin containing the spine paler, and the tips of the rays whitish; there is an ill-defined white area half way up the posterior five rays

and their connecting membranes. The anal fin is whitish with a broad black band across its base, beginning just beyond its origin, and a second slightly narrower band across its distal half, leaving a pale tip, central band, and origin. The pectorals are pale, with a dark cross-band, and basally more or less mottled. The ventrals are similar in appearance to the pectorals. The tail is pale with, as mentioned above, a conspicuous black base and a single fairly narrow dark cross-band. The adipose fin is for its greater part contained in the dark second body-band, but at the origin of its base is a small round pale spot, and its whole posterior third is pale.

Habitat. — All our specimens from Suriname were taken in rivers, where they appear to be not very common.

Distribution. — North-eastern South America from the Maracaibo basin, Venezuela, through British Guiana (Rupununi) and Suriname to eastern Brazil: Goyaz and the Rio São Francisco basin (Rio das Velhas and its tributary the Rio Cipo). No certain record from French Guiana (the type-locality Cayenne is doubtful, see Discussion).

In Suriname known from the Suriname Rivier, the Sipaliwini (Corantijn basin) and the Nickerie Rivier.

Fowler (1951: 561) has mistakenly listed Steindachner (1876b: 632; 1880: 60) in the bibliography of *Pseudopimelodus charus*, thus adding the Rio Paraiba and Santa Cruz to the distribution of this nominal species. It appears to have escaped his attention that the fishes which Steindachner (1876b: 632) recorded under the name *P. charus* are the same ones which that author described a few years later as *P. parahybae*. Fowler's reference to Steindachner (1880: 60) makes even less sense, as on the place indicated, Steindachner clearly states that he regards *P. charus* as a synonym of *P. bufonius*, whereas Fowler's remark: "localidades presedentes" indicates continued confusion with *P. parahybae*. Fowler's confusion is difficult to understand as in the bibliography of *Microglanis cottoides* = *P. parahybae*, he gives the same references to Steindachner under the correct species.

Discussion. — The use of the name *P. bufonius* requires some explanation. The species was described from a single specimen with a length of "sept pouces" in the Leiden museum. At present the type can no longer be found in Leiden, and as it is not in Paris either (Bauchot, in litt. 27.II.1970; also it was not listed by Bertin & Estève, 1950), it may be considered lost. The fact that neither Bleeker (1864) nor van der Stigchel (1946) made mention of it, suggests that the specimen has disappeared a considerable time ago.

Since its description, *P. bufonius* has not, to my knowledge, been recorded from anywhere near its type-locality. Many authors have speculated on the affinities of *P. bufonius*, and without much justification (as they had no

material), shifted it from genus to genus. Ultimately the situation could become so confused that Gosline (1945) listed it twice; on page 27 as *Cephalosilurus bufonius*, and on page 33 as *Zungaro bufonius*.

Gomes (1946: 6) considered *P. bufonius* to be of doubtful validity, an opinion for which he referred to Eigenmann (1912: 151); on the place indicated, however, Eigenmann did not express doubt about the validity of *P. bufonius*, but on the contrary, re-instated it, as quoted below. Eigenmann & Eigenmann (1890: 112) placed *P. bufonius* as well as *P. mangurus* in the synonymy of *P. zungaro*, and described under the last-mentioned name specimens from Goyaz. Later, Eigenmann (1912: 151) retracted his earlier statements: "In 1890 I identified *Pimelodus bufonius* with the *Pimelodus zungaro* of Humboldt. Humboldt's species is known only from his figure and description, which are said to have been taken from a fish three feet four inches long and reported to attain seven feet. It is very doubtful whether the *zungaro* of Eigenmann and Eigenmann from Goyaz is identical with Humboldt's species. It is also very doubtful whether *Pimelodus mangurus* Valenciennes from the La Plata is synonymous with *zungaro*. This elimination of synonyms leaves the genus *Pseudopimelodus*, as here understood, consisting of *raninus* Cuvier and Valenciennes (the type), *bufonius* Cuvier and Valenciennes, *acanthocheira* Eigenmann and Eigenmann, *cottoides* Boulenger, and the two species here described".

For a judgement of identity, appearance and affinities of *P. bufonius*, the only source of information is therefore Valenciennes (1840). I have carefully compared his description of the type with one of my specimens from Suriname of comparable size (RMNH no. 26606, standard length 133 mm), and found a close agreement, except that in the type: "Les épines de la dorsale et des pectorales sont assez fortes, très-finement dentelées au bord postérieur, et ont tout leur moitié supérieure nolle et articulée". The spines of my specimens are entirely encased in leathery skin, providing soft flexible tips as described by Valenciennes, but the spines have distinctive hooks along their anterior borders. However, whereas in small specimens these teeth are clearly visible, in the individual of 133 mm, the anterior rows of teeth are entirely concealed under a thick layer of skin, and are invisible without removing this skin. In view of the complete agreement otherwise existing between Valenciennes's description and my specimens, I believe that Valenciennes has overlooked the teeth on the anterior edges of the spines, for which there is certainly some justification as explained above (in specimens of the size mentioned by Valenciennes the teeth should be present). An additional argument for accepting this identification is geographical: although Valenciennes described *P. bufonius* from Cayenne, there is every reason to assume

that the type-specimen came actually from Suriname, and had been collected by Dieperink, who lived in Paramaribo (cf. p. 43). The type-locality would probably be the Suriname Rivier basin. The Suriname Rivier is now ichthyologically reasonably well known, and as one of the three species of *Pseudopimelodus* occurring in it corresponds closely with the description of *P. bufonius*, I see no reason to doubt its identity with that species.

P. charus was based on a drawing of a fish from the Rio Sabara. Subsequently Lütken (1875) recorded specimens from the Rio das Velhas under that name. I am able to reproduce the drawing of *P. charus* here, thanks to Madame Bauchot, who informed me as follows: "J'ai trouvé ce dessin dans les manuscrits de Valenciennes. C'est une aquarelle assez laide, dans les tons gris-brun, aussi ai-je demandé que la photographie soit en noir et blanc". The Rio Sabara equals the Rio das Velhas. As there is a good agreement between the drawing and Lütken's three specimens, it is practically certain that the latter were correctly identified as *P. charus*, of which they are virtual topotypes. Comparison of these specimens with *P. zungaro bufonius* from Suriname shows that they are scarcely separable by having an even slightly shorter dorsal fin, which, when adpressed, reaches less than half way to the adipose fin, whereas the white band across the middle of the dorsal fin appears to be wider and more distinct. Although it is just possible that in future, if more and fresh material is compared, the name *charus* can be revived as a subspecies, I see for the present no reason to treat it as anything but a synonym of *P. zungaro bufonius*.

***Pseudopimelodus zungaro mangurus* (Valenciennes)**

Pimelodus mangurus Valenciennes, 1834-1837, in d'Orbigny, Voy. Amér. Mérid., 9 (Atlas): Poiss. pl. 1, fig. 4-6 — no locality, plate only, without description (description and locality provided by Valenciennes, 1840, see below).

Pseudopimelodus roosevelti Borodin, 1927, Amer. Mus. Novit., 266: 1-3, fig. 1 — Parassununga, Province of São Paulo, Brazil.

Pimelodus mangurus; Valenciennes, 1840, in Cuvier & Valenciennes, Hist. Nat. Poiss. (4^e ed.), 15: 116 (depuis les Missions jusqu'au-dessus du confluent du Parana et de la Plata); Günther, 1864, Cat. Fish. Brit. Mus., 5: 134 (La Plata River).

Pimelodus bufonius; Kner, 1858, Sitzb. Akad. Wiss. Wien, Mathem.-Naturw. Cl., 26 (1857): 421 (Cujaba-Fluss); Goeldi, 1898, Bol. Mus. Paraense, 2: 456 (Cuyabá).

Pseudopimelodus mangurus; Bleeker, 1858, Visschen Ind. Arch., 1: 207 (Amer. merid.).

Pseudopimelodus bufonius; (pt.) Steindachner, 1880, Denkschr. Akad. Wiss. Wien, Mathem.-Naturw. Cl., 42 (1): 59 (Cuyaba; La Plata).

Pseudopimelodus zungaro; (pt.) Eigenmann & Eigenmann, 1891, Proc. U.S. Nat. Mus., 14: 28 (Rio Plata to Rio Magdalena).

Pseudopimelodus zungaro; (?) Eigenmann & Norris, 1900, Rev. Mus. Paul., 4: 350 (S. Paulo, without exact locality); Fischer, 1917, Ann. Carnegie Mus., 11: 411 fig. 3 (Piracicaba); (pt.) A. de Miranda Ribeiro, 1918, Rev. Mus. Paul., 10: 728 (Piracicaba; Rio Verde, Minas; Itatiba; Rio Mogy-Guassù, Salto do Pirassununga); Devincenzi, 1924, An. Mus. Nac. Montevideo, (2) 1: 152 (Rio Uruguay, frente al Salto); Devin-

cenzi & Teague, 1942, An. Mus. Hist. Nat. Montevideo, (2) 5: 42 (río Uruguay, frente a Concordia); van der Stigchel, 1946, South American Nematognathi: 44 (Parana River, Rosario de Santa Fé); van der Stigchel, 1947, Zool. Meded., 27: 44 (Parana River, Rosario de Santa Fé).

Zungaro mangurus; Eigenmann, 1910, Rep. Princeton Univ. Exp. Patagonia, 3: 384 (La Plata); Bertoni, 1914, Fauna Paraguaya: 8 (Alto Paraná); Gomes, 1946, Occ. Pap. Michigan Mus., 494: 6 (eaux douces du Brésil et du Paraguay).

Pseudopimelodus parahybae; Devincenzi & Barattini, 1926-1940, An. Mus. Hist. Nat. Montevideo, Supl.: pl. 52 (Uruguay); Devincenzi & Teague, 1942, An. Mus. Hist. Nat. Montevideo, (2) 5: 42 (Uruguay).

Pseudopimelodus variolosus; Pearson, 1937, Proc. Calif. Acad. Sci., (4) 23: 111 (Paraguay basin).

Cephalosilurus mangurus; Gosline, 1941, Stanford Ichth. Bull., 2: 85 (Brazil and Paraguay); Gosline, 1945, Bol. Mus. Nac. Rio de Janeiro, Zool., 33: 27 (Brasil e Paraguai).

Pseudopimelodus roosevelti; Gosline, 1941, Stanford Ichth. Bull., 2: 85 (Parassununga, State of São Paulo); Gosline, 1945, Bol. Mus. Nac. Rio de Janeiro, Zool., 33: 28 (São Paulo); (pt.) Gomes, 1946, Occ. Pap. Michigan Mus., 494: 4, 7 (Rio Piracicaba, Piracicaba, São Paulo); Gomes, 1956, Rev. Bras. Biol., 16: 404 (no locality); Schubart, 1964, Bol. Mus. Nac. Rio de Janeiro, Zool., 244: 18 (Rio Mogi Guaçu); Travassos & Kohn, 1965, Pap. Avuls. Zool. S. Paulo, 17: 44, 45 (Parassununga); Lundberg & Baskin, 1969, Amer. Mus. Novit., 2396: 6, 29 (no locality).

Zungaro zungaro; Fowler, 1943, Proc. Acad. Nat. Sci. Philad., 95: 318 (Arroyo Canelones; Rio Santa Lucia, Canelones); de Buen, 1950, Publ. Cient. S.O.Y.P., 2: 71 (Uruguay); Bertin & Estève, 1950, Cat. Types Mus. Paris, 5: 55 (Rio de la Plata); Ringuelet, Arámburu & de Arámburu, 1967, Los Peces Argentinos de Agua Dulce: 325 (Argentina: Río Paraná medio e inferior; Río Paraguay; Río Uruguay media e inferior; Río de la Plata).

Microglanis cottoides; De Buen, 1950, Publ. Cient. S.O.Y.P., 2: 70 (Uruguay).

Material. — One specimen, December 1907, Parassununga, São Paulo, Brazil (R. von Ihering, AMNH no. 26942, formerly no. 8638a), standard length 140 mm, paratype of *Pseudopimelodus roosevelti*. One specimen, 9 September 1908, Piracicaba, Rio Tieté, São Paulo (J. D. Haseman, FM no. 58120), standard length 107 mm. Two specimens, 15 September 1908, Salto de Avanhandava, Rio Tieté, São Paulo (J. D. Haseman, FM no. 58070), standard length 52, 56 mm. Two specimens, same data (FM no. 58122), standard length 21, 33 mm. One specimen, 7 March 1925, Rosario de Santa Fé, Paraná, Argentina (Noordraven, ZMA no. 100138), standard length 195 mm. 13 specimens, 25 March 1945, Cachoeira de Emas, Rio Mogi Guassu, Est. de São Paulo (G. S. Myers, SU no. 62437), standard length of eight specimens 26-35 mm, five specimens 108-151 mm.

Diagnostic characters. — Very close to *P. z. bufonius*, but colour pattern slightly different: the cross-bands of the body are not connected dorsally, or only just connected, the second dark band is usually not continued downwards on to the anal fin (but in small specimens it is), and the dark cross-bar on the caudal fin is broader, and almost terminal, leaving only a narrow white edge, broadest at the tip of the upper lobe.

Description. — D I.6, A 11-12 (iv or v. 6 or 7), P I.6 or I.7, V 6 (i.5), C i.14.i or i.15.i and rudiments, gill-rakers 1 + 1 + 2 to 5; branchiostegals 8 or 9: teeth in both jaws in a band, the band of premaxillary teeth with

acute projections laterally, which, however, do not reach far backwards (fig. 37a); eyes small, their greatest diameter 3.0-3.5 times in snout, 2.5-4.0 times in bony interorbital, 4.3-5.5 times in whole interorbital, and 9.5-11.0 times in head; anterior nostrils well behind upper lip; the maxillary barbels reach just to the pectoral base; the outer pair of mental barbels is a little more than half their length, and the inner pair is about half the length of the outer pair.

Head 3.0-3.7 times in standard length, depressed, its depth about 0.6 times its width, with a narrow occipital process meeting the dorsal plate; greatest width of body, between the cleithra, 3.35-4.0 times in standard length; greatest depth of body 4.8-5.0 times in standard length; predorsal length 2.6-3.05 times in standard length.

Dorsal fin with one spine and six divided rays, the spine strong, but short, with a blunt tip, its length just equal to snout and eye and 2.6-3.5 times in predorsal length, along both edges serrations, which become visible only after removing the skin; soft rays about one and a half times the length of the spine, which is still comparatively short, when pressed down they reach only from one third to half way the distance to the adipose fin. Anal fin rounded, with four or five simple and six or seven divided rays, of the same length as the dorsal rays, the longest rays a little over half the length of the head. Pectorals with one spine and seven rays; the spine is strong, with along each edge some 18 teeth, those on the outer edge small, and only slightly directed inwards, those on the inner (posterior) edge larger, though less than half the width of the spine and distinctly directed inwards; the spine is encased in thick leathery skin which is continued beyond its tip; the whole spine is strongly curved backwards; without removing the skin, the teeth along the anterior edge cannot be seen, the teeth along the posterior edge are continued along the leathery part as in *P. z. bufonius*; the combined length of the pectoral spine and its leathery tip equals the length of the head, minus the distance from tip of snout to posterior nostril, and is therefore a little longer, relatively, than in *P. z. bufonius*; the first ray is equal in length to spine and tip, but the last one is no more than half the length of the first one, and equals snout with eye. Ventrals rounded, with six rays, of which the first one is simple, the others divided, reaching two-thirds of the distance to the anal fin, the longest rays equal in length to the length of the longest anal rays. Caudal fin well-developed, forked with acute tips, with 14 divided rays, above and below one fully developed simple ray, and rudiments. Adipose fin of moderate length, its origin opposite the origin of the anal fin and its base reaching very slightly farther than the base of the anal fin, its height one third of the depth of the caudal peduncle below it.

Colour of preserved specimens. Dark brown bands and patches on a pale

brownish background. The head is either pale, with scattered small dark spots, not forming a pattern, or entirely dark; there is a dark band across the nape, reaching to the lateral line; a second, much wider dark band from the dorsal fin downwards and backwards, reaching to a little below the lateral line (in Borodin's figure of the type of *P. roosevelti*, the first band is barely indicated, the second reaches to the lateral line; in the examined paratype the second band reaches to below the lateral line, but not so far down as in *P. z. bufonius*); a third dark area is on the back, anteriorly not or just connected with the second one, posteriorly taking in most of the adipose fin and reaching down about two-thirds of the body-depth to above the origin of the anal fin; a round pale patch on the back just in front of the adipose fin is excluded from this dark area; a complete dark band, of equal width over its length, over the distal part of the caudal peduncle and the base of the caudal fin. The dorsal fin is mostly dark, with a pale spine, pale tips to the rays, and a narrow pale median cross-bar over the rays. The anal fin is pale with two broad dark cross-bars. The pectorals are pale, but the rays (not the spine) have dark bases, and there is a broad but ill-defined dark band over the middle of the fin. The ventrals are pale, with a dark base and a dark median cross-bar. The tail has a dark base, as already mentioned, followed by a broad pale band, which is followed by a subterminal dark band of about the same width as the white band; there is a narrow pale margin, and often a somewhat longer pale tip to the upper caudal lobe. The figures published by Borodin (1927), under the name *Pseudopimelodus roosevelti*, by Devincenzi & Barattini (1926-1940: pl. 52), and Devincenzi & Teague (1942: 42), under the name *Pseudopimelodus parahybae*, show the characters of *P. zungaro mangurus* very well.

Distribution. — Probably throughout the Uruguay-Paraná-Paraguay-La Plata basins.

Discussion. — The figure on which this subspecies was founded (cf. Valenciennes, 1847) is unsatisfactory, but d'Orbigny forwarded also a mounted specimen, which was re-identified as *Zungaro zungaro* by Bertin & Estève (1950), and therefore undoubtedly belongs to the present species.

As mentioned above, the fish described and figured by Devincenzi & Barattini (1926-1940: pl. 52) and Devincenzi & Teague (1942: 42) under the name *Pseudopimelodus parahybae*, clearly belongs to this species. Note that the mentioned authors record a length of 40 to 50 cm and a weight of 5 to 6 kg for their specimens, which is quite impossible for *Microglanis parahybae*. Devincenzi & Teague (1942) distinguish between *Pseudopimelodus parahybae* and *Pseudopimelodus zungaro*, but, although the mentioned authors do not express themselves very clearly on the subject, one gets an

impression that they had not examined a specimen which they could identify with the second species, and included it on the testimony of a former preparator of their museum.

Pseudopimelodus zungaro zungaro (Humboldt) (fig. 39, pl. 5)

Pimelodus zungaro Humboldt, 1833, Rec. Observ. Zool. Anat. Comp., 2: 170, pl. XLVI fig. 1 — Tomependa, sur les bords de l'Amazone.

Zungaro Humboldtii Bleeker, 1858, Visschen Ind. Arch., 1: 206 — nomen novum for *Pimelodus zungaro* Humboldt, to avoid tautonomy.

Pimelodus (Pseudopimelodus) pulcher Boulenger, 1887, Proc. Zool. Soc. Lond.: 276, pl. XXI fig. 1 — Canelos.

Pseudopimelodus variolosus A. de Miranda Ribeiro, 1914, Comm. Linh. Tel. Estr. Matto-Grosso ao Amazonas, 15, Anexo 5: 4, pl. 1 fig. 2, pl. 2 fig. 1, 2 — Coxim, no Rio Taquary, M. Grosso; S. Manoel.

Pimelodus Zungaro; Valenciennes, 1840, in Cuvier & Valenciennes, Hist. Nat. Poiss. (4° ed.), 15: 119 (le haut Maragnon, dans la province de Jaën Bracamoros); R. H. Schomburgk, 1843, Fish. Brit. Guiana, 2: 205 (the Amazon near Tomependa).

Zungaro Humboldtii; Bleeker, 1862, Atlas Ichth., 2: 11 (name only); Bleeker, 1863, Ned. Tijdschr. Dierk., 1: 101 (name only).

Pimelodus bufonius; Cope, 1878, Proc. Amer. Philos. Soc., 17: 675 (Peruvian Amazon).

Pseudopimelodus pulcher; Eigenmann & Eigenmann, 1888, Proc. Calif. Acad. Sci., (2) 1: 122 (no locality); Eigenmann & Eigenmann, 1890, Occ. Pap. Calif. Acad. Sci., 1: 111 (Eastern Ecuador); Eigenmann & Eigenmann, 1891, Proc. U.S. Nat. Mus., 14: 27 (Eastern Ecuador); Fisher, 1917, Ann. Carnegie Mus., 11: 410, fig. 1 (Salto Avandava, Rio Tieté); Borodin, 1927, Amer. Mus. Novit., 266: 3 (Ecuador); Pearson, 1937, Proc. Calif. Acad. Sci., (4) 23: 92 (Tingo de Pauca, Rio Marañon, Peru); Fowler, 1941, Bol. Mus. "Javier Prado", 5: 378 (Perú (Rio Marañón). Tambien en el Alto Amazonas en el este del Ecuador); Eigenmann & Allen, 1942, Fish. W. South America: 91 (Eastern Ecuador and Upper Marañon); Fowler, 1945, Los Peces del Perú: 47 (Perú (Rio Marañón). Tambien en el Alto Amazonas en el este del Ecuador); Gomes, 1946, Occ. Pap. Mus. Michigan, 494: 6 (Tingo de Pauca, at the mouth of Rio Crisnejas in Rio Marañon, Peru); Fowler, 1951, Arq. Zool. S. Paulo, 6: 561 (Alto Amazonas, Equador, Peru, São Paulo); Ovchynnyk, 1968, Zool. Anz., 181: 254 (Ecuador: Canelos on Rio Bobonaza, tributary of Rio Pastaza, Prov. Napo-Pastaza).

Batrachoglanis pulcher; Eigenmann, 1910, Rep. Princeton Univ. Exp. Patagonia, 3: 383 (Eastern Ecuador).

Zungaro zungaro; Fowler, 1915, Proc. Acad. Nat. Sci. Philad., 67: 209 (Peruvian Amazon); Fowler, 1940, Proc. Acad. Nat. Sci. Philad., 91: 285 (Peruvian Amazon); Fowler, 1940, Proc. Acad. Nat. Sci. Philad., 92: 95 (Bolivia: Huachi; Popoi R., upper Beni; R. Colorado, lower Bopi); Fowler, 1941, Bol. Mus. "Javier Prado", 5: 378, fig. 17 (Perú: Río Marañón, Amazonas peruano, figured specimen from Río Ampiyaco); (pt.) Eigenmann & Allen, 1942, Fish. W. South America: 90 (throughout upper Amazon); (pt.) Gosline, 1945, Bol. Mus. Nac. Rio de Janeiro, Zool., 33: 33 (Marañon); Fowler, 1945, Los Peces del Peru: 48, fig. 17 (Perú: Río Marañón, Amazonas peruano); P. de Miranda Ribeiro, 1964, Bol. Mus. Nac. Rio de Janeiro, Zool., 246: 3 (Rio Araguaya).

Pseudopimelodus zungaro; Pearson, 1924, Indiana Univ. Stud., 11 (64): 10 (Bolivia: Huachi and Popoi rivers, Upper Beni; Rio Colorado, Lower Bopi); Pearson, 1937, Proc. Calif. Acad. Sci., (4) 23: 111 (Beni basin).

Pseudopimelodus variolosus; Gosline, 1941, Stanford Ichth. Bull., 2: 85 (Rio Taquary, State of Matto Grosso, Brazil); Gosline, 1945, Bol. Mus. Nac. Rio de Janeiro, Zool.,

33: 28 (Mato Grosso); Gomes, 1946, Occ. Pap. Michigan Mus., 494: 7 (Rio Taquiri, Mato Grosso, Brazil); (pt.) Fowler, 1951, Arq. Zool. S. Paulo, 6: 562, fig. 570 (Rio Taquiri); (pt.) P. de Miranda Ribeiro, 1953, Arq. Mus. Nac. Rio de Janeiro, 42: 404 (Coxim, no Rio Taquiri, Mato Grosso; São Manoel).

Microglanis pulcher; Gosline, 1941, Stanford Ichth. Bull., 2: 85 (Canelos, Ecuador); Gosline, 1945, Bol. Mus. Nac. Rio de Janeiro, Zool., 33: 28 (este do Equador).

Material. — One specimen, "1883", Canelos, Ecuador (purchased from Gerrard, MV no. 45616), standard length 63 mm¹). Three specimens, September 1921, Huachi, Popoi River, upper Beni, Bolivia (N. E. Pearson, CAS no. 17954), standard length 96, 98, 140 mm. One specimen, September 1923, Tingo de Pauca, Marañon River, Peru (N. E. Pearson, CAS no. 17923), standard length 87 mm. One specimen, 2 May 1968, Sangadina, Mato Grosso (R. H. McConnell, coll. no. 125A), standard length 56 mm.

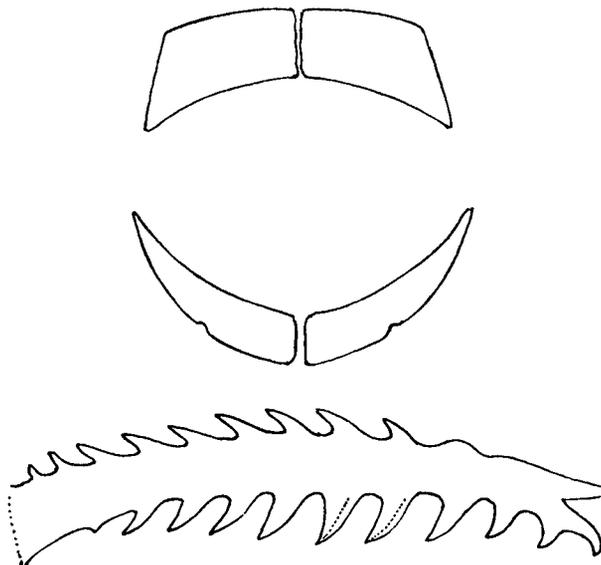


Fig. 39. Dentition and right-hand pectoral-spine of "*Pseudopimelodus pulcher*" (= *P. z. zungaro*).

Characters. — Similar to *P. z. mangurus*, but band over the caudal fin narrow, except in a few specimens; similar to *P. z. bufonius*, but dark bands on body not dorsally connected.

Discussion. — Originally I believed that *P. pulcher* was a distinct species as the only specimen then available (MV no. 45616) was not only charac-

1) It is practically certain that this specimen was collected by C. Buckley in 1880 and belonged to the same lot as the types of *P. pulcher*, for Boulenger (1887: 274) mentioned that part of Buckley's collection was: "Sold by the well-known dealer Mr. Gerrard to other institutions, principally to the Vienna Museum". It bore the identification *P. bufonius*.

terized by its remarkable tail-pattern, entirely agreeing with Boulenger's (1887) figure and different from any specimen of *P. zungaro* I had seen at the time, but also appeared to differ in certain fin-ray and gill-raker numbers. It had D I.6, A 10 (iv.6), P I.6, V 6 (i.5), C i.13.i and rudiments, gill-rakers 2 + 1 + 5.

The first doubt arose when I examined sample FM no. 58122, from a locality remote from the type-locality of *P. pulcher*. This sample had been identified as *P. pulcher* by Fisher (1917), an identification changed to *P. roosevelti* by Gomes (1946). Nevertheless, as Fisher mentioned, the larger of the two specimens agrees very well with *P. pulcher*, in tail pattern, pectoral fin (P I.6), and gill-rakers (1 + 1 + 5).

Later I found specimens with a caudal-fin pattern intermediate between that of typical *P. pulcher* and the ordinary cross-bar of *P. zungaro*. Further it became evident that in small specimens of *P. zungaro* the number of pectoral fin rays is quite often six instead of the more usual seven. One specimen identified as *P. pulcher* (CAS no. 17973) has on the left P I.7, on the right P I.6. As regards the gill-rakers, apparently small specimens tend to have one or two more (usually very rudimentary ones) than larger individuals.

There can be no reasonable doubt that *P. variolosus* is a synonym. In its description A. de Miranda Ribeiro (1914) states D I + 5, A 7, but his figure shows D I.6, and as far as the anal fin is concerned, it may be assumed that he has counted the divided rays only and not the three or four simple rays which precede them. In other respects, description and figure agree well with *P. zungaro*.

***Pseudopimelodus zungaro* subsp. 1)**

Pseudopimelodus bufonius; (pt.) Steindachner, 1880, Denkschr. Akad. Wiss. Wien, Mathem.-Naturw. Cl., 42 (1): 59 (Cauca); Miles, 1947, Peces Rio Magdalena: 58, 64 (sistema Magdalena-Cauca).

Pseudopimelodus zungaro; Eigenmann, 1922, Mem. Carnegie Mus., 9: 32 (Quibo, Rio Atrato; Soplaviento, El Digue; Honda, R. Magdalena; Puerto Berrío, R. Magdalena; El Banco, R. Magdalena); Miles, 1943, Peces de Agua Dulce del Valle del Cauca (Cauca), non vidi.

Material. One specimen, 11/13 January 1912, Soplaviento (C. H. Eigenmann, FM no. 57699), standard length 171 mm. One specimen, 21 January 1912, El Banco (C. H. Eigenmann, FM no. 57700), standard length 207 mm. Two specimens, January 1912, El Banco and Soplaviento (C. H. Eigenmann, CAS no. 17975, ex IUM nos. 13498,

1) Perhaps the name *Zungaro zungaro schultzi* Dahl 1955 is applicable to this subspecies. I have been unable to consult the original description, but found the name listed as a synonym of *Pseudopimelodus bufonius* in Dahl (1971: 54). The fish figured by Dahl under the name *P. bufonius* shows a long, rounded-lanceolate caudal fin, quite unlike any race of *P. zungaro* known to me, with a narrow dark cross-band.

13499), standard length 112, 149 mm. One specimen, 10 June 1956, Rioviego, R. Magdalena, Bolivar (G. Dahl, USNM no. 175310), standard length 101 mm. One specimen, no date, Honda (Niceforo Maria, USNM no. 121258), standard length 151 mm.

Characters. — Very similar to *P. z. bufonius*, and mainly distinguishable by the colour-pattern of the caudal fin, which is entirely dark, except for a rather narrow pale cross-bar near its base, and white tips. Hence, the tail is even darker than in the nominate race. It looks as if the amount of white on the anal fin is also reduced, the white median band being less developed, and that also the pale caudal peduncle is less developed, but all specimens examined were more or less decolourized. Number of gill-rakers 1 + 1 + 4 (four times) and 1 + 1 + 3 (twice).

Distribution. — Only known from the Rio Magdalena basin, Colombia.

Discussion. — The first to record this species from Colombia was Steindachner (1880), who had a specimen of 55 cm length from Cauca. Note, however, that the excellent figure (pl. II fig. 1) which accompanies his paper, and which shows a dark caudal band of moderate width, cannot have been taken from the Colombian specimen as its figured total length, at $\frac{3}{4}$ × natural size, is a little less than 22 cm, hence its actual length must have been ca. 29 cm.

There has been the usual confusion about the identity and nomenclature: Eigenmann (1922) used the name *Pseudopimelodus zungaro* for material from the Rio Magdalena, but note that he (Eigenmann, 1922: 32) was not very sure, as he mentioned in the discussion of *P. zungaro* that: "the large specimens reported may belong to another species". Miles (1947) rejected Eigenmann's identification and used the name *P. bufonius* for specimens from the Magdalena and Cauca, as Steindachner (1880) had done previously.

***Pseudopimelodus raninus* (Valenciennes)**

Under this name I unite four forms which, although they have hitherto been regarded as distinct species, are so similar that in my opinion there is every reason to treat them as subspecies of one species. There are scarcely any morphological differences between the four forms (one is a little more slender than the others), but they differ in colour-pattern, a difference that, at least when specimens of similar sizes are compared, appears to be constant. Just as in *P. zungaro*, and for the same reasons, I have given a fairly extensive description of the subspecies occurring in Suriname, which happens to be the nominate one, and only diagnoses indicating their differential characters, of the others.

This species is not known to attain a large size; the largest specimen

examined by me had a standard length of 166 mm, and Schultz (1944a) mentioned one of 184 mm.

The distribution includes the whole Amazon basin, French Guiana and Suriname (*P. r. raninus*); the Essequibo and Orinoco basins (*P. r. villosus*); the Maracaibo basin (*P. r. acanthochiroides*), and rivers west of the Andes in Colombia and Ecuador (*P. r. transmontanus*).

P. raninus has also been recorded from the La Plata basin, in Paraguay and Argentina (Pozzi, 1945, non vidi, and Castello, 1971), but at least one of these records was based on a misidentification, and the occurrence of *R. raninus* in the La Plata basin requires confirmation¹).

***Pseudopimelodus raninus raninus* (Valenciennes) (fig. 37b, 38b, pl. 8, 9)**

Pimelodus raninus Valenciennes, 1840, in Cuvier & Valenciennes, Hist. Nat. Poiss. (4^o ed.), 15: 117, pl. 434 — La Mana.

Pseudopimelodus acanthochirus Eigenmann & Eigenmann, 1888, Proc. Calif. Acad. Sci., (2) 1: 122 — Gurupa, Tajapuru, Teffé, Jutahy.

Pimelodus raninus Kner, 1858, Sitzb. Akad. Wiss. Wien, Mathem.-Naturw. Cl., 26 (1857): 421 (Barra do Rio negro, Guaporè und Matogrosso); (?) Regan, 1905, Proc. Zool. Soc. Lond.: 190 (Rio Negro).

Pseudopimelodus raninus; Bleeker, 1858, Visschen Ind. Arch., 1: 207 (Amer. merid.); Bleeker, 1862, Atlas Ichth., 2: 11 (name only); Bleeker, 1863, Ned. Tijdschr. Dierk., 1: 101 (name only); Steindachner, 1880, Denkschr. Akad. Wiss. Wien, Mathem.-Naturw. Cl., 42 (1): 61 (no locality); Steindachner, 1883, Denkschr. Akad. Wiss. Wien, Mathem.-Naturw. Cl., 56 (1): 4 (Rio Huellaga); Eigenmann & Eigenmann, 1888, Proc. Calif. Acad. Sci., (2) 1: 122 (name only); (pt.) Eigenmann & Eigenmann, 1890, Occ. Pap. Calif. Acad. Sci., 1: 111 (reference to original description only); (pt.) Eigenmann & Eigenmann, 1891, Proc. U.S. Nat. Mus., 14: 27 (compiled); Eigenmann, 1912, Mem. Carnegie Mus., 5: 154 (la Mana); A. de Miranda Ribeiro, 1914, Comm. Linh. Telegr. Estr. Matto Grosso ao Amazonas, 15, Anexo 5: 3 (Marão); (pt.) Eigenmann & Allen, 1942, Fish. W. South America: 91 (compiled); Gosline, 1945, Bol. Mus. Nac. Rio de Janeiro, Zool., 33: 28 (Guiana Francesca?); Gomes, 1946, Occ. Pap. Mus. Michigan, 494: 7 ("Mana" ? French Guiana); Hoedeman, 1961, Bull. Aquatic Biol., 2: 135 (Aloiké, Litany river, "French Guiana"); Marlier, 1968, Cad. Amazônia, 11: 53 (le lac du Rio Preto da Eva).

1) Dr. Castello has forwarded two of the specimens on which his record was based; they are from Vicente López near Buenos Ayres (MACN no. 3373). Their dentition indicates that these specimens are referable to *Microglanis* and not to *Pseudopimelodus*: the band of teeth in the upper jaw is laterally rounded, without any trace of a backward projection; the lateral line has pores to a little behind the dorsal base. The large specimen measures 54 mm in standard length, D I.6, A 13 (v.8), P I.6, V 6 (i.5), C 13 (branched rays only), branchiostegals 9, gill-rakers 2 + 1 + 8, head 3.1, greatest width of body 3.0, greatest depth of body 4.3, predorsal length 2.6 times in standard length. The other specimen measures 49 mm in standard length, D I.7, A 11 (iv.7), P I.6, V 6 (i.5), C 13 (branched rays only), branchiostegals 9, gill-rakers (left) 2 + 1 + 6, (right) 2 + 1 + 5, head 3.0, greatest width of body 3.0, greatest depth of body 4.5, predorsal length 2.5 times in standard length. I believe that these specimens fall within the range of variation of *Microglanis parahybae*, a very variable species. What remains of the colour-pattern supports this identification.

Pseudopimelodus acanthochira; Eigenmann & Eigenmann, 1890, Occ. Pap. Calif. Acad. Sci., 1: 114 (Amazon from Para to Tabatinga: Gurupa, Tajapura, Tefé, Jutahy); Eigenmann & Eigenmann, 1891, Proc. U.S. Nat. Mus., 14: 28 (Amazon, Solimoens); Eigenmann, 1910, Rep. Princeton Univ. Exp. Patagonia, 3: 384 (Amazonas from Para to Tabatinga); A. de Miranda Ribeiro, 1911, Arch. Mus. Nac. Rio de Janeiro, 16: 257 (no locality); Güntert, 1942, Zool. Anz., 138: 31 (no locality); Gosline, 1945, Bol. Mus. Nac. Rio de Janeiro, Zool., 33: 28 (Baixo Amazonas).

Batrachoglanis raninus; Eigenmann, 1910, Rep. Princeton Univ. Exp. Patagonia, 3: 383 (Rio de Janeiro to Essequibo and Peru).

Pseudopimelodus villosus; (pt.) Fisher, 1917, Ann. Carnegie Mus., 11: 410 (Santarem: the two larger specimens).

Pseudopimelodus acanthocheira; Fisher, 1917, Ann. Carnegie Mus., 11: 411, fig. 2 (Maciel, Rio Guaporé); Pearson, 1937, Proc. Calif. Acad. Sci., (4) 23: 111 (Mamoré basin).

Pseudopimelodus acanthochirus; Gomes, 1946, Occ. Pap. Michigan Mus., 494: 6 (Gurupá and Tajapurú, Pará; Tefé and Jutá, Amazonas).

Zungaro raninus; Bertin & Estève, 1950, Cat. Types Poiss. Mus. Paris, 5: 55 (Fl. La Mana (Guyane)).

Microglanis parahybae; Emmens & Axelrod, 1968, Catfish: 28, pl. (no locality)¹).

Material. — 45 specimens from Suriname as follows. Five specimens, 27 November 1957, "Aloiké", Litani Rivier (J. R. Gery, ZMA no. 102232), standard length 48-82 mm. One specimen, 19 December 1965, Compagnie Kreek (Mees, RMNH no. 26602), standard length 49 mm. Three specimens, 28 December 1965, Marshall Kreek (Mees, RMNH no. 26603), standard length 45, 69, 79 mm. One specimen, 20 October 1966, Gran Kreek, ca. 63 km S. of Affobakka (Nijssen, ZMA no. 105947), standard length 61 mm. One specimen, 8 December 1966, Marshall Kreek (Nijssen, ZMA no. 106371), standard length 43 mm. 34 specimens, 21 April 1967, Maka-kreek, a small tributary of the Lawa Rivier, ca. 10 km S. of Stoelmanseland (Nijssen, ZMA no. 105950), standard length 19-75 mm.

Extra-limital material. — One specimen, before 1857, Barra do Rio negro (no collector, MV no. 44439), standard length 88 mm. Two specimens, undated, Tajapurú (no collector, presumably Thayer Exp., MCZ no. 9833), standard length 89, 93 mm. One specimen, before 1883, Huallaga, Peru (A. Stübel, MTD no. 1649), damaged, see discussion. Ten specimens, July-August 1909, Maciel, Rio Guaporé, Brazil (J. D. Haseman, FM no. 58121), standard length 25-41 mm. Two specimens, 15-19 December 1909, Santarem, Brazil (J. D. Haseman, FM no. 58140), standard length 34, 120 mm. Two specimens, undated, Boby Creek, Approuage R., French Guiana (C. Ternetz, BM 1926-3-2: 703-704), standard length 41, 68 mm. One specimen, July 1965, Rio Aspeie, Boa Vista, Municipio of Castanhal, Pará, Brazil (N. Menezes, MCZ no. 46031), standard length 36 mm. Two specimens, July 1965, Rio Arari, Cachoeira do Arari, Ilha de Marajó, Pará, Brazil (N. Menezes, MCZ no. 46033), standard length 33, 34½ mm. 14 specimens, 24 April 1967, Kamaloea- or Saloea Kreek, a tributary of the Marowijne, 9 km S.E. of the mouth of the Gran Kreek, French Guiana (Nijssen, ZMA no. 105952), standard length 28-78 mm.

Diagnostic characters. — Head in size between that of *P. nigricauda* and *P. z. bufonius*, slightly angular at the gape; head and body dark above, with a fairly narrow but conspicuous pale band across the nape, reaching from pectoral to pectoral, and another pale band on the caudal peduncle, including

1) The fish described in the text of this book appears actually to be *Microglanis parahybae*, but the coloured photograph on page 28 is clearly of *P. raninus raninus*, and I have listed it as it is an excellent illustration of this form.

the posterior half of the adipose fin; pectoral fin with six rays; maxillary barbels reaching to or almost to a vertical through the origin of the dorsal fin; the dorsal fin when depressed reaches from two-thirds to nearly to the adipose fin; caudal fin scalloped, with two more or less equal lobes, hyaline white with a black base, a black band across, and a number of brown dots in between; the short occipital process narrowly separated from the much longer dorsal plate in small specimens, touching it in larger individuals; gill-rakers well-developed, slender.

Description. — D I.6, A 10-11 (iii.7, iii.8, or ii.9, usually 8 divided rays), P I.6, V 6 (i.5), C with 13 or 14 branched rays; gill-rakers well-developed, slender, 3 + 1 + 7-10; branchiostegals 9; teeth in both jaws in a broad band, the band of premaxillary teeth laterally projecting backwards; eyes small, their greatest diameter 2.5-3.0 times in snout, about 4 times in inter-orbital, and 9-11 times in head; the maxillary barbels are relatively long, reaching to well beyond the basis of the pectoral fin, and often to the vertical through the origin of the dorsal fin; the outer pair of mental barbels reaches to the basis of the pectoral fin, or slightly beyond, the inner pair is about two-thirds the length of the outer pair.

Head 2.9-3.0 times in standard length, greatest width of body 3.2-3.3 times in standard length, greatest depth of body 3.8-4.4 times in standard length, predorsal length 2.4-2.5 times in standard length.

Dorsal fin with one spine and six divided rays; dorsal spine moderate, equal to snout with eye or a little longer, encased in skin, without serrations, or these very weakly indicated; soft rays moderately long, when depressed reaching from two-thirds to just to the adipose fin, longest dorsal ray equal to postorbital part of head or slightly longer. Anal fin with three simple and seven to nine (usually eight) divided rays, rounded, its longest ray about half the length of the head. Pectorals with one spine and six divided rays; the spine is very strong, flat, curved slightly backwards, varying from somewhat less to well over half the length of the head, its anterior and posterior borders each with a series of from twelve to fifteen strong spines; the first ray is longer than the spine, the following rays are successively shorter, and the last ray is half to two-thirds the length of the first ray. Ventrals rounded, with six rays, the first one simple, the others divided, relatively long, reaching almost to the anal fin, and the longest rays equal to the distance from the gape to the pectoral fin or even slightly longer. Caudal fin with two rounded lobes, the upper lobe usually slightly the longer, with thirteen or fourteen divided rays, and above and below several simple ones: dorsally as many as eight, definitely influencing the shape of the fin; the longest ray equal to head without half the snout. Adipose fin moderate, implanted opposite the

anal fin, and its base of the same length as that of the anal fin, its height about two-fifths the depth of the caudal peduncle.

Colour. Generally blackish brown, underparts from chin to anal fin dull brown, the pigment spots not covering the whole skin. From pectoral to pectoral, across the nape, is an irregular pale bar. A pale brown band across the posterior part of the body, from adipose to anal fin; in small specimens sometimes constricted or even interrupted on the lateral line. A small pale saddle just behind this band. Barbels ringed blackish-brown and white. The dorsal fin is black, with a white edge, and with over the last four rays and their connecting membrane near their base a white band; the anal fin is black with a white edge, and with on the basal half in its posterior part, over the last six rays, a white band; the pectoral fins are black, with the basal third of the spine pale, and a small white band, sometimes almost obsolete, over the last four rays near their bases; caudal fin with a blackish brown basis and a blackish brown subterminal band, the white area in between with light brown freckles, variable in intensity and extent; the ventrals are black, with on the last two or three rays near their base usually indications of a white bar; adipose fin with on its anterior base the pale spot already mentioned, middle section black, posterior half pale brown.

The preceding description was based on material from Suriname, and small specimens from the Lower Amazon appear to agree entirely, in morphology as well as in colour-pattern. Specimens from the Rio Guaporé (FM no. 58121) do not differ, except that some have a pale blotch of irregular shape laterally just behind the dorsal fin.

A large Amazonian specimen (FM no. 58140, measuring 120 mm) is very different; with its spotted appearance it greatly resembles the next subspecies. Amazonian specimens of intermediate length are old and faded, but may have been similar.

The question whether large specimens from Suriname would also lose their distinctive pattern, even the question whether specimens from Suriname do ever attain such a large size, remains to be answered. See also the discussion of *P. r. villosus*.

Distribution. — Suriname and French Guiana: Suriname, Marowijne, Mana and Approuague basins. It may be significant that in Suriname this subspecies has not been found further west than the Suriname Rivier basin; in the Demerara River and the Essequibo it is replaced by a different subspecies. Brazil: widely distributed in the Amazon basin, upstream into Peru and to the Bolivian border. Specimens from the Paraguay and the La Plata rivers may also belong to this subspecies. Records from Rio de Janeiro are erroneous, see discussion.

Discussion. — There has been some confusion about the type-locality of this species; some authors have sought la Mana in the neighbourhood of Rio de Janeiro, and others (Gosline, 1941, 1945; Gomes, 1946) marked the locality French Guiana with a query. This uncertainty was caused by careless reading of Valenciennes (1840) who had to say this about the provenance of his material: "Il a été envoyé de la Mana au Cabinet du Roi par MM. Leschenault et Doumerc en 1824, et nous voyons par un dessin de M. Méne-strier, qu'il se porte au sud au moins jusqu'à Rio-Janéiro". This shows conclusively that Valenciennes's material came from the Mana, and that Rio de Janeiro was mentioned on the basis of a plate. Nowhere does Valenciennes say that the Mana is anywhere near Rio de Janeiro, and the fact that Leschenault visited the Mana River in French Guiana in 1824 (van Steenis-Kruseman, 1950), shows that this and no other river is meant. Eigenmann & Eigenmann (1890) indicated it correctly on their map. The plate from Rio de Janeiro would doubtless pertain to a different species, and as the only actual specimens are from the Mana, they may be regarded as the types; see also Bertin & Estève (1950).

In the older literature (Müller & Troschel in Schomburgk, 1848; Kner, 1858; Günther, 1864; Peters, 1877; Steindachner, 1883), *Pseudopimelodus raninus* has been recorded from a series of widely scattered localities in South America. At the time it was not known that *Pseudopimelodus* contains a number of superficially often very similar species and subspecies, several of which appear to have a restricted distribution. As mentioned on a previous page, Eigenmann (1912) observed that Günther's specimens do not belong to *P. raninus*, and also that even at that time the material recorded by Müller & Troschel and by Peters was in such a bad state of preservation that identification was no longer possible. Schultz (1944a: 198) referred to a specimen from the Rio Meta in Colombia. He failed to give information on the depository of this specimen so that I cannot check its identity, but it seems a safe assumption that it was misidentified and belonged to the following subspecies. I have examined the specimen from the Rio Huallaga, Peru (leg. Stübel, MTD no. 1649), recorded by Steindachner (1883: 4). Unfortunately its liquid has boiled away in the fire following a bomber-attack in 1945, and all that is left are a few charred remains, the most important ones of which are the pectoral girdle with both spines, and a piece of the cranium; the anal fin appears to have had ten rays. These remains are scarcely identifiable: until such time as fresh material from the Rio Huallaga may become available for comparison, I cannot definitely state that they belong to *P. r. raninus*, but they do certainly not contradict Steindachner's identification, which I believe to have been correct.

***Pseudopimelodus raninus villosus* Eigenmann**

Pseudopimelodus villosus Eigenmann, 1912, Mem. Carnegie Mus., 5: 152, fig. 32; pl. X fig. 1 —Potaro Landing, British Guiana.

Pseudopimelodus villosus Eigenmann, 1910, Rep. Princeton Univ. Exp. Patagonia, 3: 384 — nomen nudum (British Guiana).

Pimelodus raninus; Günther, 1864, Cat. Fish. Brit. Mus., 5: 133 (Essequibo).

Pseudopimelodus villosus; Caporiacco, 1935, Monit. Zool. Ital., 46: 58 (Curupucari (Essequibo)); Gosline, 1941, Stanford Ichth. Bull., 2: 85 (British Guiana); Gosline, 1945, Bol. Mus. Nac. Rio de Janeiro, Zool., 33: 28 (Guiana Inglesa); Gomes, 1946, Occ. Pap. Michigan Mus., 494: 2 (no locality); Lowe, 1964, J. Linn. Soc. Lond., Zool., 45: 140 (Rupununi); Alexander, 1964, Proc. Zool. Soc. Lond., 142: 420 (British Guiana); Alexander, 1966, Proc. Zool. Soc. Lond., 148: 90 (British Guiana).

Pseudopimelodus villosus villosus; Schultz, 1944, Proc. U.S. Nat. Mus., 94: 198 (British Guiana).

Pseudopimelodus; McConnell, 1967, Timehri, 43: 67 (Rupununi).

Material. — Two specimens, before 1864, Essequibo River (Ehrhardt, BM no. 1864.1.21: 16-17), standard length 117, 119 mm. One specimen, 1908, Kumaka, British Guiana (C. H. Eigenmann, FM no. 53220), standard length 62 mm, paratype of *Pseudopimelodus villosus*. One specimen, 1908, Wismar, British Guiana (C. H. Eigenmann, FM no. 53571), standard length 39 mm, paratype of *Pseudopimelodus villosus*. One specimen, 4 May 1925, Caño de Quiribana into Rio Orinoco, Venezuela (C. Ternetz, SU no. 56987), standard length 84 mm. One specimen, 13 May 1925, Caño de Quiribana into Rio Orinoco, Venezuela (C. Ternetz, SU no. 56988), standard length 97 mm. One specimen, May 1925, Caño de Quiribana into Rio Orinoco, Venezuela (C. Ternetz, SU no. 56968), standard length 81 mm. One specimen, 10 April 1957, Karanambo Creek, Rupununi (R. H. McConnell log. 3), standard length 107 mm. One specimen, May 1958, Karanambo Creek, Rupununi (R. H. McConnell), standard length ca. 92 mm. One specimen, 2 May 1958, Karanambo Creek, Rupununi (R. H. McConnell, BM no. 1970.10.29: 13), standard length 46 mm. Five specimens, 4 May 1961, Semuni Creek, Rupununi River, British Guiana (R. H. McConnell, BM no. 1970.10.29: 4-6, 9-10), standard length 43, 69, 109, 146, 166 mm.

Characters. — Morphologically similar to *P. r. raninus*, but appears to attain a larger size and differs strikingly by its much duller and less attractive coloration: the whole body is dark brown-grey, more or less mottled without a nape-band or any other clear markings; the dorsal fin is blackish, with an ill-defined paler centre; the other fins are mottled, with dark brown-grey spots on a pale background; no bands on the caudal fin. Especially ventrals and caudal fin are therefore very different from *P. r. raninus*.

A small specimen collected by Mrs. McConnell (BM no. 1970.10.29: 13) differs from the description given above in that it shows markings on the body as *P. r. raninus*, but fainter, and in addition an irregular pale band from behind D to V. Another specimen (BM no. 1970.10.29: 4, 43 mm standard length) shows very faintly similar markings. Both specimens have the pale, spotted fins diagnostic of *P. r. villosus*.

Distribution. — Known from the Demerara River (Kumaka, Wismar), and the Essequibo basin (Essequibo River, Curupucari [= Kurupukari],

Potaro Landing, Rupununi), British Guiana, and from the Caño de Quiribana, Orinoco, Venezuela. Recently discovered in western Suriname, see Introduction.

Discussion. — As regards the presumed difference in size, it should be noted that the largest specimen out of a series of 61 *P. r. raninus* from Suriname and French Guiana has a standard length of only 82 mm, whereas out of 15 specimens of *P. villosus* which I examined, six are well over 100 mm in standard length. Naturally, I have considered the possibility that the difference in coloration would be a matter of size (as suggested by Schultz, 1944a: 201, for *P. v. butcheri*), but this is contradicted by the material, as several small specimens of *P. villosus* have been available, all of which have the ventral fins and caudal fin as described, and unlike *P. r. raninus*. Also, in the material of *P. r. raninus* from Suriname, there is no difference between small and larger specimens which might be suggestive of a transition of one colour type into another (large Amazonian specimens have been discussed on a preceding page).

Eigenmann (1912: pl. X) has mistakenly figured this subspecies with a rounded caudal fin, although in the text he correctly described the caudal fin as notched. Also he has described and figured a distinct notch in the caudal fin of *P. albomarginatus*, which actually is scarcely or not at all present (the upper rays of the caudal fin are longer than the lower rays, but there is no notch). This has clearly contributed to the later confusion between the two.

***Pseudopimelodus raninus acanthochiroides* Güntert**

Pseudopimelodus acanthochiroides Güntert, 1942, Zool. Anz., 138: 29 — Santander in Kolumbien.

Pseudopimelodus villosus butcheri Schultz, 1944, Proc. U.S. Nat. Mus., 94: 199 — Río San Juan near bridge south of Mene Grande, tributary to Río Motatán, Maracaibo Basin.

Pseudopimelodus villosus butcheri; Gosline, 1945, Bol. Mus. Nac. Rio de Janeiro, Zool., 33: 28 (rio San Juan, bacia do Maracaibo, Venezuela); Gomes, 1946, Occ. Pap. Michigan Mus., 494: 7 (Río San Juan, near bridge south of Mene Grande, Venezuela, Maracaibo basin).

Pseudopimelodus albomarginatus; Fernandez & Martin, 1953, La Región de Perijá y sus Habitantes: 306 (Río Negro, Tokio, a 16 kms oeste de Machiques).

Pseudopimelodus raninus; Mago-Leccia, 1967, Bol. Soc. Venez. Cienc. Nat., 27: 255 (Venezuela).

Pseudopimelodus villosus villosus; Mago-Leccia, 1967, Bol. Soc. Venez. Cienc. Nat., 27: 255 (Venezuela).

Material. — One specimen, 1925, Santander, Colombia (E. Ritter, NMB no. 5277), standard length 107 mm, syntype of *Pseudopimelodus acanthochiroides*. One specimen, same data (NMB no. 5278), standard length 67 mm, syntype of *Pseudopimelodus acanthochiroides*. Three specimens, 17 March 1942, Río San Juan at bridge south of Mene Grande,

tributary of Río Motatán, Maracaibo basin, Venezuela (L. P. Schultz, USNM no. 121273), standard length 88, 124, 162 mm, paratypes of *Pseudopimelodus villosus butcheri*. Three specimens, 20 March 1942, Río San Pedro, Maracaibo basin, Venezuela (L. P. Schultz, ZMA no. 102122, ex USNM no. 121271), standard length 31, 45, 58 mm, paratypes of *Pseudopimelodus villosus butcheri*. Three specimens, same data (USNM no. 121271), standard length 35, 37, 46 mm, paratypes of *Pseudopimelodus villosus butcheri*. Three specimens, 21 March 1942, Río Machango, 20 km above bridge south of Laganillas, Maracaibo basin, Venezuela (L. P. Schultz, USNM no. 121276), standard length 45, 49, 55 mm, paratypes of *Pseudopimelodus villosus butcheri*.

Diagnostic characters. — Morphologically similar to *P. r. raninus*, but body a little more slender, its greatest width 3.35-3.65 times in standard length. Differs slightly but constantly in colour pattern as follows; there is a more or less distinct pale band across the body, just behind the dorsal fin (absent, or occasionally just indicated in *P. r. raninus*), pectorals with a variable but considerable amount of white (mostly black in *P. r. raninus*); ventrals with a conspicuous white margin (all black in *P. r. raninus*); adipose fin entirely dark, with a white dot on its origin and sometimes the suggestion of a white margin (the whole posterior half white in *P. r. raninus*).

Large specimens lose the colour pattern of the body, but that of the fins remains distinct and diagnostic at all sizes, as correctly pointed out by Schultz (1944a: 201). This will also serve to distinguish the present subspecies from *P. r. villosus*. The largest specimen has the adpressed dorsal fin only reaching 0.6 of the distance to the adipose fin.

Distribution. — The Maracaibo basin in Venezuela and adjacent Colombia (Santander del Norte)¹).

Discussion. — The two syntypes of *P. acanthochiroides* are much decolorized, but what remains of their colours and pattern suggests strongly

¹) In the description of *P. acanthochiroides*, Güntert does not make clear if the locality Santander pertains to the town of that name, Prov. Cauca, southern Colombia, or to the Province of Santander, but from references on later pages (Güntert, 1942: 38, 39) it is clear that the Province of Santander is meant. The province of Santander is part of the Magdalena basin, but a large area in the adjacent Province of Norte de Santander belongs to the Maracaibo basin, and it appeared likely that the specimens had been collected there, particularly as there do not appear to be any (other) records of the species from the comparatively well-known Magdalena basin (cf. Miles, 1947). This has now been confirmed by Dr. E. Sutter, who informed me as follows (in litt., 2.IV.1971): "Herr Dr. H. G. Kugler, Vorsteher der Geologischen Abteilung unseres Museums, teilt mir mit, dass Herr Dr. E. Ritter um 1925 als Chefgeologe des "Oeldistrictes" Maracaibo tätig war. Mit "Santander" ist die Provinz gemeint, und zwar zweifellos Santander del Norte, d.h. die von Maracaibo aus direkt erreichbaren Gebiete Kolumbiens, die zum Untersuchungsgebiet von Maracaibo gehörten. Nach Dr. Kugler, der selbst viele Jahre in Südamerika tätig war, haben Geologen Fische und anderes Material nur an Orten gesammelt, wo sie ein Standlager hatten und längere Zeit arbeiteten; auf Reisen wäre es zu umständlich gewesen, Alkoholmaterial zu sammeln. Es ist also ganz unwahrscheinlich, dass die Fische aus einem andern Teil der Provinz Santander stammen".

that they do not differ from fishes described two years later as *P. villosus butcheri*. As mentioned in a footnote, the type-locality of *P. acanthochiroides*, like that of *P. v. butcheri*, is the Maracaibo basin.

***Pseudopimelodus raninus transmontanus* Regan**

Pseudopimelodus transmontanus Regan, 1913, Ann. Mag. Nat. Hist., (8) 12: 467 — the Condoto, the San Juan and the Tamana, and the Durango, W. Ecuador.

Pseudopimelodus transmontanus; Eigenmann, 1922, Mem. Carnegie Mus., 9: 33, pl. II fig. 1, 2 (Creeks near San Lorenzo, Rio Telembi, Patia Basin); Gosline, 1941, Stanford Ichth. Bull., 2: 85 (San Juan and Patia basins, Colombia); Gosline, 1945, Bol. Mus. Nac. Rio de Janeiro, Zool., 33: 28 (Colombia e oeste do Equador); Gomes, 1946, Occ. Pap. Mus. Michigan, 494: 4, 7 (Rio Telembi, near San Lorenzo, Colombia, Patia basin); Ovchynnyk, 1968, Zool. Anz., 181: 254 (Rio Durango, W. Ecuador).

Material. — One specimen, 14 January 1913, creeks near San Lorenzo, Patia Basin, Colombia (A. Henn and C. Wilson, CAS no. 17977), standard length 80 mm. One specimen, 17 January 1913, Telembi above Barbacos, Colombia (A. Henn and C. Wilson, IUM no. 13008), standard length 57 mm, specimen figured by Eigenmann, 1922. One specimen, 17 January 1913, creek near San Lorenzo, Rio Telembi, Patia Basin, Colombia (A. Henn and C. Wilson, FM no. 56518), standard length 100 mm. One specimen, September 1945, Pizarro, Choco, Pacific side, Colombia (K. von Sneidern, FM no. 70328), standard length 125 mm.

Characters. — Morphologically identical with *P. r. raninus*, but colour pattern (white markings) different and diagnostic. The differences are the following: the white band across the nape is wider and more even; there is a conspicuous white spot just before the origin of the dorsal fin (larger than in *P. r. acanthochiroides*); there is a large irregularly shaped white area on the flanks, from below the end of the dorsal base diagonally downwards and backwards; on the origin of the adipose fin is a white dot, as in the nominate race, but the remainder of the adipose fin is entirely dark, not its distal half white as in *P. r. raninus* or with a small white tip as usually in *P. r. acanthochiroides*; the pale band across the caudal peduncle is not well-developed; the anal fin is dark with a white margin, but it lacks a white median cross-bar, and the anterior four rays of the ventrals have broad white (hyaline) tips (all dark in *P. r. raninus*).

The largest specimen (FM no. 70328) differs from all others in that the pale markings on the body are only faintly indicated; the ventral fins have only their basal halves dark, the whole distal halves hyaline, and all other fins have also broader hyaline edges than the smaller specimens; the adipose fin has a small white tip. I presume that the faintness of the body-markings is a matter of size, and that the difference in fin-pattern is due to individual variation as it is unlikely that fishes from the Rio Baudo (Pizarro) would differ from those of the R. San Juan, which is the next important river down the coast.

Distribution. — Rivers of the Pacific drainage of the Andes in Colombia (R. Baudo, R. San Juan and R. Patia basins) and Ecuador (R. Durango); the last-mentioned locality according to Regan (1913); I have failed to find it on a map.

***Pseudopimelodus fowleri* (Haseman)**

Cephalosilurus fowleri Haseman, 1911, Ann. Carnegie Mus., 7: 317, fig. 1, pl. XLVI — Cidade da Barra, Bahia, Rio São Francisco.

Cephalosilurus fowleri; Fisher, 1917, Ann. Carnegie Mus., 11: 411 (Penedo); Gosline, 1945, Bol. Mus. Nac. Rio de Janeiro, Zool., 33: 27 (São Francisco); Fowler, 1951, Arq. Zool. S. Paulo, 6: 519 fig. 538 (Rio São Francisco).

Lophosilurus fowleri; A. de Miranda Ribeiro, 1918, Rev. Mus. Paul., 10: 729 (Rio S. Francisco, Bahia).

Material. — One specimen, 20 March 1908, Penedo (J. D. Haseman, FM no. 58006), standard length 152 mm.

Diagnostic characters. — Head broad and depressed, somewhat angular at the gape; pectoral fins with six rays; maxillary barbels short, not quite reaching to pectoral base; the dorsal fin when depressed covers only three-fifths of its distance from the adipose fin; caudal fin rounded, not long, probably pale, mottled with dark spots; occipital process rather narrow, with a small fork at its end, where it meets the slender tip of the predorsal plate; gill-rakers moderately developed, fairly numerous but short.

Description. — D I.6, A II (iii.8), P I.6, V 6 (i.5), C with 15 divided rays; gill-rakers 1 + 1 + 11, of which only the first three developed, the last ten quite rudimentary; branchiostegals 9; teeth in both jaws in a broad band, the band of premaxillary teeth with distinct backward projections laterally; eyes small, their greatest diameter 3.5 times in snout, 4 times on bony interorbital, and 13.5 times in head; the maxillary barbels reach about 0.9 of the distance from their origin to the pectoral base; the outer pair of mental barbels is about three-fifths of their length, and the inner pair is no more than half the length of the outer pair.

Head 3.2 times in standard length, greatest width of body 3.35 times in standard length, greatest depth of body 5.0 times in standard length, predorsal length 2.5 times in standard length.

Dorsal fin with one spine and six divided rays, the spine short, equal to snout and half an eye's diameter, and 4.8 times in predorsal length, without serrations; soft rays comparatively short, when pressed down they cover little more (about 0.55) than half the distance to the adipose fin. Anal fin with three simple and eight divided rays, its longest rays half the length of the head. Pectorals with one spine and six rays; the spine is strong, flat, clearly longer than snout with eye, and 2.9 times in predorsal length; along the anterior edge is a series of 17 hooks, along its posterior edge a series of

14 larger ones; the spine has a filament of about half its length; the first ray equals in length the spine with filament, the second ray is almost as long as the first, and the last one is a little over half the length of the first ray. Ventrals rounded, with six rays of which the first one is simple, the others divided, well-developed, but reaching no more than two-thirds of the distance to the anal origin, and the longest rays about twice in head. Caudal fin rounded, not very long, with fifteen divided rays, supported by a number of simple, more or less rudimentary rays, the longest rays equal to head without snout, and 4.5 times in standard length. Adipose fin of moderate size, implanted opposite the anal fin; its height about one-third of the depth of the caudal peduncle, its base 7 times in the standard length.

Colours. The specimen examined is much decolourized, but it looks as if the head has been pale with small dark spots, whereas most of the body is pigmented, the fins are pale, distally darker, and the caudal fin has a number of dark spots. Haseman (1911: 318) described his specimen, collected four years previously, as: "above and below brown; many black spots on the sides, back, and fins".

Distribution. — On present evidence confined to the lower course of the Rio São Francisco, where known from two specimens; the type from Barra, and the specimen from Penedo examined by me.

***Pseudopimelodus albomarginatus* Eigenmann (figs. 37c, 38c, pl. 10)**

Pseudopimelodus albomarginatus Eigenmann, 1912, Mem. Carnegie Mus., 5: 153, pl. XI fig. 1 — Tukeit, British Guiana.

Pseudopimelodus albomarginatus Eigenmann, 1910, Rep. Princeton Univ. Exp. Patagonia, 3: 384 — nomen nudum (Potaro River, British Guiana).

Pseudopimelodus albomarginatus; Gosline, 1941, Stanford Ichth. Bull., 2: 85 (British Guiana); Schultz, 1944, Proc. U.S. Nat. Mus., 94: 198, 202 (British Guiana); Gosline, 1945, Bol. Mus. Nac. Rio de Janeiro, Zool., 33: 28 (Guiana Inglesa); Gomes, 1946, Occ. Pap. Michigan Mus., 494: 6 (Tukeit, Lower Potaro River, British Guiana); van der Stigchel, 1946, South American Nematognathi: 45 (Tukeit, Lower Potaro); van der Stigchel, 1947, Zool. Meded., 27: 45 (Tukeit, Lower Potaro); Grey, 1947, Fieldiana, Zool., 32: 179 (British Guiana: Tukeit, lower Potaro River).

Material. — One specimen, 1908, Waratuk (C. H. Eigenmann, FM no. 53572), standard length 70 mm. Eight specimens, 1908, Tukeit (C. H. Eigenmann, FM no. 53222), standard length 37, 39, 46, 60 mm, and four too small and shrivelled for correct measuring. One specimen, 1908, Tukeit (C. H. Eigenmann, FM no. 7379), standard length 29 mm. One specimen, 1908, Tukeit (C. H. Eigenmann, ZMA no. 104667), standard length 28 mm. One specimen, 1908, Tukeit (C. H. Eigenmann, ZMB no. 17913), standard length 35 mm. One specimen, 1908, Tukeit (C. H. Eigenmann, SU no. 21931), standard length 30 mm. All these specimens are paratypes. Two specimens, November 1959, Potaro River (R. Liley, in Mrs. McConnell's collection, one of these is now RMNH no. 26745), standard length 83, 85 mm.

Diagnostic characters. — Head very broad and depressed, angular at the

gape, above rather dark, somewhat mottled; pectoral fins with six rays; maxillary barbels short, shorter than head and usually not even reaching pectoral base; the dorsal fin when depressed does not quite reach to the adipose fin; caudal fin long, rounded-lanceolate, black, with a narrow white margin and a conspicuous irregularly shaped white area near its base; occipital process and predorsal plate strongly connected; gill-rakers well-developed, slender.

Description. — D I.6, A 10-11 (ii or iii.7 or 8), P I.6, V 6 (i.5), C 11-13 (branched rays only; counted from five specimens only, all others had the caudal fin damaged or missing), gill-rakers 2 or 3 + 1 + 7, well-developed and fairly slender; branchiostegals 9 or 10; teeth in both jaws in a broad band, the band of premaxillary teeth with distinct projections laterally (fig. 37c); eyes very small, their greatest diameter 3-4 times in snout, 3-4.5 times in bony interorbital, and 11-13.5 times in head; the maxillary barbels usually do not reach to the pectoral base, the outer pair of mental barbels is about two-thirds of their length, and the inner pair is one half to two-thirds the length of the outer pair.

Head 2.5-2.7 times in standard length, greatest width of body 3.0-3.2 times in standard length, greatest depth of body 5.0-5.5 (one specimen 6.5) in standard length, predorsal length 2.2-2.35 times in standard length.

Dorsal fin with one spine and six divided rays, the spine moderately strong and comparatively short, equal to snout, and 4.1-4.8 times in predorsal length, without serrations; soft rays long, when pressed down the rays cover about four-fifths of the distance to the adipose fin. Anal fin with two or three simple and seven or eight (once nine) divided rays, its longest rays a little less than half the length of the head. Pectorals with one spine and six rays; the spine is very strong, flat, a little longer than snout with eye, with on both sides a series of some 8-14 hooks (the number appears to increase with size: in the smallest specimen there are no more than 8 on each side, in the largest specimen 14), those on the posterior margin antrorse, those on the anterior margin basally antrorse, distally retrorse; the first three rays are about one-fifth longer than the spine, the fourth equals it in length and the fifth and sixth rays are much shorter. Ventrals rounded, with six rays, of which the first one is simple, the others divided, relatively long, reaching to the origin of the anal fin and the longest rays equal to the distance from the gape to the pectoral spine. Caudal fin long, lanceolate or lanceolate-rounded, with 11-13 divided rays and several more or less rudimentary simple rays, the longest rays equal to head without snout, or head without half the length of the snout. Adipose fin of moderate size, implanted opposite the anal fin; its height one-third to two-fifths of the depth of the caudal peduncle.

Colours. A rather complicated pattern of blackish brown on a light brown background; the largest dark areas are around and below the dorsal fin, dorsally connected with a large patch below the adipose fin, and on the caudal base, narrowly connected on each side along the lateral line with the preceding patch. Upper surface of head slightly mottled, flanks and belly dotted with brown. Dorsal fin black with a white window across the last five rays and a narrow white margin; anal fin with a white base and white margin; pectoral fins with a white base and small white tips; ventrals black with a white base and a broad white margin; adipose fin light brown, with in the middle an area of blackish brown; caudal fin blackish, with an irregular white area near its base, largest on the median rays, and a comparatively broad white margin.

Distribution. — Hitherto only known from the Potaro River, a tributary of the Essequibo. It is surprising, and may be significant, that the species is not known from the Rupununi, another tributary of the Essequibo, which is at least as well-known ichthyologically as the Potaro.

Discussion. — There has been doubt about the validity of *P. albomarginatus*; Schultz (1944a: 198) thought that it was probably the same as *P. villosus*; he also stated that the shape of the caudal fin, in which these two species differ, is not a reliable character as it changes with growth. Fernandez & Martin (1953) went even farther and decided that *P. villosus butcheri* (= *P. raninus acanthochiroides* of this revision) is a synonym of *P. albomarginatus*; they made no mention of *P. villosus*.

The examination of several paratypes, and of two more recent specimens in an excellent condition of preservation, has enabled me to confirm that *P. albomarginatus* is a valid species, probably more closely related to *P. nigricauda* and *P. fowleri* than to *P. raninus*.

***Pseudopimelodus nigricauda* species nova (figs. 37d, 38d, pls. 11, 12)**

Material. — Thirteen specimens as follows. One specimen, 23 September 1965, Zandvallen, Kabalebo (Mees, RMNH no. 26736), standard length 29 mm. One specimen, 27 November 1965, Tapanahoni, about 2 km upstream of its confluence with the Paloemeu (Mees, RMNH no. 26737), standard length 49 mm. Two specimens, same date and locality (Mees, RMNH no. 26738), standard length 171 and 189 mm. One specimen, 23 January 1966, Sipaliwini (Mees, RMNH no. 26739), standard length 212 mm, total length 271 mm, holotype of the species. One specimen, same data (Mees, RMNH no. 26740), standard length 61 mm. One specimen, 4 February 1966, Sipaliwini (Mees, RMNH no. 26741), standard length 77 mm. One specimen, 6 February 1966, Sipaliwini (Mees, RMNH no. 26742), standard length 65 mm. Two specimens, 9 February 1966, Sipaliwini (Mees RMNH no. 26743), standard length 70 and 106 mm. One specimen, 30 January 1967, Gran Mau, a small tributary of the Gran Rio about 13 km south of Djoemoe (H. Nijssen, ZMA no. 105948), standard length 128 mm. One specimen, 21 March 1967, Suriname Rivier, ca. 7½ km north of Botopassie (H. Nijssen, ZMA no. 105949), standard length 143 mm. One specimen, 21 April 1967, Maka Kreek, a

tributary of the Lawa Rivier, about 10 km south of Stoelmanseiland (H. Nijssen, ZMA no. 105951), standard length 104 mm.

Diagnostic characters. — Head very broad and depressed, angular at the gape, above light brownish with a complicated pattern of black markings; pectoral fins with six rays; maxillary barbels reaching to the base of the pectoral fins or four-fifths of that distance; the dorsal fin when depressed reaches to the adipose fin; caudal fin long, lanceolate, black with a narrow white margin; occipital process and dorsal plate narrowly separated, the occipital process forked at its end, where it is met by the slender tip of the predorsal plate; gill-rakers moderately developed, fairly numerous, but short, almost rudimentary.

Description. — D I.6 or I. 7, A 9-11 (ii to iv.7 or 8), P I.6, V i.5, C with 14 to 16 divided rays; gill-rakers 1 or 2 + 1 + 9 to 13, with usually no more than three on the hypobranchial developed, the others more or less rudimentary; branchiostegels 9 or 10; teeth in both jaws in a broad band, the band of premaxillary teeth with distinct backward projections laterally (fig. 37d); eyes small, their greatest diameter 2-2.5 times in snout, 3-4 times in bony interorbital, and 9-10 times in head; the maxillary barbels reach from 4/5 to 1 the distance from their implantation to the pectoral base; the outer pair of mental barbels is about three-quarters of their length, and the inner pair is one half to two-thirds the length of the outer pair.

Head 2.8-3.0 times in standard length, greatest width of body 2.7-3.3 times in standard length, greatest depth of body 4.2-5.4 times in standard length, predorsal length 2.3-2.5 times in standard length.

Dorsal fin with one spine and six divided rays; one specimen (no. 26742) has it with one spine and seven rays; dorsal spine moderately strong and not very long, about equal to snout with eye, without serrations; soft rays long, when pressed down the rays reach, or nearly reach, to the adipose fin. Anal fin with two to four simple and seven or eight divided rays, rounded, its longest rays about half the length of the head. Pectorals with one spine and six rays; the spine is very strong, flat, varying from not much over the length of snout with eye to nearly half the length of the head, and 2.5-2.6 times in predorsal length, with on both sides a series of about a dozen strong antrorse hooks, their length about equal to the breadth of the spine; the first ray longer than the spine, the following rays successively shorter, and the last ray about two-thirds the length of the first ray. Ventrals rounded, with six rays, of which the first one is simple, the others divided, relatively long, reaching almost to the anal fin, and the longest rays equal to the distance from the gape to the pectoral fin. Caudal fin long, lanceolate or lanceolate-rounded, with 14 to 16 divided rays besides several developed simple rays and many rudi-

ments, the longest rays equal to head without snout or to head without half the length of the snout. Adipose fin moderate, implanted opposite the anal fin, and its base of the same length as that of the anal fin or backwards a fraction longer, its height about half the depth of the caudal peduncle below it.

Colour. The colours are light brown and black. Generally speaking, the posterior part of the body, behind a vertical through the dorsal spine, is black, the anterior part light brownish. The upper surface of the head shows, on the light brownish background, a complicated though fairly regular pattern of black, and farther backwards, connecting the upper edges of the gillslits is a blackish stripe, insufficiently solid to be called a bar, across the nape. On the (mainly blackish) posterior part of the body, there is a large light brown area on the flanks between D and adipose fin, which downwards extends forwards to reach the implantation of V. The caudal peduncle has a light brown or whitish saddle, that also takes in the hind border of the adipose fin. There is a pale spot on the anterior border of the adipose fin, and another one on the back just behind the last dorsal ray, which extends as a small triangular area on the dorsal fin, where it includes a section of the last two rays and their connecting membrane. The pectoral fins are spotty blackish brown distally, hyaline with smaller and indistinct greyish brown spots basally; the dorsal fin is black, except for the pale triangle just mentioned and for very small white tips to the rays; the anal fin is dark, with some faint lighter areas and a small but distinct pale spot on the last ray near its base; the ventrals are dark, distally almost black, but with many paler spots, and the middle part of the last ray whitish, this white sometimes extending as a wedge to the one of two preceding rays; the tail behind the saddle is black, with usually some very narrow and inconspicuous white tips to the longest rays; this entirely black caudal fin is an excellent character.

Habitat. — All my specimens were obtained in rivers, where they would be at least periodically exposed to a very strong current, but in the rivers they stayed in the larger pools rather than in the rapids; their shape suggests bottom-dwellers.

Distribution. — Widely distributed in Suriname, where known from the basins of the Marowijne (Tapanahoni, Maka Kreek), the Suriname Rivier, and the Corantijn (Sipaliwini, Kabalebo). This distribution makes it practically certain that the species occurs also in French Guiana, and probably in British Guiana, but presumably not as far west as the Essequibo (see Discussion).

Discussion. — Presumably *P. nigricauda* is related to *P. albomarginatus*; the two species agree in general morphology, including body-shape and development of the occipital process. On the other hand, the differences in

colour-pattern are considerable, and as in certain morphological characters (development of the gill-rakers) they differ also, I am of the opinion that *P. nigricauda* is a separate species, not a subspecies of *P. albomarginatus*. The two species may replace each other geographically; at least, I consider it unlikely that *P. nigricauda* would have been overlooked in the comparatively well-known Essequibo basin, if it did occur there.

As this species has such a wide and strongly depressed head, I have considered the possibility that it would be referable to *Lophiosilurus alexandri* Steindachner (1876b: 154, pl. XV), but judging by its original description and figure, the type of *L. alexandri* differs by its much shorter dorsal fin which when pressed down covers only a fraction of its distance from the adipose fin, the very small and low adipose fin, the relatively shorter and more rounded caudal fin which moreover has only 12 instead of 14-16 divided rays, and the different pectoral spine, with more teeth. As in the available material of *P. nigricauda* there does not appear to be much change of the listed characters with growth, and the largest specimen is not much smaller than the type of *L. alexandri*, the differences noted must be specific. Whether they are also sufficient to uphold the monotypic genus *Lophiosilurus* is a different question, which I am inclined to answer in the negative.

In general appearance *P. nigricauda* is also close to *P. fowleri*, the only species with which it agrees in shape and number of gill-rakers. As indicated in the key and in the description, its head is a little broader and larger, its fins are distinctly longer, and the colour-pattern differs, especially that of the caudal fin.

Genus **Microglanis** Eigenmann

Microglanis Eigenmann, 1912, Mem. Carnegie Mus., 5: 155 — type by original designation, *Microglanis poecilus* Eigenmann.

Diagnosis. — Very similar to *Pseudopimelodus* but can be distinguished by three characters: small size, shape of the band of teeth in the upper jaw, and reduction in the posterior part of the lateral line.

In appearance this is a minute edition of *Pseudopimelodus*: the same heavy, somewhat flattened head, the same tapering body; spines and fin-rays generally very similar in structure and in numbers; barbels reaching to beyond pectoral base, but not (or only just) reaching to a vertical through the dorsal origin. When comparing very small specimens of *Pseudopimelodus* with *Microglanis poecilus*, one would certainly not recognise the latter as generically different, but the fact remains that *Microglanis* never grows to a larger size, the maximum size found in a large series from Suriname (2 species) being a standard length of 38 mm only. The largest species of the

genus as here defined is *M. parahybae*, of which I have examined a specimen of 79 mm standard length.

The premaxillary band of teeth is laterally rounded, without backward projections, as occur more or less distinctly in all species of *Pseudopimelodus*.

The lateral line, although complete, has no distinct pores on the posterior part of the body, whereas in *Pseudopimelodus* it is developed and pore-bearing over its whole length.

Distribution. — Tropical South America from Venezuela through the Guianas and the Amazon basin to the Rio de la Plata, and west of the Andes in Ecuador.

Discussion. — Schultz (1944a) doubted the validity of the genus *Microglanis*, as he found variation in the main character (shape of patches of teeth) it was based on, and Myers (in Gomes, 1946: 8) has suggested that the species described in *Microglanis* are only young of *Pseudopimelodus*. Hoedeman (1961: 135) referred to Schultz with approval as follows: "Furthermore I must agree with Schultz (1944: 197) where he doubts the validity of the genus *Microglanis*, at least of the species *Microglanis poecilus*. An 18 mm st.l. specimen obtained in exchange from the Carnegie Museum, entered in our collection under the manuscriptname *Batrachoglanis raninus*, and which belongs to the typical series upon which *Microglanis poecilus* was established, doubtlessly is a juvenile specimen of *raninus*". In defense of Schultz it must be said that he was only concerned with the generic name *Microglanis* and never expressed doubt about the validity of the species *Microglanis poecilus*; Hoedeman must have misunderstood him. Eigenmann (1912: 155, footnote) has mentioned that a number of duplicates of *Microglanis poecilus* were labelled as *Batrachoglanis raninus*. This was a mistaken original identification, of which Hoedeman appears to have been unaware. Actually Schultz, although doubting the validity of the character, did observe a difference in dentition as in a series of *Pseudopimelodus villosus butcheri* (= *P. raninus acanthochiroides* in this revision) he found: "The premaxillary band of teeth in this series is angular in the small ones 40 to 50 mm in length, and in the larger ones this angle projects more posteriorly as described for *Pseudopimelodus*. In a small paratype of *Microglanis poecilus* the outer or lateral ends of the premaxillary band of teeth are more rounded ...".

I can confirm the characters originally given by Eigenmann; there certainly is a difference in dentition between *Microglanis* and the species of *Pseudopimelodus* as well as between these species inter se (compare fig. 37 and 40). In this connection it is worth recording that, contrary to what Schultz found in Venezuela, there does not appear to be any difference in shape of the tooth-patches between large and small specimens of the Suri-

name species. Even where the difference in size is great, for example between the largest and smallest specimens of *Pseudopimelodus nigricauda*, the tooth-patches are of identical shape. Gomes (1946: 8) found the same in several other species, including *Pseudopimelodus villosus butcheri*.

The genus *Microglanis* as defined above contains seven species: *M. parahybae*, *M. poecilus*, *M. variegatus*, *M. ater*, *M. zonatus*, *M. iheringi*, and *M. secundus*. Two species occur in Suriname.

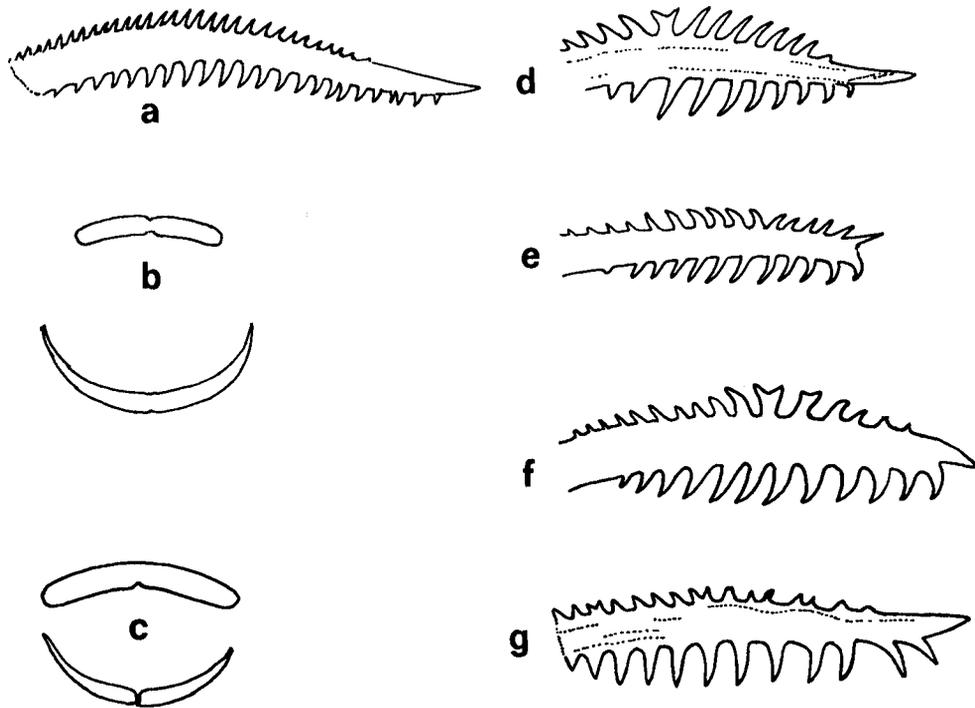


Fig. 40. Right-hand pectoral-spines and dentition of *Microglanis*. (a, b) *M. parahybae*, large specimen, spine 4 \times (all other spines 8 \times), (c, d) *M. poecilus*, (e) *M. secundus*, (f) *M. iheringi*, (g) *M. variegatus*.

***Microglanis parahybae* (Steindachner) (fig. 40a, b)**

Pseudopimelodus Parahybae Steindachner, 1880, Denkschr. Akad. Wiss. Wien, Mathem.-Naturw. Cl., 42 (1): 60 — aus dem Rio Parahyba und von Santa Cruz.

Pimelodus (Pseudopimelodus) cottoides Boulenger, 1891, Proc. Zool. Soc. Lond.: 233, pl. XXV fig. 2 — Camaquã River, Rio Grande do Sul.

Pseudopimelodus charus; Steindachner, 1876, Sitzb. Akad. Wiss. Wien, Mathem.-Naturw. Cl., 74 (1): 632 (Rio Parahyba und S. Cruz).

Pseudopimelodus parahybae; Eigenmann & Eigenmann, 1888, Proc. Calif. Acad. Sci., (2) 1: 122 (Santa Cruz); Eigenmann & Eigenmann, 1890, Occ. Pap. Calif. Acad. Sci., 1: 110 (Santa Cruz); Eigenmann & Eigenmann, 1891, Proc. U.S. Nat. Mus., 14: 27 (Rio

Parahyba to Rio Doce); A. de Miranda Ribeiro, 1911, Arch. Mus. Nac. Rio de Janeiro, 16: 253, fig. 104 (Rio Parahyba e afluentes — Santa Cruz); Fisher, 1917, Ann. Carnegie Mus., 11: 410 (Rio Ribeira; São João do Barra, Rio Parahyba; Campos, Rio Parahyba; Uruguayana).

Batrachoglanis parahybae; Eigenmann, 1910, Rep. Princeton Univ. Exp. Patagonia, 3: 383 (Rio Parahyba to Rio Doce).

Pseudopimelodus cottoides; Eigenmann, 1910, Rep. Princeton Univ. Exp. Patagonia, 3: 384 (Camaquã River, Paraguay River); Bertoni, 1914, Fauna Paraguaya: 7 (Paraguay); Pearson, 1937, Proc. Calif. Acad. Sci., (4) 23: 111 (Paraguay basin).

Microglanis parahybae; Arnold & Ahl, 1936, Fremdl. Süßwasserfische: 248-249, fig. (das südöstliche Brasilien und das dahinterliegende Paraguay und Argentinien); Gosline, 1945, Bol. Mus. Nac. Rio de Janeiro, Zool., 33: 28 (rio Paraíba); Sterba, 1959, Süßwasserfische aus aller Welt: 302, fig. 624 (Rio Parahyba, Rio Doce); Emmens & Axelrod, 1968, Catfish: 30 (Brazil); Vogt, 1970, Grzimeks Tierleben, 4: 403 (das südöstliche Brasilien bis nach Argentinien).

Microglanis cottoides; Gosline, 1945, Bol. Mus. Nac. Rio de Janeiro, Zool., 33: 28 (Rio Grande do Sul); Gomes, 1946, Occ. Pap. Mus. Michigan, 494: 15 (Rio Grande do Sul (probably Rio Camaquã); Santa Cruz, Rio de Janeiro; Lagôa dos Quadros basin, Conceição do Arroio County, Rio Grande do Sul; Rio Paraíba, Rio de Janeiro; Rio Ribeira, São Paulo; Uruguayana; Rio Grande do Sul); Fowler, 1951, Arq. Zool. S. Paulo, 6: 530 (Rio Doce, Rio de Janeiro, São Paulo, Rio Grande do Sul, Paraguay); Ringuélet, de Arámburu & Arámburu, 1964, Physis, 24: 369 (Francesca Cué, Formosa, Argentina); Ringuélet, Arámburu & de Arámburu, 1967, Los Peces Argentinos de Agua Dulce: 302 (Francesca Cué, Fsa.); Lundberg & Baskin, 1969, Amer. Mus. Novit., 2398: 6, 28 (no locality); Castello, 1971, Physis, 30: 543, 544 (Rio de la Plata).

Microglanis poecilus; (pt.) Gomes, 1946, Occ. Pap. Mus. Michigan, 494: 15 (?Amazon basin).

Material. — One specimen, ca. 1874, Santa Cruz near Rio de Janeiro (MV no. 44436), standard length 50 mm, syntype of *Pseudopimelodus Parahybae*. One specimen, ca. 1889, Camaquã R., Rio Grande do Sul (H. v. Ihering, BM no. 1889-8-24: 5), standard length 64 mm, syntype of *Pimelodus (Pseudopimelodus) cottoides*. Three specimens, ca. 1890, Rio Grande do Sul (H. v. Ihering, BM no. 1891-3-16: 36-45), standard length 26½, 28 79 mm, syntypes of *Pimelodus (Pseudopimelodus) cottoides*. Six specimens, 15 June 1908, Campos, Rio de Janeiro (J. D. Haseman, FM no. 58142), standard length 22-23 mm. Five specimens, 24 June 1908, São João da Barra, Rio de Janeiro (J. D. Haseman, FM no. 58141), standard length 22-24 mm. One specimen, July 1941, vicinity of Rio de Janeiro (T. D. White, SU no. 36949), standard length 17 mm. One specimen, undated, San Bernardino, Lagune Ipacaray, Paraguay (Fiebrig, ZMB no. 20037), standard length 37½ mm. Two specimens, undated, "Amazon (?)" (no origin, AMNH no. 14663), standard length 66, 67 mm.

Aberrant specimens. One specimen, received 1903, Pedre a molhar (ex. Steindachner, MV no. 44429), standard length 37 mm. One specimen, received 1908, Joinville (MV no. 44434), standard length 50 mm. One specimen, received 1910, Pedre a molhar (ex. Steindachner, MV no. 44431), standard length 44 mm.

Characters. — D I.6, A 12, once 13 (usually iii.9), P I.5 or I.6, V 6 (i.5), C 12-15 (branched rays), branchiostegals 9, gill-rakers 6-11 (1 to 3 + 1 + 4 to 7). Postoccipital process well-developed, ending in a V-shape, into which the anterior tip of the longer predorsal plate is fitted.

Proportions of six large specimens (37½, 50, 64, 66, 67, 79 mm in stan-

standard length) : head 3.2-3.8, greatest width of body 3.0-3.4, greatest depth of body 3.9-4.4, predorsal length 2.5-2.9 times in standard length. The small specimens (17-28 mm in standard length) are slightly more slender; head 3.3-3.5, greatest width of body 3.5-4.0, greatest depth of body 4.5-5.4, predorsal length 2.6-3.0 times in standard length. The specimens listed as aberrant are puzzling; they agree with the others in counts and in colour pattern, but have distinctly smaller heads and are far more slender; head 3.5-3.8, greatest width of body, 3.8-4.0, greatest depth of body 4.6-5.4, predorsal length 2.8-3.2 times in standard length. Note the considerable difference in body-width between these specimens and the three specimens listed first; admittedly the small specimens are in certain proportions intermediate, but that does nothing to explain the differences between the larger individuals. I have considered the possibility that the slender fishes belong to a different species, but this would make the complete agreement in counts and colour-pattern difficult to understand; the difference, therefore, remains unexplained, and requires further investigation.

Small specimens of this species are extremely similar to *M. poecilus*, but the number of anal rays is higher (12 against 10), and there are differences in colour-pattern, the most conspicuous of which is that the dark patch covering much of the adipose fin is much larger, and extends forwards to, or nearly to the dorsal fin, and often also backwards to the dark caudal base. In body-shape and structure of the pectoral spine there is little difference between the two species, in individuals of similar size. *M. parahybae*, of course, reaches a much larger size than *M. poecilus*, and these large individuals also develop a different pectoral spine with more teeth (fig. 40a). Gomes (1946) distinguished the species by width of the gape: mouth large, the gape (greatest width across opening mouth) less than 1.6 in head length, *M. poecilus*, and mouth small, the gape more than 1.7 in head length, *M. cottoides* (= *M. parahybae*). However, two syntypes (of *M. parahybae* and *M. cottoides*) have the gape 1.5 and 1.5 to 1.6 in the head, so that this character is unreliable. Probably Gomes studied slender "aberrant" individuals only.

Distribution. — South-eastern Brazil: rivers running east from the Rio Parahyba southwards, and Uruguaiana, Rio Uruguai. Argentina: a single specimen known, from Francesca Cué, Rio Pilcamayo basin, Formosa 1).

1) Recently this species was recorded as "relativamente abundante" near Buenos Ayres (Castello, 1971). Dr. Castello has been so kind to present me with two specimens which he collected personally at the Obras Sanitarias de la Nación, Buenos Ayres, 16.VI.1965 and 8.IX.1965, standard length 45, 54½ mm (RMNH no. 26705). These specimens agree in proportions and counts with the six large specimens described in the text, except that they have A 11 (iii.8), and the numbers of gill-rakers are 3 + 1 + 8 and 3 + 1 + 10 (the last two rudimentary).

Paraguay: Lagune Ipacaray. The species is almost certain to occur in Uruguay, but all records hitherto published are evidently based on misidentified specimens of *Pseudopimelodus zungaro mangurus*. From the Eigenmanns (1890) onwards, the species has also been listed as occurring in the Rio Doce, but I believe mistakenly, for nobody has ever mentioned material from that river.

Discussion. — Gomes (1946: 15) included in *M. poecilus* two specimens of uncertain provenance (? Amazon), with standard lengths of 68 and 69 mm (AMNH no. 14663). As this is almost twice the maximum standard length found by me in a material of well over 700 specimens of that species, I borrowed the specimens to check their identification. Whereas what remains of their colour pattern is not unlike *M. poecilus*, they can be distinguished at once by their entirely different pectoral spines. This spine has its bend not at about one-third of its length from base, but at about two-thirds. Moreover, instead of less than 15, there are about 30 teeth along its anterior edge, and all these teeth point outwards in the same direction, not some outwards and others inwards as in *M. poecilus*. Along the posterior edge there are about 22 larger, antrorse hooks. In all their characters these specimens agree with *M. parahybae* of similar size, to which species they are undoubtedly referable. The suggested provenance “? Amazon” is probably wrong and should be south-eastern Brazil.

Gomes (1946) used for this species the name *Pimelodus* (*Pseudopimelodus*) *cottoides* Boulenger, 1891, instead of *Pseudopimelodus parahybae* Steindachner, 1880, although the latter has priority. The legal base of the rejection of the last-mentioned name would be found in article 59 (b) of the present Code: “A species-group name that is a junior secondary homonym must be rejected by any zoologist who believes that the two species-group taxa in question are congeneric”.

The facts are as follows: there are a *Pimelodus* (*Rhamdia*) *parahybae* Steindachner, 1876, and a *Pseudopimelodus parahybae* Steindachner, 1880. Boulenger (1891) described *Pimelodus* (*Pseudopimelodus*) *cottoides*, and added: “The nearest ally of *P. cottoides* would then be *Pseudopimelodus parahybae*, Stdr. [lapsus for *parahybae*!], with which it is possibly identical. The proposal of a new name is, however, justified, even should the two species be the same, as the name *parahybae* is preoccupied in the genus *Pimelodus* for a species of the subgenus *Rhamdia* (*R. parahybae*, Stdr.)”.

Nobody before or since Boulenger has ever regarded *Pimelodus* (*Rhamdia*) *parahybae* Steindachner and *Pseudopimelodus parahybae* Steindachner as congeneric. Moreover, *Pseudopimelodus parahybae* and *Pimelodus* (*Pseudopimelodus*) *cottoides* have been treated as different species, both names having

been used and regarded as valid at least until 1945, when Gosline (1945: 28) listed them as *Microglanis parahybae* and *Microglanis cottoides*.

The synonymy of the two nominal species was accepted by Gomes (1946: 16), who gave the following comment:

"As a consequence of Boulenger's action (1891: 233) in uniting Steindachner's species, *Pimelodus (Rhamdia) parahybae* (1876) and *Pseudopimelodus parahybae* (1880) in the genus *Pimelodus*, the latter specific name becomes a homonym, and is not available even though the species was subsequently placed in *Microglanis*. Boulenger correctly indicated that the name *cottoides* was necessary even if the nominal species *parahybae* and *cottoides* should prove to be identical. It is now apparent, after the study of the specimens indicated below, that *Pseudopimelodus parahybae* Steindachner, 1880, and *Pimelodus (Pseudopimelodus) cottoides* Boulenger, 1891, are the same, and the species must be known as *Microglanis cottoides* (Boulenger)".

In my opinion, objections can be made against this conclusion, the most important one of which is that Boulenger did not propose *P. cottoides* as a nomen novum for *P. parahybae*, but only suggested that they might possibly be the same, and that in the following 55 years both names have remained in use, and have been considered to apply to different species. It was therefore not Boulenger (1891) but Gomes (1946) who definitely rejected *P. parahybae* as a homonym. But in doing so Gomes was not covered by article 59, as he did not regard *Pimelodus (Rhamdia) parahybae* and *Pseudopimelodus parahybae* as congeneric.

The case presented above clearly shows how article 59 (b) can create problems, and, as I have previously stated (Mees, 1957, stelling VI), my own opinion is that nomenclatural stability and consistency would be better served by the rule that a name, rejected as a secondary homonym, is to be restored if the condition of secondary homonymy ceases to exist (or is to be retained by those who did not accept its existence in the first place), even if the original rejection took place before 1960.

I agree with Gomes that *P. parahybae* and *P. cottoides* are synonymous; the preceding discussion was necessary to explain why I regard *P. parahybae* as a valid name, and see no need to replace it.

Specimen MV no. 44431 yielded an isopod, which was attached to the ventral surface just behind the anus. The specimen was examined by Dr. L. B. Holthuis, according to whom it is a juvenile, belonging to the Cymothoidea.

Microglanis poecilus Eigenmann (figs. 40c, d, 41, pl. 13)

Microglanis poecilus Eigenmann, 1912, Mem. Carnegie Mus., 5: 155, pl. XII fig. 2 — below Packeoo Falls, British Guiana.

Pseudopimelodus villosus; (pt.) Fisher, 1917, Ann. Carnegie Mus., 11: 140 (Santarem: the smallest specimen only).

Microglanis poecilus; Caporiacco, 1935, Monit. Zool. Ital., 46: 58 (Campo 1° Demerara); Gosline, 1941, Stanford Ichth. Bull., 2: 85 (British Guiana); Eigenmann & Allen, 1942, Fish. W. South America: 89 (no locality); Schultz, 1944, Proc. U.S. Nat. Mus., 94: 197 (no locality); Gosline, 1945, Bol. Mus. Nac. Rio de Janeiro, Zool., 33: 28 (Guiana Inglesa); (pt.) Gomes, 1946, Occ. Pap. Mus. Michigan, 494: 15 (Packeoo Falls in Essequibo River; Caño de Quiribana, Venezuela); Fowler, 1951, Arq. Zool. S. Paulo, 6: 531 (Amazonas?, Guiana, Venezuela); Boeseman, 1953, Zool. Meded., 32: 2, 3 (Djaikreek); Axelrod & Schultz, 1955, Handb. Trop. Aquarium Fish.: 347, fig. (British Guiana; Rio Apure and Rio Orinoco, and Amazon basin); Lowe, 1964, J. Linn. Soc., Zool., 45: 116, 140 (Rupununi); Mago-Leccia, 1967, Soc. Venez. Cienc. Nat. Bol., 27: 255 (Venezuela); Emmens & Axelrod, 1968, Catfish: 28 fig. (Guyana).

Material. — 714 specimens from Suriname as follows. One specimen, 8 October 1948, Djaikreek (D. C. Geijskes & P. Creutzberg, RMNH no. 19457), standard length 23 mm. 45 specimens, same data (RMNH no. 23876), standard length 16½-25 mm. 59 specimens, 17-18 February 1964, Jabocai and Witte Kreek, creeks between Kabel and Lombe (Boeseman, RMNH no. 26073), standard length 20-31 mm. Two specimens, 28 May 1964, shore of Brokopondo Meer, S.E. of Affobakka (Boeseman, RMNH no. 26074), standard length 28, 29 mm. Ten specimens, 30 July 1964, tributary of middle course of Gran Kreek (Boeseman, RMNH no. 26075), standard length 24-31 mm. Nine specimens, 7 April 1965, Para Kreek (Mees, RMNH no. 26076), standard length 24-28 mm. 16 specimens, 20 April 1965, Para Kreek (Mees, RMNH no. 26077), standard length 18-30 mm. Eight specimens, Para Kreek, 27 April 1965 (Mees, RMNH no. 26078), standard length 26-29 mm. Two specimens, 22 June 1965, Gansee, Brokopondo Meer near its shore (Mees, RMNH no. 26079), standard length 29, 30½ mm. Two specimens, 16 July 1965, creek near Kajana, Gran Rio (Mees, RMNH no. 26080), standard length 27, 29 mm. 101 specimens, 28 December 1965, Marshall Kreek (Mees, RMNH no. 26081), standard length 22-32 mm. 50 specimens, 28 December 1965, Marshall Kreek (Mees, RMNH no. 26082), standard length 20-30 mm. Five specimens, 28 December 1965, Marshall Kreek (Mees, RMNH no. 26083), standard length 23-30 mm. 118 specimens, 28 December 1965, Marshall Kreek (Mees, RMNH no. 26084), standard length 21-32 mm. One specimen, 12 March 1966, tributary of the Mamakreek near Berg-en-Dal (Mees, RMNH no. 26085), standard length 30 mm. Four specimens, 6 May 1966, Gran Kreek 50½ km S. of Affobakka (Nijssen, ZMA no. 106009), standard length 24, 24, 25½, 27 mm. Twelve specimens, 27 May 1966, Gran Kreek, 51 km S. of Affobakka (Nijssen, ZMA no. 106011), standard length 23½-31, 37 (!) mm. One specimen, 8 June 1966, Gran Kreek, 60 km S. of Affobakka (Nijssen, ZMA no. 106010), standard length 28 mm. Two specimens, 8 June 1966, Gran Kreek, 41 km S. of Affobakka (W. Vervoort, RMNH 26527), standard length 26½, 30 mm. One specimen, 9 June 1966, Gran Kreek, 58 km S. of Affobakka (Nijssen, ZMA no. 106003), standard length 30 mm. 20 specimens, 8 December 1966, Marshall Kreek (Nijssen, ZMA no. 106368), standard length 21-33 mm. 16 specimens, 14 December 1966, Carolina Kreek (Nijssen, ZMA no. 105551), standard length 22-26 mm. Three specimens, 28 January 1967, tributary of the Gran Rio, 2½ km N. of Awarradam (Nijssen, ZMA no. 106008), standard length 28, 28, 28 mm. Two specimens, 1 February 1967, tributary of Gran Rio, 3 km N. of Awarradam (Nijssen, ZMA no. 105544), standard length 29, 29 mm. 23 specimens, 27 February 1967, tributary of Kleine Saramacca, 11 km from the mouth of the latter (Nijssen, ZMA no. 105665),

standard length 24-28 mm. 26 specimens, 28 February 1967, tributary of Kleine Saracca, 13 km from the mouth of the latter (Nijssen, ZMA no. 105646), standard length 22-28½ mm. Two specimens, 18 March 1967, Awara Kreek near Botopassie (Nijssen, ZMA no. 106370), standard length 27, 28½ mm. 31 specimens, 19 March 1967, Kwati Watra Kreek near Botopassie (Nijssen, ZMA no. 106005), standard length 24-32 mm. 25 specimens, 20 March 1967, Parwapa Kreek near Botopassie (Nijssen, ZMA no. 105790), standard length 23-31 mm. Nine specimens, 21 March 1967, Jenfee Kreek, 7½ km N. of Botopassie (Nijssen, ZMA no. 105695), standard length 25-29 mm. 62 specimens, 15 April 1967, tributary of the Nickerie Rivier, 12 km S. of Stondansie (Nijssen, ZMA no. 105830), standard length 20½-31½ mm. Five specimens, 17 May 1967, headwaters of Coppename Rivier, 3°48'N., 56°57'W. (Nijssen, ZMA no. 106006), standard length 27, 27½, 29, 30, 31½ mm. 32 specimens, 18 May 1967, tributary of Coppename, 3°52'N., 56°55'W. (Nijssen, ZMA no. 106007), standard length 24-32 mm. Nine specimens, 10 August 1968, creek near aerodrome, Käysergebergte (M. S. Hoogmoed, RMNH no. 26528), standard length 17-23 mm.

Extra-limital material. One specimen, 15-19 December 1909, Santarem, Brazil (J. D. Haseman, FM no. 58140), standard length 22½ mm. Six specimens, May 1925, Caño de Quiribana into Rio Orinoco, some 24 km north of mouth of Rio Apuré, Venezuela (C. Ternetz, SU no. 40190), standard length 22½-28 mm. One specimen, same data (SU no. 58577), standard length 21 mm. 15 specimens, same locality, date and collector not given but presumably the same as above (SU no. 40189), standard length 20-25 mm. Two specimens, 17 September 1957, Morebay pond Creek, Rupununi, British Guiana (R. H. McConnell, BM no. 1971.7.29: 31-32), standard length 15, 16 mm. One specimen, 24 September 1957, Karanambo Creek, Rupununi (R. H. McConnell, BM no. 9171.7.29: 33), standard length 18 mm. 16 specimens, 4 May 1961, Semuni tacubas, Rupununi (R. H. McConnell, BM no. 1971.7.29: 34-49), standard length 17-24 mm.

Characters. — D I.5 or I.6, A 10 (usually iii.7), P I.5, V 6 (i.5), C 10-13 (divided rays), and several shorter and rudimentary simple rays, branchiostegals 9, gill-rakers 1 or 2 + 1 + 3 to 5. Pectoral spine (fig. 40d) with a sharp point and usually an Y-shaped tooth along its anterior edge, as described under the next species; caudal fin somewhat variable, usually scalloped with rounded (or at least not very sharp) lobes, the upper one the larger.

Colours. Dark earth-brown markings on a light brown background. The colour pattern, notwithstanding some slight individual variation, is extremely characteristic, as indicated on the plate. The pale band across the nape is irregular, running zig-zag, and in a few specimens it is actually interrupted, the dark areas on head and predorsal region being in contact across it. The predorsal-dorsal dark area is of a peculiar four-cornered shape as shown excellently by Eigenmann (1912: pl. XII fig. 2). The dark band across the caudal base is always more or less triangular in shape, with its apex directed forwards; a rudimentary dark band from the apex to the posterior part of the adipose fin is sometimes present. The dorsal as well the caudal fin have a dark cross-bar. The dark markings of the body are enhanced by the fact that just around them the background is paler than elsewhere on the body, almost white instead of light brown.

The coloured figure published by Axelrod & Schultz (1955) and Emmens



Fig. 41. The distribution of *Microglanis poecilus*. 1, Caño de Quiribana. 2, Packeco Falls. 3, Rupununi. 4, Stondansie, Nickerie Rivier. 5, headwaters of Coppename. 6, Kaysergebte. 7, Kleine Saramacca. 8, Suriname Rivier basin (many localities throughout the shaded area). 9, Djaikreek. 10, Santarem.

& Axelrod (1968) is so poor and incorrect that only because no other fish which resembles it closer is known from British Guiana, I accept it as representing *M. poecilus*.

Habitat. — A locally numerous inhabitant of medium-sized forest creeks with running water, in all parts of Suriname. A bottom dweller, mainly found in places where the bottom is covered with decaying leaves.

Distribution (fig. 41). — Known from Suriname, British Guiana, Venezuela and Brazil. In Suriname widely distributed (see map and list of material), and known from all major river systems. In British Guiana known from the Essequibo basin (Packeoo Falls; Rupununi). In Venezuela only known from Caño de Quiribana, Orinoco. In Brazil there is a single record from Santarem.

***Microglanis variegatus* Eigenmann & Henn (fig. 40g)**

Microglanis variegatus Eigenmann & Henn, 1914, in Eigenmann, Henn & Wilson, Indiana Univ. Stud., 19: 14 — forest pool near Vinces, Ecuador.

Microglanis variegatus; Eigenmann, 1922, Mem. Carnegie Mus., 9: 33, pl. II fig. 3, 4 (forest pool near Vinces, Ecuador); Gosline, 1941, Stanford Ichth. Bull., 2: 85 (Vinces, north of Guayaquil, Ecuador); Gosline, 1945, Bol. Mus. Nac. Rio de Janeiro, Zool., 33: 28 (oeste do Equador); Gomes, 1946, Occ. Pap. Michigan Mus., 494: 8, 9 (forest pool near Vinces, Provincia Rios, Ecuador); Ovchynnyk, 1968, Zool. Anz., 181: 253 (Pool near Rio Vinces, Prov. Los Rios).

Material. — Five specimens, December 1951, near the mouth of the Rio Cupa, a tributary of the Rio Blanco, near its junction with the Guailabanba, Rio Esmeralda basin, at 0°26'N., 79°26'W., Ecuador (Pablo Mena, SU no. 62433), standard length 23, 28, 34, 37, 46 mm.

Characters. — D I.6 (once I.5), A 11-12, P I.5 or I.6, V 6 (i.5), C 13-14 (branched rays), branchiostegals 8-9, gill-rakers 6-7 (1 or 2 + 1 + 4 or 5). A normal representative of the genus, characterized by number of anal rays, shape of pectoral spine, development of occipital process, shape of caudal fin, and not in the least place by colour.

Pectoral spine ending in a strong point, along its anterior border a series of small teeth, along its posterior border a series of curved, much larger ones; as in other members of the genus, the number of teeth increases with growth, for the smallest specimen has anterior and posterior borders of its spines with 8/6 and 7/6 teeth, the largest with 16/11 and 16/11 teeth; there is no Y-shaped tooth (fig. 40g).

The band of maxillary teeth is laterally almost square, not so clearly rounded as in other members of the genus. There is a distinct gap between occipital process and predorsal plate. The lateral line is developed on the anterior part of the body only, to above the implantation of the ventrals. The caudal fin is rounded-truncate (as illustrated by Eigenmann).

Colours. The specimens studied were (after 19 years of preservation in alcohol), more or less even brown, the upper surface of the head and the predorsal area of the body slightly darker; some specimens show a faint paler band across the nape, reaching from pectoral to pectoral, and there is an elongate pale dot before and on the origin of the adipose fin. All fins pale, lightly pigmented with brown, and without markings except for the caudal fin which shows somewhat mottled, and has a darker brown base. Unless the specimens have become strongly decolourized (and they did not give that impression), by the absence of distinct contrasting markings on body and fins, this is the dullest member of the genus.

Distribution. — Ecuador west of the Andes, where known from the type-locality, and from the locality of the sample here listed.

Discussion. — Eigenmann's (1922: pl. II fig. 4) figure suggests a fish with a very blunt head and a heavy lower jaw, but this is only seemingly so, for the specimen has evidently not been photographed in lateral view, but slightly from below.

Gomes (1946) did not describe this species but in his key gave two characters to separate it from all other species: "Lower jaw projecting; head very wide, broader than long", against: "Jaws subequal; head longer than broad". My material proves that neither of these characters is valid: the lower jaw of *M. variegatus* is scarcely protruding, exactly as in its congeners, and the head is not broader than long, but varies from distinctly longer than broad to about as broad as long, just as in *M. poecilus* and *M. secundus*.

In "broad" specimens of *M. parahybae* (some of which were examined by Gomes) and in *M. ater*, on the other hand, the heads are wider than long, see descriptions of these species.

Microglanis ater Ahl

Microglanis ater Ahl, 1936, Zool. Anz., 116: 109 — Mittelbrasilien.

Microglanis ater; Arnold & Ahl, 1936, Fremdl. Süßwasserfische: 248, fig. (Mittel- und Südbrasilien); Gosline, 1941, Stanford Ichth. Bull., 2: 85 (Mittelbrasilien); Gosline, 1945, Bol. Mus. Nac. Rio de Janeiro, Zool., 33: 29 (Mittelbrasilien); Gomes, 1946, Occ. Pap. Michigan Mus., 494: 9, 16 (Middle Brazil); Fowler, 1951, Arq. Zool. S. Paulo, 6: 530 (Brasil central); Sterba, 1959, Süßwasserfische aus aller Welt: 302, fig. 623 (Mittel- und Südbrasilien).

Material. — One specimen, undated, Mittelbrasilien (J. P. Arnold, ZMB no. 20932), standard length 66 mm, holotype of the species.

Characters. — D I.6, A 15 (iv.11), P I.6, V 6 (i.5), C 13 (branched rays only), branchiostegals 9, gill-rakers 2 + 1 + 7. A large species, easily distinguished from its congeners by the higher number of anal rays, and dark colour.

Head 3.6, greatest width of body 3.35, greatest depth of body 4.0, predorsal length 2.9 times in standard length. Eyes 3 times in snout, 9 times in head, ca. 3.5 times in the whole interorbital; maxillary barbels not reaching to the pectoral base, outer mental barbels of almost the same length, inner pair about two-thirds of the length of the outer pair, postoccipital process well-developed, ending in a V-shape, into which the anterior tip of the longer predorsal plate is fitted; dorsal spine 2.4 times in predorsal length, pectoral spine 1.6 times in predorsal length.

Colour of preserved specimen. Blackish brown; under surface from chin to anus white; a faint paler band across the nape; a slightly paler area on the flanks between the end of the dorsal fin and the anal fin; a pale dot at the origin of the adipose fin; fins also entirely dark, except for a small white patch on the last three rays of the dorsal fin, a large, ill-defined white area covering the basal half of the caudal fin, and a narrow white edge to the caudal fin. In life the ground-colour would have been black, as it still was when Ahl (1936) described the specimen.

Distribution. — Supposedly central Brazil, exact localities unknown.

Discussion. — The description made me suspect that this fish belonged in the relationship of *Pseudopimelodus raninus*, to which species it shows superficially a great resemblance, but its dentition shows it to be a true *Microglanis*.

***Microglanis zonatus* Eigenmann & Allen**

Microglanis zonatus Eigenmann & Allen, 1942, Fish. W. South America: 89, pl. III fig. 1 and 2 — Rio Morona (?).

Microglanis zonatus; Gosline, 1945, Bol. Mus. Nac. Rio de Janeiro, Zool., 33: 29 (Amazonas peruano); Fowler, 1945, Los Peces del Peru: 47 (Perú: Río Morona?); Gomes, 1946, Occ. Pap. Michigan Mus., 494: 9, 15 (? Río Morona, Peru); Fowler, 1951, Arq. Zool. S. Paulo, 6: 531 (Alto Amazonas, Peru).

Material. — None.

Characters. — Very similar to *M. poecilus*, which it closely resembles in colour pattern; anterior border of pectoral spines either with all teeth antrorse, or only the ultimate one retrorse; no Y-shaped tooth; caudal fin rounded if the published figure represents the specimen correctly.

Distribution. — Eastern Peru, Amazon basin, supposed to be from the Rio Morona, but this is uncertain.

Discussion. — As long as this species remains known from but a single specimen, of vague provenance, little can be said of its status, except that description and figure suggest something very close to *M. poecilus*. Besides in the rounded caudal fin, the figure of *M. zonatus* differs in the longer distance between ventral and anal fin. Possibly *M. zonatus* is no more than a subspecies of *M. poecilus*.

Microglanis iheringi Gomes (fig. 40f)

Microglanis iheringi Gomes, 1946, Occ. Pap. Mus. Michigan, 494: 9, pl. I — Río Turmero, near Turmero, Aragua, Venezuela.

Microglanis iheringi; Gray, 1947, Fieldiana, Zool., 32: 167 (Venezuela: Turmero River (sic!)); Luengo, 1963, Acta Biol. Venez., 3: 321, 331 (Río Turmero, cerca de Turmero; Carabobo, Venezuela); Mago-Leccia, 1967, Soc. Venez. Cienc. Nat. Bol., 27: 255 (Venezuela); Lundberg & Baskin, 1969, Amer. Mus. Novit., 2398: 6, 28 (no locality).

Material. — One specimen, 13 February 1938, 6 km S.W. of Calabogo, tributary of the Río Guarico (F. F. Bond, SU no. 47731), standard length 40 mm.

Characters. — D I.5 1/2, A 12 (v.7), P I.5 1/2, V 6 (i.5), C i.14.i and several shorter and rudimentary simple rays, branchiostegals 9, gill-rakers 2 + 1 + 4. Similar in general appearance to *M. poecilus* and *M. secundus*, but differs in colour-pattern, structure of the pectoral spine, development of the lateral line, and larger size.

The pectoral spine is close to that of *M. secundus*, and different from that of *M. poecilus*, in that the antrorse teeth on the posterior edge are large and well-developed right to the tip; from *M. secundus* it differs in that teeth along the anterior edge decrease in size and finally cease distally, and that there is a more definite tip to the spine, and also probably in the presence of an Y-shaped tooth on the anterior border of the spine, such as occurs but rarely in *M. secundus*. There is presumably some individual variation in structure of the spine, as indicated by Gomes (1946). Such variation exists also in the spines of *M. poecilus* and *M. secundus*, without affecting their basic differences.

The lateral line is well-developed, tubular with pores, to below the adipose fin; in both *M. poecilus* and *M. secundus* the lateral line is well-developed and tubular to below the dorsal fin only, the posterior part being somewhat rudimentary, without tubes, although provided with some small pores.

Recorded standard length 26-52 mm (Gomes, 1946). The maximum standard length I found in large series of the other two species is 38 mm.

Colours. In colour and colour-pattern generally similar to *M. poecilus* and *M. secundus*, but can be distinguished at a glance from these species by the mainly dark dorsal fin, which is dark brown, with the tip hyaline, slightly mottled with brown, and with a large more or less triangular hyaline patch based on the last ray, and with its apex reaching to the second ray; caudal fin with a broad dark brown cross-band (*M. poecilus* has a narrow and often incomplete cross-band; *M. secundus* lacks it altogether); the area of dark brown colour on the caudal peduncle is more or less square, as in *M. secundus*, not triangular as in *M. poecilus*.

Distribution. — Gomes (1946) recorded material from the Río Turmero, near Turmero, Aragua, Venezuela, and from the adjacent state of Carabobo,

Venezuela, without exact locality, and also one specimen from Colombia, without locality. The last-mentioned specimen is geographically of little use, except that it indicates a wide distribution. The material examined by Gomes, as far as I can judge, has been taken from rivers flowing directly north into the Caribbean, and in the Lago de Valencia. The specimen examined by me extends the range of the species to the Orinoco basin where, at least potentially, it co-exists with *M. poecilus*. This extension of range is not unexpected as until about two centuries ago, when its level was 16 m higher than at present, the Lago de Valencia, of which the Río Turmero is an affluent, drained to the Orinoco; for a description and an excellent map of the Lago de Valencia, see Luengo (1963).

Discussion. — Although the original description is quite comprehensive, the species has apparently not always been recognised in later years (the specimen examined by me was received under the name *M. poecilus*), and for that reason I have considered it advisable to give some additional notes.

***Microglanis secundus* species nova (fig. 40e, pl. 14)**

Material. — 104 specimens from Suriname as follows. Three specimens, 28 December 1963, Kwambaolo Kreek, a tributary of the Sara Kreek above Dam (Boeseman, RMNH no. 26529), standard length 22, 25, 28 mm. One specimen, 6 March 1964, rapids in the Gran Rio, 1-2 km above its confluence with the Pikien Rio (Boeseman, RMNH no. 26523), standard length 29 mm. One specimen, 27 November 1965, Tapanahoni, about 2 km upstream of its confluence with the Paloemeu (Mees, RMNH no. 26524), standard length 26½ mm. One specimen, 23 January 1966, Sipaliwini (Mees, RMNH no. 26525), standard length 35 mm, holotype of the species. Two specimens, same data (Mees, RMNH no. 26526), standard length 27, 34 mm. One specimen, 12 October 1966, Sara Kreek, 31 km S. from Dam (Nijssen, ZMA no. 106369), standard length 21 mm, 17 specimens, 14 October 1966, Sara Kreek, 27 km S. from Dam (Nijssen, ZMA no. 105545), standard length 18-38 mm. 20 specimens, 20 October 1966, Gran Kreek, 63 km S. of Affobakka (Nijssen, ZMA no. 106002), standard length 15½-34 mm. Eleven specimens, 27 February 1967, tributary of Kleine Saramacca, 11 km E.S.E. from the mouth of the latter (Nijssen, ZMA no. 106247), standard length 22-35 mm. Five specimens, tributary of Kleine Saramacca, 13 km from the mouth of the latter (Nijssen, ZMA no. 106245), standard length 25, 26, 26, 27, 36½ mm. Six specimens, 20 March 1967, Parwapa Kreek near Botopassie (Nijssen, ZMA no. 106244), standard length 26, 27, 27, 28, 29, 30 mm. One specimen, 21 March 1967, Jenjee Kreek, 7½ km N. of Botopassie (Nijssen, ZMA no. 106243), standard length 33 mm. Two specimens, 5 April 1967, tributary of Nickerie Rivier, 12 km W.S.W. from Stondansie (Nijssen, ZMA no. 106242), standard length 27, 27½ mm. 32 specimens, 17 May 1967, Coppename Rivier at 03°49'N., 56°57'W. (Nijssen, ZMA no. 106246), standard length 23-37 mm. One specimen, same data (Nijssen, ZMA no. 106211), standard length 30 mm.

Material from British Guiana. One specimen, 3 October 1957, Manari stop-off, Rupununi District, Amazon drainage (R. H. McConnell, BM no. 1971.7.29: 57), standard length 21 mm. One specimen, November 1958, Karanambo, Rupununi River, Essequibo drainage (R. H. McConnell, BM no. 1971.7.29: 52), standard length 26½ mm. One specimen, 22 April 1961, Wichabai Crossing Pool, Rupununi River (R. H. McConnell, BM no. 1971.7.29: 53), standard length 22 mm. Two specimens, 24 April 1961, Rupununi

River and Arakwai Creek (R. H. McConnell, BM no. 1971.7.29: 50-51), standard length 32½, 34 mm. Three specimens, 4 May 1961, Semuni tabucas, Rupununi (R. H. McConnell, BM no. 1971.7.29: 54-56), standard length 19, 20½, 21 mm.

Characters. — D I.5 or I.6, A 8-10, P I.6, V 6 (i.5), C 12-15 (divided rays), and several shorter and rudimentary simple rays, branchiostegals 9, gill-rakers 1 + 1 + 3 or 4. Similar in general appearance to *Microglanis poecilus* but differs in colour pattern and in shape and structure of the pectoral spine; size apparently slightly larger; caudal fin of a different shape, more distinctly forked, with the lobes of roughly equal size; one ray more in the pectoral fin.

The pectoral spine is quite different from that of *M. poecilus*. In both species these spines are somewhat variable, but in *M. poecilus* the bend in the spine, where the anterior row of teeth changes direction, is usually marked by an Y-shaped tooth; moreover towards the tip of the spine, both anterior and posterior teeth become smaller, and the spine ends in a strong point; in *M. secundus*, on the other hand, the bend of the spine where the anterior row of teeth changes direction is but rarely marked by an Y-shaped tooth (3 out of 94 specimens, and in one of these on one side only), either the change of direction is abrupt, or there is a simple tooth standing about straight between the two series; moreover, towards the tip the teeth do not become smaller, with the result that the tip of the spine does not consist of a point, but of two teeth, one pointing outwards, one pointing backwards, and the actual tip, implanted between these teeth, is soft, not spiny. Notwithstanding a certain amount of individual variation, the differences in shape of the spine, especially near its tip, are constant in the material examined, they are illustrated in fig. 40.

Size of the material examined 18-38 mm standard length. Excluding a single "giant", the maximum standard length of 756 specimens of *M. poecilus* is 33 mm.

Colours. The colour pattern of dark earth brown and light brown is very similar to that of *M. poecilus*. The most conspicuous colour differences are: the pale band across the nape is straighter, the projections forwards and backwards which give it such an irregular appearance in *M. poecilus* are greatly reduced; the saddle on the posterior part of the back is more extensive; the dark bar across the caudal base is increased in size, covering a square instead of being triangular, and dorsally it encloses a small but conspicuous pale spot; there is no dark cross-bar on the caudal fin.

Habitat. — The majority of specimens was taken in the larger creeks, some in rivers. There appears to be very little, if any, habitat-difference from *M. poecilus* as Nijssen obtained mixed samples of the two species at several

places (creeks near Botopassie, Kleine Saramacca, Coppename). However, the general pattern of distribution appears to be more inland than that of *M. poecilus*; the last-mentioned species is plentiful in creeks in the northern savanna belt, where *M. secundus* has not been found.

Distribution. — Widely distributed in Suriname, where known from the basins of the Marowijne (Tapanahoni), Suriname Rivier, Saramacca, Coppename, Nickerie Rivier, and Corantijn (Sipaliwini). Also Rupununi River, British Guiana. For details see above under habitat.

Discussion. — Because the two species are likely to be found together, and to be confused, the preceding description was based on a comparison with *M. poecilus*. Of other members of the genus, *M. zonatus* is also close, but differs by having a slightly different colour pattern, rounded caudal fin, and having the teeth on the anterior edge of the pectoral spine all, or practically all, antrorse. Differences from *M. iheringi* are given in the description of that species.

LIST OF AUCHENIPTERIDAE AND PIMELODIDAE KNOWN TO OCCUR
IN SURINAME

Auchenipteridae

- Auchenipterus nuchalis* (Spix)
Pseudauchenipterus nodosus (Bloch)
Parauchenipterus galeatus (Linnaeus)
Tatia intermedia (Steindachner)
Tatia creutzbergi (Boeseman)
Tatia brunnea n. sp.
Tatia concolor n. sp.
Tatia punctata n. sp.
Glanidium leopardus (Hoedeman)

Pimelodidae

- Hemisorubim platyrhynchos* (Valenciennes)
Brachyplatystoma filamentosum (Lichtenstein)
Brachyplatystoma vaillantii (Valenciennes)
Pseudoplatystoma fasciatum (Linnaeus)
Pimelodus ornatus Kner
Pimelodus blochii Valenciennes
Pimelodus albofasciatus n. sp.
Pimelodella cristata (Müller & Troschel)

Pimelodella macturki Eigenmann
Rhamdia quelen (Quoy & Gaimard)
Imparfinis minutus (Lütken)
Heptapterus brevior (Eigenmann)
Heptapterus longior (Eigenmann)
Heptapterus tapanahoniensis Mees
Heptapterus surinamensis Bleeker
Heptapterus bleekeri Boeseman
Pseudopimelodus raninus raninus (Valenciennes)
Pseudopimelodus raninus villosus Eigenmann
Pseudopimelodus zungaro bufonius (Valenciennes)
Pseudopimelodus nigricauda n. sp.
Microglanis poecilus Eigenmann
Microglanis secundus n. sp.

NEW SYNONYMY

<i>Auchenipterus ambyiacus</i> Fowler, 1915	=	<i>Auchenipterus nuchalis</i>
<i>Auchenipterus brevior</i> Eigenmann, 1912	=	„
<i>Auchenipterus demerarae</i> Eigenmann, 1912	=	„
<i>Auchenipterus glaber</i> Steindachner, 1876	=	<i>Parauchenipterus galeatus</i>
<i>Auchenipterus obscurus</i> Günther, 1863	=	<i>Trachycorystes trachycorystes</i>
<i>Brachyplatystoma goeldii</i> Eigenmann & Bean, 1907	=	<i>Brachyplatystoma filamentosum</i>
<i>Caecorhamdia</i> Norman, 1926	=	<i>Rhamdia</i>
<i>Centromochlus dunni</i> Fowler, 1945 (possibly a valid race)	=	<i>Tatia intermedia</i>
<i>Centromochlus steindachneri</i> Gill, 1871	=	<i>Centromochlus heckelii</i>
<i>Cephalosilurus</i> Haseman, 1911	=	<i>Pseudopimelodus</i>
<i>Ceratocheilus osteomystax</i> A. de Miranda Ribeiro, 1918	=	<i>Auchenipterus nuchalis</i>
<i>Cetopsorhamdia pijpersi</i> Hoedeman, 1961	=	<i>Imparfinis minutus</i>
<i>Gephyromochlus</i> Hoedeman, 1961	=	<i>Glanidium</i>

<i>Glanidium cesarpintoï</i> R. v. Ihering, 1928	= ? <i>Glanidium ribeiroi</i>
<i>Imparales</i> Schultz, 1944	= <i>Heptapterus</i>
<i>Imparfinis hasemani</i> Steindachner, 1915	= <i>Imparfinis minutus</i>
<i>Medemichthys</i> Dahl, 1961	= <i>Heptapterus</i>
<i>Nannorhamdia</i> Regan, 1913	= <i>Imparfinis</i>
<i>Pariolius</i> Cope, 1872	= <i>Heptapterus</i>
<i>Phenacorhamdia</i> Dahl, 1961	= <i>Heptapterus</i>
<i>Pimelodella geryi</i> Hoedeman, 1961	= <i>Pimelodella cristata</i>
<i>Pimelodella insignis</i> Schubart, 1964	= <i>Pimelodella boschmai</i>
<i>Pimelodus altipinnis</i> Steindachner, 1864	= <i>Pimelodella cristata</i>
<i>Pimelodus charus</i> Valenciennes, 1840	= <i>Pseudopimelodus zungaro</i> <i>bufonius</i>
<i>Pimelodus eigenmanni</i> v. d. Stigchel, 1946	= <i>Pimelodus altissimus</i>
<i>Pimelodus pulcher</i> Boulenger, 1887	= <i>Pseudopimelodus z. zungaro</i>
<i>Pseudopimelodus roosevelti</i> Borodin, 1927	= <i>Pseudopimelodus zungaro</i> <i>mangurus</i>
<i>Pseudopimelodus variolosus</i> A. de Miranda Ribeiro, 1914	= <i>Pseudopimelodus z. zungaro</i>
<i>Pseudopimelodus villosus butcheri</i> Schultz, 1944	= <i>Pseudopimelodus raninus</i> <i>acanthochiroides</i>
<i>Rhamdia holomelas rupununi</i> Fowler, 1914	= <i>Rhamdia foïna</i>
<i>Trachycorystes coracoideus</i> Eigenmann & Allen, 1942	= <i>Auchenipterichthys thoracatus</i>
<i>Trachycorystes jokeannae</i> Hoedeman, 1961	= <i>Parauchenipterus galeatus</i>
<i>Zungaro</i> Bleeker, 1858	= <i>Pseudopimelodus</i>

SAMENVATTING

Tot voor nauwelijks tien jaren was de visfauna van Suriname nog zeer onvoldoende bekend, doch in de jaren 1963/1967 werden grote verzamelingen bijeengebracht, achtereenvolgens door M. Boeseman, G. F. Mees, en H. Nijssen. Deze collecties bevinden zich in het Rijksmuseum van Natuurlijke Historie te Leiden en het Zoölogisch Museum te Amsterdam; zij zijn afkomstig uit de stroomgebieden van de meeste belangrijke rivieren, en al zullen zij zeker nog geen volledig beeld van de visfauna geven, toch valt te ver-

wachten dat als deze verzamelingen volledig bewerkt zijn (iets dat overigens nog jaren zal kosten), Suriname een der ichthyologisch het best bekende landen van Zuid-Amerika zal zijn geworden.

In dit artikel wordt een overzicht gegeven van de van Suriname bekende vertegenwoordigers der Auchenipteridae en Pimelodidae, twee families behorende tot de in Zuid-Amerika zeer soortenrijke orde der meervallen (Nematognathi of Siluriformes).

Tijdens het onderzoek bleek al spoedig dat een serieuze studie van de Surinaamse soorten niet mogelijk was zonder er literatuur en materiaal uit omliggende landen bij te betrekken. In verschillende gevallen resulteerde dit in nogal ingrijpende wijzigingen van de gangbare soort- en geslachtsomgrenzingen en daarmee samenhangend van de classificatie. In dit artikel worden, uit verschillende delen van Zuid-Amerika, 3 nieuwe genera en 14 nieuwe soorten beschreven, terwijl 2 vroeger beschreven genera die in recente literatuur niet meer werden erkend, uit de synonymie zijn genomen en nieuw worden gedefinieerd. Daar tegenover staat dat 9 eerder beschreven genera en 24 soorten voor het eerst in de synonymie moesten worden geplaatst.

Daar, in de uitgebreide behandeling van bepaalde genera, vaak de gegevens over Suriname dreigden te verdrinken, is terwille van de overzichtelijkheid een lijst toegevoegd van de thans van Suriname bekende soorten (blz. 237-238). De Auchenipteridae worden vertegenwoordigd door 9 soorten, behorende tot 5 genera, terwijl van de Pimelodidae 21 soorten behorende tot 10 genera bekend zijn; één dezer soorten wordt vertegenwoordigd door twee onderscheidbare geographische rassen.

REFERENCES

- AGASSIZ, L. & MME AGASSIZ, 1869. Voyage au Brésil (traduit de l'anglais avec l'autorisation des auteurs). Paris: i-xii, 1-532.
- AHL, E., 1936. Beschreibungen dreier neuer Welse aus Brasilien. — Zool. Anz., 116: 109-111.
- ARÁMBURU, A. A. DE, R. H. ARÁMBURU & R. A. RINGUELET, 1962. Peces paranenses nuevos para la fauna Argentina. — Physis, 23: 222-239.
- ARNOLD, J. P. & E. AHL, 1936. Fremdländische Süßwasserfische. Braunschweig: 1-592.
- AXELROD, H. R. & L. P. SCHULTZ, 1955. Handbook of tropical aquarium fishes. New York, Toronto, London: i-xii, 1-718.
- BEEBE, W., 1925. Studies of a tropical jungle; one quarter of a square mile of jungle at Kartabo, British Guiana. — Zoologica, 6: 5-193.
- BERG, C., 1901. Comunicaciones ictiológicas, IV. — Comm. Mus. Nac. Buenos Aires, 1: 293-311.
- BERTIN, L. & R. ESTÈVE, 1950. Catalogue des types de poissons du Muséum National d'Histoire Naturelle. 5^e Partie. Ostariophysaires (Siluriformes). Paris: 1-85.
- BLEEKER, P., 1862(-1863). Atlas Ichthyologique, 2. Amsterdam: 1-112.
- , 1863. Systema silurorum revisum. — Ned. Tijdschr. Dierk., 1: 77-122.
- , 1864. Description des espèces de Silures de Suriname conservées aux musées de Leide et d'Amsterdam. — Nat. Verh. Holl. Maatsch. Wetensch., (2) 20: 1-104.

- BLOCH, M. E., 1785. *Ichthyologie ou histoire naturelle générale et particulière des poissons*, 1. Berlin: 1-206.
- BOESEMAN, M., 1952. A preliminary list of Surinam fishes not included in Eigenmann's enumeration of 1912. — *Zool. Meded.*, 31: 179-200.
- , 1953. Scientific results of the Surinam expedition 1948-1949. Part II. Zoology No. 2. The fishes (1). — *Zool. Meded.*, 32: 1-24.
- , 1960. The fresh-water fishes of the island of Trinidad. — *Studies on the Fauna of Curaçao and other Caribbean Islands*, 48: 72-153.
- , 1968. The genus *Hypostomus* Lacépède, 1803, and its Surinam representatives (Siluriformes, Loricariidae). — *Zool. Verh.*, 99: 1-89.
- , 1969. Additional new species of *Hypostomus* Lacépède, 1803, from Surinam; with remarks on the apparent "gymnorhynchus-complex" (Siluriformes, Loricariidae). — *Beaufortia*, 16: 119-136.
- , 1972. Notes on South American catfishes, including remarks on Valenciennes and Bleeker types in the Leiden museum. — *Zool. Meded.*, 47: 293-320.
- BORODIN, N. A., 1927. Some new catfishes from Brazil. — *Amer. Mus. Novit.*, 266: 1-7.
- BOULENGER, G. A., 1887. An account of the fishes collected by Mr. C. Buckley in eastern Ecuador. — *Proc. Zool. Soc. Lond.*: 274-283, pl. XX-XXIV.
- , 1891. An account of the siluroid fishes obtained by Dr. H. von Ihering and Herr Sebastian Wolff in the province Rio Grande do Sul, Brazil. — *Proc. Zool. Soc. Lond.*: 231-235.
- BRITSKI, H. A., 1969. Lista dos tipos de peixes das coleções do Departamento de Zoologia da Secretaria da Agricultura de São Paulo. — *Pap. Avuls. Zool. S. Paulo*, 22: 197-215.
- BUSSING, W. A., 1970. Two new species of catfishes of the genera *Nannorhamdia* and *Imparales* (family Pimelodidae) from Central America. — *Contrib. Sci. Los Angeles County Mus.*, 196: 1-11.
- CARRIKER, M. A., 1931. The cave birds of Trinidad. — *Auk*, 48: 186-194.
- CASTELLO, H. P., 1971. *Pseudopimelodus raninus* (Valenciennes 1840) una nueva cita para la fauna de peces de la Republica Argentina. — *Physis*, 30: 543-545.
- COPE, E. D., 1878. Synopsis of the fishes of the Peruvian Amazon obtained by Professor Orton during his expeditions of 1873 and 1877. — *Proc. Amer. Philos. Soc.*, 17: 673-701.
- CUVIER, G. & A. VALENCIENNES, 1840. *Histoire naturelle des poissons* (4° ed.), 15. Paris: i-xxiv, 1-397.
- DAHL, G., 1961. Nematognathous fishes collected during the Macarena expedition 1959. Part II — *Noved. Colomb.*, 1: 483-514.
- , 1971. Los Peces del Norte de Colombia. Bogotá: i-xvii, 1-391.
- DEVINCENZI, G. J., 1933. Peces del Uruguay. Notas complementarias, II. — *An. Mus. Hist. Nat. Montevideo*, (2) 4 (3): 1-11, 1 pl.
- DEVINCENZI, G. J. & L. P. BARATTINI, 1926-1940. *Album ictiologico del Uruguay*. — *An. Mus. Hist. Nat. Montevideo*, Supl.: 1-8, pls. I-LII.
- DEVINCENZI, G. J. & G. W. TEAGUE, 1942. Ictiofauna del Rio Uruguay Medio. — *An. Mus. Hist. Nat. Montevideo*, (2) 5: I-VIII, 1-104.
- EIGENMANN, C. H., 1911. The localities at which Mr. John D. Haseman made collections. — *Ann. Carnegie Mus.*, 7: 299-314.
- , 1912. The freshwater fishes of British Guiana, including a study of the ecological grouping of species and the relation of the fauna of the plateau to that of the lowlands. — *Mem. Carnegie Mus.*, 5: i-xvii, 1-578.
- , 1917. *Pimelodella* and *Typhlobagrus*. — *Mem. Carnegie Mus.*, 7: 229-258.
- , 1922. The fishes of western South America, part. I. — The fresh-water fishes of northwestern South America including Colombia, Panama, and the Pacific slopes of Ecuador and Peru, together with an appendix upon the fishes of the Rio Meta in Colombia. — *Mem. Carnegie Mus.*, 9: 1-346.

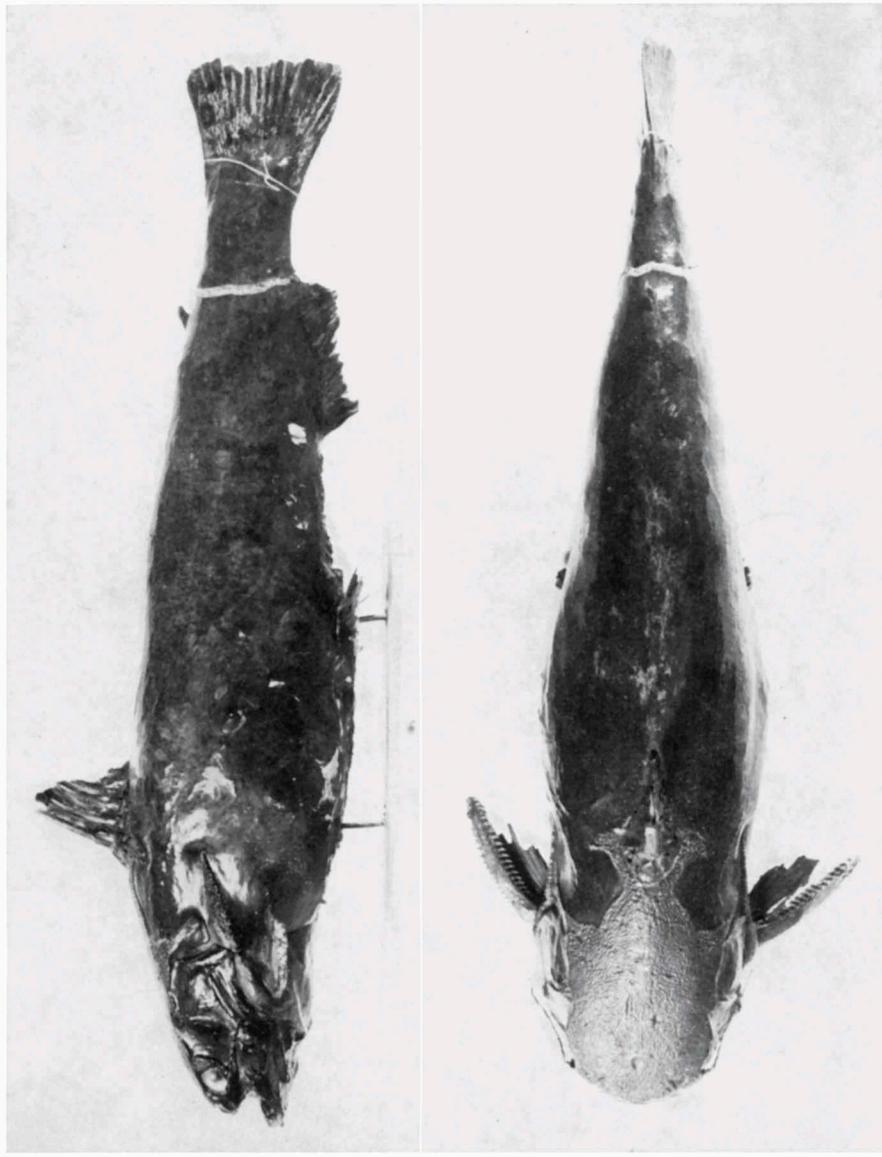
- EIGENMANN, C. H. & W. R. ALLEN, 1942. Fishes of western South America. Kentucky: i-xv, 1-494.
- EIGENMANN, C. H. & B. A. BEAN, 1907. An account of Amazon River fishes collected by J. B. Steere; with a note on *Pimelodus clarias*. — Proc. U.S. Nat. Mus., 31: 659-668.
- EIGENMANN, C. H. & R. S. EIGENMANN, 1888. Preliminary notes on South American Nematognathi I. — Proc. Calif. Acad. Sci., (2) 1: 119-172.
- , 1889. Preliminary notes on South American Nematognathi II. — Proc. Calif. Acad. Sci., (2) 2: 28-56.
- , 1890. A revision of the South American Nematognathi or cat-fishes. — Occ. Pap. Calif. Acad. Sci., 1: 1-508.
- EIGENMANN, C. H. & A. A. NORRIS, 1900. Sobre alguns peixes de S. Paulo, Brazil. — Rev. Mus. Paul., 4: 349-362.
- EMMENS, C. W. & H. A. AXELROD, 1968. Catfish. New York: 1-96.
- FERNANDEZ YEPEZ, A. & F. MARTIN S., 1953. Apuntes sobre la ictiología de Perijá. — La región de Perijá y sus habitantes (Soc. Cienc. Nat. La Salle, 13): 299-313.
- FILIPPI, PH. DE, 1853. Nouvelles espèces de poissons. — Rev. Mag. Zool., (2) 5: 164-171.
- FISHER, H. G., 1917. A list of the Hypophthalmidae, the Diplomystidae, and of some unrecorded species of Siluridae in the collections of the Carnegie Museum. — Ann. Carnegie Mus., 11: 405-427.
- FOWLER, H. W., 1914. Fishes from the Rupununi River, British Guiana. — Proc. Acad. Nat. Sci. Philad., 66: 229-284.
- , 1915. Notes on nematognathous fishes. — Proc. Acad. Nat. Sci. Philad., 67: 203-243.
- , 1940a. A collection of fishes obtained by Mr. William C. Morrow in the Ucayali River basin, Peru. — Proc. Acad. Nat. Sci. Philad., 91: 219-289.
- , 1940b. Zoological results of the second Bolivian expedition for the Academy of Natural Sciences of Philadelphia, 1936-1937. Part I. — The Fishes. — Proc. Acad. Nat. Sci. Philad., 92: 43-103.
- , 1941a. A collection of fresh-water fishes obtained in eastern Brazil by Dr. Rodolpho von Ihering. — Proc. Acad. Nat. Sci. Philad., 93: 123-199.
- , 1941b. Los peces del Peru (Continuación). — Bol. Mus. "Javier Prado", 5: 466-487.
- , 1945a. Colombian zoological survey. Part I. — The fresh-water fishes obtained in 1945. — Proc. Acad. Nat. Sci. Philad., 97: 93-135.
- , 1945b. Los Peces del Peru. Lima: 1-298.
- , 1951. Os peixes de água doce do Brasil, 1 (3). — Arq. Zool. S. Paulo, 6: 405-625.
- GEIJSKES, D. C., 1973. Reisverslag van de expeditie West Suriname 1971. — Zool. Bijdr., 15: 1-41.
- GILL, TH., 1871. On some new species of fishes obtained by Prof. Orton from the Marañon, or Upper Amazon, and Napo Rivers. — Proc. Acad. Nat. Sci. Philad., 1870: 92-96.
- GOELDI, E. A., 1901. A Piraíba, gigantesco siluroideo do Amazonas. — Bol. Mus. Paranaense, 3: 181-194.
- GOMES, A. L., 1946. A review of *Microglanis*, a genus of South American catfishes, with notes on related genera. — Occ. Pap. Mus. Zool. Michigan, 494: 1-19.
- , 1956. Descrição de uma nova espécie de "Luciopimelodinae" do Rio Mogi Guaçu, Estado de São Paulo. — Rev. Brasil. Biol., 16: 403-413.
- GOSLINE, W. A., 1940. Rediscovery and redescription of *Pariolius armillatus*, a genus and species of pimelodid catfishes described by E. D. Cope from the Peruvian Amazon in 1872. — Copeia: 78-80.
- , 1941. Synopsis of the genera of pimelodid catfishes without a free orbital rim. — Stanford Ichth. Bull., 2: 83-88.
- , 1942. Notes on South American catfishes (Nematognathi). — Copeia: 39-41.
- , 1945. Catálogo dos nematognathos de água-doce da América do Sul e Central. — Bol. Mus. Nac. (Rio de Janeiro), Zool., 33: 1-138.

- GÜNTERT, H., 1942. Beschreibung einiger zum Teil noch unbekannter südamerikanischer Siluriden aus dem Naturhistorischen Museum in Basel. — Zool. Anz., 138: 27-40.
- GÜNTHER, A., 1863. On new species of fishes from the Essequibo. — Ann. Mag. Nat. Hist., (3) 12: 441-443.
- , 1864. Catalogue of the fishes in the British Museum, 5. London: i-xxii, 1-455.
- HASEMAN, J. D., 1911. Descriptions of some new species of fishes and miscellaneous notes on others obtained during the expedition of the Carnegie Museum to central South America. — Ann. Carnegie Mus., 7: 315-328.
- HEIDE, J. VAN DER, 1966. Het stuwmeeronderzoek in Suriname. — Tijdschr. Kon. Ned. Aardr. Gen., (2) 83: 173-180.
- HOEDEMAN, J. J., 1954. *Pimelodus clarias*. — Het Aquarium, 24: 172-173.
- , 1957. Notes on the ichthyology of Surinam (Dutch Guiana), 4. Additional records of siluriform fishes (1). — Beaufortia, 6: 147-160.
- , 1961. Notes on the ichthyology of Surinam and other Guianas. — Bull. Aquatic Biol., 2: 129-139.
- , 1968. Elseviers Aquariumwissen Encyclopedie, 1. Amsterdam/Brussel: 1-188.
- HOLTHUIS, L. B., 1959. The Crustacea Decapoda of Suriname. — Zool. Verh., 44: 1-296.
- HUBBS, C. L., 1936. Fishes of the Yucatan Peninsula. — Carnegie Mus. Wash. Publ., 457: 157-287.
- , 1938. Fishes from the caves of Yucatan. — Carnegie Inst. Wash. Publ., 491: 261-295, pl. 1-4.
- IHERING, R. VON, 1930. Notas ecologicas referentes a peixes d'ague doce do Estado de S. Paulo e descricaoão de 4 especies novas. — Arch. Inst. Biol. S. Paulo, 3: 93-104, pl. 13.
- , 1937. Oviducal fertilization in the South American catfish, *Trachycorystes*. — Copeia: 201-205.
- JENTINK, F. A., 1910. Verslag omtrent 's Rijks Museum van Natuurlijke Historie te Leiden, loopende over het tijdvak van 1 September 1909 tot 1 September 1910. Leiden: 1-27.
- KAPPLER, A., 1881. Holländisch-Guiana. Stuttgart: I-VIII, 1-495.
- , 1885. Die Tierwelt im Holländischen Guiana (Fortsetzung). — Das Ausland, 58: 896-899, 918-920.
- , 1887. Surinam, sein Land, seine Natur, Bevölkerung und seine Kultur-Verhältnisse. Stuttgart: 1-384.
- KNER, R., 1858. Ichthyologische Beiträge. — Sitzb. Akad. Wiss. Wien, Mathem.-Naturw. Cl., 26 (1857): 373-448.
- LA CEPÈDE, 1803. Histoire naturelle des poissons, 5. Paris: i-lxviii, 1-803.
- LICHTENSTEIN, M. H. C., 1819. Ueber einige neue Arten von Fischen aus der Gattung *Silurus*. — Zool. Mag. (Wiedemann), 1 (3): 57-63.
- LINNAEUS, C., 1766. *Systema naturae*, ed. 12, 1. Holmiae: 1-532.
- LOWE (McCONNELL), R. H., 1964. The fishes of the Rupununi savanna district of British Guiana, South America. Part 1. Ecological groupings of fish species and effects of the seasonal cycle on fish. — J. Linn. Soc., Zool., 45: 103-144.
- , 1967. The fish-fauna of the Rupununi District, Guyana. — Timehri, 43: 58-72.
- LUENGO, J. A., 1963. La fauna ictiologica del Lago de Valencia (Venezuela) y algunas consideraciones sobre las demas hoyas del pais y Trinidad. — Acta Biol. Venez., 3: 319-339.
- LÜLING, K. H., 1963. Die Quisto Cocha und ihre häufigen Fische. — Beitr. Neotrop. Fauna, 3: 34-56.
- LUNDBERG, J. G. & J. N. BASKIN, 1969. The caudal skeleton of the catfishes, order Siluriformes. — Amer. Mus. Novit., 2398: 1-49.
- LÜTKEN, CHR. FR., 1875. Velhas-Flodens fiske. — Vidensk. Selsk. Skr., (5) 12: 124-254, I-XXI, pl. I-V.

- LYNDEN, A. J. H. VAN, 1939. Op zoek naar Suriname's zuidgrens. — Tijdschr. Kon. Ned. Aardr. Gen., (2) 56: 793-871, phot. 1-91, maps XVI-XVIII.
- McCONNELL, R. H., see under LOWE.
- MAGO-LECCIA, F., 1967. Notas preliminares sobre los peces de los llanos de Venezuela. — Bol. Soc. Venez. Cienc. Nat., 27: 237-263.
- MARLIER, G., 1968. Études sur les lacs de l'Amazonie centrale. II. Le plancton. III. Les poissons du lac Redondo et leur régime alimentaire; les chaînes tropiques du lac Redondo; les poissons du Rio Prêto da Eva. — Cad. Amazônia, 11: 1-57.
- MEES, G. F., 1957. A systematic review of the Indo-Australian Zosteropidae (Part I). Leiden: 1-204, Stellingen I-XI.
- , 1962. The subterranean freshwater fauna of Yardie Creek Station, North West Cape, Western Australia. — J. Roy. Soc. W. Austr., 45: 24-32.
- , 1967. Freshwater fishes of Suriname: the genus *Heptapterus* (Pimelodidae). — Zool. Meded., 42: 215-229.
- MILES, C., 1947. Los peces del Rio Magdalena. Ministerio Econ. Nac., Bogota: 1-214, i-xxviii.
- MYERS, G. S., 1928. New fresh-water fishes from Peru, Venezuela, and Brazil. — Ann. Mag. Nat. Hist., (10) 2: 83-90.
- , 1947. The Amazon and its fishes ... Part 2. The fishes. — The Aquarium J., 18 (4): 13-20.
- NORMAN, J. R., 1926. A new blind catfish from Trinidad, with a list of the blind cave-fishes. — Ann. Mag. Nat. Hist., (9) 18: 324-331.
- NIJSSSEN, H., 1970. Revision of the Surinam catfishes of the genus *Corydoras* Lacépède, 1803. Amsterdam: 1-75, I-II.
- NIJSSSEN, H. & I. J. H. ISBRÜCKER, 1967. Notes on the Guiana species of *Corydoras* Lacépède, 1803, with descriptions of seven new species and designation of a neotype for *Corydoras punctatus* (Bloch, 1794) — (Pisces, Cypriniformes, Callichthyidae). — Zool. Meded., 42: 21-50.
- PAVAN, C., 1946. Observations and experiments on the cave fish *Pimelodella kronei* and its relatives. — Amer. Nat., 80: 343-361.
- PEARSON, N. E., 1924. The fishes of the eastern slope of the Andes. I. The fishes of the Rio Beni Basin, Bolivia, collected by the Mulford expedition. — Indiana Univ. Stud., 11 (64): 1-83.
- PELLEGRIN, J., 1899. Notes sur les poissons recueillis par M. F. Geay dans l'Apuré et ses affluents. — Bull. Mus. Hist. Nat. Paris, 5: 156-159.
- PELZELN, A. VON, 1868-1871. Zur Ornithologie Brasiliens. Wien: 1-462, I-LIX, 1-18.
- PETERS, W., 1877. Über die von Hr. Dr. C. Sachs in Venezuela gesammelten Fische. — Mber. K. Akad. Wiss. Berlin: 469-473.
- PUYO, J., 1949. Poissons de la Guyane Française. Faune de l'Empire Français XII: 1-280.
- REGAN, C. T., 1906. On the fresh-water fishes of the island of Trinidad, based on the collection, notes, and sketches made by Mr. Lechmere Guppy, Junr. — Proc. Zool. Soc. Lond: 378-393.
- , 1911. The classification of the teleostean fishes of the order Ostariophysi. — 2. Siluroidea. — Ann. Mag. Nat. Hist., (8) 8: 553-577.
- , 1913. The fishes of the San Juan River, Colombia. — Ann. Mag. Nat. Hist., (8) 12: 462-473.
- RIBEIRO, A. DE MIRANDA, 1911. Fauna Brasiliense. Peixes IV (A): Eleutherobranchios Aspirophoros. — Arch. Mus. Nac. Rio de Janeiro, 16: 1-504.
- , 1914. Pimelodidae, Trachycorystidae, Cetopsidae, Bunocephalidae, Auchenipteridae, Hypophthalmidae. — Comm. Linh. Telegr. Estr. de Matto-Grosso ao Amazonas, 15. Anexo 5. Historia Natural. Zoologia: 1-13, pl. 1, 2.
- , 1918a. Tres generos e dezeseite especies novas de peixes brasileiros. — Rev. Mus. Paul., 10: 629-646.

- RIBEIRO, A. DE MIRANDA, 1918b. Lista dos peixes brasileiros do Museu Paulista (1.a Parte). — *Rev. Mus. Paul.*, 10: 705-736.
- , 1920. Peixes (excl. Characinidae). — *Comm. Linh. Telegr. Estr. de Matto-Grosso ao Amazonas*, 58. Anexo 5. *Historia Natural. Zoologia*: 1-15, 17 pls.
- , 1937. Sobre una colleçao de vertebrados do nordeste brasileiro. Primeira parte: Peixes e batrachios. — *O Campo*, 1: 54-56.
- RIBEIRO, P. DE MIRANDA, 1953. Tipos das espécies e subespécies do Prof. Alipio de Miranda Ribeiro depositados no Museu Nacional. — *Arq. Mus. Nac. Rio de Janeiro*, 42: 389-417.
- , 1962a. Apontamentos ictiológicos, I. — *Bol. Mus. Nac. Rio de Janeiro, Zool.*, 240: 1-6.
- , 1962b. Catálogo dos peixes do Museu Nacional, XI. — *Publ. Avuls. Mus. Nac. Rio de Janeiro*, 45: 1-12.
- , 1964a. Apontamentos ictiológicos, II. — *Bol. Mus. Nac. Rio de Janeiro, Zool.*, 246: 1-4.
- , 1964b. *Rhamdella schultzi* sp. nov. — *Bol. Mus. Nac. Rio de Janeiro*, 248: 1-4.
- , 1968a. Sôbre o dimorfismo sexual no gênero *Auchenipterus Valenciennes*, 1840. — *Bol. Mus. Nac. Rio de Janeiro, Zool.*, 261: 1-11.
- , 1968b. Apontamentos ictiológicos, III. — *Bol. Mus. Nac. Rio de Janeiro, Zool.*, 263: 1-14.
- , 1968c. Apontamentos ictiológicos, V. — *Bol. Mus. Nac. Rio de Janeiro*, 264: 1-5.
- RIDGWAY, R., 1912. Color standards and color nomenclature. Washington, D.C.: i-iv, 1-44, pl. I-LIII.
- RINGUELET, R. A., R. H. ARÁMBURU & A. A. DE ARÁMBURU, 1967. Los peces Argentinos de agua dulce. La Plata: 1-602.
- RÖSSEL, F., 1962. *Centromochlus schultzi*, ein neuer Wels aus Brasilien. — *Senck. Biol.*, 43: 27-30.
- SCHOMBURGK, R., 1848. *Reisen in Britisch-Guiana in den Jahren 1840-1844*, 3. Leipzig: i-viii, 533-1261.
- SCHOMBURGK, R. H., 1841. *Fishes of Guiana*, I. The Naturalist's Library, Ichthyology, 3: 1-262, pl. I-XXX.
- SCHUBART, O., 1964. Duas novas espécies de peixe de família Pimelodidae do Rio Mogi Guaçu (Pisces, Nematognathi). — *Bol. Mus. Nac. Rio de Janeiro, Zool.*, 244: 1-22.
- SCHULTZ, L. P., 1944a. The catfishes of Venezuela, with descriptions of thirty-eight new forms. — *Proc. U.S. Nat. Mus.*, 94: 173-338.
- , 1944b. A new genus and species of pimelodid catfish from Colombia. — *J. Wash. Acad. Sci.*, 34: 93-95.
- SEBA, A., 1758. *Nauwkeurige beschryving van het schatryke kabinet der voornaamste seldzaamheden der natuur (Locupletissimi rerum naturalium thesauri)*, 3. *Amstelædami*: 1-212.
- SHERBORN, C. D. & B. B. WOODWARD, 1901. Notes on the dates of publication of the natural history portions of some French voyages, I. "Amérique méridionale"; "Indes orientales"; "Pôle Sud" ("Astrolabe" and "Zélée"); "La Bonite"; "La Coquille"; and "L'Uranie et Physicienne". — *Ann. Mag. Nat. Hist.* (7) 7: 388-392.
- SPIX, J. B. DE, 1829. *Selecta genera et species piscium. Monachii*. I-II, 1-xvi, I-II, 1-138, Tab. A-G, I- LXXV, Anat. A-F.
- STARKS, E. C., 1913. The fishes of the Stanford expedition to Brazil. — *Stanford Publ. Univ. Ser.*: 1-77, pl. I-XV.
- STEENIS-KRUSEMAN, M. J. VAN, 1950. *Flora Malesiana*, (1) 1: 1-CLII, 1-639.
- STEINDACHNER, F., 1864. *Ichthyologische Notizen*. — *Sitzb. Akad. Wiss. Wien, Mathem.-Naturw. Cl.*, 49 (1): 200-214, Taf. 1, 2.
- , 1876a. *Ichthyologische Beiträge (IV)*. — *Sitzb. Akad. Wiss. Wien, Mathem.-Naturw. Cl.*, 72 (1): 551-616, pl. I-XIII.

- STEINDACHNER, F., 1876b. Die Süßwasserfische des südöstlichen Brasiliens (III). — Sitzb. Akad. Wiss. Wien, Mathem.-Naturw. Cl., 74 (1): 559-694.
- , 1879. Beiträge zur Kenntnis der Flussfische Südamerikas. — Denkschr. Akad. Wiss. Wien, Mathem.-Naturw. Cl., 41 (1): 151-172.
- , 1880. Zur Fisch-Fauna des Cauca und der Flüsse bei Guayaquil. — Denkschr. Akad. Wiss. Wien, Mathem.-Naturw. Cl., 42 (1): 55-104.
- , 1882. Beiträge zur Kenntnis der Flussfische Südamerikas, III. — Denkschr. Akad. Wiss. Wien, Mathem.-Naturw. Cl., 44 (1): 1-18.
- , 1883. Beiträge zur Kenntnis der Flussfische Südamerikas, IV. — Denkschr. Akad. Wiss. Wien, Mathem.-Naturw. Cl., 46 (1): 1-44.
- , 1915. Beiträge zur Kenntnis der Flussfische Südamerikas. — Denkschr. Akad. Wiss. Wien, Mathem.-Naturw. Kl., 93: 15-106, pl. I-XIII.
- STIGCHEL, J. W. B. VAN DER, 1946. South American Nematognathi. Leiden: 1-204 (also, with identical pagination, in Zool. Meded., 27 (1947)).
- , 1964. A new species of pimelodid catfish from eastern Brazil, *Pimelodella boschmai* nov. spec. — Zool. Meded., 39: 327-330.
- THINÈS, G., 1955. Les poissons aveugles (I). — Ann. Soc. Roy. Zool. Belg., 86: 1-128.
- , 1969. L'évolution régressive des poissons cavernicoles et abyssaux. Paris: 1-394.
- VAILLANT, L., 1880. Synopsis des espèces de Siluridae recueillies par M. le Dr Jobert, à Caldéron (Haute-Amazone). — Bull. Soc. Philomat. Paris, (7) 4: 150-159.
- , 1899. Note préliminaire sur les collections ichthyologiques recueillies par M. Geay en 1897 et 1898 dans la Guyane française et le Contesté franco-brésilien. — Bull. Mus. Hist. Nat. Paris, 5: 154-156.
- , 1900. Contribution à l'étude de la faune ichthyologique de la Guyane Française et du Contesté franco-brésilien. — Nouv. Arch. Mus. Hist. Nat. Paris, (4) 2: 123-136, pl. 7.
- VALENCIENNES, A., 1840. See under Cuvier & Valenciennes.
- , 1847. Poissons. In A. d'Orbigny: Voyage dans l'Amérique Méridionale, 5 (2): 1-11; 9 (Atlas), Poiss.: pl. 1-16 (plates published in 1834-1837).
- WESTERMANN, J. H., 1971. Historisch overzicht van de wording en het onderzoek van het Brokopondo-stuwmeer. — Nieuwe West-Indische Gids, 48: 1-55.



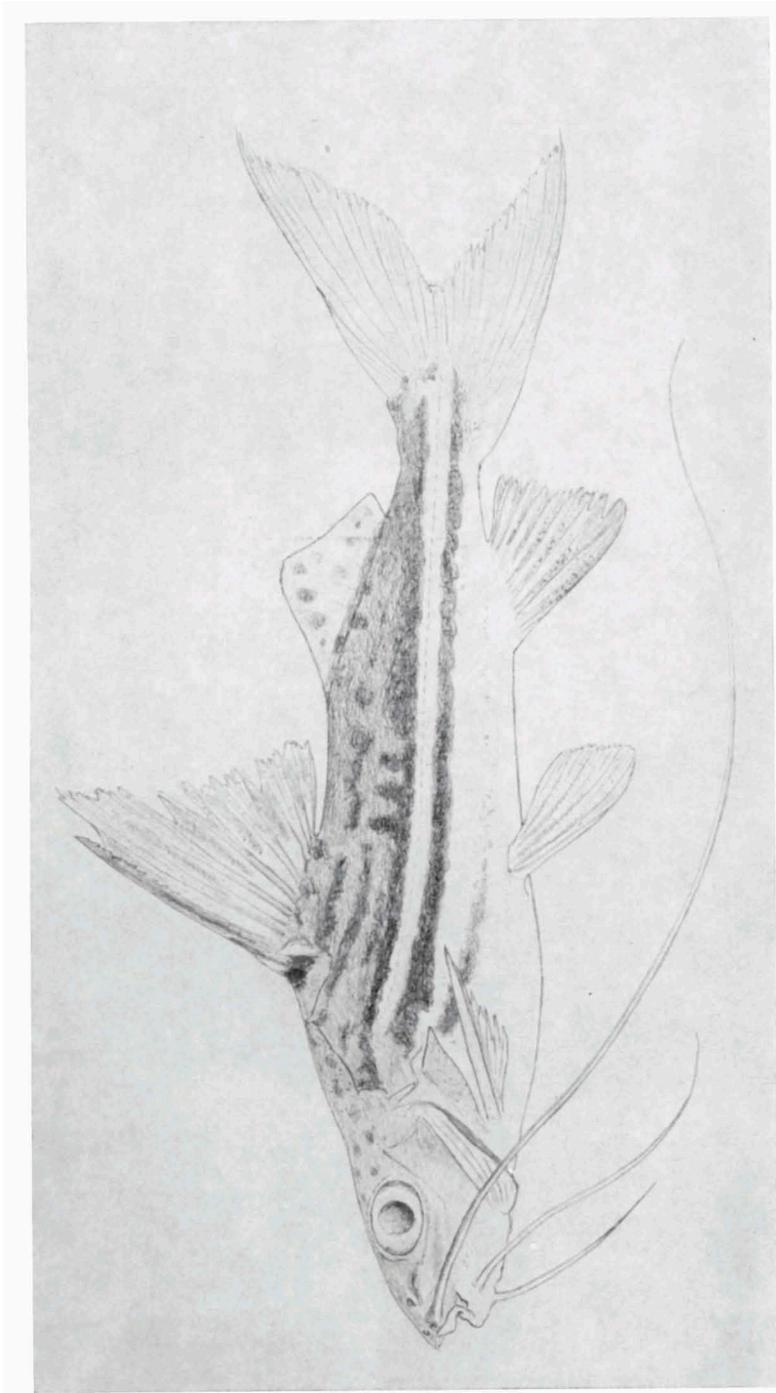
Trachycorystes trachycorystes (MNP no. A 9422, s.l. ca. 310 mm).



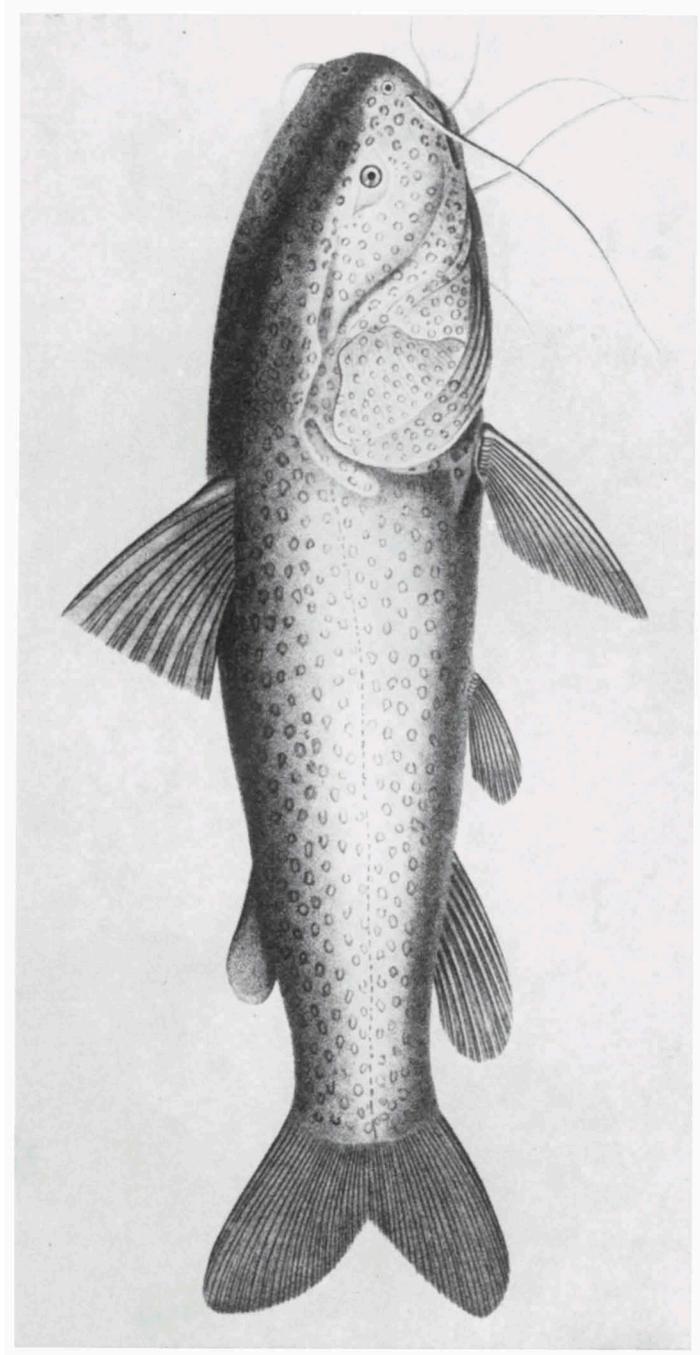
Heads viewed from below. Left: *Centromochlus heckelii*, note the narrow mouth. Middle: *Tatia anlopygia* (syntype, MV no. 47332), note the evenly divided pigment on the chin. Right: *Tatia intermedia*, note the V-shaped band of pigment on the chin.



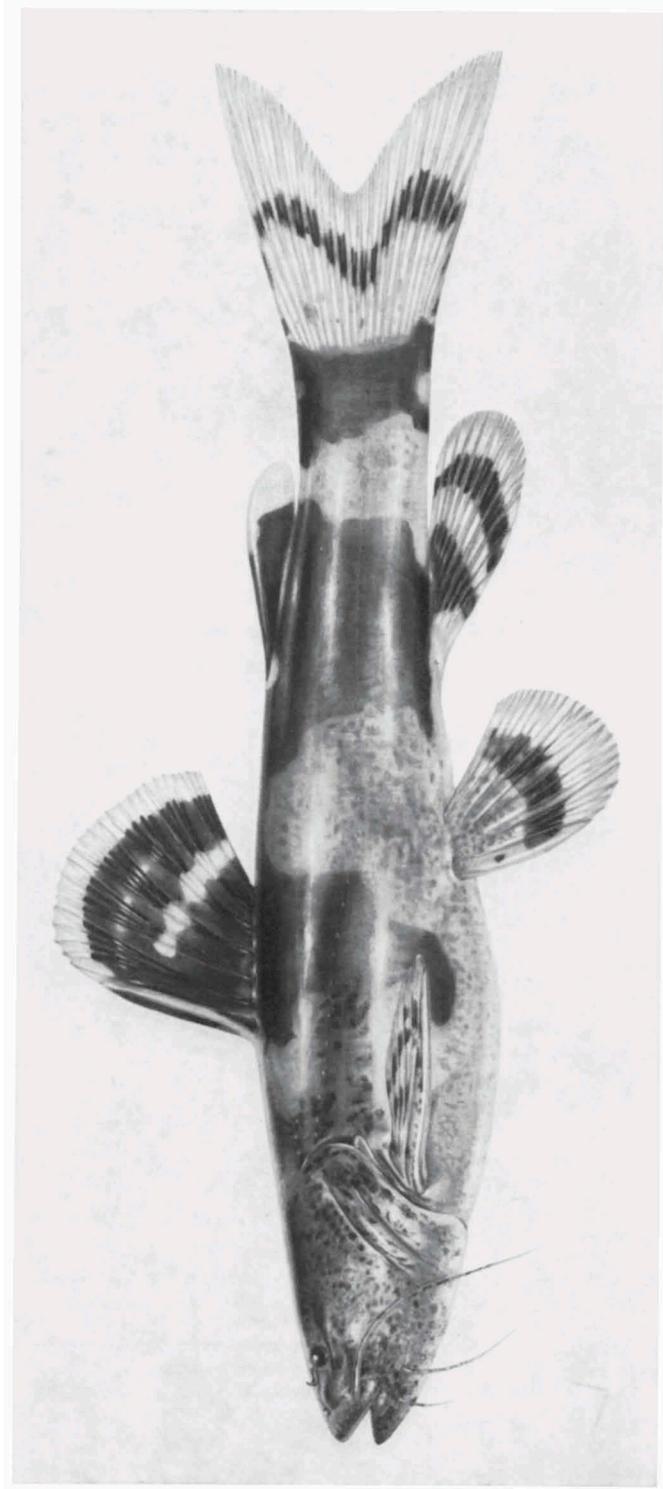
Glanidium leopardus (ZMA from no. 105854, s.l. 109 mm). $1\frac{1}{3} \times$.



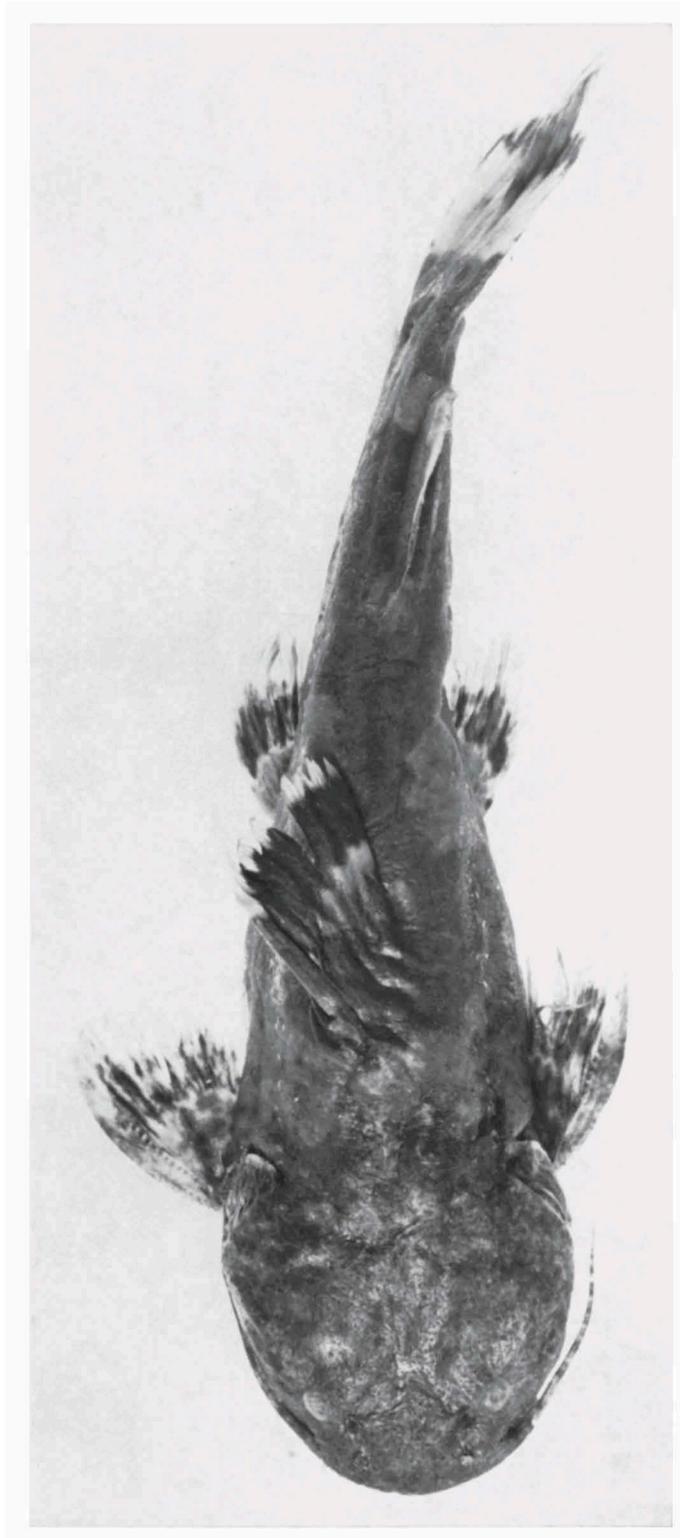
Pimelodus albofasciatus (RMNH no. 26516). I X.



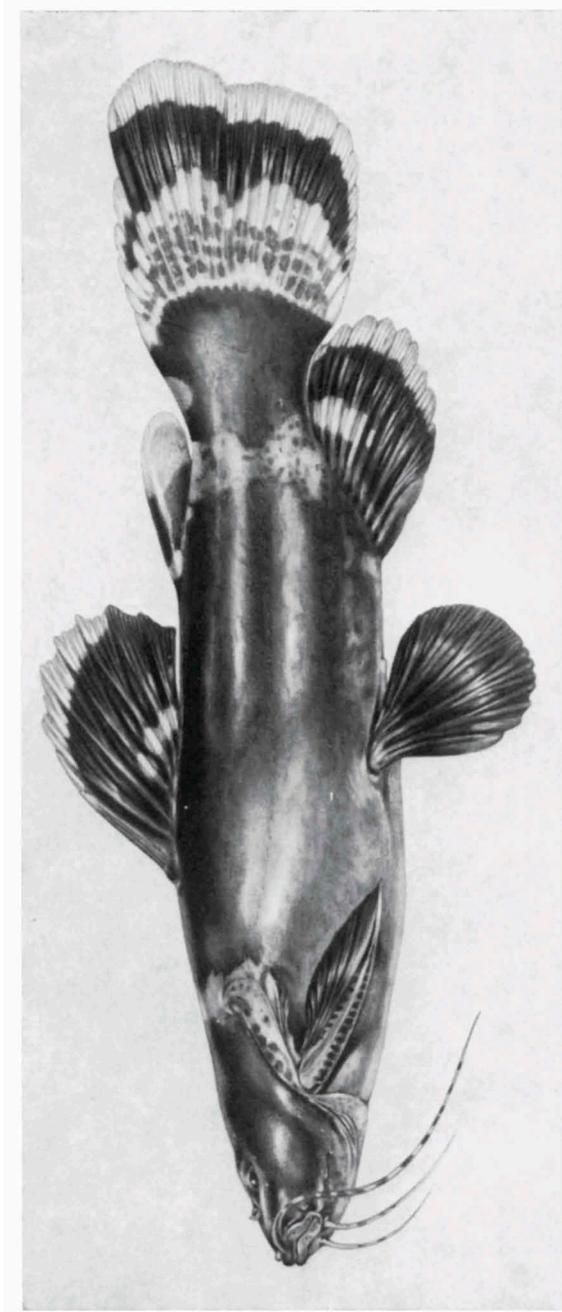
Pseudopimelodus zungaro. Reproduction of Humboldt's figure, at the same size as in the original publication.



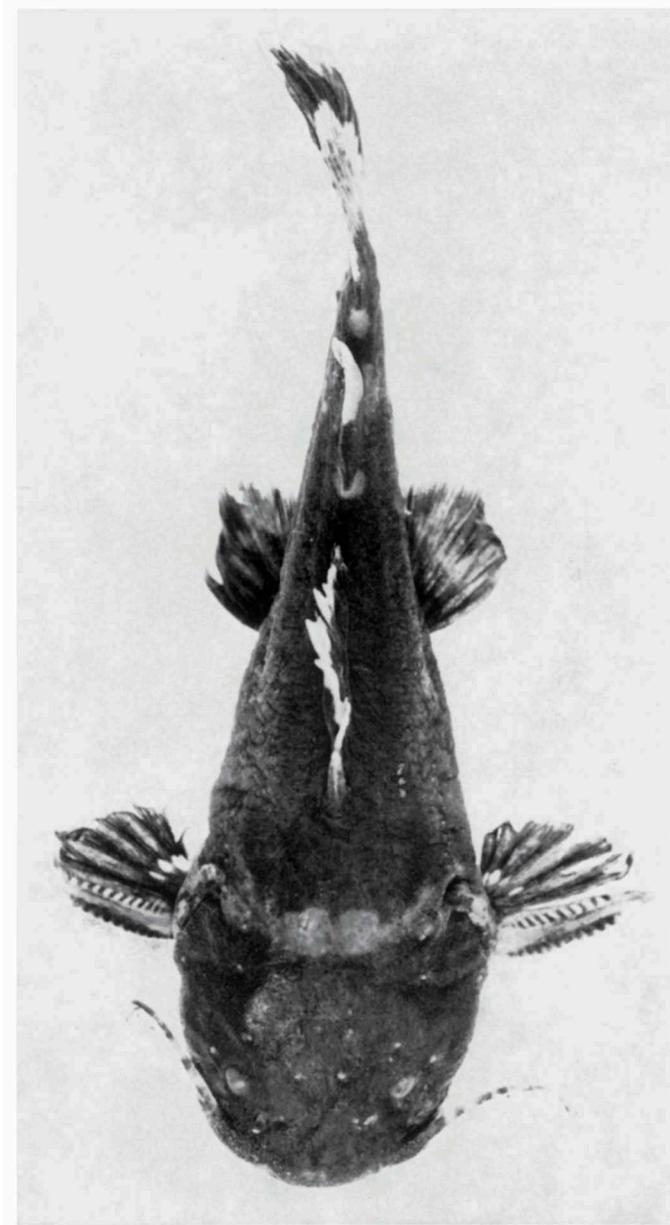
Pseudopimelodus sungaro bufonius (RMNH no. 26607, s.l. 104 mm).



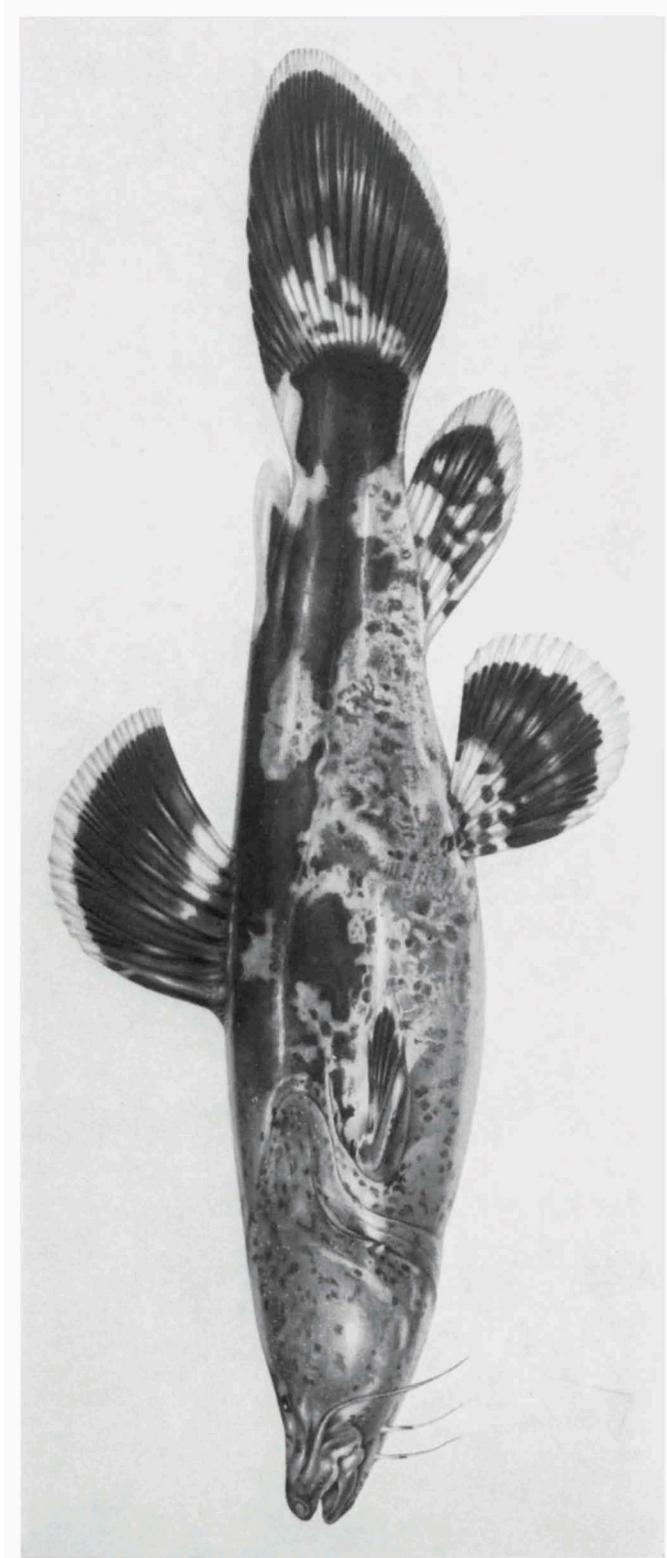
Pseudopimelodus zungaro bufonius (same specimen as in plate 6); note the comparatively slender body and the anteriorly rounded head; the teeth on the pectoral spines are clearly visible.



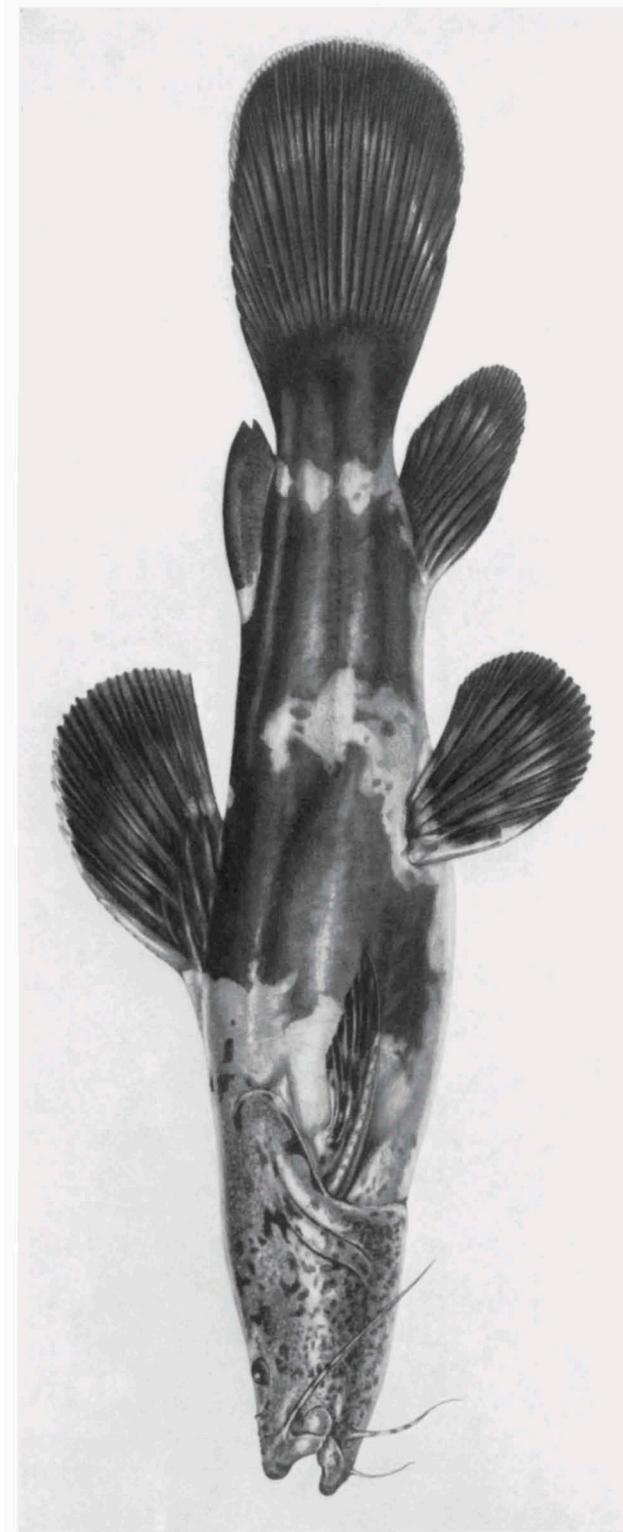
Pseudopimelodus raninus raninus (from sample RMNH no. 26603, s.l. 79 mm).



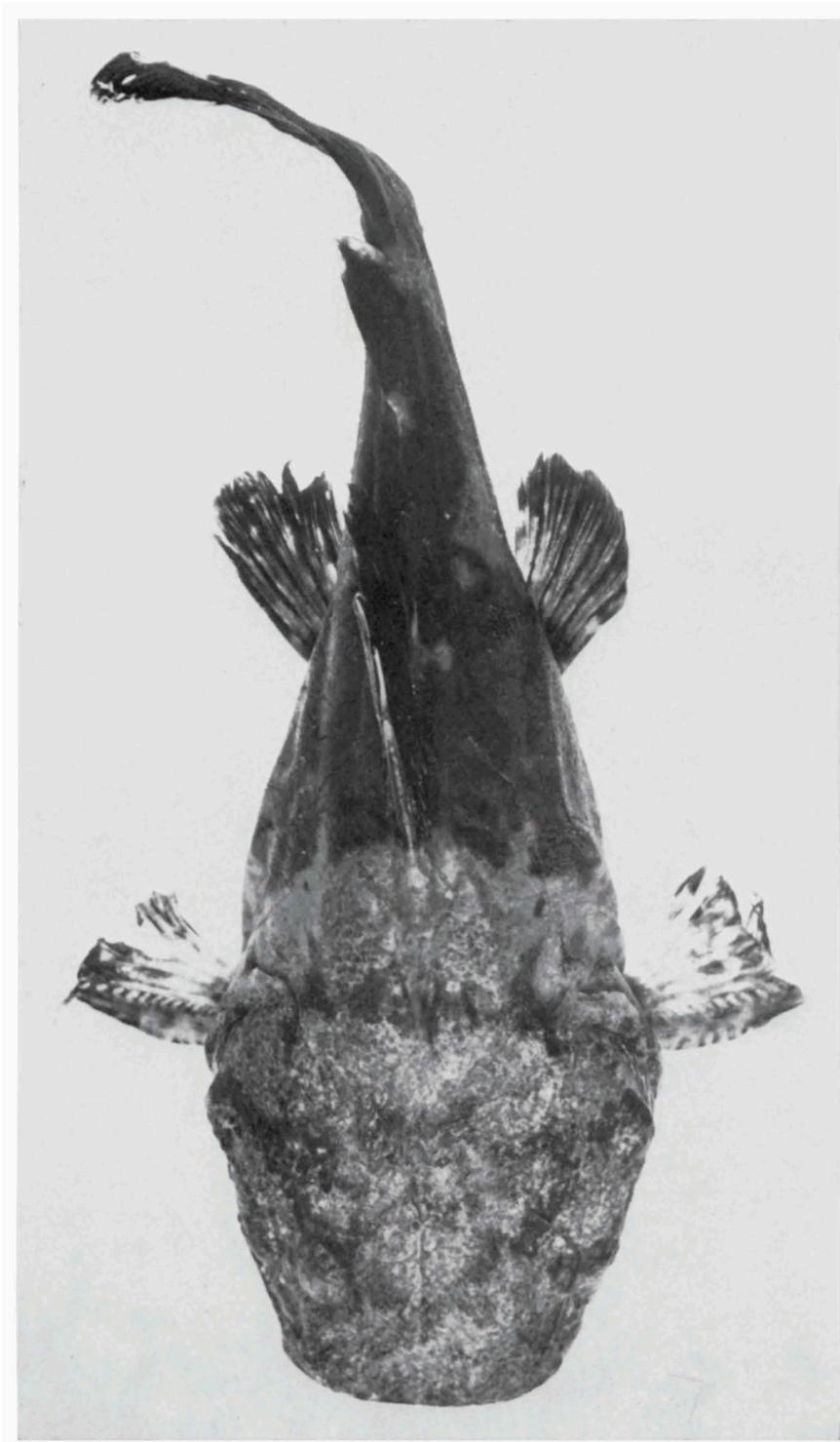
Pseudopimelodus raninus raninus (same specimen as in plate 8); note, compared with
P. zungaro, the broader, heavier head and body.



Pseudopimelodus albomarginatus (RMNH no. 26745, s.l. 85 mm).



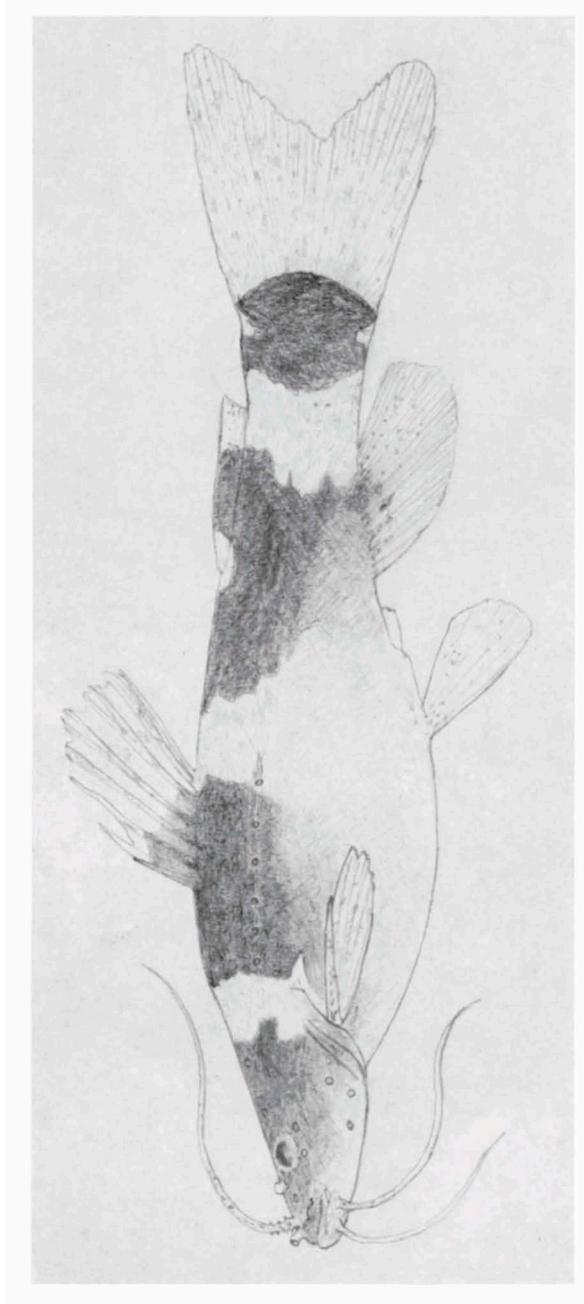
Pseudopimelodus nigricauda (ZMA no. 105948, s.l. 128 mm).



Pseudopimelodus nigricauda (from sample RMNH no. 26743, s.l. 106 mm); note the very broad head, angular at the gape.



Microglanis poecilus (from sample RMNH no. 26076, s.l. 28 mm). 4 X.



Microglanis secundus (ZMA no. 106211, s.l. 30 mm). 4 X.



Brachyplatystoma vaillantii, specimen of ca. 170 cm total length (Brokopondo, 26-II-1964, phot. A. Bakker).