

The freshwater fishes of Java, as observed by Kuhl and van Hasselt in 1820-23

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Roberts, T.R. The freshwater fishes of Java, as observed by Kuhl and van Hasselt in 1820-23. Zool. Verh. Leiden 285, 29.x.1993: 1-94, figs. 1-73, 1 table.— ISSN 0024-1652/ISBN 90-73239-17-6.

Key words: Natuurkundige Commissie voor Nederlandsch Indië; Histoire naturelle des Poissons; G. Cuvier; A. Valenciennes; G. van Raalten; J. C. Werner; P. Bleeker; discovery of new taxa; archives; illustrations; manuscripts; type specimens; *Dermogenys pusilla*.

A catalog of 79 species of freshwater fishes collected by Kuhl and van Hasselt in western Java in 1820-23 is presented, based on examination of publications, archival materials and specimens in Paris and Leiden. Archival material includes copies of their original drawings (many watercoloured) and handwritten descriptions in Latin and German or Dutch of nearly all of their new genera and species in rough drafts and in near final or final version ready for publication. A number of the descriptions, such as that of *Dermogenys pusilla*, include extensive anatomical and biological observations. Study of the manuscripts, drawings, and specimens has resulted in numerous reidentifications and new records, including a number of species not previously reported from Java and some species now perhaps extinct there, e.g. *Chitala lopis* and *Macrochirichthys macrochir*. Type material is identified for most of the species of freshwater fishes based on Kuhl and van Hasselt material. Neotypes are designated for the catfish *Mystus nigriceps* and anabantoid *Trichopsis vittata*. Systematic changes resulting from the present study include placement of *Tor douronensis*, *T. soro* and *T. tambroides* as junior synonyms of *T. tambra*, and *Mystus micracanthus* as junior synonym of *M. nigriceps*.

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Historical introduction

In a small cemetery in the Botanical Gardens at Bogor is the grave of Heinrich Kuhl (died 14 Sept. 1821, age 24) and Johan Coenraad van Hasselt (died 8 Sept. 1823, age 26) (1). Having completed studies at the University of Groningen, the German Kuhl and his younger Dutch friend and colleague van Hasselt were the first appointees to the Natuurkundige Commissie voor Nederlandsche Indië. The Commissie was founded by the Dutch Government, by Royal Decree of 2 May 1820. During the 30 or so years of its existence it made substantial contributions to knowledge of the natural history of the East Indies, but only at a considerable cost in lives of the scientists and their assistants.

Kuhl and van Hasselt, accompanied by the preparator Gerrit van Raalten and artist Gerrit Keultjes sailed on the ship "Nordloh" from the Dutch deepwater port of Texel on 11 July 1820 (Veth, 1879: 25). En route they stopped at Madeira, the Cape of Good Hope, and Cocos Island and studied oceanic organisms including elasmobranch and scombroid fishes. They arrived at Batavia (now Jakarta) in December 1820, and set about investigating and collecting the fauna and flora of Batavia, Buitenzorg (now Bogor) and neighboring areas. The Governor General van der Capellen placed a house at their disposal in Bogor and helped further their work (Veth, 1879: 25). Kuhl died after eight months. Keultjes died two days after Kuhl. Van Hasselt continued the work for another two years before he succumbed after an arduous journey to Bantam in western Java. Van Raalten survived a rhino attack and collected in Java, New Guinea, and Timor until he too died in 1829. Due largely to van

(1) Van Hasselt was born in Doesburg on 24 June 1797 (Veth, 1879: 23; van Steenis-Kruseman, 1950: 303). There is confusion concerning the birthdate and age of Kuhl. Veth, 1879: 24 states that Kuhl was born in Hanau [Hanover] on 17 September 1797, thus making him younger than van Hasselt by three months, and only 23 years old (three days short of his 24th birthday) at the time of his death. However, these calculations are contradicted by Veth, who states that Kuhl was a year older than van Hasselt, and that he died at the age of 25 (op cit.: 24, 26). The tombstone in Bogor gives Kuhl's age at death as 25. Van Steenis-Kruseman (1950: 219), gives Kuhl's birthdate only to year, 1796. I think it is likely that Kuhl was born on 17 September 1796 but have not confirmed this. In this case Kuhl would have been some nine months older than van Hasselt, and three days short of 25 at the time of his death.

Raalten the collections, drawings, and manuscripts of Kuhl and van Hasselt were shipped to Leiden. All of the Javanese marine fishes were collected by van Hasselt after Kuhl's death (van Hasselt's letter of 29 October 1822 to Temminck). Presumably van Raalten prepared all of the many stuffed specimens and skeletons, but the majority of fish specimens were preserved in alcohol. Salomon Müller, a member of the Natuurkundige Commissie who arrived in Java and started collecting freshwater fishes in 1826, might have included Kuhl and van Hasselt fish specimens with some of his shipments, but I have been unable to verify this and think it probably did not occur.

The collections, drawings and manuscripts of Kuhl and van Hasselt sent to the Rijksmuseum van Natuurlijke Historie in Leiden were soon reported on by various zoologists and botanists. Brief sketches of their travels and especially botanical collecting activities, as well as their portraits and biographical references, are to be found in van Steenis-Kruseman (1950: 219-221; 303). A more detailed account of Kuhl and van Hasselt and the history of the Natuurkundige Commissie is given by Veth (1879; including the full text of the decree by King Willem I appointing Kuhl and van Hasselt as naturalists in the East Indies), and by Sirks (1915).

Drawings, most of them probably watercoloured, were made of many of the fishes collected by Kuhl and van Hasselt. Some drawings certainly were done by Keultjes, the official artist of the Commissie. Others were done by Antoine Maurevert, who worked as an artist for Duvaucel and Diard in India, and accompanied Diard to Java. He started working as an artist for the Commissie after the death of Keultjes. Van Raalten also made excellent sketches and watercolours, and did at least some of the freshwater fishes. Perhaps Kuhl and van Hasselt did some drawings themselves. Kuhl, in any event, was a capable illustrator of fishes and birds, as evidenced by the figures in his major published work (Kuhl, 1820). A drawing of an advanced ovarian embryo of the tiny livebearing halfbeak *Dermogenys pusilla* may have been done by van Hasselt. Before shipping the drawings to Holland van Raalten made or had copies made, so that a duplicate set was retained in Java with the Governor General (ref.). It is evidently from this set that P. Bleeker obtained some of the drawings around 1853. Of the original drawings, only a few are in the archives in Leiden.

C.J. Temminck, Director of the Rijksmuseum van Natuurlijke Historie in Leiden, arranged for the fish collections and drawings to be studied by George Cuvier and Achille Valenciennes of the Muséum National de Histoire Naturelle. Cuvier's work on the monumental treatise "Le Règne Animal" was well advanced, and he and Valenciennes were going ahead with the "Histoire naturelle des Poissons". As early as 1815 Cuvier had selected Valenciennes to work with him on the Histoire naturelle des Poissons, and Valenciennes made a series of trips to European museums with important fish collections (Monod, 1963: 12; Bauchot et al., 1990). Valenciennes made two trips to Leiden, one in late 1824 and one in 1827, the primary objective of which evidently was to study the Kuhl and van Hasselt material. Cuvier's stepdaughter Sophie Duvaucel (best known as an epistolier to Stendhal and other literati) may have accompanied Valenciennes to Leiden on one or both trips. Valenciennes examined specimens in Leiden, making pencil drawings of several of them, and also made watercolored copies of many of the original drawings sent from Java. Watercoloured copies of many of the original drawings were also made by Sophie, possibly in Leiden. The artist J.C. Werner, who prepared many of the fish drawings published in Le Règne Animal and the Histoire naturelle des Poissons did original drawings of a

considerable number of Kuhl and van Hasselt freshwater fish specimens from Java, only a few of which were published in the *Histoire naturelle des Poissons*.

While some Kuhl and van Hasselt specimens were loaned or given to Cuvier and Valenciennes by Temminck, and could be studied later in Paris (Monod, 1963: 12), most of the study of the actual specimens evidently was completed in Leiden by Valenciennes. Complete descriptions of at least some definitely were prepared in Leiden, as were drawings of many specimens. Copies of all or nearly all of the original Kuhl and van Hasselt drawings were prepared and annotated with data on fin ray counts by Cuvier, Valenciennes, and Sophie on tracing paper (calque), and these provided the main or sole basis for the published descriptions of many of the species. Many of the copies are signed and dated "A. Val. Leyde 1824" or "A. Val. Leyde 1827". They are stored in the archives of the Bibliothèque Centrale of the Muséum national d'Histoire naturelle (Bibl. MNHN). So far as I have been able to ascertain, Cuvier and Valenciennes did not consult any of the unpublished descriptions by Kuhl and van Hasselt.

Valenciennes certainly visited Leiden in 1824, and apparently also in 1827. In 1824 he examined mainly the freshwater fishes collected by Kuhl and van Hasselt, which had already arrived in Leiden, while in 1827 he examined some additional freshwater fishes but mainly marine fishes collected by van Hasselt after Kuhl's death, which presumably did not reach Leiden until after 1824. That Valenciennes visited Leiden in december 1824, and was sent by Cuvier, is recorded in an annual report by Temminck (pers. commun. M. Boeseman). There are numerous drawings (actually copies of Kuhl and van Hasselt freshwater fish originals) signed "A. Val. Leyde 1824". Other similar drawings of fishes signed "A. Val. Leyde 1827", including a few of freshwater fishes recorded herein, are my only evidence of his visit in 1827. There is a manuscript by Valenciennes dated "Leyde 1822" (see account of this manuscript under *Macrochirichthys macrochir*) indicating that he also may have visited Leiden in 1822. Copies of drawings by Sophie Duvaucel are dated 1824 and 1827 but without indication of where they were done. I have no convincing evidence that Sophie D. or Sophie (as her drawings are usually signed or ascribed) visited Leiden, but at the same time there is no convincing evidence that the originals were taken or sent to Paris.

The present study of Kuhl and van Hasselt materials has led to identification of some hitherto unidentified but available nominal species, and reidentifications of some previously misidentified ones. In addition, a number of freshwater fishes collected by them are represented by specimens in Leiden, and are now reported for the first time, notably two species of *Anguilla*, *Chitala lopsis*, and several catfishes of the families Siluridae and Bagridae. Kuhl and van Hasselt collected at least 79 species of freshwater fishes in a relatively circumscribed area in western Java. Their freshwater fish discoveries include three new families (Akysidae, Helostomatidae and Rhyacichthyidae), 25 new genera, and more than 50 new species. I have been able to identify type specimens or confirm status of type specimens for many species described from their material.

Presumably all or all but a very few of the freshwater fish species collected by Kuhl and van Hasselt in Java are accounted for in the present study. This is based on the presumption, not necessarily true, that very nearly all species they collected eventually reached Europe and were mentioned in their various manuscripts and notes. At least in one instance, that of *Akysis variegatus*, a species collected by Kuhl and van Hasselt can be attributed to them only on the basis of a drawing seen by Bleeker in Java (now lost). They may also have collected the large and distinctive sil-

urid catfish *Wallago attu* (Bloch and Schneider, 1801), as indicated by an entry for "*Siluris walago* Cuv. 1 individu" in the manuscript "Catalogue des Poissons de Kuhl & van Hasselt". Bleeker (1858: 24) also noted the same or a similar entry in another manuscript, now lost, "list of Kuhl and van Hasselt fishes sent to Leiden", and presumed from this that they had indeed collected *Wallago attu* (referred to by Bleeker as *Wallago russellii*). This record cannot be confirmed, however, because no Kuhl and van Hasselt drawing or specimen of *W. attu* has been found in Leiden or in Paris. Kuhl and van Hasselt collected many species of the catfish family Ariidae, probably all marine species. Freshwater Ariidae have not been well documented for Java and are evidently poorly represented or even absent.

Sources of information

In October and December 1822 van Hasselt sent two letters to C.J. Temminck with manuscript names and brief notes prepared by himself and Kuhl for many of the fishes they had collected. Extracts or "Uittreksels" of these letters, prepared (or edited) by Temminck, were published in the first and second volumes of the *Algemeene Konst-en Letterbode* in 1823 (van Hasselt, 1823a,b,c). The next year a French translation of the Uittreksels was published (van Hasselt, 1824a,b). The translation may have been done by Temminck, or H. Boie, perhaps with help from Valenciennes. The text follows that of the original Dutch Uittreksels; there are a number of changes in spelling of scientific names, all without nomenclatural significance. An English translation by M. Boeseman (then Curator of Fishes at the Rijksmuseum) was published in Alfred, 1961. The original letters are missing, but drafts in van Hasselt's handwriting are stored in the archives of the *Natuurkundige Commissie* in the RMNH. Publication of the letters in full would be worthwhile, for they mention numerous species and manuscript names (e.g., of catfishes and snakeheads), localities, figures and other information not present in the Uittreksels.

The archives in Leiden also include substantial other early manuscript material directly related to the Kuhl and van Hasselt fish collections. One is a twelve-page list entitled "Catalogue des Poissons de Kuhl & van Hasselt" including some 424 species, all identified to genus, and the great majority to species, many with unpublished manuscript names of Kuhl and van Hasselt or of Cuvier and Valenciennes. Unfortunately the list is undated and unsigned, and it is not known who prepared it. There is some indication that it may have been based on an earlier list of 420 species which has not survived. The list includes only some 60 freshwater species, so is far from complete. A few manuscript names in the list I have been unable to connect directly to any specimens, particularly "*Labeobarbus seriatus* K. v. H.", and "*Silurus pabuoides* Cuv. Val." Some notes in the main list help clarify or confirm synonymy worked out by other means, such as *Cyprinus bramoides* = *Barbus hypselonotus*, *Cyprinus marginatus* = *B. obtusirostris*, *Barbus rubripinna* = *Hampala macrolepidota*, *Homaloptera ocellata* = *H. javanica* and *Ophiocephalus acutirostris* = *O. micropeltes*. The list concludes with a short list of twelve nominal species of "Poissons dont Mr. van Hasselt a fait mention dans ses lettres, & que nous n'avons pas retrouve jusqu'alors". The freshwater species are *Dermogenys*, *Odontopsis armata*, *Barbus tambra*, *Diplocheilus erythropterus*, *Nomaechilus* [sic] *fasciatus*, *Acanthophtalmus fasciatus*, and *A. javanicus*. All of these species can be

identified. *Diplocheilus erythropterus* was received in Leiden as *Labeo scabrosus*, and the *Nemacheilus fasciatus* probably was included with material labelled *N. chrysolaimos*.

The author of the list just mentioned is unclear. It might have been made by Hendrik Boie, Heinrich Macklot, or Pieter van Oort. Boie and Macklot left for Java as members of the Natuurkundige Commissie, with van Oort as artist and Salomon Müller as preparator, at the end of 1825. The same person who did the list also prepared an extensive manuscript, with original drawings or rough sketches in pen and pencil, of many or even most of the Kuhl and van Hasselt fishes. If the list and manuscript were prepared by either Boie or Macklot, it must have been done sometime between Valenciennes's visit to Leiden in 1824 and their departure for Java before the end of 1825. This would imply however, that all or nearly all of the Kuhl and van Hasselt fish specimens arrived in Leiden by 1824 or 1825, which seems unlikely. Of the identified handwriting samples of various persons working in Leiden around 1820-1840, those of Macklot and especially Boie seem most like the handwriting in the list and in the manuscripts under discussion. An anatomical drawing of birds (*Philedon corniculatus* and *Philedon* nov. spec. from the Rivier Dourga, 26 May 1825) is labelled in handwriting identical to that in the "Catalogue of fish collected by Kuhl & van Hasselt". The drawing is apparently signed by van Oort, but it has not been confirmed that this is in fact his signature or his handwriting. It seems more likely that the extensive descriptions and drawings or rough sketches of Kuhl and van Hasselt specimens were done by Macklot or Boie than by van Oort.

Nearly all of the original Kuhl and van Hasselt drawings of Javanese freshwater fishes have been lost or misplaced. The present whereabouts are known for only a very few, all of them in Leiden. These include watercoloured original drawings of *Silurichthys hasselti*, *Syngnathus fluviatilis* (published in Bleeker, 1983, pl. 450, fig. 12), *Anabas testudineus*, *Belontia hasselti*, *Helostoma temminckii*, *Channa lucius*, and two unidentified small sicydiin gobies. Apparently most of the originals were missing by the time Pieter Bleeker returned from Java to Holland in 1860. Bleeker saw originals or duplicates of at least 20 Kuhl and van Hasselt drawings of freshwater fishes, presumably duplicates made by van Raalten that had been left in Java. Had he seen them all, he would have been able to identify virtually every one of their species for which drawings had been made, thus avoiding much of the confusion which has remained until now.

With the exception of the few originals in the Rijksmuseum van Natuurlijke Historie in Leiden, Kuhl and van Hasselt's freshwater fish drawings are known only by the copies in the archives of the Bibliothèque Centrale in Paris. These are filed with other material under "Cuvier and Valenciennes, Histoire naturelle des Poissons, MS 480-558." In October 1991 and August-September 1992 I looked in these archives for drawings of freshwater fishes collected by Kuhl and van Hasselt. The drawings are quite diverse, including 1) watercolour or ink copies on tracing paper (calque) of original drawings of Kuhl and van Hasselt, mostly by Valenciennes or Sophie Duvaucel; 2) originals or copies of drawings of specimens by Valenciennes; and 3) unpublished original drawings and proof sheets of drawings by Werner of several catfishes, the loach *Acantopsis dialuzona* and the loach goby *Rhyacichthys aspro*. There are also manuscripts of descriptions of several species by Valenciennes for the Histoire naturelle des Poissons (including an unpublished description of *Acantopsis dialuzona*).

In addition to the specimens preserved in alcohol, there is important material of

skeletons and stuffed specimens, including some species (notably *Chitala lopis*, *Labeo erythropterus*) not otherwise represented in their collections. All of the stuffed specimens and skeletons examined by me are in Leiden and bear RMNH catalog numbers. According to M. Boeseman (pers. commun.) there are also some stuffed specimens in Paris. Many of the stuffed specimens and skeletons in Leiden bear very early labels, but it is unclear whether these were made in Java or after the specimens had arrived in Leiden. The alcohol specimens only have labels made after the specimens arrived in Leiden. The stuffed specimens are all varnished, and many of them were painted before varnishing. Several stuffed specimens of Cyprinidae (*Barbichthys laevis*, *Rasbora lateristriatus*, *Tor tambra*) and other fishes were painted with particularly distinct spots on the scales or stripes and evidently were subsequently used as models for water-coloured drawings, thus resulting in slightly surreal colour patterns.

The most interesting archival documents are of course the unpublished original descriptions by Kuhl and van Hasselt themselves of the great majority of the new genera and species of fishes (marine as well as freshwater), discovered by them on their sea voyage as well as in Java. The rough drafts of the descriptions, especially those by Kuhl, are somewhat difficult to read, but the final versions by van Hasselt are very carefully written and on the whole very legible. Many of the accounts include extensive observations on anatomy, food habits, and reproductive anatomy and would certainly repay careful study. Limitations of time and funding that could be devoted to this research have prevented me from a more thorough investigation of these manuscripts.

The arrival of Kuhl and van Hasselt's materials on Javanese fishes (letters, notes, manuscripts, drawings, and specimens) in Leiden was spread over a period of some 40 years, from 1821 or 1822 (the first letters from van Hasselt) to 1860 or later. Most of the drawings and specimens of freshwater fishes presumably arrived before Valenciennes's visit in December 1824, those of marine fishes in time for Valenciennes to work on them in Leiden or Paris in 1827. A large shipment of Kuhl and van Hasselt's manuscripts and 1200 drawings were received on 24 December 1825 (Veth, 1879: 38). Additional drawings and specimens may have been included in shipments from Salomon Müller and other members of the Natuurkundige Commissie, but this is difficult to document or date. The date of arrival of all of the notes and manuscripts on Kuhl and van Hasselt fishes (including specimen lists, and the extensive drawings and manuscripts by a person or persons unknown) is not clear, some or all of them evidently not arriving until after the death of Forsten in 1843. Finally, some of the drawings found by Bleeker in Java presumably were brought to Leiden after his return to Holland in 1860 (but the great majority of them cannot be located now).

If one had to choose a single ichthyological discovery representative of Kuhl and van Hasselt, it might well be the little viviparous halfbeak *Dermogenys pusilla*. This fish was discovered while they were both still alive, and they worked on it together. The archival materials include a rough draft of its description apparently written by Kuhl, the final draft of the description by van Hasselt, a copy of their original watercoloured drawing, and their original drawings of its soft anatomy and of a late ovarian embryo. The description provides the first account of the gonopodium of a viviparous halfbeak. These illustrations are reproduced here for the first time and the full text of van Hasselt's final draft of the description is given in the systematic account of *D. pusilla*.

Table 1. List of Kuhl and van Hasselt freshwater fishes from Java.

ANGUILLIDAE*Anguilla bicolor* McClelland, 1844*Anguilla marmorata* Quoy & Gaimard, 1824**MURAENIDAE***Gymnothorax polyuranodon* (Bleeker, 1853)**Notopteridae***Chitala lopis* (Bleeker, 1851)*Notopterus notopterus* (Pallas, 1769)**CYPRINIDAE***Barbichthys laevis* (Valenciennes in Cuvier & Valenciennes, 1842)*Crossocheilus oblongus* Kuhl & van Hasselt in van Hasselt, 1823*Cyclocheilichthys apogon* (Valenciennes in Cuvier & Valenciennes, 1842)*Cyclocheilichthys armatus* (Valenciennes in Cuvier & Valenciennes, 1842)*Cyprinus carpio* Linnaeus, 1758*Hampala macrolepidota* (Valenciennes in Cuvier & Valenciennes, 1842)*Labeo erythropterus* Valenciennes in Cuvier & Valenciennes, 1842*Labiobarbus leptocheilus* (Valenciennes in Cuvier & Valenciennes, 1842)*Lobocheilos falcifer* (Valenciennes in Cuvier & Valenciennes, 1842)*Luciosoma setigerum* (Valenciennes in Cuvier & Valenciennes, 1842)*Macrochirichthys macrochir* (Valenciennes in Cuvier & Valenciennes, 1844)*Mystacoleucus marginatus* (Valenciennes in Cuvier & Valenciennes, 1842)*Osteochilus hasselti* (Valenciennes in Cuvier & Valenciennes, 1842)*Osteochilus microcephalus* (Valenciennes in Cuvier & Valenciennes, 1842)*Oxygaster anomalura* van Hasselt, 1823*Puntius binotatus* (Valenciennes in Cuvier & Valenciennes, 1842)*Puntius bramoides* (Valenciennes in Cuvier & Valenciennes, 1842)*Puntius lateristriga* (Valenciennes in Cuvier & Valenciennes, 1842)*Puntius orphoides* (Valenciennes in Cuvier & Valenciennes, 1842)*Rasbora lateristriata* (Bleeker, 1854)*Tor tambra* (Valenciennes in Cuvier & Valenciennes, 1842)**COBITIDIDAE***Acantopsis dialuzoña* van Hasselt, 1823*Homaloptera ocellata* van der Hoeven, 1830*Homaloptera wassinki* Bleeker, 1853*Lepidocephalichthys hasselti* (Valenciennes in Cuvier & Valenciennes, 1846)*Nemacheilus chrysolaimos* (Valenciennes in Cuvier & Valenciennes, 1846)*Nemacheilus fasciatus* (Valenciennes in Cuvier & Valenciennes, 1846)*Pangio kuhlii* (Valenciennes in Cuvier & Valenciennes, 1846)*Pangio oblongus* (Valenciennes in Cuvier & Valenciennes, 1846)**BAGRIDAE***Leiocassis poecilopterus* (Valenciennes in Cuvier & Valenciennes, 1840)*Leiocassis stenomus* (Valenciennes in Cuvier & Valenciennes, 1840)*Mystus gulio* (Hamilton, 1822)*Mystus macronema* (Bleeker, 1846)*Mystus nemurus* (Valenciennes in Cuvier & Valenciennes, 1840)*Mystus nigriceps* (Valenciennes in Cuvier & Valenciennes, 1840)*Mystus planiceps* (Valenciennes in Cuvier & Valenciennes, 1840)*Mystus wyckii* (Bleeker, 1858)

CLARIIDAE

Clarias cf. batrachus Linnaeus, 1758

Clarias nieuhofi Valenciennes in Cuvier & Valenciennes, 1840

PANGASIIDAE

Pangasius djambal Bleeker, 1846

SISORIDAE

Glyptothorax platypogon (Valenciennes in Cuvier & Valenciennes, 1840)

AKYSIDAE

Akysis variegatus (Bleeker, 1847)

SILURIDAE

Kryptopterus bicirrhis (Valenciennes in Cuvier & Valenciennes, 1840)

Ompok hypophthalmus (Bleeker, 1846)

Silurichthys hasseltii Bleeker, 1858

CYPRINODONTIDAE

Aplocheilus panchax (Hamilton, 1822)

HEMIRAMPHIDAE

Dermogenys pusilla van Hasselt, 1823

Zenarchopterus dispar (Valenciennes in Cuvier & Valenciennes, 1846)

SYNGNATHIDAE

Doryichthys deokhatoides (Bleeker, 1853)

MUGILIDAE

Cestraeus oxyrhyncus Valenciennes in Cuvier & Valenciennes, 1836

ANABANTIDAE

Anabas testudineus (Bloch, 1795)

BELONTIIDAE

Belontia hasselti (Cuvier in Cuvier & Valenciennes, 1831)

Betta picta (Valenciennes in Cuvier & Valenciennes, 1846)

Trichogaster trichopterus (Pallas, 1770)

Trichopsis vittata (Cuvier in Cuvier & Valenciennes, 1831)

OSPHRONEMIDAE

Osphronemus goramy Lacepède, 1802

HELOSTOMATIDAE

Helostoma temminckii Cuvier, 1829

CHANNIDAE

Channa gachua (Hamilton, 1822)

Channa lucius (Cuvier in Cuvier & Valenciennes, 1831)

Channa micropeltes (Cuvier in Cuvier & Valenciennes, 1831)

Channa striata (Bloch, 1793)

RHYACICHTHYIDAE

Rhyacichthys aspro (Valenciennes in Cuvier & Valenciennes, 1837)

ELEOTRIDIDAE

Belobranchus belobranchus (Valenciennes in Cuvier & Valenciennes, 1837)

Eleotris fusca (Bloch & Schneider, 1801)

Ophiocara porocephala (Valenciennes in Cuvier & Valenciennes, 1837)

GOBIIDAE

Aulopareia unicolor (Valenciennes in Cuvier & Valenciennes, 1837)

Sicyopterus cf. *cynocephalus* (Valenciennes in Cuvier & Valenciennes, 1837)

Sicyopus cf. *balinense* (Bleeker, 1857)

Stiphodon cf. *elegans* (Steindachner, 1879)

Gen. & spec. undet.

MASTACEMBELIDAE

Macrogathus maculatus (Cuvier in Cuvier & Valenciennes, 1831)

Mastacembelus unicolor (Cuvier in Cuvier & Valenciennes, 1831)

SYNBRANCHIDAE

Monopterus albus Zuiew, 1793

TETRAODONTIDAE

Tetraodon nigroviridis Marion de Procé, 1822

INCERTAE SEDIS

"*Cirrhina breviceps*" Valenciennes in Cuvier & Valenciennes, 1842

"*Pimelodus javus*" Valenciennes in Cuvier & Valenciennes, 1840

Barbinae gen. and spec. undet.

Systematic account

This systematic account includes only citations of literature dealing directly with the specimens or the drawings based on specimens of freshwater fishes collected by Kuhl and van Hasselt in Java in 1820-23. It includes an annotated listing of their drawings and specimens. Only specimens collected by Kuhl and van Hasselt are indicated under the heading "Specimens". Specimens of other collectors or with unknown collectors (possibly including some collected by Kuhl and van Hasselt) are mentioned under "Comments". Particular effort was made to provide localities, lengths of actual specimens and their lengths in drawings, for such information may be essential in identifying original drawings and/or type specimens of species collected by Kuhl and van Hasselt. For the same reasons I have tried to document all nomina nuda and unpublished or manuscript names employed by Kuhl and van Hasselt. Identification and publication of these names herein should not be construed as making them available for zoological nomenclature. When no locality data is provided, it may be assumed that the only information available is "collected by Kuhl and van Hasselt in Java."

For drawings, the total length (TL) and standard length (SL) are given as if taken from an actual specimen, even though they may not correspond with the length of the actual specimen drawn. For the copies of Kuhl and van Hasselt original drawings, we do not know the scale employed, but in most instances it probably is not one to one. On many of the Werner drawings the scale is indicated, and most often it is one to one (i.e., natural size or "grandeur naturelle"). Whenever scale is indicated

on the drawings it is mentioned in the catalog below. Standard length in mm has been recorded for all specimens examined by me (including stuffed specimens and skeletons). Cuvier and Valenciennes and Kuhl and van Hasselt recorded total length in feet, inches, and lines (with a foot equal to 12 inches, and a line equal to $\frac{1}{12}$ of an inch). Cuvier and Valenciennes used the French inch, 27.07 mm (foot = 324.5 mm; line = 2.25 mm). Kuhl and van Hasselt might also have used the French system, but more likely used the Amsterdam inch (25.47 mm) or the German (Rhineland or Prussian) inch (26.15 mm).

All of the drawings and specimens indicated in this account as Kuhl and van Hasselt materials are identifiable as such by their current labels and/or catalog entries or known history (e.g., in the case of original drawings still in Leiden). What appear to be original labels done in Java are still attached to some of the mounted skeletons and dried specimens. These are recognizable by a fine multilined red border and formal handwriting, always with the information "Kuhl & van Hasselt" (or a variant thereof), a manuscript scientific name, and sometimes a vernacular name and collecting locality. Specimens preserved in alcohol in Leiden only have labels made later, again invariably with "Kuhl & van Hasselt" and the locality almost always simply "Java". So for the great majority of specimens more specific locality information is unavailable; whenever such information is available it has been given in the catalog below.

RMNH is for Rijksmuseum van Natuurlijke Historie in Leiden (the name recently has been changed to Nationaal Natuurhistorisch Museum). MNHN is for Muséum National d'Histoire Naturelle, Paris. The code number after each drawing (in parentheses) is that employed in Mss 480-558 containing the archival material for the "Histoire naturelle des Poissons" in the Bibliothèque Centrale, MNHN. The Roman numeral at the beginning of each code represents the number of the relevant volume of the Histoire. The rest of the code refers to the sequence of the documents within each file.

ANGUILLIDAE

Anguilla bicolor McClelland, 1844

Drawings.— None.

Specimens.— RMNH 3658, 620 mm (previously identified as *A. sidat* Bleeker, 1853); MNHN 3788, 428 mm, Java (previously identified as *Anguilla mowa* Bleeker, 1853; dorsal fin origin only slightly in advance of vertical through anal fin origin; dorsal fin rays 230; anal fin rays 220; vertebrae 37+73 = 110); RMNH 2035, 460 mm, stuffed.

Anguilla marmorata Quoy & Gaimard, 1824

Drawings.— None found.

Specimens.— RMNH 3743, 455 mm (marbled coloration well developed; dorsal fin origin far in advance of anal); RMNH 2310, 940 mm, stuffed (previously identified as "*Anguilla malgumora* Kaup"); RMNH 357, 800 mm skeleton (dorsal fin very

much longer than anal, its origin over vertebra 21; dorsal fin rays about 295; anal fin rays about 210; vertebrae 40?+63? = 103).

Comments.— Although no locality data are associated directly with any of the specimens reported, a manuscript in Kuhl's handwriting reads in part "*Muraena marmorata* Nobis [i.e., new combination]. Tab. nostra. Lubang. Buitenzorg im Tjihalliwoem. Tjisatani. In seinem Magen fandem wir überreste von *Clarias batrachus* u von Krebsen. Longitudo tota 3,1,6 [1023 mm]." The manuscript includes observations on respiration, circulation, digestive system, gonads, etc.

MURAENIDAE

Gymnothorax polyuranodon (Bleeker, 1853)

Drawings.— None.

Specimens.— RMNH 3801, 371 mm (with manuscript name "*Muraena blematigrina*").

Comments.— Of the 100 species of the predominantly marine eel family Muraenidae, this is exceptional in that the adults are usually encountered in freshwater, often in mountain streams. Weber & de Beaufort, 1916: 370 give locality records for Java, Sumatra, Borneo, Philippines, Sulawesi, Buru, Ambon, Ceram, Waigeu, northern New Guinea (rivers of Humboldt Bay), and Fiji. Dingerkus and Seret (pers. commun.) recently collected it in a mountain stream in New Caledonia.

NOTOPTERIDAE

Chitala lopis (Bleeker, 1851)

Drawings.— None.

Specimens.— RMNH 1655, 430 mm, stuffed; RMNH 2329, 663 mm, stuffed (both specimens previously identified as "*Notopterus capirat*" [sic; = *N. notopterus*]).

Comments.— This species may be extinct on Java. The only other specimen known from Java, the holotype of *C. lopis*, was collected by Bleeker about 1850; the species also has been recorded from Sumatra, Borneo, the Malay peninsula, and the Meklong and Chao Phraya basins of Thailand (Roberts, 1992a).

There is no precise locality information directly accompanying the two Kuhl and van Hasselt specimens recorded here, but a brief manuscript note by van Hasselt apparently is based on the 430 mm specimen; it reads, in part, "Nova species Gymnoti Pallas. Balida. Zunda. in fluv. Pontang prope Pameraya... long. 1,4,0 [442 mm TL]."

Notopterus notopterus (Pallas, 1769)

Notopterus bontianus Valenciennes in Cuvier & Valenciennes, 1848: 147 (type locality Irrawaddy and Java, but description based on specimen from Irrawaddy).

Drawings.— None.

Specimens.— MNHN 3616, 285 mm, syntype *N. bontianus*; RMNH 3324, 191 mm; RMNH 371, about 260 mm, incomplete skeleton.

CYPRINIDAE

Barbichthys laevis (Valenciennes in Cuvier & Valenciennes, 1842)
(fig. 1)

Barbus laevis Valenciennes in Cuvier & Valenciennes, 1842: 192 (type locality Buitenzorg and Sarayevi).
Dangila lipocheila Valenciennes in Cuvier & Valenciennes, 1842 (partim; specimen "long de huit pouces").

Drawings.— Partially watercoloured copy of original drawing, with manuscript name *Barbus nudicephalus* and remark "calqué par Melle Sophie 1827"; TL 272 mm, SL 205 mm (XVI B 32).

Specimens.— RMNH 2531, 160 mm (possibly holotype *B. laevis*; syntype *D. lipocheila*); RMNH 1811, 152 mm and RMNH 1812, 202 mm, stuffed, possibly syntypes *B. laevis*; none at MNHN.

Crossocheilus oblongus Kuhl & van Hasselt, 1823
(fig. 2)

Crossocheilus oblongus Kuhl & van Hasselt in van Hasselt, 1823c: 132 (type locality Java).
Labeo oblongus Valenciennes in Cuvier & Valenciennes, 1842: 357 (type locality Buitenzorg).

Drawings.— Watercolour copy by Sophie of original drawing, with accurate notation of fin ray counts by Valenciennes; TL 125 mm, SL 99 (XVI C 79).

Specimens.— RMNH 2640, 70.5 mm (probable holotype or syntype *C. oblongus*; rostral fimbriae 17); RMNH 1755, 96 mm, RMNH 1756, 112 mm, RMNH 1757, 145 mm, stuffed specimens; RMNH 380, 140 mm, skeleton (vertebrae 19?+13? = 32).

Cyclocheilichthys apogon (Valenciennes in Cuvier & Valenciennes, 1842)

Barbus apogon Valenciennes in Cuvier & Valenciennes, 1842: 392 (type locality Java).

Drawings.— Unpublished original drawing by Werner; "grandeur naturelle" TL 155 mm, SL 117 mm (XVI B 49).

Specimens.— RMNH 2509, 111 mm (with manuscript name "*Leuciscus schlegelii* Cuvier & Valenciennes"); RMNH 2446, 2: 86.3-96.8 mm; RMNH 2103, 124 mm, Buitenzorg, stuffed (previously identified as *Barbus marginatus*); RMNH 1735, 134 mm, RMNH 1736, 130 mm, stuffed; none in Paris.

Cyclocheilichthys armatus (Valenciennes in Cuvier & Valenciennes, 1842)
(fig. 3)

Barbus armatus Valenciennes in Cuvier & Valenciennes, 1842: 163 (type locality Java).

Drawings.— Watercolour copy of original drawing; TL 134 mm, SL 103 mm (XVI B 13); copy by Sophie? of original drawing done by Valenciennes Leiden 1824; “grandeur naturelle” TL 205, SL 160 (XVI B 13bis).

Specimens.— RMNH 2502, 157 mm, holotype or syntype; none in Paris.

Comments.— The description reads as if it was based on a single specimen. The remark by Valenciennes, “j’ai vu de ces poissons, longs de sept pouces et demi, parmi les collections faites a Java par MM. Kuhl et Van Hasselt” implies that he saw two or more specimens of about the same length. Only one has been located.

Cyprinus carpio Linnaeus, 1758

Cyprinus floripenna van Hasselt, 1823c: 132 (nomen nudum).

Cyprinus flavipinnis Valenciennes in Cuvier & Valenciennes, 1842: 71, fig. 457 (type locality Buitenzorg).

Drawings.— None found; fig. 457 by Acarie-Baron presumably based on Kuhl and van Hasselt drawing.

Specimens.— MNHN B.674, 130 mm, possibly holotype *C. flavipinnis*; RMNH 1872, 180 mm, RMNH 1875, 265 mm, and RMNH 1876, 275 mm, stuffed specimens labelled *C. flavipinna*.

Comments.— According to Valenciennes the description of *Cyprinus flavipinnis* is based solely on an original drawing of Kuhl and van Hasselt, but MNHN B.674 could have been the specimen drawn. Another possibility is that fig. 457 was based upon this specimen rather than on a Kuhl and van Hasselt drawing.

The Kuhl and van Hasselt material may represent the earliest record of the introduced carp in Java.

Hampala macrolepidota (Valenciennes in Cuvier & Valenciennes, 1842)

Hampala macrolepidota Kuhl & van Hasselt in van Hasselt, 1823c: 132 (nomen nudum; Buitenzorg).

Capoeta macrolepidota Valenciennes in Cuvier & Valenciennes, 1842: 280 (type locality Java).

Drawings.— Ink tracing of original drawing of unidentified barbine (no barbels shown), possibly *H. macrolepidota*, labelled “Lac Dano”; TL 135 mm (XVI B 17).

Specimens.— MNHN 89, 95.6 mm, holotype (gill rakers on first gill arch 1+8 = 9, vertebrae 19+12 = 31); RMNH 2518, 88.8 mm; RMNH 1798, 276 mm, Buitenzorg, and RMNH 1799, 228 mm, Buitenzorg, stuffed specimens; RMNH 383, 312 mm, skeleton (gill rakers 1 or 2+8 = 9 or 10, vertebrae 19?+13? = 32); RMNH 388, 181 mm, skeleton (vertebrae 19+13 = 32).

Labeo erythropterus Valenciennes in Cuvier & Valenciennes, 1842 (figs. 4-6)

Deplocheilus erythropterus van Hasselt, 1823c: 133 (Buitenzorg) (nomen nudum).

Labeo erythropterus Valenciennes in Cuvier & Valenciennes, 1842: 354 (Bantam).

Drawings.— Watercolour copy “calqué par Melle Sophie D.” of original drawing; TL 228 mm, SL 170 mm (XVI C 78); pencil drawing (by Valenciennes), with manuscript names “*Diplocheilus erythropterus*” and “*Labeo scabrosus*”; “1/3 grandeur naturelle”; TL 218 mm, SL 175 mm (XVI C 77).

Specimens.— RMNH 2277, 516 mm, stuffed, holotype (excellent condition; scales in lateral series 37, predorsal 19, transdorsal 15, transverse 8/1/4; dorsal fin rays iii11); RMNH 389, 165 mm, skeleton (excellent condition; vertebrae 23+16 = 39).

Comments.— *Labeo erythropterus* is known only from a very few specimens, and has been recorded until now only from Java (Bleeker, 1862: 53; Weber & de Beaufort, 1916: 213). The Zoological Museum of Amsterdam has a single large specimen from Air Penatai, Kurintji, Sumatra, collected in 1915 by E. Jacobson (ZMA 120.816, 395 mm). In the holotype (and in the specimen from Sumatra) the exposed shield of the scales is very rough, presumably the basis for the manuscript name “*Labeo scabrosus*”.

Labiobarbus leptocheilus (Valenciennes in Cuvier & Valenciennes, 1842)

(fig. 7)

Labiobarbus leptocheilus van Hasselt, 1823c: 132 (nomen nudum).

Dangila leptocheila Valenciennes in Cuvier & Valenciennes, 1842: 234 (type locality Batavia).

Dangila kuhlii Valenciennes in Cuvier & Valenciennes, 1842: 231 (type locality Java).

Drawings.— Watercolour copy of original drawing, labelled *L. leptocheilus* and *Dangila kuhlii*; TL 86 mm, SL 65 mm (XVI B 75).

Specimens.— None found in Paris, but according to Valenciennes in Cuvier & Valenciennes, 1842: 232, holotype *D. kuhlii* should be in MNHN. RMNH 2109, 96 mm, 2110, 96 mm, stuffed specimens.

Lobocheilos falcifer (Valenciennes in Cuvier & Valenciennes, 1842)

(figs. 8-9)

Lobocheilus falcifer Kuhl & van Hasselt in van Hasselt, 1823c: 134-5 (nomen nudum).

Labeo falcifer Valenciennes in Cuvier & Valenciennes, 1842: 358 (type locality Buitenzorg).

Labeo hispidus Valenciennes in Cuvier & Valenciennes 1842: 356 (type locality Buitenzorg).

Chondrostoma lipocheilos Valenciennes in Cuvier & Valenciennes, 1844: 400, fig. 513 (type locality Java).

?*Barbus hasselti* Bleeker, 1857: 355 (type locality Sadingwetan).

?*Lobocheilos?* (*Lobocheilos?*) *hasselti* Bleeker, 1860: 146, 154 (tentative placement in *Lobocheilos*).

Drawings.— Ink outline, by Cuvier 1824, of original drawing or of copy of drawing of *L. falcifer* (XVI C 82); watercolour copy of original drawing of *L. falcifer* made in Leiden by Sophie; TL 249 mm, SL 185 mm (XVI C 81); watercolour copy of original drawing by Valenciennes, with remark “calque commencé par moi je n’ai pas fini parceque Melle Sophie en a fait un”; TL 250 mm, SL 188 mm (XVI C 83); watercolour copy of original drawing of *L. hispidus* by “Melle Sophie D.”; TL 95 mm, SL 74 mm (XVI C 80).

Specimens.— MNHN 3865, 220 mm, holotype *Labeo falcifer*; MNHN 1894, 71.8 mm, holotype *Chondrostoma lipocheilos*; RMNH 2482, 62.5 mm; RMNH 2597, 3: 53.5-

98.0 mm; RMNH 2614, 217 m (gill rakers 9+31 = 40); RMNH 1800, 156 mm, RMNH 1801, 218 mm, Buitenzorg, RMNH 1802, 199 mm, Buitenzorg, stuffed specimens; RMNH 381, 197 mm, skeleton (vertebrae 19+11 = 30); RMNH 384, 242 mm, skeleton (vertebrae 19+13 = 32). Holotype *L. hispidus* should be in RMNH.

Comments.— Until it is conclusively demonstrated that more than a single species of *Lobocheilos* occurs in the area collected by Kuhl and van Hasselt, I consider the nominal forms listed here as conspecific. As first reviser, I choose *Lobocheilos falcifer* as having priority over *L. hispidus* and *C. lipocheilos*.

Barbus (or *Lobocheilos*) *hasselti* is known only from an original or a copy of a Kuhl and van Hasselt drawing obtained by Bleeker (1857: 355). Bleeker considered that the species was not among those he had collected. Later, he referred it, with question marks, to the genus *Lobocheilos*, stating "I erected this species from a sketch, left by Kuhl and van Hasselt, since up until now I did not succeed in obtaining specimens of the species. Before now I placed it in *Barbus*, however, I am now not strange to the idea that it could be rather be placed in *Lobocheilos*. The figure though does not seem to possess the same exactness which one usually finds in figures left by van Hasselt." I have been unable to find the original or any copy of this figure. Bleeker's remark about its poor quality suggests it was based on a stuffed specimen. The locality Sadingwetan (Sading-Vedang of Valenciennes) does not appear on any Kuhl and van Hasselt drawings of *Lobocheilos* seen by me.

Luciosoma setigerum (Valenciennes in Cuvier & Valenciennes, 1842)
(fig. 56)

Barbus setigerum Valenciennes in Cuvier & Valenciennes 1842: 203, fig. 469 (type locality rivière Pebak [sic]).

Drawings.— Pencil drawing by Valenciennes of specimen in Leiden; "grandeur naturelle" TL 221, SL 160 mm (XVI B 47); ink copy by Valenciennes of Kuhl and van Hasselt original, TL 204 mm, SL 157 mm (XVI B 44); ink copy by Sophie 1827 of same drawing; TL 204 mm, SL 157 (XVI B 45).

Specimens.— Holotype missing; no specimens found in RMNH or MNHN.

Macrochirichthys macrochir (Valenciennes in Cuvier & Valenciennes, 1844)
(figs. 10, 57)

Leuciscus macrochir Valenciennes in Cuvier & Valenciennes, 1844: 348.

Drawings.— Pencil drawing of holotype by Valenciennes Leiden, labelled with Kuhl and van Hasselt name "*Clupea macrochira*"; "3/4 grandeur naturelle" TL 251 mm, SL 215 mm (XVII C 31).

Specimens.— See comments.

Comments.— Valenciennes examined and drew a single specimen (holotype) in Leiden. According to information on drawing XVII C 31, holotype should be about 291 mm SL. RMNH 3338, 289 mm, is almost certainly this specimen, and therefore

the holotype. Its label indicates Reinwardt as collector (specimen in very good condition; gill rakers on first gill arch $5+27 = 32$; anal fin rays iii24; vertebrae $29+20 = 49$). This specimen is attributed to Kuhl and van Hasselt by Valenciennes; it may have been studied by them, and sent with material they collected to Leiden.

Bleeker expressed doubts about the identity of *Leuciscus macrochir* (Bleeker, 1860: 298), partly because of vagueness in the original description and lack of any published illustration, but also due to Valenciennes's report of 90 scales in lateral series. Valenciennes's pencil drawing leaves no doubt as to its generic identification. It is unclear how the count of 90 originated; perhaps it is a misprint. In the drawing the scales are shown only on the anteriormost and posteriormost parts of the body, but an estimate of the lateral series (from beginning of lateral line to end of hypural fan) would be closer to 120 or 130.

Fortunately drawing XVII C 31 is accompanied by a lengthy description written by Valenciennes, in which he states "les écailles sont tres petites; il y en a plus de 140 dans la longueur, et plus de trente dans la hauteur." The extensive notes on the drawing includes numeration of the fin rays as follows.— dorsal fin 8, pectoral fin 14, pelvic fin 7, anal fin 25, caudal fin 19. This description bears the Kuhl and van Hasselt manuscript name "*Clupea macrochira*" and "Val. à Leyde 1822". The date 1822 may be an error, but if the specimen indeed was collected by Reinwardt it could have been in Leiden by then. On the other hand, I have no other evidence that Valenciennes was in Leiden in 1822.

Only one species of *Macrochirichthys* is recognized currently, but the genus has not been subjected to a critical systematic revision based on adequate material from throughout its range. The specimen collected by Reinwardt appears to be the only one reported from Java.

Mystacoleucus marginatus (Valenciennes in Cuvier & Valenciennes, 1842)
(figs. 11-12)

Barbus marginatus Valenciennes in Cuvier & Valenciennes 1842: 164 (type locality Tjicanigui).

Barbus obtusirostris Valenciennes in Cuvier & Valenciennes 1842: 167 (type locality Buitenzorg).

Drawings.— Watercolour copy of original drawing of *Barbus marginatus*; TL 141 mm, SL 106 mm (XVI B 14); watercolour copy of original drawing of *Barbus obtusirostris*; TL 104 mm, SL 80 mm (XVI B 15).

Specimens.— Holotype *B. marginatus*, length "neuf pouces", presumably in RMNH; MNHN 4303, 127 mm, *B. marginatus* (non type); holotype *B. obtusirostris*, length "quatre pouces" presumably in RMNH; RMNH 2102, 90 mm, "riv. Buitenz.", stuffed; RMNH 391, ca 111 mm, incomplete skeleton.

Osteochilus hasselti (Valenciennes in Cuvier & Valenciennes, 1842)
(figs. 13, 14)

Rohita hasselti Valenciennes in Cuvier & Valenciennes 1842: 274 (type locality Java).

Rohita erythrura Valenciennes in Cuvier & Valenciennes, 1842: 268 (type locality Java).

?*Labiobarbus lipocheilus* van Hasselt, 1823c: 132 (nomen nudum).

?*Dangila lipocheila* in part Valenciennes in Cuvier & Valenciennes, 1842: 232 (type locality Java).

Drawings.— Watercolour copy of original drawing of *R. erythrura*, by Sophie; TL 212 mm, SL 165 mm (XVI C 16).

Specimens.— RMNH 2120, 104 mm, Bantam, stuffed (with old label "*Labeobarb. thysanocheilus*"); none in Paris?

Comments.— The watercolour of *R. erythrura* is quite characteristic of the species usually known as *O. hasselti*. As first reviser, I select *R. hasselti* as the senior name. Concerning *L. lipocheilus* or *D. lipocheila*, see comments under next species.

***Osteochilus microcephalus* (Valenciennes in Cuvier & Valenciennes, 1842)**

?*Labiobarbus lipocheilus* van Hasselt, 1823c: 132 (nomen nudum).

Rohita microcephalus Valenciennes in Cuvier & Valenciennes 1842: 275 (type locality Bantam).

?*Rohita vittata* Valenciennes in Cuvier & Valenciennes, 1842: 267 (type locality Bantam)

?*Dangila lipocheila* Valenciennes in Cuvier & Valenciennes, 1842: 232 (type locality Java).

Drawings.— Watercolour copy of original drawing, labelled *L. lipocheilus* M[ihi = van Hasselt] and *Dangila lipocheila*; TL 69 mm, SL 52 mm (XVI B 76).

Specimens.— *Osteocheilus microcephalus* based on two or more dried syntypes examined by Valenciennes in Leiden; RMNH 2115, 153 mm, and 2116, 155 mm, identified as syntypes *O. microcephalus* by J. Karnasuta, Feb. 1979; RMNH 2117, Bantam, 140 mm (with old label "*Labeobarb. thysanocheilus*"); RMNH 2118, 220 mm, Bantam, stuffed (with old label "*Labeobarb. thysanocheilus*"); lips with unculiferous ridges characteristic of *Osteochilus*; scales in lateral series about 33, transdorsal 11, transverse 7/1/3 or 4; total dorsal fin rays 18).

Comments.— The watercolour copy of the drawing of *L. lipocheilus* clearly represents the juvenile of a species of the genus *Osteocheilus*, presumably either *O. hasselti* or *O. microcephalus*. As first revisor I choose both these species as having priority over *D. lipocheila* Valenciennes. Bleeker (1863: 48, pl. 7, fig. 1) published a Kuhl and van Hasselt figure as "*Dangila lipocheilus* Val. (Cop. v. Has.)." It is unclear whether this figure is based on an original drawing or a copy. As published by Bleeker, the figure represents a fully scaled fish, while in the copies made by Valenciennes or Sophie Duvaucel the fish is only partially scaled. Possibly the artist or engraver was instructed to fill in the rest of the scales, but more likely the figure was engraved from a fully scaled original drawing that is now missing.

***Oxygaster anomalura* van Hasselt, 1823**

(fig. 15)

Oxygaster anomalura van Hasselt, 1823c: 133 (type locality Java).

Cyprinus oxygaster Valenciennes in Cuvier & Valenciennes, 1844: 349 (type locality Batavia)

Drawings.— Watercolour copy of original drawing; TL 112 mm, SL 86 mm (XVII C 33); pencil copy by Cuvier of drawing of holotype done by Valenciennes in Leiden, labelled "*Leuciscus oxygaster*" with extensive notes in Cuvier's handwriting; "grandeur naturelle" TL 100 mm, SL 72 mm (XVII C 32).

Specimens.— Holotype should be in Leiden, but is missing and presumed lost. Probably none in Paris (see comments).

Comments.— MNHN B. 94, 108 mm, "Java; Musée de Leyde" [no other data], clearly is not the holotype, but might have been collected by Kuhl and van Hasselt.

Puntius binotatus (Valenciennes in Cuvier & Valenciennes, 1842)
(fig. 16)

Barbus maculatus Kuhl & van Hasselt in van Hasselt, 1823c: 132 (nomen nudum).

Barbus binotatus Valenciennes in Cuvier & Valenciennes, 1842: 168 (type locality Java).

Drawings.— Watercolour copy of original drawing of *B. maculatus*; TL 76 mm, SL 58 mm (XVI B 36).

Specimens.— RMNH 2455, 3: 40.5-95.1 mm (with manuscript name "*Barbus striatus*"); none in Paris.

Puntius bramoides (Valenciennes in Cuvier & Valenciennes, 1842)
(fig. 17)

Barbus bramoides Valenciennes in Cuvier & Valenciennes, 1842: 160 (type locality Java).

Barbus hypseconotus van Hasselt, 1823c: 132 (nomen nudum).

Barbus hypsylonotus Valenciennes in Cuvier & Valenciennes, 1842: 168 (type locality Java).

Drawings.— Watercolour copy of original drawing of *B. hypsylonotus*; TL 106 mm, SL 81 mm (XVI B 16).

Specimens.— RMNH 1769, 83 mm, RMNH 1770, 190 mm, RMNH 1954, 170 mm, stuffed specimens; none in Paris.

Puntius lateristriga (Valenciennes in Cuvier & Valenciennes, 1842)
(fig. 18)

Barbus lateristriga Valenciennes in Cuvier & Valenciennes 1842: 161 (type locality Java).

Drawings.— Watercolour copy by Sophie of original drawing; TL 82 mm, SL 63 mm (XVI B 12).

Specimens.— MNHN A.9939, 70.0 mm, holotype.

Puntius orphoides (Valenciennes in Cuvier & Valenciennes, 1842)
(figs. 19, 58)

?*Barbus gardomides* (partim) Valenciennes in Cuvier & Valenciennes 1842: 158 (only specimen[s] from Java).

Barbus orphoides Valenciennes in Cuvier & Valenciennes, 1842: 193 (type locality Java).

Barbus rubripinnis Valenciennes in Cuvier & Valenciennes, 1842: 194 (type locality Java).

Drawings.— Pencil drawing of holotype of *Barbus orphoides* by Valenciennes Leiden 1824; TL 275 mm, SL 220 mm (XVI B 35); watercolour copy of original draw-

ing of *Barbus rubripinnis*; TL 106 mm, SL 85 mm (XVI B 34).

Specimens.— None in Paris.

Rasbora lateristriata Bleeker, 1854

(fig. 20)

Barbus leuciscus Cuv. *lateristriatus* Kuhl & van Hasselt in van Hasselt, 1823: 132 (Buitenzorg) (nomen nudum).

Leuciscus lateristriatus Bleeker, 1854: 94 (based on Kuhl & van Hasselt drawing).

Rasbora lateristriata Bleeker, 1860: 441.

Drawing.— Watercolour copy by Valenciennes or Sophie of original drawing, labelled "*Leuciscus lateristriatus* (nobis)"; TL 106 mm, SL 81 mm (XVII C 139).

Specimens.— RMNH 2636, 62.5 mm (very strong mandibular knob; gill rakers on first gill arch 2+10 = 12; scales in lateral series 26); RMNH 1870, 89 mm, stuffed (with label "*Leuciscus lateristriatus*"; none in Paris).

Tor tambra (Valenciennes in Cuvier & Valenciennes, 1842)

(figs. 21-24)

Barbus tambra Valenciennes in Cuvier & Valenciennes, 1842: 190 (type locality Buitenzorg).

Barbus douronensis Valenciennes in Cuvier & Valenciennes 1842: 187 (type locality Java).

Barbus soro Valenciennes in Cuvier & Valenciennes, 1842: 191 (type locality Bantam).

Drawings.— Partially completed watercolour copy of original drawing of *B. tambra*; TL 407 mm, SL 320 mm (XVI B 29); pencil copy of a drawing by Valenciennes Leiden 1824, labelled "*Barbus anisurus*" and "Tambra à Java"; "1/3 grandeur naturelle" TL 228 mm, SL 185 mm; watercolor copy of original drawing of *B. soro*; TL 175 mm, SL 135 mm (XVI B 30); pencil copy by Valenciennes of original drawing by Valenciennes Leiden 1824; TL 235, SL 190 mm (XVI B 31).

Specimens.— RMNH 2289, 525 mm, holotype *B. tambra*, stuffed (with early label "*Barbus anisurus*"; excellent condition; mentum present; scales in lateral series 21, predorsal 10, transdorsal 7, transverse 4/1/2); MNHN 3826, 93.4 mm, holotype *B. douronensis* (gill rakers on first gill arch 4+15 = 19; vertebrae 25+15 = 40); RMNH 2618, 108 mm (mentum rudimentary or absent; gill rakers 6+12 = 18; scales in lateral series 22, transdorsal 7, transverse 5/1/3; vertebrae 25+14 = 39); RMNH 2620, 99.1 mm (gill rakers 7+15 = 22; vertebrae 25+14 = 39). RMNH 2104, 105 mm, Bantam (previously identified as *Barbus laevis*); RMNH 2620, 99.1 mm (previously identified as *Labeobarbus tambroides*; gill rakers 7+15 = 22; scales in lateral series 23, transdorsal 7, transverse 5/1/2; vertebrae 25+14 = 39); RMNH 367, 206 mm, skeleton (prev. id. *B. soro*; vertebrae 26+12 = 38); RMNH 387, 362 mm, skeleton (prev. id. *B. soro*; gill rakers 25+?16 = ?21; vertebrae 24+15 = 39).

Comments.— My examination of Kuhl and van Hasselt, Bleeker, and other material indicates that there is only a single species of *Tor* in western Java, *T. tambra*. Rudimentary to greatly hypertrophied thickening of the lips and development of the median mentum and rostral hood (an appendage of the rostral cap) apparently is

due to individual (perhaps ecophenotypical) variation.

The specimen here indicated as holotype of *B. tambra* might have served as the basis for the original Kuhl and van Hasselt drawing represented by the partially watercolored copy in Paris. There is no doubt that it is the large stuffed specimen upon which the original description of *B. tambra* by Valenciennes is based, and that it is therefore the holotype.

Tor tambroides (Bleeker, 1854) supposedly differs from *T. tambra* in having a longer mental lobe (Weber & de Beaufort, 1916: 148). I have made a direct comparison with the holotype of *T. tambra* and syntypes of *T. tambroides* and conclude that the enlargement of the mental lobes, rostral, and labial flaps is similar, provided the dry condition of the holotype is taken into account. Specimens previously identified as *T. tambra*, *T. douronensis*, and *T. tambroides*, including a range of sizes, have similar counts of gill rakers, scales and vertebrae. The holotype of *B. soro* has not been located and may be lost.

COBITIDAE

Acantopsis dialuzona van Hasselt, 1823 (figs. 25, 59)

Acantopsis dialuzona van Hasselt, 1823c: 133 (type locality Batavia).

Acanthopsis biaculeatus Rüppell, 1852: 28 (nomen nudum; name *A. biaculeatus* ascribed to Kuhl).

Drawings.— Watercolour copy by Valenciennes Leiden 1824 of original drawing, with Kuhl and van Hasselt manuscript name "*Acantopsis dialyzona*" corrected to "*Acanthopsis dialyzona*" in Valenciennes's handwriting; TL 138 mm, SL 114 mm (XVIII 44); unpublished drawing by Werner, with label "*Cobitis biaculatus* [sic]"; "grandeur naturelle" TL 118 mm, SL 98 mm (XVIII 43).

Specimens.— RMNH 2707, 97.1 mm, holotype or syntype (see comment below; vertebrae 30+14 = 44); none in Paris.

Comments.— RMNH 2707 is almost certainly the specimen illustrated by Werner, and could have been the specimen in the original Kuhl and van Hasselt drawing; it might be the only one they collected.

Although Valenciennes examined the holotype in Leiden, made a watercolour copy of van Hasselt's original drawing, and had a drawing of the holotype by Werner, no account of the species appears in the *Histoire naturelle des Poissons*. While the names "*Acantopsis*" and "*Acantopsis dialuzona*" were made available by van Hasselt, 1823c (Kottelat, 1987: 373; Eschmeyer, 1990: 11), the original description barely satisfies the minimal requirements of ICZN, and no adequate description of the type material of *A. dialuzona* or of any Javanese *Acantopsis* has been published.

It is thus of value to include here a previously unpublished manuscript description of van Hasselt's material, prepared by Valenciennes for the *Histoire naturelle des Poissons* while the material was still relatively fresh (Bibl. Centr. Ms 516). The description, under the heading "*Cobitis biaculeata* K.H.", includes information especially on coloration not readily evident from the drawings:

"*Cobitis* a corps et a tete comprimées, mais museau encore plus pointu qu'aux *Cobitis* ordinaires. Hauteur huitième de la longueur; la tete le cinquième de la meme longueur; les yeux tres en

arrière sur le sommet de la tête se touchant presque; en avant d'eux 2 aiguillons assez pointus. Bouche très petite, a barbillons très courts à peine visibles. Dorsale au milieu du corps non comprise la caudale. Pectorale longue et pointue sous la gorge. Ventrales sous la dorsale médiocres. Anale très en arrière, près de la caudale; celle-ci grande et échancrée. Couleur rougeâtre sur le dos, blanche sous le ventre, une raye grise métallique le long de flancs, et sur cette raye huit à neuf taches oblongues grises plus foncées. Caudale gris verdâtre nuagée de gris, et un point noir à sa base supérieure. D 11 P 10 V 7 A 6 C 15. Long. 4 [pouces?] 6 lig. [= 123 mm?]."

Particularly noteworthy is the report of eight or nine obscure dark grey spots; these are not shown in the watercolour, evidently based on a fresh specimen. In some specimens of *Acantopsis* such spots may be much more evident after preservation.

Finally, it is of considerable interest to note that Bleeker obtained a copy of an original drawing left by van Hasselt in Java (Bleeker, 1860: 68). The present location of this copy is unknown, but it was probably based upon the same original drawing as the copy by Valenciennes (XVII 44).— The length of 136 mm given by Bleeker agrees closely with the total length of 138 mm for the Valenciennes copy.

Homaloptera ocellata van der Hoeven, 1830
(figs. 26, 60)

Homaloptera javanica van Hasselt, 1823c: 133 (nomen nudum).

Homaloptera ocellata van der Hoeven, 1830: 211 (text only; type locality Java); van der Hoeven, 1833: 8, pl. 13, fig. 12.

Balitora erythrorhina Valenciennes in Cuvier & Valenciennes, 1846: 93, pl. 524 (type locality environs de Buitenzorg).

Balitora pavonina Valenciennes in Cuvier & Valenciennes, 1846: 97 (type locality Java).

Drawings.— Watercolour copy of original drawing, labelled "*Homaloptera javanica* M." and "*Homaloptera erythrina*"; TL 64 mm, SL 50 mm (XVIII 58).

Specimens.— RMNH 2723, 113 mm, labelled holotype *H. ocellata* (vertebrae 19+13 = 32); MNHN 3121, 3: 59.2-101 mm, syntypes *B. erythrorhina*; MNHN 3123, 83.4 mm, holotype *B. pavonina*.

Comments.— The genus *Homaloptera* is credited to van Hasselt (1823) with *H. ocellata* van der Hoeven, as type species by subsequent monotypy (Eschmeyer, 1990). The publication of van der Hoeven (1830; 1833) is rare, and most authors dealing with *Homaloptera ocellata* have been unable to consult it (e.g. Roberts, 1989: 88; Eschmeyer, 1990). I have now examined a complete copy of the work in the library of RMNH, and find that the text was issued in two parts; that containing the original description of *H. ocellata* was issued in 1830, not 1833, as usually cited. The Atlas, published in 1833, includes a figure which has not been cited. Since the work is so rare, the figure (drawn by van der Hoeven) is reproduced and the full text of van der Hoeven (1830: 211) may be cited here:

"*Homaloptera* van Hass. Corpus elongatum, squamis parvis tectum. Caput parvum, nudum, ore infero, parvo, edentulo, cirris 6. Oculi parvi in superiori capitis parte siti. Membrana branchiostega radiis 3. Pinnae pectorales magnae, complanatae. Pinna dorsali supra ventrales posita.

Sp. *Homaloptera ocellata*, eene nieuwe soort van Java. Dit geslacht staat, zoo als het schijnt, tusschen *Cobitis* en *Cyprinus* in het midden. De staartvin is gevorkt, en niet afgeknot, zoo als bij *Cobitis*."

The figure legend (van der Hoeven, 1833: 8) credits the species to van Hasselt, but it appears that the text was written or at least considerably abridged and other-

wise modified by van der Hoeven, so it is correct to cite him as author of the species. The specimen indicated as holotype (RMNH 2723) appears to be the one upon which figure 12 in van der Hoeven (1833) is based.

Homaloptera wassinki Bleeker, 1853
(fig. 27)

?*Homaloptera fasciata* van Hasselt, 1823c: 133 (nomen nudum).

Balitora ocellata [nec van der Hoeven, 1830] Valenciennes in Cuvier & Valenciennes, 1846: 96 (type locality Buitenzorg).

Homaloptera valenciennesi Bleeker, 1860: 95 (replacement name for *Balitora ocellata* Valenciennes in Cuvier & Valenciennes, 1846).

Drawings.— Watercoloured copy by Valenciennes Leiden 1824 of original drawing, labelled "*Homaloptera fasciata* nob.[= Kuhl & van Hasselt]" and "*Homaloptera ocellata* K.v.H."; TL 56 mm, SL 45 mm (XVIII 58).

Specimens.— MNHN 3122, 59.3 mm, holotype *B. ocellata* Valenciennes.

Lepidocephalichthys hasselti (Valenciennes in Cuvier & Valenciennes, 1846)
(fig. 28)

Cobitis octocirrhus Kuhl & van Hasselt in van Hasselt, 1823c: 133 (nomen nudum).

Cobitis hasselti Valenciennes in Cuvier & Valenciennes, 1846: 74 (type locality rivière Tjelakakan).

Drawings.— Watercolour copy by Valenciennes? dated "Leyde 1827" of original drawing, labelled "*Cobitis hasselti*" and "rivière Tjelankahane"; TL 43 mm, SL 36 mm (XVIII 52).

Specimens.— None found; holotype lost (Roberts, 1889: 103-4).

Comments.— The manuscript name "*Acanthopthalmus unistriatus* Mihi [van Hasselt]" may refer to this species.

Nemacheilus chrysolaimos (Valenciennes in Cuvier & Valenciennes, 1846)
(fig. 29)

Noemacheilus fasciatus Kuhl & van Hasselt in van Hasselt, 1823c: 133 (Buitenzorg) (partim; nomen nudum).

Cobitis chrysolaimos Valenciennes in Cuvier & Valenciennes, 1846: 27, fig. 521 (type locality Java).

Noemacheilus chrysolaimos Kottelat, 1984: 241, figs. 14a, 15 (description; designation of lectotype).

Drawings.— Watercolour copy of original drawing of *Nemacheilus fasciatus* or *C. chrysolaimos*, labelled "*Noemacheilus fasciatus* Kuhl & van Hasselt"; TL 86 mm, SL 60 mm (XVIII 20).

Specimens.— MNHN 3961, 47.1 mm, lectotype *C. chrysolaimos*; MNHN B.2972, 41.1 mm, paralectotype *C. chrysolaimos*.

Nemacheilus fasciatus (Valenciennes in Cuvier & Valenciennes, 1846)

Noemacheilus fasciatus Kuhl & van Hasselt in van Hasselt, 1823c: 133 (Buitenzorg) (partim; nomen nudum).

Cobitis fasciata Valenciennes in Cuvier & Valenciennes, 1846: 25 (type locality Buitenzorg).

Noemacheilus fasciatus Kottelat, 1984: 247, fig. 18a.

Drawings.— None.

Specimens.— MNHN B.2798, lectotype *C. fasciata*.

Pangio kuhlii (Valenciennes in Cuvier & Valenciennes, 1846)

(fig. 30)

Acanthopthalmus fasciatus van Hasselt, 1823c: 133 (nomen nudum).

Cobitis kuhlii Valenciennes in Cuvier & Valenciennes, 1846: 77 (type locality ruisseaux des environs de Batavia).

Drawings.— Watercolour copy by Sophie(?) of original drawing of *Acanthopthalmus fasciatus*, labelled "*Acanthopthalmus fasciatus*" and "*Cobitis kuhlii*"; TL 56 mm, SL 49 mm (XVIII 56).

Specimens.— None in Paris or Leiden (see also Burridge, 1992: 181).

Comments.— The watercolour copy of Kuhl and van Hasselt's original drawing does not represent the species usually identified as *Pangio* (formerly *Acanthopthalmus*) *kuhlii*, but rather that usually identified as *Pangio* (formerly *Acanthopthalmus*) *semicinctus* Fraser-Brunner 1940 (personal comm. M. Kottelat). The earliest available name for the species erroneously identified as *P. kuhlii* apparently is *Acanthopthalmus* (= *Pangio*) *fasciatus* Bleeker 1860.

In a revision of the "*Acanthopthalmus kuhlii* complex", Burridge (1992) may have lumped several valid species together under *A. kuhlii*. Her hypothesis of variation of colour patterns within a single widely ranging species may be worth pursuing. It is unfortunate that her meristic data for over 200 "*A. kuhlii*" from different localities and with different colour patterns were also lumped together (Burridge, 1992, tables 2-3).

Burridge designated (but did not describe) a neotype for *A. kuhlii*, RMNH 2688, collected in Java by Salomon Müller between 1826 and 1836 (Burridge, 1992: 181-2).

Pangio oblongus (Valenciennes in Cuvier & Valenciennes, 1846)

(fig. 31)

Acanthopthalmus javanicus van Hasselt in Kuhl & van Hasselt, 1823c: 133 (nomen nudum).

Cobitis oblonga Valenciennes in Cuvier & Valenciennes, 1846: 76 (type locality "environs de Buitenzorg et des autres rivières").

Drawings.— Watercolour copy by Sophie(?) of original drawing, labelled *Cobitis oblongus*; TL 70 mm, SL 61 mm (XVIII 54).

Specimens.— None.

BAGRIDAE

Leiocassis poecilopterus (Valenciennes in Cuvier & Valenciennes, 1840)
(fig. 32)

Bagrus poecilopterus Valenciennes in Cuvier & Valenciennes 1840a: 431 (type locality "rivière de Hèbak [= Lebak] à Java").

Drawings.— Watercolour copy by Valenciennes 1827 of original drawing; TL 129 mm, SL 150 mm (XIV B 129); watercolour copy by Sophie of same original; TL 129 mm, SL 150 mm (XIV B 128).

Specimens.— RMNH 3004, 152 mm, holotype; none in Paris.

Comments.— *Leiocassis poecilopterus* (Valenciennes 1840), as clearly evident from the watercolour copies of Kuhl and van Hasselt's drawing, is the common, distinctively long-snouted species of *Leiocassis* widely distributed in Indonesia and the Malay peninsula usually referred to as *Leiocassis micropogon* (Bleeker, 1852) (see Roberts, 1989: 117). I have examined the Bleeker material of *L. micropogon* (RMNH 6873, 2: 140-164 mm) and conclude that it is conspecific with *L. poecilopterus*.

In Roberts (1989: 117) I tentatively placed the following nominal species as synonyms of *L. micropogon* (now identified as *L. poecilopterus*): *L. baramensis* Regan, 1906; *L. hosii* Regan, 1906; *L. merabensis* Regan, 1913; *L. doriae* Regan, 1913; *L. chaseni* de Beaufort, 1933; and *L. regani* Jayaram, 1965. With the exception of *L. chaseni* from Malay peninsula, all of these nomina had been described from Borneo (mainly North Borneo). At the time I had examined the type specimens of all but the last two named, *L. chaseni* and *L. regani*.

During a visit to the Zoological Research Collections (ZRCS) of the National University of Singapore in February 1992, I examined the holotype of *L. chaseni* (ZRCS 290, about 67 mm, Ulu Jelai, Pahang, Feb. 1910, A.D. Machado). The specimen, originally catalogued as Raffles Museum F.245, is in very poor condition, with the tail rotted away. The snout is elongate; total gill rakers on first gill arch 17. It is identifiable with *L. poecilopterus*.

Leiocassis stenomus (Valenciennes in Cuvier & Valenciennes, 1840)
(fig. 61)

Bagrus stenomus Valenciennes in Cuvier & Valenciennes, 1840a: 415 (type locality Java).

Drawings.— Unpublished printer's proof of Werner drawing of holotype; "grandeur naturelle" TL 103 mm, SL 75 mm (XIV B 106).

Specimens.— RMNH 2986, 71.6 mm, holotype (gill rakers 3+7 = 10; vertebrae 18+21 = 39); none in Paris.

Comments.— *Leiocassis stenomus* evidently is a rare species, perhaps known only from the holotype collected by Kuhl and van Hasselt.

Mystus gulio (Hamilton, 1822)
(fig. 62)

Bagrus abbreviatus Valenciennes in Cuvier & Valenciennes, 1840a: 420 (type locality Java).

Drawings.— Unpublished engraving of Werner drawing, presumably of holotype of *B. abbreviatus* (with manuscript name *Pimelodus abbreviatus*); "4/5 de la nat." TL 140 mm, SL 115 mm (XIV B 113).

Specimens.— RMNH 2942, 136 mm, holotype *B. abbreviatus* (maxillary barbel extending posteriorly to anal fin origin; gill rakers 9+31 = 40; vertebrae 18+18 = 36); none in Paris.

Mystus macronema (Bleeker, 1846)

Bagrus cavasius in part Valenciennes in Cuvier & Valenciennes, 1840a: 411 (partim; only the Kuhl and van Hasselt specimens from Java).

Drawings.— None.

Specimens.— RMNH 2953, 76.1 mm (gill rakers 6+16 = 22); RMNH 2951, 169 mm (gill rakers 6+16 = 22; vertebrae 21+21 = 42); none in Paris.

Comments.— Although Valenciennes mentioned Kuhl and van Hasselt material of *B. cavasius*, I find no trace of drawings or specimens under that name in Leiden or Paris. Werner's illustration of the holotype of *M. nigriceps*, clearly represents the species usually identified as *Mystus micracanthus* (Bleeker, 1846), and not the Indo-Malaysian species *M. macronema*, which is closely related to *M. cavasius*.

Mystus nemurus (Valenciennes in Cuvier & Valenciennes, 1840)
(fig. 63)

Bagrus nemurus Valenciennes in Cuvier & Valenciennes, 1840a: 423 (type locality Java).

Drawings.— Unpublished Werner drawing with Kuhl and van Hasselt manuscript name of *Pimelodus nemurus*; "1/3 larg. nat." TL 144 mm, SL 112 mm (XIV B 119).

Specimens.— Holotype *B. nemurus*, "longueur quinze pouces [406 mm]", should be in Leiden; RMNH 269, 174 mm, skeleton (with manuscript name "*Bagrus tetragonocephalus* v.H."); gill rakers 4+12 = 16; vertebrae 22+21 = 44); none in Paris.

Comments.— Valenciennes's description of *B. nemurus* concludes with the statement "la longueur de l'individu est de quinze pouces [406 mm]", and there is no indication that he examined more than the one specimen in describing the species. Thus this specimen is the holotype, and the specimen drawn by Werner has no type status. I have been unable to locate any Kuhl and van Hasselt specimen of *Mystus* with a total length of 406 mm. The closest to this is the holotype of *B. anisurus*, with a total length of 384 mm. This specimen is identified by me as *M. planiceps* (see below). Possibly Valenciennes used the same specimen as holotype of *B. anisurus* and also as holotype of *B. nemurus*. I have not been able to locate the specimen drawn by Werner.

Mystus nemurus as presently understood (Smith, 1945; Roberts, 1989) is the commonest and best known species of bagrid catfish in Southeast Asia, and it would be highly desirable to fix its type status. Most of the Kuhl and van Hasselt material from western Java, however, seem to be a different species, the one known as *M. planiceps*, also based on their material. The only Kuhl and van Hasselt specimen found that corresponds with the present concept of *M. nemurus* is RMNH 269, a skeleton. The skeleton is not in excellent condition, so that while the gill raker count of $4+12 = 16$ is reliable, the vertebral column has been extensively repaired so that the count of $22+22 = 44$ vertebrae may not be reliable. At present I cannot confirm that the widespread Southeast Asian species commonly identified as *M. nemurus* is present in the extant Kuhl and van Hasselt material. In Leiden I find only one other lot from Java that corresponds to *M. nemurus* as currently understood: RMNH 2940, 2: 110-125 mm, Krawang, S. Müller (body relatively short; maxillary barbels extending posteriorly to anal fin origin or beyond; gill rakers $5+10-12 = 15-17$).

Mystus nigriceps Valenciennes in Cuvier & Valenciennes, 1840
(fig. 64)

Bagrus nigriceps Valenciennes in Cuvier & Valenciennes, 1840a: 412 (type locality Java).

Bagrus keletius Valenciennes in Cuvier & Valenciennes, 1840a: 411- 412 (partim; specimen[s] from Java only).

Drawings.— Unpublished drawing of holotype by Werner with Kuhl and van Hasselt manuscript name *Pimelodus nigriceps*; "grandeur naturelle" TL 122 mm, SL 96 mm (XIV B 97).

Specimens.— RMNH 3009, 99.1 mm, neotype *B. nigriceps* by present designation (possible holotype *B. nigriceps*); (gill rakers $9+30 = 39$); RMNH 2963, 93.4 mm, MNHN 4369, 77.2 mm, syntype *B. keletius* (adipose fin long; gill rakers $8+25 = 33$; vertebrae $20+18 = 38$; see Roberts, 1989: 121-124, tables 6, 8); RMNH 2948, 119 mm (maxillary barbel extending posteriorly to caudal fin base; gill rakers on first gill arch $8+31 = 39$).

Comments.— Valenciennes's original description and Werner's unpublished figure of the holotype are clearly based on the species known as *Mystus micracanthus* Bleeker, 1846, which therefore must be placed as a junior synonym of *M. nigriceps* Valenciennes, 1840. Of the Kuhl and van Hasselt specimens of *M. nigriceps*, RMNH 3009 seems most likely to have been the one drawn by Werner.

The original description of *Bagrus keletius* is based mainly on material from Pondichery (India) not conspecific with *M. nigriceps*. Although Valenciennes indicates that he had more than one specimen from Pondichery ("les individus de Pondichéry..."), there is now only a single syntype from that locality, MNHN A.9011, 84.0 mm (adipose fin short; gill rakers on first gill arch $8+26 = 34$; vertebrae $18+17 = 35$). It belongs to a small group of species typically found in estuaries and in brackish or tidal riverine habitats including *Mystus gulio* Hamilton, 1822.

Mystus planiceps (Valenciennes in Cuvier & Valenciennes, 1840)
(figs. 65, 66)

Bagrus planiceps Valenciennes in Cuvier & Valenciennes, 1840a: 421 (type locality Java).

Bagrus anisurus Valenciennes in Cuvier & Valenciennes, 1840a: 422 (type locality Java).

Drawings.— Unpublished engraving of Werner drawing of holotype; “3/5 de la nat.” TL 136 mm, SL 112 mm (XIV B 114); ink tracing of original drawing of *Pimelodus anisurus* by Valenciennes Leiden 1827; TL 373 mm, SL 285 mm (XIV B 116); ink tracing by Sophie of same original drawing; TL 372 mm, SL 282 mm (XIV B 117); unpublished drawing by Werner of *P. anisurus*; “1/3 de la nature” TL 122 mm, SL 93 mm (XIV B 115).

Specimens.— MNHN B.615, 102 mm, holotype *B. planiceps* (gill rakers 5+12 = 17; vertebrae 24+23 = 47); RMNH 2956, 286 mm, holotype *B. anisurus* (gill rakers 4+14 = 18; vertebrae 24+23 = 47); RMNH 2939, 181 mm (maxillary barbel very short, extending posteriorly slightly beyond pectoral fin; gill rakers 5+12 = 17; vertebrae 24+24 = 48); RMNH 2941, 161 mm (maxillary barbel extends to middle of pelvic fins; gill rakers 5+12 = 17; vertebrae 24+24 = 48); RMNH 2957, 87.5 mm (gill rakers 4+13 = 17; vertebrae 25 or 26+22 = 47 or 48); RMNH 2958, 102 mm (gill rakers 4+13 = 17); RMNH 2959, 168 mm (gill rakers 5+13 = 18; vertebrae 24+23 = 47); RMNH 2962, 62.6 mm (gill rakers 3+12 = 15; vertebrae 24+23 = 47).

Comments.— *Mystus planiceps* is very similar to *M. nemurus* but is distinguished by its more elongate body (with slightly more vertebrae) and shorter barbels. It may also lack the thin dark midaxial streak diagnostic of *M. nemurus*, but this cannot be verified on many specimens that are old and poorly preserved. Gill rakers are slightly more numerous in *M. planiceps*.

Mystus wyckii (Bleeker, 1858)

Drawings.— None.

Specimens.— RMNH 2964, 200 mm.

Comments.— Although Kuhl and van Hasselt apparently did not have a manuscript name for *Mystus wyckii*, they evidently recognized it as a new species, for van Hasselt mentions a *Bagrus* with “caudalis supra et infra albomarginata”, from “Tjikande in flumine Tjidourcan”.

CLARIIDAE

Clarias cf. batrachus Linnaeus, 1758
(fig. 67)

Clarias punctatus Valenciennes in Cuvier & Valenciennes, 1840b: 384 (type locality Java).

Drawings.— Anatomical drawing (by Keultjes?) (RMNH).

Specimens.— RMNH 3093, 2: 121-193 mm (gill rakers 4+18 = 22, 6+17 = 23);

RMNH 238, ca 139 mm, incomplete skeleton; none in Paris.

Comments.— Nominal species *C. punctatus* overlooked by Weber & de Beaufort, 1913; placed as synonym of *C. batrachus* by Bleeker, 1858: 344.

Van Hasselt manuscript notes on *Clarias batrachus* include a very detailed legend for the anatomical figure.

Clarias nieuhofti Valenciennes in Cuvier & Valenciennes, 1840

Drawings.— None.

Specimens.— MNHN B.301, 384 mm, Java (not a type); none in Leiden.

PANGASIIDAE

Pangasius djambal Bleeker, 1846

Drawings.— None.

Specimens.— RMNH 2201, 860 mm, stuffed (with unpublished manuscript name "*Bagrus microcephalus* K & van H").

SISORIDAE

Glyptothorax platypogon (Valenciennes in Cuvier & Valenciennes, 1840)
(fig. 34)

Pimelodus platypogon Valenciennes in Cuvier & Valenciennes, 1840b: 152 (type locality Java).

Drawings.— Ink and partially watercoloured copy of original drawing of *P. platypogon*, by Valenciennes Leyden 1827; TL 79 mm, SL 65 mm (XV A 79); similar copy of same original, apparently by Sophie, with note by Valenciennes "calqué sur mon dessin fait à Leyde"; TL 79 mm, SL 65 mm (XV A 80).

Specimens.— MNHN 2903, 2: 70-74 mm, and MNHN B.196, 2: 50-64 mm, syntypes *P. platypogon*.

Comments.— The original drawing of *P. platypogon* must have been fully coloured, since both copies have notes providing colour descriptions. Valenciennes noted: "le corps noir olive, marbre a noir"; Sophie noted: "le corps olive marbré de noir". Sophie usually copied the originals of Kuhl and van Hasselt, but in this case she copied Valenciennes's copy.

AKYSIDAE

Akysis variegatus (Bleeker, 1847)

Akysis variegatus Bleeker, 1858: 24.

Drawings.— None found.

Specimens.— None found.

Comments.— The very small and poorly known catfish *Akysis variegatus* was identified by Bleeker (1858: 24) as the subject of a Kuhl and van Hasselt drawing he obtained in Java. I have not found the drawing or any copy of it, but have no reason to doubt Bleeker's identification. *Akysis variegatus* is the only species of the family Akysidae known from Java.

SILURIDAE

Kryptopterus bicirrhis (Valenciennes in Cuvier & Valenciennes, 1840)

Drawings.— None.

Specimens.— RMNH 2995, 2: 98.2-108 mm.

Ompok cf. bimaculatus (Bloch, 1794)

Drawings.— None.

Specimens.— RMNH 2914, 2: 98.2-252 mm (gill rakers 3-4+10-11 = 13-15; vertebrae 11+38 = 49).

Ompok hypophthalmus (Bleeker, 1846)

Drawings.— None.

Specimens.— RMNH 2908, 147 mm (nasal barbel extending posteriorly to about middle of anal fin, mental barbels to below posterior border of eye; gill rakers 3+11 = 14; vertebrae 11+43 = 54).

Comments.— The manuscript name "*Silurus pabuoides* Cuv. Val.", which I have been unable to relate directly to any drawing or specimen, might refer to this species.

Silurichthys hasseltii Bleeker, 1858 (fig. 33)

Silurichthys Hasseltii Bleeker, 1858: 270 (type locality Tjisekat, in fluviis).

Drawings.— Original Kuhl & van Hasselt watercolour, with locality Tjisekat and other pencil notes in Dutch in very small handwriting, presumably the same drawing found by Bleeker in Java and used by him for the original description of *Silurichthys hasseltii*; TL 133 mm, SL 112 mm (RMNH).

Specimens.— RMNH 2922, 115 mm TL according to Bleeker (1862: 82), supposedly from Tjisekat (not examined by me); RMNH 2992, 93.0 mm (anal fin rays 53; vertebrae 12+39 = 51); none in Paris.

Comments.— There is no indication that any Kuhl and van Hasselt specimens or drawings of *S. hasseltii* were in Leiden by 1824 and 1827. The drawing obtained in Java

by Bleeker is perhaps the only one of this species they had done. Bleeker found the 115 mm Kuhl and van Hasselt specimen in Leiden, and assumed that it served as the basis for the drawing of his original description, but this was uncertain. Reason for scepticism is provided by Bleeker, who originally reported the length of the "specimen" as 134 mm (Bleeker, 1858). This corresponds closely to my measurement of 133 TL for the drawing presently at RMNH. Later, however, after he examined the 115 mm specimen in Leiden, he reported that the measurement of 134 mm reported for the drawing in his original description was a typographical error for 114 mm (Bleeker, 1862: 82 footnote). Bleeker often assumed (incorrectly in most cases) that Kuhl and van Hasselt drawings are lifesize. Although Bleeker identified RMNH 2922 as the specimen upon which the original drawing and his description of *Silurichthys hasseltii* is based, the specimen has no type status, and there is even doubt that it is actually the specimen in the drawing, and whether it was in fact collected at Tjisekat, as presumed by Bleeker. The two Kuhl and van Hasselt specimens apparently are the only specimens of *Silurichthys* reported from Java. RMNH 2922 was on loan during my visit to Leiden so I was unable to compare it with the drawing.

CYPRINODONTIDAE

Aplocheilus panchax (Hamilton, 1822)
(fig. 70)

Odontopsis armata van Hasselt, 1823c: 131 (type locality Buitenzorg).

Panchax kuhlii Valenciennes in Cuvier & Valenciennes, 1846: 384 (type locality "les etangs auprès de Batavia").

"*Homalopsis javanicus* V. Hass., icon inedit" Bleeker, 1860: 489 (as unpublished synonym of *Panchax buchanani* Valenciennes in Cuvier & Valenciennes 1846).

Drawings.— Ink copy of original drawing, with unpublished van Hasselt manuscript name "*Nomalopsis* [sic] *javanica* M[ihi = van Hasselt]."; TL 47 mm, SL 39 mm (XVIII 152).

Specimens.— None.

Comments.— As pointed out by Kottelat (1987: 370), the names *Odontopsis* van Hasselt, 1823 and *O. armata* van Hasselt, 1823 are both available by description. Due, however, to the vagueness of the original description, the names have never been used subsequent to van Hasselt. *Odontopsis* is one of only 40 nominal genera of fishes that could not be placed in a classification of recent forms (Eschmeyer, 1990: 495).

Examination of the ink copy of the original drawing of *O. armata*, including the inset enlarged dorsal view of the jaws and their dentition, leaves no doubt as to its identification with the fish known as *Aplocheilus panchax*. *Odontopsis* van Hasselt, 1823 has priority over *Aplocheilus* McClelland, 1839 (type species either *Esox panchax* Hamilton, 1822 or *chrysostigmus* McClelland, 1839, a possible synonym of *E. panchax*; see Eschmeyer, 1990: 34). In the interest of nomenclatural stability, I maintain existing usage of *Aplocheilus*. It should be noted that the name *A. armatus* (van Hasselt, 1823) is available, should the Javanese fish prove to be a distinct species.

It is interesting to note that Bleeker resolved the generic and species identity of *Homalopsis javanicus* (= *Odontopsis armata*), and that this has passed unnoticed. As

Bleeker remarks, "van Hasselt knew very well the generic difference between the two kinds [*Aplocheilus* and *Betta*] and placed *Panchax buchmanii* in his genus *Homalopsis*, while *Betta picta* he placed in his genus *Anostoma*" (Bleeker, 1860: 489). As with other Kuhl and van Hasselt drawings Bleeker found in Java, he did not explain the circumstances of how he obtained an original or copy of van Hasselt's drawings of *Homalopsis javanicus* and *Anostoma picta*. These presumably were part of the duplicate set of drawings prepared by van Raalten and left with the Governor General van der Capellen.

HEMIRAMPHIDAE

Dermogenys pusilla van Hasselt, 1823 (figs. 35, 68a+b)

Dermogenys pusillus van Hasselt, 1823c: 131 (type locality Java).
Dermogenys pusillus Bleeker, 1866: 165.

Drawings.— Watercolour copy of original drawing, labelled "jeune hemiramphé" and "*Dermogenys pusilla* N."; TL 48 mm, SL 32 mm (XIX A 3); wash drawing, probably by Keultjes, dissection of *D. pusilla*, (RMNH); pen and pencil drawing, perhaps by van Hasselt, ovarian embryo (RMNH).

Specimens.— None.

Comments.— Although Valenciennes copied Kuhl and van Hasselt's original drawing of *D. pusilla* in Leiden, his remark on the copy indicates that he considered it an unidentified juvenile form rather than a distinct species. The earliest subsequent author to consider *D. pusilla* a valid species appears to be Bleeker. Gender of *Dermogenys* is feminine, so correct spelling of species name is *D. pusilla* (as pointed out by Eschmeyer, 1990: 122).

The original account of *D. pusilla* by Kuhl and van Hasselt, only one of the hundreds of unpublished fish descriptions they prepared, provides an good sample of their industry and scientific ability (original in archives of RMNH). The final draft, prepared by van Hasselt, reads as follows:

Dermogenys Nobis

Hautkiefel (genys [Greek] Kiefer)

Genus e familia Esoceorum novum, *Henirampus* [sic; *Hemiramphis* in Kuhl's draft] proximum, at mandibula utrinque appendice cutaneo longitudinali caudaque rotundata et habitatione diversum. Maxillae tomior intermaxillaribus formata, maxillaribus glabris remotis. Sp. *Dermogenys antennarius* Hass. in flumine prope Mare ad Labouan [*D. antennarius* = *Zenarchopterus*; see below under *Z. dispar*].

NB wordt gezegd nooit in Zee voor te komen

ad narium aperturam filamen tenue/ unde nomen/ Rostro longissimo omnium Superiorum, magis 1/3 parte corporis/: a cauda ad oris aperturam/ cum membrana laterali et inferiore longitudinali; P. anali monstruosa quasi in 3 pinnis divisa, valde elongatis pinna dorsali multo fortiores. PC. [pinna caudalis] subrecta, supra rotundata.

Colore argenteo supra olivescente, stria longitudinali coerulea laterali. Appendice caroso pono anum.

PP. 9 PV. 6 PA. 12 PD. 11 PC. 20

Long. 0,6,6

Latit. 0,0,7 Supra PV.

Dermogenys pusillus Nobis. Julang Julang. Buitenzorg. Tjikanjavar den 10 Mei 1821. Laenge 0,1,6.

Oeffnet man den Unterkiefer, so sieht die obere weit in die Hoehle.

Respirations werkzeuge: Das Herz ist sehr dunkelroth gefärbt, von der Seite gesehen Stellt es ein niedriges Dreieck dar, dessen Basis die der Bauchhoehle zugekehrte Kante ist, dessen Spitze oben der Rückenfläche sich zuwendet, so dass eine vordere und hintere Fläche entsteht. Auf jener sitzt der Aortenbulbus auss der ziemlich gestreckt weit ist. Von unten gesehen hat das Herz eine laengliche ovale gestelt.

Am dem innern Kiemendeckel findet sich keine Kiemenausbreitung. Die Kiemen der 4 Bogen sind nicht von bedeutender Länge, der letzte Bogen ist seiner groessern Laenge nach angewachsen.

Die Luftblase ist sehr gross und breit und fuellt die ganze Ruckenfläche der Hoehle aus bis zum After hinreichend. Ob ein Ausfuhrungsgang und eine glandel da sei, darf ich nicht mit Sicherheit verneinen.

Verdauungswerkzeuge. Der Darmkanal ist ganz einfach der Magen mit nichts als eine Erweiterung ohne allen Blindsack oder Anhang. Am Pylorus könnte sich vielleicht eine Klappe finden, es ist wenigstens eine starke Einschnürung, das indem ich den Darm von flagen aus nicht ausblagen konnte. Der ganz einfache Darm läuft auf der Bauchfläche zwischen beiden Ovarien hin zum After.

Die Leber ist aeusserst blass, graulichfleischfarben und Kurz den Magen von unten deckend aber so breit als die Bauchhöhle. Ihre grossere Portion[?] liegt rechts. Ihr hinterer Rand is schwach 2 lappig. Die Gallenblase und die Gaenge konnte ich die Kleinheit wegen nicht erkennen.

Die Milz ist ein kleines Körperchen om Magen über d. Leber gelegen.

Urin- und Geschlecht-werkzeuge. Die Nieren müssen äusserst gering sein, da ich sie nicht erkennen konnte.

Die sehr stark entwickelten Ovarien lagen am jeder Seite in das ganzen Länge der Eingeweidehöhle hin und bestanden aus nicht sehr zahlreichen sehr stark entwickelten Eiern von einer Linie [2.2 mm] im Diameter, unter denen nur wenige opak[?]gelbe/ : vermuthlich verdorbene kleine Eierchen gemischt waren.

Die entwickelten Eier haben ganz das Ansehen von hellem Kandies Zucker. In jedem liegt der ziemlich entwickelte Embryo. Die 2 Augen sind vollig ausgebildet mit schwarzer Pupille. Der Kopf ist sehr breit. Vor den Augen ist ein blassrothes ziemlich weites gefäss, welche sich in kleinere zerästelt, nach hinten läuft der Kopf in einem schmalen Schwanz aus. Jenes breite Gefäss wie liert sich an der Unterseite des Kopfes. An jeder Seite ästelt sich ein anderer Gefässstamm aus in die seitlichen Theile des Zellig und Blasenkorpers, auf welchen der Fisch liegt und der ohne Zweifel sein Bauch mit den darin liegen dem Dotter ist. Dieser Koerper hat eigentlich die Kandiesfarbe und besteht aus unsöhlichen kleinen runden Bläschen, die das Ansehen von Fetttöpfchen haben. Das Blut ist schon hochroth gefarbt, der Koerper und Kopf weisslich mit dem schwarzen Pigment-flecken. Die 2 seitlichen ausstrahlenden Gefässe verfolgt man/ nicht bei allen gleich leicht./ bis hinter die Augen, wo sie nach unten verschwinden, wo vermuthlich das Herz liegt/ In sehr starken Arak ward die Koerper weisslicher, der Bläschen Koerper opak[?] und die Pupille weis. Das Silberpigment der Augen war sehr entwickelt vorhanden. Bei einem sah ich das vordere Gefäss sich noch ein Stueckchen weit an der Unterflaeche des Kopfes fortsetzen, wo es aber nicht weiter sichtbar war.

From the foregoing account, it appears that the original generic concept (unpublished) of *Dermogenys* included *Zenarchopterus dispar*. There is no mention of *D. antennarius* in the Uittreksels. In addition to providing an excellent generic diagnosis and species descriptions, Kuhl and van Hasselt described quite well the main features of the reproductive anatomy of the small viviparous species *D. pusilla*. Had they studied *D. antennarius* in comparable detail, they would have discovered that it is oviparous.

The wash drawing of the dissection of *D. pusilla* is tentatively attributed to Keultjes, because he was still alive at the time the observations were made, and other anatomical drawings in the RMNH archives presumed or known to be by him exhibit the same technique.

Zenarchopterus dispar Valenciennes in Cuvier & Valenciennes, 1846
(fig. 69)

Hemiramphus dispar Valenciennes in Cuvier & Valenciennes, 1846: 58 (type locality Madagascar?; Moluques?; rivière Labouane, Java).

Drawings.— Ink copy of original drawing, labelled *Hemiramphus dispar* by Valenciennes; TL 178 mm, SL 112 mm (XIX A 31).

Specimens.— None.

Comments.— Valenciennes's original description of *Zenarchopterus dispar* is based mainly on specimens doubtfully collected in Madagascar (MNHN 4594, 3: 80-87 mm, (females; MNHN 4595, 2: 88-93 mm, males). After describing these specimens Valenciennes (1846: 61-2) remarked "je connaissais le singulier hémirampe qui vient de faire le sujet de cet article, par un dessin fort exact, et par conséquent d'une détermination très-facile, qui avait été envoyé par MM. Kuhl et Van Hasselt au Musée Royal de Leyde. Ils disaient que cet hémirampe venait de la rivière Labouane, l'un des cours d'eau de Java. Une espèce aussi singulier pourrait-elle exister à la fois à Madagascar et aux Moluques?"

As Valenciennes does not otherwise mention specimens of his *H. dispar* from the Moluques, and as the MNHN possesses only the two series of syntypes from "Madagascar?", it seems he confused Java with the Moluccas, and hence "Moluques" should not be considered as part of the type locality. The copy of Kuhl and van Hasselt's drawing shows a sexually mature male with the distinctive features of *Z. dispar*. The morphology of the dorsal fin and anal gonopodium appears to be similar to that of *Z. dispar* figured by Mohr (1926: 254, fig. 16).

The van Hasselt manuscript name "*Dermogenys antennarius*" based on a fish of length 0,6,6 [166 or 176 mm] "in flumine prope Mars ad Labouan", including a brief mention of the anal fin divided into three parts (gonopodium), is based on *Z. dispar*.

SYNGNATHIDAE

Doryichthys deokhatoides (Bleeker, 1853)

Syngnathus fluviatilis van Hasselt, 1823b: 329 (rivieren bij Batavia) (nomen nudum).

Syngnathus brachyurus Bleeker, 1853: 19 (type locality rivier Paninbang) (based on Kuhl and van Hasselt drawing left in Java).

Syngnathus fluviatilis Bleeker, 1853: 25 (based on original Kuhl and van Hasselt drawing left in Java).

Doryichthys fluviatilis Weber and de Beaufort, 1922: 55 (cited as doubtful species perhaps identical with *D. deokhatoides*).

Drawings.— Original van Hasselt drawing in RMNH reported by Alfred, 1964: 157, reproduced in Bleeker, 1987, pl. 450, fig. 12 as *S. fluviatilis* (possibly the same drawing found by Bleeker in Java).

Specimens.— RMNH 3852, 186 mm (no type status).

Remarks.— Weber and de Beaufort, 1922: 55-56 identified RMNH 3852 as *Microphis brachyurus* (Bleeker 1853), and stated that *S. fluviatilis* "...is known only from the description of Bleeker, made after an inedited figure of van Hasselt. It has

never been found again and is therefore rather dubious." Identification of *S. fluviatilis* with *D. deokhatoides* has been accepted by subsequent authors including Alfred (1964) and Dawson (1985: 56).

Van Hasselt's manuscript description of *S. fluviatilis* includes notes on anatomy and reproduction.

MUGILIDAE

Cestraeus oxyrhyncus Valenciennes in Cuvier & Valenciennes, 1836

Drawings.— None.

Specimens.— RMNH 1351, 136 mm, stuffed.

Anabantidae

Anabas testudineus (Bloch, 1795)

(figs. 36, 37)

Anabas scandens Cuvier in Cuvier & Valenciennes, 1831: 337, 340.

Drawings.— Original watercolour by Keultjes, with manuscript name "*Anabas tampela* Nobis [= by Kuhl & van Hasselt]"; TL 107 mm, SL 87 mm (RMNH); watercolour copy of original drawing, by Valenciennes 1827; TL 105 mm (VII C 15); ink copy (no watercolour) by Sophie(?) of original drawing; TL 105 mm (VII C 20).

Specimens.— MNHN A.344, 3: 48.6-101 mm; RMNH 1581, 2: 95.2-151 mm; RMNH 1075, 78 mm, RMNH 1076, 135 mm, RMNH 1077, 142 mm, stuffed specimens; RMNH 139, 102 mm, skeleton.

BELONTIIDAE

Belontia hasselti (Cuvier in Cuvier & Valenciennes, 1831)

(fig. 38)

Polyacanthus hasselti Cuvier in Cuvier & Valenciennes, 1831: 353, pl. 195 (type locality Java).

Drawings.— Original watercoloured drawing by van Raalten and Maurevert; TL 181, SL 138 mm (RMNH); ink copy (with eye only in watercolour) by Valenciennes 1827 of original drawing; TL 181 mm (VII C 27); ink copy probably by Sophie of original drawing labelled *Polyacanthus olivaceus* M.; TL 181 mm (VII C 34); ink copy by Valenciennes?, labelled *Polyacanthus hasselti*; TL 181 mm (VII C 35).

Specimens.— MNHN A.358, syntypes, 2: 120-130 mm; RMNH 1078, 141 mm, RMNH 1079, 130 mm, stuffed specimens; RMNH 140, 90 mm, incomplete skeleton.

Comments.— Although both copies are ink outlines, the original drawing must have been coloured, because VII C 34 has detailed colour notes in the handwriting of Sophie Duvaucel. Because of these notes, I presume the copy was made by her. The

other copy (VII C 35) is sufficiently different in style, notably in the simpler representation of the lateral line, that it probably was done by someone else, presumably Cuvier; neither copy is signed or attributed. *Polyacanthus olivaceus* is an unpublished name of van Hasselt.

Betta picta (Valenciennes in Cuvier & Valenciennes, 1846)
(fig. 39)

Panchax pictum Valenciennes in Cuvier & Valenciennes, 1846: 385 (type locality environs de Buitenzorg).

Drawings.— Watercolour copy of original drawing, labelled "*Panchax pictum*"; TL 45 mm, SL 34 mm (XVIII 151); ink copy of original drawing, labelled "*Anostoma picta* (nobis) [= Kuhl & van Hasselt]"; TL 46 mm, SL 34 mm (XVIII 151bis).

Specimens.— None.

Comments.— Type species of *Betta* Bleeker, 1850 is *Betta trifasciata* Bleeker, 1850, by monotypy (Eschmeyer, 1990: 58). Weber & de Beaufort (1922) reported only a single species of *Betta* from Java, *B. picta*, with *B. trifasciata* as junior synonym. If Java truly has only a single species of *Betta*, then *B. trifasciata* must be a junior synonym of *B. picta*, but further study is needed to reach a satisfactory conclusion.

Trichogaster trichopterus (Pallas, 1770)
(fig. 41)

Trichopus trichogaster Cuvier in Cuvier & Valenciennes, 1831, pl. 199.

Drawings.— Watercolour by Valenciennes 1827 of original drawing; TL 85 mm, SL 67 mm (VII C 68); ink copy by Sophie? of same original drawing; TL 85 mm (VII C 66).

Specimens.— MNHN A.370; RMNH 1600, 2: 55.1-61.2 mm.

Comments.— Although Cuvier's text on *Labrus* (or *Trichopus*) *trichogaster* (Cuvier & Valenciennes, 1831: 388-391) does not specifically mention Kuhl and van Hasselt specimens, plate 199 apparently is based on one of them.

Trichopsis vittata (Cuvier in Cuvier & Valenciennes, 1831)
(fig. 40)

Osphromenus vittatus Cuvier in Cuvier & Valenciennes, 1831: 387.

Drawings.— Watercolour copy by Sophie? of original drawing, with unpublished manuscript name *Osphromenus javanensis*; TL 57 mm, SL 41 mm (VII C 61); watercolour copy of same original drawing by Valenciennes?; TL 58 mm, SL 40 mm (VII C 71).

Specimens.— RMNH 1605, 38.2 mm, neotype *O. vittatus* by present designation (possible holotype *O. vittatus*; previous identification *Osphronemus goramy*; anal fin vii,25; vertebrae 9+20 = 29); none in Paris.

Comments.— The material upon which Cuvier based his very brief description

of *O. vittatus* cannot be identified with certainty. The description may have been based on the single extant Kuhl and van Hasselt specimen of *Trichopsis* (here designated neotype) or perhaps on the drawing which also served for the description of *Betta picta*. The beautiful watercolour of "*O. javanensis*," clearly identifiable with the species usually known as *Trichopsis vittata*, cannot possibly have served as the basis for the original description of *O. vittatus*. It is possible that RMNH 1605 served as the basis for this drawing, but this cannot be verified. Thus one is reduced to choosing between a drawing of a *Betta* or a specimen of *Trichopsis* as the basis for the description. In the interest of nomenclatural stability, I identify the original description with the specimen of *Trichopsis*, which may possibly be the specimen upon which it was based.

It may be noted that type species of *Trichopsis* Canestrini, 1860 is *Trichopsis striata* (Bleeker, 1850), by monotypy, and that *O. vittatus* was placed as a senior synonym of *T. striata* by Bleeker, 1879: 3, 25. Bleeker did not discuss the original description or type material of *O. vittatus*, but he has been followed by all subsequent authors.

OSPHRONEMIDAE

Osphronemus goramy Lacepède, 1802

Osphronemus notatus Cuvier in Cuvier & Valenciennes, 1831: 386 (type locality Java).

Drawings.— Fine ink drawing of specimen of *Osphronemus notatus* by Valenciennes Leiden 1824, with very accurate notes on fin ray counts; "grandeur naturelle" TL 112 mm (VII C 54); pencil drawing by Valenciennes of same specimen, with fin rays and scales less carefully drawn; TL 112 mm (VII C 64).

Specimens.— RMNH 1083, 135 mm, RMNH 1084, 132 mm, RMNH 10-84, 152 mm, RMNH 1087, 180 mm, stuffed specimens; RMNH 141, 239 mm, skeleton; none in Paris.

Comments.— As first pointed out by Bleeker (1850: 10), *O. notatus* is based on a juvenile specimen of the giant goramy, *O. goramy*; this identification is verified in Roberts, 1992b. Valenciennes's ink drawing of *O. notatus* is reproduced in Bauchot, et al., 1990: 26, fig. 6.

HELOSTOMATIDAE

Helostoma temminckii Cuvier, 1829 (fig. 42)

Helostoma temminckii Cuvier in Cuvier & Valenciennes, 1831: 342, pl. 194.

Drawings.— Original watercolour by van Raalten, with manuscript name "*Helostoma striolatum* M"; TL 242 mm, SL 189 mm (RMNH); watercolour copy of original drawing, by Valenciennes Leiden 1827; TL 242 mm (VII C 32); crude ink copy by unknown copyist, with colour notes and name "*Heleostoma striolatum* M.[ihi = van

Hasselt]"; TL 243 mm, SL ca. 200 mm (VII C 29); ink copy by Valenciennes?, very different style from VII C 29, labelled *Helostoma temminckii* with colour notes in Valenciennes's handwriting; TL 240 mm (VII C 30).

Specimens.— Holotype presumably in Paris, not found; RMNH 1081, 182 mm, stuffed (possibly specimen utilized for original drawing by van Raalten); RMNH 136, 202 mm, skeleton.

CHANNIDAE

Channa gachua (Hamilton, 1822) (fig. 43)

Ophicephalus marginatus Cuvier in Cuvier & Valenciennes, 1831: 411-12 (type locality Pondichery and Buitenzorg; descriptions given of specimens from both localities).

Ophicephalus limbatus Cuvier in Cuvier & Valenciennes, 1831, pl. 201 (no accompanying text; type locality western Java, based on Kuhl and van Hasselt specimen).

Drawings.— Watercolour copy of original drawing, by Valenciennes Leiden 1827, labelled "*Ophicephalus guacha* [sic] H. Buch."; TL 106 mm, SL 88 mm (VII C 108); similar watercolour copy of same original drawing, with manuscript name "*Ophicephalus limbatus* Kuhl"; TL 106 mm, SL 87 mm (VII C 115).

Specimens.— MNHN 2247, 4: 86-125 mm, syntypes *O. marginatus*.

Comments.— The name *Channa limbata* (Cuvier in Cuvier & Valenciennes, 1831) new comb. is available should the Javanese species currently identified with *C. gachua* turn out to be distinct.

Channa lucius (Cuvier in Cuvier & Valenciennes, 1831) (figs. 44, 45)

Ophicephalus lucius Cuvier in Cuvier & Valenciennes 1831: 416 (type locality Java).

Drawings.— Original watercolour drawing by Keultjes, with manuscript name "*Ophiocephalus radiatus* Nobis"; TL 320, SL 270 mm (RMNH); watercolour copy by Valenciennes 1827 of original drawing; TL 320 mm, SL about 275 mm (VII C 83); watercolour copy by Sophie of same original drawing; TL 315 mm (VII C 120); fine pencil drawing by Valenciennes of holotype; "grandeur naturelle" TL 233 mm, SL about 195 mm (VII C 82); different pencil drawing by Valenciennes of holotype; "grandeur naturelle" TL 233 mm (VII C 121).

Specimens.— Holotype should be in RMNH. RMNH 1138, 214 mm, RMNH 1140, 420 mm, stuffed; RMNH 120, 435 mm, skeleton (dorsal fin rays 42, anal 25; vertebrae 50?); RMNH 122, ca 380 mm (dorsal fin rays 45, anal 27; vertebrae 55?).

Comments.— Cuvier (1831) did not provide the etymology of the species epithet "lucius" in the name *Ophicephalus lucius*, which he attributed to Kuhl and van Hasselt. However it presumably refers to the pike, *Esox lucius* Linnaeus, 1758, also questionably the lucius of the Romans (see Cuvier and Valenciennes, 1846: 280-281). Therefore

in the combinations *Ophicephalus lucius* and *Channa lucius* it is a noun in apposition, and the correct spelling of the currently accepted name is *Channa lucius*.

The original figure by Keultjes together with the copy made by Valenciennes are reproduced so that they can be compared. The original shows the fish fully scaled, whereas the copy shows only a few scales, and the colours in the original are more somber than those in the copy.

Channa micropeltes (Cuvier in Cuvier & Valenciennes, 1831)

Ophiocephalus micropeltes Cuvier in Cuvier & Valenciennes, 1831: 427 (type locality Java).

Drawings.— None.

Specimens.— RMNH 1131, 210 mm, RMNH 1132, 250 mm, stuffed specimens, one or both perhaps syntypes; none in Paris.

Comments.— RMNH 2318, 605 mm, stuffed, Java, collector unknown, apparently is the syntype of "26 pouces [= 702 mm]" mentioned by Cuvier, and upon which most of his description may be based (very good condition; total length 710 mm; dorsal fin rays 44).

Channa striata (Bloch, 1793)

Ophiocephalus planiceps Cuvier in Cuvier & Valenciennes, 1831: 424.

Drawings.— None.

Specimens.— MNHN A.629, 99 mm, syntype *O. planiceps*; RMNH 1131-35, 5: 210-465 mm, stuffed (previously identified *O. planiceps*); RMNH 1143, 341 mm (previously identified *O. melanosoma*).

Comments.— Van Hasselt's manuscript on *Ophiocephalus striatus* includes a lengthy account of anatomy and physiology, mentioning the optic nerve, circulatory and respiratory organs, heart, digestive system, lengths of the parts of the alimentary canal and its associated structures, kidneys, and gonads.

It also mentions an undescribed parasitic nematode, "*Ascaris ophiocephali* N.", "ein *Liorhynchus*." The mention of *Liorhynchus* Rudolphi, 1801 suggests that it was a spiruloid of the family Rhabdochonidae or more likely Camallanidae; the specimen cannot be located in the RMNH (pers. commun., J. van der Land).

RHYACICHTHYIDAE

Rhyacichthys aspro (Valenciennes in Cuvier & Valenciennes, 1837)
(figs. 46, 71)

Platyptera melanocephala Cuvier, 1829: 248 (nomen nudum).

Platyptera trigonocephala Cuvier, 1829: 248 (nomen nudum).

Platyptera aspro Valenciennes in Cuvier & Valenciennes, 1837: 321, pl. 326 (drawn by Acarie-Baron)
(type locality Bantam in Java; Celebes).

Platypterus flavipinnis Valenciennes, 1836?, pl. 83, fig. 1.

Drawings.— Watercolour copy by Valenciennes 1827 of original drawing of juvenile from Bantam, with Kuhl and van Hasselt manuscript name *Platyptera trigonocephala*; TL 63 mm, SL 52 mm (XII A 234); ink copy by Sophie? of same drawing; TL 64 mm, SL 53 mm (XII A 233); fine original drawing by Werner of adult, labelled "*Platyptera melanocephala* van Hasselt" and "*Platyptera trigonocephala* van Hasselt"; "grandeur naturelle" TL 184, SL 152 mm (XII A 230).

Specimens.— RMNH 2114, 150 mm, syntype, stuffed (specimen drawn by Werner); RMNH 2113, 148 mm, stuffed; RMNH 173, 133 mm, skeleton; none in Paris.

Comments.— Apparently van Hasselt himself thought that his juvenile and adult specimens represented two distinct species. Cuvier (1829: 248) considered the figures of two specimens of *Rhyacichthys* collected by van Hasselt in Bantam represented two species, which he named but did not describe. Valenciennes in Cuvier & Valenciennes (1837: 326) pointed this out, and concluded that the figures represented adult and juvenile of a single species, remarking that van Hasselt's drawing of the juvenile had paler coloration enhanced by lemon yellow, with oblique stripes on the caudal fin. The figure by Acarie-Baron in Cuvier & Valenciennes (1837, pl. 326) is based on a specimen collected by van Hasselt in Bantam; the same figure with colours added based on van Hasselt's drawing was published by Valenciennes (1836?, pl. 83, fig. 1), as *P. flavipinnis*. In this as in other instances reported herein, it is unknown why Werner's drawing was not published.

The generic name *Platypterus* Valenciennes, 1836?, type species by original designation and monotypy *P. flavipinnis* Valenciennes [= *P. aspro*] clearly is senior to *Rhyacichthys* Boulenger 1901, but possibly preoccupied by *Platypterus* Chandoir, 1838 in Coleoptera (cited by Eschmeyer, 1990: 319). If Valenciennes (1836?) was in fact published in 1836, then *Platypterus flavipinnis* even has seniority over *Platyptera aspro* Valenciennes in Cuvier & Valenciennes, 1837. Nevertheless, the generic name *Rhyacichthys* is well known at least to ichthyologists, and is the basis of the family name Rhyacichthyidae, while *Platypterus* and *P. flavipinnis* Valenciennes, 1836? apparently have been overlooked by all subsequent authors (including Eschmeyer, 1990). Therefore I continue to use *Rhyacichthys*.

ELEOTRIDAE

Belobranchnus belobranchnus (Valenciennes in Cuvier & Valenciennes, 1837)

Drawings.— None.

Specimens.— RMNH 2042, 78.9 mm; RMNH 2045, 67.9 mm; RMNH 2048, 58.0 mm.

Comments.— The manuscript name "*Eleotris poecilopterus* v. Hasselt" is based on this species.

Eleotris fusca (Bloch & Schneider, 1801)

Drawings.— None.

Specimens.— RMNH 2062, 2 (not found); RMNH 989, 135 mm and RMNH 990, 144 mm, stuffed specimens.

Ophiocara porocephala (Valenciennes in Cuvier & Valenciennes, 1837)

Eleotris ophicephalus Valenciennes in Cuvier & Valenciennes, 1837: 239 (type locality Java).

Drawings.— None.

Specimens.— MNHN A.1549, 117 mm, holotype *E. ophicephalus*; RMNH 987, 211 mm, RMNH 988, 185 mm, stuffed specimens; RMNH 175, 169 mm, skeleton.

GOBIIDAE

Aulopareia unicolor (Valenciennes in Cuvier & Valenciennes, 1837)
(fig. 47)

Gobius unicolor Valenciennes in Cuvier & Valenciennes, 1837: 88 (type locality "rivières de l'île de Java").

Drawings.— Watercolour copy of original drawing, labelled "*Gobius unicolor*, Lebak rivier"; TL 118 mm, SL 88 mm (XII A 52).

Specimens.— MNHN A.1120, 63 mm (holotype *G. unicolor*).

Comments.— Placed as synonym of *Acentrogobius chlorostigmatoides* (Bleeker, 1849) by Koumans (1953: 58), but identified as valid species of *Aulopareia* in Bauchot et al. (1991: 40).

Sicyopterus cf. *cynocephalus* (Valenciennes in Cuv. & Val., 1837)
(fig. 48)

Gobius hasseltii Bleeker, 1851: 251, fig. 8 (based on Kuhl and van Hasselt drawing: "longitudo figurae descriptae 123""").

Drawings.— Watercolour copy by Valenciennes 1827 of original drawing, with manuscript name "*Gobius setiger*" and locality "rivier Tjidekat"; TL 122 mm, SL 99 mm (XII A 86).

Specimens.— None found.

Comments.— The copy or original of the Kuhl and van Hasselt drawing reproduced by Bleeker in the original description of *Gobius hasseltii* (Bleeker, 1851, fig. 8) is lost. The watercolour copy by Valenciennes is based on an original or copy of the same figure. Lynn Parenti (pers. commun., Feb. 1993) identified a photograph of the Valenciennes copy as a male *Sicyopterus*, probably *S. cynocephalus*. Koumans (1953: 226) included *Sicydium setiger* van Hasselt (a nomen nudum) and *Gobius hasseltii* Bleeker, 1851, as junior synonyms of *S. cynocephalus*.

It is quite possible that *Gobius hasseltii* is not the same species as *Sicyopterus cynocephalus*, in which case it should be known as *Sicyopterus hasseltii* (Bleeker, 1851).

Sicyopus cf. *balinense* (Bleeker, 1857)
(fig. 49)

Drawings.— Watercoloured copy by Valenciennes 1827 of original drawing drawing, with locality “rivier Tjeonung”; TL 54 mm, SL 46 mm (XII A 86 bis).

Specimens.— Not found.

Comments.— Identification of drawing as male? *S. cf. balinense* by L. Parenti (Feb. 1993), who notes that otherwise it might be *Sicyopus polycnodon* (Bleeker, 1849).

Stiphodon cf. *elegans* (Steindachner, 1879)
(fig. 50)

Deltentosteus taeniatus Bleeker, 1983, pl. 438, fig. 12 (nomen nudum; name and figure only).

Drawings.— Original watercolour by unknown artist, with locality “Tjizeralang”; TL: 41.6 mm, SL 36.0 mm (RMNH), also reproduced in Bleeker (1983, pl. 438, fig. 12).

Specimens.— Not found.

Comments.— Drawing identified as female *Stiphodon*, possibly *S. elegans*, by L. Parenti (Feb. 1993).

Gen. & spec. undet.
(fig. 51)

Drawings.— Original watercolour by unknown artist, with locality “Tjisekat”; TL 44 mm, SL 36 mm (RMNH).

Specimens.— Not found.

Comments.— Helen Larson (pers. commun., Feb. 1993) suggests the drawing may be a *Pseudogobiopsis*, perhaps *P. oligactis* (Bleeker, 1875) or else a *Rhinogobius* or a *Pseudogobius*.

MASTACEMBELIDAE

Macrognathus aculeatus (Bloch, 1786)

Drawings.— None.

Specimens.— RMNH 1349, 4: 57.5-201 mm (201 mm specimen with about 40 pairs of rostral toothplates; dorsal fin spines 18); RMNH 1179, 199 mm, stuffed; none in Paris.

Macrognathus maculatus (Cuvier in Cuvier & Valenciennes, 1831)
(fig. 52)

Drawings.— Watercoloured copy by Valenciennes of original drawing, labelled

Rhynchobdella maculata; TL 145 mm, SL 134 mm (VIII B 107); watercoloured copy by Sophie(?) of same original drawing; TL 144 mm, SL 134 mm (VIII B 104).

Specimens.— RMNH 1178, 173 mm, RMNH 1180, 224 mm, stuffed specimens; none in Paris.

Mastacembelus unicolor (Cuvier in Cuvier & Valenciennes, 1831)
(fig. 53)

Mastacembelus unicolor Cuvier in Cuvier & Valenciennes, 1832: 453 (type locality Java).

Drawings.— Watercolored copy by Valenciennes 1827 of Kuhl and van Hasselt drawing not used in original description; TL 297 mm, SL 277 mm (VIII B 106); watercolored copy by Sophie? of same original drawing; TL 295 mm, SL 275 mm (VIII B 103).

Specimens.— MNHN 5693, 137 mm, holotype *M. unicolor* (for meristic data including vertebral counts see Roberts, 1989: 179, table 16);

RMNH 1354, 2: 103-159 mm; RMNH 1181, 341 mm, stuffed.

SYNBRANCHIDAE

Monopterus albus Zuiew, 1793

Drawings.— Watercoloured copy by Valenciennes 1827 of original drawing, labelled "*Monopterus javanicus* Lacepède de Buitenzorg" and "*Synbranchus eurychassis* K. v.H."; TL 395 mm (XXVII 188).

Specimens.— RMNH 3887, 201 mm; RMNH 3888, 309 mm; RMNH 3893, 563 mm; RMNH 3894, 835 mm; RMNH 2032, 720 mm, RMNH 2033, 730 mm, RMNH 2237, 640 mm, stuffed specimens; none in Paris.

TETRAODONTIDAE

Tetraodon nigroviridis Marion de Procé, 1822
(fig. 54)

Drawings.— Watercolour copy by Valenciennes? of original drawing, labelled "*Tetraodon fluviatilis* Ham. Buch." and "rivière de la province de Bantam"; TL 84 mm, SL 68 mm (XXIX 79).

Specimens.— RMNH 4020, 2 (not found); none in Paris?

Comments.— So far as I have been able to determine, Kuhl and van Hasselt material of *T. nigroviridis* has not been reported previously; the watercolour copy of their original drawing was located in the archival material for the unpublished volume 14 of Histoire naturelle des Poissons.

There is no locality accompanying the drawing cited here, and I have not located any Kuhl and van Hasselt specimens in Paris or Leiden; however, a brief manuscript

note by van Hasselt on "*Tetraodon melanochloris* Hasselt" from "fluv. Paambang... tab. nostra" presumably refers to the drawing.

Incertae sedis

"Cirrhina breviceps" Valenciennes in Cuvier & Valenciennes, 1842
(fig. 72)

Cirrhina breviceps Valenciennes in Cuvier & Valenciennes, 1842: 293 (type locality rivière de Bantam).

Drawings.— Pencil drawing of holotype by Valenciennes, labelled "*Cirrhina breviceps*", "*Labeobarbus breviceps*" and "rivière de Bantam"; "grandeur naturelle"; TL 203 mm, SL 150 mm (XVI C 36).

Specimens.— A single dried specimen seven inches long, the holotype drawn by Valenciennes at Leiden; according to Weber & de Beaufort, 1916: 238, the specimen no longer exists at Leiden. No specimen found in Paris. I have been unable to find any specimen labelled *Barbus*, *Cyprinus*, *Labeobarbus*, or *Cirrhina brevis*.

Comments.— The genus *Cirrhina* or *Cirrhinus*, as now understood, is not known to occur in Java or even in Indonesia. Weber & de Beaufort, 1916: 238 remarked that this species is probably a *Labeo*. Valenciennes's drawing, however, with small mouth, short pair of rostral barbels; dorsal fin branched rays 11; scales in lateral series about 36-40, does indeed call to mind the genus *Cirrhinus*. Taking into consideration all of the labeoin cyprinids in the Kuhl and van Hasselt material, and especially the stuffed specimens, it seems highly likely that *Cirrhina breviceps* was based upon a specimen of *Osteochilus* which is no longer extant. Some of these specimens retain the strong unculiferous ridges on the lips characteristic of *Osteochilus*; but others have the lips removed or so reduced by drying that they could easily be mistaken for a species of *Cirrhinus*. The Kuhl and van Hasselt manuscript name *Labeobarbus seriatus*, for which only a single specimen is listed in the "Catalogue des poissons de Kuhl & van Hasselt" might refer to this taxon.

Barbinae gen. and spec. undet.
(fig. 73)

Drawings.— Ink copy of Kuhl and van Hasselt original drawing labelled "*Labeobarbus* [or *Labiobarbus*] Mihi Kuhl" and "Sading-Vitang Rivière"; TL 121 mm, SL 91 mm (XVI B 74).

Comments.— The drawing apparently never was used for a description, and the species it depicts is unidentified.

"Pimelodus javus" Valenciennes in Cuvier & Valenciennes, 1840

Pimelodus javus Valenciennes in Cuvier & Valenciennes, 1840b: 187 (type locality Java, probably erroneous).

Drawings.— None.

Specimens.— A single specimen four and a half inches long, the holotype, was attributed to Kuhl and van Hasselt by Valenciennes. Bleeker (1862: 61) reported holotype lost.

Comments.— According to Bleeker (1862: 61) no species corresponding to the description by Valenciennes occurs in Java. He suggested it might belong to the Neotropical catfish genus *Rhambdia*.

Discussion

H. Kuhl and J.C. van Hasselt were among the best educated naturalists who ever went to the East Indies. They were students of the noted zoologist Professor Theodorus van Swinderen at the University of Groningen. In 1818 they made a walking tour of Germany, attending lectures and visiting natural history cabinets. In 1819 Kuhl accompanied Temminck on a study trip to London, meeting Leach and Robert Brown, and Kuhl and van Hasselt travelled together to Paris, where they met Cuvier, Geoffroy St. Hilaire, Humboldt, Lamarck, Leschenault, and others (Kuhl, 1820a). Both were deeply interested in comparative anatomy, often making dissections and extensive notes and drawings. Their published work includes a systematic revision of German bats by Kuhl (1818-19); systematic accounts of parrots, gulls, mammals, fishes, amphibians and reptiles by Kuhl (1820a, b); and a monograph on comparative anatomy (muscles, brain, viscera, skeleton) of elasmobranchs, teleosts, amphibians, reptiles, mammals, and birds by van Hasselt and Kuhl (1820). Van Hasselt did a thesis on the embryology of frogs.

The results of their ichthyological exploration of Java are known mainly by the work of Cuvier and Valenciennes in the "Histoire naturelle des Poissons". The archival material for the Histoire naturelle des Poissons is stored in the archives of the Bibliothèque Central of the Muséum National d'Histoire Naturelle, Mss 480-558. Included are extensive notes and originals or copies of most of the drawings consulted in preparation of the 22 published volumes of the Histoire, and similar material for an additional 12 volumes that were never published (Pietsch, 1985). Material for the 22 published volumes of the Histoire is filed in Mss 480-525; material for the unpublished volumes in Mss 526-537 and 558 (Mss 538-557 contain a variety of invertebrates, fossil fishes and other materials not directly related to the Histoire). Drawings of Kuhl and van Hasselt fishes are filed in Mss 494 (Poissons à labyrinthes branchiaux), 496 (incl. Mastacembles), 508 and 509 (Siluroïdes), 512, 513 and 519 (Cyprinoides), 516 (Loches et Poecilies), 517 (Hémiramphes et Exocoets), 521 (Clupéoides incl. *Notopterus*), 530 (Apodes, incl. *Monopterus*) and 532 (Gymnodontes).

Jacques Christophe (also known as Jean Charles) Werner (1798-1856) (see Nissen, 1978: 167 for clarification of name and dates) was the most important illustrator for the Histoire naturelle des Poissons, producing not quite half of some 620 published illustrations. Apart from Laurillard, who did the beautiful anatomical illustrations of the perch in Volume 1 and a number of anatomical figures in later volumes, he was the most skillful. The anabantoid fishes *Helostoma temminckii*, *Polyacanthus hasselti*, and *Trichogaster trichopterus* along with the snakehead *Ophicephalus limbatus* were illustrated by Werner based on Kuhl and van Hasselt specimens and published in

Volume 7 (Cuvier & Valenciennes, 1828, pls. 194-5, 199, 201). Werner also prepared illustrations of other Kuhl and van Hasselt specimens, including the carp *Cylocheilichthys armatus*, the loach *Acantopsis dialuzona*, the loach goby *Rhyacichthys aspro*, and six nominal species of bagrid catfishes, but these were not published. Originals or printer's proofs of these Werner illustrations are among the archival material for the *Histoire naturelle des Poissons* listed above. As the only specimens of *A. dialuzona* and most of the other fishes illustrated by Werner are in Leiden, either Werner must have travelled to Leiden to draw them or the specimens must have been brought to him and subsequently returned.

Werner is best known for the several hundred colour plates in his "Atlas des oiseaux d'Europe pour servir de complément au manuel d'ornithologie de M. Temminck" (Werner, 1826-30). He ranks (with George H. Ford, James Green, and Robert Mintern of London, Joseph Zehner and Eduard Konopicky of Vienna, Charles Alexandre Le Sueur of France and the United States) among the great ichthyological illustrators of the nineteenth century. It is a pity that all of his drawings of Kuhl and van Hasselt specimens (and indeed of many other fishes) were not published in the appropriate volumes of the *Histoire naturelle des Poissons*. This was probably related to financial difficulties. Although Valenciennes continued to produce the *Histoire naturelle des Poissons*, it became increasingly difficult to obtain funds for the work after Cuvier died in May 1832. This finally resulted in cessation of publication in 1850 with 12 volumes unpublished (Pietsch, 1985). Long before this Valenciennes evidently had to economize on illustrations. Although the number of plates published with each volume declined only slightly, after 1833 (vol. 9) publication of successive volumes was delayed, and beginning with vol. 11 (published July 1836) the quality of the illustrations declined. Whereas Werner always drew directly from specimens, Acarie-Baron was more of a copyist, and not a particularly good one. Nearly all of the published figures of catfishes (vols. 14-16, 1840-1842) are by Acarie-Baron; a cursory search through Mss 508-10 reveals that many were based on drawings by other illustrators. Some are decidedly inferior copies of very good or excellent pencil originals (usually incomplete) by Cuvier. The Acarie-Baron illustrations were excoriated by Albert Günther, who characterized no fewer than 13 as not good, mediocre, bad, or very bad (Günther, 1864; 1868). It may be noted that the Werner drawings are not all of the highest quality, and the explanation at least in part is that he often had to draw specimens that were stuffed or otherwise in poor condition.

The only other published figures of Kuhl and van Hasselt fishes in the *Histoire naturelle des Poissons* are of the carps *Cyprinus flavipinnis* and *Luciosoma setigerum* by Acarie-Baron in Volume 16 (Cuvier & Valenciennes, 1842, pls. 457 and 469) and of the loaches *Cobitis* (= *Nemacheilus*) *chrysolaimus* and *Balitora erythrina* (= *Homaloptera ocellata*) by Oudart in Volume 18 (Cuvier & Valenciennes, 1846, pls. 521 and 524).

Valenciennes was an accomplished illustrator of fishes, but only five illustrations in the *Histoire naturelle des Poissons* are attributed to him; of these, perhaps the finest is of *Coryphaena hippurus* in Volume 9 (Cuvier & Valenciennes, 1833, pl. 266). Although he made drawings of several Kuhl and van Hasselt specimens, most are incomplete and none were published. Evidently they were only intended as aides memoir for descriptions.

Pieter Bleeker (1819-1878) arrived in Batavia in March 1842 and remained in the East Indies for 18 years, returning to Holland in September 1860 (Weber & de

Beaufort, 1911: vii). During this period, in the words of George S. Myers, "Batavia was the ichthyological capital of the World." Bleeker amassed a collection of 2500 fish species and published 520 articles on fishes during his lifetime. He described some 1100 fish species, marine and freshwater, mainly from the East Indies. The fish collections he sent to Europe comprised over 30,000 specimens (Day, 1878: iv).

Bleeker's earliest ichthyological publications concerned the fishes of western Java, basically the same area studied by Kuhl and van Hasselt only 20 years earlier. Eventually he published some 44 papers dealing with fishes of Java. He most certainly knew about Kuhl and van Hasselt before arriving in Java. In 1840 and in 1841 he applied unsuccessfully for a post at the Rijksmuseum van Natuurlijke Historie in Leiden, and stayed for six months in Paris, where "he spent his morning hours in the hospitals, his afternoons in the institutions of the Jardin des Plantes" (Weber & de Beaufort, 1911: vi). He probably did not meet Valenciennes, but of this I am unsure. It is unknown whether Bleeker saw any of the Kuhl and Hasselt specimens or drawings before he left for Batavia. In any event, the fishes reported on in Bleeker's earliest papers (1844-1847) are mainly labroids and catfishes; volumes 14-15 of the *Histoire naturelle des Poissons*, in which Valenciennes treated these groups, were published in January and November of 1840. Bleeker returned to Holland in the Spring of 1841 and in May 1841 was commissioned as army surgeon 3rd class of the Dutch East Indian army. He was only 22 years old.

Bleeker obtained at least 66 Kuhl and van Hasselt fish drawings in Java, as mentioned in his publications from 1851 through 1862 (pers. commun., Martien van Oijen, May 1993). Bleeker described six new species of freshwater fishes known to him only by the originals or copies of Kuhl and van Hasselt drawings that he obtained in Java: *Barbus* (= ?*Lobocheilos*) *hasseltii*, *Leuciscus* (= *Rasbora*) *lateristriatus*, *Silurichthys hasseltii*, *Syngnathus brachyurus*, *Syngnathus fluviatilis*, and *Gobius* (= *Sicydium*) *hasseltii*. The Kuhl and van Hasselt drawing of *Akysis variegatus* obtained by Bleeker provides the only evidence that they collected this small and poorly known species. Bleeker also had copies or originals of Kuhl and van Hasselt drawings of *Homalopsis javanicus* and *Anostoma picta* in his possession in Java, which enabled him to positively identify these species. The circumstances of how he came by the drawings is unknown. Evidently he brought some of them to Leiden after his return to Europe in 1860. I have not checked into the fate of the marine fish drawings obtained by Bleeker. Perhaps a number of them were used in the plates of his *Atlas Ichthyologique*. Of the freshwater fish drawings, only a few can be identified tentatively with those now in Leiden (*Silurichthys hasseltii*, *Syngnathus fluviatilis*).

In addition to drawings, Bleeker obtained in Java a "list of fishes sent by Kuhl and van Hasselt to Leiden" (Bleeker, 1858: 24, 94). The list Bleeker had differs significantly from the manuscript list "Catalogue des Poissons de Kuhl & van Hasselt" now in Leiden, in that it includes manuscript names of numerous marine Ariidae and other catfishes (e.g. *Pimelodus labroides*, *Pimelodus microstoma*, *Bagrus breviceps*, *Sarcogenys rostratus*) (Bleeker, 1858: 24, 94). The fate of this list is unknown. It is noteworthy that Bleeker apparently never saw Kuhl and van Hasselt's extensive original notes and unpublished manuscripts even after his return to Holland in 1860.

Bleeker apparently did not recover any Kuhl and van Hasselt fish specimens in Java.

Between 1824-27 and Bleeker's return to Holland in 1860, or perhaps later,

almost all of the original Kuhl and van Hasselt drawings copied by Achille Valenciennes and Sophie Duvaucel (including those of marine fishes) were lost (Alfred, 1961; Kottelat, 1987: 368).

The loss of the Kuhl and van Hasselt fish drawings (many fully watercoloured) has not been explained. I have not found out how, when or where it occurred. Some Dutch colleagues suggested that the drawings were sent to Paris and kept there. My search for Kuhl and van Hasselt drawings in the archives for the "Histoire naturelle des Poissons" in the Bibliothèque Centrale at MNHN failed to turn up even a single original Kuhl and van Hasselt drawing. Perhaps I have been overly influenced by this, but it has led me to tend to discount the hypothesis that the drawings were lost in Paris. The present evidence, including many copies of freshwater fish drawings signed "A. Val. Leyde 1824" and a few "A. Val. Leyde 1827", indicates Valenciennes copied the original drawings in Leiden, not in Paris. If the originals were in Paris he presumably could have retained them until his work was completed, so why would he go to the trouble of copying them? And if Valenciennes was remiss in not returning the drawings to Leiden, why did Temminck not write to request their return? Temminck did write for specimens on loan to be returned (letter to Valenciennes, dated 12 August 1826, Bibl. MNHN archives ms 1998/136, partially quoted by Monod, 1963: 12). Perhaps there is such a letter from Temminck, or other documentation concerning the missing drawings, hidden in the archives. My limited study of Valenciennes's work in other foreign museums, including his use of the Hardwicke collection of Indian Fish drawings in London, indicates he copied or had copies made mainly of drawings he could not take to Paris. Whatever happened, one can only hope that eventually the missing drawings will be found.

Conclusion: an appreciation of Kuhl and van Hasselt as ichthyologists

Heinrich Kuhl and Johan Coenraad van Hasselt made a substantial contribution to the ichthyology of Java and of the East Indies. It is likely that we are aware of all or almost all of their discoveries; perhaps some of their specimens and drawings never arrived in Europe. Due to the efforts of van Raalten, Temminck, Cuvier, Valenciennes, and Bleeker most of their specimens and drawings reached Leiden, and most of their discoveries were reported upon. These include the families Helostomatidae and Rhyacichthyidae, 22 new genera, and more than 50 previously undescribed species of freshwater fishes. Their productivity and knowledge is not to be compared to that of metropolitan museum-based ichthyologists, such as Valenciennes and Albert Günther, but rather to that of the locally resident collectors such as Francis Hamilton and Pieter Bleeker. The productivity and quality of the work is best shown by their drawings (or rather the copies, which fortunately are of high quality), and of their own conclusions as to the identification of the species they had collected. As demonstrated by the comments of Cuvier and Valenciennes, by the Uittreksels, and especially by their unpublished manuscripts, Kuhl and van Hasselt were fully aware that they had discovered many new genera and species of fishes. While Cuvier and Valenciennes lumped the genera, Kuhl and van Hasselt's original taxonomic assessments agree much better with modern ones. Kuhl and van Hasselt recognized species (*Dermogenys pusilla*, "*Odontaspis armatus*") of sizes smaller than Cuvier, Valenciennes, and other museum based

ichthyologists of the time were prepared to describe. While their freshwater collections were not so extensive as those made by other explorers, it should be pointed out that the area they explored was not so rich, and that they discovered a high proportion of the species present.

It should be noted that the earliest ecological observations of Javanese freshwater fishes were made by Kuhl and van Hasselt, and partly recorded in van Hasselt (1823c: 132).

"Although the different rivers have always many species in common they often contain a few which are wholly their own and not found in others; whilst in one and the same river the species also differ considerably in connection with the amount the bed rises above sea-level; and those are not at all the same species which are found in the muddy rivers near the beach and which are found in the clear water of the mountains. There are some notes lacking at this moment for giving you the distribution of each species but for which I will have a better opportunity in future with the shipment" (translated by M. Boeseman in Alfred, 1961: 85).

While not mentioned in this passage, Kuhl and van Hasselt also recognized swamps as a distinct habitat, being careful to differentiate the fishes collected in the swamps of Sading-Vetang from those of the river. Such habitat distinctions almost never were made (or at least not reported) by early fish collectors in Asia, with the notable exception of Francis Hamilton.

It is also through the drawings or copies of Kuhl and van Hasselt drawings and particularly through their great unpublished manuscripts that one gains a highly favorable regard for their scientific and ichthyological ability. The drawings, like those of Hamilton, are so well done that one can invariably recognize the species, and they demonstrate an excellent knowledge of fishes. But their knowledge and ability is best indicated by their recognition of new taxa and the quality of their systematic and anatomical descriptions. Had they survived, explored all of the main islands of the Dutch East Indies as originally intended, and published the results after returning to Europe, this work would have been a great advance in the science of ichthyology.

Acknowledgements

For many years the Muséum National d'Histoire Naturelle has encouraged and facilitated my work. I am grateful to friends and colleagues in the Section d'Ichtyologie for numerous courtesies: Marie Louise Bauchot, Roland Billard, Jacques Daget, Martine Desoutter, Guido Dingkerkus, Guy Duhamel, Jean-Claude Hureau, Françoise Nadot, Bernard Seret. Radiographs of several Kuhl and van Hasselt specimens were prepared by Janine Abel. Marie Louise Bauchot helped decipher Valenciennes's handwritten original descriptions of *Macrochirichthys macrochirus* and *Acantopsis dialuzona*. For discussion of Kuhl and van Hasselt and their fishes, and considerable help of various kinds, I thank Marinus Boeseman, Koos van Egmont, Lipke Holthuis, Isaac Isbrucker, Peter Koomen, Maurice Kottelat, G. F. Mees, J. van der Land, Peter Ng, Helen Larson, Han Nijssen, Martien van Oijen, Lynn Parenti, Ted Pietsch, C. Smeenk, Hans Tegelaar, and Jan van Tol. Drafts of the manuscript were read by Boeseman, Holthuis, Kottelat and van Oijen, who are responsible for numerous improvements. The manuscript particularly has benefitted from a number of discussions with L. Holthuis concerning history, nomenclature, and other matters. C. Smeenk and J. van Tol helped with the reading of Kuhl and van Hasselt's manuscript descriptions of *Dermogenys pusilla*.

This study would not have been possible without the kind permission and gracious assistance of

Mme Monique Ducreux, Conservateur en chef, Bibliothèque Centrale, MNHN, and her Archivistes Mmes Catherine Hustache and Françoise Serres. My thanks also to other library staff for their help on numerous occasions.

The research was supported by grants from the Smithsonian Institution, Muséum National d'Histoire Naturelle, and the Jan-Joost ter Pelwijk fund. I am particularly grateful to Ira Rubinoff, Ross Simons, Frank Talbot, Roland Billard, and Martien van Oijen for help in obtaining these grants.

References

- Alfred, E.R., 1961. The Javanese fishes described by Kuhl and van Hasselt.— Bull. Natl. Mus., Singapore 30: 80-88, pls. 3-8.
- Alfred, E.R., 1964. A syngnathid fish mentioned by van Hasselt.— Bull. Natl. Mus., Singapore 32: 157-158.
- Bauchot, M.L., J. Daget, & R. Bauchot, 1990. L'ichtyologie en France au début du XIXe siècle: l'Histoire naturelle des Poissons de Cuvier & Valenciennes.— Bull. Mus. natl. Hist. nat., 4e sér., 12 (sec. A, 1), suppl.: 3-142.
- Bauchot, M.L., M. Desoutter, D.F. Hoese, & H.K. Larson, 1991. Catalogue critique des types de poissons du Muséum national d'Histoire naturelle.— Bull. Mus. natl. Paris, (4) 13, sec. A (1-2) suppl.: 1-82.
- Bleeker, P., 1850. Bijdrage tot de kennis der visschen met Doolhofvormige Kieuwen van den Sunda-Molukschen Archipel.— Verh. Bat. 23: 1-15.
- Bleeker, P., 1851. Over enige nieuwe soorten van Blenioïden en Gobioïden van den Indischen Archipel.— Nat. Tijdschr. Ned. Ind. I: 259-275.
- Bleeker, P., 1852. Bijdrage tot de kennis der ichthyologische fauna van Blitong (Billiton), met beschrijving van eenige nieuwe soorten zoetwatervisschen.— Nat. Tijdschr. Ned. Ind. 3: 87-100.
- Bleeker, P., 1853. Bijdrage tot de kennis der Troskieuwige visschen van den Indischen Archipel.— Verh. Bat. Gen. 25: 1-30.
- Bleeker, P., 1854. Overzicht der ichthyologische fauna van Sumatra, met beschrijving van eenige nieuwe soorten.— Nat. Tijdschr. Ned. Ind. 7: 49-108.
- Bleeker, P., 1857. Descriptiones specierum piscium javanensium novarum vel minus cognitarum diagnosticae.— Nat. Tijdschr. Ned. Ind. 13: 323-368.
- Bleeker, P., 1858. Ichthyologiae Archipelagi Indici Prodromus. Vol. 1. Siluri: xii+370.— Batavia.
- Bleeker, P., 1860. Ichthyologiae Archipelagi Indici Prodromus. Vol. 2. Cyprini: xiii+492.— Batavia.
- Bleeker, P., 1862-63. Atlas ichthyologique des Indes orientales néerlandaises orientales. 3. Cyprins: 1-150, pls. 102-144.
- Bleeker, P., 1866. Révision des Hémirhamphes de l'Inde archipélagique.— Ned. Tijdschr. Dierk. 3: 136-170.
- Bleeker, P., 1879. Mémoire sur les poissons à pharyngiens labyrinthiformes de l'Inde archipélagique. Verh. Akad. Amsterdam 19: 1-56.
- Bleeker, P., 1983. Atlas ichthyologique des Indes orientales néerlandaises. Plates originally prepared for planned tomes XI-XIV published for the first time. With Introduction by M. Boeseman: 1-22, pls. 421-575 (eleven plates missing).— Washington, D.C.
- Burridge, M.E., 1992. Systematics of the *Acanthopthalmus kuhlii* complex (Teleostei: Cobitidae), with the description of a new species from Sarawak and Brunei.— Copeia 1992: 172-186.
- Cuvier, G., 1829. Le Règne Animal, distribué d'après son organisation, pour servir de base à l'histoire naturelle des animaux et d'introduction à l'anatomie comparée.— 2e éd. 2. xviii+532 pp.
- Cuvier, G., & A. Valenciennes, 1831. Histoire naturelle des Poissons, vol. 7: xxix+531, pls. 170-208 (pp. 1-440 by Cuvier, 441-531 by Valenciennes).— Paris.
- Cuvier, G., & A. Valenciennes, 1832. Histoire naturelle des Poissons, vol. 8: xix+509, pls. 209-245 (pp. 1-470 by Cuvier, 471-509 by Valenciennes) (dated 1831 on title page, but published Jan. 1832).— Paris.
- Cuvier, G., & A. Valenciennes, 1833. Histoire naturelle des Poissons, vol. 9: xxix+512, pls. 246-279 (pp. 1-198, 330-359, 372-427 by Cuvier, rest by Valenciennes).— Paris.
- Cuvier, G., & A. Valenciennes, 1837. Histoire naturelle des Poissons, vol. 12: xxiv+507, pls. 344-368 (volume by Valenciennes).— Paris.

- Cuvier, G., & A. Valenciennes, 1840a. Histoire naturelle des Poissons, vol. 14: xxii+464, pls. 389-420 (entire volume by Valenciennes) (dated 1839 on title page, but actual date of publication Jan. 1840).— Paris.
- Cuvier, G., & A. Valenciennes, 1840b. Histoire naturelle des Poissons, vol. 15: xxi+540, pls. 421-455 (volume by Valenciennes).— Paris.
- Cuvier, G., & A. Valenciennes, 1842. Histoire naturelle des Poissons, vol. 16: xx+472, pls. 456-487 (volume by Valenciennes).— Paris.
- Cuvier, G., & A. Valenciennes, 1844. Histoire naturelle des Poissons, vol. 17: xxiii+497, pls. 487-519 (volume by Valenciennes).— Paris.
- Cuvier, G., & A. Valenciennes, 1846. Histoire naturelle des Poissons, vol. 18: xix+505, pls. 520-533 (volume by Valenciennes).— Paris.
- Cuvier, G., & A. Valenciennes, 1848. Histoire naturelle des Poissons, vol. 21: xiv+536, pls. 607-633 (volume by Valenciennes).— Paris.
- Dawson, C.E., 1985. Indo-Pacific pipefishes (Red Sea to the Americas).— Gulf Coast Research Laboratory, Ocean Springs, Mississippi: vi+230.
- Day, F., 1878. The fishes of India; being a natural history of the fishes known to inhabit the seas and fresh waters of India, Burma, and Ceylon. Part 4: i-xx+553-779, pls. 139-195.— London.
- Eschmeyer, W.S., 1990. Catalog of the genera of Recent fishes.— California Acad. Sci. San Francisco: vi+697.
- Fraser-Brunner, A., 1940. On some fishes of the genus *Acanthopthalmus*, with description of a new species.— Ann. Mag. Nat. Hist. 11 (6): 170-175.
- Günther, A., 1864. Catalogue of the fishes in the British Museum. 5. Catalogue of the Physostomi, containing the families Siluridae, Characinidae, Haplochitonidae, Sternoptychidae, Scopelidae, Stomiatidae, in the collection of the British Museum: xxii+455.— London.
- Günther, A., 1868. Catalogue of the fishes in the British Museum. 7. Catalogue of the Physostomi, containing the families Heteropygii, Cyprinidae, Gonorrhynchidae, Hyodontidae, Osteoglossidae, Clupeidae, Chirocentridae, Alepocephalidae, Notopteridae, Halosauridae in the collection of the British Museum: xx+512.— London.
- Hasselt, J.C. van, 1823a. Uittreksel uit een' brief van Dr. J.C. van Hasselt, aan den Heer C.J. Temminck.— Algemeene Konst- en Letter-Bode, 1: 315-317.
- Hasselt, J.C. van, 1823b. Uittreksel uit een' brief van Dr. J.C. van Hasselt, aan den Heer C.J. Temminck.— Op. cit., 1: 329-331.
- Hasselt, J.C. van, 1823c. Uittreksel uit een' brief van den Heer J.C. van Hasselt, aan den Heer C.J. Temminck, geschreven uit Tjécande, Residentie Bantam, den 29sten December 1822.— Op. cit., 2: 130-133.
- Hasselt, J.C. van, 1824a. Sur les poissons de Java. Extrait d'une première lettre du Dr. J.C. van Hasselt à M. C.J. Temminck.— Bull. Sci. Nat. Géol., 2 (zool.) 73: 89-92.
- Hasselt, J.C. van, 1824b. Extrait d'une seconde lettre sur les poissons de Java, écrite par M. van Hasselt à M. C.-J. Temminck, datée de Tjécande, résidence de Bantam, 29 décembre 1822. Suite de la dernière, écrite en octobre 1822.— Op. cit., 2 (zool.) 306: 374-377.
- Hasselt, J.C. van, & H. Kuhl, 1820. Beiträge zur Zoologie und vergleichenden Anatomie. Zweite Abth. Beiträge zur vergleichenden Anatomie: 4+212, 11 pls [by Kuhl].— Frankfurt am Main.
- Hoeven, J. van der, 1830. Handboek der Natuurlijke Dierkunde, of grondbeginsels der Natuurlijke geschiedenis van het dierenrijk. Deel 2, stuk 1.— Amsterdam. ii+350 pp.
- Hoeven, J. van der, 1833. Verzameling der Platen, behorende tot het Handboek der Dierkunde van J. van der Hoeven: 1-12, pls. 1-20.— Amsterdam.
- Kottelat, M., 1984. Revision of the Indonesian and Malaysian loaches of the subfamily Noemacheilinae.— Jap. J. Ichth. 31: 225-260.
- Kottelat, M., 1987. Nomenclatural status of fish names created by J.C. van Hasselt (1823) and of some cobitoid genera.— Jap. J. Ichth. 33: 368-375.
- Koumans, F.P., 1953. The fishes of the Indo-Australian archipelago. X. Gobioidae: xiii+423.— Leiden.
- Kuhl, H., 1818-19. Die deutschen Fledermäuse: 11-49+185-215, pls.— Frankfurt am Main.
- Kuhl, H., 1820a. Beiträge zur Zoologie und Vergleichenden Anatomie. Erste Abth. Beiträge zur Zoologie: 8+152.— Frankfurt am Main.
- Kuhl, H., 1820b. Conspectus Psittacorum. Cum specierum definitionibus, novarum descriptionibus, etc.— Bonn. Nova Acta Caes. Leop.-Carol. Nat. Cur. 10.
- Mohr, E., 1926. Die Gattung *Zenarchopterus* Gill.— Zool. Jahrb., Abt. Syst. Geogr. Biol. Tiere 52: 231-266.
- Monod, T., 1963. Achille Valenciennes et l'Histoire naturelle des Poissons Mélanges Ichthyologiques.— Mém. IFAN: 9-45.

- Nissen, C., 1978. Die zoologische Buchillustration: ihre Bibliographie und Geschichte. Band 2: Geschichte: xvii+604.— Stuttgart.
- Pietsch, T., 1985. The manuscript material for the Histoire naturelle des Poissons, 1828-1849: sources for understanding the fishes described by Cuvier and Valenciennes.— Archs. nat. Hist. 12: 59-106.
- Roberts, T.R., 1989. The freshwater fishes of western Borneo (Kalimantan Barat, Indonesia).— Mem. California Acad. Sci. 14: xii+210.
- Roberts, T.R., 1992a. Systematic revision of the Old World freshwater fish family Notopteridae.— Ichth. Expl. Freshw. 2: 361-383.
- Roberts, T.R., 1992b. Systematic revision of the southeast Asian anabantoid fish genus *Osphronemus*, with descriptions of two new species.— Ichthyol. Expl. Freshw. 2: 351-360.
- Rüppell, E., 1852. Verzeichniss der in dem Museum der Senckenbergischen naturforschenden Gesellschaft aufgestellten Sammlungen. Vierte Abtheilung. Fische und der Skelette: 1-40.— Frankfurt-am-Main.
- Sirks, M.J., 1915. Indisch natuuronderzoek. Een beknopte geschiedenis van de beoefening der natuurwetenschappen in de Nederlandsche kolonien: xi+303, 23 pls.— Amsterdam.
- Smith, H.M., 1945. The freshwater fishes of Siam, or Thailand.— Bull. U. S. Nat. Mus. 188: xi+622, 9 pls.
- Steenis-Kruseman, M.J. van, 1950. Malaysian plant collectors and collections: being a cyclopaedia of botanical exploration in Malaysia and a guide to the literature up to the year 1950: clii+639.— Haarlem.
- Valenciennes, A., 1836?. Atlas des Poissons. In G. Cuvier, Le Règne Animal, 3rd ed. ("Edition des Disciples"). 4: 120 pls.— Paris.
- Veth, H.J. 1879., Overzicht van hetgeen, in het bijzonder door Nederland, gedaan is voor de kennis der fauna van Nederlandsch Indië: viii+204.— Leiden.
- Werner, J.C., 1826-30. Atlas des oiseaux d'Europe pour servir de complément au manuel d'ornithologie de M. Temminck.— Paris.

Received: 2.xi.1992

Accepted: 30.iii.1993

Edited: M.J.P. van Oijen

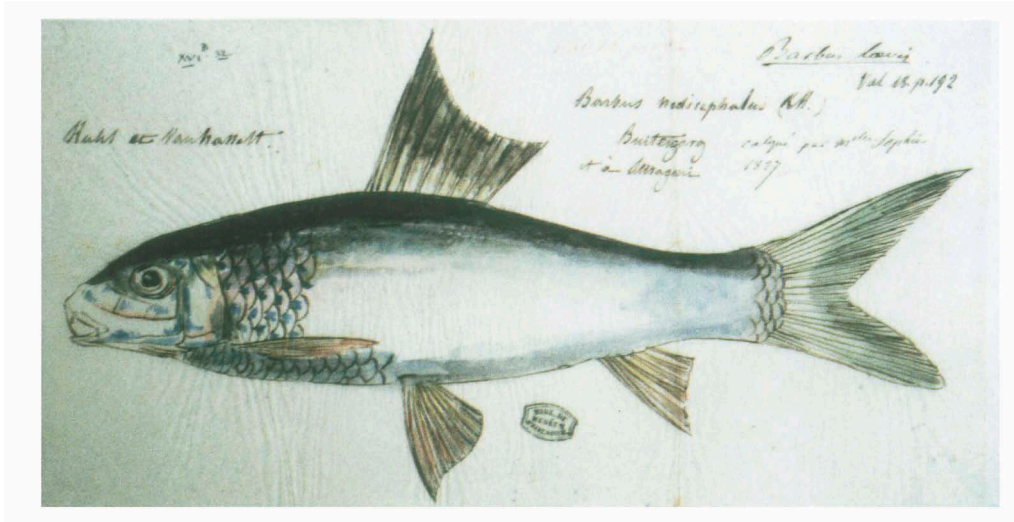


Fig. 1. *Barbichthys laevis* (XVI B 32). Photo Bibl. MNHN.

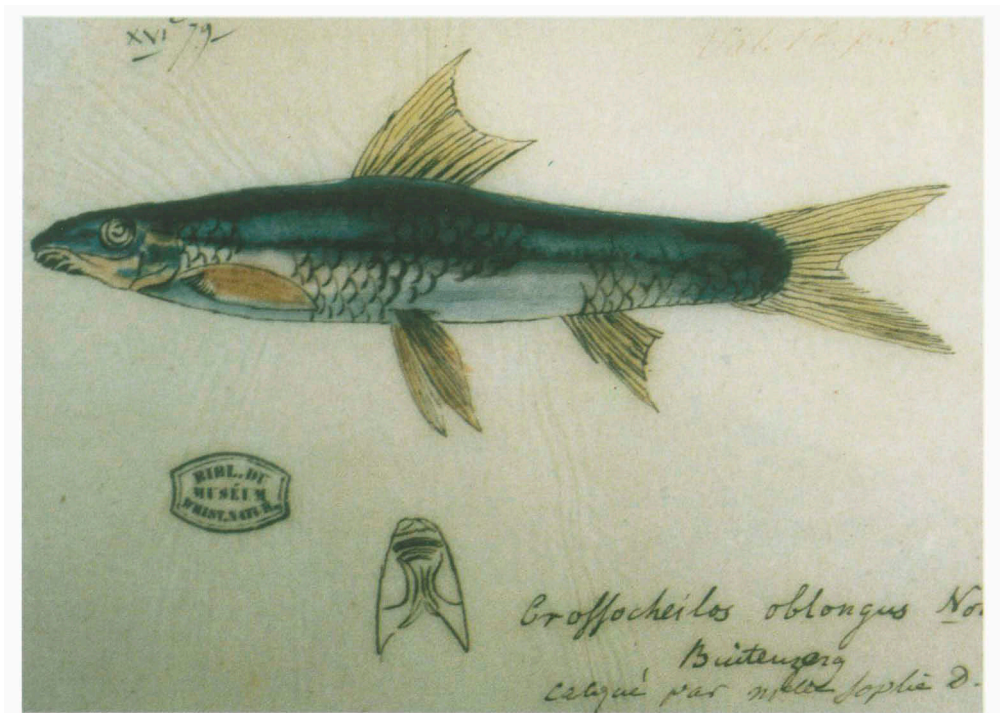


Fig. 2. *Crossocheilus oblongus* (XVI C 79). Photo Bibl. MNHN.

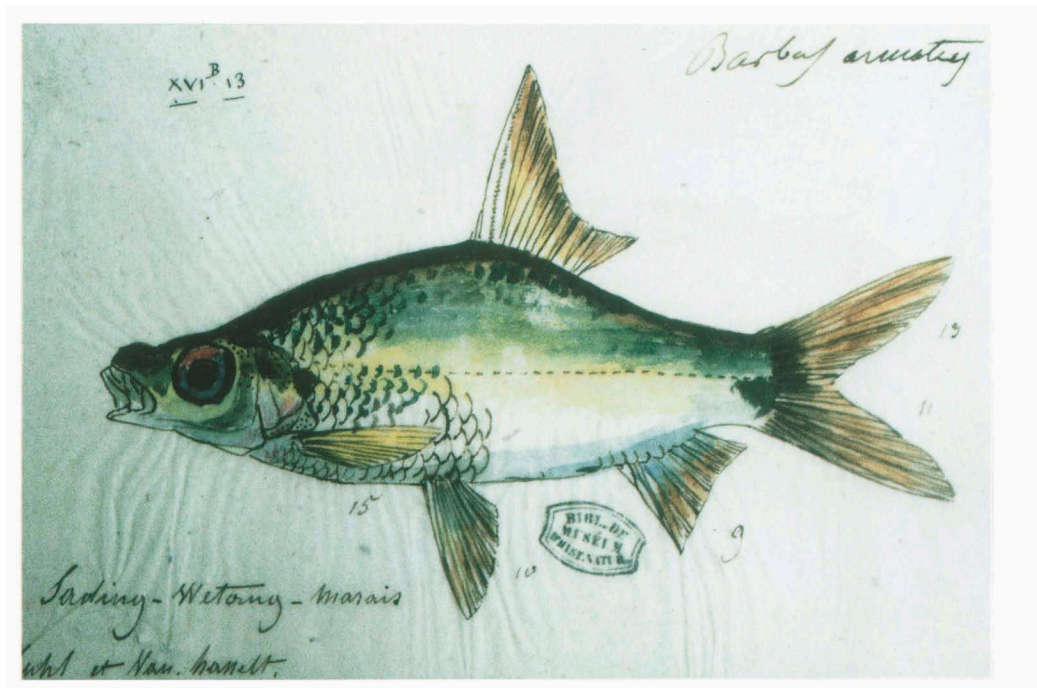


Fig. 3. *Cyclocheilichthys armatus* (XVI B 13). Photo Bibl. MNHN.

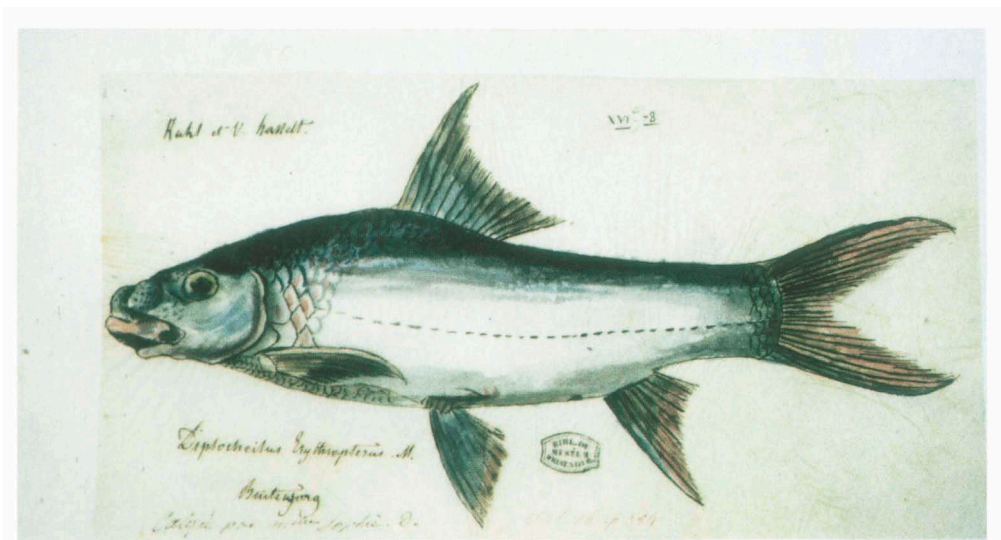


Fig. 4. *Labeo erythropterus* (XVI C 78). Photo Bibl. MNHN.



Fig. 5. *Labeo erythropterus*, holotype.



Fig. 6. *Labeo erythropterus*, holotype (head).

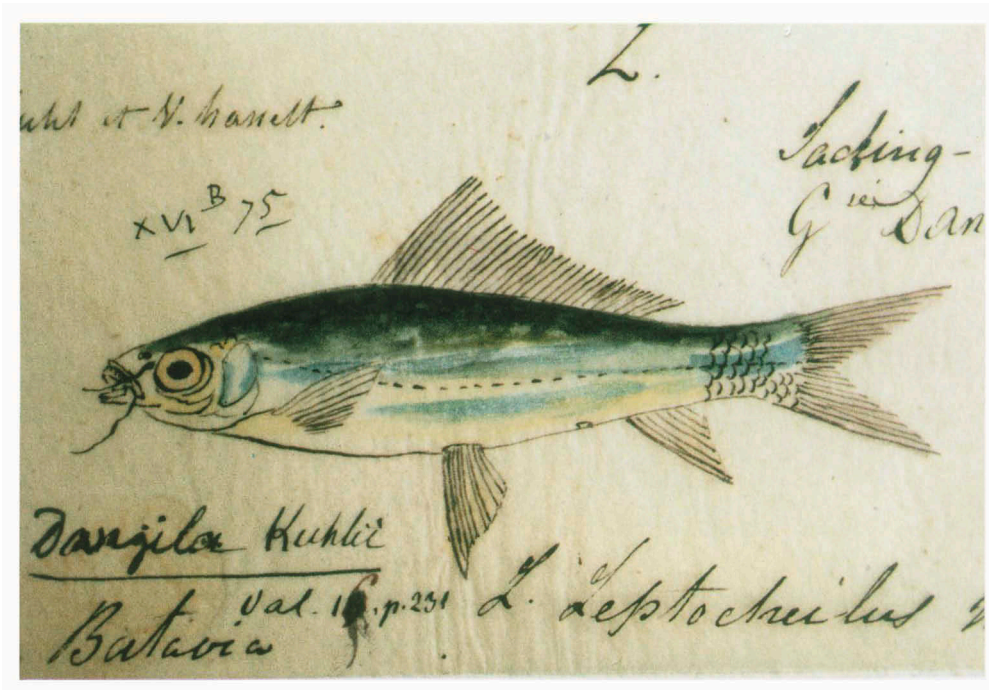


Fig. 7. *Labiobarbus leptocheilus* (XVI B 75). Photo Bibl. MNHN.

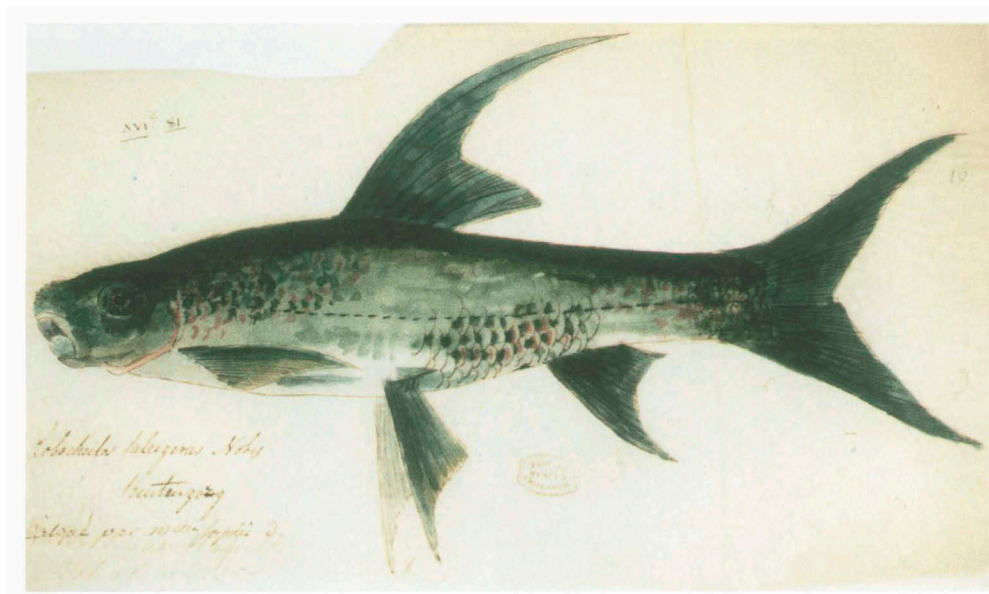


Fig. 8. *Lobocheilos falcifer*, adult (XVI C 81). Photo Bibl. MNHN.

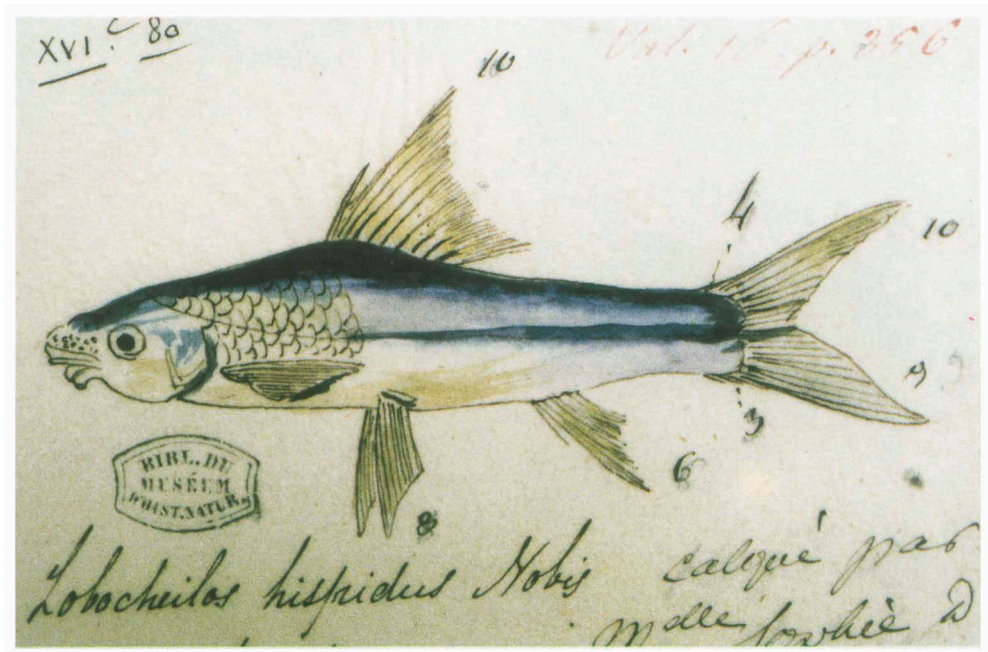


Fig. 9. *Lobocheilos falcifer*, juvenile (*Lobocheilos hispidus*) (XVI C 80). Photo Bibl. MNHN.

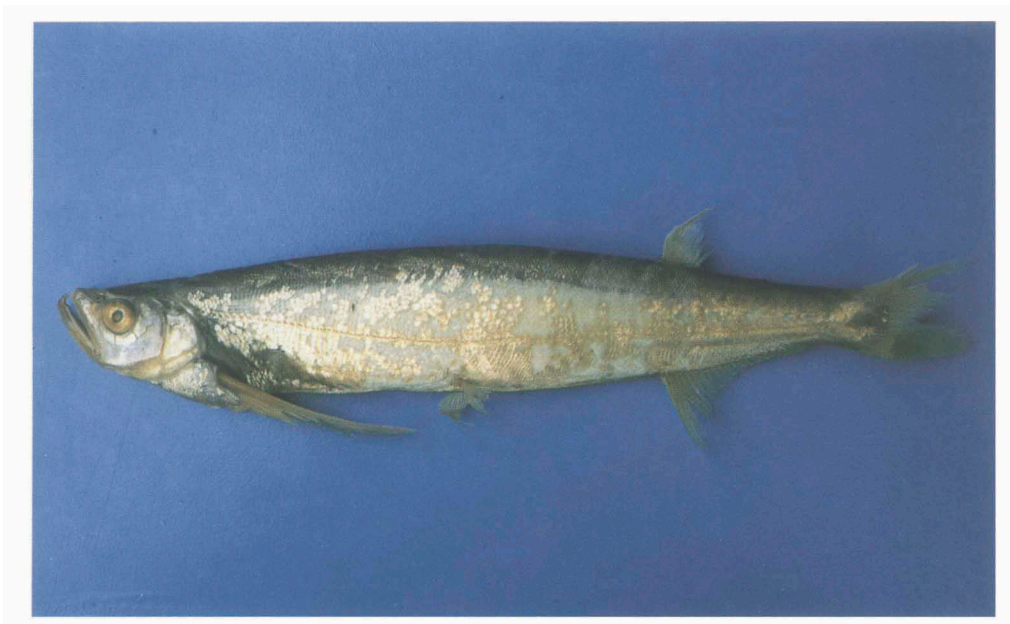


Fig. 10. *Macrochirichthys macrochir*, holotype.

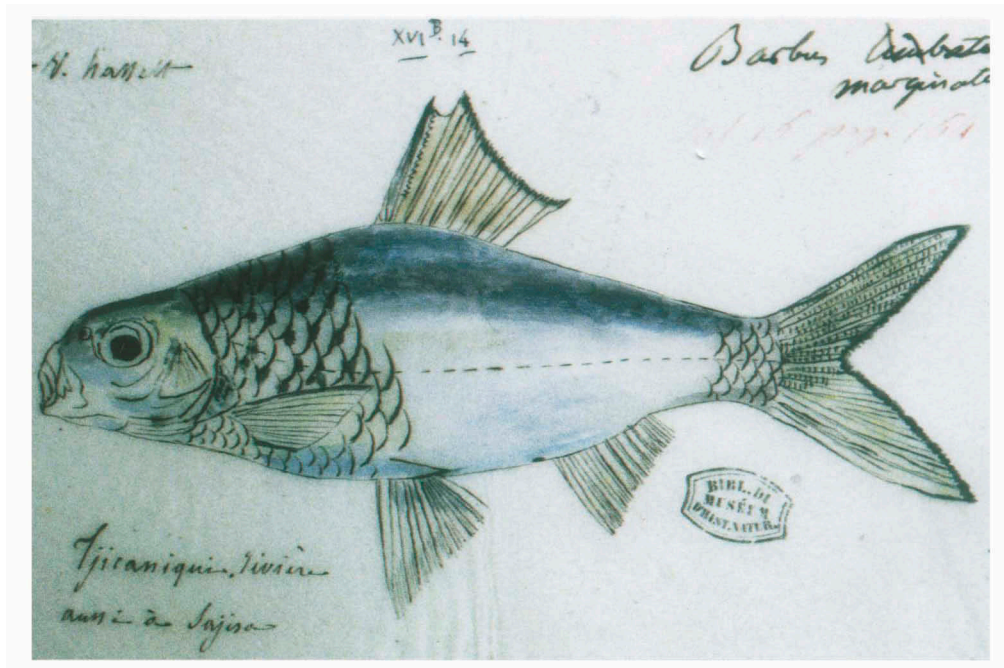


Fig. 11. *Mystacoleucus marginatus* (XVI B 14). Photo Bibl. MNHN.

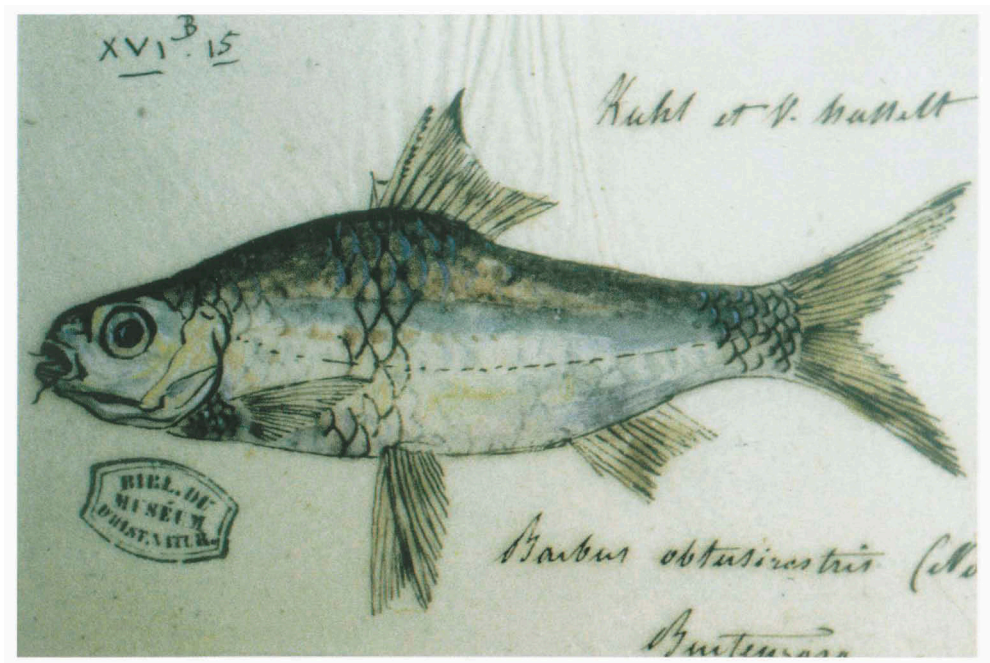


Fig. 12. *Mystacoleucus marginatus* (*Barbus obtusirostris* of van Hasselt and of Valenciennes) (XVI B 15). Photo Bibl. MNHN.

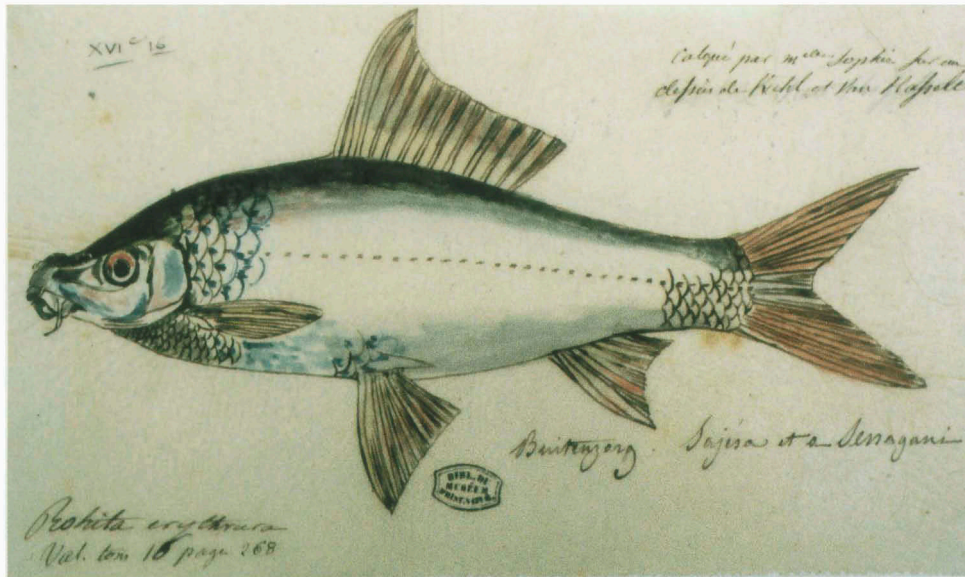


Fig. 13. *Osteochilus hasselti*, adult (XVI C 16). Photo Bibl. MNHN.



Fig. 14. *Osteochilus* cf. *hasselti*, juvenile (*Labiobarbus lipocheilus* van Hasselt (XVI B 76). Photo Bibl. MNHN.

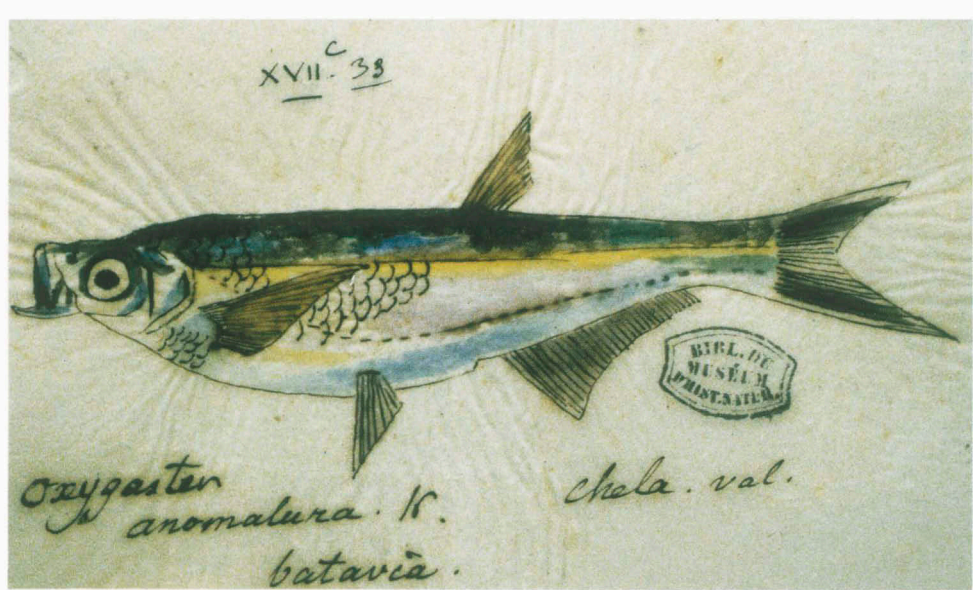


Fig. 15. *Oxygaster anomalura* (XVII C 33). Photo Bibl. MNHN.



Fig. 16. *Puntius binotatus* (XVI B 36). Photo Bibl. MNHN.

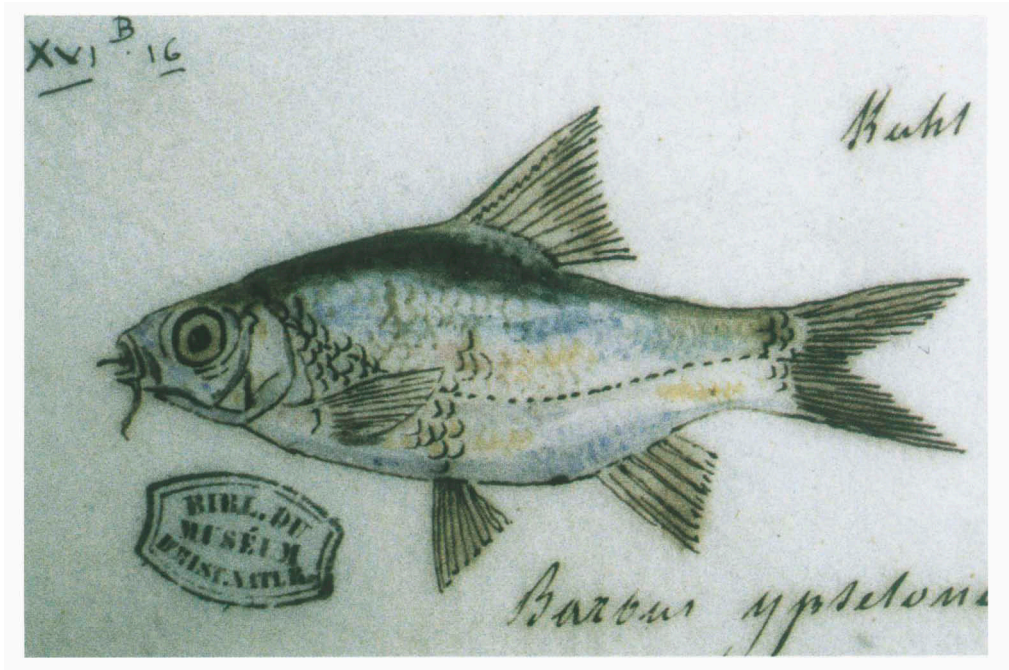


Fig. 17. *Puntius bramoides* (XVI B 16). Photo Bibl. MNHN.

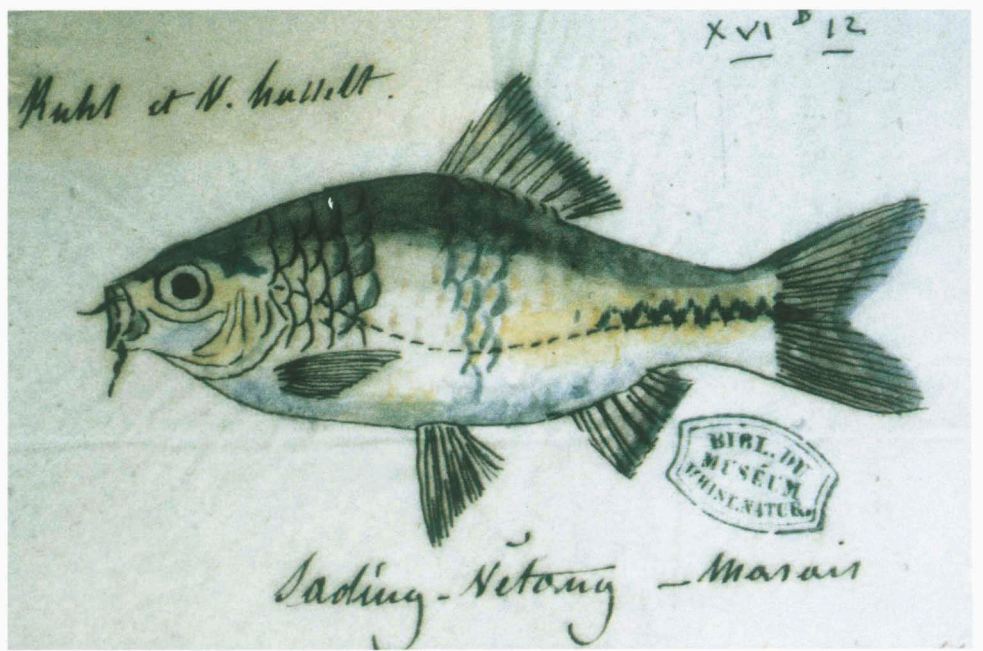


Fig. 18. *Puntius lateristriga* (XVI B 12). Photo Bibl. MNHN.

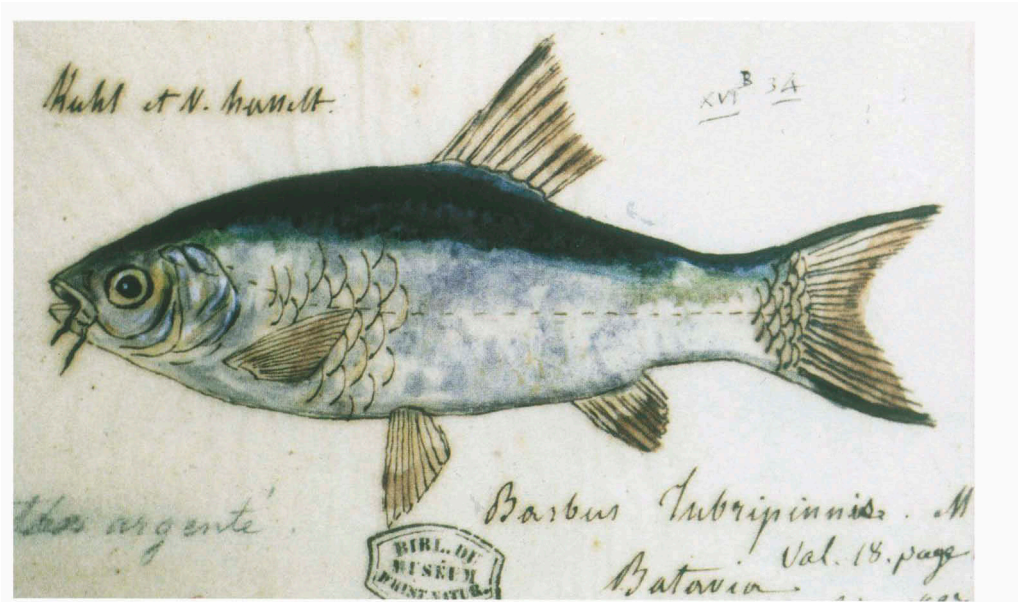


Fig. 19. *Puntius orphoides* (XVI B 34). Photo Bibl. MNHN.

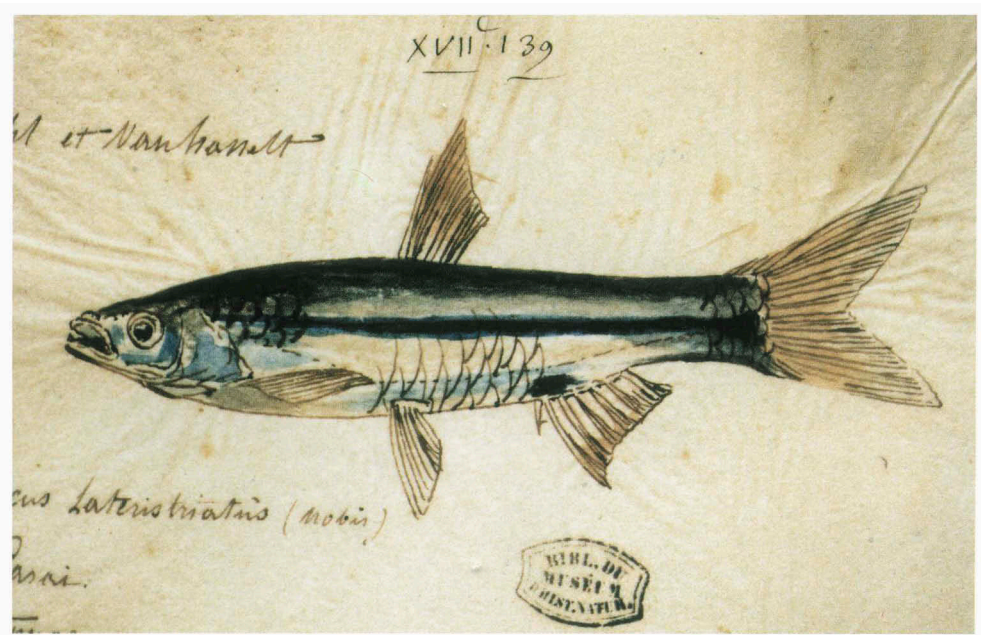


Fig. 20. *Rasbora lateristriata* (XVII C 139). Photo Bibl. MNHN.

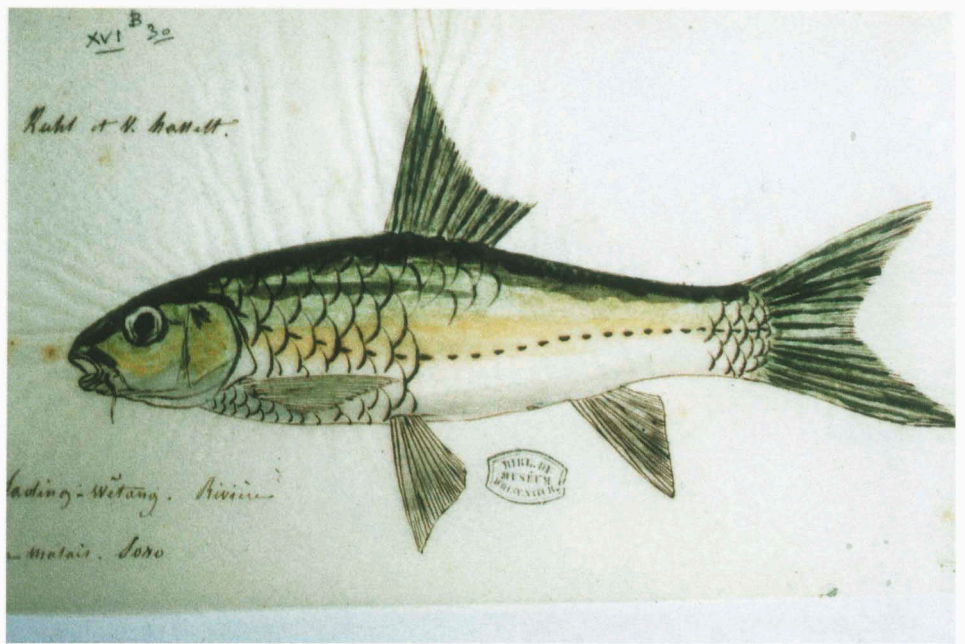


Fig. 21. *Tor tambra*, juvenile ("*Barbus soro*") (XVI B 30). Photo Bibl. MNHN.

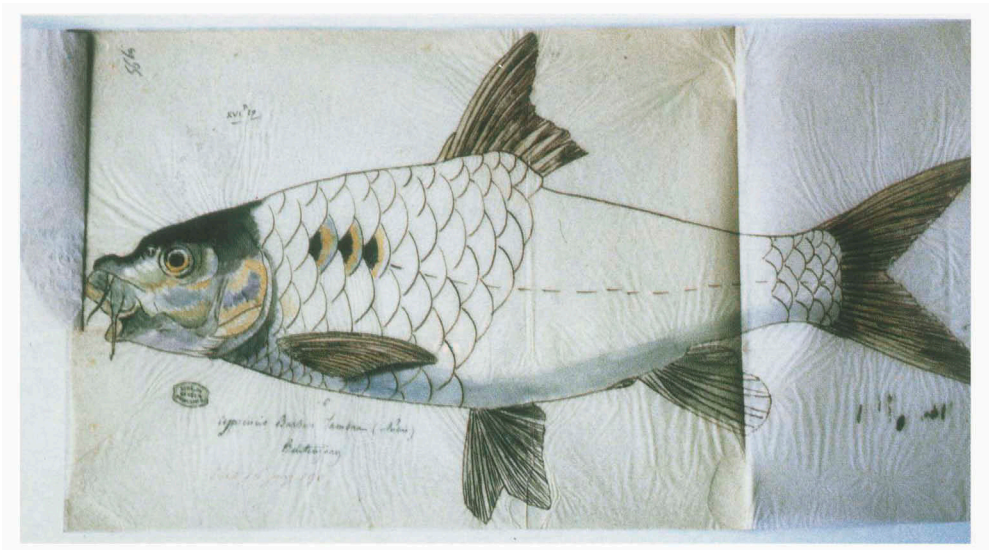


Fig. 22. *Tor tambra*, large adult (XVI B 29). Photo Bibl. MNHN.



Fig. 23. *Tor tambra*, holotype.

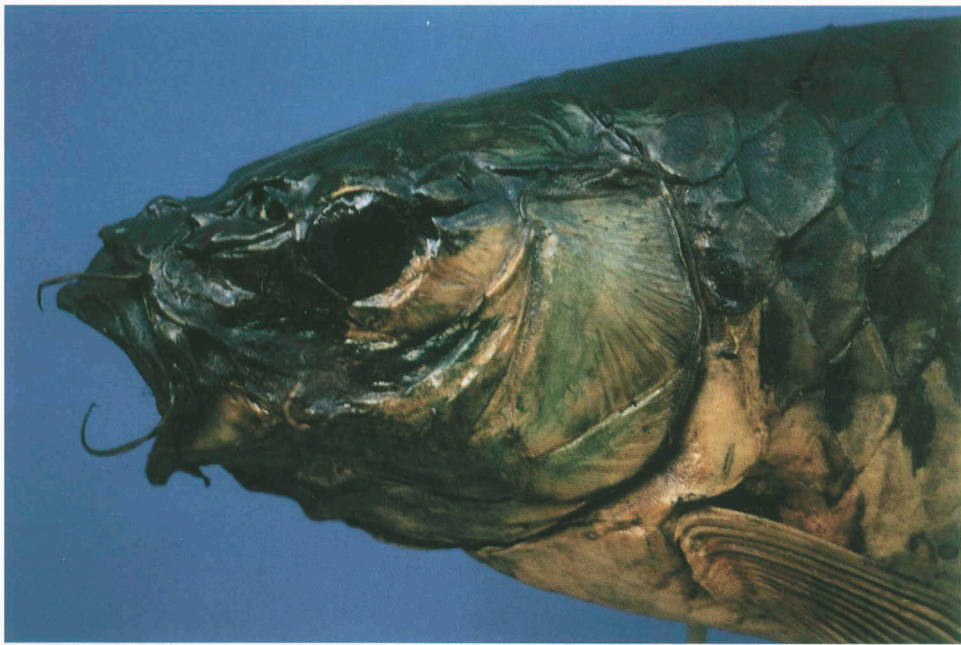


Fig. 24. *Tor tambra*, holotype (head).



Fig. 25. *Acanthopsis dialyzona* (XVIII 44). Photo Bibl. MNHN.

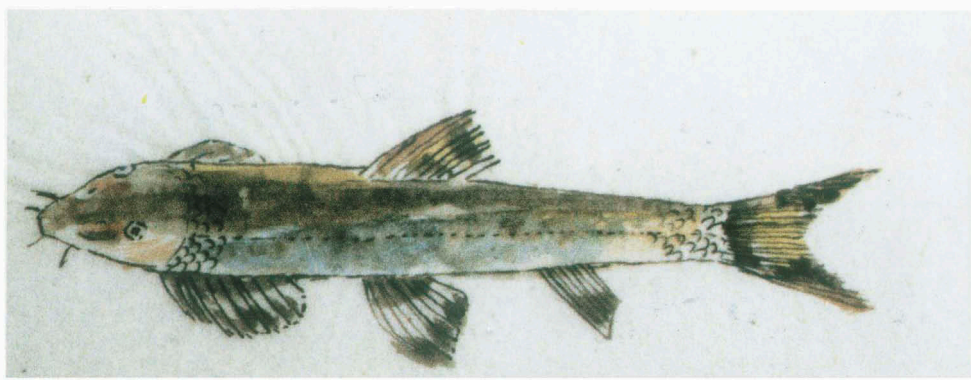


Fig. 26. *Homaloptera ocellata* (XVIII 58). Photo Bibl. MNHN.

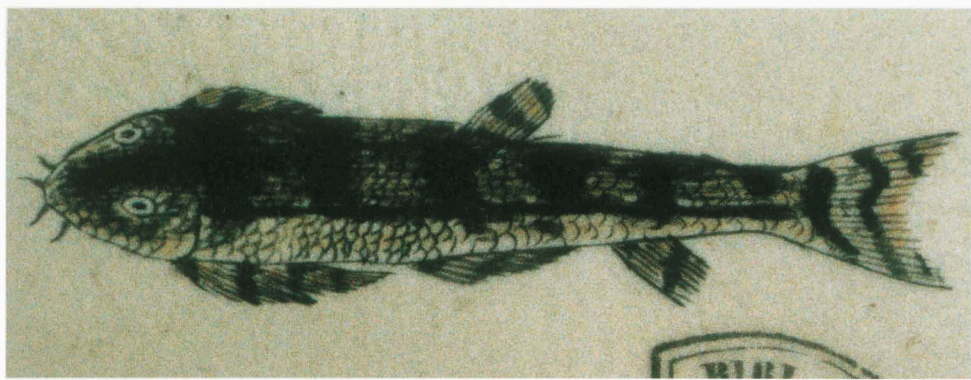


Fig. 27. *Homaloptera wassinki* (XVIII 59). Photo Bibl. MNHN.

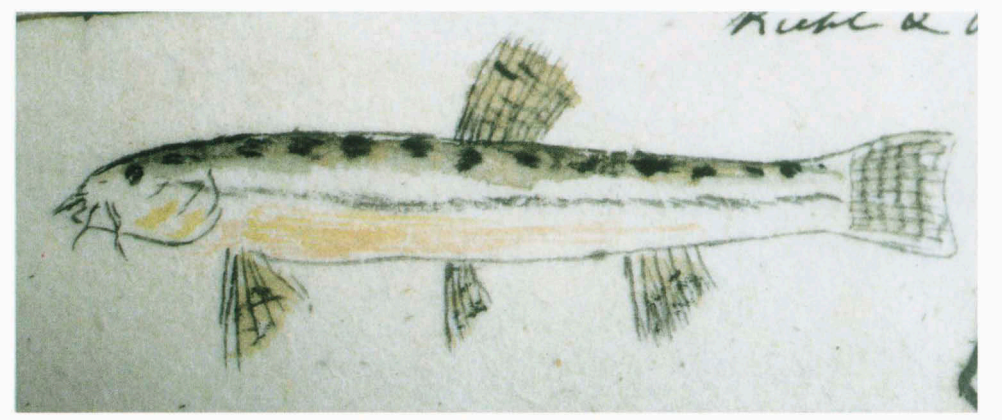


Fig. 28. *Lepidocephalichthys hasselti* (XVIII 52). Photo Bibl. MNHN.



Fig. 29. *Nemacheilus chrysolaimus* (XVIII 20). Photo Bibl. MNHN.



Fig. 30. *Pangio kuhlii* (XVIII 56). Photo Bibl. MNHN.

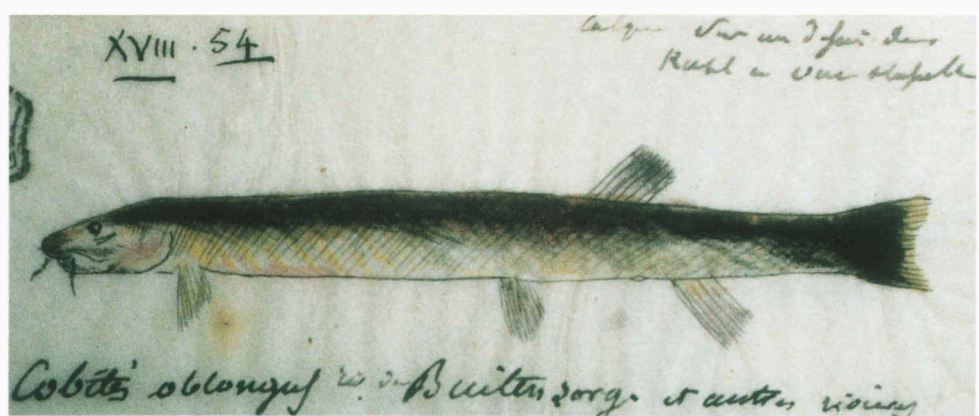


Fig. 31. *Pangio oblongus* (XVIII 54). Photo Bibl. MNHN.

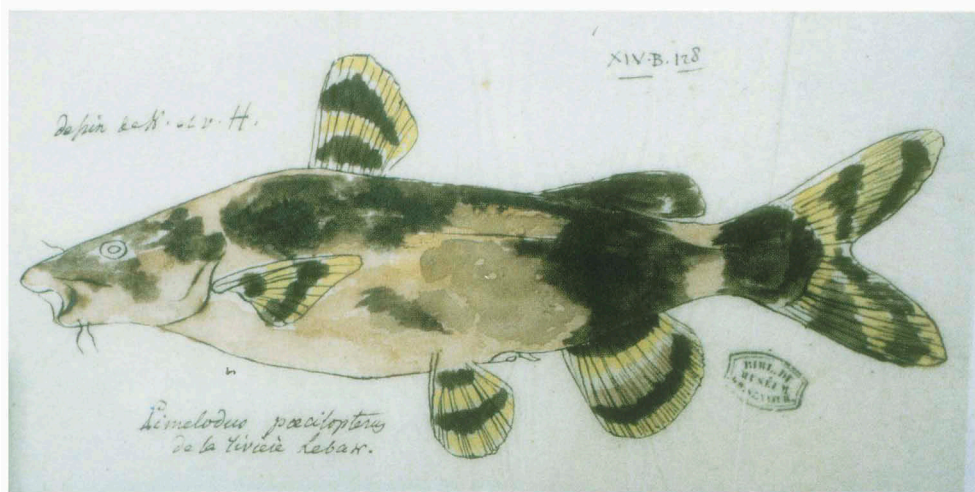


Fig. 32. *Leiocassis poecilopterus* (XIV B 128). Photo Bibl. MNHN.



Fig. 33. *Silurichthys hasseltii*, holotype (RMNH).

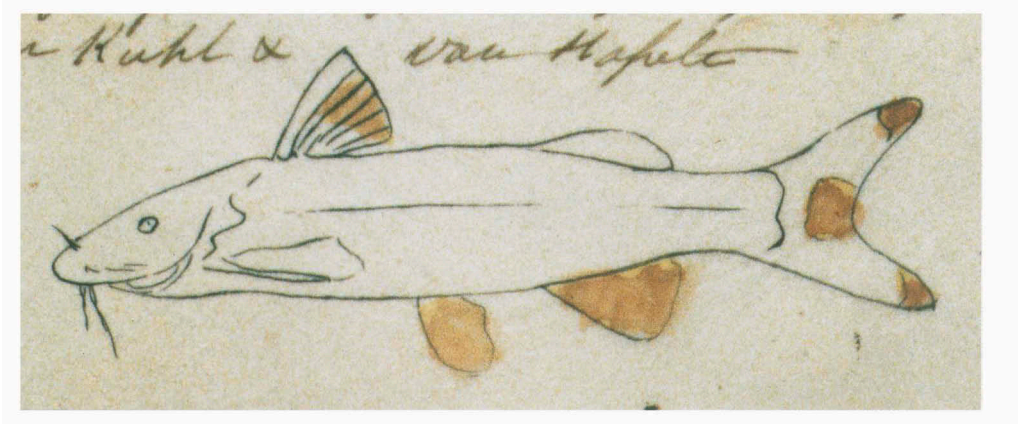


Fig. 34. *Glyptothorax platypogon* (XV A 79). Photo Bibl. MNHN.

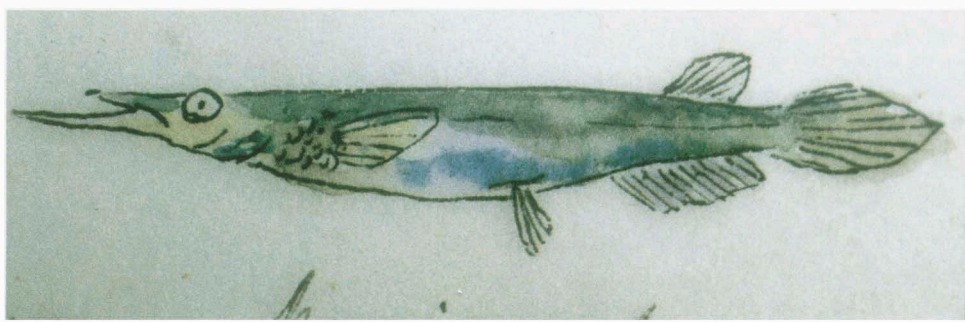


Fig. 35. *Dermogenys pusilla* (XIX A 3). Photo Bibl. MNHN.

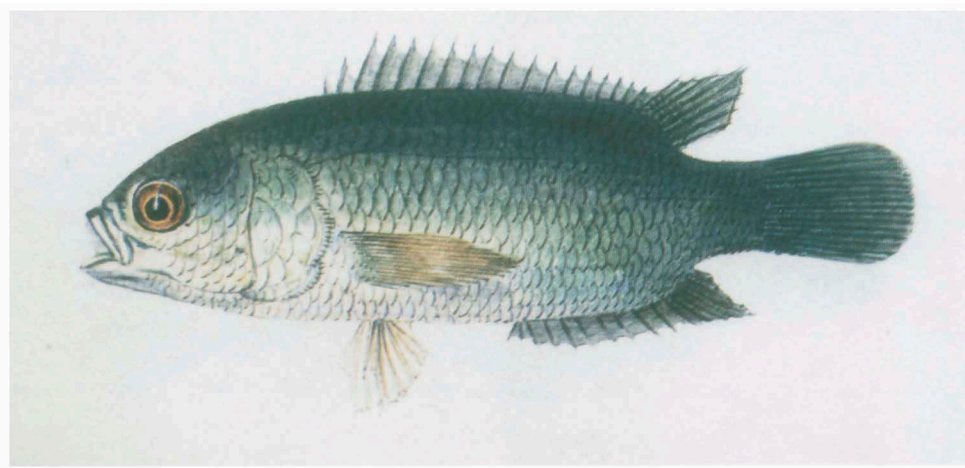


Fig. 36. *Anabas testudineus*, Keultjes original (RMNH).

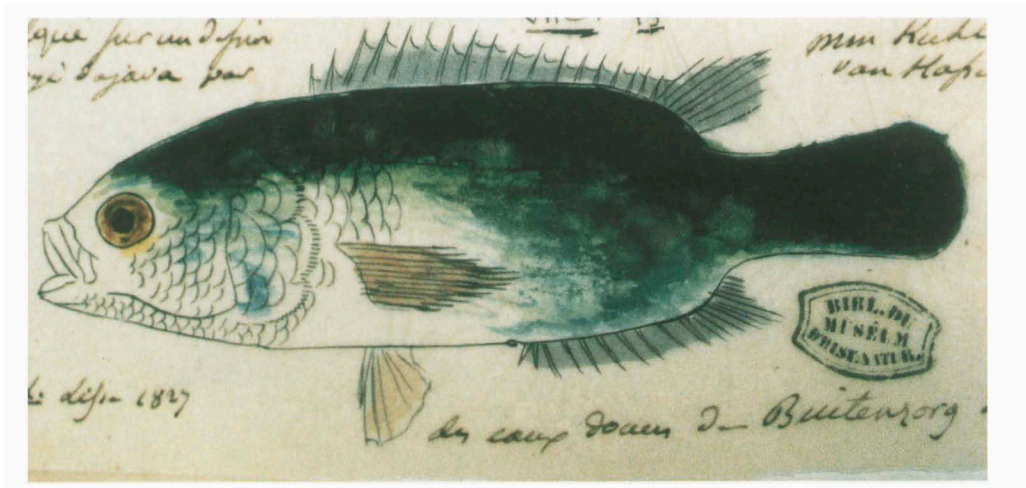


Fig. 37. *Anabas testudineus*, copy of original watercolor by Valenciennes, Leiden, 1827 (VII C 15). Photo Bibl. MNHN.

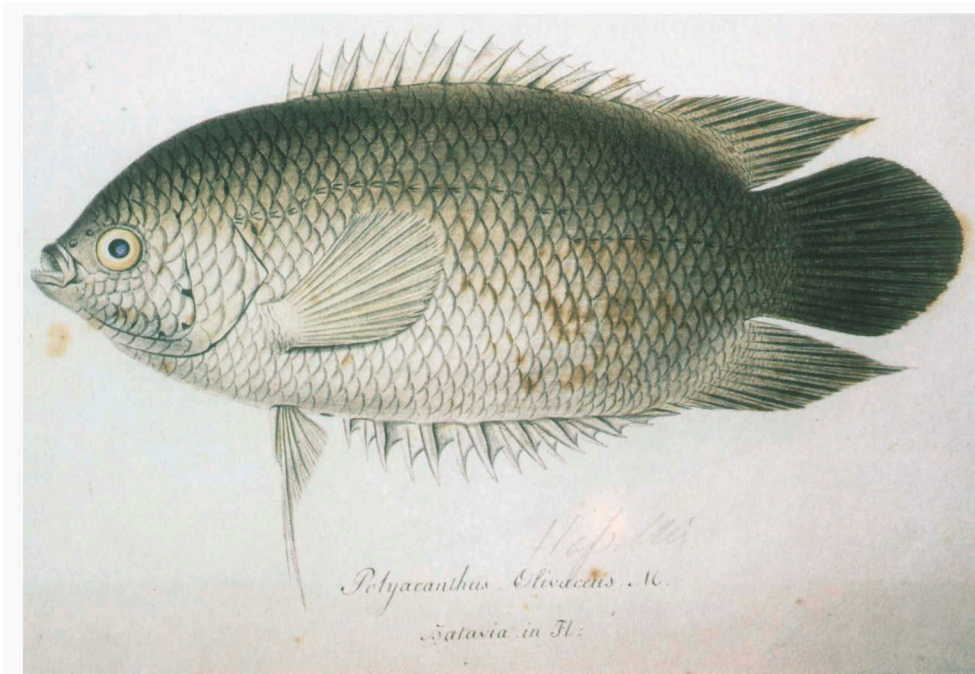


Fig. 38. *Belontia hasselti*, Maurevert original (RMNH).

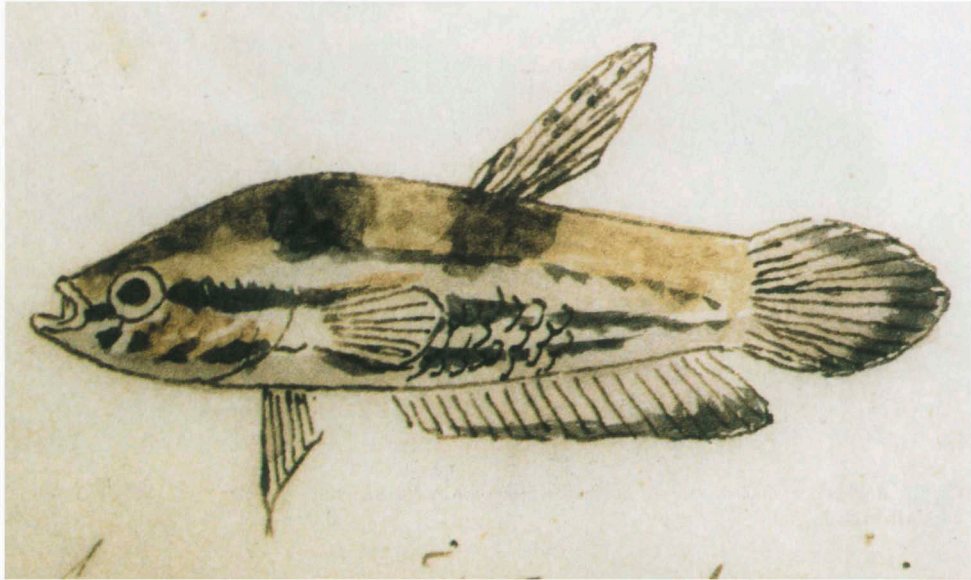


Fig. 39. *Betta picta* (XVIII 151). Photo Bibl. MNHN.



Fig. 40. *Trichopsis vittata* (VII C 61). Photo Bibl. MNHN.



Fig. 41. *Trichogaster trichopterus* (VII C 68). Photo Bibl. MNHN.

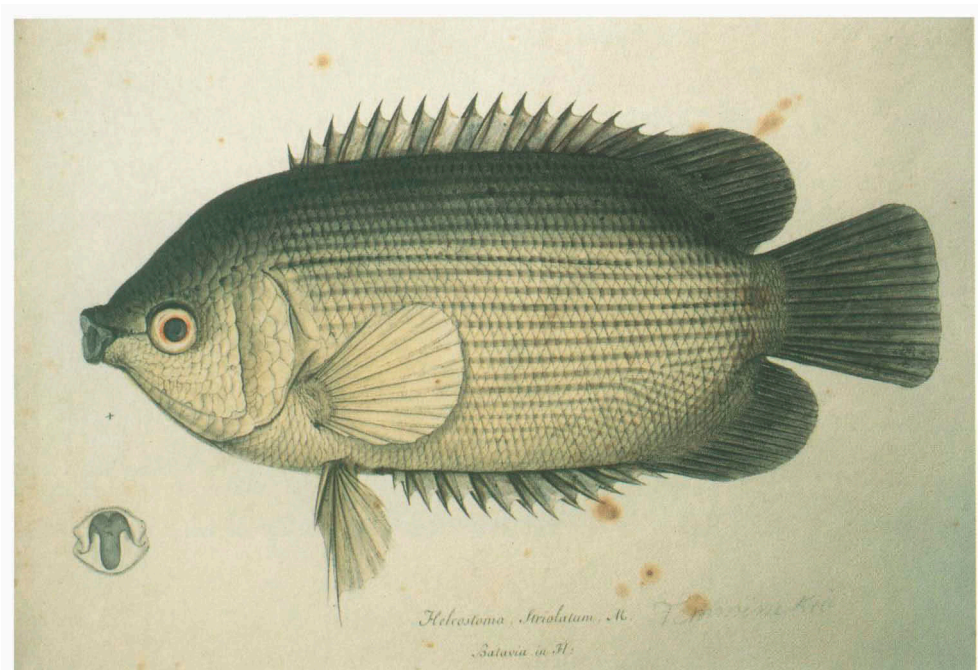


Fig. 42. *Helostoma temminckii*, van Raalten original (RMNH).



Fig. 43. *Channa gachua* (VII C 108). Photo Bibl. MNHN.

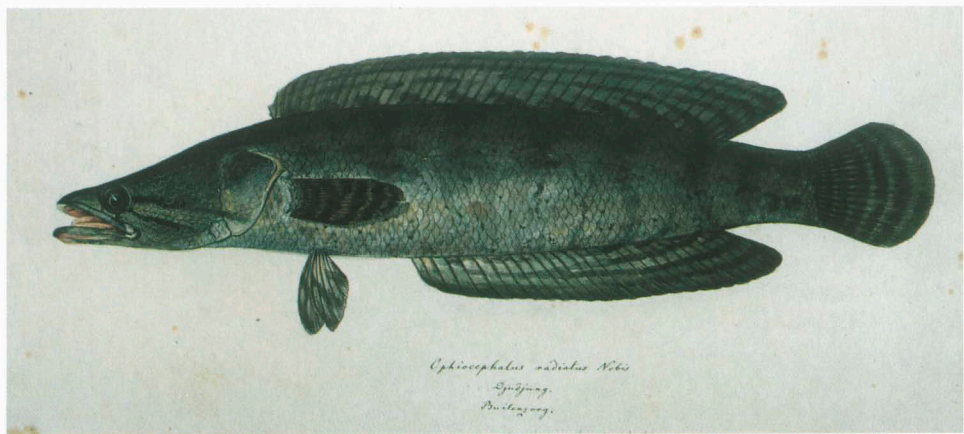


Fig. 44. *Channa lucius*, Keultjes original (RMNH).

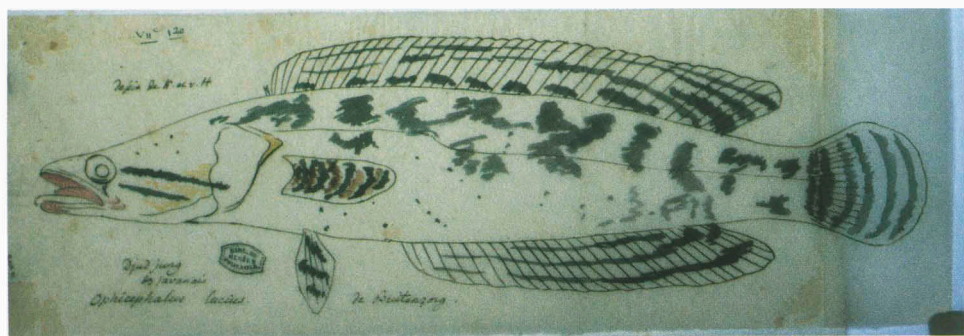


Fig. 45. *Channa lucius* (VII C 83). Photo Bibl. MNHN.

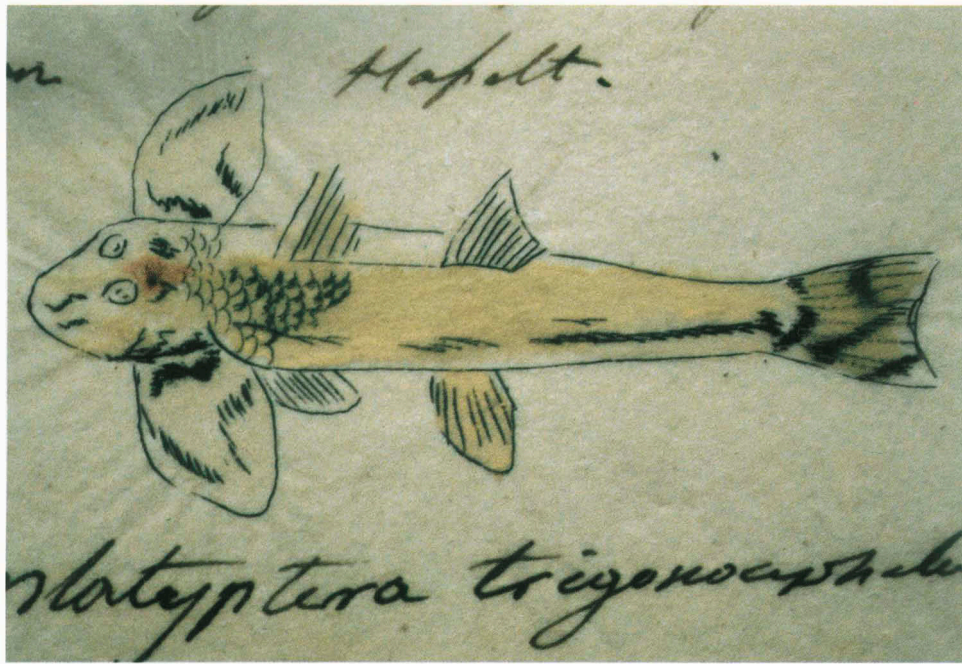


Fig. 46. *Rhyacichthys aspro*, juvenile (XII A 234). Photo Bibl. MNHN.

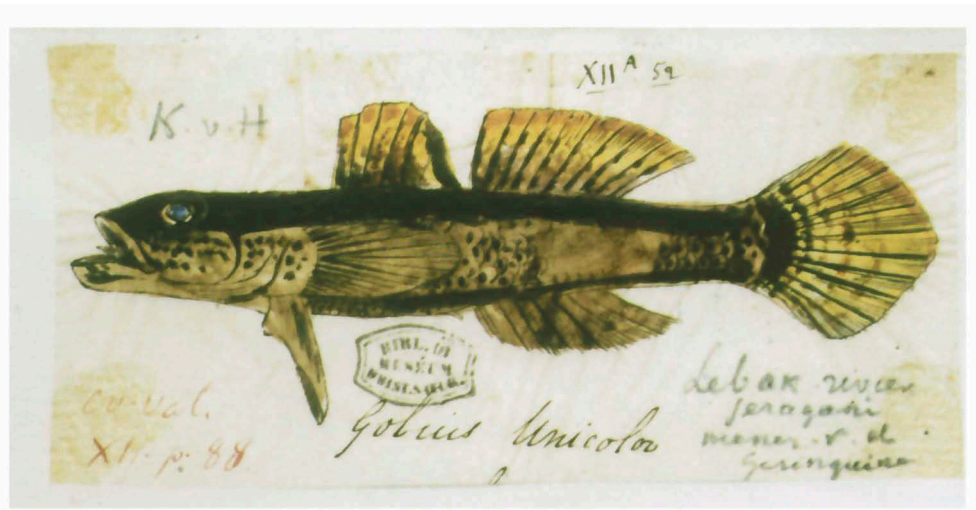


Fig. 47. *Aulopareia unicolor* (XII A 52). Photo Bibl. MNHN.

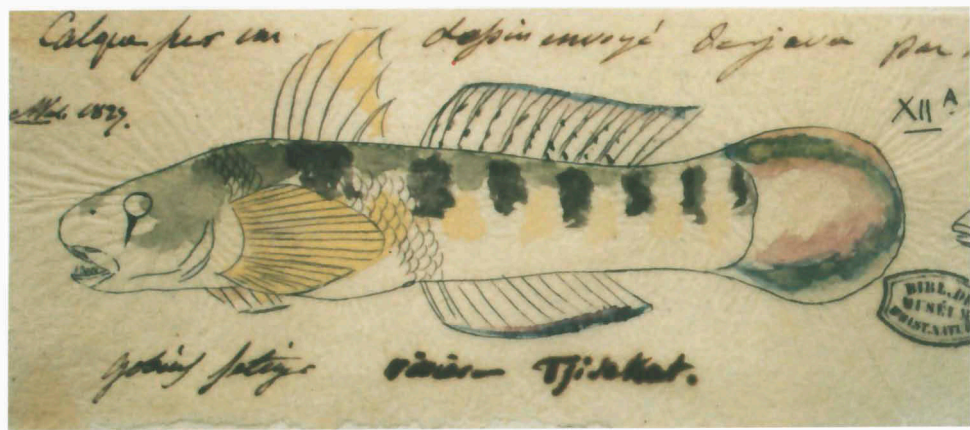


Fig. 48. *Sicyopterus cf. cynocephalus* (XII A 86). Photo Bibl. MNHN.

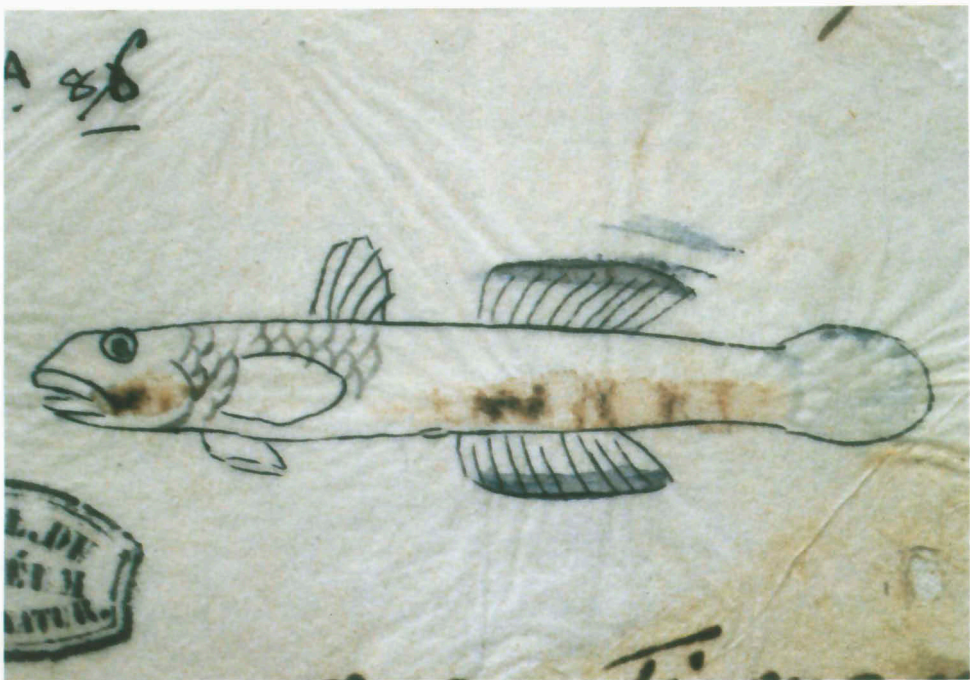


Fig. 49. *Sicyopterus cf. balinense* (XII A 86bis). Photo Bibl. MNHN.



Fig. 50. *Stiphodon cf. elegans* (RMNH).



Fig. 51. Gobiidae, genus and species undet. (RMNH).

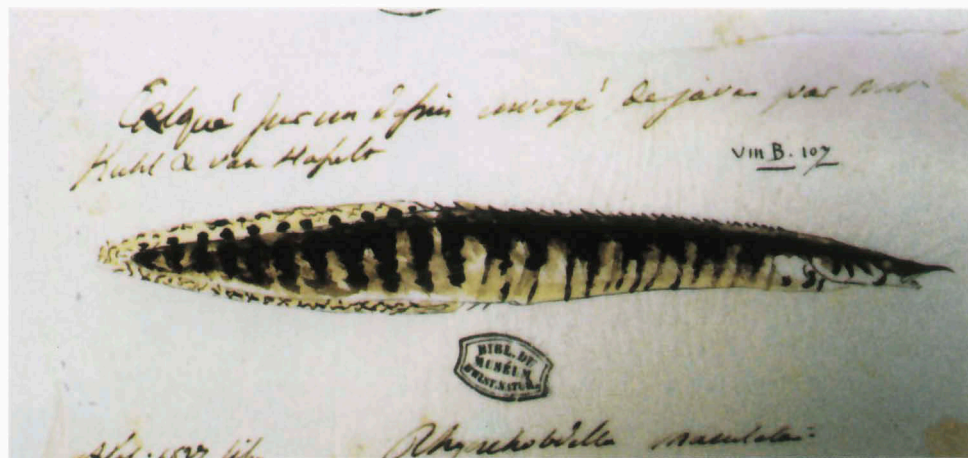


Fig. 52. *Macrognathus maculatus* (VIII B 107). Photo Bibl. MNHN.

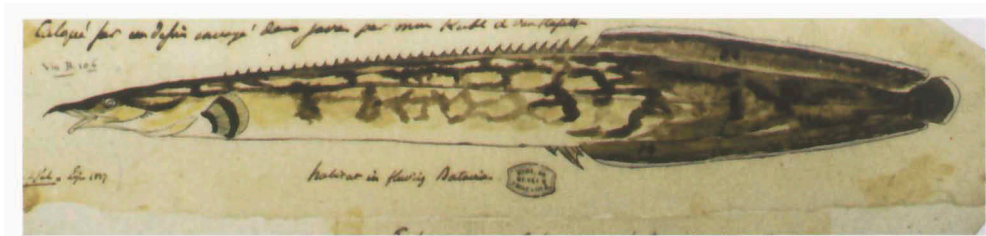


Fig. 53. *Mastacembelus unicolor* (VIII B 106). Photo Bibl. MNHN.

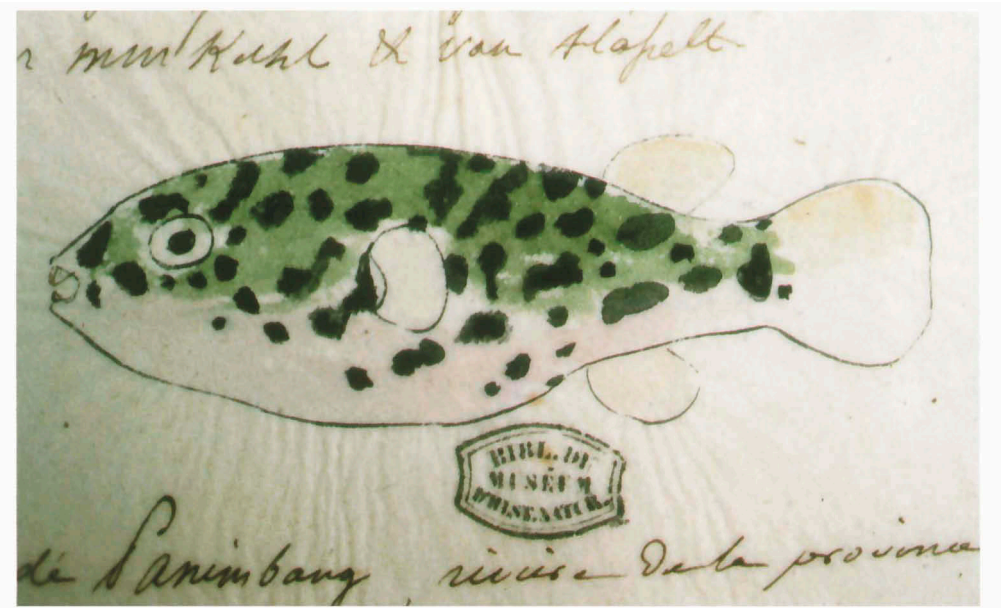


Fig. 54. *Tetraodon nigroviridis* (XXIX 79). Photo Bibl. MNHN.

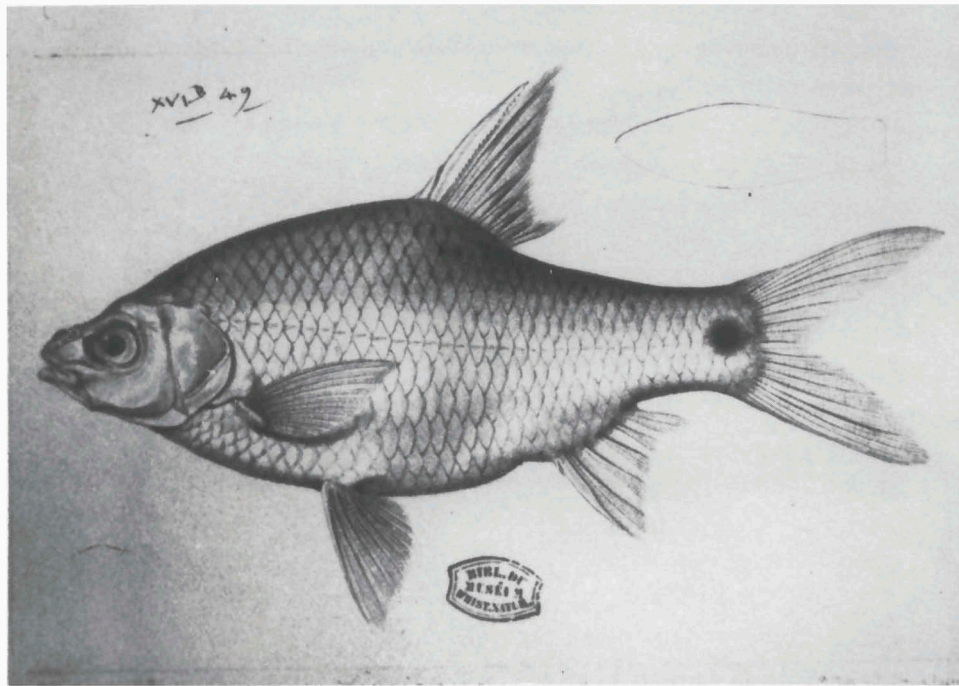


Fig. 55. *Cyclocheilichthys apogon* (XVI B 49). Photo Bibl. MNHN.

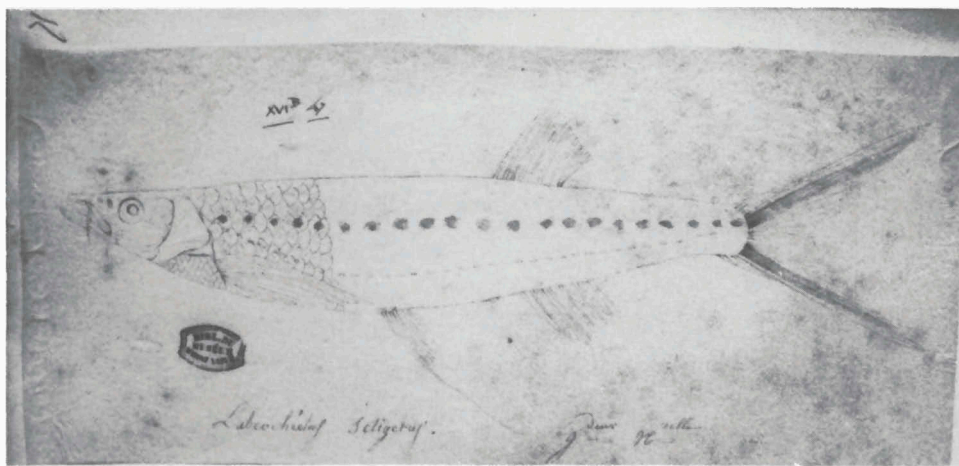


Fig. 56. *Luciosoma setigerum*, holotype (XVI B 47). Photo Bibl. MNHN.



Fig. 57. *Macrochirichthys macrochirus*, holotype (XVIII C 31). Photo Bibl. MNHN.

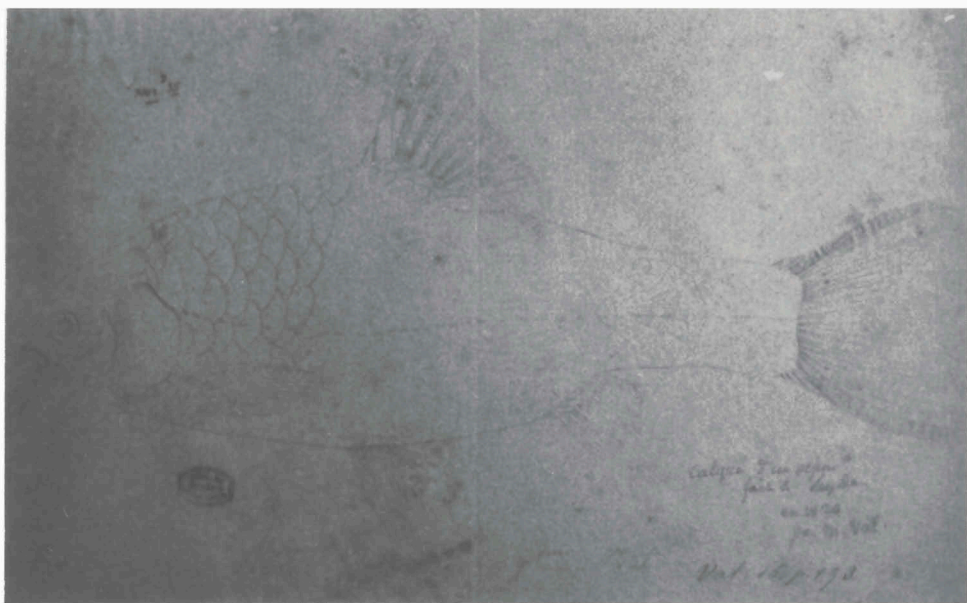


Fig. 58. *Puntius orphoides* (XVI B 35). Photo Bibl. MNHN.

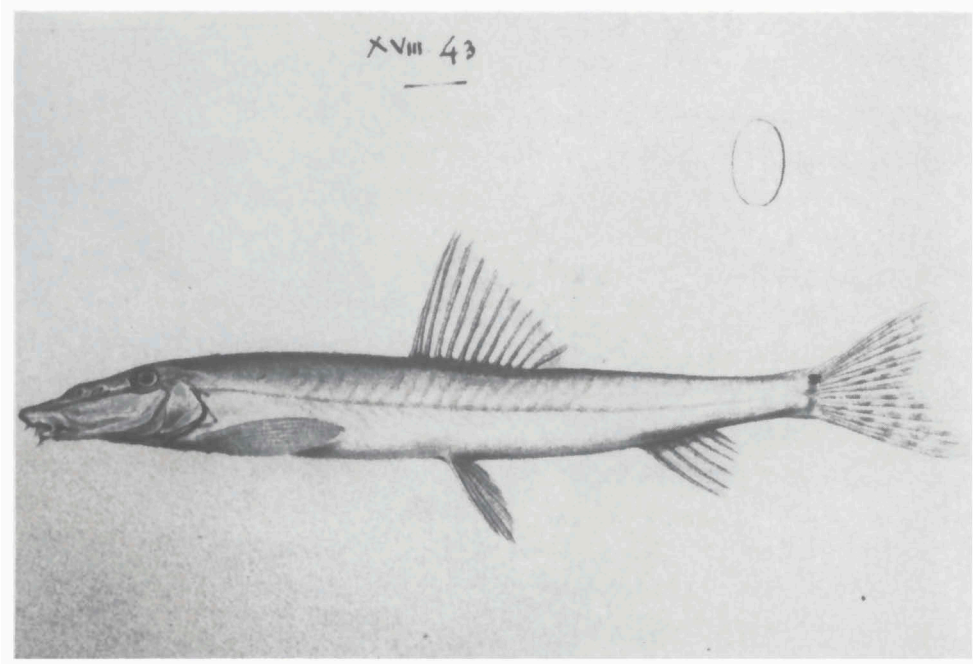


Fig. 59. *Acantopsis dialuzona*, holotype (XVIII 43). Photo Bibl. MNHN.

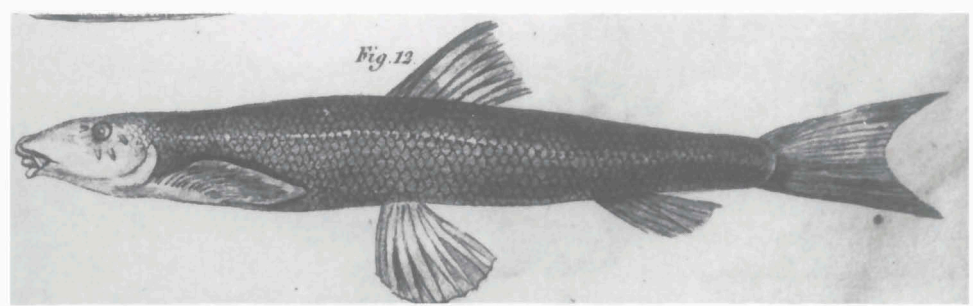


Fig. 60. *Homaloptera ocellata*, holotype (van der Hoeven, 1833, pl. 13, fig. 12).

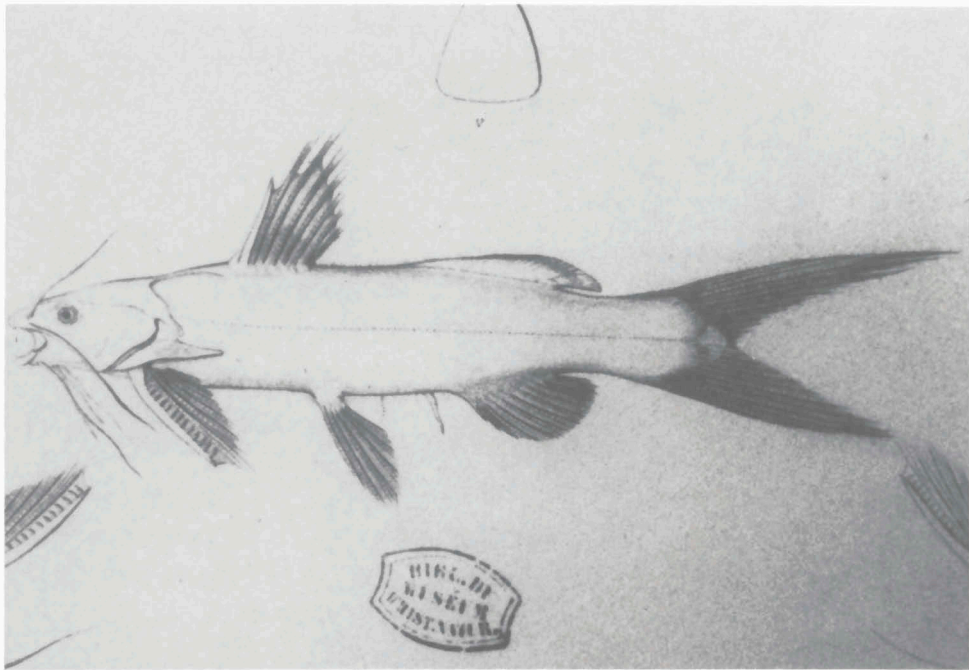


Fig. 61. *Leiocassis stenomus*, holotype (XIV B 106). Photo Bibl. MNHN.

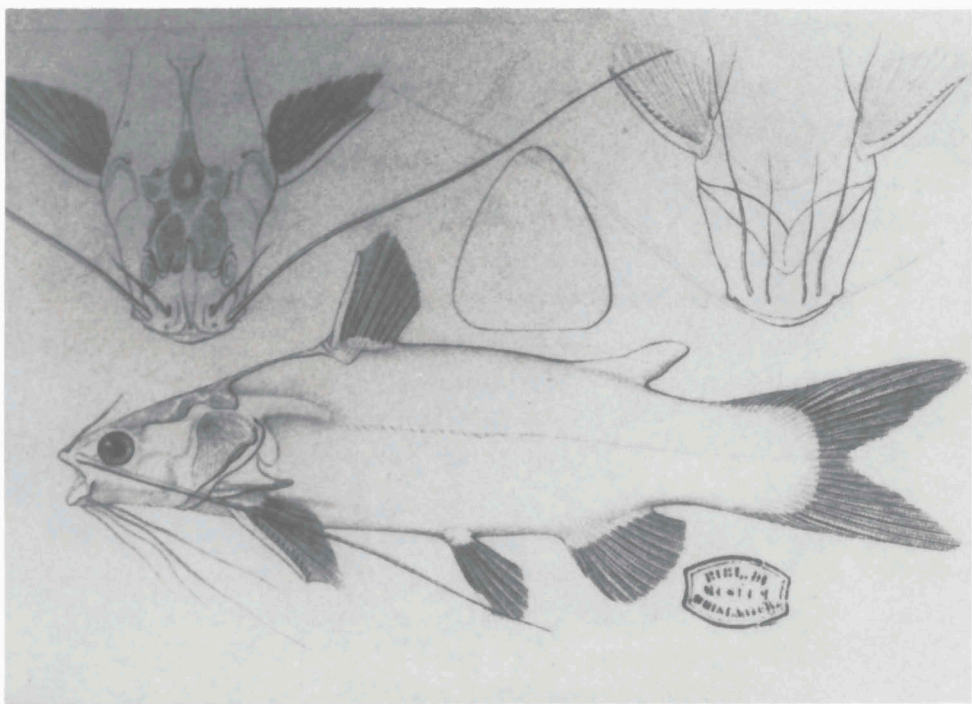


Fig. 62. *Mystus gulio* (holotype *B. abbreviatus*) (XIV B 113). Photo Bibl. MNHN.

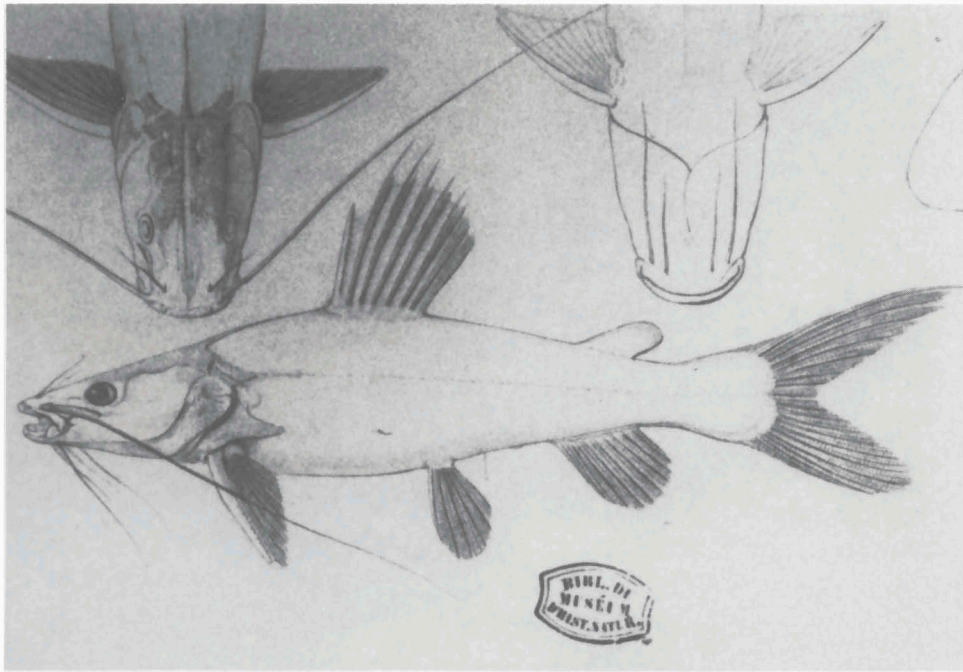


Fig. 63. *Mystus nemurus*, subadult (XIV B 119). Photo Bibl. MNHN.

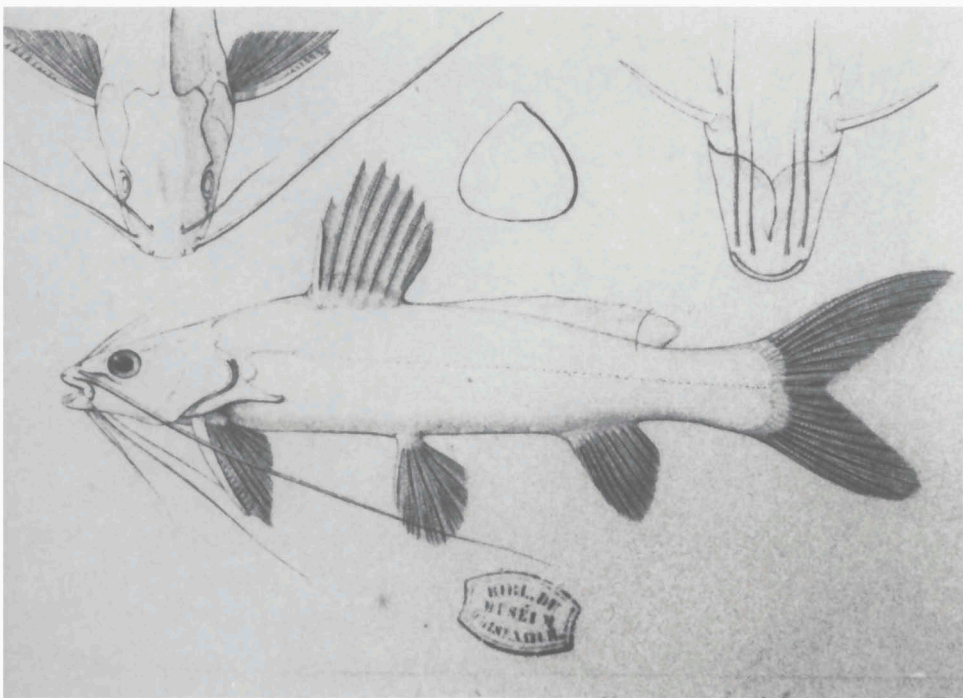


Fig. 64. *Mystus nigriceps*, holotype (XIV B 97). Photo Bibl. MNHN.

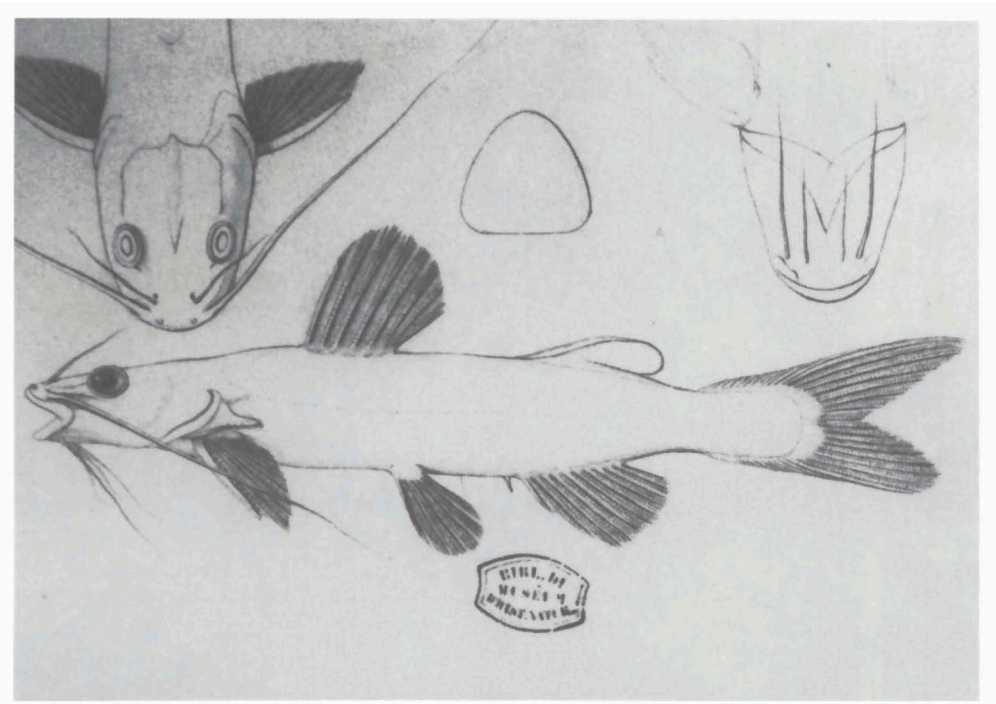


Fig. 65. *Mystus planiceps*, holotype (XIV B 114). Photo Bibl. MNHN.

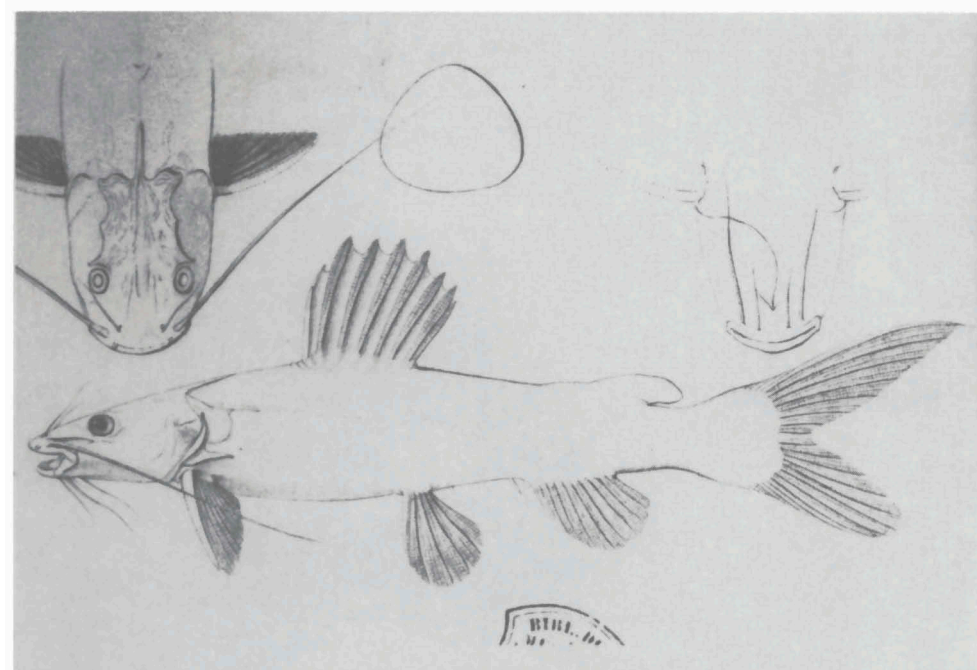


Fig. 66. *Mystus planiceps*, large adult (holotype *B. anisurus*) (XIV B 115). Photo Bibl. MNHN.

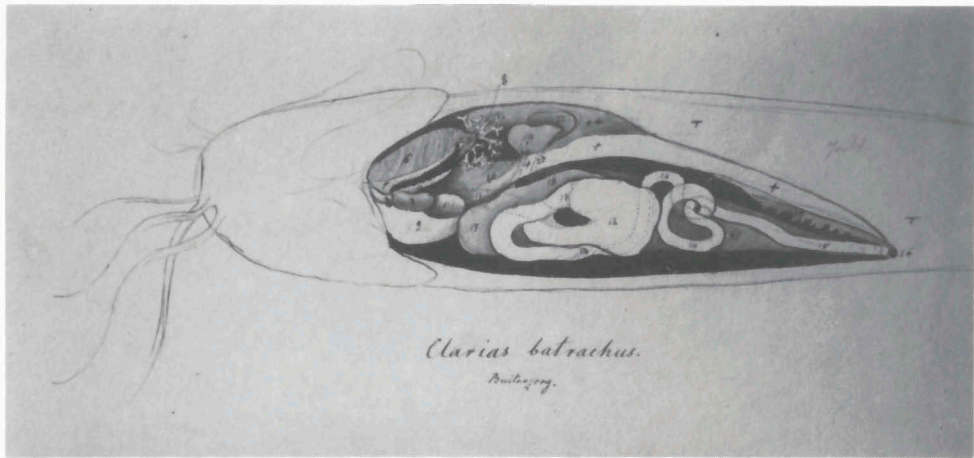


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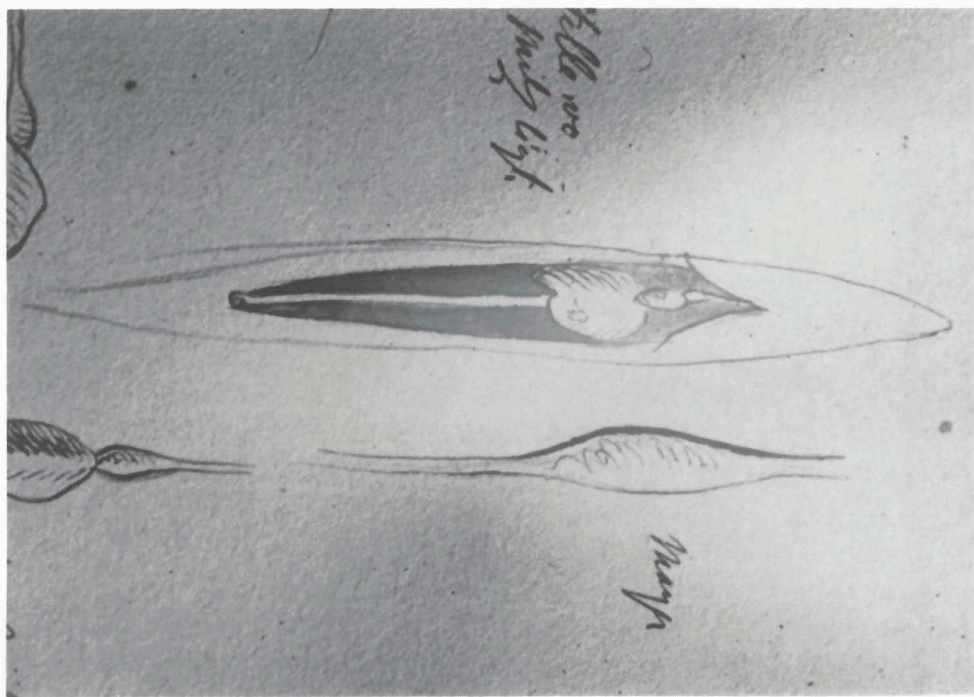


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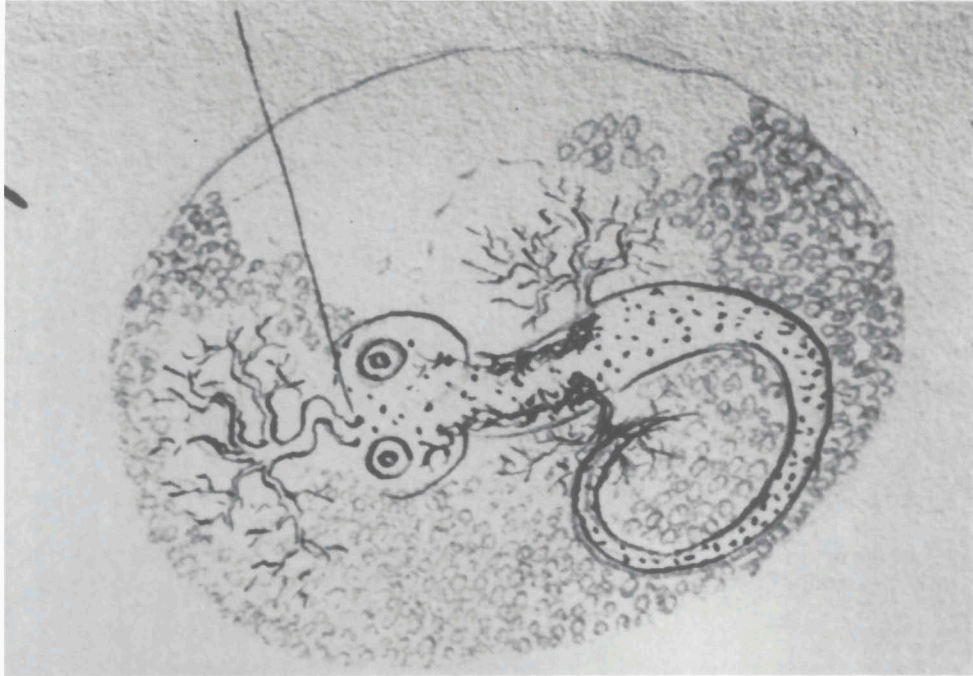


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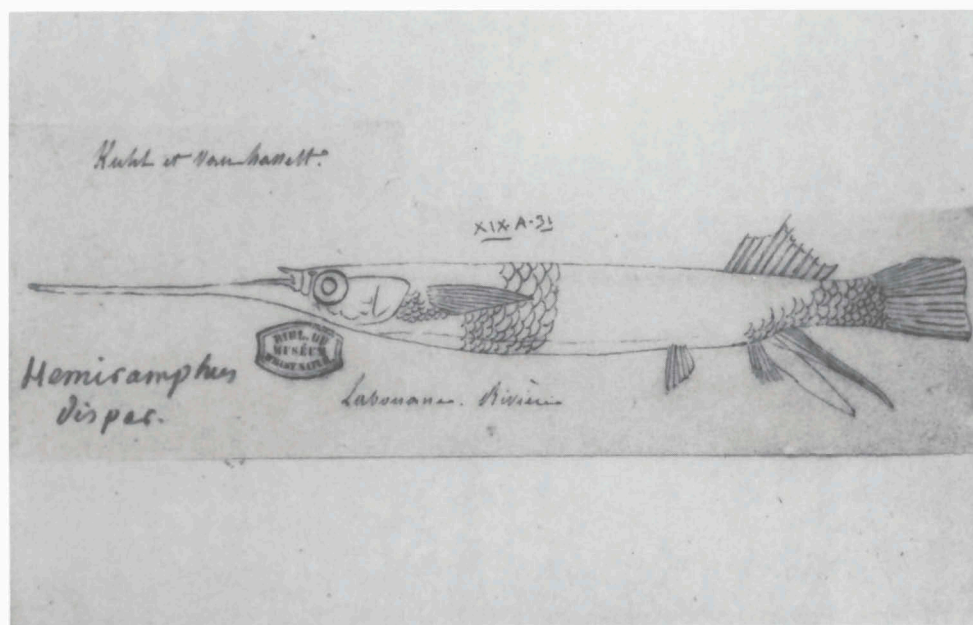


Fig. 69. *Zenarchopterus dispar* (XIX A 31). Photo Bibl. MNHN.

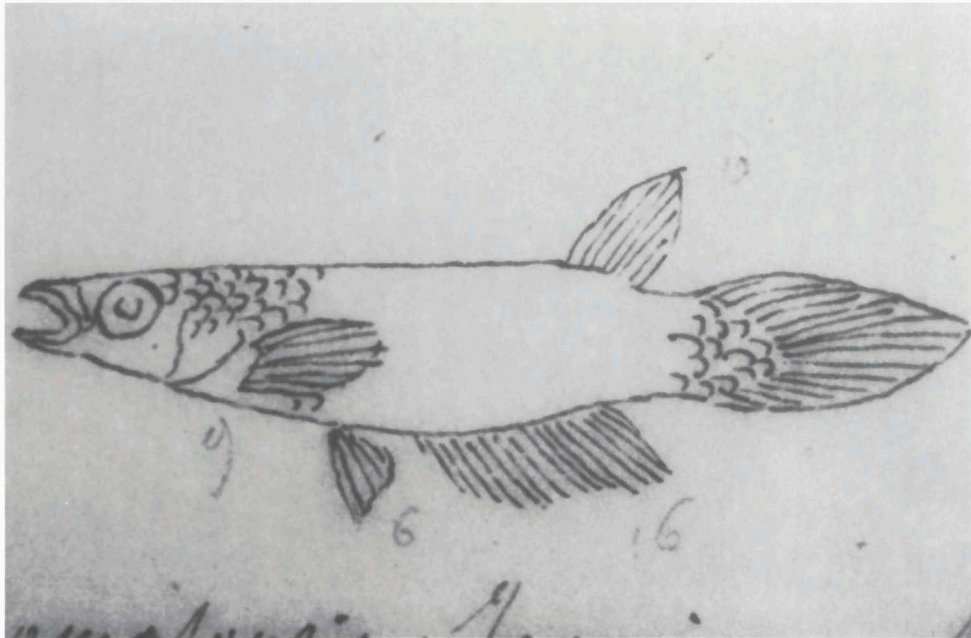


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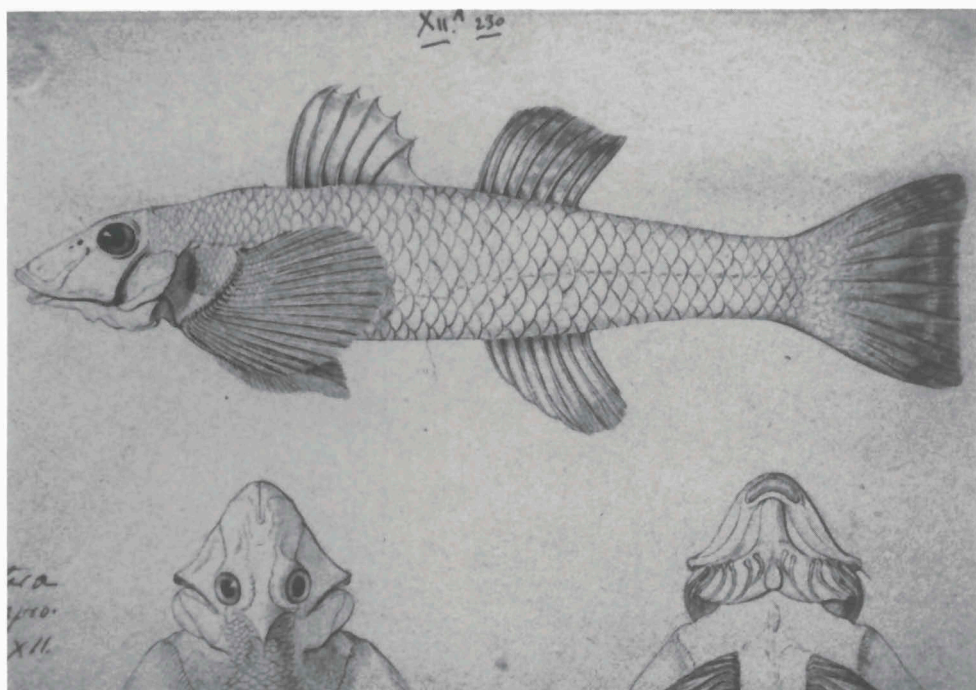


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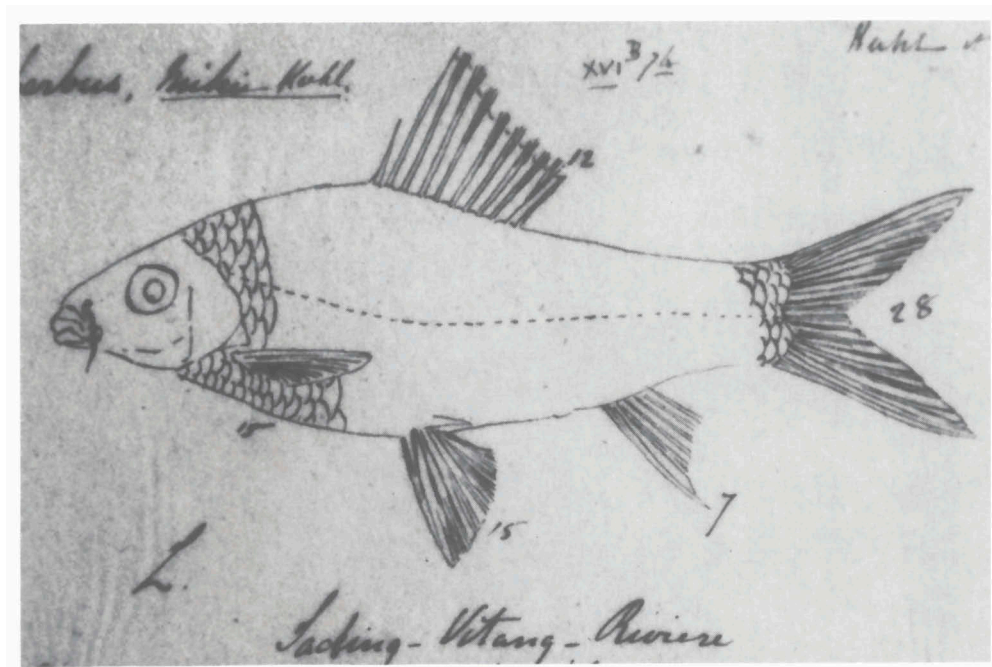


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<i>hypseconotus</i> (<i>Barbus</i>)	21	<i>Leuciscus schlegelii</i>	15
<i>hypsylonotus</i> (<i>Barbus</i>)	21	<i>limbata</i> (<i>Channa</i>)	40
<i>javanensis</i> (<i>Osphronemus</i>)	38, 39	<i>limbatus</i> (<i>Ophicephalus</i>)	40, 47
<i>javanica</i> (<i>Homaloptera</i>)	24	<i>Liorhynchus</i>	41
<i>javanica</i> (<i>Nomalopsis</i>)	33	<i>lipocheila</i> (<i>Dangila</i>)	15, 17, 19, 20
<i>javanicus</i> (<i>Acanthophthalmus</i>)	26	<i>lipocheilos</i> (<i>Chondrostoma</i>)	17, 18
<i>javanicus</i> (<i>Homalopsis</i>)	33, 34, 49	<i>lipocheilus</i> (<i>Dangila</i>)	20
<i>javanicus</i> (<i>Monopterus</i>)	45	<i>lipocheilus</i> (<i>Labiobarbus</i>)	19, 20
<i>javus</i> (<i>Pimelodus</i>)	46	<i>Lobocheilos</i>	17, 18

<i>Lobocheilus falcifer</i>	17, 18	<i>Mystus planiceps</i>	28, 29, 30
<i>Lobocheilus hasselti</i>	17, 18, 49	<i>Mystus wyckii</i>	30
<i>lopis</i> (<i>Chitala</i>)	14	<i>Nemacheilus chrysolaimos</i>	48
<i>Luciosoma setigerum</i>	18, 48	<i>Nemacheilus fasciatus</i>	26
<i>lucius</i> (<i>Channa</i>)	40, 41	<i>nemurus</i> (<i>Bagrus</i>)	28
<i>lucius</i> (<i>Esox</i>)	40	<i>nemurus</i> (<i>Mystus</i>)	28, 29, 30
<i>lucius</i> (<i>Ophicephalus</i>)	40, 41	<i>nemurus</i> (<i>Pimelodus</i>)	28
<i>macrochir</i> (<i>Leuciscus</i>)	18, 19	<i>nieuhofti</i> (<i>Clarias</i>)	31
<i>macrochir</i> (<i>Macrochirichthys</i>)	18, 19	<i>nigriceps</i> (<i>Bagrus</i>)	29
<i>macrochira</i> (<i>Clupea</i>)	18, 19	<i>nigriceps</i> (<i>Mystus</i>)	28, 29
<i>Macrochirichthys</i>	19	<i>nigriceps</i> (<i>Pimelodus</i>)	29
<i>Macrochirichthys macrochir</i>	18, 19	<i>nigroviridis</i> (<i>Tetraodon</i>)	45
<i>Macrognathus aculeatus</i>	44	<i>Noemacheilus chrysolaimos</i>	26
<i>Macrognathus maculatus</i>	44	<i>Noemacheilus fasciatus</i>	26
<i>macrolepidota</i> (<i>Capoeta</i>)	16	<i>Nomalopsis javanica</i>	33
<i>macrolepidota</i> (<i>Hampala</i>)	16	<i>notatus</i> (<i>Osphronemus</i>)	39
<i>macronema</i> (<i>Mystus</i>)	28	<i>Notopterus</i>	47
<i>maculata</i> (<i>Rhynchobdella</i>)	45	<i>notopterus</i> (<i>Notopterus</i>)	14
<i>maculatus</i> (<i>Barbus</i>)	21	<i>Notopterus bontianus</i>	14, 15
<i>maculatus</i> (<i>Macrognathus</i>)	44	<i>Notopterus capirat</i>	14
<i>malgumora</i> (<i>Anguilla</i>)	14	<i>Notopterus notopterus</i>	14
<i>marginatus</i> (<i>Mystacoleucus</i>)	19	<i>nudicephalus</i> (<i>Barbus</i>)	14, 15
<i>marginatus</i> (<i>Ophicephalus</i>)	40	<i>oblonga</i> (<i>Cobitis</i>)	26
<i>marginatus</i> (<i>Barbus</i>)	16, 19	<i>oblongus</i> (<i>Cobitis</i>)	26
<i>marmorata</i> (<i>Anguilla</i>)	13	<i>oblongus</i> (<i>Crossocheilus</i>)	15
<i>marmorata</i> (<i>Muraena</i>)	14	<i>oblongus</i> (<i>Labeo</i>)	15
<i>Mastacembelus unicolor</i>	45	<i>oblongus</i> (<i>Pangio</i>)	26
<i>melanocephala</i> (<i>Platyptera</i>)	41, 42	<i>obtusirostris</i> (<i>Barbus</i>)	19
<i>melanochloris</i> (<i>Tetraodon</i>)	46	<i>ocellata</i> (<i>Balitora</i>)	25, 48
<i>melanosoma</i> (<i>Ophiocephalus</i>)	41	<i>ocellata</i> (<i>Homaloptera</i>)	25, 33, 48
<i>merabensis</i> (<i>Leiocassis</i>)	27	<i>octocirrhus</i> (<i>Cobitis</i>)	25
<i>micracanthus</i> (<i>Mystus</i>)	28, 29	<i>Odontopsis</i>	33
<i>microcephalus</i> (<i>Bagrus</i>)	31	<i>Odontopsis armata</i>	33
<i>microcephalus</i> (<i>Osteochilus</i>)	20	<i>Odontopsis armatus</i>	50
<i>microcephalus</i> (<i>Rohita</i>)	20	<i>oligactis</i> (<i>Pseudogobiopsis</i>)	44
<i>micropeltes</i> (<i>Channa</i>)	41	<i>olivaceus</i> (<i>Polyacanthus</i>)	37, 38
<i>micropeltes</i> (<i>Ophicephalus</i>)	41	<i>Ompok</i> cf. <i>bimaculatus</i>	32
<i>Microphis brachyurus</i>	36	<i>Ompok hypophthalmus</i>	32
<i>micropogon</i> (<i>Leiocassis</i>)	27	<i>ophicephalus</i> (<i>Eleotris</i>)	43
<i>microstoma</i> (<i>Pimolodes</i>)	49	<i>Ophicephalus guacha</i>	40
<i>Monopterus</i>	47	<i>Ophicephalus limbatus</i>	40, 47
<i>Monopterus albus</i>	45	<i>Ophicephalus lucius</i>	40, 41
<i>Monopterus javanicus</i>	45	<i>Ophicephalus marginatus</i>	40
<i>mowa</i> (<i>Anguilla</i>)	13	<i>Ophicephalus micropeltes</i>	41
<i>Muraena blematigrina</i>	14	<i>Ophiocara porocephala</i>	43
<i>Muraena marmorata</i>	14	<i>ophiocephali</i> (<i>Ascaris</i>)	41
<i>Mystacoleucus marginatus</i>	19	<i>Ophiocephalus melanosoma</i>	41
<i>Mystus</i>	28	<i>Ophiocephalus planiceps</i>	41
<i>Mystus cavasius</i>	28	<i>Ophiocephalus radiatus</i>	40
<i>Mystus gulio</i>	28, 29	<i>Ophiocephalus striatus</i>	41
<i>Mystus macronema</i>	28	<i>orphoides</i> (<i>Barbus</i>)	21
<i>Mystus micracanthus</i>	28, 29	<i>orphoides</i> (<i>Puntius</i>)	21
<i>Mystus nemurus</i>	28, 29, 30	<i>Osphromenus javanensis</i>	38, 39
<i>Mystus nigriceps</i>	28, 29	<i>Osphromenus notatus</i>	39

<i>Osphronemus vittatus</i>	38, 39	<i>punctatus</i> (<i>Clarias</i>)	30, 31
<i>Osphronemus goramy</i>	38, 39	<i>Puntius binotatus</i>	21
<i>Osphronemus notatus</i>	39	<i>Puntius bramoides</i>	21
<i>Osteocheilus</i>	20	<i>Puntius lateristriga</i>	21
<i>Osteochilus</i>	20, 46	<i>Puntius orphoides</i>	21
<i>Osteochilus hasselti</i>	19, 20	<i>pusilla</i> (<i>Dermogenys</i>)	34, 35, 50
<i>Osteochilus microcephalus</i>	20	<i>pusillus</i> (<i>Dermogenys</i>)	34
<i>oxygaster</i> (<i>Cyprinus</i>)	20	<i>radiatus</i> (<i>Ophiocephalus</i>)	40
<i>oxygaster</i> (<i>Leuciscus</i>)	20	<i>Rasbora lateristriata</i>	22
<i>Oxygaster anomalura</i>	20	<i>Rasbora lateristriatus</i>	49
<i>oxyrhynchus</i> (<i>Cestraeus</i>)	37	<i>regani</i> (<i>Leiocassis</i>)	27
<i>panchax</i> (<i>Aplocheilus</i>)	33	<i>Rhambdia</i>	47
<i>panchax</i> (<i>Esox</i>)	33	<i>Rhinogobius</i>	44
<i>Panchax buchmanani</i>	33, 34	<i>Rhyacichthys</i>	42
<i>Panchax kuhlii</i>	33	<i>Rhyacichthys aspro</i>	41, 48
<i>Panchax pictum</i>	38	<i>Rhynchobdella maculata</i>	45
<i>Pangasius djambal</i>	31	<i>Rohita erythrura</i>	19, 20
<i>Pangio fasciatus</i>	26	<i>Rohita hasselti</i>	19, 20
<i>Pangio kuhlii</i>	26	<i>Rohita microcephalus</i>	20
<i>Pangio oblongus</i>	26	<i>Rohita vittata</i>	20
<i>Pangio semicinctus</i>	26	<i>rostratus</i> (<i>Sarcogenys</i>)	49
<i>pavonina</i> (<i>Balitora</i>)	24	<i>rubripinnis</i> (<i>Barbus</i>)	21, 22
<i>picta</i> (<i>Anostoma</i>)	34, 38, 49	<i>Sarcogenys rostratus</i>	49
<i>picta</i> (<i>Betta</i>)	38, 39	<i>scabrosus</i> (<i>Labeo</i>)	17
<i>pictum</i> (<i>Panchax</i>)	38	<i>scandens</i> (<i>Anabas</i>)	37
<i>Pimelodus abbreviatus</i>	28	<i>schlegelii</i> (<i>Leuciscus</i>)	15
<i>Pimelodus anisurus</i>	30	<i>semicinctus</i> (<i>Acanthophthalmus</i>)	26
<i>Pimelodus javus</i>	46	<i>semicinctus</i> (<i>Pangio</i>)	26
<i>Pimelodus nemurus</i>	28	<i>seriatus</i> (<i>Labeobarbus</i>)	46
<i>Pimelodus nigriceps</i>	29	<i>setiger</i> (<i>Gobius</i>)	43
<i>Pimelodus platypogon</i>	31	<i>setiger</i> (<i>Sicydium</i>)	43
<i>Pimolodes microstoma</i>	49	<i>setigerum</i> (<i>Barbus</i>)	18
<i>Pimolodus labroides</i>	49	<i>setigerum</i> (<i>Luciosoma</i>)	48
<i>planiceps</i> (<i>Bagrus</i>)	30	<i>Sicydium setiger</i>	43
<i>planiceps</i> (<i>Mystus</i>)	28, 30	<i>Sicyopterus cynocephalus</i>	43
<i>planiceps</i> (<i>Ophiocephalus</i>)	41	<i>Sicyopterus hasseltii</i>	43
<i>platypogon</i> (<i>Glyptothorax</i>)	31	<i>Sicyopus</i> cf. <i>balinense</i>	44
<i>platypogon</i> (<i>Pimelodus</i>)	31	<i>Sicyopus polycnodon</i>	44
<i>Platyptera aspro</i>	41, 42	<i>sidat</i> (<i>Anguilla</i>)	13
<i>Platyptera melanocephala</i>	41, 42	<i>Silurichthys hasselti</i>	32, 33, 49
<i>Platyptera trigonocephala</i>	41, 42	<i>Silurus pabuoides</i>	32
<i>Platypterus</i>	42	<i>soro</i> (<i>Barbus</i>)	22, 23
<i>Platypterus flavipinnis</i>	41, 42	<i>stenomus</i> (<i>Bagrus</i>)	27
<i>poecilopterus</i> (<i>Bagrus</i>)	27	<i>stenomus</i> (<i>Leiocassis</i>)	27
<i>poecilopterus</i> (<i>Eleotris</i>)	42	<i>Stiphodon</i>	44
<i>poecilopterus</i> (<i>Leiocassis</i>)	27	<i>Stiphodon</i> cf. <i>elegans</i>	44
<i>Polyacanthus hasselti</i>	38, 47	<i>striata</i> (<i>Channa</i>)	41
<i>Polyacanthus olivaceus</i>	37, 38	<i>striata</i> (<i>Trichopsis</i>)	39
<i>polyuranodon</i> (<i>Gymnothorax</i>)	14	<i>striatus</i> (<i>Barbus</i>)	21
<i>polycnodon</i> (<i>Sicyopus</i>)	44	<i>striatus</i> (<i>Ophiocephalus</i>)	41
<i>porocephala</i> (<i>Ophiocara</i>)	43	<i>striolatum</i> (<i>Heleostoma</i>)	39
<i>Pseudogobiopsis</i>	44	<i>striolatum</i> (<i>Helostoma</i>)	39
<i>Pseudogobiopsis oligactis</i>	44	<i>Sycidium hasseltii</i>	49
<i>Pseudogobius</i>	44	<i>Synbranchus eurychasnis</i>	45

<i>Syngnathus brachyurus</i>	36, 49	<i>Trichogaster trichopterus</i>	47
<i>Syngnathus fluviatilis</i>	36, 37, 49	<i>Trichopsis</i>	39
<i>taeniatus</i> (<i>Deltentosteus</i>)	44	<i>Trichopsis striata</i>	39
<i>tambra</i> (<i>Barbus</i>)	22, 23	<i>Trichopsis vittata</i>	38, 39
<i>tambra</i> (<i>Tor</i>)	23	<i>trichopterus</i> (<i>Trichogaster</i>)	47
<i>tambroides</i> (<i>Labeobarbus</i>)	22	<i>Trichopus trichogaster</i>	38
<i>tambroides</i> (<i>Tor</i>)	23	<i>trifasciata</i> (<i>Betta</i>)	38
<i>tampela</i> (<i>Anabas</i>)	37	<i>trigonocephala</i> (<i>Platyptera</i>)	41, 42
<i>temminckii</i> (<i>Helostoma</i>)	39, 40, 47	<i>unicolor</i> (<i>Aulopareia</i>)	43
<i>testudineus</i> (<i>Anabas</i>)	37	<i>unicolor</i> (<i>Gobius</i>)	43
<i>tetragonocephalus</i> (<i>Bagrus</i>)	28	<i>unicolor</i> (<i>Mastacembelus</i>)	45
<i>Tetraodon fluviatilis</i>	45	<i>unistriatus</i> (<i>Acanthopthalmus</i>)	25
<i>Tetraodon melanochloris</i>	46	<i>valenciennesi</i> (<i>Homaloptera</i>)	25
<i>Tetraodon nigroviridis</i>	45	<i>variegatus</i> (<i>Akysis</i>)	31, 32
<i>thysanochelilus</i> (<i>Labeobarbus</i>)	20	<i>vittata</i> (<i>Rohita</i>)	20
<i>Tor</i>	22	<i>vittata</i> (<i>Trichopsis</i>)	38, 39
<i>Tor douronensis</i>	23	<i>vittatus</i> (<i>Osphromenus</i>)	38, 39
<i>Tor tambra</i>	22, 23	<i>wassinki</i> (<i>Homaloptera</i>)	25
<i>Tor tambroides</i>	23	<i>wyckii</i> (<i>Mystus</i>)	30
<i>trichogaster</i> (<i>Labrus</i>)	38	<i>Zenarchopterus dispar</i>	36
<i>trichogaster</i> (<i>Trichopus</i>)	38		