REVISION OF THE FISHES COLLECTED BY BURGER AND VON SIEBOLD IN JAPAN

by

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INTRODUCTION

The collections made by Burger and Von Siebold during the second quarter of the previous century, in the neighbourhood of Nagasaki, were so extensive that they gave Temminck & Schlegel the opportunity to build the foundation for the knowledge of the Japanese ichthyofauna.

In her publication "'s Rijks Museum van Natuurlijke Historie, 1820-1915", Dr. A. Gijzen states: "Burger sent among others fishes"; "25 December 1832 Temminck gives him a list of the desired species of animals." As she further states, Burger's position in Japan is not quite clear; in a letter from 9 November 1839, Temminck writes to the Minister that he knows Burger as a collector only, but that he knows no further particulars about him.

Burger's name has been mentioned in several publications, generally as Bürger, but according to an original signature in our archives, this spelling must be regarded as erroneous.

Burger not only collected an excellent collection of Japanese fishes, more than 650, generally dry preserved and stuffed, specimens, but he had also a number of beautifully coloured drawings of Japanese fishes made by (a) Japanese artist(s), while he also made a manuscript on this subject containing the descriptions of 200 species. Almost all this material still is in the possession of the Museum of Natural History at Leiden.

About Von Siebold we know more particulars: according to Dr. A. Gijzen (l.c.), "Von Siebold has been sent to Japan by Van der Capellen, then Gouverneur-Generaal of the Dutch East-Indies, for explorations. He wanted to give a description of his voyage and invoked Temminck's assistance for the zoological part". In May 1827 he begins to send all kinds of objects

to our institution: mammals, birds, reptiles, fishes, crustaceans, shells, fossils, skeletons, skulls, skins, seeds, etc. He was in service of the Dutch East-Indian government. Our collections still contain more than 700 specimens of Japanese fishes, generally preserved in spirits.

On the specimens, data and drawings collected by Burger and Von Siebold, Temminck & Schlegel based the descriptions they give in the volume Pisces in the Fauna Japonica. In the present paper I always use both the names of Temminck and Schlegel, in contradistinction to many recent authors, who generally suppose that volume to have been composed by Schlegel only. In my opinion the use of both names seems more correct, not because Temminck's active collaboration has been proven, but because of lack of proof for the opposite. The occurrence of the specific name *temminckii* just means that that species at least probably has been described by Schlegel only.

Starting in 1940, I made a detailed study of the Japanese material of fishes from Burger and Von Siebold. Dr. F. P. Koumans at Leiden told me that a reexamination of this material would be profitable, not only for our collection, but also for the systematic ichthyology in general. Among the specimens he had to use on some previous occasions, he had found that the identifications of this material were sometimes unreliable and erroneous. During my investigations, these errors in the identifications of the various species proved to be even more numerous than presumed, while several of the species mentioned in Temminck & Schlegel's volume have been described insufficiently and/or inaccurately; some of the references made by these authors proved to be erroneous or refer to dubious species in previous literature; some of the plates in the Fauna Japonica, which have been made after the Japanese drawings collected by Burger, are inexact as to the coloration, some others have been more or less changed and corrected; in some cases there are even differences of varying importance between the plates and the descriptions of the same species, given by Temminck & Schlegel. On account of all these imperfections in that otherwise so splendid publication, it has been the source of a certain amount of more or less serious errors and inaccuracies in more recent literature on this subject. A reinvestigation consequently is of importance, especially as the material, still almost wholly being in the Museum of Natural History at Leiden, in spite of its age, still is in a sufficiently good condition, especially the specimens preserved in spirits, allowing a correction and/or an extension of the necessary data.

Although Burger's manuscript never has been published, it nevertheless seems of importance to lay more stress upon its existence in our collections,

and to make clear to science its quality and the use Temminck & Schlegel made of it. It is important to know that some of Temminck & Schlegel's new species have been based upon Burger's description and his Japanese drawings only, while in several of the descriptions in the Fauna Japonica, Temminck & Schlegel copied parts of Burger's text, sometimes even verbally.

I consequently publish the results of my investigations to correct, or at least restrict, the number of inaccuracies and errors which have originated in some cases by occasional inadequateness of Temminck & Schlegel's descriptions, to correct erroneous data and provide additional ones, and to lay stress upon some neglected peculiarities as to the origin of some of the data in the Fauna Japonica, viz., Burger's manuscript.

During my investigations I further found that several of the new species described in the Fauna Japonica have been based on a heterogeneous material, a fact which makes this reinvestigation, and consequently this paper, much more important. In the material of *Gobius flavimanus* T. & S., in which I could discriminate at least five separate species, I found a new Gobioid species: *Oplopomus koumansi,* the first of its genus to occur in the Japanese waters.

The present paper can be considered as an addition to Temminck & Schlegel's publication; its connection with that valuable volume is so close that its value completely depends on the importance of the latter. There is no doubt about the immense and fundamental value of Temminck & Schlegel's volume in systematic ichthyology, and especially in Japanese systematic ichthyology. Its importance and the measure of progress its publication meant in this branch of science, can best be proven by comparing it with the strangely rare preceding literature on this subject, of which I now give a short historical review.

THE DAWN OF JAPANESE ICHTHYOLOGY

Before Temminck & Schlegel started the publication of the first part of their volume (1842), but few investigators, scientists, amateurs and artists, contributed to Japanese ichthyology. In spite of the rather early trade connections between Japan and the western European countries, especially the Iberian and Low Countries, on account of which one might expect a more extensive literature on Japanese ichthyology during this period, there are a small number of works of this kind only, most of which concern fishes collected near the periphery of the Japanese ichthyological zone, e.g., the seas around the Riu Kiu and Kurile Islands, which must be

excluded from a review of Japanese ichthyology in strict sense. A few only deal with fishes from the Japanese mainland.

This lack of data undoubtedly is a result of the hostile and suspicious attitude of the Japanese during that period. A short quotation from Langsdorf (1812, p. 260) is significant:

„Von allem Umgang der Eingebornen abgeschnitten, und waffenlos in der Gewalt einer aüsserst misstrauischen Nation, waren uns auch alle Mittel für Wissenschaften zu arbeiten entzogen, und der Geist durch den ungewohnten Verlust der Freiheit abgespannt. Bloss die Fische, welche man uns als Provisionen für die Küche brachte, gewährten uns einen Gegenstand der wissenschaftlichen Beschäftigung, und durch heimliche Versprechungen brachten wir es endlich dahin, dass der japanische Provisionsmeister jedesmal verschiedene Arten von Fischen brachte, welche dem Hrn. Hofr. T i l e s i u s und mir lehrreiche und angenehme Unterhaltung verschafften. Man ging so weit, dass man uns nicht einmal gegen baare Bezahlung irgend etwas zu kaufen, oder einem Japaner auch nur das geringste zu schenken gestattete."

Other publications from this period describe the same difficulties which must be responsible for the typical scarcety of scientifically valuable publications on the natural history of Japan.

In connection with these facts, it is not altogether astonishing that it lasted a long time before a more or less representative collection of Japanese fishes became available for scientific research, but, when at last such a collection was made, it could form the base for an extensive publication as the part Pisces in the Fauna Japonica, a work which still is of fundamental value for the study of the fishes of Japan.

As a matter of fact, already before the appearance of the Fauna Japonica, a number of Japanese fishes had become known to science; these data are contained in a number of publications, which are dealt with in the following pages.

The Japanese themselves did not publish scientific papers before the later half of the last century. As Dr. C. C. Krieger of the Ethnographical Museum at Leiden kindly informed me, the Japanese already in early times made collections of objects of natural history, and also published upon this subject. These papers, however, consisted chiefly of numerous plates in water colours, generally very interesting and artistically perfect, but unimportant from a scientific point of view, as they are lacking in accuracy of details. Many of these drawings of natural historical objects found their way to various museums and collections in Europe and, presumably, the rest of the world. One of these is mentioned by Dean (1923, p. 335, no. 742):

"Encyclopédie japonaise; under this heading, Valenciennes records four collections of native paintings of Japanese fishes: one in the Bibliothèque du Roi; another in the Museum d'Histoire Naturelle de Paris; another in the collections of Sir Joseph Banks; and the fourth belonging to the Duc de Rivoli". One of these copies, that in the Banksian library, is referred to also by Richardson (1846,p. 188), who on the same page mentions a number of other anonymous works of the same kind.

As an example of an anonymous Japanese work on fishes, which appeared in about the same time as the part Pisces of the Fauna Japonica, some of the plates from such a publication are reproduced here (Plates III-V). These figures are taken from a copy in the library of the Museum of Natural History at Leiden (cited under "Artiste inconnu" in the list of literature at the end of the present paper). It consists of about 100 drawings of fishes and 10 of cephalopods, all in water colours on rice paper altogether occupying 134 pages. There is no separate text but on each drawing there are some indications in Japanese characters, chiefly concerning the vernacular names of the animals and generally their dimensions. These drawings as a rule are charming from an artistic point of view, but scientifically they are without value, being more or less inexact and generally with incorrect colours or colour markings. Notwithstanding these defects often the species, or at least the genus, meant by the figures, can be determined with a certain amount of accuracy.

These Japanese publications are mentioned here for curiosity's sake only, in the following pages an attempt is given for a survey of the more scientific literature on the fishes of Japan till 1850, the year in which the part Pisces of the Fauna Japonica became complete.

For convenience's sake I divided this period in: A. Pre-Linnean period, and B. Post-Linnean period; the latter has again been divided into 1. Before 1800, and 2. After 1800.

A. Pre-Linnean period.

Dean (1923) mentions as pre-Linnean authors on Japanese ichthyology: Montanus (1669), Kaempfer (1729) and Charlevoix (1736). The remarkable book of Montanus (Beschryving van Japan; Gedenkwaerdige gesantschappen der Oost-Indische Maatschappij in 't Vereenigde Nederland, aan de kaisaren van Japan; etc., 1669), however, proved to contain no remarks of systematic ichthyological importance; the work of Charlevoix was not available to me.

Kaempfer's interesting publication (De beschryving van Japan, etc., 1729), among the various descriptions of all sorts of peculiarities of Japan and the Japanese people, contains a short enumeration of some species

of fishes on page 95 and following. As generally in such early publications, the descriptions he gives are to vague to be of scientific use, which makes their identification almost without exceptions unreliable; only the vernacular names, although inaccurate, give some more reliable indications: "*Tobiwo* is wat de Nederlanders noemen een *Springer* (vliegende Visch) om dat ze uyt het water springt" (p. 98) probably concerns a *Tobino-uwo* (= *Cypselurus agoo* (T. & S.), cf. Jordan, Tanaka & Snyder, 1913, p. 106). The figures (plate XI fig. 1-8, plate XII fig. 1-4) are very inaccurate. This volume also lays stress upon the difficulties caused by the hostile attitude of the Japanese.

B. Post-Linnean period.

This period, although considerably more important from our point of view, still shows a remarkable scarcity of ichthyological publications of scientific importance, especially when we take Japanese ichthyology in strict sense, excluding the Riu Kiu and Kurile areas.

1. Before 1800.

As I mean to give a survey of the Japanese ichthyology in strict sense, I will name some of the authors who described material from the surrounding areas (Riu Kiu and Kurile Islands) only, without giving a review of their publications. The important literature of these authors can be found in the list of literature at the end of the present paper.

The first to be mentioned only is S. P. Kracheninnikow (1766, Kurile Islands; 1770, Kamtschatka and surrounding area).

The second, Pallas, also should be omitted from this review although he may have had a few specimens from the seas near Japan. He never described any new species after Japanese specimens. His publications can be found in the list of literature (Pallas, 1769, 1770, Kurile Islands; 1783, Kurile Islands; 1810, Riu Kiu and Kurile Islands).

The first author of real importance is Houttuyn (1782), who published the descriptions of 42 Japanese marine animals, 36 of which are fishes. These descriptions have been made after material collected in Japan by Thunberg, and transmitted to Houttuyn by J. C. M. Radermacher in Batavia. They are generally very inaccurate and incomplete, while there are no figures to make an identification of Houttuyn's species more easy. Nevertheless his species have in general been identified with more or less reliability by later authors and several of his names have been accepted by science. In Jordan, Tanaka & Snyder's Catalogue (1913), 14 of his species are retained.

Thunberg (1790, 1792, 1793) described in six short publications 12 Japanese species of fishes, the material of which he collected himself in

Japan during a voyage to this country. According to the introduction of the first of these publications, the number of descriptions was restricted by the loss of a large quantity of Thunberg's material. In his second publication (1792a), Thunberg mentions the material sent to Holland by Radermacher, and described there by Houttuyn (1782).

Thunberg's descriptions are partly written in Swedish, with a short specific diagnosis in Latin only, partly wholly in Latin. Although better than those by Houttuyn, and as a rule sufficiently distinct to show which species is meant, they sometimes contain some inaccuracies; the same refers to his for the rest rather exact figures. When compared with Houttuyn's descriptions, they show a distinct progress in scientific value. Jordan, Tanaka & Snyder (1913) still mention 5 or 6 of Thunberg's names based on Japanese specimens.

Jordan, Tanaka & Snyder (1913) also mention Japan as origin of the type material of *Lophius stellata* Vahl (p. 428), but Vahl (1797, p. 213) states concerning his two new species (*L. stellata* and *L. setigerus*) "Begge era fra China", and further remarks in the description of the species "Habitat in mari Chinensi".

Steller (1774) should be mentioned only as he has described material from the neighbourhood of the Kurile Islands. Although he worked during the pre-Linnean period, I mention him here because parts of his unpublished manuscripts were published by more recent authors (Kracheninnikow, Pallas, Tilesius). Steller's (1774) book was not available to me, it is said to contain some remarks on Japanese ichthyology, probably from the periphery of the Japanese zone.

2. After 1800.

The first author to be mentioned here is Tilesius (1809, 1811, 1811-'12, 1813, 1831) who in his various publications described many species after Japanese material. Tilesius for instance published several papers on Japanese fishes which he obtained during his voyage around the world with Von Krusenstern and Langsdorf (see below), while he also described material from neighbouring areas (Kamtschatka, Kurile Islands). When compared with previous authors, his descriptions show a considerable progress in scientific value. They are generally very extensive and quite accurate, while Tilesius himself made many very fine drawings which accompany his descriptions. On account of the complete lack of cooperation from the side of the Japanese, which is sufficiently illustrated by the short quotation from Langsdorf (p. 4), Tilesius' material must have been very small, not giving him the opportunity to compose a work on Japanese ichthyology which sufficiently shows his great capacities in this branch of science. As

to these capacities Langsdorf (1812, p. 5 "Vorerinnerungen") writes: "... danke ich meinem Freunde und Reisegefährten, dem Herrn Hofr. v. Tilesius, der mit den ausgebreitesten wissenschaftlichen Kentnissen seltene Talente für die schöne Künste besitzt". He also made the drawings of fishes in the atlas of Von Krusenstern's publication (1810-'12). Tilesius must have had the necessary capacities to build the foundations of Japanese ichthyology, but destiny withheld him the one further thing needful: a sufficient material.

Jordan, Tanaka & Snyder (1913) still mention 4 species named by Tilesius after Japanese type material.

Von Krusenstern (1810-'12) described in his book the voyage around the world he made with Von Langsdorf and Tilesius. The text contains no remarks of any importance from our present point of view, but his atlas contains several fine figures of fishes, probably made by Tilesius (pl. 20, 22, 59-64, 87), which show sufficient detail to identify the various species, some of which were new to science. Some of the names Tilesius gives in this atlas have been retained (see, e.g., nos. LXIV and LXV in the present paper).

Langsdorf (1812) deelt with the same subject as the previous author, their voyage around the world. In this publication he states "dass eigentlich wissenschaftliche, naturhistorische Beschreibungen von Pflanzen und Thieren nicht in ein Buch gehören, welches allgemeine Ansichten darbieten und den Leser aller Stände unterhalten soll", and he continues: "so habe ich dieselben ganz davon getrennt, und werde sie in der Folge in besondern Heften herausgeben". "Beyträge zur Kentniss der Insecten, Fische, Vögel, etc. sollen ihnen nach und nach, wenn Zeit und Kräfte hinzureichen, folgen." As far as I know, however, Langsdorf never published anything on the fishes collected during his voyage but he must have placed his material at the disposal of other authors. at least Cuvier & Valenciennes (1828-'44) often mention his name in their descriptions. In Jordan, Tanaka & Snyder's Catalogue (1913), his name is mentioned 4 times in connection with those of Cuvier & Valenciennes as author of a new Japanese species of fish, or even abusively without the latter names (e.g., p. 248: *Erosa erosa* (Langsdorf); see also no. LXXIV in the present paper).

A publication of very little importance by P. F. von Siebold, erroneously ascribed to G. T. de Siebold (1824), contains among other particulars the names of several authors on Japanese natural history and, in a Spicilegia Faunae Japonicae, the name of but one species of Japanese fish: *Squalus cirratus* Bosc. (l.c., p. 14).

Richardson (1846) published a paper containing a list of all the species

known until 1846 to inhabit the Chinese and Japanese waters; he generally mentions some literature and some peculiarities of his material only. His paper being published after the appearance of the first 4 parts of the volume Pisces in the Fauna Japonica, he was able to correct some nomenclatural errors in the latter publication. Temminck & Schlegel's species *Anoplus, Aploactis, Glaucosoma* and *Erythrichthys* were renamed according to the rules of nomenclature (see nos. XXXII, LXXXIV, XCVI, CLVI). Jordan, Tanaka & Snyder (1913) still mention at least 4 species named by Richardson after Japanese type specimens.

In this short enumeration I have quite intentionally omitted the various publications by Bloch, Bloch; Schneider, Lacépède, Cuvier & Valenciennes and Müller & Henle. These publications are more of a general kind, while I included in my survey publications only or principally concerning the ichthyology of the Japanese area. Nevertheless it seems not without importance to mention these authors here as they have, among the very extensive material, had some Japanese specimens, some of which they identified as new species. In Jordan, Tanaka & Snyder's Catalogue (1913), these authors still mention the following amounts of species based on Japanese material: Bloch 5, Bloch; Schneider 1?, Lacépède 2, Cuvier & Valenciennes 20 (from Langsdorf?), Müller & Henle 9.

Recapitulating, we see that but few authors published during the period preceding the appearance of the ichthyological volume of the Fauna Japonica. Only Thunberg and Tilesius give sufficiently accurate and complete descriptions of their new species, while the latter gives some very nice figures too. But none of them had a sufficient material at his disposal to be able to give a more complete survey of the ichthyological fauna in the Japanese waters. Richardson's publication can better be regarded as contemporary with Temminck & Schlegel's volume and gives an enumeration of previously described species only.

Literature on this subject can be found in the publications by Dean, Pages, Von Wenckstern and Giussani, all mentioned in the list of literature at the end of the present paper.

THE PART PISCES IN THE FAUNA JAPONICA

After the previous statement on the value of the publications on systematic ichthyology during the "pre-Fauna Japonica" period, it is not very difficult to illustrate the immense progress in this branch of science brought about by the appearance of Temminck & Schlegel's volume, of which I now give a short review.

The part Pisces in the Fauna Japonica has been published in 6 parts during the years 1842-1850. The exact dates of publication can be found in the list of literature I give at the end of the present paper. Temminck & Schlegel were the first authors who had the opportunity to start and accomplish the composition of so extensive a publication on this subject. The circumstances which brought about this opportunity I have mentioned in the beginning of the introduction: the arrival of a considerable amount of ichthyological material from the Japanese area from their travellers Burger and Von Siebold, while Burger also sent them a quite inaccurate manuscript containing several interesting data concerning about 200 species of Japanese fishes and a nice collection of drawings made after fresh Japanese material by (a) Japanese artist(s). All this material still is in the Museum of Natural History at Leiden.

In this work Temminck & Schlegel give descriptions of almost all 358 species they mention; only of a few previously described species they thought these descriptions sufficient and give references only. This number of 358 species may seem small in comparison with the modern number of species known from this area, Jordan, Tanaka & Snyder mention in their Catalogue (1913) 1239 species, but in comparison with previous publications on this subject it is a formidable step forward, the most extensive paper of the previous period being Houttuyn's description of 36 species. Of Temminck & Schlegel's numerous new species, more than 160 are still accepted by modern ichthyologists (cf. Jordan, Tanaka & Snyder, 1913), while of the authors of the previous period the most important show the following numbers (also according to Jordan c.s., l.c.): Cuvier & Valenciennes 20, Houttuyn 16, Müller & Henle 9, Thunberg 5.

The species described in the Fauna Japonica can, according to modern views, be divided according to their original authors: Temminck & Schlegel 165, Cuvier & Valenciennes 35, Linnaeus 26, Houttuyn 14, Müller & Henle 11, Forskål 19, Thunberg 9, etc. Here must be taken into account that several species are included which have first been described after specimens from other parts of the earth, which fact also accounts for the differences from the previously mentioned amounts.

The quantitative progress caused by Temminck & Schlegel's volume thus must have been sufficiently proved, those numbers speak for themselves. But the qualitative progress still must be proven.

As I stated before, Temminck & Schlegel give descriptions of almost all species they mention except some species belonging to the subclassis Elasmobranchii, which they thought sufficiently described by Müller & Henle (1841), and a few further species of various groups, of which they give

references to previous literature only; of some species they give additional descriptions. The early date of this publication taken into consideration, and in comparison with previous and contemporary papers, these descriptions are generally rather exact, although from a modern point of view often insufficient and som times inaccurate. Some are very extensive, some are quite exemplary, even almost from a modern point of view, but others are short, sometimes too short and, although fitting in the conceptions and ideals of their time, inaccurate and insufficient in our view. Nevertheless they generally seem to continue the progressive line of development shown in systematic ichthyological literature during the previous period. The gap between the reality of Temminck & Schlegel's publication and the requirements in modern ichthyological science is exactly what I want to fill up as well as possible by reinvestigating Temminck & Schlegel's material and publishing the results in the present paper.

I need not repeat the various points which caused the previously mentioned gap, and which made the volume Pisces of the Fauna Japonica, although still a valuable monument in ichthyology, in some relatively small parts a source of inaccuracies and even errors, for I already mentioned them in the beginning of the introduction (p. 2). I hope many of the fallacies caused by the less exact parts of Temminck & Schlegel's publication will come to an end with the publication of the present paper.

As stated before, the part Pisces in the Fauna Japonica has been based on material collected by Von Siebold and Burger, on a collection of Japanese plates made after fresh material, collected by Burger, and an unpublished manuscript from the latter.

The material Burger and Von Siebold have sent to Holland consists of about 1500 specimens, partly dry preserved and stuffed (almost all specimens collected by Burger), and partly preserved in spirits (the majority of Von Siebold's specimens); some of the specimens in spirits have been stuffed with cotton, while there are also a few dry skins. The stuffed and dry preserved specimens are sometimes in a more or less bad condition, with the fins more or less damaged while sometimes the squamation too is in a bad state. They have been cut open on one side, which has consequently been badly damaged, while often the other side has been painted, generally more or less in accordance with the plates in the Fauna Japonica. They have further also been varnished for better preservation. The sometimes very thick cover of paint and varnish makes an accurate investigation of the squamation often impossible, but sometimes the unpainted side, although damaged, provides the necessary characters. The cover of paint and varnish, sometimes in connection with scales (and skin), in

some cases makes a distinction between spines, soft simple rays and branched soft rays unreliable or even impossible. On account of this not too much stress must be laid on the fin formulae of stuffed material given in the present paper. Nevertheless the majority of the stuffed material still is in a quite satisfactory condition and permits a reliable identification.

The specimens preserved in spirits are generally in a very good condition. Their former coloration as a rule is lost. They are much easier to investigate as they generally give much more reliable characters than the often more or less, sometimes even badly deformed, stuffed specimens. They further admit an examination of the dentification and the gill-rakers, which is generally impossible in stuffed specimens. It is therefore necessary to set more value upon the characters given in the present paper of this part of the material than upon the characters of the stuffed specimens.

Some of the specimens show no indications as to their collector and/or locality. A part of these specimens, some of which have been stuffed and some preserved in spirits, have indications referring to the Fauna Japonica. All these specimens too, about 50, I have included in the reexaminated material.

Our collections further contain some skeletons or parts of skeletons, doubtless belonging to the same material. These have partly been prepared here, partly (e.g., jaws of Elasmobranchii) in Japan. Of these, which I have identified as far as possible, I give an enumeration at the end of the present paper.

The beautiful Japanese drawings Burger had made during his sojourn in Japan almost all have been reproduced in the Fauna Japonica, generally without any changes, but in some cases they seem to have been corrected by Temminck & Schlegel. Only a few have been omitted, of which I give reproductions in the present paper (plates I and II). I also mention the few cases in which there is a more or less distinct difference between the colours on the Japanese plate and the reproduction in the Fauna Japonica. It must further be remarked that not all plates in the Fauna Japonica are reproductions of Burger's Japanese drawings, but some probably have been made in Holland (uncoloured figures), others are of uncertain origin. The latter easily can be recognised by the different way in which they are drawn as well as by the fact that no originals of these plates are in Burger's collection.

As I stated before, Burger also composed a manuscript, written in the Dutch language, containing the descriptions and a few particulars of 200 species he discriminated. This manuscript, still almost complete, is in the Museum of Natural History at Leiden. Sixteen of the descriptions are

lacking, but of the greater part of these it was possible to find out which species Burger must have described on account of numbers on the Japanese drawings refering to descriptions in Burger's manuscript. As Temminck & Schlegel often used parts of Burger's descriptions it seems not without interest to quote one of Burger's descriptions as an illustration of their design and value.

No. 167.
Pisces Acanthopterijgii.
Fam. IV.
Perches, Cuv:
Sijnanceia, Schn:
Sijnanceia Benoogose, Jap: ベニオゴゼ紅鼠魚

Lijf: Kort, dik, breed, rondachtig, vleezig, met eene dikke huid en naauwelijks zichtbare schubben bezet.

Kop: Kort, zeer dik rondachtig, van voren verticaal afgesneden, met zeer vele knobbels, stekels, huidachtige aanhangsels als ook verhoogingen en verdiepingen bedekt.

Mond: zeer groot, breed, hoekig, zich schuins naar beneden openende.

Kaken: beide even lang, met verscheidene rijen zeer kleine scherpe tanden gewapend, de bovenkaak sterk uitzetbaar.

Tong: Kort, breed, ovaal, glad.

Keel: naauw, scherpachtig.

Oogen: hoog op zijde aan den kop, naar boven gerigt, klein ovaal, in eene verdieping liggenden; De oogkringen met een uitstekende rand en vele knobbels omgeven.

Iris: oranje.

Neusgaten: dubbel, digt bij elkander boven aan den kop, klein rondachtig, in eene verdieping, een weinig voor de oogkringen geplaatst, het voorste met een uitstekend vliesje voorzien, waarmede het kan worden gesloten.

Kieuwendeksels: uit twee groote, breede, rondachtige platen, de voorste in dikke knobbelachtige tanden eindigende; de achterste plaat in een driehoekig vlies eindigende, hetwelk met verscheidene vlakke tanden en knobbels bezet is.

Behalve dat is de geheele kop voornamelijk achter de oogen, als ook de plaat onder de oogkringen nog met zeer vele knobbels, tanden, verhoogingen en verdiepingen bedekt, welke zich tot aan het begin van de zijdestreep, tot aan de hoeken van de kieuwenopeningen uitstrekken, en daardoor aan den kop een zeer vreemd en mismaakt aanzien geven.

Kieuwenvlies: met zeven stralen, door de kieuwendeksels bedekt.

Kieuwenopeningen: naauw, rondachtig.

Rug: eenigzins rondachtig, dik, vleezig.

Buik: dik, breed, rondachtig, vleezig uitstekende.

Zijden en staart: dik, breed, rondachtig, vleezig tezamengedrukt.

Aars: groot, rondachtig uitstekende, een weinig digter bij den staart, dan bij den kop; digt achter denzelven met een uitstekend rond, vliesachtig buisje voorzien.

Zijdestreep: met eene kleine bogt naar den buik, langs de zijden, en voorts regtlijnig in den staart met verscheidene, dikke, korte, huidachtige aanhangsels bezet.

Rugvin: zeer lang, beginnende digt aan den kop tegenover de borstvinnen, zich tot digt aan de staartvin uitstrekkende, met veertien gedorende en zes getakte stralen, welke laatste een weinig boven de gedorende uitsteken.

Aarsvin: rondachtig uitstekende, beginnende een weinig achterlijker als de aars, zich tot op denzelven afstand van de staartvin, als de rugvin uitstrekkende, met drie gedorende en zes getakte stralen.

Buikvinnen: regt onder de borstvinnen geplaatst klein kort hoekig, met vijf stralen.

Borstvinnen: groot, zeer breed, rondachtig, bijna vlerksgewijze, zich tot digt beneden aan de buikvinnen uitstrekkende, met veertien eenigzins getakte stralen.

Staartvin: kort, boogsgewijze afgesneden met twaalf getakte stralen.

Kleur: bloedrood, met gele en witachtige vlekken, bij wijze van breede dwarsstrepen, op iedere zijde. Vinnen: rood met geel en wit.

Lengte: vijf duimen.

Dikte van den kop: bij de twee duimen.

AANMERKINGEN

Schaarsch, wordt somwijlen in het voorjaar, vooral in treknetten in de Baaijen om Nagasaki gevangen; zijn vleesch wordt voor smakelijk gehouden.

In some cases, when Temminck & Schlegel received no material of new species known to them only by Burger's description and/or a Japanese drawing, these have been used as the only foundation for their species. In several cases when there was a description by Burger of the species dealt with, some, generally small, parts of Temminck & Schlegel's descriptions obviously have been taken from Burger's manuscript, as I mentioned before sometimes even verbally (e.g., the vernacular name, the "Aanmerkingen" (Remarks) and now and then the size and coloration).

One of Burger's descriptions proved to concern a species not described in the Fauna Japonica, and of which we have in our collection 20 specimens preserved in spirits and collected by Von Siebold in Japan. This material has on its label a number, no. 128, refering to Burger's manuscript. I also found a small Japanese drawing of this species in Burger's collection, of which I give a reproduction in the present paper (plate II fig. 1). These specimens as well as several other specimens which seem to have been omitted by Temminck & Schlegel, I investigated, while I publish the results in this paper.

As I stated before, not all of Burger's descriptions have been left in his manuscript, some presumably have been lost (nos. 41, 42, 57, 58, 61, 62, 65, 66, 98, 100, 124, 125, 126, 127, 147 and 198). Of three of these descriptions only I was unable to discover which species they must have meant (nos. 61, 100 and 124).

The material concerning the Elasmobranchiid species (except the Chimaeroid specimens) have been used by Müller & Henle for the composition of their valuable monograph (1838-'41), which has been mentioned in the list of literature at the end of the present paper.

Stress must be laid upon the fact that I have not intended to give complete references of the literature of the various species. I generally have mentioned the most important or interesting items of the literature only. I further generally compared the specimens with material from other collections, if available.

Finally I want to express my thanks to Prof. H. Boschma for his help to bring this publication to a successful conclusion, and to Dr. F. P. Koumans for his many advices during my researches. I am greatly indebted to Dr. C. C. Krieger of the Ethnographical Museum at Leiden for the translation of Japanese characters and descriptions.

REVISION OF THE MATERIAL

I examined the various species in the same order as in which they have been described in the Fauna Japonica, part Pisces, which order I also maintain in this paper. The first name as well as the numbers of pages and eventual plates at the top of the review of each species concern Temminck & Schlegel's publication.

I. **Niphon spinosus** (p. 1, plate I figs. 1 & 2)

Niphon spinosus Cuvier & Valenciennes, 1828b, p. 131, pl. 19; — Günther, 1859, p. 80; — Boulenger, 1895, p. 124; — Jordan & Richardson, 1910, p. 431; — Fowler & Bean, 1930, p. 192; — Tanaka, 1930, p. 957, fig. 522.

There are three stuffed specimens in Burger's collection, and two stuffed specimens from Japan without further information, probably from the same collection. One specimen from Burger's collection must be in the British Museum, cf. Richardson (1846, p. 222). Total (standard) length of Burger's specimens: no. 41:25.5 (22) cm, no. 42:40 (35) cm, no. 43:48 (42) cm; of the specimens without information: no. 158:10.5 (8.2) cm, no. 793:21 (17) cm.

Plate I figs. 1 & 2 in the Fauna Japonica shows exact reproductions of an original plate in Burger's collection; Burger's manuscript contains the very inexact descriptions of a juvenile and an adult specimen (nos. 174 & 175).

The homogeneous material is, although stuffed, still in a rather good condition; the smallest specimen still shows distinct longitudinal stripes on the back. As to the reliability of the original identification, there can be no doubt: *Niphon spinosus* C. & V.

II. **Perca-labrax japonicus** (p. 2, plate II fig. 1)

Labrax japonicus Cuvier & Valenciennes, 1828b, p. 85; — Bleeker, 1853b, p. 23; — idem, 1857, p. 53.

Percalabrax japonicus, Günther, 1859, p. 71.

Lateolabrax japonicus, Boulenger, 1895, p. 123; — Jordan & Richardson, 1910, p. 429; — Fowler & Bean, 1930, p. 190.

Burger's collection contains five stuffed speciemens, Von Siebold's collection one stuffed specimen and four specimens in spirits; there is also one specimen in spirits from Japan, 1844, without further indications. Some specimens from Burger are in the British Museum, cf. Richardson (1846, p. 222). Total (standard) length of Burger's specimens: no. 36:13.5 (12) cm, no. 37:17 (14.5) cm, no. 38:27 (23.5) cm, no. 39:40 (36.5) cm; no. 40:56 (48) cm; of Von Siebold's specimens: no. 18:24.5 (21) cm, no. 19:12.5 (10.5) cm, no. 20a:16 (13.5) cm, no. 20b:13 (11) cm, no. 60 (stuffed): 17.5 (15) cm; of the specimen from Japan, 1844: no. 17:29.5 (24.5) cm.

Plate II fig. 1 is an exact reproduction of an original plate in Burger's collection, which must have been made after the more or less deformed stuffed specimens. The specimens preserved in spirits have the dorsal and ventral outlines less angular. There is a description of this species in Burger's manuscript (no. 173).

The material is homogeneous; specimen no. 17 differs by having 15(1) soft rays in D^2 and 10(1) in A; specimen no. 19 must be a variety, having never had any spots on the back, cf. Fauna Japonica, p. 2. Except these differences, however, the specimens convincingly agree with the descriptions cited above. They belong to *Lateolabrax japonicus* (C. & V.).

III. **Diploprion bifasciatum** (p. 2, plate II A)

Diploprion bifasciatum Cuvier & Valenciennes, 1828b, p. 137, pl. 21; — Bleeker, 1857, p. 59; — Bleeker, 1873-'76, p. 71, pl. 68 (346) fig. 21; — Jordan & Richardson, 1910, p. 427, fig. 2; — Tanaka, 1929, p. 908, fig. 501; — Fowler & Bean, 1930, p. 183; — Weber & De Beaufort, 1931, p. 9, fig. 3.

We possess one stuffed specimen from Burger, one specimen in spirits from Von Siebold, and two Japanese specimens without name of collector. Total(standard) length of Burger's specimen: no 89:24 (20) cm; of Von Siebold's specimen: no. 43:22.5 (19) cm; of the specimens from unknown collector: no. 158:10.5 (8.2) cm, no. 793:21 (17) cm.

The plate in the Fauna Japonica is an exact reproduction of an original plate in Burger's collection; the shape of the dorsal fins is inexact, in our specimens D^1 is slightly higher than D^2. Burger's manuscript contains a description of this species (no. 94).

The specimens still are in a very good condition; the transverse bands on the body are still distinct. They doubtless belong to *Diploprion bifasciatum* (K. & V. H.) C. & V.

IV. **Apogon novemfasciatus** (p. 2, plate II fig. 2)

Apogon novemfasciatus Cuvier & Valenciennes, 1828b, p. 154; — Weber & De Beaufort, 1929, p. 302.
Apogon fasciatus, Günther, 1859, p. 241.
Apogon novemfasciata, Fowler & Bean, 1930, p. 56.

There is one specimen in spirits in Von Siebold's collection. Total (standard) length: no. 53:17.5 (16.5) cm.

The plate in the Fauna Japonica has been made after an original plate which still exists in Burger's collection. In some characters our specimen, which is not the one represented (cf. Fauna Japonica), differs from this plate: D VI.I.9 (1); P 14; snout 1.8 in eye, which is 2.8 in head. According to Jordan & Snyder (1901d, p. 901) this plate must be incorrect.

The specimen still has remains of longitudinal stripes on the body. It is in such a bad condition that it is impossible to make an absolutely reliable identification. As it is not the specimen represented on plate II fig. 2 in the Fauna Japonica, we can not rely on characters shown by this figure to make

even a very careful supposition more sound. In the present condition it was impossible to find more than 6 spines in D^1; accepting this number, however, the only possibility would be that the specimen belongs to *Apogon kiensis* Jord. & Snyd. (1901d, p. 905, fig. 9); the description of that species indeed contains no distinct differences of specific value, but proved that *A. kiensis* never has been found to exceed 65 millimetres; this makes such an identification rather improbable. In consequence of this it seems probable that the D^1 has had 7 spines, in which case it may belong to *A. novemfasciatus* C. & V. (l.c.), to *A. endekataenia* Blkr., or, if that species really differs, to *A. schlegeli* Blkr.

The condition of the specimen, however, making a reliable identification impossible, it provisionally stays in our collections as *Apogon novemfasciatus* C. & V., by authority of Temminck & Schlegel.

V. **Apogon lineatus** (p. 3)

Apogon lineatus, Bleeker, 1857, p. 54, pl. I fig. 1; — Günther, 1859, p. 239; — Jordan & Snyder, 1901d, p. 898, fig. 4.

There are two completely identical specimens in Von Siebold's collection. Total (standard) length: no. 70a*:8 (6.5) cm, no. 70b:8 (6.5) cm.

From this species there is no plate in the Fauna Japonica, neither is there a description in Burger's manuscript.

Both specimens have no remains of colours or colour markings left. They completely agree with Bleeker's specimens of *A. lineatus* in our collection (no. 5585), and, accepting the colour markings as described in the Fauna Japonica, with the descriptions cited above. This must be the type material of *Apogon lineatus* T. & S. Completely arbitrarily I have chosen one of the specimens, no. 70a, as type.

VI. **Apogon nigripinnis** (p. 3)

Apogon nigripinnis Cuvier & Valenciennes, 1828b, p. 113; — Weber & De Beaufort, 1929, p. 321.
Amia nigripinnis, Bleeker, 1873-'76, p. 99.
Apogon niger, Jordan & Snyder, 1901d, p. 895, fig. 2.

Von Siebold's collection contains three specimens in spirits. Total (standard) length: no. 4558a:10 (8.5) cm, no. 4558b:7.5 (6.2) cm, no. 4558c:7.3 (6) cm.

There is no plate of this species in the Fauna Japonica, nor a description in Burger's manuscript.

These specimens have no remains of colours or colour markings left. Specimen no. 4558a differs from the other specimens by having but 4

instead of 5 soft rays in V. They all agree with the descriptions cited above. According to Jordan & Snyder (1901d, p. 896), *A. niger* Döderl. differs from *A. nigripinnis* C. & V. by having no dark vertical bands nor a black edge to the caudal fin, but Weber & De Beaufort (l.c.) consider them identical. The specimens belong to *Apogon nigripinnis* C. & V.

VII. **Apogon carinatus** (p. 3)

Apogon carinatus Cuvier & Valenciennes, 1828b, p. 157.
Apogonichthys carinatus, Bleeker, 1857, p. 56, pl. 1 fig. 3; — Günther, 1859, p. 247; — Jordan & Snyder, 1901d, p. 892, fig. 1; — Fowler & Bean, 1930, p. 16.

There are two specimens in spirits in Von Siebold's collection; two further specimens in spirits from Japan, 1844, without name of collector, probably belong to the same collection. Total (standard) length of Von Siebold's specimens: no. 72a:12.3 (10) cm, no. 72b:12 (10) cm; of the specimens without name of collector: no. 71a & b: 13 (10.5) cm.

The Fauna Japonica contains no plate of this species, Burger's manuscript contains no description.

The material has hardly any colours left; a distinct dark blotch can be seen on the posterior four finrays and included membranes of D^2. The agreement with the descriptions cited above, especially with the description by Jordan & Snyder, is very close. There can be but little doubt as to the identity of these specimens: they belong to *Apogonichthys carinatus* (C. & V.).

VIII. **Apogon semilineatus** (p. 4, plate II fig. 2)

Apogon semilineatus, Bleeker, 1857, p. 55, pl. 1 fig. 2; — Günther, 1859, p. 240; — Jordan & Snyder, 1901d, p. 903, fig. 7.
Amia semilineata, Fowler & Bean, 1930, p. 97.

We possess four specimens in spirits from Von Siebold, four female specimens in spirits with the indication "Faun. Jap.", and two specimens in spirits from Japan, 1845, without further information, probably belonging to the same collection. Total (standard) length of Von Siebold's specimens: no. 65a*:10 (8.3) cm, no. 56b:9.5 (8) cm, no. 65c & d:8.6 (7.2) cm; of the specimens with the indication "Faun. Jap.": no. 66a:11 (9) cm, no. 66b:9 (7.4) cm, no. 66c & d:8.8 (7) cm; of the specimens without indication: no. 64a:11 (9) cm, no. 64b:9.5 (8) cm.

Compared with plate II fig. 2 in the Fauna Japonica, our specimens have the snout less pointed, the lower jaw slightly longer than the upper, the snout slightly produced in some (male) specimens only. Burger gives no description of this species in his manuscript.

This material obviously belongs to one single species; the two longitudinal stripes on the head and the anterior part of the body, as described by Jordan & Snyder (l.c.), are still visible, but the inferior band never extends on the caudal peduncle as described by Fowler & Bean (l.c.); the tip of the snout and of the spinous dorsal fin are both dark, and there is a dark blotch at the base of the caudal fin.

The specimens show a rather close agreement with the descriptions cited above, especially with the description by Jordan & Snyder. They represent the type material of *A. semilineatus* T. &. S. Specimen no. 65a I regard as the type.

IX. **Serranus Kawa-mebari** (p. 5)

Serranus kawamebari, Günther, 1859, p. 107.
Siniperca? kawamebari, Boulenger, 1895, p. 138.
Bryttosus kawamebari, Jordan & Snyder, 1900, p. 354, pl. XII; — Jordan & Richardson, 1910, p. 433, fig. 3; — Tanaka, 1924, p. 618, fig. 412.

Burger's collection contains three stuffed specimens. Total (standard) length: no. 2088:7.3 (6.5) cm, no. 2089*:8.5 (7.5) cm, no. 2047:10.5 (9) cm.

This species is not represented by a plate in the Fauna Japonica or by a description in Burger's manuscript.

The specimens have no remains of colours or colour markings and, as generally in stuffed, dry-preserved specimens, have the fins more or less damaged. The complete agreement with the descriptions cited above illustrates a complete lack of doubt as to the identity of Temminck & Schlegel's species. The specimens represent the type material of *Bryttosus kawamebari* (T. &. S.). Specimen no. 2047 was, when I found it in our collection, identified as *Serranus* or *Epinephelus* only, and has a rather irregular squamation, so I chose specimen no. 2089 as type in spite of its considerably smaller size.

X. **Serranus oculatus** (p. 5, plate III A)

Etelis carbunculus Cuvier & Valenciennes, 1828b, p. 127, pl. 18; — Günther, 1859, p. 79; — Jordan & Thompson, 1911b, p. 465, pl. CCI fig. 524; — Fowler, 1931b, p. 195.
Serranus oculatus Cuvier & Valenciennes, 1828b, p. 266, pl. 32.
Anthias oculatus, Günther, 1859, p. 92.
Etelis oculatus, Jordan & Evermann, 1898a, p. 1282.

Burger's collection contains two stuffed specimens. Total (standard) length: no. 86:43 (35) cm, no. 87:42 (34) cm.

Plate III A in the Fauna Japonica is an exact reproduction of an original plate in Burger's collection. The shape is not completely exact. According

to our specimens, there must be five rows of scales between base of D^2 and lateral line; the preopercle should be serrate; the posterior rays of D^2 and A should be somewhat prolonged; in specimen no. 87, the first simple ray of D^2 is not spinous, in specimen no. 86 that first ray is even not simple. In Burger's manuscript there is a description of this species (no. 154).

The material is obviously homogeneous; both specimens have one side painted yellowish red with some indistinct, slightly more reddish longitudinal stripes on the superior part of the body, while the inferior parts are more yellowish.

On account of the squamation (large scales), and the dentification, the specimens must belong to the Lutianid species *Etelis carbunculus* C. & V. (l.c.); according to Jordan & Thompson (l.c., p. 466) this species may be identical with *E. oculatus* (C. & V.), but they are not completely sure and even mention a possible way to distinguish both species on account of differences in the colour markings. The occurrence, however, of the colour markings, as described above, on both our specimens, makes a distinction as proposed by these authors improbable.

Except some proportional differences, caused by the deformation of stuffed material, these specimens sufficiently agree with the descriptions cited above; the most important of the differing characters of Burger's specimens are: D X.11, with the first spine about 2.7 in the second; the pectorals 4 in total length; the head 3.8 in total length; the suborbital width about 7.5 in head, the interorbital space about 3.8 in head; the opercle has one blunt point only; the lateral line consists of about 50 scales, a transverse row above the origin of the anal fin 5-1-14 scales, each scale with 7-11 radiating striae; there are 8 oblique rows of scales on the preopercle, and canines on the lower jaw too. In this enumeration I frequently use the word "about", to accentuate the unreliability of the characters of these dry specimens. The specimens therefore probably belong to *Etelis carbunculus* C. & V.

XI. **Serranus latifasciatus** (p. 6)

Serranus latifasciatus, Günther, 1859, p. 154; — Day, 1888, p. 780, figs.
Serranus grammicus Day, 1878, p. 23, pl. V fig. 4.
Epinephelus latifasciatus, Boulenger, 1895, p. 206; — Jordan & Richardson, 1910, p. 452; — Tanaka, 1927, p. 687, fig. 441.

There are two stuffed specimens in Burger's collection; total (standard) length: no. 21*:39 (32.5) cm, no. 22:30 (25) cm.

There is no plate of this species in the Fauna Japonica, nor a description in Burger's manuscript.

Both specimens still have distinct remains of colour markings, and agree with the descriptions cited above, showing but slight unimportant differences: head 3.2, height 4.2 in total length; eye 6-7, interorbital space 5.6-6.5, in head; maxillary reaching one-third eye-diameter beyond eye, 2.3 in head; D slightly behind pectoral base. Several of these differences must have been caused by the way of preservation of these dry specimens. The specimens represent the type material of *Epinephelus latifasciatus* (T. & S.). Specimen no. 21 I chose as type.

XII. **Serranus poëcilonotus** (p. 6, plate IV A fig. 1)

Serranus morrhua Cuvier & Valenciennes, 1833, p. 434; — Günther, 1859, p. 154; — Fowler & Bean, 1930, p. 243.
Serranus poëcilonotus, Bleeker, 1857, p. 61; — Günther, 1859, p. 155.
Epinephelus morrhua, Boulenger, 1895, p. 208; — Jordan & Richardson, 1910, p. 454, fig. 11; — Weber & De Beaufort, 1931, p. 42.
Epinephelus poecilonotus, Tanaka, 1925, p. 630, fig. 415.

Burger's collection contains one stuffed specimen, Von Siebold's collection two specimens in spirits. Total (standard) length of Burger's specimen: no. 75*:17 (14.5) cm, of Von Siebold's specimens: no. 176a:5.8 (4.7) cm, no. 176b:12 (9.5) cm.

Plate IV A fig. 1 in the Fauna Japonica is not made after an original plate in Burger's collection, Burger's manuscript contains no description of this species.

The specimens obviously belong to the same species; the still distinct colour markings seem to be variable, as described in the Fauna Japonica. All specimens sufficiently agree with the descriptions cited above. They all must belong to *Epinephelus morrhua* (C. & V.). I have chosen specimen no. 75 as Temminck & Schlegel's type specimen of *poëcilonotus.*

XIII. **Serranus octocinctus** (p. 7, plate IV A fig. 2)

Serranus octocinctus, Bleeker, 1853b, p. 24.
Epinephelus septemfasciatus, Boulenger, 1895, p. 226; — Jordan & Richardson, 1910, p. 458.

There is in our collection one specimen in spirits collected by Von Siebold, and one specimen in spirits with the indication "Faun. Jap." only. Total (standard) length of Von Siebold's specimen: no. 124:12.5 (10.3) cm, of the second specimen: no. 123*:17 (13.5) cm.

Plate IV A fig. 2 is not made after an original plate in Burger's collection, and Burger's manuscript contains no description of this species.

Both specimens show but slight unimportant differences when compared

with the descriptions cited above: eye 1.3 in snout, 5 in head; maxillary not reaching beyond orbit, interorbital space about equal to diameter of eye; lower edge of preopercle with one blunt indistinct point only; A III.9. They also agree with the specimens described by Temminck & Schlegel as *Plectropoma susuki* (no. XXIII). They belong to *Epinephelus septemfasciatus* (Thunb.), and represent Temminck & Schlegel's type material of *octocinctus*. As type specimen I chose specimen no. 123.

XIV. **Serranus Tsirimen-ara** (p. 7, plate IV A fig. 3)

Serranus tsirimenara, Bleeker, 1857, p. 62; — Günther, 1859, p. 144.
Epinephelus fasciatus, Boulenger, 1895, p. 238; — Tanaka, 1929, p. 903, figs. 499, 500, 501; — Weber & De Beaufort, 1931, p. 58.
Epinephelus tsirimenara, Jordan & Richardson, 1910, p. 460, fig. 13.
Serranus fasciatus, Fowler & Bean, 1930, p. 263.

There are five stuffed specimens in Burger's collection, and two specimens in spirits in Von Siebold's collection. Total (standard) length of Burger's specimens: no. 62:25 (20.5) cm, no. 63:27.5 (23.5) cm, no. 64*:33 (28) cm, no. 65:27 (22) cm, no. 2754:26 (23) cm; of Von Siebold's specimen: no. 114a & b:15.5 (12.5) cm.

Plate IV A fig. 3 has not been made after an original plate in Burger's collection. In comparison with this figure, our specimens have the anal spines slightly shorter, the opercular flap longer and sharper, and some indistinct small scales on the maxillaries. Burger's manuscript contains no description of this species.

The extensive material is homogeneous and sufficiently agrees with the descriptions cited above. Differences, occurring especially in the stuffed specimens, are unimportant: head about 2.6 in standard length, eye 4.3-5.3 in head, maxillary reaching to below or even beyond the posterior edge of the eye, teeth on lower jaw in two rows on posterior part only, some indistinct small scales on the maxillaries. On account of this agreement, the opinions of Jordan & Richardson (1910, p. 460) and of Jordan, Tanaka & Snyder (1913, p. 157), viz., the consideration of *tsirimenara* Temminck & Schlegel as a separate species, seems improbable. Consequently I agree with the opinions of other recent authors cited above, and identify these specimens as *Epinephelus fasciatus* (Forsk.). Specimen no. 64 I consider as the type specimen of Temminck & Schlegel's *tsirimenara*.

XV. **Serranus trimaculatus** (p. 8)

Serranus trimaculatus Cuvier & Valenciennes, 1828b, p. 331; — Günther, 1859, p. 109.
Epinephelus trimaculatus, Boulenger, 1895, p. 221.

Epinephelus fario, Jordan & Richardson, 1910, p. 451, fig. 9; — Tanaka, 1927, p. 726, fig. 451.
Serranus fario, Fowler & Bean, 1930, p. 249.

Our collection contains one stuffed specimen from Burger, and three from Von Siebold, two of which are stuffed, the third in spirits. There must be some further specimens in the British Museum, cf. Richardson (1846, p. 232). Total (standard) length of Burger's specimen: no. 54:35 (28) cm, of Von Siebold's specimens: no. 55:23 (19) cm, no. 56:26 (21.5) cm, no. 121:23.5 (19.5) cm.

There is no plate of this species in the Fauna Japonica, nor a description in Burger's manuscript.

The specimens still have distinct remains of colour markings; D XI. 16-17; eye 5-6.2 in head, 3.2 in pectorals, 1.4 in snout in adult specimens, snout about 4.5 in head; height about 3 in standard length; interorbital space 6.5-7.5 in head; first dorsal spine about 6, second about 3.8 in head; first anal spine about 7, second 3.5-4 in head.

Except some differences in some of the generally rather unreliable characters I just mentioned, the specimens agree with the descriptions cited above. The belong to *Epinephelus fario* (Thunb.).

XVI. **Serranus epistictus** (p. 8)

Serranus epistictus, Bleeker, 1857, p. 60, pl. II fig. 1; — Günther, 1859, p. 128.
?*Epinephelus latifasciatus,* Boulenger, 1895, p. 206.
Epinephelus epistictus, Jordan & Richardson, 1910, p. 453, fig. 10.

Burger's collection contains one stuffed specimen. Total (standard) length: no. 88*:27.5 (23) dm.

There is no plate of this species in the Fauna Japonica, and it has not been described by Burger in his manuscript.

The specimen has distinct spots on D, A, and C, some in horizontal rows on the opercles, and some less distinct spots on head and body, probably forming longitudinal rows too; D XI.14; height 3.7, head 3.4 in total length; eye 5 in head; maxillary reaches beyond the eye; the lower jaw projects considerably; interorbital space about 6, maxillary 2.3 in head. The specimen agrees with the descriptions cited above, showing but slight variations in comparison with the far more convincing agreements, but, except the colour markings and a few other slight differences, also shows a remarkable agreement with the material (see no. XI) and descriptions of *Epinephelus latifasciatus* (T. & S.). The few differences can be found in some of the characters of Burger's specimen I have given before.

This led to a reinvestigation of the colour markings in all specimens

concerned. In the smallest specimen I found that the lines partly, e.g., on the opercles, consisted of indistinctly separated spots. Both the specimens of *Epinephelus latifasciatus* (T. & S.) being larger than the specimen of *epistictus* T. & S., it seems rather probable that this specimen represents a younger form of the first species, as has already been presumed by Boulenger (l.c.) and Jordan & Richardson (l.c.). Jordan, Tanaka & Snyder (1913, p. 155) and Tanaka (1927, p. 687), however, do not confirm this opinion.

Having but one specimen at my disposal, I feel unable to come to a sufficently well-founded and definite decision. Consequently I provisionally regard the specimen as representing a separate species, *Epinephelus epistictus* (T. & S.), of which species it is the type specimen.

XVII. **Serranus areolatus japonicus** (p. 8)

Serranus chlorostigma Cuvier & Valenciennes, 1828b, p. 352; — Günther, 1859, p. 151; — Fowler & Bean, 1930, p. 252.

Epinephelus chlorostigma, Boulenger, 1895, p. 203; — Jordan & Richardson, 1910, p. 446, fig. 6; — Tanaka, 1927, p. 737, fig. 453; — Weber & De Beaufort, 1931, p. 39.

Burger's collection contains one stuffed specimen. Total (standard) length: no. 76*:33 (27.5) cm.

The specimen has painted colour markings on one side; D XI.17 (1), A III.8; longest dorsal spine slightly shorter than longest soft ray, about 3 in head; head 2.75 in standard length, eye 5.7 in head; height 3 in standard length; lateral line about 110, 16 rows of scales above lateral line; the maxillary reaches beyond centre of eye; the lower opercular spine reaches further backward than upper one. There is no description of this species in Burger's manuscript.

Except some slight differences in some of these characters, the specimen shows a sufficient agreement with the descriptions cited above. It represents Temminck & Schlegel's type specimen of *areolatus japonicus*, a synonym of *Epinephelus chlorostigma* (C. & V.).

XVIII. **Serranus Ara** (p. 9)

Serranus ura Cuvier & Valenciennes, 1828b, p. 332; — Günther, 1859, p. 147.

Von Siebold's collection contains one specimen in spirits. Total (standard) length: no. 91:13 (10.7) cm.

The Fauna Japonica contains no plate of this species, Burger's manuscript no description.

This specimen still has distinct colour markings; I could find no distinct

auxiliary basal scales on the body. When compared with descriptions and material of *Epinephelus fario* (Thunb.) (see XV), the only differing characters proved to be the colour markings and the lacking of auxiliary basal scales, as mentioned before. This specimen therefore must belong to *Epinephelus fario* (Thunb.).

XIX. **Serranus aka-ara** (p. 9, plate III fig. 1)

Serranus akaara, Günther, 1859, p. 140.
Epinephelus akaara, Boulenger, 1895, p. 216; — Jordan & Richardson, 1910, p. 450; — Tanaka, 1927, p. 717, fig. 449.

Burger's collection contains four stuffed specimens; there must be one more specimen from Burger's collection in the British Museum, of Richardson (1846, p. 231). Total (standard) length: no. 82:32 (26) cm, no. 83:24.5 (20.5) cm, no. 884:31 (25.5) cm, no. 85*:36 (29.5) cm.

Compared with the reproduction in the Fauna Japonica, Burger's original plate shows a less dark coloration of the back and the inferor parts of the fish; the pectoral fin is not yellow but light brown with red finrays, the caudal fin ditto with a narrow greenish edge. The shape too is not completely exact, the differing characters from Burger's specimens being as follows: D XI.15-16; posterior edge of preopercle distinctly ascending forwards; the second anal spine much stronger but hardly longer than the third one; the opercular spines are less sharp and wider apart; the diameter of the eye is slightly shorter than the length of the snout, about 5 in head; the maxillaries reach to below the posterior edge of the orbit. There is a description of this species in Burger's manuscript (no. 157).

This material is homogeneous; all specimens have one side painted with red spots. The exact agreement with the descriptions cited above leaves no room to doubt the identity of these specimens: they represent the type material of *Epinephelus akaara* (T. & S.). I have chosen specimen no. 85 as type specimen.

XX. **Serranus awo-ara** (p. 9, plate III fig. 2)

Serranus awoara, Günther, 1859, p. 150.
Epinephelus awoara, Boulenger, 1895, p. 230; — Jordan & Richardson, 1910, p. 457, fig. 12; — Tanaka, 1927, p. 693, fig. 442; — Weber & De Beaufort, 1931, p. 51.

There are two stuffed specimens in Burger's collection, and one stuffed specimen and two specimens in spirits in Von Siebold's collection. According to Richardson (1846, p. 231) there is one more specimen from Burger's collection in the British Museum. Total (standard) length of Burger's specimens: no. 77:21 (17.5) cm, no. 78*:38 (31) cm; of Von

Siebold's specimens: no. 80:28 (23) cm, no. 110a:21.5 (17.5) cm, no. 110b:21 (17) cm. There are three more specimens from Japan, without further information, probably belonging to the same collection. Total (standard) length: no. 18:28.5 (23.5) cm, no. 79:39.5 (33) cm, no. 81:30 (25) cm.

Plate III fig. 2 is a rather exact reproduction of an original plate in Burger's collection. The shape seems to be less exact in comparison with the type material, which shows several differing characters: D XI.16; eye 5-5.5 in head; the maxillary reaches to below the posterior edge of the orbit, about 2.1 in head; the ascending edge of the preopercle is more oblique towards the eye; the posterior dorsal spines are somewhat shorter. Burger's manuscript contains a description of this species (no. 158).

In this homogeneous material, only the specimens in spirits and specimen no. 81 still show distinct cross-bands on the body. The stuffed specimens have some yellow spots painted on the ventral parts of the body and the head. The agreement with the descriptions cited above is almost complete. This is the type material of *Epinephelus awoara* (T. & S.). I have chosen specimen no. 78 as type specimen as its size best agrees with that of the specimen described in the Fauna Japonica ("15 pouces").

XXI. **Serranus moara** (p. 10, plate IV fig. 2)

Serranus moara, Bleeker, 1857, p. 24; — Günther, 1859, p. 133.
?*Epinephelus nebulosus,* Boulenger, 1895, p. 240 (partly?); — Weber & De Beaufort, 1931, p. 57.
Epinephelus moara, Jordan & Richardson, 1910, p. 456; — Tanaka, 1927, p. 645, fig. 419.

There are in our collection two stuffed specimens from Burger, one specimen in spirits from Japan, 1844, without further indications, and one stuffed specimen from Japan, also without further indications; the latter two specimens probably belong to the same collection. Total (standard) length of Burger's specimens: no. 70:26 (21) cm, no. 72*:40.5 (33.5) cm; of both further specimens: no. 181:26 (21) cm, no. 71:36 (31) cm.

Plate IV fig. 2 (not fig. 1 as erroneously in the text in the Fauna Japonica), has been made after an original plate in Burger's collection, on which plate the anal fin has a less bluish colour. The shape differs in some characters from our material, which has scales on maxillary, D, A, P, and C, while the eye is about 6 in head. The teeth are drawn too blunt and inaccurate. Burger gives a description of this species in his manuscript (no. 160).

This material has no remains of colour markings; D XI.15; head about

2.5 in standard length; eye about 6 in head; height about 3.5 in standard length; interorbital space about 1.3 in diameter of eye; maxillary 2.2 in head, reaches beyond orbit; the middle opercular spine closer to the lower than to the upper spine; the origin of D above base of P; longest dorsal spine about 3.3 in head, second about 5-5.5 in head; the third anal spine is slightly longer than the second, which is 5-5.5 in head; P shorter than the postorbital part of the head; about 20 rows of scales above lateral line; teeth on mandibles in two series.

When compared with the descriptions cited above, some of the characters of the material I just mentioned proved to vary. The greater part of these differences probably should not be taken too seriously on account of the way of preservation and the condition of the specimens.

A comparison with two specimens of *Epinephelus nebulosus* (C. & V.) in Bleeker's collection, which specimens also have been used for the description of this species by Weber & De Beaufort (l.c.), proved that there is but one distinct difference, viz., the longer and stronger second anal spine in *Epinephelus nebulosus* (C. & V.), which even surpasses the third.

As the material at my disposal seems insufficient for a final decision, and in consequence of the rather distinct difference in the size of the second anal spine, which really seems to be of specific value, I provisionally keep the name *Epinephelus moara* (T. & S.). This material in any case represents Temminck & Schlegel's type material, and I have chosen specimen no. 72 as the type specimen.

XXII. **Serranus dermopterus** (p. 10)

Serranus dermopterus, Günther, 1859, p. 154.
Epinephelus dermopterus, Boulenger, 1895, p. 269.
Trisotropis dermopterus, Jordan & Richardson, 1910, p. 462, fig. 14; — Tanaka, 1930, p. 933, fig. 511.

Burger's collection contains one stuffed specimen, Von Siebold's collection two specimens in spirits. Total (standard) length of Burger's specimen: no. 51*:19.5 (16) cm; of Von Siebold's specimens: no. 149a:6.5 (5.3) cm, no. 149b:3.5 (2.8) cm.

There is no description of this species in Burger's manuscript, nor a plate in the Fauna Japonica.

The specimens have no remains of colours or colour markings; D XI.19-20; A III.9-10; head 3.2, 2.8, 2.7 in standard length; snout in the two juvenile specimens (no. 149a & b) shorter than diameter of eye; eye 3.5-5, interorbital space 4-5 in head; height 2.7, 2.6, 2.2 in standard length; height of soft dorsal about 2 in head (damaged?); soft anal rays longer than soft

dorsal rays; second anal spine 3.25-3.5 in head; ventral fins damaged; teeth on mandible in one single row only.

Except some slight variations in the characters just mentioned, there is a sufficient agreement with the descriptions cited above. These specimens represent the type material of *Tristotropis dermopterus* (T. & S.). Specimen no. 51 I consider as the type specimen.

XXIII. **Plectropoma susuki** (p. 11, plate IV fig. 1)

Plectropoma susuki Cuvier & Valenciennes, 1828b, p. 404; — Günther, 1859, p. 160.
Epinephelus septemfasciatus, Boulenger, 1895, p. 226; — Jordan & Richardson, 1910, p. 458.

Burger's collection contains three stuffed specimens. Total (standard) length: no. 73:22.5 (19) cm, no. 74:14 (11.5) cm, no. 160:25 (21) cm.

Plate IV fig. 1 (not fig. 2 as erroneously in the text of the Fauna Japonica) is an exact reproduction of an original plate in Burger's collection. Burger also gives a description of this species in his manuscript (no. 161).

This homogeneous material still has distinct colour markings; A and P are painted light blue on one side. The specimens belong to *Epinephelus septemfasciatus* (Thumb.).

XXIV. **Plectropoma leopardinum** (p. 12)

Plectropoma leopardinus Cuvier & Valenciennes, 1828b, p. 392, pl. 36.
Plectropoma maculatum, Boulenger, 1895, p. 160; — Weber & De Beaufort, 1931, p. 77, fig. 8.
Plectropomus maculatus, Jordan & Richardson, 1910, p. 442; — Fowler & Bean, 1930, p. 197.
Plectropoma maculatus, Barnard, 1927, p. 469.
Paracanthistius maculatus, Fowler, 1928, p. 172.
Plectropomus leopardus, Fowler & Bean, 1930, p. 199.

There is one stuffed specimen in Burger's collection. Total (standard) length: no. 162:33 (27) cm.

The Fauna Japonica contains no plate, Burger's manuscripts contains no description of this species.

The specimen has still visible, small spots on body, head and fins. As to the identity, there can be no doubt: *Plectropoma maculatum* (Bl.).

XXV. **Diacope octolineata** (p. 12, plate VI fig. 2)

Diacope octolineata Cuvier & Valenciennes, 1828b, p. 418.
Diacope decemlineata Cuvier & Valenciennes, 1830b, p. 528.
Genyoroge bengalensis, Günther, 1859, p. 178 (partly).
Lutianus kasmira, Jordan & Thompson, 1911b, p. 446.
Lutjanus kasmira, Fowler, 1931b, p. 157; — Weber & De Beaufort, 1936, p. 256.

Von Siebold's collection contains one specimen in spirits. Total (standard) length: no. 216:8 (6.3) cm.

Plate VI fig. 2 in the Fauna Japonica gives an exact reproduction of an original plate in Burger's collection. The shape of this figure, however, is not completely exact, Von Siebold's specimen having an about rectangular preopercular angle, with distinct serration, a slightly concave caudal fin, and some further slight differences. Burger's manuscript contains no description of this species.

The specimen has no remains of colours or colour markings, except some indistinct remains of a longitudinal lateral band along the body. As it shows several considerable differences in comparison with the description as well as the plate in the Fauna Japonica, it most certainly does not represent the described specimen. The specimen for instance has no distinct preopercular notch, the teeth on the vomer in a triangular patch with a posterior prolongation and one lateral band only.

Other specimens in our collection, identified as *Diacope octolineata* C. & V. agree with the description and the figure in the Fauna Japonica, but when compared with Von Siebold's specimen show distinct differences. The specimen proved to belong to *Lutjanus vitta* (Q. & G.) and thus must be included in the material of that species mentioned below (no. XXVI).

The species meant by the description and the plate in the Fauna Japonica is *Lutjanus kasmira* (Forsk.).

XXVI. Diacope vitta (p. 13, plate VI fig. 1)

Serranus vitta, Cuvier & Valenciennes, 1828b, p. 239; — idem, 1830b, p. 505.
Mesoprion vitta, Günther, 1859, p. 207.
Lutianus vitta, Jordan & Thompson, 1911b, p. 448, fig. 2.
Lutjanus vitta, Fowler, 1931b, p. 138; — Weber & De Beaufort, 1936, p. 250.

Burger's collection contains one stuffed specimen, Von Siebold's collection contains one stuffed specimen and two specimens in spirits. To these must be added a specimen from Von Siebold's collection, abusively labelled as *Diacope octolineata* C. & V. (no. XXV). There is also a specimen from Japan without further indications, probably belonging to the same collection. Total (standard) length of Burger's specimen: no. 165:20.3 (17) cm; of Von Siebold's specimens: no. 167:33.5 (27.5) cm, no. 232a:20 (17) cm, no. 232b:19.5 (16.5) cm; of the specimen without indications: no. 166:28 (23) cm.

Plate VI fig. 1 in the Fauna Japonica is a very exact reproduction from an original plate in Burger's collection. The shape is not completely exact, for our specimens have distinct canines and have the upper parts of the

head, posterior of the centre of the eye, scaly. There is a description of this species in Burger's manuscript (no. 163).

The material is homogeneous, with still distinct colour markings. The stuffed specimens have one side painted in accordance with the plate in the Fauna Japonica. There is no reason to mistrust the original identification: the specimens must belong to *Lutjanus vitta* (Q. & G.).

XXVII. **Diacope Calvetii** (p. 14)

Diacope marginata Cuvier & Valenciennes, 1828b, p. 425.
Genyoroge marginata, Günther, 1859, p. 181.
Lutianus vaigiensis, Jordan & Thompson, 1911b, p. 457, fig. 4.
Lutjanus vaigiensis, Fowler, 1931b, p. 115; — Weber & De Beaufor., 1936, p. 279.

Burger's collection contains one stuffed specimen. Total (standard) length: no. 2169:46.5 (39.5) cm.

There is no plate of this species in the Fauna Japonica, nor a description in Burger's manuscript.

The specimen has no remains of colour markings; eye 5.2, interorbital space 4.4 in head; eye 2 in snout; preorbital width 4.2 in head; second anal spine 3 in head, stronger than third, which is 3.4 in head; ventral spine about 1.5 in postorbital part of head.

Except some differences in these characters, not very important in a dry preserved, stuffed specimen, the specimen agrees with the descriptions cited above. It must belong to *Lutjanus vaigiensis* (Q. & G.).

XXVIII. **Diacope sparus** (p. 14)

Mesoprion sparus, Günther, 1859, p. 188.
Platyinius sparus, Jordan & Evermann, 1902, p. 344, fig. 16.
Pristipomoides sparus, Jordan & Thompson, 1911b, p. 460, fig. 5.
Pristipomoides argyrogrammicus, Fowler, 1931b, p. 189.

Burger's collection contains one stuffed specimen. Total (standard) length: no. 2183*:54.5 (47) cm.

There is no plate of this species in the Fauna Japonica, nor a description in Burger's manuscript.

The specimen has no remains of colours or colour markings; all fins are damaged; D X.10 (1); eye 4.7, snout 2.7, maxillary 2.25 in head; expansion of maxillary 1.6, infraorbital width at the end of the maxillary 1.5 in eye-diameter; scales in oblique row between dorsal and anal spines 8-1-19; 8 oblique rows of scales on the cheeks; seventh dorsal spine 2.5 in head, first anal spine 1.8 in third; lower jaw shortest; villiform teeth on upper jaw and on the anterior part of the lower jaw in many more than 4 or 5 series, brush-like; the outer row on both jaws shows enlarged teeth, but the

three anterior teeth on each half of the upper jaw more distinctly longer.

In several of these characters the specimen proved to differ from the descriptions cited above, in consequence of which I am not completely sure as to the synonymy of our specimen with those described by the cited authors. In any case it is the type specimen of *Aprion sparus* (T. & S.). This species may prove to be synonymous with *Serranus argyro-grammicus* C. & V. (1831b, p. 472, not 183 as abusively stated by Fowler (l.c.) and Weber & De Beaufort, 1936, p. 313), cf. Fowler (l.c.), but this opinion has not been accepted by Weber & De Beaufort (l.c.), which authors suppose *argyrogrammicus* C. & V. to be synonymous with *Serranus zonatus* C. & V. In accordance with Weber & De Beaufort (1936, p. 310), I consider *Pristipomoides* Bleeker as a synonym of *Aprion* C. & V.

XXIX. **Centropristis hirundinaceus** (p. 15, plate V fig. 1)

Centropristis hirundinaceus Cuvier & Valenciennes, 1831a, p. 450; — Günther, 1859, p. 87.

Chelidoperca hirundinacea, Boulenger, 1895, p. 305; — Jordan & Richardson, 1910, p. 464; — Tanaka, 1915, p. 343, figs. 296, 297; — Weber & De Beaufort, 1931, p. 91.

There are two stuffed specimens in Burger's collection, and one specimen in spirits in Von Siebold's collection; besides these there is one further specimen from Japan without other indications, which probably belongs to the same collection. Total (standard) length of Burger's specimens: no. 173:16.5 (13) cm, no. 174:19 (14.5) cm; of Von Siebold's specimen: no. 296:16.5 (13.5) cm; of the specimen without indications: no. 172:16.5 (14) cm.

Burger's original plate differs from the reproduction in the Fauna Japonica (plate V fig. 1), by having the margin of the anal fin coloured orange. The shape is rather exact, except the size of the eyes, which are slightly larger in our specimens. There is a description of this species in Burger's manuscript (no. 162).

Of this homogeneous material all stuffed specimens have been painted on one side in accordance with the figure in the Fauna Japonica; the specimen in spirits has no remains of colour markings left; further characters: height about 4.5 in total length, about 3.75 in standard length; maxillary reaching to below the posterior third of the eye; the interorbital is scaly, and there is a row of scales below and before the eyes reaching to the nostrils; the fourth dorsal spine 3 in head.

Except some unimportant differences in the characters just mentioned, the specimens sufficiently agree with the descriptions cited above. They must belong to *Chelidoperca hirundinacea* (C. & V.).

XXX. Cirrhites aureus (p. 15, plate VII fig. 2)

Cirrhitichthys aureus, Günther, 1860, p. 75; — Jordan & Herre, 1907b, p. 161, fig. 1.

Our collection contains one specimen from Burger and two specimens in spirits from Japan, probably belonging to the same collection. Total (standard) length of Burger's specimen: no. 536*:10.5 (9) cm; of the two further specimens: no: 4742a:7.5 (6.2) cm, no. 4742b:4.8 (4) cm.

Burger's collection contains the original of plate VII fig. 2, which has the fins painted slightly more yellowish than the body. The eye has been drawn much too small. This species has been described by Burger in his manuscript (no. 156).

The stuffed specimen is in a very bad condition, with the fins damaged and one side painted indistinctly orange, and deformed. The specimens in spirits, however, are very well preserved. To illustrate the unreliability of the characters of stuffed specimens, I give some of the most characteristic (in comparison with the same characters in one of the specimens preserved in spirits): head 3.4 (3) in standard length; height 2.8 (2.4) in standard length; eye 4.3 (3.5) in head. Nevertheless there can be no doubt as to the homogeneity of this material. The specimens agree with the descriptions cited above.

This material represents Temminck & Schlegel's types. I chose specimen no. 536 as type specimen of *Cirrhitichthys aureus* (T. & S.).

XXXI. Aulacocephalus (p. 15, plate V fig. 2)

Aulacocephalus schlegelii Günther, 1859, p. 173.
Aulacocephalus temminckii, Boulenger, 1895, p. 158.
Aulacocephalus temmincki, Jordan & Richardson, 1910, p. 438.

Burger's collection contains one stuffed specimen. Total (standard) length: no. 91:24 (20.5) cm.

Plate V fig. 2 is an exact reproduction of an original plate in Burger's collection. The shape does not completely agree with Burger's specimen, which has the preopercle more angular, D IX.12, the head slightly smaller, and the eye 5.7 in head. Burger's manuscript contains a description of this species (no. 69).

The specimen has been painted yellowish green with a yellowish dorsolateral longitudinal band on one side; the fins are damaged; D IX.12; A III.10; head 3.3 in total length; interorbital space 1.3 in eye, about equal to the width of the posterior end of the maxillary; the outer row of teeth on the anterior part of the lower jaw is more enlarged than on the upper jaw.

There can be no doubt as to the identity of this specimen: *Aulacocephalus*

temminckii Bleeker; on this specimen, Temminck & Schlegel founded their name *Aulacocephalus.*

XXXII. Therapon oxyrhynchus (p. 16, plate VI fig. 3)

Therapon oxyrhynchus, Bleeker, 1857, p. 64; — Günther, 1859, p. 281; — Jordan & Thompson, 1912, p. 538; — Tanaka, 1915, p. 367, figs. 311, 312.
Pelates oxyrhynchus, Fowler, 1931b, p. 363.

Burger's collection contains five stuffed specimens, Von Siebold's collection one specimen in spirits; two further specimens from Japan probably belong to these collections too. Total (standard) length of Burger's specimens: no. 95*:26 (23) cm, no. 96:25 (21.5) cm, no. 97:15 (12.5) cm, no. 98:19.5 (17) cm, no. 2872:19.5 (16.5) cm; of Von Siebold's specimen: no. 344:14 (12.8) cm; of the two further specimens: no. 93:11 (9.2) cm, no. 94:11.2 (9.5) cm.

Plate VI fig. 3 has been made after an original plate in Burger's collection; the reproduction of the colours is very exact, but the shape slightly differs from our specimens which have a dorsal fin with a low scaly sheath, slightly longer dorsal spines and a serrated preorbital edge. Burger's manuscript contains a description of this species (no. 159).

This material is obviously homogeneous; the colour markings are still distinct. The agreement with the descriptions cited above is complete.

The specimens represent the type material of *Therapon oxyrhynchus* T. & S. Specimen no. 95 I chose as type specimen.

XXXIII. Anoplus (p. 17, plate VIII)

Anoplus banjos, Günther, 1859, p. 264.
Banjos banjos, Jordan & Thompson, 1912, p. 540, fig. 2.

Burger's collection contains four stuffed specimens, Von Siebold's collection one specimen in spirits. One specimen from Burger must be in the British Museum, cf. Richardson (1846, p. 236). Total (standard) length of Burger's specimens: no. 66:26 (21.5) cm, no. 67:17.5 (15) cm, no. 68:29.5 (24) cm, no. 69:36 (30.5) cm; of Von Siebold's specimen: no. 192:7.3 (6) cm.

Plate VIII is an exact reproduction of an original plate in Burger's collection; the numbers of finrays are not exact: in our specimens D X.12, A III.7.

The specimens still show spots on the soft dorsal fin and a light caudal margin in those specimens in which these fins are complete or slightly damaged only. They all doubtless belong to *Banjos banjos* (Rich.). On these specimens Temminck & Schlegel established their genus *Anoplus.*

XXXIV. Priacanthus Benmebari (p. 19, plate VII fig. 1)

Priacanthus macracanthus Cuvier & Valenciennes, 1829a, p. 108; — Günther, 1859, p. 220; — Boulenger, 1895, p. 354; — Jordan & Thompson, 1912, p. 530; — Weber & De Beaufort, 1929, p. 388; — Fowler, 1931b, p. 70.
Priacanthus benmebari, Günther, 1859, p. 218.

There are six stuffed specimens in Burger's collection and three specimens in spirits in Von Siebold's collection. Two specimens from Burger must be in the British Museum, cf. Richardson (1846, p. 237). One of the stuffed specimens, originally regarded as belonging to *Priacanthus japonicus* C. & V., also proved to belong to this species (see XXXVI, no. 313). Total (standard) length of Burger's specimens: no. 249:13 (11.5) cm, no. 250: 20.5 (18) cm, no. 251:34 (30) cm, no. 252:33.5 (29) cm, no. 253:33.5 (29.5) cm, no. 254*:37 (32) cm; of Von Siebold's specimens: no. 323a:105 (8.5) cm, no. 323b:19.5 (16.5) cm, no. 323c:22 (19) cm.

The reproduction in the Fauna Japonica agrees with Burger's original plate. Compared with our specimens it shows some very slight inaccuracies only. Burger's manuscript contains a description of this species (no. 164).

This material is homogeneous; all stuffed specimens have one side painted yellowish red, the ventral parts more yellow, and D, A, and P with painted spots. The identification leaves no room for doubt: *Priacanthus macracanthus* C. & V.

Among these specimens, which reprensent the type material of *Priacanthus benmebari* T. & S., I chose specimen no. 254 as type.

XXXV. Priacanthus dubius (p. 19)

Priacanthus hamruhr, Cuvier & Valenciennes, 1829a, p. 104; — Günther 1859, p. 219.
Priacanthus dubius, Günther, 1859, p. 221.
Priacanthus hamrur, Boulenger, 1895, p. 355; — Jordan & Thompson, 1912, p. 528; — Weber & De Beaufort, 1929, p. 384, fig. 93; — Barnard, 1927, p. 499; — Fowler, 1931b, p. 74.

In Burger's and Von Siebold's collections there is no specimen identified as *Priacanthus dubius*, but there is a specimen in spirits in Von Siebold's collection labelled "*Priacanthus blochii* Bl. auct. Blkr. (= *Priacanthus japonicus* Blkr. (non C. & V.)); Japan". Total (standard) length: no. 315*:19 (15.5) cm.

This specimen has the eye not distinctly smaller than in *Priacanthus macracanthus* C. & V.; A. III. 15 (1); scales in oblique row between the origins of D and A about 9-1-40; head 1.2 in height, which is 2.5 in standard length; eye 2.7 in head; a blunt short spine at preopercular angle; snout about 1.5 in eye.

Except some slight differences in the characters just mentioned, the specimen agrees with the descriptions cited above, consequently probably belongs to *Priacanthus hamrur* (Forsk.). *Priacanthus dubius* T. & S. has been generally regarded as a synonym of *Priacanthus hamrur* (Forsk.), this specimen probably represents the type of Temminck & Schlegel's species.

XXXVI. **Priacanthus japonicus** (p. 20)

Priacanthus japonicus Cuvier & Valenciennes, 1829a, p. 106, pl. 50; — Günther, 1859, p. 217; — Jordan & Thompson, 1912, p. 532.
Priacanthus boops, Günther, 1859, p. 216; — Boulenger, 1895, p. 357; — Barnard, 1927, p. 500; — Fowler, 1931b, p. 77.

There are six stuffed specimens in Burger's collection. One further stuffed specimen from Japan, 1845, probably belongs to the same collection. Total (standard) length of Burger's specimens: no. 244:18 (15) cm, no. 245:18 (15.5) cm, no. 246:34.5 (29) cm, no. 247:33.5 (28) cm, no. 248:44 (37.5) cm, no. 2222:46 (39.5) cm; of the specimen from unknown collector: no. 313:17.5 (15) cm.

There is no plate of this species in the Fauna Japonica, and it has not been described by Burger in his manuscript.

The material proved to be heterogeneous: specimen no. 313 belongs to *Priacanthus macracanthus* C. & V. The other specimens have one side painted, the dorsal parts reddish, the ventral parts more yellowish, the head reddish; height about 2.5 in standard length; head about 3.7 in total, 3 in standard length; maxillary 2 in head; the preopercle variable, more or less serrate; about 60 scales in lateral line; about 12-1-45 in transverse row; teeth on palatines in rather broad bands; second dorsal spine about 2.3 in last one; eye 2.4-2.5 in head.

Except some very slight differences in some of these characters, the specimens convincingly agree with the descriptions of *Priacanthus japonicus* C. & V. as well as of *Priacanthus boops* (Bl.; Schn.) cited above. These names must be synonyms. Our material belongs to *Priacanthus boops* (Bl.; Schn.).

XXXVII. **Priacanthus niphonius** (p. 21, plate VII figs. 1 & 2)

Priacanthus niphonius Cuvier & Valenciennes, 1829a, p. 107; — Günther, 1859, p. 217.
Pseudopriacanthus niphonius, Boulenger, 1895, p. 358; — Jordan & Thompson, 1912, p. 534; — Weber & De Beaufort, 1929, p. 390, fig. 94; — Fowler, 1931b, p. 80.

There are four stuffed specimens in Burger's collection and two specimens in spirits in Von Siebold's collection. One more specimen from

Burger must be in the British Museum, cf. Richardson (1846, p. 238). Total (standard) length of Burger's specimens: no: 237:14 (12.5) cm, no. 238:18.5 (16) cm, no. 239:23 (19.5) cm, no. 240:17.5 (14.5) cm; of Von Siebold's specimens: no. 318:20.5 (17) cm, no. 319:7.2 (5.9) cm.

The plate in the Fauna Japonica has not been made after an original in Burger's collection. Fig. 2 agrees with specimen no. 319, fig. 1 with the rest of the material. Burger's manuscript contains no description of this species.

The material is homogeneous. All specimens from Burger's collection have one side painted reddish yellow, the back and head darker reddish; the pectorals still have blackish tips. These specimens doubtless belong to *Pseudopriacanthus niphonius* (C. & V.).

XXXVIII. **Holocentrum spinosissimum** (p. 22, plate VIII A)

Holocentrum spinosissimum, Günther, 1859, p. 41.
Holocentrus spinosissimus, Jordan & Fowler, 1902f, p. 13, fig. 3.

Burger's collection contains two stuffed specimens, Von Siebold's collection two specimens in spirits. Total (standard) length of Burger's specimens: no. 232*:20 (17.5) cm, no. 233:19.5 (16.5) cm; of Von Siebold's specimens: no. 386a:21 (18.5) cm, no. 386b:21 (18) cm.

Plate VIII A in the Fauna Japonica ("*Holocentrus spinosissimus*") has not been made after an original plate in Burger's collection. There is no description of this species in Burger's manuscript.

The stripes on the body are still distinct on the specimens in spirits, but indistinct on the stuffed material; D XI 13 (1); scales in transverse row 3-1-6; opercle has three variable spines; the maxillary reaches to below the centre of the eye; the third anal spine is longer than the soft rays.

The specimens agree with the descriptions cited above. They represent the type material of *Holocentrum spinosissimum* T. & S. As type specimen I have chosen specimen no. 232.

XXXIX. **Myripristis japonicus** (p. 23, plate IX A)

Myripristis japonicus Cuvier & Valenciennes, 1829a, p. 173, pl. 58; — Günther, 1859, p. 25.
Ostichthys japonicus, Jordan & Fowler, 1902f, p. 11, fig. 2; — Tanaka, 1928, p. 854, fig. 487.

Burger's collection contains three stuffed specimens. Total (standard) length: no. 241:7.4 (7.1) cm, no. 242:30 (25.5) cm, no. 243:45 (40) cm. One should keep account with the circumstance that specimen no. 241 has a mutilated caudal fin.

The plate in the Faune Japonica is an exact reproduction of an original plate in Burger's collection. Burger's manuscript contains no description.

All specimens have one side painted yellowish red, the lower parts more yellow; A I,V. 11; pectorals not anterior of dorsal fin. They belong to *Ostichthys japonicus* (C. & V.).

XL. Sillago japonica (p. 23, plate X fig. 1)

Sillago japonica, Günther, 1860, p. 244; — Jordan & Snyder, 1902a, p. 487; — Weber & De Beaufort, 1931, p. 173.

Burger's collection contains but one stuffed specimen, Von Siebold's collection contains seven specimens in spirits. Total (standard) length of Burger's specimen: no. 743:21.5 (20) cm; of Von Siebold's specimens: no. 366a & b:17 (15) cm, no. 366c:16 (14) cm, no. 366d & e:13.5 (12) cm, no. 366f:13.3 (11.5) cm, no. 367*:19 (16.5) cm.

The plate in the Fauna Japonica is an exact reproduction of an original plate in Burger's collection. There is a description of this species in Burger's manuscript (no. 170).

The specimens in spirits are well preserved, but the stuffed specimens are deformed with damaged fins. They all belong to the same species and represent Temmick & Schlegel's type material of *Sillago japonica* T. & S. Specimen no. 367 I chose as type.

XLI. Percis pulchella (p. 24, plate X fig. 2)

Percis pulchella, Günther, 1860, p. 240.
Parapercis pulchella, Jordan & Snyder, 1902a, p. 463; — Tanaka, 1927, p. 754, figs. 458-461.

There are three stuffed specimens in Burger's collection and eight specimens in spirits in Von Siebold's collection. Total (standard) length of Burger's specimens: no. 750*:20 (17) cm, no. 751:16 (13.7) cm, no. 752:14.2 (12.2) cm; of Von Siebold's specimens: no. 416a:16 (13.3) cm, no. 416b:15 (13) cm, no. 416c-h:8.5-6 (7-5.3) cm.

Plate X fig. 2 has been made after an original plate in Burger's collection, which shows more distinct pale blue stripes on the head. The shape slightly differs from our material, which has slightly larger eyes, the head about 4, the height about 5 in standard length. Burger gives a description of this species in his manuscript (no. 78).

This material is homogeneous; the colour markings are still distinct; the interorbital space about 2.5 in snout. It agrees with the descriptions cited above and represents the type material of *Parapercis pulchella* (T. & S.). Specimen no. 750 I regard as the type.

XLII. **Percis sexfasciata** (p. 25)

Percis sexfasciata, Günther, 1860, p. 241.
Neopercis sexfasciata, Jordan & Snyder, 1902a, p. 467; — Tanaka, 1912, p. 164, figs. 167, 168, 174.

Our collection contains three stuffed specimens from Burger and two specimens in spirits in Von Siebold's collection, one of which is abusively labelled "*Percis japonica* v. Siebold, F. jap., Japon" (no. 415). Total (standard) length of Burger's specimens: no. 745:17.5 (15.5) cm, no. 746*:18 (16) cm, no. 747:16.5 (14.5) cm; of Von Siebold's specimens: no. 4836:8.5 (7.5) cm, no. 415:16.5 (14.2) cm.

This material proved to be heterogeneous: specimen no. 4836 belongs to a different species, in all probability to *Parapercis ommatura* Jordan & Snyder, as it shows all the characters mentioned in the description of this species by its authors (1902a, p. 465).

The further specimens obviously belong to another species. Specimen no. 415 still has distinct colour markings, A 21, interorbital space 8 in head; this specimen also much better agrees with the descriptions cited above than the stuffed specimens which are more or less badly deformed. The latter specimens have about 60? scales in lateral line, A 19, head 4 in standard length, interorbital space 8-9 in head, 2.3 in diameter of eye. Nevertheless the agreement with the descriptions is convincing. These specimens represent the type material of *Neopercis sexfasciata* (T. & S.). I chose specimen no. 746 as type.

XLIII. **Uranoscopus asper** (p. 26, plate IX fig. 1)

Uranoscopus asper, Günther, 1860, p. 228.
Uranoscopus japonicus, Jordan & Snyder, 1902a, p. 475; — Tanaka, 1913, p. 197, figs. 202-204.

Our collection contains four stuffed specimens from Burger and two specimens in spirits from Von Siebold. Some further specimens from Burger must be in the British Museum, cf. Richardson (1846, p. 211). Total (standard) length of Burger's specimens: no. 711:25 (20) cm, no. 712:18.5 (14) cm, no. 713*:27.5 (22) cm, no. 2873:8.5 (7.5) cm.

Plate IX fig. 1 is an exact reproduction of an original plate in Burger's collection. The numbers of finrays and the shape in this figure are not completely exact when compared with our specimens, which have D IV 14 (1), A 14 (1) and height 3.2-4.5 in standard length. Burger gives a description of this species in his manuscript (no. 79).

This homogeneous material still has distinct colour markings, which proved

to be somewhat variable on the back. It represents the type material of *Uranoscopus asper* T. & S. Burger's specimen no. 713 I regard as type specimen. The material now has to be named *Uranoscopus japonicus* Houttuyn.

XLIV. Uranoscopus bicinctus (p. 26, plate X B)

Uranoscopus bicinctus, Günther, 1860, p. 228; — Jordan & Snyder, 1902a, p. 476; — Tanaka, 1914, p. 253, figs. 248 & 249.

There are four stuffed specimens in Burger's collection and two specimens in spirits in Von Siebold's collection. Total (standard) length of Burger's specimens: no. 708: 18 (15) cm, no. 714:24.5 (20) cm, no. 715:26 (21.5) cm, no. 716*:33.5 (27.5) cm; of Von Siebold's specimens: no. 418a:24.5 (20.5) cm, no. 418b:19 (15.5) cm.

The plate in the Fauna Japonica has not been made after an original drawing in Burger's collection. The shape of the specimen represented is rather exact. Burger gives no description of this species in his manuscript.

The specimens have no or very slight remains of colour markings; the number of small points along the lower edge of the preopercles proved to be variable; specimen no. 716 has five on each side only, no. 715 has five on the left and four on the right side, while the other specimens have four on each side; D IV 12-13. This is the type material of *Uranoscopus bicinctus* T. & S. I chose specimen no. 716 as type.

XLV. Uranoscopus inermis (p. 27, plate X A)

Uranoscopus inermis Cuvier & Valenciennes, 1829a, p. 310, pl. 65.
Anema inerme, Günther, 1860, p. 230.
Ichthyscopus lebeck, Jordan & Snyder, 1902a, p. 476.

Burger's collection contains one stuffed specimen erroneously labelled *Uranoscopus fimbriatus* C. & V. (a name unknown in literature), but obviously belonging to this species. Total (standard) length: no. 2174:53 (44) cm.

Plate X A has been made after an original plate in Burger's collection; the specimen represented on Burger's plate has the back and the dorsal fin less dark and the ventral parts less bluish. Compared with Burger's specimen, the shape seems not completely exact too: the opercle has to be one-third longer, the body less high, D 19 or 20? Burger's manuscript contains a description of this species (no. 178).

The colour markings on the body are still distinct. The specimen obviously belongs to *Ichthyscopus lebeck* (Bl.; Schn.).

XLVI. **Uranoscopus elongatus** (p. 27, plate IX fig. 2)

Anema elongatum, Günther, 1860, p. 230.
Gnathagnus elongatus, Jordan & Snyder, 1902a, p. 478.

There are two stuffed specimens in Burger's collection. Total (standard) length: no. 709*:20.5 (17.5) cm, no. 710:20 (16.5) cm.

Plate IX fig. 2 is a reproduction of an original plate in Burger's collection, which represents a specimen with a more yellowish green back and dorsal fin. The eye has been drawn slightly too small. Burger's manuscript gives no description of this species.

Both specimens have one side painted with dark spots; the fins are damaged, D 13, A 17; head about 3.6, height about 4.8 in standard length.

Except some small differences in the characters just mentioned, the specimens agree with the descriptions cited above. They represent the type material of *Gnathagnus elongatus* (T. & S.). Specimen no. 709 I regard as type.

XLVII. **Polynemus plebejus** (p. 29, plate XI fig. 1)

Polynemus plebeius Broussonet, 1782, fig.
Polynemus lineatus Günther, 1860, p. 327.
Polynemus taeniatus Günther, 1860, p. 526.
Polydactylus agonasi Jordan & McGregor, 1906, p. 814, fig.
Polynemus plebejus, Weber & De Beaufort, 1922, p. 202.

Our collection contains three stuffed specimens from Burger and one specimen in spirits from Japan, without further information, probably belonging to the same collection. Total (standard) length of Burger's specimens: no. 782:18 (13) cm), no. 783:20.5 (16.5) cm, no. 784:21 (16) cm; of the Japanese specimen without name of collector: no. 427:20.5 (16) cm.

The plate in the Fauna Japonica is an exact reproduction of an original plate in Burger's collection. The shape of the specimen represented on this plate slightly differs from the stuffed specimens, probably on account of the deformation of specimens preserved in this way. Burger gives a description of this species in his manuscript (no. 200).

The stuffed specimens show no remains of colour markings, but the specimen in spirits still has distinctly speckled fins; rest of coulour markings on the body could not be found on account of the badly damaged squamation of the latter specimen.

A difficulty is that the name *Polynemus plebeius* (or *plebejus*) has been in use for three forms which by some authors (e.g., Jordan & McGregor, l.c.) have been regarded as different species:

P. plebejus T. & S. = *Polydactylus agonasi* Jord. & McGr.

P. plebejus Gthr. = *Polynemus zophomus* Jord. & McGr.

P. plebeius Brouss. = *Polynemus lineatus* Gthr., afterwards changed into *Polynemus taeniatus* Gthr.

Accepting for our specimens an original existence of colour markings as described and drawn in the Fauna Japonica, these specimens in this respect very satisfactorily agree with a short description of *Polynemus plebeius* Brouss. by Jordan & McGregor (l.c., p. 815): "general colour is very dark, the fins are almost black and the body is brown; above lateral line there is a series of narrow dark brown lines extending along the entire side of the body; opposite base of second dorsal there are 7 of these dark lines above lateral line; below lateral line they are faintly developed". The dark colour of the body and the fins possibly exists in dead specimens only, consequently may be a character of less importance, as seems confirmed by Broussonet's original description, probably made after a fresh specimen: "colour: silvery, back grey, fins white" (n.b., in Broussonet's figure the fins seem rather dusky). At the moment the colour of our specimens is brownish yellow.

Compared with the descriptions cited above, the stuffed specimens proved to differ in several characters, probably on account of their bad way of preservation. To illustrate the deformation and the unreliability of the characters of stuffed material, I will give some characters and add, in parentheses, the same characters in the specimen in spirits, which is in a very good state: height about 5 (4.3), height of tail near the end of the second dorsal 8-9 (7) in total length; eye 5-5.5 (3.8) in head, about 1.3 (1) in interorbital space, more than 3 (2) in postorbital part of head; snout about 1 (1.5) in eye. Nevertheless this material obviously is homogeneous. The specimen in spirits shows a very close agreement with the descriptions.

As remarked by Weber & De Beaufort (1922, p. 202) there is no reason to distinguish three separate species; they are just variations of one single species: *Polynemus plebeius* Brouss., to which our Japanese specimens must belong.

XLVIII. Mullus chrysopleuron (p. 29, plate XII fig. 1)

Upeneus chrysopleuron, Bleeker, 1857, p. 70; — Günther, 1859, p. 410; — Tanaka, 1914, p. 279.

Pseudupeneus chrysopleuron, Snyder, 1907, p. 95; — Fowler, 1933, p. 315.

There are no Japanese specimens in our collections.

The plate in the Fauna Japonica is a reproduction of an original plate in Burger's collection, which represents a more pink-coloured specimen. Furthermore there is a description of this species in Burger's manuscript

(no. 76). This description and Burger's original plate have been the only sources for the description of this species in the Fauna Japonica.

XLIX. **Mullus Bensasi** (p. 30, plate XI fig. 2)

Upeneoides bensasi, Bleeker, 1857, p. 71; — Günther, 1859, p. 399.
Upeneus bensasi, Snyder, 1907, p. 97, fig. 3; — Fowler, 1933, p. 321, fig. 27.

There are two specimens in spirits in Von Siebold's collection. Total (standard) length: no. 4682:8 (6.7) cm, no. 4683*:14.5 (12.8) cm.

Burger's collection contains the original plate after which plate XI fig. 2 in the Fauna Japonica has been made. It represents a slightly lighter, pink specimen, but except this the reproduction is rather exact. Burger's manuscript contains a description of this species (no. 171).

Both specimens, but especially no. 4683, are in a very bad state. They have no remains of colours or colour markings. As the Fauna Japonica mentions a specimen measuring "six pouces" only, it seems probable that specimen no. 4683 only has been used for the original description. That specimen consequently represents the type of *Upeneus bensasi* (T. & S.).

Though in a very bad condition, the specimens sufficiently agree with the descriptions cited above. The numbers of finrays seem to be D VII.I.8, A I.6.

L. **Mullus subvittatus** (p. 30)

Upeneus sulphureus Cuvier & Valenciennes, 1829a, p. 450; — Snyder, 1907, p. 99; — Weber & De Beaufort, 1931, p. 364; — Fowler, 1933, p. 330, fig. 30.
Upeneoides sulphureus, Günther, 1859, p. 398.

There are two specimens in spirits in Von Siebold's collection. Total (standard) length: no. 4700a:13 (11) cm, no. 4700b*:13.5 (11.5) cm.

There is no plate of this species in the Fauna Japonica nor a description in Burger's manuscript.

The only visible remains of colour markings are the dark tip and two indistinct horizontal bands on the spinous dorsal; D VIII.I.8 (1), A I.6 (1); height 3.6, depth of caudal peduncle 9.3 in standard length; eye 3.8-4, interorbital space 3.6, maxillary 2.5 in head; scales in lateral line 36; second dorsal spine 1.4, pectorals 1.3, ventrals 1.8 in head.

The specimens closely agree with the descriptions cited above, but considerably differ from the descriptions of *Upeneus subvittatus* (T. & S.) by Snyder (l.c., p. 101) and Fowler (l.c., p. 324; after Snyder), as can be seen from comparison with the characters mentioned before. The latter descriptions thus must concern another species, and Snyder's *Upeneus subvittatus* has to be renamed.

Our specimens doubtless belong to *Upeneus sulphureus* C. & V. and represent the type material of *Upeneus subvittatus* T. & S. Specimen no. 4700b I regard as the type.

LI. **Mullus dubius** (p. 30, plate XI fig. 3)

Upeneus dubius, Günther, 1859, p. 411.

There is but one specimen, in spirits, in Von Siebold's collection. Total (standard) length: no. 4702*:7.6 (6.4) cm.

The plate of this species in the Fauna Japonica is a reproduction of an original plate in Burger's collection, which is coloured lighter, pink. The drawing seems not completely exact, for our badly damaged specimen has a rather distinct opercular spine, D VIII.I.8, but a very close comparison is of no use on account of the very bad state of the specimen. Burger's manuscript gives no description of this species.

The specimen has hardly any scales left, and no remains of colours or markings; eye 4, snout 2.3 in head, eye about 1.7 in snout; D VIII.I.8. The condition of the specimen makes a sufficiently founded identification very difficult, if not impossible. The agreement however, with the descriptions of *Pseudupeneus chrysopleuron* (T. & S.) cited before (XLVIII) seems rather convincing. Our specimen consequently probably belongs to that species. It is the type specimen of Temminck & Schlegel's *dubius*.

LII. **Acropoma** (p. 31, plate XII figs. 2 & 3)

Acropoma japonicum Günther, 1859, p. 250; — Jordan & Snyder, 1901d, p. 912, fig. 10; — Weber & De Beaufort, 1929, p. 369, fig. 89; — Fowler & Bean, 1930, p. 145.

Von Siebold's collection contains one specimen in spirits. Total (standard) length: no. 312:13.5 (11) cm.

Plate XII fig. 2 has been made after an uncoloured original drawing in Burger's collection; the eye must be slightly larger, D VII.I.10. There is no description of this species in Burger's manuscript.

On this specimen Temminck and Schlegel founded their genus *Acropoma*. It doubtless belongs to *Acropoma japonicum* Gthr.

LIII. **Sphyraena japonica** (p. 33)

Sphyraena japonica, Bleeker, 1857, p. 67, pl. IV fig. 5; — Günther, 1860, p. 338; — Tanaka, 1913, p. 224, figs. 229, 230 & 246; — Weber & De Beaufort, 1922, p. 225.

We have one specimen in spirits from Von Siebold. Total (standard) length: no. 499*:14.5 (12.5) cm.

There is no plate nor a description of this species in Burger's manuscript.

The specimen closely agrees with the descriptions cited above; the pectorals seem slightly too short only, but this may be on account of damage: 3? in head; A II.8 or III.7. It is Temminck & Schlegel's holotype of *Sphyraena japonica* (C. & V?) T. & S. The description by Cuvier & Valenciennes is insufficient to decide their original authorship of this species.

LIV. **Sphyraena obtusata** (p. 33, plate XIII fig. 2),

Sphyraena obtusata Cuvier & Valenciennes, 1829a, p. 350; — Günther, 1860, p. 339; — Weber & De Beaufort, 1922, p. 226; — Barnard, 1925; p. 315.

In our collections there is one stuffed specimen from Japan, which probably represents the specimen mentioned in the Fauna Japonica. Total (standard) length: no. 775:37 (33) cm.

Plate XIII fig. 2 is an exact reproduction of an original plate in Burger's collection. Burger also gives a description of this species in his manuscript (no. 75).

Although stuffed and badly deformed, the specimen still sufficiently agrees with the descriptions cited above. It consequently belongs to *Sphyraena obtusata* C. & V.

LV. **Sphyraena nigripinnis** (p. 34, plate XIII fig. 1)

Sphyraena nigripinnis, Günther, 1860, p. 338.

Our collections contain no Japanese specimen of this species, so I fear that the type has been lost.

Burger's original plate has been exactly reproduced in the Fauna Japonica. He gives no description of this species in his manuscript.

LVI. **Trigla Bürgeri** (p. 35, plate XIV figs. 1 & 2)

Trigla Burgeri, Bleeker, 1857, p. 73.
Lepidotrigla bürgeri, Günther, 1860, p. 198.
Lepidotrigla alata, Jordan & Richardson, 1908, p. 650, fig. 7.

We have in our collections three stuffed specimens from Burger and one specimen in spirits from Von Siebold. Total (standard) length of Burger's specimens: no. 689:15 (12.5) cm, no. 690*:23.5 (18.5) cm, no. 691:18 (14.5) cm; of Von Siebold's specimen: no. 506:11 (9) cm.

In Burger's collection there is an original of plate XIV, which has been

reproduced very exactly. Burger also described this species in his manuscript (no. 180).

All specimens have the back painted reddish on one side; A 16. They doubtless belong to *Lepidotrigla alata* (Houttuyn), and represent the type material of *bürgeri* T. & S. Specimen no. 690 I regard as type.

LVII. Trigla hemisticta (p. 36, plate XIV figs. 3 & 4, XIV B)

Trigla hemisticta, Günther, 1860, p. 201.
Otohime hemisticta, Jordan & Starks, 1907, p. 132, fig.; — Jordan & Richardson, 1908, p. 658.

Burger's collection contains one stuffed specimen, Von Siebold's collection one specimen in spirits. Total (standard) length of Burger's specimen: no. 695*:31 (26.5) cm, of Von Siebold's specimen: no. 501:28 (23) cm.

There are no originals of the plates in the Fauna Japonica in Burger's collection, neither is there a description of this species in Burger's manuscript.

Specimen no. 501 still shows distinct remains of colours, but the specimens further show the same characters: D VIII.11; A I.10; a small median ovate patch of teeth on the vomer; six ovate or round plates along each side of the spinous dorsal; the bands of teeth on the jaws not narrow; the longest soft rays of D^2 longer than the diameter of the eye. Except some differences in these characters, the specimens sufficiently agree with the descriptions cited above. They represent the type material of *Pterygotrigla hemisticta* (T. & S.). (*Pterygotrigla* Waite precedes, thus has preference over *Otohime* Jord. & Starks, cf. Jordan, Tanaka & Snyder, 1913, p. 289).

I chose specimen no. 695 as type.

LVIII. Trigla Kumu (p. 37, plate XIV A fig. 3)

Trigla kumu, Bleeker, 1857, p. 74; — Günther, 1860, p. 204.
Chelidonichthys kumu, Jordan & Richardson, 1908, p. 656.

There are two stuffed specimens from Burger and three specimens in spirits from Von Siebold in our collections. Total (standard) length of Burger's specimens: no. 696:32.5 (26) cm, no. 699:40 (33.5) cm; of Von Siebold's specimens: no. 503a:18.5 (15) cm, no. 503b:13.5 (11) cm, no. 503c:7.5 (6.5) cm.

Plate XIV A fig. 3 has been made after an original plate in Burger's collection, which is coloured more brick-red. In his manuscript Burger also gives a description of this species (no. 179).

The specimens still have some slight remains of colour markings; D IX(-X).16(-17); A 15-16(-17); height 4.5 in standard length. They agree with the descriptions cited above and doubtless belong to *Chelidonichthys kumu* (Less. & Garn.).

LIX. Dactyloptera orientalis (p. 37, plate XV A)

Dactylopterus orientalis Cuvier & Valenciennes, 1829b, p. 134, pl. 76; — Günther, 1860, p. 222.
Dactylopterus japonicus Bleeker, 1857, p. 72.
Dactyloptena orientalis, Jordan & Richardson, 1908, p. 666.

Our collection contains two stuffed specimens from Burger, four specimens in spirits from Von Siebold and one stuffed specimen from Japan, without further information, probably belonging to the same collections. Total (standard) length of Burger's specimens: no. 719:23.5 (19.5) cm, no. 720:31 (25.5) cm; of Von Siebold's specimens: no. 526a:18.5 (15.5) cm, no. 526b:11.5 (9) cm, no. 526c:8 (6.3) cm, no. 526d:4.7 (3.8) cm; of the specimen without name of collector: no. 718:27 (22.5) cm.

The plate in the Fauna Japonica is an exact reproduction of a plate in Burger's collection. Burger's manuscript contains no description of this species.

These specimens are in a rather good state; D I.I.VI (or V.1).8; scales in transverse row between D and P about 21. The specimens belong to *Dactyloptena orientalis* (C. & V.).

LX. Peristedion orientale (p. 37, plate XIV figs. 5 & 6, XIV A figs. 1 & 2)

Peristethus orientale, Günther, 1860, p. 219.
Peristedion orientale, Jordan & Richardson, 1908, p. 660; — Kamohara, 1936, p. 437, pl. 29 fig. 2.

Burger's collection contains one stuffed specimen. Total (standard) length: no. 660*:18.5 (17.5)cm.

The figures in the Fauna Japonica have been made after originals in Burger's collection, which are coloured lighter blue. Burger's manuscript contains no description of this species.

The specimen is in a bad state, with the fins damaged, probably about D VIII.20, A 20. It agrees with the descriptions cited above, and represents Temminck and Schlegel's type specimen of *Peristedion orientale* T. & S.

LXI. Cottus intermedius (p. 38)

Cottus intermedius, Günther, 1860, p. 167.
Gymnocanthus intermedius, Jordan & Starks, 1904b, p. 292.

Von Siebold's collection contains one empty dried skin of this species. Total (standard) length: no. 652*:17 (15.5) cm.

There is no plate of this species in the Fauna Japonica, neither is there a description in Burger's manuscript.

The specimen is in a very bad condition, many characters have been lost; D IX.15; A 15. It agrees with the descriptions cited above, and is Temminck and Schlegel's holotype of *Gymnocanthus intermedius* (T. & S.).

LXII. **Cottus uncinatus** (p. 38)

Centridermichtys fasciatus, Günther, 1860, p. 169.
Trachydermus ansatus, Jordan & Starks, 1904b, p. 262, fig. 14.

Von Siebold's collection contains three specimens in spirits. Total (standard) length: no. 536a*:10 (8.5) cm, no. 536b:9.5 (8) cm, no. 536c:7.5 (6.5) cm.

The Fauna Japonica contains no plate, Burger's manuscript no description of this species.

The specimens agree with the descriptions cited above. They must belong to *Trachydermus ansatus* (Rich.), and represent Temminck and Schlegel's type material of *uncinatus* T. & S. Specimen no. 536a I regard as type.

LXIII. **Platycephalus insidiator** (p. 39, plate XV fig. 1)

Platycephalus insidiator, Cuvier & Valenciennes, 1829b, p. 227; — Günther, 1860, p. 177.
Platycephalus indicus, Bleeker, 1877a, plate 1 (418) fig. 3; — Jordan & Richardson, 1908, p. 641.

Burger's and Von Siebold's collections contain no specimens of this species, but there is a stuffed specimen labelled *Platycephalus indicus* Blkr., Japan, which may belong to these collections. Total (standard) length: no. 727:45 (39) cm.

The plate in the Fauna Japonica has been made after an original plate in Burger's collection, which is coloured lighter with much darker spots on the caudal fin. Burger also gives a description of this species in his manuscript (no. 81).

The only Japanese specimen of this species in our collection has written on the ventral side the indication "*Pl. fuscus.* C. V. 4, p. 241"; on the same place there were rests of an earlier identification as "*insidiator*", while this name also was found on a small piece of paper in the mouth.

The specimen has no remains of colours or colour markings, except three distinct dark bands on the caudal fin about as in the figure in the Fauna Japonica, and as described by Jordan & Richardson (l.c., p. 642): "caudal

with a median longitudinal black band, above and below which are two oblique ones, the upper band being shorter than the other two". The specimen further closely agrees with the descriptions cited above. The lack of colour markings can be explained by Jordan & Richardson's observation that the colour markings are "tending to become obsolete in old specimens" (l.c., p. 642).

The specimen must belong to *Platycephalus indicus* (L.).

LXIV. **Platycephalus guttatus** (p. 39, plate XV fig. 2)

Platycephalus punctatus Cuvier & Valenciennes, 1829b, p. 243.
Platycephalus guttatus Cuvier & Valenciennes, 1829b, p. 244; — Günther, 1860, p. 183.
Platycephalus crocodilus, Cuvier & Valenciennes, 1829b, p. 256 (inexact).
Thysanophrys crocodilus, Jordan & Richardson, 1908, p. 638, fig. 4.

Burger's collection contains one stuffed specimen and one specimen in spirits. One of the specimens originally identified as *Pl. japonicus* proved to belong to this species too (see LXV). Total (standard) length: no. 730:55.5 (48.5) cm, no. 577:38 (33.5) cm.

Plate XV fig. 2 is a very exact reproduction of a plate in Burger's collection. Compared with our material, the head seems to be drawn too short in comparison with the width, while the anal fin should have 11 rays. Burger's manuscript contains a description of this species (no. 82).

The fin formula is D IX.11, A 11; the stuffed specimen has eye 6 in head, interorbital space 1.5 in eye, the specimen in spirits interorbital space 2 in eye. Both specimens belong to *Thysanophrys crocodilus* (Tiles.).

LXV. **Platycephalus japonicus** (p. 40, plate XVI fig. 3)

Platycephalus japonicus, Bleeker, 1853b, p. 28; — idem, 1857, p. 78; — Günther, 1860, p. 181.
Thysanophrys japonicus, Jordan & Richardson, 1908, p. 636, fig. 3.

Our collection contains one stuffed specimen from Burger, five specimens in spirits from Von Siebold, and one stuffed specimen from Japan without information, probably belonging to the same collection. Total (standard) length of Burger's specimen: no. 731:49 (43.5) cm; of Von Siebold's specimens: no. 569a:21.5 (18) cm, no. 569b:19 (16) cm, no. 569c:15.5 (13) cm, no. 569d:12.5 (10.5) cm, no. 569e:8.5 (7) cm; of the specimen without name of collector: no. 2058:23 (20) cm.

Of the uncoloured figure there is no original in Burger's collection. The shape seems rather exact. Burger has not described this species.

This material proved to be heterogeneous: specimen no. 2058 probably

belongs to the former species, *Thysanophrys crocodilus* (Tiles.) on account of the shape of the preopercular spines, the number of finrays (D IX.11; A 11), and some indications of minor importance.

The further specimens have D I.VIII.12; scales 60-105; the stuffed specimen slightly differs from the rest of the material, probably on account of deformation and different age: head 3 in standard length, eye 6 in head, interorbital space 1.7, longest preopercular spine 2.6 in eye.

The numbers of scales in longitudinal rows proved to increase with age; these numbers in the specimens, arranged according to increasing size, are: 60, 68, 70, 75, 75, 105. This agrees with (and supports) another observation of increase of the number of scales by Koumans (1936, p. 267-276).

These specimens must belong to *Thysanophrys japonicus* (Tiles.).

LXVI. **Platycephalus asper** (p. 40, plate XVI figs. 4 & 5)

Platycephalus asper Cuvier & Valenciennes, 1829b, p. 257, pl. 82; — Günther, 1860, p. 190.
Rogadius asper, Jordan & Richardson, 1908, p. 630, fig. 1.

We possess one stuffed specimen from Burger and one specimen in spirits from Japan without name of collector. Total (standard) length of Burger's specimen: no. 732:17 (15) cm; of the other specimen: no. 4878:11 (9) cm.

In Burger's collection there is an original plate after which plate XVI fig. 4 in the Fauna Japonica has been made. His manuscript contains no description of this species.

In these specimens the preopercles have 5 spines posteriorly, one of which is placed laterally on the base of the strongest one; D in stuffed specimen: I. VIII.11. These specimens doubtless belong to *Rogadius asper* (C. & V.).

LXVII. **Platycephalus spinosus** (p. 40, plate XVI figs. 1 & 2)

Platycephalus spinosus, Bleeker, 1857, p. 77; — Günther, 1860, p. 190.
Thysanophrys spinosus, Jordan & Richardson, 1908, p. 633, fig. 2.

Von Siebold's collection contains seven specimens in spirits. Total (standard) length: no. 567a*:11.5 (9.5) cm, no. 567b:10.7 (8.7) cm, no. 567c & d:10 (8.3) cm, no. 567e & f:6.7 (5.5) cm, no. 567g:6(5) cm.

Plate XVI figs. 1 & 2 slightly differ from our specimens which have no medial spine directly behind the eyes, and eyes 3 in head. The colours exactly agree with an original plate in Burger's collection. This species has not been described in Burger's manuscript.

The specimens have remains of the colour markings still visible on the fins; scales in lateral series about 40. The agreement with the descriptions cited above is almost complete. This must be the material of *Thysanophrys spinosus* (T. & S.); specimen no. 567a I regard as type.

LXVIII. **Bembras japonicus** (p. 41, plate XVI fig. 8)

Bembras japonicus Cuvier & Valenciennes, 1829b, p. 282, pl. 83; — Günther, 1860, p. 191; — Jordan & Richardson, 1908, p. 643.

Our collections contain three stuffed specimens from Burger, one specimen from Von Siebold, one stuffed specimen from Japan, collector unknown, and one specimen in spirits from Japan, 1844, also collector unknown. Total (standard) length of Burger's specimens: no. 684:22.5 (19.5) cm, no. 685:24.5 (20.5) cm, no. 686:23.5 (20.5) cm; of Von Siebold's specimen: no. 565:19 (16.5) cm; of the specimen in spirits from unknown collector: no. 566:25.5 (21.5) cm, and of the stuffed ditto: no. 683:24 (21) cm.

Burger's original of plate XVI fig. 8 is coloured much lighter, flesh-coloured. The dorsal fins should be different; according to our material D^1 XI, D^2 I.11. Burger has composed a description of this species in his manuscript (no. 181).

Specimen no. 566 still has distinct spots on dorsal fins. The agreement with the descriptions cited above is rather close. The specimens must belong to *Bembras japonicus* C. & V.

LXIX. **Bembras curtus** (p. 42, plate XVI figs. 6 & 7)

Bembras curtus, Günther, 1860, p. 191.
Parabembras curtus, Jordan & Richardson, 1908, p. 644.

There is one stuffed specimen in Burger's collection. One further stuffed specimen from Japan, 1835, without name of collector, probably belongs to the same collection. Total (standard) length of Burger's specimen: no. 682*:16 (14) cm, of the other Japanese specimen: no. 2057:17 (15) cm.

Fig. 6 in the Fauna Japonica agrees with an original plate in Burger's collection, which contains no original of fig. 7. Compared with our specimens the shape in these figures seems not completely exact. The specimen I chose as type specimen, (no. 682) probably has D. IX.9, A III.5(?), with second anal spine longest and stoutest, third slightly weaker and shorter, first 2.5 in second. These numbers, however, are very difficult to count, the fins being in a very bad condition. Nevertheless I chose this specimen as type as it is the only specimen of which I am sure it has been used

for the description in the Fauna Japonica. Burger's manuscript contains no description of this species.

Both specimens are in a bad condition, but in spite of a probable difference in number of dorsal finrays (no. 2057 has D with 8 spines) they must belong to the same species. The agreement with the descriptions cited above is sufficient. These specimens represent the type material of *Parabembras curtus* (T. & S.). Specimen no. 682 I have chosen as type, for reasons given above.

LXX. **Scorpaena cirrhosa** (p. 42, plate XVII figs. 2 & 3)

Scorpaena cirrhosa, Cuvier & Valenciennes, 1829b, p. 318; — Günther, 1860, p. 120.
Scorpaenopsis cirrhosa, Jordan & Starks, 1904a, p. 136.

There are three stuffed specimens in Burger's collection and one specimen in spirits in Von Siebold's collection. One more specimen from Burger must be in the British Museum, cf. Richardson (1846, p. 215). Total (standard) length of Burger's specimens: no. 613:31.5 (26) cm, no. 614:26 (21), no. 615:25.5 (21) cm; of Von Siebold's specimen: no. 4361:17.5 (14.5) cm.

The colours on the plate of this species in the Fauna Japonica exactly agree with an original plate in Burger's collection. The size of the eye seems to be inexact, in our specimens 5.4-6 in head. Burger's manuscript contains a description of this species (no. 72).

Our specimens have the third anal spine slightly shorter than second, 2.5 in head; A III.5 (1). They belong to *Scorpaenopsis cirrhosa* (Thunb.).

LXXI. **Scorpaena neglecta** (p. 43, plate XVII fig. 4)

Scorpaena onaria Jordan & Snyder, 1900, p. 365, pl. XVI.
Scorpaena fimbriata, Jordan & Starks, 1904a, p. 133.

There are six stuffed specimens in Burger's collection. Total (standard) length: no. 618:18 (14.5) cm, no. 619:24.5 (19) cm, no. 620:14.5 (12) cm, no. 621:11 (9) cm, no. 622:9.7 (8) cm, no. 623:12 (10.2) cm.

There is no original drawing in Burger's collection nor is there a description in his manuscript.

This homogeneous material differs from that of the former species (LXX, *Scorpaenopsis cirrhosa* (Thunb.)) by having a higher spinous dorsal, about 5.7 in standard length (*Sc. cirrhosa*: 7.2); no or an indistinct median crest in anterior part of interorbital gutter; teeth on palatines; a large dark blotch on spinous dorsal, especially between 7th and 9th spine. In contradiction with the description in the Fauna Japonica I found dermal flaps on the jaws,

behind the preopercular edge and (probably) on the body, viz., along the lateral line. The differences between *neglecta* and *cirrhosa* as mentioned in the Fauna Japonica almost all are very small and, especially in the younger specimens, rather dubious.

Jordan & Snyder (l.c.), Jordan & Starks (l.c.) and Jordan, Tanaka & Snyder (1913, p. 241) all consider *neglecta* T. & S. as synonymous with *onaria* Jord. & Snyd. Fig. 177 in Jordan, Tanaka & Snyder (l.c.) first made me doubt this synonymy on account of the too compressed form of the body in that figure, but a comparison with a description of *onaria* Jord. & Snyd. by its authors (l.c.) showed that these different characters in our material are far less important than the conformities. The differing characters were: head 2.4, height about 4 in standard length; longest anal spine 3 in head; first dorsal spine 2 in third, fourth dorsal spine longest, slightly longer than third; preopercle with 4 spines; interorbital space 6.5 in head; I could find no bifid spine projecting outwards on preorbital. Of these characters the proportional size of head and especially of height differ more considerably only, but these differences, at least partially, must be caused by the deformation of the stuffed material.

The description of *Scorpaena fimbrata* Döderl. cited above, which species afterwards has been considered synonymous with *neglecta* T. & S., also essentially agrees with our material (except fin formula: D XII.9 (1); A III.5 (1)).

On account of these facts I must accept the synonymy of *Scorpaena neglecta* T. & S., *onaria* Jord. & Snyd. and *fimbriata* Döderl. The specimens consequently belong to *Scorpaena neglecta* T. & S. The specific name *neglecta* has not been preoccupied by Heckel, as has been supposed by Jordan & Snyder (l.c.) and Jordan & Starks (l.c.), Heckel (1840) having described a species belonging to a different genus: *Scorpaenopsis neglecta* H.

LXXII. Pelor japonicus (p. 44, plate XVIII fig. 2)

Pelor japonicus, Günther, 1860, p. 151.
Inimicus japonicus, Jordan & Starks, 1904a, p. 159; — Tanaka, 1914, p. 247, fig. 246.

We possess four stuffed specimens from Burger and one specimen in spirits from Von Siebold. One more specimen from Burger must be in the British Museum, cf. Richardson (1846, p. 212). Another specimen in spirits from Japan, 1845, without name of collector, probably belongs to the same collection. Total (standard) length of Burger's specimens: no. 589:24 (19) cm, no. 599:21.5 (16.5) cm, no. 600:20.5 (16) cm, no. 601:29 (24.5) cm; of Von Siebold's specimen: no. 612:24 (19.5) cm; of the specimen without name of collector: no. 613:24.5 (19.5) cm.

Plate XVIII fig. 2 is an exact reproduction of an original plate in Burger's collection. The drawing seems not completely exact: in our specimens A II.9, P 11, with the inferior ray also attached with a small basal membrane. Burger's manuscript contains a description of this species (no. 74).

The specimens closely agree with the descriptions cited above. Specimen no. 613 still has distinct red-brownish colour markings. They all must belong to *Inimicus japonicus* (C. & V.).

LXXIII. **Pelor aurantiacum** (p. 44, plate XVIII fig. 1)

Inimicus aurantiacus, Jordan & Starks, 1904a, p. 160.

Our collection contains one stuffed specimen from Burger and one specimen in spirits from Von Siebold. Total (standard) length of Burger's specimen: no. 597*:29 (23.5) cm; of Von Siebold's specimen: no. 614:21.5 (18.5) cm.

The plate in the Fauna Japonica is an exact reproduction of an original plate in Burger's collection. The number of finrays seems inexact; in our specimens they are very difficult to count, being covered by a very thick skin: D XVII.7, AII?.9 or 10. Burger's manuscript contains a description of this species (no. 166).

These specimens have no remains of colours or colour markings left. The differences from the former species (LXXII), as mentioned in the Fauna Japonica and by Jordan & Starks (l.c.), are not very convincing. Comparing this material with our specimens of *Pelor japonicum* T. & S., the slight differences all proved to be within the range of variation of the latter species. The only distinct difference probably has been the coloration, but the colours of *japonicum* as well as of *aurantiacum* having been described as rather variable, this difference too may at best be regarded as a variation only, as has been done by Jordan, Tanaka & Snyder (1913, p.249) and by Tanaka (1914, p. 247). Both these specimens consequently belong to Temminck& Schlegel's variety *aurantiacus* of the species *Inimicus japonicus* (C. & V.). They are the type specimens of the species *aurantiacus* T. & S.; specimen no. 597 I regard as type.

LXXIV. **Synanceia erosa** (p. 45, plate XVII fig. 1)

Synanceia erosa Cuvier & Valenciennes, 1829b, p. 459, pl. 96.
Synancidium erosum, Günther, 1860, p. 146.
Erosa erosa, Jordan & Starks, 1904a, p. 156.

Burger's collection contains two stuffed specimens, Von Siebold's collection seven specimens in spirits. Further there is in our collections a dry

preserved head of this species, from Japan, without name of collector. Total (standard) length of Burger's specimens: no. 627:14.5 (12.5) cm, no. 628:17.5 (15) cm; of Von Siebold's specimens: no. 621a:15.5 (13.5) cm, no. 621b:10 (8.5) cm, no. 621c-g:4.7-3.9 (4-3.2) cm; length of the head: no. 625:6 cm.

The plate in the Fauna Japonica agrees with the original plate in Burger's collection. The number of finrays is inexact: in our specimens D XIV.7, A III.6 (or 7), P 15. Burger gives a description of this species in his manuscript (no. 167).

The specimens closely agree with the descriptions cited above. They must belong to *Erosa erosa* (Langsd.; C. & V.).

LXXV. **Pterois lunulata** (p. 45, plate XIX)

Pterois lunulata, Günther, 1860, p. 124; — Jordan & Starks, 1904a, p. 142.

We possess one stuffed specimen from Burger and one stuffed specimen and three specimens in spirits from Von Siebold. Total (standard) length of Burger's specimen: no. 602*:24 (19) cm; of Von Siebold's specimens: no. 603:26 (20) cm, no. 666a:23 (17) cm, no. 666b:17.5 (13.5) cm, no. 666c:10 (7) cm.

The plate in the Fauna Japonica is an exact reproduction of an original plate in Burger's collection. According to our specimens, the number of finrays is inexact, must be D XIII.11(-12), A III.7. In his manuscript Burger gives a description of this species (no. 168).

Several of these specimens still have remains of colour markings, about in accordance with plate XIX in the Fauna Japonica; P 14; eye about equal to interorbital space; spines on the head variable; scales in lateral series 72, tubes in lateral line 27. This material closely agrees with the descriptions cited above. It represents the type material of *Pterois lunulata* T. & S. Specimen no. 602 I regard as type.

LXXVI. **Sebastes marmoratus** (p. 46, plate XXI figs. 1 & 2)

Sebastes marmoratus Cuvier & Valenciennes, 1829b, p. 345; — Günther, 1860, p. 104. *Sebastiscus marmoratus*, Jordan & Starks, 1904a, p. 124.

There are nine stuffed specimens in Burger's collection, five specimens in spirits in Von Siebold's collection, and four stuffed specimens from Japan, which probably belong to the same collection. One more specimen from Burger must be in the British Museum, cf. Richardson (1846, p. 215). Total (standard) length of Burger's specimens: no: 295:38 (31.5) cm, no. 576:17 (14) cm, nos. 577, 578 & 580:16-15.5 (13-12.5) cm, no. 583:23

(20.5) cm, no. 585: 26.5 (22) cm, no. 586:35 (29) cm, no. 588:19 (16) cm; of Von Siebold's specimens: no. 642a: 21 (17.5) cm, no. 642b:13 (10.5) cm, no. 642c:7.8 (6.2) cm, no. 642d:5.5 (4.5) cm, no. 642e:4.5 (3.5) cm; of the specimens without name of collector: no. 581:21.5 (18) cm, no. 582:22 (18) cm, no. 584:25.5 (20.5) cm, no. 587:45.5 (38) cm.

Fig. 1 of the plate in the Fauna Japonica is an exact reproduction of an original plate in Burger's collection, but there is no original plate of fig. 2. The number of finrays is not exact, in our specimens A III.5, P 17-19. There is a description of this species in Burger's manuscript (no. 165).

This extensive material proved to be homogeneous. The specimens still show slight remains of colour markings. They closely agree with the descriptions cited above and consequently must belong to *Sebastiscus marmoratus* (C. & V.).

LXXVII. **Sebastes pachycephalus** (p. 47, plate XX fig. 3)

Sebastes pachycephalus, Günther, 1860, p. 97.
Sebastichthys pachycephalus, Jordan & Starks, 1904a, p. 117; — Tanaka, 1930, p. 950.

Burger's collection contains four stuffed specimens. There are two further specimens, in spirits, with only the indications "1844, Japan" and "Japan", which probably belong to the same collection. Total (standard) length of Burger's specimens: no. 563:15.5 (13) cm, no. 564:29 (25) cm, no. 565:26 (21) cm, no. 566*:32 (27) cm; of the two further Japanese specimens: no. 654:15 (12) cm, no. 655:19 (15.5) cm.

Burger's collection contains no original plate of this species, neither is there a description in his manuscript.

This material proved to be heterogeneous. Specimen no. 654 has lost all evidence of colour markings, but specimen no. 655 still has distinct brownish spots on A, P, V, and C, more irregularly shaped brownish parts on D, while the body and the head show a more mottled coloration. Except the badly damaged squamation, these two specimens are very well preserved. They differ from the rest of this material, except by the coloration just mentioned, by the different number of dorsal finrays: D XIV.12 or XIV.12 (1), A III.6 (1) and the narrow and deeply concave interorbital, in which there are two very distinct ridges including a deep channel. These specimens very closely agree with the description of *Sebastichthys elegans* (Steind. & Döderl.) by Jordan & Starks (l.c., p. 118). A few characters only slightly differ: in specimen no. 655 P with lower 9 rays not branched, almost reaching vent; V not reaching vent. Specimen no. 654 even better agrees, only the eye is slightly too large (juvenile character?). Both specimens must belong to *Sebastichthys elegans* (Steind. & Döderl.).

The rest of this material is now coloured yellowish brown, somewhat darker than our specimens of *Sebastiscus marmoratus* (C. & V.) (LXXVI). D XIII.13 (1), A III.6 (1); height 2.75-3 in standard length; eye 4.5-5, snout about 3.8-4, last dorsal spine 3.5, twelfth ditto 4.2-4.6 in head; maxillary reaching to below or even slightly beyond posterior edge of eye. Except some slight differences in some of the characters just mentioned, which partially have been caused by the deformation of these stuffed specimens, they closely agree with the descriptions cited above. This must be the type material of *Sebastichthys pachycephalus* (T. & S.). Specimen no. 566 I regard as type.

LXXVIII. **Sebastes inermis** (p. 47, plate XXI figs. 3 & 4)

Sebastodes schlegelii, Jordan & Evermann, 1898a, p. 1834.
Sebastodes hakodatis, Jordan & Snyder, 1900, p. 361, pl. XV.
Sebastodes fuscescens, Jordan & Starks, 1904a, p. 110.

We possess four stuffed specimens from Burger and three specimens in spirits from Von Siebold. Total (standard) length of Burger's specimens: no. 99:19 (15.8) cm, no. 567:27 (22) cm, no. 579:19 (15.5) cm, no. 589:16 (13.5) cm; of Von Siebold's specimens: no. 652a:17 (13.5) cm, no. 652b: 12.5 (10.5) cm, no. 652c:10 (8) cm.

The plate in the Fauna Japonica is an exact reproduction of an original plate in Burger's collection. The shape shows a combination of the characters of both parts of the material (see below), but more closely agrees with the stuffed specimens from Burger's collection. Burger also gives a description of this species (no. 73), which seems to be based on the stuffed specimens only: D XIII.13, A III.8, jaws equal, preopercle with serrated spines, etc.

This material proved to be heterogeneous. The stuffed specimens obviously differ from the material in spirits by being more slender, having smaller eyes, a narrower interorbital space, a different fin formula, size and situation of the spines on the head. This appears from the following data, which also include some particulars of *S. ventricosus* (LXXIX):

	S. inermis stuffed	*S. inermis* in spirits	*S. ventricosus*	plate F. Jap.
Height	3.5(4.3)–3.7(4.6)	2.5(3.1)–2.9(3.6)	2.8(3.4)–3.1(3.7)	3(3.6)
Head	2.7(3.3)–2.9(3.5)	3(3.7)–3.2(3.8)	3.1(3.7)–3.2(3.8)	2.9(3.4)
Eye	4.5–4.6	3–3.1	3.1–3.3	5.8
Snout	4.3–4.4	4.4–4.5	4.3–4.5	3.8
Int. orb. sp.	4.8–5.4	3.8–4.2	3.5–4.1	5
D	XIII.12(1)	XIII.13(1)–XIII.15(1)	XIII.14(1)–XIII.15(1)	XIII.12(1)
A	III.6(1)	III.7(1)–III.8(1)	III.7(1)–III.8	III.7(1)
P	17	16–18	16–17	18

The description in the Fauna Japonica has been composed of the characters of both parts of this material. Just as the plate, it seems to have been based originally on Burger's manuscript, and was "corrected and completed" with characters of Von Siebold's specimens. As the plate in the Fauna Japonica better agrees with Burger's specimens, I feel inclined to regard these specimens as the types of Temminck & Schlegel's *inermis*.

Burger's specimens have one side painted with irregular dark blotches; slight remains of colour markings on the other side and on the fins are still visible. They have one distinct preopercular spine, longest dorsal spines about 2. 3 in head, lower jaw hardly longer than upper, scales in lateral series about 50-55. These specimens in my opinion belong to *Sebastodes fuscescens* (Houttuyn). In consequence of this, *Sebastodes inermis* (T. & S.) must be regarded as synonymous with *S. fuscescens* (Houttuyn), but not with *S. inermis* (C. & V.).

Von Siebold's specimens have no remains of colours or colour markings left. They agree with the descriptions of *Sebastodes inermis* (C. & V.) cited below (see LXXIX), and must belong to that species.

LXXIX. **Sebastes ventricosus** (p. 48, plate XX figs. 1 & 2)

Sebastes inermis Cuvier & Valenciennes, 1829b, p. 346; — Günther, 1860, p. 97.
Sebastes ventricosus, Bleeker, 1857, p. 80; — Günther, 1860, p. 97.
Sebastodes inermis, Jordan & Starks, 1904a, p. 103.

Our collections contain four stuffed specimens from Burger. Total (standard) length: no. 572:17 (14.5) cm, no. 573:21.5 (18) cm, no. 574:28 (23) cm, no. 575*:28.5 (24) cm.

The plate in the Fauna Japonica has not been made after an original plate in Burger's collection. According to Burger's specimens, there should be (generally) two spines on the shoulder; the numbers of finrays are variable: D XIII.14-15, A III.7-8, P 15-16. This species has not been described by Burger in his manuscript.

These specimens closely agree with the specimens in spirits originally identified as belonging to the former species (see LXXVIII), and also with the descriptions cited above. They must belong to *Sebastodes inermis* (C. & V.), and represent the type material of *ventricosus* T. & S. Specimen no. 575 I regard as the type of that species.

LXXX. **Apistus alatus** (p. 49, plate XXII A fig. 2)

Apistus alatus Cuvier & Valenciennes, 1829b, p. 492; — Günther, 1860, p. 131.
Apistus venenans Jordan & Starks, 1904a, p. 146.

Von Siebold's collection contains one specimen in spirits. Total (standard) length: no. 709:8 (6) cm.

There is a plate of this species in Burger's collection, which has been exactly reproduced in the Fauna Japonica. Burger gives no description.

The specimen has the head 2.9 in standard length, A III.7. It further closely agrees with the descriptions cited above. Jordan & Starks (l.c.) consider *alatus* T. & S. as not synonymous with *alatus* C. & V., in consequence of which they name the former species *Apistus venenans* Jord. & Starks; this name, however, had to be changed afterwards into *evolans* Jord. & Starks, the name *venenans* beng preoccupied. Jordan & Starks' opinion not being generally accepted, I provisionally identify Von Siebold's specimen as *Apistus alatus* C. & V.

LXXXI. **Apistus rubripinnis** (p. 49, plate XXII fig. 2)

Tetraroge rubripinnis, Günther, 1860, p. 133.
Paracentropogon rubripinnis, Jordan & Starks, 1904a, p. 167.

There are seven specimens in spirits in Von Siebold's collection. Total (standard) length: no. 716a*:6.4 (5.2) cm, no. 716b-g:6.1-4.3 (4.9-3.5) cm.

The plate in the Fauna Japonica is an exact reproduction of an original plate in Burger's collection. Burger's manuscript contains a description of this species too (no. 169).

These specimens still have remains of colour markings; D XIV (XIII). 7-8; head about equal to height; 2.8 in standard length; dentification on both jaws about equal; second and third dorsal spines 1.8, the posterior dorsal spine 2.5, the third anal spine 2.4 in head. Except some slight differences in these characters, the specimens closely agree with the descriptions cited above. They represent the type material of *Paracentropogon rubripinnis* (T. & S.). Specimen no. 716a I regard as type.

LXXXII. **Monocentris japonicus** (p. 50, plate XXII fig. 1)

Monocentris japonicus, Cuvier & Valenciennes, 1829b, p. 461, pl. 97; — Günther, 1859, p. 9; —Jordan & Fowler, 1902f, p. 19; — Weber & De Beaufort, 1929, p. 223.

We possess two stuffed specimens from Burger, three specimens in spirits from Von Siebold, and three stuffed specimens from Japan without name of collector. Total (standard) length of Burger's specimens: no. 677:8.5 (7.5) cm, no. 679:11.5 (10.5) cm; of Von Siebold's specimens: no. 623a:5.5 (4.5) cm, no. 623b:12 (10) cm, no. 623c:16 (13.5) cm; of the specimens without name of collector: no. 678:9.5 (8.5) cm, no. 680:14 (12.3) cm, no. 681:16 (14.5) cm.

The plate in the Fauna Japonica is an exact reproduction of an original plate in Burger's collection. Burger's manuscript contains a description of this species (no. 80).

There can be no doubt as to the reliability of the original identification of these specimens. They doubtless belong to *Monocentris japonicus* (Houttuyn).

LXXXIII. **Minous pusillus** (p. 50)

Minous pusillus, Günther, 1860, p. 149.
Decterias pusillus, Jordan & Starks, 1904a, p. 154, fig. 15.

Von Siebold's collection contains twelve specimens in spirits. Total (standard) length: no. 713a*:6 (4.7) cm, no. 713b-l:6-4 (4.6-3.2) cm.

Of this species there is no plate in the Fauna Japonica, neither is there a description in Burger's manuscript.

The colour markings are still distinct. The specimens closely agree with the descriptions cited above. They represent the type material of *Decterias pusillus* (T. & S.). Specimen no. 713a I chose as type.

LXXXIV. **Aploactis** (p. 51, plate XXII figs. 3 & 4)

Aploactis aspera, Günther, 1860, p. 142; — Jordan & Starks, 1904a, p. 171.

We possess eight specimens in spirits from Von Siebold. Total (standard) length: no. 715a:7.9 (6.7) cm, no. 715b:7.6 (6.4) cm, no. 715c-h: 7-5.5 (6.2-4.7) cm.

On the plate in the Fauna Japonica, the number of finrays seems inexact: in our specimens D XIV.11-12, A 13-14? This species has not been described by Burger.

This material is rather well preserved; the numbers of finrays are very difficult to count, the spines and simple soft rays being almost indistinguishable; height 5-5.5 in total length; bands of teeth on premaxillaries slightly widened in front. The specimens were named "*Aploactis Schlegeli* Bl.", a name unknown in literature (cf. Sherborn, 1902). Except some differences of less importance in the characters just mentioned, these specimens sufficiently agree with the descriptions cited above. They represent the material on which Temminck & Schlegel founded their genus *Aploactis,* and belong to *A. aspera* Rich.

LXXXV. **Labrax hexagrammus** (p. 53, plate XXIII figs. 1 & 2)

Chirus hexagrammus, Günther, 1860, p. 91 (partly?).
Hexagrammos otakii Jordan & Starks, 1903b, p. 1006.

There are six stuffed specimens in Burger's collection and two specimens in spirits in Von Siebold's collection. Total (standard) length of Burger's specimens: no. 257:30.5 (26.5) cm, no. 642:20 (17.5) cm, no. 644:35 (30) cm, no. 645:33 (29) cm, no. 646:38.5 (33) cm, no. 647:39.5 (34.5) cm; of Von Siebold's specimens: no. 28a:21 (18) cm, no. 28b:15.5 (13:5) cm.

Plate XXIII fig. 2 agrees with an original plate in Burger's collection; there is no original of fig. 1. The shape is not exact: in our specimens the pectoral fin has 18-19 rays, the end generally slightly branched, while the superior lateral line reaches to about the middle of soft dorsal fin only. Burger described this species in his manuscript (no. 148).

The numbers of finrays in our specimens are D XIX-XX.21-22, A 21-22. They very closely agree with the descriptions cited above and doubtless belong to *Hexagrammos otakii* Jord. & Starks.

LXXXVI. **Labrax agrammus** (p. 56, plate XXII A fig. 1)

Agrammus schlegelii Günther, 1860, p. 94.
Agrammus agrammus, Jordan & Starks, 1903b, p. 1004.

Our collections contain eleven stuffed specimens from Burger and two specimens in spirits from Von Siebold. Total (standard) length of Burger's specimens: nos. 630-640*:22.5-13 (19-11) cm; of Von Siebold's specimens: no. 2072a:15 (12.7) cm, no. 2072b: 13.5 (11.5) cm.

The plate in the Fauna Japonica has not been made after an original plate in Burger's collection. Burger also gives no description of this species.

The specimens still have remains of colours and colour markings, but the spots do not form such distinct cross-bands as the specimen represented on the plate in the Fauna Japonica. Von Siebold's specimens have a distinct supraorbital flap, in Burger's specimens this character must be lost or at least indistinct on account of damage of these stuffed specimens. They further have scales on the suborbitals and, in some of the specimens, A 20. The agreement with the descriptions cited above is very close. This must be the type material of *Agrammus agrammus* (T. & S.). The largest specimen, no. 640, I regard as type.

LXXXVII. **Sciaena japonica** (p. 58, plate XXIV fig. 1)

?*Otolithus argenteus,* Günther, 1860, p. 310.
?*Sciaena nibe* Jordan & Thompson, 1911a, p. 258.
?*Sciaena japonica,* Jordan & Thompson, 1911a, p. 260; — Jordan & Metz, 1913, p. 36.
?*Johnius argentatus,* Fowler, 1933, p. 394.

Of this species we possess no specimens. According to the Fauna Japonica,

there never has been a specimen in Burger's or Von Siebold's collection, and this species consequently has been founded on a description and a plate from Burger only.

The plate in the Fauna Japonica is an exact reproduction of an original plate in Burger's collection which only slightly differs by representing the free posterior edges of the scales with a narrow bluish-grey (not brown!) rim. As mentioned before, Burger has given a description of this species in his manuscript (no. 177), which differs on several points from the plate in the Fauna Japonica. On account of these differences and not all characters mentioned in Burger's description being cited in the Fauna Japonica, I now will give some of the more important remarks by Burger:

Head: broad, bluntly cut off anteriorly, covered with scales.

Mouth: moderate, terminal, slightly oblique.

Jaws: equal; behind one row of strong curved teeth several rows of small teeth; upper jaw slightly protractile.

Tongue: short, broad, oval, smooth.

Lips: thick, broad, fleshy.

Nostrils: anterior round, posterior oblong.

Opercle: with one very feeble spine.

Gill-membrane: with seven rays.

Lateral line: rather indistinct, almost straight.

Dorsal fin: D XI.II.27 (afterwards corrected? into X.II.27, probably by the authors of the Fauna Japonica).

Anal fin: A II.8.

Ventral fins: V I.5.

Pectoral fins: P 18.

Caudal fin: C 20.

Here I must once more emphasize that Burger's descriptions without exception proved to be rather inexact. Temminck & Schlegel generally corrected and completed Burger's data with characters from the specimen(s) that (which) generally accompanied Burger's descriptions. Burger's plates too often show inaccuracies, but these also sometimes have been corrected by the authors of the Fauna Japonica. In this case, however, there was no way to verify Burger's data and plate. On account of this, it is very difficult, if not impossible, to make a final statement as to the identity and synonymy of Temminck & Schlegel's species. As I have no material to verify every proposition made by various authors during the last century, I can do nothing but give the results of my investigations, and hope that some day, with the aid of a sufficient material and my data, some investigator will be able to come to a final decision.

Accepting Burger's data, this species according to Weber & De Beaufort (1936, p. 484, 485) probably must belong to the genus *Pseudosciaena* Bleeker. Günther (1860, p. 310), however, regards *japonica* T. & S. as synonymous with *Otolithus argenteus* C. & V. According to Jordan & Thompson (l.c.) the synonymy proposed by Günther probably is wrong.

Jordan & Thompson (l.c., p.246) mention *Sciaena japonica* T. & S. as a "doubtful species, known only from a very incorrect figure",and suppose (p. 260) that it may possibly be identical with *Sciaena nibe* Jord. & Thomps. (p. 258), but certainly not with *Sciaena argentata* (*bleekeri*) as suggested by Steindachner, or with *Sciaena argenteus* as I have mentioned before. The description of *Sciaena nibe* by its authors contains several different characters, which, however, may be caused by inaccuracies in Burger's data. Jordan & Thompson's opinion must be regarded as a possibility.

Jordan, Tanaka & Snyder (1913, p. 36) just mention *Sciaena japonica* T. & S. as a separate species, citing the Fauna Japonica as the only literature.

Jordan & Metz (l.c) describe some specimens from Korea as belonging to *Sciaena japonica* T. & S., and state that their material corresponds with the plate in the Fauna Japonica. It would be interesting to know how close the correspondency is. A reinvestigation of these specimens might procure the clue to this problem.

Fowler (l.c.)regards Temminck & Schlegel's species as synonymous with *Sparus argentatus* Houttuyn, and gives as its present name *Johnius argentatus* (Houttuyn). This proposition, however, seems somewhat dubious, and needs confirmation. Fowler's generic name at least must be wrong if we accept Burger's data. His description too differs in several characters, but there are characteristic agreements which make Fowler's opinion quite possible and even make me inclined to support it. The identification of Houttuyn's original description of *argentatus,* however, will always be rather dubious (see LXXXIX).

This species I consequently provisionally regard as *Pseudosciaena japonica* (T. & S.). As I have no material of this species, I am not in the position to indicate a so called plesiotype of Temminck & Schlegel's species.

LXXXVIII. **Corvina cuja** (p. 58)

?*Corvina cuja,* Cuvier & Valenciennes, 1830a, p. 96; — Günther, 1860, p. 300.
Sciaena mitsukurii, Jordan & Thompson, 1911a, p. 246; — Tanaka, 1912, p. 177.
?*Sciaena albiflora,* Jordan & Thompson, 1911a, p. 249.
Johnius cujus, Fowler, 1934, p. 390.

There are two stuffed specimens in Burger's collection. Total (standard) length: no. 754:265 (22.5) cm, no. 755:27.5 (23) cm.

The Fauna Japonica contains no plate, Burger's manuscript no description of this species.

Both specimens obviously belong to the same species. They are deformed and painted, the backs greenish, the ventral parts yellow; on the unpainted sides both specimens still have distinctly darker, brownish backs, while specimen no. 754 shows distinct brown spots on the centra of the dorsal scales.

The fins are more or less damaged, D X.I.27 (1), A II.7 (1); height 3.4, head 3.3-3.5 in standard length; snout 3.5-4, eye 5-5.5 in head; eye 1.3-1.4 in snout, 1.5 in interorbital space; the maxillary reaches to below second half of eye; second anal spine 2.3-2.4 in head.

The specimens closely agree with the descriptions cited above, only the descriptions by Cuvier & Valenciennes and Günther show some differences (eye, interorbital space, squamation on fins). The description by Jordan & Thompson of *albiflora* Rich. (1911a, p. 249) differs in number of dorsal rays, but shows no further differences of importance. Of the differences between this species and *mitsukurii*, as given by Jordan & Thompson (l.c., p. 252), the difference in preopercular teeth is not convincing, for even in our two specimens there is a distinct variation, while a difference in coloration also seems insufficient to discriminate these species; a difference in size of the second anal spine also proved unreliable as the type of *mitsukurii* differed from the further specimens of that species by having a second anal spine with exactly the same characters as in *albiflora*. I consequently am inclined to doubt a discrimination between these species, although it has been accepted by Fowler and Tanaka (l.c.).

According to Jordan & Thompson (l.c., p. 249) this Japanese species differs from the Indian *Bola cujus* Ham. Buch. in the size of the anal spine, but according to Fowler (l.c., p. 391) that difference is "hardly satisfactory". Moreover that spine seems to be subject to variation in *mitsukurii*. In consequence of this, I agree with Fowler and provisionally accept a synonymy between the Japanese and Indian species, and identify our specimens as *Johnius cujus* (Buch. Ham.).

LXXXIX. **Corvina sina** (p. 58, plate XXIV fig. 2)

Sciaena schlegeli, Jordan & Thompson, 1911a, p. 254.
?*Sciaena argentata*, Tanaka, 1928, p. 870.
?*Johnius aneus*, Fowler, 1933, p. 376.

Our collection contains one stuffed specimen from Burger and two specimens in spirits from Von Siebold. Total (standard) length of Burger's

specimen: no. 771:30 (24.5) cm; of the specimens in spirits: no. 757a:20.7 (17:5) cm, no. 757b:20 (17) cm.

The plate in the Fauna Japonica is an exact reproduction of an original plate in Burger's collection. We possess a description of this species in Burger's manuscript (no. 176).

Especially the specimens in spirits are in a very good condition. All coloration has vanished; D X.I.26-28 (1), A II.7-8 (1), scales in lateral line 50; height 3.2 (-3.4 in stuffed specimen), head 3.2 (-3.4) in standard length; snout 3.5, eye 4-4.2 in head, eye 1.3 in snout; interorbital space 3-3.3 in head; second anal spine about 4, maxillary 2.3 in head; base of soft dorsal 2.8 in standard length, about two times longer than base of spinous dorsal.

Fowler (l.c., p. 376) considers Temminck & Schlegel's *sina* identical with *aneus* Bloch, but his description differs in some characters (D, second anal spine, etc.), consequently probably does not represent the same species. Tanaka (l.c.) proves the dubiousness of an identification of Houttuyn's descriptions by considering Temminck & Schlegel's species identical with *Sparus argentatus* Houttuyn, which species Fowler accepted as identical with *japonicus* T. & S. (see LXXXVII). Tanaka's next synonym is *Sciaena bleekeri* Day. His description, however, differs in several characters: head, height, eye, D, etc.

Our specimens very closely agree with the description by Jordan & Thompson (l.c., p. 254); these authors reject a synonymy with *Corvina sina* C. & V.

I regard our specimens as *Pseudosciaena schlegeli* Blkr.

XC. **Pogonias nigripinnis** (p. 59, plate XXV)

Hapalogenys nigripinnis, Günther, 1859, p. 317; — Jordan & Thompson, 1912, p. 551.
Hapalogenys kishinouyei, Jordan & Thompson, 1912, p. 554.

There are four stuffed specimens in Burger's collection, one of which was labelled "*P. melanopterus* Schl.", a name unknown in literature. According to Richardson (1846, p. 236) the British Museum too in its collections has a specimen from Burger which, when arriving from Berlin, also was identified as *Pogonias melanopterus*. Our collections further contain a specimen in spirits with the indication "Japan, F. Jap.". Total (standard) length of Burger's specimens: no. 282*:35 (29) cm, no. 283:30 (24.5) cm, no. 284:25 (20.5) cm, no. 2216:42 (34) cm; of the specimen in spirits: no. 722:30.5 (25) cm.

The plate in the Fauna Japonica is an exact reproduction of an original

plate in Burger's collection. Burger also gives a description of this species in his manuscript (no. 146).

Only specimen no. 282 still has distinct remains of dark horizontal bands on the body; the antrorse dorsal spine is visible in the specimens nos. 284, 2216 and 722 only, in the other specimens it must be covered by scales; D I.XI. 1.13-14 (1), A III.9 (-11 in specimen no. 722); eye 4-4.6, snout 2.4-2.7 in head; posterior dorsal spine 3 in fourth, second anal spine 4 in head (2.5 in specimen no. 284).

All specimens closely agree with the descriptions cited above, except sometimes in a few characters which proved to be intermediary between the data Jordan & Thompson (l.c.) give for ***nigripinnis*** and for ***kishinouyei***. This agrees with the opinion of Jordan, Tanaka & Snyder (1913, p. 169), which authors consider these species as synonymous.

Our specimens represent the type material of *Hapalogenys* ***nigripinnis*** (T. & S.). Specimen no. 282 I regard as type.

XCI. Pristipoma japonicum (p. 60, plate XXVI fig. 2)

Pristipoma japonicum Cuvier & Valenciennes, 1830a, p. 288; — Günther, 1859, p. 303.
Parapristipoma trilineatum, Jordan & Thompson, 1912, p. 544.

Burger's collection contains three stuffed specimens, Von Siebold's collection two specimens in spirits; we further possess two stuffed specimens and one specimen in spirits from Japan, which probably belong to these collections too. Total (standard) length of Burger's specimens: no. 351:13 (11) cm, no. 352:17.5 (15)cm, no. 359:30.5 (26.5) cm; of Von Siebold's specimens: no. 798a:23.5 (19) cm, no. 798b:25.5 (20.5) cm; of the further Japanese specimens: no. 358:27.5 (22.5) cm, no. 2036:22 (18.5) cm, no. 799:13 (11) cm.

In Burger's collection there still is an original plate after which the figure in the Fauna Japonica has been made; on this original the coloration of ventral parts is light blue. Burger also gives a description of this species (no. 71).

Specimen no. 799 has very distinct colour markings, in complete agreement with the description of juvenile colour markings by Jordan & Thompson (l.c.); D XIV-XV.15-17, A III.7-8; interorbital space 3.5 in head; scales along the bases of all vertical fins except spinous dorsal which has a very low sheath.

The specimens all belong to *Parapristipoma trilineatum* (Thunb.).

XCII. Diagramma punctatum (p. 60, plate XXVI A)

Diagramma punctatum, Cuvier & Valenciennes, 1830a, p. 302; — Günther, 1859, p. 323.

Diagramma ocellatum, Cuvier & Valenciennes, 1830a, p. 303.
Plectorhynchus pictus, Jordan & Thompson, 1912, p. 546; — Weber & De Beaufort, 1936, p. 426.

We possess two stuffed specimens from Burger and one ditto from Japan without name of collector. Total (standard) length of Burger's specimen: no. 306:27 (22) cm, no. 308:34 (28.5) cm; of the specimen without name of collector: no. 2227:55.5 (46.5) cm.

The plate in the Fauna Japonica is an exact reproduction of an original plate in Burger's collection. Burger has also composed a description of this species in his manuscript (no. 60).

Specimen no. 2227 has a very distinctly speckled body, soft dorsal fin and, especially, caudal fin; specimen no. 308 has less distinct spots on the fins only; D X.21-22; head 3.6, height 2.8 (-3 in specimen no. 2227) in standard length; eye 1.6 (-2 in specimen no. 2227) in snout; first anal spine 3.5-5 in second.

With the specimens described later (XCIV & XCV) this material belongs to *Plectorhynchus pictus* (Thunb.).

XCIII. Diagramma cinctum (p. 61, plate XXVI fig. 1)

Diagramma cinctum, Günther, 1859, p. 325.
Plectorhynchus cinctus, Jordan & Thompson, 1912, p. 549.

There are four stuffed specimens in Burger's collection. One more of Burger's specimens must be in the British Museum, cf. Richardson (1846, p. 239). We further have a specimen in spirits from Japan, 1844, which probably belongs to the same collection. Total (standard) length of Burger's specimens: no. 309:19 (15.5) cm, no. 310:21 (17.5) cm, no. 311*:44 (36) cm, no. 313:16.5 (13.5) cm; of the specimen in spirits: no. 822:22 (18.5) cm.

The plate in the Fauna Japonica is an exact reproduction of an original plate in Burger's collection; it does not represent the exact shape of our specimens, which have the profile slightly steeper and the posterior preopercular edge rather fine but sharply serrate. This species has been described by Burger in his manuscript (no. 59).

Remains of colour markings are still visible, especially distinct on body, D and C in specimen no. 822, in accordance with the figure in the Fauna Japonica; D XII (-XIII in specimen no. 313). 15-16, A III. (6-)7 (1); scales transverse between bases of soft dorsal and anal fin 12-1-17; height 2.6 in standard length; eye 3.8 in head.

These specimens represent the type materal of *Plectorhynchus cinctus* (T. & S.). Specimen no. 311 I regard as type.

XCIV. Diagramma poëcilopterum (p. 61)

Diagramma poëcilopterum Cuvier & Valenciennes, 1830a, p. 314; — Günther, 1859, p. 329.

We possess three stuffed specimens from Burger and one ditto from Japan without name of collector. Total (standard) length of Burger's specimens: no. 296:18 (14.5) cm, no 297:16.5 (14) cm, no. 299:16 (13.5) cm; of the specimen without name of collector: no. 298:17 (14.5) cm.

There is no plate of this species in the Fauna Japonica nor a description in Burger's manuscript.

Longitudinal bands are still distinctly visible on specimen no. 298, scarcely on no.299 only; D X.21-23, A III.6-7; eye 3.5 in head, posterior dorsal spine 1.35 in second.

With the material of *D.punctatum* (see XCII) and *D. pictum* (see XCV), these specimens belong to *Plectorhynchus pictus* (Thunb).

XCV. Diagramma pictum (p. 62)

Diagramma pictum, Cuvier & Valenciennes, 1830a, p. 315; — Günther, 1859, p. 327.

Burger's collection contains three stuffed specimens. We have two further specimens, in spirits, without name of collector, from Japan, 1844. Total (standard) length of Burger's specimens: no. 300:8.5 (7) cm, no. 301:7.5 (6.7) cm, no. 302:7.5(7) cm; of the specimens in spirits: no. 823a:8.8 (7) cm, no. 823b:7.7 (6) cm.

This species is not represented by a plate in the Fauna Japonica, nor by a description in Burger's manuscript.

The longitudinal bands along the body are still distinctly visible, especially on the specimens no. 823a & b which have the colour markings exactly as described by Jordan & Thompson (1912, p. 548) for a specimen 100 mm long. As remarked before, these specimens, with those described by Temminck & Schlegel as *D. punctatum* or *D. poëcilopterum* (see XCII & XCIV), belong to *Plectorhynchus pictus* (Thunb.).

XCVI. Glaucosoma (p. 62, plate XXVII)

Glaucosoma burgeri, Günther, 1859, p. 211; — Jordan & Thompson, 1911b, p. 440, fig. 1.

We possess no Japanese specimens of this species. According to Temminck & Schlegel, "l'individu qui a servi de type à cette figure a été malheureusement détruit".

The "figure" about which Temminck & Schlegel write is the original of

the plate in the Fauna Japonica, which still is in Burger's collection. Burger also made a description (no. 144) of this species in his manuscript. According to his data, the fin formula must be: D IX.11, A III.10. The description in the Fauna Japonica, in which Temminck & Schlegel founded the new genus *Glaucosoma,* has been made after this description and Burger's Japanese plate only. Taking "eye 3.2 in head, snout 3.8 in head" as a lapsus for "eye 3.8 in head, snout 3.2 in head", the description in the Fauna Japonica exactly agrees with Jordan & Thompson's description (l.c.). Temminck & Schlegel's *Glaucosoma* at present must be named *Glaucosoma bürgeri* Rich.

XCVII. **Scolopsides inermis** (p. 63, plate XXVIII fig. 1)

Scolopsis inermis, Günther, 1859, p. 357; — Jordan & Thompson, 1912, p. 555; — Weber & De Beaufort, 1936, p. 330.

There are four stuffed specimens in Burger's collection and one specimen in spirits in Von Siebold's collection. Total (standard) length of Burger's specimens: no. 334:16.5 (14.5) cm, no. 335:18 (15.5) cm, no. 336:21 (17.5) cm, no. 337*:23 (19) cm; of Von Siebold's specimen: no. 853:23 (18.5) cm.

In Burger's collection there is a nice Japanese plate of this species, which has been exactly reproduced in the Fauna Japonica. Burger's manuscript contains a description (no. 155).

The specimens have D X.9, lateral line 36, scales in transverse series 2-3 above and 11-12 below lateral line. They represent the type material of *Scolopsis inermis* (T. & S.),and specimen no. 337 I regard as the type. The descriptions cited above proved to be exact.

Tanaka (1928, p. 858) mentions among his synonyms of this species *Anthias vosmeri* Bloch, consequently gives it the name *Scolopsis vosmeri* (Bl.). This opinion, however, has not been confirmed by the more recent publication of Weber & De Beaufort's synonymy (l.c.).

XCVIII. **Latilus argentatus** (p. 63, plate XXVIII fig. 2)

Latilus argentatus Cuvier & Valenciennes, 1830a, p. 369; — Bleeker, 1857, p. 85; — Günther, 1860, p. 252.
Latilus japonicus, Jordan & Snyder, 1902a, p. 489.
Branchiostegus japonicus, Barnard, 1927, p. 501, pl. XXI fig. 3.

We have two stuffed specimens collected by Burger. One further specimen from Burger's collection must be in the British Museum, cf. Richardson (1846, p. 239). Total(standard) length: no. 258:34 (28) cm; no. 259:44 (37) cm.

The plate in the Fauna Japonica has been made after an original plate in Burger's collection; this original represents a specimen with light-blue stripes on the caudal fin. The eye has been drawn too small, must be 3.6 in head; the pectoral and soft dorsal fin are too low; the serrature near the preopercular angle should be much coarser. Burger gives a description of this species in his manuscript (no. 70).

The specimens have on both jaws an outer row of larger teeth, the posterior ones on lower jaw are almost canine-like. In this character the specimens differ from the description by Barnard (l.c.), but they closely agree with the other descriptions cited above as well as with the rest of Barnard's description. They belong to *Branchiostegus*(?) *japonicus* (Houttuyn).

Jordan, Tanaka & Snyder (1913, p. 187) distinguish *L. argentatus* C. & V. from *L. japonicus* (Houttuyn), and regard the genus *Branchiostegus* Raf. as distinct from *Latilus*, consequently name this species *Latilus japonicus* (Houttuyn). As I have not the opportunity to reexamine the points of view of these authors as well as of Barnard (l.c.), I provisionally accept the opinion of the more recent author, i.c., Barnard.

IC. **Cheilodactylus zonatus** (p. 64, plate XXIX)

Cheilodactylus zonatus Cuvier & Va enciennes, 1830a, p. 365, pl. 129.
Chilodactylus zonatus, Günther, 1860, p. 82.
Goniistius zonatus, Jordan & Herre, 1907b, p. 164, fig. 2.

There are six stuffed specimens in Burger's collection and one specimen in spirits in Von Siebold's collection. Two more specimens collected by Burger must be in the British Museum, cf. Richardson (1846, p. 239). Total (standard) length of Burger's specimens: no. 590:28 (23) cm, no. 591:25 (20.5) cm, no. 592:25 (19.5) cm, no. 593:18 (14.5) cm, no. 596:38.5 (32) cm, no. 805:38.5 (33) cm; of Von Siebold's specimen: no. 836:30 (24) cm.

The plate in the Fauna Japonica is an exact reproduction of an original plate in Burger's collection. A comparison with our specimens of this species made clear the inexactness of the colour markings as represented on the plate. The shape too is not completely exact: the lateral line on the caudal peduncle should approach to the dorsal outline. Burger gives a description of this species in his manuscript (no. 63).

Remains of colours and colour markings are still distinct on the stuffed specimens, indistinct on specimen no. 836; D XVII.30-32, P 14 (2-6-6). The agreement of these specimens with the descriptions cited above is very close. They must belong to *Goniistius zonatus* (C. & V.).

C. **Caprodon** (p. 64, plate XXX)

Anthias schlegelii Günther, 1859, p. 93.
Caprodon schlegelii, Boulenger, 1895, p. 314; — Jordan & Richardson, 1910, p. 467; — Tanaka, 1924, p. 607.

There is but one stuffed specimen from Burger in our collections. Total (standard) length: no. 279:31.5 (25.5) cm.

Plate XXX in the Fauna Japonica is an exact reproduction of an original Japanese plate in Burger's collection. Both the eye and the maxillary have been drawn too small. Burger's manuscript contains no description of this species.

The specimen has been painted; D X.19, A III.8; ventrals and pectorals scaly; maxillary extends beyond centre of eye; on the anterior part of the upper jaw 3 canines on the left, 2 on the right side; lower jaw with 3 canines on each side, middle one strongest; teeth on vomer indistinct, if present; no teeth on palatines; superior opercular spine inconspicuous; pectoral 2.7 in standard length. Some of these characters more or less differ from the descriptions cited above, but the agreements are far more important and numerous.

This must be the specimen on which Temminck & Schlegel founded their genus *Caprodon*. It has to be named *Caprodon schlegelii* (Günther).

CI. **Amphiprion japonicus** (p. 66)

Amphiprion clarkii, Günther, 1862, p. 5.
Amphiprion bicinctus, Weber & De Beaufort, 1940, p. 338.

Von Siebold's collection contains one specimen in spirits. Total (standard) length: no.873* :11 (8) cm.

This species is not represented by a plate in the Fauna Japonica or by a description in Burger's manuscript.

The specimen has distinct remains of its former coloration. The description in the Fauna Japonica is, though incomplete, exact. The agreement with the descriptions cited above, especially by Weber & De Beaufort, is complete. The specimen belongs to *Amphiprion bicinctus* Rüpp. and is the type of *A. japonicus* T. & S.

CII. **Heliases notatus** (p. 66)

Heliastes notatus, Günther, 1862, p. 63.
Chromis notatus, Jordan & Snyder, 1902c, p. 599.

We possess two specimens in spirits from Von Siebold. Total (standard) length: no. 895a*:12 (9.2) cm, no. 895b:9.5 (7.2) cm.

The Fauna Japonica contains no plate of this species and it has not been described by Burger in his manuscript.

Remains of the former coloration are still visible, in accordance with the description in the Fauna Japonica; A. II.10 (1). The agreement with the descriptions cited above is very close. The specimens represent the type material of *Chromis notatus* (T. & S.). Specimen no. 895a I regard as type.

CIII. **Chrysophrys aries** (p. 67, plate XXXI)

Chrysophrys aries, Günther, 1859, p. 489.
Sparus sarba, Weber & Thompson 1912, p. 581.
Sparus sarba, Weber & De Beaufort, 1936, p. 468.

There are two stuffed specimens in Burger's collection and one specimen in spirits in Von Siebold's collection. Total (standard) length of Burger's specimens: no. 406:31 (25) cm, no. 407*:33 (28.5) cm; of Von Siebold's specimen: no: 955:24.5 (19) cm.

The plate in the Fauna Japonica is a very exact reproduction of an original plate in Burger's collection. Burger also made a description of this species in his manuscript (no. 68).

The material is obviously homogeneous; height 2.7 in total length; diameter of eye less than interorbital space, 1.8 in snout; upper molars in four or five rows, innermost row short; scales on preopercle in 4-6 transverse rows. Except some slight differences in the characters just mentioned, the specimens convincingly agree with the descriptions cited above. They must belong to *Sparus sarba* Forsk., and represent the type material of Temminck & Schlegel's *aries*. Specimen no. 407 I chose as type.

CIV. **Chrysophrys longispinis** (p. 68, plate XXXII)

?*Sparus latus*, Jordan & Thompson, 1912, p. 583; — Tanaka, 1914, p. 270, fig. 262.
?*Sparus swinhonis*, Jordan & Thompson, 1912 p. 586; — Tanaka 1914, p. 267, fig. 261.

Five stuffed specimens of this species are in Burger's collection, one stuffed specimen in Von Siebold's collection. One more specimen from Burger must be in the British Museum, cf. Richardson (1846, p. 240). Total (standard) length of Burger's specimens: no. 410:17 (14) cm, no. 411:25.5 (20) cm, no. 417:33.5 (28) cm, no. 2230:37.5 (32) cm, no. 2871:31 (25.5) cm; of Von Siebold's specimen: no. 412:33 (27.5) cm.

The plate in an exact reproduction of an original plate in Burger's collection. The squamation has not been drawn in complete accordance with our specimens: the scaly part of the head should almost reach to the eye and the suborbital. Burger's manuscript contains a description (no. 67).

This homogeneous material still has rather indistinct longitudinal bands on the soft dorsal fins of some of the specimens.

At first sight already, it was obvous that the specimens must belong to *Sparus latus* Houttuyn or *Sparus swinhonis* Gthr., but when comparing the data of our specimens with those in the descriptions cited above, I made some curious observations: it proved to be impossible to identify this material as belonging to one of these species. To illustrate this and to give other investigators some data to facilitate a final decision. I will give some of the principal characters of our specimens:

	410	411	2871	412	417	2230
D	XI.11(1)	XI.12(1)	XI.11(1)	XI.11(1)	XI.11(1)	XI.11(1)
A	III.8(1)	III.8(1)	III.8(1)	III.8(1)	III.8(1)	III.8(1)
P	16	16	16	16	15	16
head/st. l.	3.4	3.3	3.3	3.3	3.3	3.3
heigth/st. l.	2.9	2.7	3.0	2.9	3.0	2.9
l. lat.	46?	50	46	46	47	47?
l. trans.	?	6-1-14	5-1-14	6-1-14	5-1-14?	6-1-14
eye head	3.8	3.9	4.1	4.1	4.1	4.4
snout/head	3.0	2.8	2.7	2.8	2.8	2.8
int. orb. sp./hd.	3.9	3.7	3.5	3.4	3.4	3.2
4th dors. sp./hd.	1.6	1.8	2.1	2.3	2.3	2.6
2nd an. sp./hd.	1.4	1.6	1.8	2.0	2.1	2.4

I ranged the specimens according to increasing size; specimen no. 412 has an open mouth with a protruded snout, on account of which I slightly corrected some of the data.

The decrease of the eye-diameter, the increase of the interorbital space and the relative shortening of the spines of dorsal and anal fins during growth can distinctly be seen from these data. There also seems to be a development in the dentification; in the juvenile specimens the teeth are much less differentiated.

The characters given by Jordan & Thompson (l.c. p. 581) in their key to distinguish *latus* and *swinhonis* proved to be insufficient; as to the form of the body our specimens should belong to *swinhonis*, but as to the number of scales in the lateral line to *latus*, while the length of the 2nd anal spine in our specimens forms a fine series between the data given as characteristic for both species by these authors. Differences in colour markings give no decision as only specimen no. 410, the smallest, has some rather distinct rows of spots on the scales.

On p. 587 in the same publication, Jordan & Thompson give as further characters useful to distinguish both species the number of scales, the length of the dorsal spines and "some smaller points of difference". These differences too are not convincing: the numbers of scales in our specimens

lie between those mentioned by Jordan & Thompson, the number in lateral line better agrees with *latus*, the number in transverse series with *swinhonis*; in the second "discriminating" character, the relative length of the dorsal spines, the smaller specimens agree with *latus* and the larger with *swinhonis*.

The further characters are intermediate or differ from the descriptions of both species cited above, but these differences generally can be accounted for by deformation and damage of these stuffed specimens. The descriptions of Tanaka were even of less use for a distinct discrimination between both species than those by Jordan & Thompson and did not help me solve this problem. The easiest way seems to be a synonymy between *latus* and *swinhonis*.

A comparison with specimens belonging to closely related or even possibly synonymous species also gave no solution. Specimens of *Sparus* (*Chrysophrys*) *datnia* (Ham. Buch.) from Makassar (Piller, 1849, no. 977; total length: 25:5 & 22 cm) and from Bengal and Japan (Bleeker, no. 5726; total length: 17 & 17 cm) differ considerably in some characters: height 2.2-2.5 in standard length; lateral line 43-44, transverse series 4-1-11 or 4-1-12. Specimens of *Sparus schlegeli* Blkr. from Japan (Bleeker, 1879, no. 5727; total length: 15 cm) and from Amoy, China (Schlegel, 1862, no. 951; total length: 15 cm) differ slightly less: height 2.5-2.6 in standard length; scales in transverse series 5-1-13. All these specimens especially differ in relative height, which difference cannot be explained by the eventual deformation of the stuffed specimens. It would have been a strange accident if all specimens were deformed in exactly the same degree. These specimens consequently belong to a different species. Unfortunately I had no specimens identified as *S. swinhonis* or *latus* at my disposal.

I provisionally regard our specimens as *Sparus latus* Houttuyn.

CV. Chrysophrys cardinalis (p. 69, plate XXXIII)

Pagrus cardinalis, Günther, 1859, p. 470.
Evynnis cardinalis, Jordan & Thompson, 1912, p. 573.

We possess three stuffed specimens from Burger and four specimens in spirits from Von Siebold. Total (standard) length of Burger's specimens: no. 401:26 (21) cm, no. 402:30 (25.5) cm, no. 403:23.5 (20) cm; of Von Siebold's specimens: no. 954a:18 (14.5) cm, no. 954b:16.5 (13) cm, no. 954c:9.5 (7.5) cm, no. 954d:7.6 (6.4) cm.

Burger's collection contains an original Japanese plate of this species which has been exactly reproduced in the Fauna Japonica. He also gives a description in his manuscript (no. 150).

This material has the spots on the back still visible; height 2.4-2.6, head

3.3-3.4 in standard length; eye 3.5-4, maxillary 2.7-3 in head. It closely agrees with the descriptions cited above and must belong to *Evynnis cardinalis* (Lacép.).

CVI. **Chrysophrys tumifrons** (p. 70, plate XXXIV)

Pagrus tumifrons, Günther, 1859, p. 470.
Taius tumifrons, Jordan & Thompson, 1912, p. 571.

There is one stuffed specimen in Burger's collection and one specimen in spirits in Von Siebold's collection. Total (standard) length of Burger's specimen: no. 418*:30 (25) cm; of Von Siebold's specimen: no. 960:18 (14) cm.

The plate in the Fauna Japonica is an exact reproduction of an original Japanese plate in Burger's collection. The number of finrays has not been drawn in a completely exact manner: according to our specimens it should be D XII.10 (1), A III.8-9. The lowest lobe of the opercular edge misses in our specimens. Burger gives a description of this species in his manuscript (no. 153).

Specimen no. 960 differs from the other specimens by having a left ventral fin with three spines, one of which is of normal length, the others about 0.65. All specimens further agree with the descriptions cited above. They represent the type material of *Taius tumifrons* (T. & S.). Specimen no. 418 I regard as type.

CVII. **Chrysophrys major** (p. 71, plate XXXV)

Pagrus major, Günther, 1859, p. 470.
Pagrosomus major, Jordan & Thompson, 1912, p. 576; — Tanaka, 1914, p. 315.

We possess four stuffed specimens from Burger and ten specimens in spirits from Von Siebold. Another specimen in Burger's collection, labelled "*Chrysophrys orientalis*" (an unpublished name), also proved to belong to this species (no. 2182). Total (standard) length of Burger's specimens: no. 404:27 (23.5) cm, no. 405*:40 (33.5) cm, no. 413:27.5 (21.5) cm, no. 415:27.5 (22.5) cm, no. 2182:63 (51) cm; of Von Siebold's specimens: no. 961a:17 (13) cm, no. 961b:16 (12.5) cm; no. 961c:9.5 (7.8) cm, no. 961d-j:7-4.5 (5.5-3.5) cm.

The plate in the Fauna Japonica is an exact reproduction of an original plate in Burger's collection. It shows the back slightly less arched than in our material, consequently the body less deep. Burger's manuscript contains a description of this species (no. 145).

These specimens all closely agree with the descriptions cited above (only

specimen no. 405 slightly differs: eye 4.2 in head). They represent the type material of *Pagrosomus major* (T. & S.). I chose specimen no. 405 as type.

CVIII. Dentex griseus (p. 72, plate XXXVI)

Dentex griseus, Günther, 1859, p. 372.
Gymnocranius griseus, Jordan & Thompson, 1912, p. 568, fig. 7.

There are four stuffed specimens in Burger's collection and one specimen in spirits in Von Siebold's collection. One more specimen collected by Burger must be in the British Museum, cf. Richardson (1846, p. 242). Total (standard) length of Burger's specimens: no. 323:26 (21) cm, no. 324:32.5 (26) cm, no. 325:35 (29.5) cm, no. 2248*:42 (35) cm; of Von Siebold's specimen: no. 1026: 23 (18.5) cm.

Burger's collection still contains the original Japanese plate after which the reproduction in the Fauna Japonica has been made. This reproduction is very exact. Burger also described this species in his manuscript (no. 143).

The agreement with the descriptions cited above is very close. The specimens represent the type material of *Gymnocranius griseus* (T. & S.). Specimen no. 2248 I regard as type.

CIX. Dentex setigurus (p. 73, plate XXXVII fig. 1)

Dentex setigurus Cuvier & Va'enciennes, 1830b, p. 253.
Synagris sinensis, Günther, 1859, p. 379.
Euthyopteroma virgatum, Jordan & Thompson, 1912, p. 564; — Tanaka, 1913, p. 200, fig. 208.

We possess three stuffed specimens from Burger and two specimens in spirits from Von Siebold. According to Richardson (1846, p. 242) there must be one specimen from Burger in the British Museum. Total (standard) length of Burger's specimens: no. 90:40 (32.5) cm, no. 318:19.5 (16.5) cm, no. 319:25.5 (21) cm; of Von Siebold's specimens: no. 1022a & b:20 (15.5) cm.

The plate in the Fauna Japonica is a reproduction of an original plate in Burger's collection. This original slightly differs by having the longitudinal stripe on the snout and the caudal filament painted yellow. There is a description of this species in Burger's manuscript (no. 151); here Burger describes the coloration as represented on his plate.

The specimens still have remains of their former coloration, especially the specimens in spirits; the stuffed ones are painted about in accordance with the plate in the Fauna Japonica; height slightly more than head, 3.3-3.7 in standard length; eye 3.5-4.5 in head; preorbital width about equal to eye; 2-4 small canines on each side of the tip of the upper jaw; third developed

ray of the upper lobe of the caudal fin with a long filament; the pectoral base is scaly. Although slightly differing in some of the characters just mentioned, the specimens sufficiently agree with the descriptions cited above. According to Weber & De Beaufort (1936, p. 352), these specimens must belong to the genus *Nemipterus* Swainson. I consequently identify them as *Nemipterus virgatus* (Houttuyn).

CX. **Lethrinus haematopterus** (p. 74, plate XXXVIII)

?Lethrinus erythropterus Cuvier & Valenciennes, 1830b, p. 313.
Lethrinus richardsonii Günther, 1859, p. 456.
Lethrinus haematopterus, Jordan & Thompson, 1912, p. 560; — Weber & De Beaufort, 1936, p. 440.

We possess four stuffed specimens from Burger, two of which (no. 2181 & 2246) were identified as "*Lethrinus erythropterus* Schl." and one stuffed specimen and three specimens in spirits from Von Siebold. Total (standard) length of Burger's specimens: no. 435*:32 (27) cm, no. 437:29.5 (24.5) cm, no. 2181:53 (45.5) cm, no. 2246:41 (32.5) cm; of Von Siebold's specimens: no. 436:18.5 (15) cm, no. 1047a:23 (18) cm, no. 1047b:20.5 (16) cm, no. 1047c:9.7 (7.5) cm.

Burger's Japanese plate has been exactly reproduced in the Fauna Japonica. The shape is not exact; according to our specimens, the eye should be 4 in head, 2 in snout (in adult specimens; in specimen no. 436 3.3 in head and 1.8 in snout, in specimen no. 1047c 2.8 in head and 1.3 in snout). There is a description of this species in Burger's manuscript (no. 141).

All stuffed specimens have been painted in accordance with the plate in the Fauna Japonica; eye slightly more than or equal to interorbital space; dorsal spines are rather stout, third slightly shorter than longest ray, not even 3 in head; the lateral series of teeth is blunt but still conical; there are 4-5 rows of scales between the spinous dorsal fin and lateral line. The agreement with the descriptions cited above is very close. Only Cuvier & Valenciennes' description is insufficient, which makes a synonymy doubtful. A description of this species by Günther (1859, p. 464) agrees much less closely than the description of *richardsonii*, and more or less differs in all the characters described before. This agrees with the synonymy given by Weber & De Beaufort (l.c.).

The specimens represent the type material of *Lethrinus haematopterus* T. & S., which name I retain as long as a synonymy with *erythropterus* C. & V. has not been convincingly proved. Specimen no. 435 I regard as type.

CXI. Melanychthys (p. 75, plate XXXIX)

Girella punctata, Günther, 1859, p. 427; — Jordan & Thompson, 1912, p. 589.
?Girella melanichthys, Jordan & Thompson, 1912, p. 592.

There are five stuffed specimens and one specimen in spirits in Burger's collection, and one specimen in spirits in Von Siebold's collection. Total (standard) length of Burger's specimens: no. 371:23 (18.5) cm, no. 372:33 (26.5) cm, no. 373:42 (33) cm, no. 2342:45.5 (38) cm, no. 2346:38.5 (31.5) cm, no. 1225 (in spirits): 27 (21) cm; of Von Siebold's specimen: no. 1224:12.5 (10) cm.

The plate in the Fauna Japonica is an exact reproduction of an original plate in Burger's collection. According to our material, the plate is not completely exact: the eye should be at least 4.6 in head, the opercle generally less scaly. Burger has described this species (no. 152).

This material is obviously homogeneous; longitudinal stripes caused by rows of scales with basal spots, are distinct on specimen no. 1224 only, indistinct on the specimens nos. 1225, 2346 and perhaps 2342.

According to Jordan & Thompson (l.c.) Temminck & Schlegel's *Melanychthys* should be identical with *Girella melanichthys* (Rich.), but their key doubtless leads to *punctata* Gray. They distinguish these two species on account of a differing fin formula, but our material shows that this cannot be a criterion, the fin formula being very variable: D XIV-XV.12-14, A III.12.

Jordan & Thompson's description of *punctata* differs in many respects from our specimens; these, e.g., have the following different characters: specimen no. 371: scales in transverse series between the bases of D and A 6-1-15 (about 2 rows along the bases of these fins not included); 2-3 series of tricuspid teeth; ventral not reaching vent; no spots on scales; specimen no. 372: 2 series of tricuspid teeth; scales, ventrals and spots as former specimen; no. 373: interorbital space 3, 3rd anal spine 2.5 in head; scales, teeth, ventrals and spots as before; specimen no. 2342: scales and ventrals as no. 373; spots on scales indistinct; specimen no. 2346: scales transverse about 6-1-15; 3 series of tricuspid teeth; last dorsal spine 2.5 in head; lower half of opercle almost completely covered with scales, in accordance with the plate in the Fauna Japonica; ventrals not reaching vent; spots on lateral scales indistinct; no. 1225: scales, ventrals and spots as no. 2346; no. 1224: eye 3.5, interorbital space 3.4 in head; scales transverse 7-1-15; distance between preopercular margin and eye 2 in eye; posterior dorsal spine 2.4 in head, equal to 3rd anal spine; pectoral fin 1.3 in head, ventral fin reaching vent, 1.5 in head. The differences from Jordan & Thompson's

description of *melanichthys* are generally slight: scales 50-54, transverse 6(7)-1-15, spots on scales in some specimens.

In my opinion both species probably are but varieties of one single species, which must be named *Girella punctata* Gray. To this species belong our specimens, which form the material on which Temminck & Schlegel founded their genus *Melanychthys*.

CXII. Gerres equula (p. 76, plate XL fig.1)

Gerres oyena, Günther, 1859, p. 352.
Xystaema erythrourum, Jordan, 1907b, p. 246.

There is one specimen in spirits in Von Siebold's collection; in Burger's collection I found a stuffed specimen labelled *Gerres japonicus* T. & S., which specimen so closely resembles the plate in the Fauna Japonica. that I suppose it has been made after this specimen. Total (standard) length of Burger's specimen: no. 274*:23.5 (17.5) cm; of Von Siebold's specimen: no. 1086:19 (15) cm.

The plate in the Fauna Japonica has been made after an original Japanese plate in Burger's collection. It represents Burger's specimen only, but considerably differs from Von Siebold's specimen which, as appeared, belongs to a different species. In Burger's manuscript there is a description (no. 149) which also concerns his specimen only. As vernacular name Burger gives "Sizugara", which must be the Japanese name of *Gerres erythrourus* (Bl.) (cf. Jordan, l.c.).

As mentioned above this material is obviously heterogeneous. The description in the Fauna Japonica has been made after specimen no. 274 only, which specimen exactly agrees with the descriptions cited above, consequently belongs to *Gerres erythrourus* (Bl.). It is the type specimen of Temminck & Schlegel's *equula*.

Specimen no. 1086 completely agrees with Jordan's description of *Gerres japonica* (l.c., p. 247) and doubtless belongs to that species. The only difference is the number of scales in transverse series: 4-1-9.

According to Weber & De Beaufort (1931, p. 342) there is no reason to separate *Gerreomorpha* All. & Macl. from *Gerres* Cuvier, while these authors mention *Xystaema* Jord. & Everm. among the synonyms of the species of *Gerres* only. In consequence of this I use the generic name *Gerris* for both our specimens.

CXIII. Velifer (p. 312, plate A (Supplement))

Velifer hypselopterus Bleeker, 1879, p. 16; — Regan, 1907, p. 633.

We possess no specimens of this species.

The plate in the Fauna Japonica has not been made after a plate in Burger's collection. Burger also gives no description of this species.

According to the description in the Fauna Japonica, Temminck & Schlegel have had at their disposal three specimens, measuring about "8 pouces". As Regan in his publication (l.c.) mentions three specimens in the British Museum measuring nearby 20 cm in total length, of which specimens he gives an additional description, I suppose that these are Temminck & Schlegel's original specimens. Regan gives no particulars as to the collector or in which way they came into the possession of the British Museum.

CXIV. **Ditrema** (p. 77, plate XL, fig. 2)

Ditrema temminckii, Günther, 1862, p. 246; — Jordan & Sindo, 1902a, p. 357.

In our collection there are one stuffed specimen and a specimen stuffed with cotton but now in spirits, both from Burger. Total (standard) length: no. 389:20.5 (16) cm, no. 1678:23.5 (18.5) cm.

The plate in the Fauna Japonica has been made after a Japanese original plate in Burger's collection, which shows the lips more pink than the reproduction. This species has been described by Burger, whose description still exists in his manuscript (no. 142); it does not even mention the two ventral apertures.

Specimen no. 389 has lost almost all scales, specimen no. 1678 those on the opercle only; D X.21 (1), A III.26 (1); scales about 70; eye 1.3 in snout; interorbital space 3.2-3.3 in head; lower jaw slightly included; all anal rays are about equal, probably because both specimens are female or on account of damage of the fins. Except some slight differences in these characters, the specimens agree with the descriptions cited above. They belong to *Ditrema temminckii* Blkr. and represent the material on which Temminck & Schlegel founded their genus *Ditrema.*

CXV. **Chaetopterus** (p. 78, plate XXXVII fig. 2)

?Serranus filamentosus Cuvier & Valenciennes, 1830b, p. 508.
Chaetopterus dubius Günther, 1859, p. 385.
Pristipomoides siebo'dii, Jordan & Thompson, 1911b, p. 462, fig. 6.
Pristipomoides filamentosus, Fowler, 1931b, p. 191.

We have but one stuffed specimen, collected by Burger, which has written on one side the note "n. gen. inter *Aprion* et *Aphareus*". Total (standard) length: no. 281:40 (32.5) cm.

Burger's original Japanese plate has been exactly reproduced in the

Fauna Japonica; the numbers of scales and dorsal spines and rays are not exact, should be: scales 66(7), transverse 7 (or 8)-1-16, D X.11. Burger has not described this species.

The specimen has very large eyes, oval, with longest diameter 3.5 in head; interorbital space anteriorly equal to vertical diameter of eye, 1.7 in posterior part of interorbital space; height 3.3 in standard length; two opercular spines, upper indistinct; 3rd anal spine longest and stoutest; lower jaw slightly projecting; no canines, but some teeth on the anterior edge of the jaws somewhat longer. Except some slight differences in these characters, the specimen sufficiently agrees with the descriptions cited above. The characters which differ from *Pristipomoides sieboldii* as described by Jordan & Thompson (l.c.) agree with the description of *P. ulaula* by the same authors (p. 463); both these species probably are identical. The description by Cuvier & Valenciennes is not very convincing. Burger's specimen has no "dents fortes et crochues". As, in my opinion, a synonymy with Cuvier & Valenciennes' *filamentosus* has not been proved satisfactorily, I provisionally reject Fowler's opinion and name this specimen *Pristipomoides sieboldii* Blkr. On this specimen Temminck & Schlegel founded their genus *Chaetopterus*.

CXVI. Chaetodon strigatus (p. 80, plate XLI fig. 1)

Chaetodon strigatus Cuvier & Valenciennes, 1831a, p. 25; — Günther, 1860, p. 34.
Microcanthus strigatus, Jordan & Fowler, 1902c, p. 541; — Weber & De Beaufort, 1936, p. 22.

We possess three stuffed specimens from Burger and one specimen in spirits from Von Siebold. Total (standard) length of Burger's specimens: no. 505:16.8 (14) cm, no. 506:16.5 (13.7) cm, no. 507:26 (22) cm; of Von Siebold's specimen: no. 1117:12 (9.5) cm.

The plate in the Fauna Japonica is an exact reproduction of an original plate in Burger's collection. There is a description of this species in Burger's manuscript (no. 99).

The specimens have a low scaly sheath along the base of the spinous dorsal fin; scales 50-55, in transverse series 10-1-24; D XI.16 (1), A III.14 (1); the pectoral fins are about as long as the ventrals; head 3-3.3 in standard length; six longitudinal bands, 5th and 6th extending on anal fin. Although some of these characters slightly differ, the specimens sufficiently agree with the descriptions cited above. They belong to *Microcanthus strigatus* (C. & V.).

CXVII. **Chaetodon modestus** (p. 80, plate XLI fig. 2)

Chaetodon modestus, Günther, 1860, p. 10; — Jordan & Fowler, 1902c, p. 535.
Coradion desmotus Jordan & Fowler, 1902c, p. 539, fig. 5.

Our collection contains four stuffed specimens from Burger and two specimens in spirits from Von Siebold. Total (standard) length of Burger's specimens: no. 464:9.5 (8) cm, no. 465:10.5 (9) cm; no. 466*:13 (11) cm, no. 467:11 (9.5) cm; of Von Siebold's specimens: no. 1138a:11.3 (9.5) cm, no. 1138b:10.5 (8.7) cm.

Burger's collection contains a nice Japanese plate of this species, which has been exactly reproduced in the Fauna Japonica. It slightly differs from our specimens, which have a scaly sheath along spinous dorsal fin, the basal part of the anal spines covered with scales, edge of caudal fin nearly straight or truncate, eye 3.2 in head, A III.17-18. According to a note written on Burger's original plate there has been a description of this species in Burger's manuscript (no. 98), which, however, is missing.

Remains of the former coloration are still visible on the specimens in spirits, while Burger's specimens have been painted about in accordance with the plate in the Fauna Japonica; D XI.22-23, A III.17-18; about 40 scales in lateral line, which does not reach to below the last dorsal ray, but ends at a distance of about half the diameter of the eye (variable!) before that place; about 13 rows of scales between the base of the spinous dorsal and the lateral line, about 30 between lateral line and anal spines; no pores of lateral line on the caudal peduncle; eye-diameter slightly shorter than snout, 3.2 in head, 1.3 in caudal peduncle; first anal spine shorter than height of caudal peduncle; there seem to have been 4 cross bands, the 4th has been painted across the caudal base of the stuffed specimens. Except some slight differences in these characters the specimens rather convincingly agree with the descriptions cited above. As has already been stated by Jordan, Tanaka & Snyder (1913, p. 211) *desmotes* Jord. & Fowl. is synonymous with *modestus* T. & S. This must be the type material of *Chaetodon modestus* T. & S. Specimen no. 466 I regard as type.

CXVIII. **Chaetodon aureus** (p. 81, plate XLII fig. 1)

Chaetodon aureus, Günther, 1860, p. 29.
Chaetodon collaris, Jordan & Fowler, 1902c, p. 534, fig. 3.
Chaetodon (Chaetodontops) collare, Weber & De Beaufort, 1936, p. 91.

We possess but one specimen in spirits, collected by Von Siebold. Total (standard) length: no. 1121*:14 (11.5) cm.

The plate in the Fauna Japonica is an exact reproduction of an original

plate in Burger's collection. Burger's manuscript contains no description of this species.

The specimen still has distinct remains of the former coloration which prove the exactness of the plate in the Fauna Japonica, at least in this character; the lateral line ends slightly before the vertical line through the posterior dorsal ray; the squamation is damaged, scales in longitudinal series about 30; snout hardly longer than eye-diameter; D XII.24. The agreement with the descriptions cited above is rather close. The specimen belongs to *Chaetodon* (*Chaetodontops*) *collare* Bl., and is the type of *aureus* T. & S.

CXIX. **Heniochus macrolepidotus** (p. 82, plate XLIV fig. 1)

Heniochus macrolepidotus, Cuvier & Valenciennes, 1831a, p. 93; — Günther, 1860, p. 39; — Jordan & Fowler, 1902c, p. 542.
Heniochus acuminatus, Weber & De Beaufort, 1936, p. 37.

Our collection contains two stuffed specimens from Burger and five specimens in spirits from Von Siebold. Total (standard) length of Burger's specimens: no. 517:9.5 (8) cm, no. 518:7 (6) cm; of Von Siebold's specimens: no. 1163a:8.7 (7.5) cm, no. 1163b:6.7 (5.3) cm, no. 1163c-e:4.8-4.1 (3.8-3.3) cm.

Burger's collection contains a Japanese plate which has been exactly reproduced in the Fauna Japonica. The numbers of finrays in D and A is inexact; according to our specimens this must be D XI-XII.24-25, A III. 17-18. According to a note on Burger's original plate this species has been described in Burger's manuscript (no. 198); this description, however, is missing.

The specimens in spirits still have distinct remains of colour markings while the stuffed specimens have been painted about in accordance with the plate in the Fauna Japonica; in all specimens in spirits the posterior band reaches to the base of the soft dorsal fin; specimen no. 1163a is blackish along the 1st and 2nd anal spine. The agreement with the descriptions cited above is complete. The specimens belong to *Heniochus acuminatus* (L.).

CXX. **Holacanthus septentrionalis** (p. 82, plate XLIV fig. 2)

Holacanthus septentrionalis, Günther, 1860, p. 52; — Jordan & Fowler, 1902c, p. 545.
Holacanthus ronin Jordan & Fowler, 1902c. p 546, fig. 6.
Chaetodontoplus septentrionalis, Weber & De Beaufort, 1936, p. 127.

We possess two stuffed specimens from Burger and one specimen in spirits from Von Siebold. Total (standard) length of Burger's specimens:

no. 553:16 (13.5) cm, no. 554:18 (15) cm; of Von Siebold's specimen: no. 1204*:20 (16.5) cm.

The plate in the Fauna Japonica has been made after an original plate in Burger's collection which is coloured lighter brown than the reproduction and has the stripes lighter bluish. Burger's manuscript contains no description of this species.

The original colour markings are still visible on specimen no. 1204 only, the stuffed specimens have been painted about in accordance with the plate in the Fauna Japonica; D XIII.17-18, A III.17-18; the lateral line ends about as in the former species, slightly before the vertical line through the posterior dorsal ray. The agreement with the descriptions cited above is quite close. These specimens represent the type material of *Chaetodontoplus septentrionalis* (T. & S.). Specimen no. 1204 I regard as type.

CXXI. Platax vespertilio japonicus (p. 83, plate XLIII)

Platax teira, Günther, 1860, p. 492; — Jordan & Fowler, 1902c, p. 526; — Weber & De Beaufort, 1936, p. 185, fig. 50.

Our collection contains three stuffed specimens from Burger. Total (standard) length: no. 962:18.5 (14) cm, no. 963:22.5 (18.5) cm, no. 964*:29.5 (24) cm.

The plate in the Fauna Japonica is an exact reproduction of an original Japanese plate in Burger's collection. The number of rays in the dorsal fin should be D V.32. Burger gives no description of this species in his manuscript.

The specimens have been painted in accordance with the plate in the Fauna Japonica; the standard length is about equal to the height; fin formula: D V.32, A III.23-25; about 75 scales in longitudinal series. Except some slight differences in these characters the specimens closely agree with the descriptions cited above. They belong to *Platax teira* (Forsk.) and are the type specimens of Temminck & Schlegel's *japonicus*. Specimen no. 964 I regard as type.

CXXII. Hypsinotus (p. 84, plate XLII fig. 2)

Hypsinotus rubescens Günther, 1860, p. 63.
Antigonia rubescens, Jordan & Fowler, 1902c, p. 523, fig. 2; — Weber & De Beaufort, 1929, p. 266.

We possess no Japanese specimens of this species. According to Temminck & Schlegel the type has been "détruit par accident".

The plate in the Fauna Japonica has been made after an original plate in Burger's collection. Burger also gives a description of this species in his

manuscript (no. 197). This description and Burger's plate have been the only sources for the description by Temminck & Schlegel. Nevertheless the descriptions in the Fauna Japonica and by Burger do not give exactly the same data, as the characters given in Burger's description have been completed and corrected(?) with those on Burger's Japanese plate. Burger mentions 9 dorsal spines, which is one more argument for the synonymy given by the authors cited above.

CXXIII. Pempheris molucca (p. 85, plate XLIV fig. 3)

?*Pempheris moluca* Cuvier & Valenciennes, 1831a, p. 306; — Weber & De Beaufort, 1936, p. 213.
?*Pempheris molucca*, Günther, 1860, p. 213.

Our collection contains no specimens of this species.

The plate in the Fauna Japonica has been made after an original plate in Burger's collection. This species has not been described by Burger.

The description in the Fauna Japonica has been made after Burger's Japanese plate only. Temminck & Schlegel's identification probably is wrong. According to Jordan, Tanaka & Snyder (1913, p. 137) there occurs but one species of the genus *Pempheris* in the Japanese waters, viz., *P. japonicus* Döderl.

CXXIV. Pimelepterus indicus (p. 86)

Pimelepterus cinerascens, Day, 1878, p. 143, pl. XXXV fig. 3.
Kyphosus cinerascens, Jordan & Thompson, 1912, p. 596; — Weber & De Beaufort, 1936, p. 224.

We possess three stuffed specimens from Burger. Total (standard) length: no. 447:30 (24.5) cm, no. 448:20 (16.5) cm, no. 2212: 53.5 (44.5) cm.

Of this species there is neither a plate in the Fauna Japonica nor a description in Burger's manuscript.

The specimens have the soft fins damaged; the 6th dorsal spine is longest, but still more than 2 in head; scales about 65, in transverse series 9-1-19; the preopercle is not serrated. The longest, 6th dorsal spine is in accordance with the figures by Day (l.c.) and Bleeker (1877a, pl. 364 fig. 4). These specimens must belong to *Kyphosus cinerascens* (Forsk.).

CXXV. Histiopterus typus (p. 86, plate XLV)

Histiopterus typus, Bleeker, 1876, p. 269; — Jordan, 1907a, p. 237.

Our collection contains one specimen in spirits from Von Siebold and one stuffed Japanese specimen which probably belongs to the same collection,

especially as Temminck & Schlegel write about two specimens. Total (standard) length of Von Siebold's specimen: no. 422*:22.5 (20.5) cm; of the stuffed specimen: no. 543: 64.5 (60) cm.

The plate in the Fauna Japonica is an exact reproduction of a plate in Burger's collection which is probably not of Japanese origin. There is no description in Burger's manuscript.

The specimens have the fins more or less damaged, especially specimen no. 422 (D and C); D IV.27, A III.10 (1)-11; scales in longitudinal series about 70; the ventral fins almost reach the 1st anal spine; 2nd anal spine longest and stoutest. These specimens doubtless represent the type material of *Histiopterus typus* T. & S. On account of its more complete data I regard specimen no. 422 as type of this species.

CXXVI. Histiopterus acutirostris (p. 88)

Evistias acutirostris, Jordan, 1907a, p. 237.

We possess one stuffed specimen from Burger and one stuffed Japanese specimen without name of collector, but which must belong to this collection too. Total (standard) length of Burger's specimen: no. 822*:46 (38.5) cm; of the specimen without name of collector: no. 2398:67 (63) cm.

There is neither a plate of this species in the Fauna Japonica nor a description in Burger's manuscript.

The squamation of specimen no. 822 is damaged, specimen no. 2398 still has indistinct remains of cross bands on the body; D IV.27, A III.12; height 1.7 (no. 2398)-2 (no. 822) in standard length; snout 2 in head; 3rd dorsal spine about 2 in 4th. These specimens, when compared with the description cited above, slightly differ in some of the characters just mentioned only. They represent the type material of *Evistias acutirostris* (T. & S.). Specimen no. 822 I regard as type.

CXXVII. Scaradon fasciatus (p. 89, plate XLVI figs. 1 & 2)

Hoplegnathus fasciatus, Günther, 1861, p. 357.
Oplegnathus fasciatus, Jordan & Fowler, 1902a, p. 76.

There are eleven stuffed specimens in Burger's collection; one further specimen, in spirits, with the indication "F. Jap." must belong to the same material. Total (standard) length of Burger's specimens: no. 1185:8.5 (7) cm, no. 1186:12.5 (10) cm, no. 1187:10 (8) cm, no. 1188:9.5 (7.5) cm, no. 1189:21.5 (17) cm, no. 1190:39 (31) cm, no. 1191:44 (35.5) cm, no. 2190:44.5 (36) cm, no. 2202*:63.5 (53) cm, no. 2213:49 (40) cm, no. 2349:37 (29) cm; of the specimen in spirits: no. 1226:21.5 (17.5) cm.

Both figures of this species in the Fauna Japonica are exactly reproduced

after plates in Burger's collection. In their text Temminck & Schlegel use the name *Scaradon,* but in their Index and on their plate the name *Scarodon.* The figures do not represent our specimens very exactly: our adult specimens have the body more slender; the basal line of the anal fin is too steep; in the juvenile specimens (nos. 1185-1188) there are 3 anal spines, eye 3-3.5 in head. This species has been described by Burger in his manuscript (no. 64).

The specimens still have remains of their original coloration, about as on the plate in the Fauna Japonica; D XII.16 (1)-18, A III.12-14; height in adult specimens 2.5-2.7 (no. 1226:1.9) in standard length, 2.9-3.4 (no. 1226:2.5) in total length; head in adult specimens 3.7-4.2 in total length; eye in adult specimens 4.5-5.3 in head, 1.8-2.2 in snout. Except some unimportant differences in some of these characters, the specimens agree with the descriptions cited above. The differences almost all have been caused by deformation of the stuffed specimens. This must be the type material of *Oplegnathus fasciatus* (T. & S.). Specimen no. 2202 I chose as type.

CXXVIII. **Scaradon punctatus** (p. 91)

Hoplegnathus punctatus, Günther, 1861, p. 358.
Oplegnathus punctatus, Jordan & Fowler, 1902a, p. 77.

Our collection contains five stuffed specimens from Burger. Total (standard) length: no. 1192:14 (11.5) cm, no. 1193:19 (15.5) cm, no. 1194:28 (22) cm, no. 1195*:34.5 (28) cm, no. 2258:31 (24.5) cm.

Of this species there is neither a plate in the Fauna Japonica nor a description in Burger's manuscript.

The specimens still have remains of colour markings; D XII.16-7, A III.12(1); scales in longitudinal series about 90; height 2.2 in standard length. The agreement of these specimens with the descriptions cited above is very close. They must represent the type material of *Oplegnathus punctatus* (T. & S.). Specimen no. 1195 I regard as type.

In the next group (CXXIX-CXXXIX) it was almost impossible to count the exact numbers of finrays, especially in D and A, as they generally are covered with scales, paint and varnish in the stuffed specimens. The difference between spines and unbranched soft rays often could not be discriminated with sufficient certainty. In consequence some of the numbers of finrays in this part are not reliable.

CXXIX. **Scomber scombrus japonicus** (p. 92)

Scomber saba Bleeker, 1854, p. 405.
Scomber janesaba Bleeker, 1854, p. 406.

Scomber tapeinocephala Bleeker, 1854, p. 407.
Scomber japonicus, Evermann & Kendall, 1910, p. 327; — Kishinouye, 1923, p. 403. figs. 1, 7, 16, 28-30.
Pneumatophorus japonicus, Starks, 1922, p. 9.

Von Siebold's collection contains one specimen in spirits. Total (standard) length: no. 1259:40.5 (35) cm.

Of this species there is neither a plate in the Fauna Japonica nor a description in Burger's manuscript.

This specimen is in a very good condition; it has distinct remains of the former coloration: about 30 irregular, branched and curved transverse dark stripes on the back, ending slightly below the lateral line on the body and slightly above the lateral line on the caudal peduncle; below these is a much less distinct brownish longitudinal stripe; the tops of D^1 and C and the basal parts of P and V are brownish, and there are some brown irregular blots on interorbital space and snout.

I investigated this specimen together with Temminck & Schlegel's material of *Scomber pneumatophorus japonicus* (see CXXX & CXXXI). The various data and my conclusion can be seen there.

CXXX, CXXXI. Scomber pneumatophorus japonicus (p. 93, plate XLVII figs. 1 & 2)

For literature, see CXXIX.

There are three stuffed specimens of this species in Burger's collection, two with the indication "major" and one with "minor"; Von Siebold's collection contains five specimens in spirits, all with the indication "minor". Total (standard) length of Burger's specimens: no. 834:34 (30) cm, no. 836:40.5 (35) cm, no. 894:18 (16) cm; of Von Siebold's specimens: no. 1274a & b:26 (22) cm, no. 1274c:18 (15.5) cm, no. 1274d:11.7 (10) cm, no. 1274e:11.2 (8.7) cm.

The plate in the Fauna Japonica is an exact reproduction of an original plate in Burger's collection. The finrays have not been drawn in a completely exact manner: some of our specimens have 10(-11) dorsal spines, the 10th very small and inconspicuous, and I wonder whether some of the specimens in which I could find but 9 spines did not also have a 10th formerly. The anal fin should have but one free spine. The fin formula consequently probably has to be as follows: D IX?-XI.1.11. V or IX?-XI.2.10.V, A I.1.10-11.V. According to remains of colour markings on the specimens in spirits, the coloration as represented on the plate is quite exact. Burger's manuscript contains two descriptions of this species, one of the form called "major" (no. 183) and one of the form "minor" (no. 184).

These descriptions are both very inexact and mention following differences between both forms: tongue: long ("minor")—short ("major"), throat: smooth—sharpish, eyes: behind—above angle of mouth, iris: greenish white—yellowish brown, D IX.12.V—IX.11.V, A I.12.V—II.12.V, P 18-20, back: dark bluish with stripes—green with blue stripes. As far as I could control these differences, they proved to be incorrect, and so probably will be the rest.

The remains of the former coloration are still distinct on the specimens in spirits and form a distinct intermediairy series between those represented on the plate in the Fauna Japonica when ranged according to increasing size. The stuffed specimens all have been painted yellowish with a greenish back, have been varnished afterwards, and have the fins more or less damaged (especially specimen no 894).

I accurately investigated these specimens and compared them with Von Siebold's specimen of *Sc. scombrus japonicus* T. & S. and with Bleeker's Japanese specimens of *Sc. saba* Blkr. (no. 6035, 2 specimens), *Sc. janesaba* Blkr. (no. 6036, 3 specimens) and *Sc. tapeinocephala* Blkr. (no. 6041, 2 specimens) (see table p. 90/91).

The data given by Starks should be compared with our three largest specimens only, the data given by Evermann & Kendall with the whole material.

The only specimens with characters considerably beyond the range of variation given by Evermann & Kendall are the specimens nos. 1259, 836 & 834. It seems a strange coincidence that these are just the three largest specimens too. Generally the characters of stuffed specimens are unreliable, and especially when they concern the shape of head and body, but here all characters of Burger's specimens have been more or less confirmed, if not accentuated, by the same characters in the, definitely undeformed, specimen in spirits.

The relatively smaller size of the head in our three oldest specimens probably can be best explained by accepting it as a typical adult character, although it then still seems a mystery why Evermann & Kendall, who investigated specimens measuring up to 38 cm standard length, got but so small a range of variation. Nevertheless the mistake probably must be theirs, as Starks's data exactly confirm mine. Except this decrease of relative length, it can also be found in the length of the maxillary and the snout. Only the relative length of the snout in specimen no. 6041b does not fit in the for the rest quite exemplary series of data.

Not so easy to explain is the difference in distance between the origins of D^1 and D^2. The relative length of this distance in comparison with the

	Evermann & Kendall	Starks	1259	836	834	1274a	b
Total length			40.5	40.5	34	26	26
Standard length	4–38	28–34	35	35	30	22	22
D^1			XII	IX?	IX?	IX	IX
A (except finlets).....			I. I 11	I. I. II	I. I. 10	I. I. II	I. I. II
Head/st. length	3.14–3.41	3.56–3.7	3.6	3.6	3.7	3.4	3.4
Distance tip of snout to origin of D^1/st. l.	2.44–2.75		2.8	2.8	2.8	2.7	2.7
Distance origin D^1 to origin D^2/st. l.	3.14–3.41		2.8	3.1	3.1	3.4	3.3
Distance tip lower jaw to base of V/st. l.	2.61–2.90		3	2.9	3	2.8	2.9
Scales between origin of D^1 and occiput.....		50–55	55	54?	?	55	56
Scales transv. between origin D^2 and lin. lat.		21–24	23	?	?	24	24
Length of maxillary/st. l. .		9.1	9.5	9	9 2	8.5	8.4
Length of snout/st. l		11–12	12	11.7	11.4	11.2	11

standard length does not seem to be a very sound character to distinguish the Atlantic and Pacific species, for in specimen no. 1259 it passes even below the minimum given for Atlantic specimens by Evermann & Kendall. There is a strange gap between the data for this character in our two largest specimens, so it cannot be an adult character although a slight increase of the distance between the origins of D^1 and D^2, according to our data, does not seem improbable. The only, rather unsatisfactory way of explaining this difference in specimen no. 1259 must be to accept provisionally a considerably wider range of variation in this character than has been observed by Evermann & Kendall. The material used by these authors undoubtedly was much too small (11 specimens) and contained but 4 specimens from Japan, all of about the same length: 7-8 1/4 inch, which specimens of course do not show the total variation in this species. Starks (l.c., p. 9) mentions the probability of different "tribes" along the Pacific coast of California. If there are distinct variations within this species at so short distances from each other, then we may accept a rather considerable variation in the whole of the immense region in which this species occurs.

Another variation must be the extraordinarily high number of dorsal spines in specimen no. 1259. Luckily I also found a specimen (no. 6041a) with 11 spines, which gives us the complete series from 9 to 12.

These specimens all doubtless belong to the only Pacific species *Pneumatophorus japonicus* (Houttuyn).

c	894	1274d	e	6035a	b	6036a	b	c	6041a	b
28	18	11.7	11.2	21 4	21.2	17	16 5	16 5	20.8	12.5
25·5	16	10	8.7	18.5	18	15	14.5	14.5	18.3	10 8
IX	?	X	X	X	X	IX	X	X	XI	IX
I. 1. 11	?	I. 1. 10?	I. 1. 10?	I. 1. 11	I. 1. 11	I. 1. 11	I. 1. 11	I. 1. 11	I. 1. 11	I. 1. 11
3·4	3·4	3·2	3·3	3·5	3·4	3·2	3·3	3 2	3 5	3·4
2.7	2.7	2.8	2.7	2.7	2.7	2.6	2.7	2.6	2.8	2.7
3·5	·3	3·3	3·2	3·2	3·4	3·5	3·5	3·5	3·2	3.6
2.9	2.9	2.8	2.9	2.9	2 9	2.8	2.7	2.8	2.9	2.7
50	>50	?	?	52	53	52?	?	52?	?	?
24	?	?	?	24	22	23	?	?	24?	?
8.2	8.4	8.3	8.3	8.5	8.6	8.2	8.3	8.3	8.8	7.9
10.6	10.4	10.6	10.4	11.3	11.2	10.2	10	10	11?	11.5

CXXXII. **Thynnus orientalis** (p. 94)

Thynnus thynnus, Günther, 1860, p. 362.
Orcynus thynnus, Day, 1880-'84, p. 93.
Thunnus thynnus, Jordan & Evermann, 1896, p. 870.

Our collection contains one stuffed specimen from Burger. Total (standard) length: no. 794*:50 (41.5) cm.

Of this species there is neither a plate in the Fauna Japonica nor a description in Burger's manuscript.

The specimen has the soft fins damaged and has but slight traces of spots on the ventral part of the body; the eye is rather large, 5.4 in head, but this character generally more or less differs from normal in stuffed specimens; the maxillary almost reaches to below the centre of the eye; snout 3.4 in head; jaws equal. Except the extraordinarily large eyes, the specimen closely agrees with the descriptions cited above. It probably belongs to *Thunnus thynnus* (L.), and represents the type of Temminck & Schlegel's *orientalis*.

CXXXIII. **Thynnus thunina** (p. 95, plate XLVIII)

Gymnosarda alleterata, Jordan & Evermann, 1896, p. 869.

There are four stuffed specimens in Burger's collection. Total (standard) length: no. 796:33 (29) cm, no. 797:48 (43) cm, no. 798:56 (48.5) cm, no. 1237:35 (30) cm.

The plate in the Fauna Japonica has been made after an original Japanese plate which still is in Burger's collection and which represents the striped region darker bluish. The shape best agrees with our specimen no. 798, which specimen differs only by its different fin formula, about D XV.I.12 VIII, A I (2?).12.VII, and the size of the eye, about 5 in head, which is a common difference in stuffed specimens. Burger has made a description of this species in his manuscript (no. 88), which also far better agrees with specimen no. 798. The fin formula, according to the characters given by Burger, should be D XIV.12VIII, A 11.VII.

All specimens have the soft fins in a very bad condition; remains of colour markings are still visible on one side, the other side has been painted. Specimen no. 798 distinctly differs from the further specimens by having a spinous dorsal fin which almost reaches the soft dorsal and by having 15 spines in D^1; the other specimens have a considerable distance between both dorsal fins which about equals the length of the spinous dorsal, while the latter fin has but 11 spines.

Specimen no. 798 has on the unpainted side some indistinct remains of spots, about as large as the pupil, 2-3 in the diameter of the eye, situated below the pectoral fin. The fin formula has been mentioned before. This specimen must belong to *Euthynnus allitteratus* (Raf.) (maybe *Euthynnus* Lütken should be replaced as synonym of *Gymnosarda* Gill, cf. Jordan & Evermann, l.c., p. 868).

The specimens nos. 796, 797 & 1237 have the snout about 4.4 in head, D XI.I.10-11?.VIII (in no. 1237: D XI.3.8.VIII?), A 2?.11.VII (in no. 1237: A 3.11.VII, the 1st spine very inconspicuous); in specimen no. 1237 the pectoral fins hardly reach beyond the 9th dorsal spine while the dorsal point of the corselet reaches unto the end of the soft dorsal fin. The numbers of finrays are very difficult to count. These specimens probably belong to *Auxis thazard* (Lacép.). The agreement with the descriptions of that species by Günther (1860, p. 369) and Jordan & Evermann (l.c., p. 867), is quite sufficient.

CXXXIV. Thynnus pelamys (p. 96, plate XLIX)

Thynnus pelamys, Cuvier & Valenciennes, 1831b, p. 113; — Günther, 1860, p. 364.
Gymnosarda pelamis, Jordan & Evermann, 1896, p. 868.
Euthynnus pelamis, Tanaka, 1912, p. 140, fig. 151.
Katsuwonus pelamis, Kishinouye, 1923, p. 453.

As has been stated in the Fauna Japonica, Temminck & Schlegel never received a Japanese specimen of this species.

The plate in the Fauna Japonica is an exact reproduction of an original

Japanese plate in Burger's collection. Burger has described this species in his manuscript (no. 86). Several of the characters given in this description do not agree with Burger's plate or its reproduction in the Fauna Japonica. The latter must have been corrected by Temminck & Schlegel:

Burger's description: D XV.13.VIII, A 12.VI, V 5, P 28, jaws equal.

Burger's Japanese plate: D XV.13.VIII, A 1.12.VII, V 1.5, P 26, lower jaw projecting.

Plate XLIX: D XV.1.13.VIII, A 1.11.VII, V 1.5, P 23, lower jaw projecting.

This species should be named *Katsuwonus pelamis* (L.).

CXXXV. **Thynnus Sibi** (p. 97, plate L)

Thynnus alalonga, Cuvier & Va'enciennes, 1831b, p. 120; — Günther, 1860, p. 366.
Germo alalunga, Jordan & Evermann, 1896, p. 871.

There are two stuffed specimens in Burger's collection, one of which (no. 2327) erroneously has been named *Th. Sibu* T. & S. Total (standard) length: no. 799:60 (52) cm, no. 2327*:63 (52.5) cm.

The plate in the Fauna Japonica has been exactly made after an original Japanese plate in Burger's collection. The soft dorsal and anal fins probably should have been drawn longer, at least as long as the spinous dorsal fin; the numbers of finrays should be about as follows: D XIII.2.12.IX, A 1 or 2.12.IX. Burger described this species in his manuscript (no. 91). According to his data, the fin formula should be: D XIV.12.VIII, A 11.VIII.

Specimen no. 799 is in a very bad condition, its fins damaged. The specimens have D and A with 9 finlets, the anterior ones attached; the lateral keel on the caudal peduncle reaches forwards to below the 7th finlet; the dorsal point of the corselet reaches beyond the soft dorsal fin. The agreement with the descriptions cited above is rather convincing. The specimens belong to *Germo alalunga* (Gmel.) and represent the type material of *sibi* T. & S. Specimen no. 2327 I regard as type.

CXXXVI. **Thynnus macropterus** (p. 98, plate LI)

Thynnus albacora, Günther, 1860, p. 365.
For further literature, see CXXXV.

We possess but one stuffed specimen from Burger. Total (standard) length: no. 2252:72.5 (61) cm.

The plate in the Fauna Japonica is an exact reproduction of an original Japanese plate which still is in Burger's collection. It is not completely exact in shape: the specimen has a rather indistinct corselet of about the

same form as in Temminck & Schlegel's *sibi* (see CXXXV), the fin formula should be about D XIII.2.12.IX, A 2 (or 3).12 (or 11).IX. Burger's manuscript contains a description of this species (no. 185). According to Burger's data, the fin formula should be: D XIV.14.IX, A 12.IX. His description of the coloration (spinous dorsal "greyish green and yellow", soft dorsal and anal fin "yellow") disagrees with his plate, in consequence of which one of these must be erroneous unless this character really shows so considerable variation.

The specimen has damaged fins, but they nevertheless still demonstrate a striking agreement in shape and numbers of rays with our specimens of *Germo alalunga* (Gmel.) (see CXXXV). Only the coloration seems to be different, but that character is rather unreliable; in the description of *Thynnus argentivittatus* C. & V. (= *Germo alalunga* (Gmel.)) by Cuvier & Valenciennes (1831b, p. 134) these authors describe the colours of D, A and V as yellowish, which about agrees with Burger's description of *macropterus* T. & S. A further difference, the somewhat shorter pectoral fins, about 4.4 in total length, probably has been caused by damage; they even do not reach to below the end of the spinous dorsal fin. The head is slightly smaller, 3.8 in standard length (3.5 in *sibi* T. & S.), but this difference too is not important as the relative length of the head generally decreases with growth. The further characters show no differences: head 3.5 in standard length, 4 in total length; height 3.8 in standard length. The agreement with the descriptions of *Germo alalunga* (Gmel.) seems conclusive. This specimen must belong to that species and is the type of *macropterus* T. & S.

CXXXVII. **Pelamys orientalis** (p. 99, plate LII)

?Pelamys chiliensis Cuvier & Valenciennes, 1831b, p. 163.
Pelamys orientalis, Günther, 1860,p. 368.
?Pelamys chilensis, Günther, 1860, p. 368.
?Sarda chilensis, Jordan & Evermann, 1896, p. 872.
Sarda orientalis, Kishinouye, 1923, p. 424.

There are three stuffed specimens in our collection, two of which from Burger in the common dry state, but the third, which has no name of collector but the indication "Faun. Jap." only, is preserved in spirits. Total (standard) length of Burger's specimens: no. 842:49 (42.5) cm, no. 2286*:58 (49.5) cm; of the 3rd specimen: no. 1244:47 (40) cm.

The plate in the Fauna Japonica is an exact reproduction of an original Japanese plate in Burger's collection. Burger's manuscript contains a description of this species (no. 87). According to this description, the

formula of the dorsal fin should be: D XIX.12.VIII; he does not describe the anal fin.

The dry specimens have one side painted about in accordance with the plate in the Fauna Japonica, while the other side still shows the original colour markings; the specimen in spirits has distinct remains of its former coloration on both sides; the fin formula probably is D XVIII.3.12.VIII, A IV.11.VI (in specimen no. 1244), with the anterior spines very inconspicuous, covered by scales; the maxillary reaches to below the posterior edge of orbit; each half of the jaws has 13-15 strong teeth with some very small ones between these; P 9 in total length. The specimens slightly vary in some of these characters, but further sufficiently agree with the descriptions cited above. According to Kishinouye (l.c., p. 425) there are some small differences between *P. orientalis* T. & S. and *P. chiliensis* C. & V. which, however, are too small to be distinguished in our stuffed specimens. The first species probably occurs near Japan, the second near the Pacific coasts of South America only. Our specimens represent the type material of *Sarda orientalis* (T. & S.). Specimen no. 2286 I regard as type.

CXXXVIII. **Cybium chinense** (p. 100, plate LIII fig. 1)

Cybium chinense Cuvier & Valenciennes, 1831b, p. 180; — Kishinouye, 1923, p. 418, fig. 34.

We possess no Japanese specimens of this species. As Temminck & Schlegel already stated in the Fauna Japonica, they never received Japanese specimens.

The plate in the Fauna Japonica is an exact reproduction of an original plate in Burger's collection. Burger has described this species in his manuscript (no. 90). According to this description, the fin formula should be: D XIV.14.VII, A 15.VI. Except this fin formula Burger's description and plate rather closely agree with the descriptions cited above. This species should be named *Cybium chinense* (C. & V.).

CXXXIX. **Cybium niphonium** (p. 101, plate LIII fig. 2)

Cybium niphonium Cuvier & Valenciennes, 1831b, p. 180; — Günther, 1860, p. 371; — Kishinouye, 1923, p. 421, fig. 32.

Scomberomorus niphonius, Tanaka, 1912, p. 154, fig. 164.

There are three stuffed specimens in Burger's collection. Total (standard) length: no. 843:65.5 (56) cm, no. 844:50.5 (41) cm, no. 2285:98.5 (84) cm.

The plate in the Fauna Japonica has been made after an original Japanese plate in Burger s collection. In our copy, this plate shows a ventro-lateral longitudinal orange band, reaching from the pectoral base to beyond the

6th free finlet, which lacks on the original Japanese plate. This band probably is accidental, and therefore erroneous. According to our specimens the maxillary should reach to below the posterior border of the eye while the fin formula should be about as follows: D XX. 2 (or 3).14.VIII, A 3?.13(or 14).VIII. This species has been described by Burger in his manuscript (no. 89). According to his data the fin formula should be D XX.16.VIII, A 14.VIII.

These specimens have one side painted, but the other side still has distinct remains of the former coloration which are more or less variable: in specimen no. 843 rows of darker spots and stripes along the ventral parts of the body and the caudal peduncle between the origin of A and C, in specimen no. 844 about as on the plate in the Fauna Japonica, while specimen no. 2285 has a coloration intermediary between that of the two other specimens; height 6.5-7 in total, about 6 in standard length; head 5.5 in total length; eye 5-6.5 in head, interorbital space 3.3 in head. The agreement with the descriptions cited above is rather close. These specimens belong to *Cybium niphonium* (C. & V.).

CXL. **Trichiurus lepturus japonicus** (p. 102, plate LIV)

?Trichiurus lepturus, Cuvier & Valenciennes, 1831b, p. 237; — Günther, 1860, p. 346; — Goode & Bean, 1895, p. 208.
Trichiurus japonicus, Bleeker, 1857,p. 98; — Günther, 1860, p. 347.

Our collection contains one stuffed specimen from Burger and two specimens and one head, collected by Von Siebold, in spirits. Total length of Burger's specimen: no. 2040*:95 cm; of Von Siebold's specimens: no. 1496a:61.5 cm, no. 1496b:62 cm; of the head (till gill-opening): 12 cm.

The plate in the Fauna Japonica is an exact reproduction of an original Japanese plate in Burger's collection. This species has been described by Burger (no. 48).

The specimens have about 136 rays in D, 115 in A; height 17.5 in length; head 8.1-8.6 in length; eye equal to interorbital space, 2.7 in snout with protruding part of lower jaw, 2.3 in snout without lower jaw; length of P about equal to length of snout (without lower jaw). The specimens about agree with the descriptions cited above. The differences between *Trichiurus japonicus* T. & S. and *T. lepturus* L. as stated by Temminck & Schlegel and Bleeker (l.c.) do not exist in our material. A comparison, however, with several specimens of *lepturus* in our collection (all Atlantic) showed a very distinct and constant difference: the head in all these specimens of *lepturus* is larger, about 7-7.5 in length, while in our specimens of *japonicus* it is 8.1-8.6 in length, consequently considerably smaller. On

account of this I want to discriminate both species and regard our Japanese specimens as the type material of a separate species, *Trichiurus japonicus* T. & S. Specimen no. 2040 I regard as type.

CXLI. **Histiophorus orientalis** (p. 103, plate LV)

Histiophorus orientalis, Günther, 1860, p. 514; — Goode, 1883, p. 309; — Weber, 1913, p. 408.
Istiophorus orientalis, Fowler, 1928, p. 136.
?Istiophorus brookei Fowler, 1934, p. 400.

We have no Japanese specimens of this species. According to Temminck & Schlegel, these authors never received such a specimen and consequently founded their species on Burger's data and plate only.

The plate in the Fauna Japonica is an exact reproduction of an original Japanese plate in Burger's collection. In his manuscript Burger gives a description (no. 195) of this species.

Lütken (in Goode, l.c., p. 309, 375) mentions *H. orientalis* T. & S. as a doubtful species, probably identical with *H. gladius* (Brouss.). All other authors, however, discriminate both these species.

CXLII. **Elacate bivittate** (p. 104, plate LVI)

Elacate pondiceriana Cuvier & Valenciennes, 1831b, p. 329.
Elacate bivittate Cuvier & Valenciennes, 1831b, p. 329.
Elacate nigra, Günther, 1860, p. 375.
Rachycentron canadus, Jordan & Evermann, 1896, p. 948; — Weber & De Beaufort, 1931, p. 302.

There are seven stuffed specimens in Burger's collection, one stuffed specimen and one specimen in spirits in Von Siebold's collection. Total (standard) length of Burger's specimens: no. 817:29.5 (24.5) cm, no. 820:21.5 (18) cm, no. 828:54 (45) cm, no. 829:49 (42) cm, no. 2159:100 (82) cm, no. 2177:63 (52.5) cm, no. 2337:118 (102) cm; of Von Siebold's specimens: no. 819:37 (31) cm, no. 1251:23 (17.5) cm.

The plate in the Fauna Japonica is an exact reproduction of an original Japanese plate in Burger's collection. The numbers of finrays probably should be D VIII.3.29-35, A III.24-26. Burger's manuscript contains a description of this species (no. 93).

In the stuffed specimens the shape of the body varies between almost cylindrical and more or less compressed (width till 2 in height); the smallest specimens still have longitudinal bands (nos. 817, 819, 820 & 1251). The agreement with the descriptions cited above is very close. The specimens belong to *Rachycentron canadus* (L.).

CXLIII. **Chorinemus orientalis** (p. 106, plate LVII fig. 1)

Chorinemus orientalis, Günther, 1860, p. 474.
Scomberoides orientalis, Wakiya, 1924, p. 237.

We possess two stuffed specimens from Burger and two specimens in spirits from Von Siebold. Total (standard) length of Burger's specimens: no. 851:19 (16) cm, no. 852*:20.5 (17) cm; of Von Siebold's specimens: no. 1336a:13.5 (11) cm, no. 1336b:7.5 (6.2) cm.

The plate in the Fauna Japonica is an exact reproduction of an original Japanese plate which is still in Burger's collection. According to our specimens, the opercular edge should be circular, the posterior rays of the soft dorsal and the anal fins semi-detached, the eye 4 in head, the antrorse spine as long as 2nd spine, 2 in eye and the 1st spine of D^1 2 in 2nd. This species has been described by Burger in his manuscript (no. 193).

The back of specimen no. 852 (and perhaps no. 851) has remains of a marbled coloration; the maxillary almost extends till below the posterior edge of the orbit; snout equals or slightly surpasses diameter of eye; D I.VII.I.20. The agreement of these specimens with the descriptions cited above is very close. They must represent the type material of *Chorinemus orientalis* T. & S. Specimen no. 852 I chose as type.

According to Weber & De Beaufort (1931, p. 284) this species does not occur in the Indo-Australian waters. A specimen from Borneo (no. 1337), however, collected by Müller, which I found in our collection, probably belongs to it.

CXLIV. **Trachinotus anomalus** (p. 107, plate LVII fig. 2)

Psenes anomalus, Bleeker, 1857, p. 105; — Günther, 1860, p. 495.
Psenopsis anomala, Regan, 1902a, p. 131.

We possess no Japanese specimens belonging to Burger's or Von Siebold's collections. According to the Fauna Japonica, Temminck & Schlegel never received any specimens of this species.

The plate in the Fauna Japonica is an exact reproduction of an original Japanese plate in Burger's collection. Burger gives no description of this species, so his plate must have been the only foundation for Temminck & Schlegel's description of *Psenopsis anomala* (T. & S.).

CXLV. **Caranx muro-adsi** (p. 108, plate LVIII fig. 1)

Decapterus muroadsi, Bleeker, 1857, p. 101; — Barnard, 1927,p. 534.
Caranx muroadsi, Günther, 1860, p. 425.
Decapterus muro-adsi, Norman, 1935, p. 261.

There are no specimens of this species in Burger's and Von Siebold's collections.

The plate in the Fauna Japonica is an exact reproduction of an original Japanese plate still in Burger's collection. This species has been described by Burger in his manuscript (no. 188). This description and the Japanese plate have been the only sources for the founding of *Decapterus muroadsi* (T. & S.).

CXLVI. **Caranx maru-adsi** (p. 109, plate LVIII fig. 2)

Decapterus maruadsi, Bleeker, 1857, p. 100.
Decapterus maru-adsi, Norman, 1935, p. 259.

We have but one stuffed specimen, from Burger's collection. Total (standard) length: no. 941*:30.5 (25.5) cm.

The plate in the Fauna Japonica is an exact reproduction of an original Japanese plate. According to Bleeker (l.c.) this plate is not altogether exact. Burger's manuscript contains a description of this species (no. 187), according to which the fin formula should be D VII.35.I, A II.27.I.

The specimen has been badly stuffed, and is damaged and deformed. Its characters are rather unreliable. The lateral line originates on the schoulder, goes to a point at half height and about above the 8th anal ray, and further straight to C. The agreement with the descriptions cited above seems sufficient. This specimen is the type of *Decapterus maruadsi* (T. & S.).

CXLVII. **Caranx trachurus japonicus** (p. 109, plate LIX fig. 1)

?Caranx trachurus, Cuvier & Va'enciennes, 1833, p. 11, fig. 246.
?Trachurus trachurus, Günther, 1860, p. 419; — Jordan & Evermann, 1896, p. 910.
Trachurus japonicus, Nichols, 1920, p. 477.

There is one stuffed specimen in Burger's collection, while Von Siebold's collection contains five specimens in spirits. Total (standard) length of Burger's specimen: no. 1314*:36 (29.5) cm; of Von Siebold's specimens: no. 1313a:15 (12) cm, no. 1313b: 14.3 (11.5) cm, no. 1313c:13.5 (10.5) cm, no. 1313d:12.2 (10) cm, no. 1313e:8.5 (7) cm.

The plate in the Fauna Japonica is a very exact reproduction of an original Japanese plate in Burger's collection. The maxillary, according to our specimens, should reach to below front of pupil. This species has been described by Burger in his manuscript (no. 186).

The length of the accessory lateral line in our specimens is variable, in specimen no. 1314 and some of the specimens in spirits more or less distinct along the soft dorsal fin, in some other specimens inconspicuous or lacking.

Before the spinous dorsal fin, which has 8 spines, our specimens have a more or les distinct antrorse spine which in some of the specimens has been covered by scales. The fin formula probably is as follows: D I.VIII.I.30-32; the 3rd to 5th pectoral rays are longest; eye about equal to snout, 3.2-3.3 in head; the lateral plates are about as high as eye, 4 in height of the body. A comparison with the descriptions cited above gave but few differences. According to Nichols (l.c.), the species *Trachurus trachurus* (L.) should be divided into several separate species. His key (p. 477) doubtless leads to *Trachurus japonicus* (T. & S.). A comparison with two specimens of *Trachurus mccullochi* Nichols (no. 16818, Australia, in spirits), which species has been regarded as identical with *japonicus*, shows that in *mccullochi* there is a considerably more abrupt bend in the lateral line. The specimens represent the type material of *Trachurus japonicus* (T. & S.), which species by authority of Nichols I regard as separate from *trachurus*. Specimen no. 1314 I have chosen as type.

CXLVIII. **Caranx flavocoeruleus** (p. 110, plate LIX fig. 2)

Caranx hippos, Günther, 1860, p. 449.
Caranx forsteri, Weber, 1913, p. 395.
Caranx sexfasciatus, Weber & De Beaufort, 1931, p. 243.

We possess five stuffed specimens from Burger and two specimens in spirits from Von Siebold. Total (standard) length of Burger's specimens: no. 929:11.5 (9) cm, no. 930:11.8 (9.5) cm, no. 931:12 (9.5) cm, no. 932:16 (12.5) cm, no. 933*:20.5 (16) cm; of Von Siebold's specimens: no. 1319a:8.7 (7) cm, no. 1319b:6 (4.7) cm.

The plate in the Fauna Japonica is an exact reproduction of an original Japanese plate which still is in Burger's collection; the only difference is a procumbent 1st dorsal spine, which is conspicuous in several of our specimens, has been drawn in Burger's Japanese plate, but has been forgotten in the reproduction. Burger's manuscript contains a description of this species (no. 189).

The shape of the body in the stuffed specimens is variable on account of a more or less serious deformation; 5-6 cross bands are still visible in specimen no. 1319a and on the unpainted side of specimen no. 932; all stuffed specimens have been painted on one side, about in accordance with the plate in the Fauna Japonica, with a greenish back; height 2.8-3.8, head 4-4.3 in total length. Except some unimportant differences in some of these characters, the specimens agree with the descriptions cited above. They belong to *Caranx sexfasciatus* Q. & G. and represent the type material of *flavocoeruleus* T. & S. Specimen no. 933 I regard as type.

CII. **Caranx equula** (p. 111, plate LX fig. 1)

Carangoides equula, Bleeker, 1857, p. 102.
Caranx equula, Günther, 1860, p. 438; — Barnard, 1927, p. 540.
?Caranx dasson Jordan & Snyder, 1907, p. 210 (partly?).
Caranx (Carangoides) equula, Wakiya, 1924, p. 166.

Our collection contains one stuffed specimen from Burger and seven specimens in spirits from Von Siebold. Total (standard) length of Burger's specimen: no. 2185:71 (56.5) cm; of Von Siebold's specimens: no. 1311a*:19 (15) cm, no. 1311b:12.5 (9.7) cm, no. 1311c-g:6.3-5.2 (5-4) cm.

The plate in the Fauna Japonica is an exact reproduction of an original plate in Burger's collection. It disagrees with Burger's stuffed specimen, but the agreement with the specimens in spirits is very close; only the size of the eye slightly differs, should be 3-3.5 in head. Burger has described this species in his manuscript (no. 92). Some of his data differ from his specimen but agree with the specimens in spirits, e.g., nostrils close to eyes; A II.24; teeth: numerous, small, sharp; etc.; the remaining characters, however, better agree with his example. Burger consequently must have used a heterogeneous material.

Our material obviously is heterogeneous too. According to keys by Weber & De Beaufort (1931, p. 192, 204) all specimens belong to the genus *Caranx* Lacép., but Burger's specimen belongs to the subgenus *Selar* Blkr., Von Siebold's specimens to the subgenus *Carangoides* Blkr.

Of the specimens no. 1311a-g, only some of the smallest specimens have indistinct cross-bars; the snout is about equal to the diameter of the eye. The agreement of these specimens with the descriptions cited above is about complete. As these specimens far better agree with the plate in the Fauna Japonica than Burger's specimen no. 2185 (while the description by Temmick & Schlegel contains data about all specimens), I regard these as the types of *Caranx (Carangoides) equula* T. & S. Specimen no. 1311a I have chosen as type.

Burger's stuffed specimen has the back painted bluish green; height 3.5 in standard length; eye 5 in head; the maxillary almost reaches to below front of orbit; the posterior width of the preorbital surpasses that of the maxillary; the teeth are uniseriate, blunt, conical. Except some differences in these characters, the specimen agrees with the descriptions of *Caranx cheilio* (Snyd.) by Snyder (1904, p. 524) and Fowler (1928, p. 146, pl. XII, c), less closely with the descriptions of *C. dasson* Jord. & Snyd. by Jordan & Snyder (1907, p. 210) and Fowler (1928, p. 146). It therefore probably belongs to *Caranx (Selar) cheilio* (Snyd.).

By choosing Von Siebold's specimens as types of *equula* T. & S., I

discriminate this species and *C. cheilio* Snyd. in contradistinction with Fowler (1934, p. 405) who regards them as synonymous.

CL. **Caranx ciliaris** (p. 112)

Caranx citula Cuvier & Valenciennes, 1833, p. 126.
Caranx armatus, Günther, 1860, p. 453.
Caranx (Citula) armatus, Wakiya, 1924, p. 169, pl. XX fig. 1.
Caranx (Citula) schlegeli Wakiya, 1924, p. 170, pl. XX fig. 2.
Caranx (Citula) plumbeus, Wakiya, 1924, p. 171, pl. XX fig. 3.
Caranx (Carangoides) armatus, Weber & De Beaufort, 1931, p. 233.

Burger's collection contains one stuffed specimen, Von Siebold's collection contains two specimens in spirits labelled "*Caranx* (*Citula*), (décrit d.) Fauna Jap.". Total (standard) length of Burger's specimen: no. 917:17 (13.3) cm; of Von Siebold's specimens: no. 1370:23 (20) cm, no. 1422:6.3 (5) cm.

Of this species there is neither a plate in the Fauna Japonica nor a description in Burger's manuscript.

The specimens have no remains of their former coloration; D I.VIII.I. 20-22, A II.I.16-18; the long soft dorsal and anal rays have been damaged, their length probably increases with age. The characters of these specimens are generally intermediate between those described by Wakiya for his three presumed species. The agreement with the further descriptions cited above is very close. The specimens belong to *Caranx* (*Carangoides*) *armatus* (Forsk.).

CLI. **Blepharis indicus** (p. 113, plate LX fig. 2)

Blepharis indicus Cuvier & Valenciennes, 1833, p. 154.
Caranx ciliaris, Günther, 1860, p. 454.
Alectis ciliaris, Wakiya, 1924, p. 213, pl. XXXII fig. 4; — Barnard, 1927, p. 549; — Weber & De Beaufort, 1931, p. 269.
Alectis indicus, Wakiya, 1924, p. 214.
Alectis temminckii Wakiya, 1924, p. 215.
Alectis breviventralis, Wakiya, 1924, p. 216, pl. XXXIII.

We possess two specimens in spirits from Von Siebold. Total (standard) length: no. 1310a:19 (15) cm, no. 1310b:7.5 (5.5) cm.

The plate in the Fauna Japonica is an exact reproduction of an original Japanese plate in Burger's collection. The shape of the body as represented on this plate is intermediate between the shapes of our specimens no. 1310a (more elongate) and no. 1310b (more elevated); the fin formula should probably be as follows: D I (procumbent). VI-VII.I.19. This species has not been described by Burger.

Indistinct remains of cross-bands are still visible on the small specimen.

The agreement with the descriptions cited above is about complete. The differences between Wakiya's presumed species probably have been caused by juvenile characters. The specimens must belong to *Alectis ciliaris* (Bl.).

CLII. **Seriola purpurascens** (p. 113, plate LXI)

Seriola Dumerilii, Cuvier & Valenciennes, 1833, p. 201, pl. 258.
Seriola dumerilii, Günther, 1860, p. 462.
Seriola dumerili, Jordan & Evermann, 1896, p. 903; — Weber & De Beaufort, 1931, p. 297.
Seriola purpurascens, Wakiya, 1924, p. 228, pl. XXXVI fig. 2.

We possess three stuffed specimens from Burger and one Japanese specimen in spirits which probably belongs to the same collection. Total (standard) length of Burger's specimens: no. 864:44.5 (36.5) cm, no. 2192*:70 (57) cm, no. 2271:52 (43) cm; of the specimen in spirits: no. 1294:27 (33.5) cm.

The plate in the Fauna Japonica is an exact reproduction of an original Japanese plate in Burger's collection. According to our specimens the eyes are larger, 4-4.6 in head in the stuffed specimens. Burger has described this species in his manuscript (no. 190).

The stuffed specimens have no remains of their former coloration left; height 3.4-3.5 in standard length, 4.3-4.4 in total length, head 3.7-3.8 in standard length, 4.5-4.6 in total length; maxillary 2.2-2.3 in head; the horizontal distance between the base of P and the origin of D 0.7-1 in diameter of eye; the stuffed specimens have very large oval eyes, length about 0.75-0.8 in height, 4-4.6 in head. The stuffed specimens slightly differ in some of these characters but further sufficiently agree with the descriptions cited above, while the agreement with specimens of *Seriola dumerili* in Bleeker's collection proved to be very close; Bleeker's specimens only differ by having the origin of D slightly more anterior than Burger's specimens, which may be caused by deformation of this stuffed material.

The specimens probably belong to *Seriola dumerili* Risso and represent the type material of *purpurascens* T. & S. Specimen no. 2192 I regard as type.

CLIII. **Seriola aureovittata** (p. 115, plate LXII fig. 1)

Seriola lalandii, Günther, 1860, p. 463.
Seriola aureovittata, Wakiya, 1924, p. 223, pl. XXXV fig. 2.
?Seriola sparna Jenkins, 1914, p. 442, fig. 14.

There are four stuffed specimens in Burger's collection. Total (standard) length: no. 861:18.5 (15) cm, no. 862:28 (22.5) cm, no. 863:29 (23) cm, no. 2168*:56 (46.5) cm.

The plate in the Fauna Japonica is a very exact reproduction of an original Japanese plate in Burger's collection. According to our specimens, the fin formula should be D I (procumbent'). VII.I.30-33, while the size of the eye should be 3.7-4.5 in head; generally the size of the eyes in stuffed specimens considerably surpasses that in fresh material. There is a description of this species in Burger's manuscript (no. 192).

The specimens have no remains of their original colour markings left and have the back on one side painted green; on account of this paint and varnish the squamation is very indistinct; A II.I.20-21, P 20; eye about 1.5 in snout; the maxillary reaches to below the second quarter of the diameter of the eye, which, however, is unnaturally large; the length of the maxillary 2.2-2.5 in head; the lateral keel on the caudal peduncle is rather indistinct. Except some differences in characters just mentioned, the specimens rather closely agree with the descriptions cited above; only the description of *Seriola sparna* Jenkins, which species is supposed to be synonymous with *aureovittata* T. & S. (cf. Fowler, 1928, p. 142), in some characters differs from our specimens which have, e.g., a different fin formula, the posterior margin of the maxillary about 1.4 in vertical diameter of eye, pectoral fins about 2 in head. These specimens represent the type material of *Seriola aureovittata* T. & S. Specimen no. 2168 I regard as type.

CLIX. **Seriola quinqueradiata** (p. 115, plate LXII fig. 2)

Seriola quinqueradiata, Günther, 1860, p. 464; — Wakiya, 1924, p. 225, pl. XXXVI fig. 1.

Burger's collection contains five stuffed specimens. Total (standard) length: no. 860:20.5 (17) cm, no. 865:41.5 (33.5) cm, no. 866:39 (33) cm, no. 2176*:71 (62) cm, no. 2278:62 (52.5) cm.

The plate in the Fauna Japonica is an exact reproduction of an original Japanese plate in Burger's collection. According to our specimens, the eye should be drawn larger, its diameter 4-6 in head, but the size in these stuffed specimens is unnatural. Burger's manuscript contains a description of this species (no. 191).

All specimens have on one side the back painted green; D VI (or V. I. 30-35; height 3.9-4.5 in standard length, 4.7-5.5 in total length; eye 4-6 in head, 1.7 in snout, unnaturally large; origin of D about at a distance of 1.5 diameter of eye behind base of P. Except the considerable but unimportant difference in eye-diameter, the specimens closely agree with the descriptions cited above. They represent the type material of *Seriola quinqueradiata* T. & S. Specimen no. 2176 I regard as type.

CLV. **Seriola intermedia** (p. 116)

Seriola intermedia, Günther, 1860, p. 466.
Seriolina intermedia, Wakiya, 1924, p. 230, pl. XXXVIII fig. 1.
Zonichthys nigrofasciata, Barnard, 1927, p. 557.
Seriola nigrofasciata, Weber & De Beaufort, 1931, p. 295, fig. 59.

There is one stuffed specimen in Burger's collection. Total (standard) length: no. 859*:25.5 (21) cm.

Of this species there is neither a plate in the Fauna Japonica nor a description in Burger's manuscript.

The specimen is in a very bad condition; it still has slight traces of the former coloration; the spinous dorsal fin has been damaged; A I.I.15; height equal to head, 3.5 in standard length, 4.4 in total length; height of head 1.4 in its length; eye 4 in head. The specimen slightly differs in some of these characters but further closely agrees with the descriptions cited above. It doubtless belongs to *Seriola nigrofasciata* (Rüpp.) and is the type of *intermedia* T. & S.

CLVI. **Erythrichthys** (p. 117, plate LXIII fig. 1)

Erythrichthys schlegelii Günther, 1859, p. 395.
Erythrichthys schlegeli, Jordan & Thompson, 1912, p. 598.
Erythrocles schlegeli, Tanaka, 1927, p. 785, fig. 470.

There are two stuffed specimens in Burger's collection. Total (standard) length: no. 349:57.5 (47) cm, no. 350:47 (38) cm.

The plate in the Fauna Japonica is an exact reproduction of an original Japanese plate in Burger's collection. According to Burger's specimens the fin formula must be D X (or IX.I).I.11, A III.9, the diameter of eye 3.5 in head. Burger's manuscript contains no description of this species.

Both specimens have one side painted reddish; in the middle of the short space between D^1 and D^2 there is a distinct separate spine (fin membrane damaged?); scales in transverse series between D^2 and A 7-1-16; head 4.2-4.5 in total length; a single row (or very narrow band) of small teeth on the palatines. Except some slight differences in these characters, the specimens closely agree with the descriptions cited above. They belong to *Emmelichthys schlegelii* Rich. and represent the material on which Temminck & Schlegel founded their genus *Erythrichthys.*

CLVII. **Scombrops** (p. 118, plate LXIII fig. 2)

Scombrops chilodipteroides, Günther, 1859, p. 249.
Scombrops boops, Jordan & Snyder, 1901d, p. 910.

Von Siebold's collection contains four specimens in spirits named

"*Scombrops*" only. Total (standard) length: no. 202a:22 (17.5) cm, no. 202b:14.5 (11.7) cm, no. 200:13.5 (11) cm, no. 203:12 (9.5) cm.

The plate in the Fauna Japonica is an exact reproduction of an original Japanese plate in Burger's collection. The only difference is that in Burger's plate the posterior edge of A has been drawn about straight. The fin formula must be D VIII.I,1.13, A III. 12. This species has not been described by Burger.

In the description in the Fauna Japonica there are some errors. On p. 119, below: "d'un tiers plus basse" must be "d'un tiers plus haute"; on p. 120: "L'anale est très-développé..." must be "La caudale etc.".

The specimens have the mouth oblique, about 30 degrees with the axis of the body. The agreement with the descriptions cited above is very close. They belong to *Scombrops boops* (Houttuyn) and represent the material on which Temminck & Schlegel founded their genus *Scombrops*.

CLVIII. **Coryphaena japonica** (p. 120, plate LXIV)

Coryphaena hippurus, Günther, 1860, p. 405; — Jenkins, 1904, p. 447; — Barnard, 1927, p. 566, pl. XXVI fig. 1; — Weber & De Beaufort, 1931, p. 185, figs. 37, 38, & 39.

There are five stuffed specimens in Burger's collection. Total (standard) length: no. 1411:40.5 (32) cm, no. 1412:47 (37.5) cm, no. 1413:51 (40) cm, no. 2241:93 (71) cm, no. 2295*:113 (95) cm.

The plate in the Fauna Japonica is an exact reproduction of an original Japanese plate in Burger's collection. The shape of the head agrees with our largest specimens only. According to Burger's specimens, the eye should be larger, 3.8-5 in head. This species has been described by Burger in his manuscript (no. 95).

The specimens still have some remains of colour markings on D; the backs have been painted green on one side; height 5.4-6.8 in total length. The agreement with the descriptions cited above is complete. These specimens belong to *Coryphaena hippurus* L. and represent the type material of *japonica* T. & S. Specimen no. 2295 I regard as type.

CLIX. **Stromateus punctatissimus** (p. 121, plate LXV)

Stromateoides aculeatus, Bleeker, 1853b, p. 37.
Stromateus argenteus, Günther, 1860, p. 400.
Stromateoides argenteus, Jordan & Metz, 1913, p. 27, pl. IV.

There are two stuffed specimens in Burger's collection. Total (standard) length: no. 889:24 (17) cm, no. 890:31 (23) cm.

The plate in the Fauna Japonica is an exact reproduction of an original

Japanese plate in Burger's collection. According to Burger's specimens the size of the eyes is inexact, should be 4.6 in head. These specimens also have an indistinct squamation on the fins which is more or less damaged. This species has been described by Burger in his manuscript (no. 199). According to his data the fin formula should be D 41, A 39, P 18, C 22. This formula, which has been copied in the Fauna Japonica, must be inexact. In our specimens it is about as follows: D 48 (VI.42?), A 42-45 (VI?.36-39).

The specimens have the fins damaged, the anterior spines very inconspicuous, covered with scales, paint and varnish. Bleeker (l.c.) and Jordan, Tanaka & Snyder (1913, p. 135) regard this species as synonymous with *S. argenteus* Euphr. and *S. aculeatus* Bl.; Schn. and C. & V.; Günther (l.c.) as possibly, Jordan & Metz (l.c.) as doubtless synonymous with *S. argenteus* Bl., *S. candidus* C. & V. and *S. securifer* C. & V. The only difference Jordan & Metz could find between *S. argenteus* Euphr. and *S. argenteus* Bl. was a difference in fin formula: in the first species D 46, A 43 and in the second D 41, A39. The descriptions by Bleeker and Günther, however, mention a normal range of variation which about covers that presumed difference, consequently make a separation on account of a difference in this character rather improbable. The differences between the descriptions of these two species by Bleeker, Günther and Jordan & Metz all may be caused by variation, damage, deformation and differing age.

To come, if possible with the rather limited material at my disposal, to a final decision, I compared Burger's specimens with three specimens of *S. argenteus* Bl. (no. 1474) and one specimen of *S. candidus* C. & V. (no. 1479), collected by Kuhl & Van Hasselt, and with two specimens of *S. aculeatus* Bl. collected by Bleeker (no. 6065).

No.	889 & 890	1474a	b	c	1479	6065a	b
Tot. length	24-31	9.2	9.3	16	24	21.5	21.5
Std. length	17-23	7.4	7.5	12.5	18	15	15
D	48	49	.....	51	55	48	51
A	42-45	45	.....	48	44	46	48
Height/st. l.	1.6-1.8	1.2	1.25	1.3	1.6	1.4	1.4
Head/st. l.	4.2-4.5	3.25	3.25	3.5	4.2	4	4
P/st. l.	? ?	4?	4?	3	2.7	3.1	3.1
Heigth D/st. l	? ?	4.2?	3.3?	2.3	3.4?	2.7	2.7
Height A/st. l.	? ?	3.9?	2.8	3.5?	2.5	2.3	2.4

Several of these specimens have more or less damaged fins, which makes some of these data unreliable. Nevertheless these data distinctly show that there are no serious gaps between the ranges of variation of the different parts of the material. The relative length of the head and height of the body give a nice series of data illustrating a distinct decrease during growth. On

account of this outcome of my investigations I see no reason and no way to discriminate the various species mentioned above. I therefore regard them as synonymous.

The description in the Fauna Japonica is not very exact. Several of Temminck & Schlegel's data more or less differ from our specimens; the remarks about the "pointe antérieure des ventrales" and "les ventrales un peu plus longue" both concern the anal fin.

Burger's specimens as well as the further specimens mentioned above must belong to *Stromateoides argenteus* (Euphr.).

CLX. **Zeus japonicus** (p. 123, plate LXVI A)

Zeus japonicus Cuvier & Valenciennes, 1835, p. 24; — Günther, 1860, p. 394; — Jordan & Fowler, 1902c, p. 517; — Barnard, 1925, p. 374.

There are four stuffed specimens in Burger's collection and one stuffed specimen and one specimen in spirits in Von Siebold's collection. The latter specimen has been labelled "*Zeus faber japonicus*". Total (standard) length of Burger's specimens: no. 810:22 (18.5) cm, no. 811:30 (25) cm, no. 812:30.5 (26) cm, no. 2279:36.5 (29) cm; of Von Siebold's specimens: no. 808:21 (16.5) cm, no. 1424:19 (15) cm.

The plate in the Fauna Japonica ("*Zeus faber japonicus*") has not been made after a plate in Burger's collection. The number of finrays is inexact, should be D X.22-23, A IV.21-22, V I.7. This species has not been described by Burger in his manuscript.

Fries c.s. (1895, p. 306, 308) regard *Zeus japonicus* as possibly synonymous with *Zeus faber* L.; the only difference I could find in this material is the differing average number of bucklers: in *japonicus* D 6-7, A 5-7, V 8-9, P 7-8 (in *faber* D 7-10, A 7-9, V 7-9, P 7-10, cf. Fries c.s.). This must be sufficient to discriminate both species.

The specimens completely agree with the descriptions cited above. They belong to *Zeus japonicus* C. & V.

CLXI. **Zeus nebulosus** (p. 123, plate LXVI)

Zeus nebulosus, Günther, 1860, p. 395.
Zenopsis nebulosus, Jordan & Fowler, 1902c, p. 515; — Fowler, 1928, p. 95, pl. V a.

We possess six stuffed specimens from Burger and two specimens in spirits in Von Siebold's collection. Total (standard) lentgh of Burger's specimens: no. 813:10.5 (9.5) cm, no. 814:13.5 (11) cm, no. 815:19 (15) cm, no. 816*:42 (36) cm, no. 2326:28 (23.5) cm, no. 2361:41 (35) cm; of Von Siebold's specimens: 1429a:12.5 (10.5) cm, no. 1429b:12 (9.5) cm.

The plate in the Fauna Japonica is a reproduction of an original Japanese plate in Burger's collection, which has been coloured slightly less dark. According to our specimens the depth of the maxillary should be 5-5.5 in head, the ventral base about below the anterior margin of the orbit. This species has not been described by Burger.

The specimens have no, or hardly any, colour markings left; D IX.25-27; 5-6 bucklers before V, the anterior ones very small; eye 3.6-4.5 in head, 1.5-1.9 in snout; interorbital space 4.5-5.5 in head. The agreement with the descriptions cited above is very close. The specimens represent the type material of *Zenopsis nebulosis* (T. & S.). Specimen no. 816 I regard as type.

CLXII. **Equula nuchalis** (p. 126, plate LXVII fig. 1)

?*Leiognathus argenteus* Lacépède, 1802c, p. 87.
Equula nuchalis, Bleeker, 1853b, p. 38; — Günther, 1860, p. 500.
??*Leiognathus brevirostris*, Day, 1878, p. 241; — Weber & De Beaufort, 1931, p. 330.

There is one specimen in spirits in Von Siebold's collection. Total (standard) length: no. 1287*:12.5 (10) cm.

The plate in the Fauna Japonica is an exact reproduction of an original Japanese plate in Burger's collection. According to Von Siebold's specimen there should be on this plate some distinct spines dorso-anterior of the eye; A III.14(1). This species has been described by Burger in his manuscript (no. 194).

The specimen still has a distinct dark blotch on the nape, but the further colour markings are very inconspicuous; height 2.6, head 4.3 in total length; eye 3.4, snout 2.9 in head; longest dorsal spine 2 in head, 3.4 in height, longest anal spine 4.5 in height of body; the lateral line does not reach C.

According to Jordan & Snyder (1901b, p. 747) this species is synonymous with *Centrogaster argentatus* Houttuyn, according to Jordan, Tanaka & Snyder (1913, p. 131) with *Leiognathus argenteus* Lacép., but the original descriptions of these species are so insufficient that their identification cannot be very reliable, so I hesitate to accept this synonymy. Day (1878, p. 241) and Weber & De Beaufort (1931, p. 330) regard *nuchalis* as synonymous with *Leiognathus brevirostris* (C. & V.), but this synonymy too seems to be wrong. I compared Von Siebold's specimen of *nuchalis* with a specimen of *brevirostris* in our collection (no. 17031) and it proved to differ in several characters: 2nd dorsal spine 2 (no. 17031: 1.8), 2nd anal spine 2.5 (1.9) in head; the dark nuchal blotch is less regular and the coloration differs from the plate in the Fauna Japonica in specimen no. 17031, while this specimen has a very indistinct dentification which makes

a synonymy very improbable. The further differences may be caused by juvenile characters in the very small specimen of *brevirostris* (6(6.5) cm).

I consequently provisionally regard Von Siebold's specimen as belonging to a separate species. It is the type of *Leiognathus nuchalis* (T. & S.).

CLXIII. **Equula rivulata** (p. 126, plate LXVII fig. 2)

Equula rivulata, Bleeker, 1853b, p. 38; — Günther, 1860, p. 504.

Von Siebold's collection contains one specime in spirits. Total (standard) length: no. 1438*:7.7 (6.5) cm.

The plate in the Fauna Japonica is an exact reproduction of an original Japanese plate in Burger's collection. According to Von Siebold's specimen, the eye should be 2.5 in head, the preopercular angle less than 90 degrees, there should be some distinct spines dorso-anterior of the eye and short spines along the bases of D and A which form sheaths. This species has not been described in Burger's manuscript.

The specimen has no remains of its former coloration; longest dorsal spine 3.5, longest anal spine 3 in height; the teeth are small, fine, sharp, in one single row on both jaws. The agreement with the descriptions cited above is very close. I also compared the specimens with a slightly smaller specimen of this species in Bleeker's collection (no. 6147:6.7 (5.6) cm) which slightly differs in few characters only: longest dorsal spine 3, longest anal spine 2.6 in height of body; the teeth are very small, more inconspicuous than in Von Siebold's specimen, but it is impossible to fix the exact degree of this difference as the mouth of Bleeker's specimen has been heavily damaged. This specimen is the type of *Leiognathus rivulatum* (T. & S.).

CLXIV. **Mene maculata** (p. 127, plate LXVIII fig. 3)

Mene maculata, Cuvier & Valenciennes, 1835, p. 104, pl. 285; — Günther, 1860, p. 415; — Jordan & Seale, 1907, p. 15; — Weber & De Beaufort, 1931, p. 309, fig. 66.

We possess two stuffed specimens from Burger and three specimens in spirits from Von Siebold. Total (standard) length of Burger's specimens: no. 881:15.5 (13) cm, no. 882:15.5 (13) cm; of Von Siebold's specimens: no. 6076a:10.5 (8.8) cm, no. 6076b:7 (5.8) cm, no. 6076c:4.2 (3.5) cm.

The plate in the Fauna Japonica is an exact reproduction of an original Japanese plate in Burger's collection. The eye should be drawn slightly larger, D III-IV.40-42, A about 21. This species has not been described by Burger.

The specimens closely agree with the descriptions cited above. They belong to *Mene maculata* (Bl.; Schn.).

CLXV. **Amphacanthus fuscescens** (p. 127, plate LXVIII fig. 1)

Amphacanthus fuscescens, Cuvier & Valenciennes, 1835, p. 156; — Bleeker, 1857, p. 106.
Teuthis fuscescens, Günther, 1861, p. 321.
Siganus fuscescens, Jordan & Fowler, 1902c, p. 560; — Fowler, 1928, p. 282.

We possess six stuffed specimens from Burger and one Japanese specimen in spirits which probably belongs to the same collection. Total (standard) length of Burger's specimens: no. 1092:20 (16) cm, no. 1093:26 (21) cm, no. 1094:29 (24) cm, no. 1105:24 (19.5) cm, no. 1106:30.5 (24.5) cm, no. 1107:32 (26.5) cm; of the specimen in spirits: no. 1557:9.7 (8) cm.

The plate in the Fauna Japonica is an exact reproduction of an original plate in Burger's collection. It seems not completely exact. According to our specimens the eye should be about 3.3 in head, the height 3.5-3.75 in total length, V I.3.I, the lateral line not branched, composed of short simple tubes placed not very close. This species has been described by Burger (no. 196).

The remains of coulour markings are very indistinct in these specimens; D I.XIII.10; height 3.5-3.75 in total, about 3 in standard length; 1st anal spine 2.8-3 in head, 4th 1.8 in head, 7th 2.4-2.7 in head; P 1.2-1.3 in head; scales on cheek indistinct (or lacking?), but probably have been there originally. Except some slight differences in these characters the specimens closely agree with the descriptions cited above.

According to Jordan (1923, p. 208, note 404): "The proper application of the name *Teuthis* is not yet definitely settled. Its first restriction, that of Cantor, 1849, makes it identical with *Siganus,* but the first use of the name (pre-Linnaean) was for a species of *Acanthurus*". *Siganus* Forsk., 1775, has priority against *Centrogaster* Houtt., 1782 and *Amphacanthus* Bl.; Schn., 1801.

The specimens must belong to *Siganus fuscescens* (Houttuyn).

CLXVI. **Amphacanthus aurantiacus** (p. 128, plate LXVIII fig. 2)

For literature: see CLXV.

We possess no specimens of this presumed species. According to Temminck & Schlegel, they never received any material.

The plate in the Fauna Japonica has been made after an original Japanese plate in Burger's collection. It has the back slightly more brownish. Burger described this species in his manuscript (no.96). This description only slightly differs from Burger's description of *A. fuscescens* (no. 165): D I.XIV.9, A VIII.8 and the coloration. The differing number of finrays is

within the normal range of variation. I am inclined to consider *aurantiacus* as a variety of *fuscescens* only.

According to various authors, the synonymy of the three species of *Amphacanthus* described by Temminck & Schlegel is rather intricate:

Günther (1861, p. 321): *fuscescens* Houtt. = ? *aurantiacus* T. & S. This possibility has been mentioned by Bleeker (1857, p. 107) too.

Day (1878, p. 168: *fuscescens* Houtt. = *albopunctatus* T. & S.

Jordan & Fowler (1902c, p. 560): *fuscescens* Houtt. = *albopunctatus* T. & S. = *aurantiacus* T. & S.

Jordan & Seale (1906, p. 360): *fuscescens* Houtt. = *albopunctatus* T. & S.

Jordan, Tanaka & Snyder (1913, p. 215): *fuscescens* Houtt. = *albopunctatus* T. & S. = *aurantiacus* T. & S.

Fowler (1928, p. 282): *fuscescens* Houtt. = not!! *albopunutatus* T. & S.

In my opinion all three species are synonymous, *aurantiacus* and *albopunctatus* are but varieties of *fuscescens* Houttuyn.

CLXVII. **Amphacanthus albopunctatus** (p. 128)

Teuthis albopunctata, Günther, 1861, p. 318.
Siganus oramin, Barnard, 1927, p. 785.
?*Siganus albopunctatus,* Fowler, 1928, p. 280.
For further literature: see CLXV.

There are two stuffed specimens belonging to this presumed species in Burger's collection. Total (standard) length: no. 1097*:29.5 (23.5) cm, no. 1098:25 (20.5) cm.

This species has not been represented by a plate in the Fauna Japonica. It has been described by Burger (no. 96) together with *aurantiacus*: "In the Bay of Nagasaki there exists another species, coloured dark with small white stripes(?), caught chiefly in spring".

Specimen no. 1097 only still has distinct remains of lighter spots on the body, specimen no. 1098 is plain. As the Fauna Japonica mentions but one specimen of *albopunctatus,* I suppose that specimen no. 1098 formerly belonged to Temminck & Schlegel's material of *fuscescens.* D I.XIII.10; head 4, height 2.8 in standard length; snout 2.4, eye 3.3, maxillary 3.8 in head; the maxillary does not reach to below the hind nostril which is situated exactly halfway between front nostril and eye; the antero-supraorbital area not? dentate; opercle with many striae; the cheek seems scaleless. The agreement with the descriptions cited above as well as with the descriptions and material of *fuscescens* Houttuyn (see CLXV) is very close. These specimens, or a least specimen no. 1097, represent the type material of

albopunctatus T. & S., which species in my opinion is but a variety of *Siganus fuscescens* (Houttuyn). Specimen no. 1097 I regard as type of Temminck & Schlegel's *albopunctatus*.

CLXVIII. **Naseus fronticornis** (p. 129, plate LXIX)

Naseus fronticornis, Cuvier & Valenciennes, 1835, p. 259.
Naseus unicornis, Günther, 1861, p. 348.
Acanthurus unicornis, Jordan & Fowler, 1902c, p. 559.
Monoceros unicornis, Barnard, 1927, p. 781.

We possess no Japanese specimens of this species which have been used for the composition of the Fauna Japonica.

The plate in the Fauna Japonica is an exact reproduction of an original Japanese plate in Burger's collection. Burger has not described this species.

CLXIX. **Prionurus scalprum** (p. 129, plate LXX)

Prionurus scalprum Cuvier & Valenciennes, 1835, p. 298; — Günther, 1861, p. 347.
Xesurus scalprum, Jordan & Fowler, 1902c, p. 556.

There are five stuffed specimens in Burger's collection and one specimen in spirits in Von Siebold's collection. Total (standard) length of Burger's specimens: no. 1124:11 (9) cm, no. 1125:18.5 (15) cm, no. 1126:21.5 (17) cm, no. 1127:33.5 (28) cm, no. 1128:47.5 (41) cm; of Von Siebold's specimen: no. 1534:19.3 (15.5) cm.

The plate in the Fauna Japonica is a reproduction of an original Japanese plate in Burger's collection which has the nostrils painted brick-red, as the teeth. According to our specimens the eye should be 2-2.8 in snout, the dorsal profile of the snout less concave (except in the smallest specimens). This species has been described by Burger (no. 97).

The specimens have a simple lateral line, only on one side of specimen no. 1534 the lateral line branches below the 2nd soft dorsal ray, both branches diverge and run parallel from below the 1st soft dorsal ray till about below the 6th dorsal spine where the inferior branch ends; D IX.22-23 (1); eye 1.3-1.6 in interorbital space; P 4.6 in total length. The agreement with the descriptions cited above is very close. The specimens belong to *Xesurus scalprum* (C. & V.).

CLXX. **Cepola Krusensternii** (p. 130, plate LXXI fig. 1)

Cepola Krusensternii, Bleeker, 1857, p. 108.
Cepola krusensternii, Günther, 1861, p. 488.
Acanthocepola krusensterni, Jordan & Fowler, 1903c, p. 701.

Von Siebold's collection contains six specimens in spirits. A specimen

from Burger's collection must be in the British Museum, cf. Richardson (1846, p. 277). We further have two stuffed specimens without name of collector which probably belong to the same collections. Total (standard) length of Von Siebold's specimens: no. 1530a*:47 (38) cm, no. 1530b:39.5 (31.5) cm, no. 1530c:26 (22) cm, no. 1530d:20 (17) cm, no. 1530e:18 (15.5) cm, no. 2421:15 (13.5) cm; of the stuffed specimens: no. 2005:30.5 (26) cm, no. 2006:41 (36.5) cm.

The plate in the Fauna Japonica is an exact reproduction of an original Japanese plate in Burger's collection. It is slightly differing from our specimens: the eye should be 3-3.3 in head, V I.5 with 1st soft ray prolonged. As it represents an unarmed preopercle which occurs in specimen no. 2421 only, and a scaly head which constitutes a feature of the specimens no. 1530a-e, this plate must have been made after a heterogeneous material. Burger's manuscript contains a description of this species (no. 47) in which he describes D, C and A as forming one fin with 234 rays; this number must be wrong. As Burger does not mention the opercular spines and describes the opercles as scaly, he must have made this description after a heterogeneous material too.

Our material proved to be heterogeneous too. The smallest specimen, no. 2421, differs from the other specimens by its smaller and considerably more numerous scales, the unarmed preopercle, scaleless head and by having less rays in D and A.

The specimens no. 1530a-e have a more or less dark edge along A, specimen no. 1530d has D slightly speckled with pigment; D 80-86, A 76-81 (these numbers may slightly differ from the true quantity as these fins have been damaged); about 200 scales in longitudinal series; distinct scales on the preopercles; height 10, -17 in juvenile specimens, in total length; head 8.5, -14 in juvenile specimens, in total length; lower jaw almost equal to upper; the preopercle armed with distinct spines. The agreement with the descriptions cited above is very close. These specimens represent the type material of *Acanthocepola krusensternii* (T. & S.).

The two stuffed specimens have one side painted reddish, the fins partly damaged, which makes it difficult to count the exact number of finrays. Nevertheless there can be no doubt that these specimens have had about the same numbers as the specimens no. 1530a-e, while in the further characters too they show a close agreement with these specimens. They must belong to the type material of *Acanthocepola krusensternii* (T. & S.) too. Specimen no. 1530a I regard as type.

The specimen no. 2421 has already been separated from the further material by Koumans (1936, p. 275), who also identified it as *Cepola*

schlegelii Blkr. This specimen has about 400 scales in longitudinal series; D about 68, A about 64; no scales on the head; height 11.5, head 9 in total length; the preopercle unarmed. This specimen very closely agrees with the descriptions of *Cepola schlegelii* Blkr. by Bleeker (1857, p. 110), Günther (1861, p. 488) and Jordan & Fowler (1903c, p. 700). It doubtless belongs to that species.

CLXX'. **Cepola abbreviata**

Cepola abbreviata, Günther, 1861, p. 488; — Day, 1878, p. 324, pl. LXVIII fig. 4.
Acanthocepola abbreviata, Jordan & Seale, 1907, p. 27; — Weber & De Beaufort, 1936, p. 553, fig. 106.

In Burger's collection I found a stuffed specimen identified as *Cepola abbreviata* C. & V. This species has not been described by Temminck & Schlegel. Total (standard) length: no. 2003: ?, C mutilated (17.5) cm.

This specimen is in a very bad condition, the fins damaged. The fin formula of this specimen must be about as follows: D 68, A 73?; scales in lateral series about 190; the opercles are scaly; the preopercle is armed with 5 spines; height 8, head 8.5 in standard length; eye 2.5 in head; snout equal to interorbital space, 2 in eye-diameter; jaws of equal length, lower jaw included laterally; the maxillary reaches till below centre of eye. The descriptions cited above show but slight differences in some of these characters. This specimen belongs to *Acanthocepola abbreviata* (C. & V.).

CLXX". **Cepola mesoprion**

Cepola limbata Cuvier & Valenciennes, 1835, p. 402.
Cepola mesoprion Bleeker, 1854, p. 414.
Acanthocepola mesoprion, Jordan & Evermann, 1902, p. 363.
Acanthocepola limbata, Jordan & Fowler, 1903c, p. 702.

Among the Japanese specimens which probably belong to the material used by Temminck & Schlegel, I also found a stuffed specimen identified as *Cepola mesoprion* Blkr. This species has not been described in the Fauna Japonica. Total (standard) length: no. 2004:46.5, C mutilated (45.5) cm.

This specimen has very small scales, about 400 in longitudinal series; D 102, A 105; it still has a distinct dark spot in front of D; the preopercle is armed with 7 blunt spines. The agreement with the descriptions cited above is very convincing. This specimen must belong to *Acanthocepola limbata* (C. & V.).

CLXXI **Lophotes Capellei** (p. 132, plate LXXI fig. 2)

Lophotes capellei, Fowler, 1928, p. 88.

We possess no Japanese specimens of this species. According to Temminck & Schlegel, Burger's specimen has been destroyed.

The plate in the Fauna Japonica is an exact reproduction of an original Japanese plate in Burger's collection. This species has been described by Burger in his manuscript (no. 132).

The description in the Fauna Japonica has been made after Burger's plate and description.

CLXXII. **Mugil japonicus** (p. 134, plate LXXII fig. 1)

Mugil cephalus Linnaeus, 1758, p. 316; — Jordan & Evermann, 1896, p. 811; — Tanaka, 1911, p. 50, figs. 42-45; — Weber & De Beaufort, 1922, p. 253; — Barnard, 1927, p. 302.
Mugil japonicus, Bleeker, 1853b, p. 41.
Mugil cephalotus, Günther, 1861, p. 419.

Burger's collection contains six stuffed specimens. Total (standard) length: no. 1161:17.5 (14.5) cm, no. 1162:19 (15.5) cm, no. 1163:25.5 (21) cm, no. 1164:32.5 (26) cm, no. 1165:47.5 (39) cm, no.1166*:51 (42) cm.

The plate in the Fauna Japonica is an exact reproduction of an original Japanese plate in Burger's collection. According to Burger's specimens, the cheeks should be drawn scaly, the 1st dorsal spine about equal to 1st dorsal soft ray, both about 2 in head. Burger's manuscript contains a description of this species (no. 77).

All specimens have one side painted greenish, about in accordance with the plate in the Fauna Japonica: on the other side of some of the specimens there are still distinct remains of the original coloration; height 4.8(-5.7 in juvenile specimens), head 4.5(-3.8 in juvenile specimens) in standard length, height 5.75(-7), head 5.5(-4.7) in total length; eye 5(-3.4 in juvenile specimens) in head. Keeping into account this variation during growth, the specimens closely agree with the descriptions cited above. They belong to *Mugil cephalus* L. and represent the type material of *Mugil japonicus* T. & S. Specimen no. 1166 I regard as type.

CLXXIII. **Mugil haematocheilus** (p. 135, plate LXXII fig. 2)

Mugil haematocheilus, Bleeker, 1857, p. 107.
Mugil haematochilus, Günther, 1861, p. 422.
Liza haematochila, Tanaka, 1912, p. 137, figs. 142, 144, 146 & 150.

There are four stuffed specimens of this species in Burger's collection. Total (standard) length: no. 1157:16 (13.5) cm, no. 1158:24(20) cm, no. 1159:25 (21) cm, no. 1160*:30 (25.5) cm.

The plate in the Fauna Japonica has been made after an original Japanese

plate in Burger's collection. The latter has the back of the specimen represented coloured more yellowish. The shape is not completely exact. As has already been stated by Bleeker (1857, p. 108), the body should be more slender, the height about 5 in standard, 6 in total length; according to Burger's specimens, the vertical fins must be scaly, A III.8-9. This species has been described by Burger (no. 172).

The specimens are in a very bad condition, the squamation damaged; head 4.3 in standard length, 5.3 in total length; height of head 1.5, width of head 1.7-1.8 in length of head; eye 4.5-4.7 in head, only specimen no. 1157: 3.9 in head; eye 1.3-1.5 in interorbital space; snout about 4 in head, only specimen no. 1160: 3.8 in head; 1st dorsal spine about equal to postorbital part of head, about 1.8 in head; the scales are rather large, about 35-40 in longitudinal series. The specimens differ in several of these characters from the descriptions cited above, but these differences probably have been caused by difference in age, by deformation of the stuffed specimens, by their bad condition and by normal variation. The specimens represent the type material of *Mugil haematocheilus* T. & S. Specimen no. 1160 I regard as type.

CLXXIV. **Stichaeus hexagrammus** (p. 136, plate LXXIII fig. 1)

Stichaeus hexagrammus, Günther, 1861, p. 284.
?Ozorthe hexagramma, Jordan & Evermann, 1898b, p. 2441.
Ernogrammus hexagrammus, Jordan & Snyder, 1902d, p. 490, figs. 23.

We possess no specimens which have been used by Temminck & Schlegel. According to the Fauna Japonica, these authors never received any.

The plate in the Fauna Japonica has been made after an original Japanese plate in Burger's collection which has been coloured slightly more green-yellowish, but this difference is hardly visible. There is a description of this species in Burger's manuscript (no. 134).

The description in the Fauna Japonica has been made after Burger's plate and description only.

CLXXV. **Gunellus nebulosus** (p. 138, plate LXXIII fig. 2)

Centronotus nebulosus, Günther, 1861, p. 287.
Enedrias nebulosus, Jordan & Evermann, 1898b, p. 2414; — Jordan & Snyder, 1902d, p. 468, fig. 14.

Our collection contains three stuffed specimens from Burger, one specimen in spirits from Von Siebold, and one specimen from Japan, 1845, from unknown collector, which probalby belongs to this collection too. Total (standard) length of Burger's specimens: no. 1042:24 (22.5) cm, no.

1044:23.8 (22.4) cm, no. 1045:24.8 (23.2) cm; of Von Siebold's specimen: no. 1788*:26.8 (25.5) cm; of the specimen in spirits from unknown collector: no. 1787:15 (14) cm.

The plate in the Fauna Japonica is an exact reproduction of an original Japanese plate in Burger's collection. According to our stuffed specimens, the shape as represented on this plate is inexact: the height should be 10-12 in standard length, 10.8-12.8 in total length; the head 10.7-11.3 in standard length, 11.5-12 in total length; as this difference does not exist in the specimens in spirits, it must be caused by deformation of the dry preserved specimes. According to all specimens, the number of finrays must be D 80, A II.37. Burger's manuscript contains a description of this species (no. 49).

Only the stuffed specimens still have indistinct remains of their former coloration. As I have mentioned before, there are some differences between the stuffed specimens and the specimens preserved in spirits. In the latter specimens, the height is 7.5-8 in standard length, 8-8.7 in total length; the head 8 in standard length, 8.6 in total length. As the stuffed specimens are almost cylindrical, considerably thicker than the more compressed specimens in spirits, I suppose that these differences, at least partially, have been caused by deformation of the dry specimens. According to the data given by various authors, this species also has a very wide range of variation in these characters:

	height/std. l.	height/tot. l.	head/std. l.	head/tot. l.
Fauna Japonica	7.4	8	7.4	8
Günther (l.c.)	10.15	11	10.15	11
Jordan & Evermann (l.c.)	8.5-9.5	?	7.5-8	?
Jordan & Snyder (l.c.)	6.67	?	8.8	?

The data form a more or less continuous series, in consequence of which I believe that the authors cited above all described the same, very variable, species.

According to our specimens, the fin formula should be D 76-80, A II.34?-37; the teeth on both jaws are situated in very narrow bands, perhaps in 2 rows?; the depth of the caudal peduncle 2.5-2.8 in head. The specimens sufficiently agree with the descriptions cited above. They represent the type material of *Enedrias nebulosus* (T. & S.). Specimen no. 1788 I regard as type.

CLXXVI. **Gunellus crassispina** (p. 139)

For descriptions: see CLXXV.

We possess one specimen in spirits from Burger. Total (standard) length: no. 1781*:19.8 (18.5) cm.

Of this species there is neither a plate in the Fauna Japonica nor a description in Burger's manuscript.

This specimen differs from the specimens of former species (CLXXV) only by having a slightly increased number of anal rays: D 79; A II.38; height 7.3 in standard length, 7.8 in total length; head 8.3 in standard length, 8.9 in total length. This specimen must belong to *Enedrias nebulosus* (T. & S.). It is the type of Temminck & Schlegel's *crassispina*.

CLXXVII. **Pseudoblennius** (p. 313, plate LXXIX A figs. 2 & 3)

Pseudoblennius percoides Günther, 1861, p. 297; — Jordan & Starks, 1904b, p. 309.

We possess one stuffed specimen from Burger and seven Japanese specimens in spirits which probably belong to the same collection. Total (standard) length of Burger's specimen: no. 1046:16 (13.8) cm; of the specimens in spirits: no. 1747a:8.3 (7) cm, no. 1747b-d:7.5-6.5 (6.5-5.5) cm, no. 1748:17.3 (15) cm, no. 1749a & b:7 (5.7) cm.

The plate in the Fauna Japonica, on which this species has been called "*Pseudoclinus*", has not been made after an original plate in Burger's collection. Fig. 2 agrees with the two largest specimens only, especially with specimen no. 1748; the stuffed specimen has been stuffed badly, is deformed, and more or less differs in some characters: height at 1st dorsal spine 5.5, at 1st soft ray 7 in standard length; head 3 in standard length; no? tentacle above eye, probably damaged; A 17, V I.2; the inferior profile almost straight. Burger's manuscript contains a description (no. 50), which describes the coloration of the juvenile specimens only.

The stuffed specimen has slight remains of its former coloration on the head and the body, indistinct traces on C and P, which are about in accordance with the plate in the Fauna Japonica; some of the specimens in spirits have indistinct traces on the vertical fins; head 2.7-3, height 4.8-5.5 in standard length; pores in lateral line 38(3); eye 5 in head; small teeth on the palatines. In the adult specimens the maxillary reaches slightly beyond the eye, but in the juvenile specimens hardly till below the posterior edge of the orbit, while the latter specimens have the snout slightly shorter than the adult specimens too. On account of this, the juvenile specimens in these characters better agree with *P. cottoides* (Rich.) as described by Jordan & Starks (l.c., p. 311), but in my opinion these are but juvenile characters. Taking this into consideration, the specimens slightly differ in some of the characters mentioned above only, but further sufficiently agree with the descriptions cited above. They belong to *Pseudoblennius percoides* Gthr. and represent the material on which Temminck & Schlegel based their genus *Pseudoblennius*.

CLXXVIII. **Dictyosoma** (p. 139, plate LXXIII fig. 3)

Dictyosoma temminckii, Günther, 1861, p. 279.
Dictyosoma bürgeri, Jordan & Snyder, 1902d, p. 482.

We possess two stuffed specimens from Burger and three specimens in spirits from Von Siebold. Total (standard) length of Burger's specimens: no. 996:19.6 (18.7) cm, no. 997:16 (15.3) cm; of Von Siebold's specimens: no. 1948a:22 (20.5) cm, no. 1948b:14.4 (13.5) cm, no. 1948c:13.3 (12.5) cm.

The plate in the Fauna Japonica is an exact reproduction of an original Japanese plate in Burger's collection. It is not completely accurate. According to our specimens there should be more and smaller pores on the head, D LIII-LIV.9-10, A II (or I?). 42-44; head about 6.8, height 9-9.5 in standard length; eye about 6.5 in head; snout less blunt. This species has been described by Burger in his manuscript (no. 51).

The specimens have no remains of their original coloration; the stuffed specimens slightly differ from the specimens in spirits, probably on account of deformation: height 10.5 in standard length, 11 in total length; all specimens have bands of small teeth on vomer and platines; the maxillary reaches till below the posterior border of the eye; no ventral fins. Except some slight differences in these characters, the specimens closely agree with the descriptions cited above. They belong to *Dictyosoma bürgeri* Van der Hoeven and represent the material on which Temminck & Schlegel based their genus *Dictyosoma.*

CLXXIX. **Gobius flavimanus** (p. 141, plate LXXIV fig. 1)

Gobius flavimanus, Bleeker, 1853b, p. 42; — Günther, 1861, p. 76.
Acanthogobius flavimanus, Jordan & Snyder, 1901f, p. 98.
Aboma snyderi Jordan & Fowler, 1902d, p. 575, fig. (juv.).

Von Siebold's collection contains eighteen specimens in spirits. Total (standard) length: no. 1905a* & b:15.8 (13) cm, no. 1906:8.8 (7.2) cm, no. 1907a-o:6.4-3.5 (5.5-2.9) cm.

The plate in the Fauna Japonica has been made after an original Japanese plate in Burger's collection which has the spots on D and C lighter brown, the eye lighter bluish-grey, the dark blue pupil bordered with white. The shape best agrees with the largest specimens of the 1st group (see below), nos. 1905a & b, 1906; these specimens slightly differ in a few characters only: D VIII.14(1)-15(1), eye up to 4.8 in head, length of P equals head without snout, V half of eye-diameter shorter, D^1 beginning about 0.75 eye-diameter behind base of P, teeth distinct, scales on opercles. This species has been described by Burger in his manuscript (no. 53). According to

Burger's data, the fin formula should have to be D VIII.15, A 13; this agrees with the 1st group mentioned below, which I identified as *Acanthogobius flavimanus* (T. & S.).

The material is obviously heterogeneous. On account of the differences in fin formulae I distinguish the following groups:

Group	Quantity	D	A	Standard length
A	11	D VIII.14(1)-15(1)	A 12(1)-14(1)	13-3.5
B	1	D VIII.11(1)	A 11(1)	3
C	1	D VII.11(1)	A 11(1)	2.9
D	3	D VI.I.9(1)	A 10(1)	3.5-3.8
E	1	D VI.10(1)	A 10(1)	4.2
F	1	D IV.10(1)	A 9(1)	3.4

A. The three largest specimens, nos. 1905a & b and 1906, still have distinct remains of their former coloration on D and C, and indistinct traces on A and V; D VIII.14(1)-15(1), A 12(1)-14(1), P 20-21; scales about 52-58 in longitudinal series; eye about 4.5, maxillary 2.5-2.7 in head; origin of D^1 0.75 eyediameter behind base of P; D^2 and A do not reach till C. Except some slight differences in these characters, the specimens closely agree with the first three descriptions cited above. The smaller specimens of this group are slightly different, but these differences must be caused by youth. They have no remains of colour markings; depth of caudal peduncle about 3.5 in head; 2nd dorsal spine longest; P not quite reaching till below soft dorsal fin. These small specimens closely agree with Jordan & Fowler's description of *Aboma snyderi* (l.c.), differing only in the few characters just mentioned.

As *Aboma snyderi* Jord. & Fowl. has been regarded as based on juvenile specimens of *flavimanus* (cf. Tomiyama, 1936, p. 85; Koumans, 1940a, p. 146), I regard the material of this group as homogeneous and type material of *Acanthogobius flavimanus* (T. & S.). Specimen no. 1905a I regard as type.

B. This specimen is small and in a very bad condition. As far as I could see it has but 11 rays in D^2, while the tongue is distinctly bilobate. In these characters it obviously differs from the specimens in the former group. The squamation too is slightly different, viz. 46 scales in lateral series. I even doubt whether it is an *Acanthogobius*, but the evidently juvenile specimen cannot be identified with sufficient evidence.

C. This specimen seems to differ from the former one by having probably

but 7 dorsal spines. On account of the bad condition of this small, probably juvenile specimen, it is impossible to determine its identity.

D. These three specimens distinctly differ from all other groups by having a pungent spine in D^2. On account of this character as well as several others, they must doubtless belong to the genus *Oplopomus* (Ehrenberg) C. & V., although they differ from the diagnosis of that genus as given by Koumans (1931, p. 92, 93) by having but 24 scales in lateral series and no armature on the preopercle. The latter difference, however, may be a juvenile character as young specimens of *O. oplopomus* (C. & V.) also have a rather inconspicuous preopercular serrature.

The specimens easily can be distinguished from *O. oplopomus* (C. & V.) by their scaly cheeks, 24 scales in lateral series, 2nd-6th ray of D^1 with distinct filament, while they differ from *O. caninoides* (Blkr.) by having a probably naked opercle, 24 scales in lateral series, 2nd-6th ray of D^1 with filaments, 7 or 8 predorsal scales. They consequently must belong to a new species. This genus too is new for the Japanese fauna.

Oplopomus koumansi nov. spec.

D VI.I.9(1), A 1.9(1), P 18, l. lat. 24, l. tr. 7, predorsal scales 7 or 8.

Body elongate, compressed, height 6 in standard length, 7.2 in total length. Head convex, compressed but rather flat and broad behind the eyes, 3.4-3.5 in standard length, 4.2-4.3 in total length. Profile convex, but slightly less than in *O. oplopomus* (C. & V.). Eye 3.2 in head, interorbital $^1/_3$ eye-diameter. Snout obtuse, convex, shorter than eye, tip before inferior part of eye. Lips moderate. Mouth oblique, lower jaw a little prominent. Maxillary extends to below anterior part of eye. Teeth in upper jaw in outer row enlarged. In lower jaw outer row considerably enlarged with on each side a slender canine. Preopercle unarmed. Longitudinal mucous canals. In interorbital an open pore. Behind each eye at the beginning of supraopercular groove an open pore. Head scaled above behind the eyes, cheeks scaly, opercle naked(?). Body with large ctenoid scales. Dorsal fins separate. First dorsal fin higher than body, first ray longer than eye, middle rays are longest, ending in well developed filaments. Second dorsal slightly higher than body, anal fin nearly equal to height of body. First ray of second dorsal fin is a pungent spine which is about equal to the pungent spines of first dorsal fin. Pectoral fin obtuse, shorter than head. Ventral fin acute, shorter than head. Caudal fin obtuse, convex, shorter than head.

Coloration almost completely vanished. A dark blotch on base of caudal fin. Numerous tiny brown spots on first dorsal fin.

Habitat: Japan (probably neighbourhood of Nagasaki).

E. This specimen is in a very bad condition. It seems to agree sufficiently with the description of *Ctenogobius gymnauchen* (Blkr.) by Jordan & Snyder (l.c., p. 58), so it may belong to that species.

F. This specimen even belongs to another family, the Callionymidae. Except slight differences in some juvenile characters of this very small specimen, viz., eye 3.5, snout 5 in head, it closely agrees with the descriptions and our material of *Callionymus lunatus* T. & S. (see CXCIII). Some slight remains of the former coloration confirm this. I consequently regard this specimen as belonging to that species.

CLXXX. **Gobius brunneus** (p. 142, plate LXXIV fig. 2)

?*Ctenogobius similis*, Jordan & Snyder, 1901f, p. 56.

Our collection contains one specimen in spirits labelled "*Gobius brunneus* Schl., Japan, 1854; type v. Fauna Japonica". Total (standard) length: no. 1923*:5.3 (4.7) cm (C damaged).

The plate in the Fauna Japonica has been made after an original Japanese plate in Burger's collection which has been painted slightly less dark. This plate doubtless represents a completely different species, belonging even to another genus. This species has been described by Burger in his manuscript (no. 52). On account of his remarks about head, jaws and tongue, this description must concern our specimen only, and not Burger's original plate (see Koumans, 1935, p. 150).

Jordan & Snyder (l.c., p. 74) and Tomiyama (1936, p. 88) both mention this species as a *Glossogobius*; their descriptions and Tomiyama's figure (fig. 35) considerably differ from our specimen, but far better agree with Burger's plate and the reproduction in the Fauna Japonica. This agrees with the opinion of Koumans (1935, p. 149): "two species to be mixed here, one (a *Rhinogobius*) on which Bürger based the description of his manuscript, and to which the type specimen of *Gobius brunneus* belongs, and another (a *Glossogobius giuris*) after which was made the figure in Fauna Japonica". The description in the Fauna Japonica in very superficial.

The specimen is juvenile and in a rather bad condition; no remains of colour markings; head 3.5 in standard length; snout 3, maxillary 2.6, eye 4.5 in head (the latter must be a juvenile character); scales in longitudinal series 32, transverse 9 or 10; A 8(1); a narrow groove between the eyes; mucous pores doubtful; highest dorsal spine (damaged?) 2 in head; D^2 and A damaged. Except some slight differences in these characters which

must have been caused by youth, damage, variability and perhaps sexual differences, the specimen closely agrees with the description of *"Ctenogobius" similis* (Gill) by Jordan & Snyder (l.c.). I also compared this specimen with the only specimen of *similis* in our collection (no. 12509; total (standard) length: 8.6 (7) cm; from Japan). The agreement seems complete, which makes a synonymy very probable, but as I have not a sufficient number of specimens of *similis* at my disposal, and especially no specimens of the same length as our specimen of *brunneus,* I cannot make a final decision.

The specimen must be the type of *Rhinogobius brunneus* (T. & S.).

CLXXXI. **Gobius olivaceus** (p. 143, plate LXXIV fig. 3)

For literature: see Koumans (1935, p. 148).

As Temminck & Schlegel mentioned in the Fauna Japonica, they never received any Japanese specimens of this species.

The plate in the Fauna Japonica has been made after an original Japanese plate in Burger's collection which represents a specimen with a slightly more yellowish body. This species has not been described by Burger.

Gobius olivaceus T. & S. is probably identical with *Glossogobius giuris* (Ham. Buch.) (cf. Koumans, 1935, p. 149).

CLXXXII. **Gobius virgo** (p. 143, plate LXXIV fig. 4)

Gobius virgo, Günther, 1861, p. 79.
Pterogobius virgo, Jordan & Snyder, 1901f, p. 88.

As has been remarked in the Fauna Japonica, Temminck & Schlegel never received any Japanese specimens of this species.

The plate in the Fauna Japonica is an exact reproduction of an original Japanese plate in Burger's collection. Burger's manuscript contains a description of this species (no. 135). The data given in this description and Burger's Japanese plate have been the only sources for the description in the Fauna Japonica. The species meant by this description must be a *Pterogobius,* consequently must be named *Pterogobius virgo* (T. & S.).

CLXXXIII. **Gobius hasta** (p. 144, plate LXXV fig. 1)

Gobius hasta, Günther, 1861, p. 78.
Synechogobius hasta, Jordan & Snyder, 1901f, p. 102.

In our collection I found one specimen preserved in spirits, labelled *"Gobius hasta* Schleg., Japan, 1844". As the part of the Fauna Japonica which contains the description of this species has been published in 1845, this

specimen may have been used by Temminck & Schlegel for the composition of that description. Total (standard) length: no. 1909*:23.4 (19) cm. According to the Fauna Japonica, the specimen should measure "dix pouces".

The plate in the Fauna Japonica has been made after an original Japanese plate in Burger's collection which represents the anal fin with a rusty edge, painted in about the same colour as the centre of the pectoral fin. This species has not been described by Burger.

Except some inaccuracies which have already been mentioned by Koumans (1931, p. 110), the description by Jordan & Snyder (l.c.) sufficiently agrees with our specimen. It must be the type of *Synechogobius hasta* (T. & S.).

CLXXXIII'. **Acentrogobius pflaumii**

Gobius pflaumii Bleeker, 1853b, p. 42, fig. 3.
Acentrogobius pflaumi, Jordan & Snyder, 1900, p. 372.
Ctenogobius virgatulus Jordan & Snyder, 1901f, p. 63, fig. 9.
Ctenogobius pflaumi, Jordan & Snyder, 1901f, p. 65.
Gobius pflaumi, Tomiyama, 1936, p. 66.

There were two unidentified Gobiid specimens from Japan, 1844, which probably belong to the material Temminck & Schlegel received from Japan. Total (standard) length: no. 1928a & b:8 (6.8) cm, no. 1928c:6.7 (5.5) cm.

These specimens never have been used by Temminck & Schlegel. They have no remains of their former coloration except some traces on D^1, about in accordanc with Jordan & Snyder's figure. D VI.11(1), A 11; scales in longitudinal series 27, transverse 9. I compared these specimens with two type specimens of *Acentrogobius pflaumii* (Blkr.) (no. 4496) and a more recently caught specimen from Kobe, Japan (no. 15065). The agreement with these specimens as well as with the descriptions cited above is about complete. They must belong to *Acentrogobius pflaumii* (Blkr.).

CLXXXIII". **Leucopsarion petersi** (plate II fig. 1 in present paper)

Leucopsarion petersi, Jordan & Snyder, 1901f, p. 125, fig. 31; — Tomiyama, 1936, p. 54; — Koumans, 1931, p. 61.

Our collection contains twenty specimens in spirits from Von Siebold, labelled "*Liparis* Bürger, no. 128, V. Siebold, Japan". Total (standard) length: no. 3623:4.4-4 (4-3.5) cm.

Among the Japanese plates Burger collected in Japan, and which generally have been reproduced in the Fauna Japonica, I found an unpublished coloured plate of this species, of which I give a reproduction.

The number on the label, no. 128, refers to a description in Burger's manuscript.

The specimens are in a rather bad condition, but their identification leaves no room for doubt. They belong to *Leucopsarion petersi* Hilg.

CLXXXIV. **Sicydium obscurum** (p. 145, plate LXXVI fig. 1)

Tridentiger obscurus, Günther, 1861, p. 566; — Jordan & Snyder, 1901f, p. 113.

We possess one stuffed specimen from Burger and three specimens in spirits from Von Siebold. Total (standard) length of Burger's specimen: no. 985:14.4 (12.2) cm; of Von Siebold's specimens: no. 1738a:7 (5.7) cm, no. 1738b:5.5 (4.7) cm, no. 1746*:9.2 (7.5) cm.

The plate in the Fauna Japonica has been made after an original Japanese plate in Burger's collection which has been coloured slightly lighter. This plate originally represented Burger's specimen only, but Temminck & Schlegel, who considered this material homogeneous, considerably changed the plate in order to improve the agreement with Von Siebold's specimens. For instance they changed the shape of the head and the position of the ventrals as can be seen on the original plate. It now represents a more or less intermediary form. A number on the original plate refers to a description by Burger (no. 138), which still is in his manuscript. This description probably concerns Burger's specimen only.

As I have mentioned above, the material Temminck & Schlegel used for their new species is heterogeneous. Burger's dry preserved, deformed and damaged specimen probably hardly has been looked at by Temminck & Schlegel. It rather closely agrees with Tanaka's descriptions of *Sicyopterus japonicus* Tanaka (1909, p. 22; 1913, p. 203, figs. 209-211, 215), differing but slightly in some characters which must be rather unreliable in such a badly preserved specimen: head 5.5, height 6.5 in standard length; no teeth on upper jaw (damaged?); soft dorsal fin beginning slightly behind vent; origin of anal fin below 2nd soft dorsal ray; posterior anal ray below 10th soft dorsal. The specimen must belong to that species: *Sicyopterus japonicus* (Tanaka).

Von Siebold's specimens are in a much better condition. They must have been examined much more closely by Temminck & Schlegel than Burger's specimen, as shows the changing of Burger's plate. They have 36 or 37 scales in lateral series, eye 6 in head, the maxillary reaches till below centre of eye. Except slight differences in these characters, the specimens closely agree with the descriptions cited above. They must represent the type material of *Tridentiger obscurus* (T. & S.). Specimen no. 1746 I regard as type.

CLXXXV. **Amblyopus Lacepedii** (p. 146, plate LXXV fig. 2)

?*Taenioides lacepedei*, Jordan & Snyder, 1901f, p. 128, fig. 33.

We possess no Japanese specimens of this species. According to Temminck & Schlegel, they founded this species on Burger's description and plate only.

The plate in the Fauna Japonica has been made after an original Japanese plate in Burger's collection which slightly differs in coloration. It represents a specimen with a less reddish, brown edge along dorsal fin and with yellowish brown pectoral rays. This species has been described by Burger in his manuscript (no. 136).

Jordan & Snyder (l.c.) and Jordan, Tanaka & Snyder (1913, p. 364) describe or mention this species as *Taenioides lacepedei* (T. & S.), but the figures and descriptions by these authors differ in some characters: head longer, pectoral fins larger than in Fauna Japonica. Burger's data and plate probably are inexact.

According to Tomiyama (1936, p. 102) this species is synonymous with *Gobioides rubicundus* Hamilton, which, however, is very doubtful.

CLXXXVI **Periophthalmus modestus** (p. 147, plate LXXVI fig. 2)

Periophthalmus cantonensis, Jordan & Snyder, 1901f, p. 49; — Tanaka, 1927, p. 684, figs. 438-440; — Tomiyama, 1936, p. 99.
Periophthalmus cantonensis cantonensis, Eggert, 1935, p. 59.

We possess six specimens in spirits from Von Siebold. Total (standard) length: no. 1956a:8.3 (6.8) cm, no. 1956b & c:7.3 (6) cm, no. 1956d-f:6.9-6.3 (5.7-5.2) cm.

The plate in the Fauna Japonica has been made after an original Japanese plate in Burger's collection which represents a specimen with a slightly more dusky back and a considerably more dusky caudal fin. The opercles have been drawn too short, the snout too long, should be more blunt. Burger described this species in his manuscript (no. 54).

The condition of these specimens is satisfactory; D XII-XVI.12 (1), A 12 (1); scales in lateral series about 72-80; snout about 3.5, depth of caudal peduncle about 3 in head; height of D^1 about equal to height of body above vent; the first rays of D^2 and A unbranched but not spinous. Except some slight differences in these characters, the specimens closely agree with the descriptions cited above. They doubtless belong to *Periophthalmus cantonensis* (Osbeck) C. & V., which name I prefer to replace by *P. modestus* Cantor.

As Dr. Koumans told me, the name *cantonensis* does not occur in the

German translation of Osbeck's book (1765, p. 171), nor in Sherborn's Index Animalium (1924), and consequently probably not in the English version of Osbeck's "Reise" (1771, p. 201?) too. This name consequently seems to occur in the original version only (1757, p. 131?), which is pre-Linnaean. In the two translations I just mentioned, this species abusively has been regarded as synonymous with *Gobius niger* L. The first time it has been mentioned afterwards is by Cuvier & Valenciennes (1837, p. 188) when they mention Osbeck's *cantonensis* as possibly a variation of *P. koelreuteri* and cite Osbeck's description. This quotation, however, is quite insufficient, so I prefer to use the name *P. modestus* Cantor.

CLXXXVII. **Boleophthalmus Boddaertii** (p. 148, plate LXXVI fig. 3) (plate IV fig. 1 in present paper)

Apocryptes pectinirostris, Cuvier & Valenciennes, 1837, p. 150.
Boleophthalmus pectinirostris, Günther, 1861, p. 102.
Boleophthalmus chinensis, Jordan & Snyder, 1901f, p. 47.

We have in our collection two stuffed specimens from Burger and three stuffed specimens from Japan which probably belong to the same collection. Total (standard) length of Burger's specimens: no. 992:16 (13) cm, no. 993:18.5 (16) cm; of the further Japanese specimens: no. 991:18.5 (16) cm, no. 994:19.8 (17) cm, no. 995:19.5 (16.5) cm.

The plate in the Fauna Japonica has been made after an original Japanese plate in Burger's collection which shows more oblong spots on D^2. According to our specimens, the number of finrays should be D V.25 (1). This species has also been described by Burger (no. 137).

The specimens generally still have distinct remains of the original colour markings on the fins; they are more or less deformed; head 4.3-4.7, height 6.8-7.5 in standard length; D^2 with at most 8 longitudinal rows of spots; depth of caudal peduncle 3-3.5 in head; lower jaw with two canines, one on each side of symphysis. Except slight differences in some of these characters, the specimens closely agree with the descriptions cited above. They belong to *Boleophthalmus pectinirostris* (L.).

The name *Apocryptes chinensis* Osbeck (Amoen. Acad., 1754) is pre-Linnaean, and in the German and English translations (1765, 1771) this species has been described as *Gobius pectinirostris,* after Linné (1758). The species described by Cuvier & Valenciennes (1837, p. 143-152) as belonging to the genus *Apocryptes* form a homogeneous group with the exception of *A. pectinirostris,* which species belongs to the genus *Boleophthalmus* C. & V. This species therefore has to be named *Boleophthalmus pectinirostris* (L.).

Among Von Siebold's specimens in our collection I found two specimens labelled "*Boleophthalmus puellus,* fauna jap.". That name, however, does not occur in literature (cf. Sherborn). Total (standard) length: no. 2003a:18.8 (15.5) cm, no. 2003b:17.4 (14) cm. These specimens completely agree with the material of *pectinirostris,* only specimen no. 2003a has one more dorsal spine, D VI.25 (1). These specimens too must belong to *Boleophthalmus pectinirostris* (L.).

CLXXXVIII. **Eleotris obscura** (p. 149, plate LXXVII figs. 1, 2 & 3)

Eleotris obscura, Günther, 1861, p. 115.
Odontobutis obscura, Bleeker, 1877b, p. 56; — Jordan & Snyder, 1901f, p. 43.
Mogurnda obscura, Tanaka, 1912, p. 130, figs. 134-136.

There are nine specimens in spirits in Von Siebold's collection. Total (standard) length: no. 2039a:12.3 (10) cm, no. 2039b:12 (10) cm, no. 2039c:8.5 (6.8) cm, no. 2039d:4.2 (3.3) cm, no. 2040a*:13.3 (10.7) cm, no. 2040b:11.2 (9.1) cm, no. 2040c:10.5 (9.2) cm, no. 2040d:8 (6.6) cm, no. 2040e:7.5 (6) cm.

The plate in the Fauna Japonica is an exact reproduction of an original Japanese plate in Burger's collection. The shape is not completely exact: D^2 and A should be higher, 6th and 7th rays longest, more than head without postorbital part; the eye must slightly project above the profile, about 6 in head. This species has been described by Burger in his manuscript (no. 55).

Several of the specimens still have remains of their former coloration on the fins, but these are almost always less regular than on the plate in the Fauna Japonica; D VI-VIII.1.8 (1)-9 (1), A 1.6 (1)-8 (1); scales in lateral series 37-40, transverse to origin of A about 16; eye varying with growth, 5.5-6.8 in head, 1.3-1.8 in interorbital space, which about equals snout; snout about 3.5 in head; outer teeth not enlarged, anterior teeth about as long as diameter of pupil; scales on body ciliate. Except slight differences in some of these characters, the specimens closely agree with the descriptions cited above. They represent the type material of *Odontobutis obscura* (T. & S.). Specimen no. 2040a I regard as type.

CLXXXIX. **Eleotris oxycephala** (p. 150, plate LXXVII figs. 4 & 5) (plate V fig. 1 in present paper?)

Eleotris oxycephala, Günther, 1861, p. 115; — Jordan & Snyder, 1901f, p. 46; — Tanaka, 1912, p. 174, figs. 184-186.
Culius oxycephalus, Bleeker, 1877b, p. 47.

Although Temminck & Schlegel mention two specimens, I could find no

Japanese specimens of this species in our collection, so I fear the types are lost.

This species has not been described by Burger. The figs. 4 & 5 on plate LXXVII in the Fauna Japonica have not been made after an original plate in Burger's collection.

CXC. **Callionymus longicaudatus** (p. 151, plates LXXVIII figs. 1 & 2 and LXXIX A)

Callionymus japonicus Houttuyn, 1782, p. 312.
Callionymus Reevesii, Bleeker, 1853b, p. 44.
Callionymus longecaudatus, Günther, 1861, p. 148.
Calliurichthys japonicus, Jordan & Fowler, 1903a, p. 942, fig. 2.

Our collection contains two stuffed specimens from Burger, two specimens in spirits from Von Siebold, two specimens in spirits with the indication "F. Jap." and six stuffed specimens from Japan which probably belong to Temminck & Schlegel's material too. Total (standard) length of Burger's specimens: no. 1004*:38.5 (21.5) cm, no. 1009:33.5 (19) cm; of Von Siebold's specimens no. 2075a:32.5 (19) cm, no. 2075b:31 (18) cm; of the further specimens in spirits: no. 2076a:25.5 (15) cm, no. 2076b:20 (12) cm; of the further stuffed specimens: no. 1002:26 (16) cm, no. 1003:26 (16.5) cm, no. 1005:23.5 (14.5) cm, no. 1006:34.5 (20) cm, no. 1007:28 (18) cm, no. 1008:24.5 (16) cm.

The figures of this species probably have not been made after Japanese plates. According to our specimens they are not completely exact. The caudal fin should be more elongate, the middle rays longer in proportion to outer. Plate LXXIX fig. 1 seems exact. This species has not been described by Burger.

The specimens in spirits still have distinct remains of colour markings, especially on the fins; in the specimens with the best preserved fins the 1st and 2nd dorsal spines are provided with filaments, their length equal to head, but in the other specimens these spines have been damaged; D IV.9(1) (in specimen no 1006: D IV.10(1)), A 8(1), the ends of both branches of posterior rays split in both fins. The agreement of these specimens with the descriptions cited above is almost complete. They belong to *Calliurichthys japonicus* (Houttuyn) and represent the type material of *C. longicaudatus* (T. & S.). Specimen no. 1004 I regard as type.

CXCI. **Callionymus variegatus** (p. 153)

Calliurichthys variegatus, Jordan & Fowler, 1903a, p. 944.

There are two specimens in spirits in Von Siebold's collection; one further specimen in spirits, from Japan, 1845, probably belongs to the same col-

lection. Total (standard) length of Von Siebold's specimens: no. 2096*:9.7 (7.3) cm, no. 2097:12 (8.5) cm; of the specimen without name of collector: no. 2074:16.5 (12) cm.

Of this species there is neither a plate in the Fauna Japonica nor a description in Burger's manuscript.

Specimen no. 2096 still has distinct remains of its former coloration on body and fins, which lack in the other specimens. They proved to belong to different species. As Temminck & Schlegel mention two specimens measuring "environ trois pouces", both female, I suppose that specimen no. 2096 only can represent one of these types.

Specimen no. 2096: D IV.8(1), A 7(1); height 7.8, head 2.7 in standard length; eye 4 in head, snout 3.2 in head; preopercular spine simple. The agreement of this specimen with the description cited above is quite close. This specimen must be the type of *Calliurichthys variegatus* (T. & S.).

Specimen no. 2097: D IV.9(1), A 9(1); height 9.5, head 3 in standard length; eye 4.3, snout 3.7 in head; preopercular spine simple with some small antrorse barbs on the upper edge; the first dorsal spine mutilated. This specimen closely agrees with our material and the descriptions of *Calliurichthys japonicus* (Houttuyn) (see CXC), and must belong to that species.

Specimen no. 2074: D IV.9(1), A 9; height about 8.6, head 3.6 in standard length; eye 4.5, snout 3.2 in head; preopercular spine complex; a distinct dark ocellus on D^1. This specimen has been stuffed with cotton. It closely agrees with some specimens I identified as *Callionymus punctatus* Rich., which species formerly has been regarded as *C. valenciennei* T. & S., and with the descriptions of that species (see CXCII). It must be a female specimen of *Callionymus punctatus* Rich.

CXCII. **Callionymus Valenciennei** (p. 153, plate LXXVIII fig. 3)

Callionymus flagris Jordan & Fowler, 1903a, p. 952, fig. 7.

We have in our collection four specimens in spirits from Von Siebold and one stuffed specimen from Japan, 1845, which probably belongs to the same material. Total (standard) length of Von Siebold's specimens: no. 2078*:11.2 (7.8) cm, no. 2079a:15 (11) cm, no. 2079b:12.5 (9.5) cm, no. 2079c:10.3 (7.7) cm; of the stuffed specimen: no. 1011:16(12) cm.

The plate in the Fauna Japonica has been made after an original Japanese plate in Burger's collection which slightly differs in coloration. The colours are less dusky, the pectoral rays with lightbrown spots. In the Fauna Japonica the gill-apertures are erroneously coloured greyish, like the spots on the head

According to the Fauna Japonica, this plate represents a male specimen. It by far best agrees with specimen no. 2078, although it still shows some differing characters. This species has been described by Burger in his manuscript (no. 139).

The material proved to be heterogeneous; all specimens have remains of colour markings on the fins, specimen no. 2079a on the body too.

Specimen no. 2078, which must be the specimen represented on Burger's Japanese plate and the plate in the Fauna Japonica, has been described by Temminck & Schlegel as a male of *C. valenciennei*. These authors describe the shape of D^1 as follows: "elle est attaché au dos, par derrière, au moyen d'une membrane qui s'étend presque jusqu'à la base du premier rayon de la deuxième dorsale; la hauteur de ses membranes égale la distance comprise entre les yeux et l'orifice branchial; ses deux premier rayons naissent d'une base commune, et ils sont dans le mâle tous les quatres prolongés en des fils, de plus du double de la longueur des membranes". This agrees with this specimen, but not with Jordan & Fowler's description of *C. valenciennei* (1903a, p. 951) which must concern a different species.

Of the four dorsal spines, the 1st and 4th are longest, 2nd shortest; first slightly less than half standard length; posterior dorsal ray prolonged, reaching far beyond caudal base; distance between D^2 and C 2 in length of C; A 8(1), posterior ray distinctly behind D^2; P 2 in length of C, which is 2.4 in standard length; upper jaw slightly projecting, inferior profile of head almost straight; colour markings: three indistinct, rather regular, transverse rows of brown spots on C, an indistinct brownish band along edge of posterior part of A.

Except a number of slight differences in some of these characters, the specimen very closely agrees with the description of *C. flagris* by Jordan & Fowler (l.c.). As specimen no. 2078 best agrees with the plate and the description of the male specimen in the Fauna Japonica, I regard it as the type of *Callionymus valenciennei* T. & S., while I consider *C. flagris* as a synonym. The species meant by Jordan & Fowler's description of *C. valenciennei* (l.c., p. 951) should be named *C. punctatus* Rich., this being the next synonym these authors give.

Specimen no. 2079a is one of the specimens that have been described in the Fauna Japonica as female specimens of *C. valenciennei*. It distinctly differs from the further specimens by having a much broader interorbital space, 8 or 9 in head. A comparison with descriptions of *C. beniteguri* by Jordan & Fowler (1903a, p. 956) and Jordan & Snyder (1900, p. 370) gave no differences of importance, so I suppose it to belong to that species.

The specimens nos. 2079b & c and 1011 also have been described as

females of *valenciennei*. They indeed quite closely agree with Jordan & Fowler's description of that species (1903a, p. 951). Except specimen no. 1011, which has D^1 destroyed, these specimens have a distinct dark ocellus on that fin; the 4th dorsal spine is shortest. These specimens must belong to the species meant by Jordan & Fowler's description of *valenciennei*, which species, as I have mentioned before, must be renamed *Callionymus punctatus* Rich. A comparison with three specimens of *C. richardsonii* in Bleeker's collection proved the synonymy with that species.

CXCIII. **Callionymus lunatus** (p. 155, plate LXXVIII fig. 4)

Callionymus lunatus, Günther, 1861, p. 146; — ? Jordan & Fowler, 1903a, p. 949, fig. 5.

We possess one specimen in spirits from Von Siebold and one stuffed specimen from Japan, 1845. Total (standard) length of Von Siebold's specimen: no. 2092*:21.5 (15.5) cm; of the stuffed specimen: no. 1013:19 (14) cm.

The plate in the Fauna Japonica has not been made after a Japanese plate in Burger's collection. Burger also gives no description of this species.

Specimen no. 1013 originally did not belong to Temminck & Schlegel's material of this species, for they note that this species "ne nous est connue que d'après un seul individu, conservé dans la liqueur forte". This specimen, which has a distinct dark ocellus on D^1, doubtless belongs to *Callionymus punctatus* Rich., as it closely agrees with the material and description of that species (see CXCII).

Specimen no. 2092 also has a distinct blotch on the posterior part of D^1, and some very indistinct remains on the other fins; all these remains about in accordance with the plate in the Fauna Japonica; eye about 1.3 in snout, 4 in head, 3.2 in width of head; preopercular spine with one large tooth turned upwards, preceded by a small one (damaged); D^2 slightly lower than D^1 which equals height of body; 1st dorsal spine with filament which reaches till half way the distance between D^2 and C; head 1.2 in length of C, upper caudal rays about 1.7 in longest.

Some of these characters more or less differ from Jordan & Fowler's description (l.c., p. 949), but the agreement seems nevertheless sufficient. This specimen must be the type of *Callionymus lunatus* T. & S.

CXCIV. **Callionymus altivelis** (p. 155, plate LXXIX fig. 1)

Callionymus altivelis, Günther, 1861, p. 147; — Jordan & Fowler, 1903a, p. 948.

We have in our collection one stuffed specimen with the indication

"F. Jap." and one specimen in spirits from Von Siebold. Total (standard) length of Von Siebold's specimen: no. 2077:22 (14.7) cm; of the stuffed specimen: no. 1012*:19.8 (14.8) cm.

The plate in the Fauna Japonica has been made after an original Japanese plate in Burger's collection which slightly differs in coloration. On this plate the colour markings on the back have been painted less regular, not forming cross bands. This species has been described by Burger in his manuscript (no. 140).

Specimen no. 2077 still has some slight remains of a blotch on the posterior part of D^1 and of oblique stripes on D^2; P 20; head about 3.4 in standard length. The descriptions cited above have been made after the Fauna Japonica. The agreement is about complete.

According to the Fauna Japonica, Temminck & Schlegel received but one specimen. They must have used the specimen with the indication "F. Jap.", no. 1012, while Von Siebold's specimen probably has arrived afterwards. Specimen no. 1012 I regard as type of *Callionymus altivelis* T. & S.

CXCV. **Hoplichthys Langsdorfii** (p. 156, plate LXXIX fig. 2)

Oplichthys Langsdorfii Cuvier & Valenciennes, 1829b, p. 264, pl. 81.
Hoplichthys langsdorffii, Günther, 1860, p. 191.
Hoplichthys langsdorfii, Jordan & Richardson, 1908, p. 645, fig. 5.

We have one stuffed specimen from Burger, three specimens in spirits from Von Siebold, and three stuffed Japanese specimens which probably belong to these collections too. Total (standard) length of Burger's specimen: no. 657: ?, C damaged (13) cm; of Von Siebold's specimens: no. 588a:18 (15.5) cm, no. 588b:16.7 (14.5) cm, no. 588c:16.5 (14) cm; of the three stuffed specimens without name of collector: no. 653:17.5 (16) cm, no. 654:16.2 (15) cm, no. 655:17.5 (16) cm.

The plate in the Fauna Japonica has been made after an original Japanese plate in Burger's collection which has been coloured less dark. It is not very exact. This species has not been described by Burger.

The specimens have indistinct remains of colour markings on D^1; D VI.15(1), A 17(1), P 16-17 with the lower three or four rays longer than next, 13th ray, and connected by a short membrane only; in D^2 5th or 6th ray longest, 1st ray 2 and 15th 3 in longest ray; head 3.5-3.6, height 3.5 in standard length; eye 4.5, snout 3 in head; height of D^1 slightly more than longitudinal diameter of eye, about 6.5 in head; supraorbital spines in two slightly diverging bands; no spines before eye; 28 lateral scutes, the last scute on the caudal fin.

The agreement with the descriptions cited above is very close. The specimens belong to *Hoplichthys langsdorfii* C. & V.

CXCVI. **Lophius setigerus** (p. 158, plate LXXX)

Lophius setigerus, Cuvier & Valenciennes, 1837, p. 383; — Bleeker, 1853b, p. 46; — Günther, 1861, p. 180.
Lophiomus setigerus, Jordan & Sindo, 1902b, p. 363.

We possess one stuffed specimen from Burger, two stuffed specimens and two specimens in spirits from Von Siebold. Total (standard) length of Burger's specimen: no. 1030:45 (36.5) cm; of Von Siebold's specimens: no. 1028:23 (20) cm, no. 1029:31.5 (28) cm, no. 2033a:16.5 (13.5) cm, no. 2033b:7.5 (6) cm.

The plate in the Fauna Japonica is an exact reproduction of an original Japanese plate in Burger's collection. The humeral spine and the dentification have been drawn inaccurately, while there should be a slender flap at the top of the 1st dorsal spine. Burger described this species in his manuscript (no. 83).

The remains of the coloration are very indistinct; specimen no. 1030 seems to have no humeral spine, probably damaged?; D IV.II.8-9; head 2.4 in standard length in smallest, 3.3 in larger specimens; width of head 1.6-2, width of mouth 2.5-3, snout 6.5-10 in head, the snout 0.8-1.3 in interorbital space; eye 2-2.5 in snout; teeth in two or more rows, outer with rather small, inner with long sharp teeth, especially on lower jaw; 1st dorsal spine about 3-4 in standard length, with a slender flap at the top (specimen no. 2033a has on the flap two small black spots which make it look like a small fish); 2nd dorsal spine 1.1-1.4 in 1st; probably 5 rays in V; P 4-6 in total length; a row of short blunt spines along maxillary (probably covered by the lips in living specimens) .

The agreement of these specimens with the descriptions cited above is rather close. They belong to *Lophiomus setigerus* (Vahl).

CXCVII. **Chironectes marmoratus** (p. 159, plate LXXXI fig. 1)

Chironectes marmoratus, Cuvier & Valenciennes, 1837, p. 402.
Antennarius marmoratus, var. *marmorata,* Günther, 1861, p. 185, 187.
Pterophryne histrio, Jordan & Sindo, 1902b, p. 368, fig. 2.

Von Siebold's collection contains one specimen in spirits. Total (standard) length: no. 2102:12.8 (9.5) cm.

The plate in the Fauna Japonica has been made after an original Japanese plate in Burger's collection which shows the white spots, stripes and ventral

flaps without any red. Only the 1st anal ray should be drawn simple. The anterior filament on the snout lacks in our specimen, but that may be caused by damage. Burger's manuscript contains a description of this species (no. 182).

The specimen has distinct remains of its former coloration, which character rather closely agrees with the figures in the Fauna Japonica and by Jordan & Sindo (l.c.); there are three distinct bands on C. The specimen closely agrees with the descriptions cited above. It must belong to *Pterophryne histrio* (L.).

CXCVIII. **Chironectes tridens** (p. 159, plate LXXXI figs. 2-5)

Chironectes tridens, Bleeker, 1853b, p. 47.
Antennarius tridens, Günther, 1861, p. 191; — Jordan & Sindo, 1902b, p. 372; — Tanaka, 1929, p. 929, figs. 508-510.

There are five stuffed specimens in Burger's collection. Total (standard) length: no. 1021:7 (5.5) cm, no. 1022:11.2 (9) cm, no. 1023:12 (9.5) cm, no. 1024:11.5 (9.2) cm, no. 1025*:19 (15.5) cm.

The plate in the Fauna Japonica is an exact reproduction of an original Japanese plate in Burger's collection. Burger's manuscript contains a description of this species (no. 84).

The specimens still have distinct remains of their former coloration; D III.12; height 2.3-2.7 in total length, but this is quite an unreliable character in stuffed specimens. The agreement with the descriptions cited above is about complete. These specimens represent the type material of *Antennarius tridens* (T. & S.). Specimen no. 1025 I regard as type.

CIC. **Halieutaea stellata** (p. 160, plate LXXXII)

Halieutaea stellata, Cuvier & Valenciennes, 1837, p. 456; — Günther, 1861, p. 203; — Jordan & Sindo, 1902b, p. 380.

There are four stuffed specimens in Burger's collection, one stuffed specimen and two specimens in spirits in Von Siebold's collection. Total (standard) length of Burger's specimens: no. 1032:10 (8) cm, no. 1033:16.5 (13.5) cm, no. 1034:18.5 (15) cm, no. 1035:20 (16) cm; of Von Siebold's specimens: no. 1031:10(8) cm, no. 2038a:21.5 (17.5) cm, no. 2038b:17.5 (14.5) cm.

The plate in the Fauna Japonica is an exact reproduction of an original Japanese plate in Burger's collection. This species has also been described by Burger in his manuscript (no. 85). He mentions five soft dorsal rays, but in our specimens I could find but four.

The ventral fins are very fleshy, a weak spine easily can be overlooked,

V 5 or I.5; D IV. The agreement with the descriptions cited above is about complete. These specimens belong to *Halieutaea stellata* (Vahl).

CC. **Labrus reticulatus** (p. 161, plates LXXXIII, LXXXIII A & LXXXIV)

Cossyphus reticulatus Cuvier & Valenciennes, 1839, p. 139.
Semicossiphus reticulatus, Günther, 1862, p. 99; — Jordan & Snyder, 1902c, p. 621.

There are seven stuffed specimens in Burger's collection. Total (standard) length: no. 1249:37.5 (31.5) cm, no. 2242:61 (51) cm, no. 2282:90 (77) cm, no. 2287:40.5 (34.5) cm, no. 2317:66.5 (58) cm, no. 2334:47 (39.5) cm, no. 2345:39 (32) cm.

Plate LXXXIII is an exact reproduction of an original Japanese plate in Burger's collection; this collection also contains an original of plate LXXXIII A, which has been coloured about as plate LXXXIII, but much darker, especially on head, back and fins. Of plate LXXXIV too there is an original plate in Burger's collection which differs by having the lower parts of D^2 and the posterior parts of the interspinal membranes of D^2 less yellow, reddish, and back along the dorsal fins much more yellowish.

Plate LXXXIII agrees with the three smallest specimens, nos. 1249, 2287 & 2345. The head should be 3 in standard length, the longest rays of D^2 and A equal to postorbital part of head or slightly longer, V 1.8-2 in head, eye 6-7 in head. Specimen no. 2334 is intermediary between those represented on this plate and plate LXXXIII A.

Plate LXXXIII A agrees with specimen no. 2242. The head and the longest rays of D^2 and A must be as mentioned before, the eye 7.4 in head, the teeth longer and stronger, the longest about 0.6 eye diameter. Specimen no. 2317 is intermediary between those represented on this plate and plate LXXXIV.

Plate LXXXIV agrees with specimen no. 2282. The eye must be 7.5 in head, V half eye diameter longer than postorbital part of head.

Burger's manuscript contains a description of this species (no. 56).

The specimens have no remains of their former coloration; D XI.9(1)-10(1), A III.11(1)-12(1), P 17; scales in lateral series 45-48, 3 or 4 on C; the bony ridges on the upper jaw are probably not serrate; no scales on D^1. The agreement with the descriptions cited above is almost complete. The specimens belong the *Semicossyphus reticulatus* (C. & V.).

CCI. **Labrus japonicus** (p. 163, plate LXXXV)

Labrus japonicus Cuvier & Valenciennes, 1839, p. 99.
Cossyphus japonicus, Bleeker, 1857, p. 114.

Choerops japonicus, Günther, 1862, p. 96.
Choerops azurio Jordan & Snyder, 1902c, p. 614.
Choerodon azurio, Tanaka, 1914, p. 311, fig. 281.

Our collection contains four stuffed specimens from Burger and one specimen in spirits from Von Siebold. Total (standard) length of Burger's specimens: no. 1220:27.5 (23) cm, no. 1221:36 (30) cm, no. 1222:27.5 (22.5) cm, no. 2374:44 (37) cm; of Von Siebold's specimen: no. 2362:31 (25) cm.

Burger's collection contains a Japanese plate after which the plate in the Fauna Japonica has been made; its coloration is slightly different: the anterior and superior parts of the head light violaceous, the blue spots along the lateral line much smaller, the inferior tip of C light blue, lighter even than the basal band along A. As to the shape too, the reproduction in the Fauna Japonica is not completely exact as can be seen from the characters given below. On the original plate I found the number 62, which must refer to a description in Burger's manuscript which is missing.

All the stuffed specimens have one side painted, about in accordance with the plate in the Fauna Japonica; A III.10(1); scales in lateral series 27(2) or 28(2), transverse 3 (or 4)-1-9(or 10); head 3(-3.4 in juvenile specimens) in standard length, 3.4(-3.7) in total length; height 2.4(-2.8 in juvenile specimens) in standard length, 2.9(-3.2) in total length; eye 6(-4.5 in juvenile specimens) in head, 1.5-2.3 in height of preorbital; the posterior edge of the preopercle is very finely serrate, except in the largest specimen, no. 2374; jaws equal; pectoral margin convex. Except some slight differences in these characters, which generally must be caused by differing age, these specimens closely agree with the descriptions cited above. They must belong to *Choerodon azurio* (Jord. & Snyd.).

CCII. **Labrus rubiginosus** (p. 165, plate LXXXVI fig. 1)

Labrichthys rubiginosa, Günther, 1862, p. 114.
Pseudolabrus japonicus, Jordan & Snyder, 1902c, p. 625.

We possess four stuffed specimens from Burger, one stuffed specimen and three specimens in spirits from Von Siebold. Total (standard) length of Burger's specimens: no. 1215:16.5 (14.5) cm, no 1217:17.5 (15) cm, no. 1218:17 (14.5) cm, no. 1219*:23.5 (19.8) cm; of Von Siebold's specimens: no. 1216:15.5 (13.5) cm, no. 2172a:16.5 (14) cm, no. 2172b:14 (12) cm, no. 2172c:9 (7.7) cm.

The plate in the Fauna Japonica has been made after an original Japanese plate in Burger's collection which shows a darker red body and band along the edge of D^2. There should be about 24 scales in lateral series. The size

of the eye is variable, 4.5 in head in the smallest specimen, 5.7 in the largest. Burger gives no description of this species.

All the stuffed specimens have one side painted reddish yellow, the back darker, brownish; the other side still has slight traces of the former coloration on D, viz., a dark blotch across the base of 5th spine in some of the specimens, which lacks on the plate in the Fauna Japonica; the specimens in spirits have the same remains of colour markings; D IX.11(1); scales in transverse series 3-1-8; snout 2.8-3.1, longest dorsal spine about 3, longest soft dorsal ray 2-2.4, 2nd anal spine 4-4.5, longest anal ray 2.2-2.5 in head; the pectoral fins reach slightly beyond ventrals. These specimens belong to *Pseudolabrus japonicus* (Houttuyn), and represent the type material of *rubiginosus* T. & S. Specimen no. 1219 I regard as type.

CCIII. **Crenilabrus flagellifer** (p. 166, plate LXXXVI fig. 2)

Ctenolabrus flagellifer Cuvier & Valenciennes, 1837, p. 240.
Duymaeria flagellifera, Günther, 1862, p. 121; — Jordan & Snyder, 1902c, p. 623; — Tanaka, 1930, p. 953, figs. 518, 519 & 521; — Weber & De Beaufort, 1940, p. 140.

As has been stated by Temminck & Schlegel, they never received any Japanese specimens of this species.

The plate in the Fauna Japonica has been made after an original Japanese plate in Burger's collection, which is slightly different. According to Burger's plate there should be a scaly sheath along the dorsal fins, the scales should have a blue centre with around it a semicircular olive-green band and with a narrow light yellow stripe along the posterior edge of each scale; the membrane of A should have about three irregular rows of broad blue stripes, growing indistinct and disappearing posteriorly; the ventrals must be slightly darker, while there should be a narrow black line along the base of P. A number on Burger's plate (no. 58) probably refers to a description of this species in Burger's manuscript which is missing.

CCIV. **Cirrhilabrus** (p. 167, plate LXXXVI fig. 3)

Cirrhilabrus temminckii, Günther, 1862, p. 124.
Cirrhilabrus temmincki, Jordan & Snyder, 1902c, p. 651, fig. 10; — Weber & De Beaufort, 1940, p. 22.

There are two specimens in spirits in Von Siebold's collection. Total (standard) length: no. 2137a:10.5 (8.5) cm, no. 2137b:11.5 (9.5) cm.

According to our specimens, the figure in the Fauna Japonica, which has not been made after a Japanese plate in Burger's collection, is rather exact. The anal and dorsal fins have a scaly sheath, while there are some large scales on caudal base; a nice figure has been given by Jordan & Snyder (l.c., fig. 10). This species has not been described by Burger.

The specimens still have remains of their former coloration, in accordance with the plate in the Fauna Japonica; D XI.9(1); scales in transverse series 2-1-7; snout slightly longer than diameter of eye. The agreement with the descriptions cited above is about complete. These specimens must represent the original material of *Cirrhilabrus* T. & S., and should be named *C. temminckii* Blkr.

CCV. **Julis poecilepterus** (p. 169, plate LXXXVIbis fig. 1)

Platyglossus poecilopterus, Günther, 1862, p. 166.
Halichoeres poecilopterus, Jordan & Snyder, 1902c, p. 637.

We possess one stuffed specimen from Burger, two stuffed specimens and one specimen in spirits from Von Siebold. Total (standard) length of Burger's specimen: no. 1383:18.5 (16.5) cm; of Von Siebold's specimens: no. 1384:19.5 (17) cm, no. 1385*:21 (18) cm, no. 2225:19 (16.5) cm.

The plate in the Fauna Japonica slightly differs from the Japanese plate in Burger's collection after which it has been made. The specimen represented on Burger's plate has the spots and stripes on the body as well as the bands along the bases of the dorsal fins and the edge of the anal fin coloured pink, the latter band with a violaceous edge; the lateral band is darker and extends between the middles of 1st and 2nd row of scales below the anterior part of the lateral line and its imaginary prolongation. According to our specimens, the numbers of scales in the lateral line should be 20.4.5 (3?), in lateral series 26(3?). A number on Burger's plate (no. 57) refers to a description in his manuscript which is missing.

All stuffed specimens have one side painted in accordance with the plate in the Fauna Japonica, while the other side still has remains of the original coloration on head and body; the specimen in spirits has indistinct traces on the fins too, also about in accordance with the plate; scales in transverse series 3-1-8; head about equal to height, about 3 in standard length, 4-4.3 in total length; snout 2.9-3, longest dorsal spine 3, length of C 1.5, of V 1.7 in head. The agreement with the descriptions cited above is almost complete. These specimens must represent the type material of *Halichoeres poecilepterus* (T. & S.). Specimen no. 1385 I regard as type.

CCVI. **Julis pyrrhogramma** (p. 170, plate LXXXVIbis fig. 2)

For literature: see CCV.

There are two stuffed specimens in Burger's collection and three specimens in spirits in Von Siebold's collection. Total (standard) length of Burger's specimens: no. 1377:13.5 (11.5) cm, no. 1378*:21 (18) cm; of

Von Siebold's specimens: no. 2239a:18.5 (16) cm, no. 2239b:14.7(12.5) cm, no. 2239c:13.5 (11.5) cm.

The figure in the Fauna Japonica has not been made after an original in Burger's collection. This species has not been described by Burger.

Remains of the former coloration are still visible. The plate and the description in the Fauna Japonica seem rather correct in this character. Except the differing coloration, these specimens completely agree with the material and the descriptions of Temminck & Schlegel's previous species (CCV). They must belong to the same species, *Halichoeres poecilepterus* (T. & S.), and represent the type material of *pyrrhogramma* T. & S. Specimen no. 1378 I regard as type.

CCVII. **Julis cupido** (p. 170, plate LXXXVIbis fig. 3)

Julis cupido, Bleeker, 1862a, p. 93, pl. 33 fig. 1; — Günther, 1862, p. 181.
Thalassoma cupido, Jordan & Snyder, 1902c, p. 646; — Weber & De Beaufort, 1940, p. 132.

We have in our collection one stuffed specimen and three specimens in spirits from Von Siebold. Total (standard) length: no. 1386:15 (13) cm, no. 2217a*:14.2 (12) cm, no. 2217b:13.3 (11) cm, no. 2217c:12 (10.2) cm. According to the Fauna Japonica there should be five specimens.

The figure in the Fauna Japonica has not been made after a plate in Burger's collection. The squamation has been inexactly drawn. According to our specimens there should be 27 scales in lateral line (about 19.2.5(1)), in lateral series about 24(3), while there must be some indistinct scales on the superior part of the opercle. This species has not been described by Burger.

The specimens still have some remains of their original coloration, about as on the plate in the Fauna Japonica; A III.11(1); scales in transverse series 2-1-9; height 3.4, head 3.9 in standard length, head 4.5 in total length; height of head 1.2-1.4, eye 5-6, interorbital space 4, snout 3.5 in head; the coloration on Bleeker's figure does not agree with our specimens (see note by Weber & De Beaufort, l.c., p. 133). The agreement with the descriptions cited above is rather close. These specimens must be the types of *Thalassoma cupido* (T. & S.). Specimen no. 2217a I regard as lectotype.

CCVIII. **Xyrichthys dea** (p. 171, plate LXXXVII)

Novacula dea, Günther, 1862, p. 175.
Iniistius dea, Jordan & Snyder, 1902c, p. 654.

Our collection contains two stuffed specimens from Burger and one stuffed specimen and one specimen in spirits from Von Siebold. Total

(standard) length of Burger's specimens: no. 1196*:27 (22.5) cm, no. 1198:22.5 (19) cm; of Von Siebold's specimens: no. 1197:25 (21) cm, no. 2334:24 (20.5) cm.

The plate in the Fauna Japonica has been made after an original Japanese plate in Burger's collection which slightly differs by representing a specimen with a dark ocellus below 3rd-4th spine of D^2, its diameter slightly less than the diameter of the pupil. Our specimens too have this ocellus, which is larger than the pupil, 1.3-2 in eye. The squamation has not been drawn exactly; there are in our specimens some scales on the upper part of the opercle and in an oblique row below the eye; in lateral series 23(2), transverse 3-1-10, in lateral line 25. A number on Burger's plate refers to a description in Burger's manuscript (no. 147) which is missing.

All specimens have one side painted, about in accordance with the plate in the Fauna Japonica, while the other side (except specimen no. 1197) still has a distinct ocellus; specimen no. 2334 has some indistinct remains of the original coloration on D^2; D II.VII.12(1); head 3.3-3.5 in standard length; depth of caudal peduncle 2.2, length of P 1.3 in head; the outer rays of V do not reach till vent. The specimens sufficiently agree with the cited descriptions. They represent the type material of *Iniistius dea* (T. & S.). Specimen no. 1196 I regard as type.

CCIX. **Scarus ovifrons** (p. 173, plate LXXXVIII)

Scarus ovifrons, Jordan & Snyder, 1902c, p. 659.

There are three stuffed specimens in Burger's collection. Total (standard) length: no. 1255:29 (25) cm, no. 1256*:56 (48.5) cm, no. 2229:76 (65) cm.

The plate in the Fauna Japonica is an exact reproduction of an original Japanese plate in Burger's collection. According to the Fauna Japonica this plate has been made after a specimen measuring "deux pieds et trois pouces", probably specimen no. 1256. This specimen, however, slightly differs in some characters: A III.9(1), scales in lateral series 22, in lateral line about 25; V more pointed, D higher, about as high as A; longest dorsal spine 1.3 in longest soft ray, which is 2.7 in head. This species seems to have been described by Burger, for a number on the Japanese plate (no. 65) probably refers to a description in his manuscript. This description is missing.

The specimens have one side painted, about in accordance with the plate; scales in transverse series 2-1-7; height 3.2-3.5 in total length; eye 5.5-8 in head; length of V equals C, both 1.3 in length of P. The agreement with the cited descriptions is quite close. These specimens must represent the type material of *Callyodon ovifrons* (T. & S.). Specimen no. 1256 I regard as type.

CCX. **Callyodon japonicus** (p. 174, plate LXXXIX)

Callyodon japonicus Cuvier & Valenciennes, 1839, p. 294, pl. 406; — Bleeker, 1857, p. 115; — Günther, 1862, p. 215; — Jordan & Snyder, 1902c, p. 657.

Our collection contains three stuffed specimens from Burger and one specimen in spirits from Von Siebold. Total (standard) length of Burger's specimens: no. 1212:24 (20) cm, no. 1213:39 (33) cm, no. 1214:36.5 (30.5) cm; of Von Siebold's specimen: no. 2132:30 (24.5) cm.

The plate in the Fauna Japonica is an exact reproduction of a Japanese plate in Burger's collection. It slightly differs from our specimens in some of the characters I give below. A number on Burger's plate refers to a description in his manuscript (no. 66) which is missing.

All stuffed specimens have been painted, about in accordance with the plate in the Fauna Japonica; A III.9(1); V I.5; scales in lateral series 21, in lateral line 25 or 26, transverse 2-1-6; behind and below the eye there is an oblique row of scales and there are some large scales on the opercle; the head further scaleless; lateral line interrupted below D^2; height 2.4-3 in standard length; head (in specimen no. 2132) 3.3 in standard length, 3.9 in total length; eye 4.6-6.2 in head; A inserted slightly before D^2, without distinct scaly sheath; large scales along base of C; teeth on anterior parts of both jaws in oblique rows of 3-4 teeth; one or two oblique, large, curved teeth on each side of the upper jaw, behind imbricate teeth, the posterior one generally smaller or even lacking; a single row of small teeth, situated more interiorly, on the posterior part of the upper jaw; the posterior part of the lower jaw with only one row too. In some of these charcters the specimens more or less differ from the descriptions cited above. They probably belong to *Calotomus japonicus* (C. & V.).

CCXI. **Fistularia immaculata** (p. 175, 320) (plate II fig. 3 in present paper)

Fistularia petimba, Jordan & Evermann, 1896, p. 758; — Jordan & Starks, 1902, p. 67.
Fistularia villosa, Weber & De Beaufort, 1922, p. 12, fig. 5.

There is one stuffed specimen in Burger's collection; Von Siebold's collection contains three specimens in spirits; one specimen from Japan, 1845, without name of collector, probably belongs to these collections too. Total (standard) length of Burger's specimen: no. 1176: 80, 101 with caudal filament (77) cm; of Von Siebold's specimens: no. 2258a:41, 54 (39) cm, no. 2258b:20, 35 (19) cm, no. 2258c:24.2, 37 (23) cm; of the specimen without name of collector: no. 2263:70.5, 91 (67.5) cm.

Burger's collection contains a rather exact Japanese plate of this species, which has not been reproduced in the Fauna Japonica. He has not described

this species, and Temminck & Schlegel too, although announcing their intention to do so, give no description in the Fauna Japonica.

The condition of these specimens is rather satisfactory; D 15-16(1), A 14(1)-15(1). These specimens doubtless belong to *Fistularia villosa* Klunz.

CCXII. **Aulostoma sinensis** (p. 320)

Aulichthys japonicus, Jordan & Starks, 1902, p. 63.

We possess of this species but one specimen, collected by Von Siebold and preserved in spirits. Total (standard) length: no. 2267:13 (12.3) cm.

Neither the Fauna Japonica nor Burger's collection of Japanese plates contains a plate of this species. It has also not been described by either Burger or Temminck & Schlegel; the latter authors mention this species only in a short note (p. 175) and in their Index.

The specimen has 53 lateral plates; head 3.5 in standard length; height 2.4 in length of snout; length of C 1.4 in postorbital part of head. The agreement of this specimen with the cited description is quite close. It belongs to *Aulichthys japonicus* Brevoort.

CCXIII. **Platessa variegata** (p. 176, plate XC) (plate III in present paper)

Pleuronectus variegatus, Günther, 1862, p. 453.
Verasper variegatus, Jordan & Starks, 1906, p. 184; — Norman, 1934, p. 312, fig. 213.

There are two stuffed specimens in Burger's collection; a further stuffed specimen without indications as to locality or collector probably belongs to the same collection as its size exactly agrees with that of the specimen after which the plate in Burger's collection has been made, viz. "dix-sept pouces". Total (standard) length of Burger's specimens: no. 1332:31.5 (26) cm, no. 1333*:37 (30.5) cm; of the third specimen: no. 1339:45.5 (38.5) cm.

The plate in the Fauna Japonica has been made after an original Japanese plate in Burger's collection. On the latter plate the lateral line is less bright, light drab. According to our specimens, the plate is not completely exact, as can be seen from the characters I give below. There may have been a description of this species in Burger's manuscript, but all descriptions of flatfishes are missing.

The specimens have one side painted and varnished, indistinct marble, but the blind side still has remains of the original coloration; specimen no. 1332 has some distinct dark spots on the blind side, all specimens distinct dark spots on D, A and C; D 79-82, 15-23 posterior rays branched; the lateral line extends on the head and curves till near the bases of 4th or 5th dorsal rays; scales in lateral line on body and caudal peduncle 89-95,

in transverse rows above lateral line 30-34, below lateral line 34-38; distinct rows of scales close before each ray of D and A and between the caudal rays; the scales on the proximal third of C even cover the rays; height 2.2-2.3 in standard length, 2.8 in total length; head 3.8-4 in standard length, 4.7-5 in total length; eye 6-7 in head; the maxillary reaches till below anterior edge or centre of pupil of right eye, its posterior margin slightly convex, the angles rounded, the lower sharper than the upper; anterior nostril situated slightly higher than posterior; D originates above pupil of left eye; some scales on V. Several of these characters more or less differ from the descriptions cited above, but the agreement with Norman's description is almost complete. These specimens must represent the type material of *Verasper variegatus* (T. & S.). Specimen no. 1333 I regard as type.

CCXIV. **Platessa asperrima** (p. 177, plate XCI)

Pleuronectes asperrimus, Günther, 1862, p. 453.
Clidoderma asperrimum, Jordan & Starks, 1906, p. 221, fig. 20; — Norman, 1934, p. 314, fig. 233.

Burger's collection contains two stuffed specimens. Total (standard) length: no. 1337:30.8 (25.5) cm, no. 1338*:42.5 (35) cm.

The plate in the Fauna Japonica is an exact reproduction of an original plate in Burger's collection. It is not completely accurate as can be seen from the characters given below. This species may have been described by Burger, but all descriptions of flatfishes are missing in his manuscript.

The specimens have no remains of their original coloration; D 86-88, A 66-70; height 2.3-2.4 in standard length, 2.9-3 in total length; head 3.7-3.9 in standard length, 4.5-4.7 in total length; maxillary on ocular side 3.3 in head; depth of caudal peduncle and length of snout about equal to diameter of eye; greatest depth between A and straight part of lateral line shorter than head; longest rays of D and A 2.3-2.5 in head, P on ocular side 2-2.3 in head, on blind side 2.6 in head; V 1.6-1.7 in P. In some of these characters the specimens more or less differ from the descriptions cited above. Some have been caused by copying inexact data from the Fauna Japonica, while the only differences of importance must be caused by deformation of these stuffed specimens. The description by Norman shows a quite close agreement. This must be the type material of *Clidoderma asperrimum* (T. & S.). Specimen no. 1338 I regard as type.

CCXV. **Platessa cornuta** (p. 179, plate XCII fig. 1)

Parophrys cornuta, Günther, 1862, p. 455.
Pleuronichthys cornutus, Jordan & Starks, 1906, p. 201; — Norman, 1934, p. 319, fig. 246.

We possess two stuffed specimens from Burger and one stuffed specimen and five specimens in spirits from Von Siebold. Total (standard) length of Burger's specimens: no. 1334:16.5 (13) cm, no. 1335:15.5 (12) cm; of Von Siebold's specimens: no. 1336*:24.5 (20) cm, no. 3496a: C damaged (14.5) cm, no. 3496b:10.4 (8.3) cm, no. 3496c:8.8 (6.7) cm, no. 3496d:5.8 (4.5) cm, no. 3501:23.5 (18) cm.

The plate in the Fauna Japonica is an exact reproduction of a Japanese plate in Burger's collection. It is not completely accurate, e.g., the course of the lateral line, the shape and size of the fins, head and nostrils. A number on Burger's plate refers to a description in his manuscript (no. 127) which is missing.

More or less distinct remains of colour markings can be found on the specimens in spirits only; the stuffed specimens have been deformed by their way of preservation; specimen no. 3496a has all fins badly damaged, C mutilated, and is in a very bad condition; the lateral line is curved upwards above opercle and runs back along base of D, till about 0.6 of its length; the young specimens have a distinct temporal branch; head 4.2 (in juvenile specimens)-4.7 (in adults) in standard length, 5.4-5.9 in total length; height 1.8-2.2 in standard length, 2.3-2.7 in total length; no teeth on jaws on blind side; maxillary on ocular side about equal to diameter of eye; scales in lateral series about 100; longest rays of A slightly longer than of D; P on ocular side about equal to postorbital part of head, 1.6 in head; V 3 in head; nostrils distinct, anterior surrounded by short membrane. Some of these characters slightly differ from the cited descriptions. Norman's description seems by far most accurate. This must be the type material of *Pleuronichthys cornutus* (T. & S.). Specimen no. 1336 I regard as type of this species.

CXVI. **Rhombus cinnamomeus** (p. 180, plate XCIII)

Pseudorhombus cinnamomeus, Günther, 1862, p. 427; — Norman, 1934, p. 110 fig. 68.
Pseudorhombus misakius, Jordan & Starks, 1906, p. 175, figs. 4 & 5.

Our collection contains two stuffed specimens from Burger and three specimens in spirits from Von Siebold, the latter with the indication "var."; at least one of these, if not all, must represent the variety described by Temminck & Schlegel, but all these specimens have lost every indication as to their previous coloration. This variety must have had the body "parsemé d'un grand nombre de taches semblables à celle qui se voit ordinairement derrière les pectorales, mais ces taches sont moins distinctes, de forme irregulière et pour la pluspart claires au centre". Total (standard) length of Burger's specimens: no. 1324*:26 (21.5) cm, no. 1325:28 (23) cm; of

Von Siebold's specimens: no. 3520a:28.5 (23.5) cm, no. 3520b:13 (10.5) cm, no. 3520c:8.2 (7) cm.

The plate in the Fauna Japonica is a slightly darker reproduction of a Japanese plate in Burger's collection. Of the five specimens in our collection, which proved to belong to various species, the plate best agrees with those collected by Burger, especially specimen no. 1325, after which this plate possibly has been made. The lateral line has been drawn inaccurately, as can be seen from the description thereof given below. The further agreement is quite close. According to a number on Burger's plate, he described this species in his manuscript, but this description is missing (no. 125).

The specimens nos. 1324 & 1325 have the ocular side painted, with a dark ocellus surrounded by whitish spots, about as on the plate in the Fauna Japonica, and have been varnished afterwards. There are no remains of colour markings on the blind side. Specimen no. 1325 has D and A damaged. D 80?-84, A 64?-65; scales in lateral line on body and caudal peduncle about 82, in lateral series about 91-95, transverse about 30-1-35. The anterior part of the lateral line curves upwards and ends near the base of 8th or 9th dorsal ray; a side-branch originates about above the posterior margin of the preopercle, runs straight in the direction of the centre of the right eye, divides close before that eye in a short branch close above the eye and a branch which curves about perpendicularly downwards and around the left eye till slightly before the anterior margin of the eye, in the space between the eye and the maxillary; the posterior end of the lateral line extends on C for about $^3/_4$ of its length. There are rows of scales along the rays of D, A and C; the scales on the body are ctenoid on the ocular side, in specimen no. 1324 generally ctenoid on the blind side too, in specimen no. 1325 on the contrary generally cycloid on the blind side. Head 3.8-4, height 2 in standard length. The margins of D and A not pointed as on the plate in the Fauna Japonica. The agreement of these specimens with the descriptions cited above is almost complete, only the occurrence of ctenoid scales on the blind side has not been remarked by these authors.

I compared the specimens with a very well preserved specimen of about the same length in Bleeker's collection (no. 6735). The agreement proved to be almost complete. Bleeker's specimen differs in but one character, viz., by having cycloid scales on the blind side only. This must be a variable character.

Burger's specimens represent the types of *Pseudorhombus cinnamomeus* (T. & S.). Specimen no. 1324 I chose as lectotype.

Specimen no. 3520a has C damaged, but is further in a satisfactory

condition; it still has some very indistinct remains of ocelli on the body. Specimen no. 3520b is in a much worse condition, without scales except some in lateral line. They distinctly differ from the previous specimens and belong, as far as can be seen, to the same species. D 73-74, A 56, P 11-12 on ocular side; height 2.2, head 3.4-3.7 in standard length; slight notch in front of eye; snout equal to eye, 4-5 in head; scales in lateral line 70-74; it runs exactly as in *Pseudorhombus cinnamomeus* (T. & S.); the interhaemal spine is rather distinct; the gill-rakers are long, slender, pointed, about 18 on lower part of anterior arch; the teeth on both jaws and both sides about equal, small, close set laterally; all scales on ocular side ctenoid, on blind side cycloid.

Norman's Monograph of the Flatfishes (1934) contains no descriptions of Japanese species of the genus *Pseudorhombus* Blkr., to which both specimens doubtless belong, which sufficiently agree. The best agreement I found is with Norman's description of *Pseudorhombus javanicus* (Blkr.) (p. 109, fig. 67), which differs in the squamation of the ocular side and the number of gill-rakers only. A comparison with three specimens of *javanicus* Blkr. (no. 6736), collected and named by Bleeker, and which must be types, also gave but few differences. Von Siebold's specimens have a differing squamation on the ocular side, slightly longer but much more slender gill-rakers, a slightly differing length of the maxillary (2.3 in head) and seem to have a slightly weaker curve in the lateral line. The last character is hardly visible and unimportant, the third lies within the range of variation of that character as given by Norman. The occurrence of ctenoid or cycloid scales on the ocular side seems a not completely certain character as I just found that this character even proved to vary in the two types of *cinnamomeus*.

The specimens must belong to *javanicus* Blkr. or to a species not mentioned by Norman, as far as I know a new species. I provisionally regard the shape and number of gill-rakers as liable to variation, and identify the specimens as *Pseudorhombus javanicus* (Blkr.).

Specimen no. 3520c is in a bad condition. All scales have disappeared. D 95, A 72. Height 2.6, head 4.1 in standard length; snout 4.1, maxillary 3, lower jaw 2, eye 3.8 in head; eyes on left side. The interorbital space is very narrow, a bony ridge, its width about 3.5 in eye-diameter. V on blind side short based, on ocular side elongate with 1st ray well in advance of that of blind side. No remains of the former coloration.

This specimen quite closely agrees with Norman's description of *Arnoglossus tenuis* Gthr. (l.c., p. 187) and his figure (fig. 134). I consequently provisionally regard it as such.

CCXVII. **Rhombus myriaster** (p. 181, plate XCII fig. 2)

Platophrys myriaster, Jordan & Starks, 1906, p. 167.
Bothus myriaster, Norman, 1934, p. 236, fig. 178.

There is one specimen in Von Siebold's collection, preserved in spirits. Total (standard) length: no. 3523*:17 (14.5) cm.

The figure in the Fauna Japonica has not been made after a plate in Burger's collection. Burger's manuscript contains no description of this species.

Remains of the original coloration are still distinct, and prove the accuracy of the figure in the Fauna Japonica in this character; A 70, posterior rays very weak; interorbital space 2.2 in head; length of P 2 in standard length. The agreement with the cited descriptions is quite close. This must be the type of *Bothus myriaster* (T. & S.).

CCXVIII. **Rhombus grandisquama** (p. 183, plate XCII figs. 3 & 4)

Scaeops grandisquama, Jordan & Starks, 1906, p. 168, fig. 1.
Bothus (Arnoglossus) poecilurus, Weber & De Beaufort, 1929, p. 131, fig. 132.
Engyproposon grandisquama, Norman, 1934, p. 209, fig. 156.

Von Siebold's collection contains six specimens in spirits. Total (standard) length: no. 3533a*:9.5 (7.8) cm, no. 3533b-d:9-7 (7.3-5.7) cm, no. 3534a & b:7.8 (6.5) cm (specimen no. 3534a with damaged C).

The figures in the Fauna Japonica have not been made after a plate in Burger's collection. The numbers of finrays must be D 76-83, A 57-60. This species has not been described by Burger.

Some of the specimens have slight remains of colour markings on the fins; the specimens no. 3534a & b are in a very bad condition, all specimens have the squamation damaged. Scales in lateral series about 40?; pectorals in females equal to head without snout (on ocular side); distinct dark spots on upper and lower caudal margin. The agreement with the cited descriptions, especially with the description by Norman, is very close. These must be the type specimens of *Engyproposon grandisquama* (T. & S.). Specimen no. 3533a I regard as type.

CCXIX. **Hippoglossus olivaceus** (p. 184, plate XCIV)

Pseudorhombus olivaceus, Günther, 1862, p. 429.
Paralichthys olivaceus, Jordan & Starks, 1906, p. 180; — Norman, 1934, p. 84, fig. 50.
Paralichthys olivaceus, Jordan & Starks, 1906, p. 181.

Our collection contains two stuffed specimens from Burger. Total (standard) length: no. 1301:39 (32) cm, no. 1302*:44 (36) cm.

The plate in the Fauna Japonica exactly agrees with the Japanese plate in Burger's collection, after which it has been made. It is slightly inexact in some characters. The curve in the lateral line should be situated more posteriorly, the longest rays in D and A must be slightly longer than head without postorbital part, about 2.5 in head; maxillary 2 in head; D 78, A 60. This species has been described by Burger, as can be concluded from a number on the Japanese plate (no. 126), but this description is missing.

Both specimens have been painted on the ocular side, in accordance with the plate in the Fauna Japonica. Specimen no. 1301 has the posterior ends of D and A damaged. Probably both have been deformed by their way of preservation; height 3.3-3.5 in total length; head 4.7-4.8 in total length; interorbital space hardly shorter than diameter of eye, about 7.5 in head; scales in lateral line about 110(10); length of P on ocular side 2 in head. The agreement with the descriptions cited above is rather close, with Norman's description even complete. These specimens must represent the type material of *Paralichthys olivaceus* (T. & S.). Specimen no. 1302 I regard as type.

CCXX. **Solea zebrina** (p. 185, plate XCV fig. 1)

Synaptura zebra, Günther, 1862, p. 484; — Weber & De Beaufort, 1929, p. 177.
Brachirus zebra, Bleeker, 1866-'72, p. 22, pl. 9 (240) fig. 3.
Zebrias zebrinus, Jordan & Starks, 1906, p. 232, fig. 26.

We possess three stuffed specimens from Burger and three specimens in spirits from Von Siebold. Total (standard) length of Burger's specimens: no. 1306:19 (16.5) cm, no. 1307:28 (25) cm, no. 1308*:30.5 (27.5) cm; of Von Siebold's specimens: no. 3580a:23.5 (20.5) cm, no. 3580b:12.5 (11) cm, no. 3580c:9 (7.8) cm.

On Burger's Japanese plate, after which the plate in the Fauna Japonica has been made, all scales have a distinct greyish spot, which makes the body seem less dark. According to our specimens there should be rows of scales along the rays of D, A and C, and some scales on the base of P; P 7-8. A number on Burger's Japanese plate refers to a description in his manuscript (no. 41) which is missing.

The stuffed specimens have the ocular side painted in accordance with the plate in the Fauna Japonica; height 2.6-2.8 in standard length, with fins included 2.2 in standard length; head 6.5-7.5 in total length; eye in juvenile specimens 4.5-5.5, in adults 6.5-7 in head; interorbital space in adult specimens more than half diameter of upper eye, in juveniles less; scales in lateral line about 110, transverse about 35-1-41; the lateral line extends on head, with a distinct angular curve (as described in the Fauna Japonica)

over about 24 scales; longest rays of D and A 4-4.3 in height; P 7-8, its length on ocular side about equal to postorbital part of head or slightly longer; V 5 on ocular side. In some of these characters the specimens slightly differ from the descriptions cited above, but the agreement is nevertheless quite sufficient. They doubtless belong to *Synaptura zebra* (Bl.) and represent the type material of *zebrina* T. & S. Specimen no. 1308 I regard as type.

CCXXI. **Achirus japonicus** (p. 186)

Soleu japonica, Günther, 1862, p. 471.
Amate japonica, Jordan & Starks, 1906, p. 228, fig. 23.

We have but one specimen, preserved in spirits and collected by Von Siebold. Total (standard) length: no. 4832*:8.8 (7.5) cm.

Of this species there is neither a plate in the Fauna Japonica or Burger's collection, nor a description in Burger's manuscript.

The specimen has no remains of its original coloration; D 82, A 54; height 2.6 in standard length; upper eye 7 in head; interorbital space about 1.7 in diameter of eye. The agreement with the cited descriptions is rather close. This must be the type of *Amate japonica* (T. & S.).

CCXXII. **Plagusia japonica** (p. 187, plate XCV fig. 2)

Plagusia japonica, Bleeker, 1858, p. 26; — Günther, 1862, p. 492.
Usinosita japonica, Jordan & Starks, 1906, p. 237.

We possess two stuffed specimens from Burger; eight further specimens from Japan, 1845, probably belong to this collection too. Total (standard) length of Burger's specimens: no. 1298: 16 (14.5) cm, no. 1299*:48.5 (46.5) cm; of the specimens in spirits: no. 3582:31.6 (29.8) cm, no. 3583:35.5 (33.5) cm, no. 3584:32 (30) cm, no. 3585a:21 (19.5) cm, no. 3585b:9.7 (9) cm, no. 3585c:9 (8.5) cm, no. 3585d:8 (7.5) cm, no. 4835:14 (13) cm. The specimens no. 3585 with the indication "var.?"; these, or some of these, must belong to the variety described by Temminck & Schlegel: "nous possédons plusieurs individus, qui ont toutes les nageoires à leur face inférieure d'un jaunâtre uniform".

The plate in the Fauna Japonica is an exact reproduction of a Japanese plate in Burger's collection. The number of finrays and scales have been drawn inexactly. A number on Burger's plate (no. 24) must refer to a description in his manuscript, but description no. 24 concerns *Tetraodon poëcilonotus.* Probably description no. 42 has been meant, but that description is missing.

Both stuffed specimens have the ocular side painted olive green. The specimens in spirits, except the specimens no. 3585, have D and A dark brown with a whitish margin.

The specimens no. 3585b-d proved to belong to another species. No. 3585c has the squamation generally well preserved, with a distinct normal and upper lateral line; the lower one lacks. The two other specimens have a badly damaged squamation. The fringes on the lips are indistinct or lacking; D 100-102, A 82-85; scales in lateral series about 70? These specimens closely agree with Jordan & Stark's description of *Areliscus interruptus* (Gthr.) (1906, p. 240). I provisionally regard them as such.

The rest of this material is homogeneous. The stuffed specimens are deformed. Height 4.5 (in specimens in spirits 3.6-3.9) in standard length, 4.7 (3.8-4.1) in total length; head 4.6-5 in standard length, 4.8-5.3 in total length; three distinct lateral lines on ocular side, none on blind side. Except the differing height in the stuffed specimens, they closely agree with the descriptions cited above. They represent the type material of *Rhinoplagusia japonica* (T. & S.). Specimen no. 1299 I chose as lectotype.

CCXXIII. **Cyprinus haematopterus** (p. 189, plate XCVI)

Cyprinus carpio, Günther, 1868, p. 25; — Jordan & Fowler, 1903e, p. 860; — Weber & De Beaufort, 1916, p. 102.

Temminck & Schlegel first wrote that they never received the specimen after which the Japanese plate, which still is in Burger's collection, has been made, but afterwards, in a note (p. 216) they state that they have received "un grand et bel individu de la grande carpe du Japon, *Cyprinus haematopterus*, ce qui nous a mis à même de remplacer la figure faite au Japon etc.". This specimen, according to its label collected by Von Siebold, is still in our collection. Total (standard) length: no. 2400*:33 (27) cm.

As stated in the Fauna Japonica, and partly quoted above, the plate Temminck & Schlegel give of this species has been made especially for the Fauna Japonica. Only the coloration has been made after the Japanese plate. When compared with the plate in the Fauna Japonica, Burger's Japanese plate represents a more elongate specimen, height 3.6, head 4.4 in standard length; the mouth opened, the barbels slightly shorter than in the Fauna Japonica. The posterior spines of D and A more distinctly serrate, D ending above 4th soft ray of A, margin of P more convex. The scales covered with less conspicuous concentrical stripes, crossed by some radial lines. The ridges on the head finer and more regular. The uncoloured figures have not been made after Japanese figures. Burger's manuscript contains a description of this species (no. 119).

The stuffed specimen has no remains of its former coloration. It doubtless belongs to *Cyprinus carpio* L., and is the type of *haematopterus* T. & S.

CCXXIV. **Cyprinus melanotus** (p. 190, plate XCVII figs. 1, 1a & 1b)

We possess one stuffed specimen from Burger and one specimen in spirits from Von Siebold. Total (standard) length of Burger's specimen: no. 1874:36.5 (30.5) cm; of Von Siebold's specimen: no. 2399*:35.5 (27.5) cm.

Of this species there is neither a Japanese plate in Burger's collection, nor a description in Burger's manuscript.

The specimens have distinct remains of their coloration, which prove the accuracy of the Fauna Japonica in this character. D. VI.18(1)-20(1), A III.5(1). They must belong to *Cyprinus carpio* L. This species should be based on a "specimen badly fed" (cf. Günther, 1868, p. 17).

The two specimens represent the type material of *melanotus* T. & S. Specimen no. 2399 I regard as type.

CCXXV. **Cyprinus conirostris** (p. 191, plate XCVII figs. 2, 2a & 2b)

We have in our collection five stuffed specimens from Burger and one specimen in spirits from Von Siebold. According to the Fauna Japonica there have been "une sixaine d'individus empaillés". Total (standard) length of Burger's specimens: no. 1720:14 (11) cm, no. 1721:20 (16) cm, no. 1722:20.5 (16.5) cm, no. 1723:27.5 (22.5) cm, no. 1724*:31 (25) cm; of Von Siebold's specimen: no. 2428:18 (13.5) cm.

The plate in the Fauna Japonica has not been made after a Japanese plate in Burger's collection. This species has not been described by Burger.

The specimens have no remains of their former coloration. D IV.16(1)-19(1), A III.5(1). They belong to *Cyprinus carpio* L. and represent the type material of *conirostris* T. & S. Specimen no. 1724 I regard as type.

CCXXVI. **Carassius Langsdorfii** (p. 192, plate XCVIII figs. 1, 1a & 1b)

Carassius auratus, Günther, 1868, p. 32; — Jordan & Fowler, 1903e, p. 860; — Weber & De Beaufort, 1916, p. 103, fig. 45.

There are five stuffed specimens in Burger's collection, one of which (no. 1712) identified as *Carassius auratus* (L.), and fifteen specimens in spirits in Von Siebold's collection, ten of which (no. 2379) named *Carassius auratus* (L.) and one (no. 2369) identified as *Carassius* spec. Total (standard) length of Burger's specimens: no. 1712:14.5 (11.5) cm, no. 1715:13.5 (11) cm, no. 1716:15 (12) cm, no. 1718:19 (16) cm, no. 1719:30.5 (25.5)

cm; of Von Siebold's specimens: no. 2387a:17 (13.5) cm, no. 2387b:10 (8) cm, no. 2387c:8 (6.8) cm, no. 2388:17 (13) cm, no. 2379a-j:14-6.5 (10-5) cm, no. 2369:22 (17.5) cm. According to the Fauna Japonica Temminck & Schlegel had ten specimens at their disposal, their (total) length varying between 8 and 30 cm. Probably only the specimens which are still labelled with the name *langsdorfii* have belonged to their material. The specimens no. 4379 almost all have a more or less abnormal shape, which has not been mentioned in the Fauna Japonica.

The coloured figure in the Fauna Japonica has been made after an original Japanese plate in Burger's collection. It is very accurate. Burger described this presumed species in his manuscript (nos. 36 & 118).

Only specimen no. 2369 still has distinct remains of its former coloration; especially the back is very dark. The other specimens without colour markings. D IV.16(1)-18(1), A III.5(1); lateral line with about 30 scales, transverse about 5 (or 6)-1-7 (or 8) at highest part of body. They all belong to *Carassius auratus* (L.).

CCXXVII. **Carassius Bürgeri** (p. 194, plate XCVIII figs. 2, 2a & 2b)

Von Siebold's collection contains ten specimens in spirits. According to the Fauna Japonica, there have been twelve specimens. Total (standard) length: no. 2389a:13 (10) cm; no. 2389b:11 (8.5) cm, no. 2389c:7.5 (6) cm, no. 2389d:9.2 (7.5) cm, no. 2390:12.5 (9.5) cm, no. 2391a:13 (9) cm, no. 2391b:8.5 (6.5) cm, no. 2392a*:15.5 (12) cm, no. 2392b:12 (9) cm, no. 2392c:11.5 (9) cm.

The figures in the Fauna Japonica have not been made after a Japanese plate in Burger's collection. This species has not been described by Burger.

The specimens are well preserved. D IV.15(1)-17(1); the subocular width is variable. They belong to *Carassius auratus* (L.) and represent the type material of *bürgeri* T. & S. Specimen no. 2392a I regard as type.

CCXXVIII. **Carassius Cuvieri** (p. 194, plate XCVIII figs. 3, 3a & 3b)

There are fourteen specimens in spirits in Von Siebold's collection. According to the Fauna Japonica there have been twenty. Total (standard) length: no. 2382a:9 (7) cm, no. 2382b-g:7.5-5.5 (5.5-4) cm, no. 2383a & b:8.7-8.5 (6.5-6.3) cm, no. 2384a-c:8-6 (6-4.5) cm, no. 2385:12 (9) cm, no. 2386*:18 (14.5) cm.

The figures in the Fauna Japonica have not been made after a plate in Burger's collection. This species has not been described by Burger.

The specimens still have slight remains of their former coloration on their fins, in accordance with the Fauna Japonica. D IV.16(1)-18(1). They

belong to *Carassius auratus* (L.) and represent the type material of *cuvieri* T. & S. Specimen no. 2386 I regard as type.

CCXXIX. **Carassius grandoculis** (p. 195, plate XCVIII figs. 4, 4a & 4b)

There is one specimen in spirits in Von Siebold's collection. Total (standard) length: no. 2393*:17.5 (13.5) cm.

The figures in the Fauna Japonica have not been made after a plate in Burger's collection. They slightly differ from the specimen which has the eye about equal to snout, 4.3 in head; D IV.17(1). This species has not been described by Burger.

There are some slight remains of colour markings on the membranes of the fins. According to Günther (1868, p. 32) this is "a specimen badly fed". It doubtless belongs to *Carassius auratus* (L.) and is the type of *grandoculis* T. & S.

CCXXX. **Gobio esocinus** (p. 196, plate XCIX figs. 2, 2a & 2b)

Pseudogobio esocinus, Günther, 1868, p. 175; — Jordan & Fowler, 1903e, p. 831; — Tanaka, 1912, p. 157, figs. 165, 171 & 172.

There are ten specimens in spirits in Von Siebold's collection. Total (standard) length: no. 2478a*:18 (15.5) cm, no. 2478b-j:12-7.3 (10-5.8) cm.

The figures in the Fauna Japonica have not been made after a plate in Burger's collection. They are not completely accurate, as can be seen from the characters given below. Burger has not described this species.

All specimens have distinct remains of their former coloration, about in accordance with the plate in the Fauna Japonica. D II.8(1), A II.7(1); scales 40, transverse 5-1-6 (or 5); height 5-5.7 in standard length; head 3.3-3.8 in standard length; eye 4.5-5.5, snout 2.3 in head; eye 2.2-2.6 in snout; distance between nostrils and eye 3.2-3.5 in snout; barbels varying with growth, in adult specimens 0.8 in eye, in juvenile 2 in eye; the 1st soft ray in D and A simple; P reaching to or slightly beyond ventral base; V 1.3-1.8 in distance to origin of A; distance between base of A and C larger than between base of A and tip of V (in 2 specimens equal to that distance); the pharyngeal teeth in two rows, one of which, however, is very small and feeble, and probably has been overlooked by the authors of the Fauna Japonica. The specimens differ in several of these characters from the cited descriptions, but these differences generally are very slight and probably due to variation.

These specimens represent the type material of *Pseudogobius esocinus* (T. & S.). Specimen no. 2478a I regard as type.

CCXXXI. **Gobio barbus** (p. 198, plate XCIX figs. 1, 1a & 1b)

Barbus schlegelii, Günther, 1868, p. 135.
Hemibarbus barbus, Jordan & Fowler, 1903e, p.825.

We have in our collection one stuffed specimen from Burger and two specimens in spirits from Von Siebold. Total (standard) length of Burger's specimen: no. 1737*:46 (39.5) cm; of Von Siebold's specimens: no. 2627a:24 (20) cm, no. 2627b:11.5 (10.2) cm.

The coloured plate in the Fauna Japonica has been made after a Japanese plate in Burger's collection which represents a specimen with less dark back and lateral stripes on the body, and with slightly pink lower jaw and barbels. There are no original plates of the uncoloured figures. This species has not been described by Burger.

The specimens in some characters slightly differ from the plate in the Fauna Japonica: scales in lateral line 46, transverse below origin of D 8-1-8(9); eye 4.8 in head, 1.8(-1.6 in young specimens) in snout; barbels shorter than eye, 1.6-1.9 in its diameter. Further characters: P 20, V 10(2.8); head 4 in standard length, 4.8 in total length; eye equal to interorbital space, 1.6-1.8 in snout; origin of D above tip of P; 5 rows of scales between lateral line and base of V; origin of A equidistant between origin of V and base of C. Except some differences in these characters, the specimens sufficiently agree with the descriptions cited above. They represent the type material of *Hemibarbus barbus* (T. & S.). Specimen no. 1737 I regard as type.

CCXXXII. **Capoëta elongata** (p. 200, plate C figs. 1, 1a & 1b)

Barbus homogenes, Günther, 1868, p. 136.
Gnathopogon elongatus, Jordan & Fowler, 1903e, p. 882.

There are two specimens in spirits in Von Siebold's collection. Total (standard) length: no. 2496a*:9.5 (7.8) cm, no. 2496b:8 (6.5) cm.

The figures in the Fauna Japonica have not been made after plates in Burger's collection. According to our specimens they are not very accurate. There should be 38 scales in the lateral line; D II.8(1), 1st soft ray simple; A II.7(1), 1st soft ray simple; P 15; body more slender, height about equal to head, 3.8-4 in standard length, 4.6-4.8 in total length. This species has not been described by Burger.

The specimens but slightly differ from the cited descriptions in some of the following characters: D, A, head and height as described above; eye 1.2 in snout, 4.6 in head; snout 4 in head; the maxillary almost reaches till below the anterior margin of the eye; barbel 1.7 in diameter of eye; nostrils closer to eye than to intermaxillary.

They must represent the type material of *Gnathopogon elongatus* (T. & S.). I regard specimen no. 2496a as type.

CCXXXIII. **Capoëta gracilis** (p. 201, plate C figs. 2, 2a & 2b) (plate IV fig. 2 in present paper)

Barbus homozonus, Günther, 1868, p. 137.
Gnathopogon gracilis, Jordan & Fowler, 1903e, p. 823.

There is one specimen in spirits in Von Siebold's collection. Total (standard) length: no. 2499*:6.7 (5.3) cm.

The figures in the Fauna Japonica have not been made after Japanese plates in Burger's collection. They are not completely accurate. This species has not been described by Burger.

The specimen has 35 scales in lateral line, in transverse series below origin of D 4-1-5(6); D II.8(1), 1st soft ray simple; A II.7(1), 1st soft ray simple; height 4.3, head 3.7 in standard length, 5.4 and 4.6 in total length; eye 3.3 in head; cleft of mouth as in the previous species (*Gnathopogon elongatus* (T. & S.)). It sufficiently agrees with the cited descriptions, and represents the type of *Gnathopogon gracilis* (T. & S.).

CCXXXIV. **Capoëta lanceolata** (p. 202, plate C figs. 3, 3a & 3b)

Acheilognathus melanogaster Bleeker, 1860, p. 92, pl. 2 fig. 1.
Achilognathus melanogaster, Günther, 1868, p. 278.
Acheilognathus lanceolata, Jordan & Fowler, 1903e, p. 819.

There is one specimen in spirits in Von Siebold's collection. Total (standard) length: no. 2501*:7.5 (6.2) cm.

Burger's collection of Japanese plates contains no plate, his manuscript no description of this species. The figures in the Fauna Japonica are not completely accurate, as can be seen from the characters given below.

The specimen has remains of an almost invisible spot above middle of P; D II.9(1), 1st soft ray simple; A II.10(1), 1st soft ray simple; V 9(2.7); scales in lateral line 35(1), transverse below origin of D 6-1-5(6); barbels hardly longer than diameter of eye; D slightly higher than on the plate in the Fauna Japonica, longest ray equal to head without snout; the length of P and V about 6.2 in standard length; base of A 4.9 in standard length; depth of caudal peduncle 2 in head. Except some slight differences in some of these characters, the specimen agrees with the descriptions cited above. It is the type of *Acheilognathus lanceolata* (T. & S.).

CCXXXV. **Capoëta intermedia** (p. 203, plate C figs. 4, 4a & 4b)

For descriptions: see CCXXXIV.

Von Siebold's collection contains two specimens in spirits. Total (standard)) length: no. 2500a*:7.7 (6.3) cm, no. 2500b:7.3 (5.8) cm.

Of this species there are neither plates in Burger's collection nor a description in Burger's manuscript. The figures in the Fauna Japonica are not very accurate.

The specimens have 10 soft rays in D, the 1st simple; in A 10 or 11 soft rays, also with 1st simple; V 9(2.7); scales in lateral line 36; height 2.9 in standard length, 3.5 in total length; head 4.3-4.4 in standard length, 5.4 in total length; eye 3-3.2 in head; head slightly less blunt than in the figures in the Fauna Japonica; barbels slightly shorter or equal to diameter of eye; a still distinct yellowish lateral stripe along body and caudal peduncle. The differences from the previous species (CCXXXIV) lie within the range of variation. The specimens belong to *Acheilognathus lanceolatus* (T. & S.) and represent the type material of *intermedia* T. & S. Specimen no. 2500a I regard as type.

CCXXXVI. **Capoëta limbata** (p. 203, plate C figs. 5, 5a & 5b)

Achilognathus limbatus, Günther, 1868, p. 277.
?*Acheilognathus limbatus*, Jordan & Fowler, 1903e, p. 818.

We possess four specimens from Von Siebold, preserved in spirits. Total (standard) length: no. 2497a*:7.2 (5.7) cm, no. 2497b-d:7-6.3 (5.5-5) cm.

There is of this species neither a Japanese plate in Burger's collection nor a description in his manuscript. The plate in the Fauna Japonica is inexact as can be seen by comparing the figures with the characters given below.

The specimens still have some distinct remains of coloration along the edge of A and indistinct traces on membrane of D, while there is a rather distinct yellowish lateral band along body and caudal peduncle; a dark blotch on the shoulder, as mentioned in Jordan & Fowler's description, is not visible on these specimens. They rather considerably disagree with Jordan & Fowler's description (l.c.) in the following characters: D II.9(1), 1st soft ray simple; A II.12(1), 1st soft ray simple; V 9(2.7); height 2.4 in standard length, 3 in total length; barbels about equal to diameter of eye; interorbital space convex, about 3.5 in head; length of P 1.2-1.3 in head; origin of D slightly behind middle of length; base of A longer than head without snout; depth of caudal peduncle 2 in head; lateral line curved with convex side downwards; anal with dark margin, its origin about at middle of length without head. These differences are generally slight, but

they seem too numerous. Maybe Jordan & Fowler's description represents another species. The specimens further have in transverse series below origin of D 6-1-5(6) scales; eye 1.2 in interorbital space.

This is the type material of *Acheilognathus limbatus* (T. & S.). I regard specimen no. 2497a as type.

CCXXXVII. **Capoëta rhombea** (p. 204, plate C figs. 6, 6a & 6b)

Achilognathus rhombeus, Günther, 1868, p. 279.
Achilognathus stecnackeri (Sauvage), Jordan & Fowler, 1903e, p. 815.
Paracheilognathus rhombea, Jordan & Fowler, 1903e, p. 815.
Paracheilognathus rhombeum, Tanaka, 1912, p. 167, figs. 175-177.

Our collection contains eleven specimens in spirits from Von Siebold and three specimens in spirits without the name of the collector but with the indication "f. jap.". Total (standard) length of Von Siebold's specimens: no. 2490*:10 (8.5) cm, no. 2492:7.5 (6) cm, no. 2493a-c:10.5-9.5 (8.3-7.3) cm, no. 2494a:8 (6.3) cm, no. 2494b:7.4 (5.6) cm, no. 2495:8.5 (6.7) cm, no. 2505a-c:8.2-7.2 (6.5-5.5) cm; of the specimens without name of collector: no. 2491a-c:9-8 (7-6.3) cm. According to the Fauna Japonica, Temminck & Schlegel had but 10 specimens at their disposal, measuring about 8-10 cm.

The coloured figure in the Fauna Japonica has been made after a Japanese plate in Burger's collection which is slightly different by having the lateral band coloured light blue. It is not very accurate. Of the uncoloured figures we possess no Japanese originals. This species has not been described by Burger.

Several specimens still have remains of colour markings, about in accordance with the coloured figure in the Fauna Japonica; D II.13(1)-14(1), 1st soft ray simple with soft top only; A II.10(1)-12(1), 1st soft ray simple with soft top; V 9(2.7); scales 37 or 38, transverse below origin of D 6(7)-1-7(8); height 2.4-2.6 in standard length, 2.9-3.3 in total length; eye 3.2-3.8 in head, 1.3-1.6 in interorbital space; snout 4-4.3 in head; longest dorsal ray 1-1.4 in head; origin of D not or hardly behind origin of V; longest anal ray equal to or slightly longer than head without snout; V generally slightly shorter than P, about reaching till origin of A; base of A about equal to distance to base of C; P 1.3-1.5 in head.

Except a few differences in some of these characters, the specimens rather closely agree with the descriptions cited above. They represent the type material of *Paracheilognathus rhombeum* (T. & S.). Specimen no. 2490 I regard as type.

CCXXXVIII. **Leuciscus platypus** (p. 207, plate CI figs. 1, 1a & 1b) (plate IV fig. 2 in present paper)

Opsariichthys platypus, Günther, 1868, p. 296.
Zacco platypus, Jordan & Fowler, 1903e, p. 851; — Tanaka, 1912, p. 83, figs. 72-74.

There is one stuffed specimen in Burger's collection, and six specimens in spirits in Von Siebold's collection. Total (standard) length of Burger's specimen: no. 1852:17.5 (14.5) cm; of Von Siebold's specimens: no. 2858a*:15.5 (13) cm, no. 2858b-f: 15-10.5 (12.5-8.7) cm.

Only fig. 1 in the Fauna Japonica has been made after a Japanese plate which still is in Burger's collection and which slightly differs in coloration: the back lighter, yellowish green. The numbers of finrays and the squamation have not been drawn very accurately; the head must be about equal to height, 4-4.3 in standard length. Burger's manuscript contains a description of this species (no. 37).

The specimens still have some remains of their former coloration; D III.7(1), A III.9(1), P 16 or 17, V 10(2.8); scales in lateral line 44(2), transverse below origin of D 9(8)-1-6(5); height 4-4.3 in standard length; eye 4-4.4, snout 2.9-3.2 in head; lower jaw included; D equidistant between anterior rim of orbit and base of C; P reaches till base of V. Except some slight differences in some of these characters, the specimens closely agree with the cited descriptions. They represent the type material of *Zacco platypus* (T. & S.). Specimen no. 2858a I regard as type.

CCXXXIX. **Leuciscus macropus** (p. 209, plate CI figs. 2, 2a & 2b)

For descriptions: see CCXXXVIII.

There are four specimens in spirits, collected by Von Siebold, in our collection. Total (standard) length: no. 2770a*:11.8 (9.8) cm, no. 2770b-d:11.5-10.3 (9.5-8.7) cm.

Of this species there is neither a Japanese plate in Burger's collection, nor a description in his manuscript. The figures in the Fauna Japonica have the squamation drawn inaccurate; our specimens have 44 (2), transverse below origin of D 9(8)-1-6(5) scales. The head must be about equal to height, 4-4.3 in standard length, 5-5.2 in total length.

The specimens have the same remains of coloration as the previous (CCXXXVIII) and agree with the same descriptions. They slightly differ from our specimens of *platypus* by having no distinct circular ridges on the head, but a few slight edges only, while the length of the fins slightly differs. These differences, however, are not of specific value. The specimens belong to *Zacco platypus* (T. & S.) and represent the type material of *macropus* T. & S. I regard specimen no. 2770a as type.

CCXL. **Leuciscus minor** (p. 210, plate CI figs. 3, 3a & 3b)

For descriptions: see CCXXXVIII.

Our collection contains one stuffed specimen from Burger and eight specimens in spirits from Von Siebold. Total (standard) length of Burger's specimen: no. 1845:11.7 (10) cm; of Von Siebold's specimens: no. 2860a*:11.2(9) cm, no. 2860b-h:10.5-7.3 (8.5-6.5) cm.

Of this species we possess neither a Japanese plate nor a description by Burger. According to our specimens, the figures in the Fauna Japonica are inaccurate. There should be 44(2) scales in longitudinal series, 9(8)-1-6(5) in transverse series below origin of D; A III.9(1), P 16 or 17; head 4-4.3, height 4.5 in standard length; in largest specimens longest anal rays longer than head.

Remains of the former coloration are still visible, in complete accordance with those on the specimens of the two previous presumed species (CCXXXIX & CCXXXVIII). The only characters in which these specimens differ from those previously regarded as belonging to *platypus* T. & S., viz., a slightly more slender body, the almost complete lacking of circular ridges on the head and a slightly differing length of A, are not of specific value. These specimens too must belong to *Zacco platypus* (T. & S.), and represent the type material of *minor* T. & S. Specimen no. 2860a I regard as type.

CCXLI. **Leuciscus Temminckii** (p. 210, plate CI figs. 4, 4a & 4b)

Opsariichthys temminckii, Günther, 1868, p. 295.
Zacco temminckii, Jordan & Fowler, 1903e, p. 852; — Tanaka, 1928, p. 862, fig. 489.

We possess two stuffed specimens from Burger and five specimens in spirits from Von Siebold. Total (standard) length of Burger's specimens: no. 1847:12.3 (10.2) cm, no. 1848:13 (11) cm; of Von Siebold's specimens: no. 2546a*:13 (10.6) cm, no. 2546b-e: 12.6-6.1 (10.4-4.9) cm.

Of this species we have neither a Japanese plate in Burger's collection, nor a description in his manuscript. The figures in the Fauna Japonica are not completely accurate. Our specimens have 50-52 scales in lateral line, 11-1-6(5) in transverse series below origin of D, snout 3.3-3.6 in head, P 10.

The specimens have some remains of colour markings on body and fins. D III.7(1), A III.10(1), P 16, V 10(2.8). Height 3.8-4 in standard length; head 3.7-3.9 in standard length; snout 3.3-3.6, interorbital space 2.8-3, eye 4, postorbital part of head 2.2, base of D 2.3 in head. A does not reach

till base of C; origin of D equidistant between tip of snout and base of C, or slightly closer to base of C.

In some of these characters the specimens slightly differ from the cited descriptions, but the agreement in the further characters is very close. These specimens represent the type material of *Zacco temminckii* (T. & S.). Specimen no. 2546a I regard as type.

CCXLII. **Leuciscus Sieboldii** (p. 211, plate CI figs. 5, 5a & 5b)

Opsariichthys sieboldii, Günther, 1868, p. 295.
Zacco sieboldi, Jordan & Fowler, 1903e, p. 854.

Our collection contains four specimens in spirits from Von Siebold. According to the Fauna Japonica, Temminck & Schlegel received but three specimens. Total (standard) length: no. 2545a*:14 (12) cm, no. 2545b-d:13-10.5 (11-8.5) cm.

We have neither a Japanese plate of this species, nor a description in Burger's manuscript. The figures are inexact, as can be seen from the characters given below.

All specimens have a distinct bluish lateral band along the posterior part of the body and the caudal peduncle and some remains on the fins. A III.9(1), P 16; scales in lateral line 58-60, transverse below origin of D 15(14)-1-?; height 4-4.5, head 4-4.2 in standard length. Snout 3.4-3.6, eye 4-4.2, base of D 2.3, of A 2 in head. The maxillary reaches beyond anterior margin of eye. The rays of A are slightly longer than on the figure in the Fauna Japonica, but do not reach till base of C.

The specimens closely agree with the material of the previous species, differing only in the number of finrays in A, the size of the head, and the differing number and size of the scales. The first two may be caused by normal variation or sexual dimorphy, but the latter seems too considerable to neglect. In contradistinction with Jordan, Tanaka & Snyder (1913, p. 75) and Tanaka (1914, p. 296), I provisionally separate *Zacco temminckii* and *Z. sieboldii* (T. & S.) until there possibly will be found specimens with intermediary data as to the number and size of the scales.

The specimens represent the type material of *Zacco sieboldii* (T. & S.). I regard specimen no. 2545a as type.

CCXLIII. **Leuciscus uncirostris** (p. 211, plate CII figs. 1, 1a & 1b)

Opsariichthys uncirostris, Günther, 1868, p. 295; — Jordan & Fowler, 1903e, p. 855; — Tanaka, 1928, p. 862, fig. 489.

There are three specimens in spirits in Von Siebold's collection. Total

(standard) length: no. 2878a*:15.5 (12.5) cm, no. 2878b:12.3 (10) cm, no. 2878c:11.5 (9.5) cm.

We have of this species neither a Japanese plate, nor a description in Burger's manuscript. The figures in the Fauna Japonica have the squamation and the shape drawn inaccurately, there should be 16 rays in P and 10(2.8) in V.

The specimens have some slight traces of colours on D only. D III.7(1). Scales in lateral line about 50, transverse below origin of D 10-1-7(6). Height 4.5-4.7 in standard length, 5.7-5.8 in total length; head 3.3-3.4 in standard length, 4.2-4.3 in total length. Eye 5, interorbital space about 3.6, snout 3.4, length of P 1.6-1.7, of V 2.3, base of D 2.6-3, of A 2.2-2.3, maxillary 2.1, mandible 1.8-1.9, width of head about 2.5 in head. The maxillary reaches till below centre of eye. Longest ray of A about 1.6, of P about 1.6, of V about 2.3 in head; D when depressed not reaching till above A, its upper margin straight; anterior rays of A not greatly produced, margin of A about straight.

Many of these characters differ from the cited descriptions, but these differences are generally very slight and unimportant. The specimens are the types of *Opsariichthys uncirostris* (T. & S.). I chose specimen no. 2878a as lectotype.

CCXLIV. **Leuciscus variegatus** (p. 213, plate CII figs. 2, 2a & 2b)

Pseudogobio variegatus, Günther, 1868, p. 175.
Sarcocheilichthys variegatus, Jordan & Fowler, 1903e, p. 833; — Tanaka, 1911, p. 6, fig. 7.

Our collection contains one stuffed specimen from Burger and five specimens in spirits from Von Siebold. According to the Fauna Japonica, Temminck & Schlegel had but five specimens at their disposal. Total (standard) length of Burger's specimen: no. 1846:14.5 (12) cm; of Von Siebold's specimens: no. 4976a*:16 (13) cm, no. 4976b-e:11.3-5.5 (9.5-5) cm.

The figures in the Fauna Japonica have not been made after a plate in Burger's collection. They are not completely accurate: there should be 39-42 scales in lateral line, the body must be slightly more slender, height at least 4 in standard length, 5 in total length; the base of A must be shorter, about as long as the postorbital part of the head; the outer rays of C slightly prolonged. This species has not been described by Burger.

Specimen no. 4976e (5.5(5)cm) differs from the other specimens by having the first two simple rays of D and A much more distinct, longer and more slender, their length about 1.3-1.5 in diameter of eye, and by having a more slender and more elongate body, height 5 in standard length,

6 in total length. These differences probably have been caused by juvenile characters of the very young specimen. For the rest it completely agrees with the larger specimens.

All specimens, especially the smaller, have distinct remains of their former coloration on the posterior part of the body and the caudal peduncle, and on the fins; a dark blotch above base of P. D III.7(1), A III.6(1), V 9(2.7). Scales in lateral line 39-42. Head 4.5 in standard length, 5.5 in total length; height as described above; eye 4.3(-3.2 in juvenile specimens) in head, 1.7(-1) in snout; depth of caudal peduncle 2 in head; snout 2.7-3.2 in head. The 1st simple ray of D is very small; insertion of D slightly closer to tip of snout than base of C; insertion of A behind D.

Except some, generally slight, differences in these characters, the specimens sufficiently agree with the cited decriptions. They represent the type material of *Sarcocheilichthys variegatus* (T. & S.). Specimen no. 4976a I regard as type.

CCXLV. **Leuciscus parvus** (p. 215, plate CII figs. 3, 3a & 3b)

Pseudorasbora parva, Günther, 1868, p. 186; — Jordan & Fowler, 1903e, p. 840.

Our collection contains one specimen in spirits from Burger and one specimen in spirits from Von Siebold. Total (standard) length of Burger's specimen: no. 2638:6.6 (5.5) cm; of Von Siebold's specimen: no. 2634*:10.8 (9) cm.

Of this species we have neither a Japanese plate, nor a description in Burger's manuscript. The figures in the Fauna Japonica but slightly differ from our specimens, which have a shorter base of D which about equals the postorbital part of the head, A III.6(1), V 9(2.7).

The specimens still have slight remains of colours on the scales and fins, as has been described in the Fauna Japonica. Height 3.4-3.6 in standard length, 4.2-4.5 in total length; head 4 in standard length, 5 in total length; eye 4-4.3, snout 3.3, interorbital space 2.3, base of D about 2 in head. The superior row of scales, along base of D. consists of very small scales; the nostrils are closer to eyes than to tip of snout; no? pectoral flap.

These specimens represent the type material of *Pseudorasbora parva* (T. & S.). Specimen no. 2634 I regard as type.

CCXLVI. **Leuciscus pusillus** (p. 216, plate CII figs. 4, 4a & 4b)

For descriptions: see CCXLV.

Our collection contains three specimens in spirits with the indication "f. jap.", but without name of collector. Total (standard) length: no.

2639a*:8.5 (7) cm, no. 2639b:6.8 (5.5) cm, no. 2639c:5.5 (4.5) cm.

The figures in the Fauna Japonica have not been made after Japanese plates in Burger's collection. They are not completely accurate, as can be seen from the data given below. This species has not been described by Burger.

The specimens hardly differ from the material of the previous species (CCXLV). The differences mentioned in the Fauna Japonica partly do not exist, partly are very small, within the normal range of variation: scales 36?, transverse 6(5)-1-6(5); eye 3.8-4, snout 3.5-3.7, interorbital space 2.3-2.6 in head. The dorsal profile is exactly as in *parva;* head 4-4.2 in standard length; A III.6(1).

These specimens doubtless belong to *Pseudorasbora parva* (T. & S.), and represent the type material of *pusillus* T. & S. Specimen no. 2639a I regard as type.

CCXLVII. **Gonorhynchus abbreviatus** (p. 217, plate CIII figs. 5, 5a & 5b)

Gonorhynchus abbreviatus, Jordan & Herre, 1906, p. 643, fig. 5; — Tanaka, 1913, p. 229, figs. 234, 235 & 237.

There are two specimens in spirits in Von Siebold's collection. Total (standard) length: no. 2686a*:13 (11.5) cm, no. 2686b:10.2 (9) cm.

The figures in the Fauna Japonica have not been made after a Japanese original in Burger's collection. They are quite accurate. This species has not been described by Burger.

The specimens still have remains of colours on the fins. A III.6(1). Height 9.5-10 in standard length, 10.5-11 in total length; head 4 in standard length, 4.6 in total length; nostrils at beginning of 2nd quarter of snout; preopercular margin invisible; tips of V near vent. The specimens closely agree with the descriptions cited above. They represent the type material of *Gonorhynchus abbreviatus* T. & S. I chose specimen no. 2686a as lectotype.

CCXLVIII. **Cobitis rubripinnis** (p. 220, plate CIII figs. 1, 1a & 1b) (plate V fig. 2 in present paper?)

Misgurnus anguillicaudatus, Günther, 1868, p. 345; — Jordan & Fowler, 1903d, p. 766.
Misgurnus fossilis anguillicaudatus, Berg, 1907, p. 435.

There are fifteen specimens in spirits in Von Siebold's collection, labelled "*Cobitis haematopterus*"; Günther (1868, p. 345) remarks that the British Museum too contained a specimen thus identified. The name further never occurs in literature, therefore must be erroneous. These are probably the specimens Temminck & Schlegel identified as *rubripinnis.* Total (stand-

ard) length: no. 2705a & b*:17.1 (15) cm, no. 2705c-o:14.5-5.2 (12.5-4.5) cm (no. 2705f:12.8 (11.3) cm).

Burger's collection contains a nice Japanese plate of this species, after which the coloured figure has been made. The figures in the Fauna Japonica closely agree with the young specimens, less closely with the specimens no. 2705a & f. This species has been described by Burger (no. 38).

Distinct remains of the former coloration are still visible on body and fins, especially on the young specimens. D 9(1), A 8(1), P. 10; scales in transverse series about 32. Head 6-6.2 (6.3-6.5 in specimens no. 2705a & f) in standard length, 6.8-7 (7.1-7.4) in total length; eye about 3, interorbital space 5.6-6.2 in head, interorbital space 2 in snout. P hardly longer than postorbital part of head; origin of D closer to base of C than to occiput. The specimens no. 2705a & f further differ by having a less slender body, height 6.2-7 in standard length, 7-8 in total length. The differing characters in these specimens must be normal (sexual?) variations.

All specimens rather closely agree with the descriptions cited above. They belong to *Misgurnus anguillicaudatus* (Cantor), which species may be synonymous with *M. fossilis* (L.), or represent just a local race or subspecies of the latter (cf. Berg, 1907, p. 435). I have not sufficient material at my disposal for a final decision in this matter.

The specimens further are the types of *rubripinnis* T. & S. I have chosen specimen no. 2705b as type.

CCIL. **Cobitis maculata** (p. 221, plate CIII figs. 2 & 2a)

For descriptions: see CCXLVIII.

We possess no specimens of this species. The description in the Fauna Japonica shows a remarkable conformity with specimen no. 2705f of the previous species (CCXLVIII), which, however, is considerably longer than the type specimen of this species (specimen no. 2705f:12.9 (11.3) cm; type specimen: "trois pouces et un quart", about 9 cm).

The figures of this species in the Fauna Japonica have not been made after Japanese plates in Burger's collection. They closely agree with specimen no. 2705f, which only has a shorter P. The colour markings too agree with the specimen, only the lateral band should have been painted slightly broader and higher. This species has not been described by Burger.

This species generally has been considered as synonymous with the previous.

CCL. **Cobitis taenia japonica** (p. 222, plate CIII figs. 3 & 3a)

Cobitis taenia, Günther, 1868, p. 362; — Jordan & Fowler, 1903d, p. 771.

There are eight specimens in spirits in Von Siebold's collection. According to the Fauna Japonica, Temminck & Schlegel had but six specimens at their disposal. Total (standard) length: no. 2703a*:11 (9.5)cm, no. 2703b-h:9.8-6.4 (8.4-5.4) cm.

The coloured figure in the Fauna Japonica has been made after a Japanese plate in Burger's collection. The latter plate shows the colour markings on back, D and C less dark and less accurate. According to our specimens the position of D should be more backwards, slightly behind middle of standard length; A 8(1) or 7(1); length of fins is variable. This species has not been described by Burger.

The specimens still have distinct colour markings. A 7-8 (1), V 7. Height about 6 in standard length, head 4.9-5.5 in standard length. Snout about 2.4, length of V 1.7, eye 5.5-6.5, interorbital space 5.5-6.5 in head; length of P 1.8-3 in distance between its origin and origin of V; V 1.8-2.4 in distance between its origin and origin of A. The specimens but slightly differ in some of these characters. They belong to *Cobitis taenia* L. and are the types of *japonica* T. & S. Specimen no. 2703a I regard as type.

CCLI. **Cobitis curta** (p. 223, plate CIII figs. 4 & 4a)

Botia curta, Günther, 1868, p. 368.
Hymenophysa curta, Jordan & Fowler, 1903d, p. 773.

We possess one specimen from Von Siebold, preserved in spirits. Total (standard) length: no. 2708*:6.2 (5) cm.

The figures in the Fauna Japonica have not been made after Japanese plates in Burger's collection. A figure 4b, as mentioned in the text, does not exist. This species has not been described by Burger.

The specimen has some very indistinct traces of its former coloration on the fins only. The number of simple rays in D is very difficult to count as these rays are very small and covered by skin. Probably D 13(1) (?3.10(1)), A 8(1). Height about 4.5 in standard length, 5.5 in total length; head 3.5 in standard length, 4.6 in total length; width of body 2 in height; origin of D behind middle of standard length. In some of these characters the specimen disagrees with the cited descriptions. It is the type of *Hymenophysa curta* (T. & S.).

CCLII. **Poecilia latipes** (p. 224, plate CII fig. 5)

Haplochilus latipes, Günther, 1866, p. 311.
Oryzias latipes, Jordan & Snyder, 1906, p. 289, fig.

Our collection contains six specimens in spirits, three of which without

name of collector but with the indication "f. jap.", and three stated to be collected by Kuhl & Van Hasselt, also with the indication "f. jap." (no. 2713). As Kuhl & Van Hasselt never collected in Japanese waters, that indication must be erroneous. Total (standard) length: no. 2713a*:4.3 (3.5) cm, no. 2713b:4 (3.3) cm, no. 2713c:3.7 (3.1) cm, no. 2714a-c:3.8-3 (3.1-2.4) cm.

The figure in the Fauna Japonica is a reproduction after a much lighter and more vague coloured Japanese plate which is still in Burger's collection. The shape seems rather inaccurate, for our specimens differ in several characters, viz., relative size of height, head, 31 scales in lateral series. Burger's manuscript contains a description of this species (no. 120).

The teeth are small, in two rows. A 18(1)-20(1), V 6. Head 3.8-4.1 in standard length, 4.7-4.8 in total length; height 3.6-3.9 in standard length, 4.4-4.6 in total length. Throat scaly; base of V closer to vent than to opercle; P as long as head without snout; posterior anal rays generally considerably longer than anterior rays. The specimens slightly differ in some of these characters from the cited descriptions, but the agreement is still sufficient. The specimens represent the type material of *Aplocheilus latipes* (T. & S.). I regard specimen no 2713a as type.

CCLIII. **Fundulus virescens** (p. 225, plate CII fig. 6)

Fundulichthys virescens, Jordan & Snyder, 1906, p. 288.

We possess no Japanese specimens of this species. The plate in the Fauna Japonica has been made after a Japanese plate which still is in Burger's collection, and which has been coloured much lighter. Burger described this species in his manuscript (no. 121). This description has partly been copied in the Fauna Japonica. A 9, cf. Burger.

CCLIV. **Silurus japonicus** (p. 226, plate CIV fig. 1)

Silurus asotus, Günther, 1864, p. 33.
Parasilurus asotus, Jordan & Fowler, 1903f, p. 903; — Tanaka, 1928, p. 840, fig. 483.

We possess five stuffed specimens from Burger and seven specimens in spirits from Von Siebold. Total (standard) length of Burger's specimens: no. 675*:45.5 (42) cm, no. 1817:28.5 (26) cm, no. 1818:30 (27) cm, no. 1819:41 (38) cm, no. 2260:41.5 5(39) cm; of Von Siebold's specimens: no. 2924a & b:29.7 (26.7) cm, no. 2924c-g: 19-6.6 (16.7-5.8) cm.

The plate in the Fauna Japonica is an exact reproduction of a Japanese plate in Burger's collection. The shape has not been drawn completely

accurately, as can be seen from the data given below. This species has been described by Burger (no. 39).

The stuffed specimens are more or les deformed and damaged. D 5?, P I.13-14, V 13 (1.12). Head 4.5 in standard length, 5 in total length; eye 7.5-9, snout 3.5-3.9, interorbital space 2-2.2, mandible about 2, maxillary barbel 0.6-0.9, mandibular barbel 2.8-3.5 in head. Height of D about equal to length of head without postorbital part, in small specimens longer, in larger specimens slightly less. Length of P about equal to postorbital part of head. The tongue is blunt and fleshy; the vomerine teeth not interrupted in the middle. Except a number of slight differences in some of these characters, the specimens closely agree with the cited descrpitions. They belong to *Parasilurus asotus* (L.) and represent the type material of *japonicus* T. & S. Specimen no. 675 I regard as type.

CCLV. **Bagrus aurantiacus** (p. 227, plate CIV fig. 2)

Pseudobagrus aurantiacus, Günther, 1864, p. 85; — Jordan & Fowler, 1903f, p. 906.

Our collection contains five specimens in spirits from Von Siebold and two specimens in spirits from Japan, 1845, which probably belong to the same material. Total (standard) length of Von Siebold's specimens: no. 2952a:6.2 (5.2) cm, no. 2952b:5.9 (4.9) cm, no. 2955a*:19 (16.5) cm, no. 2955b:9.3 (7.8) cm, no. 2955c:6.8 (5.7) cm; of the specimens without name of collector: no. 2949a:11.7 (10) cm, no. 2949b:10.5 (9) cm.

The plate in the Fauna Japonica is an exact reproduction of a Japanese plate in Burger's collection. It is not very accurate, as can be seen from the data given below. This species has been described by Burger in his manuscript (no. 122).

The specimens are in a good condition. D II.7 (or perhaps D II.6(1)), with 1st spine very short and covered by skin; A 20, P I.7. Height 5.5-6 in standard length, 6.5-7 in total length; head 4-4.4 in standard length, 4.8-5.1 in total length; length of the lateral maxillary barbels about equal to head without snout or slightly longer, they never reach beyond base of ventral spine; nasal barbels 1.8 (-2.8 in juvenile specimens) in head. The vertebral apophyses along upper and lower profile of caudal peduncle seem to continue the caudal fin almost to A and adipose D; the 2nd dorsal spine about 1.2-1.3 in longest dorsal rays; V reaches till base of A. The rays of A and V are slightly shorter than drawn on the plate in the Fauna Japonica.

The specimens hardly differ in a few of these characters from the cited descriptions. They represent the type material of *Pseudobagrus aurantiacus* (T. & S.). I regard specimen no. 2955a as type.

CCLVI. **Plotosus lineatus** (p. 228, plate CIV fig. 2)

Plotosus anguillaris, Günther, 1864, p. 24; — Jordan & Fowler, 1903f, p. 898; — Weber & De Beaufort, 1913, p. 229.

Our collection contains ninety eight, generally juvenile, specimens, collected by Von Siebold and preserved in spirits. Total (standard) length: no. 3089a:14 (12.8) cm, no. 3089b:13 (12) cm, no. 3090 (96 specimens): 6-3.4 (5.7-3.1) cm.

The plate in the Fauna Japonica has been made after a Japanese plate in Burger's collection. On that plate the two longitudinal bands have been coloured clear white. According to our material, there are several inaccuracies in the plate in the Fauna Japonica, as can be seen from the characters given below. Burger described this species in his manuscript (no. 40).

The material proved to be heterogeneous: one small specimen belongs to *Misgurnus anguillicaudatus* (Cantor) (or *M. fossilis* (L.), see CCXLVIII), while another proved to be a young amphibian. The further specimens all have white longitudinal bands, but these are very indistinct on the older specimens (no. 3089a & b). The numbers of finrays are very difficult to count, probably about as follows: D^1 I.4-5, D^2 80-100, A 68-77, P I.10-11, V 11-12, C 10. Height 6.8-7.2 in standard length, 7.4-7.8 in total length; head 4.3-4.5 in standard length, 4.6-4.8 in total length; eye 6.5 in head, about 2.5 in snout; interorbital flat in older specimens, convex in juveniles; nasal barbels almost reach till hind margin of eye, maxillary barbels about one eye-diameter longer; mandibular barbels slightly longer than snout. D inserted above tip of pectoral spine; dorsal spine 2 in height of D, with anterior as well as posterior edge serrate; pectoral spine 3.5 in head, outer and inner edges serrate; length of V about 1.6 in P; a distinct preanal dendritic organ.

The specimens closely agree with the cited descriptions. They belong to *Plotosus anguillaris* (Bl.).

CCLVII. **Salmo (Plecoglossus) altivelis** (p. 229, plate CV figs. 1, 1a, 1b & 1c)

Plecoglossus altivelis, Günther, 1866, p. 165; — Jordan & Snyder, 1902b, p. 584.

There are two stuffed specimens in Burger's collection and five specimens in spirits in Von Siebold's collection. Total (standard) length of Burger's specimens: no. 1971:21 (18) cm, no. 2414:19 (16.5) cm; of Von Siebold's specimens: no. 3179a*:21.2 (18) cm, no. 3179b:20.8 (17.5) cm, no. 3179c:13 (10.8) cm, no. 3179d & e:9.5 (8) cm.

Of this species there is a Japanese plate in Burger's collection after which

the coloured plate in the Fauna Japonica has been made. It shows the blotches along the hind margin of the preopercle and on the lateral line above middle of P more distinctly yellow. The numbers of finrays have been drawn inexactly. This species has not been described by Burger.

According to our specimens, the fin formula seems to be as follows: D 2.9 (1)-10, A 3.14 (1)-15, P 1.13-14, V 1.7. Length of P 6 in standard length. The smallest specimens have some differing juvenile characters: height 6 in standard length, 7 in total length; head 4.2 in standard length, 5 in total length; eye 4.5, snout 3.6, interorbital space 4 in head. Except in these juvenile characters, all specimens agree with the descriptions cited above. They represent the type material of *Plecoglossus altivelis* (T. & S.). I regard specimen no. 3179a as type.

CCLVIII. **Saurus trachinus** (p. 231 plate CVI fig. 2)

Saurus myops, Günther, 1864, p. 398; — Weber & De Beaufort, 1913, p. 145.
Trachinocephalus myops, Jordan & Herre, 1907a, p. 514.

Our collection contains two stuffed specimens from Burger and three specimens in spirits from Von Siebold. Total (standard) length of Burger's specimens: no. 1814:18.5 (15.5) cm, no. 1929:24 (21) cm; of Von Siebold's specimens: no. 3227a:14 (12) cm, no. 3227b:11(9.5) cm, no. 3228*:14 (11.8) cm.

The plate in the Fauna Japonica has been made after a Japanese plate in Burger's collection. The latter has the blue colour markings painted lighter, more greyish blue. The plate in the Fauna Japonica slightly differs from our specimens, as can be seen from the characters given below. This species has been described by Burger in his unpublished manuscript (no. 32).

Distinct remains of the former coloration are still visible on specimen no. 3228 only. D 2.10 (1), A 15 (1)-16 (1), V. 8. Head 3.8 in standard length, 4.5 in total length; eye (in specimen no. 3227a) 5.6, snout 8 in head. Scales in transverse series below origin of D 3-1-7; base of A 4 in standard length; the plate in the Fauna Japonica shows D slightly too low. The specimens closely agree with the cited descriptions. They belong to *Saurus myops* (Bl.; Schn.) and represent the type material of *trachinus* T. & S. Specimen no. 3228 I regard as type.

CCLIX. **Saurus lucius** (p. 232, plate CVI fig. 1)

Saurus varius, Günther, 1864, p. 395.
Synodus japonicus, Jordan & Herre, 1907a, p. 516.
Saurus variegatus, Weber & De Beaufort, 1913, p. 147.

As has been stated in the Fauna Japonica, Temminck & Schlegel never received any specimens of this species.

The plate in the Fauna Japonica is an exact reproduction of a Japanese plate collected by Burger. There is a description of this species in Burger's manuscript (no. 30).

According to the cited authors, this species is synonymous with *Salmo variegatus* (= *varius*) Lacép., and perhaps with *Cobitis japonica* Houttuyn.

CCLX. **Aulopus elongatus** (p. 233, plate CV fig. 2)

Saurida argyrophanes, Günther, 1864, p. 400; — Jordan & Herre, 1907a, p. 519.
Saurida eso Jordan & Herre, 1907a, p. 520, fig. 1.
Saurida tumbil, Weber & De Beaufort, 1913, p. 142.

We possess one stuffed specimen from Burger and two specimens in spirits from Von Siebold. Total (standard) length of Burger's specimen: no. 1955:33 (29) cm; of Von Siebold's specimens: no. 3235a*:21.5 (18.5) cm, no. 3235b:20.2 (17.2) cm.

The plate in the Fauna Japonica is an exact reproduction of a Japanese plate in Burger's collection. It is not completely accurate, as can be seen from the characters given below. Burger's manuscript contains a description of this species (no. 31).

The stuffed specimen is in a rather bad condition and considerably deformed. D 2.10 (1), A 2.8 (1)-9 (1), P 1.13-14; scales in lateral line 56-63, transverse below origin of D 5-1-7 (6). Head 4.2 (5 in specimen no. 1955) in standard length, 4.9 (5.8) in total length; height 2 (1.3 in specimen no. 1955) in head; eye 5 (6.2) in head; snout equal to interorbital space, 4.5 in head; origin of D about equidistant between tip of snout and adipose fin. its 1st ray 3 in head; P reaches beyond base of V, its length about equal to posterior part of head, 6.7-7 in standard length; V 5.7 in standard length; the adipose eyelid damaged.

Some of these characters differ from the cited descriptions, but these differences are quite unimportant. The specimens belong to *Saurida tumbil* (Bl.) and represent the type material of *elongatus* T. & S. Specimen no. 3235a I regard as type.

CCLXI. **Clupea Kowal** (p. 235, plate CVII fig. 1)

Clupea (Harengula) perforata, Weber & De Beaufort, 1913, p. 74.

Our collection contains three specimens in spirits from Von Siebold. Total (standard) length: no. 4335a:12.3 (10.2) cm, no. 4335b:11.5 (10) cm, no. 4335c:9.8 (8) cm.

Burger's collection of Japanese plates contains a specimen representing

this species, after which the plate in the Fauna Japonica has been made. The reproduction is very accurate, but slightly differs from our specimens. According to these there are about 43? scales in longitudinal series, head 4-4.2 in standard length, snout 3.5-4 in head, P 15, V 8 (1.7). This species has been described in Burger's manuscript (no. 109).

The specimens have a badly damaged squamation, but the further condition is satisfactory. They considerably differ from Jordan & Herre's (1906, p. 634) description of *Harengula zunasi* Blkr., which species generally has been assumed as identical with *kowal* T. & S. (nec Rüppell). A specimen from Bleeker's collection, identified by Bleeker as *zunasi* (no. 7113, 6.3 (5.5) cm), in spite of its bad condition, also proved to differ from Von Siebold's specimens, but also from Jordan & Herre's description (l.c.). The specimen probably has many juvenile characters.

The specimens have the dorsal parts dark. D 17 (1)-18 (1), A 19. Abdominal scutes have rather long and strong spines, 18 preventral, 12-13 postventral. Height 3.3-3.5, head 4-4.2 in standard length. Eye 3-3.2, snout 3.5, interorbital space 5 anteriorly, 3.5 posteriorly, length of P 1.4 in head. The maxillary extends to below front margin of pupil. A median row of small teeth on the tongue, a row over almost the whole length of the palatines, and some on the anterior part of the mandible. Gill-rakers about as long as gill-filaments, about 50 on lower part of 1st branch, the longest about $^3/_5$ diameter of eye. The scales are large, their hind margin crenulated, irregular, generally with a frayed point, with 1-5 vertical stripes and often some small perforations. The distance between tip of snout and origin of D 2.6 in total length.

I found a complete agreement with four specimens in spirits of *Spratella kowala* Blkr., collected and identified by Bleeker (no. 3375), and an almost complete agreement with Weber & De Beaufort's description of *Clupea (Harengula) perforata* (Cant.) (1913, p. 74). The only differences from this description are the number of gill-rakers (viz., 50 on lower part of 1st arch), the occurrence of some teeth on the anterior part of the mandibles, and 1-5 vertical lines on the scales. The latter two also exist in Bleeker's specimens, consequently are quite normal. The first difference too may occur in Bleeker's specimens, but it was impossible to count the gill-rakers in these specimens without causing damage. The slightly more slender body probably is just a juvenile character.

I consequently regard the three specimens as belonging to *Clupea (Harengula) perforata* (Cant.), which species seems to be new for Japan. A synonymy with *zunasi* Blkr., as has been accepted formerly, must be considered improbable.

Our collection contains two further specimens in spirits, labelled "*Clupea*, Japan, 1845" only. They probably belong to the same collection as those previously mentioned. Total (standard) length: no. 3269a:8.5 (7) cm, no. 3269b:8(6.6) cm.

These specimens are slightly more slender (a juvenile character?), but further completely agree with the specimens from Von Siebold. Height 3.6-3.7 in standard length. They probably belong to *Clupea* (*Harengula*) *perforata* (Cant.) too.

CCLXII. **Clupea micropus** (p. 236, plate CVII fig. 2)

Etrumeus micropus, Bleeker, 1853b, p. 48; — Günther, 1868, p. 467; — Jordan & Herre, 1906, p. 628.

Of this species we possess no Japanese specimens. The types must be lost.

The plate in the Fauna Japonica has been made after a Japanese plate in Burger's collection. The latter represents a specimen with more sea-greenishly painted fins. This species has been described by Burger in his manuscript (no. 110).

CCLXIII. **Clupea melanosticta** (p. 237, plate CVII fig. 3)

Clupea melanosticta, Günther, 1868, p. 430.
Sardinella melanosticta, Jordan & Herre, 1906, p. 632.

Our collection contains four specimens in spirits from Von Siebold. Total (standard) length: no. 3258a*:14.5 (12) cm, no. 3258b:14.3 (11.8) cm, no. 3258c:13.5 (12) cm, no. 3258d:13 (11) cm.

Burger's collection of Japanese plates contains a specimen which has been reproduced in the Fauna Japonica. It shows the back and the fins coloured more sea-greenish than the reproduction. The plate in the Fauna Japonica is not completely accurate, as can be seen from the characters given below. Burger described this species in his manuscript (no. 111).

All specimens still have a distinct lateral row of spots. D 18 (1)-19 (1), the anterior two simple rays very small; A 18 (1), P 17, V 8. The squamation has been damaged. Height 5.1-5.3 in standard length, 6.3-6.5 in total length; head 3.6-3.7 in standard length, 4.4-4.5 in total length. Eye 4, snout 3.4-3.6, interorbital space 5.8-6 in head. Abdominal scutes: 18 preventral, 14 postventral. D equidistant between tip of snout and caudal base; ventral base slightly behind middle of standard length. No teeth on palatines and pterygoids. Radiating oblique striae on the opercle. In some of these characters the specimens slightly differ from the cited descriptions .They represent the type material of *Clupea* (*Amblygaster*) *melanosticta* T. & S. I regard specimen no. 3258a as type.

CCLIV. **Clupea melastoma** (p. 237, plate CVIII fig. 1)

Pellona elongata, Günther, 1868, p. 456; — Weber & De Beaufort, 1913, p. 90.
Ilisha elongata, Jordan & Herre, 1906, p. 635.

As they stated in the Fauna Japonica, Temminck & Schlegel never received any specimens of this species. The only sources for their description have been Burger's description (no. 33) and his Japanese plate. The reproduction of that plate in the Fauna Japonica is quite accurate.

This species is not identical with *melastoma* Bl.; Schn., and should be named *Pellona elongata* (Benn.).

CCLXV. **Clupea gracilis** (p. 238, plate CVIII fig. 2)

Spratelloides gracilis, Günther, 1868, p. 465; — Weber & De Beaufort, 1913, p. 20, fig. 12.
Stolephorus japonicus, Jordan & Herre, 1906, p. 629.

We possess eleven specimens in spirits from Von Siebold. Total (standard) length: no. 3260a*:11 (10) cm, no. 3260b-k:9-7.7 (8-6.8) cm.

Of this species there is no Japanese plate in Burger's collection. The plate in the Fauna Japonica slightly disagrees in some characters from our specimens, as can be seen from the characters given below. Burger described this species in his manuscript (no. 112).

All specimens have a broad, silvery lateral band. D 12 (1)-13 (1), A 12 (1)-13 (1), P 12. Height 6-6.7, head 4.5 in standard length. Eye 3.8-4.2, snout about 2.9 in head. The upper part of opercular margin curved slightly forwards only. V slightly longer than postorbital part of head, inserted behind middle of D. Except a few differences in some of these charecters the specimens agree with the cited descriptions, especially with the description by Weber & De Beaufort. They represent the type material of *Spratelloides gracilis* (T. & S.). Specimen no. 3260a I regard as type.

CCLXV'. **Clupea**

Our collection contains one further specimen in spirits, collected by Von Siebold, and identified as *Clupea* spec. Total (standard) length: no. 3262:6.7 (5.5) cm.

This specimen is dark above, silvery below. D 17(1), A 22, P 16, V 6. Scales in longitudinal series about 48, transverse about 14. The body is compressed, especially the belly. The back keeled before D. Height 2.8 in standard length, 3.6 in total length; head 3.3 in standard length, 3.9 in total length. Eye 3.6, snout 4.5, interorbital space 5, maxillary 2.7 in head; the maxillary reaches till below front margin of eye. Preopercle and opercle

with rounded margin; jaws equal; teeth on tongue, on jaws doubtful; 5 postfrontal striae. Origin of D slightly before middle of standard length, posterior ray prolonged, 1.8 in head, about as long as dorsal base. A low, its base equal to length of P, 1.6 in head. V inserted below 7th dorsal ray, hardly behind tip of P, their length 2.5 in head. Ventral scutes: 19 preventral, 14 postventral. Margin of scales entire, with blunt point directed backwards, cycloid. There seems to be no lateral line.

According to Weber & De Beaufort's keys (1913), this specimen must belong to the genus *Clupea* L., and probably to the subgenus *Alosa* Cuv., but I am unable to determine its further identity.

CCLXVI. **Engraulis japonicus** (p. 239, plate CVIII fig. 3)

Engraulis japonicus, Bleeker, 1857, p. 119; — Jordan & Herre, 1906, p. 638.

As Temminck & Schlegel stated in the Fauna Japonica, they never received any Japanese specimens of this species.

Burger's collection contains a Japanese plate of this species, which has been accurately reproduced in the Fauna Japonica. There is a description by Burger in his manuscript (no. 113). This description and the Japanese plate have been the only sources for the description in the Fauna Japonica.

CCLXVII. **Chatoessus punctatus** (p. 240, plate CIX fig. 1)

Chatoëssus punctatus, Günther, 1868, p. 408.
Konosirus punctatus, Jordan & Herre, 1906, p. 624.
Dorosoma thrissa, Tanaka, 1928, p. 866, fig. 490.

We possess two stuffed specimens collected by Burger and two specimens in spirits collected by Von Siebold. Total (standard) length of Burger's specimens: no. 1771:22.5 (18.5) cm, no. 1772:23.5 (20) cm; of Von Siebold's specimens: no. 3315a* & b:23.5-23 (19) cm.

Burger's collection of Japanese plates contains a nice specimen of this species after which the plate in the Fauna Japonica very accurately has been made. According to our specimens both plates are not very exact, as can be seen from the characters given below. Burger described this species in his manuscript (no. 114).

The stuffed specimens still have remains of their former coloration. D 17(1)-18(1), the 1st ray very small; A 20(1)-22(1). The squamation has been damaged, especially in the specimens in spirits, while in the stuffed specimens it has, on one side, been covered by paint as these specimens have been painted about in accordance with the plate in the Fauna Japonica. There seem to be about 53 scales in lateral series, transverse about 20. The

stuffed specimens are somewhat deformed; height in the specimens in spirits 3.3-3.4 in standard length, 4-4.2 in total length; head 3.6 in standard length, 4.5 in total length. Eye 5.3-6, snout about 4.4, length of P 1.5 in head. There are 19 preventral and 15 postventral scutes. Insertion of V below 3rd dorsal ray.

Although the specimens in a few of these characters slightly differ from the cited descriptions, they still sufficiently agree. They belong to *Dorosoma thrissa* (L.) and represent the type material of *punctatus* T. & S. Specimen no. 3315a I regard as type.

CCLXVIII. **Elops machnata** (p. 241, plate CIX fig. 2)

Elops saurus, Günther, 1868, p. 470 (partly); — Jordan & Herre, 1906, p. 617, fig. 1 (partly?).
Elops machnata, Regan, 1909, p. 39; — Weber & De Beaufort, 1913, p. 4.

There are three stuffed specimens in our collection, collected by Burger. Total (standard) length: no. 1649:23 (19.5) cm, no. 1650:30.5 (26) cm, no. 1651:31.5 (26.5) cm.

Burger's collection of Japanese plates contains a specimen representing this species. It slightly differs from the plate in the Fauna Japonica, which has been made after it, by being coloured less dusky, especially the indications of the scales and the dark parts on head and fins. They are not completely accurate as a comparison with the characters given below shows. Burger's manuscript contains a description of this species (no. 115).

All specimens have one side painted green on the back, D and C. The specimens are deformed by their way of preservation and all more or less damaged. D 22-23, A 15(1), P 16?, V 15. Height 6-7 in standard length, 7.2-8.3 in total length; head 4-4.3 in standard length, 4.8-5.2 in total length. Eye 4.6-4.8, snout 4.3-4.5, maxillary 1.7 in head. V has two spines, the 1st very short and close to the base of 2nd, strong spine. Insertion of V about $^3/_4$ diameter of eye behind middle of standard length, slightly before origin of D. Scales in longitudinal series 96, transverse about 32. Gular plate 1.5 in lower jaw.

Except a few slight differences in some of these characters, the specimens generally agree with the descriptions cited above. They must belong to *Elops machnata* (Forsk.).

CCLXIX. **Butirinus glossodontus** (p. 242, plate CIX fig. 3)

Albula conorhynchus, Günther, 1868, p. 468.
Albula vulpes, Jordan & Herre, 1906, p. 620, fig. 2; — Weber & De Beaufort, 1913, p. 7, fig. 5.

As has already been stated by Temminck & Schlegel, these authors never received any Japanese specimens of this species. It is represented on one of the Japanese plates in Burger's collection, which has been reproduced, slightly darker, in the Fauna Japonica. This species has also been described by Burger in his unpublished manuscript (no. 116). According to this description, the fin formula of this species must be as follows: D 16, A 8, P 15, V 10. This proves the inaccuracy of Burger's descriptions. This specimen has, with the Japanese plate, been the only source for the description in the Fauna Japonica.

CCLXX. **Collia nasus** (p. 243, plate CIV figs. 4, 4a & 4b)

Coilia nasus, Günther, 1868, p. 405; — Jordan & Herre, 1906, p. 640.

We possess two specimens in spirits collected by Von Siebold. Total (standard) length: no. 3367a*:27.5 (25.5) cm, no. 3367b:27 (25.5) cm.

Burger's collection of Japanese plates contains a specimen representing this species after which the plate in the Fauna Japonica has been made. The reproduction is very accurate, but differs in some characters from the specimens, as can be seen from the characters given below (viz., finrays, scales and scutes). This species has not been described by Burger.

Both specimens have the squamation damaged. D 14(1), A 85-88, V 7 (1.6), scutes 46. Scales in longitudinal series probably not more than 65. Height 6.2-6.5 in standard length; width of body 2.8 in height; eye and snout together about 2.7 in head. Eye 1.2 in snout, 6 in head, snout 5.6 in head. There are some lateral teeth on the vomer. Origin of D at the end of 1st quarter of total length; 1st ray of D more than 3 in 2nd, which is about 2 in 3rd. The specimens but slightly differ in a few of these characters from the cited descriptions. They represent the type material of *Coilia nasus* T. & S. Specimen no. 3367a I chose as lectotype.

CCLXXI. **Belone gigantea** (p. 245)

Belone annulata, Günther, 1866, p. 240.
Tylosurus giganteus, Jordan & Stark, 1903a, p. 529.
Tylosurus annulatus, Weber & De Beaufort, 1922, p. 126.

Our collection contains three stuffed specimens collected by Burger. Total (standard) length: no. 1879:47.5 (45) cm, no. 2270*:99 (91.5) cm, no. 2275:101.5 (94) cm.

Of this species there is not a plate in the Fauna Japonica neither a Japanese plate in Burger's collection, nor a description in Burger's manuscript.

The specimens have been painted green laterally; the fins are damaged. Eye 2.2-2.4 in postorbital part of the head; jaws about equal; V equidistant

between posterior margin of eye and caudal base; teeth not curved forwards. The specimens closely agree with the cited descriptions.

The original descriptions of *Belone annulata* C. & V. and *Belone gigantea* T. & S. both have been published in 1846, but according to Jordan & Starks (l.c., p. 530) "*giganteus* is the earlier of the two". (Weber & De Beaufort erroneously state that *gigantea* T. & S. was first published in 1847). According to Fowler (1928, p. 73), this species may be synonymous with *Belone indica* Lesueur.

The specimens represent the type material of *Tylosurus giganteus* (T. & S.). I regard specimen no. 2270 as type.

CCLXXII. **Belone gracilis** (p. 246, plate CX fig. 1)

Belone anastomella, Günther, 1866, p. 249.
Tylosurus anastomella, Jordan & Starks, 1903a, p. 531.

We possess two stuffed specimens and one specimen in spirits. collected by Burger. According to the Fauna Japonica Temminck & Schlegel had but two specimens at their disposal. Total (standard) length: no. 1878*:78.5 (74) cm, no. 1881:59 (55.5) cm, no. 2806:82 (76.5) cm.

Burger's collection contains a Japanese plate of this species after which the figure in the Fauna Japonica has been made. That reproduction is quite accurate, but in some characters disagrees with our specimens as can be seen from the data given below. Burger's manuscript contains a description of this species (no. 34), which better agrees with the description and the plate in the Fauna Japonica than with the specimens. According to Burger s data, the fin formula should be as follows: D 27, A 28, P 12, V 6.

Both stuffed specimens have one side painted green and seem more or less deformed; the specimens nos. 1881 & 2806 have the tips of the jaws mutilated. D 17-18, A 22(-23)?), P 11 (1.10). Height about 21 in standard length, 22 in total length, about 18 in distance between hind margin of eye and caudal tip. Head about 3.6 in standard length. Orbit 3(-3.5 in specimen no.2806) in postorbital part of head; snout 1.5-1.6 in head, about 5.5 in distance between anterior border of orbit and caudal base. Height at ventrals 1.3-1.5 in postorbital part of head which is 10.6-11.5 in standard length without head. Lower jaw distinctly projecting; scales on body preopercle and opercle. Base of D 2-2.3, of A 1.7-1 9 in head. V equidistant between insertion of P and caudal base. Origin of D above 6th-8th anal ray. C damaged in stuffed specimens, in specimen no. 2806 hardly emarginate; its median rays rather long, about 1.3 in postorbital part of head. Several of these characters differ more or less from the description and the plate in the Fauna Japonica, which seem rather inaccurate. The speci-

mens but slightly differ in a few of the just mentioned characters from the cited descriptions. They belong to *Tylosurus anastomella* (C. & V.) and, although they seem slightly larger than the specimens Temminck & Schlegel mention ("a peu près deux pieds" and "deux pieds et demi"), I regard them as the types of *gracilis* T. & S. As I found, the measurements Temminck & Schlegel give often are not very accurate. Specimen no. 1878 I chose as lectotype.

CCLXXIII. **Hemiramphus Sajori** (p. 246, plate CX fig. 2)

Hemiramphus sajori, Bleeker, 1857, p. 116; — Günther, 1866, p. 265.
Hyporhamphus sajori, Jordan & Starks, 1903a, p. 533; — Tanaka, 1914, p. 285, figs. 270 & 273.

We possess two specimens in spirits, collected by Von Siebold. Total (standard) length: no. 2822a*:26.7 (24) cm, no. 2822b:24.5 (22) cm.

The plate in the Fauna Japonica is an exact reproduction of a Japanese plate in Burger's collection. It slightly disagrees with Von Siebold's specimens, which, e.g., have the 1st and 2nd rays of D and A simple; head 3.4 in standard length, 3.8 in total length; eye 6 in snout, 9 in head; head and body scaly. Burger's manuscript contains a description of this species (no. 117).

The specimens still have a distinct lateral band. D 16, A 16, P 13. Height about 11 in standard length, 12 in total length; head 3.4 in standard length, 3.8 in total length. Snout measured from tip of upper jaw to orbit 2.3 in distance between tip of upper jaw and opercular edge. Length of lower jaw till angle of mouth more than distance from there to pectoral base. P longer than postorbital part of head. Except a few slight differences in some of these characters, the specimens closely agree with the descriptions cited above. They represent the type material of *Hyporhamphus sajori* (T. & S.). Specimen no. 2822a I regard as type.

CCLXXIV. **Exocoetus Agoo** (p. 247) (plate I in present paper)

Cypsilurus agoo, Jordan & Starks, 1903a, p. 541, fig. 3; — Tanaka, 1913, p. 215, figs. 219, 222 & 223.

As they stated in the Fauna Japonica, Temminck & Schlegel never received any specimens of this species from their "Dutch travellers", but they received from Burger a nice Japanese plate and a description which still is in Burger's manuscript (no. 35). Of the plate I give a, to my regret uncoloured, reproduction. The upper half has been coloured blue, the lower light, the fins light grey.

Burger's description (no. 35) describes the posterior part of the head as scaly; the jaws with very small equiform teeth; the opercles without scales; D 12, A 10, P 10, V 6.

CCLXXV. **Lota phycis** (p. 248, plate CXI fig. 1)

Lotella phycis, Günther, 1862, p. 346; — Svetovidov, 1936, p. 433, fig. 2.

Our collection contains two stuffed specimens from Burger and one specimen in spirits from Von Siebold. Total (standard) length of Burger's specimens: no. 1388:23.5 (21) cm, no. 1389:21.8 (19.7) cm; of Von Siebold's specimen: no. 3449*:25 (22.5) cm.

The coloured figure in the Fauna Japonica has been made after a Japanese plate which still is in Burger's collection. The latter plate slightly differs from the reproduction by representing a more reddish pectoral edge, and a light red barbel, of about the same colour as the lower jaw. Our specimens slichtly differ in some of the characters given below. Burger's manuscript contains no description of this species.

All specimens are in a rather bad condition; the squamation is heavily damaged or, in the stuffed specimens, covered with greenish paint and varnish. D 6?.59. Height 5-5.3 in standard length, 5.5-5.9 in total length. Snout slightly shorter than bony interorbital space, which is about 5 in head. Origin of D slightly behind pectoral base. Base of A 2.1-2.2 in standard length.

These specimens represent the type material of *Lotella phycis* (T. & S.). Specimen no. 3449 I regard as type.

CCLXXVI. **Motella pacifica** (p. 249)

Motella pacifica, Günther, 1862, p. 367.
Onus pacificus, Collett, 1892, p. 6.

We possess one specimen in spirits, collected by Von Siebold. Total (standard) length: no. 3444*:34 (30) cm.

We have of this species neither a Japanese plate nor a description by Burger.

The specimen has 29 scales in lateral line, in longitudinal series about 210?, transverse below D^1 about 22-1-68?. B 7. Height 6.6 in standard length, 7.7 in total length; head 4.7 in standard length, 5.4 in total length. Eye oval, vertical diameter 1.8 in horizontal; longest diameter slightly more than interorbital space, 5 in head; covered by a membrane. Snout 3.7 in head; lower jaw considerably shorter than upper, the difference about 2 in snout; the maxillary reaches beyond eye. Teeth on lower jaw in two

rows, the outer small. The 1st ray of D^1 probably has been broken.

The specimen agrees with the cited, rather incomplete, descriptions and represents the type of *Onus* (or *Gaidropsarus*, cf. Barnard, 1925, p. 322) *pacificus* (T. & S.).

CCLXXVII. **Brotula multibarbata** (p. 251, plate CXI fig. 2)

Brotula multibarbata, Günther, 1862, p. 371; — Jordan & Fowler, 1902e, p. 754.

Our collection contains three stuffed specimens from Burger and two specimens in spirits from Von Siebold. Total (standard) length of Burger's specimens: no. 1402:46.5 (44.5) cm, no. 2238:56.5 (53.5) cm, no. 2268:58.5 (56) cm; of Von Siebold s specimens: no. 3467:41.5 (39) cm, no. 3468*:44 (41) cm.

The figure in the Fauna Japonica has been made after a Japanese plate in Burger's collection. In several characters these plates differ more or less from our specimens, as can be seen from the characters given below. Burger described this species in his manuscript (no. 46).

The specimens in spirits still have some remains of their former coloration. D, C and A together have about 205-215 rays; P. 21 (or 22?). Height about equal to head (in the specimens preserved in spirits), 4.8-5.1 in standard length, 5.1-5.4 in total length. The stuffed specimens are more or less deformed; height 4.7-5.8 in standard length, 5.1-6.2 in total length. Eye 4.7-5.1, snout 5.1-5.4, interorbital space 5.7-6.1 in head. The maxillary reaches beyond eye, even when mouth opened. Anterior mandibular barbels shortest, about 4.5 in head; barbels on upper jaw shorter than on lower. Length of V 1.8 in head, the outer filament about $^1/_3$ shorter than inner. P with two filaments.

The descriptions cited above have been made after the Fauna Japonica, and differ in several of the described characters from our specimens. This must be the type material of *Brotula multibarbata* T. & S. Specimen no. 3468 I regard as type.

CCLXXVIII. **Brotula imberbis** (p. 253, plate CXI fig. 3)

Sirembo imberbis, Günther, 1862, p. 373; — Jordan & Fowler, 1902e, p. 757.

We possess one stuffed specimen collected by Burger and three specimens in spirits collected by Von Siebold. Total (standard) length of Burger's specimen: no. 1401:18.8 (17.5) cm; of Von Siebold's specimens: no. 3469a*:16.5 (15) cm, no. 3469b:15.5 (14) cm, no. 3469c:13.7 (12.5) cm.

The figure in the Fauna Japonica is an exact reproduction of a Japanese

plate in Burger's collection. It disagrees in some characters from our specimens as can be seen from the data given below (viz., finrays, height and head in proportional size). Burger's manuscript contains a description of this species (no. 45).

The stuffed specimen is in a bad condition and deformed by its way of preservation. The specimens in spirits still have some remains of colours on the fins. D about 90, A about 70. Height (in the specimens preserved in spirits) 6.6 in standard length, 7.3 in total length; in the stuffed specimen: 11.5 in standard length, 12.2 in total length. Head 5 in standard length, 5.4 in total length; in stuffed specimen 5.9 in standard length, 6.3 in total length. Eye 3.6 in head. Head and trunk 1.4 in tail. Hind margin of eye hardly closer to snout than to gill-aperture. V consisting of two filaments.

The specimens but slightly differ in some of these characters from the cited descriptions. They represent the type material of *Sirembo imberbis* (T. & S.). Specimen no. 3469a I regard as type.

CCLXXVIII'. **Brotula armata** (p. 255)

Sirembo armatus, Günther, 1862, p. 374.
Hoplobrotula armata, Jordan & Fowler, 1902e, p. 760.

There is one stuffed specimen in our collection, collected by Burger. Total (standard) length: no. 1409*:61 (57) cm.

Of this species we possess neither a Japanese plate nor a description by Burger. Temminck & Schlegel have not mentioned this species in their Index.

The specimen has the following fin formula: D 88, A 75, C 9. Height 6.4 in standard length, 6.8 in total length; head 5 in standard length, 5.4 in total length. Lower jaw slightly included. P 21, its length 1.7 in head; V consisting of two filaments. Origin of D above posterior third of P; P reaches slightly beyond half the distance till vent. In some of these characters the specimen more or less differs from the cited descriptions. It is the type of *Hoplobrotula armata* (T. & S.).

CCLXXIX. **Ateleopus** (p. 255, plate CXII fig. 1)

Ateleopus japonicus, Günther, 1862, p. 398; — Goode & Bean, 1895, p. 349; — Jordan & Thompson, 1914, p. 299, pl. 37 fig. 1.
Ateleopus, Jordan & Evermann, 1905, p. 506.

Our collection contains a stuffed specimen from Japan which probably represents the specimen mentioned in the Fauna Japonica. Total (standard) length: no. 1410:? (82) cm (C damaged).

The figure in the Fauna Japonica is an exact reproduction of a Japanese plate in Burger's collection. As far as can be seen from the rather badly preserved specimen, the figures are sufficiently accurate. Burger's manuscript contains a description of this species (no. 123).

As stated before, the specimen is in a rather bad condition, with the fins more or less damaged and the head shrunken. The data in the description in the Fauna Japonica generally seem quite exact. D 9, A about 102, P 11 (or 12?). A seems to end at about 1½ eye-diameter before caudal base, but that may be caused by damage. One side has been painted and varnished.

The specimen seems to agree with the descriptions cited above. It should be named *A. japonicus* Blkr.

CCLXXX. **Macrourus japonicus** (p. 256, plate CXII figs. 2, 2a & 2b)

Macrurus japonicus, Günther, 1862, p. 395.
Coelorhynchus japonicus, Jordan & Gilbert, 1904, p. 617.

We have of this species three stuffed specimens collected by Burger and one specimen in spirits collected by Von Siebold. Total (standard) length of Burger's specimens: no. 1405:? (22) cm, no. 1406:? (23) cm, no. 2360:91.5 (85) cm; of Von Siebold's specimen: no. 3476*:? (33) cm. Three of these specimens have a damaged caudal fin.

Burger's collection of Japanese plates contains a specimen representing this species, after which the coloured figure in the Fauna Japonica has been made. That reproduction is quite accurate, but slightly differs in the numbers of finrays from our best preserved specimen (no. 3476), as can be seen from the data given below. Temminck & Schlegel seem to have corrected the Japanese plate before reproducing it. Burger's manuscript contains a description of this species (no. 133), in which he gives the following numbers of finrays: D II.9.?, A 77, P 14, V 1.6, C 6.

Specimen no. 2360 belongs to *Molva vulgaris* Fleming, a species not occurring near Japan. Its label must be erroneous, and the specimen should be omitted from this review.

The other specimens are more or less damaged, especially the stuffed specimens, which are deformed too. On account of this, it is impossible to ascertain the identity of the stuffed specimens, but I am inclined to regard them as belonging to the same species as the better preserved specimen in spirits. Of the latter only I give some characters: D II.9, about 95, A about 100, P 18. Height 7, head 3.7 in standard length. Interorbital space 4.4-4.6 in head; length of V 1.7 in P, longest ray 0.9 in P; the ends of anal rays branched; the space between dorsal fins 1.5 in base of D^1. Specimen no. 3476 further closely agrees with the cited descriptions, and represents, with

the two stuffed specimens, the type material of *Coelorhynchus japonicus* (T. & S.). Specimen no. 3476 I regard as type.

CCLXXXI. **Anguilla japonica** (p. 258, plate CXIII fig. 1)

Anguilla japonica, Bleeker, 1853b, p. 51; — Jordan & Snyder, 1901c, p. 842; — Tanaka, 1912, p. 148, figs. 152, 153 & 154.

We possess four specimens in spirits, collected by Von Siebold, and one specimen in spirits with the indication "F. jap." only. Total (standard) length of Von Siebold's specimens: no. 3660a:27 (26.6) cm, no. 3660b:26.4 (26) cm, no. 3661a*:50.3 (49.5) cm, no. 3661b:46.8 (46) cm; of the fifth specimen: no. 3659:33.2 (32.9) cm.

The figure in the Fauna Japonica is an exact reproduction of a Japanese plate in Burger's collection. It slightly differs from the specimens which have a more projecting lower jaw, eye 2.3-2.5 in snout, height 6.5-7.8 in head and trunk, head 2.3 in trunk. This species has also been described by Burger in his manuscript (no. 130).

The specimens differ from the cited descriptions in a few characters only. Head 8.4-9 in total length, about 1.5 in the distance between gill-aperture and origin of D, 2.2-2.3 in distance till vent. Height of body 18.5-23.5 in total length, in front of A 7-7.6 in head and trunk. Eye about 14, snout 5.4-6 in head; eye 1.6-2 in interorbital space. Teeth villiform. Upper jaw 3.4-4 in head. Length of P 2.4-3.2 in head. Distance between tip of snout and origin of D 3.4-3.6 in total length.

These specimens represent the type material of *Anguilla japonica* T. & S. Specimen no. 3661a I regard as type.

CCLXXXI'. **Anguilla**

Burger's collection contains another stuffed specimen, identified as *Anguilla* spec. Total (standard) length: no. 2747:? (73.5) cm. C damaged.

This specimen is in a very bad condition and is deformed by its way of preservation. It consequently has but few reliable characters, which makes an identification almost impossible. It seems to show a certain affinity with *Conger myriaster* (Brevoort), as described by Jordan & Snyder (1901c, p. 849), but it differs by the following characters: head 2.2 in trunk, jaws about equal, length of P 3 in head, equal to the distance between its tip and origin of D. The specimen has no remains of its former colours. I regard it as *Conger* spec.

CCLXXXII. **Conger vulgaris** (p. 259)

Leptocephalus erebennus Jordan & Snyder, 1901c, p. 849.

We have of this species three stuffed Japanese specimens, collected by Burger. Total (standard) length: no. 2197:120 (117.5) cm, no. 2198:129 (128) cm, no. 2233*:134.5 (133.5) cm.

Of this species we have neither a Japanese plate nor a description by Burger.

The specimens have a dark edge along the fins and are dark on the snout. They are more or less deformed, and even slightly differ from each other: head and trunk 1.4, 1.35 and 1.35 in tail. Head 1.7, 1.86 and 1.85 in trunk; insertion of D slightly behind pectoral tip; the distance between gill-aperture and D 2.3-2.6 in head. The specimens further rather closely agree with the description of *Conger erebennus* (Jord. & Snyd.) cited above. I consequently regard them as such.

Temminck & Schlegel seem to have overlooked that the name *vulgaris* was preoccupied by Cuvier, 1829. I arbitrarily choose specimen no. 2233 as lectotype of *vulgaris* T. & S.

CCLXXXIII. **Conger anago** (p. 259, plate CXIII fig. 2) (plate II fig. 2 in present paper)

Ophisoma anagoides B'eeker, 1864, p. 27.
Congromuraena anago, Günther, 1870, p. 42.
Congrellus anago, Jordan en Snyder, 1901, p. 855, fig. 8; — Weber & De Beaufort, 1916, p. 262, fig. 109 & 111.

Our collection contains one stuffed specimen collected by Burger and seven specimens in spirits, some of them stuffed with cotton, collected by Von Siebold. Total (standard) length of Burger's specimen: no. 2022:39.7 (39.4) cm; of Von Siebold's specimens: no. 3676a:18.8 (18.6) cm, no. 3676b & c:17.3 (17.1) cm, no. 3682a:59.3 (59) cm, no. 3682b*:34.6 (34.3) cm, no. 3682c:31 (30.5) cm, no. 3682d:13 (12.7) cm.

The plate in the Fauna Japonica is an exact reproduction of a Japanese plate in Burger's collection. It shows the closest agreement with the specimens no. 3682a & b, but is not completely accurate, as can be seen from the data given below. This species has also been described by Burger (no. 131). In this description he gives, amongst other things, the following data: "Jaws: ... with several rows of numerous small, sharp, pointed teeth". "Dorsal fin: ... beginning opposite to pectorals". "Caudal fin: ... short". This description in these characters by far best agrees with the specimens no. 3682a & b.

The material proved to be heterogeneous. The specimens no. 3682c & d (now numbered 17179) belong to a different species. Height 16, head 5.9-6.4 in length; head and trunk 1.45-1.55 in tail. Eye about 5, snout about 3.5 in

head. D begins slightly behind base of P, at a distance which about equals eye-diameter. The specimens have distinctly enlarged teeth on the intermaxillary plate, in a patch outside the mouth. They closely agree with Weber & De Beaufort's description of *Congrellus roosendaali* (1916, p. 261). These specimens must belong to that species.

The specimens no. 3682a & b have the height 16-18, head 6.2-6.4 in length; head and trunk 1.2 in tail. Eye 5, snout 4.4, length of P 3-3.4 in head. There are 52 pores in lateral line before vent, the 9th and 10th above anterior and posterior end of pectoral base; this base is oblique. Anterior nostril with a distinct tube just above upper lip, hind nostril before centre of eye. Several pores behind eye, on snout and in a row along each side of the lower part of the head. Teeth in bands on jaws and vomer only. These specimens closely agree with the cited descriptions, completely with the description by Weber & De Beaufort, consequently doubtless belong to the same species. They represent the type material of *Congrellus anago* (T. & S.). Specimen no. 3682b I regard as type.

The specimens nos. 2022 and 3676a-c slightly differ from the previous two (no. 3682a & b) in the following characters: origin of D slightly more backwards; teeth laterally almost along the entire length of the jaws in one series, in more series anteriorly. The pores in the lateral line are far less conspicuous. Height about 15-16, head 5.8-5.9 in length. They further completely agree with the previously mentioned type specimens, consequently must belong to the same species: *Congrellus anago* (T. & S.).

CCLXXXIV. **Conger urolophus** (p. 260, plate CXIV fig. 1)

Ophichthus urolophus, Günther, 1870, p. 73; — Jordan & Snyder, 1901c, p. 872.
Ophichthys urolophus, Tanaka, 1927, p. 789, fig. 471.

We possess two specimens in spirits, one of which has been stuffed with cotton, collected by Von Siebold. Total length: no. 3688a*:40.5 cm, no. 3688b:39.5 cm.

Burger's collection of Japanese plates contains a nice specimen representing this species. It slightly differs from the reproduction in the Fauna Japonica by showing the short stripes and spots on the back in a very inconspicuous manner, except on the anterior part, before D and on the head; the finrays of D light tawny. Both plates are not completely exact. This species has not been described by Burger.

The specimens have no remains of their former coloration. Height 2.8 in head, which is about 3 in trunk, 9 in length. Head and trunk together 2.2-2.3 in length. Eye 8-8.5, snout 5.5-6, postorbital part of head 1.4-1.5,

length of P 3.4 in head. The nostrils divide the snout in three about equal parts, the anterior has a distinct tube. The vomerine teeth irregular, in one row. Origin of D behind pectoral tip. A slightly or not lower than D. In some of these characters the specimens slightly differ from the cited descriptions. They represent the type material of *Ophichthus urolophus* (T. & S.). Specimen no. 3688a I regard as type.

CCLXXXV. **Conger uropterus** (p. 261)

Myrus uropterus, Günther, 1870, p. 50; — Jordan & Snyder, 1901c, p. 861.

Our collection contains one stuffed specimen from Burger and one specimen in spirits from Von Siebold. According to the Fauna Japonica, Temminck & Schlegel had but one specimen, measuring about 45 cm, at their disposal. Total (standard) length of Burger's specimen: no. 2030:56.5 (56.3) cm; of Von Siebold's specimen: no. 3689*:45 (44.8) cm.

Of this species we have in our collections neither a Japanese plate nor a description by Burger.

The stuffed specimen is deformed. Height about 3.5 in head; head 9.3-10 in total length. There is a low fin along caudal peduncle. The agreement with the descriptions cited above is quite close. The specimens represent the type material of *Echelus uropterus* (T. & S.). Specimen no. 3689 I regard as type.

CCLXXXVI. **Conger Hamo** (p. 262, plate CXIV fig. 2)

Muraenesox bagio, Bleeker, 1864, p. 24, pl. 26 (170) fig. 2.
Muraenesox cinereus, Günther, 1870, p. 46; — Jordan & Snyder, 1901c, p. 857; — Weber & De Beaufort, 1916, p. 253, fig. 104.

Our collection contains one stuffed specimen collected by Burger and two heads in spirits, from Von Siebold's collection. We have three further stuffed specimens identified as *Conger* spec., two of which proved to belong to this species too. Total (standard) length of Burger's specimen: no. 2029*:57.5 (57) cm; of Von Siebold's specimens: no. 3700 (length of head only): 18 and 13 cm; of the specimens named *Conger* spec.: no. 2031:81 (80) cm, no. 2309:71.2 (70.5) cm, no. 2354:82.8 (82) cm.

Burger's collection of Japanese plates contains a specimen representing this species, after which the figure in the Fauna Japonica has been made. The reproduction is quite accurate. Burger described this species in his manuscript (no. 43).

Specimen no. 2031 agrees with the previously mentioned specimen no. 2747 (see CCLXXXI'). It still has a distinct dark edge along D, C and A.

As it seems impossible to determine its identity, I provisionally regard it as *Conger* spec.

The further specimens and heads obviously belong to one single species. Eye 8.5-10 in head, about 2.5 in snout. Insertion of D before pectoral base. The specimens closely agree with the cited descriptions. They belong to *Muraenesox cinereus* (Forsk.), and represent the type material of *hamo* T. & S. Specimen no. 2029 I regard as type.

CCLXXXVII. **Ophisurus serpens** (p. 264, plate CXV fig. 1)

Ophichthys serpens, Günther, 1870, p. 65 (partly?).
Oxystomus macrorhynchus, Jordan & Snyder, 1901c, p. 876.

We possess but one Japanese specimen, collected by Von Siebold and preserved in spirits. According to the Fauna Japonica, Temminck & Schlegel had two specimens, measuring about 75 and 125 cm, at their disposal. Total length: no. 3708:130 cm.

The plate in the Fauna Japonica is an exact reproduction of a Japanese plate in Burger's collection. It slightly disagrees from our specimen, which, e.g., has following characters: head 3.85 in trunk, eye 3.6 in snout, the canines on the vomer larger and with wider interspaces. Burger's manuscript contains no description of this species.

Height 3.8 in head; head 3.85 in trunk; trunk and head together 1.7 in tail. Snout 3.5, length of P 5.5 in head; postorbital part 1.6 in head. The specimen rather closely agrees with Jordan & Snyder's description (l.c.). It belongs to *Ophisurus macrorhynchus* Bleeker.

CCLXXXVIII. **Ophisurus porphyreus** (p. 265, plate CXVI)

Ophichthys rostellatus, Günther, 1870, p. 56 (partly).
Mystriophis porphyreus, Jordan & Snyder, 1901c, p. 874.

We have in our collection one specimen in spirits, collected by Von Siebold. Total length: no. 1684*:115.5 cm.

Burger's collection of Japanese plates contains no specimen representing this species, which also has not been described in Burger's manuscript.

Height 3.5 in head, cleft of mouth 2.3 in head. Eye 2 in snout, which is about 10 in head. The anterior teeth on the intermaxillary rather small; no transverse series of canines. Teeth on lower jaw in a single series. A row of smaller teeth behind the 4 or 5 large vomerine teeth, reaching till slightly behind angle of mouth. The specimen closely agrees with Jordan & Snyder's description (l.c.); it is the type specimen of *Brachisomophis porphyreus* (T. & S.).

CCLXXXIX. **Muraena Kidako** (p. 266, plate CXVII)

Muraena nubila, Günther, 1870, p. 117 (partly).
Gymnothorax kidako, Jordan & Snyder, 1901c, p. 881.
Lycodontis kidako, Fowler, 1928, p. 56.

Our collection contains one stuffed specimen collected by Burger, one specimen in spirits collected by Von Siebold, and three specimens in spirits, also from Japan but without name of collector; these probably too belong to the material used by Temminck & Schlegel. Burger's collection contains five stuffed specimens identified as *Muraena* spec.; these proved to belong to this species too. Total length of Burger's first mentioned specimen: no. 2027:71 cm; of Von Siebold's specimen: no. 3957*:76.5 cm; of the specimens without name of collector: no. 3779a:65 cm, no. 3779b:52.5 cm, no. 3779c:42.5 cm; of Burger's specimens labelled "*Muraena* spec.": no. 2219:100 cm, no. 2220:97 cm, no. 2235:64 cm, no. 2259:102 cm, no. 2302:63.5 cm.

Burger s collection contains a Japanese plate of this species, which has been exactly reproduced in the Fauna Japonica. The latter plate slightly disagrees with our specimens; the length of head and trunk must be about 2.1 in length, head 2.5-2.6 in trunk. Burger described this species in his manuscript (no. 44).

The stuffed specimens are more or less deformed, the specimens no. 3779a-c have been stuffed with cotton. Remains of the former coloration are still distinct. Except some slight differences caused by deformation of the stuffed specimens, they all closely agree with the cited descriptions. They represent the type material of *Muraena (Gymnothorax) kidako* T. & S. Specimen no. 3957 I regard as type.

CCXC. **Muraena albimarginata** (p. 267, plate CXVIII)

Gymnothorax albimarginatus, Bleeker, 1864, p. 107, pl. 38 (182) fig. 2, pl. 40 (184) fig. 3; — Jordan & Snyder, 1901c, p. 880.
Muraena hepatica, Günther, 1870, p.122.
Muraena (Gymnothorax) hepatica, Weber & De Beaufort, 1816, p. 385.

Our collection contained no specimens thus identified, but one of Burger's stuffed specimens labelled as *Muraena* spec. proved to belong to this species. Total length: no. 2236*:93 cm.

The plate in the Fauna Japonica is an exact reproduction of a Japanese plate in Burger's collection. Burger's manuscript contains no description of this species.

The specimen has the head about 4 in trunk; eye slightly closer to tip of snout than to angle of mouth, about 13 in head. It further closely agrees

with the description by Weber & De Beaufort, slightly less close with the further cited descriptions. It must belong to *Muraena* (*Gymnothorax*) *hepatica* Rüpp., and probably is the type of *albimarginata* T. & S.

CCXCI. **Muraena pardalis** (p. 268, plate CXIX)

Gymnothorax pardalis, Bleeker, 1864, p. 86, pl. 25 (169) fig. 2, pl. 26 (170) fig. 1.
Muraena pardalis, Günther, 1870, p. 99; — Jordan & Snyder, 1901c, p. 879.
Muraena (*Muraena*) *pardalis,* Weber & De Beaufort, 1916, p. 357.

Our collections contain one stuffed specimen collected by Burger, one specimen in spirits from Von Siebold, and one specimen in spirits from Japan, 1845, without name of collector but probably belonging to the same material. Total length of Burger's specimen: no. 2028:85 cm; of Von Siebold's specimen: no. 3742*:76.5 cm; of the third specimen: no. 3778:87 cm.

Burger's collection of Japanese plates contains no specimen representing this species, which also has not been described by Burger. The plate in the Fauna Japonica is quite exact; according to our specimens, the height should be about 10, the head 7 in length, the cleft of mouth 2-2.3 in head. The stuffed specimens slightly differ by deformation.

The specimens still have a distinct coloration; specimen no. 3778 has the tail mutilated. Height about 10, head 7 in length; eye about 2.5, snout more than 4, cleft of mouth 2-2.3 in head. The large fangs on the maxillary plate are invisible in specimen no. 2028, lacking in specimen no. 3778, distinct in specimen no. 3742. This material closely agrees with the cited descriptions and represents the type material of *Muraena* (*Muraena*) *pardalis* T. & S. Specimen no. 3742 I choose as lectotype.

CCXCII. **Muraena minor** (p. 269, plate CXV fig. 2)

Muraena reticularis, Günther, 1870, p. 105.
Gymnothorax reticularis, Jordan & Snyder, 1901c, p. 882.
Muraena (*Priodonophis*) *reticularis,* Weber & De Beaufort, 1916, p. 388.

We possess of this species one stuffed specimen collected by Burger, two specimens in spirits collected by Von Siebold, and one stuffed specimen without name of collector but obviously belonging to the same material. Total length of Burger's specimen: no. 2025:60 cm; of Von Siebold's specimens: no. 3771a*:46 cm, no. 3771b:45 cm; of the fourth specimen: no. 2026:98.5 cm.

Of this species we have neither a Japanese plate nor a description by Burger.

The specimens still have remains of their former coloration, especially

those preserved in spirits. Head 2.6-2.8 in trunk, about 7.5-8 in length; eye 1.7-2 in snout. They closely agree with the cited descriptions, belong to *Muraena* (*Priodonophis*) *reticularis* Bl., and represent the type material of *minor* T. & S. Specimen no. 3771a I regard as type.

CCXCII' **Muraena**

We have in our collection two further stuffed specimens, collected by Burger and labelled "*Muraena* spec.". Total length: no.2234:122 cm, no. 2301:71.5 cm.

Both specimens, but especially the first, agree with the description of *Aemasia lichenosa* by Jordan & Snyder (1901c, p. 883). The differences in specimen no. 2234 are but slight: head 8 in length, 2.5 in trunk; eye closer to tip of snout than to angle of mouth; gill aperture slightly larger than eye. Specimen no. 2301 has the head smaller, head and trunk 2 in length; the teeth proportionally shorter and less slender, but these differences possibly have been caused by differing age, variability, deformation and/or sexual dimorphy. I consequently regard specimen no. 2234 as doubtlessly belonging to *Muraena* (*Aemasia* (? or *Gymnothorax*?)) *lichenosa* (Jord. & Snyd.), while specimen no. 2301 possibly belongs to the same species.

CCXCIII. **Echeneis naucrates** (p. 270, plate CXX fig. 1)

Echeneis naucrates, Günther, 1860, p. 384.
Leptecheneis naucrates, Barnard, 1927, p. 420; — Fowler, 1928, p. 420, fig. 66.

We have in our collection six stuffed specimens collected by Burger and one specimen in spirits collected by Von Siebold. Total (standard) length of Burger's specimens: no. 909:38 (34) cm, no. 912:46 (41) cm, no. 913:51 (45.5) cm, no. 2177:69 (61.5) cm, no. 2299:81 (72:5) cm, no. 2351:62.5 (56.5) cm; of Von Siebold's specimen: no. 3645:43.5 (38.8) cm.

The plate in the Fauna Japonica is an exact reproduction of a Japanese plate in Burger's collection. It slightly disagrees with our specimens, as can be seen from the characters given below. Burger described this species in his manuscript (no. 129).

Distinct remains of the former coloration can be found on specimen no. 3645 only. A 34-38, P about 22, V 1.5. Height (varying on account of the deformation of the stuffed specimens) 9-13 in standard length (lower jaw included). Eye 6.5(-5.6) in head. Disc 2.5-2.9 times longer than broad. Length of P 1.2 in head without lower jaw. The specimens closely agree with the cited descriptions, and belong to *Leptecheneis naucrates* (L.).

CCXCIV. **Echeneis remora** (p. 271)

Echeneis remora, Günther, 1860, p. 378; — Barnard, 1927, p. 422, pl. 18 fig. 1; — Fowler, 1928, p. 419, fig. 65.

Of this species we possess but one specimen, collected by Burger. It has been stuffed and dry preserved. Total (standard) length: no. 907:24.5 (21) cm.

We have of this species neither a Japanese plate nor a description by Burger.

The width of the body between the pectoral fins is 6.5, the length of the head without lower jaw 4.6 in standard length; the disc about 2.5 times longer than broad, 3.5 in standard length. Angle of mouth below or even slightly behind 3rd dorsal lamina. V longer than distance between base of P and eye. The specimen rather closely agrees with the cited descriptions. It must belong to *Echeneis remora* L.

CCXCV. **Echeneis pallida** (p. 271, plate CXX figs. 2 & 2a)

Echeneis brachyptera, Günther, 1860, p. 378; — Tanaka, 1915, p. 363, figs. 306, 307, 309 & 310; — Barnard, 1927, p. 421; — Fowler, 1928, p. 421.

Our collection contains two specimens in spirits with the indication "Fauna Jap." only. Total (standard) length: no. 3646a*:16 (13.5) cm, no. 3646b:14 (12) cm.

The plate in the Fauna Japonica, which has not been made after a Japanese plate in Burger's collection, is rather accurate. It differs but slightly from our specimens, which have D and A higher than in the figure, the highest point about at 6th ray. This species has not been described by Burger.

D 16-17.29, P about 19, V 1.5. Height about 6.5, head 5 in total length. Eye 2 in snout, 5.6-6 in head without the projecting lower jaw. Snout till tip of upper jaw 2.75 in head without lower jaw. Length of disc 3.2 in standard length, 3.7 in total length. Upper jaw angular, lower jaw rounded. Except a few differences in some of these characters, the specimens agree with the cited descriptions. They belong to *Echeneis brachyptera* Lowe, and represent the type material of *pallida* T. & S. Specimen no. 3646a I regard as type.

CCXCVI. **Echeneis albescens** (p. 272, plate CXX fig. 3)

Echeneis albescens, Günther, 1860, p. 377; — Barnard, 1927, p. 421; — Fowler, 1928, p. 419.

As they stated in the Fauna Japonica, Temminck & Schlegel never received any specimens of this species.

Burger's collection of Japanese plates contains a specimen after which the figure in the Fauna Japonica has been made. That reproduction is quite accurate. Burger has not described this species. It consequently has been founded on the Japanese plate only.

CCXCVII. **Syngnathus serratus** (p. 272, plate CXX fig. 4)

Syngnathus serratus, Günther, 1870, p. 167.
Trachyramphus serratus, Jordan & Snyder, 1901e, p. 9; — Weber & De Beaufort, 1922, p. 99, fig. 41.

Our collection contains four specimens in spirits collected by Von Siebold, and one stuffed specimen from China?, with the indication "F. j.". The name of the locality must be erroneous. Total (standard) length of Von Siebold's specimens: no. 3847a*:20.4 (20) cm, no. 3847b-d:16.7-13.5 (16.4-13.2) cm; of the stuffed specimen: no. 1627:26.8 (26.5) cm.

Of this species we possess no Japanese plate. The figure in the Fauna Japonica is quite accurate and closely agrees with specimen no. 3847a (brood organ!). Only should D be drawn about two times higher, and there must be a small A behind vent and radial lines on the opercle. Burger gives no description of this species.

The specimens have 21-24 rings on trunk; eye 2-2.2 in snout, 5-5.6 in head. They closely agree with the cited descriptions and represent the type material of *Trachyramphus serratus* (T. & S.). I choose specimen no. 3847a as type.

CCXCVIII. **Syngnathus tenuirostris** (p. 273, plate CXX fig. 5)

Syngnathus schlegeli Kaup, 1856, p. 46; — Jordan & Snyder, 1901e, p. 7.

We possess one specimen in spirits collected by Von Siebold, which has been thus identified. Total (standard) length: no. 3858:12.1 (11.5) cm. This cannot be the specimen described by Temminck & Schlegel, for their specimen measured about 18.5 cm.

Burger's collection of Japanese plates contains no specimen representing this species. Burger also gives no description. The plate in the Fauna Japonica completely disagrees with our specimen and doubtless represents a different species.

The specimen, as stated before, completely differs from the figure, but it also completely disagrees with the description in the Fauna Japonica. It does not represent the type of *tenuirostris* T. & S., which must be considered lost.

I compared the specimen with Bleeker's specimens of *Microphis brachyu-*

rus (Blkr.) (no. 7249), and with Weber & De Beaufort's description of this species (1922, p. 44). As I could find no differences of any importance, and even hardly any slight variations, there can be no doubt that this specimen belongs to that species.

CCIC. **Hippocampus longirostris** (p. 273)

Hippocampus guttulatus, Günther, 1870, p. 202 (partly).
Hippocampus kelloggi Jordan & Snyder, 1901e, p. 14, pl. 8.
Hippocampus kuda, Jordan & Snyder, 1901e, p. 15; — Weber & De Beaufort, 1922, p. 110.

We possess two stuffed specimens and one specimen in spirits, collected by Von Siebold. Total length: no. 1533:24 cm, no. 1534:20 cm, no. 3911:13 cm.

Of this species we have neither a Japanese plate nor a description by Burger.

The specimens all closely agree with the cited descriptions. They belong to *Hippocampus kuda* Blkr.

CCC. **Hippocampus brevirostris** (p. 274)

Hippocampus japonicus Kaup, 1856, p. 7, tab. 1 figs. 5 & 5a; — Duméril, 1870, p. 505; — Jordan & Snyder, 1901e, p. 16, pl. 10.
Hippocampus antiquorum, Günther, 1870, p. 199 (partly).

Our collection contains one stuffed specimen and five specimens in spirits, all collected by Von Siebold. Total length: no. 1540:12 cm, no. 3915a*:8.7 cm, no. 3915b-e:7.8-6 cm.

We have of this species neither a Japanese plate nor a description by Burger.

D 15-16, rings 10 + about 37. The length of the snout slightly less than distance between eye and gill aperture. Spines blunt; no filaments. Except a few differences when compared with Günther's description, the specimens closely agree with the cited descriptions. They belong to *Hippocampus japonicus* Kaup, and represent the type material of *brevirostris* T. & S. Specimen no. 3915a I regard as type. Jordan & Snyder's presumed synonymy with *H. mohnikei* Blkr. is erroneous.

CCCI. **Hippocampus coronatus** (p. 274, plate CXX fig. 7)

Hippocampus coronatus, Kaup, 1856, p. 16, tab. 4 fig. 2; — Duméril, 1870, p. 250; — Günther, 1870, p. 205; — Jordan & Snyder, 1901e, p. 18; — Weber & De Beaufort, 1922, p. 113.

We have in our collection four stuffed specimens thus identified, collected by Von Siebold. According to the Fauna Japonica there have been five

specimens. A Japanese specimen preserved in spirits, and erroneously identified as *Hippocampus fasciatus* Kaup, which must have belonged to the material used by Temminck & Schlegel, may have been that fifth specimen. It proved, however, to belong to another, closely related species. Total length of Von Siebold's specimens: no. 1541:7 cm, no. 1542:7.6 cm, no. 1543*:12 cm, no. 1544:11.6 cm; of the specimen in spirits: no. 3924:8.7 cm.

Burger's collection contains no Japanese plate of this species, his manuscript no description. The figure in the Fauna Japonica slightly differs from our specimens, which have the spines longer and more slender, especially the smaller specimens; the largest have the body about 1.5 times deeper, with 10 rings, and the tail with about 38 rings. The latter number is very difficult to count in the small specimens. These characters do not concern specimen no. 3924.

All specimens except no. 3924 have the snout about as long as the posterior part of the head, in the two smallest specimens slightly less than height of body; the latter character, however, probably varies with age. Length of head about 0.75 in its height. The filaments lacking, probably damaged. These specimens rather closely agree with the cited descriptions. They represent the type material of *Hippocampus coronatus* T. & S. I regard specimen no. 1543 as type.

Specimen no. 3924 is obviously closely related to this species, and also to *H. japonicus* Kaup. It has, e.g., 12 rays in D and a considerably lower coronet than *H. coronatus*. It completely agrees with Jordan & Snyder's description (1901e, p. 18) and Bleeker's specimens of *H. mohnikei* Blkr., and must belong to that species.

CCCII. **Hippocampus gracilissimus** (p. 274, plate CXX fig. 6)

Acentronura gracillima, Kaup, 1856, p. 18; — Duméril, 1870, p. 527; — Günther, 1870, p. 198.

Acentronura gracilissima, Jordan & Snyder, 1901e, p. 12.

Our collection contains six specimens in spirits, collected by Von Siebold. Total length: no. 3927a*-f:8-6.6 cm.

We have no Japanese plate of this species, which also has not been described by Burger. The plate in the Fauna Japonica is quite accurate.

Rings about 13 + 43; egg pouch on 10-11 plates. Head 2.25 in trunk, head and trunk 1.3-1.4 in tail. Eye 1.7 in snout. The specimens further closely agree with the cited descriptions. They represent the type material of *Acentronura gracilissima* T. & S. Specimen no. 3927a, the largest specimen, I regard as type.

CCCII'. **Hippocampus hystrix**

Hippocampus hystrix Kaup, 1856, p. 17, tab. 2 fig. 5; — Duméril, 1870, p 514; — Günther, 1870, p. 206; — Jordan & Snyder, 1901e, p. 16; — Weber & De Beaufort, 1922, p. 109.

I further found one stuffed specimen, collected by Von Siebold, and labelled "*Hippocampus hystrix* Kaup, Japan", and with an old label reading "*Hippocampus* n.sp., Japon". This specimen, which must belong to the material dealt with here, has not been described in the Fauna Japonica. Total length: no. 1537*:19 cm.

The specimen has the head partly damaged, but is further in a satisfactory condition, and could be identified without difficulties. It closely agrees with the descriptions cited above, consequently must belong to *Hippocampus hystrix* Kaup. It is further probably one of the specimens on which Kaup based his first description, as Kaup mentions a specimen in our collection while this is the only specimen we possess.

In the following part (CCCIII-CCCXXX) I have used the names given by Jordan, Tanaka & Snyder, 1913, p. 215-230, in order to obtain the necessary uniformity in nomenclature.

CCCIII. **Tetraodon argenteus** (p. 275, plate CXXI fig. 2)

Tetrodon sceleratus, Günther, 1870, p. 277; — Barnard, 1927, p. 969.
Spheroides sceleratus, Jordan & Snyder, 1901g, p. 234.
Sphoeroides sceleratus, Fowler, 1928, p. 467.

Our collection contains one stuffed specimen from Burger and two specimens in spirits with the indication "f. jap." only. The Fauna Japonica mentions but two specimens, viz., a stuffed specimen measuring about 60 cm and a specimen preserved in spirits measuring about 13 cm. The third probably arrived after the publication of this part of the Fauna Japonica. Total (standard) length of Burger's specimen: no. 1588:59 (51) cm; of the specimens in spirits: no. 4045a:28 (23) cm, no. 4045b:13 (10.5) cm.

The plate in the Fauna Japonica is an exact reproduction of a Japanese plate in Burger's collection. It is quite accurate. This species has not been described by Burger.

The stuffed specimen has, as almost all stuffed specimens of this group, one side painted yellow and greenish yellow, while the other side still shows the original colour markings. The specimens in spirits have the back brown, the ventral surface almost white, and a broad silvery lateral band. D 13 (or 12(1)), A 11-12. The area covered with prickles is variable; specimen no. 4045a has a dorsal area which ends close before halfway between eye

and D, in specimen no 4045b it reaches to beside D, while specimen no. 1588 even has some small prickles on the sides too. Interorbital space about 1.2-1.4, length of P 0.8-1.3 in snout. The specimens further closely agree with the cited descriptions. They belong to *Sphoeroides sceleratus* (Forst.).

CCCIV. **Tetraodon lunaris** (p. 277, plate CXXII fig. 1)

Tetraodon spadiceus, Bleeker, 1865, p. 60, 64, pl. 3 (207) fig. 1.
Tetrodon lunaris, var. *spadiceus*, Günther, 1870, p. 274.
Spheroides spadiceus, Jordan & Snyder, 1901g, p. 234.
Tetrodon spadiceus, Barnard, 1927, p. 968.

We have in our collection three stuffed specimens collected by Burger and two specimens in spirits collected by Von Siebold. According to the Fauna Japonica, Temminck & Schlegel had six specimens at their disposal, measuring about 16-30 cm. A small stuffed specimen without any indications as to its locality or collector probably is that sixth specimen, so I include it in my report. Total (standard) length of Burger's specimens: no. 1554:22 (18.5) cm, no. 1555:22.5 (19) cm, no. 1556:29 (24) cm; of Von Siebold's specimens: no. 4047a:22.8 (19) cm, no. 4047b:17 (14.2) cm; of the sixth specimen: no. 1553:15 (12.5) cm.

The plate in the Fauna Japonica has been made after a Japanese plate in Burger's collection. The latter shows the back less blackish and the prickles on throat and breast more regular, in longitudinal rows. As to the shape, both plates slightly differ from our specimens, which have, e.g., the eye not round, horizontal diameter about 0.75 in vertical; D slightly before A; more mucous pores on the head. Burger's manuscript contains a description of this species (no. 22).

The stuffed specimens have one side painted, more or less in accordance with the figure in the Fauna Japonica. The prickles on the back generally not or hardly extending to or beyond tip of P, in specimens no. 1555 and 4047a till about 1.3 eye-diameter before D, but never farther. D 1.11-12, A 1.10-11. Interorbital space 0.7 in postorbital part of head, 2.2-2.4 in head; eye about 4 in head. C lunate. Except some slight differences in these characters, the specimens closely agree with the cited descriptions. They belong to *Sphoeroides spadiceus* (Rich.). I am not completely sure whether or not this species is identical with *lunaris* Bl.; Schn. At least the differences Jordan & Snyder (l.c.) and Barnard (l.c.) give seem insufficient for specific discrimation. The different size of the head for instance (3.8-4.25 and 3.4-3.6) cannot stand when we accept Bleeker's data (l.c.). A difference in the position of the speckles too is unimportant, as this character proved to vary in our specimens.

CCCV. **Tetraodon inermis** (p. 278, plate CXXII fig. 2)

Tetrodon laevigatus, Günther, 1870, p. 274 (partly).
Spheroides inermis, Jordan & Snyder, 1901g, p. 237; — Tanaka, 1913, p. 233, fig. 239.
Tetrodon inermis, Barnard, 1927, p. 968

We have but one specimen. It is stuffed, and has been collected by Burger. The length mentioned in the Fauna Japonica ("vingt pouces", about 60 cm) must be erroneous. Total (standard) length: no. 2265*:70 (59) cm.

The plate in the Fauna Japonica is an exact reproduction of a Japanese plate in Burger's collection. It seems not completely accurate, for our specimens slightly differ in several characters: D about 12(1) or 13, A 10(1) or 11, P 16; the line of mucous tubes below eye more regular, somewhat convex towards eye; an almost vertical line midway between eye and gill aperture. Burger described this species in his manuscript (no. 21).

The specimen seems to be slightly deformed by its way of preservation. Height 3.1, head 3.4 in standard length. Interorbital space equal to distance between eye and pectoral base, 2.7 in head. Snout 1.7, height of caudal peduncle 4.8, 1st rays of A and D 2 in head. Except some rather slight differences in these characters, which have probably been caused by deformation and different age, the specimen closely agrees with the cited descriptions. It is the type of *Sphoeroides inermis* (T. & S.).

CCCVI. **Tetraodon vermicularis** (p. 278, plate CXXIV fig. 1)

Gastrophysus vermicularis, Bleeker, 1857, p. 125.
Tetrodon vermicularis, Günther, 1870, p. 280.
Spheroides vermicularis, Jordan & Snyder, 1901g, p. 244.
?*Spheroides borealis* Jordan & Snyder, 1901g, p. 245, fig. 5.

There are in our collection two stuffed specimens from Burger and four specimens in spirits (one of them stuffed with cotton), collected by Von Siebold. Total (standard) length of Burger's specimens: no. 1557:28 (23) cm, no. 1558:27 (22) cm; of Von Siebold's specimens: no. 4011:9.2 (7.3) cm, no. 4012a*:11 (9) cm, no. 4012b:7.1 (5.8) cm, no. 4012c:5.3 (4.3) cm.

The plate in the Fauna Japonica has been made after a Japanese plate in Burger's collection. It is quite an accurate reproduction. As to the coloration, it best agrees with the specimens no. 4012a-c, which specimens only slightly differ in number of finrays. Burger's manuscript contains a description of this species (no. 23).

The original colour markings are still very distinct on the specimens in

spirits, inconspicuous on one side of the stuffed specimens, which have the other side painted. This material proved to be heterogeneous.

The specimens no. 4012a-c completely agree with a specimen of *vermicularis* in Bleeker's collection (no. 7335). D 13, A 11-12. Height 3.3 in standard length, 4 in total length, about equal to head. Eye 4-4.8, caudal peduncle 1.5, length of P 2.3-2.4, interorbital space 2.5, its bony part about 4 in head. Eye 2 in snout. Distance between gill apertures and D about equal to length of head. Lower jaw included. The coloration is about as Jordan & Snyder (l.c.) described for *borealis*. In some of these characters the specimens more or less differ from the descriptions cited above, but these differences probably are due to different age and normal variation. The agreements are far more convincing. These specimens represent the type material of *Sphoeroides vermicularis* T. & S., for they far better agree with the description and figure in the Fauna Japonica than the further specimens. I choose specimen no. 4012a as type.

Specimen no. 4011 closely agrees with Jordan & Snyder's description of *Sphoeroides pardalis* (see CCCX), and with our material of that species. I consequently regard it as such.

The specimens nos. 1557 & 1558 are both deformed and have one side painted, while the other side still show less conspicuous remains of the former coloration. These specimens too seem to belong to *Sphoeroides pardalis* (T. & S.), but as they are in a very bad condition and in several characters differ from material and descriptions of that species, I am not completely sure as to the reliability of such an identification. I consequently provisionally let the specimens keep the name *vermicularis* T. & S.

CCCVII. **Tetraodon poecilonotus** (p. 279, plate CXXIV fig. 2)

Tetrodon oblongus, var. *alboplumbeus*, Günther, 1870, p. 278.
Spheroides alboplumbeus, Jordan & Snyder, 1901g, p. 243.

We possess of this species four stuffed specimens collected by Burger and seven specimens in spirits with the indication "f. jap." only. Total (standard) length of Burger's specimens: no. 1576:10.7 (8.7) cm, no. 1577:14.4 (11.6) cm, no. 1578:21.7 (16.5) cm, no. 1579:28 (23) cm; of the specimens in spirits: no. 4038a*:16.2 (13.5) cm, no. 4038b-g:16-5.3 (13-4.2) cm.

The plate in the Fauna Japonica has been made after a Japanese plate, the colours of which exactly agree with the description Burger gives in his manuscript (no. 24), but not with our specimens. The latter further differ from the figure in the Fauna Japonica by the following characters: head 3.1-3.5(-3.8 in the deformed stuffed specimens) in standard length; length of P about equal to snout or slightly longer; small prickles on the back.

All specimens have distinct remains of their former coloration, especially the specimens preserved in spirits. Height about equal to or slightly more than head, which is 3.1-3.5(-3.8) in standard length. D 12-13, A 10-11. Eye 4.2-5, snout 2.2-2.5, interorbital space about 2 in head; the bony interorbital about 1.4 in snout, eye 1.7-2.1 in snout. The distance between gill aperture and D considerably longer than head. The teeth on the upper jaw seem not smaller than on the lower. There is a line of mucous pores running from near angle of mouth, along throat, with a curve upwards till close to base of P. The spots are, at least on some of the specimens, sharply defined, generally smaller than the interspaces. In some of these characters the specimens more or less differ from the cited descriptions. They belong to *Sphoeroides alboplumbeus* (Rich.), and represent the type material of *poecilonotus* T. & S. I regard specimen no. 4038a as type.

CCCVIII. **Tetraodon stictonotus** (p. 280, plate CXXVI fig. 1)

Tetrodon stictonotus, Günther, 1870, p. 281.
Spheroides stictonotus, Jordan & Snyder, 1901g, p. 235, figs. 1 & 2; — Tanaka, 1917, p. 444, fig. 350.

Of this species we have in our collection three stuffed specimens collected by Burger. Total (standard) length: no. 1580:38.5 (32.5) cm, no. 1581:39.5 (32.5) cm, no. 1582*:41.5 (34.5) cm.

Burger's collection contains no plate representing this species; he also gives no description in his manuscript. The plate in the Fauna Japonica is not completely accurate, as can be seen from the characters given below.

The specimens still have remains of their former coloration, which seem to prove the correctness of the plate in the Fauna Japonica in this character. D 16, A 14. Height 3.2-3.5 in standard length, 4.2-4.4 in total length; the specimens seem slightly deformed. Head 3.7-3.8 in standard length, 4.5-4.7 in total length, its upper profile nowhere concave(?). Eye about 5.5(?), interorbital space 1.7-2.2, snout about 2.5 in head; snout 1.2-1.3 in interorbital space. There seems to be no line of mucous pores along the abdomen. The prickles are distinct, especially on abdomen; one of the specimens only has the dorsal and abdominal prickles confluent behind pectorals. Except a few differences in some of these characters, the specimens closely agree with the cited descriptions. They represent the type material of *Sphoeroides stictonotus* (T. & S.). Specimen no. 1582 I regard as type.

CCCIX. **Tetraodon firmamentum** (p. 280, plate CXXVI fig. 2)

Arothron firmamentum, Bleeker, 1857, p. 124.
Tetrodon firmamentum, Günther, 1870, p. 299.
Tetraodon firmamentum, Jordan & Snyder, 1901g, p. 250.

Burger's collection contains two stuffed specimens and one specimen preserved in spirits and stuffed with cotton. One further Japanese specimen, in spirits, probably belongs to the same collection. Total (standard) length of Burger's specimens: no. 1559:27 (21.5) cm, no. 1560*:30.5 (24.5) cm, no. 4033:25.5 (20.5) cm; of the fourth specimen: no. 4034:71 (65) cm.

We have of this species neither a Japanese plate nor a description by Burger. The plate in the Fauna Japonica is rather accurate and but slightly differs from our specimens: there must be a transverse line of mucous pores between eye and gill aperture; D 14, A 14.

There are still some remains of colour markings, about as on the plate in the Fauna Japonica. D 14, A 14, P 16. Height 2.8-3 in standard length, 3.5-3.8 in total length. Head 3-3.2 in standard length, 3.7-3.9 in total length. Eye about 2.3 in interorbital space, the anterior part of which is about equal to snout. Nostrils at end of 2nd third of snout.The specimens are more or less deformed by their way of preservation. They further quite closely agree with the cited descriptions, and represent the type material of *Tetraodon firmamentum* T. & S.

I choose specimen no. 1560 as lectotype.

CCCX. **Tetraodon pardalis** (p. 282, plate CXXIII fig. 2)

Tetrodon pardalis, Günther, 1870, p. 281.
Spheroides pardalis, Jordan & Snyder, 1901g, p. 239; — Tanaka, 1912, p. 91, figs. 89, 90 & 97.

We possess of this species four stuffed specimens collected by Burger and one specimen with the indication "f. jap." only. Total (standard) length of Burger's specimens: no. 1572:16.5 (13) cm, no. 1573:21 (17) cm, no. 1574:25.5 (20.5) cm, no. 1575*:29 (23) cm; of the fifth specimen, preserved in spirits: no. 3997:29 (23.5) cm.

Burger's collection contains a Japanese plate of this species, which has been exactly reproduced in the Fauna Japonica. It slightly differs from our specimens, which, e.g., have vertical lines of mucous pores behind angle of mouth and between eye and gill aperture, and a line forming a curve along throat between angle of mouth and base of P; the tip of A slightly more rounded; the body less high, but that may be caused by deformation. This species has not been described by Burger.

The specimens still have remains of colour markings, the stuffed ones have one side painted, the fins brick-red. D 12-13, A 10, P 15-16. Eye 2-2.25 in snout; interorbital space slightly concave, somewhat more than snout, about 2.3 in head. A slightly more pointed than D. These characters generally are rather unreliable in such stuffed, deformed specimens. They further

closely agree with the cited descriptions, and represent the type material of *Sphoeroides pardalis* (T. & S.). I regard specimen no. 1575 as type.

CCCXI. **Tetraodon porphyreus** (p. 282, plate CXXI fig. 1)

Tetrodon porphyreus, Günther, 1870, p. 287.
Spheroides porphyreus, Jordan & Snyder, 1901g, p. 237.

We have of this species four stuffed specimens collected by Burger. According to the Fauna Japonica, there have been five. Total (standard) length: no. 1564:36 (29.5) cm, no. 1565:38.5 (31) cm, no. 1566*:42.5 (36) cm, no. 1567:38 (32) cm.

Burger's collection of Japanese plates contains a specimen representing this species. It has been accurately reproduced in the Fauna Japonica. In several characters, however, these plates disagree with our specimens, as can be seen from the data given below. Burger's manuscript contains a description of this species (no. 20); he describes the "lateral line" (line of mucous pores) as indistinct, branched on head, the branches including eyes and nostrils, etc.

The specimens are probably more or less deformed, which must be taken into account in the following data. D 16(4.12), A 13(3.10), P 15 or 16. Height 3.3-3.6 in standard length, 3.9-4.4 in total length. Head till pectoral base 3-3.2 in standard length, 3.6-3.9 in total length. Eye 5-5.5 in head. Length of P about equal to snout. The difference in length between D and A is small, they are about as long as C. The lines of mucous pores are inconspicuous. The specimens in several of these characters differ from the cited descriptions, which have all been made after the Fauna Japonica. They represent the type material of *Sphoeroides porphyreus* (T. & S.). I regard specimen no. 1566 as type.

CCCXII. **Tetraodon rubripes** (p. 283, plate CXXIII fig. 1)

Tetrodon rubripes, var. *rubripes*, Günther, 1870, p. 279.
Spheroides rubripes, Jordan & Snyder, 1901g, p. 238; — Tanaka, 1913, p. 221, figs. 224, 225 & 228.

Our collection contains three stuffed specimens from Burger and one specimen in spirits with the indication "Faun. Jap." only. Total (standard) length of Burger's specimens: no. 1583:33 (26.5) cm, no. 1584*:41 (34) cm, no. 1585:39.5 (32.5) cm; of the specimen in spirits: no. 3996:33.5 (29) cm.

The plate in the Fauna Japonica is an exact reproduction of a Japanese plate in Burger's collection. The numbers of finrays have been drawn inexactly. Burger described this species in his manuscript (no. 105).

The remains of the coloration are still distinct, especially on the specimen in spirits. D 19 or 18, A 15, P 16-17. Heigth 2.4-3.1, head 3-3.3 in standard length. Eye 6-8 in head, 3-3.5 in snout; snout slightly more than the somewhat convex interorbital space, which is 2-2.8 in head. Lateral fold weak. The dorsal area of prickles reaches backwards till close to base of D. The specimens further closely agree with the descriptions cited above. They represent the type material of *Sphoeroides rubripes* (T. & S.). Specimen no. 1584 I regard as type.

CCCXIII. **Tetraodon xanthopterus** (p. 284, plate CXXV fig. 1)

Tetrodon rubripes, var. *xanthopterus,* Günther, 1870, p. 279.
Spheroides xanthopterus, Jordan & Snyder, 1901g, p. 239.

We possess of this species three stuffed specimens from Burger and one specimen in spirits from Von Siebold. Total (standard) length of Burger's specimens: no. 1561:24 (20) cm, no. 1562:31 (26.5) cm, no. 1563:36.5 (31) cm; of Von Siebold's specimen: no. 4407*:37 (30.5) cm.

The plate in the Fauna Japonica is an exact reproduction of a Japanese plate in Burger's collection. According to our specimens, it is not very accurate, as may be seen from the data given below. Burger's manuscript contains a description of this species (no. 19).

The stuffed specimens have one side painted, about in accordance with the plate in the Fauna Japonica, while the other side still shows distinct remains of the former coloration; the specimen in spirits has distinct remains on both sides. D 17 or 18, A 15-17, P 17. The specimens are deformed, height variable. Head 3.3-3.6 in standard length, 4-4.2 in total length. Eye 3-3.5 in snout, 7-7.5 in head. Snout about 2.2, interorbital space about 2, P 2.2-2.3, A and D 1.5-1.7 in head. A narrow band of small prickles along caudal peduncle. The specimens further show a close agreement with the cited descriptions. They represent the type material of *Sphoeroides xanthopterus* (T. & S.). I regard specimen no. 4407 as type.

CCCXIV. **Tetraodon rivulatus** (p. 285, plate CXXIV fig. 3)

Tetrodon rivulatus, Günther, 1870, p. 305.
Eumycterias rivulatus, Jordan & Snyder, 1901g, p. 255.
Canthigaster rivulatus, Tanaka, 1911, p. 37, figs. 28 & 29; — Fowler, 1928, p. 465.

We have in our collection four stuffed specimens from Burger and two specimens in spirits from Von Siebold. Total (standard) length of Burger's specimens: no. 1568:10.8 (8.8) cm, no. 1569:13.5 (11) cm, no. 1570:14 (11.3) cm, no. 1571:15.2 (12.3) cm; of Von Siebold's specimens: no. 4653a*:10.5 (8.5) cm, no. 4653b:10 (8) cm.

Burger's Japanese plate, after which the plate in the Fauna Japonica has been made, slightly differs from that reproduction by having the blue stripes on the body slightly, on C considerably lighter. They both seem rather accurate. Burger described this species in his manuscript (no. 25).

The specimens preserved in spirits only have distinct remains of their former coloration, but these do not agree with the plate in the Fauna Japonica: two dark longitudinal stripes, beginning at upper and lower end of gill aperture and ending close before C, and a dark blotch at the base of D; C dusky, especially upper and lower parts of caudal base. Head about 3 in standard length; interorbital space 2.5-3, length of P 2.5 in head. No median elevation or fold between chin and vent to be found. Jaws equal in the specimens preserved in spirits, but lower jaw included in the deformed stuffed specimens. The specimens closely agree with the cited descriptions. They represent the type material of *Canthigaster rivulatus* (T. & S.). I regard specimen no. 4653a as type.

CCCXV. **Tetraodon grammatocephalus** (p. 286, plate CXXVI fig. 3)

For descriptions: see CCCXIV.

We possess of this species but one specimen, preserved in spirits and collected by Von Siebold. Total (standard) length: no. 4003*:7.2 (5.5) cm.

Of this species we have in our collection neither a Japanese plate nor a description by Burger. The plate in the Fauna Japonica is quite exact, only A has been drawn slightly too small.

The specimen has some remains of stripes on the head, in accordance with the plate in the Fauna Japonica, and further closely agrees with the material and the descriptions of the previous species (see CCCXIV). It belongs to *Canthigaster rivulatus* (T. & S.), and is the type of *grammatocephalus* T. & S.

CCCXVI. **Tetraodon lineatus** (p. 287, plate CXXV figs. 2 & 3)

Tetrodon stellatus, var. *aerostaticus,* Günther, 1870, p. 294.
Tetraodon aerostaticus, Jordan & Snyder, 1901g, p. 250.
Tetrodon aerostaticus, Barnard, 1927, p. 974.
Tetrodon stellatus, Fowler, 1928, p. 469.

We have in our collection four stuffed specimens collected by Burger and five specimens in spirits collected by Von Siebold. According to the Fauna Japonica, Temminck & Schlegel had but six specimens at their disposal. Total (standard) length of Burger's specimens: no. 1612:9.2 (7.5) cm, no. 1613:10.4 (8.5) cm, no. 1614:7.2 (6) cm, no. 1615:18.9 (17) cm;

of Von Siebold's specimens: no. 4009a:11.7 (9.5) cm, no. 4009b-e:7-4 (5.9-3.5) cm.

The plate in the Fauna Japonica is an exact reproduction of a Japanese plate in Burger's collection. It closely agrees with our specimens. This species has not been described by Burger.

The specimens still have remains of colour markings, which are in accordance with the plate in the Fauna Japonica. D 10-11, A 10-11, P about 18. Head 2.5-3 in standard length. Eye about 7.5, length of C about 2, of P about 3 in head. Interorbital space less than snout, which is about 2.2-2.3 in head. No prickles on posterior part of caudal peduncle. Except a few slight differences in some of these characters, the specimens closely agree with the cited descriptions. They belong to *Tetraodon aerostaticus* Jenyns (which species possibly is a juvenile form of *stellatus* Bl.; Schn.).

CCCXVII. **Orthagoriscus mola** (p. 288, plate CXXVII)

Orthagoriscus mola, Günther, 1870, p. 317.
Mola mola, Jordan & Snyder, 1901g, p. 260; — Barnard, 1927, p. 986.

We have of this species one stuffed Japanese specimen, collected by Burger. Total (standard) length: no. 2678:84.5 (76) cm.

The plate in the Fauna Japonica is an exact reproduction of a Japanese plate in Burger's collection. This species has also been described by Burger (no. 26).

The specimen is quite nicely preserved. It doubtless belongs to *Mola mola* (L.).

CCCXVIII. **Diodon tigrinus** (p. 288, plate CXXVIII fig. 1)

Chilomycterus affinis Günther, 1870, p. 314; — Fowler, 1928, p. 473, pl. 49 A.
?*Chilomycterus californiensis*, Jordan & Snyder, 1901g, p. 258; — (Eigenmann), Jordan & Snyder, 1901g, p. 258.

There are two stuffed specimens of this species in Burger's collection. Total (standard) length: no. 1529:37 (31) cm, no. 1530:41 (34) cm.

Burger's collection contains a Japanese plate of this species, which has been accurately reproduced in the Fauna Japonica. It slightly differs from our specimens, as can be seen from the characters given below. This species has been described by Burger (no. 17).

Both specimens have one side painted with dark spots. The original spots are still distinctly visible on the fins (except on V). The body is slightly dusky on back and behind P. D 12(-13?), A 12, P 20?-21. Head about 3 in standard length. Bony orbit about 3.6, snout 3, A 2.4 in head. Longest

(upper) rays of P about 2.2 in head, longest rays of D slightly longer, of A slightly shorter. One blunt three- or four-rooted spine on posterior part of interorbital, two spines below or behind and below eye. Dorsal spines but slightly shorter than abdominal. The spines on the tail as described by Günther (l.c.). The specimens slightly differ from the cited descriptions in some of these characters. They belong to *Chilomycterus affinis* Gthr. I am inclined to consider *californiensis* as identical with this species, although our specimens differ somewhat from the descriptions Jordan & Snyder give of *californiensis*, as can be seen from the data given above.

CCCXIX. **Diodon novemmaculatus** (p. 289, plate CXXVIII fig. 2)

Diodon maculatus, Günther, 1870, p. 307.
Diodon holacanthus, Jordan & Snyder, 1901g, p. 257; — Barnard, 1927, p. 979.

Of this species we have in our collection two stuffed specimens collected by Burger and one stuffed specimen and one in spirits, collected by Von Siebold; one further specimen in spirits, from Japan, 1845, probably belongs to the same material. Total (standard) length of Burger's specimens: no. 1521:10.5 (8.5) cm, no. 1522:10.8 (8.8) cm; of Von Siebold's specimens: no. 1525:13.7 (12.2) cm, no. 4090:7.5 (6.5) cm; of the fifth specimen: no. 4088:11 (9) cm.

The plate in the Fauna Japonica has been made after a Japanese plate in Burger's collection. The latter represents the ventral surface of the specimen more clearly white. Burger described this species in his manuscript (no. 18).

The specimens still have distinct remains of their former coloration, especially those preserved in spirits. The dark spots are very irregularly shaped, not forming cross-bands as on the plate in the Fauna Japonica, or short dorsal bands only (e.g., between the eyes). They all accurately agree with the cited descriptions, and doubtless belong to *Diodon holacanthus* L.

CCCXX. **Balistes conspicillum** (p. 289, plate CXXIX fig. 1)

Balistes conspicillum, Günther, 1870, p. 220; — Fowler, 1928, p. 451.
Pachynathus conspicillum, Jordan & Fowler, 1902b, p. 256.
Balistes niger, Tanaka, 1914, p. 250, fig. 247; — Barnard, 1927, p. 951.

We possess of this species two stuffed specimens collected by Burger; one specimen in spirits from Japan, 1844, probably belongs to the same material. Total (standard) length of Burger's specimens: no. 1433:15.5 (12) cm, no. 1435:19.5 (15.5) cm; of the third specimen: no. 4085:27.5 (25) cm.

The plate in the Fauna Japonica is an exact reproduction of a Japanese plate in Burger's collection. Our specimens slightly differ in shape: the inferior profile with a sharper angle; the distance between ventral spine and insertion of A equal to snout and rather spinous. This species has been described by Burger in his manuscript (no. 106).

The specimens have distinct remains of their former coloration on the body; the stuffed specimens have the fins (except P) and lips painted, about as on the plate in the Fauna Japonica. Scales in longitudinal series about 48-40, transverse between origin of D^1 and vent about 40-44. Eye 4-4.5 in head. On caudal peduncle 2.5 longitudinal series of spines. The specimens rather closely agree with the cited descriptions. They belong to *Balistes niger* Park.

CCCXX'. **Balistes maculatus**

Balistes maculatus, Günther, 1870, p. 213 (partly?); — Day, 1878, p. 687, pl. 175 fig. 3.
Canthidermis rotundatus, Jordan & Fowler, 1902b, p. 260.

Our collection further contains a stuffed specimen identified as *B. maculatus,* which has been collected by Burger. Total (standard) length: no. 1454:30 (25.5) cm.

Almost the whole surface of the body of this specimen is covered with small spines. Scales in longitudinal series 46, transverse about 32. Eye 2.7 in snout. The specimen closely agrees with the cited descriptions, consequently probably belongs to *Canthidermis rotundatus* (Procé).

CCCXXI. **Monacanthus cirrhifer** (p. 290, plate CXXX fig. 1)

Monacanthus setifer, Günther, 1870, p. 239 (partly?); — Barnard, 1927, p. 955 (partly?).
Stephanolepis cirrhifer, Jordan & Fowler, 1902b, p. 264.
Monacanthus cirrhifer, Fowler, 1928, p. 456.

Of this species we possess six stuffed specimens collected by Burger, eleven specimens in spirits collected by Von Siebold, and one specimen in spirits with the indication "faun. jap." only. Total (standard) length of Burger's specimens: no. 1681:12.5 (10) cm, no. 1682:24.7 (20.5) cm, no. 1683:22.5 (17.5) cm, no. 1684:23 (18.5) cm, no. 1685*:28.5 (23.5) cm, no. 1734:23.5 (19) cm; of Von Siebold's specimens: no. 4143a & b:20 (16.2) cm, no. 4143c:13.3 (10.5) cm, no. 4144a-h: 6.2-3.3 (4.8-2.5) cm; of the last specimen: no. 4145:18.5 (15) cm.

Burger's Japanese plate, after which the plate in the Fauna Japonica has been made, shows no dark indications of scales on head, body and caudal peduncle. The reproduction is further quite accurate. According to our

specimens there should be 14-15 rays in P, the head slightly longer, D and A slightly lower. Burger's manuscript contains a description of this species (no. 27).

The specimens preserved in spirits, especially the small ones (no. 4144), have distinct remains of their former coloration: more or less marbled with white spots. D I.33-34, A 33-34. Head 3.2-3.6 in standard length. Eye about equal to interorbital space, 3.8-4.6 in head. Squamation rough. The specimens quite closely agree with the cited descriptions by Jordan & Fowler and Fowler, less closely with those by Günther and Barnard. They represent the type material of *Monacanthus cirrhifer* T. & S. Specimen no. 1685 I regard as lectotype.

Günther (1870, p. 239) regards *Monacanthus setifer* Benn. as synonymous with *cirrhifer* T. & S.; according to Steindachner (cf. Jordan & Fowler, 1902b, p. 265), both species are different. A specimen of *setifer* in our collection shows no differences of importance, but as I have not a sufficient material at my disposal to make a final decision, I can only mention this possibility.

CCCXXII. **Monacanthus oblongus** (p. 291, plate CXXX fig. 2)

Monacanthus oblongus, Günther, 1870, p. 241; — Barnard, 1927, p. 956.
Stephanolepis oblongus, Jordan & Fowler, 1902b, p. 266, fig. 2.

Our collection contains seven stuffed specimens from Burger, three specimens in spirits (two of which have been stuffed with cotton), with the indication "f. jap." only, and one specimen with the same indication, identified as *Monacanthus* spec. Total (standard) length of Burger's specimens: no. 1670:8 (6.5) cm, no. 1671:14 (12) cm, no. 1672:? (14.5) cm, no. 1673:18.5 (16) cm, no. 1674:17.2 (14.6) cm, no. 1675:23.5 (20) cm, no. 1676:32.5 (28.5) cm; of the specimens preserved in spirits: no. 4133a:20.5 (17.5) cm, no. 4133b*:9.3 (7.7) cm, no. 4133c:7.1 (5.5) cm, no. 4138:8.5 (6.7) cm.

Burger's collection contains no Japanese plate of this species. The figure in the Fauna Japonica closely agrees with the specimens nos. 1670, 4133b & c and 4138, considerably less with the other specimens. Burger has not described this species.

The specimens have no remains of colour markings. They proved to belong to two different species.

The specimens nos. 1670, 4133b & c (now numbered 17180), and 4138 have the following fin formula: D I.26-28, A 24-27. The specimens in spirits have the upper and middle rays of C prolonged, as has been drawn in the figure in the Fauna Japonica; the total length with the prolonged rays

included is: no. 4133b:10 cm, no. 4133c:7.5 cm, no. 4138:9.3 cm; specimen no. 1670 probably has these rays damaged. Eye 2.5-2.8 in snout; length of P about 2.5 in head; dorsal spine rough anteriorly. These specimens quite closely agree with the cited descriptions. They represent the type material of *Monacanthus oblongus* T. & S. I regard specimen no. 4133b as type.

The specimens nos. 1671-1676 and 4133a have the caudal fin truncate, about 1.5-1.8 in head. D I.35-38, A 33-34. These specimens closely agree with the description of *Pseudomonacanthus modestus* (Gthr.) by Jordan & Fowler (1902b, p. 268, fig. 3). I regard them as such (*Cantherines modestus* (Gthr.)).

In the Fauna Japonica, the description of the juvenile specimens concerns *Monacanthus oblongus* T. & S., of the adult specimens *Cantherines modestus* (Gthr.).

CCCXXIII. **Alutera cinerea** (p. 292, plate CXXXI fig. 1)

Monacanthus monoceros, Günther, 1870, p. 251.
Alutera monoceros, Jordan & Fowler, 1902b, p. 274; — Barnard, 1927, p. 960.

We have of this species one stuffed specimen collected by Burger, and one stuffed specimen from Von Siebold. Total (standard) length of Burger's specimen: no. 1700:43 (38.5) cm, of Von Siebold's specimen: no. 1701*:50 (43.5) cm.

The plate in the Fauna Japonica is an exact reproduction of a Japanese plate in Burger's collection. It slightly differs from our specimens, as can be seen from the data given below. Burger's manuscript contains a description of this species (no. 28). According to his data, the fin formula should be as follows: D I.50, A 51, P 12.

Both specimens closely agree with each other and with the cited descriptions, except the different number of finrays in D and A in specimen no. 1700: D I.37, A 39. They belong to *Alutera monoceros* (Osbeck), and represent the type material of *cinerea* T. & S. I regard specimen no. 1701 as type.

CCCXXIV. **Alutera nasicornis** (p. 293, plate CXXXI fig. 2)

Monacanthus nasicornis, Günther, 1870, p. 254.
Pseudaluteres nasicornis, Jordan & Fowler, 1902b, p. 277.

Our collection contains but one specimen, preserved in spirits, and with the indication "F. jap.". Total (standard) length: no. 4111*:7.7 (6.7) cm.

The plate in the Fauna Japonica has not been made after a Japanese plate. This species has not been described by Burger.

The specimen completely agrees with the cited descriptions. It is the type of *Pseudaluteres nasicornis* (T. & S.).

CCCXXV. **Triacanthus brevirostris** (p. 294, plate CXXIX fig. 2)

Triacanthus brevirostris, Günther, 1870, p. 209; — Jordan & Fowler, 1902b, p. 253; — Regan, 1903, p. 183.

We possess two stuffed specimens collected by Burger and one specimen in spirits collected by Von Siebold. Total (standard) length of Burger's specimens: no. 1686:10.5 (9) cm, no. 1690:21 (17.5) cm; of Von Siebold's specimen: no. 4123*:21.5 (17.5) cm.

The plate in the Fauna Japonica has been made after a Japanese plate collected by Burger. The latter does not show the asperities and lines (except the lateral line) on head and body. The reproduction must have been corrected by Temminck & Schlegel. Burger's manuscript contains a description of this species (no. 108).

D V.23-24. The specimens agree with the cited descriptions. They represent the type material of *Triacanthus brevirostris* T. & S. Specimen no. 4123 I regard as type.

CCCXXVI. **Triacanthus anomalus** (p. 295, plate CXXIX fig. 3)

Triacanthodes anomalus, Günther, 1870, p. 208; — Jordan & Fowler, 1902b, p. 252; — Tanaka, 1911, p. 68, figs. 60 & 61.

Our collection contains four stuffed specimens collected by Burger and three specimens in spirits from Von Siebold. Total (standard) length of Burger's specimens: no. 1691:9.5 (7.5) cm, no. 1692:10.5 (8.5) cm, no. 1693:12.5 (10) cm, no. 1694:11.5 (9.5) cm; of Von Siebold's specimens: no. 4118a*:10 (8) cm, no. 4118b & c:9 (7.3) cm.

Burger's collection contains a plate of this species, which has been accurately reproduced in the Fauna Japonica. According to our specimens, these plates are not completely exact, as can be seen from the data given below. Burger's manuscript contains a description of this species (no. 107).

D VI.15, A 12-13, P 14. Height 2-2.3, head 3 in standard length. Snout 2.5, length of P about 2, length of spines of D and V about 1-1.2 in head. Height of soft D about 3.5, of A about 4 in height of body. The ventral spines are hardly shorter and not weaker than dorsal spines. There are 2-5 spines on each "scale". Except a few slight differences in some of these characters, the specimens closely agree with the cited descriptions. They represent the type material of *Triacanthodes anomalus* (T. & S.). I regard specimen no. 4118a as type.

CCCXXVII. **Ostracion immaculatus** (p. 296)

Ostracion cubicus, Günther, 1870, p. 260; — Fowler, 1928, p. 461.
Ostracion immaculatus, Jordan & Fowler, 1902b, p. 280.
Ostracion tuberculatus, Barnard, 1927, p. 962.

There are three stuffed specimens in Burger's collection and one stuffed specimen and two specimens in spirits in Von Siebold' collection. Total (standard) length of Burger's specimens: no. 1494:12 (9.3) cm, no. 1495: 15.7 (12.5) cm, no. 1496:18 (14.5) cm; of Von Siebold's specimens: no. 1497*:23 (18.5) cm, no. 3982a:12.8 (10) cm, no. 3982b:8 (6.3) cm.

Of this species we have neither a Japanese plate nor a description by Burger.

There are some remains of spots on the carapace. An indistinct short blunt median ridge before D; interorbital space concave; belly convex except posterior part. Eye about 3 in head, snout of carapace 1.5 in C. The specimens generally closely agree with the cited descriptions. They represent the type material of *Ostracion immaculatum* T. & S., which species may be identical with *O. tuberculatus* L. I choose specimen no. 1497 as lectotype.

CCCXXVIII. **Ostracion stictonotus** (p. 297, plate CXXXI fig. 3)

Aracana aculeata, Günther, 1870, p. 266; — Jordan & Fowler, 1902b, p. 284; — Tanaka, 1912, p. 119, figs. 120-123; — Fowler, 1928, p. 465.

Our collection contains three stuffed specimens from Burger and six specimens in spirits from Von Siebold. Total (standard) length of Burger's specimens: no. 1478:5.5 (4.5) cm, no. 1479:11 (9) cm, no. 1480:11.3 (9.5) cm; of Von Siebold's specimens: no. 3983a*:11 (9) cm, no. 3983b:9 (7.5) cm, no. 3984a:10.5 (8.5) cm, no. 3984b-d:8-6.5 (6.5-5.3) cm.

The plate in the Fauna Japonica is an exact reproduction of a Japanese plate in Burger's collection. It shows the rays of D and A slightly too short. Burger has not described this species.

The specimens still have distinct dark spots on the back. D 11, A 10, P 12. Head about 3.6 in standard length. They further closely agree with the cited descriptions and belong to *Aracana aculeata* (Houttuyn). They represent the type material of *stictonotus* T. & S. I regard specimen no. 3983a as type.

CCCXXIX. **Ostracion brevicornis** (p. 298, plate CXXX fig. 3)

Ostracion diaphanus, Günther, 1870, p. 264; — Barnard, 1927, p. 963; — Fowler, 1928, p. 464.
Ostracion diaphanum, Jordan & Fowler, 1902b, p. 281.

We possess of this species two stuffed specimens collected by Burger and five specimens in spirits collected by Von Siebold; one further specimen in spirits from Japan, 1845, and two stuffed specimens without any indications as to their locality or collector, may belong to this material too. Total (standard) length of Burger's specimens: no. 1468:11.5 (9.5) cm, no. 1471*:21 (17) cm; of Von Siebold's specimens: no. 3980a:10.3 (8.5) cm, no. 3980b-e:3.4-2.4 (3-2) cm; of the three further specimens: no. 3981:16 (13.3) cm, no. 1469:15.7 (13) cm, no. 1470:15.5 (12.5) cm.

Of this species we have a nice Japanese plate, collected by Burger, and reproduced quite accurately in the Fauna Japonica. According to our specimens, there should be 9 rays in A, eye about 2.5 in head in adult specimens, length of P about equal to snout. Burger's manuscript contains a description of this species (no. 29).

All specimens in spirits are coloured more or less reddish. Specimen no. 3981 is just an empty skin and carapace. It further distinctly differs from the other specimens by having a three angled carapace. Except the lacking of the anterior spine on the lateral ridge, which should have been below the eye (cf. Snyder), it completely agrees with Snyder's description of *Lactophrys tritropis* Snyd. (1911, p. 535) (= *stellifer* (Bl.)). I regard it as such.

The further specimens obviously belong to one single species. The proportions of the carapace are somewhat variable, its greatest dorsal width about 4 in its length. Eye 2.3-2.8 in head; depth of caudal peduncle about 3 in head. C rounded. These specimens closely agree with the cited descriptions. They belong to *Ostracion diaphanus* Bl.; Schn., and represent the type material of *brevicornis* T. & S. Specimen no. 1471 I regard as type.

CCCXXX. **Ostracion cornutus** (p. 299, plate CXXXI fig. 4)

Ostracion cornutus, Günther, 1870, p. 265; — Jordan & Fowler, 1902b, p. 282; — Barnard, 1927, p. 963.

We have in our collection one stuffed specimen from Burger and one specimen in spirits from Von Siebold; a further stuffed specimen without any indications probably belongs to the same material. Total (standard) length (spines excluded) of Burger's specimen: no. 1473:6.5 (5.2) cm; of Von Siebold's specimen: no. 3965:5 (3.8) cm; of the third specimen: no. 1472:5.5 (4.5) cm.

The plate in the Fauna Japonica is an exact reproduction of a Japanese plate in Burger's collection. The artist has forgotten to draw the anal fin (A 9); according to the specimens, the spines must be considerably longer, about 2 in length of carapace; the eye slightly larger; D 9. This species has not been described by Burger.

Height 1.9-2.2, head 2.8-3 in standard length. Eye 2 in head. The small specimens have juvenile characters. They all closely agree with the descriptions cited above, and doubtless belong to *Ostracion cornutus* L.

CCCXXXI. **Chimaera monstrosa** (p. 300, plate CXXXII)

?*Chimaera phantasma* Jordan & Snyder, 1900, p. 338; — idem, 1904, p. 223.

Our collection contains two stuffed specimens collected by Burger. Total length: no. 2648 (male): 70 cm, no. 2649 (female): 80.5 cm.

The plate in the Fauna Japonica is an exact reproduction of a Japanese plate in Burger's collection. It represents a male specimen, but slightly differs from our male specimen (no. 2648), the characters of which, however, are unreliable on account of its condition and deformation. It has D higher, caudal filament much longer, P longer, eye larger, snout less pointed, and no transverse lines on back. Burger's description of this species (no. 16 in his manuscript), is quite unreliable.

It is regrettable that both specimens have been stuffed, for they are now in a rather bad condition, deformed, and consequently many of their most important characters are lacking or unreliable.

Specimen no. 2648 is a male. When compared with the only male specimen of *Chimaera monstrosa* L. in our collection (no. 7383, collected by Bleeker), it shows no differences of importance which cannot be caused by its condition. It remains possible, however, that the specimen belongs to a different species. The descriptions of *phantasma* Jord. & Snyd. cited above seem to show a close agreement too. I consequently have no arguments to doubt Jordan & Snyd r's opinion as they regard *monstrosa* T. & S. as identical with their *phantasma,* but also none to confirm it. Without any material of *phantasma* Jord. & Snyd. at my disposal, I cannot make a final decision, so I provisionally accept Jordan & Snyder's view, and regard this specimen as *Chimaera phantasma* Jord. & Snyd.

Specimen no. 2649 is a female. I compared it with a female specimen of *monstrosa* L. (no. 16599), but here too I found no reliable differences, except perhaps the somewhat shorter pectoral fins of Burger's specimen. For a final identification, I need some reliably identified specimens of *phantasma* Jord. & Snyd. I provisionally regard this specimen as *Chimaera phantasma* Jord. & Snyd. too.

CCCXXXII. **Scyllium Bürgeri** (p. 301)

Scyllium Bürgeri Müller & Henle, 1841, p. 8, pl. 2.
Scyllium bürgeri, Günther, 1870, p. 404.
Halaelurus burgeri, Jordan & Fowler, 1903b, p. 601.

Under this name we have two stuffed specimens from Burger, while one stuffed specimen without any indications as to locality or collector probably belongs to the same material. Total (standard) length of Burger's specimens: no. 2576:65.5 (53.5) cm, no. 2593*:49 (37.5) cm; of the third specimen: no. 2585:45 (36) cm.

Burger's collection of Japanese plates contains a nice specimen representing this species, which has been reproduced slightly too dark by Müller & Henle (l.c.). It agrees with the specimens nos. 2593 and 2585 only. Burger's manuscript contains a description of this species (no. 3), which also agrees with these two specimens only.

Specimen no. 2576 has the head convex dorsally; the longitudinal diameter of eye about 5, interorbital space 2.6, width of mouth 2.5, width of head 1.8 in length of head. Except some slight differences in these characters, which, at least partially, have been caused by the deformation of the rather badly stuffed specimen, it closely agrees with the descriptions of *Squalus mitsukurii* Jord. & Snyd. cited below (see CCXLII). I consequently regard it as such.

Specimen no. 2593 has distinct dark spots on back and fins (except on V and A), specimen no. 2585 less conspicuous spots on the body. They both closely agree with the descriptions cited above, and represent the type material of *Halaelurus bürgeri* (M. & H.). I choose specimen no. 2593 as lectotype.

CCCXXXII'. **Chiloscyllium ornatum**

Another stuffed specimen from Burger, identified as *Chiloscyllium* spec., and on an old label as *Scyllium ornatum*, with the indication "ocean ind.", must belong to the material dealt with here. The stated locality must be erroneous. Total (standard) length: no. 2535:67.5 (55.5) cm.

This specimen obviously belongs to the genus *Chiloscyllium* M. & H. It closely agrees with Jordan & Fowler's description of *Chiloscyllium indicum* (Gmel.) (l.c., p. 604), the only species of this genus occurring in the Japanese waters. I consequently regard it as such.

CCCXXXIII. **Crossorhinus barbatus** (p. 301)

?*Crossorhinus barbatus*, Müller & Henle, 1841, p. 21, pl. 5; — Duméril, 1865, p. 338; — Günther, 1870, p. 414.
Orectolobus barbatus, Jordan & Fowler, 1903b, p. 606.

Our collection contains a large amount of specimens of this species, all from Japan: four stuffed specimens from Burger, previously indentified

as *Cr. labiatus* (no. 2614) or *Cr. lobatus;* fourteen embryonal specimens collected by Von Siebold; one stuffed specimen from Burger erroneously identified as *Scyllium* spec.; one specimen in spirits from Japan, 1844, without any further indications as to collector, identified as *Cr. lobatus*; one stuffed Japanese specimen without any indications. Total (standard) length of Burger's specimens: no. 2608:93 (74) cm, no. 2611:117 (98) cm, no. 2614:52.5 (42) cm, no. 2622:74.5 (59.5) cm; of Von Siebold's specimens: no. 4249 (six specimens) and no. 4250 (eight specimens): 13.3-10.5 (10.5-9) cm; of Burger's specimens erroneously identified as *Scyllium*: no. 2581:24 (19.7) cm; of the adult specimen in spirits: no. 4373:84 (66) cm; of the last, stuffed specimen: no. 2639:58 (48) cm.

We have in Burger's collection of Japanese plates a nice specimen representing this species, which has been reproduced by Müller & Henle (l.c.). It closely agrees with our specimens. Burger's manuscript contains a description of this species (no. 2).

This extensive material is obviously homogeneous. Specimen no. 4373 still has its original coloration, which proves the accuracy of the plates mentioned before. The adult specimens closely agree with the cited descriptions, while the embryonal specimens, in spite of some juvenile characters, obviously belong to the same species, and generally agree with the cited description too.

According to Regan (1906, p. 435), the species *Crossorhinus barbatus* as described by Müller & Henle, Duméril and Günther, must be divided into two separate species, a Japanese: *japonicus,* and an Australian: *barbatus* (Gmel.). The Japanese species (= *barbatus* Jord. & Fowl.) differs from the Australian by having "no papilliform projections above the eye" and a "nasal cirrhus with a simple branch". Our specimens confirm the first differing character, but the second seems to be variable, the nasal cirrhus generally being simple with a short side-branch, but sometimes more or less bifid. I consequently doubt whether the differences between the Japanese and the Australian "species" are not rather of subspecific order. Having no Australian specimens at my disposal, I provisionally regard the specimens as *Orectolobus japonicus* Regan. A skeleton and a pair of jaws will be taken into account later.

CCCXXXIV. **Carcharias (Prionodon) japonicus** (p. 302, plate CXXXIII)

Carcharias japonicus, Jordan & Fowler, 1903b, p. 614.

Our collection contains no specimens of this species. According to the Fauna Japonica, Temminck & Schlegel had only jaws at their disposal. We still have two pairs of jaws, but these will be taken into account later.

The plate in the Fauna Japonica is an exact reproduction of a Japanese plate in Burger's collection. Burger described this species in his manuscript (no. 4). The name of the species meant by this description and the Japanese plate must still be *Carcharhinus japonicus* (T. & S.) (cf. Jordan, Tanaka & Snyder, 1913, p. 13).

CCCXXXV. **Triakis scyllium** (p. 302)

Triakis scyllium Müller & Henle, 1841, p. 63, pl. 26; — Duméril, 1865, p. 397; — Günther, 1870, p. 384; — Jordan & Fowler, 1903b, p. 609.

We possess but one, stuffed specimen of this species. It has been collected by Burger. Total (standard) length: no. 2578*:82: (64.5) cm.

We have of this species neither a Japanese plate nor a description by Burger.

The specimen closely agrees with the cited descriptions, and must be the type of *Triakis scyllium* M. & H.

CCCXXXVI. **Oxyrhina glauca** (p. 302)

Oxyrhina glauca Müller & Henle, 1841, p. 69, pl. 29; — Duméril, 1865, p. 409.
Lamna glauca, Günther, 1870, p. 391.
Isuropsis glauca, Jordan & Fowler, 1903b, p. 623.

We have in our collection three stuffed specimens collected by Burger, all previously identified as *Squalus oxyrhinus,* the two smallest specimens with the indication "Original-exemplar". A skeleton and two pairs of jaws will be taken into account later. Total (standard) length: no. 2529*:100.5 (83) cm, no. 2553:83.5 (72) cm, no. 2587:66 (54.5) cm.

There is a nice plate of this species in Burger's collection, which has been reproduced quite accurately by Müller & Henle (l.c.). Burger has not described this species.

The specimens have 20 or more teeth on each half of jaw; D^1 considerably closer to P than to V. The differences from *Oxyrhina gomphodon,* as described by Müller & Henle (l.c., p. 69) and indicated on their plate (no. 29) are slightly exaggerated. The specimens closely agree with the cited descriptions and represent the type material of *Isuropsis glauca* (M. & H.). I choose specimen no. 2529 as type.

CCCXXXVII. **Heptanchus indicus** (p. 303)

Heptanchus indicus, Müller & Henle, 1841, p. 82, pl. 32 (partly?).

Of this species we have only a pair of jaws, which will be taken into

account later. According to the Fauna Japonica, there has been one stuffed specimen, collected by Burger.

Burger's collection of Japanese plates contains a specimen representing this species. It has been accurately reproduced by Müller & Henle (l.c.). Burger has not described this species.

Neither Jordan & Fowler (1903b), nor Jordan, Tanaka & Snyder (1913) mention *indicus* Cuv. for the Japanese area, so the synonymy given by Müller & Henle must be erroneous. Temminck & Schlegel's *Heptanchus indicus* must represent one of the few (3 according to Jordan, Tanaka & Snyder, 1913, p. 7) Hexanchid species occurring in the Japanese area, of which we have, to my regret, no material.

CCCXXXVIII. **Mustelus vulgaris** (p. 303, plate CXXXIV)

Mustelus manazo Bleeker, 1857, p. 126; — Duméril, 1865, p. 403; — Günther, 1870, p. 387; — Jordan & Fowler, 1903b, p. 608; — Barnard, 1925, p. 30, pl. 1 fig. 4.

We possess three stuffed specimens collected by Burger and one stuffed specimen and two embryonal or just born specimens in spirits, collected by Von Siebold, all of which have been identified as *M. vulgaris*. Total (standard) length of Burger's specimens: no. 2595:226 (174) cm, no. 2600:72.3 (59.5) cm, no. 2625:42.8 (35) cm; of Von Siebold's specimens: no. 2619:53.5 (43.5) cm, no. 4308a & b:20-19.5 (15.5-15) cm.

The plate in the Fauna Japonica is a very accurate reproduction of a Japanese plate in Burger's collection. According to our specimens, the posterior tip of D^1 should be ending less close to insertion of V, while the lower part of C should be slightly higher anteriorly. Burger described this species in his manuscript (no. 6).

The material obviously is heterogeneous, which must have been caused by an accidental change of labels. Specimen no. 2595 has the nostrils closer to mouth than to tip of snout and the interspace between the nostrils smaller than the part of snout before them. It further completely agrees with the descriptions of *Prionace glauca* (L.) by Müller & Henle (l.c., p. 36), Duméril (l.c., p. 353), Günther (l.c., p. 364) and Jordan & Fowler (l.c., p. 613). It must belong to that species.

The smallest of the further specimens still has an umbilical cord. The adult specimens have the distance between the insertions of D^1 and P about equal to base of D^1; the distance between the bases of D^1 and V about 1½-2 in base of D^1. The specimens further closely agree with the cited descriptions as well as with a specimen of *M. manazo* collected by Bleeker (no. 7396), which, however, is in a very bad condition. They consequently doubtless belong to *Mustelus manazo* Blkr.

CCCXXXIX. **Lamna cornubica** (p. 304)

Lamna cornubica, Müller & Henle, 1841, p. 67; — Jordan & Fowler, 1903b, p. 623.

We have no specimens of this species in our collection; a pair of jaws will be taken into account later.

Burger's collection of Japanese plates contains no specimen representing this species, his manuscript no description.

CCCXL. **Galeus japonicus** (p. 304)

Galeus japonicus Müller & Henle, 1841, p. 58, pl. 22; — Duméril, 1865, p. 391; — Günther, 1870, p. 380; — Jordan & Fowler, 1903b, p. 611.

Although Temminck & Schlegel mention but one specimen, we now have in our collection two stuffed specimens, collected by Burger. Total (standard) length: no. 2528*:90 (72) cm, no. 2548:68 (56) cm.

We have of this species neither a Japanese plate nor a description by Burger.

The specimens have the vent at about the middle of the total length; the outer edges of the teeth serrate. They closely agree with the cited descriptions and belong to *Galeus japonicus* M. & H. (or *Galeorhinus japonicus* (M. & H.), cf. Jordan, Tanaka & Snyder, 1913, p. 12). One of the specimens even must belong to Müller & Henle's type material of this species, probably specimen no. 2528.

CCCXLI. **Cestracion Philippi** (p. 304)

Cestracion Philippi, Müller & Henle, 1841, p. 76 (partly).
Heterodontus zebra Bleeker, 1857, p. 127.
Heterodontus Philippi, var. *japonica* Duméril, 1865, p. 424.
Cestracion philippi, Günther, 1870, p. 415 (partly).
Heterodontus japonicus, Jordan & Fowler, 1903b, p. 599.

We have of this species seven stuffed specimens collected by Burger, one specimen preserved in spirits from Japan, 1844, and one stuffed specimen without any information as to locality and collector. The latter two specimens probably belong to the same material. Total (standard) length of Burger's specimens: no. 2563:42.5 (34.5) cm, no. 2564:51 (40.5) cm, no. 2609:94 (77) cm, no. 2615:64.5 (51.5) cm, no. 2628:51 (40.5) cm, no. 2641:40.3 (30.5) cm, no. 2643:? (56) cm; of the specimen in spirits: no. 4202:50 (38) cm; of the stuffed specimen of uncertain origin: no. 2616:29 (23) cm.

Burger's collection of Japanese plates contains a nice specimen representing this species, which has been accurately reproduced by Müller & Henle (l.c.). His manuscript contains a description (no. 7).

The specimens have D^1 considerably larger than D^2; origin of D^2 slightly closer to base of C than to origin of D^1. Eye 4.5-5, snout 1.6 in head. There can be no doubt as to the identity of these specimens: they must belong to *Heterodontus japonicus* (Duméril). A skeleton and a pair of jaws will be taken into account later.

CCCXLII. **Acanthias vulgaris** (p. 304, plate CXXXV)

Squalus mitsukurii, Jordan & Fowler, 1903b p. 629, fig. 3; — Tanaka, 1917, p. 471, figs. 368-370.

?*Squalus brevirostris* Tanaka, 1917, p. 464, figs. 362-364.

?*Squalus japonicus*, Tanaka, 1917, p. 467, figs. 365-367.

We have no specimens thus identified in our collection, but one of the specimens identified as *Scyllium Bürgeri* proved to belong to this species (see CCCXXXII). According to the Fauna Japonica, Temminck & Schlegel never received any specimens of this species.

A Japanese plate of this species in Burger's collection has been accurately reproduced in the Fauna Japonica. Burger's manuscript contains a description (no. 101), which, in spite of the general unreliability of its data, rather closely agrees with the cited descriptions and our only specimen. The present name of this species must be *Squalus mitsukurii* Jord. & Snyd. (cf., e.g., Jordan, Tanaka & Snyder, 1913, p. 18).

CCCXLIII. **Squatina vulgaris** (p. 305, plate CXXXVI)

Squatina japonica, Jordan & Fowler, 1903b, p. 641.

Our collection contains a rather large amount of specimens of this species: eight stuffed specimens collected by Burger; three specimens in spirits collected by Von Siebold; two stuffed specimens, one of which preserved in spirits, from Japan. Total (standard) length of Burger's specimens: no. 2597:67 (58.5) cm, no. 2601:51.5 (44) cm, no. 2613:53 (44.5) cm, no. 2635:59.5 (51) cm, no. 2636:35 (30) cm, no. 2636a:84.5 (72) cm, no. 2644:68 (59) cm, no. 2645:47.5 (41) cm; of Von Siebold's specimens: no. 4196a & b:22 (18.5) cm, no. 4196c:21 (17.5) cm; of the stuffed specimen in spirits: no. 4193:37.5 (32) cm; of the dry preserved stuffed specimen: no. 2638:35.5 (31) cm.

The plate in the Fauna Japonica is an exact reproduction of a Japanese plate in Burger's collection. Burger's manuscript contains a description of this species (no. 8).

The specimens in spirits still have some remains of their former coloration. All specimens completely agree with Jordan & Fowler's description (l.c.), and doubtless belong to *Squatina japonica* Bleeker, which species,

however, may be identical with *Sq. aculeata* or even with the common *Sq. squatina* (cf. Jordan & Fowler, 1903b, p. 642).

CCCXLIV. **Pristiophorus cirratus** (p. 305, plate CXXXVII)

Pristiophorus cirratus, Bleeker, 1857, p. 128.
Pristiophorus japonicus Gürther, 1870, p. 433; — Jordan & Fowler, 1903b, p. 639.

Of this species we possess four stuffed specimens collected by Burger, and one stuffed specimen and one specimen and a head preserved in spirits, collected by Von Siebold. They were all labelled *Pristis cirratus* Latham, on an old label *P. cirrhatus*. Total (standard) length of Burger's specimens: no. 2656:33 (about 28.5) cm, no. 2657:74 (about 65) cm, no. 2658:67 (about 58) cm, no. 2659:86? (about 73.5) cm; of Von Siebold's specimens: no. 2653:81 (about 68) cm, no. 4358:55? (about 45.5) cm; length of the snout of the head in spirits: no. 4243:19.5 cm. The base of the caudal fin is quite indistinct, especially in the stuffed specimens; therefore the standard length mentioned above is not completely reliable. The specimens nos. 2659 and 4358 have the saw damaged; their length behind the eyes till tip of C is 65.5 and 41.5 cm.

Burger's collection of Japanese plates contains a nice specimen which has been accurately reproduced in the Fauna Japonica. According to our material, it shows the distribution of the teeth along the saw somewhat too regular, but this is quite a variable character in our specimens. Burger's manuscript contains a description of this species (no. 102).

The specimens have between each pair of large teeth along the saw, 1-4 small ones. The interorbital is more or less concave. The origin of D^1 closer to tip of saw than tip of C. Base of D^2 entirely before middle between origin of D^1 and tip of C. P slightly closer to tip of snout than to D^2. These specimens doubtless belong to *Pristiophorus japonicus* Gthr.

CCCXLV. **Zygaena malleus** (p. 306, plate CXXXVIII)

Sphyrna zygaena, Müller & Henle, 1841, p. 51; — Jordan & Fowler, 1903b, p. 618; — Barnard, 1925, p. 32.
Cestracion zygaena, Duméril, 1865, p. 382.
Zygaena malleus, Günther, 1870, p. 381.

Von Siebold's collection contains one stuffed specimen and two specimens and a head preserved in spirits, Burger's collection seven stuffed specimens. Total (standard) length of Burger's specimens: no. 2599:89 (62) cm, no. 2617:59.5 (43) cm, no. 2618:83.5 (59.5) cm, no. 2624:94.5 (65.5) cm, no. 2627:53 (37) cm, no. 2632:77.5 (55) cm, no. 2633:76 (55) cm; of Von Siebold's specimens: no. 2610:95.5 (69) cm, no. 4208:65.5 (44.5) cm, no. 4209:48 (32.5) cm; length of the head: no. 4206:14 cm.

The plate in the Fauna Japonica has been made after a Japanese plate in Burger's collection, which has been coloured slightly more bluish. Burger's manuscript contains a description of this species (no. 5).

This material is obviously homogeneous, closely agrees with the cited descriptions, and doubtless belongs to *Sphyrna zygaena* (L.).

CCCXLVI. **Rhinobatus laevis** (p. 306, plate CXXXIX)

Rhynchobatus laevis, Müller, & Henle, 1841, p. 111; — Duméril, 1865, p. 483.
Rhynchobatus djeddensis, Günther, 1870, p. 441; — Barnard, 1925, p. 58, pl. 3 fig. 6.
Rhynchobatus djiddensis, Jordan & Fowler, 1903b, p. 644.

We had in our collection no specimens thus identified, but two stuffed specimens labelled *Rhinobatus* spec., without any indications as to locality or collector probably belong to the material dealt with here; two of the stuffed specimens identified as *Rhinobatus schlegelii* (see CCCXLVII) proved to belong to this species too. According to the Fauna Japonica, there have been "un bon nombre d'individus". Total (standard) length of the specimens identified as *Rhinobatus* spec.: no. 2688:44.5 (38) cm, no. 2690:61 (51.5) cm; of the two specimens collected by Burger but erroneously labelled *"Rh. schlegelii":* no. 2682: 80.5 (68.5) cm, no. 2683:50.5 (43) cm.

The plate in the Fauna Japonica is an exact reproduction of a Japanese plate in Burger's collection. Burger also described this species (no. 9).

The specimens agree with the cited descriptions. They doubtless belong to *Rhynchobatus djiddensis* (Forsk.).

CCCXLVII. **Rhinobatus Schlegeli** (p. 307)

Rhinobatus (*Rhinobatus*) *Schlegelii* Müller & Henle, 1841, p. 123, pl. 42; — Duméril, 1865, p. 497.
Rhinobatus schlegelii, Günther, 1870, p. 445.
Rhinobatus schlegel, Jordan & Fowler, 1903b, p. 645.

We possess of this species six stuffed specimens collected by Burger (two specimens identified as *schlegelii* proved to belong to the previous species, CCCXLVI); four specimens in spirits from Von Siebold. I am inclined to include here a small specimen, stuffed but in a quite satisfactory condition, although Müller & Henle mention but 9 specimens in our collection. One more specimen from Burger's collection must be in the British Museum (cf. Richardson, 1846, p. 195). Total (standard) length of Burger's specimens: no. 2680*:75.5 (66) cm, no. 2681:55.5 (48.5) cm, no. 2684:38.5 (33.5) cm, no. 2685:68 (59.5) cm, no. 2686:67.5 (59.5) cm, no. 2687:77.5 (68.5) cm; of Von Siebold's specimens: no. 4225a:49 (44.5)

cm, no. 4225b-d:11.5-11 (10-9.5) cm; of the specimen with uncertain identity: no. 2689:36.5 (32) cm.

Burger's collection of Japanese plates contains a nice specimen representing this species, which has been accurately reproduced by Müller & Henle (l.c.). Burger's plate only is somewhat more orange-coloured. His manuscript contains a description of this species (no. 10).

The specimens all closely agree with the cited descriptions and represent the type material of *Rhinobatus schlegelii* M. & H. Specimen no. 2680 I regard as lectotype.

CCCXLVIII. **Platyrhina sinensis** (p. 307)

Platyrhina sinensis, Müller & Henle, 1841, p. 125; — Duméril, 1865, p. 576; — Günther, 1870, p. 471.
Discobatus sinensis, Jordan & Fowler, 1903b, p. 647.

In the part of our collection we received from Burger, I found two stuffed specimens identified as *Platyrhina bürgeri,* which name also occurs on Burger's Japanese plate of *sinensis* Bl.; Schn. Total (standard) length: no. 2696:46 (40) cm, no. 2697:58 (51) cm.

As I mentioned above, Burger's collection contains a Japanese plate of this species, which has been reproduced by Müller & Henle (l.c.). Compared with the latter plate, it is slightly less brownish, with D^1, D^2 and C less reddish, whilst the spines above the eyes, the median spines and those in two transverse rows behind the spiracles, have been coloured white. Burger's manuscript contains no description.

The specimens have the simple median dorsal row of spines continued till base of D^2. They closely agree with the cited descriptions, and doubtless belong to *Discobatus sinensis* (Bl.; Schn.).

CCCIL. **Urolophus aurantiacus** (p. 307)

Urolophus fuscus, Jordan & Fowler, 1903b, p. 657.

Of this species we have in our collection one small specimen in spirits, collected by Von Siebold. The specimens mentioned by Temminck & Schlegel in the Fauna Japonica, measuring about 75 cm, after which Burger's Japanese plate (see below) has been made, is not in our collection, and probably never arrived here. Total (standard) length: no. 4238:9.7 (8.3) cm.

Burger's collection contains a Japanese plate, which has been reproduced by Müller & Henle (1841, pl. 56 fig. 2). He also described this species in his manuscript (no. 104). The description is quite inexact.

The specimen closely agrees with the cited description. It must belong to the only species of the genus *Urolophus* M. & H. occurring in the Japanese waters: *U. fuscus* Garman. As I have stated before, this is not the specimen after which the plate has been made.

CCCL. **Torpedo (Astrape) japonica** (p. 307, plate CXL)

?*Astrape dipterygia,* Müller & Henle, 1841, p. 131; — Duméril, 1865, p. 523; — Günther, 1870, p. 454.
Astrape japonica, Jordan & Fowler, 1903b, p. 656.

We have in our collection of this species one stuffed specimen erroneously named *Narcine timlei* (Bl.; Schn.), collected by Burger, and three stuffed specimens identified as *Narcine* spec., also collected by Burger. Total (standard) length: no. 2418*:32 (26.5) cm, no. 2314:22 (16.5) cm, no. 2369:27 (20.5) cm, no. 2735:20.5 (16) cm.

The plate in the Fauna Japonica is an exact reproduction of a Japanese plate in Burger's collection. According to our specimens, the total width should be about 2.6 in total length. Burger described this species in his manuscript (no. 11).

The specimens have all been stuffed and are consequently badly deformed. They more or less closely agree with the cited descriptions, but on acount of their bad condition, I am unable to confirm Jordan & Fowler's view as to the possible identity of *Narke japonica* (T. & S.) with *N. dipterygia* (Bl.; Schn.). I consequently provisionally accept their view, and regard these specimens as the types of a separate species: *Narke japonica* (T. & S.). Specimen no. 2418 I choose as lectotype.

CCCLI. **Raja Kenojei** (p. 308)

Raja Kenojei Müller & Henle, 1841, p. 149, pl. 48; — Duméril, 1865, p. 556.
Raja kenojei, Günther, 1870, p. 461; — Jordan & Fowler, 1903b, p. 652.

We have in our collection three stuffed specimens collected by Burger and one specimen stuffed with cotton but preserved in spirits, from Japan, without name of collector. Total length of Burger's specimens: no. 2499*:37 cm, no. 2500:41 cm, no. 2501:40.5 cm; of the fourth specimen: no. 4243:29.5 cm.

Burger's collection of Japanese plates contains a specimen representing this species, which has been reproduced by Müller & Henle (l.c.). The latter plate shows the dorsal side too reddish in comparison with Burger's original. The plates are rather inaccurate, there should, e.g., be five (or three) longitudinal rows of spines on the tail. Burger's manuscript contains a description of this species (no. 12).

This material proved to be heterogeneous: specimen no. 2501 distinctly differs from the other specimens by having patches of spines on the upper surface of the pectoral fins, sharp pointed teeth, and considerably longer claspers. It closely agrees with a specimen of *Raja meerdervoortii* Blkr. (no. 7432) collected by Bleeker, and with a description of that species by Jordan & Fowler (l.c., p. 650), consequently must belong to that species.

The specimen no. 4243 has but three longitudinal rows of spines on the tail, the specimens nos. 2499 and 2500 have five rows. These three specimens further have the distance between the eyes shorter than that between eye and margin of disc; interorbital space about 2.7, width of mouth 1.6, D^1 about 2.5 in snouth; 2 (or 1) median spines on the anterior part of the back; C very small; distance between D^1 and D^2 about 1.5 in base of first, with a small spine close behind D^1 and two larger close before D^2; specimen no. 2499 has some rather inconspicuous spines on the two almost median ridges on the snout, both other specimens a small patch on the tip only. These specimens further closely agree with the cited descriptions, and represent the type material of *Raja kenojei* M. & H. I choose specimen no. 2499 as lectotype.

CCCLI′ **Ovum Rajae**

Burger's collection further contains an egg labelled "Ovum Rajae". It is spirally wound like a pointed screw, the length of its axis is 10.5 cm. Its identity must remain uncertain as I have not sufficient material at my disposal for comparison.

CCCLII. **Trygon Kuhlii** (p. 308)

Trygon Kuhlii Müller & Henle, 1841, p. 164, pl. 51 fig. 2.
Trygon (Trygon) Kuhlii, Duméril, 1865, p. 603.
Trygon kuhlii, Günther, 1870, p. 479.
Dasyatis kuhlii, Jordan & Fowler, 1903b, p. 659.

Our collection contains no specimens thus identified, but the specimen Müller & Henle mention, and which consequently belongs to their type material, must be one of the five stuffed specimens I provisionally identified as *Dasyatis akajei* (see below, CCCLIII). On account of the condition of these specimens (dry preserved with mouth closed, no remains of coloration, tail mutilated), it is impossible to find out which one belongs to this species.

Müller & Henle give an exact reproduction of a Japanese plate in Burger's collection representing this species (1841, pl. 51 fig. 2, not pl. 54 as

abusively stated in the Fauna Japonica). Burger's manuscript contains no description of this species.

CCCLIII. **Trygon Akajei** (p. 308)

Trygon Akajei Müller & Henle, 1841, p. 165, pl. 54 fig. 1.
Trygon (Trygon) akajei, Duméril, 1865, p. 604.
Trygon pastinaca, Günther, 1870, p. 478 (partly).
Dasyatis akajei, Jordan & Fowler, 1903b, p. 659.

We have of this species four stuffed specimens collected by Burger and two specimens in spirits from Von Siebold, while another stuffed specimen, collected by Von Siebold and identified as *Trygon* spec., possibly belongs to this species too. Total length of Burger's specimens: no. 2449:57? cm, no. 2450:31? cm, no. 2451:31.5 cm, no. 2452:48.5 cm; of Von Siebold's specimens in spirits: no. 4255a*:33 cm, no. 4255b:29 cm; of Von Siebold's stuffed specimen: no. 2456:41.5 cm. The specimens nos. 2449 and 2450 have the tail mutilated, the length of their bodies is 27 and 12 cm.

Müller & Henle (l.c.) have given an exact reproduction of a Japanese plate of this species in Burger's collection. Burger's manuscript contains a description (no. 13).

The specimens in spirits have three appendages at the bottom of the mouth, but this character is invisible in the stuffed specimens, which have the mouth closed. The latter specimens have been more or less badly deformed, which makes several of their characters quite unreliable, but they nevertheless seem to belong to the same species as the specimens preserved in spirits. The anterior margins of the disc, which are hardly longer than the posterior ones (measured between lateral angle and vent), are broadly convex except in the deformed stuffed specimens, which have this margin generally almost straight or even slightly concave; length of disc till vent about 1.5-2 in length of tail; the median row of blunt tubercles on the posterior part of the disc in some specimens indistinct or even lacking; the folds along the tail indistinct; tail with but one spine; eye in the specimens preserved in spirits about 3 in interorbital space. The specimens further agree with the cited descriptions.

According to Müller & Henle, they had but four stuffed specimens of this species at their disposal, while they had one stuffed specimen of the previous species, *D. kuhlii,* from our collection in their type material of that species; as I have stated before (see CCCLII), that specimen seems to be lacking, but I am convinced that one of the five specimens dealt with here must be regarded as such. It is, however, impossible to find out with

sufficient certainty which one must be thus regarded, so I provisionally regard them all as representing the type material of *Dasyatis akajei* (M. & H.). I choose specimen no. 4255a, which doubtless belongs to Müller & Henle's type material, as lectotype.

CCCLIV. **Trygon Zugei** (p. 309)

Trygon Zugei Müller & Henle, 1841, p. 165, pl. 54 fig. 2.
Trygon (Trygon) zugei, Duméril, 1865, p. 606.
Trygon zugei, Günther, 1870, p. 481.
Dasyatis zugei, Jordan & Fowler, 1903b, p. 660.

Our collection contains two stuffed specimens collected by Burger. Total length: no. 2447:49.5 cm, no. 2448:46 cm.

We have in Burger's collection a plate of this species which has been accurately reproduced by Müller & Henle (l.c.). Burger's manuscript contains a description (no. 103).

This material has been deformed by its way of preservation. The anterior margins of the disc are concave, probably deformed; they are slightly longer than the posterior margins measured between lateral angle and vent; length of disc about equal to width, its dorsal surface smooth; snout 3 in length of disc, measured between tip of snout and vent; interorbital space convex (probably on account of the stuffing of the specimens); base of V hardly less than interorbital spoace. The specimens further closely agree with the cited descriptions. They belong to the type material of *Dasyatis zugei* (M. & H.).

CCCLV. **Pteroplatea japonica** (p. 309, plate CXLI)

Pteroplatea japonica, Duméril, 1865, p. 614; — Jordan & Fowler, 1903b, p. 662.

Of this species we posses four stuffed specimens collected by Burger and three specimens in spirits from Von Siebold; one stuffed Japanese specimen may belong to the same material. Total length of Burger's specimens: no. 2478:42.5 cm, no. 2479*:50 cm, no. 2480:27.5 cm, no. 2481:29 cm; of Von Siebold's specimens: no. 4252a-c:12.5-10.8 cm; of the stuffed specimen without name of collector: no. 2484:30 cm.

The plate in the Fauna Japonica is an exact reproduction of a Japanese plate in Burger's collection. According to our specimens it is quite accurate. Burger described this species in his manuscript (no. 14).

This material is obviously homogeneous. The interorbital space is about equal to or slightly more than snout. The specimens closely agree with the cited descriptions, and represent the type material of *Pteroplatea japonica* T. & S. I regard specimen no. 2479 as lectotype.

CCCLVI. **Myliobates aquila** (p. 310, plate CXLII)

Myliobatis tobijei Bleeker, 1857, p. 130; — Duméril, 1865, p. 640; — Jordan & Fowler, 1903b, p. 663.
Myliobatis cornuta Günther, 1870, p. 490.

Our collection contains two stuffed specimens from Burger and one Japanese specimen in spirits from an unknown collector, probably belonging to the same material. Total length of Burger's specimens: no. 2426:18? cm, no. 2433:52? cm; of the specimen preserved in spirits: no. 4217:38.5 cm. The stuffed specimens both have the tail mutilated, their length of disc till vent is 10.5 and 25 cm, in the third specimen 12 cm.

Burger's collection of Japanese plates contains a specimen representing this species, which has been accurately reproduced in the Fauna Japonica. This species has also been described in Burger's manuscript (no. 15).

The specimens have the length of the disc about 1.6 in its width, and have no horns above the orbits. They doubtless belong to the genus *Aetobatus* Blainv., consequently to the only species of that genus reported from the Japanese waters: *Aetobatus tobijei* (Blkr.). They closely agree with the descriptions cited above and with specimens of this species, collected and identified by Bleeker (no. 7461).

CCCLVII. **Cephaloptera japonica** (p. 310)

Cephaloptera Japanica Müller & Henle, 1841, p. 185.
Cephaloptera japonica, Duméril, 1865, p. 659.
Dicerobatis japonica, Günther, 1870, p. 496.
Mobula japonica, Jordan & Fowler, 1903b, p. 666, fig. 10.

We have of this species but one stuffed specimen, collected by Burger, although Müller & Henle (l.c.) mention to have examined two specimens from our collection, one of which must have been about 125 cm in total length. Total length of our specimen: no. 2440*:98.5 cm.

Of this species we have neither a Japanese plate nor a description by Burger.

The specimen closely agrees with the cited descriptions. The other specimen mentioned by Müller & Henle probably being lost, I regard this specimen as the type of *Mobula japonica* (M. & H.).

CCCLVIII. **Heptatrema cirrhatum** (p. 310, plate CXLIII)

Eptatretus burgeri, Jordan & Snyder, 1901a, p. 729.

As has been stated by Temminck & Schlegel, they never received any specimens of this species.

Although Temminck & Schlegel mention a Japanese plate, after which the plate in the Fauna Japonica must have been made, there is none in Burger's collection, so I think it must have been lost. Burger described this species in his manuscript (no. 1).

Our collection further contains a small number of skeletons, or parts of skeletons, of Japanese fishes, which I have tried to identify as far as possible. Here follows an enumeration of this material, with the most important measurements and generally the exact identity. I number them with the numbers used for the same species in the previous part of my publication.

XLV. **Anema inerme**

Of this species we have one skeleton from Von Siebold's collection. Total (standard) length: 44.5 (35) cm.

A comparison with the material and the descriptions of *Ichthyscopus lebeck* (Bl.; Schn.) shows a complete agreement, so it must belong to that species.

CLVIII. **Coryphaena hippurus**

One skeleton, from Von Siebold's collection. Total (standard) length: 111 (87) cm.

This skeleton too I compared with our material. It doubtless belongs to *Coryphaena hippurus* L.

CCIX. **Pseudoscarus** spec.

One skeleton, from Von Siebold's collection. Total (standard) length: 68 (54) cm. A comparison with our material of that species shows that this skeleton must belong to *Callyodon ovifrons* (T. & S.). It belongs to the type material.

CCXI. **Aulostoma chinense**

One skull in Von Siebold's collection. Length 27 cm. A comparison with our material of that species shows that it probably belongs to *Fistularia villosa* Klunz.

CCXCIII. **Echeneis remora**

One skeleton in Von Siebold's collection. Total (standard) length: 72 (62.5) cm. On account of the rather acute P, the pointed and very prom-

inent lower jaw, and the number of anal rays (about 33), I suppose that this skeleton probably belongs to *Leptecheneis naucrates* (L.).

CCCXXXI. **Chimaera monstrosa**

There are two skeletons in Burger's collection which have been ascribed to this species. Total length 84 and 80 cm. The smaller is incomplete. They probably both belong to the same species as the stuffed specimens I have dealt with before. I consequently provisionally regard these as *Chimaera phantasma* Jord. & Snyd. too.

CCCXXXIII. **Crossorhinus barbatus**

One skeleton and one pair of jaws, collected by Burger. Total (standard) length of the skeleton: 101 (83) cm. Width of the jaws: 7.5 cm, length from angle of mouth: 10 cm. This material probably belongs to *Orectolobus japonicus* Regan.

CCCXXXIV. **Carcharias (Prionodon) japonicus**

Of this species we possess two pairs of jaws only. Width 15 and 14 cm; length from angle of mouth of upper jaw: 25.5 and 20.5 cm; of lower jaw: 22 and 18 cm. These jaws probably represent, with a Japanese plate and a description by Burger, the only material on which Temminck & Schlegel based their species *Carcharhinus japonicus* (T. & S.).

CCCXXXVI. **Lamna glauca**

We have one skeleton and two pairs of jaws thus identified. They have been collected by Burger. Total (standard) length of the skeleton: 182 (149) cm; it has the tail mutilated. Width of the jaws: 16.5 and 14 cm; length of upper jaw: 17.5 and 14 cm; length of lower jaw: 13.5 and 11 cm.

The smallest jaws must have been identified erroneously; they probably belong to the genus *Lamna* Cuv., consequently to the only species of that genus occurring in the Japanese area, *Lamna cornubica* (Gmel.) (see CCCXXXIX).

The other jaw and the skeleton may belong to *Isuropsis glauca* (M. & H.), thus to the type material of that species.

CCCXXXVII. **Notidanus indicus**

We have one pair of jaws thus identified, collected by Burger. Width of the jaws: 13 cm; length of upper jaw: 15 cm, of lower jaw: 17 cm. Ac-

cording to the shape of the teeth, these jaws probably belong to a Japanese Heptranchid species, but having no material for comparison, I cannot find out which.

CCCXXXVIII. **Mustelus vulgaris**

One skeleton, collected by Burger. Total (standard) length: 80 (64.5) cm. It probably belongs to *Mustelus manazo* Blkr.

CCCXXXIX. **Lamna cornubica**

Burger's collection contains one pair of jaws thus identified. Width of the jaws: 11.5 cm, length of upper jaw: 17 cm, of lower jaw: 15.5 cm. These probably belong to *Lamna cornubica* (Gmel.).

CCCXL. **Cestracion philippi**

One skeleton and a pair of jaws, collected by Burger. Total (standard) length of the skeleton: 79.5 (66) cm; width of the jaws: 7.5 cm; length of upper jaw: 11 cm, of lower jaw: 10.5 cm. This material probably belongs to *Heterodontus japonicus* (Duméril).

CCCXLIII. **Rhina squatina**

One skeleton, collected by Burger. Total (standard) length: 64 (58.5) cm; it has the tail mutilated. This skeleton probably belongs to *Squatina japonica* Blkr.

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EXPLANATION OF THE PLATES

Plate I

Reproduction of an unpublished Japanese drawing in Burger's MS. Original legend. "*Exocoetus, E. agoo,* à ne pas figurer". This identification seems right: *Cypselurus agoo* (T. & S.) (see CCLXXIV). Almost ½ original size.

Plate II

Reproduction of three unpublished Japanese drawings in Burger's MS.

Upper figure, original legend: "*Liparis* n. sp.". Probably *Leucopsarion petersi* Hilg. (see CLXXXIII"). $2^2/_3$ original size.

Middle figure, original legend: "*Conger,* espèce voisine de l'*Anago,* à ne pas donner". This identification is right, or the drawing is a less exact figure of *Congrellus anago* (T. & S.) itself (see CCLXXXIII). $^2/_3$ original size.

Lower figure, original legend: "*fistularia tabacaria*? Japon, Bürger". Probably *Fistularia villosa* Klunz. (see CCXI). $^2/_5$ original size.

Plate III

Reproduction of two Japanese drawings, after "Artiste inconnu" (pages 115 & 116).

Left figure, original legend in Japanese characters: "Hoshi-garei: large specimens measure 1-2 shaku, small ones 5-6 sun; there are black spots on the white skin" (1 shaku = 10 sun = 11.93 inch). Dorsal view of *Verasper variegatus* (T. & S.). About ½ original size.

Right figure: ventral view of *Verasper variegatus* (T. & S.) (see CCXIII). About ½ original size.

Plate IV

Reproduction of two Japanese drawings, after "Artiste inconnu" (pages 60 & 68).

Left figure, left specimen, legend: "Tofu gyo, kajika, kawaokoze". Gyo means fish, kajika (or kazika) is the vernacular name of several Cottid fishes, while kawaokoze also must be a vernacular name. The drawing represents a Cottid species of uncertain identity. The right specimen has the following explanatory text: "Tenschi benran, toihaze, Bizen, tantogyo,

mekurahazu, Chikuzen, mutsugoro, Fukugawa-fushi, deiko". Tenschi benran is a kind of handbook, Fukugawa-fushi means Annals of the town Fukugawa, Bizen and Chikuzen are provinces, the further names must be vernacular names of these localities. This drawing probably represents *Boleophthalmus pectinirostris* L. (see CLXXXVIII). About ½ original size.

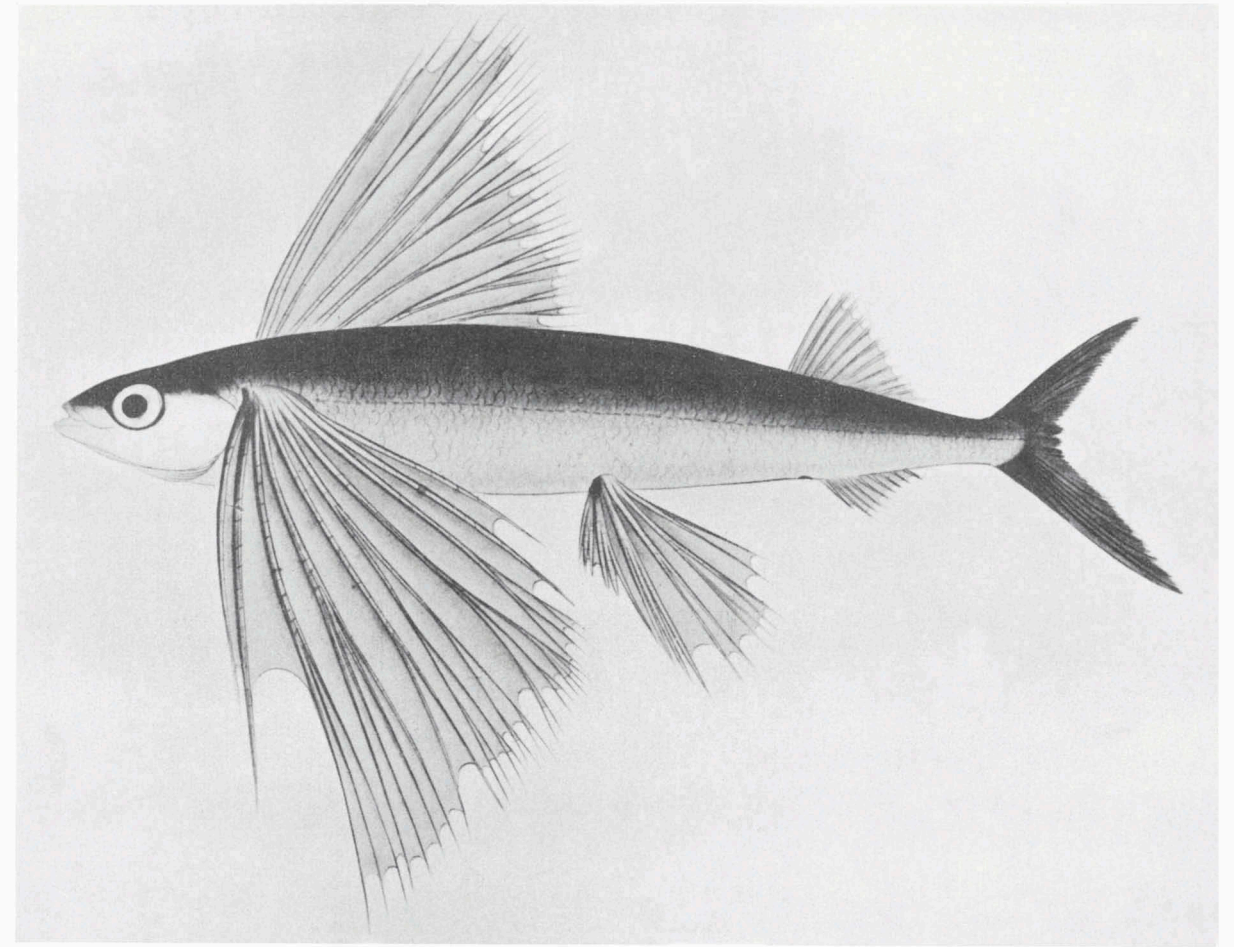
Right figure, legend from top to bottom: "Jogyo; hae, hai, shirobae, haya; isshu yanagibae; isshu oikawa, akabae". These must be vernacular names, the upper and lower figures must represent *Zacco platypus* (T. & S.) (see CCXXXVIII & CCXXXIX), the middle figure (according to a Japanese encyclopedia) *Barbus homozonus* Gthr. (= *Gnathopogon gracilis* (T & S.)) (see CCXXXIII). About ½ original size.

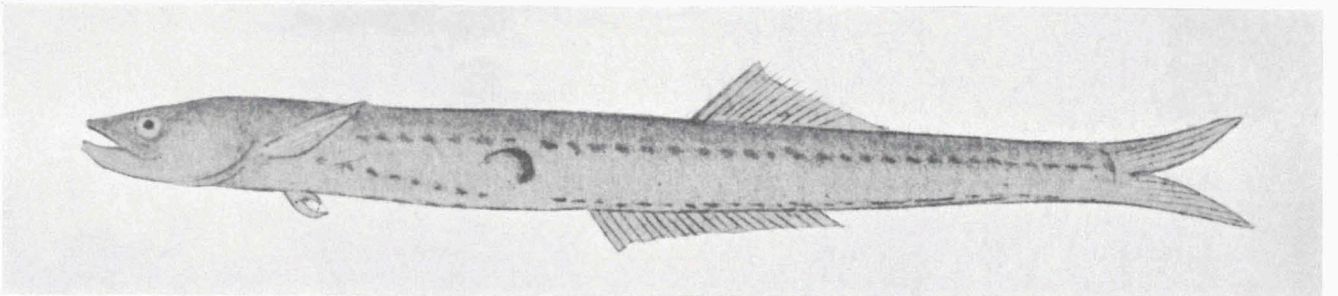
Plate V

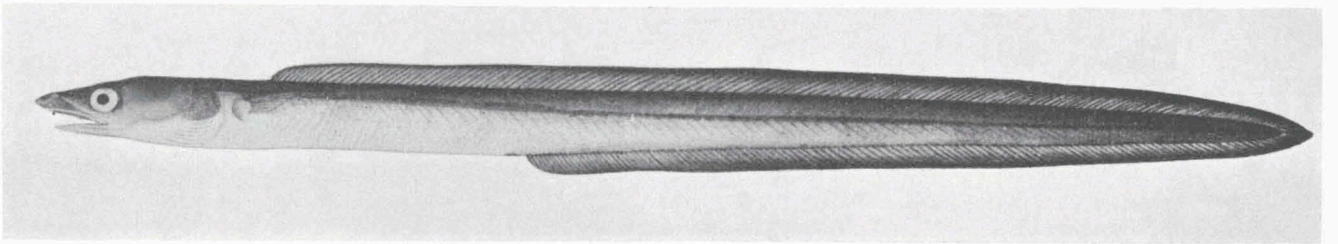
Reproduction of two Japanese drawings, after "Artiste inconnu" (pages 63 & 64).

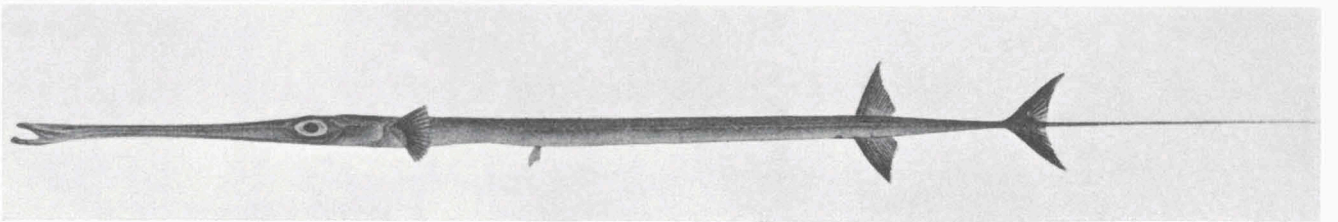
Left figure, legend from top to bottom: "Yogyo; chichikabure; shimahaze; doman". These are vernacular names. The identity of the upper figure remains uncertain, the middle represents *Tridentiger bifasciatus* Steind. (cf. Jordan, Tanaka & Snyder, 1913, p. 359), the third *Eleotris oxycephala* T. & S.? (cf. Jordan, Tanaka & Snyder, 1913, p. 339), but that identification is probably erroneous (see CLXXXIX). About ½ original size.

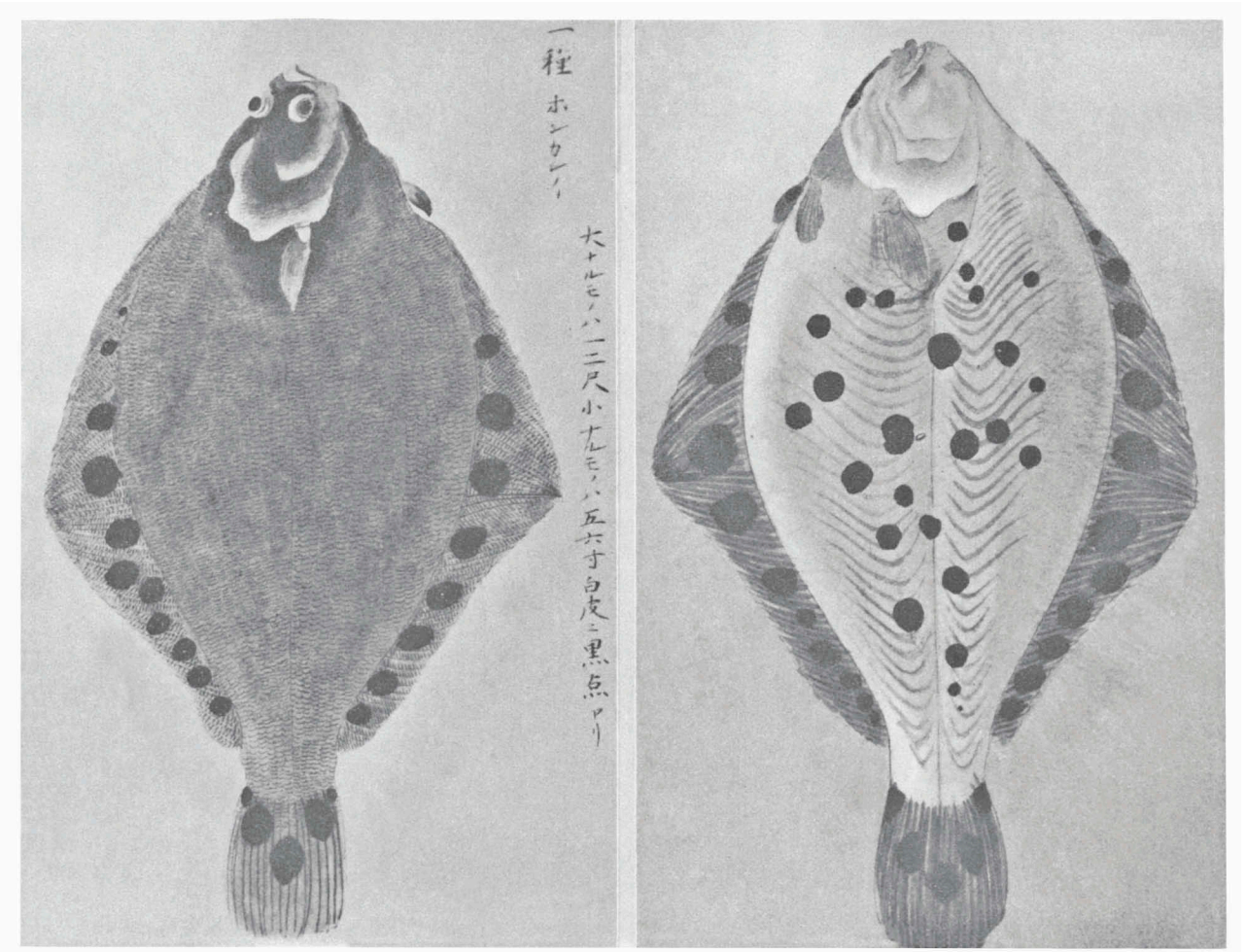
Right figure, legend: "Shugyo; (ushi)dojo; grows up to 6-7 sun" (1 sun = 1.1931 inch). This figure obviously represents a Cobitid species, dojo is the vernacular name of *Misgurnus anguillicaudatus* (Cant.) (cf. Jordan, Tanaka & Snyder, 1913, p. 60). About ½ original size.

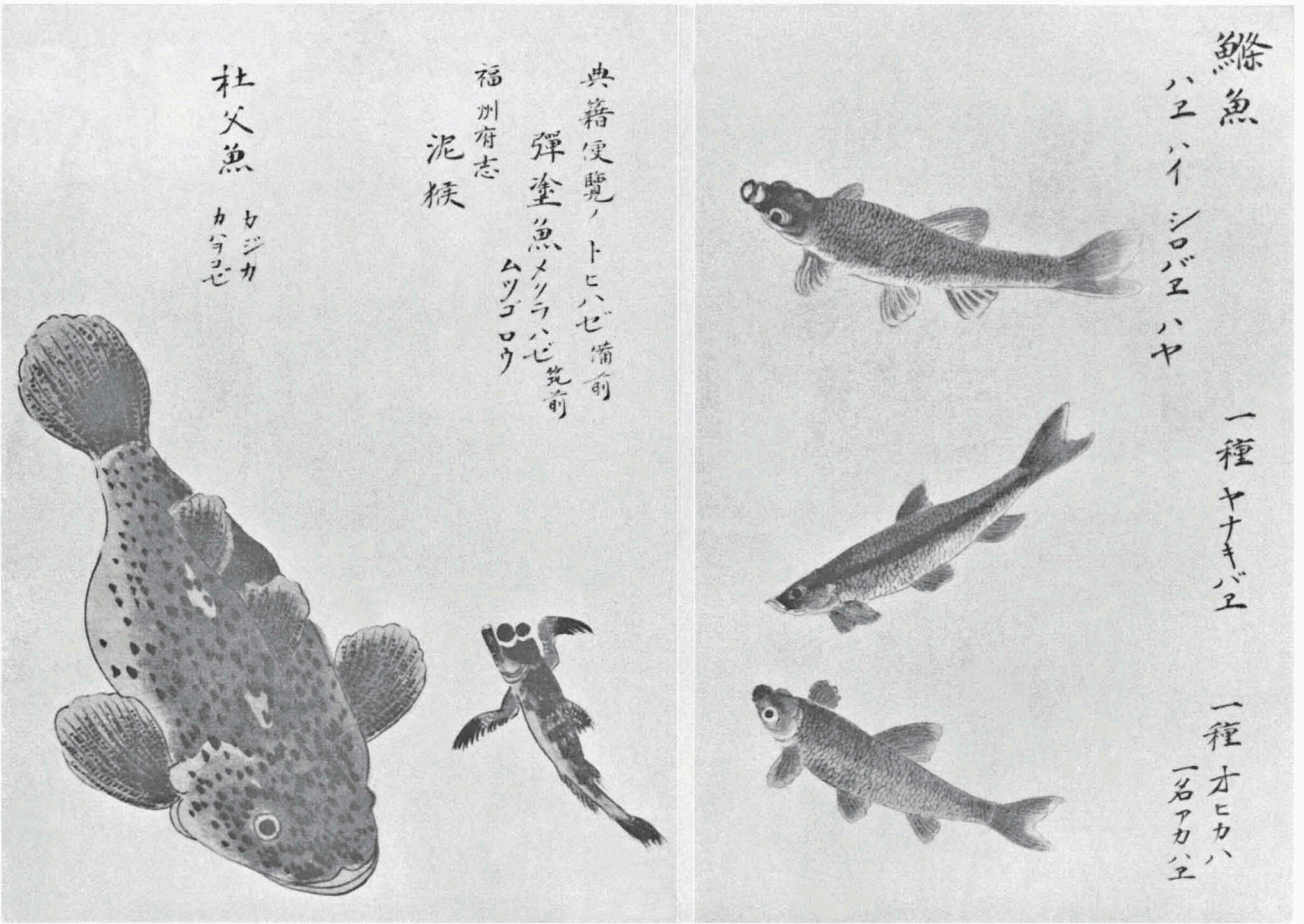


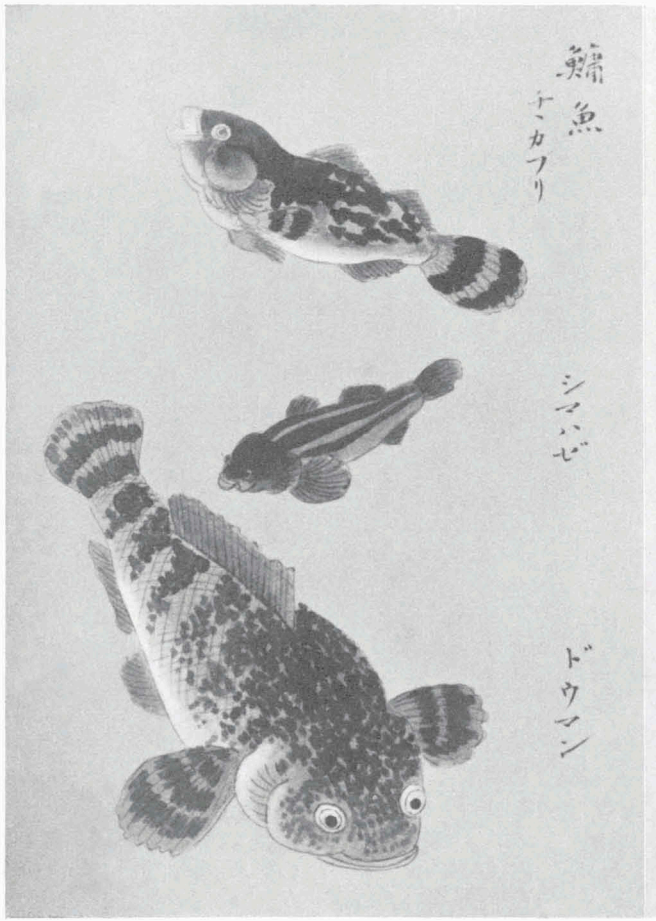


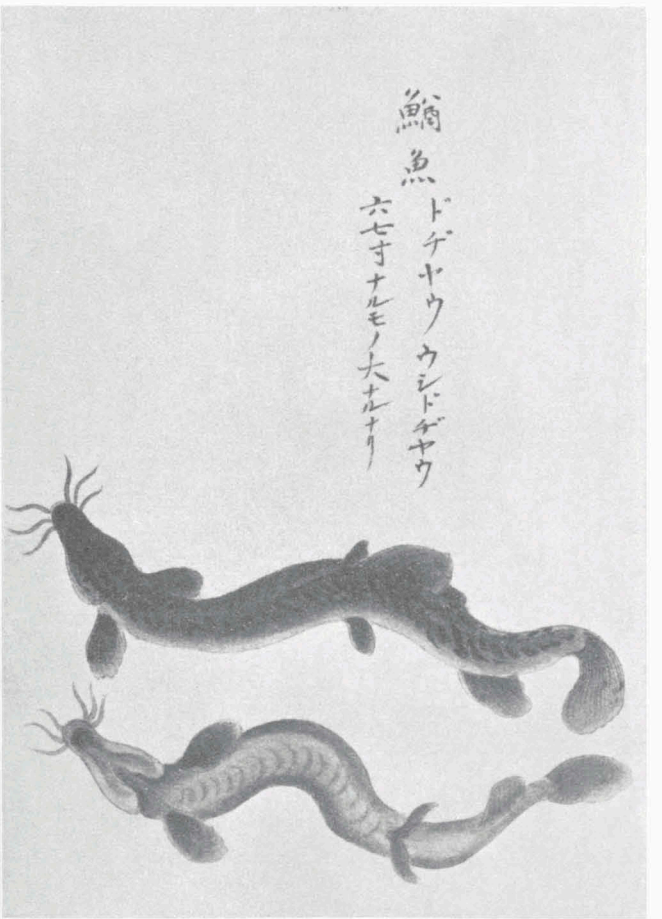







鰷魚
ハエ ハイ シロバエ ハヤ
一種 ヤナギバエ
一種 オヒカハ
一名アカハエ
杜父魚 カジカ カヂカ
典籍便覽ノトヒハゼ備前
彈塗魚 メクラハゼ筑前
ムツゴロウ
福州府志
泥猴


鰯魚
シマハゼ
ドウマン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