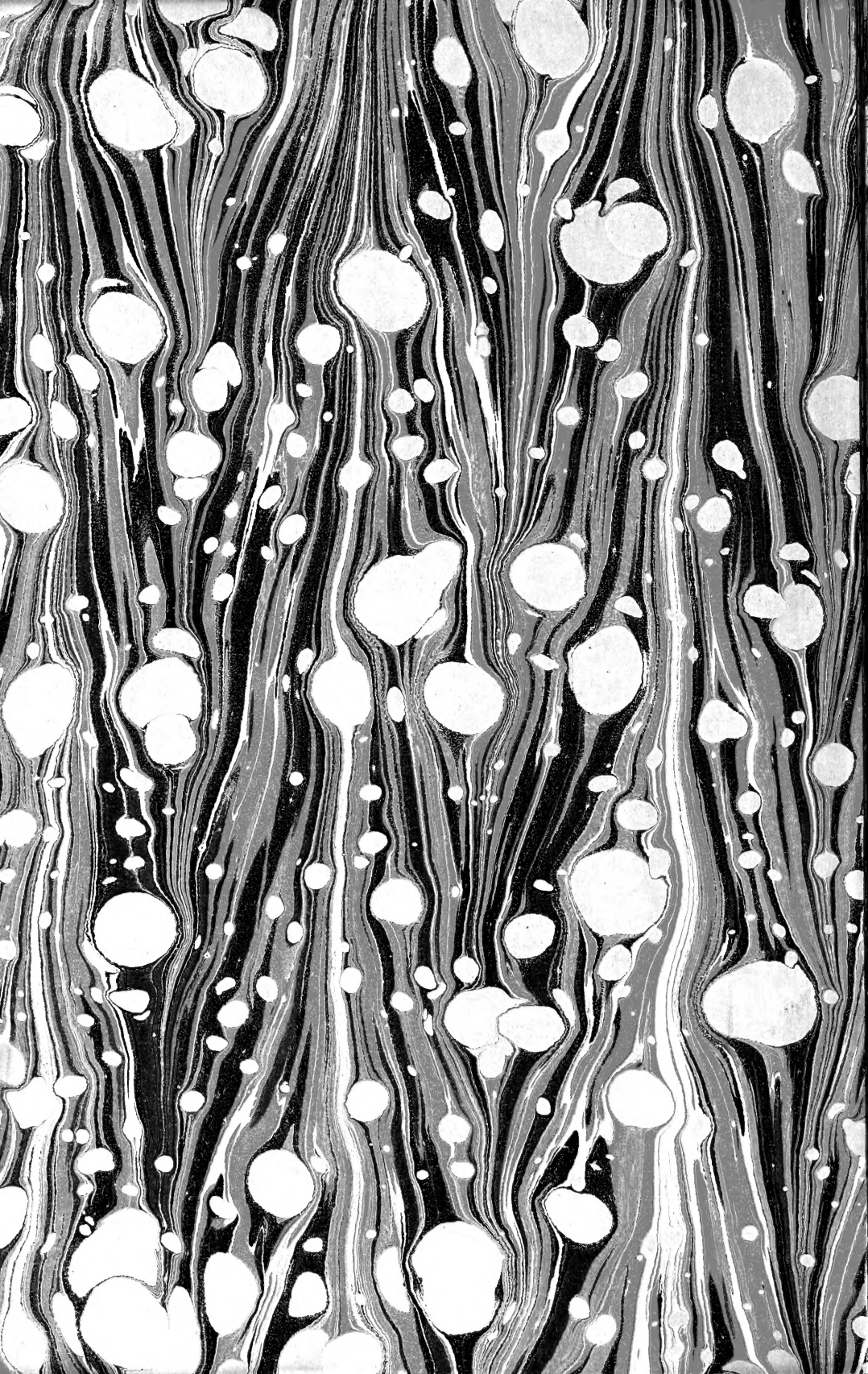

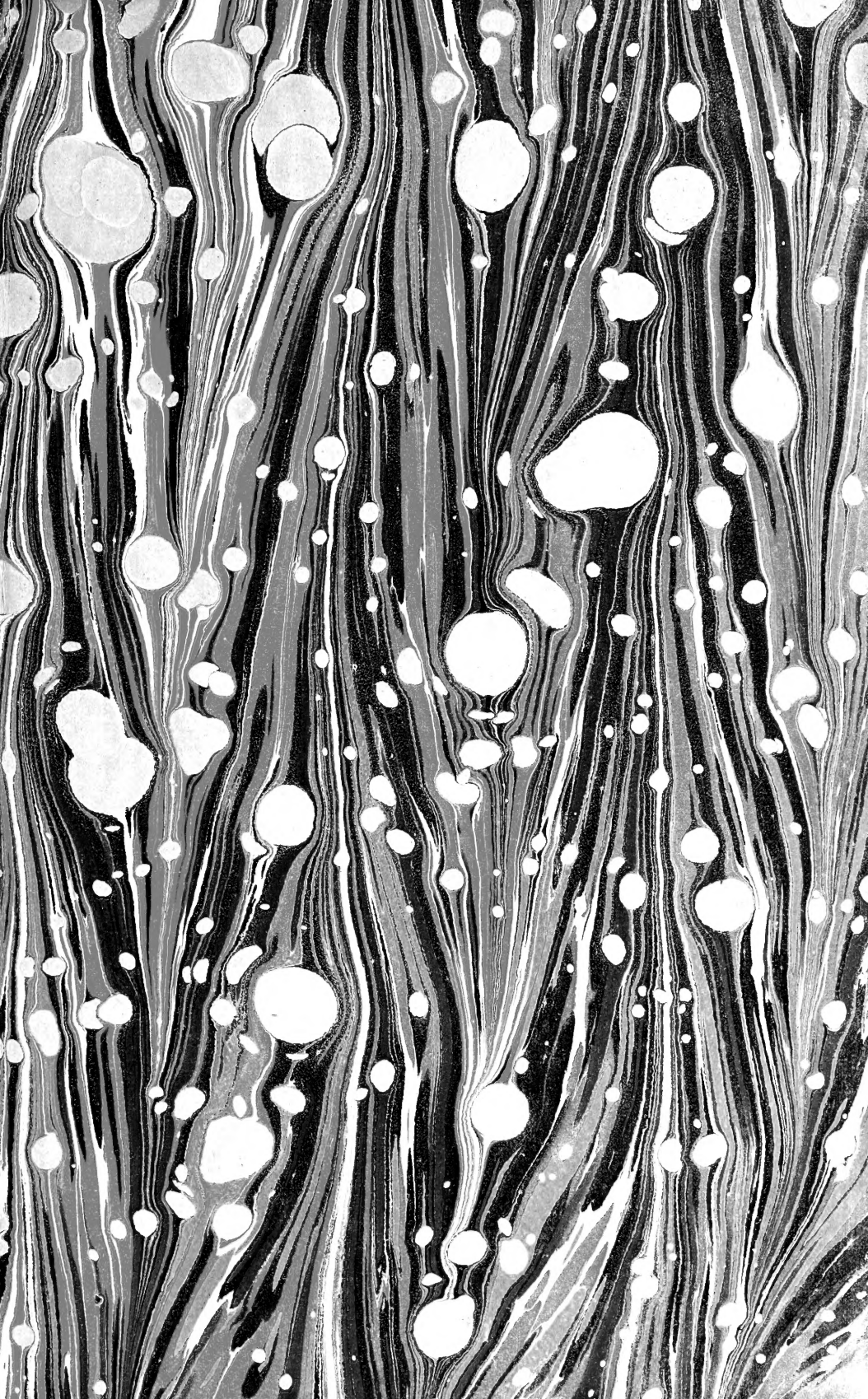

Theo. Gill

1876

SYNOPSIS

OF

THE FRESH WATER FISHES

OF

THE WESTERN PORTION

OF

THE ISLAND OF TRINIDAD, W. I.

BY

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MEMBER OF THE LYCEUM OF NATURAL HISTORY IN NEW YORK.

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1858.

Synopsis of the Fresh Water Fishes

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WESTERN PORTION OF THE ISLAND OF TRINIDAD, W. I.

By Theodore Gill.

Read September 13, 1858.

I.

By the kindness and liberality of our friend Mr. D. Jackson Steward of the city of New York, we were enabled this year to undertake a tour through several of the West Indian islands for the purpose of collecting and studying the species of molluscous animals and shells, and incidentally the members of the various other classes known to the zoologist. In pursuance of this object, we visited the island of Trinidad, where we resided for a period of several months, which extended through portions of the spring and summer.

Knowing the intimate relation which existed between the ornithological fauna of the island, and that of the neighboring continent, from the mention of the habitats of the species described or enumerated in the memoirs of Mr. Philip Lutley Sclater and other naturalists, and from the collections which we had the privilege of examining; noticing also the similarity of the mammals, insects, and the terrestrial mollusks to species and groups inhabiting the northern parts of South America, we were induced to inquire if this similarity extended to the other groups, and for this purpose to devote especial attention to those two classes of the vertebrated animals,—the reptiles and the fishes,—which had been most neglected. As most of the species of the ichthyic class which inhabit the Gulf of Paria, and the seas which bound the island on the north and east, were found to be the same as those distributed through the entire Caribbean sea, very few were preserved, attention being chiefly confined to those living in the fresh waters of the island.

II.

In the first collection of fluviatile fishes which we had the privilege of examining, there were found to be species of the genus *Hypostomus* of Lacepede and of the *Callichthys* of Linnæus,—one which represented the naked Siluroids and belonged to one of the South American types of the extensive genus *Pimelodus*, as it has been adopted by Valenciennes in the "Histoire Naturelle des Poissons," and finally, a species of the family of Cyprinodonts of Agassiz. The first three are members of groups nearly peculiar to South America. It was consequently discovered at an early period of our investigations, that the resemblance which existed between the mammalian and ornithic faunæ of the island extended also to the fishes of its rivers. Believing that these facts would be interesting contributions to the knowledge of the geographical distribution of animals, and having many new species and genera which we were desirous to make known, we have prepared the present synopsis.

It is not our intention in this communication to discuss the geographical distribution of fishes of the island. We defer this to a future time. At present, we will only remark that we are not acquainted with a single genus of fishes inhabiting the island and peculiar to the fresh waters, that is common to the United States, or indeed, as far as is yet known, to any portion of North America.

III.

In the memoir which we now offer as a contribution to the history of the fresh water fishes of the island of Trinidad, it is designed to give detailed descriptions of the genera, and such concise, comparative descriptions of the species belonging to them, as will enable naturalists to distinguish them from all the other species of the groups now known. At a future time the various new species which are here indicated will be described

in more detail, and those representing new genera will be fully illustrated.

With the intention of rendering this memoir more useful to the inhabitants of Trinidad, and to facilitate the identification of the fishes described, we have given the popular names, whenever they have been ascertained, by which the species or groups of allied species are known in the island; but there, as in almost every country, only the larger and more remarkable species have had such names bestowed on them. As is almost universally the case among those who are unlearned in zoology, most of the rare and small species have no vernacular names, the latter being generally regarded as the young of larger ones, and all the species of a genus, when there is not a marked difference in color or some trenchant peculiarities, are confounded under a single specific name.

IV.

In the early part of the present year, a work was published by Dr. L. A. A. De Verteuil, a physician of considerable attainments residing in the island, on "Trinidad; its geography," &c. To this volume there is an appendix on the "Natural history of Trinidad," the zoological portion of which contains a chapter on the "Mammalia," and a catalogue of the indigenous species, by the author of the volume; "an essay on the Ornithology of Trinidad, by Antoine Leotaud, M.D.P.;" a "catalogue of reptiles by Dr. J. Court," and one of fishes by Dr. Leotaud. The latter is stated to "exhibit nearly all the genera which may be said to belong to the island;" it will be observed what reliance this statement is entitled to, on a comparison of his catalogue of the genera represented by fluviatile species with those given in our synopsis. We had almost determined to pass it over in silence, but on subsequent reflection, it was deemed advisable to call the attention of naturalists to it and to correct its errors, in order that none should imbibe false views on the subject of the geographical distribution of groups and the habits of species,

for such would be the result if the genera of the catalogue were regarded as correctly identified. So flagrant are some of these errors that the very improbability of their commission by one having any pretensions to scientific lore might well mislead the naturalist.

Dr. Leotaud, adopting the classification of Cuvier, and professing also to adopt his genera, has given a catalogue of sixty-seven genera, and has noted as representing them less than two hundred species of the osseous fishes of that naturalist. Of these sixty-seven genera, nine are indicated as being represented by fresh water species; one of these genera is represented as containing both marine and fluviatile species, and the others have only fresh water species attributed to them.

We will now give in the author's own words, such parts of the catalogue as relate to the species which form the subject of our synopsis; the notes which we place after the species to which they refer, are, in the original, placed at the bottom of the page.

" *Order* I.—ACANTHOPTERYGIANS.

Family V.

MENIDES.

Gerres.—1 species.

Fresh water pike, or brochet.

Family VII.

SCOMBEROIDES.

Trichiurus.—1 species.

A fish found in our ponds and ravines resembling the lamprey; hence its name of cutlass-fish or coutelas.

Order II.—MALACOPTERYGIANS.

Family V.

CYPRINOIDES.

Poecilia.—2 species.

A small fish found in rivulets, and even in wells in Port of Spain.

Family III.

SILUROIDES.

Mystus.—2 species.

The common catfish or machoiran, and the barbe, an inhabitant of our rivers.

Callichthys.—2 species.

Cascaradura, and a small fish found in clear streams.

Hypostomus.—1 species.

Anne Marie.

Family IV.

SALMONIDES.

Hydrocyon.—2 species.

Fresh-water sardines.

Family V.

CLUPEÆ.

Erythrinus.—2 species.

Guabine and yarrao, two fresh-water fishes; the former very common in ponds, ravines, and rivers; the latter found only in clear rivulets.

Order III.—APODAL MALACOPTERYGIANS.

ANGUILIFORMS.

Synbranchus.—1 species.

Dog headed eel, or anguille-tête-chien, abundant in ponds and ravines."

As none of the above fishes are described, the only means for their identification are in the notes of Dr. Leotaud, referring them to the vernacular names, which a person who has resided in the island, or who has identified the species with those names, can alone know. With this qualification, we will now proceed to identify and refer them to their proper genera.

The species known to the inhabitants of the island as the "brochet," and referred to Gerres by Dr. Leotaud, belongs to the genus Crenicichla of Heckel, of the family of Chromidoids.

The "coutelas," or "cutlass fish," belongs to the genus Carapus Cuv., of the family of Gymnotidæ, and has no other rela-

tion to the Scombroid genus Trichiurus than as a member of the same class, and its only resemblance consists in the elongation of the tail into a filament. It has not the most remote resemblance to the Lamprey, and even belongs to a different subclass.

The fishes referred to Pœcilia would have been placed by most naturalists in the genus Hydrargyra of Lacepede.

Of the Siluroids referred to the genus Mystus, the fresh water species belongs to the genus which we call Pimelenotus; in conformity with the system adopted, it should have been placed in the catalogue in Pimelodus. The marine fish is a Bagrus, of which genus there is more than one species in the island.

There are three genera and at least four species of mailed Siluroids belonging to the old genus Callichthys. The true Cascaduras belong to the genus Callichthys as revised by us, and our new genus Hoplosternum; the "small fish" is nearly allied to Callichthys paleatus of Jenyns, and belongs to the Swainsonian genus Hoplosoma.

The "Anne Marie," or "Tata," as it appears to be more commonly called, is rightly identified as belonging to the genus Hypostomus.

The two species of so called Hydrocyon belong to two very distinct genera; one of them is a species of the genus Tetragonopterus as accepted by Valenciennes, and the other is a Curimatus of Valenciennes, and an Anodus of Spix and Agassiz. The species of both genera are very abundant.

Of the two species referred to Erythrinus, one only belongs to that genus as revised by Müller and Troschel, and now accepted by ichthyologists; it is that one called "yarrow:" the other species, called by the people "waubeen," belongs to the genus Macrodon of Müller and Troschel.

V.

In addition to the species given in the catalogue, several others are noticed in the subsequent remarks on their habits and uses. It is said that "Besides the above, there are the common eel (Anguilla) and the Coscorob, very common in ponds and rivers, the cats (Callichthys?). I have also been told that a *trout* is not scarce in our mountain streams; this fact I have not been able to ascertain."

There are two species called "Coscorobs," both of which belong to the family of Chromididæ and the genus Cychlasoma of Swainson, or Acara of Heckel; they might have been placed, as had been done by previous writers, in the genus Chromis.

The "common eel" we were unable to obtain, but there is undoubtedly a species of eel which is not a Synbranchus, and which probably belongs to Anguilla or some allied genus. We have never seen it.

The common river cat-fish or Pimelenotus was twice brought to us as the trout, but as the species mentioned by Dr. Leotaud is said to be found in the mountain streams, it is probably a different fish, and perhaps belongs to the family of Characini of Müller and Troschel.

We have been unable to identify the fishes called by the Doctor "Cats (Callichthys?)." They have never been seer by us, and we were never able to obtain a description from any of the residents. Do they belong to the genus Doras of Lacepede?

A species of Siluroid has been described to us as resembling the common river cat-fish in almost every feature, but wanting the barbles; it was stated to be very rare, and only found in the Caroni river, the chief stream on the western side of the island. This fish very probably belongs to the genus Ageniosus of Lacepede.

VI.

We embrace this opportunity of rendering our thanks to the gentlemen of Trinidad who have contributed to us specimens of the fishes of the island, or who have otherwise assisted us in our ichthyological researches.

To our kind and excellent friends, Messrs. Frederick A. Searles and Frederick Weedon of Orange Grove, Tacarigua, we are especially indebted. While partaking of their hospitality, their acquaintance with the island enabled them to point out and direct us to many interesting localities that might have otherwise been unknown. Mr. John Wilson, also of Tacarigua, procured for us several additional individuals of some rare fishes of which we had previously only unique specimens, and which we describe as the Corynopoma Veedonii, the Stewardia albipinnis, and the Nematopoma Searlesii. By the aid of the above gentlemen, and especially of Mr. Wilson, we were also enabled to obtain a very complete collection of the reptiles of the island, a catalogue of which will be given in a subsequent paper in these "Annals."

Mr. Cleavers interested himself in obtaining for us a suite of the fishes of a small "river," one of the tributaries of the Caroni, flowing past his residence, which has increased our knowledge of the local distribution of the species.

The Deputy-assistant Commissary-general, Frederick A. Ibbettsen, also obtained for us specimens of the fishes of the St. Ann's river, a small stream discharging itself into the Gulf of Paria in the rear of Port of Spain, the capital of the island. They were similar to those found in the Caroni and its tributaries.

To Mr. Sylvester Devenish, Secretary of the Society of Arts; to Dr. Philbrick of the Pitch Lake, La Brea; to the Rev. A. McSorley of Tacarigua, and to the Rev. Mr. Lambert, of Arouca, we are under obligations for favors shown, and aid afforded.

In the preparation of this memoir, we have been greatly

assisted by the kindness of Mr. J. Carson Brevoort, who allowed us the use of his extensive and well assorted library, which surpasses in the number and value of ichthyological memoirs and volumes, any other in New York. The officers of the Smithsonian Institution of Washington have also enabled us to consult the library of the Institution.

Specimens of most of the species which are herein described have been deposited in the museum of the Smithsonian Institution, and in the private cabinets of Messrs. Steward and Brevoort.

VII.

We will now proceed to describe the genera and species represented in the Island. The classification which we have adopted is a modification of that of the late Dr. Johannes Müller.

Sub-class.

Teleostei, Muller.

Order.

ACANTHOPTERYGII, Artedi, Cuv.

Family.

Sclænidæ, Cuv.

Sub-family.

Polycentrinæ, Gill.

Genus.

Polycentrus, Mull. and Troschel.

Body ovate, compressed, covered by moderate ctenoid scales.

Head with the profile triangular, thin, compressed, rounded above.

Mouth rather large, with the gape linear-elliptical. Lower jaw passing beyond the upper. The intermaxillaries form the entire arch of the upper jaw and are very extensible, and when retracted enter between the orbits.

Teeth on the intermaxillaries and dentary numerous, card-like, with recurved summits: two small patches of similar teeth on the chevron of the vomer.

Lips thin.

Tongue slender, sub-linear, and destitute of teeth.

Lower pharyngeal bones double, together forming a nearly equilateral triangle, separated by a furrow in the middle, and with a posterior sinus: covered by card-like teeth.

Branchiostegal rays six.

Nares two, subrotund, of nearly equal size, in a bare oval space; the posterior one immediately before the eye.

Operculum with an angular spine, preoperculum deeply serrated at the inferior margin and for a short distance above the angle: first infra-orbital serrated.

The various bones of the opercular apparatus and the head above to the maxillary bones covered by scales like those of the body.

Lateral line obsolete.

Dorsal long, commencing at the nape, and the greater portion sustained by spinous rays, which decrease in length from the middle of the fin towards the soft portion: the latter with a short base, higher than long, and exceeding the height of the spinous portion.

Anal long, commencing at about the middle of the body and a short distance behind the anus; the spinous portion of extreme length, composing by far the greater portion of the fin; soft portion similar in size to the corresponding part of dorsal; the entire fin has nearly the same proportions as the latter.

Caudal not emarginate.

Ventrals triangular with one spinous and five soft rays.
Pectorals rounded.

The genus which we have now described was first indicated by Drs. Müller and Troschel in Sir Robert Schomburgh's "Reisen in Britisch Guiana," and afterwards described in more detail in the third volume of the "Horæ Ichthyologicæ." It was founded on a single species brought from Guiana by Schomburgh. Its natural affinities appear to us to be at present not well determined. By Müller and Troschel it was placed in the family of Sciænidæ, and in deference to their opinion we have so retained it, regarding it, at the same time, as the type of a distinct tribe. In the great length of the ascending branches of the intermaxillaries, and the consequent power of protraction of the jaws, it resembles the Mænidoids. The spinous portion of the anal is of extraordinary length, and is only equalled by that of the fishes of the genus Etroplus of Valenciennes among the Ctenolabroids, and by some of the Anabantidæ. Only a single species of the genus has been hitherto described; it has been called by Müller and Troschel, Polycentrus Schomburghii; the number of anal rays in that species is thirteen, and the color is indicated by the single word "braun." The species of Trinidad has one more ray than its congener, and differs widely from it in color. In allusion to the last character we have given its specific name.

Polycentrus tricolor, Gill.

Body oblong oval, highest at the fifth and sixth dorsal spines: the head forms one-third of the entire length, and is shorter by an eighth of its length than the highest part of the body. The diameters of the eyes are rather more than a quarter the length of the head; they are separated from each other by a space nearly equal to one of their diameters, and about the same

distance from the snout. The body is crossed at its place of greatest depth by fourteen rows of scales.

The dorsal fin commences above the base of the opercular spine; the anal under the sixth spine of the dorsal.

D. xviii. 7. A. xiv. 7. C. 16. V. i. 5. P. 12.

The ground color is whitish brown, striped with longitudinal lines of dark brown running along the angles of each row of scales. The bases of the vertical fins are purple; the remaining portions brownish white with numerous scattered black dots. The ventrals are purple, dotted with black; the pectorals white, immaculate. Head dark brown, dotted with black.

Only two specimens of this fish were obtained, one of which was taken in the "Tranquil river," a small narrow stream, three or four feet in depth, with a muddy bottom, and few or no stones. The other was captured by Mr. John Wilson, in the "Arouco river," under similar circumstances, and in a place where a number of the larger branches of trees clogged the stream. Both were caught in company with Cychlasoma tænia, and with species of Poecilurichthys hereafter described.

Family.

GOBIDÆ, CUV.

Sub-family.

GOBINÆ, SWAINSON.

Genus.

CTENOGOBIUS, GILL.

Body oblong, compressed, with the dorsal and abdominal outline subrectilinear, gradually tapering to the caudal fin, without any constriction of the tail.

The scales with which the body is covered are moderate or rather large, angular at the middle of their free borders, and with those borders pectinated, the teeth generally decreasing

towards the angles; from the angles, the radiated striæ on the posterior fields of the scales originate.

Head, when not inflated, long, laterally compressed, above broad and rather flat behind the eyes; the latter are horizontal, and closely approximated.

Mouth terminal, moderate, with the gape elliptical, jaws subequal. The intermaxillaries which alone form the arch of the upper jaw are moderately protractile, the ascending branch being more than half the length of the horizontal one, and retractile to about the anterior borders of the orbits.

Teeth on both the intermaxillaries and dentaries in an anterior row, slender, subcylindrical, recurved, behind which are many similar, but smaller ones. The remaining bones of the mouth and the tongue are without teeth.

Tongue oblong, with the angles blunt, and with the front emarginate, attached to within a short distance of the margin to the floor of the mouth by the skin.

Lower pharyngeals together forming an elongated triangle, with the sides and posterior broadly emarginate and with a shallow furrow running through the middle: teeth not numerous, long and slender.

Branchiostegal membrane attached to anterior part of the thorax, and containing five rays.

Lateral line obsolete.

Dorsal double; the anterior one rises above or slightly behind the base of the pectorals, and is of a subtriangular form, supported by slender spines; the posterior one is long, moderately high and subequal.

Anal smaller than second dorsal, terminating at the same distance from the head.

Caudal with the margin rounded.

Ventrals funnel-shaped, united anteriorly by a rather low traverse.

This is one of the many heterogeneous types that have been

referred to the genus Gobius. The chief distinctive characters of the present genus repose on the pectinated scales, the approximated eyes, and the slender and scattered pharyngeal teeth. Several species of Chinese and Japanese Gobies, of which Gobius flavimanus of Temminck and Schlegel may be considered as the type, appear to be referable to this or a closely allied genus.

Ctenogobius fasciatus, Gill.

Body oblong, with dorsal and abdominal outlines straight, converging as they approach the caudal fin; anteriorly, it is thick and little compressed, the size at the pectorals being three quarters of the greatest height, which is little more than one-seventh of the entire length; the thickness gradually diminishes to the tail, which is much compressed. The head is less than a fifth of the total length, inclusive of the caudal; the eyes are more than a quarter of the length of the head, and are distant the length of one of their diameters from the snout; the space between them is only two-sevenths of an orbit's diameter. The first dorsal commences at a distance from the snout of less than a quarter of the entire length; the space between it and the second dorsal is equal to the diameter of the orbit. The anal commences under the second ray of the second dorsal; the pectorals are pointed, and extend as far back as the margin of the united ventrals, or to the posterior border of the anus.

D. v. 11. A. 10. C. 8. 7. 7. 8. V. 6.+6. P. 13.

The prevailing color of the body is sienna tinged with yellow; on the side, there are four dark linear black spots in a line, the distances between which are as great as their length. A dark spot and numerous black dots color the base of the caudal fin. The dorsal fin is of a raw sienna color, and is crossed by three or four sublinear black spots. The caudal is of the same color, crossed by five zigzag linear bands of black. The anal pectorals and ventrals are of a uniform sienna. Head

sienna-yellow, with irregular black spots and dots near the mouth and between the eyes, and with scattered dots on the cheeks and opercular bones. A dark spot forming a triangle covers the operculum.

Order.

PHARYNGOGNATHI, Mull.

Sub-Order.

ACANTHOPTERYGII, Mull.

Family.

Chromididæ, Bonaparte.

Genus.

Cychlasoma, Swainson, (emend.)

Body oval, compressed, covered by large scales.

Head obese, with the profile triangular.

Mouth moderate, with the gape vertically elliptical; lower jaw shorter than the upper. The intermaxillaries, which alone form the arch of the upper jaw, are very protractile, and the ascending branches are as long or longer than the horizontal; when retracted their extremities reach to a point in the forehead beyond the anterior borders of the orbits.

Teeth on the intermaxillaries of the anterior row moderate, sub-cylindrical, approximated, recurved at the apices; behind these are many irregular, smaller teeth, which increase in number and size towards the symphisis of the intermaxillaries. The dentaries are provided with similar teeth, but the hinder ones near the symphisis are a little smaller than those of the outer row. Palatines, vomer, and tongue edentate.

Lips thick.

Tongue thick and rounded in front.

Lower pharyngeals united into a single equilateral, triangular

bone, and covered with moderate teeth, of which the row near the posterior margin and those along the middle, extending from the anterior angle, are largest; these are laterally compressed, curved posteriorly for about two-thirds of their length, and from this point, with a bolder curve, they advance forwards; as the teeth approach the sides they lose this form, and begin to assume a subcylindrical shape with the apices hardly uncinate.

Branchial arches with the concave sides armed with compressed bony papillæ, which, on the first pair, are sometimes dilated at the extremities.

Branchiostegal rays five.

Opercular apparatus with the bones entire; operculum with a blunt spine at the angle; operculum, sub-operculum, cheeks, and the upper part of head, to within a short distance of the anterior borders of orbits, covered by large scales; the scales on the cheeks are in three or four rows.

Nares simple, between the mouth and eyes.

Lateral line interrupted; the anterior portion near the back and nearly parallel with it; the second rectilinear, running along the middle of the sides and the tail.

Dorsal long, commencing at the nape, with the spinous portion low, sub-equal, slightly increasing in height towards the soft portion. The latter is much shorter than the spinous portion, high, with the middle rays extended beyond the membrane, and with the anterior and posterior rays decreasing in length towards the extremities of the fin.

Anal commencing below posterior spines of dorsal, with three or four spinous rays increasing towards soft portion. The central soft rays elongated with filiform extremities, and produced beyond the connecting membrane, like the dorsal fin.

Both of these fins have the soft portions with their bases covered by scales.

Caudal with the base covered by scales; the margin rounded or truncated.

Pectorals large.

Ventrals triangular, with one spinous and five soft rays.

The genus which we have above characterized was first indicated under the name of Cychlasoma by Mr. William Swainson, in 1839, in his "Natural History of Fishes, Amphibians, and Reptiles, or Monocardian Animals." About a year later, Mr. Jacob Heckel published a very important Memoir on the fishes, which are comprised in the family Chromididæ. In that work he established, among other genera, one for which he used the name of Acara, a vernacular term by which some species of the genus are known in South America. Mr. Heckel embraced in this genus, those fishes which had been described by Bloch as Perca bimaculata, Labrus punctatus, and Sparus Surinamensis, and also the Chromis Nilotica of Cuvier, C. Braziliensis of Quoy and Gayward, C. taenia of Bennet, Sparus Desfontaines of Lacepede, and Lobotes ocellatus of Spix. Mr. Swainson took as the type of his genus the Labrus punctatus, and refers to the figure given by Bloch:—that species is indeed the only one mentioned by him. As it is a true Acara, the latter genus is consequently synonymous with Cychlasoma, and in accordance with the law of priority, the Swainsonian name must be adopted as that of the present genus.

The characters given by Swainson to his genus are not very satisfactory, and even incorrect in some respects. He chiefly distinguishes it from the genus for which he retains the name of Chromis, by the rounded caudal fin, and by the large pectorals, which are also rounded, assigning to Chromis a lunate caudal, and pointed pectorals and ventrals. But Swainson's Chromis is rather synonymous with Geophagus of Heckel, for the only species which are referred to it are those fishes which were described by Bloch as Labrus melanogaster and Sparus Surinamensis, the latter of which is a true Geophagus, although placed by Heckel in his genus Acara. Swainson also states, as one of the characters of Cychlasoma, that the "lateral line is abruptly bent;" this statement certainly does not con-

vey a true impression, and is even erroneous, as the lateral line is interrupted at the posterior part of the body, towards which the anterior portion of the line is conducted in a direction nearly parallel with the back, and is abruptly discontinued at a point under the middle of the soft portion of the dorsal, or near its posterior termination, and where the constriction of the body commences. The only genus of Chromidoids possessing a lateral line, which could be correctly described as "abruptly bent," is the restricted Cychla of Bloch.

The other characters given in the diagnosis of the genus by Swainson, apply almost equally well to several other genera of Chromididæ. His name itself is also objectionable, but the law of priority renders it imperative that it should be retained.

Several species appear to have been referred by Mr. Heckel to his genus Acara, which are not congeneric with the majority of his species, or with those he first describes. The Sparus Surinamensis has been referred by Drs. Müller and Troschel to Heckel's genus Geophagus, and is even regarded by them as the same as his Geophagus megasema. The species of the Old World that have been referred to Acara, when critically examined, which Mr. Heckel does not seem to have possessed the opportunity of doing, will probably be found to belong to a distinct genus.

The genus Cychlasoma, as we have restricted it, will include only those species whose bodies are covered by rather large scales, whose cheeks have three or four rows, and which have the greater portions of the vertical fins scaleless, only the bases being covered; the forehead is also generally straight or convex, and the eyes large. With these characters, that species which Mr. Heckel, in his memoir on the new fresh-water fishes of Brazil obtained by the traveller M. Natterer, has described as the Acara crassispinis, will also be excluded: this species appears to be generically distinct from both Cychlasoma and from Astronotus of Swainson, the latter of which is represented by the fish named by Cuvier, and described by Agassiz, as

Lobotes ocellatus. If it should be found, on a more critical examination, to be really distinct from Astronotus, to which it is most nearly allied, Heckel's name of ACARA might appropriately be retained as its generic name. This would be no more than an act of justice to that naturalist, who has contributed more than any other to the history of the family. The Acara crassispinis is generically distinguished from Cychlasoma by the smaller scales which cover the body, the concave forehead, and the much larger number of rows of scales which cover the cheeks, the number of rows amounting to ten. It belongs to the Section E. of the genus Acara, in the arrangement of Heckel, a section which is characterized in the words, "Bucca squamarum seriebus 10; squamis omnibus minoribus:" the other sections of his Acara are distinguished by the number of rows of buccal scales, the size of the sub-orbital, and the presence or absence of dark colored vertical bands, and all belong to Cychlasoma, as now restricted.

Cychlasoma will then include the Acara Heckelii of Müller and Troschel, Perca bimaculata and P. punctata of Bloch, and Heckel's species Acara tetramerus, viridis, diadema, vittatus, pallidus, dorsiger, marginatus, dimerus, nassa, cognata, and unicolor. Some of the fishes recently described as belonging to "Chromys," by Count Castelnau, also belong to this genus, but as he has not described the character of the pharyngeal bones or the dentition, it is difficult to refer some of his species to any established genera. His Chromys uniocellata and C. obscura appear to be species of Cychlasoma. The species which he describes and figures as "Chromys punctata? Bloch," is certainly very different from the Labrus punctatus of Bloch, and even appears to belong to another genus.

§ I.

Species with three spines to the anal fin.

Cychlasoma pulchrum, Gill.

VERNACULAR: *Cascarub.*

Body highest at the fifth and sixth dorsal spinous rays; commencement of dorsal distant three-tenths of the entire length of body from the extremity of the muzzle; the greatest height of the body is nearly one-third of the total length. The head is considerably less than a quarter of the entire length, inclusive of the caudal; the facial outline from dorsal to mouth moderately curved. Anal fin commencing under the first soft ray of the dorsal. Eleven rows of scales obliquely cross the body at its greatest height. The first part of the lateral line runs through a row of fifteen scales; the second, one of ten scales.

D. xiii.—11. A. iii.—7. C. 16. V. i. 5. P. 12.

The general color of the body and head is olive green. A number of lines of a sky-blue color, some of the lower of which are interrupted, obliquely cross the cheeks and preoperculum in a posteriorly ascending direction; distant and scattered spots are generally continued from the latter on the operculum. The body is crossed by about eight obscure bands; and as many interrupted longitudinal stripes as there are rows of scales run along the sides, each stripe being formed by bars running through the middle of each scale which are abruptly discontinued a short distance from the posterior margins. A distinct, subrotund black spot is branded on each side, on the fourth and fifth rows of scales in an oblique line from the base of the dorsal fin between its eighth and eleventh spines: dots similar to those on the operculum are also more or less thickly distributed over the body. There is a distinct infra-orbital black spot.

§ II.

Species with four spines to the anal fin.

Cychlasoma taenia (Bennett) Gill.

Vernacular: *Cascarub.*

Synonymy.

Chromis taenia, Bennett, Proceedings, &c., Zool. Soc. of London, part I., p. 112, 1830.
Acara taenia, Heckel (nomen) Zool. Abhandlungen aus den Annalen den Wiener Museums der Naturgescheite, vol. II. p. 361, 1841.
Chromis taenia D. H. Storer, Synopsis of the Fishes of North America, page 68. Ib. in Memoirs American Academy, vol. II. p. 520, 1846.

The body is highest at the seventh spine of the dorsal, which fin commences in advance of the anterior third of the body; the greatest height of the body is more than two-fifths of the total length, inclusive of the caudal fin. The head bears a proportion to the entire length of one to three and two-thirds; its profile rapidly declines from the dorsal. Anal fin commencing under the thirteenth spine of the dorsal. The body at its greatest height is obliquely crossed by twelve rows of scales; the anterior portion of the lateral line is contained in a row of seventeen scales, and the posterior in one of ten.

D. xv.—10. A. iv.—9. C. 16. V. i.—5. P. 12.

Color of head dark olive green, tinged with yellow. Body olive green, crossed by seven to nine obscure dusky bands, and with as many longitudinal interrupted stripes along the sides as there are rows of scales. A nearly round black spot is on each side on the fourth and fifth rows of scales in an oblique line from the back, and below the eighth, ninth, and tenth dorsal spines; two other spots, which are sometimes merged into one,

precede it. The pectorals are yellow. An infraorbital black spot is present.

This species of Acara was first indicated under the name of Chromis taenia by Mr. E. T. Bennett, who described it from specimens in a small collection formed during a voyage of H. M. S. Chanticleer. This notice is in Latin, and is confined to a description of the color and of the radial formula. He gives as its *habitat* the island of Trinidad. Subsequently Dr. David H. Storer gave a translation of this description in an appendix to his "Synopsis of the Fishes of North America," originally published by the American Academy of Arts and Sciences, in the third volume of their new series of "Memoirs."

This fish is in that memoir said to be found in the Caribbean sea *on the authority of Mr. Bennett*, although that naturalist had simply stated that it was found in Trinidad ("apud Trinidad"). The learned ichthyologist of Boston, who appears to have been unacquainted with Dr. Heckel's memoir on these and the allied genera of fishes, was probably misled by the knowledge that some of the species of the genus Chromis found in Europe were marine, and as Mr. Bennett had not stated that it was from the *fresh waters of Trinidad*, rather hastily assumed that it also was marine, and would consequently be found in the whole of the Caribbean sea, in accordance with the law which appears to govern the geographical distribution of the marine fishes, as well as the other West Indian marine animals.

Genus.

CRENICICHLA, HECKEL.

Body oblong, covered by small scales; dorsal and abdominal outlines nearly rectilinear and parallel with each other.

Head with the lateral aspect elongately triangular.

Mouth moderate with the gape oval. Lower jaw longer than the upper. The intermaxillaries alone form the edge of the upper jaw, and are very protractile; their ascending branches are longer than the horizontal, and when retracted, reach to a line posterior to the centre of the orbits.

Teeth on the intermaxillaries in an anterior row, moderate, subcylindrical, and recurved near the summits; behind these are one or two irregular rows of smaller ones. Dentary with similar teeth. Palatines, vomer, and tongue naked.

Lips thin.

Tongue rather thin, long.

Lower pharyngeals forming an equilateral triangle, covered with teeth, of which those near the posterior margin and along the middle are largest, compressed, and with the summits scarcely uncinate; the lateral teeth are much smaller.

Branchial arches with the concave sides provided with bony, compressed, scabrous papillæ.

Branchiostegal rays five.

Preoperculum with the posterior margin serrated; operculum with an obtuse spine.

Operculum, preoperculum, and the head above, as far as the eyes, covered with scales similar to those of the body.

Nares simple, near the mouth.

Lateral line interrupted; both portions rectilinear.

Dorsal commencing above the base of the ventrals, and extending along the entire length of the back; the spinous portion is long, low, and subequal, the soft portion hardly half the length of the spinous, but much higher, especially the middle rays, which are considerably produced beyond the membrane.

Anal commencing under soft portion of dorsal, and terminating at the same distance, supported by three spinous rays. Soft portion with the median and posterior rays produced.

The bases of both these fins are destitute of scales.

Caudal with the base covered by scales; the margin rounded.

Ventrals triangular, with one spinous and five soft rays.
Pectorals moderate, rounded.

We accept this genus with the same limits as have been given to it by Mr. Heckel.

Crenicichla frenata, Gill.

Vernacular: *Brochet.*

The back from the nape to the posterior third of the dorsal fin is straight; from the latter point, it obliquely descends to the end of the fin, and thence again advances in a straight line to the caudal. The frontal outline from the dorsal fin to the snout descends very gradually, and as far as the eyes, in a slight curve. The head forms two-sevenths of the entire length, inclusive of the caudal fin. The distance from the mouth to the origin of the dorsal is only a quarter of the total length, and exceeds by more than a third the height of the body at the latter point. There are seven series of buccal scales. The anterior portion of the lateral line runs through about twenty-three scales, and the posterior through twelve.

D. xix.—13. A. iii., 8. C. 2. 16. 3. V. i. 5. P. 15.

The color is olive green above, on the sides, and on the head, and whitish beneath; the demarcation between the upper and lower regions is very well defined, and is on a level with the posterior portion of the lateral line. A moderately broad black band extends from the jaw to the opercular spine, but interrupted at the eye; on the operculum this band is bordered beneath with sky blue. A black spot colors each side beneath the fourth, fifth, and sixth dorsal spines, and on the lateral line, which is also bordered with blue beneath, and sometimes even on the sides and above. On the scales which cover the upper third of the base of the caudal fin a second spot, margined with yellowish, exists. A number of elegant

metallic yellow spots is painted on the side along the anterior portion of the lateral line, and extends to the caudal; a second row also adorns the sides on a line with the posterior portion.

The dorsal and anal have oblique dusky bands; ventrals and pectorals whitish.

This species is most closely allied to the Perca saxatilis of Bloch, or the Crenicichla saxatilis of Heckel.

Order.

MALACOPTERYGII, Cuvier.

Sub-order.

ABDOMINALES, Cuvier.

Family.

Siluroidæ, Cuvier.

Sub-family.

Pimelodinæ, Bonaparte.

Genus.

Pimelenotus,* Gill.

Body entirely naked, oblong, slightly compressed or subcylindrical anteriorly, and becoming more and more compressed as it approaches the caudal.

Head slightly compressed laterally, with the profile subconical; moderately broad above, narrowing very gradually to the muzzle; the posterior prolongation of the interparietal nearly reaches to the buckler, but is not continuous or united with it; the bones are covered by a thin, tense, and smooth skin, through which the sculpture or wrinkles of the casque are apparent.

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* Πιμελη, fat, and Νωτος, back, in allusion to the long adipose dorsal.

Mouth with the gape moderate, and nearly square; the intermaxillaries are slightly arched; the maxillaries continued into long and simple barbles; from the skin behind the lower jaw are also suspended two pair of barbles.

Teeth equal and villiform in broad bands on both the intermaxillaries and the dentaries.

Tongue thick and large, rounded in front, and attached by the margin to the skin of the floor of the mouth.

Lateral line extending in nearly a straight line along the middle of the side to the caudal.

First dorsal with the height and length nearly equal, situated on the anterior part of the body; its first ray is generally slender, and not dentated. Second or adipose dorsal very long, compressed, attached for its entire length to the back, with the margin generally trenchant, and with the height increasing towards the posterior half.

Anal short, and with the length and height almost equal, placed nearly under the middle of the adipose dorsal.

Caudal forked.

Pectorals moderate, with the first soft rays longest.

Ventrals moderate, with rounded margins.

The genus which we have thus named and described is one of those that have been embraced by M. Valenciennes in a group which he, as well as other naturalists, considered to be only of generic importance, and described under the name of Pimelodus. The Pimelenotis are included in the "Histoire Naturelle des Poissons" in a fourth section of that group, a section which is thus defined:—

"Des pimélodes qui ont, comme les précédens, les barbillons seulement au nombre de six, ou un casque plus prononcé, quoique non continu au bouclier, parce que sa production interpariétale est trop courte pour atteindre sa deuxième plaque interépineuse, et pour couvrir ou enchasser la prémière."

Even in the section so restricted, there appear to be embraced several genera, which we may at a future time name and characterize. Müller and Troschel have already separated, under the name of Calophysus, a most distinct genus, the typical species of which was formerly placed in this group by M. Agassiz, in the "Selecta Genera et Species Piscium," of Spix, and by M. Valenciennes in the "Histoire Naturelle des Poissons."

The "preceding" species to which Valenciennes alludes in the paragraph which we have above cited, form a third section in his arrangement; they are distinguished by the round and smooth head; and the presence of only six barbles, the nasal ones being absent. Two or more genera seem to be also embraced in the section. The type, P. raninus, Val., belongs to a new genus, which we call Batrochoglanis. The species which constitute this genus have an aspect nearly similar to the North American Pimelodus, but their body is even shorter and stouter than in that genus, and the anal, as in almost all of the South American Pimelodinæ, is much shorter, and only supported by from eight or nine to fourteen rays. The caudal is either rounded or emarginate, and the adipose fin small. Batrochoglanis will include the Pimelodus raninus of Val. as its type, and as additional species P. bufonius, Val., P. mangurus, Val., and P. charus, Val.

The fish which Lacepede has indicated as the Tachisurus Chinensis, from Chinese drawings, appears to be also the type of a distinct genus, but as we have never been able to examine it, we are not able to give its characters.

Another genus which was placed by Valenciennes, in a fifth section of Pimelodus, but which appears to have very little real affinity to any other genera of Pimelodinæ, has recently received from M. Dumeril the name of Conostoma. After the separation from Pimelodus of these natural genera, and several others that have been founded by naturalists, the genus to which the name of Pimelodus should be restricted, deprived of the

numerous species with which it has little affinity, is almost exclusively confined to the North American continent. The Asiatic species, which have been referred by M. Valenciennes to his first section of Pimelodus, appear to form a distinct genus, but are only known by imperfect and very unsatisfactory descriptions, and most of them have never been seen by naturalists, the descriptions having been drawn up simply from inspection of Chinese figures. One of these Asiatic species, which has long been known by a brief description and figure given by Russel in his "History of Aleppo," and which has received from Linnæus, the name of Silurus cous, proves not to belong to the genus. Valenciennes, who had only the work of Russel as original authority, referred it to Pimelodus with doubt. The species has recently been re-discovered, and has been placed by Mr. Heckel in the genus Arius, in his memoir on the Syrian Fish, obtained by Russegger. There have been still further separated from Pimelodus, the Noturus of Rafinesque, which is confined to North America, the Calophysus of Müller and Troschel, peculiar to South America, and the Asiatic genus, Bagarius of Bleeker. The Tachisurus of Lacepede, will also probably be found, when properly restricted, to be an exclusively Asiatic genus.

The genus which we have now called Pimelenotus, and which we believe we have been the first to recognise, is, with the exception of a single species, peculiar to South America and its zoological dependencies. In the number of its species it appears to hold that station in South America, which is possessed by the natural genus Pimelodus in North America; it embraces many of the species described by M. Valenciennes in the "Histoire Naturelle des Poissons," and by Drs. Müller and Troschel in their "Horæ Ichthyologicæ," and in Schomburgh's "Reisen." The P. Sebae, P. pati, P. sapo, P. Hilarii, P. gracilis, and P. Pentlandii, which were first described by M. Valenciennes, are some of the species that appear to belong to the "new genus," but P. pati and the allied species are doubtful. The species

described by Drs. Müller and Troschel are the P. Sellonis, P. Stegelichii, and P. Deppei. It is the P. Deppei that we have alluded to in our remarks on the geographical distribution of the genus, as being the only species that has been discovered beyond the boundaries of the South American zoological province; that species, according to Drs. Müller and Troschel, was brought by the gentleman to whom it was dedicated, M. F. Deppe, from the Sandwich Islands, but from what particular island we are unfortunately not informed. The discovery of a representative of this group in those Islands is most interesting, and we may well look forward to the time when our knowledge of their fresh water fishes will be increased, as an archipelago that has contributed to the malacologist so many species of most interesting genera peculiar to the Islands, will doubtless afford some interesting ichthyic novelties.

Pimelenotus Vilsoni, Gill.

VERNACULAR: *Catfish; Barbe.*

This species is one of the most slender of the genus. Of the entire length from the snout to the termination of the lobes of the caudal fin, the head to the end of the operculum bears a proportion of only one to about five and two thirds; the visible portion of the posterior projection of the interparietal of Cuvier and Valenciennes, or the supra-occipital of Owen, extends a very short distance beyond the operculum. The cranium is irregularly wrinkled, the wrinkles becoming more prominent, posteriorly. The anterior "fontanelle," or "solution of continuity," is elongated and narrow, extending from a point on a line between the inner angles of the maxillary barbles, as far back as the posterior borders of the orbits. The eyes are large and longitudinally oval, and the longitudinal diameters are contained between four and five times in the length of the head,

from the snout to the margin of the operculum. Less than one and a half of these diameters separates the eyes from each other, and the same distance intervenes between them and the muzzle. The superior nasal openings are very small, and nearly equidistant between the anterior borders of the orbits and the muzzle. The upper jaw is shorter than the lower. The maxillary barbles reach as far back as the end of the anal, and often even to the tail. The opercula are radiatedly striated. The pectoral spine is rather slender, shorter than the first soft ray, and generally denticulated along the whole of its internal border, and on its external one towards the extremity. The first dorsal ray is a very slender spine, which is sheathed in a membrane that extends much beyond the spine itself. The ventrals are nearly under the dorsal's posterior ray. The caudal is unequally forked, and its lower lobe is larger, and has its margin rounded.

The radial formula, inclusive of the rudimentary rays, may be rendered as follows:

D. I. 6. A. 10. C. 3. I. 5. 4. I. 10. P. I. 8. V. 6.

The color of the upper regions of the body is brown; beneath it is pearly. The caudal, anal, ventral, and pectoral fins are minutely punctate. At the base of the dorsal there is a rather broad longitudinal dusky band; this is succeeded above by a pearly band, which is about as broad, or sometimes broader than the preceding; the remainder of the fin is of a lighter color than the basal band, the dusky appearance being caused by the numerous dots with which the membrane is covered.

This species appears to be more nearly allied to the Pimelenotus Sellonis, described by Messrs. Müller and Troschel in their "Horæ Ichthyologicæ," than to any species that has yet been discovered. It differs from that fish, however, in the greater length of the barbles, the position of the anal, and the number of its rays, and also in the proportions of its parts to each other.

Subfamily.

CALLICHTHYINÆ, BONAPARTE.

Genus.

CALLICHTHYS, LINN. (EMEND.)

Body oblong, compressed, with the dorsal and abdominal outlines nearly rectilinear and parallel; the median line of the back behind the first dorsal is bare, or sometimes covered by small and irregular plates.

Head broad and much depressed: interparietal plate with the breadth and length nearly equal, and with the posterior extension short and obtuse. Nuchal plates with their internal borders contiguous for the entire or greater part of their length, and each of a sub-triangular form, with the posterior margin rounded and parallel, or nearly so, with the dorso-lateral plates which succeed them on the body.

Eyes very small.

Mouth small, with the gape sub-circular. Jaws nearly equal, or with the upper slightly projecting when the mouth is closed.

Teeth on the dentaries very small, compressed, and recurved. The intermaxillaries and vomer appear to be edentate.

Lips thin, covering the jaws, the lower forming a membranous veil reflected backwards and emarginate. Each angle of the mouth is furnished with a double barble, whose branches are only united at the base.

Branchiostegal membrane supported by three moderate rays, and a small or rudimentary one.

First dorsal subquadrate, above the ventrals.

Second dorsal above the anal, and consisting of a single spine or spiniform plate, which sustains a slender membrane representing the adipose fin of the Pimelodinæ; this spine is preceded by several small plates.

Anal short.

Caudal with the margin rounded.

Ventrals with the margins rounded; the first rays are spinous.

Humeral plates anteriorly approximated to each other on the breast, and with the internal sides receding from each other in opposite directions, in such a manner as to leave the breast perfectly unprotected posteriorly; these plates are curved backwards behind the pectoral fins, and are prolonged behind into a triangular spine, from the angle of which they advance obliquely upwards and forwards to the mastoid plates.

Callichthys, as we have now limited it, will only include the species of the old genus with naked breasts. The species now known are C. asper, Val., C. læviceps, Val., if distinct from the preceding, C. exaratus, Mull. and Troschel, and C. cælatus, Val. The C. pictus of Mull. and Troschel appears to be also referable to this genus.

Callichthys Kneri, Gill.

Vernacular; *Cascadura.*

The length of the head, from the snout to the inferior angle of the branchial aperture, equals the height of the body, and is rather less than one sixth of the entire length, including the caudal fin. The casque is covered by a number of irregular raised lines, which give a coarse reticulated appearance to it, leaving pits in the interspaces. The eyes are considerably nearer to the extremity of the snout, than the end of the opercular spine; their diameters are one tenth of that distance, and they are separated from each other by a space equal to seven of their diameters.

The pectoral fins have the spinous rays compressed, strongly serrated on their edge, and the external side beset with rather strong, recurved tooth-like spines.

D. I. 7 — 1. A. I. 6. C. 14. P. I. 7. V. 6.

The color is a brownish black, with a darker line along the length of each plate. The naked skin of the abdomen is slightly tinged with purple. The rays of the caudal fin are barred with brownish black.

It attains a length of about four inches.

We have taken pleasure in dedicating this species to Prof. Rudolph Kner, who has contributed much to our knowledge of the Callichthyinæ, and other groups of Siluroids.

Genus.

HOPLOSTERNUM, GILL.

Body oblong, compressed, with the dorsal and abdominal outlines nearly straight and parallel; the median line of the back behind the first dorsal is naked, or protected by small plates.

Head broad, and moderately depressed. The interparietal plate is little, if any, broader than long, and its posterior prolongation is short and obtuse; nuchal plates broad, contiguous along the median line for the greater portion of their length.

Eyes moderate.

Mouth small, with the gape subcircular; the upper jaw is little longer than the lower. The intermaxillaries, dentaries, and vomer are destitute of perceptible teeth.

Lips thin; the lower is reflected backwards, and emarginated in the middle; at each angle of the mouth, there is a double barble as in *Callichthys*.

Branchiostegal membrane consisting of three moderate rays, and a small rudimentary one.

Dorsals and anal with the same form and situation as in the genus *Callichthys*.

Caudal emarginate, or occasionally slightly rounded.

Ventrals with rounded margins.

Humeral plates anteriorly, either simply contiguous or interlocking with each other on the breast; the internal borders

recede from each other at an angle less than a right angle, and are extended backwards for some distance, when they are terminated by a more or less rounded angle, from which they advance obliquely upwards and forwards to the mastoid plates; the sides of the breast are thus protected by these plates, and the interval or bare skin of the breast between them, is of a more or less elongated triangular form.

This genus is framed for the species of Callichthyinæ with the head depressed, and with the breast protected by the humerals. The Callichthys lævigatus of Valenciennes, of which the C. subulatus of the same author is the male, may be considered as its type. The remaining species are C. littoralis of Hancock, which appears to be distinct from C. lævigatus, C. albidus, Val., C. chiquitos, Castelnau, C. thoracatus, Val., and C. longifilis, Val. The C. personatus of Ranzani, and C. sulcatus of Kner, appear to be synonymous with the latter species.

Hoplosternum laevigatum, (Val.) Gill.

Vernacular; *Cascadura.*

SYNONYMY.

Callichthys laevigatus, Val. Hist. Nat. des Poissons, vol. 15, p. 314, (female.) 1840.

This species is very variable in its proportions, in the length of the spinous rays of the pectorals, and in the extent and width of the naked skin which intervenes between the frontal plates. It rarely reaches a length of more than five or six inches, of which the height generally forms considerably less than a quarter. The head bears a variable proportion to the greatest height of the body, the latter being sometimes less, and sometimes greater than the length from the muzzle to the margin of the operculum: the height is always greatest at the first dorsal spine, from which point the profile descends, with a very

slight curve, to the snout; this curve is boldest between the interparietal projection and the dorsal spine; from the former point to the snout, it is nearly straight. The whole surface of the casque is pitted; the indentations are generally more numerous and approximated on the anterior plates, than on the posterior ones; and are there separated from each other only by the broad and elevated lines of the surface, which, by their frequent intersection, give a coarsely reticulated appearance to the casque. The interspace between the interior margins of the anterior frontals, or the "solution of continuity" of Valenciennes, is generally large, of an ovate-fusiform shape, and extends from the anterior angle of the interparietal, (where it is sometimes slightly rounded, the interparietal being proportionally emarginated, or truncated) to within a short distance of the bare skin of the muzzle, from which it is generally separated by the intervention of a small sub-triangular plate, whose apex is posterior. Occasionally this plate is absent, and the bare skin of the muzzle is continuous with that of the interval between the frontals; this interval is also variable in its proportional length, sometimes being thrice as long as it is wide, and at other times not more than twice its width. The eyes are circular and of moderate size, the diameters of the orbits forming about a sixth of the entire length of the head; they are separated from each other by about three and a half, and are at a distance from the snout of about two and a half diameters.

This description applies equally to the males and the females. We now proceed to describe the sexual characters and differences; these are chiefly manifested exteriorly in the spines of the pectorals, and have afforded to Valenciennes the characters which distinguish two of his nominal species, the *Callichthys laevigatus*, and the *C. subulatus*.

In the males, or those described by Valenciennes as *Callichthys subulatus*, the spines of the pectoral fins are stout; externally, and on the superior borders, they are covered by rasp-like asperities; internally, they are nearly smooth; a smooth

space is also on the exterior sides, which extends across the greater portion of the width of the base, and thence gradually decreases towards the middle of the spine; the internal border is serrated for the third or half of its length, commencing at the base; the length of each spine is generally contained about four times and a half in the extreme length of the fish. The genital papilla is about a third of the length of the ventral fin.

The female has been described under the name of *Callichthys laevigatus;* in this sex, the spines of the pectorals are for the most part smooth on both sides, but covered on the superior borders with rasp-like asperities as in the male; the interior borders are strongly serrated for almost the entire length; these spines are never recurved at their apices, but nearly straight for the entire length, or very slightly curved inwards; they are also generally shorter than those of the males, although the length varies, being sometimes nearly a fifth of the entire length, while in other individuals, as in those described by Valenciennes, they are contained as much as six times and a half in the extreme length of the body. The genital papilla is much shorter than in the male.

D. I. 7. A. 8. C. I. 6. 6. I. V. 6. P. I. 8.

The last rays of both the dorsal and anal fins are double.

The color of the fish preserved in spirits is a dark olive brown above, and lighter beneath, with the margins of the dorso-lateral plates also lighter. The naked skin of the abdomen is tinged with purple.

Vague and comprehensive as this description may appear, there cannot be any doubt that it is only applicable to one species. We have so many specimens, and the passages between the aberrant forms are so well established, that we have finally, without hesitation, referred all of them to one and the same species. We had, indeed, at first believed that those individuals in which the azygous plate between the anterior frontals is absent, and in which there is also a broad

channel connecting the bare skin of the muzzle with that of the "fontanelle," belonged to a distinct species, especially as those differences were accompanied by rather smaller size, and longer pectoral spines. On a closer examination of other individuals, we found that the plate varied greatly in size, and that in some, in which the channel hardly existed, it was obsolete. The pectoral spines were also found to vary in length in specimens that were otherwise identical. We have, therefore, concluded to regard the two specimens with those characters as only forming a variety.

The Callichthys lævigatus of Valenciennes appears to have been first figured in the great "Atlas du Voyage dans l'Amerique Meridionale" of M. D'Orbigny. As Dr. Kner has already observed, the figure given represents a female. On a comparison of specimens of the Trinidad fish with that figure, a difference is observed in the form of the operculum, and in the caudal plates; but as the figure does not appear to have been drawn with much attention to the minute details, we do not venture to separate the two on such evidence, after the positive assertion of Valenciennes. In the figure of the species of Buenos Ayres, the operculum is represented as having the border slightly emarginate, while in the fish of Trinidad, it is nearly straight; the caudal plates are also represented as being quite angular posteriorly in the figure of D'Orbigny; in the Trinidad species they are more rounded. Little reliance, however, is to be placed in the latter character, as the caudal plates are subject to considerable variation. Still greater differences are perceptible in the forms of the mastoids, and both pairs of frontals; but the design of the former appears to have been an error of the draughtsman.

Subsequently, M. Valenciennes, in his continuation of the "Histoire Naturelle des Poissons," described this species, and referred to the figure in the "Atlas" of M. D'Orbigny. In this work he stated that he had received it from Buenos Ayres, through M. D'Orbigny, and from Trinidad, through M. Robin.

The distance between those two places is so great, that it appears hardly possible that the same species occurs at both points. We have, consequently, only given in the synonymy reference to the "Histoire Naturelle des Poissons," in which it is said to inhabit Trinidad; as the figure of M. D'Orbigny, only represents the fish found in Buenos Ayres, we have omitted to refer to it.

At a later date, Dr. R. Kner published (in the seventeenth volume of the "Sitzungsberichte der Mathematisch-naturwissenschaftlichen Classe der kaiserlichen Akademie der Wissenschaften," for June, 1855), "Ichthyologische Beiträge," containing descriptions, among other Siluroids, of the species of Callichthys preserved in the Museum of the Academy. In that memoir he described the C. lævigatus Val., and drew attention to the fact that the species, as described in the "Histoire Naturelle des Poissons," and figured in the Atlas of D'Orbigny's voyage, was a female, and that the C. subulatus of Val. would probably prove to be a male of the same species. Dr. Kner does not positively state the place from which his specimens of C. lævigatus were procured.

The C. subulatus of Val. is stated by its founder to have been brought from Buenos Ayres with the C. lævigatus, and also to have been sent from Cayenne by M. Poiteau. There can be little doubt, as Dr. Kner has suggested, that this fish is the male of the C. lævigatus. The male of the species found in Trinidad corresponds as well to the description given by M. Valenciennes of his C. subulatus, as the female does to that of C. lævigatus, and if we had been positive of the identity of the fish of that island, with the one of Buenos Ayres, we would have placed the C. subulatus as a synonym. The proof of the identity of the Buenos Ayrian and Trinidad fishes remains to be satisfactorily proved, as we have already observed. The specimens brought by M. Robin from Trinidad were probably dried, as in the case of Hypostomus Robinii, and had perhaps lost some of their specific characters. If it should be found

necessary to regard the Trinidad fish as a distinct species, the name of *H. sapidissimum* may be given, in allusion to the esteem in which it is held in the island as an article of food.

Hoplosternum Stevardii, Gill.

VERNACULAR: *Cascadura.*

This species is very closely allied to the Hoplosternum lævigatum, but the description which we proceed to furnish will prove that it is quite distinct.

It attains a larger size than the preceding; the two males which are in our possession being between eight and nine inches in length from the muzzle, to the ends of the lobes of the caudal fin; in this length, the head is contained about four times and two-thirds, and is slightly shorter than the body is high at the dorsal spine: the profile slopes with a slight but continuous curve from this point to the snout. The entire surface of the casque is very closely pitted, and the raised lines between them form a coarse network. These pits are also finely granulated, and the surface thus assumes, when viewed under a magnifier, an appearance slightly resembling that of the brain coral (*Meandrina*). The naked interspace between the anterior frontals, or the "solution of continuity," is of an oval form, and is shorter and broader than in *Hoplosternum lævigatum;* it extends for about three-quarters of the distance of the inner margins of the frontal plates, terminating posteriorly at the interparietal, the anterior angle of which plate is slightly truncated; anteriorly, this interspace is rounded; the anterior azygous triangular plate between the anterior frontals is of moderate size.

The eyes appear to be smaller than in the *Hoplosternum lævigatum*, the diameters of the orbits being rather less than a seventh of the entire length of the head from the snout to the

margin of the operculum; the space that intervenes between them is equal to about four and a half of their diameters, and that which separates them from the muzzle equals three and a third diameters.

In the males, the spines are robust, compressed, and contained between four and a half and five times in the extreme length of the body; they are recurved at their extremities, and the external sides and superior border, as well as the superior half of the internal sides, are covered by rasp-like asperities; at the base of the spine on the external side, there is an elongated triangular smooth space, and the lower portion of the internal side is also smooth; the internal border is entire, and not serrated.

The female of this species has never been seen by us.

The radial formula is nearly the same as in the *Hoplosternum lævigatum.*

D. I. 8—I. A. I. 6. C. I. 6. 6. 1. V. 6. P. I. 9.

The color, as in the preceding species, is olive brown above, with a tinge of purple on the skin of the abdomen.

Genus.

HOPLOSOMA, SWAINSON.

Body oblong, compressed, highest at the anterior dorsal fin, with the dorso-lateral plates overlapping each other on the median dorsal line, behind the first fin.

Head compressed, and with the profile presenting nearly the form of a rectangular triangle; interparietal plate with an elongated triangular posterior extension; nuchal plates sublateral and oblique, with the shape subrhomboidal, and with the transverse and longitudinal diameters nearly equal; they are separated from each other by a median plate.

Mouth inferior and small, and with an oval gape.

Intermaxillaries, dentaries, and vomer smooth, or with microscopic teeth.

Lips thin; the upper hardly covering the jaw; the lower

one is reflected backwards, and emarginated in the middle, and the angles on each side of this emargination are generally protracted into two short barbles. A double barble, which is a prolongation of the maxillary, is present at each angle of the mouth, as in *Callichthys*, and *Hoplosternum*.

First dorsal quadrangular, and opposite the ventrals.

Second dorsal, a small adipose fin sustained by a single spine, which is preceded by several azygous plates.

Caudal forked.

Pectorals rounded.

Ventrals subtriangular.

Humeral plates as in *Hoplosternum*, anteriorly contiguous, and with the internal borders abruptly departing from each other at less than a right angle, and leaving the bare skin of the abdomen between their borders of a semi-elliptical form.

Anus a short distance posterior to the base of the ventrals.

This genus was first established in 1839, by William Swainson, in the work* that we have before had occasion to refer to; the name is in that work incorrectly written Hoplisoma. The genus was framed for the reception of the Cataphractus punctatus of Bloch, which was the only species known at that time. Since then, several species have been added by different zoologists. Those at present known are Hoplosoma paleatum, or the Callichthys paleatus of Jenyns, and the H. splendens and H. taiosh, which were likewise described by Count Castelnau as species of Callichthys. We now add a species from Trinidad very nearly allied to that described by Jenyns.

Hoplosoma æneum, Gill.

VERNACULAR: *Cascadura.*

Body oblong, highest at the spinous ray of the first dorsal fin, from which the dorsal outline slopes in nearly a straight

* The Natural History of Fishes, Amphibians and Reptiles, or Monocardian Animals, vol. i., p. 336, and vol. ii., pp. 189, 304.

line to the caudal; the greatest height is rather less than a fifth of the total length, inclusive of the caudal, and is two and a half times greater than the height at the end of the tail. The head, from the muzzle to the margin of the operculum, is contained three and two fifth times in the length from the muzzle to the base of the caudal, and five times in the entire length, including the caudal fin. The eyes are about two-ninths of the length of the head, and are distant more than two diameters from each other, and still further from the muzzle.

The first dorsal commences at a distance from the snout, exceeding one and two thirds of the head's length; its base equals three diameters of the eye, and the distance between its last ray, and the spine of the adipose fin, is less than four diameters.

D. I. 7—1. A. I. 6. C. I. 6, 6, I. V. 6. P. I. 7.

The head and dorso-lateral plates are of a deep bronze color; the ventral plates yellowish. All of the fins are immaculate. The operculum, and the humeral and nuchal plates are of an iridescent blue color.

This species is very closely allied to the Hoplosoma paleatum (Callichthys paleatus, Jenyns), but it differs from that species by the proportionally longer head, and the greater distance between the first and second dorsals, as well as by the unspotted dorsal and caudal fins.

This fish is very abundant in the clear streams of the island of Trinidad, and lives in numbers of twenty or thirty, or even more. It attains a length of from two and a half to three, and sometimes even four inches, while the H. paleatum is said to be less than two inches long.

Family.

GONIODONTES, AGASSIZ.

Sub-family.

HYPOSTOMINÆ, GILL.

Genus.

HYPOSTOMUS, LACEPEDE, KNER.

Body oblong and moderate, sub-angular, covered by several rows of high, imbricated plates, which are more or less pectinated posteriorly. Abdomen covered with very small granulated plates.

Head large, broader than the body, depressed, with the vertical aspect semi-oval, and with the eyes oblique, and visible from above. Branchial apertures advanced far forwards, and under the eyes. Interopercula with the margins simply pectinated or dentated.

Mouth moderate, with the labial veil semicircular and entire, straight and narrow in front, with broad and rounded margin behind, and with the whole of the inferior surface studded with papillæ; opposite the angles of the mouth, a small tentacle is often continued from each side of the veil.

Teeth rather short, slender, curved, and with hooked apices.

First dorsal subquadrate, placed over the bases of the ventrals, and rather higher than long.

Anal small, composed of one simple and four or five soft rays, placed a short distance behind the anus, and between the first and second dorsals, or under the last rays of the former.

Caudal forked or lunate; the lobes nearly equal, or the lower slightly longer than the upper.

Pectoral large, with the first ray a large and robust clavate spine, beset with villiform teeth.

Ventrals moderate, with the first ray simple, large, cartilaginous, and flexible, and with asperities similar to those on the pectorals.

Hypostomus Robinii, Val.

Vernacular: *Tata.*

Synonymy.

H. Robinii, Cuv. and Val. Hist. Nat. des Poissons, vol. xv., p. 500, 1840.

The body behind the head is slender, and has four longitudinal carinæ above, of which the two superior run along the row of plates on each side of the dorsal, leaving the back between them flattened; of the remaining two, one runs on each side along the centres of the second row of plates. Another carina is formed by the angles of the fourth row, and is very distinct anterior to the ventral, and obsolete behind it.

The head from the muzzle to the nape is about two-ninths of the entire length of the body, inclusive of the caudal; but excluding that fin, it bears a proportion to the body of one to three and a fifth. The width of the head at the base of the pectorals is considerably less than its length; the anterior portion of the interparietal is tumid, and from this tumidity a blunt ridge proceeds backwards to the short, sub-acute termination of the plates; the plates above the eye are also tumid, and an obsolete ridge is continued from each to the second lateral carina from the back; another rounded ridge advances from the antero-superior border of the orbit to the anterior border of the nostril; a wide, rounded, central ridge also extends from the muzzle to the space between the nostrils. The eyes are a seventh of the length of the head, and separated from each other by a space equal to three diameters; the interval between them and the muzzle exceeds four diameters.

D. I. 7—I. A. 1, 4. C. I. 6, 8, I. P. I. 6. V. I. 5.

Head with numerous round black spots. Dorsal purplish, with two rows of black spots between the intervals of the rays; one of these rows is frequently obsolete, and sometimes the two

coalesce, forming a single row of large spots. Pectorals and ventrals with single rows of spots between the rays.

It attains a length of six to nine inches, and is occasionally found a foot in length.

A single dried individual of this species was brought from Trinidad by M. Robin, and served for the description of that species by M. Valenciennes. Other but smaller specimens have been brought from the tributaries of the Rio de la Plata by M. D'Orbigny, which M. Valenciennes was unable to distinguish from the species of Trinidad. M. Valenciennes describes the interparietal plate as being destitute of a crest, but with a slight convexity, and places it at the head of a section, composed of species in which the angles and crests are nearly obsolete, and the head and body become gradually depressed. No mention is made of the blunt and obsolete ridges and elevations noticed in the above description, but as our specimens are from the same place as the one described by the French ichthyologist, and agree in other respects, there can be no doubt that they belong to the same species.

If this fish has been correctly identified as belonging to the same species as that found in the affluents of the La Plata, it has certainly a most extensive range.

Genus.

ANCISTRUS, KNER. (EMEND.)

Trunk slender and moderate, covered by several rows of high and oblique, regularly imbricated plates, whose free margins are pectinated. Skin of abdomen entirely naked and smooth.

Head large, ovate, triangular, broader than the body. Interparietal with the breadth and length nearly equal. Eyes moderate. Branchial apertures under the eyes.

Interoperculum movable, and armed with a tuft of rather

long and slender spines, with hooked apices; this tuft is nearly concealed in a fossette under the operculum when it is depressed.

Mouth moderate, with the labial veil semi-ovate and entire, narrow and nearly straight in front, broad and with a rounded margin behind; the inferior surface of the veil is covered by conical papillæ.

Teeth slender with hooked apices.

First dorsal sub-quadrate, little longer than high, and generally supported by eight rays; its anterior portion, or the middle, is placed opposite the bases of the ventrals.

Anal small, consisting of from three to six rays.

Pectorals large, with the first rays robust, and covered with prickly spines.

Ventrals moderate, with the first rays claviform, as in the pectorals, but much more slender.

As we have above restricted the genus Ancistrus, the Hypostomus duodecimalis of Valenciennes, and H. multiradiatus of Hancock will be excluded. For those and the allied species described by Dr. Kner, we would propose a new genus under the name of Pterygoplichthys, intending by that name to allude to the many-rayed dorsal of those fishes, which are singular among the Goniodonts by the presence of twelve or more rays to that fin. They are also distinguished from the true Ancistri by the presence of small plates on the abdomen. The genus Ancistrus seems to have been framed with especial regard to those fishes to which the name is here restricted, and is by Dr. Kner divided into two sections, which correspond to Ancistrus and Pterygoplichthys, his section α answering to the former genus, and β to the latter.

Ancistrus guacharote (Val.), Gill.

SYNONYMY.

Hypostomus guacharote, Cuv. and Val. Hist. Nat. des Poissons, vol. xv., p. 508. 1840.

The body is moderately slender. The head from the muzzle to the nape forms a quarter of the entire length, inclusive of the caudal, and a third of the length to the base of that fin; at the opercular bones or bases of the pectorals, it is as broad as long; on the posterior portion, it is flattened above, and rounded on the sides, without any crests or sharp angles. The eyes have diameters equal to a fifth of the length of the head; the distance between them is equal to two and a half diameters, and is little less than their distance from the snout. The anterior angle of the branchial aperture is under the fore part of the eye.

The first dorsal commences at a distance from the snout, equal to double the length of the head; its base exceeds the interval between the eyes, and is three-fifths of the greatest height; the distance between its last ray, and the spine of the adipose dorsal, is equal to half the length of the base of the first dorsal.

D. I. 7—I. A. 4. C. I. 6, 8 I. P. 1, 6. V. 1, 5.

The color of the body and fins is a reddish brown; the body is immaculate; the fins clouded with a darker color.

The description which Valenciennes has given of the Hypostomus guacharote answers in every particular to the species inhabiting the waters of Trinidad. The specimens, from which that ichthyologist drew his description, were brought from the island of Porto Rico by M. Plée. The specific name given to the species is the same as the popular one by which it is known in that island. It appears to be rather rare in Trinidad; the vernacular name by which it is there called is *Tata*, the same

as that given to the Hypostomus Robinii, Val. It attains a length of four or five inches.

Family.

ERYTHRINIDÆ, VALENCIENNES.

Sub-family.

ERYTHRININÆ, GILL.

Genus.

MACRODON, MULL.

Body oblong, compressed, covered by large scales; the dorsal and abdominal outlines are but slightly convex, and the former is sometimes rectilinear.

Head large, compressed, with an obtusely rounded muzzle; there is only one supratemporal between the fifth sub-orbital plate and the cranium.

Mouth large, with the gape elliptical and wide. The jaws are nearly equal; the upper formed above by the small and immovable intermaxillaries, and on the sides by the maxillaries, which are articulated to their extremities.

Teeth on the intermaxillaries, maxillaries, and dentaries, conical, and acute in a single, unequal row; on each side of the symphisis of the intermaxillaries there is a long tooth, on the outer side of which are smaller ones; one or two others of large size exist on each branch, flanked on each side by smaller ones, which gradually decrease as they recede from the larger. Dentaries with large canines, whose apices, when the mouth is closed, are sheathed in corresponding fossettes on the borders of the roof of the palate. There is an anterior row of long conical teeth continued without interruption on the median line, the row being completed in front by some which are placed on an arch concentric with the jaw; on the inner

sides of this row are the villiform teeth on the palatine plates; two small immovable plates, which appear to be detached from the larger ones, on account of the elasticity of the osseous peduncles which bear them, are also covered with villiform teeth.

Lateral line running in a straight line to the caudal fin.

Branchiostegal rays five, flat, and broad.

Dorsal subquadrate, with the height and length nearly equal, placed nearly in the middle of the body.

Anal posterior, with the height and length nearly equal, and with the margin arched, the rays increasing in length towards the middle or posterior third.

Caudal covered at the base by scales, and with a rounded margin.

Ventrals and *pectorals* of moderate size, and with rounded margins.

In the description of the dentition of this and of the succeeding genus, we have followed M. Valenciennes.

Macrodon ferox, Gill.

Vernacular: *Yarrow.*

Body moderate, compressed, with the dorsal outline straight, and the abdomen arched. The head is compressed, elongated, and from the snout to the opercular margin, constitutes a quarter of the entire length, inclusive of the caudal; the eyes have diameters which nearly equal a fifth of the length of the head; they are separated from each other by a space equal to seven-sixths of a diameter, and are nearly as far distant from the snout. The height of the body is considerably less than a sixth of the entire length; the thickness is three fifths of the height. The ventrals are considerably in advance of the centre of the

body, and under the anterior third of the dorsal. Twelve rows of scales cross the body, and the lateral line runs through about forty.

D. 14. A. 11. C. 17. P. 10. V. 8.

The back and sides are purplish brown; the abdomen whitish. The rays of the dorsal are spotted with from four to six blotches, of the color of the body, which also stain the membrane on each side; between the blotches, the rays are yellow; the remainder of the fin is immaculate. The rays of the caudal are yellow, interrupted by from five to seven irregular broad bands of the color of the body, which are also continued on the membrane. Anal pearly, crossed by about four purplish-brown bands; the ventrals and pectorals have the same distribution of color as the dorsal.

This species is most closely allied to M. tareira, Val., differing chiefly in the absence of the ruddy or yellow spots distributed on the back and sides of that species, and in the different color of the fins; the Trinidad species is also more slender in its proportions than the M. tareira, and its eyes are larger.

Genus.

ERYTHRINUS, GRONOV., MULL.

Body oblong, sub-compressed, covered by large scales; dorsal and abdominal outlines slightly arched.

Head large, broad, compressed, with a rounded muzzle. The whole cheek is covered by six sub-orbital plates, behind the last of which are two supra-temporals.

Mouth large, with the gape oval, wide; jaws nearly equal; the upper formed by the intermaxillaries above, and by the maxillaries, which are articulated to their ends, on the side.

Teeth in single rows on the intermaxillaries, maxillaries, and dentaries; these are conical, and on the intermaxillaries one or

two of the middle ones pass beyond the others. Those on the palatines and pterygoids are all equal and villiform; the latter bones are continued along the internal border of the former, and constitute the arched plate of the palate, separated in the middle, from that of the opposite side, by the smooth vomer.

Lateral line running in a straight direction to the caudal fin.

Branchiostegal rays five, broad.

Dorsal with the height and length nearly equal.

Anal between the posterior portion of the dorsal, and the base of the caudal; its height and length are nearly equal, and its margin rounded.

Caudal with the base covered by scales, and with a rounded margin.

Ventrals and *Pectorals* moderate, and with rounded margins.

Erythrinus cinereus, Gill.

Vernacular: *Waubeen.*

Body thick and stout, the total length, inclusive of the caudal, rather less than five times as great as the height, and four and a half times greater than the length of the broad and short head. The eyes, less than one seventh of the head's length, are separated from each other by a space little less than three of their diameters, and are distant from the snout nearly two diameters. The distance of the dorsal from the snout is more than double the length of the head. The body is crossed by ten rows of scales, and thirty-five are perforated by the lateral line.

D. 10. A. 11. C. 16. P. 15. V. 8.

The color is ash, lighter on the abdomen; the dorsal has about four rows of dusky spots between the rays; all the other fins are immaculate.

Family.

CHARACINIDÆ, MULLER.

Sub-family.

TETRAGONOPTERINÆ, GILL.

Genus.

PŒCILURICHTHYS, GILL.

Body oval, compressed, and with the abdomen rounded, the whole covered by moderate scales.

Head with the profile triangular; cheeks covered entirely by the large third suborbital plate.

Mouth moderate, with the gape elliptical; lower jaw shorter than the upper. The intermaxillaries form the upper part of the arch of the upper jaw, and are immovable.

Teeth in two rows on the intermaxillaries, and in one row on the dentaries; they are wide, compressed, increasing to the crowns, which are multicuspid, with the middle cusp largest; the teeth of the maxillaries, when any are present, are very small and conical. Palatine, vomer, and tongue smooth.

Opercula with the margins rounded.

Nasal apertures near the superior and anterior margin of the eyes.

Lateral line with the anterior portion deflected for a short distance, and then continued in a straight line along the flanks, sometimes to the caudal fin, and at other times abruptly terminated near the middle.

Dorsal nearly in the middle of the body, short, and higher than long. The adipose dorsal is near the region above the posterior portion of the anal.

Anal long, moderately high, declining towards the posterior end.

Caudal forked, with the lobes of equal size.
Pectorals moderate, with the external rays longest.

The species of this genus have been included by all previous naturalists, who have had occasion to treat of the family to which they belong, under the group which has received from Artedi the generic name of Tetragonopterus. Valenciennes had, indeed, in the Histoire Naturelle des Poissons, observed that his attention had been arrested by the great difference of form which existed between these fishes, and those species for which the Artedian genus was originally chiefly instituted; but as the variation of form was unaccompanied by any corresponding anatomical characters, he did not deem it advisable to elevate the section to the rank of a genus.

We, however, believe, that so great a variation in form as that which exists between the species of the first and second sections of Valenciennes, even if unaccompanied by any other difference, is of generic value; and we have therefore separated them into two distinct genera, retaining Tetragonopterus as the generic name of the rhomboidal, or sub-orbicular species, and to the elongated oval species we give the name of Pœcilurichthys, in allusion to the bands or spots which are almost always branded on the tail. We derive the name from the Greek Ποικιλος, variegated, Ουρα, tail, and Ιχθυς, fish; it is therefore sufficiently distinct in signification, as well as in sound, from Pœcilichthys of Agassiz.

Another group, which is represented in the island of Trinidad, has the lateral line abruptly terminated at a considerable distance from the caudal fin; in other respects it has the greatest affinity to Poecilurichthys, having, like the typical species of that genus, two rows of cuspidate teeth in the upper jaw, and one in the lower. We have not been able to study it with much care, as we have only two specimens of a single species, but when it has been dissected, and the pharyngeal bones examined, it will in all probability be found to present additional

characters, which will distinguish it from Poecilurichthys proper. The tail is without the large spot which is found in almost every species, not only of that genus, but of almost every other Characin found in South America, or its zoological dependencies.

This group we have provisionally only elevated to the rank of a sub-genus, which we have called Hemigrammus,* intending by that name to allude to the lateral line, which does not traverse more than half of the length of the side.

In the genus Poecilurichthys, most of the species which have been described by Valenciennes as belonging to the second section of Tetragonopterus, will be included. These are Poecilurichthys Linnaei, P. taeniatus, first described by Jenyns, P. grandisquamis, or Tetragonopterus grandisquamis, of MM. Muller and Troschel, P. Orbignyanus, described by M. Valenciennes, P. fasciatus, first described as a Chalceus by M. Cuvier, P. scabripinnis, described by Jenyns, P. Peruanus, a species of Muller and Troschel, and P. Wappi, first described by Valenciennes. There are four other species which have been referred by the great ichthyologist of France to his second section, which probably do not belong to this genus. The Tetragonopterus interruptus of Jenyns, which he had not seen, but which was conjectured by him to be a species of his genus Piabuca, hardly belongs to either that genus, as it should properly be restricted, or to Schizodon of Agassiz, which was united to Piabuca by Valenciennes; by the small number of anal rays, it appears to be more nearly allied to the genus of Agassiz, but is probably the type of a new one, which will be distinguished, among other characters, by the imperfect lateral line. The Tetragonopterus viejita Val., T. melanurus Val., and T. spirulus Val., are perhaps types of as many distinct genera.

* Ἡμι half, and Γράμμα, line.

Sub-genus.

PŒCILURICHTHYS, GILL.

Lateral line continued to the caudal fin.

Pœcilurichthys Brevoortii, Gill.

VERNACULAR: *Sardine.*

Body oval, with the head forming little more than one-fifth of the entire length, inclusive of the caudal fin. The eyes are large, their width being slightly less than a third of the head's length; the distance between their anterior borders and the snout is more than two-thirds of one of their diameters, and twice that space intervenes between them. The dorsal commences at a distance from the snout equal to double the length of the head; the greatest height of the body is equal to one-third of the entire length. The ventrals do not reach the anal; the tips of the pectorals barely extend to the bases of the ventrals. There are no markings on the operculum. The body is crossed by fifteen rows of scales.

D. 11. A. 29. C. I. 9. 8. I. P. 13. V. 8.

The back and upper part of the body are of a pale yellowish green color, which is separated from the lighter hue of the lower portion, by an obscure silvery band, extending from the upper angle of the operculum to the caudal fin. There is a very distinct black spot on each shoulder, a little above the oblique portion of the lateral line, and another on the tail, which often advances along the middle rays of the caudal to the margin of that fin, terminating in a point; the anterior portions of the pectorals, and the anal, are bright orange. The opercular bones are silvery.

This is the largest of the Trinidad species of this genus, and

reaches a length of between five and six inches. It is at once distinguishable from the other insular species by its greater height, and by the presence of black humeral and caudal spots. It appears to be very nearly allied to the Tetragonopterus Linnæi of Valenciennes, or the Albula maculata of Linnæus. The former, which is probably the same as the Linnæan species, is an inhabitant of Cayenne.

We have dedicated it to Mr. J. Carson Brevoort, of the city of Brooklyn, whose profound knowledge of the North American marine fishes, and especially those of the family of Scombroids, to which his memoir on the "lost fish," Selene argentea of Lacepede, bears testimony, places him among the first of ichthyologists.

Pœcilurichthys tæniurus, Gill.

VERNACULAR: *Sardine.*

Body slender, with a subfusiform outline, four times longer than high. The head, from the snout to the margin of the operculum, forms more than two-elevenths of the entire length, inclusive of the caudal fin. The diameters of the eyes are considerably more than a third of the height of the head; a space exceeding half of one of their diameters intervenes between them and the snout, and the space between them is equal to three quarters of a diameter. The body, at its greatest height, is crossed by fourteen rows of scales. The dorsal commences at a distance from the snout, equal to two-fifths of the entire length of the body. The extremities of the ventrals extend to the commencement of the anal.

D. 10. A. 27. C. I. 9. 9. I. P. 13. V. 8.

The ground color is yellowish green; a broad silvery band passes along the sides, and extends from the angle of the operculum to the peduncle of the tail; the middle rows of the caudal are covered by a broad black band, which extends to

the margin of the fin, and is bordered above and below by yellow; the remainder of the fin is white; the anterior rays of the first dorsal and adipose fin are red. The other fins and the operculum are silvery. There is a humeral spot as in *P. Brevoortii Gill.*

The average length of this species is less than three inches. Its distinctive characters reside in the slender body, and the uniform black band running along the median rays of the caudal fin, and bordered above and beneath with yellow.

Pœcilurichthys pulcher, Gill.

VERNACULAR: *Sardine.*

The outline of the body is oval, and including the caudal, is three and two-fifths longer than the height at the dorsal. The head forms three-sixteenth parts of the entire length of the body; the eyes are very large, their diameters being nearly one-third of the length of the head; they are separated from each by a space equal to one of their diameters, and by two-thirds of that distance from the snout. The distance of the dorsal from the snout is more than double the length of the head. The ventrals do not extend as far back as the anal.

D. 10. A. 22. C. 7. 8. 8. P. 20. V. 8.

The body is chiefly of a greenish yellow color, with a silvery band running along the sides; an obscure humeral blotch is generally perceptible; at the end of the caudal peduncle there is a black spot, which is bordered above and below by red, or sometimes yellow blotches. The dorsal and anal fins are white, tinted with red; on the operculum there are blotches of a bright golden color.

This species is readily distinguished by its smaller size, which rarely exceeds one inch and a half; by the golden markings on the opercula, which are seen in neither of the preceding

species, and by the red or yellow blotches above and beneath the black caudal spot. It associates in large numbers, and is very familiar, approaching the bather, and nibbling at his legs and body.

Subgenus.

HEMIGRAMMUS, GILL.

Lateral line abruptly discontinued at the middle of the body.

Pœcilurichthys unilineatus, Gill.

The height of the body, before the dorsal, is contained three times and a fifth in the total length from the snout to the end of the lobes of the caudal. The length of the head bears to that length the proportion of three to thirteen. The eyes are very large, and only contained three and two-seventh times in the head's length; the distance between them is less than the diameter, and a space equal to only four sevenths of the diameter separates them from the snout. The dorsal commences at two-fifths of the length of the body from the snout. Twelve rows of scales cross the highest point of the body.

D. 11. A. 27. C. I. 8. 8. I. P. 12. V. 6.

The chief color of the body is a light greenish yellow; a rather indistinct silvery stripe runs along the middle. The pectoral, ventral, and caudal fins are white; the dorsal has the upper part covered by a large black spot, and the lower half and margin white; a narrow band of black obliquely crosses the four or five anterior rays of the anal, commencing at the top of the first ray; the remainder of the fin is white. There are golden blotches on the surface of the operculum.

The size of this species is the same as that of Pœcilurichthys pulcher. Its subgeneric character will distinguish it from all known species. The black line on the anal, and the unspotted

shoulder and tail also distinguish it. Like Pœcilurichthys pulcher, its opercula have golden blotches.

Sub-family.

CURIMATINÆ, GILL.

Genus.

CURIMATUS, CUV., VAL.

Body with a sub-fusiform or oval outline, compressed, covered by moderate or small scales.

Head moderate, compressed, with the profile sub-conical; broad, and generally rounded above; third sub-orbital large and covering the cheeks.

Mouth small and with a subquadrate gape, placed at the extremity of the snout. The margin of the upper jaw is formed above by the thin and trenchant intermaxillaries, which are movable but not protractile, and on the sides by the small maxillaries. The maxillaries, intermaxillaries, and dentaries are edentate; the margins of the latter, like those of the intermaxillaries, are trenchant; at their symphisis is a tubercle, which is received into a corresponding notch in the upper jaw.

Opercula with the margins rounded.

Lateral line continued in a straight line to the end of the tail.

Dorsal subquadrate, as high, or higher than long, placed over the bases of the ventrals.

Adipose fin pedunculated, opposite the anal.

Anal with the base short, and generally exceeded by the length of the first ray.

Pectorals moderate and not pointed, the first ray not being longest.

Ventrals moderate and triangular, with spiniform axillary scales.

Caudal deeply emarginate.

Curimatus argenteus, Gill.

VERNACULAR: *Silver-fish.*

Body sub-fusiform, highest at the anterior base of the dorsal, where it is three-tenths of the entire length; the greatest thickness is contained two and a third times in its height. The head, from the muzzle to the angle of the operculum, is contained four times and two-thirds in the entire length; the distance from the muzzle to the nape is only two-thirds of this length. The diameter of the orbit is greater than the space that intervenes between it and the muzzle, and is contained little more than three times in the total length of the head; the distance between the orbits surpasses by more than a third their respective diameters. The commencement of the dorsal is less than a third of the length of the body nearer the snout than the end of the caudal. The lateral line runs through thirty-seven scales; thirteen obliquely cross the body from the front of the dorsal to the belly.

D. 10. A. 8. C. 3, 10, 9, 2. V. 9. P. 13.

The color is uniform silvery on the body. A black spot is branded on the middle scales at the base of the caudal, and a number of black dots cover the inferior third of the membrane, between the middle rays of the dorsal, and give the appearance of a rounded spot.

Sub-family.

STEVARDIANÆ, GILL.

The group, which we have erected into a distinct tribe or sub-family under the above name, is very distinct and peculiar among the Characins, and may very readily be distinguished from any other tribe of the family. In the want of an adipose dorsal, especially, it widely departs from any other.

In the posterior position of the dorsal, which is placed over the anal, it resembles the genus Gasteropelecus of Bloch, and Serpes of Lacepede. It bears a further resemblance to that fish, as well as to Anastomus of Cuvier, and Piabucina of Valenciennes, in the oblique fissure of the mouth. In the armature of the mouth, it resembles Tetragonopterus of Artedi, and the allied genera, having like them two rows of compressed teeth, whose cutting margins are each armed with several triangular points, of which the middle is largest. A character which may serve to distinguish it, in addition to the want of an adipose fin, is in the operculum, which, in all known species, is more or less extended, sometimes armed with a posterior spine, but generally terminating in a claviform process, or in a slender filament. The dorsal is also much higher than long, and exceeds in height, but is much shorter than, the anal; the last posterior rays of the latter fin are generally longer than those which precede them, and in one genus, that fin regularly increases towards the posterior margin. The sub-orbitals are nearly similar to those of the Tetragonopteri.

Genus.

STEVARDIA, GILL.

Body subfusiform, compressed, covered by moderate scales; abdomen rounded.

Head with the lateral aspect subconical, compressed.

Mouth oblique, moderate, narrow, with the gape elongated elliptical. The teeth of the dentary, when the mouth is closed, are received behind those of the exterior row of the intermaxillaries, but on account of the obliquity of the mouth, the lower jaw projects considerably beyond the upper.

Teeth in two rows on the intermaxillaries, and in a single one on the dentaries; these are wide, compressed, widening towards the crowns, which are multicuspid, with the median cusp longest.

Nasal apertures with their common border circular, large, and situated near the eyes, and on a line between them and the snout.

Operculum with a triangular, spiniform dilatation behind; cheeks entirely covered by the large third sub-orbital.

Lateral line deflected for a short distance from the mastoids, and thence running in a nearly straight line to the tail.

Dorsal posterior, over the middle of the anal, with the height not greatly exceeding the length.

Anal rather long, with the height moderate, decreasing towards the posterior termination.

Caudal deeply forked, with the lobes subequal.

Ventrals very small, with the external rays longest.

Pectorals moderate, pointed, with the external rays longest.

We are generally averse to the dedication of groups of species to individuals, and admit its expediency in only few and exceptional instances, but in this case we believe that we shall be justified in so doing: we have taken peculiar pleasure in dedicating to our excellent friend, Mr. Jackson Steward, of whom we have before made mention, this most interesting genus, the type of a new sub-family of the Characins, and a near relation of the extraordinary fish to which we have given the name of Nematopoma. Mr. Steward, animated by a laudable zeal for the increase of our knowledge of animals, and of their geographical distribution, has enabled us to visit those islands, from a single one of which we have succeeded in obtaining the many new and remarkable forms, some of which this memoir is designed to illustrate. We are therefore actuated as much by a desire to commemorate his agency in the discovery of these animals, as in gratitude to himself, by the name which we have bestowed upon this genus.

Stevardia albipinnis, Gill.

Body subfusiform, elongated, with the dorsal outline slightly arched, and the abdominal outline, as far as the termination of the anal, convex. The head, from the snout to the end of the opercular spine, bears a proportion to the entire length, inclusive of the caudal, of little less than one to five and a third, and its length is considerably less than the greatest height of the body. The diameters of the eyes are about three-tenths of the length of the head; they are separated from each other by a space exceeding one of those diameters, and their distance from the snout is less than a diameter. The dorsal commences on the posterior half of the body, above the seventh or eighth ray of the anal, and is about a third higher than long. The lateral line runs through about forty scales.

D. 10. A. 20. C. 6. I. 8. 9 I. 5–8. P. 10. V. 6.

The body is yellowish green, with a black line on the side, extending from a point in advance of the dorsal to the caudal. Opercular bones silvery; all the fins are white.

Genus.

Corynopoma,* Gill.

Body subfusiform, compressed, covered by moderate scales; abdomen rounded.

Head compressed, with the lateral aspect triangular.

Mouth opening obliquely upwards, moderate, with the gape elongated, elliptical. Lower jaw advanced beyond the upper, but with the single row of teeth received between the external and internal rows of the latter.

Teeth multicuspid, with the median cusps largest, in two rows on the intermaxillaries, and in one row on the dentaries.

* Κορυνη, club, and Πωμα, operculum, in allusion to the claviform prolongation of the operculum.

Nasal apertures near the antero-superior corners of the eyes.

Operculum with a posterior triangular dilatation, from the extremity of which issues a more or less long and slender compressed process.

Lateral line deflected at its commencement, but soon continued in a straight line, on the flank, to the caudal fin.

Dorsal posterior, above the middle of the anal, much higher than long, with the base short.

Anal long, of moderate height, and decreasing posteriorly.

Caudal deeply forked, with the lobes of nearly equal length.

Ventrals very small, pointed.

Pectorals moderate, pointed, with the superior rays longest.

The most important peculiarity, which distinguishes this genus from Stevardia, is the claviform extension of the operculum.

Corynopoma Riisei, Gill.

The general shape of the body is similar to that of the *Stevardia albipinnis.* The head, from the snout to the end of the crest of the external occipital, forms about one seventh of the entire length, inclusive of the caudal fin, and exclusive of it, a fifth. The distance from the snout to the margin of the preoperculum is nearly as great as to the crest. The claviform prolongation of the operculum is most slender at the posterior third of its length, and is slightly deflected in the direction of the anus; it advances but little beyond the inner angle of the base of the pectoral. The eyes are about two fifths of the length of the head from the snout to the occipital crest, and are separated from each other by a space nearly equal to one of their diameters; much less than that distance intervenes between them and the snout. The height of the body is greatest at the middle, and is there about a third more than the length of the head.

The dorsal commences at a distance from the snout equal to three lengths of the head; the length of the base of this fin is about three sevenths of that of the longest rays. The base of the anal has a length almost three times as great as the dorsal's, but its longest rays are considerably shorter than those of the latter fin; the last two or three rays are longer than those which immediately precede them.

D. 8. A. 27. P. 10. V. 6.

The color is nearly similar to that of Stevardia albipinnis.

Mr. A. H. Riise of the Danish island of St. Thomas, the gentleman to whom this species has been dedicated, is well known as one of the most active zoologists of the West Indies, and has greatly contributed to our knowledge of the terrestrial Mollusks, and the Echinoderms, by his contributions to Dr. Louis Pfeiffer, and Dr. A. Lutken.

Corynopoma Veedonii, Gill.

This species resembles in the general shape of the body, and in its size, *Stevardia albipinnis*, and *Corynopoma Riisei*. The head is slightly longer in proportion to the total length, and the eyes are rather smaller, but the chief difference consists in the greater length, and the direction of the claviform prolongation of the operculum; this appendage, instead of being deflected downwards for its entire length, descends only at the base, and very soon advances upwards with a curve, and is continued in a nearly straight line, and in a direction towards the anterior portion of the dorsal; it terminates on a line with the base of the ventral; its size is nearly equal from its point of curvature to the termination.

The dorsal commences at nearly the same distance from the snout as in the *Corynopoma Riisei*, and its proportion varies little from those of the latter species, its height being more than double the length of the base. The anal is not quite as long in proportion to the dorsal as in the *C. Riisei;* its first and longest

rays are more than three quarters of the length of the dorsal's; the subsequent rays gradually decrease in length towards the posterior portion of the fin, but the last three or four rays are produced beyond the others as in the *C. Riisei.*

D. 9. A. 31. P. 10. V. 6.

The color is, as in the preceding species, silvery green above, and white beneath, with a black line posteriorly on the sides and caudal peduncle; there is also a rose-colored band, in the living animal, on each side.

Genus.

NEMATOPOMA,* GILL.

Body subfusiform, compressed, covered by moderate scales; abdomen convex and rounded.

Head compressed, with the profile sub-conical.

Mouth opening obliquely upwards, moderate, with the gape elongated elliptical. Lower jaw advanced beyond the upper, but with its single row of teeth received in the space between the outer and inner rows of the latter.

Teeth in two rows on the intermaxillaries, and in a single one on the dentaries; they are broad, compressed, with the crowns multicuspid, and with the middle cusp longest.

Nasal apertures near the antero-superior border of the eyes; the posterior one is much larger.

Operculum with a triangular spiniform dilatation, which is continued from the apex into a very long slender setaceous filament, which has a compressed dilatation at the extremity. Cheeks entirely covered by the large third suborbital.

Lateral line deflected for a short distance from the mastoids, and thence running in a nearly straight course to the caudal.

Dorsal posterior, above the middle of the anal, with the base short, and with the height very great.

* Formed from Νεμα, a thread or filament, and Πωμα, operculum, in reference to the slender filament of the operculum.

Anal long, and high, increasing posteriorly.

Caudal very deeply forked, and with the lower lobe much longer than the upper.

Ventrals small, pointed behind.

Pectorals moderate, pointed, with the external rays longest.

This is readily distinguishable from all the allied genera of the sub-family by the slender filament of the operculum, the unequally lobed caudal, the excessively high dorsal, and the anal, which regularly increases in height from the anterior to the posterior end, a character which is hardly possessed by any other fish.

Nematopoma Scarlesii, Gill.

The body is slender, subfusiform, with the abdominal outline to the end of the anal much more arched than the dorsal; the head, from the snout *to the occipital crest*, forms one fourth of the length *exclusive of the caudal*, one fifth of the length to the end of the upper lobe of that fin, and one sixth of the length to the end of the filamentary termination of the lower lobe. The eyes are large, their diameters exceeding a third of the head's length as previously measured; they are separated by more than a diameter from each other, and less than a diameter intervenes between them and the snout. The dorsal commences above the fifth or sixth ray of the anal, and when bent back extends beyond the peduncle of the tail; its longest rays are five times the length of the base of the fin; the length of the base of the anal is nearly three and a half times greater than that of the dorsal, but its height is not much greater than half of that fin. The opercular filament is expanded at the extremity, and reaches to a point behind the dorsal. The pectorals, extending as far back as the ventrals do, pass beyond the anterior margin of the anal.

D. 10. A. 26. C. 2. I. 8. 9 I. 4. P. 10. V. 6.

The color is the same as in Stevardia albipinnis.

Note on the Genus Ctenogobius.

This genus, first described at page 374, proves to have been insufficiently characterized. The form of the head, in comparison with some other species of Gobies, can scarcely be said to be *long*, and the plan of stating the extent of the squamation, adopted in describing the other genera, was omitted in the diagnosis of the present one. To remedy this defect, and to more accurately restrict the genus, the following amendments are made:

The head is inflated, laterally oblong and subquadrate, and with the profile before the eyes very descending. The eyes are in the anterior portion of the head, nearly horizontal, and closely approximated. The head, vertex, and nape are destitute of scales, and the bare space extends, in the typical species, to the front of the dorsal fin.

The cleft of the mouth extends little further back than the anterior border of the eye.

The anterior row of large, subcylindrical recurved teeth on the intermaxillaries extends along the greater portion of the length of the jaw, and the teeth decrease in size from the front: the mandibular row extends around the front only, and the terminal one, on each side, is larger and more recurved than the rest, and may be regarded as a canine.

The form of the head in *Ctenogobius* has a generic resemblance to the *Gobius Niger* of Linnæus. It especially differs generically from that species by the naked vertex, and nape.

Eine bei weitem werthvollere Mittheilung über die Süsswasserfische der Insel Trinidad hat Gill geliefert: Synopsis &c. Annals Lyceum New-York VI, p. 363–430.

Diese Abhandlung zeigt, wie viel Neues und Interessantes noch auf den Inseln Westindiens zu finden ist. Möchte sie doch eine Aufforderung für die Naturforscher sein, jene Inseln, die doch so leicht zugänglich sind, gründlicher zu erforschen. Die beschriebenen Fische gehören folgenden Familien an: 1 Scianoid, 1 Gobioid, 3 Chromiden, 7 Siluroiden, 11 Characinen. Die neuen Gattungen und Arten sind unten bezeichnet.

Preservation Assessment