J. PIERPONT MORGAN PUBLICATION FUND

Reports of The Princeton University Expeditions to Patagonia, 1896-1899

J. B. HATCHER, in Charge

EDITED BY WILLIAM B. SCOTT
BLAIR PROFESSOR OF GEOLOGY AND PALEONTOLOGY, PRINCETON UNIVERSITY

VOLUME III—ZOOLOGY

Part IV. Catalogue of the Fresh-Water Fishes of Tropical and South Temperate America

BY C. EIGENMANN
INDIANA UNIVERSITY

(Pp. 375-511)

PRINCETON, N. J.
THE UNIVERSITY
STUTTGART
E. SCHWEIZERBART'SCHE VERLAGSHANDLUNG (E. NÄGELE)
1910
Issued February 12, 1910

PRESS OF
The New Era Printing Company
Lancaster, Pa.
REPORTS OF THE
PRINCETON UNIVERSITY EXPEDITIONS
TO PATAGONIA, 1896-1899

J. B. HATCHER
IN CHARGE

EDITED BY
WILLIAM B. SCOTT
BLAIR PROFESSOR OF GEOLOGY AND PALÆONTOLOGY, PRINCETON UNIVERSITY

VOLUME III, 2
ZOOLOGY

UNIV. OF CALIFORNIA

PRINCETON, N. J.
The University
STUTTGART
SCHWEIZERBART'SCHE VERLAGSHANDLUNG (E. NÄGELE & DR. SPROESSER)
1905-11
J. PIERPONT MORGAN PUBLICATION FUND

REPORTS OF THE
PRINCETON UNIVERSITY EXPEDITIONS TO PATAGONIA
1896-1899

VOLUME III, 2

ZOOLOGY

IV. CATALOGUE OF THE FRESH-WATER FISHES OF TROPICAL AND SOUTH TEMPERATE AMERICA

BY CARL H. EIGENMANN
INDIANA UNIVERSITY

V. NON-MARINE MOLLUSCA OF PATAGONIA

BY H. A. PILSBRY
ACADEMY OF NATURAL SCIENCES, PHILADELPHIA

VI. CRUSTACEA OF SOUTHERN PATAGONIA

BY A. E. ORTMANN
CARNEGIE MUSEUM, PITTSBURGH

VII. HIRUDINEA OF SOUTHERN PATAGONIA

BY J. PERCY MOORE
UNIVERSITY OF PENNSYLVANIA

PRINCETON, N. J.
THE UNIVERSITY
STUTTGART
SCHWEIZERBART'SCHE VERLAGSHANDLUNG (E. NÄGELE & DR. SPRÖSSE) 1905-11
PART IV.

CATALOGUE OF THE FRESH-WATER FISHES OF TROPICAL AND SOUTH TEMPERATE AMERICA.

BY

C. H. EIGENMANN,
INDIANA UNIVERSITY.

IN the following list are enumerated the orders, families, genera and species of fishes inhabiting the fresh waters of the West Indies, South America, and Middle America south of a line joining the Rio Panuco on the east and the Rio Presidio near Mazatlan on the west. The list attempts to be complete to June, 1909.*

Under each genus will be found the synonyms and the type of the genus, and the total range of its species. The range will be the sum of the distributions of the species enumerated, except in cases of genera having extralimital species.

Under each species are given its synonyms and the geographical distribution.

Opposite each species, except in the case of the Characins and species dealt with in the Patagonian section of this work, will be given a reference which will connect this work with the literature on the species.

A catalogue of the fresh-water fishes of South America was published by Eigenmann and Eigenmann in the Proceedings of the United States National Museum, 1891, and a catalogue of the Middle American species in the same serial for 1892. Free use has been made of these catalogues. The task of bringing the work down to date has been greatly lessened by the following works of recent years:


* The entire MS. was completed to 1906. Delay in publication has enabled me to bring the catalogue down to June, 1909. In consequence of bringing the catalogue down to 1909 some discrepancies between the preceding and following lists of species will be found. An especially large number of additions are made to the Characins and the fauna of Guiana.


Eigenmann, C. H., The American Characidæ, in MS.

These papers, exclusive of the MS. monograph on the Characidæ, are referred to under the name of the author and the page. Other papers are quoted by the author, year of publication and the page. The full titles may readily be found in the bibliography at the end of the Catalogue.

All fishes recorded from fresh water are enumerated. In tropical America many marine species enter fresh water. Some of these do not go far beyond the mouths of rivers, others ascend streams several thousand miles. Perhaps some of the marine species enumerated should have been excluded, probably others should have been added. The author will be very glad to be informed of any omissions or errors of any sort.

In order to emphasize the Pacific slope fauna the species from this area are in heavy type. To readily distinguish the Amazonian species, these are preceded by an A.

Class I. MARSIPOBANCHII.

Order HYPEROARTII.

Family PETROMYZONIDÆ.

LAMPETRA Gray.

Type: Petromyzon fluviatilis Linnaeus.
Range: Brooks of America and Europe.

1. Lampetra spadicea Bean, . . . Meek, 2.
Habitat: Rio Lerma Basin.

GEOTRIA Gray.

Velasia Gray.

Type: Geotria australis Gray.
Range: Southern South America and Australia.

1. Geotria chilensis (Gray).

Macrophthalmia chilensis Plate.

Habitat: Streams of Chili and Argentina; New Zealand.

EXOMEGAS Gill.

Type: Petromyzon macrostomus Burmeister.

Range: From Buenos Aires south.

1. Exomegas macrostomus (Burmeister).
Habitat: La Plata River.
EIGENMANN: CATALOGUE OF FRESH WATER FISHES.

2. *Exomegas macrostomus gallegensis* (Smitt).
   Habitat: Rio Gallegos.
   **CARAGOLA** Gray.
   **Mordacia** Gray.
   Type: *Caragola lapicida* Gray.

Range: Southern South America and Australia.

1. *Caragola mordax* (Richardson).
   *Caragola lapicida* Gray; *Petromyzon anwundteri* Philippi; *Petromyzon acutidens* Philippi.
   Habitat: Chili and Tasmania.

---

Class II. **PISCES.**

Subclass **SELACHII.**

Order **ASTEROSPONDYLI.**

Suborder **GALEI.**

Family **GALEIDÆ.**

**CARCHARHINUS** Blainville.

*Eulamia, Platypodon, Isogomphodon and Lamiopsis* Gill.
Type: *Carcharhinus commersoni* Blainville = *Carcharias lamia* Rafinesque.
Range: All warm seas.

Habitat: Lake Nicaragua and its outlet.

**MUSTELUS** Cuvier.

Type: *Squalus mustelus* Linnaeus.
Range: Warm and temperate seas.
Habitat: La Plata.

---

Order **BATOIDEI.**

Suborder **SARCURA.**

Family **RAJIDÆ.**

**RAJA** Linnaeus.

*Dipturus and Platopterus* Rafinesque; *Dasybatis* Blainville; *Protergyia Otto; Lévirafa and Batis* Bonaparte; *Uraptera* Müller & Henle; *Malacorhinus* Garman.

Type: *Raja batis* Linnaeus.
Range: Temperate seas, a few of the species entering rivers.
Habitat: La Plata.
Habitat: La Plata.

---

Family **NARCOBATIDÆ.**

**NARCINE** Henle.

*Cyclonarce and Gionionarce* Gill.
Type: *Torpedo brasiliensis* Ölfers.

Range: Warm seas; a single American species; enters rivers.
Suborder MASTICURA.

Family MYLIOBATIDÆ.

**Myliobatis** Duméril.

_Holorhinus_ Gill.

_Type: Raja aquila_ Linnaeus.

_Habitat:_ All warm seas; _La Plata._

Family DASYATIDÆ.

**Paratrygon** Duméril.

_Disceus_ Garman.

_Type: Trygon aiereba_ Cuvier.

_Range that of the single species._

A1. **Paratrygon** _strongylopterus_ (Schomburgk), _Günther,_ VIII, 476.

**Trygon** _aireeba_ Duméril; **Trygon orbiculiris** Günther.

_Habitat:_ British Guiana; _Amazons._

**Potamotrygon** Garman.

_Type: Pastinaca humboldtii_ Roulin.

_Range: Fresh waters of South America._

1. **Potamotrygon** _brachyurus_ (Günther), _Günther_ 1880, 8.

_Habitat:_ _La Plata._

A2. **Potamotrygon** _humboldtii_ (Roulin).

**Trygon** _hystrix_ Müller & Henle.

*Trygon garrapa_ Schomburgk.

_Habitat: Rivers from the _La Plata_ to the Orinoco; Paraguay, Rio Branco; Orinoco at Apuré._

3. **Potamotrygon** _d'orbignyi_ (Castelnau), _Günther,_ VIII, 484.

_Habitat:_ Orinoco.

A4. **Potamotrygon** _reticulatus_ Günther, as _hystrix_ Günther, VIII, 482.

_Habitat:_ Surinam; Santarem.

5. **Potamotrygon** _magdalena_¹ (Steindachner), _Steindachner,_ 1878, 56.

_Habitat:_ _Rio Magdalena._

A6. **Potamotrygon** _motoro_ (Müller & Henle), _Steindachner,_ VIII, 484.

**Trygon** _henlei_ Castelnau; **Trygon garrapa_ Schomburgk; **Tæniura mulleri** and _henlei_ Castelnau.

_Habitat:_ _Rio Cuyaba; Rio Branco._

A7. **Potamotrygon** _dumerilii_ (Castelnau), _Günther,_ VIII, 484.

_Habitat:_ Araguauy; Tocantins; Rio Crixas; Paraguay.

**Ellipesurus** Schomburgk.

_Type: Ellipesurus spinicauda_ Schomburgk.

_Range that of the single species._


_Habitat:_ _Rio Jurua; Rio Branco._

—Garman considers _d'orbignyi_ and _magdalena_ synonymous with _humboldtii._
Subclass *DIPNOI*.
Order *DIPNEUMONA*.
Family *LEPIDOSIRENIDÆ*.

*Lepidosiren* Fitzinger.
*Amphibichthys* Hogg.
Type: *Lepidosiren paradoxa* Fitzinger.
Range that of the single species.

A1. *Lepidosiren paradoxa* Fitzinger,
Günther, III, 322.
*Lepidosiren assimilis* Castelnau; *Lepidosiren articulata* Ehlers.
Habitat: Amazons to Paraguay.

Subclass *TELEOSTOMI*.
Order *RHYMOBOGANOIDEA*.
Family *LEPISOSTEIDÆ*.

*Lepisosteus* Lacépède.¹
*Cylindrosteus*, *Atractosteus*, *Sarchirus* Rafinesque; *Lepisosteus* Agassiz.
Type: *Lepisosteus gavialis* Lacépède.
Range: Panama and northward to Cuba and the Atlantic slope of North America.

Lepidosteus berlandi Girard; *Atractosteus lucius* Duméril; *Lepisosteus viridis* Günther.
Habitat: Cuba and Mexico from Tampico north.
2. *Lepisosteus tropicus* (Gill), . . . Meek, 7.
Habitat: Isthmus of Tehuantepec, Rio Usumacinta to Panama; Huamuchal.

Superorder *OSTARIOPHYSI*.
Order *NEMATOGNATHI*.
Family *ASPREDINIDÆ*.
Subfamily *BUNOCEPHALINÆ*.

*Bunocephalichthys* Bleeker.
Type: *Bunocephalus hypsiurus* Kner.
Range that of the single species.
Habitat: Rio Branco.

*Agnus* Eigenmann MS.
Type: *Bunocephalus scabriceps* E. & E.
¹ *Lepiososteus osseus*, a north temperate species, reaches Tampico just within the tropics.

Range: Amazons to Guiana.
Habitat: Jutahy.
2. *Agnus lyriformis* Eigenmann MS.
Habitat: British Guiana.

*Bunocephalus* Kner.
Type: *Platystacus verrucosus* Bloch.
Range: Amazons; Paraguay; Rio Grande do Sul.
1. Bunocephalus amaurus Eigenmann MS.
   Habitat: British Guiana.
A2. Bunocephalus verrucosus (Bloch),
    E. & E., 16.
   Habitat: Amazon, below the Madeira.
3. Bunocephalus dorica Boulenger,
    Boulenger, 1902.
   Habitat: Paraguay.
4. Bunocephalus iheringii Boulenger,
    Boulenger, 1891, 235.
   Habitat: Rio Grande do Sul and Paraguay.
   Habitat: Paraguay.
A6. Bunocephalus gronovii Bleeker,
    E. & E., 17.
   Habitat: Mouth of Rio Negro and Demarara.
A7. Bunocephalus bicolor Steindachner,
    E. & E., 17.
   Habitat: Amazon and its tributaries from Cudajas to Huallaga.

Subfamily ASPREDININÆ.

PLATYSTACUS Bloch.
Type: Platystacus cotylephorus Bloch; Cotylephorus Swainson.
Range: Surinam.
A1. Platystacus cotylephorus Bloch,
    E. & E., 21.
   Silurus hexadactylus Lacépède; Aspredo sexcirrhis Cuvier & Valenciennes; Aspredo spectrum Gronow.
   Habitat: Surinam and Rio Para.
2. Platystacus nematophorus Bleeker,
    E. & E., 23.
   Habitat: Surinam.

ASPREDO Bleeker.
Type: Aspredo batrachus (Linnaeus).
   Range: Guiana to the Aragua.

A1. Aspredo aspredo (Linnaeus),
    E. & E., 23.
   Platystacus lavis Bloch; Aspredo batrachus (Linnaeus).1
   Habitat: Guiana; Rio Para and Arary.
   Habitat: French and British Guiana.

CHAMAIGENES Eigenmann.
Type: Aspredo filamentosus C. & V.
Range that of the single species.
   Habitat: Guianas.

ASPREDINICHTHYS Bleeker.
Type: Aspredo tibicen Temmink.
Range that of the single species.

Vaillant has suggested that batrachus may be identical with sicuephorus, in which case the next species should go by the name of batrachus.
A. Aspredinichthys tibicen (Temmink), E. & E., 24.

Habitat: Guiana; Curuca, Rio Muria.

Family DIPLOMYSTIDÆ.

DIPLOMYSTE Duméril.

Type: Arius pappilosus Cuvier & Valenciennes.

Range that of the single species.


Arius carcharias, villosus, squalus, micropterus and synodon Philippi.

Habitat: Chili and Rio Negro of Patagonia.

Family SILURIDÆ.

Subfamily ARIINÆ.

PARADIPLOMYSTES Blecker.

Type: Pimelodus coruscans Lichtenstein.

Range that of the single species.

1. Paradipomystes coruscans (Lichtenstein), E. & E., 30.

Habitat: Brazil.

GENIDENS Castelnau.

Type: Genidens cuvieri Castelnau.

Range that of the single species.


Genidens cuvieri and granulosus Castelnau.

? Rhamdia laukidi Bleeker.

Habitat: Rio de La Plata; Araguaia.

FELICHTHYS Swainson.

Breviceps Swainson; Ailurichthys Baird & Girard; Mystus Gronow.

Type: Silurus bagre Linnaeus.

Range: Tropical seas of America. Probably several species will be found entering streams. F. bagre and marinus are found in the market at Georgetown.

1 Many species of the Ariinae in addition to those enumerated are found at the mouths of rivers and undoubtedly enter fresh water at times.

Galeichthys Cuvier & Valenciennes.

Type: Galeichthys feliceps Cuvier & Valenciennes.

Range: Pacific and temperate seas.


Habitat: Rio Papaloapam Basin.

NETUMA Bleeker.

Type: Arius nasutus Cuvier & Valenciennes.

Range: Tropical seas, entering rivers.

1. Netuma upsilonophorus (Eigenmann & Eigenmann), E. & E., 73.

Habitat: Rio Grande do Sul.

2. Netuma barbus (Lacépède), E. & E., 76.

Pimelodus commersoni Lacépède; Bagrus barbatus Quoy & Gaimard; Pimelodus versicola Castelnau.

1 Galeichthys guatemalensis Günther has been reported from Rio Lara, Darien.
Habitat: La Plata and northward, entering rivers.

ARIUS Cuvier & Valenciennes.
Type: *Pimelodus arius* Buchanan.
Range: Tropical seas, entering rivers.
Habitat: Rio Grande do Sul.
2. *Arius multiradiatus* Günther, E. & E., 92.
Habitat: Rios Bayano and Cianati, Panama.

HEXANEMATICHTHYS Bleeker.
Type: *Bagrus sundaicus* Cuvier & Valenciennes.
Range: Tropical seas, a few of the species entering rivers.
1. *Hexanematichthys assimilis* (Gunther), E. & E., 81.
Habitat: Atlantic coast of Central America; Lake Yzabel, Guatemala; Rio Magdalena.
Habitat: Rio Doce.

SCIADEICHTHYS Bleeker.
Type: *Bagrus emphysetus* Müller & Troschel.
Range: Tropical seas, a few of the species entering rivers.
Habitat: Amazon and northward.

Subfamily Ictalurinae.

ICTALURUS Rafinesque.
Range: Isthmus of Tehuantepec northeast throughout the Atlantic slope.
1. *Ictalurus meridionalis* (Günther), Meek, 11.
Habitat: Atlantic slope of the Isthmus of Tehuantepec.

AMEIURUS Rafinesque.
Type: *Pimelodus cupreus* Rafinesque.
Range: Lerma Basin and valley of Mexico northeast throughout the Atlantic slope of America.

(AUSTOR Jordan & Evermann.)
(Type: *Gadus lacustris* Walbaum.)

Subfamily Callophysinae.

CALLOPHYSUS Müller & Troschel.
Type: *Callophysus macropterus* Müller

1 *Ictalurus furcatus* and *punctatus* of the Mississippi valley reach the Rio Panuco.

1. *Hexanematichthys assimilis* (Günther), E. & E., 81.
Habitat: Atlantic coast of Central America; Lake Yzabel, Guatemala; Rio Magdalena.
2. *Hexanematichthys grandoculis* (Steindachner), E. & E., 85.
Habitat: Rio Doce.

SCIADEICHTHYS Bleeker.
Type: *Bagrus emphysetus* Müller & Troschel.
Range: Tropical seas, a few of the species entering rivers.
Habitat: Amazon and northward.

Subfamily Ictalurinae.

ICTALURUS Rafinesque.
Range: Isthmus of Tehuantepec northeast throughout the Atlantic slope.
1. *Ictalurus meridionalis* (Günther), Meek, 11.
Habitat: Atlantic slope of the Isthmus of Tehuantepec.

AMEIURUS Rafinesque.
Type: *Pimelodus cupreus* Rafinesque.
Range: Lerma Basin and valley of Mexico northeast throughout the Atlantic slope of America.

(AUSTOR Jordan & Evermann.)
(Type: *Gadus lacustris* Walbaum.)

Subfamily Callophysinae.

CALLOPHYSUS Müller & Troschel.
Type: *Callophysus macropterus* Müller

& Troschel; *Pimelotropis* Gill; *Pseudocallophysus* Bleeker.
Range that of the single species.
1. *Callophysus macropterus* (Lichten-
Pimelodina Steindachner.
Type: *Pimelodina flavipinnis* Steindachner.
Range: Lower Amazon.
Habitat: Para.
Habitat: Para.
A3. *Pimelodina guldii* Steindachner, St. 1908b.
Habitat: Rio Purus.

Pinirampus Bleeker.
Type: *Pinirampus pirinampu* Spix.
? *Pimelodus barbancho* Humboldt; *Pinirampus typus* Bleeker.
Habitat: Paraguay; Rio Tocantins to Venezuela.

Megalonema Eigenmann MS.
Type: *Megalonema platycephalum* Eigenmann.
Range that of the single species.
Habitat: Essequibo Basin.

Luciopimelodus Eigenmann & Eigenmann.
*Perugia* Eigenmann & Norris.
Type: *Pimelodus pati* Valenciennes.
Range: Rio de La Plata to Rio Branco.
Habitat: La Plata and Rio Branco.

Subfamily Pimeolinae.

Habitat: La Plata; Paraguay.
Habitat: Amazons.

Zungaropsis Steindachner.
Type: *Zungaropsis multimaculatus* St.
Range that of the single species.
A1. *Zungaropsis multimaculatus* Steindachner, St. 1908a.
Habitat: Xingu.

Lophiosilurus Steindachner.
Type: *Lophiosilurus alexandri* Steindachner.
Range that of the single species.
*Pseudopimelodus agassizii* Steindachner.
Habitat: Rio San Francisco.

Batrachoglanis Gill.
Type: *Pimelodus raninus* Cuvier & Valenciennes.
Range: Rio de Janeiro to the Essequibo.
*Pseudopimelodus charus* Steindachner, non Cuvier & Valenciennes.
Habitat: Rio Parahyba to Rio Doce.
A2. *Batrachoglanis raninus* (Cuvier & Valenciennes), E. & E., 111.
Habitat: Rio Janeiro to Essequibo and Peru.
Habitat: Eastern Ecuador.
PATAGONIAN EXPEDITIONS: ZOOLOGY.

PSEUDOPIMELODUS Bleeker.
Type: Pimelodus bufonius Cuvier & Valenciennes.
Range: Rio de La Plata to Rio Magdalena.
Pimelodus charus Cuvier and Valenciennes.
Habitat: Rio San Francisco to Magdalen.
Habitat: Camaquam River; Paraguay River.
Habitat: Amazons from Para to Tabatinga.
4. Pseudopimelodus villosus Eigenmann MS.
Habitat: British Guiana.
5. Pseudopimelodus albomarginatus Eigenmann MS.
Habitat: Potaro River, British Guiana.

ZUNGARO Bleeker.
Type: Pimelodus zungaro Humboldt.
Range: La Plata and Upper Amazon.
Zungaro humboldtii Bleeker.
Habitat: Marañon.
2. Zungaro mangurus (Valenciennes).
Habitat: La Plata.

BREVIGLANIS Eigenmann MS.
Type: Breviglanis frenata Eigenmann.
Range: British Guiana.
1. Breviglanis frenata Eigenmann MS.
Habitat: Amatuk Cataract.
2. Breviglanis melas Eigenmann MS.
Habitat: British Guiana.
3. Breviglanis phalacra Eigenmann MS.
Habitat: Amatuk Cataract.

LEPTOGLANIS Eigenmann MS.
Type: Leptoglanis essequibensis Eigenmann.
Range that of the single species.
1. Leptoglanis essequibensis Eigenmann MS.
Habitat: Middle Essequibo River.

MYOGLANIS Eigenmann MS.
Type: Myoglanis potaroensis Eigenmann.
Range: Guiana and ? Uruguay.
1. Myoglanis potaroensis Eigenmann MS.
Habitat: Potaro River, British Guiana.
A2. Myoglanis colletii (Steindachner), 1 E. & E., 146.
Habitat: Maldonado.

CHASMOCEPHALUS Eigenmann MS.
Type: Chasmocephalus longior Eigenmann.
Range: British Guiana.
1. Chasmocephalus longior Eigenmann MS.
Habitat: Central British Guiana.
2. Chasmocephalus brevior Eigenmann MS.
Habitat: Potaro River.

HEPTAPTERUS Bleeker.
Type: Pimelodus mustelinus Valenciennes.
Range: La Plata to Rio Grande do Sul.
1. Heptapterus mustelinus (Valenciennes), St., 1907, 486.
Habitat: Santa Catharina and Rio Grande do Sul; Rio de La Plata.
2. Heptapterus eigenmanni Steindachner, E. & E., 144.
H. mustelinus Eigenmann, non Valenciennes.
Habitat: Maldonado.
Habitat: Alto da Serra, Sao Paulo.

I am not sure of the generic position of this species.
ACENTRONICHTHYS Eigenmann & Eigenmann.
Type: Acentronichthys leptos Eigenmann & Eigenmann.
Range: Maldonado to Surinam.
Habitat: São Matheos.
2. Acentronichthys surinamensis (Bleeker), E. & E., 146.
Habitat: Surinam.

IMPARFINIS Eigenmann & Norris.
Type: Imparfinis piperatus Eigenmann & Norris.
Rhamdioglanis v. Ihering.
Range: South Eastern Brazil.
1. Imparfinis piperatus Eigenmann & Norris, E. & N., 1900, 352.
Habitat: São Paulo, Brazil.
2. Imparfinis frenatus (von Ihering), v. I., 1907, 16.
Habitat: San Sebastiao.
3. Imparfinis transfasciatus (Ribeiro), R., 1908.
Habitat: Rio Ribeira.

NANNOGLANIS Boulenger.
Type: Nannoglanis fasciatus Boulenger.
Range: Alto do Serra; Ecuador.
Habitat: Ecuador.
Habitat: Alto do Serra, southeastern Brazil.

RHAMDIA Bleeker and RHAMDELLA Eigenmann & Eigenmann.
Pteronotus Swainson; Pimelonotus Gill; Notoglanis Günther.

The genera Rhamdia and Rhamdella (type eriarcha) are both valid, but since not all species have been ex-
**Habitat:** Guayaquil; Esmeraldas; Rio Saule; Rio Peripa.

**Habitat:** Peruvian Andes.

A15. **Rhamdia quelen** (Quoy & Gaimard), E. & E., 127.  
**Habitat:** Rio Saule; Rio Peripa.

**Habitat:** Rio Santiago; Rio Zamora and Rio Bamboiza.

A17. **Rhamdia multiradiata** (Kner), E. & E., 130.  
**Pimelodus arekaima** Schomburgk (part).  
**Habitat:** Amazonas and tributaries and northward.

**Habitat:** La Plata to Rio Grande do Sul.

**Habitat:** Rio San Francisco and its tributaries; Porto Alegre south to Rio de La Plata.

**Rhamdia boucardi** Regan.  
**Habitat:** Yucatan.

21. **Rhamdia wagneri** (Günther), Regan, 1907–8, 13.  
**Pimelodus cinerascens** Kner & Steinacher, non Günther; **Rhamdia bransfordi** Gill.  
**Habitat:** Eastern and western slopes of Central America; Tabasco, Mexico.

A22. **Rhamdia longicauda** (Boulenger), E. & E., 135.  
**Habitat:** Eastern Ecuador.

A23. **Rhamdia dorai** (Gill), E. & E., 135.  
**Habitat:** Marañon.

**Habitat:** Goyaz.

**Habitat:** Cudajas.

26. **Rhamdia brachypterus** (Cope), Meek, 21.  
**Habitat:** Mountain streams of south-central Vera Cruz.

27. **Rhamdia heteracanthus** Regan, Regan, 1907–8, 134.  
**Habitat:** Costa Rica.

**Habitat:** Costa Rica.

29. **Rhamdia regani** Meek, Meek, 1907a, 144.  
**Habitat:** Costa Rica.

(RHAMDELLA Eigenmann & Eigenmann.)

(Type: **Rhamdella eriarcha** Eigenmann & Eigenmann.)

(Range: Rio Janeiro to Mexico; on both slopes of Central America and Mexico.)

30. **Rhamdia joana** (Müller & Troschel), E. & E., 126.  
**Habitat:** Guiana.

**Habitat:** Rio das Velhas.

A32. **Rhamdia notata** (Schomburgk), E. & E., 139.  
**Habitat:** Rio Branco.

I am not sure of the genus of numbers 38–52.
Some of these are probably **Rhamdia**.
33. Rhamdia eriarcha Eigenmann & Eigenmann, ............ E. & E., 139.
   Habitat: Rio Grande do Sul.
34. Rhamdia exudans (Jenyns),
   E. & E., 140.
35. Rhamdia ignobilis Steindachner,
   St. 1907a, 484.
   Habitat: Rio Cubatao.
36. Rhamdia jenynsii (Günther),
   E. & E., 140.
   Habitat: Rio de Janeiro to the Rio de La Plata.
   Habitat: Rio Eten, Peru.
38. Rhamdia minuta (Lütken),
   E. & E., 142.
   Habitat: Rio de Janeiro; Macacos.
39. Rhamdia straminea Cope,
   ...... 1893.
   Habitat: Rio Grande do Sul.
40. Rhamdia parryi Eigenmann & Eigenmann, ............ Regan, 1907–8, 130.
   Habitat: Rio Zaneleneo near Tonala, Mexico.
41. Rhamdia petenensis (Günther),
   Regan, 1907–8, 132.
   Habitat: Lake Peten and Chiapas, Mexico.
42. Rhamdia baronis müleri (Troschel),
   Habitat: Pacific slope of Mexico.
43. Rhamdia guatemalensis (Günther),
   Regan, 1907–8, 132.
   R. oaxaca Meek.
   Habitat: Huamuchal, Guatemala and Nicaragua.
44. Rhamdia salvini (Günther),
   Regan, 1907–8, 135.
   Habitat: Rio San Gerónimo, Guatemala.
45. Rhamdia policaulus (Günther),
   Regan, 1907–8, 136.
   Habitat: Rio San Gerónimo, Guatemala.
46. Rhamdia managuensis (Günther),
   Regan, 1907–8, 133.
   Habitat: Lake Managua.
47. Rhamdia hypselurus (Günther),
   Regan, 1907–8, 134.
   Habitat: Mexico.
48. Rhamdia motaguensis (Günther),
   Regan, 1907–8, 130.
   Habitat: Rio Motagua.
49. Rhamdia laticauda (Heckel),
   Regan, 1907–8, 136.
   Habitat: Mexico.
50. Rhamdia nicaraguensis (Günther),
   Regan, 1907–8, 130.
   Habitat: Lake Nicaragua.
51. Rhamdia micropterus (Günther),
   Regan, 1907–8, 133.
   Habitat: Rio San Gerónimo.
52. Rhamdia godmani (Günther),
   Günther, V, 124.
   Habitat: Lower Vera Paz; Mexico; Rio Motagua.
54. Rhamdia barbata Meek,
   M., 1907, 106.
   Habitat: Managua and Rio San Francisco, Nicaragua.
55. Rhamdia brachycephalus Regan,
   R., 1907–8, 135.
   Habitat: Guatemala.
56. Rhamdia underwoodi Regan,
   R., 1907–8, 135.
   Habitat: Costa Rica.

TYPHLOBAGRUS Ribeiro.

Type: Typhlobagus kronei Ribeiro.
Range that of the single species.
1. Typhlobagus kronei Ribeiro.
   Habitat: Caves of Santa Catharina.

PHREATOBIOUS Gældi.³

Type: Phreatobius cisternarum Gældi.
Range that of the single species.

³ I am not sure of the zoological position of this subterranean fish.
Habitat: Subterranean waters of Marajo.

**Pimeleodus** Lacépède.

_Pseudarioides_ Bleeker; _Pseudorhamdia_ Bleeker.

Type: *Silurus clarias* Bloch.

Range: Rio de La Plata to Panama.

A1. *Pimelodus cyanostigma* (Cope),  
E. & E., 164.

Habitat: Pebas, Ecuador.

2. *Pimelodus quadrimaculatus* (Bloch),  
E. & E., 164.

Habitat: America.


Habitat: Paraguay; Brazilian Amazons and northward.

4. *Pimelodus albigans* (Valenciennes),  
E. & E., 169.

Habitat: Rio de La Plata to Matto Grosso.

A5. *Pimelodus pictus* Steindachner,  
E. & E., 170.

Habitat: Marañon to Hyaray.

A6. *Pimelodus clarias* (Bloch),  
E. & E., 171.

*Pimelodus maculatus* Lacépède; *Pimelodus rigidus* Spix; *Pimelodus blochii* Cuvier & Valenciennes; *Pimelodus arekaima* Schomburgk; *Mystus ascia* Gronow; *Pimelodus macrostoma* Bleeker; _Pseudarioides pantherinus_ Lütken; _Pseudorhamdia piscatrix_ Cope; _Piramutana macrospila_ Günther.

Habitat: Rio de La Plata to Panama.

7. *Pimelodus valenciennis* Kröyer,  
E. & E., 180.

*Pimelodus nigribarbis* Boulenger.

Habitat: Rio de La Plata to Paraguay and San Francisco.

8. *Pimelodus grosskopfi* Steindachner,  
E. & E., 180.

Habitat: Magdalena Basin.

A9. *Pimelodus altipinnis* Steindachner,  
E. & E., 180.

Habitat: Amazon and northward.

A10. *Pimelodus fur* (Reinhardt),  
E. & E., 182.

*Pimelodus maculatus* Kner, _non_ Valenciennes; *Pimelodus microstoma* Steindachner.

Habitat: Rio Paraguay; Rio San Francisco and Amazon.

11. *Pimelodus spegazzinii* Perugia,  
Perugia, 1891, 32.

Habitat: Rio Durango.

12. *Pimelodus argenteus* Perugia,  
Perugia, 1891, 31.

Habitat: Rio de La Plata; Rio Parana.

**Gelidiella** Eigenmann & Norris.

Type: *Pimelodus eques* Müller & Troschel.

Range that of the single species.

A1. *Gelidiella eques* (Müller & Troschel),  
E. & E., 166.

Habitat: Brazilian Amazons and northward.

**Iheringichthys** Eigenmann & Norris.

Type: *Pimelodus labrosus* Kröyer.

Range: Rio de La Plata Basin.

1. *Iheringichthys labrosus* (Kröyer),  
E. & E., 180.

Habitat: Rio de La Plata Basin.

2. *Iheringichthys megalops* Eigenmann & Ward,  
E. & W., 1907, 115.

Habitat: Bahia Negra on the Paraguay.

**Pimelodella** Eigenmann & Eigenmann.

Type: *Pimelodus cristatus* Müller & Troschel.

Range: La Plata to Panama and western Ecuador.

A1. *Pimelodella cristata* (Müller & Troschel),  
E. & E., 150.

*Pimelodus agassizii* Steindachner; *Pimelodus ophthalmicus* Cope.

Habitat: North of the Mucuri to Peru and Ecuador.
A2. *Pimelodella wesselii* (Steindachner), E. & E., 152.
Habitat: Rio Puty to Cudajas and Essequibo.

Habitat: Rio de La Plata to the Orinoco.

Habitat: Rio Parahyba.

Habitat: Western Ecuador and eastern Panama.

Habitat: Pacific slope of Ecuador.

Habitat: Durango; Sapayo and Vaqueria rivers, northwest Ecuador.

A8. *Pimelodella lateristriga* (Müller & Troschel), E. & E., 156.
Habitat: Atlantic slope, north of Rio Grande do Sul; Paraguay.

Habitat: Rio Paráhyba.

Habitat: Canelos.


Habitat: Rio Chagres and its tributaries.

15. *Pimelodella brasiliensis* (Steindachner), E. & E., 162.
Habitat: Rio Paráhyba.

Habitat: Paraguay.

17. *Pimelodella yucensis* Steindachner, Steind., 1902, 47.
Habitat: Pacasmaya, north Peru.


P. eigenmanni Meek, non Boulenger.
Habitat: São Paulo.

19. *Pimelodella megalops* Eigenmann MS.
Habitat: Central British Guiana.

20. *Pimelodella macturkii* Eigenmann MS.
Habitat: Coastwise streams of British Guiana.

**Bergiaria** Eigenmann & Norris.

Type: *Pimelodus westermanni* Reinhardt.

**Bergiella** Eigenmann & Norris. (Preoc.)
Range: Rio San Francisco to La Plata.

1. **Bergiaria westermanni** (Reinhardt), E. & E., 180.
Habitat: Rio das Velhas.

2. **Bergiaria platana** (Steindachner).
Habitat: La Plata.

**Conorhynchos** Bleeker.

Type: *Pimelodus conirostris* Cuvier & Valenciennes.
Range: Porto Seguro and Rio San Francisco to Yucatan.

1. **Conorhynchos conirostris** (Cuvier & Valenciennes), ..................E. & E., 185.
Habitat: Rio San Francisco Basin.

A2. **Conorhynchos glaber** Steindachner, E. & E., 185.
Habitat: Porto Seguro.
	Habitat: Rio Usumacinta, Montecristo, Chiapas.

**Bagropsis** Lütken.
Type: *Bagropsis reinhardtii* Lütken.
Range that of the single species.

Habitat: Rio das Velhas.

**Platynematichthys** Bleeker.
Type: *Bagrus punctulatus* Kner.
Range: Amazons and tributaries.

*Bagrus nigripunctatus* Kner.
Habitat: Rio Guapore to Rio Branco.
Habitat: Aragua. 

**Phractocephalus** Agassiz.
Type: *Phractocephalus bicolor* Agassiz.
Range that of the single species.

*Phractocephalus bicolor* Agassiz.
Habitat: Amazons and northward.

**Sciades** Müller & Troschel.
*Leiarius, Sciadichthys* Bleeker.
Type: *Bagrus pictus* Müller & Troschel.
Range: Amazons and tributaries; Paraguay.

(Sciades.)

*Arin longibarbis* Castelnau.
Habitat: Amazon; Paraguay.

(Sciadoides Eigenmann & Eigenmann.)
(Type: *Sciaedes marmoratus* Gill.)

Habitat: Marañon.

**Nemuroglanis** Eigenmann & Eigenmann.
Type: *Nemuroglanis lanceolatus* Eigenmann & Eigenmann.
Habitat: Jutahy.

**Brachyplatystoma** Bleeker.
*Piramutana, Piratinga, and Malacobagrus* Bleeker.
Type: *Platystoma vaillantii* Cuvier & Valenciennes.
Range: Parahyba through Amazons.
* Piratinga pira-aiba Gældi; B. gældii Eigenmann & Bean; Platystoma mucosa Vaillant; Platystoma verrucosum Boulenger.
Habitat: Brazil; Para.
A2. *Brachyplatystoma piramuta* (Kner), E. & E., 186.
Habitat: Amazon and its tributaries.
A2. *Brachyplatystoma vaillantii* (Cuvier & Valenciennes), ........ E. & E., 196.
*Platystoma affinis* Cuvier & Valenciennes.
Habitat: Eastern slopes north of Rio Parahyba.
*Bagrus goliath* Kner in part (the two larger specimens mentioned).
Habitat: Rio Tocantins; Amazon; Rio Madeira.
*Bagrus goliath* Kner (the type only).
Habitat: Amazon and its tributaries.
Habitat: Rio Jurua.
6. Brachyplatystoma parnahyba Steindachner, St., 1908d, 126.
Habitat: Parnahyba.
A7. Brachyplatystoma paraense Steindachner, St., 1909a.
Habitat: Pará.

Tañionema Eigenmann & Bean.
Type: Taonionema steeri E. & B.
Habitat: Lower Amazon.
A2. Taonionema platynema (Boulenger), Boul., 1898, 477.
Habitat: Para.

Duopalatinus Eigenmann & Eigenmann.
Type: Platystoma emarginatum Cuvier & Valenciennes.
1. Duopalatinus emarginatus (Cuvier & Valenciennes), E. & E., 200.
Habitat: Rio San Francisco Basin.
A2. Duopalatinus goldii Steindachner, St., 1908a.
Habitat: Rio Purus.

Paulicea von Ihering.
Type: Paulicea jahu v. Ihering.
Range: La Plata and Amazon Basins.
1. Paulicea jahu v. Ihering.
Habitat: Rio Tiete at São Paulo.
A2. Paulicea liitheni (Steindachner), E. & E., 201.
Habitat: Amazon.

Steindachneria Eigenmann & Eigenmann.
Type: Steindachneria ambyura Eigenmann & Eigenmann.
Range: Rios Doce, Jequitinhonha and Parahyba.
Habitat: Rio Jequitinhonha.

Hemisorubim Bleeker.
Type: Platystoma platorynchos Cuvier & Valenciennes.
Habitat: Orinoco; Amazons; Para-
hyba: Paraguay.

Pseudoplatystoma Bleeker.
Hemiplatystoma Bleeker.
Type: Silurus fasciatus Linnaeus.
Range: La Plata to the Magdalena.
A1. Pseudoplatystoma fasciatum (Lin-
naeus), E. & E., 209.
Platystoma truncatum Agassiz; Platys-
toma punctifer Castelnau.
Habitat: Amazons to Rio Magdalena.
A2. Pseudoplatystoma fasciatum nigricans Eigenmann & Eigenmann,
Habitat: Xingu.
A3. Pseudoplatystoma fasciatum brevifile Eigenmann & Eigenmann,
Habitat: Goyaz.
A4. Pseudoplatystoma fasciatum interme-
dium Eigenmann & Eigenmann,
Habitat: Obidos; Rio Puty.
A5. Pseudoplatystoma fasciatum reticula-
tum Eigenmann & Eigenmann,
E. & E., 211.
Habitat: Rio Negro.
A6. Pseudoplatystoma tigrinum (Cuvier & Valenciennes), E. & E., 211.
Habitat: Amazon and northward.
A7. Pseudoplatystoma coruscans Agassiz,
E. & E., 211.
PATAGONIAN EXPEDITIONS: ZOOLOGY.

Sorubim caparary Spix; Platystoma pardalis, orbignianum Valenciennes; Platystoma punctatum Cuvier & Valenciennes; Platystoma forschhammeri Reinhardt.
Habitat: Rio de La Plata to Paraguay; Rio San Francisco Basin.

SORUBIM Spix.
Type: Silurus lima Bloch & Schneider. Range that of the single species.

Sorubim infraocularis Spix; Platystoma luceri Weyenbergh.
Habitat: Rio de La Plata; Amazons to the Rio Magdalena.

SORUBIMICHTHYS Bleeker.
Type: Sorubim jandia Spix. Range: Amazons and Orinoco.
Sorubim piranaca Spix; Platystoma artedii Günther; Sorubimichthysortonii Gill.
Habitat: Amazon and Orinoco Basins.

Sorubim jandia Spix.
Habitat: Amazon.

Habitat: Huallaga.

PLATYSTOMATICHTHYS Bleeker.
Type: Platystoma sturio Kner.
Range that of the single species.

Habitat: Amazon Basin.

Subfamily DORADINÆ.

Physopyxis Cope.
Type: Physopyxis lyra Cope. Range that of the single species.
Habitat: Ambyiacu River.

Dorad Lacépède.
Pterodoras, Platydoras Bleeker; Zathorax Cope.
Type: Silurus costatus Linnaeus. Range: Rios Paraguay and Francisco to Rio Magdalena.

(Lithodoras Bleeker.)
(Type: Lithodoras lithogaster Bleeker.)
Doras carinatus Valenciennes, non Silurus carinatus Linnaeus; Doras papilionatus Filippi; Doras lithogaster Heckel.


Subfamily DORADINÆ.

Physopyxis Cope.
Type: Physopyxis lyra Cope. Range that of the single species.
Habitat: Ambyiacu River.

Dorad Lacépède.
Pterodoras, Platydoras Bleeker; Zathorax Cope.
Type: Silurus costatus Linnaeus. Range: Rios Paraguay and Francisco to Rio Magdalena.

(Lithodoras Bleeker.)
(Type: Lithodoras lithogaster Bleeker.)
Doras carinatus Valenciennes, non Silurus carinatus Linnaeus; Doras papilionatus Filippi; Doras lithogaster Heckel.


Habitat: Para; Rio Negro and Cayenne.

(Doras Lacépède.)
A2. Doras uranoscopus Eigenmann & Eigenmann, E. & E., 220.
Habitat: Lake Hyanuary.
Doras murica Natterer.
Habitat: La Plata Basin; Amazon.
4. Doras maculatus Valenciennes.
Habitat: La Plata Basin.
Habitat: Magdalena Basin.
A6. Doras regani Steindachner, St., 1908.
Habitat: Para.
Habitat: Calabozo, Venezuela.
Habitat: Surinam.

Habitat: Surinam.

Habitat: Paraguay Basin.

A11. Doras costatus (Linnaeus),
E. & E., 231.
Habitat: Rio San Francisco and Paraguay north to Guiana.

Habitat: Paraguay and Rio Preto to Calabozo and Huallaga.

Doras costatus Hancock, non Linnaeus.
Habitat: Rio Cupai.

Habitat: Macn. 

(Acanthodoras Bleeker.)
(Type: Silurus cataphractus Linnaeus.)

A15. Doras cataphractus (Linnaeus),
E. & E., 234.
Cataphractus americanus Bloch & Schneider; Doras blockii Cuvier & Valenciennes; ? Doras brunnesc Schomburgk; Doras polygramma and polygramma Heckel; Callichthysasper Gronow.
Habitat: Central Brazil; Guiana.

Habitat: Coary.

17. Doras marmoratus Reinhartd,
E. & E., 237.
Habitat: Rio San Francisco Basin.

(Ambyodoras Bleeker.)
(Type: Doras affinis Kner.)

A18. Doras affinis Kner, .... E. & E., 238.
Doras truncatus Bleeker.
Habitat: Rio Branco and Rio Guaporé.

A19. Doras weddellii Castelnau,
E. & E., 239.
Doras grypus Cope.
Habitat: Paraguay; Amazons and tributaries, chiefly westward.

(Centrochir Agassiz.)
(Type: Doras crocodili Humboldt.)

20. Doras crocodili Humboldt,
Habitat: Rio Magdalena.

(Agamyx Cope.)
(Type: Doras pectinifrons Cope.)

21. Doras castaneo-ventris Schomburgk,
Habitat: British Guiana.

Habitat: Eastern Ecuador.

A23. Doras flavopictus Steindachner,
St., 1908a.
Habitat: Iquitos.

(Astrodoras Bleeker.)
(Type: Doras asterifrons Heckel.)

Habitat: Amazons and tributaries.

A25. Doras heckelii Kner, ... E. & E., 243.
Habitat: Solimoens.

Habitat: Amazon.

A27. Doras nauticus Cope, .... E. & E., 246.
Habitat: Nauta.

Oxydoras Kner.
Pseudodoras and Rhinodoras Bleeker.
Type: Doras niger Valenciennes.
Range: La Plata and Paraguay; Rio San Francisco; Amazons and Guianas.

A1. Oxydoras niger (Valenciennes),
E. & E., 247.
Doras humboldti Agassiz; Corydoras edentatus Spix; Rhinodoras priono-
mus Cope; *Rhinodorus teffeanus* Steindachner.
Habitat: Amazons and northward; Rio San Francisco.

2. *Oxydoras knerii* Bleeker, ... E. & E., 249.
Habitat: Cujaba to Asuncion on the Paraguay.

3. *Oxydoras eigemnanni* Boulenger,
Boul., 1896, 28.
Habitat: Paraguay Basin.

4. *Oxydoras d'orbignyi* Kröyer,
E. & E., 249.
Habitat: Rio de La Plata.

5. *Oxydoras amazonum* (Steindachner),
E. & E., 250.
Habitat: Teffé.

**Hemidoras** Bleeker.
Type: *Doras stenopeltis* Kner.
Range: Rio Puty; Rio Paraguay; Amazons and Guiana.

A1. *Hemidoras trachyparia* Boulenger,
Boul. 1898, 423.
Habitat: Rio Jurua.

A2. *Hemidoras nattereri* Steindachner,
E. & E., 253.
Habitat: Solimoens.

Habitat: Rio Paraguay.

Habitat: Rio Jurua.

A5. *Hemidoras brevis* (Kner),
E. & E., 254.
Habitat: Solimoens and Marañon.

A6. *Hemidoras fimbriatus* (Kner),
E. & E., 255.
Habitat: Rio Guaporé.

A7. *Hemidoras punctatus* (Kner),
E. & E., 255.
Habitat: Rio Guaporé.

A8. *Hemidoras lipophthalmus* (Kner),
E. & E., 255.
Habitat: Rio Capin and Rio Negro.

A9. *Hemidoras stenopeltis* (Kner),
E. & E., 255.

Habitat: Amazon and Solimoens.

A10. *Hemidoras trimaculatus* Boulenger,
Boul., 1898, 422.

Habitat: Rio Jurua.

A11. *Hemidoras stubelii* (Steindachner),
E. & E., 257.

Habitat: Huallaga.

A12. *Hemidoras morei* (Steindachner),
E. & E., 257.

Habitat: Rio Negro.

A13. *Hemidoras elongatus* Boulenger,
1898, 424.

Habitat: Rio Jurua.

A14. *Hemidoras humeralis* (Kner),
E. & E., 257.

Habitat: Rio Negro.

A15. *Hemidoras carinatus* (Linnaeus),
E. & E., 258.

*Doras ozyrhyncus* Valenciennes.

Habitat: Guianas; Calderon.

16. *Hemidoras microstomus* Eigenmann MS.
Habitat: Essequibo River.

(HASSAR Eigenmann & Eigenmann.)

(Type: *Oxydoras orestes* Steindachner.)

Range: Rio Puty and Amazons.

17. *Hemidoras micropaxus* Eigenmann MS.
Habitat: Demarara.

18. *Hemidoras notospilus* Eigenmann MS.
Habitat: Crab Falls, Essequibo River.

19. *Hemidoras leporhinus* Eigenmann MS.
Habitat: Central British Guiana.

A20. *Hemidoras orestes* (Steindachner),
E. & E., 258.

Habitat: Xingu and Huytahy.

21. *Hemidoras affinis* (Steindachner),
E. & E., 258.

Habitat: Rio Puty.

A22. *Hemidoras wilderi* Kindle,
Kindle, 1894, 251.

Habitat: Trocera on the Tocantins.
LEPTODORAS Boulenger.
Type: *Oxydoras acipenserinus* Günther.
Range: Xeberos to Rio Jurua.


Habitat: Xeberos.
A2. *Leptodoras juruensis* Boulenger, Boul., 1898, 479.
Habitat: Rio Jurua.

3. *Leptodoras linnelli* Eigenmann MS.
Habitat: British Guiana.

Subfamily AUCHENIPTERINÆ.

ASTEROPHYSUS Kner.
Type: *Asterophysus batrachus* Kner.
Range that of the single species.

Habitat: Marabitanos.

TRACHELYOPTERICHTHYS Bleeker.
Type: *Trachelyopterus taniatus* Kner.
Range that of the single species.

Habitat: Solimoens and tributaries.

TRACHELYOPTERUS Cuvier & Valenciennes.
Type: *Trachelyopterus coriaceus* Cuvier & Valenciennes.
Range: Amazons; Cayenne.

Habitat: Cayenne; Obidos; Porto do Moz; Paraguay.
Habitat: Porto do Moz.

WERTHEIMERIA Steindachner.
Type: *Wertheimeria maculata* Steindachner.
Range that of the single species.

Habitat: Jequitinhonha.

CENTROMOCHLUS Kner.
Type: *Centromochlus megalops* Kner.
Range: Amazons and Guiana.

Habitat: Xeberos.
A2. *Leptodoras juruensis* Boulenger, Boul., 1898, 479.
Habitat: Rio Jurua.

3. *Leptodoras linnelli* Eigenmann MS.
Habitat: British Guiana.

1. *Centromochlus oncinus* (Schomburgk), E. & E., 266.
Habitat: Rio Padauri.

2. *Centromochlus megalops* Kner.
Habitat: Amazons and tributaries.
Habitat: Marañon.
Habitat: Amazon; Solimoens and tributaries.
Habitat: Canelos.
Habitat: Rio Guaporé; Cudajas; Essequibo.

GLANIDIUM Lütken.
Type: *Glanidium albescens* Lütken.
Habitat: Coast streams from Rio Janeiro to the Amazon.

TRACHYCORYSTES Bleeker.
Type: *Trachycorystes typus* Bleeker.

Parauchenipterus Bleeker.
Range: Amazons to Guiana and Magdalena.

Habitat: Demarara.
Habitat: Marañon.

Habitat: Magdalena.

Habitat: Essequibo.

Habitat: Magdalena.


Trachycorystes typus Bleeker.
Habitat: Brazil.

Habitat: Guaporé; Rios Negro and Branco.

Habitat: Brazil.

Habitat: Mouths of rivers draining eastern Minas Geraes; Paraguay.

Habitat: Marañon.

*Auchenipterus maculatus, immaculatus* and *punctatus* Cuvier & Valenciennes; *Auchenipterus lacustris* Lütken. Habitat: Rio Velha's to the Orinoco and Paraguay.

Habitat: Demarara.

Habitat: Arary.

Auchenipterichthys Bleeker.

Type: *Auchenipterus thoracatus* Kner.
Range: Amazons and tributaries.

Habitat: Solimoens and tributaries.
(Seeary; Hyarary; Guaporé.)

A2. *Auchenipterichthys longimanus* (Günther), E. & E., 284.
Habitat: Southern tributaries of the Amazon.

Pseudauchenipterus Bleeker.

Type: *Pseudauchenipterus nodosus* (Bloch.)

*Felicthys* Swainson.

Range: Lower courses of rivers from Jequitinhonha to Guiana.

Habitat: Jequitinhonha.

Habitat: Rio San Francisco.

Habitat: Para; mouths of streams draining eastern Minas Geraes.


*Auchenipterus furcatus* Cuvier & Valenciennes.

Habitat: Bahia; Para; Guiana.

Habitat: Trinidad.

Habitat: Trinidad.

Epapterus Cope.

Type: *Epapterus dispilurus* Cope.

Range that of the single species.

**Auchenipterus** Cuvier & Valenciennes. 
Type: *Hypophthalmus nuchalis* Spix. 
*Euanemus* Müller & Troschel. Range: Paraguay to Surinam.

*Auchenipterus dentatus* Cuvier & Valenciennes; *Epapterus colymbetes* Müller & Troschel. Habitat: Amazons; Surinam.


Subfamily **Ageneiosinae**.

**Ageneiosus** Lacépède. 
Type: *Ageneiosus armatus* Lacépède. 
*Ceratorhynchus* Agassiz; *Hypophthalmus* Schomburgk; *Davalla* Bleeker; *Ageneiosus* Günther. 
Range: La Plata and its tributaries; Paranahyba northward to Guiana and westward to Peru.


(Ageneiosus Lacépède.)


**Tetranematichthys** Bleeker. 
Type: *Ageneiosus quadrifilis* Kner. 
Range that of the single species.


(Pseudageneiosus Bleeker.) 
(Type: *Ageneiosus brevifilis* Cuvier & Valenciennes.)


Family **HYPOPHTHALMIDÆ.**

**HELOGENES** Günther.¹

*Type:* *Helogenes marmoratus* Günther.

Range that of the single species.

1. *Helogenes marmoratus* Günther, 
   E. & E., 313.

Habitat: Essequibo.

**HYPOPHTHALMUS** Spix.

*Type:* *Hyphothalmus edentatus* Spix.

**Family PYGIDIIDÆ.**

Subfamily **CETOPSINÆ.**

**HEMICETOPSIS** Agassiz.

*Type:* *Silurus candiru* Spix.

Range: A narrow area from Para to Ecuador.

A1. *Hemicetopsis candiru* (Spix),
   E. & E., 319.

Habitat: Rio Cupai to Rio Huallaga.

A2. *Hemicetopsis plumbeus* Steindachner,
   E. & E., 320.

Habitat: Canelos.

**CETOPSIS** Agassiz.

*Type:* *Silurus cacutiens* Lichtenstein.

Range that of the single species.

A1. *Cetopsis cacutiens* (Lichtenstein),
   E. & E., 320.

Habitat: Amazon from Gurupa to Rio Cupai; Orinoco; Iriansga.

Subfamily **PYGIDINÆ.**

**NEMATOGYNS** Girard.

*Type:* *Trichomycterus inermis* Guichenot.

Range that of the single species.

**Nematogenys inermis** (Guichenot),
   E. & E., 323.

**Nematogenys nigricans** and **pallidus** Philippi.

¹This genus is a member of a new family.

**PSEUDOCETOPSIS** Bleeker.

*Type:* *Cetopsis gobioides* Kner.

Range: Iriansga, Marañon.

1. *Pseudocetopsis gobioides* (Kner),
   E. & E., 322.

Habitat: Iriansga.

A2. *Pseudocetopsis centralis* (Gill),
   E. & E., 322.

Habitat: Marañon.


Habitat: Rio Zamora, eastern Ecuador.

**CETOPSOGITON** Eigenmann & Bean.

*Type:* *Cetopsis occidentalis* Steindachner.

1. *Cetopsogiton occidentalis* (Steindachner),
   ............ E. & E., 322.

Habitat: Guayaquil.

**Subfamily PARIOLIIDA.**

**Habitat:** Central Chili.

**PARIOLIUS** Cope.

*Type:* *Pariolius armillatus* Cope.

Range that of the single species.

A1. *Pariolius armillatus* Cope,
   E. & E., 324.

Habitat: Ambyiacu.
Hatcheria Eigenmann.
Type: *Hatcheria patagoniensis* Eigenmann.
Habitat: Patagonia.
2. *Hatcheria macrai* (Girard),
E. & E., 328.
Habitat: Uspullata.
3. *Hatcheria maculata* (Cuvier & Valenciennes),
E. & E., 329.
Habitat: Western slopes of central Chili.
4. *Hatcheria areolata* (Cuvier & Valenciennes),
E. & E., 330.
Habitat: Western slopes of central Chili.

Pygidium Meyen.
Type: *Pygidium fuscum* Meyen.
Range: Andes from Venezuela and Colombia to Patagonia; southeastern Brazil and central Argentina; Guianas.
1. *Pygidium minutum* (Boulenger),
Habitat: San Lorenzo district, Rio Grande do Sul.
Habitat: Peru.
3. *Pygidium palleum* (Philippi),
E. & E., 325.
Habitat: Chili.
4. *Pygidium marmoratum* (Philippi),
E. & E., 326.
Habitat: Chili.
5. *Pygidium tenue* (Weyenbergh),
E. & E., 326.
Habitat: Sierra de Cordoba near Cruz-de-eje.
6. *Pygidium corduvense* (Weyenbergh),
E. & E., 326.
Habitat: Rio Primero, Argentina; Bolivian Chaco.
7. *Pygidium tigrinum* (Philippi),
E. & E., 326.
Habitat: Chili.
8. *Pygidium rivulatum* (Cuvier & Valenciennes),
E. & E., 330.
*Trichomycterus iuca, gracilis, barbatula*
Cuvier & Valenciennes; *T. pentlandi, pictus* Castelnau.
Habitat: Titicaca; Ucayale and tributaries.
9. *Pygidium brasiliense* (Reinhardt),
E. & E., 332.
10. *Pygidium poeyanum* (Cope),
E. & E., 326.
Habitat: Western slopes of southern Peru.
Habitat: Merida and Rio Albireggas near Merida, Venezuela.
Habitat: Western slopes of Peruvian Andes; Rio Zamora; † French Guiana.
13. *Pygidium laticeps* (Kner),
E. & E., 334.
Habitat: Western slopes of Peruvian Andes.
A14. *Pygidium oroyae* Eigenmann & Eigenmann,
E. & E., 334.
Habitat: Oroya River.
Habitat: Rio de Belén, Province of Catamarca, Argentina.
Habitat: Rio de Cachi, Province Salta, Argentina.
17. *Pygidium riojanum* Berg, 1897.
Habitat: Cordillera de la Rioja, Argentina.
A18. *Pygidium punctatissimum* (Castelnau),
E. & E., 334.
Habitat: Araguaia.
A19. *Pygidium knerii* (Steindachner),
E. & E., 335.
Habitat: Eastern slopes of Ecuador; Rio Zamora.

400 PATAGONIAN EXPEDITIONS: ZOOLOGY.

A20. *Pygidium eigenmanni* (Boulenger),
Boll. Mus. Torino, XIII.
*Pygidium knerii* Eigenmann & Eigen-
mann, *non* Steindachner.
Habitat: Cumbaca.

A21. *Pygidium vittatum* (Regan),
Regan, 1903.
Habitat: Marcapata Valley, Eastern Peru.

A22. *Pygidium dispar* (Tschudi),
E. & E., 335.
Habitat: Eastern and western slopes of
Ecuador.

A23. *Pygidium punctulatum* (Cuvier &
Valenciennes), ......E. & E., 336.
Habitat: Western slopes of Peruvian
Andes.

Habitat: Mendoza, Argentina.

A25. *Pygidium goeldii* (Boulenger),
Boul., 1896.
Habitat: Rio de Janeiro.

A26. *Pygidium retropinnis* (Regan),
Regan, 1903.
Habitat: St. Augustine, Andes of Co-
lombia, 5,000 feet.

A27. *Pygidium nigromaculatum* (Boulen-
ger), ............... E. & E., 336.
Habitat: Colombia.

A28. *Pygidium pardus* (Cope),
E. & E., 337.
Habitat: Jequetipoca; Callao Bay.

A29. *Pygidium immaculatum* Eigenmann
& Eigenmann, ......E. & E., 337.
Habitat: Juiz de Fora; São Matheos;
Goyaz.

A30. *Pygidium laezenowskii* (Steindach-
nner), ..............E. & E., 338.
Habitat: Rio de Huambo; Rio de Tor-
tora.

A31. *Pygidium nigricans* (Cuvier & Valen-
ciennes), .............E. & E., 338.
Habitat: Santa Catharina.

A32. *Pygidium amazonicum* (Steindach-
nner), ..............E. & E., 338.
Habitat: Cudajás.

33. *Pygidium borellii* (Boulenger).
Habitat: Bolivian Chaco; Salta Argen-
tina.

34. *Pygidium quechuorum* Steindachner,
St., 1902, 49.
Habitat: Arequiba, Peru.

Habitat: Rio Ribeira.

36. *Pygidium guianensis* Eigenmann,
E., 1909, 11.
Habitat: Potaro River, British Guiana.

37. *Pygidium barbouri* Eigenmann MS.
Habitat: Rio Beni.

EREMOPHILUS Humboldt.

*Thricomycterus* Humboldt; *Trachypoma*
Giebel.
Type: *Eremophilus mutisii* Humboldt.
Range that of the single species.

1. *Eremophilus mutisii* Humboldt,
E. & E., 274.

*Trachypoma marmoratum* Giebel.
Habitat: Bogota.

TRIDENS Eigenmann & Eigenmann.

Type: *Tridens melanops* Eigenmann &
Eigenmann.
Range: Upper Amazons.

A1. *Tridens melanops* Eigenmann & Ei-
genmann.
Habitat: Iça.

A2. *Tridens brevis* Eigenmann & Eigen-
mann.
Habitat: Tabatinga.

PSEUDOSTEGOPHILUS Eigenmann & Eigen-
mann.

Type: *Stegophilus nemurus* Günther.
Range that of the single species.

A1. *Pseudostegophilus nemurus* (Günther),
E. & E., 341.
HENONEMUS Eigenmann & Ward.
Type: Stegophilus intermedius E. & E.
Range: Rio de La Plata; Amazons.
1. Henonemus maculatus (Steindachner), E. & E., 343.
Habitat: Rio de La Plata.
A2. Henonemus punctatus (Boulenger), E. & E., 343.
Habitat: Eastern Ecuador.
A3. Henonemus intermedius (Eigenmann & Eigenmann), .. E. & E., 343.
Habitat: Goyaz.
Habitat: Lake Manacapuru.

HOMODLETUS Eigenmann & Ward.
Type: Homodletus anisitsi Eigenmann & Ward.
Range that of the single species.
Habitat: Villa Rica, Paraguay.

STEGOPHILUS Reinhardt.
Type: Stegophilus insidiosus Reinhardt.
Range: Rio das Velhas; Solimoes.
Habitat: Rio das Velhas.
Habitat: Solimoes and tributaries.

MIUROGLANIS Eigenmann & Eigenmann.
Type: Miuroglanis platycephalus Eigenmann & Eigenmann.
Range that of the single species.
Habitat: Jutahy.

ACANTHOPOMA Lütken.
Type: Acanthopoma annectens Lütken.
Range that of the single species.
1. Acanthopoma annectens Lütken, L., 1892.
Habitat: Brazil.

VANDELLIA Cuvier & Valenciennes.
Type: Vandella cirrhosa Cuvier & Valenciennes.
Range: Solimoes and Marañon and tributaries.
Habitat: Ucayale; Calderon; Lake Hyanuary.
Habitat: Ucayale; Calderon; Lake Hyanuary.

PAREIODON Kner.
Centrophorus Kner; Asteromycterus Guichenot.
Type: Pareiodon microps Kner.
Range that of the single species.
Trichomycterus pusillus Castelnau.
Habitat: Amazon and tributaries.

Family CALLICHTHYIDÆ.

SCLEROMYSTAX Günther.
Type: Callichthys barbatus Quoy & Gaimard.
Range that of the single species.

Habitat: Rio Janeiro.

CALLICHTHYS Linnaeus.
Type: Callichthys asper Quoy & Gaimard.
Range: La Plata to Trinidad.
PATAGONIAN EXPEDITIONS: ZOOLOGY.

A1. *Callichthys callichthys* Linnaeus, 1
E. & E., 452.
*Callichthys tamoata* Linnaeus; *C. asper* Quoy & Gaimard; *Calaphractus depressus* Swainson; *Callichthys callatus* Cuvier & Valenciennes; *C. laviceps* Cuvier & Valenciennes; *C. loricatus* Gronow; *C. kneri* Gill; *C. affinis* Günther; *C. hemiphractus* Hensel. Habitats: La Plata to Trinidad.

Habitat: Rio de Janeiro.

HOPLOSTERNUM Gill.
Type: *Callichthys levigatus* Valenciennes.
Range: La Plata to Trinidad.
A1. *Hoplosternum litorale* (Hancock),
E. & E., 456.
*Callichthys subulatus* Cuvier & Valenciennes; *C. levigatus* Valenciennes; *C. albidus* Cuvier & Valenciennes; *Hoplosternum stewardii* Gill. Habitats: La Plata to Trinidad.

*Callichthys longifilis* Cuvier & Valenciennes; *C. personatus* Ranzani; *C. exaratus* and *pictus* Müller & Troschel; *C. sulcatus* Kner; *C. chiquitos* Castelnau. Habitats: Amazons and northward; Paraguay.


A1. *Decapagon adpersum* (Steindachner),
E. & E., 461.
Habitats: Porto do Moz; Cudajas; Tabatinga.

Dianema Cope.
Type: *Dianema longibarbis* Cope.
Range of the single species.

A1. *Dianema longibarbis* Cope,
Habitats: Ambyiacu.

Chænothorax Cope.
Type: *Chænothorax bicornutus* Cope.
Range: Marañon and tributary.

Habitats: ?

A2. *Chænothorax bicornutus* Cope,
E. & E., 464.
Habitats: Marañon.

A3. *Chænothorax semiscutatus* Cope,
E. & E., 464.
Habitats: Ambyiacu.

Brochis Cope.
Type: *Brochis cruxoris* Cope.
Range: Marañon and tributaries.

Habitats: Ambyiacu.

Habitats: Ambyiacu.

Aspidoras von Hering.
Type: *Aspidoras rochai* v. Hering.
Range of the single species.

Habitats: Fortaleza, Ceará.

Corydoras Lacépède.
*Hoplosoma* Swainson; *Hoplosoma* Gill; *Gasterodermis* Cope.
Type: *Corydoras Geoffroy* Lacépède.
Range: La Plata to Guiana.
Habitat: Cudajas; Teffé.
Habitat: Rio Janeiro to Rio Doce.
4. Corydoras aneus (Gill), E. & E., 471.
Habitat: Trinidad.
5. Corydoras armatus (Günther), E. & E., 471.
Habitat: Marañón and tributaries.
Corydoras marmoratus Steindachner; Callichthys punctatus Cuvier & Valenciennes.
Habitat: La Plata and tributaries.
7. Corydoras punctatus (Bloch), E. & E., 472.
Corydoras geoffroy Lacépède; Corydoras ambicus Cope.
Habitat: Guiana; Solimoens; Marañón.
Habitat: Cubatao and Raiz da Serra, São Paulo.
Corydoras agassizii Steindachner.
Habitat: Ambyiacu.
Habitat: Ambyiacu.
Habitat: Ambyiacu.
Habitat: Villa Bella.
Habitat: Paraguay.
Habitat: Paraguay.
15. Corydoras raimundii Steindachner, St., 1906, 84.
Habitat: Parnahyba.
Habitat: Paraguay.
17. Corydoras treilii Steindachner, St., 1906.
Habitat: Parnahyba.
18. Corydoras julii Steindachner, St., 1906.
Habitat: Parahim and Parnahyba.

OSTEOGASTER Cope.
Type: Corydoras eques Steindachner.
Range: Amazonas.
Habitat: Solimoens.
2. Osteogaster splendens (Castelnau), E. & E., 468.
Habitat: Tocantins.

Family LORICARIIDÆ.

PLECOSTOMUS Gronow.
Type: Loricaria plecostomus Linnaeus.
Range: La Plata to western Ecuador and Colombia.
A1. Plecostomus plecostomus (Linnaeus), Regan, 205.
Hypostomus guacari Lacépède; Loricaria flora Shaw; Plecostomus bicir-
rhodus Gronow; Hypostomus robinii Gill; Plecostomus brasiliensis Bleeker; Plecostomus seminudus Eigenmann & Eigenmann; Plecostomus boulengeri Eigenmann & Kennedy.

Habitat: La Plata north to Trinidad; not in southeastern Brazil.

2. Plecostomus commersonii (Cuvier & Valenciennes), .......... Regan, 206.

relationships, and for the purpose of discussing the geographical distribution, it will be better to recognize a larger number of genera. My estimate of the character of these can best be expressed by the following key, in which I have followed to a very large extent the phraseology of Regan, but in which are recognized a larger number of genera than are admitted by him. The list of species is accepted with but slight modifications from Regan.

SUBFAMILIES OF LORICARIIDÆ.

a. Haemal spines all simple; lower and fourth upper pharyngeals not toothed; anterior rudimentary ray of ventral normally shaped, but internal and directed forwards, upper part of the body protected by bony scutes.

b. Lower transverse portion of clavicles and coracoids not exposed; margin of snout naked or covered with small granular plates.

Plecostominae.

bb. Lower transverse portion of clavicles and coracoids exposed; margin of snout composed of more or less firm plates.

Hydropomatinæ.

aa. Haemal spines of the vertebrae above the anal fin bifid; lower and fourth upper pharyngeals toothed.

c. No anterior rudimentary ray of ventral; caudal peduncle elongate and strongly depressed; upper part of body with bony scutes.

Loricarinæ.

c. Anterior rudimentary ray of ventral internal, plate-like; caudal peduncle cylindrical or compressed.

d. Upper part of body with bony scutes; abdomen with a large, regular, nearly square patch of small granular plates, naked at the sides and anteriorly and posteriorly.

Neopterocostominae.

a. First scute of lower lateral series posterior to the temporal plate, with which the second is not in contact.

b. Premaxillaries nearly equal in length to the dentaries, and with about the same number of teeth.

Plecostomus spiniger Hensel; Plecostomus limosus Eigenmann & Eigenmann; ? Plecostomus aspilogaster, Cope.

Habitat: La Plata Basin, including Rio Grande do Sul; eastern Brazil.

3. Plecostomus punctatus (Cuvier & Valenciennes), ............. Regan, 207.

Hydropomus subcarinatus Castelnau;

c. Operculum and interoperculum little, and not independently movable.

d. Snout granular to its margin.

e. Adipose fin present.

f. Operculum and interoperculum not margined with bristles.

g. Body covered with plates.

1. Plecostomus Gronow.

gg. Body naked.

2. Lithogenes Eigenmann.

ff. Operculum and interoperculum with well-developed marginal bristles.

3. Paganopecul. Regan. (Type, Plecostomus wertheimeri Steind.)

ee. Adipose fin absent.

h. Operculum and interoperculum with well-developed marginal bristles.

4. Canthopomus Eigenmann nov.

hh. Operculum and interoperculum not margined with bristles.

5. Rhinelepis Spix.

hhh. Adipose replaced by a low median crest. No externally visible occipital crest.


dd. Snout with a naked margin.


cc. Interoperculum more or less freely movable, usually spinate or bristly.

i. Snout granular to its margin.

j. Teeth numerous, bifid.

k. Interoperculum usually armed with slender spines with hooked apices which can be everted and completely retracted beneath the operculum.

l. Sides of head without bristles.

m. Last dorsal ray connected with the scute by an inconspicuous membrane at its base.

n. Dorsal with 1, 7 or 8 rays.

8. Hemiancistrus Bleeker.

nn. Dorsal with 1, 10 or 1, 13 rays.

9. Pterygoplichys Gill.

mm. Last dorsal ray attached by
Plecostomus punctatus Günther; Plecostomus officinialis Steindachner; Plecostomus commersoni, affinis and scabriceps Eigenmann & Eigenmann. Habitat: Southeastern Brazil.

Well developed membrane either to the 3 or 4 scales following it; or to the spine of the adipose fin. D. I, 7.


ll. Sides of head with slender bristles. D. I, 7. Last dorsal ray attached to the scute following it by an inconspicuous membrane at its base.

11. Lasiancistrus Regan.

kk. Interoperculum armed with slender spines which cannot be completely retracted beneath the opercleum, or with permanently everted bristles, sides of head with bristles which are always longer in the male than in the female, and may be wanting in the latter; last dorsal ray connected by a membrane with one or two scutes following it; abdomen completely naked.

o. D. I, 7 or I, 8.


oo. D. I, 9 or I, 10.


jj. Teeth few, spoon-shaped.


qq. Interoperculum with some slender, evertible spines.

15. Panauge Eigenmann.

ii. Snout with naked margin.

q. Mouth wide, the length of mandibular ramus nearly equal to the interorbital width; naked margin of snout not very wide, without tentacles.


qq. Mouth moderate or narrow, the length of mandibular ramus considerably less than the interorbital width.

r. Snout with a broad, naked margin, without tentacles.

17. Xenocara Regan. (Type, the first species, X. latifrons Günther.)

rr. Snout with tentacles, the naked margin broad in males, narrow in females. 18. Ancistrus Kner.

bb. Premaxillaries much shorter than the dentaries and with fewer teeth.

s. Premaxillaries united; body not greatly de-


19. Pseudacanthicus Bleeker.

11. Premaxillaries not united; body much depressed.

20. Lithoicus Eigenmann.

aa. First two scutes of the lower lateral series below the temporal plate and in contact with it above.


Hypoptopominae.

a. Temporal plates imperforate.


bb. No adipose fin.


c. Abdomen covered with three longitudinal series of plates.

d. An adipose dorsal fin.


cc. Abdomen naked or covered with numerous small plates, irregularly arranged.


Loricariinae.

a. Teeth in the jaws in small or moderate number, not setiform; a more or less distinct orbital notch.

b. Snout rounded or pointed, not, or not much produced.

27. Loricaria Linneus.

bb. Snout produced, with a long rostrum.

c. Snout expanded at tip.


cc. Snout pointed, not expanded at tip.

29. Reganella Eigenmann.

aa. Teeth in the jaws numerous, setiform; orbit circular, without distinct notch.

d. Dorsal opposite to the ventrals.

c. Snout rounded or pointed, not produced as a rostrum; lateral keels obsolete.

30. Hartia Steindachner.

cc. Snout produced, forming a distinct rostrum; sides of the head in the male margined with bristles.

31. Sturisoma Swainson.

dd. Dorsal opposite to the anal; snout very long, body very slender.

32. Farlowella Eigenmann & Eigenmann.

Neoplecostominae.

a. Elongate; upper part of body enclosed in bony scutes; eyes small, teeth bifid, in a single series; an adipose fin.

33. Neoplecostomus Eigenmann & Eigenmann.
5. **Plecostomus festae** Boulenger, Regan, 208.  
Habitat: Pacific slope of Ecuador.

A6. **Plecostomus verrobis** (Cuvier & Valenciennes), ............Regan, 209.  
**Hypostomus plecostomus** C. & V., non L.I; **Hypostomus pantherinus** Kner;  
**Plecostomus bicirrhous** (part) Günther.  
Habitat: Venezuela; Guiana; Marajo Island.

A7. **Plecostomus carinatus** Steindachner, Regan, 209.  
Habitat: Amazon.

Habitat: Rio Tiete, São Paulo, Brazil.

Habitat: Paraguay, Rio Preto; Rio Puty; San Goñalbo.

10. **Plecostomus laplatae** Eigenmann, E., 1907.  
Habitat: La Plata.

**Hypostomus squamium** Schomburgk;  
**Plecostomus scopularius**, biseriatus, virescens Cope;  
**Plecostomus villarsi** Lütken; **Pl. anna** Steindachner.  
Habitat: Amazons to Orinoco.

12. **Plecostomus tenicauda** Steindachner, Steindachner, 1878, 40.  
Habitat: Magdalena and tributaries.

A13. **Plecostomus alatus** (Castelnau), Regan, 211.  
**Plecostomus francisci** Lütken.  
Habitat: Aragua and San Francisco.

Habitat: Rio Piracicaba, São Paulo, Brazil.

15. **Plecostomus cordovae** Günther, Regan, 212.  
Habitat: Córdova.

16. **Plecostomus borellii** Boulenger, Regan 212.  
Habitat: Bolivia.

Habitat: Piracicaba, São Paulo, Brazil.

A18. **Plecostomus latirostris** Regan, Regan, 213.  
**Plecostomus pantherinus** Boulenger, non Kner.  
Habitat: Goyaz and Rio Jungada, Matto Grosso.

19. **Plecostomus ternetzi** Boulenger, Regan, 213.  
Habitat: Paraguay.

20. **Plecostomus macrops** Eigenmann & Eigenmann, ............Regan, 214.  
Habitat: Rio das Velhas.

Habitat: Rio Piracicaba, São Paulo, Brazil.

22. **Plecostomus garmani** Regan, Regan, 214.  
**Plecostomus lima** Eigenmann & Eigenmann, non Lütken.  
Habitat: Rio San Francisco; Rio das Velhas; Rio Grande do Sul.

A23. **Plecostomus atropinnis** Eigenmann & Eigenmann, ............Regan, 215.  
Habitat: Goyan.

24. **Plecostomus robindii** Cuvier & Valenciennes, ............Regan, 215.  
Habitat: Montevideo; Trinidad.

25. **Plecostomus unae** Steindachner, Regan, 215.  
**Plecostomus robindii** Günther and Eigenmann & Eigenmann, non C. & V.  
Habitat: Bahia.

26. **Plecostomus wuchereri** Günther, Regan, 216.  
**Plecostomus brevicauda** Günther; Pl.

---

1 If, as Regan thinks, this species or variety is identical with *garmani* the species should of course go by the older name *atropinnis.*
EIGENMANN: CATALOGUE OF FRESH WATER FISHES.

Pl. vermicularis Eigenmann & Eigenmann.
Habitat: Bahia and Rio San Francisco, Paraguay.

27. Plecostomus lütkeni Steindachner,
    Regan, 1917.
Plecostomus lima Steindachner, non Lütken.
Habitat: Southeastern Brazil.

28. Plecostomus auriguttatus (Kner),
    Regan, 217.

29. Plecostomus obtusirostris Steindachner,
    St., 1907a, 490.

30. Plecostomus unicolor Steindachner,
    St., 1908f, 164.

31. Plecostomus hemiurus Eigenmann MS.
    Habitat: British Guiana.

32. Plecostomus horridus (Kner),
    Regan, 1908b, 795.

33. Plecostomus iheringii Regan,
    Regan, 1908b, 795.

34. Plecostomus margaretifer Regan,
    Regan, 1908b, 796.

35. Plecostomus strigaticeps Regan,
    Regan, 1908b, 796.

36. Plecostomus albobractatus Regan,
    Regan, 1908b, 797.

37. Plecostomus boyasensis Regan,
    Regan, 1908b, 798.

Plecostomus latirostris part Regan.
Habitat: Goyaz.

POGONOPOMA Regan.
Type: Plecostomus wertheimeri Steindachner.

Range that of the single species.

1. Pogonopoma wertheimeri (Steindachner), .......................... Regan, 218.
Habitat: Santa Clara, southeastern Brazil.

CANTHOPOMUS Eigenmann, genus novum.
Type: Rhinelepis genabarbis Cuvier & Valenciennes.
Range: Amazons.

A1. Canthopomus pellegrini (Regan),
    Regan, 218.
Habitat: Upper Amazon.

A2. Canthopomus genabarbis (Cuvier & Valenciennes), .......................... Regan, 218.
Rhinelepis agassizi Steindachner.
Habitat: Amazon.

RHINELEPIS Spix.
Type: Rhinelepis aspera Spix.
Range: Parahyba; Parana and San Francisco.

1. Rhinelepis parahybae Steindachner,
    Regan, 219.
Habitat: Rio Parahyba.

2. Rhinelepis aspera Spix, .......... Regan, 220.
Rhinelepis strigosa Cuvier & Valenciennes.
Habitat: Parana and San Francisco.

3. Rhinelepis microps v. Ihering,
    v. I., 1907, 24.
Habitat: Piquete, São Paulo.

HEMIPSILICHTHYS Eigenmann & Eigenmann.

9 Kronichthys Ribeiro.
Type: Xenomystus gobio Lütken.
Range: Parahyba to Santa Catharina.

1. Hemipsilichthys gobio (Lütken),
    Regan, 221.

2. Hemipsilichthys calmoni Steindachner,
    St., 1907, 82.
? *Kronichthys subteres* Ribeiro; *N. duseni*, *Hemipsilichthys cameroni* St.
Habitat: Santa Catharina.

**Hemiancistrus** Bleeker.
Type: *Ancistrus medians* Kner.
Range: Amazons north to Veragua; Para to western Ecuador and Pacific side of Panama.
1. **Hemiancistrus annectens** (Regan), Regan, 225.
   Habitat: St. Javier and Río Durango; northwestern Ecuador.
2. **Hemiancistrus medians** (Kner), Regan, 229.
   Habitat: Surinam.
3. **Hemiancistrus aspidolepis** (Günther), Regan, 230.
   Habitat: Veragua, Pacific slope of Panama.
A4. **Hemiancistrus brachyurus** (Kner), Regan, 231.
   *H. pictus* of Kner, Günther and Eigenmann, *nou Castelnau.
   Habitat: Río Negro.
A5. **Hemiancistrus scaphirhynchus** (Kner), Regan, 231.
   Habitat: Amazons.
A6. **Hemiancistrus oligospilus** (Günther), Regan, 232.
   Habitat: Río Capin.
A7. **Hemiancistrus vittatus** (Steindachner), Regan, 232.
   Habitat: Amazons; Paraguay.
A8. **Hemiancistrus bachii** (Boulenger), Regan, 233.
   Habitat: Río Jurua.
9. **Hemiancistrus schombourghi** (Günther), Regan, 233.
   Habitat: British Guiana.
10. **Hemiancistrus bowallii** Regan, Regan, 1906, 96.
   Habitat: Upper Potaro, British Guiana.
11. **Hemiancistrus megacephalus** (Günther), Regan, 234.
? *Hyphostomus itacu* Cuvier & Valenciennes; *Chatostomus macrops* Lütken.
Habitat: Guiana.
A12. **Hemiancistrus platycephalus** (Boulenger), . . . . . . . Regan, 235.
   Habitat: Eastern Ecuador.

**Pterygoplichthys** Gill.
Type: *Hyphostomus duodecimalis* Cuvier & Valenciennes.
Range: Paraguay to Magdalena.
1. **Pterygoplichthys undecimalis** (Steindachner), . . . . . . . Regan, 226.
   Habitat: Río Magdalena.
2. **Pterygoplichthys etentaculatus** (Spix), Regan, 226.
   *Hyphostomus duodecimalis* Cuvier & Valenciennes; *Ancistrus longimanus* Kner.
   Habitat: Río San Francisco.
A3. **Pterygoplichthys gibbiceps** (Kner), Regan, 227.
   *Liposarcus altipinnis* Günther; *Liposarcus scrophus* Cope.
   Habitat: Amazons from Gurupa to Nauta.
A4. **Pterygoplichthys lituratus** (Kner), Regan, 227.
   Habitat: Eastern Brazil; Río Guaporé and Amazons.
A5. **Pterygoplichthys multiradiatus** (Hancock), . . . . . . . Regan, 228.
   *Hyphostomus pardalis* Castelnau; *Liposarcus varius*, *Liposarcus jeanesianus* Cope.
   Habitat: Amazons and Guiana; Paraguay.
6. **Pterygoplichthys anisitsi** Eigenmann & Kennedy, . . . . . . . Regan, 229.
   *Ancistrus multiradiatus alternans* Regan.
   Habitat: Paraguay and southern Bolivia.
A7. Pterygoplichthys punctatus Günther, Regan, 229.
Ancistrus duodecimalis Kner, non Cuvier & Valenciennes.
Habitat: Amazons; Venezuela.
Habitat: Paraguay. Probably young of anisitsi.
9. Pterygoplichthys gigas (Boulenger), Regan, 230.
Habitat: Paraguay.

Parancistrus Bleeker.
Type: Hypostomus aurantiacus Castelnau.
Range: Amazon Basin.
A1. Parancistrus niveatus (Castelnau), Regan, 235.
Hemiancistrus longipinnis Kindle.
Habitat: Araguary; Tocantins.
A2. Parancistrus punctatissimus (Steindachner), . . . . Regan, 236.
Habitat: Amazon.
A3. Parancistrus aurantiacus (Castelnau), Regan, 236.
Hypostomus nigricans Castelnau; Hypostomus vicinus Castelnau.
Habitat: Peruvian Amazon.

Lasiancistrus Regan.
Type: Chetostomus heteracanthus Günther.
Range: Peruvian Amazon and Venezuela.
A1. Lasiancistrus heteracanthus (Günther), . . . . . . . . . Regan, 237.
Habitat: Peruvian Amazon.
A2. Lasiancistrus pictus (Castelnau), Regan, 237.
Habitat: Ucayale.
3. Lasiancistrus mystacinus (Kner), Regan, 238.
Habitat: Caracas.
4. Lasiancistrus guacharote (Cuvier & Valenciennes), . . . . . . . . . Regan, 238.

Chetostomus trinitatis Günther.
Habitat: Said to be Porto Rico.

Pseudancistrus Bleeker.
Type: Hypostomus barbatus Cuvier & Valenciennes.
Range: Colombia to Guiana.
1. Pseudancistrus setosus (Boulenger), Regan, 239.
Habitat: Colombia.
A2. Pseudancistrus barbatus (Cuvier & Valenciennes), . . . . Regan, 240.
Hypostomus guttatus Cuvier & Valenciennes.
Habitat: Guiana; Paraguay.
3. Pseudancistrus depressus (Günther), Regan, 240.
Habitat: Surinam.
4. Pseudancistrus guntheri (Regan), Regan, 241.
Plecostomus guttatus Günther, non Cuvier & Valenciennes.
Habitat: British Guiana.
5. Pseudancistrus nigrescens Eigenmann MS.
Habitat: Potaro River.

Delturus Eigenmann & Eigenmann.
Type: Delturus parahyba E. & E.
Range: Southeastern Brazil.
1. Delturus angulicauda (Steindachner), Regan, 241.
Habitat: Southeastern Brazil.
2. Delturus parahyba Eigenmann & Eigenmann, . . . . . . . . . Regan, 241
Habitat: Rio Parahyba.

Cochliodon Heckel.
Type: Cochliodon hypostomus Heckel = Hypostomus cochliodon Kner.
Range that of the single species.
Cochliodon hypostomus Heckel; Loricaria melanoptera Natterer.  
Habitat: Amazon to Paraguay.

Panaque Eigenmann & Eigenmann.  
Type: Chaetostomus nigrolineatus Peters.  
Range: Goyaz to Xeberos and Magdalena.  
A1. Panaque dentex (Günther), Regan, 243.  
Habitat: Xeberos.

2. Panaque cochliodon (Steindachner), Regan, 243.  
Chaetostomus gibbosus Steindachner and Panaque gibbosus Regan.  
Habitat: Magdalena Basin.  
A3. Panaque nigrolineatus (Peters), Regan, 244.  
Habitat: Goyaz; Venezuela.

Chaetostomus Tschudi.  
Type: Chaetostomus lhororbynchus Tschudi.  
Range: Mountains north of Peru to Panama and Venezuela.  
1. Chaetostomus lhororbynchus Tschudi, Regan, 246.  
Habitat: Andes of western Peru.  
A2. Chaetostomus marcapatae Regan, Regan, 246.  
Habitat: Marcapata Valley, eastern Peru.  
A3. Chaetostomus brevis Regan, Regan, 246.  
Habitat: Rios Bomboiza and Zamora, eastern Peru.  
Habitat: Rios Huambo and Tortora, eastern Peru.  
A5. Chaetostomus dermorhynchus Bou- 

Habitat: Eastern and western Ecuador.  
Habitat: Rio Mamoni near Chepo.  
Habitat: Puerto Cabello, Venezuela.  
9. Chaetostomus guairensis Steindachner, Regan, 249.  
Habitat: Caracas, Venezuela.  
10. Chaetostomus marginatus Regan, Regan, 249.  
Chaetostomus microps Boulenger, non Günther.  
Habitat: Salidero, northwest Ecuador.  
A11. Chaetostomus branickii Steindachner, Regan, 250.  
Habitat: Callacate, eastern Peru.  
12. Chaetostomus anomalus Regan, Regan, 250.  
Habitat: Merida and neighboring mountains, Venezuela.  
13. Chaetostomus thomsoni Regan, Regan, 250.  
Habitat: Villeta, Colombia.  
Habitat: Valencia, Venezuela.  
15. Chaetostomus microps Günther, Regan, 251.  
Hypostomus erinaceus Günther, non Cuvier & Valenciennes.  
Habitat: Western slope of Ecuador.

Xenocara Regan.  
Type: Chaetostomus latifrons Günther.  
Range: Peru to Guiana.  
A1. Xenocara latifrons (Günther), Regan, 253.  
Habitat: Peruvian Amazon.  
A2. Xenocara gymnorrhynchus (Kner), Regan, 254.  
? Hypostomus nudiceps Müller & Tro- 

Habitat: Venezuela and Guiana; Paraguay.
Ancistrus Kner. 1

Thysanoecara Regan.

Type: Ancistrus cirrhosus Kner.

Range: Paraguay to Rio Chagres; Rio Grande do Sul.


Habitat: Amazon; Guiana.


Habitat: Guiana.

A3. Ancistrus hoplogenys (Günther), Regan, 255.

Chatostomus leucoctictus Günther; Chatostomus alga, malacops, tectirostris Cope.

Habitat: Guiana, Amazons and Paraguay.

A4. Ancistrus cirrhosus (Cuvier and Valenciennes), . . . . . . Regan, 256.

Chatostomus variolus Cope.

Habitat: Trinidad; Guiana; Amazons; Paraguay; Rio Grande do Sul. Ancistrus ancistrus dubius Eigenmann & Eigenmann, . . . . . . . . . . . . . . . E. 446.

Habitat: Amazons.

1 Doubtful species of this genus are Chatostomus sericus Cope and Hypostomus erinaceus C. & V.

Kner (1853) described the genus Ancistrus to include many species, which he divides into the two groups, Brachypteri, D. I, 7-1, 9, and Macropteri, D. I, 11-1, 13.

Gill (1859) separated the Macropteri under the name Pterygoplichthyso, saying: "The genus Ancistrus seems to have been framed with special 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 a answering to the former genus and b to the latter."

The species known to Kner and included in his Brachypteri are: Hypostomus cirrhosus C. & V., Ancistrus dolichopterus Kner, Ancistrus gymnorhynchus Kner, Ancistrus mystacinus Kner, Ancistrus pictus Kner, Ancistrus brachyurus Kner, Ancistrus scaphirhynchus Kner. There can be no mistake as to what Gill meant.

Gill redescribed the genus Ancistrus, not to restrict

5. Ancistrus chagresi Eigenmann & Eigenmann, . . . . . . . . . Regan, 256.

Habitat: Rio Chagres.

6. Ancistrus rothschildi (Regan), . . . . . . . . . . . . . . . Regan, 1905.

Habitat: Puerto Cabello, Venezuela.

A7. Ancistrus occidentalis (Regan), Regan, 257.

Habitat: Canelos, eastern Ecuador.

8. Ancistrus brevipinnis (Regan), Regan, 257.

Habitat: Rio Grande do Sul; Theresopolis.

A9. Ancistrus montanus (Regan), Regan, 258.

Habitat: Eastern Andes of Bolivia.

A10. Ancistrus bufonius (Cuvier & Valenciennes), . . . . . . Regan, 258.

Hypostomus calamita Cuvier & Valenciennes; Chatostomus jelskii Steinbachner.

Habitat: Eastern Andes of Peru and Bolivia.

A11. Ancistrus stigmaticus Eigenmann & Eigenmann, . . . . . . . . . . . . . Regan, 259.

Habitat: Goyaz to San Mathios.


It, but as he described or redescribed all of the other genera of fresh-water fishes from Trinidad.

His description of Ancistrus was either drawn from his specimens of guacharote or from Cuvier & Valenciennes's (XV, 508) description of guacharote. Guacharote was known to Kner only through C. & V.'s description and on account "der Ungenauigkeit der Beschreibung", he was unable to place it with certainty. He thought it might be his mystacius.

Regan considers guacharote as belonging to his new subgenus Lasiancistrus. But because Gill's wording of the description applies only to brachyurus and scaphirhynchus (and median) of Kner, Regan considers the latter typical of Ancistrus. Gill's diagnosis based on guacharote, a species not known to Kner and at least subgenerically distinct from brachyurus and scaphirhynchus, can have no bearing whatever on the restriction of Ancistrus.

Fortunately Bleeker definitely restricted the name to Kner's first species, cirrhosus.
PATAGONIAN EXPEDITIONS: ZOOLOGY.

**PSEUDACANTHICUS** Bleeker.
Type: *Hypostomus serratus* Cuvier & Valenciennes.
Range: Amazon to Surinam.
1. *Pseudacanthicus serratus* (Cuvier & Valenciennes), Regan, 260.
   Habitat: Surinam.
A2. *Pseudacanthicus spinosus* (Castelnau), Regan, 260.
   Habitat: Amazon.
3. *Pseudacanthicus fordi* (Günther), Regan, 261.
A4. *Pseudacanthicus hystrix* (Cuvier & Valenciennes), Regan, 261.
   Habitat: Rio Negro.

**LITHOXUS** Eigenmann MS.
Type: *Lithoxus lithoides* Eigenmann.
Range that of the single species.
1. *Lithoxus lithoides* Eigenmann MS.
   Habitat: Cataracts of British Guiana.

**ACANTHICUS** Spix.
Type: *Acanthicus hystrix* Spix.
Range that of the single species.
   *Rhinelepis acaudatus* Cuvier & Valenciennes.
   Habitat: Amazon; Guiana.

**HYPOPTOPOMA** Günther.
Type: *Hypoptopoma thoracatum* Günther.
Range: Upper Amazon.
   *Hypoptopoma bilobatum* Cope.
   Habitat: Upper Amazon.
A2. *Hypoptopoma joberti* (Vailant), Regan, 265.

**OTOCINCLUS** Cope.
Habitat: Upper Amazon; Jurua. *Hypoptopoma steindachneri* Boulenger.
A3. *Hypoptopoma thoracatum* Steindachner, non Günther.
Habitat: Amazons.
A4. *Hypoptopoma gulare* Cope, Regan, 265.
Habitat: Upper Amazon.

**OXYROPSIS** Eigenmann & Eigenmann.
*Arismonta* Holmberg.
Type: *Oxyropsis wrightiana* Eigenmann & Eigenmann = *Hypoptomus carinatus* Steindachner.
Range: Upper Amazon and Paraguay.
A1. *Oxyropsis carinatus* (Steindachner), Regan, 264.
   *Oxyropsis wrightiana* E. & E.
   Habitat: Upper Amazon.
2. *Oxyropsis inexpectatus* (Holmberg), Regan, 264.
   *Oxyropsis güntheri* (Boulenger), Habitat: Paraguay.

**HISONOTUS** Eigenmann & Eigenmann.
Type: *Otocinclus vestitus* Cope.
Range: Southeastern Brazil, Paraguay and Ambyiacu.
1. *Otocinclus affinis* Steindachner, Regan, 267.
Habitat: Santa Cruz.
2. *Otocinclus vittatus* Regan, Regan, 267.
Habitat: Paraguay.
   Habitat: Ambyiacu.
   *Otocinclus fimbriatus* Cope.
   Habitat: Rio Grande do Sul.
   Habitat: Ribeira.
Habitat: Santa Cruz.

Habitat: Ribeira.

Habitat: Tieté.

Habitat: Piracicaba.

Habitat: La Plata.

**Parotocinclus** Eigenmann & Eigenmann.
Type: *Otocinclus maculicauda* Steindachner.
Range that of the single species.
1. *Parotocinclus maculicauda* (Steindachner), .............. Regan, 268.
Habitat: Santa Cruz to Ribeira.

**Microlepidogaster** Eigenmann & Eigenmann.
Type: *Microlepidogaster perforatus* Eigenmann & Eigenmann.
Range: Southeastern Brazil.
1. *Microlepidogaster nigricauda* (Boulenger), .............. Regan, 268.
*Hisontus lavior* and *leptochilus* Cope.
Habitat: Rio Grande do Sul.
Habitat: Rio Grande do Sul.
3. *Microlepidogaster lophophanes* (Eigenmann & Eigenmann), ... Regan, 269.
Habitat: Santa Cruz.

**Loricaria** Linnaeus.
Type: *Loricaria dura* Linnaeus = *Loricaria cataphracta* Linnaeus.
*Parahemiodon, Hemiloricaria* and *Pseudohemiodon* Bleeker.
Range: La Plata to Panama and western Ecuador; all streams.

(Rhineloricaria Bleeker.)
(Type: *Loricaria lima* Kner.)
1. *Loricaria filamentosa* Steindachner, Regan, 274.
Habitat: Rio Magdalena; Berbice.
Habitat: Porto Real, Province Rio de Janeiro.
Habitat: Paraguay.
Habitat: Solimoens and Parana; Paraguay.
Habitat: Xeberos and Canelos.
Habitat: Northwest Ecuador (St Javier, 60 feet; Rio Durango, 350 feet).
7. *Loricaria uracantha* Kner & Steindachner, ................. Regan, 278.
Habitat: Atlantic and Pacific slope of Panama.
8. *Loricaria magdalena* Steindachner, Regan, 279.
Habitat: Rio Magdalena.
9. *Loricaria cadea* Hensel1 ... Regan, 279.
Habitat: Rio Cadea; Rio Grande do Sul.
Habitat: Solimoens and tributaries.
Habitat: Bolivia; Argentina.
Habitat: Rio Janeiro; Amazon.

1 According to Steindachner this is the female of *L. lima*.
Loricaria lima Steindachner, non Kner.
Habitat: Rio Preto to Rio Parahyba.
A14. Loricaria lima Kner, ... Regan, 282.
Habitat: Rio Parahyba to Para; both slopes of Panama.
15. Loricaria microlepidota Steindachner, ............... St., 1907b.
Habitat: Rio Jurua.
16. Loricaria strigilata Hensel, Regan, 283.
Habitat: Rio Grande do Sul.
Loricaria henselii Steindachner.
Habitat: Cubatao.
17. Loricaria microlepidogaster Regan, Regan, 283.
Habitat: Rio Grande do Sul.
18. Loricaria cubatoensis Steindachner, St., 1907g, 489.
Habitat: Cubatao.
19. Loricaria latirostris Boulenger, Regan, 283.
Loricaria paulina Boulenger.
Habitat: Rio Mogy-guassu, about 250 miles inland from Santos.
20. Loricaria steinbachi Regan, Regan, 1906, 97.
Habitat: Salta, Argentina
21. Loricaria jaraguensis Steindachner, St., 1909a
Habitat: Santa Catharina.
(Pseudoloricaria Bleeker.)
(Type: Loricaria lavivscola Cuvier & Valenciennes.)
A22. Loricaria lavivscola Cuvier & Valenciennes, ............... Regan, 284.
Habitat: Amazonas.
A23. Loricaria punctata Regan, Regan, 285.
Habitat: Porto do Moz to Barro do Rio Negro.
(Loricariichthys Bleeker.)
(Type: Loricaria maculata Bloch.)
A24. Loricaria maculata Bloch, Regan, 286.
Loricaria amasonica Castelnau.
Habitat: Amazonas; Guiana; Paraguay.

A25. Loricaria typus Bleeker, Regan, 286.
Loricaria parahemiodon Günther;
Loricaria valenciennesi Vaillant;
Loricaria stubellii Steindachner.
Habitat: Surinam; Amazon; Paraguay.
? Loricaria castanea Castelnau.
Habitat: Amazon; Rio de Janeiro.
A27. Loricaria nudirostris Kner, Regan, 288.
Habitat: Rio Negro.

28. Loricaria labialis Boulenger, Regan, 288.
Habitat: Paraguay.
29. Loricaria spizii Steindachner, Regan, 289.
Habitat: Southeastern Brazil.
30. Loricaria anus Cuvier & Valenciennes, Regan, 289.
Habitat: La Plata and Rio Grande do Sul.
31. Loricaria microdon Eigenmann.
Habitat: Rupununi River, British Guiana.
32. Loricaria grisea Eigenmann.
Habitat: Essequibo River.
33. Loricaria submarginata Eigenmann.
Habitat: Potaro Basin.
A34. Loricaria stewarti Eigenmann.
Habitat: Chipoo Creek, Rio Branco Basin.

(Loricaria Linnaeus.)

35. Loricaria evansi Boulenger, Regan, 290.
Habitat: Rio Jungada, Matto Grosso, Brazil.
36. Loricaria nudiventris Cuvier & Valenciennes, ............... Regan, 290.
Habitat: Rio San Francisco.
37. Loricaria macrops Regan, Regan, 290.
Habitat: Rio de La Plata.
EIGENMANN: CATALOGUE OF FRESH WATER FISHES. 415

A38. Loricaria cataphracta Linnaeus,
Regan, 291.
Loricaria cirrhosa Bloch & Schneider;
Loricaria setifer Lacépède; Plecosomus flagellaris Gronow; Loricaria dura Bleeker.
Habitat: Amazons; Guiana; Paraguay.
A39. Loricaria parnahybce Steindachner, St., 1907.
Habitat: Rio Parnahyba.
A40. Loricaria carinata Castelnau,
Regan, 292.
Loricaria lata Eigenmann & Eigenmann.
Habitat: Rio Jurua; Rio Paraguay; Matto Grosso; Goyaz.
A41. Loricaria similima Regan, Regan, 292.
Loricaria filamentosa Boulenger, non Steindachner.
Habitat: Canelos, East Ecuador.
42. Loricaria apeltogaster Boulenger,
Regan, 292.
Habitat: Paraguay.
43. Loricaria macrodon Kner, Regan, 293.
Habitat: Rio Cuyaba.
44. Loricaria piracicabce v. Ihering,
v. I., 1907, 28.
Habitat: Piracicaba.
45. Loricaria vetula Cuvier & Valenciennes, .............. Regan, 293.
Habitat: La Plata; Rio Janeiro.
46. Loricaria variegata Steindachner,
Regan, 293.
Habitat: Rio Mamoni, near Chepo, Panama.
A47. Loricaria macromystax Günther,
Regan, 294.
Habitat: Peruvian Amazon.
A48. Loricaria lamina Günther,
Regan, 294.
Habitat: Peruvian Amazon.
49. Loricaria laticeps Regan, Regan, 295.
Loricaria lamina Boulenger, non Günther.
Habitat: Paraguay.
50. Loricaria platycephala (Kner).
Habitat: Rio Cuyaba.
51. Loricaria brunnea Hancock.
Habitat: British Guiana.
Doubtful species are the following:
52. Loricaria platyura Müller & Troschel.
Habitat: Rupununi.
53. Loricaria caracasensis Bleeker.
Habitat: Caracas.
54. Loricaria transfordi Gill.
Habitat: Panama.

HEMIODONTICHTHYS Bleeker.
Type: Hemiodon acipenserinus Kner.
Range that of the single species.
A1. Hemiodontichthys acipenserinus (Kner), ............ Regan, 296.
Habitat: Amazon and Paraguay.

REGANELLA Eigenmann.
Type: Hemiodon depressus Kner.
Range that of the single species.
1. Reganella depressa (Kner), Regan, 296.
Habitat: Rio Negro.

HARTTIA Steindachner.
Type: Harttia loricariiformis Steindachner.
Range: southeastern Brazil; Solimoens and Surinam.
1. Harttia loricariiformis Steindachner,
Regan, 298.
Habitat: Southeastern Brazil.
2. Harttia platystoma (Günther),
Regan, 298.
Habitat: Surinam.
Habitat: Ribeira.
A4. Harttia brevirostris (Eigenmann & Eigenmann), ........ Regan, 299.
Habitat: Iça.
STURISOMA Swainson.

Type: Loricaria rostrata Spix.
Range: Rio Paraguay to Magdalena and Pacific slope of Panama and Ecuador.

Oxyloricaria Bleeker (barbata).

1. Sturisoma guntheri Regan, Regan, 299.
Loricaria rostrata Günther, non Spix.
Habitat: Manacapuru; Xeberos.

2. Sturisoma robustum Regan, Regan, 300.
Loricaria rostrata Boulenger, non Spix.
Habitat: Paraguay.

3. Sturisoma lyra Regan, ... Regan, 300.
Loricaria rostrata Boulenger, non Spix.
Habitat: Rio Jurua.

4. Sturisoma barbatum Kner, Regan, 301.
Habitat: Rio Cuyaba.

5. Sturisoma panamense Eigenmann & Eigenmann, .......... Regan, 201.
Loricaria rostrata Steindachner, non Spix; Loricaria aurea Steindachner.
Habitat: Rio Magdalena; Pacific slope of Panama.

6. Sturisoma frenatum (Boulenger),
Regan, 302.
Habitat: Northwest Ecuador (St. Ja-
vier, 60 feet; Solidero, 350 feet; Rio Durango, 350 feet).

FARLOWELLA Eigenmann & Eigenmann.

Type: Acestra acus Kner.
Range: Amazon and northward.
Acestra Kner, preoccupied.

A1. Farlowella gladius (Boulenger),
Regan, 303.
Habitat: Rio Jurua.

2. Farlowella gracilis Regan, Regan, 303.
Habitat: Magdalena Basin.

3. Farlowella oxyrhynchus (Kner),
Regan, 304.
Habitat: Rio Mamore; Upper Amazon; Paraguay.

4. Farlowella kneri (Steindachner),
Regan, 304.
Habitat: Amazonas of Peru and Ecuador.

5. Farlowella aca (Kner), ... Regan, 304.
Habitat: Venezuela.

6. Farlowella amazonum (Günther),
Regan, 305.

Farlowella carinata Eigenmann & Ei-
genmann.
Habitat: Amazonas.

7. Farlowella gladiolus (Günther),
Regan, 305.
Habitat: Rio Cupai.

NEOPLECOSTOMUS Eigenmann & Eigen-
mann.

Type: Plecostomus microps Steindach-
er.
Range that of the single species.

Plecostomus microps Steindachner.
Habitat: Goyaz; Cayenne; Rio de Ja-
neiro; Rio Parahyba.

A2. Neoplecostomus gransus (Cuvier & Valenciennes), ...... Regan, 306.
Plecostomus microps Steindachner.
Habitat: Goyaz; Cayenne; Rio de Ja-
neiro; Rio Parahyba.

Family CYCLOPIDÆ.

Cyclopium Swainson.1

Arges and Brontes Cuvier & Valenci-
es; Stygogenes Günther.

1 I have retained the species of this family as recog-

I am not certain of the position of most of the localities of this genus, whether on the Amazonian or Pacific slope. I have taken it for granted that they are from the Atlantic slope unless specifically stated that they are from the Pacific side.

Type: Cyclopium humboldtii Swainson.
Range: Mountain streams of northern South America on both slopes.

Habitat: Andes of Ecuador.

A2. Cyclopium eigenmanni (Regan),
Regan, 312.

Cyclopium cyclopium Putnam, non
Humboldt.
Habitat: Ecuador, on both slopes.
A3. *Cyclopium vaillanti* (Regan),
Regan, 312.
Habitat: Huamani Peak, Ecuador, 10,700 feet.
4. *Cyclopium orientale* (Boulenger),
Regan, 313.
Habitat: Albiregga and Milla Rivers, above Merida, Venezuela.
A5. *Cyclopium brachycephalus* (Günther),
Regan, 313.
Habitat: Andes of Peru; Cuenca, Ecuador.
A6. *Cyclopium chotae* (Regan),
Regan, 313.
Habitat: Chota Valley, northern Ecuador.
7. *Cyclopium marmoratum* (Regan),
Regan, 314.
Habitat: Andes of Peru; Cuenca, Ecuador.
A8. *Cyclopium longifile* (Steindachner),
Regan, 314.
Habitat: Rio Huambo and Rio Totora, Peru.
A9. *Cyclopium sabalo* (Cuvier & Valenciennes), Regan, 315.
Habitat: Peruvian Andes.
A10. *Cyclopium taczanowskii* (Boulenger),
Regan, 315.
Habitat: Peruvian Andes.
A11. *Cyclopium prenadiilla* (Cuvier & Valenciennes), Regan, 316.
Habitat: Andes of Ecuador and Peru.
A12. *Cyclopium fissidens* (Regan),
Regan, 316.
Habitat: Andes of Ecuador.
A13. *Cyclopium festae* (Boulenger),
Regan, 316.
Habitat: Eastern Ecuador.
A14. *Cyclopium thesalia* (Steindachner),
St., 1907b.
Habitat: Andes of Cayandelet, A15. *Cyclopium peruanum* (Steindachner),
Regan, 317.
Habitat: Amable Maria, Peru.
A16. *Cyclopium simonsii* (Regan),
Regan, 317.
Habitat: Huaras, Peru, 10,700 feet.
17. *Cyclopium homodon* (Regan),
Regan, 309.
Habitat: Villets, Colombia, 3,500 feet.
A18. *Cyclopium boulengeri* (Regan),
Regan, 310.

Stygogenes humboldtii Boulenger, non Swainson.
Habitat: Canelos, Ecuador.
A19. *Cyclopium guntheri* (Boulenger),
Regan, 310.
† Arges homodon Regan.
Habitat: Colombia.
20. *Cyclopium cyclopium* (Humboldt),
Regan, 211.
*Cyclopium humboldtii* Swainson; (C. prenadiilla Cuv. & Val.; C. brachycephalus Günther; C. whymperi Boulenger; C. eigenmanni Regan fide Evermann & Kendall).
Habitat: Andes near Quito.
21. *Cyclopium heterodon* (Regan),
Regan, 1907, 799.
Habitat: Western Colombia.
22. *Cyclopium retrospina* (Regan),
Regan, 1907, 800.
Habitat: Western Colombia.

**Astroblepus** Humboldt.

Type: *Astroblepus grizalvii* Humboldt.
Range that of the single species.
1. *Astroblepus grizalvii* Humboldt,
Regan, 318.
† Arges guntheri Boulenger; † Arges brachycephalus Günther.
Habitat: Popoyan; Rio Cauca.
Order PLECTOSPONDYLI.

Family CATOSTOMIDÆ.

Holarctic fishes entering the northern border of the tropics.

Carpioïdes Rafinesque.
Type: Catostomus cyprinus Le Sueur.
Range: Guatemala through the Mississippi valley and Great Lakes.
1. Carpioïdes meridionalis (Günther),
   Meek, 26.
   Habitat: Vera Cruz to the Usumacinta in Guatemala.
2. Carpioïdes tumidus Baird & Girard,
   Meek, 27.
   Habitat: Rio Panuco to the Rio Grande.
   Habitat: Rio Panuco Basin.

Pantosteus Cope.
Type: Minomus platyrhynchus Cope.
Range: From tropical America northward through the Rocky Mountains.
1. Pantosteus plebeius (Baird & Girard),
   Meek, 30.
   Catostomus guzmaniensis Girard; Catostomus nebuliferus Garman.
   Habitat: From the northern margin of tropical America at Durango northward.

Moxostoma Rafinesque.
Type: Catostomus anisurus Rafinesque.
Range: Rio Lerma through the eastern United States.
1. Moxostoma australinum Bean, Meek, 35.
   Habitat: Rio Lerma Basin and headwaters of the Rio Mezquital.

Family CYPRINIDÆ.

Xystrosus Jordan & Snyder.
Type: Xystrosus propoche Jordan & Snyder.
Range that of the single species.
1. Xystrosus popoche Jordan & Snyder,
   Meek, 43.
   Habitat: Rio Lerma Basin.

Algansea Girard.
Type: Leuciscus tincella Cuvier & Valenciennes.
Range: Lerma Basin.
1. Algansea tincella (Cuvier & Valenciennes), . . . . . . . . Meek, 44.
   Ceratichthys sallei Günther.
   Habitat: Rio Lerma; valley of Mexico; Rio Panuco Basin.
2. Algansea dugesi Bean, . . . . Meek, 45.
   Habitat: Lerma Basin.
3. Algansea rubescens Meek, . . Meek, 46.
   Habitat: Lerma Basin.
4. Algansea lacustris Steindachner,
   Meek, 47.
   Algansea tarascorum Steindachner.
   Habitat: Lerma Basin.
5. Algansea affinis Regan,
   Regan, 1907-8, 151.
   Habitat: Rio Lerma.
6. Algansea stigmatura Regan,
   Regan, 1907-8, 152.
   Habitat: Mexico.

Hybognathus Agassiz.
Type: Hybognathus suchalis Agassiz.
Dionda Girard; Agoma Girard.
Range: Border of tropical America northeastward through the Mississippi valley to the Delaware.
1. Hybognathus episcopus (Girard), Meek, 48.
   Dionda melanops, couchi, amara, flaviatilis Girard; Hybognathus serenus, melanops Jordan; Hybognathus punctiger Garman; Hybognathus civilis Cope; Hybognathus episcopus Jordan & Evermann.
   Habitat: Rio Mezquital to Texas.

2. Hybognathus rasconis (Jordan & Snyder), Meek, 50.
   Habitat: Panuco Basin.

LEUCISCUS Cuvier.

Type: Cyprinus leuciscus Linnaeus.
Range: Europe, Asia and North America.
1. Leuciscus nigrescens (Girard), Meek, 55.
   Tigoma pulchella, pulchra Girard; Gila conspersa, nigrescens, modesta Garman; Leuciscus purpureus Rutter; Leuciscus niger Bean.
   Habitat: Headwaters of Rio Mezquital and northward.

FALCULA Jordan & Snyder.

Type: Falcula chapalae Jordan & Snyder.
Range that of the single species.
1. Falcula chapalae Jordan & Snyder, Meek, 58.
   Habitat: Lerma Basin.

AZTECULA Jordan & Evermann.

Type: Notropis asteus Woolman.
Range: Central Mexico.
Azteca Jordan & Evermann.
1. Aztecula vittata (Girard), . . Meek, 59.
   Notropis asteus Woolman.
   Habitat: Valley of Mexico and the Rio Balsas Basin.

2. Aztecula lermæ (Evermann & Goldsborough), . . . . . . Meek, 60.
   Habitat: Rio Lerma Basin.

   Habitat: Mexican Plateau.

NOTROPIS Rafinesque.

Type: Notropis atherinoides Rafinesque.
Codoma, Alburnops, Moniana Girard; Graodus Günther; Orcella Jordan & Evermann; Nototropis Meek.
Range: Rio Balsas north through the eastern slope of America.
1. Notropis calientis Jordan & Snyder, Meek, 65.
   Habitat: Lerma Basin.

2. Notropis boucardi ( Günther), Meek, 67.
   Graodus nigrotaniatus Günther.
   Habitat: Rio Balsas.

3. Notropis ornatus (Girard).
   Habitat: Rio Mezquital and northward.

4. Notropis forlonensis Meek, . . Meek, 70.
   Habitat: Rio Panuco Basin.

EVARRA Woolman.

Type: Evarra eigenmanni Woolman.
Range: Valley of Mexico.
1. Evarra eigenmanni Woolman, Meek, 77.
   Habitat: Valley of Mexico.

2. Evarra tlahuacensis Meek, . . Meek, 78.
   Habitat: Valley of Mexico.

HYBOPSIS Agassiz.

Type: Hybopsis gracilis Agassiz.
Yuriria Jordan & Evermann.
Range: Rio Lerma northeast through the Mississippi Valley and California.
1. Hybopsis altus (Jordan), . . Meek, 81.
   Habitat: Rio Lerma Basin.
Family CHARACIDÆ.
Subfamily ANODINÆ.

ANODUS Spix.
Elopomorphus Gill.
Type: Anodus elongatus Spix.
Range: Amazons and Orinoco.
1. Anodus elongatus Spix.
Elopomorphus jordani Gill; Anodus steatops Cope.
Habitat: Amazons.

EIGENMANNINA Fowler.
Type: Anodus melanopogon Cope.
Range: Amazon and Orinoco.
1. Eigenmannina orinocensis (Steindachner).
Habitat: Orinoco River.
A2. Eigenmannina melanopogon (Cope).
Habitat: Peruvian Amazon.

Subfamily CURIMATINÆ.

POTAMORHINA Cope.
Type: Curimatus pristigaster Steindachner.
Range: Solimoens and Marañon.
A1. Potamorkina pristigaster (Steindachner).
Habitat: Amazons from Rio Negro to Peru.

PSECTROGASTER Eigenmann & Eigenmann
Type: Psectrogaster rhomboides Eigenmann & Eigenmann.
Range: Rio Paraguay northward.
1. Psectrogaster rhomboides Eigenmann & Eigenmann.
Curimatus cyprinoides Steindachner, non Linneus.
Habitat: Rio Puty.
2. Psectrogaster curviventris Eigenmann & Kennedy.
Habitat: Rio Paraguay.
3. Psectrogaster atratus Gill.
Habitat: Bolivia.
A4. Psectrogaster amazonicus Eigenmann & Eigenmann.
Anodus ciliatus Müller & Troschel.
Habitat: Amazons.
A5. Psectrogaster ciliatus (Müller & Troschel).
Habitat: Amazon and its tributaries; Guiana; Rios Parana and Paraguay.

CURIMATOPSIS Steindachner.
Type: Curimatopsis macrolepis Steindachner.
Range: Amazons.
Habitat: Amazons and tributaries from Rio Negro to Tabatinga.
A2. Curimatopsis microlepis Eigenmann & Eigenmann.
Habitat: Jatuarana.

CURIMATELLA Eigenmann & Eigenmann.
Type: Curimatella lepidurus Eigenmann & Eigenmann.
Range: Paraguay and San Francisco and northward to Guiana.
1. Curimatella lepidurus Eigenmann & Eigenmann.
Habitat: Rio San Francisco.
A2. Curimatella meyeri (Steindachner).
Habitat: Amazons.
Habitat: Serpa.
A4. Curimatella alburna (Müller & Troschel).
Habitat: Guaporé, northward to Amazons and Guiana; Paraguay.
5. Curimatella alburna australis Eigenmann & Kennedy.
Habitat: Paraguay.
Habitat: Jutahy.

Habitat: Amazonas.

A8. Curimatella xinguensis Steindachner.
Habitat: Xingu.

CURIMATUS OKEN.
Cyphocharax, Steindachnerina and Peltopleura Fowler.
Type: Salmo edentulus Bloch = Salmo cyprinoides Linnaeus.
Range: Every stream from Panama to the Rio de La Plata on the eastern slope and on the western slopes of Panama and Ecuador.

Habitat: Orinoco and Guiana, Amazonas and Paraguay.

2. Curimatus gilli Eigenmann & Kennedy.
Habitat: Paraguay Basin.

A3. Curimatus spiluropis Eigenmann & Eigenmann.
Habitat: Iça and Solimoens and Parana Basins.

Habitat: Amazon and Solimoens.

A5. Curimatus albulus Lütken.
Habitat: Rio das Velhas.

6. Curimatus nasus Steindachner.
Habitat: Ecuador and Paraguay Basin.

7. Curimatus conspersus Holmberg.
Habitat: Paraguay.

8. Curimatus troschelli Günther.
Habitat: Western slopes of Ecuador.

9. Curimatus nigrotaenia Boulenger.
Habitat: Matto Grosso.

10. Curimatus elegans Steindachner.
Habitat: Coastwise streams of southeastern Brazil; Paraguay.

11. Curimatus elegans nitens Holmberg.
Curimatus nitens Holmberg; Curimatus elegans paraguayensis Eigenmann & Kennedy.
Habitat: Paraguay Basin.

Habitat: Bahia.

13. Curimatus argenteus Gill.
Habitat: Trinidad.

Habitat: Solimoens, Amazon and Paraguay Basin.

15. Curimatus bimaculatus sialis Eigenmann & Eigenmann.
Habitat: Lake Manacapuru.

Habitat: Amazonas at Serpa and Peru.

A17. Curimatus dobula Günther.
Habitat: Eastern slope of Peru and Ecuador.

A18. Curimatus güntheri Eigenmann & Eigenmann.
Habitat: Tabatinga.

Habitat: Surinam.

20. Curimatus magdalenae Steindachner.
Habitat: Rivers Mamoni and Magdalen.

Habitat: Para.

22. Curimatus gilberti Quoy & Gaimard.
Curimatus vogu Hensel; Curimatus albula Lütken.
Habitat: Southeastern Brazil; Paraguay Basin.

23. Curimatus gilberti brevipinnis Eigenmann & Eigenmann.
Habitat: La Plata Basin.

Habitat: Lake Hyanuary to Obidos.

25. Curimatus nagelli Steindachner.
Habitat: Rio Janeiro.
   Habitat: Rio Negro and Lago Alexo.
A27. *Curimatus brevipes* Eigenmann & Ogle.
   Habitat: Peru.
   Habitat: Rio de La Plata.
   Habitat: Eastern slope of Peru.
   Habitat: Rios Solimoens, Marañon and Paraguay, with their tributaries.
A31. *Curimatus hypostomus* Boulenger.
   Habitat: Eastern slopes of Peru.
A32. *Curimatus mivartii* Steindachner.
   Habitat: Magdalena Basin.
A33. *Curimatus leuciscus* Günther.
   Habitat: Amazons.
A34. *Curimatus leuciscus boliviæ* Eigenmann & Ogle.
   Habitat: Bolivia.
A35. *Curimatus vitatus* Kner.
   Habitat: Solimoens and tributaries.
   Habitat: Xingu.
A37. *Curimatus isognathus* Eigenmann & Eigenmann.
   Habitat: Solimoens.
A38. *Curimatus knerii* Steindachner.
   *Curimatus cyprinoides* Kner (not of Linnaeus).
   Habitat: Amazons and northward.
   *Salmo edentulus* Bloch.
   Habitat: Amazons and northward.
40. *Curimatus boulenegeri* Eigenmann nom. nov.
   *Curimata guntheri* Boulenger (not E. & E.).
   Habitat: Rio Vinces, Ecuador.
41. *Curimatus macrops* Eigenmann & Eigenmann.
   Habitat: Rios Puty and Conçallo.
A42. *Curimatus falcatus* Eigenmann & Eigenmann.
   Habitat: Xingu.
A43. *Curimatus simulatus* Eigenmann & Eigenmann.
   Habitat: Upper Solimoens.
44. *Curimatus copei* Fowler.
   Habitat: Surinam.
45. *Curimatus schomburghii* Günther.
   Habitat: Guianas.
46. *Curimatus essequibensis* Günther.
   *Anodus cyprinoides* Müller & Troschel.
   Habitat: Essequibo.
A47. *Curimatus aureus* Pellegrin.
   Habitat: Rio Guayas, Ecuador.

**Semitapicis** Eigenmann & Eigenmann.
   Type: *Charax planirostris* Gronow.
   Range: Maracaibo to Argentina; not in southeastern coastwise streams.
   *Curimatus abramoides* Kner.
   Habitat: Rio Negro to Obidos.
A2. *Semitapicis laticeps* (Cuvier & Valenciennes).
   *Curimatus altamazonicus* Cope.
   Habitat: Lake Maracaibo to the Rio Paraguay.

**Gasterotomus** Eigenmann.
   Type: *Anodus latior* Spix.
   Range that of the single species.
   Habitat: Amazons south to Argentina; not in southeast coastwise streams.

Subfamily **Parodontinae**.

**Parodon** Cuvier & Valenciennes.
   Type: *Parodon suborbitalis* Cuvier & Valenciennes.
   Range: Colombia to the Rios San Francisco and La Plata; not in coastwise streams of southeastern Brazil.
1. Parodon suborbitalis Cuvier & Valenciennes.
   *Parodon nasus* Kner; *Parodon hilarii* Reinhardt.
   Habitat: Lake Maracaibo to Cujaba and Rio das Velhas.

2. Parodon buckleyi Boulenger.
   Habitat: Eastern Ecuador.

3. Parodon gestri Boulenger.
   Habitat: Rio Coxipo.

4. Parodon affinis Steindachner.
   Habitat: La Plata Basin.

5. Parodon caliensis Boulenger.
   Habitat: Colombia.


   Habitat: Rio Paraguay.

   Habitat: Piracicaba.

**Saccodon** Kner.

1. *Saccodon wagneri* Kner & Steindachner.
   Habitat: Western Ecuador.

2. *Saccodon craniocephalum* Thominot.
   Habitat: Western Ecuador.

Subfamily HEMIODINAE.

1. *Hemiodus unimaculatus* (Bloch).
   *Hemiodus crenidens* Müller.
   Habitat: Guianas to the Paraguay River.

2. *Hemiodus semitaniatus* Kner.
   Habitat: Matto Grosso, French Guiana.

3. *Hemiodus fowleri* Steindachner.
   Habitat: Amazon.

   Habitat: Rios Cupai and San Francisco.

5. *Hemiodus immaculatus* Kner.
   Habitat: Orinoco to the Amazon.

   Habitat: Rios Icanno and Capin.

   Habitat: Solimoens and Marañon and their affluents; Paraguay.

8. *Hemiodus goeldii* Steindachner, *St., 1908a*.

9. *Hemiodus quadrimaculatus* Pellegrin,
   *Pellegrin, 1908, 343*.
   Habitat: French Guiana.

10. *Hemiodus argenteus* Pellegrin,
    *Pellegrin, 1908, 344*.
    Habitat: Orinoco.

**Anisitsia** Eigenmann.

1. *Anisitsia kappleri* (Günther).
   Habitat: Surinam.

2. *Anisitsia notata* (Schomburgk).
   *Hemiodus microcephalus* Günther.
   Habitat: Guianas to the Aragua and Guaporé.

3. *Anisitsia amazonum* (Humboldt).
   *Curimatus amazonum* Humboldt; *Prochilodus humboldtii* Cuvier & Valenciennes.
   Habitat: Amazons.

   Habitat: Paraguay Basin.
Subfamily **Prochilodinae**.

   Habitat: Western Ecuador.

2. *Prochilodus steindachneri* Fowler.  
   Habitat: Parahyba.

   Habitat: Southeastern Brazil.

   Habitat: Ypanema.

5. *Prochilodus longirostris* Steindachner.  
   Habitat: Magdalena Basin.

   Habitat: Southeastern Brazil.

   *Prochilodus nigricans* Günther.  
   Habitat: Magdalena to Essequibo and Rio Negro.

   Habitat: Parnahyba.

   Habitat: Eastern Peru.

    *Prochilodus asper* Steindachner.  
    Habitat: Magdalena Basin.

    Habitat: Venezuela.

    Habitat: Southeastern Brazil.

    Habitat: Alta Parana to Alto Beni; Maracaibo.

Subfamily **Chilodinae**.

    Habitat: Peruvian Amazon.

    Habitat: Guiana and Amazons.

    Habitat: Amazon.

    Habitat: San Francisco Basin.

    *Prochilodus costatus* Cuvier & Valenciennes.  
    Habitat: Paraguay Basin to the Rio San Francisco.

    Habitat: La Plata Basin.

    Habitat: Paraguay to Rio de Janeiro.

    Habitat: La Plata Basin.

22. *Prochilodus nigricans* Agassiz.  
    Habitat: La Plata and Amazon systems.

    Habitat: Rio Negro Basin.

    Habitat: Orinoco Basin.

    Habitat: Orinoco and Amazons.

    Habitat: Amazons.

27. *Prochilodus caudofasciatus* Starks, 1907, 773.  
    Habitat: Rio Perené, Peru.

C. **Chilodus** Günther.

1. *Chilodus punctatus* Müller & Troschel.  
   Habitat: Guianas.

   Type: *Chilodus punctatus* Müller & Troschel.

   Range: Guianas.
Subfamily Gymnocharacinæ.

Gymnocharacinus Steindachner.
Type: Gymnocharacinus bergii Steindachner.
Habitat: Range that of the single species.

Subfamily Anostomatinae.

Lemolyta Cope.

Schizodontopsis Garman.
Type: Schizodon teniatus Kner.
Range: Orinoco, Amazonas.
A1. Lemolyta teniata (Kner).
Habitat: Amazonas.

Anostomus Gronow.

Pithecocharax Fowler.
Type: Salmo anostomus Linnaeus.
Range: Amazon valley and northward.
Anostomus salmones Gronow.
Habitat: Essequibo and Jutahy.
A2. Anostomus gracilis (Kner).
Habitat: Rio Guaporé.
A3. Anostomus trimaculatus Kner.
Habitat: Amazonas and affluents.
A4. Anostomus ncayalensis (Fowler).
Habitat: Peruvian Amazon.
A5. Anostomus proximus Garman.
Habitat: Villa Bella; Ueranduba.
Habitat: Amazonas.
Habitat: Içá.
A8. Anostomus orinocensis Steindachner.
Habitat: Orinoco.

Schizodon Agassiz.
Type: Schizodon fasciatus (Spix).
Range: La Plata to Venezuela.
Habitat: La Plata to Amazon.

A2. Schizodon fasciatus (Spix).
Habitat: Venezuela and Amazon; Paraguay.
3. Schizodon borelli Boulenger.
Habitat: Upper Paraguay.
4. Schizodon dissimilis (Garman).
Anostomus fasciatus Eigenmann & Kennedy.
Habitat: Rio Puty; Paraguay Basin.
A5. Schizodon isognathus Kner.
Habitat: Cujaba, Aparé.
6. Schizodon knerii (Steindachner).
Habitat: Rio Grande do Sul to Rio San Francisco.
7. Schizodon plata Garman.
Habitat: La Plata.
A8. Schizodon elongatus Steindachner, St., 1908a.

Lahilliella Eigenmann & Kennedy.
Type: Schizodon nasutus Kner.
1. Lahilliella nasuta (Kner).
Habitat: Rio Puty and La Plata basin.

Rhytiodus Kner.

Garmanina Fowler.
Type: Rhytiodus microlepis Kner.
Range: Rio Negro to Peru.
Habitat: Barra do Rio Negro.
A2. Rhytiodus argenteofuscus Kner.
Schizodon sagittarius Cope.
Habitat: Rio Negro to Peruvian Amazon.
PATAGONIAN EXPEDITIONS: ZOOLOGY.

ANOSTOMOIDES Pellegrin.
Type: Anostomoides atrianalis Pellegrin.
Range that of the single species.
1. Anostomoides atrianalis Pellegrin.
   Habitat: Orinoco.

LEPORINUS Agassiz.
Abramites Fowler.
Type: Leporinus novemfasciatus Agassiz = Salmo fasciatus Bloch.
Range: All east slope streams from the Magdalena to the La Plata.
A1. Leporinus nattereri Steindachner.
   Habitat: Amazon.
A2. Leporinus striatus Kner.
   Habitat: Rio Magdalena, Peruvian Amazon and Paraguay.
   Habitat: Rio Janeiro.
A4. Leporinus melanopleura Günther.
   Habitat: Bahia and Cipo.
A5. Leporinus taniatus Lütken.
   Habitat: Rio das Velhas.
A6. Leporinus nigrotaeniatu (Schomburgk).
   Habitat: Guiana and middle course of the Amazons.
A7. Leporinus semivittatus Boulenger.
   Habitat: Rio Negro.
A8. Leporinus müllerli Steindachner.
   Habitat: Orinoco, Solimoens and Marañon.
A9. Leporinus agassizi Steindachner.
   Habitat: Solimoens.
A10. Leporinus megalae Günther.
    Leporinus marcgravii Lütken.
    Habitat: Guianas; Peruvian Amazon and Rio de Janeiro.
A11. Leporinus bimaculatus Castelnau.
    Leporinus frederici Eigenmann & Norris, non Bloch.
    Habitat: Goyaz to Taubaté.
12. Leporinus steindachneri Eigenmann.

Leporinus affinis Steindachner, non Günther.
Habitat: Southeastern Brazil.
13. Leporinus munscarpum Steindachner.
   Habitat: Colombia.
A14. Leporinus friderici Bloch.
    Curimatus acutidens Valenciennes;
    Leporinus leschenuaultii Cuvier & Valenciennes;
    Leporinus megalae Günther, in part.
   Habitat: Venezuela; Guianas to La Plata.
15. Leporinus reinhardtii Lütken.
    Leporinus affinis Lütken, not of Günther.
   Habitat: Rio das Velhas.
A16. Leporinus obtusidens Valenciennes.
    Leporinus pachyrurus Cuvier & Valenciennes;
    Leporinus elongatuum Cuvier & Valenciennes.
   Habitat: La Plata Basin; Rio Grande do Sul; Rio Cipo; Magdalena Basin.
17. Leporinus silvestrii Boulenger.
   Habitat: Matto Grosso.
18. Leporinus bahiensis Steindachner.
   Habitat: Bahia.
19. Leporinus copeaudi Steindachner.
   Habitat: Southeastern Brazil; Tieté.
A20. Leporinus trifasciatus Steindachner.
   Habitat: Huallaga and Paraguay Basin.
21. Leporinus eques Steindachner.
   Habitat: Rio Magdalena and Rio Paraguay.
A22. Leporinus affinis Günther.
   Habitat: Orinoco; Rio Capin and La Plata Basin.
23. Leporinus mormyrops Steindachner.
   Habitat: Parahyba.
24. Leporinus solarii Holmberg.
   Habitat: Rio de La Plata.
A25. Leporinus hypselonotus Günther.
   Habitat: Orinoco; Solimoens; Marañon; Paraguay.
26. Leporinus conirostris Steindachner.
   Habitat: Southeastern Brazil; Paraguay; São Paulo.
Subfamily LEPORELLINÆ.

LEPORELLUS Lütken.

Type: Leporinus pictus Kner = Leporinus vittatus Cuvier & Valenciennes.

Range that of the single species.

Subfamily NANNOSTOMATINÆ.

NANNOSTOMUS Günther.

Type: Nannostomus beckfordii Günther.

Range: Guiana; Amazons; Paraguay.

1. Nannostomus beckfordii Günther.
Habitat: Demarara.

2. Nannostomus anomalus Steindachner.
Habitat: Rio Negro and Amazon.

Habitat: British Guiana.

Habitat: Potaro River.

5. Nannostomus simplex Eigenmann.
Habitat: Lama Stop off, British Guiana.

PECILOBRYCON Eigenmann.

Type: Pacilobrycon harrisoni Eigenmann.

1. Pacilobrycon harrisoni Eigenmann.
Habitat: Christianburg, British Guiana.

2. Pacilobrycon auratus Eigenmann.
Habitat: Essequibo River.

3. Pacilobrycon erythrurus Eigenmann.
Habitat: Essequibo Basin.

4. Pacilobrycon ocellatus Eigenmann.
Habitat: British Guiana.

5. Pacilobrycon trifasciatus Steindachner.
Habitat: Amazons and affluents.

6. Pacilobrycon eques Steindachner.
Habitat: Peruvian Amazon.

7. Pacilobrycon unifasciatus Steindachner.
Habitat: Amazons.

CHARACIDIUM Reinhardt.

Chorimycterus Cope; Nannognathus Boulenger; Pacilasomatops Fowler.

Type: Characidium fasciatum Reinhardt.

Range: Orinoco south to the Rio San Francisco and the La Plata Basin.

1. Characidium ethostoma Cope.
Habitat: Ambyiacu.

2. Characidium borellii (Boulenger).
Habitat: San Pablo, Argentina.

3. Characidium fasciatum Reinhardt.
Habitat: Orinoco south to the Rio das Velhas and the La Plata Basin.

4. Characidium purpuratum Steindachner.
Habitat: Ecuador.

5. Characidium steindachneri Cope.
Habitat: Peruvian Amazon.

6. Characidium tenue (Cope).
Habitat: Rio Grande do Sul.

7. Characidium laterale Eigenmann.
Habitat: Potaro River.
8. Characidium vintoni Eigenmann.  
Habitat: Shrimp Creek near Kaieteur.

Habitat: British Guiana.

Habitat: Rio Branco Basin.

Habitat: Gluck Island, Essequibo River.

Habitat: Essequibo River.

13. Characidium brevirostris Pellegrin.  
Habitat: Northern Brazil.

ARCHICHEIR Eigenmann.  
Type: Archicheir minutus Eigenmann.

COPEINA Fowler.  
Type: Pyrrhulina argyrops Cope.  
Range that of the single species.

1. Archicheir minutus Eigenmann.  
Habitat: Christianburg, British Guiana.

MICROCHARAX Eigenmann.  
Type: Nannostomus lateralis Boulen-ger.  
Range that of the single species.

1. Microcharax lateralis (Boulen-ger).  
Habitat: Paraguay Basin.

JOBERTINA Pellegrin.  
Type: Jobertina interrupta Pellegrin.  
Range that of the single species.

1. Jobertina interrupta Pellegrin.  
Habitat: Serra d'Estrello, Brazil.

Subfamily Pyrrhulinae.

COPEINA Fowler.  
Type: Pyrrhulina argyrops Cope.  
Range: Amazons.

Habitat: Amazons.

A2. Copeina guttata (Steindachner).  
Habitat: Amazons.

A3. Copeina argyrops (Cope).  
Habitat: Amazons.

POGONOCHARAX Regan.  
Type: Pogonocharax rehi Regan.  
Habitat: Argentina.

PYRRHULINA Cuvier & Valenciennes.  
Type: Pyrrhulina filamentosa Cuvier & Valenciennes,  
Range: Paraguay and Amazons; Surinam.

A1. Pyrrhulina lata Cope.  
Habitat: Ambyiacu.

2. Pyrrhulina australis Eigenmann & Ken-ney.  
Pyrrhulina semifasciata Boulenger (non Steindachner).  
Habitat: Paraguay and tributaries.

A3. Pyrrhulina melanostoma (Cope).  
Habitat: Ecuador.

Habitat: Surinam.

A5. Pyrrhulina semifasciata Steindachner.  
Habitat: Amazons.

Habitat: Paraguay and Amazons.

A7. Pyrrhulina maxima Eigenmann & Ei-genmann.  
Habitat: Solimoes.

Subfamily Aphiocharacinae.

COELURICHTHYS Ribeiro.  
Type: Calurichthys iporanga Ribeiro.  
Range that of the single species.

Habitat: Ribeira.
HOLOSHESTHES Eigenmann.
Type: *Cheirodon pequira* Natterer.
Range that of the single species.
Habitat: Upper Paraguay and Rio Guaporé.

ODONTOSTILBE Cope.
Type: *Odontostilbe fugitiva* Cope.
Range: Trinidad; Ecuador and Paraguay.
1. *Odontostilbe pulcher* (Gill).
Habitat: Trinidad.
A2. *Odontostilbe fugitiva* Cope.
Habitat: Ecuador.
Habitat: Pilcomayo.
Habitat: Paraguay.
5. *Odontostilbe tramentina* Eigenmann & Kennedy.
Habitat: Paraguay.

CHEIRODON Girard.
Type: *Cheirodon pisciculus* Girard.
Range: Magdalena; Amazon south to the Rio San Francisco, and the La Plata Basin; western slope of Chili.
1. *Cheirodon interruptus* (Jenyns).
Habitat: La Plata Basin.
2. *Cheirodon monodon* Cope.
Habitat: Rio Grande do Sul.
Habitat: “South America.”
4. *Cheirodon pisciculus* Girard.
Habitat: Chili.
A5. *Cheirodon nattereri* Steindachner.
*Cheirodon pulcher* Steindachner, non Gill; *Cheirodon steindachneri* Eigenmann & Eigenmann.
Habitat: Amazon; Paraguay.
Habitat: Matto Grosso.
Habitat: Amazon; Magdalena; Paraguay.
Habitat: San Francisco Basin.
Habitat: Rio Paraguay.
Habitat: Lower Amazon.

APHYOCHARAX Günther.
Type: *Aphyocharax pusillus* Günther.
Range: Amazons south to the Paraguay.
1. *Aphyocharax rathbuni* Eigenmann.
Habitat: Paraguay.
2. *Aphyocharax dentatus* Eigenmann & Kennedy.
Habitat: Paraguay.
Habitat: Paraguay.
Habitat: Marañón Basin.
A5. *Aphyocharax alburnus* (Günther),
Habitat: Marañón and La Plata Basin.
Habitat: Amazon.
Habitat: Paraguay.
Habitat: Brazil.
A7. *Aphyocharax filigerus* Cope.
Habitat: Marañón.

HOLOPRION Eigenmann.
Type: *Cheirodon agassizii* Steindachner.
Range: Jatuarana and “Brazil.”
1. *Holoprion maxillaris* (Ulrey).
Habitat: Brazil.
2. *Holoprion agassizii* (Steindachner).
Habitat: Jatuarana.
Subfamily CRENUCHINÆ.

Crenuchus Günther.

Type: Crenuchus spilurus Günther.
Range that of the single species.
Habitat: Amazons and Guiana.

Pecilocharax Eigenmann.

Type: Pecilocharax bovallii Eigenmann.
Range that of the single species.
1. Pecilocharax bovallii Eigenmann.
Habitat: Kaieteur, Potaro River.

Subfamily IGUANODECTINÆ.

Iguanodectes Cope.

Type: Iguanodectes tenuis Cope.
Range that of the single species.

Henochilus Garman.

Type: Henochilus wheatlandi Garman.
Range that of the single species.
Habitat: Southeastern Brazil.

Brycon Müller & Troschel.

Bryconodon Eigenmann. Triurobrycon Eigenmann.
Type: Brycon falcatus Müller & Troschel.
Range: La Plata to Guatemala in all streams; western Peru, Ecuador and Panama.

(Chalcinopsis Kner.)

(Type: Chalcinopsis striatulus Kner.)

A1. Brycon striatulus (Kner).
Chalcinopsis chagrensis Kner.
Habitat: Ecuador to Panama.
2. Brycon guatemalenis Regan.
Habitat: Central America.
Habitat: Cauca.
4. Brycon alburnus (Günther).
Habitat: Western Ecuador.
5. Brycon dentex Günther.
Habitat: Western Ecuador to Guatemala.

(Megalobrycon Günther.)

Subfamily TETRAGONOPTERINÆ.

Henochilus Garman.

Type: Henochilus wheatlandi Garman.
Range that of the single species.
Habitat: Southeaster Brazilian.

Brycon Müller & Troschel.

Bryconodon Eigenmann. Triurobrycon Eigenmann.
Type: Brycon falcatus Müller & Troschel.
Range: La Plata to Guatemala in all streams; western Peru, Ecuador and Panama.

(Chalcinopsis Kner.)

(Type: Chalcinopsis striatulus Kner.)

A1. Brycon striatulus (Kner).
Chalcinopsis chagrensis Kner.
Habitat: Ecuador to Panama.
2. Brycon guatemalenis Regan.
Habitat: Central America.
Habitat: Cauca.
4. Brycon alburnus (Günther).
Habitat: Western Ecuador.
5. Brycon dentex Günther.
Habitat: Western Ecuador to Guatemala.

(Megalobrycon Günther.)

Habitat: Upper Paraguay Basin.
A7. Brycon cephalus (Günther).
Habitat: Peruvian Amazon.
A8. Brycon erythropterus (Cope).
Habitat: Ambyiacu.
Habitat: Rio Mucuri.
Habitat: Amazons.
Brycon insignis Steindachner.
Habitat: Southeastern Brazil.
(Brycon Müller & Troschel.)
Habitat: Salinas; Paraguay; Rio San Francisco; Amazon.
13. Brycon carphophagus (Cuvier & Valenciennes).
Habitat: Minas Geraes.
Habitat: La Plata.
A15. Brycon stükellii Steindachner.
Habitat: Amazons.
Habitat: Amazon Basin.
17. *Brycon nattereri* Günther.
   *Chalcus opalinus* Kner.
   Habitat: Upper Parana Basin.
   Habitat: Southeastern Brazil.
   Habitat: Ambiyacu.
    Habitat: Orinoco.
    Habitat: Essequibo.
22. *Brycon atricaudatus* (Kner).
    *Brycon moorei* Steindachner.
    Habitat: Magdalena and Western Ecuador.
    Habitat: Bahia.
    Habitat: Peru.
25. *Brycon opalinus* (Cuvier).
    *Characinus amazonicus* Agassiz.
    Habitat: Brazil.
    Habitat: Guianas.
27. *Brycon orbignianus* (Cuvier & Valenciennes).
    *Chalcus rhodopterus* Cuvier & Valenciennes; *Brycon orthotrophia* Günther.
    Habitat: La Plata Basin.
    Habitat: Rio das Velhas.

**Othonophanes** Eigenmann.
Type: *Brycon labiatus* Steindachner.
Range that of the single species.
1. *Othonophanes labiatus* (Steindachner).
    Habitat: Cauca.

**Holobrycon** Eigenmann.
Type: *Brycon pesu* Müller & Troshchel.
Range that of the single species.
    Habitat: Guiana; Amazons.

**Scissor** Günther.
Type: *Scissor macrocephalus* Günther.
Range that of the single species.
1. *Scissor macrocephalus* Günther.
    Habitat: Surinam.

**Phenacogaster** Eigenmann.
Type: *Tetragonopterus pectinatus* Cope.
Range: Amazons and Guiana.
    Habitat: Ecuador.
A2. *Phenacogaster bairdii* (Steindachner).
    *Astyanax tabatinga* Steindachner.
    Habitat: Tabatinga.
    Habitat: British Guiana.
    Habitat: British Guiana.

**Deuterodon** Eigenmann.
*Joinvillea* Steindachner.
Type: *Deuterodon iguape* Eigenmann.
Range South Eastern Brazil to Nicaragua.
    Habitat: Rio Iguape, Santa Catharina.
    Habitat: Parahyba.
    Habitat: Santa Cruz.
    *Joinvillea rosa* Steindachner.
    Habitat: Joinville, Santa Catharina, Brazil.
5. *Deuterodon nasutus* Meek.
    Habitat: Nicaragua.
    Habitat: Essequibo Basin.
    Habitat: Potaro River.
PATAGONIAN EXPEDITIONS: ZOOLOGY.

HEMIBRYCON Günther.
Type: Hemibrycon polyodon Günther.
Range: Peru; Ecuador; Trinidad.
1. Hemibrycon guppii (Regan).
Habitat: Trinidad.
2. Hemibrycon teniurus (Gill).
Habitat: Trinidad.
A3. Hemibrycon jelskii (Steindachner).
Habitat: Peru.
Habitat: Guiana.
2. Astyanax erythropeterus (Holmberg).
Habitat: La Plata Basin.
3. Astyanax pellegrini Eigenmann.
Habitat: Paraguay.
4. Astyanax correntinus (Holmberg).
Habitat: Parana.
A5. Astyanax riveti Pellegrin.
Habitat: Rio Pove, Ecuador.
6. Astyanax festa (Boulenger).
Habitat: Western Ecuador.
A7. Astyanax brevirostris (Günther).
Habitat: Ecuador and Peru.
A8. Astyanax asymmetricus Eigenmann.
Habitat: Tabatinga.
Habitat: Tabatinga.
A10. Astyanax zonatus Eigenmann.
Habitat: Tabatinga.
11. Astyanax cordovaë (Günther).
Habitat: Argentina.
Habitat: Tabatinga.
Habitat: Tabatinga.
Habitat: Guiana.
A15. Astyanax abramis (Jenyns).
Habitat: Orinoco to La Plata.
Albula maculata Linneus; Tetragonopterus lineatus, orbignianus, cronovii Cuvier & Valenciennes; Paeilurichthys brevoortii Gill; T. bartlettii Günther; T. orientalis Cope; T. microstoma Hensel; T. obscurus Hensel; T. caudimaculatus Cope, and T. jacuhiensis Cope.
Habitat: All streams from the Rio Bayano south to the La Plata and east of the Andes.
17. Astyanax bimaculatus boréalis Eigenmann.
Habitat: Magdalena Basin.
EIGENMANN: CATALOGUE OF FRESH WATER FISHES.

Habitat: Paraguay and Goyaz.

Habitat: Rio San Francisco.

20. *Astyanax bimaculatus vittatus* Castelnau.
   ? *T. bahiensis* Steindachner.
   Habitat: Bahia.

Habitat: Rio de Janeiro.

22. *Astyanax goyazensis* Eigenmann.
Habitat: Goyaz.

23. *Astyanax longior* Cope.

Habitat: Truando.

Habitat: Potaro River.

Habitat: Potaro River.

A27. *Astyanax stilbe* (Cope).
Habitat: Para.

Habitat: Cauca.

29. *Astyanax atratoensis* Eigenmann.
Habitat: Truando.

30. *Astyanax 'wappi* (Cuvier & Valenciennes).
   Habitat: British Guiana.

   (ASTYANAX Baird & Girard).

Habitat: Paraguay.

32. *Astyanax brevirhinus* Eigenmann.
Habitat: Jequitinhonha.

33. *Astyanax gilton* Eigenmann.
Habitat: Parahyba.

A34. *Astyanax maximus* (Steindachner).
   *Tetragonopterus alosa* Günther.
   Habitat: Peru.

35. *Astyanax regani* Meek.
Habitat: Costa Rica.

36. *Astyanax globiceps* Meek.
Habitat: Costa Rica.

37. *Astyanax albeolus* Eigenmann.
Habitat: Costa Rica.

A38. *Astyanax fasciatus* (Cuvier).
   *Tetragonopterus rutilus* Jenyns; ? *T. viejita* Cuv. & Val.; *T. microstoma* Günther; *Astyanax carolina* Gill; *T. cuvieri*; *T. arstedii* Lütken; *T. copei* Ulrey.
   Habitat: Mexico to Patagonia. Apparently absent at Panama where it is replaced by *fischeri*.

39. *Astyanax fasciatus* macrophthalmus Regan.
Habitat: Mexico.

40. *Astyanax fasciatus jequitinhonhae* Steindachner.
Habitat: Rio Jequitinhonha.

41. *Astyanax fasciatus nicaraguensis* Eigenmann & Ogle.
Habitat: Nicaragua.

42. *Astyanax fasciatus parahybæ* Eigenmann.
Habitat: Parahyba.

43. *Astyanax fasciatus aenensis* (Günther).
   *T. panamensis, brevimanus and humilis* Günther; *T. finitimus, belizianus, cobanensis* and *oaxacensis* Bocourt.
   Habitat: Mexico and Central America.

44. *Astyanax angustifrons* Regan.
Habitat: Mexico.

45. *Astyanax scabripinnis* (Jenyns).
   *T. jenynsi* Steindachner; *A. microcephalus* Ribeiro.
   Habitat: Parahyba to Santa Catharina.

46. *Astyanax scabripinnis laticeps* (Cope).
   Habitat: Rio Grande do Sul.

47. *Astyanax scabripinnis rivularis* (Lütken).
Habitat: Rio San Francisco.

48. *Astyanax scabripinnis* longirostris Steindachner.
Habitat: Cubatao.

49. *Astyanax scabripinnis intermedius* Eigenmann.
Habitat: Rio Parahyba and Santa Clara.

50. *Astyanax taniatus* (Jenyns).
* Tetragonopterus fasciatus* Steindachner and recent authors.
Habitat: Parahyba and northward.

51. *Astyanax eigenmanniorum* (Cope).
Habitat: São Paulo to Rio Primero.

52. *Astyanax mexicanus* (Philippi).
* Astyanax argentatus* Baird & Girard; * Tetragonopterus brevimanus* and * petenensis* Günther; * T. nitidus* and * fulgens* Bocourt; * T. streetsi* Cope.
Habitat: Rio Grande south to Central America.

53. *Astyanax fischeri* (Steindachner).
* A. panamensis* Steindachner, *non* Günther.
Habitat: Panama.

54. *Astyanax rubropictus* (Berg).
Habitat: Argentina, Territorio de los Andes.

55. *Astyanax multidens* Eigenmann.
Habitat: Obidos.

56. *Astyanax mutator* Eigenmann.
Habitat: Upper Potaro.

57. *Astyanax gracilior* Eigenmann.
Habitat: Villa Bella to Obidos.

58. *Astyanax paucidens* Ulrey.
Habitat: Lower Amazon and tributaries.

59. *Astyanax guianensis* Eigenmann.
Habitat: British Guiana.

60. *Astyanax essequibensis* Eigenmann.
Habitat: British Guiana.

**Bryconamericus** Eigenmann.

Type: *Bryconamericus exodon* Eigenmann.
Range: La Plata to Rio Grande do Sul and to western Peru and Costa Rica.

1. *Bryconamericus exodon* Eigenmann.
Habitat: Rio Paraguay.

Habitat: Tapajos.

3. *Bryconamericus straminus* Eigenmann MS.
Habitat: Paracica and Rio Uruguay.

Habitat: Paraguay and Tabatinga.

5. *Bryconamericus boops* Eigenmann.
Habitat: Maldonado.

Habitat: Ambyiacu.

7. *Bryconamericus alburnus* (Hensel).
Habitat: Rio Cadea.

Habitat: Brazil.

Habitat: Marañon Basin.

Habitat: Goyaz.

11. *Bryconamericus chapadai* (Fowler).
Habitat: Paraguay Basin.

*Tetragonopterus microphthalmus* and *petenensis* Günther, in part; * T. simus* Boulenger.

13. *Bryconamericus scleroparius* (Regan).
Habitat: Costa Rica.

Habitat: Cordoba, Argentina.

15. *Bryconamericus iheringii* (Boulenger).
*Tetragonopterus pliodus* Cope.
Habitat: Rio Grande do Sul and La Plata Basin.

Habitat: Panama.

17. *Bryconamericus hyphessus* Eigenmann.
Habitat: British Guiana.

**Piabina** Reinhardt.

Type: *Piabina argenteus* Reinhardt.
Range: South Eastern Brazil.

Habitat: Piracicaba.
2. Piabina argentea Reinhardt.
   Habitat: Rio das Velhas Basin.

CREAGRUTUS Günther.
Type: Leporinus mülleri Günther.
Range: Peru to Carança, on both slopes; Guiana.
    Creagrutus nasutus Günther.
    Habitat: Peru.
A2. Creagrutus mülleri (Günther).
    Creagrutus affinis Steindachner.
    Habitat: Cauca and Ecuador.
3. Creagrutus melanonus Eigenmann.
   Habitat: Essequibo Basin.

ASTYANACINUS Eigenmann.
Type: Tetragonopterus moorii Boulenger.
Range that of the single species.
1. Astyanacinus moorii (Boulenger).
   Habitat: Paraguay Basin.

CREATOCHANES Günther.
Type: Salmo melanurus Bloch.
Range: Guianas to Amazons.
    Habitat: Guianas to Amazons.
2. Creatochanes affinis Günther.
    Habitat: British and French Guiana.
3. Creatochanes caudomaculatus Günther.
    Habitat: South America.
    Habitat: Tabajos.

BRYCOCHANDUS Eigenmann.
Type: Brychochandus durbini Eigenmann.
Range that of the single species.
    Habitat: Rio Tapajos.

BRYCONOPS Kner.
Type: Bryconops alburnoides Kner.
Range: Rio Branco to Rio Guapore.
    Habitat: Rio Guaporé.
A2. Bryconops lucidus Kner.
    Habitat: Rio Branco.

CTENOBRYCON Eigenmann.
Type: Tetragonopterus hauxwellianus Cope.
Range: Amazons.
    Tetragonopterus gibbicervix Pellegrin.
    Habitat: Amazons; Paraguay.
A2. Ctenobrycon multifasciatus (Steindachner).
    Habitat: Amazon.
3. Ctenobrycon spilurus (Cuvier & Valenciennes).
   Habitat: Guianas.
   Habitat: Paraguay.

PSELLOGRAMMUS Eigenmann.
Type: Hemigrammus kennedyi Eigenmann.
Range that of the single species.
1. Psellogrammus kennedyi (Eigenmann).
    Habitat: Paraguay Basin.

HEMIGRAMMUS Gill.
Holopristis Eigenmann.
Type: Pacilurichthys (Hemigrammus) unilineatus Gill.
Range: Paraguay Basin; Rio Grande do Sul; Rio San Francisco Basin; Amazon and Trinidad.
1. Hemigrammus nanus (Reinhardt).
    Habitat: San Francisco Basin.
2. Hemigrammus uhreyi (Boulenger).
    Habitat: Paraguay Basin.
Habitat: Manacapurú.

Habitat: Erukin in British Guiana.

A5. *Hemigrammus levis* Durbin.  
Habitat: Amazon.

A6. *Hemigrammus hyanuary* Durbin MS.  
Habitat: Lake Hyanuary.

7. *Hemigrammus rodwayi* Durbin.  
Habitat: British Guiana near the coast.

8. *Hemigrammus tridents* Eigenmann.  
Habitat: Arroyo Pypucu, Paraguay.

Habitat: Rockstone and Gluck Island, British Guiana.

Habitat: Gluck Island, Wismar, British Guiana.

A11. *Hemigrammus lunatus* Durbin MS.  
Habitat: Amazon.

A12. *Hemigrammus microstomus* Durbin MS.  
Habitat: Amazon.

Habitat: Tukeit and Gluck Island, British Guiana.

A14. *Hemigrammus cupreus* Durbin MS.  
Habitat: Jatuarana, Lake Saraca.

15. *Hemigrammus cylindricus* Durbin.  
Habitat: Tumatumari, Crab Falls, Rockstone and Gluck Island, British Guiana.

A16. *Hemigrammus unilineatus* Gill.  
Habitat: Trinidad; Orinoco; Para.

A17. *Hemigrammus elegans* (Steindachner).  
Habitat: Amazon.

18. *Hemigrammus micropterus* Meek.  
Habitat: Orinoco.

Habitat: Amazons.

Habitat: Rio Grande do Sul.

Habitat: Amazons.

22. *Hemigrammus matei* Eigenmann.  
Habitat: Argentina.

**Hyphessobrycon** Durbin.  
Type: *Hemigrammus compressus* Meek.  
Range: Mexico to Paraguay and Rio San Francisco.

1. *Hyphessobrycon callistus* (Boulenger).  
Habitat: Matto Grossso.

Habitat: San Francisco and Paraguay Basins; Amazon.

Habitat: Lower Amazon.

Habitat: Amazons; Orinoco.

5. *Hyphessobrycon anisitsi* Eigenmann.  
Habitat: Paraguay.

Habitat: Las Amates, Guatemala.

Habitat: Konawaruk, British Guiana.

Habitat: Serpa.

Habitat: Tabatinga.

Habitat: Obidos.

Habitat: Gluck Island and Rockstone, British Guiana.

Habitat: Panama.

A13. *Hyphessobrycon siraminus* Durbin MS.  
Habitat: Tabatinga.

Habitat: Cane Grove Corner, British Guiana.

A15. *Hyphessobrycon melanzonatus* Durbin.  
Habitat: Amazon.
   Habitat: Kangaruma, British Guiana.
17. *Hyphessobrycon stictus* Durbin.
   Habitat: British Guiana near the coast.
18. *Hyphessobrycon lütkeni* (Boulenger).
   Habitat: Paraguay and Rio Grande do Sul.
   Habitat: Para.
   Habitat: Para.
22. *Hyphessobrycon robustulus* (Cope).
   Habitat: Peruvian Amazon.
   Habitat: Papaloapam Basin, Mexico.

**DERMATOCHEIR** Durbin.
Type: *Dermatocheir catablepta* Durbin.
Range that of the single species.
   Habitat: Tumatumari, British Guiana.

**PRISTELLA** Eigenmann.
Type: *Holopristis riddlei* Meek.
Range: Orinoco and Guiana.
1. *Pristella riddlei* (Meek).
   Habitat: Orinoco and British Guiana.
   Habitat: Mahaica Basin, British Guiana.

**THAYERIA** Eigenmann.
Type: *Thayeria obliqua* Eigenmann.
Range that of the single species.
   Habitat: Amazon.

**GYMNOCORYBUS** Eigenmann.
Type: *Gymnocorybus thayeri* Eigenmann.
Range: Amazons; Paraguay.
   Habitat: Amazon and Solimoens.
2. *Gymnocorybus ternetzi* (Boulenger).
   Habitat: Paraguay.

**MENKHUSAIA** Eigenmann.
Type: *Tetragonopterus xinguensis* Steindachner.
Range: Amazons and Paraguay.
   *Tetragonopterus lineatus* Steindachner (non Perugia).
   Habitat: Iquitos.
   Habitat: Tabatinga.
   Habitat: Obidos and Ica.
   Habitat: Amazon.
5. *Mankhausia doceana* (Steindachner).
   Habitat: Eastern Brazil.
   Habitat: Essequibo.
   Habitat: Cudajas.
   Habitat: Tabatinga.
   *Tetragonopterus agassizii* Steindachner.
   Habitat: Amazons to Guiana.
    Habitat: Pebas.
    Habitat: Paraguay.
    Habitat: Surinam; Amazons.
    Habitat: Guiana.
Habitat: Villa Bella.

A15. *Mankhausia xinguensis* (Steindacher).
Habitat: Xingu.

Habitat: Gurupa to Itaituba; Guiana.

A17. *Mankhausia dichrous* (Kner).
Habitat: Paraguay Basin and Amazons.

Habitat: Tabatinga.

Habitat: Amazons to Guianas.

Habitat: Icancha.

Habitat: Serpa and Villa Bella.

Habitat: Tapajos.

Habitat: Amazonas; Guiana.

Habitat: Para to Santarem.

Habitat: Pará.

Habitat: Lake Hyanuary.

Habitat: Potaro River above and below the Kaieteur.

Habitat: Essequibo Basin.

**Tetragonopterus** Cuvier.

Type: *Tetragonopterus argenteus* Cuvier.
Range: Orinoco and Guianas; Amazons and south to Rio Parahyba and La Plata.


T. rufipes Valenciennes; T. sana Castelnau.
Habitat: La Plata Basin to Guiana.

A2. *Tetragonopterus huberi* Steindacher.
Habitat: Rio Purus.


T. artedii and schomburgkii Cuvier & Valenciennes; T. ortoni Gill.
Habitat: Amazons and Guiana.

Habitat: Parahyba.

**Markiana** Eigenmann.

Type: *Tetragonopterus nigripinnis* Perugia.
Range La Plata and Orinoco.


2. *Markiana geayi* Pellegrin.
Habitat: Apuré, Venezuela.

**Subfamily Diapominae.**

**Diapoma** Cope.

Type: *Diapoma speculiferum* Cope.
Range that of the single species.

1. *Diapoma speculiferum* Cope.
Habitat: Rio Grande do Sul.

**Subfamily Stevardiinae.**

**Stevardia** Gill.

*Corynopoma and Nematopoma* Gill.

Type: *Stevardia albipinnis* Gill.
Range that of the single species.

1. *Stevardia albipinnis* Gill.

*Corynopoma riisei and veedonii* Gill;
*Nematopoma scarsii* Gill.
Habitat: Trinidad.
EIGENMANN: CATALOGUE OF FRESH WATER FISHES.

439

Subfamily PIABUCINÆ.

PIABUCINA Cuvier & Valenciennes.
Type: **Piabucina erythrinoides** Cuvier & Valenciennes.
Range: Panama to British Guiana and Ecuador.
A1. **Piabucina unitaniata** Günther.
Habitat: Ecuador and British Guiana.
2. **Piabucina festa** Boulenger.
Habitat: Panama.
3. **Piabucina panamensis** Gill.
Habitat: Panama.
4. **Piabucina erythrinoides** Cuvier & Valenciennes.
5. **Piabucina pleurotania** Regan.
Habitat: Venezuela.
6. **Piabucina astrigata** Regan.
Habitat: Western slope of Ecuador.

A7. **Piabucina elongata** Boulenger.
Habitat: Eastern slope of Ecuador.

CHALCEUS Cuvier.

**Pellegrinina** Fowler.
Type: **Chalceus macrolepidotus** Cuvier.
Range that of the single species.
A1. **Chalceus macrolepidotus** Cuvier.
**Chalceus ararepeera** Cuvier & Valenciennes; *P. heterolepis* Fowler.
Habitat: Guiana.

PLETHODECTES Cope.
Type: **Plethodectes erythrurus** Cope.
Range that of the single species.
A1. **Plethodectes erythrurus** Cope.
Habitat: Peru.

Subfamily LEBIASINÆ.

LEBIASINA Cuvier & Valenciennes.
Type: **Lebiasina bimaculata** Cuvier & Valenciennes.
Range: Streams of western slopes of Peru and Ecuador.
1. **Lebiasina bimaculata** Cuvier & Valenciennes.

Habitat: Western slopes of Peru and Ecuador.

PHOXINOPSIS Regan.
Type: **Phoxinopsis typicus** Regan.
Range that of the single species.
1. **Phoxinopsis typicus** Regan, Regan, 1907b, 262.
Habitat: Argentina.

Subfamily GASTEROPELECANÆ.

GASTEROPELECUS Gronow.
Type: **Clupea sternicla** Linnaeus.
Range: Amazons.
A1. **Gasteropeleucus sternicla** (Linnaeus).
**Salmo gasteropeleucus** Pallas.
Habitat: Amazons.

CARNEGIELLA Eigenmann.
Type: **Gasteropeleucus strigatus** Günther.
Range that of the single species.
A1. **Carnegiella strigata** (Günther).
**Gasteropeleucus fasciatus** Garman.
Habitat: Amazons and Guiana.

PTERODISCUS Eigenmann.
Type: **Pterodiscus levis** Eigenmann.
Range that of the single species.
A1. **Pterodiscus levis** Eigenmann.
Habitat: Para.

THORACOCHARAX Fowler.
Type: **Gasteropeleucus stellatus** Kner.
Range: Panama to Paraguay.
A1. **Thoracocharax stellatus** (Kner).
*Gasteropeleucus securus* Philippi.
Habitat: Amazons; Paraguay; Orinoco.
PATAGONIAN EXPEDITIONS: ZOOLOGY.

A2. *Thoracocharax pectorosus* (Garman).
   Habitat: Amazons.

   Habitat: Panama.

**CHALCINUS** Cuvier & Valenciennes.

*Triportheus* Cope.
Type: *Chalcinus brachypomus* Cuvier & Valenciennes = *Chalceus angulatus* Agassiz.
Range: Magdalena to Guiana and south to Rio San Francisco on the east, and the La Plata Basin on the west.

1. *Chalcinus pictus* Garman.
   Habitat: Jutahy.

2. *Chalcinus paranensis* Günther.
   Habitat: Parana and Paraguay rivers.

A3. *Chalcinus angulatus* Spix.

*Chalcinus brachypomus* Cuvier & Valenciennes; *Chalcinus milleri* Philippi; *Chalcinus trifurcatus* Castelnau; *Chalcinus nematurus* Kner; *Triportheus flavus* Cope.
Habitat: Orinoco; Amazons; Paraguay.

   Habitat: Paraguay; Amazon.

A5. *Chalcinus angulatus vittatus* Garman.
   Habitat: Amazon.

   Habitat: Rio Puty.


**Subfamily** AGONIATES Müller & Troschel.

Type: *Agoniates halecinus* Müller & Troschel.
Range that of the single species.

1. *Agoniates halecinus* Müller & Troschel.
   Habitat: Guiana.

**PIABUCUS** Oken.

Type: *Salmo argentinus* Linnaeus = *Piabucus dentatus* Kölreuter.
Habitat: Amazon.

   *Chalceus rotundatus* Schomburgk; *Chalcinus brachypomus* Günther (non Cuvier & Valenciennes).
   Habitat: Guianas; Amazon; San Francisco.

   *Chalceus knerii* Steindachner.
   Habitat: Amazons.

   Habitat: Araguay.

   Habitat: Orinoco; Amazons.

**PSEUDOCORYNOPSOMA** Perugia.

*Bergia* Steindachner, *Chalceinopelecus* Holmberg.
Type: *Pseudocorynopsoma dorio* Perugia.
Range that of the single species.

   *Bergia altipinnis* Steindachner; *Chalceinopelecus argentius* Holmberg.
   Habitat: La Plata Basin.

**Subfamily** AGONIATINÆ.

Range: Guiana; Amazons; La Plata.

   Habitat: Amazons.

   *Salmo argentinus* Linnaeus.
   Habitat: Guianas; Iquitos.

3. *Piabucus melanostomus* Holmberg.
   Habitat: La Plata Basin.

A4. *Piabucus pusii* Steindachner.
   Habitat: Rio Purus.
   Habitat: Southeastern Brazil.

**LEPTAGONIATES** Boulenger.

Type: *Leptagoniatus steindachneri* Boulenger.

Range that of the single species.

   Habitat: Sarayacu, Peru.

Subfamily **STICHANODONTINAE**.

**STICHANODON** Eigenmann.

Type: *Liükkenia insignis* Steindachner.

Range that of the single species.

   Habitat: Amazon.

Subfamily **STETHAPRIONIDAE**.

**POPTELLA** Eigenmann.

Type: *Tetragonopterus longipinnis* Pohta.

Range that of the single species.

   Habitat: Dutch Guiana.

**STETHAPRION** Cope.

Type: *Stethaprion erythrops* Cope.

Range: Amazons and Santa Cruz.

   Habitat: Amazons.

A2. *Stethaprion chryseum* Cope.
   Habitat: Marañon.

**FOWLERINA** Eigenmann.

Type: *Tetragonopterus compressus* Günther.

Range: Paraguay to British Guiana and eastern Brazil.

   *Tetragonopterus compressus* Günther.
   Habitat: Amazons and Guiana.

2. *Fowlerina paraguayensis* Eigenmann.
   Habitat: Paraguay; Eastern Brazil.

**BRACHYCHALCINUS** Boulenger.

Type: *Brachychalcinus retrospina* Boulenger.

Range Upper Amazon; Paraguay.

   Habitat: Tabatinga.

2. *Brachychalcinus retrospina* Boulenger.
   Habitat: Santa Cruz; Descalvados.

Subfamily **SERRASALMONIDAE**.

**PYGOPRISTIS** Müller & Troschel.

Type: *Pygopristis fumarius* Müller & Troschel = *Serrasalmo denticulatus* Cuvier.

Range: Paraguay to Guiana.


*Pygopristis fumarius* Müller & Troschel; *Serrasalmo punctatus* Schomburgk.

Habitat: Guianas to Amazon.

2. *Pygopristis serrulatus* (Cuvier & Valenciennes).
   Habitat: Matto Grosso and Paraguay.
PATAGONIAN EXPEDITIONS: ZOOLOGY.

PYGOCENTRUS Müller & Trochel.
Type: Serrasalmo piraya Cuvier.
Range: Orinoco to La Plata and Rio das Velhas; not in coastwise streams of southeastern Brazil.
1. Pygocentrus niger (Schomburgk).
   Habitat: Upper courses of all streams of Guiana.
A2. Pygocentrus piraya (Cuvier).
   Serrasalmo paranha Agassiz; ? Serrasalmo nigricans Agassiz; Pygocentrus bidorsalis Natterer.
   Habitat: Guiana; Amazon to Rio das Velhas and Paraguay.
3. Pygocentrus notatus (Lütken).
   Habitat: Venezuela.
A4. Pygocentrus scapularis (Günther).
   Habitat: British Guiana to Para.
A5. Pygocentrus alius Gill.
   Habitat: Marañon.
A16. Pygocentrus nattereri (Kner).
   Habitat: La Plata Basin; ? Orinoco.
7. Pygocentrus bilineatus Eigenmann.
   Habitat: North Western Guiana.
8. Pygocentrus ternetsi Steindachner.
   Habitat: Rio Paraguay.
   Habitat: Rio Para.
   Habitat: Para.

SERRASALMO Lacépède.
Type: Salmo rhombeus Linnaeus.
Range: Orinoco to Guianas, south to the Rio das Velhas and Paraguay and Bolivia.

Habitat: Rios Guaporé and Huallaga.
A2. Serrasalmo gibbus Castelnau.
   Habitat: Aragua.
   Serrasalmo humeralis Castelnau, not of Cuvier & Valenciennes; Serrasalmo irritans Peters; Serrasalmo iridopsis Ulrey (non Cope).
   Habitat: La Plata Basin; Orinoco; Amazons; Rio das Velhas.
   Habitat: Rio San Francisco.
A5. Serrasalmo gymnogenys Günther.
   Habitat: Amazon and Paraguay.
   Habitat: Ambyiacu.
A7. Serrasalmo asopus Cope.
   Habitat: Solimoens and Marañon.
A8. Serrasalmo maculatus Kner.
   Pygocentrus melanurus Heckel; Pygocentrus nigricans Heckel.
   Habitat: Amazons and Bolivia.
   ? Serrasalmo aureus Agassiz; Pygocentrus dulcis Heckel.
   Habitat: Guianas to Paraguay and Bolivia.
A10. Serrasalmo humeralis Cuvier & Valenciennes.
   Habitat: Amazons and Paraguay.
   Habitat: Peruvian Amazon.
A12. Serrasalmo rhombeus (Linnaeus).
   Habitat: Guianas; Paraguay.
A13. Serrasalmo paraënsis Steindachner.
   Habitat: Rio Para.

Subfamily MYLIST.É.

MYLESINUS Cuvier & Valenciennes.
Type: Mylesinus schomburgkii Cuvier & Valenciennes.
Range that of the single species.
1. Mylesinus schomburgkii Cuvier & Valenciennes.

Habitat: Guiana; Rio Vaupes.

CATOPRION Müller & Trochel.
Type: Serrasalmo mento Cuvier.
Range that of the single species.
EIGENMANN: CATALOGUE OF FRESH WATER FISHES.

Myletinus macropterus Ulrey.
Habitat: Guianas to Rio Guaporé.

Acnodon Eigenmann.
Type: Myletus oligocanthus Müller & Troschel.
Range that of the single species.
A1. Acnodon oligocanthus (Müller & Troschel).
Habitat: Guianas and Brazil.

Piaractus Eigenmann.
Type: Myletes brachypomus Cuvier.
Range: Orinoco to La Plata; not in coastwise streams of southeastern Brazil.
A1. Piaractus brachypomus (Cuvier).
Habitat: La Plata Basin and Guaporé.
A2. Piaractus macropterus (Cuvier).
Habitat: Orinoco and Matto Grosso.

Metynnis Cope.
Sealeina Fowler.
Type: Metynnis luna Cope.
Range: Guianas to Paraguay.
Habitat: Guianas; Amazons to Rio Guaporé and Paraguay.
A2. Metynnis maculatus (Kner).
Habitat: Guiana to Rio Parana.
Habitat: Para.
Myletes hyspauchen Ulrey.
Habitat: Amazons.
A5. Metynnis gallicii Eigenmann.
Myletes lippincottianus Ulrey (non Cope).
Habitat: Brazil.
Habitat: Paraguay Basin.
A7. Metynnis unimaculatus Steindachner.
Habitat: Rio Parnahyba.

Myleus Müller & Troschel.
Tometes Cuv. & Val.; Myloptus Gill.
Type: Myletus setiger Müller & Troschel.
Range: Orinoco and Guianas to the Paraguay and Rio San Francisco; not in coastwise streams of southeastern Brazil.
Myletes doidyxodon Cuvier & Valenciennes; Tometes trilobatus Cuvier & Valenciennes; Myletes filosus Heckel.
Habitat: Guianas and Brazil.

Myleus scumburgkii (Jardine).
Myletes palometa Cuvier & Valenciennes; Myletes divaricatus Cuvier & Valenciennes; Myletes pacu Schomburgk.
Habitat: Essequibo.
A3. Myleus torquatus (Kner).
Habitat: Rio Branco.
4. Myleus ellipticus ( Günther).
Habitat: Essequibo.
A5. Myleus lunii (Steindachner).
Habitat: Guiana.
A6. Myleus discoideus (Kner).
Habitat: Bananeira; Rio Branco; Matto Grosso.
A7. Myleus rhomboidalis (Cuvier).
Tetragonopterus latus Schomburgk.
Habitat: Guiana and Amazon.
Habitat: Amazon Basin.
A9. Myleus micans ( Lütken).
Habitat: San Francisco Basin.
A10. Myleus rubripinnis Müller & Troschel.
Habitat: Essequibo.
11. Myleus tiete (Eigenmann & Norris).
Habitat: Piracicaba.
A12. Myleus asterias (Müller & Troschel).
Habitat: Guianas and Paraguay.
Habitat: Rios Cipo and San Francisco.
Habitat: Paraguay.
Habitat: Santarem.

Habitat: Orinoco.

**COLOSSOMA** Eigenmann.

*Waiteina* and *Reganina* Fowler.
Type: *Myletes oculus* Cope.
Range: Amazon and La Plata Basins. Not in southeastern coastwise streams.

Habitat: Ambyiacu.

A2. *Colossoma nigripinnis* (Cope).
Habitat: Amazons.

Habitat: Parana.


**MYLOSOMA** Eigenmann.

Type: *Myletes albiscopus* Cope.
Range: Guiana and Orinoco to the La Plata Basin; not in the coastwise streams of southeastern Brazil.


Habitat: Ambyiacu.

Subfamily **CYNODONTINÆ**.

**RHAPHIODON** Agassiz.
Type: *Rhaphiodon vulpinus* Spix.
Range that of the single species.

Habitat: Orinoco to La Plata.

**CYNODON** Spix.
Type: *Cynodon gibbus* Spix.
Range that of the single species.

Habitat: Amazon to Rio Mamore.

**HYDROLYCUS** Müller & Troschel.
Type: *Hydrocyon scomberoides* Cuvier.
Range: Amazons south to the Araguay and north in the Guianas to Orinoco.

Habitat: Orinoco and Guianas; Amazons and south to Araguay.

A2. *Hydrolycus copei* Gill.
Habitat: Marañon.

Habitat: Marañon.

Subfamily **CHARACINÆ**.

**ASIPHONICHTHYS** Cope.
Type: *Asiphonichthys stenopterus* Cope.
Range that of the single species.

1. *Asiphonichthys stenopterus* Cope.
Habitat: Jacuhy.

**CHARAX** Scopoli.

*Epicyrtus* Müller & Troschel; *Anacrytus* Günther; *Cynopotamus* C. & V.; *Cyrtocharax* Fowler.
Type: *Salmo gibbosus* Linnaeus.

Habitat: Amazons.

5. *Colossoma orbignyanum* (Cuvier & Valenciennes).
Habitat: La Plata Basin.

Habitat: Peruvian Amazon.

Range: Guiana; Amazons; Paraguay.

*C. sanguineus* Cope.
Habitat: Ecuador.

A2. *Charax gibbosa* (Linnaeus).
*Epicyrtus macrolepis* Kner.
Habitat: Guianas; Amazons and Paraguay.

A3. *Charax pancairadiata* (Günther).
Habitat: Amazonas.

Habitat: Marañon.
A5. Charax amazonum (Günther).
   Habitat: Ecuador.
6. Charax argentea Valenciennes.
   Habitat: La Plata and Paraguay.
7. Charax atratoensis Eigenmann.
   Habitat: Atrato.
8. Charax squamosa Eigenmann & Kennedy.
   Habitat: Paraguay.
   Habitat: Paraguay.

Rcestes Günther.
Type: Cynoptamus molossus Kner.
Range that of the single species.
1. Rcestes molossus (Kner).
   Habitat: Amazonas south to Paraguay.

Gilbertollus.
Gilbertella Eigenmann.
Type: Anacyrtus (Rcestes) alatus Steindachner.
Range: that of the single species.
1. Gilbertollus alatus (Steindachner).
   Habitat: Rio Magdalena.

Bramocharax Gill.
Type: Bramocharax bransfordii Gill.
Range: Central America.
1. Bramocharax bransfordii Gill.
   Habitat: Lake Nicaragua.
2. Bramocharax elongatus Meek, M., 1907, 110.
   Habitat: Nicaragua.

Raboides Günther.
Type: Epicyrtus microlepis Reinhardt.
Range: Panama to the Orinoco; Amazonas south to the Rio das Velhas and the Paraguay.
   ? Epicyrtus gibbosus Cuvier & Valenciennes (non Linneaus).
   Habitat: Obidos; Paraguay Basin; Mamori River in Bolivia.
2. Raboides guatemalensis Günther.

Habitat: Rios Chagres and Huamuchala.
A3. Raboides affinis (Günther).
   Raboides rubrivertex Cope.
   Habitat: Amazons and Orinoco.
4. Raboides bonariensis Steindachner.
   Raboides microlepis Eigenmann & Kennedy (non Reinhardt).
   Habitat: La Plata Basin.
A5. Raboides myersii Gill.
   Habitat: Amazonas.
6. Raboides prognathus (Boulenger).
   Habitat: Paraguay Basin.
A7. Raboides bicornis Cope.
   Habitat: Pebas.
A8. Raboides xenodon (Lütken).
   Habitat: Rio das Velhas; Amazons.
9. Raboides dayii Steindachner.
   Habitat: Magdalena Basin.
10. Raboides francisci Steindachner.
    Habitat: Rio San Francisco.

Eucynopotamus Fowler.
Type: Cynopotamus gulo Cope.
Range: Magdalena; Peruvian Amazon; Araguay and La Plata Basin.
A11. Eucynopotamus magdalenae (Steindachner).
   Habitat: Magdalena Basin; Rio Paraguay.
A2. Eucynopotamus humeralis (Valenciennes).
   Habitat: La Plata Basin; Goyaz.
A3. Eucynopotamus gulo (Cope).
   Habitat: Pebas.
A4. Eucynopotamus knerii (Steindachner).
   Cynopotamus humeralis Kner (non Valenciennes).
   Habitat: La Plata Basin and Peruvian Amazon.

Evermannolus Eigenmann.
Evermannella, Eigenmann.
Type: Cynopotamus biserialis Garman.
Range that of the single species.
PATAGONIAN EXPEDITIONS: ZOOLOGY.

   Habitat: Amazons.

   **Salminus Agassiz.**
   Type: *Hydrocynus brevidens* Valenciennes = *Salminus maxillosus* Cuvier & Valenciennes.
   Range: Cauca to Ecuador; Amazon to Rio Grande do Sul.

1. *Salminus maxillosus* Cuvier & Valenciennes.
   *Hydrocynus brevidens* Valenciennes, non Cuvier; *Salminus brevidens* Eigenmann & Eigenmann, non Cuvier; ? *Salminus orbignyanus* Cuvier & Valenciennes.
   Habitat: La Plata Basin.

2. *Salminus affinis* Steindachner.
   Habitat: Cauca and Rio Santiago, Ecuador.


   **Subfamily HYDROCYNINÆ.**
   **Hydrocynus** Cuvier.
   Type: *Hydrocynus lucius* Cuvier.
   Range: Maracaibo to Guianas, south to Amazons.

1. *Hydrocynus lucius* Cuvier.
   Habitat: Not known.

   (**Xiphostoma** Spix.)
   (Type: *Xiphostoma cuvieri* Agassiz.)

   *Xiphostoma oseryi* (Castelnau).
   Habitat: Guianas and Amazons.

   Habitat: Guiana to Solimões.

   *Xiphostoma tedo* Cope.
   Habitat: Amazons.

A5. *Hydrocynus longipinnis* (Steindachner).
   Habitat: Rio Cipo and La Plata Basin.

   **Catabasis** Eigenmann & Norris.
   Type: *Catabasis acuminatus* Eigenmann & Norris.
   Range that of the single species.

   Habitat: Rio Tieté.

   **Exodon** Müller & Troschel.
   **Hystricodon** Günther.
   Type: *Exodon paradoxus* Müller & Troschel.
   Range that of the single species.

   *Epicyrthus exodon* Cuvier & Valenciennes.
   Habitat: Guiana; Amazon.

   **Boulengerella** Eigenmann.
   Type: *Xiphostoma lateristriga* Boulenger.
   Range that of the single species.

   Habitat: Manaos.

   **Luciocharax** Steindachner.
   **Clenolucius** Gill (nomen nudum); **Belonocharax** Fowler.
   Type: *Luciocharax insculptus* Steindachner.
   Range: Lake Maracaibo to the Atrato.

1. *Luciocharax insculptus* Steindachner.
   *Belonocharax beani* Fowler.
   Habitat: Magdalena Basin.

2. *Luciocharax hujeta* (Cuvier & Valenciennes).
   Habitat: Lake Maracaibo.
Subfamily ACESTORHAMPHEINÆ.

OLIGOSARGUS Günther.
Type: Oligosargus argenteus Günther.
Range that of the single species.
1. Oligosargus argenteus Günther.
Habitat: Brazil.

ACESTORHYNCHUS Eigenmann.
Xiphorhynchus and Xiphorhamphus Müller & Troschel.
Type: Salmo falcatus Bloch.
Range: Guiana to Rio San Francisco and Paraguay Basins.
A1. Acestorhynchus falcivrostris (Cuvier).
Habitat: Guiana to Rio Paraguay.
A2. Acestorhynchus heterolepis (Cope).
Habitat: Peruvian Amazon.
A3. Acestorthychnus microlepis (Schomburgk).
Habitat: Guianas to the Amazon.
A4. Acestorhynchus falcatus (Bloch).
Xiphorhamphus ferox Günther.
Habitat: Guiana to Rio Paraguay.
A5. Acestorhynchus lacustris (Lütken).
Habitat: San Francisco Basin.

ACESTORHAMPHUS Eigenmann.
Sphyanocharax Fowler.
Type: Xiphorhamphus hepsetus Cuvier.
Range: La Plata Basin and southeastern Brazil.

Subfamily ERYTHRINÆ.

Hoplias Gill.
Macrodon Müller.
Type: Esox malabaricus Bloch.
Range: Atlantic slope north of La Plata; Pacific slope, Ecuador and northward.
1. Hoplias microlepis (Günther).
Habitat: Western slopes of South America from Ecuador to Panama; eastern slope of Panama.

A2. Hoplias malabaricus (Bloch).
Erythrinus trahira Spix; Erythrinus macrodon Agassiz; Erythrinus microcephalus Agassiz; Erythrinus brasiliensis Spix; Macrodon guaviina Valenciennes; Macrodon auritus Cuvier & Valenciennes; Macrodon teres Cuvier & Valenciennes; Macrodon patana Cuvier & Valenciennes; Macrodon aimara Cuvier &
Valenciennes; *Macrodon ferox* Gill; *Macrodon intermedius* Günther.
Habitat: Eastern slope of South America from La Plata to Rio Magdalena and Huallaga.

3. *Hoplias malabaricus microphthalmus* Pellegrin.
Habitat: French Guiana.

Habitat: Ribeira.

**HOPLERYTHRINUS** Gill.

*Ophiocephalops* Fowler.
Type: *Erythrinus unitaeniatus* Spix.
Range: From the La Plata to the Orinoco, including south-eastern coastwise streams.

*Erythrinus vittatus* Cuvier & Valenciennes; *Erythrinus kessleri* Gill; *Erythrinus kessleri* Steindachner.

**STERNARCHUS** Bloch & Schneider.
Type: *Gymnotus albifrons* Linnaeus.
Range: Paraguay, Parana and San Francisco to the Orinoco.

Habitat: Basin of the Rio San Francisco and the Parana and Paraguay.

*Sternarchus lacépèdii* Castelnau; *Sternarchus maximilliani* Castelnau.
Habitat: Guianas, Amazonas and Paraguay.

Habitat: Amazonas.

Habitat: Amazon near mouth of Rio Negro; Guiana.

1 For the details concerning this family, see Eigenmann & Ward, Proc. Wash. Acad Sci., vii. pp. 159-188.

*Erythrinus gronovii* Cuvier & Valenciennes.
Habitat: San Francisco; Guiana; Orinoco.

**ERYTHRINUS** Gronow.
Type: *Cyprinus cylindricus* Linnaeus.
Range: From the La Plata to Guiana and Peru; Trinidad.

2. *Hoploerythrinus longipinnis* (Günther).
*Erythrinus longipinnis* (Bloch & Schneider).
*Cyprinus cylindricus* Linnaeus; *Cyprinus cephalus* Linnaeus; *Erythrinus salmoenus* Gronow; *Erythrinus brevicauda* Günther.
Habitat: Rio Janeiro to Surinam and Peru.

**STERNARCHOGiton** Eigenmann & Ward.
Type: *Sternarchus sachsi* (Peters).
Habitat: Orinoco.
EIGENMANN: CATALOGUE OF FRESH WATER FISHES.

Sternarchorhamphus Eigenmann & Ward.
Type: Sternarchus müllerii Steindachner.
Range: Para to Peru.
A1. Sternarchorhamphus macrostomus (Günther).
   Habitat: Peruvian Amazon.
A2. Sternarchorhamphus müllerii (Steindachner).
   Habitat: Para.
A3. Sternarchorhamphus tamandua (Boulenger).
   Habitat: Jurua.

Sternarchorynchus Castelnau.
Type: Sternarchorynchus müllerii Castelnau = Sternarchus oxyrhynchus. Müller & Troschel.
Range: Peruvian Amazon to Guiana.
A1. Sternarchorynchus mormyrus (Steindachner).
   Habitat: Marabitanos; Peruvian Amazon.
A2. Sternauchorynchus oxyrhynchus (Müller & Troschel).
   Habitat: Guiana.
A3. Sternarchorynchus curvoirostris (Boulenger).
   Habitat: Canelos.

Rhamphichthys Müller & Troschel.
Type: Gymnotus rostratus Linnaeus.
Range: Rio de La Plata to Guiana.
   Gymnotus longirostris. Lacèpède; Rhamphichthys schomburgkii and schneideri Kaup.
   Habitat: The Guianas to the Amazons.
A2. Rhamphichthys marmoratus Castelnau.
   Rhamphichthys pantherinns and lineatus Castelnau.
   Habitat: Orinoco and Guiana south to the Rio de La Plata.
A3. Rhamphichthys reinhardtii (Kaup).
   Rhamphichthys blochii Kaup.
   Habitat: Rio Negro south to Paraguay.

Rhamphichthys Gill.
Type: Rhamphichthys müllerii Kaup.
Range: Paraguay to Cauca.
1. Hypopomus artedi (Kaup).
   Rhamphichthys müllerii Kaup.
   Habitat: French Guiana.
A2. Hypopomus brevirostris (Steindachner).
   Habitat: Cauca; Guiana to Paraguay.

Steatogenys Boulenger.
Type: Rhamphichthys elegans Steindachner.
Range that of the single species.
A1. Steatogenys elegans (Steindachner).
   Habitat: Solimoens and tributaries; Guiana.

Eigenmannia Jordan & Evermann.
Type: Sternopygus humboldtii Steindachner.
Range: Rio de La Plata to Rio Magdalena and Pacific slope of Panama.
A1. Eigenmannia microps (Boulenger).
   Habitat: British Guiana.
A2. Eigenmannia humboldtii (Steindachner).
   Habitat: Marajo; Magdalena; Mamoni.
A3. Eigenmannia virescens (Valenciennes).
   Sternopygus tumifrons and lineatus Müller & Troschel; Sternopygus microstomus Reinhardt; Sternopygus limbatus Schreiner.
   Habitat: Rio Magdalena to the Rio de La Plata and Rio San Francisco.
A4. Eigenmannia axillaris (Günther).
   Habitat: Para.
A5. Eigenmannia troscheli (Kaup).
   Habitat: Amazons from Manaos to Peru.
Gymnotus Linnaeus.  

Giton Kaup.  
Type: Gymnotus carapo Linnaeus.  
Range that of the single species.  
Gymnotus fasciatus Pallas; Gymnotus albus Pallas; Gymnotus brachyurus Bloch; Gymnotus putol Lacépède; Carapus brachyurus Cuvier; Carapus inaquilabiatus Valenciennes.  
Habitat: Rio Motagua south to Rio de La Plata and San Francisco.  
2. Gymnotus carapo pantherinus (Steindachner). St., 1908d. 
Habitat: Santos.  
Sternopygus Müller & Troschel.  
Type: Sternopygus macrurus (Bloch & Schneider).  

Family ELECTROPHORIDÆ.  

Electrophorus Gill.  
Type: Gymnotus electricus Linnaeus.  
Range that of the single species.  

Order SYNBRANCHIA.  

Family SYNBRANCHIDÆ.  

Synbranchus Bloch.  
Unibranchapterura Lacépède; Ophisternon McClelland; Tetrabranchus Bleeker.  

1 In a recent paper (The Gymnotidae, Proc. Wash. Acad. Sci., VII, p. 174) I followed Gill in using the name Gymnotus for the current Gymnotus carapo Linnaeus, this species being the only one described by Linnaeus in his tenth edition. No doubt seems to have been entertained about the nature of the Gymnotus carapo of Linnaeus and its supposed synonymy and bibliography were given in the paper quoted above, p. 175.  
Mr. Lönberg has kindly called my attention to his paper (Bilang till K. Svenska Vet.-Akad. Handb., XXII, Afd. IV, 23, 1896) on Linnaean Type-specimens in which he has shown that the type of Linnaeus is not the current Gymnotus carapo, but the Gymnotus fasciatus of Pallas or Giton fasciatus Auct. The latter  

Range: Paraguay and Rio San Francisco to Magdalena and Guayaquil.  
Carapus arenatus Eydoux Souleyet; Carapus sanguinolentus Castelnau; Sternopygus marcgravii Reinhardt; Gymnotus carapus Günther and other recent authors non Linnaeus.  
Habitat: Orinoco, south to Paraguay and Rio das Velhas.  
2. Sternopygus aequilabiatus (Humboldt).  
Habitat: Magdalena and Guayaquil.  
Habitat: Amazons and Rio Puty.  
4. Sternopygus aequilabiatus nigriceps von Ihering, . . . . . . . . . . v. I., 1907.  
Habitat: State of Maraubam.  

Electrophorus electricus (Linnaeus), Günther, VIII, 10.  
Habitat: Brazil and northward.  

Type: Synbranchus marmoratus Bloch.  
Range: Tropical America and Indies.  
Synbranchus immaculatus Bloch; S. species must therefore stand as Gymnotus carapo Linnaeus, the name Gymnotus replacing the more recent Giton.  
The current Gymnotus carapo must be known by its oldest name, which is macrurus Bloch & Schneider. Müller & Troschel in 1839 proposed the name Sternopygus for macrurus, tumifrons, virencens, linearis, and aequilabiatus. In 1894 I selected as the type of Sternopygus the then current carapo, of which macrurus was a synonym. The fact that the name carapo of Linnaeus did not refer to the species under consideration need not invalidate this restriction, since there was no doubt whatever about the fish that was intended to serve as type. It may stand as Sternopygus macrurus (Bloch & Schneider).
transversalis Bloch & Schneider; 
Unibranchapterura grisea and lineata Lacépéde; Synbranchus fuliginosus Ranzani; Murana lumbricus Gronow; Synbranchus vittatus Castelnau; Synbranchus hieronymi, döringii and tigrinus Weyenberg.

Habitat: Cuba; Vera Cruz to La Plata and Peru; both sides of Guatemala and Panama.

Order APODES.

Family ANGUILLIDÆ.

Anguilla Shaw.
Type: Anguilla anguilla (Linnaeus).
Range: North temperate to tropical waters.

1. Anguilla chrysopa Rafinesque,⁷
J. & E., 348.
Habitat: Cuba and Central America and northward.

Order ISOSPONDYLI.

Family ENGRAULIDÆ.

Stolephorus Lacépéde.
Type: Atherina japonica Houttuyn.
Range: Marine, entering rivers. A marine genus with many species on both coasts; some of them entering rivers.⁸

Habitat: Rio Bayano, near Panama, and Ribeira.

A2. Stolephorus clupeoides (Swainson),
J. & E., 447.
Stolephorus surinamensis Bleeker.
Habitat: Surinam; Rio Capin; Bahia; Rio Grande do Sul.

Habitat: Guianas; Bahia; Panama.

A4. Stolephorus nattereri (Steindachner),
1879b, 57.
Habitat: Para.

5. Stolephorus olidus Günther, ..... 1880.
Habitat: La Plata; Parana.

6. Stolephorus manjuba Ribeiro,
Ribeiro, 1908.

7. Stolephorus brevirostris (Günther),
G., VII, 392.
Habitat: Province of Bahia.

8. Stolephorus vaillanti (Steindachner),
Steind., 1908g, 193.
Habitat: Rio San Francisco.

Anchovia Jordan & Evermann.
Type: Engraulis macrolepidotus Kner & Steindachner.
Range: Marine.

1. Anchovia macrolepidota (Kner & Steindachner), ........ J. & E., 449.
Habitat: Gulf of California to Panama, entering rivers.

Pterengraulis Günther.
Type: Clupea atherinoides Linnaeus.
Range: Marine.

A1. Pterengraulis atherinoides (Linnaeus),
Habitat: Coasts of Guiana and Brazil, entering rivers.

Stolephorus peruanus Steindachner. Ichthyolog. Beitr.,
VIII, 60.
Habitat: Callao, Peru.

Stolephorus tapirulus Cope.
1877, 45.
Habitat: Coast of Peru.

¹ For the synonymy see J. & E., 348.
² Stolephorus januarius Steindachner. Ichthyol. Beitr.,
VIII, 58.
Habitat: Rio de Janeiro Bay.
LYCENGRAULIS Günther.
Type: *Engraulis grossidens* Cuvier.
Range: Marine.
*Engraulis janeiro* Agassiz; *Engraulis dentex* Cuvier & Valenciennes.
Habitat: Coast of Guiana to Rio de Janeiro, entering rivers.

CLupea Linnaeus.
Type: *Clupea harengus* Linnaeus.
Range: Marine.
Habitat: Para.

ILISHA Gray.2
*Platygaster* Swainson; *Pellona* Cuvier & Valenciennes.
Type: *Ilisha abnormis* Gray.
Range: Marine.
*Pellona orbigniana* and *castelnana* Cuvier & Valenciennes.
Habitat: Coast of Surinam to La Plata, entering rivers.

Family CLUPEIDÆ.1

DOROSOMA Rafinesque.
Type: *Dorosoma notatum* Rafinesque.
Range: Lake Peten through the Mississippi valley.
1. *Dorosoma anale* Meek,3 ... Meek, 1893.
Habitat: Atlantic streams of Mexico, south of Vera Cruz.

CETENGRAULIS Günther.
Type: *Cetengraulis edentulus* Günther.
Range: Chiefly marine; one record for fresh water.
Habitat: Rio Jurua.

Pristigaster Cuvier.
Type: *Pristigaster cayanus* Cuvier.
Range: Marine, entering rivers.
*Pristigaster martii* Agassiz; *Pristigaster phaeoton* Cuvier & Valenciennes.
Habitat: Coast of Guiana and northern Brazil, entering rivers; Rio Jurua.
2. *Pristigaster effulgens* Regan, Regan, 1903.
Habitat: Rio Vaguera, northwest Ecuador.

DOROSOMIDÆ.

2. *Dorosoma petenense* Günther, Günther, VII., 408.
Habitat: Lake Peten.
Habitat: Nicaragua.

SIGNALOSA Evermann & Kendall.
Type: *Signalosa atchafalaya* Evermann & Kendall.
Range that of the single species.
1. *Signalosa mexicana* (Günther), VII., 409.
Signalosa atchafalaya Evermann & Kendall.
Habitat: Louisiana to Central America.

Family ELOPIDÆ.

Tarpon Jordan & Evermann.
Type: Megalops atlanticus Cuvier & Valenciennes.
Range: Marine.
1. Tarpon atlanticus (Cuvier & Valenciennes), ............ J. & E., 409.
Megalops elongatus Girard; Megalops thrissoides Günther.
Habitat: Long Island to Brazil, entering rivers.

Family OSTEOGLOSSIDÆ.

Osteoglossum Vandelli.
Ischnosoma Spix; Scleropages Günther.
Type: Osteoglossum bicirrhosum Vandelli.
Range: Tropical America; Australia and the East Indian Archipelago.

Osteoglossum vandelli Cuvier; O. arowana Schomburgk; O. minus Valenciennes.
Habitat: Guianas to Para and Huallaga.

Arapaima Müller.
Sudis Cuvier; Vastres Cuvier & Valenciennes.
Type: Sudis gigas Cuvier.
Range that of the single species.

Sudis pirarucu Spix; Vastres cuvieri, mapâ, agassizii, arapaima Cuvier & Valenciennes.
Habitat: Guiana to Bahia and the Peruvian Amazon.

Order HAPLOMI,
Family PÆCILIIDÆ.¹

Cynodontichthys Meek.
Type: Cynodontichthys tenuis Meek.
Range that of the single species.
1. Cynodontichthys tenuis Meek, Meek, 107.
Habitat: Oaxaca, Mexico.

Fundulus Lacépède.²
Type: Fundulus mudfish Lacépède.
Hydrargira Lacépède.
Range: Central America, south to Paraguay and Peru and north to Cape
¹I am unable to locate Rheodeoides vaillantii Thomisot, Bull. Soc. Philom. (7), VIII, 150 (Magdalena River, Bolivia).
²Fundulus vinctus Jordan & Gilbert, ....... Meek, 105.
Habitat: Southern portion of Lower California.

Fundulus punctatus Günther,
Cod and California. In fresh and salt water.
1. Fundulus punctatus Günther, Meek, 103.
F. guatemalensis Günther; F. oaxaca Meek.
Habitat: Lakes Dueñas, Amatitlan; Rio Guacalate; western Ecuador; Mexico.
2 Fundulus extensus Jordan & Gilbert,
J. & E., 646.
Habitat: Lower California.

Fundulus vinctus Jordan & Gilbert, ....... Meek, 105.
Habitat: Southern portion of Lower California.
   Habitat: Lake Atitlan.

   Habitat: Rio San Geronimo; Lake Yzabal, Guatemala.

5. *Fundulus cubensis* Eigenmann, Eigenm., 1903, 222.
   Habitat: Rio del Pinar, Cuba.

   Habitat: Arroyo Trementina, Paraguay.

   Habitat: Villa Maria, Paraguay.

---

**APLOCHEILUS** McClellan.

Type: *Aplocheilus chrysostigmus* McClellan.

Range: Tropical America; boundaries not well defined.

1. *Aplocheilus peruanus* Regan, Regan, 1903, 626.
   Habitat: Perim, Peru; 800 meters.

   Habitat: Punta Arenas, Costa Rica.

   Habitat: Trinidad.

---

**ZOOGONETICUS** Meek.

Type: *Platypcecilus cuitzenoensis* Bean.

Range: Principally in Mexican plateau, south to Lake Atitlan.

1. *Zoogoneticus cuitzenoensis* (Bean), Meek, 110.
   Habitat: Rio Lerma Basin.

2. *Zoogoneticus dugesii* (Bean), Meek, 111.
   Habitat: Rio Lerma Basin.

3. *Zoogoneticus pachycephalus* (Günther), . . . . . . . . Meek, 112.
   Habitat: Lake Atitlan.

4. *Zoogoneticus robustus* (Bean), Meek, 112.
   *Z. maculatus* Regan.
   Habitat: Rio Lerma Basin.

   Habitat: Rio Lerma Basin.

6. *Zoogoneticus miniatu*s Meek,
   Habitat: Valley of Mexico.

---

**RIVULUS** Poey.

Type: *Rivulus cylindraceus* Poey.

Range: United States to Paraguay.


*Rivulus urophthalmus* Günther; *Rivulus poeyi* Steindachner.
   Habitat: Para; Gurupa; Cayenne.

   Habitat: Rio Negro to Pebas; Venezuela; Trinidad.

   Habitat: Rio Janeiro.

   Habitat: Cauca.

   Habitat: Colonía Risso.

   Habitat: Rio San José; Costa Rica.

   Habitat: Amazons.

A8. *Rivulus obscureus* Garman,
   Habitat: Lake Hyanuary.

   Habitat: Jutahy.

10. *Rivulus flabellicauda* Regan, Regan, 1907, 64.
    Habitat: Juan Véñas, Costa Rica.

    Habitat: Guatemala.

\* = *diazi* fide Regan.
   Habitat: El Hule in Oaxaca.
13. *Rivulus breviceps* Eigenmann,
    Eigenbm., 1909, 49.
   Habitat: Shrimp Creek, near Kaieteur.
14. *Rivulus hilmica* Eigenmann,
    Eigenbm., 1909, 50.
   Habitat: Upper Potaro.
15. *Rivulus breviceps* Eigenmann,
    Eigenbm., 1909, 50.
   Habitat: Shrimp Creek, near Kaieteur.
16. *Rivulus stagnatus* Eigenmann,
    Eigenbm., 1909, 50.
   Habitat: Lower Potaro.
17. *Rivulus lanceolatus* Eigenmann,
    Eigenbm., 1909, 51.
   Habitat: Rockstone, British Guiana.
18. *Rivulus frenatus* Eigenmann,
    Eigenbm., 1909, 51.
   Habitat: Gluck Island, British Guiana.

**PTEROLEBIAS** Garman.
Type: *Pterolebias longipinnis* Garman.
Range that of the single species.
A1. *Pterolebias longipinnis* Garman,
    Garman, 142.
   Habitat: Santarem.

**CYNOLEBIAS** Steindachner.
Type: *Cynolebias porosus* Steindachner.
Range: La Plata to Pernambuco.
1. *Cynolebias bellottii* Steindachner,
    Steindachner, 1881, 9.
   Habitat: La Plata.
2. *Cynolebias maculatus* Steindachner,
    Steindachner, 1881, 10.
   Habitat: La Plata.
3. *Cynolebias elongatus* Steindachner,
    Steindachner, 1881, 11.
   Habitat: La Plata.
4. *Cynolebias robustus* Günther,
    Günther, 1883.

1 Garman considers *elongatus* a synonym of *porosus*
and *robustus* a synonym of *maculatus.

Habitat: San Antonio; Buenos Aires.
5. *Cynolebias porosus* Steindachner,
    Steindachner, 1876, 124.
   Habitat: Pernambuco.

**GIARDINICHTHYS** Bleeker.

**LIMNURGUS** Günther.
Type: *Girardinichthys innominatus* Bleeker.
Range that of the single species.
1. *Girardinichthys innominatus* Bleeker,
    Meek, 116.

**LIMNURGUS** variegatus Günther; Characodon geddesi Regan.
Habitat: Valley of Mexico.

**ILYODON** Eigenmann.
Type: *Ilyodon paraguayensis* Eigenmann.
Range that of the single species.
1. *Ilyodon paraguayensis* Eigenmann,
    1907a, 428.

**CHARACODON** Günther.
Type: *Characodon lateralis* Günther.
Range: Mexico and Central America.
1. *Characodon multiradiatus* Meek,
    Meek, 119.
   Habitat: Rio Lerma Basin.
2. *Characodon eiseni* Rutter, Meek, 119.
   Habitat: Lowland streams of Jalisco and Tepic.
3. *Characodon variatus* Bean, Meek, 120.
   *Characodon ferrugineus* Bean.
   Habitat: Rio Lerma Basin.
4. *Characodon lateralis* Günther,
   Meek, 121.
   Habitat: Central America, north to Jalisco.
5. *Characodon garmani* Jordan & Evermann,
   Meek, 121.
   Habitat: Headwaters of Ríos Mezquital and Nazas.

* = variatus fide Regan.
" = lateralis fide Regan.
6. Characodon furcidens Jordan & Gilbert, Meek, 122.
Habitat: Southern Lower California and lowland streams of Jalisco and Colima.

Chapalichthys Meek.
Type: Characodon encaustus Jordan & Snyder.
Range that of the single species.
1. Chapalichthys encaustus (Jordan & Snyder), . . . . . . . . . . . Meek, 123.
Habitat: Basin of the Río Lerma.

Cyprinodon Lacépède.
Prinodon Rafinesque.
Type: Cyprinodon variegatus Lacépède.
Range: Central America north to Río Colorado and Cape Cod, south to the Amazon.
1. Cyprinodon bovinus Baird & Girard, Meek, 126.
C. eximius Girard; C. latifasciatus Garman; C. elegans Meek.
Habitat: Río Nasas and headwaters of the Río Mezquital.
A2. Cyprinodon amazonus Eigenmann, Eigenm., 1894, 627.
Habitat: Lower Amazon.
Habitat: Near mouth of the Río Magdalena.
Esox ovinus Mitchill; Lebias rhomboidalis Val., Lebias ellipsoida Le Sueur; Cyprinodon gibbosus B. & G.; Trifarcins riverendi Poey.
5. Cyprinodon dearborni Meek, Meek, 1909, 208.
Habitat: Curaçoa, Dutch W. I.

Pseudoxiphophorus Bleeker.¹
Pecelioides Steindachner.
Type: Xiphophorus bimaculatus Heckel.
Range: Eastern slope of Mexico.
1. Pseudoxiphophorus bimaculatus (Heckel), . . . . . . . . . . . Meek, 127.
P. reticulatus Trosch.; P. b. taniatus Regan.
Habitat: Eastern slopes of Mexico from Jalapa to Guatemala, up to an altitude of 600 feet.
2. Pseudoxiphophorus jonesi Günther, Regan, 1907a, 260.
P. bimaculatus J. & E., non Heck.; P. pauciradiatus Regan.
Habitat: Orizaba.

Petalosoma Regan.
Type: Petalosoma cultratum Regan.
Range that of the single species.
1. Petalosoma cultratum Regan, Regan, 1909d, 458.
Habitat: Costa Rica.

Gambusia Poey.
Type: Gambusia punctata Poey.
Range: Mexico north to the Southern States.
Habitat: Fresh waters of Cuba.
Habitat: Fresh waters of Cuba.
3. Gambusia annectens Regan, Regan, 1907a, 259.
Habitat: Carrulo and Juan Veñas, Costa Rica.
Habitat: Ditches at Obispo, Panama.

¹This genus should according to Regan be merged with Gambusia.
5. Gambusia fasciata Meek, . . . Meek, 129.  
Habitat: Pacific slope of the Isthmus of Tehuantepec.

6. Gambusia gracilis (Heckel), Meek, 130.  
Habitat: Both slopes south of the City of Mexico.

7. Gambusia affinis (Baird & Girard), Meek, 130.  
Habitat: Rio Panuco; Rio Conchos and northward.

Habitat: Fresh waters of the Isthmus of Panama.

Habitat: Rio Lerma Basin.

Habitat: Rio Papaloapam.

11. Gambusia terrabensis Regan, Regan, 1907a, 260.  

12. Gambusia rhabdophora Regan, Regan, 1908d.  
Habitat: Costa Rica.

Paragambusia Meek.  
Type: Gambusia nicaraguensis Günther.  
Range that of the single species.

1. Paragambusia nicaraguensis (Günther), . . Meek, 133.  
Habitat: Southern Mexico and Lake Nicaragua.

Belosox Kner.  
Type: Belosox belizanus Kner.  
Range that of the single species.

Habitat: Southern Mexico; Lake Peten; Honduras; Guatemala.

Anableps Bloch.  
Type: Anableps tetrophthalmus Bloch.  
Range: Isthmus of Tehuantepec to the Amazons.

Habitat: Rio Tehuantepec to Panama.

A2. Anableps anableps (Linnaeus), Günther, VI, 337.  
Anableps tetrophthalmus Bloch; A. surinamensis Lacépède; A. gronovii Cuvier & Valenciennes; A. lineatus Gronow.

Habitat: Guianas; Orinoco; Amazons.

Anableps coactatus and elongatus Cuvier & Valenciennes.

Habitat: Para to Guiana.

Fitzroya Günther.  
Jenynsia Günther.  
Type: Labias multidentatus Jenyns.  
Range: La Plata to Rio Grande do Sul.

1. Fitzroya lineata (Jenyns), Garman, 69.  
Lebias multidentatus Jenyns; Pacelia punctata Valenciennes; Xiphophorus obscurus minor and heckelii Weyenberg.

Habitat: La Plata and Rio Grande do Sul.

2. Fitzroya pyrogramma Boulenger, Boul., 1902, 336.  
Habitat: Argentine Republic.

Glaridichthys Garman.  
Glaridodon Garman.  
Type: Glaridodon latidens Garman.  
Range: Cuba and northern Mexico.

1. Glaridichthys latidens (Garman), . . Meek, 134.  
Habitat: Chihuahua.

Habitat: Fresh waters of Cuba.


Habitat: Fresh waters of Cuba.


Habitat: Fresh waters of Cuba.

**Toxus Eigenmann.**

Type: *Toxus riddlei* Eigenmann.

Range that of the single species.


Habitat: San Cristobal, Cuba.

**Girardinus Poey.**

Type: *Girardinus metallicus* Poey.

Range: Cuba to Rio Grande do Sul.


Habitat: Fresh waters of Cuba.

2. *Girardinus denticulatus* Garman, Garman, 47.

Habitat: Remedios, Cuba.


Habitat: Cuba.


Habitat: Pinar del Rio, Cuba.


Habitat: Cauca.

**Phalloptytus Eigenmann.**

Type: *Phalloptytus januarius* Hensel.

Range that of the single species.

1. *Phalloptytus januarius* (Hensel), Hensel, 1907a, 430.

**Girardinus iheringii** Bouleanger; *Gambusia gracilis* Perugia.


**Phalloseros Eigenmann.**

Type: *Girardinus caudomaculatus* Hensel.

Range that of the single species.

1. *Phalloseros caudomaculatus* (Hensel), Hensel, 1907a, 431.


**Acanthophacelus Eigenmann,**

Type: *Pecilia reticulata* Peters.

Range: Leeward Islands, northern South America.

1. *Acanthophacelus guppii* (Günther), G., VI, 353.

Habitat: Trinidad; Venezuela.


*Pecilia vandepollii* and *orbensitis* Van Lindth de Jende.

Habitat: Leeward Islands; Guiana.


Habitat: Georgetown Trenches.


Habitat: Creeks near Wismar, British Guiana.

**Cnesterodon Garman.**

Type: *Pecilia decemmaculata* Jenyns.

Range: Amazons to Maldonado.

1. *Cnesterodon decemmaculatus* (Jenyns), Garman, 44.

Habitat: Rio Grande do Sul to Maldonado.


Habitat: Amazons.

**Goodea Jordan.**

Type: *Goodea atripinnis* Jordan.

*Xenendum* Jordan & Snyder.

Range: Rio Lerma Basin and headwaters of the streams approaching it.

1. *Goodea whitei* Meek, Meek, 137.

Meek, 1909, 209, considers this a *Girardinus.*
Habitat: Upper Balsas Basin.

   Habitat: Upper Panuco Basin.

3. *Goodea luitpoldi* (Steindachner),
   Meek, 139.
   *Xenendum xaliscone* Jordan & Snyder.
   Habitat: Rio Lerma Basin.

4. *Goodea atripinnis* Jordan, .. Meek, 140.
   *Xenendum caliente* Jordan & Snyder.
   Habitat: Lerma and Panuco Basins.

5. *Goodea calientis* Jordan & Snyder,
   Meek, 148.
   *Goodea atripinnis* Meek.
   Habitat: Lerma and upper tributaries of Rio Panuco.

**SKIFFIA** Meek.
Type: *Skiffia lermae* Meek.
Range: Lerma Basin.

1. *Skiffia multipunctata* (Pellegrin),
   Meek, 141.
   Habitat: Rio Lerma Basin.

2. *Skiffia lermae* Meek, ...... Meek, 142.
   Habitat: Rio Lerma Basin.

3. *Skiffia variegata* Meek, ...... Meek, 143.
   Habitat: Rio Lerma Basin.

4. *Skiffia bilineata* (Bean), .. Meek, 144.
   Habitat: Rio Lerma Basin.

**PLATYPÆCIUS** Günther.2
Type: *Platypæcius maculates* Günther.
Range: Mexico, south to Panama.

1. *Platypæcius maculates* Günther,
   Meek, 145.
   Habitat: Atlantic lowland streams south of Vera Cruz.

2. *Platypæcius tropicus* Meek,
   Meek, 1907a, 146.
   Habitat: Costa Rica at Turrialba.

3. *Platypæcius spilonotus* Regan,
   Regan, 1909, 460.

1 *atripinnis* fide Regan.
2 *Platypæcius mentalis* Gill may be found in fresh

Habitat: San José.

4. *Platypæcius nelsoni* Meek, .. Meek, 147.
   Habitat: Papayo; Guerrero.

**HETERANDRIA** Agassiz.
Type: *Limia formosa* Girard.
Range: Cuba and Mexico to Amazon.

1. *Heterandria pleurospilus* (Günther),
   Meek, 148.
   Habitat: Pacific slope of southern Mexico and Central America; Lake of Dueñas.

   Habitat: Atlantic and Pacific slopes of southern Mexico.

   Habitat: Presidio.

   Habitat: Fresh waters of western Cuba.

A5. *Heterandria minor* Garman,
    Garman, 92.
   Habitat: Villa Bella.

**PECILIA** Bloch & Schneider.
Type: *Pecilia vivipara* Bloch & Schneider.
Range: West Indies and Mexico to Ecuador and Montevideo.

   *Limia cubensis* Poey.
   Habitat: Cuba.

2. *Pecilia latipunctata* Meek,2 .. Meek, 150.
   Habitat: Basin of the Rio Panuco.

   Habitat: Fresh and brackish water from Mazatlan to Tehuantepec.

   *Molienesia fasciata* Müller & Troschel;
   *Gambusia modesta* and *plumbea*

1 *sphenops* fide Regan.
Troschel; *Pacilia mexicana* Steindachner; *Pacilia limantouri* Jordan & Snyder; *P. chisoyensis dovi gillii* Günther.

Habitat: Atlantic slope from Monterey, Mexico, to Costa Rica; Pacific slope from the Rio Balsas, Mexico, to Lake Amatitlan, Guatemala.


*Pacilia surinamensis* and *unimaculata* Valenciennes; *Pacilia schneideri* Cuvier & Valenciennes.

Habitat: Martinique; Guianas; Rio Grande do Sul and Paraguay.


Habitat: Rio das Mogubas; Para.


Habitat: Rio Chagres.


Habitat: Warm springs of San Salvador, Mexico.


Habitat: Lake Peten.


Habitat: Atlantic slope of the isthmus of Panama.


Habitat: San Domingo and the Barbadoes.


Habitat: ? Jamaica.


Habitat: Central America.


Habitat: Streams about Panama.


Habitat: Montevideo.


Habitat: Salvador.


Habitat: Hot springs, San Vicenta; Santa Elena, Ecuador.


Habitat: Santarem; Para.


Habitat: Santa Cruz; Para.


Habitat: Basin of Rio Motagua.

21. *Pacilia tenuis* Meek, Meek, 1907a, 147.

Habitat: Costa Rica.


Habitat: Costa Rica.


Habitat: Costa Rica.


**Mollienesia** Le Sueur.

Type: *Mollienesia latipinna* Le Sueur.

Range: South Carolina to Lake Peten.


*Pacilia multilineata* Le Sueur; *P. lineolata*, *Limia pacilioides*, *formosa* and *matamorensis* Girard.

Habitat: Lowland streams from Yucatan to South Carolina.


Habitat: Lake Alcohuaca and Huamanita, Mexico.


Habitat: Lake Peten.

**Xiphophorus** Heckel.

Type: *Xiphophorus helleri* Heckel.

Range: Atlantic slope of Mexico and Guatemala.
1. Xiphophorus helleri Heckel, J. & E., 701.  
Habitat: Atlantic slope of Mexico and Guatemala.

Habitat: Rio Chisoy.

3. Xiphophorus jalapa Meek, ......... Meek, 156.  
Habitat: Central Vera Cruz.

4. Xiphophorus montezuma Jordan & Snyder, .......... Meek, 158.  
Habitat: Rio Panuco Basin.

5. Xiphophorus strigatus Regan, .............. Regan, 1907, 65.  
X. helleri Meek (non Heckel).  
Habitat: Southern Mexico, Vera Cruz and Oaxaca.

6. Xiphophorus brevis Regan, .............. Regan, 1907–8, 108.  
Habitat: Stann Creek, British Honduras.

Orestias Valenciennnes.

Orestiasini, Orestiasiformes Bleeker.  
Type: Orestias cuvieri Valenciennes.  
Range: Titicaca Basin; headwaters of Urubamba; Rio Rimac.

Orestias humboldtii Valenciennes; O. pentlandi Castelnau, non Valenciennes.  
Habitat: Lake Titicaca.

Orestias bairdii Cope.  
Habitat: Lake Titicaca; Cuzco Valley.

3. Orestias elegans Garman, Garman, 149.  
Habitat: Small lakes in headwaters of Rio Rimac, 4,200 meters.

4. Orestias mulleri Valenciennes, .............. Garman, 149.  

5. Orestias luteus Günther, (non Val.).  
Habitat: Lake Titicaca.

6. Orestias agassizi Valenciennes, .............. Garman, 150.  
Orestias tschudii Castelnau; O. owenii Günther, in part; O. ortoni and frontosus Cope.  
Habitat: Lake Titicaca.

7. Orestias albus Valenciennes.  
Orestias müllerii Günther, in part.  
Habitat: Lake Titicaca.

Habitat: Lake Titicaca.

Habitat: Land-locked lake Umayo, nine miles northwest of Lake Titicaca and 100 feet higher.

Orestias müllerii Günther, in part.  
Habitat: Lake Titicaca.

Orestias jussieui Castelnau.  
Habitat: Titicaca and Guasaona River; Lake Chinchoro near Cuzco.

Habitat: Lake Titicaca.

Habitat: Andes of Eastern Peru.

Tomeurus Eigenmann.

Type: Tomeurus gracilis Eigenmann.  
Range that of the single species.

1. Tomeurus gracilis Eigenmann.  
Habitat: Wismar and Aruka River, British Guiana.

*According to Regan this is helleri.
Family GALAXIIDÆ.

1. Galaxias Cuvier.
   Mesites Jenyns.
   Type: Galaxias truttaceus Cuvier.
   1. Galaxias attenuatus (Jenyns).
      Mesites gracilinus Canestrini; Galaxias minutus Philippi; ? G. punctatus Philippi.
      Habitat: Southern Patagonia, Tierra del Fuego and Falkland Islands.
   2. Galaxias maculatus (Jenyns).
      Galaxias coppingeri Günther; Mesites attenuatus Jenyns.
      Habitat: Puerto Montt, south to the Falkland Islands and St. Augustine.
      ? Galaxias grandis Philippi; G. delfini Philippi.
      Habitat: Southern Patagonia.
   4. Galaxias alpinus (Jenyns).
      Habitat: Alpine lakes of Hardy Peninsula, Tierra del Fuego.
   5. Galaxias smithii Regan.
      Habitat: Southern Chili.

Family APLOCHITONIDÆ.

1. Aplochiton Jenyns.
   Farionella Cuvier & Valenciennes.
   Haplochiton Günther.
   Type: Aplochiton zebra Jenyns.
   1. Aplochiton zebra Jenyns.
      Farionella gayii Cuvier & Valenciennes.

Order SYNENTOGNATHI.

Family BELONIDÆ.

Tylosurus Cocco.
   Type: Tylosurus cantraini Cocco = T. acus Lacépède.
   Range: Marine, entering rivers.
   1. Tylosurus microps (Günther), J. & E., 712.
      Habitat: Guiana.
   2. Tylosurus amazonicus (Steindachner), J. & E., 712.
      Habitat: Para; Manacapuru; Taïapuru.
   3. Tylosurus almeida (Quoy & Gaimard), J. & E., 715.
      Belone timucu Cuvier & Valenciennes;
   B. truncata and guianensis Günther, non Müller & Troschel.
      Habitat: Surinam to Rio de Janeiro.
   4. Tylosurus marinus (Walbaum), J. & E., 714.
      Esox longirostris Mitchell; Belone truncata Le Sueur; B. scrutator Girard.
      Habitat: Cape Cod to Yucatan, entering rivers.
   5. Tylosurus fluviatilis Regan, Regan, 1903, 626.
      Habitat: Rivers of northwestern Ecuador.
      Habitat: Panama.

\^For a detailed account of the Galaxiidae see Section 1 of this report.
EIGENMANN: CATALOGUE OF FRESH WATER FISHES.

ATHLENNES Jordan & Fordice.
Type: Belone hians Cuvier & Valenciennes.
Range: Marine.
Belone maculata Poey.
Habitat: West Indies to Bahia, entering rivers.

 POTAMORRHAPHIS Günther.
Type: Belone taniata Günther = guianensis Schomburgk.
Range that of the single species.
A1. Potamorrhaphis guianensis (Schomburgk), Günther, VI, 256.
Belone scolopacina Cuvier & Valenciennes; Belone taniata Günther.
Habitat: Guiana to Paraguay.

Order ACANTHOPTERÆ.
Family MUGILIDÆ.
Subfamily MUGILINÆ.
Mugil Linnaeus.
Type: Mugil cephalus Linnaeus.
Range: Marine. In many seas.
Mugil petrosus C. & V.; M. brasiliensis Jordan & Gilbert.
Habitat: Both coasts, entering rivers.

Subfamily AGONOSTOMINÆ.
Agonostomus Bennett.
Type: Agonostomus telfairii Bennett.
Range: Fresh waters of the West Indies; Central America; New Zealand; Australia; Celebes, etc.
(Dajaus Cuvier & Valenciennes.)
(Type: Dajaus monticola Cuvier & Valenciennes).
1. Agonostomus percoideus Günther,
J. & E., 819.
Habitat: Fresh waters of Santo Domingo; Trinidad.
2. Agonostomus monticola Bancroft,
J. & E., 819.
Habitat: West Indies to Trinidad; Atlantic and Pacific slope of Mexico and Central America.

3. Agonostomus microps Günther,
J. & E., 820.
Habitat: Rio Guacalate.
4. Agonostomus macracanthus Regan,
Regan, 1907, 65.
Habitat: Rio Guacalate, Guatemala.
5. Agonostomus salvini Regan,
Regan, 1907, 66.
Habitat: Rio Nacasil, Guatemala.
6. Agonostomus nasutus Günther,
G., III, 463.
N. digneti Vaill.
Habitat: Mountain torrents of Lower California to Costa Rica.

Xenorhynchichthys Regan.
Type: Joturus stipes Jordan & Gilbert.
Range that of the single species.
1. *Xenorhynchichthys stipes* (Jordan & Gilbert).
   Habitat: Central America.

**Protistius** Cope.
Type: *Protistius semotilus* Cope.
Range that of the single species.
1. *Protistius semotilus* Cope, 1874, 66.
   Habitat: Peruvian Andes. Elevation 12,000 feet.

**Gastropterus** Cope.
*Pisciregia* Abbott.
Type: *Gastropterus archæus* Cope.
Range: Ocean to 7,500 feet.
1. *Gastropterus archæus* Cope, 1878, 700.
   Habitat: Arequipa, Pacific slope of Peru. Altitude 7,500 feet and ocean.
   Habitat: Coast of Peru.

**Atherina** Linnaeus.
*Membras* Bonaparte.
Type: *Atherina hepsetus* Linnaeus.
Range: Marine. Fresh waters of Cuba.
1. *Atherina evermanni* Eigenmann, Eigenm., 1903.
   Habitat: Western Cuba.

**Chirostoma** Swainson.
*Atherinoides, Atherinichthys* Bleeker; *Heterognathus* Girard.
Type: *Atherina humboldtiana* Cuvier & Valenciennes.
Range: Mexico.

(Eslopsarum Jordan & Evermann.)
(Type: *Chirostoma jordani* Woolman.)

**Joturus** Poey.
Type: *Joturus pichardi* Poey.
1. *Joturus pichardi* Poey, ... J. & E., 821.
   *Agonostoma globiceps* Günther.
   Habitat: Cuba, in mountain streams.

Family **Atherinidæ.**

1. *Chirostoma jordani* Woolman, Meek, 169.
   *Chirostoma brasiliense* Jordan; *Atherinichthys brevis* Steindachner.
   Habitat: Rio Lerma and the valley of Mexico.
2. *Chirostoma breve* Steindachner, St., 1895, 526.
   Habitat: Rio Lerma; valley of Mexico.
   Habitat: Durango.
4. *Chirostoma arge* Jordan & Synder, Meek, 171.
   Habitat: Rio Lerma Basin.
   Habitat: Rio Lerma Basin.
   Habitat: Rio Lerma Basin.
7. *Chirostoma labarca* Meek1, Meek, 173.
   Habitat: Rio Lerma Basin.
   Habitat: Rio Lerma Basin.
   Habitat: Rio Lerma Basin.
10. *Chirostoma humboldtianum* (Cuvier & Valenciennes), ... Meek, 175.
   *Atherina vomerina* C. & V.

1 *Atherinichthys argentensis* C. & V, La Plata; *Odontesthes perugiae* Evermann & Kendall, Argentina.

* = jordani fide Regan.
* = bartoni fide Regan.
* = bartoni fide Regan.
Habitat: Rio Lerma and valley of Mexico.

11. **Chirostoma chapalae** Jordan & Snyder, Meek, 176.
Habitat: Rio Lerma Basin.

12. **Chirostoma grandoculis** Steindachner, Meek, 176.
Habitat: Rio Lerma Basin.

13. **Chirostoma promelas** Jordan & Snyder, ... Meek, 177.
Habitat: Rio Lerma Basin.

14. **Chirostoma diazi** Jordan & Snyder, ... J. & S., 1899, 137.
**Chirostoma sphyraena** Meek, non Bou- lenger.
Habitat: Rio Lerma Basin.

15. **Chirostoma sphyraena** Bou勒enger, ... Meek, 177.

16. **Chirostoma lucius** Bou勒enger, ... Meek, 178.

17. **Chirostoma octotane** Jordan & Snyder, ... Meek, 180.

18. **Chirostoma estor** Jordan, ... Meek, 180.
**Atherinichthys albus** Steindachner.
Habitat: Rio Lerma and valley of Mexico.

**Menidia** Bonaparte.
Type: **Atherina menidia** Linnaeus.

1. **Menidia sallei** (Regan), ... Meek, 181.
Habitat: Mexico.

2. **Menidia guatemalensis** (Günther), ... J. & E., 801.
Habitat: Lakes of Guatemala.

3. **Menidia laticlava** (Cuvier & Valenciennes).
Habitat: Chili and Patagonia.

4. **Menidia mauleana** (Steindachner).
Habitat: Pichi Lagune, a branch of Lake Llanquihue.

5. **Menidia hatcheri** Eigenmann.
Habitat: Lake Puyurredon.

**Thyrina** Jordan & Culver.

**Melaniris** Meek.
Type: **Thyrina evermanni** Jordan & Culver.
Range: Pacific slope of Mexico.

1. **Thyrina guatemalensis** (Günther), ... Regan, 1907–8, 64.

2. **Thyrina meeki** Miller, ... M., 1907, 110.
Habitat: Rio Montagua Basin, Guatemala.

3. **Thyrina sardina** Meek, Meek, 1907, 114.
Habitat: Lakes of Nicaragua.

**Xenatherina** Regan.
Type: **Menidia lisa** Meek.
Range that of the single species.

1. **Xenatherina lisa** (Meek), ... Regan, 1907–8, 64.

**Atherinopsis** Girard.

**Basilichthys** Girard.
Type: **Atherinopsis californiensis** Girard.
Range: California to Patagonia.

1. **Atherinopsis regius** (Humboldt).
**Atherina microlepidota** Jenyns.
Habitat: Callao to Gallegos and Montevideo, entering fresh waters.
2. *Atherinopsis bonariensis* (Cuvier & Valenciennes),

Evermann & Kendall, 1906, 95.
Habitat: Lakes of Argentina.

Family POLYCENTRIDÆ.

**POLYCENTRUS** Müller & Troschel.

Type: *Polycentrus schomburgkii* Müller & Troschel.
Range: Guiana and Trinidad.

Habitat: Essequibo; Orinoco; Trinidad.

2. *Polycentrus tricolor* Gill,
Günther, III, 370.

Habitat: Trinidad.

**MONOCIRRHUS** Heckel.

Type: *Monocirrhus polyacanthus* Heckel.
Range that of the single species.

A1. *Monocirrhus polyacanthus* Heckel,
Günther, III, 371.
Habitat: Rio Cupai and ponds near the Rio Negro.

Family CENTROPOMIDÆ.

**CENTROPOMUS** Lacépède.

*Oxylabrax* Bleeker; *Macrocephalus* Brown.
Type: *Sciena undecimalis* Bloch.
Range: Marine. Some, possibly all, of the species entering or living in fresh water.

A1. *Centropomus medius* Günther,
J. & E., 1119.
*C. grandoculatus* E. & J.; *C. pedimacula* part J. & E.
Habitat: Atlantic and Pacific coasts, entering rivers.

A2. *Centropomus parallelus* Poey,
J. & E., 1122.
*C. gabbii* and *heringi* Fowler; *C. mexicanus* Bocourt.
Habitat: Cuba to Bahia; Pacific coast, entering rivers.

3. *Centropomus undecimalis* (Bloch),
J. & E., 1118.
*C. undecimradiatus, boubina* and *auroro-viridis* Lacépède; *C. argenteus* Regan; *C. appendiculatus* Poey.
Habitat: Atlantic coast, entering rivers.

A4. *Centropomus pectinatus* Poey,
J. & E., 1122.
*C. pedimacula* Poey.
Habitat: Cuba to Pernambuco, entering rivers.

5. *Centropomus nigrescens* Günther,
Regan, 50.
Habitat: Rio Presidio to Panama.

6. *Centropomus robalito* Jordan & Gilbert,
J. & E., 1123.
*C. armatus* Günther, non Gill.
Habitat: Pacific coast from Mazatlan to Panama, entering rivers.

7. *Centropomus armatus* Gill,
Regan, 1903, 627.
*C. atridorsalis* Regan; *C. brevis* Günther.
Habitat: Rio Vaqueria near La Tola, northwestern Ecuador.

8. *Centropomus ensiferus* Poey,
Regan, 1906c, 391.
*C. affinis* Steind.; *C. scaber* Bocourt.
Habitat: Guiana.
Family SERRANIDÆ.

**Percichthys** Girard.

*Type*: *Percichthys trucha* Cuvier & Valenciennes.
*Range*: Valparaiso to the Rio Negro.

1. **Percichthys trucha** (Cuvier & Valenciennes).

*Perca levis* Jenyns; *Percichthys chilensis* Girard.

2. **Percichthys melanops** Girard.

Family HÆMULIDÆ.

**Pomadasis** Lacépède.

*Pristopoma* Oken; *Rhencus* and *Rhoncus* Jordan & Evermann.

*Type*: *Pomadasis argenteus* Lacépède.
*Range*: Marine. Tropical seas, entering rivers.

1. **Pomadasis boucardi** Steindachner, Regan, 1907–8, 43.

*P. templei* Meek.
*Habitat*: Rio Panuco, east coast.


*Pristopoma humble* Kner & Steindachner, *non* Bowditch; *Pristopoma labiaciforme* Bouleguer.
*Habitat*: Rio Bayano, near Panama.

3. **Pomadasis andrei** (Sauvage), J. & E., 1332.

*Habitat*: Rio Guayas, near Guayaquil.

4. **Pomadasis crocro** (Cuvier & Valenciennes), .......... J. & E., 1333.

*Pristopoma cultriferum* Poey; *Pomadasys approximans* Bean & Dressel; *P. starri* Meek.
*Habitat*: West Indies; Sao Matheos; *Itabapuana*; Cannavierias.

5. **Pomadasis grandis** Meek, Meek, 1907, 116.

*Habitat*: Lake Nicaragua.

6. **Pomadasis branicki** (Steindachner), J. & E., 1333.

*Habitat*: Mazatlan to Peru, entering rivers.

7. **Pomadasis macracanthus** Günther, Regan, 1907–8, 42.

*Habitat*: Rio Presidio to Panama.

8. **Pomadasis leuciscus** Günther, Regan, 1907–8, 42.

*Habitat*: California to Peru.

Family SCIÆNIDÆ.

**Aplodinotus** Rafinesque.

*Type*: *Aplodinotus grunniens* Rafinesque.

1. **Aplodinotus grunniens** Rafinesque.

*Habitat*: Chiapas, Mexico, northward through the Mississippi valley.

For details see the Patagonian section of this report.
*Sciana rubella* Schomburgk; *Johnius crouvina* and *amazonicus* Castelnau; *Corvina monacantha* Cope.
Habitat: Brazil and Guiana.


A5. *Plagioscion rubella* Schomburgk; *Johnius crouvina* and *amazonicus* Castelnau; *Corvina monacantha* Cope.
Habitat: Brazil and Guiana.


Habitat: Paraguay Basin.


*Sciana magdalena* Steindachner.
Habitat: Rio Magdalena to Para.

Habitat: Rivers of Brazil.

**PACHYURUS** Agassiz.

*Lepipterus* Cuvier & Valenciennes.
Type: *Pachyurus squamipinnis* Agassiz.
Range: Amazons; Paraguay; Rio San Francisco.


*Pachyurus lundii* Reinhardt.
Habitat: Rio San Francisco and tributaries; Para.

2. *Pachyurus francisci* (Cuvier & Valenciennes),

**PACHYPOPS** Gill.
Type: *Micropogon trifilis* Müller & Troschel.
Range: Guiana to the Guaporé and southeastern Brazil.

A1. *Pachypops furcraus* (Lacépède),
Jordan & Eigenmann, 1889, 413.

*Corvina biloba* Cuvier & Valenciennes.
Habitat: Rivers of Brazil and Guiana.

A2. *Pachypops trifilis* (Müller & Troschel),
Jordan & Eigenmann, 1889, 413.
Habitat: Rio Guaporé to Guiana.

3. *Pachypops adspersus* (Steindachner),
Jordan & Eigenmann, 1889, 414.

*Corvina grunniens* Schomburgk.
Habitat: Southeastern Brazil.

**ETHEOSTOMA** Rafinesque.

Type: *Etheostoma flabellare* Rafinesque.
Range: Rio Mesquital north through Atlantic slope of America.

(RAFINESQUELLUS Jordan & Evermann.)
(Type: *Aplesion pottsii* Girard.)
Family CICHLIDÆ.¹

**Chætobranchus** Heckel.
Type: *Chætobranchus flavescens* Heckel.
Range: Guiana to the Guaporé.

A1. *Chætobranchus flavescens* Heckel,
Pellegrin, 164.

*Chætobranchus brunneus* Heckel; *Chromys ucayalensis* Castelnau; *Chætobranchus robustus* Günther; *Geophagus badipinnis* Cope.
Habitat: Amazons, north to Guiana and south to the Guaporé.

A2. *Chætobranchus semifasciatus* Steindachner, 165.
Habitat: Amazons.

**Chætobranchopsis** Steindachner.
Type: *Chætobranchopsis orbicularis* Steindachner.
Range: Amazon and Paraguay.

Habitat: Amazons.

2. *Chætobranchopsis australis* Eigenmann & Ward, 1907, 144.
Habitat: Paraguay.

*Cichla* Bloch & Schneider.
Type: *Cichla ocellaris* Bloch & Schneider.
Range: Guianas to Argentina; not in southeast Brazil.


*Cichla monoculus* Agassiz; *C. ataba-pensis* Humboldt; *C. orinocensis* Humboldt; *C. argus* Valenciennes; *Cychla nigro-maculata* and *trifasci-ata* Schomburgk; *Acharnes speciosus* Müller & Troeschel; *Cichla toucounara* and *multifasciata* Castelnau; *Crenicichla orinocensis* Günther.
Habitat: Amazons and northward.

¹ For the details of this family see Pellegrin, 1904, and various papers by Regan, 1904 and 1905.

A2. *Cichla temensis* Humboldt, 149.

*Cichla tucunare* Heckel; *Cychla flavo-maculata* Schomburgk; *C. conibos* Castelnau.
Habitat: Orinoco; Amazons.

Habitat: Rio Pequiri, Misiones, Argentina.

4. *Cichla chacoensis* (Holmberg), 1891, 182.
Habitat: Formosa, Chaco, Argentina; Rio Paraguay and tributaries.

**Uaru** Heckel.
Type: *Uaru amphiascanthoides* Heckel.
Range: Guiana and Amazon.

A1. *Uaru amphiascanthoides* Heckel,
Pellegrin, 212.

*Pomotis fasciatus* Schomburgk; *Uaru obscurum* Günther.
Habitat: Amazons; Guiana.

A2. *Uaru imperialis* (Steindachner), 213.
Habitat: Amazon near the Rio Negro.

**Herotilapia** Pellegrin.
Type: *Heros multispinosus* Günther.
Range that of the single species.

1. *Herotilapia multispinosa* (Günther), 211.
Habitat: Lake Managua.

**Paraneetroplus** Regan.
Type: *Paraneetroplus bulleri* Regan.
Range that of the single species.

Habitat: Rio de Sarabia, Mexico.

**Neetroplus** Günther.
Type: *Neetroplus nematopus* Günther.
Range: Eastern slope of Mexico and Central America.
ACAROPSIS Steindachner.
Type: Acara nassa Heckel.
Range that of the single species.
A1. Acaropsis nassa (Heckel),
Pellegrin, 144.
Habitat: Guiana; Orinoco and Amazons.

PETENIA Günther.
Type: Petenia splendida Günther.
Range that of the single species.
1. Petenia splendida Günther,
Pellegrin, 207.
Habitat: Lake Peten.

TOMOCICHLA Regan.
Type: Tomocichla underwoodi Regan.
Range that of the single species.
1. Tomocichla underwoodi Regan,
Regan, 1908d, 463.
Habitat: Costa Rica.

HERICHTHYS Baird & Girard.
Type: Herichthys cyanoguttatus Baird & Girard.
Range: Texas to Guatemala.
1. Herichthys cyanoguttatus Baird & Girard, ..
Neetroplus carpintis Jordan & Snyder;
Heron temporalis Fowler.
Habitat: Texas to northeastern Mexico.

1 A. filamentosus (Lacépède) and A. planifrons (Kaznp).

2 In 1839 Swainson (Nat. Hist. Fishes, Amph. and Rept., II) defined the genera Astronotus (p. 229) and Cichlasoma (p. 230). The types and only species of the genera are Lobotes ocellatus Agassiz and Sciana punctata Linneaus.

In 1840 Heckel defined his new genus Acara. It in-
EIGENMANN: CATALOGUE OF FRESH WATER FISHES. 471

A1. *Equidens* tetramerus (Heckel),
Pellegrin, 135.

? *Sciema punctata* Linnaeus; *Acaropsis vi-
ridis, diadema, pallidus and dimerus*  

since *crassispinis* is a synonym of *ocellatus*, the type of 
the latter genus. If one of the two species figured is 
selected we may have *tetramerus* or again *crassispinis* 
as the type for *Acaropsis*. If the former is selected the 
name *Acaropsis* will stand.  

Inasmuch as Heckel does not select a type, it is 
incumbent on a later naturalist to select a type from 
among the four species discussed, or from among any 
of Heckel's species.  

In the earliest paper by Gill (Synopsis of the Fresh-
Water Fishes of Trinidad) he says, p. 19: "As it 
[Labrus punctatus, the type of *Cichlasoma*] is a true 
*Acaropsis*, 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." Gill re-defines the genus *Cychlasoma*, 
excluding several of Heckel's species, and continues:  
"With these characters, that species which Mr. Heckel 
... has described as the *Acaropsis crassispinis*, will also 
be excluded [from the genus *Cychlasoma*]; this species 
appears to be generically distinct from both *Cychlasoma* 
and from *Acaropsis* of Swainson. ... If it should be 
found, on a more critical examination, to be really 
distinct from *Acaropsis*, to which it is most nearly 
allied, Heckel's name of *Acaropsis* might appropriately be 
retained as its generic name. ... It belongs to the 
section E of the genus *Acaropsis*, in the arrangement of 
Heckel ...; the other sections ... all belong to 
*Cychlasoma* as now restricted." 

Gill thus removed from *Acaropsis* all of Heckel's species 
but *crassispinis*. 

There can be no question that it was entirely within 
the province of Gill to restrict the genus to this species. 
But it was found later that *crassispinis* is a synonym of 
*ocellatus*, the type of *Acaropsis*. *Acaropsis* is therefore 
the exact synonym of *Acaropsis* and cannot be used for 
anything else. Inasmuch as *tetramerus* and other spe-
cies are distinct from *Acaropsis*, I coined the name 
*Equidens* for them in 1894. (Ann. N. Y. Acad. Sci., 
VII, 616, using the *Acaropsis tetramerus* Heckel as type.) 

The name *Acaropsis* has been resurrected by Regan (Ann. 
and Mag. Nat. Hist. (7), XV, 1905, p. 330), who says:  
"After removing from Heckel's genus the species 
which belong to *Acaropsis, Cychlasoma* and *Acaropsis*, 
I use *Acaropsis* for the remainder, regarding Gill's restric-
tion of the name *Acaropsis* to a species which was already 
the type of another genus as invalid." 

I know of no rule, ancient or modern, of scientific 
nomenclature which authorizes anyone to regard as 
invalid the work done by someone else, unless that work 
was done contrary to the accepted canons. In fact, the 
rules (if I am not mistaken) have been made especially 
to prevent this sort of procedure.
2. *Æquidens centralis* (Holmberg),
   Pellegrin, 136.
   Habitat: Santiago del Estero, Argentina.
3. *Æquidens portalegrensis* (Hensel),
   Pellegrin, 137.
   Habitat: Porto Alegre, Rio Grande do Sul; Paraguay.
A4. *Æquidens vittatus* (Heckel),
    Pellegrin, 137.
    Habitat: Colombia to Guiana; Amazons and Paraguay.
A5. *Æquidens sypilus* (Cope),
    Pellegrin, 137.
    Habitat: Upper Amazons.
A6. *Æquidens dorsigerus* (Heckel),
    Pellegrin, 138.
    Habitat: Paraguay; Amazons.
   Habitat: Paraguay.
A8. *Æquidens flavescens* (Cope),
    Regan, 1905, 343.
    Habitat: Ambyiacu.
A9. *Æquidens thayeri* (Steindachner),
    Pellegrin, 139.
    Habitat: Amazons (Lago Maximo; Hyanuary; Teffé).
10. *Æquidens pulcher* (Gill),
    Pellegrin, 140.
    Habitat: Rio Magdalena to Trinidad.
11. *Æquidens coeruleopunctatus* (Kner & Steindachner).
   *Acara latifrons* Steindachner.
   Habitat: Rio Chagres; northwestern Ecuador.
12. *Æquidens latifrons* (Steindachner),
    Pellegrin, 141.
    Habitat: Rio Magdalena.
13. *Æquidens equinocitialis* (Regan),
    Regan, 1905, 337.
    Habitat: Western Ecuador.
14. *Æquidens rivulatus* (Günther),
    Pellegrin, 141.
   *Acara pulchra* Günther, non Gill.
   Habitat: Western Ecuador.
15. *Æquidens sapayensis* Regan.
   Habitat: Western Ecuador.
16. *Æquidens freniferus* (Cope),
    Pellegrin, 141.
   Habitat: Ambyiacu.
A17. *Æquidens minutus* (Hensel),¹
    Pellegrin, 142.
18. *Æquidens genyi* (Pellegrin),
    Pellegrin, 142.
   Habitat: River Camopi, French Guiana.
A19. *Æquidens subocularis* (Cope),
    Pellegrin, 189.
   *Geophagus* *mesops* thayeri Steindachner.
   Habitat: Amazons.
20. *Æquidens maronii* (Steindachner),
    Pellegrin, 143.
   Habitat: French Guiana.
A21. *Æquidens zamorensis* (Regan),
    Regan, 1905, 339.
   Habitat: Ecuadorian Amazons.

**Thorichthys** Meek.

Type: *Thorichthys ellioti* Meek.

Range: Eastern slope of Mexico and Central America.
1. *Thorichthys aureus* (Günther),
   Pellegrin, 202.
   *Héros* *maculipinnis* and *helleri* Steindachner.
   Habitat: Eastern Mexico, south of Vera Cruz; Guatemala.
   Habitat: Vera Cruz, Mexico.
3. *Thorichthys callolepis* Regan,
   Regan, 1904, 258.
   Habitat: Santo Domingo de Guzman.
4. *Thorichthys affinis* (Günther),
   Habitat: Guatemala and British Hon-
¹ Regan considers this the young of *Geophagus gymnogenys* Hensel.
duras; Lake Peten; Belize; Lake Floris.

CICHLASOMA Swainson.²
Type: Sciœna bimaculata Linnaeus.
Range: Mexico to La Plata; on both slopes of Central America. Chiefly in middle America, few in South America.

(1. Cichlasoma Swainson.)
A1. Cichlasoma bimaculatum (Linnaeus),
Regan, 68.
Labrus punctatus Linnaeus, part; Chromis kawia Bennett; Acara gronovii, margarita and marginatus Heckel.
Habitat: Paraguay to Trinidad; Amazon.

(2. Mesonauta Günther.)
(Type: Heros festivus Heckel.)
2. Cichlasoma festivum (Heckel),
Regan, 69.
Heros insignis Heckel; Chromys acora Castelnau.
Habitat: Paraguay to Orinoco.

(3. ———.)
3. Cichlasoma facetum (Jenyns),
Pellegrin, 181.
Heros jenynsii Steindachner; Heros acaroides Hensel.
Habitat: La Plata Basin.
4. Cichlasoma autochthon (Günther),
Pellegrin, 199.
La Plata Basin; southwestern Brazil. A5. Cichlasoma oblongum (Castelnau),
Pellegrin, 200.
Habitat: Province Goyaz.
6. Cichlasoma globosum Miller,
Miller, 1907, 114.
Habitat: Motagua Basin.
7. Cichlasoma mahuana Miller,
Miller, 1907, 115.
Habitat: Motagua Basin.
8. Cichlasoma acutum Miller,
Miller, 1907, 117.
Habitat: Motagua Basin.
9. Cichlasoma milleri Meek,
Meek, 19079, 142.
Habitat: Motagua Basin.

(4. ———.)
A10. Cichlasoma temporale (Günther),
Pellegrin, 182.
Acara crassa Steindachner; Heros galldii Boulenger.
Habitat: Amazons; Guiana.
A11. Cichlasoma coryphanoides (Heckel),
Heros niger Heckel.
Habitat: Amazons.
12. Cichlasoma biocellatum Regan,
Regan, 1909, 234.
Habitat: Costa Rica.

(5. Archocentrus Gill.)
(Type: Heros centrarchus Gill & Bransford.)
13. Cichlasoma nigrofasciatum (Gün- thert), ............. Pellegrin, 187.
Habitat: Lakes Atitlan, Amatitlan and Guatemala.
Cichlasoma octofasciatum Regan; C. hedricki Meek, ........ Regan, 331.
Habitat: Southern Mexico to British Honduras.
14. Cichlasoma spilurus (Günther),
Pellegrin, 186.
Habitat: Guatemala in Rio Motagua; Lake Yzabal.
15. Cichlasoma septemfasciatum Regan,
Regan, 1908d, 461.
Habitat: Costa Rica.
16. Cichlasoma spinostissimum Vaillant & Pellegrin, ............. Pellegrin, 188.

Habitat: Rio Polochic, Guatemala.
17. Cichlasoma immaculatum Pellegrin, Regan, 77.
Habitat: Rio Polochic.
18. Cichlasoma centrarchus (Gill & Branson), Cichlasoma zonatum Meek, Meek, 245.
Habitat: Lake Nicaragua.
(6. Theraps Günther.)
(Type: Theraps irregularis Günther.)
19. Cichlasoma zonatum Meek, Meek, 245.
Habitat: Nîtepec, Oaxaca.
20. Cichlasoma eigenmanni (Meek), Cichlasoma centraurus Regan, Regan, 225.
Habitat: Rio Papaloapam.
21. Cichlasoma nebuliferum ( Günther), Regan, 226.
Cichlasoma teapa Evermann & Goldsborough; Heros gibbiceps Steind.
Habitat: Eastern lowland streams of the Isthmus of Tehuantepec; Teapa, Mexico.
22. Cichlasoma parma ( Günther), Regan, 227.
Cichlasoma maculicandua Regan.
Habitat: Rio Chagres; Rio Motagua; Lake Yzabal.
23. Cichlasoma fenestratum ( Günther), Regan, 227.
Habitat: Southern Mexico and Guatemala.
24. Cichlasoma nigrum Meek, M., 1907, 128.
Habitat: Nicaragua.
25. Cichlasoma bifasciatum (Steindachner), Regan, 228.
Habitat: Mexico.
Habitat: Lake Peten, Lake Amatitlan, Rio Chiantla; Lake Nacasîl; Rio Sarabia.
27. Cichlasoma microphthalum Günther, Regan, 230.
Cichlasoma guntheri Pellegrin; C. oblongum Günther, non Castelnau.
Habitat: Rio Motagua.
28. Cichlasoma sexfasciatur Regan, Regan, 230.
Habitat: Guapote, Mexico.
29. Cichlasoma melanurus (Günther), Regan, 231.
Habitat: Vera Cruz to Lake Peten.
30. Cichlasoma labridens Pellegrin, Regan, 443.
Cichlasoma bartoni (non Bean) Meek, Regan, 225.
Habitat: Rio Panuco and tributaries, Mexico.
31. Cichlasoma gadovii Regan, Regan, 232.
? C. melanurus (non Günther) Meek.
Habitat: Motzorongo, southern Mexico.
32. Cichlasoma intermedium (Günther), Regan, 232.
Acarra rectangularis Steindachner.
Habitat: Yzabal and Lake Peten; Mexico.
33. Cichlasoma anguliferum Günther.
Habitat: Guatemala.
34. Cichlasoma pavonaceum Garman, Regan, 234.
Habitat: Monclova, Coahuila, Mexico.
35. Cichlasoma sieboldii (Kner & Steindachner), Regan, 235.
Habitat: Panama; Colombia.
36. Cichlasoma deppii (Heckel), Pellegrin, 179.
? Heros montezuma Heckel.
Habitat: Mexico, Vera Cruz.
37. Cichlasoma godmanni (Günther), Regan, 235.
Habitat: Rio Cahabon (Atlantic Slope) and west slope of Panama.
38. Cichlasoma irregularum (Günther), Regan, 236.
Habitat: Guatemala, Atlantic slope.
39. *Cichlasoma lentiginosum* (Steindachner), \ldots \ldots \ldots \ldots Pellegrin, 181.
Habitat: Mexico.

(7. \ldots \ldots \ldots \ldots )

40. *Cichlasoma baltatum* (Gill & Bransford), \ldots \ldots \ldots \ldots Regan, 238.
Habitat: Lake Nicaragua.
41. *Cichlasoma nicaraguense* (Günther), \ldots \ldots \ldots \ldots Regan, 238.
Habitat: Lake Nicaragua.
42. *Cichlasoma alfari* Meek, \ldots \ldots \ldots \ldots Meek, 1907a, 148.
Habitat: Costa Rica.

(8. Astotheros Pellegrin.)

(Type: *Heros heterodontus* Vaillant & Pellegrin.)

43. *Cichlasoma robertsoni* Regan, \ldots \ldots \ldots \ldots Regan, 239.
Habitat: Stann Creek, British Honduras.
44. *Cichlasoma longimanus* (Günther), \ldots \ldots \ldots \ldots Regan, 240.
Habitat: Lake Nicaragua.
45. *Cichlasoma macracanthus* (Günther), \ldots \ldots \ldots \ldots Regan, 241.
Habitat: Chiapam and Huamuchal.
46. *Cichlasoma heterodontum* Vaillant & Pellegrin, \ldots \ldots \ldots \ldots Regan, 241.
Habitat: Isthmus of Tehuantepec.
47. *Cichlasoma evermanni* Meek, Meek, 214.
Habitat: Tehuantepec and Niltepec, Mexico.
48. *Cichlasoma altifrons* (Kner & Steindachner), \ldots \ldots \ldots \ldots Regan, 242.
Habitat: Pacific rivers of Chiriqui (western Veragua).
49. *Cichlasoma lithrinus* Regan, \ldots \ldots \ldots \ldots Regan, 1908d, 462.
Habitat: Costa Rica.
50. *Cichlasoma rostratum* (Gill & Bransford), \ldots \ldots \ldots \ldots Regan, 243.
Habitat: Lake Nicaragua.

(9. *Erythrichthys* Meek.)

51. *Cichlasoma margaritiferum* (Günther), \ldots \ldots \ldots \ldots Regan, 316.
Habitat: Lake Peten; Rio Polochic, Le Mullin.
52. *Cichlasoma citrinellum* Günther, \ldots \ldots \ldots \ldots Regan, 316.
*Heros lobochilus* (part) Günther; *Heros basilaris* Gill & Bransford.
Habitat: Lake Nicaragua and Lake Managua.
53. *Cichlasoma granadense* Meek, \ldots \ldots \ldots \ldots Meek, 1907, 121.
Habitat: Nicaragua.

(10. \ldots \ldots \ldots \ldots )

54. *Cichlasoma dorsatum* Meek, \ldots \ldots \ldots \ldots Meek, 1907, 123.
Habitat: Nicaragua.
55. *Cichlasoma erythraum* Günther, \ldots \ldots \ldots \ldots Regan, 318.
Habitat: Lake Managua.
56. *Cichlasoma lobochilum* Günther, \ldots \ldots \ldots \ldots Regan, 318.
Habitat: Lake Managua.
57. *Cichlasoma labiatum* Günther, \ldots \ldots \ldots \ldots Regan, 319.
Habitat: Lakes Managua and Nicaragua.

(11. *Heros* Heckel.)

(Type: As restricted by Jordan & Gilbert, *Heros severus* Heckel.)

A58. *Cichlasoma severum* (Heckel) \ldots \ldots \ldots \ldots Regan, 322.

*Heros spurius, coryphaeus, modestus, efasciatus* Heckel; *Chromys appendiculata* and *fasciata* Castelnau; *Uurus centarchoides* Cope.
Habitat: Amazons; Guiana; Parahyba.

(12. *Hoplocharus* Kaup.)

(Type: *Hoplocharus pentacanthus* Kaup.)
476 PATAGONIAN EXPEDITIONS: ZOOLOGY.

59. *Cichlasoma psittacus* Heckel, Regan, 323.

*Hoplarchus pentacanthus* Kaup; *Pomotis fasciatus* Schomburgk.

Habitat: Rios Negro and Orinoco.

(13. *Parapetenia* Regan.) (Type: *Acara adspersa* Günther.)

60. *Cichlasoma adspersum* (Giinther), Regan, 324.

Habitat: Barbadoes.

61. *Cichlasoma tetracanthus* (Cuvier & Valenciennes), .......... Regan, 325.

*Chromis fusco-maculatus* Guichenot.

Habitat: Cuba.


Habitat: Almendares River, Cuba.

63. *Cichlasoma griseum* Eigenmann, Eigenmann, 1903, 232.

Habitat: San Antonio de las Baños, Cuba.

64. *Cichlasoma latum* Eigenmann, Eigenmann, 1903, 233.

Habitat: San Juan River, Cuba.

65. *Cichlasoma cinctum* Eigenmann, Eigenmann, 1903, 234.

Habitat: Paso Real, Cuba.


Habitat: Pinar del Río.

67. *Cichlasoma istlanum* Jordan & Snyder, .................. Regan, 326.

Habitat: Basin of Rio Balsas.

68. *Cichlasoma steindachneri* (Jordan & Snyder), .................. Regan, 444.

Habitat: Basin of the Rio Panuco, Mexico.

69. *Cichlasoma bartoni* (Bean), Regan, 327.

Habitat: Basin of the Rio Panuco, Mexico.

70. *Cichlasoma beani* Jordan, Regan 328.

Habitat: Rio Presidio, near Mazatlan; Rosario; Sinaloa (northernmost or Pacific coast?).


Habitat: Rio Negro, southern Mexico.

72. *Cichlasoma feste* Boulenger, Regan, 329.

Habitat: Rio Durango; Rio Guayas, Ecuador.

73. *Cichlasoma ornatum* Regan, Regan, 331.

Habitat: Rio Durango; St. Javier, northwest Ecuador.

74. *Cichlasoma urophthalmus* Günther, Regan, 332.

*Heros trocheli* Steindachner.

Habitat: Yucatan; Belize; Lake Peten.

75. *Cichlasoma trimaculatum* Günther, Regan, 333.

Habitat: Chiapam and Huamuchal.

76. *Cichlasoma salvini* Günther, Regan, 334.

*Heros triogramma* Steindachner.

Habitat: Lakes Peten, Santa Yzabal; Rio Mullins, Guatemala; Motzorongo, Refugio, El Huele, Perez and Obispo, Mexico.

77. *Cichlasoma mojarra* Meek, . Meek, 217.

Habitat: San Geronimo and Miltepec, Oaxaca, Mexico.

78. *Cichlasoma multifasciatum* Regan, Regan, 335.

*Heros friedrichsthali* (part) Günther.

Habitat: Guatemala; British Honduras.

79. *Cichlasoma friedrichsthali* (Heckel), Miller, 1906.

*Heros motaguensis* and *managuensis* Günther.³

Habitat: Nicaragua; Honduras; Lake Peten.

80. *Cichlasoma dovii* Günther, Regan, 338.

Habitat: Lake Nicaragua.

81. *Cichlasoma spectabile* Steindachner, Regan, 339.

Habitat: Amazon.

82. *Cichlasoma krausi* Steindachner, Regan, 339.

³ Regan considers these species distinct.
Chromis dentatus Guichenot MS.
Habitat: Maracaibo and Cauca.
Habitat: Costa Rica.
Habitat: Costa Rica.

Crenicara Steindachner.
Type: Crenicara elegans Steindachner.
Range that of the single species.
A1. Crenicara punctulata (Günther), Pellegrin, 133.
Crenicara elegans Steindachner.
Habitat: Essequibo and Amazons.

Dicrossus Agassiz.
Type: Dicrossus maculatus Steindachner.
Range that of the single species.
Habitat: Amazons.

Batrachops Heckel.
Boggiania Perugia.
Type: Batrachops reticulatus Heckel.
Habitat: Upper Paraguay.
2. Batrachops semifasciatus Heckel, Regan, 1905, 155.
Habitat: Paraguay to Montevideo.
Batrachichla elegans Steindachner.
Habitat: Guianas to Amazon.
A4. Batrachops punctulatus Regan, Regan, 1905, 156.
Habitat: Essequibo and Amazon.
A5. Batrachops cyanotus (Cope), Regan, 1905, 156.
1 I am unable to give this and the next species their proper place.

Habitat: Upper Amazon.
Habitat: La Plata.

Crenicichla Heckel.
Type: Crenicichla viitata Heckel.
Range: Guiana to La Plata.
Habitat: Rio Guaporé; Paraguay to Buenos Aires; Rio Grande do Sul.
A2. Crenicichla saxatilis (Linnaeus), Regan, 1905, 159.
Scarus rufescens Gronow; Cichla labrini Agassiz; Cychla rutilus Schomburgk; Scarus pavoninus Gronow; Crenicichla frenata Gill; C. proteus Cope; C. argynnis Cope; C. semicincta Steindachner; C. albopunctata Pellegrin; C. vaillanti Pellegrin.
Habitat: Trinidad to Amazons; Paraguay Basin; Rio Grande do Sul.
Crenicichla anthurus Cope.
Habitat: Amazon of Ecuador.
Habitat: Orinoco.
5. Crenicichla lacunaris Castelnau, Regan, 1905, 162.
Crenicichla punctata Hensel; C. polyisticta Hensel.
Habitat: Southern and eastern Brazil, Bahia to Rio Grande do Sul.
A6. Crenicichla macrophthalmus Heckel, Regan, 1905, 162.
Habitat: Rio Negro.
A7. Crenicichla wallaci Regan, 1905, 162.
Habitat: Rio Essequibo; Rio Negro.
A8. Crenicichla vittata Heckel, Regan, 1905, 163.
Habitat: Amazon; Paraguay; Eastern Brazil.


Habitat: Rio Cupai.


Habitat: Surinam.


Habitat: ?


Crenicichla johanna, var. vittata Günther, non Heckel.

Habitat: Amazon.


Crenicichla funebris Heckel.

Habitat: Brazil; Guiana; Venezuela.

14. Crenicichla cincta Regan, Regan, 1905, 166.

Crenicichla fasciata Pellegrin, non Schomburgk.

Habitat: Marajo Island, Para.


Crenicichla lenticulata Pellegrin, non Heckel.

Habitat: Amazon; Guiana.


Crenicichla adspersa Heckel.

Habitat: Rio Negro; Rio Guaporé.

A17. Crenicichla johanna Heckel.

Cychla fasciata Schomburgk; Crenicichla obtusirostris Günther.

Habitat: Brazil; Guiana; Venezuela.

RETROCULUS Eigenmann & Bray.

Type: Retroculus boulengeri Eigenmann & Bray.

Range that of the single species.

A1. Retroculus lapidifer (Castelnau), Regan, 1906, 50.

R. boulengeri E. & B.

Habitat: Amazon.

HETEROGRAMMA Regan.

Mesops Günther preoccupied.

Type: Mesops tanitatus Günther.

Range: Amazons, Rio Puty and Paraguay.


Habitat: Lower Solimoens, Amazon and Rio Puty.

A2. Heterogramma tanitatum (Günther), Pellegrin, 151.

? Geophagus amanus Cope.

Habitat: Amazons; Paraguay.


Habitat: Paraguay.


Habitat: Paraguay.

5. Heterogramma borellii Regan, Regan, 1906, 63.

Habitat: Parahuaty.

6. Heterogramma steindachneri Regan, Regan, 1908a, 370.

Habitat: Georgetown.


Habitat: La Plata.

GEOPHAGUS Heckel.

Biotodoma Eigenmann & Kennedy.

Type: Sparus surinamensis Bloch.

Range: Panama to La Plata.

A1. Geophagus surinamensis (Bloch), Pellegrin, 162.

Geophagus megasema and altifrons Heckel; Chromis proxima Castelnau.

Habitat: Amazons and northward.

2. Geophagus steindachneri Eigenmann & Hildebrand.

Geophagus brasiliensis Steindachner, Fischfauna des Cauca, etc., not brasi-

liensis Quoy & Gaimard.
Habitat: Magdalena Basin.
3. Geophagus brasiliensis (Quoy & Gaimard), .......... Pellegrin, 156.
Chromis unipunctata and obscura Castelnau; Acara gymnopoma Günther; Geophagus rhabdotus, bucephalus, labiatus, scymnophilus and pygmaeus Hensel; Chromis gibbiceps Valenciennes.
Habitat: Coastwise streams from Bahia to Rio de la Plata.
G. duodecimspinosus Boulenger.
Habitat: Paraguay Basin.
5. Geophagus australis Eigenmann, E., 1907a, 454.
Habitat: La Plata.
6. Geophagus brachyurus Cope,
Pellegrin, 159.
Habitat: Rio Grande do Sul.
7. Geophagus cupido Heckel,
Pellegrin, 153.
Habitat: Amazonas; Essequibo.
8. Geophagus gymnogenys Hensel,
Pellegrin, 158.
? Geophagus camurus Cope.
Habitat: Rio Grande do Sul.
9. Geophagus crassilabris Steindachner,
Pellegrin, 160.
Geophagus jurupari Vaillant, non Heckel.
Habitat: Colombia at Ibaqui; Panama, near Candelaria.
A10. Geophagus camopiensis Pellegrin,
Pellegrin, 160.
Habitat: French Guiana.
A11. Geophagus damon Heckel,
Pellegrin, 161.
Habitat: Middle course of Amazon.
A12. Geophagus jurupari Heckel,
Pellegrin, 159.
Geophagus lencostictus Müller & Trotschel; Satanoperca macrolepis Günther; Geophagus pappaterra Eigenmann & Kennedy, non Heckel.
Habitat: Guiana; Amazonas; Paraguay.

SATANOPERCA Günther.
Type: Geophagus acuticeps Heckel.
Range: Guiana to Paraguay.
1. Satanoperca balzanii (Perugia),
Pellegrin, 155.
Habitat: Paraguay Basin.
A2. Satanoperca acuticeps (Heckel),
Pellegrin, 155.
Habitat: Amazon and Solimoens.
A3. Satanoperca pappaterra (Heckel),
Pellegrin, 156.
Habitat: Guaporé and Guiana.

BIOTEOCUS Eigenmann & Kennedy.
Type: Saraca opercularis Steindachner.
Range that of the single species.
Saraca Steindachner preoccupied.
A11. Biotacus opercularis (Steindachner),
Pellegrin, 163.
Habitat: Villa Bella; Saraca.

SYMPHYSODON Heckel.
Type: Symphysodon discus Heckel.
Range: Amazonas.
A1. Symphysodon discus Heckel,
Pellegrin, 214.
Habitat: Amazonas and tributaries.
Habitat: Santarem; Teffé.

PTEROPHYLLUM Heckel.
Type: Platoo scalaris Cuvier & Valenciennes.
Range: Orinoco to Amazonas.
Platooide dumerili Castelnau.
Habitat: Amazonas.
2. Pterophyllum altum Pellegrin,
Pellegrin, 216.
Habitat: Orinoco.
PATAGONIAN EXPEDITIONS: ZOOLOGY.

Family CARANGIDÆ.

Oligoplites Gill.
Type: Chorinemus occidentalis Günther =Scomber saurus Bloch & Schneider.
Range: Tropical seas of America; one species in fresh water.

1. Oligoplites palometa (Cuvier & Valenciennes) ......... J. & E., 899.
Habitat: Lake Yzabal to Lake Maracaibo.

Family GOBIIDÆ.

Philypnus Cuvier & Valenciennes.
Type: Platyccephalus dormitor Bloch =Gobionorus dormitor Lacépède.
Range: Both slopes of middle America.
1. Philypnus dormitor (Lacépède), J. & E., 2195.
Platyccephalus dormitor Bloch; Batracus guavina Bloch & Schneider;
Eleotris longiceps Günther; Eleotris dormitatrix Cuvier.
Habitat: Eastern slope of Mexico, Central America (Lake Nicaragua) to
Surinam; entering salt water.
2. Philypnus maculatus (Günther), J. & E., 2195.
Philypnus lateralis Gill.
Habitat: Pacific slope from Sonora to Panama and Ecuador; entering salt
water.

Dormitator Gill.

Prochilus Cuvier.
Type: Dormitator gundlachi Poey.
Range that of the single species.
A1. Dormitator maculatus (Bloch), J. & E., 2196.
Eleotris mugiloides, sima and ? grandisquama Cuvier & Valenciennes;
Eleotris latifrons Richardson; Eleotris somnolentus Girard; Eleotris
omocyanus Poey; Dormitator microphthalmus Gill; Dormitator gund-
lachi Poey; Dormitator lineatus Gill.

The Atlantic and Pacific slope forms have at times been considered distinct.

Habitat: Atlantic slope from South Carolina to Para; Pacific slope from
Cape San Lucas to Panama; entering fresh and salt water.

Guavina Bleeker.
Type: Eleotris guavina Cuvier & Valenciennes.
Range: Cuba to Rio Grande do Sul.
Habitat: Cuba to Rio Grande do Sul; entering rivers and salt water.
A2. Guavina brasiliensis (Sauvage). (Probably identical with guavina.)
Habitat: Bahia.
Eleotris Bloch & Schneider.
Type: Gobius pisonis Gmelin.
Culius Bleeker.
Range: Both slopes of middle America, West Indies, south to Rio de Janeiro.
1. Eleotris amblyopsis Cope, J. & E., 2199.
Habitat: Surinam.
2. Eleotris pisonis (Gmelin), J. & E., 2200.
Gobius amorea Walbaum; Eleotris gyrinus Cuvier & Valenciennes; Eleo-
tris belizianus Sauvage.
Habitat: Florida to southern Brazil.
A3. Eleotris perniger (Cope), J. & E., 2201.
Habitat: Jamaica to Rio de Janeiro.
Culius equidens Jordan & Gilbert.
Habitat: Pacific slope, Sonora to Ecuador.
EIGENMANN: CATALOGUE OF FRESH WATER FISHES. 481

Sicydium Cuvier & Valenciennes.
Type: Gobius plumieri Bloch.
Range: Fresh waters of the West Indies and Central America to Ecuador.
1. Sicydium plumieri (Bloch), J. & E., 2206.

Sicydium siragus Poey.
Habitat: Fresh waters of the West Indies.
2. Sicydium pittieri Regan, Regan, 1907a, 260.
Habitat: Panama to western Ecuador.
3. Sicydium altum Meek, Meek, 1907, 149.
Habitat: Costa Rica to 600 meters.

Cotylopus Guichenot.
Sicya Jordan & Evermann; Oreogobius Bouleneger.
Type: Cotylopus acutipinnis Guichenot.
Range: Mazatlan to Panama.
1. Cotylopus gymnogaster (Ogilvie-Grant), .......... J. & E., 2207.
Habitat: Streams about Mazatlan.
2. Cotylopus salvini (Ogilvie-Grant), J. & E., 2207.
Oreogobius rosenbergii Bouleneger.
Habitat: Streams near Panama to Ecuador.
3. Cotylopus punctatus Regan, Regan, 1905, 362.
Sicydium multipunctatum Regan.
Habitat: Tequesxtlan.

Evorthodus Gill.
Type: Evorthodus breviceps Gill.
Range that of the single species.
Habitat: Fresh waters of Trinidad and Surinam.

Lophogobius Gill.
Type: Gobius cristagalli Valenciennes = cyprinoides Pallas.

Range that of the single species.
1. Lophogobius cyprinoides (Pallas), J. & E., 2209.
Gobius cristagalli Valenciennes.
Habitat: Southern Florida; West Indies.

Gobius Linnaeus.¹

Gobionellus Girard; Ctenogobius Gill.
Type: Gobius niger Linnaeus.
Range: Marine; in all warm seas.
Gobius lineatus Jenyns; G. calactus Girard; G. brunneus, mapo and laceratus Poey; G. andrei Sauvage; G. carolinensis Gill; Evorthodus catulus Jordan & Gilbert.
Habitat: Both coasts, occasionally entering rivers.
Habitat: Trinidad.
Gobius bosci Sauvage.
Habitat: Mouth of Amazon.

Awaous Steindachner.

Chonophorus Poey.
Type: Awaous ocularis, etc.
Range: Both slopes of middle America, south to the Rio Doce and Ecuador.
Habitat: Mouths of rivers, Surinam to Rio Doce.
Habitat: Rosario, Sinaloa, Mexico.

¹ It is very probable that other species of the genus Gobius enter rivers; parvus Meek, is recorded from Boca del Rio, Vera Cruz; claytoni Meek from the same place, and microdon Gilbert from San Juan Lagoon, north of Rio Ahone, Mexico.
Gobius banana and martinicus Cuvier & Valenciennes; Chonophorus bucculentus Poey; Rhinogobius contractus Poey; Gobius doliococephalus Cope; Eucenogobius latus O'Shaughnessy.

Habitat: West Indies; west slope, Lower California to Panama; east slope, Mexico to Rio Doce.

4. Awaous mexicanus (Günther), J. & E., 2237.
Habitat: Eastern slope of Mexico.


Gobius guntheri Regan.
Habitat: Western Ecuador (to western Mexico).

Family BATRACHOIDIDÆ.

Thalassophryne Günther.

Type: Thalassophryne maculosa Günther.
Range: South America, entering rivers.

A1. Thalassophryne amazonica Steindachner, 1876, 113.

Habitat: Xingu; mouth of the Rio Negro.

A2. Thalassophryne nattereri Steindachner, Steindachner, 1876, 115.
Habitat: Para.

Family BLENNIIDÆ.

Chasmodes Cuvier & Valenciennes.

Type: Blennius bosquianus Lacépède.
Range: Marine.

Citharichthys Bleeker.

Type: Citharichthys cayennsis Bleeker = spiopterus Günther.
Range: Marine and fresh water.


Citharichthys guatemalensis Bleeker; Hemirhombus fuscus Poey; Citharichthys cayennsis Bleeker.

Order HETEROSOMATA.

Family PLEURONECTIDÆ.

Citharichthys Bleeker.

Type: Citharichthys sumichrasti Jordan & Goss; Citharichthys spiopterus Günther 1869, not of 1862.
Habitat: Guaymas to Panama, entering rivers.
Family SOLEIDÆ.

ACHIRUS Lacépède.

Prinectes Rafinesque; Grammichthys, Monochirus Kaup; Baiostoma Bean.

Type: Achirus fasciatus Lacépède.

Range: Marine and fresh water.

1. Achirus klunzingeri (Steindachner), J. & E., 2697.

Habitat: Panama to Guayaquil, entering rivers.

2. Achirus mazatlanus (Steindachner), J. & E., 2698.

Habitat: Pacific slope of Mexico, entering rivers.

3. Achirus lineatus (Linnaeus), J. & E., 2697.

Monochir maculipinnis Agassiz.

Habitat: Florida Keys and the West Indies to Uruguay; all streams from Cayenne to La Plata; ascending the Amazon to Tabatinga.

4. Achirus fonsecensis ( Günther ), J. & E., 2699.

Habitat: Pacific coast of tropical America, entering rivers.

5. Achirus fischeri (Steindachner), J. & E., 2699.

Habitat: Mamone River near Panama.


Habitat: Rio Grande do Sul.


Habitat: Atlantic coast, north of the Isthmus of Tehuantepec; ascending rivers.

8. Achirus jenynsii ( Günther ), Günther, IV, 476.

Achirus lorentzi Weyenbergh.

ACHIROPSIS Steindachner.

Type: Achirus nattereri Steindachner.

Range: Rio Negro to Goyaz.

A1. Achir is nattereri Steindachner, Steindachner, 1876, V, 110.

Habitat: Rio Negro.

A2. Achirops is asphyxiatus Jordan, Jordan & Goss, 1889, 318.

Habitat: Goyaz.

APIONICHTHYS Kaup.

Soleotalpa Günther.

Type: Apionichthys dumerilii Kaup.

Range: South America.

A1. Apionichthys unicolor ( Günther ), Günther, IV, 489.

Apionichthys dumerilii Kaup; A. nebulosus Peters.

Habitat: Surinam; Amazon, near Obidos.

SYMPHURUS Rafinesque.

Bibronia Cocco; Plagusia Cuvier; Apho ristia Kaup; Glossichthys Gill; Amonopleurops Günther; Acedia Jordan.

Type: Symphurus nigrescens Rafinesque.

Range: Marine.

1. Symphurus plagusia Bloch & Schneider, Günther, IV, 490.

Achirus ornatus Lacépède; Plagusia tessellata Quoy & Gaimard; Plagusia brasiliensis Agassiz.

Habitat: La Plata.
PATAGONIAN EXPEDITIONS: ZOOLOGY.

Order PLECTOGNATHI.
Family TETRAODONTIDÆ.

**Colomesus** Gill.

*Batrachops* Hollard.

Type: *Tetrodon psittacus* Bloch & Schneider.

Range: Marine and fresh waters of tropical America.


*Cherlichthys asellus* Müller & Troschel.

Habitat: West Indies; Guiana to Marañon and Para.

**Lagocephalus** Swainson.

*Physogaster* and *Gastrophysus* Müller;

*Promecocephalus* Bibron; *Tetrodon* Gill.

Type: *Tetrodon pennanti* Yarrell = *Tetrodon lagocephalus* Linnaeus.

Habitat: Chiefly tropical seas.

1. *Lagocephalus lavigatus* (Linnaeus).

*Tetrodon curvus* and *mathematicus* Mitchill; *Holocanthus melanothus* Gronow; *Tetrodon lincolatus* Poey.

Habitat: Cape Cod to Brazil, entering rivers; Para.

---

**SUMMARY.**

<table>
<thead>
<tr>
<th>Families</th>
<th>Number of Species in the Entire Area</th>
<th>Number of Species in the Amazon Basin</th>
</tr>
</thead>
<tbody>
<tr>
<td>Petromyzonidae</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>Galeidae</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Rajidae</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Narcobatidae</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Myleobatidae</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Dasyatidae</td>
<td>9</td>
<td>5</td>
</tr>
<tr>
<td>Lepidosirenidae</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Lepisosteidae</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Aspredinidae</td>
<td>22</td>
<td>10</td>
</tr>
<tr>
<td>Diplomystidae</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Siluridae</td>
<td>300</td>
<td>139</td>
</tr>
<tr>
<td>Hypophthalmidae</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Pygidiidae</td>
<td>66</td>
<td>28</td>
</tr>
<tr>
<td>Callichthyidae</td>
<td>34</td>
<td>16</td>
</tr>
<tr>
<td>Loricariidae</td>
<td>208</td>
<td>81</td>
</tr>
<tr>
<td>Cyclopidæ</td>
<td>23</td>
<td>15</td>
</tr>
<tr>
<td>Catostomidae</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>Cyprinidae</td>
<td>21</td>
<td></td>
</tr>
<tr>
<td>Characidae</td>
<td>659</td>
<td>317</td>
</tr>
<tr>
<td>Gymnotidae</td>
<td>31</td>
<td>22</td>
</tr>
<tr>
<td>Electrophoridae</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Synbranchidae</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Anguillidae</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Engraulidae</td>
<td>13</td>
<td>7</td>
</tr>
<tr>
<td>Clupeidae</td>
<td>5</td>
<td>3</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Families</th>
<th>Number of Species in the Entire Area</th>
<th>Number of Species in the Amazon Basin</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dorosomidae</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>Elopidae</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Osteoglossida</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Arapaimidae</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Pæciliidae</td>
<td>160</td>
<td>14</td>
</tr>
<tr>
<td>Galaxiidae</td>
<td>7</td>
<td></td>
</tr>
<tr>
<td>Aplachitonidae</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Belonidae</td>
<td>8</td>
<td>4</td>
</tr>
<tr>
<td>Mugiliidae</td>
<td>11</td>
<td>1</td>
</tr>
<tr>
<td>Atherinidae</td>
<td>33</td>
<td></td>
</tr>
<tr>
<td>Polycentridae</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Centropomidae</td>
<td>8</td>
<td>3</td>
</tr>
<tr>
<td>Serranidae</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>Hæmulidae</td>
<td>8</td>
<td></td>
</tr>
<tr>
<td>Sciaenidae</td>
<td>13</td>
<td>7</td>
</tr>
<tr>
<td>Percidae</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Cichlidae</td>
<td>187</td>
<td>55</td>
</tr>
<tr>
<td>Carangidae</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Gobiidae</td>
<td>27</td>
<td>8</td>
</tr>
<tr>
<td>Batrachoididae</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Blenniidae</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Pleuronectidae</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Soleidae</td>
<td>12</td>
<td>4</td>
</tr>
<tr>
<td>Tetraodontidae</td>
<td>2</td>
<td>1</td>
</tr>
</tbody>
</table>

Totals .......... 1917    748
LIST OF PAPERS DEALING WITH THE FRESH WATER FISHES OF SOUTH AMERICA.

Arranged according to the year of publication and alphabetically under each year.

Marcgravus, Georgius.
1648 Historiae Rerum Naturalium Brasiliae, iv.

Piso, Gulielmus.
1658 Indiae Uttriusque Re Naturali et Medica. Liber Tertius.

Willoughby, Francis.
1686 De Historia Piscium.

Artedi, Petrus.

Linnaeus, Carolus.
1749-69 Amoenitates Academice.
1754 Museum Adolphi Friderici, Stockholm, 1754.

Gronovius, Laurentius Theodorus.
1754-56 Museum Ichthyologicum.

Linnaeus, C.
1758 Systema Naturae, ed. x.

Seba, Albert.
1758 Locupletissimi Rerum Naturalium Thesauri Accurata Descriptio, vol. iii, 1758.

Van der Lott, Fr.

Gronovius, L. Th.
1763, ’64 ’81 Zoophylacium Gronovianum.

Linnaeus, C.
1766 Systema Naturae, ed. xii.

Pallas, Petrus Simon.
1769 Spicilegia Zoologica, Petrop., 1769-’79.

Bajon.
1774 Mémoire sur un poisson à commotion électrique connu à Cayenne sous le nom d'Anguille tremblant.

Garden, Alex.

Hunter, John.

Williamson, H.
PATAGONIAN EXPEDITIONS: ZOOLOGY.

Bajon.
1777 Mém. pour servir à l'histoire de Cayenne.

Bloch, Marcus Elieser.

Bryant, W.
1786 An account of an electric Eel or the torpedo of Surinam. In Transactions American Philosophical Society, II.

Flagg, Henry Collins.
1786 Observations on the numb fish or torporific Eel. In Transactions American Philosophical Society, II.

Parra, Ant.
1787 Descripción de diferentes Piezas de Historia Natural, etc. Havana.

Gmelin, Johann Friedrich.
1788 Linnæi Systema Naturæ, ed. xii.

Bonnaterre, M. l'Abbé.

Guisan.

Lacépède, Bernard Germain.

Bloch, M. E.
1801 Systema Ichthyologiae, ed. Schneider, Johann Gottlob.

Fahlberg, Sam.
1801 Beskrifning öfver electriska Ålen, I Gymnotus electricus. In Vedensk Ak. nya Handl., 1801.

Shaw, George.

Dumeril, Marie Constant.

Humboldt, Alexander von.
1806 Versuche über die elektrischen Fische.

Cuvier, Georges.

Meckel, J. F.

Guisan.
1819 Comment. de Gymmoto electrico. Tübingen.

Lichtenstein, K. M. H.

Knox, R.

Quoy et Gaimard, G.

Cuvier, G., et Valenciennes, M.
1828 Histoire Naturelles des Poissons, i, ii.

Hancock, J.
1828 Notes on some species of fishes and reptiles, from Demarara. In Zoological Journal, iv, also in Isis, 1830.

Agassiz, Louis.
1829 Selecta Genera et Species Piscium, quae in itinere per Brasiliam collegit J. B. de Spix. 1829.

Cuvier, G., et Valenciennes, M.
1829 Histoire Naturelle des Poissons, iii and iv.

Lichtenstein, K. M. H.
1829 In Wiedemann Zoöl. Mag., 1, part 3.

Spix, J. B.
1829 See Agassiz, 1829.

Bend.

Cuvier, G., et Valenciennes, M.
1830 Histoire Naturelle des Poissons, v and vi.

Lesson, R. P.

Cuvier, G., et Valenciennes, M.
1831 Histoire Naturelle des Poissons, vii and viii.

Ofiers, J. F. M.

Traill, T. S.
1832 Description of a Silurus known in Demarara by the name Gildbacke, more properly Geel-buijk [S. Parkeri n. sp.]. In Mem. Wern. Soc., vi, 1832.

Cuvier, G., et Valenciennes, M.
1833 Histoire Naturelle des Poissons, ix.

Griffith, R.

Henle, J.

Quoy et Gaimard.

Cuvier, G., et Valenciennes, M.
1835 Histoire Naturelle des Poissons, x.

Meyen.
1835 Reise in Peru.

Wiegmann, F. A.
1835 In Wiegmann’s Archiv, 1835, ii, 268, redescribes Meyen’s Pygidium fuscum.
PATAGONIAN EXPEDITIONS: ZOOLOGY.

Cuvier, G., et Valenciennes, M.
1836 Histoire Naturelle des Poissons, xi.

Eydoux et Souleyet.

Cuvier, G., et Valenciennes, M.
1837 Histoire Naturelle des Poissons, xii.

Fitzinger, L. J.
1837 Lepidosiren paradoxa. Isis, p. 379, 1837.

Bradley, Thom.

Van Der Hoeven, J.

Cuvier, G., et Valenciennes, M.
1839 Histoire Naturelle des Poissons, xiii, xiv.

Faraday, M.
1839 In Philosophical Transactions, 1839.

Natterer, J.

Swainson, W.
1839 On the Natural History and Classification of Fishes, Amphibians and Reptiles. The Cabinet Cyclopædia, conducted by the Rev. Dionysius Lardner, 1838–'39.

Bischoff, T. L. W.

Cuvier, G., et Valenciennes, M.
1840 Histoire Naturelle des Poissons, xv.

Heckel, Jacob.
1840 Brasilianische Fluss-Fische. Annalen des Wiener Museums, ii.

Ranzani, Ab. Cam.

Müller, J., und Henle, J.

Schomburgk, Robert Hermann.
1841 The Natural History of the Fishes of Guiana, part i. Naturalist's Library; Ichthyology, iii.

Schonbein, Ch. Fr.

Cuvier, G., et Valenciennes, M.
1842 Historie Naturelle des Poissons, xvi.

Jenyns, L.
1842 The Zoology of the Voyage of H. M. S. Beagle—Fishes. London.
Müller, Johannes.

Ranzani, Ab. Cam.

Valentin, G.

Schomburgk, Robert Hermann.
1843 *The Natural History of the Fishes of Guiana, part ii.* Naturalist’s Library; Ichthyology, v.

Cuvier, G., et Valenciennes, M.
1844 *Histoire Naturelle des Poissons,* xvii.

Müller, Johannes, und Troschel, Franz Hermann.

Richardson, John.
1844–7 *Voy. Erebus and Terror.* Fishes.

Guichenot, A.
1845 *Poissons, in Ramon de la Sagra, Histoire Naturelle de Cuba.* Paris.

Heckel, J.
1845 *In Müller’s Arch. Anat., p. 534, 1845.*

Hyrtl, Jos.

Miranda.
1845 *Esperimenti instituti sul Gimnoto elettrico.* Napoli.

Müller, J., und Troschel, F. H.
1845 *Horæ Ichthyologiæ, i and ii.*

Tschudi, J. J. von.
1845 *In Fauna Peruana.*

Cuvier, G., et Valenciennes, M.
1846 *Histoire Naturelle des Poissons,* xviii and xix.

Owen, R.

Chiaje, Della.

Cuvier, G., et Valenciennes, M.
1847 *Histoire Naturelle des Poissons,* xx.

Valenciennes, A.
1847 *In Humboldt Recueil d’Observations Zoologiques.* 1847.
1847 *In D’Orbigny, Voyage dans l’Amérique Méridionale.* Poissons.

Cuvier, G., et Valenciennes, M.
1848 *Histoire Naturelle des Poissons,* xxi and xxii.
PATAGONIAN EXPEDITIONS: ZOOLOGY.

Gay, Cl.
1848 Historia física y política de Chile, ii.

Müller, J., und Troschel, F. H.

Schultze, Max.
1848 Zur Kenntniss der electrischen Organe der Fische. Halle.

Müller, J., und Troschel, F. H.
1849 Horæ Ichthyologæ, iii.

Reinhardt, J.
1849 Nye sydamerikanske Ferskvandsfiske. Videnskabelige Meddelelser fra den Naturhistoriske Forening i Kjøbenhavn, Nos. 3-5.

Smith, J. P. G.

Gray, J. E.

Gray, J. E., and Gerrard.

Deménil, A.

Pacini.
1852 Sulla struttura del organ. elettrico del Gimnato e di altri pesci elettrici, sulle condizione elettromotrici di questi organi e loro comparazione a diverse pile elettrice. Firenze.

Reinhardt, J.
1852 Om Svømmeblaeren hos Familien Gymnotini. Videnskabelige Meddelelser fra den Naturhistoriske Forening i Kjøbenhavn, 1852.

Kner, Rudolf.

Filippi, F.

Baird, Spencer F., and Girard, Charles.

Girard, C.

Gronow, L. Th.

Reinhardt, J.
1854 Notits om slægten Pachyurus og de der til hørende Arter. (Loc. cit., 1849).
Wyman, Jeffries.

Castelnau, François de.
1855 Animaux nouveaux ou rares recueillis pendant l'expédition dans les parties de l'Amérique du Sud. Poissons, 1855.

Girard, C.

Kner, R.

Bruehl, C. B.
1856 Osteologisches aus dem Pariser Pflanzengarten. Wien, 1856.

Duméril, Marie Constant.

Kaup, J. J.

Kner, R.

Philippi, R. A.
1857 Ueber einige chilenische Fische und Vögel. Wiegmann's Arch. Naturg., Jg. 23, i, p. 266.

Bleeker, Pieter.
1858 Ichthyologie Archipel. Indici Prodromus, i, Siluroidei.

Gill, Theodore.

Kner, R.

Reinhardt, J.
1858 Stegophilus insidiosus en ny Mallefisk fra Brasilien og dens Levemaade. (Loc. cit.).

Gill, T.

Girard, Charles.

Guenther, Albert.
1859a Catalogue of the Acanthopterygian Fishes in the collection of the British Museum, i, 1859.
Hyrtl, Jos.

Kner, R.

Guenther, A.
1860 Catalogue of the Acanthopterygian Fishes, etc., ii.

Guichenot, Alph.

Kaup, J. J.
1860 In Wiegm. Arch., 1860.

Kner, R.

Gill, T.

Guenther, A.
1861 Catalogue of the Acanthopterygian Fishes, etc., iii, 1861.

Kaelreuter, J. T.

Bleeker, P.

Guenther, A.
1862 Catalogue of the Fishes, etc., iv, 1862.

Bleeker, P.
1863a Systema Silurorum Revisum.

Gill, T.

Guenther, A.

Philippi, R. A.
1863 Nachrichten über ein Paar chilenische Fische. Wiegmann's Arch. Naturg., Jg. 29, i.
Steindachner, Franz.

Bleeker, P.
1864 Description des Épèces de Silures de Suriname Conservées aux Musees de Leide et d'Amsterdam.

Canestrini, G.

Gill, T.

Guenther, A.
1864 Catalogue of the Fishes, etc., v, 1864.

Kner, R.

Kner, R., and Steindachner, F.

Steindachner, F.

Dumeril, Aug.

Guenther, A.
1865 Description of New Species of Characinidae from the Upper Amazon. Ann. and Mag. Hist., xviii, 1865.

Philippi, R. A.

Bleeker, P.
1866 Description d'une Espèce Inédite de Stolephorus de Surinam. Nederl. Tiidschr. Dierk, iii, 1866.

Guenther, A.
1866 Catalogue of Fishes, etc., vi, 1866.

Philippi, R. A.

Reinhardt, J.

Steindachner, Fr.
PATAGONIAN EXPEDITIONS: ZOOLOGY.

Cope, Edward Drinker.

Steindachner, Fr.

Agassiz, Prof., and Mrs. Louis.
1868 A Journey in Brazil. Boston, Ticknor & Fields.

Bocourt, M.

Burmeister, H.

Guenther, A.
1868 Catalogue of the Fishes, etc., vii.

Hensel, R.

Peters, M.

Steindachner, Fr.

Guenther, A.

Steindachner, Fr.

Cope, E. D.

Gill, T.

Guenther, A.
1870 Catalogue of the Fishes, etc., viii, 1870.

Hensel, R.

Schilling.

Cope, E. D.

Cunningham, R. O.
Giibel, C. G.
1871 Zeltschrift für die gesammten Naturwissenschaften, iii, 1871.

Putnam, F. W.
1871 In American Naturalist, 1871, p. 395.

Cope, E. D.

Gill, T.
1872 Arrangement of the Families of Fishes or Classes Pisces, Marsipobranchii and Leptocardii; prepared for the Smithsonian Institution. Smithsonian Miscellaneous Collections, 247.

Guenther, A.

Cope, E. D.

Guenther, A.

Lütken, Chr.
1874 Ichthyographische Bidrag. I. Nogle nye eller mindre fuldstændigt kjendte Pandsermaller, især fra det nordlige Sydamerika; Videnskabelige Meddelelser fra den naturhistoriske Forening i Kjøbenhavn, 1874. II. Nye eller mindre vel kjente Malleformer fra forskjellige Verdensdele (loc. cit.). III. Nogle nye eller mindre fuldstændigt kjente mellem-eller sydamerikansk Karpeplax (loc. cit.).


1874b Enumeratio piscium flumen Rio das Velhas et lacum Lagoa Santa qui rivulose vicinos habitant. L. c., pp. 139–143.

Steindachner, Fr.

Garman, S.

Lütken, Chr.

Steindachner, Fr.


Gill, T.
Rozier.
1876 In Journal de Physique, 1876.

Steindachner, Fr.

Cope, E. D.

Garman, Samuel.

Gill, T., and Bransford, J. F.

Guenther, A.

Peters, M.

Weyenberg, H.

Cope, E. D.
1878 Synopsis of the Fishes of the Peruvian Amazon obtained by Professor Orton during his Expeditions of 1873 and 1877. Amer. Philos. Soc., 1878, pp. 673–701.

Gill, T.
1878 Elopomorphus jordani. Forest and Stream, 1878, May 21.

Steindachner, Fr.

Guenther, A.
1880b An Introduction to the Study of Fishes. Edinburgh, 1880.

Sauvage, M. H. E.
Steindachner, Fr.

Vailant, L.
1880 In Bull Soc. Philom., 7, x, 1880.

Steindachner, Fr.

Gill, T.

Jordan, D. S., and Gilbert, C. H.

Steindachner, Fr.

Thominot, Alex.

Swain, J.

Gill, T.

Guenther, A.

Jordan, D. S., and Gilbert, C. H.

Grant, W. R. Ogilvie.
1884 A revision of the Fishes of the Genera Sicydium and Lentipes, with descriptions of five new species.

Jordan, D. S.

Jordan, D. S., and Eigenmann, C. H.
Thominit, A.

Wright, R. Ramsey.

Boulenger, G. A.

Jordan, D. S.

Eigenmann, Carl H., and Eigenmann, Rosa Smith.

Steindachner, Fr.

Jordan, D. S.

Woodward, A. Smith.

Boulenger, G. A.

Eigenmann, C. H., and R. S.
1889a A revision of the Erythrininae. (Loc. cit.), ii, pp. 100–116, Pl. 1, November 8, 1889.
1889c Descriptions of New Nematognathoid Fishes from Brazil. West American Scientist, No. 42.

Jordan, D. S., and Eigenmann, C. H.

Jordan, D. C., and Goss, D. K.
Woodward, A. Smith.

Bridge, T. W., and Haddon, A. C.

Eigenmann, C. H., and R. S.

Garces, Modesto.
1890 Un Viaje a Venezuela. Bogota, Roldan and Zamago.

Garman, S.
1890 (1) On the species of Chalcinus; (2) on species of Gasteropelecus; (3) On species of Cynopotamus; (4) On the species of Anostomus. Bulletin Essex Institute, vol. xxii, Nos. 1, 2, and 3, 1890.
1890a Henochilus wheatlandii. (Loc. cit.), vol. xxii, No. 4.

Boulenger, G. A.
1891 An account of the Siluroid Fishes obtained by Dr. H. von Ihering and Herr Sebastian Wolff in the Province Rio Grande do Sul, Brazil. P. Z. S., 1891, pp. 231–235, pls. xxv, xxvi.

Day, F.
1891 whymper's Supp. App. to Travels amongst the Great Andes of the Ecuador.

Eigenmann, C. H., and R. S.

Gill, Theodore.

Holmberg, Eduardo L.

Perugia, A.

Steindachner, Fr.

Vaillant, L.

Bean, T. H.

Boulenger, G. A.
On some new or little known Fishes obtained by Dr. J. W. Evans and Mr. Spencer Moore during their recent expedition to the Province of Matto Grosso, Brazil. Ann. and Mag. Nat. Hist. (6), x, 9–12, Pls. I and II.

Eigenmann, C. H.
1892 On the presence of an Operculum in the Aspredinidae, Am. Nat., xxvi, 1892, 71.

Woolman, A. J.

Ayers, H.

Berg, C.

Eigenmann, C. H.

Ihering, H. von.

Philippi, R. A.

Baiern, Therese von.

Boulenger, G. A.

Cope, E. D.

Ehlers, E.

Eigenmann, C. H., and Bray, Wm. L.

Eigenmann, C. H.

Gill, T.

Lankester, E. R.

Quelch, J. J.
Ulrey, A. B.

Berg, C.

Boulenger, G. A.

Gill, T.

Kindle, E. M.

Lahille, Fernando.
1895 Lista de los Pescados de la Plata, durante el ano 1894, recogidos en los alrededores. Revista Mus. de la Plata, vi, pp. 265–278.

Steindachner, Fr.

Steindachner, Fr. and von Bayern, Therese.

Ulrey, A. B.

Woolman, A. J.

Alessandri, G. de.
Boulenger, G. A.

Geldi, E. A.

Jordan, D. S., and Evermann, B. W.

Steindachner, Fr.

Ameghino, Florentino.

Berg, Carlos.

Boulenger, G. A.

Eigenmann, C. H.

Geldi, G. A.

Kerr, J. G.

Perugia, Alberto.
1897a Di alcuni Pesci Racolti nell' Alto Paraguay dal Cav. Guido Boggiana, 1. c., 147–150.

Plate, L.

Quelch, J. J.

Vaillant, L.
Woodward, A. Smith.
Vaillant, L.
Bean, T. H.
Bean, B. A.
Boulenger, G. A.
Gould, E. A.
Ihering, H. von.
Kerr, J. G.
1898b List of Fishes inhabiting the range of swamps in which Lepidosiren paradoxa has been found. Proc. Zool. Soc., 1898, 492.
Smitt, F. A.
Steindachner, F.
Vaillant, L.

Berg, C.

Boulenger, G. A.
1899a Viaggio del Dr. Enrico Festa, Poissons de l'Équateur. Deuxième Partie, Boll. Mus. Torino, xiv, No. 335.

Dean, B.

Delfín, F. J.
1899 Catalogo de los Peces de Chile. Rev. Chilena, ii, iii.

Ihering, H. von.

Kerr, J. G.

Pellegrin, J.

Vaillant, L.

Bayern, Princessin Therese von.

Boulenger, G. A.

Eigenmann, C. H., and Norris, A. A.
1900 Sobre Alguns Peixes de S. Paulo, Brazil. Revista do Museu Paulista, iv, 349–362.

Gilbert, C. H.
Jordan, D. S., and Evermann, B. W.

Vaillant, L.

Woodward, A. S.

Berg, C.
1901a Beitrag zu Dr. G. Hagmann's Acanthicus hystrix Spix, aus dem unteren Amazonas. Zool. Anz., xxiv, 586

Boulenger, G. A.

Eigenmann, C. H., and Norris, A. A.

Guilá, E. A.

Hagmann, G.

Jordan, D. S.

Pellegrin, J.

Poche, F.

Popta, Canna M. L.
1901 Tetragonopterus longipinnis, n. sp. Notes Leyden Mus., xxiii, pp. 85–90, fig.

Sangiorgi, D.

Smitt, F. A.

Boulenger, G. A.
1902a Description of new Fishes and Reptiles discovered by Dr. F. Silvestri in South America. Ann. and Mag. Nat. Hist. (7); ix, pp. 284–288.
PATAGONIAN EXPEDITIONS: ZOOLOGY.

Evermann, B. W., and Marsh, M. C.

Evermann, B. W., and Goldborough, E. L.

Kerr, J. G.


Meek, S. E.

Pellegrin, J.


Plate, L.


Ribeiro, S. de M.

Vaillyant, L., et Pellegrin, J.

Boulenger, G. A.

Delfin, F. T.

1903a Adicion al Catalogo de los Peces de Chile, con description de una nueva especie. L. c., pp. 220–225, figs.

1903b Contribucion a la ictiologia Chilena. L. c., pp. 268–273, fig.

Eigenmann, C. H. and Kennedy, C. H.

Eigenmann, C. H.

Fowler, H. W.

1903a Descriptions of new, little known, and typical Atherinide. L. c., pp. 727–742, pls. xli–xliv.

1903b New and little known Mugilidae and Sphyraenidae. L. c., pp. 743–752, figs., pls. xlv, xlvi.

Gill, T. N.
1903a Note on the Fish genera named Macrodon. L. c., pp. 1015–1016.

Kerr, J. G.

Meek, S. E.
1903 Distribution of the freshwater Fishes of Mexico. Amer. Nat., xxxvii, pp. 771–784, figs.

Pellegrin, J.

Regan, C. T.

Schreiner, C., and Ribeiro A. de Miranda.

Steindachner, Fr.

Vaillant, L., et Pellegrin, J.

Dollo, L.

Regan C. T.

Meek, S. E.
1904 The fresh-water Fishes of Mexico north of the Isthmus of Tehuantepec. Field Columbian Museum Publication 93.

Pellegrin, J.

Eigenmann, C. H.

Evermann, B. W., and Kendall, W. C.

Ihering, Rudolf von.
PATAGONIAN EXPEDITIONS: ZOOLOGY.

Jordan, D. S.

Meek, S. E.

Regan, C. T.
1905 Description of a new Loricariid Fish of the genus Xenocara from Venezuela. Novititates Zoologicae, vol. xii, Jan., 1905.

Cole, Leon J., and Barbour, Thomas.

Evermann, B. W., and Kendall, W. C.

Fowler, H. W.

McIndoo, M. E.

Regan, C. T.

Ribeiro, A. de M.
Starks, Edwin Chapin.  

Steindachner, F.  

Eigenmann, C. H., and Bean, B. A.  

Eigenmann C. H.  

Eigenmann, C. H., and Ogle, Fletcher.  

Eigenmann, C. H., assisted by Waldo Lee McAtee and David Perkins Ward.  

Ihering, R. von.  
1907 Diversas especies novas de Peixes Nematognathos do Brazil. Notas Preliminares, i, 14–39.

Meek, S. E.  

Miller, Newton.  

Pellegrin, Jacques.  

Regan, C. T.  
1907–8 Pisces in Biologia Centrali Americana, 1907–8.

Ribeiro, A. de M.  
1907a Una novidade Ichthyologia. Kosmos iv, Jan.
PATAGONIAN EXPEDITIONS: ZOOLOGY.

Steindachner, Fr.


Bean, Barton A.

Eigenmann, C. H.

Meek, S. E.

Pellegrin, J.


Regan, C. T.

1908a Description of a new Fish of the Genus Galaxias from Chile. L. c.


Ribeiro, A. de M.

Steindachner, Fr.


1908c Über eine noch unbekannte art der Gattung Bergiella Eig. aus dem La Plata, etc. Akad. Anzeiger, Nr. vii, März.

EIGENMANN: PAPERS DEALING WITH FRESH WATER FISHES. 511


Durbin, Marion Lee.

Eigenmann, C. H.

Evermann, B. W., and Goldsborough, E. L.

Evermann, B. W. and Radcliffe, Lewis.

Meek, S. E.

Pellegrin, J.

Regan, C. T.
1909a Description of a new Cichlid Fish of the Genus Heterogramma from the La Plata. L. c., March.

Steindachner, F.
(1) Archiguiana.
(2) Archamazona.

Red, lines of primary origin of South American fresh-water fishes, a, from the ocean, b, from the hypothetical Antarctic continent, c, from the hypothetical Helenis. (1), (2), (7), (8) and (9), primary centers of radial migration. Green, lines of migration from the primary centers, (3), (4) and (5), secondary centers of radial migration. Blue, lines of migration from the secondary centers. (6), tertiary center of radial migration. Brown, lines of migration from the tertiary center.

Map to Illustrate the Migrations of South American Fresh-Water Fishes.
PART V.
NON-MARINE MOLLUSCA OF PATAGONIA.

BY
HENRY A. PILSBRY,
ACADEMY OF NATURAL SCIENCES, PHILADELPHIA.

This report deals with the non-marine mollusks of Tierra del Fuego and Patagonia as far north as the thirty-ninth parallel, where the Rio Negro Valley forms a transition region, the Patagonian fauna giving place to the La Platan.

The scope of the work has been extended to include some account of all the South American forms of certain little-known families, such as the Amnicolidae and Sphaeriidae, and all of the Chilinidae occurring east of the Andes. Finally, the relationships of the South American molluscan fauna with the faunas of other continents are considered.

The collections made by Mr. J. B. Hatcher and placed in my hands by Professor William B. Scott form the basis of this report. The material from the region along the Rio Chico de la Santa Cruz and in the base of the Andes above its head is ample. Elsewhere but few mollusks were collected, and I have used material which I owe to the generosity of Dr. H. von Ihering, Director of the Museu Paulista, Dr. W. H. Rush, U.S.N., and others.

ZONAL DISTRIBUTION OF PATAGONIAN MOLLUSCA.

An inspection of the data existing on Patagonian mollusks shows that several faunulas largely distinct in species occupy zones extending from the Atlantic to the Andes and succeeding one another from north to south. So far as aquatic animals are concerned, these zones are determined by the drainage systems, which are separated by poorly watered plains, and flow independently into the Atlantic. The aquatic mollusks known from these several zones are enumerated below.

*Chilina, Lymnaea* and *Pisidium* are the only genera of fresh-water mollusks which extend throughout Patagonia, the first two also in Tierra del
Fuego. The Unionidae and Mutelidae, groups copiously represented in the La Plata, have their southern limit in the Rio Negro, each represented by one species; Planorbis has two, Ancylus one species, the rest of the fauna being Patagonian. The Rio Negro fauna, including the region of Bahia Blanca, is transitional also in land mollusks, the genera Bulimulus, Odontostomus and Strophocheilus reaching their southern limit in the Sierra Ventana, near Bahia Blanca. In the humid region west of the Cordillera the faunal zones are deflected southward, the transition zone as marked by the southern limit of Unionidae being in the neighborhood of Chiloe Island. That the transverse faunal zones of Patagonia run northward in the Andean region is shown by the occurrence on the upper Rio Chico of several Magellanic forms.

I. LA PLATAN ZONE.¹

Includes the Plata and its tributaries in Argentina, Uruguay, Paraguay, Brazil, and rivers flowing into the Atlantic in the Brazilian states of Sao Paulo and Rio Grande do Sul. Except in Chilinidae, only the genera of this fauna are mentioned below, the species being very numerous. Chilinidae: Chilina fluminea, C. f. microdon, C. globosa, C. rushii, C. parva, C. portillensis, C. tehuelcha mendozana.

Physidae: Physa.
Lymnaeidae: Lymnaea, Planorbis.
Ancylidae: Ancylus.
Amnicolidae: Littoridina, Potamopyrgus, Potamolithus.
Ampullariidae: Ampullaria, Asolene.
Cyrenidae: Corbicula.
Sphaeriidae: Musculium, Pisidium.
Unionidae: Diplodon, Castalia, Castalina.
Mutelidae: Anodontites, Leila, etc.

II. PATAGONIAN ZONE.

A. RIO NEGRO FAUNA.²

(All of the known aquatic mollusks of this fauna and those following are enumerated.)

¹ Probably the La Platan fauna is a subdivision of the Amazonian, chiefly characterized by the great development of Chilinidae and Amnicolidae.
² Including also the Rio Colorado, and known solely by the works of d’Orbigny and Doering.
Chilinidae: *Chilina tehuelcha, C. puelcha, C. parchappii.*
Lymnaeidae: *Lymnaea viator, Planorbis peregrinus, P. anatinus.*
Ancylidae: *Ancylus concentricus bonariensis.*
Amnicolidae: *Littoridina parchappii, L. australis.*
Sphaeriidae: Not reported, but doubtless present.
Unionidae: *Diplodon patagonicus.*
Mutelidae: *Anodontites puelchana.*

B. Rio Chubut Fauna.

Unknown.

C. Rio Santa Cruz Fauna.

Amnicolidae: *Littoridina hatcheri, L. simplex, L. sublineata.*
Sphaeriidae: *Musculium patagonicum, Pisidium magellanicum, P. patagonicum, P. observationis.*

D. Magellanic, Fuegian and Falkland Faunas.

Sphaeriidae: *Pisidium magellanicum.*

These several faunas may be roughly compared with the life-zones of North America. The La Platan zone is equivalent to the Austral, the Rio Negro fauna to the Transition, and the remainder of the Patagonian zone to the Boreal zone of the northern continent.

The distinctness of the Patagonian faunas A, C, D may be attributed to three main factors: (1) Climate, which imposes limits on the north or south distribution of species. (2) Absence of streams flowing north or south, and the consequent isolation of the river systems, favoring the evo-

---

1known only from the collections of Mr. J. B. Hatcher.
2From the researches of Captain King, Dr. Coppinger, the U. S. Exploring Expedition, the French Expedition to Cape Horn, Dr. Michaelson and others.
lution of distinct species. (3) Ignorance of the Patagonian faunas between the Rio Negro and the Rio Santa Cruz system, and along the base of the Andes, where Transition forms and intermingling of the species may occur.

GASTROPODA.

Family ENDODONTIDÆ.

Two genera of this family are known from Patagonia: Stephanoda and Radiodiscus. The relationships of these forms to genera of other regions are unknown, since we have as yet no knowledge of their soft anatomy. Endodontidae were present in the North American Carboniferous, represented by forms resembling the modern Gonyodiscus and Charopa in shell characters, and like their descendants, living in and upon decaying stumps. The family is now found all over the world, even on the most remote islands.

RADIODISCUS Pilsbry.


Minute, discoidal, openly umbilicate Patuloid snails, with the embryonic 1½ whorls minutely engraved spirally, the rest of the shell densely radially costulate. Aperture rotund-lunate, but slightly oblique, and as high as wide. Type R. millecostatus Pils. & Ferr.

In the Endodontidae, where small differences in the shell characterize extensive series of species, it seems desirable to recognize as of generic rank such readily definable groups as Radiodiscus.

The distribution of this genus is very wide, extending from Tierra del Fuego to the mountain ranges of the southern boundary of Arizona, where it meets the Holarctic Gonyodiscus and the Nearctic Helicodiscus, both at their southern limits. At present, the known distribution of Radiodiscus is markedly discontinuous, one area extending from southern Arizona to central Mexico, the other from southern Brazil to Cape Horn; yet it must be remembered that the Andes and northern South America are unsearched for minute shells. We know very few so small as these (2 to 3 mm. diam.); and some of the species imperfectly described may turn out to belong to Radiodiscus. It is likely that the group is an Austral one, which has invaded Mexico from the south.

Some Tasmanian snails have a great resemblance to Radiodiscus, in
size, form and sculpture — a resemblance possibly due to convergence, but perhaps indicating affinity. I have not been able to actually compare specimens. On account of their spirally sculptured embryonic shells Hedley has referred them to the subgenus *Allodiscus* of the genus *Flammulina*.¹

**Radiodiscus coppingeri** (E. A. Smith).

*Helix (Patula) coppingeri* Smith, P. Z. S., 1881, p. 36, pl. 4, f. 14, 14a.  

The shell is described as $1 \times 1\frac{1}{2}$ mm., composed of $3\frac{1}{2}$ whorls, the "umbilicus moderately small, equalling about one-sixth of the basal diameter."

It was described from Tom Bay (Dr. Coppinger), found on a rotten tree. This is near Madre de Dios Island, on the west coast. Strebel reports specimens which he identified as *coppingeri* from the west coast of Tierra del Fuego, Ushuaia, and Navarin Island. While this form must stand near *R. patagonicus*, it appears distinct by the much smaller umbilicus, if we may trust the published figures. I have not seen specimens. The apical sculpture has not been described.

**Radiodiscus magellanicus** (E. A. Smith).

*Helix (Patula) magellanica* E. A. Smith, P. Z. S., 1881, p. 36, pl. 4, figs. 15, 15a.

This species, described from the same place as the preceding, will probably prove to be a *Radiodiscus*, when the embryonic whorls are examined.

**Radiodiscus patagonicus** (Suter).

(Plate XLII, Figs. i, 1a, 1b.)

*Pyramidula patagonica* Suter, Revista do Museu Paulista, IV, 1900, p. 334, pl. 3, f. 6, 6b.  

The shell is openly umbilicate (the umbilicus about one-fourth the total diameter), of a uniform pale brown tint, discoidal, the spire convex but low, suture deeply impressed. Whorls about $3\frac{1}{2}$, convex, slowly increasing, the embryonic $1\frac{1}{2}$ densely striate spirally, the rest radially costellate,

¹ *Cf. Flammulina* (*Allodiscus*) *roblini* Petterd, as figured by Hedley in Records of the Australian Museum, VII, 1909, p. 300.
the riblets about as wide as their intervals, about 25 in 1 mm. on the last half of the last whorl. Under the microscope some very minute striations may be seen upon the ribs, and in places an extremely minute and very faint spiral striation. The rotund-lunate aperture is slightly oblique.

Alt. 0.9, diam. 1.7 mm. (50 miles above Sierra Oveja).

" 1.2 " 1.8 mm. (Santa Cruz).

Santa Cruz (v. Ihering, type locality). Near Mt. of Observation. On the Rio Chico 50 miles above Sierra Oveja, on a dry stone near the water. Spring near base of the Andes, 65 miles north of the Rio Chico, elevation 2400 ft. Banks of a small stream 10 miles from Ushe Lake (J. B. Hatcher).

The above description and the figures are from a shell collected alive 50 miles above the Sierra Oveja. The original description, in Portuguese, was based upon fossil specimens, which had lost the color and part of the finer sculpture. The original lot of *patagonicus* was from Santa Cruz, on the coast, in a modern deposit. Part of the original lot is before me. They are a little larger than the living shell described, with the whorls slightly deeper; yet in the series examined from all of the localities yet known, the very slight differences seem to intergrade.

**STEPHANODA** Albers.

This group comprises Patuloid species in which the embryonic whorl is typically smooth, but in some forms now referred here it is marked with radial striæ, but no spirals. It differs from *Amphidoxa* (with which I formerly united it) by the more numerous, less rapidly widening whorls. Without a knowledge of the soft parts, the relationships of these South American snails to the Austral *Charopa* and *Flammulina*, and to the northern Patuliform genera, cannot be defined. The following species from southern Patagonia belong here:

*S. lyrata* (Gld.), summit of highest mountain near Orange Harbor, etc. (*Helix lyrata* Gld.).
*S. leptotera* (Mab. et Rochebr.), Orange Bay (*Patula leptotera* M. & R.).
*S. rigophila* (Mab. et Rochebr.), Orange Bay (*Patula r.*, M. & R.).
*S. michaelseni* (Strebel), Magellan Strait to Navarin Island (*Patula m.*, Strebel, 1907).
Family **ZONITIDÆ.**

The small land snails originally described as *Helix saxatilis* Gld. and *H. ordinaria* Smith have all the external characters of the *Hyalinia* group of *Zonitidae*. *H. saxatilis* has pedal grooves and a mucous pore at the tail. Mabille and Rochebrune have proposed for it the generic term *Payenia*. What status this group will ultimately be given depends wholly upon the internal anatomy, of which we know nothing. It may possibly belong to the *Endodontidae*.


**PAYENIA ORDINARIA** (E. A. Smith), P. Z. S., 1881, p. 36, pl. 4, f. 16, 16a.

Tom Bay, on the west coast, attached to the frond of a fern.

Family **LIMACIDÆ.**

Except as introduced animals, *Limacidae* are unknown in South America. A species of *Limax* (probably the European *Agriolimax levius* or *A. agrestis*) has been reported from the Falkland Islands and from Ushuaia, Tierra del Fuego (Strebel, Wissenschaftliche Ergebnisse der schwedischen Süd Polar-Expedition, die Gastropoden, p. 7, 1908).

*Agriolimax levius* under the name *Agriolimax argentimis* Strobel has attained a rather wide distribution in temperate South America. Doering reports it from the Rio Colorado, Rio Negro, and Sierra de Córdoba.

Family **SUCCINEIDÆ.**

**SUCCINEA** Drap.

**SUCCINEA PATAGONICA** E. A. Smith.


*S. lebruni* Mabille et Rochebrune, Miss. Sci. Cap Horn, Moll., p. 14, pl. 6, f. 4a, 4b.

The shell is rather ventricose, greenish-yellow, with the first whorl light scarlet. Length 12.5 mm. Cockle Cove, shores of Trinidad Channel and Puerto Bueno (Dr. Coppinger); Rio McClelland (Capt. Crawshay).

*S. lebruni* seems to differ only in the smaller size of the type specimens, length 8–9 mm. — a trivial distinction. It was taken at Punta Arenas and Orange Bay.
Two specimens, the largest 10 mm. long, were taken by Mr. Hatcher at Punta Arenas.

**Succinea magellanica** Gould.


The shell is ventricose, similar to the preceding, except that the apex is not red. Type locality Orange Bay, but reported from numerous localities between Punta Arenas and Navarin Island by Strebel (*l. c.*). It has been recorded also from the region of Sierra Ventana, above Bahia Blanca, by Dr. Adolfo Doering, but there is a possibility that some similar form has been mistaken for *S. magellanica*.

**Succinea ordinaria** E. A. Smith.


A species with 3 to 3½ very convex whorls, length 10.25 mm., diam. 6, length of aperture 6 mm. It is "apparently very like *S. lebruni* Mabille, but without the sanguineous apex and rather more coarsely sculptured." I have not seen this species, which is probably closely related to *S. magellanica*. Admiralty Sound, Tierra del Fuego (Captain Crawshay).

**Succinea meridionalis** d’Orbigny.


Sierra de la Ventana (d’Orbigny). Swamps in the pampa north of the Rio Negro (Doering, for var. cornea Doer.).

**Succinea burmeisteri** Doering.

(Plate XLII, Figs. 2–6.)

*Succinea burmeisteri* Doering, Malakozoologische Blätter für 1873, XXI, p. 59, Taf. 2, f. 15–19 (Rosario am Paraná).

"Longit. 12 mm. Lat. 7.3 mm. Apertura 8 mm. longa, 5½ mm. lata."

Dr. Doering's description and figures apply fairly well to a *Succinea* of the *S. avara* group, which is abundant and widely distributed in the territory of Santa Cruz, collected at the following stations:

Near Mt. of Observation (near the coast, south of Santa Cruz River).
Near Pescadores, south side Santa Cruz River, 15 miles above mouth.
Spring on Rio Chico, above mouth of Rio Chalia.
Spring on Rio Chico, north side, near Sierra Ventana.
Spring on Rio Chico, 7 miles above Sierra Ventana.
Spring near Sierra Oveja.
Springs on Rio Chico, 15, 40 and 50 miles above Sierra Oveja, and 25 and 15 miles below confluence of Rio Belgrano.
Stream near mouth of the Rio Belgrano.
Base of Andes, 40 miles north of Rio Chico, 2000 feet elevation.
Base of Andes, 50 miles north of Rio Chico, 1750 feet elevation.
Base of Andes, 65 miles north of Rio Chico, 2400 feet elevation.
Pool near Arroyo Eke, near head of Spring Creek, elevation 1750 feet.

Specimens from a spring 7 miles above the Sierra Ventana, "on horse dung near the water," are figured, Pl. XLII, figs. 4, 5, 6. The color varies from honey-yellow to whitish-yellow, always with the first whorl of a deeper yellow shade. The suture is very deep and the whorls extremely convex. The specimens figured measure:

<table>
<thead>
<tr>
<th>Length</th>
<th>Diam.</th>
<th>Aperture</th>
</tr>
</thead>
<tbody>
<tr>
<td>11</td>
<td>6.9</td>
<td>7.25</td>
</tr>
<tr>
<td>12.3</td>
<td>6.9</td>
<td>7</td>
</tr>
</tbody>
</table>

It will be noted that, as compared with Doering's description, these shells have the aperture shorter.

At all other stations the shells are smaller. Two figured from the Rio Chico 50 miles above Sierra Oveja (Pl. XLII, figs. 2, 3) representative of this small form measure:

<table>
<thead>
<tr>
<th>Length</th>
<th>Diam.</th>
<th>Aperture</th>
</tr>
</thead>
<tbody>
<tr>
<td>7.9</td>
<td>4.9</td>
<td>5</td>
</tr>
</tbody>
</table>

In a series of fossil individuals from the banks of a stream 10 miles from Ushe Lake (collected January 14, 1898), there is remarkable variation in contour, though most of the shells are much lengthened.
Family *LYMNÆIDÆ*.

*LYMNÆÆ* Lamarck.

*Lymnaea* is more widely distributed than any other genus of freshwater mollusks, extending from the shores of the Arctic Ocean to Tasmania and Cape Horn, and in the Pacific reaching the Hawaiian group. The genus in its present limits is a synthetic group, which no doubt will ultimately be divided into several genera.

There are very few species in tropical South America, where the genus seems to be of rare occurrence; but in Patagonia the species are more numerous, individuals are abundant and generally distributed. South American *Lymnaeas* fall into three subgenera or sections of the genus. Section I is clearly an intrusive element from North America. Section II may possibly be of North American origin, but its relationships are unknown, as no specimens with the soft parts have been received. Section III is peculiar to Patagonia, and not closely related to any northern forms.

I. Section *GALBA* Schrank. The marginal teeth of the radula differ from the laterals by being more oblique, but are essentially *tricuspid*. The shell is small, compactly coiled, of very convex whors, usually umbilicate, the columellar lip broadly revolute, not folded. The type is *L. truncatula* of Europe. South America species, *L. viator*, *L. cousini*.

II. Section —— ? Dentition unknown. The shell is lengthened, fragile, *Succinea*-shaped, of few whors, the last large and elliptical. *L. peregrina*, *L. andeana*.

III. Section *PECTINIDENS* n. sect. The marginal teeth are broad and short, the cusps split into a comb-like series of many narrow denticles. Type *Lymnaea diaphana* King. There are two groups of species.

Group of *L. diaphana*. Moderately large, elongated forms, with very convex whors and a narrow umbilical chink.

Group of *L. patagonica*. Small forms, with very short spire (peculiarly liable to truncation) and few whors, the last relatively very large and short, rimate or imperforate. *L. patagonica*, *L. p. riochicoensis*, *L. pic-
It is possible that the presence of acid in the water, causing erosion of the shell, may also account for the stunted stature of these forms.

**DENTITION OF SOUTH AMERICAN LYMNAEAS.**

*Dentition of L. viator* d'Orb. — The radula examined was from one of the specimens taken on the Rio Chico near the Sierra Oveja. The central tooth is narrow and unicuspid as usual. There are three or four lateral teeth, having two long cusps. In the following transition teeth the inner cusp (entocone + mesocone) is long and bifid, ectocone simple. The marginal teeth are very oblique, with three cusps, entocone, mesocone and ectocone. In some of the outer marginal teeth there may be one or two minute accessory cusps.

The radula of *L. viator* agrees well with that of the European *L. truncatula* as figured by Lehmann. It differs from typical *Lymnaea* by retaining the primitive tricuspid type of teeth in the marginal series, with few small accessory cusps or none. *Lymnaeas* with this type of teeth have a continuous distribution from Patagonia to Alaska and in the Palaearctic region.

*Dentition of Lymnaea diaphana* King. — These are about 30, 7, 1, 7, 30 teeth. The central tooth is wider than usual in *Lymnaea*, unicuspid. The lateral teeth are bicuspid, the broad inner cusp becoming bifid on the transition teeth. The inner marginals have the mesocone and entocone split into four to six small cusps, the ectocone remaining simple. Further out the marginals become transversely lengthened, their cusps lie
parallel to the long axis of the tooth, and are split into a comb-like series of denticles.

The marginal teeth of *L. diaphana* differ from those of typical *Lymnaea* by their prostrate position, the cusp of one tooth overlying the basal plate of the succeeding one in the same transverse row, and also by the comb-like cusps. In typical *Lymnaea* (*L. stagnalis*, fig. 3) the cusp stands obliquely erect, its cutting edge transverse to the long axis of the tooth.

*Fig. 3.*

Marginal teeth of *Lymnaea stagnalis* L. (after Dybowski).

*Fig. 4.*

Two outer lateral and two inner marginal teeth of *Lymnaea patagonica riochicoensis* Pils.

*Lymnaea patagonica riochicoensis* (fig. 4, two outer lateral and two inner marginal teeth) has a radula closely resembling that of *L. diaphana*. There are ten lateral teeth.

No *Lymnaea* of the northern hemisphere, of which the teeth are known, has marginals like those of *L. diaphana*, but I have shown that somewhat similar teeth exist in a Hawaiian species.¹

¹ Figures of Lymnaeid teeth may be found in the following works, among others:

Lehmann: *Die lebenden Schnecken und Muscheln der Umgegend Stettins und in Pommern*, 1873, Taf. 15, 16.

J. Hazay: Malak. Blätter, n. F., VII, Taf. 1 (*Lymnaea auricularia, ovata, peregra*).


Fischer et Crosse: *Mission Scientifique au Mexique*, Mollusques, II, pl. 36 (*L. auricularia*).


Section Galba Schrank.

LYMNÆA VIATOR d’Orbigny.

(Plate XLVI, Fig. 8).


A species of the group of L. truncatula. The shell is small and smoothish, composed of five very convex whorls, joined by a very deep suture; the aperture is oval or nearly round, more than half the length of the shell. The axis is very distinctly umbilicate. Length 8, diam. 4 mm.

d’Orbigny records this species from the banks of the Rio Negro, 41° S. lat., 7 or 8 leagues above the mouth, very abundant. This may be considered the type locality. Afterwards he collected it also at Santiago, Chili, and at Callao and Lima, Peru, in irrigation ditches. The specimens from Peru, he notes, are constantly more elongate than those of Patagonia and Chili, with the whorls more deeply separated. Dr. W. H. Rush collected many specimens in a creek in the Prado, at Montevideo, Uruguay. These specimens, with others from Lima before me, do not seem separable from the Antillean L. cubsis Pfr. (1840) by any character in the shells.

Specimens from a pool on the bank of the Rio Chico, a mile west of the Sierra Oveja (Pl. XLVI, fig. 8) are larger than those from Uruguay, the individual figured measuring length 10, diam. 5.1, length of aperture 5 mm., whorls 5½. The spire is longer, and the umbilicus somewhat narrower. The columellar margin is broadly revolute and without fold or perceptible sinuosity. This form differs from that figured by d’Orbigny, and from the Montevideo shells examined, chiefly by having a longer spire and shorter aperture, the latter half as long as the shell; by having more whorls, a smaller umbilicus, and by its somewhat greater size.

Section Pectinidens n. sect.

LYMNÆA DIAPHANA King.

(Plate XLVI, Figs. 3, 7, 9).

Lymnaea diaphana King, Zoological Journal, V, p. 344, No. 43, 1830. Lymnaea diaphana King, Sowerby, Conchologia Iconica, XVIII, pl. 5, fig. 30, 1872.
**Patagonian Expeditions: Zoology.**

*Limnaea diaphana* King, Strebel, Zool. Jahrb., XXV, p. 163, Taf. 8, figs. 100a–c, 1907.


Freshwater ponds in the neighborhood of Cape Gregory (Cabo San Gregorio) on the north side of the Straits of Magellan, just west of the 40th meridian (King). Punta Arenas and Gente Grande, Lagune (Strebel). Punta Arenas (Mabille, for *L. lebruni*).

King’s type measured about 17 × 7.5 mm.; Strebel’s shells were smaller, 10–13 mm. long, and he seems to have entertained some doubt of their identity with King’s. *L. lebruni* is described as 16 to 20 mm. long, and agrees well with *L. diaphana* in other respects. It may be noted that Mabille and Rochebrune do not mention *L. diaphana*, and evidently overlooked it.

On the Rio Chico de la Santa Cruz Mr. Hatcher collected numerous *Lymnaeas* of the *L. diaphana* type, some agreeing with the typical form from the Straits of Magellan, others divergent therefrom.

In what I take to be typical *L. diaphana*, from a spring on the Rio Chico, 15 miles above the Sierra Oveja (Pl. XLVI, figs. 3, 7, 9) the shell is thin, but moderately strong, narrowly rimate, rather long, the last whorl swollen, but much smaller than in *L. d. inelegans*, very evenly rounded, with sculpture of unequal growth-lines, but not malleated, and very glossy. The spire is long, slender and acuminate. The shortly ovate aperture is rather small; columella very narrowly revolute, not adnate above, continuing free to the parietal wall above the axial crevice. The color is light brown, or, when the cuticle is worn off, pink, or pinkish white. Specimens measure:

Fig. 3. Length 17, diam. 9.4, length of aperture 8.8 mm.; whorls 5⅔.

<table>
<thead>
<tr>
<th>Shell</th>
<th>Length</th>
<th>Diameter</th>
<th>Length of Aperture</th>
</tr>
</thead>
<tbody>
<tr>
<td>9</td>
<td>14</td>
<td>7.25</td>
<td>6.9</td>
</tr>
<tr>
<td>7</td>
<td>6.3</td>
<td>11.2</td>
<td>10.8</td>
</tr>
<tr>
<td>17</td>
<td>9.8</td>
<td>9.4</td>
<td>5⅔</td>
</tr>
<tr>
<td>17.8</td>
<td>10.4</td>
<td>10</td>
<td>5⅔</td>
</tr>
</tbody>
</table>

In a small stream, 5 miles above Sierra Oveja, the shells are nearly typical in shape, but small and thin. One measures, length 11.8, diam.
6.7, aperture 6.7 mm.; whorls 5. One from near the Sierra Ventana is similar.

In a pool near the Sierra Oveja the shells are similar, but darker colored, more olive. The apices are eroded.

**LYMNÆA DIAPHANA INELEGANS subsp. nov.**

(Plate XLVI, Figs. 1, 2, 4-6).

The shell is narrowly rimate, short and wide, the last whorl disproportionately large, inflated, with sculpture of rather coarse growth-wrinkles and more or less malleation. The spire is small, shortly conic. Aperture very ample. Columella very indistinctly or not folded, narrow, nearly straight in the middle, its edge narrowly reflexed, expanding in the axial region. The specimens figured measure:

- Length 16, diam. 10.5, length of aperture 10.8 mm.; whorls 5.
- 16 " 9.3 " 9.7 " 4½.
- 16 " 10 " 9.4 " 5.
- 15 " 10 " 9.7 " 4½.
- 15.3 " 9 " 9 " 5.

Spring on the Rio Chico, 25 miles above the Sierra Oveja (figs. 1, 2, 4, 6). Small stream, 35 miles above Sierra Oveja (fig. 5).

The specimens from the second locality mentioned are more regular in contour. Up to a length of 15½ to 16 mm. the surface shows no malleation, and at that size the shells of this lot reach maturity. The lip expands slightly and a very thin, white, submarginal callus strengthens it. In one individual growth has proceeded beyond this stage, the part added being strongly malleated. This shell (Pl. XLVI, fig. 5) measures, length 17, diam. 10, length of aperture 9.8 mm.; whorls 5.

In two of the four lots from “springs on the Rio Chico, 25 miles above Sierra Oveja,” there are some dwarf individuals. One measures, length 10, diam. 6, aperture 6.5 mm.; whorls 4½. In another lot, all the shells are similarly dwarfed.

In the Rio Chico, 50 miles above Sierra Oveja, a similar dwarf shell was taken.

In and near drying pools on a high divide near the base of the Andes, 50 miles north of the Rio Chico, elevation 2400 ft., the shells are very fragile, pale, dull buff, with strongly developed, low, wave-like costation
and more or less malleation. One measures, length 14, diam. 8, length of aperture 8.6 mm.; whorls 4⅞. Those from the Arroyo Eke, near the head of Spring Creek, are also small.

In Swan Lake (about 50 miles north of the Rio Chico) the shells are very delicate, almost like tissue paper, but little malleated or (usually) without malleation, and of a pale olive color. Most of the examples conform nearly to Pl. XLVIa, fig. 2, in shape, but I have also figured the most elongate (fig. 1) and the shortest (fig. 3) shells. Fig. 2 measures, length 19, diam. 11, length of aperture 10.9 mm.; whorls 4⅛.

Mr. Hatcher in his narrative has alluded to the abundance of shells in this lake (Reports of the Princeton University Expeditions to Patagonia, I, p. 166). The lake basin is composed of igneous rocks dammed by a lava flow. To the absence of calcareous material, the tenuity of the shells is probably due.

*Lymnaea brunneoflavida* Preston, Annals and Magazine of Natural History (8), V, January, 1910, p. 110, pl. 4, fig. 1, from the Falkland Islands, is described as wider, more opaque and darker than *L. diaphana*, alt. 14, diam. 8, aperture 8.75 mm. It evidently stands close to *L. diaphana*.

**LYMNÆA PATAGONICA** Strebel.

*Limnaea patagonica* Strebel, Zool. Jahrb., XXV, p. 164, Taf. 8, figs. 103a, b, 1907.

Strebel's types are said to differ from the form he describes as *L. diaphana* by being browner, more of a chestnut-brown, the whorls increase more rapidly in width, the apex is commonly broken, with the breach closed by shell-material; the columella stands more nearly vertical, and its reflection is somewhat wider, but leaves an umbilical crevice open. It measures as follows:

Length 14.8, diam. 12.6, aperture 10.7 × 6.8 mm., 3½ whorls remaining.

10.4, " 8.1, " 7.2 × 4.5 " 3 "

Puerto Bridges, in a fresh-water lake.

**LYMNÆA PATAGONICA RIOCHICOENSIS** subsp. nov.

(Plate XLVI, Figs. 10, 11.)

The shell resembles *L. patagonica* in shape, being short ovate; the axis is imperforate. It is pale honey-yellow or very pale yellowish-brown. In
an entire specimen (fig. 11) there are 3½ convex and rapidly enlarging whorls, the last inconspicuously marked with rather widely spaced, very low longitudinal wrinkles, and some weak malleation in places. The aperture appears to be less rounded than in *L. patagonica*. The parietal and axial callus is a mere transparent film (not distinct as shown in fig. 11), closely adnate throughout. The columella is white, solid and rounded, nearly straight, and without trace of a fold. The largest specimen (fig. 11) measures:

Length 6.8, diam. 4.8, aperture 4.9 × 3.1 mm.

Rio Chico, 25 miles below the confluence of the Rio Belgrano, in the river under stones, numerous specimens. Also in a pool near the Sierra Oveja, one characteristic individual.

Most of the adult examples taken are very much eroded, the spire removed, and the last whorl deeply eaten in places, as though by acid. The parietal callus is thick, with the outer edge distinctly raised. The external erosion is compensated by thickening of the shell from the inside. Fig. 10 measures:

Length 5, diam. 4, aperture 4.1 × 3 mm.; 2½ whorls.

Although the perfect and the deeply eroded shells were in one lot when received, yet I have no doubt that they came from two sources, one of pure water, the other carrying CO₂, doubtless from leaching through decaying organic matter.

**Lymnaea pictonica** Rochebrune et Mabille.


A small, very fragile species, with exserted spire and truncate apex, 2 or 3 convex, rapidly increasing whorls remaining. There is a very narrow perforation.

Length 6, diam. 3 mm.

Picton Island, in the southeastern termination of the Beagle Channel.

This species seems to be decidedly narrower than the preceding. It may be the southern terminal member of the series of short *Lymneaes* represented in the Magellan district by *L. patagonica* and on the Rio Chico, 400 to 500 miles farther north, by *L. p. riochicoensis*. It is quite possible, however, that these several forms may prove to be independent shortened forms, each directly related to more normal forms.
The shell is acuminate-oblong, imperforate, very thin and fragile, pale yellowish-corneous, translucent. Surface dull, smooth to the eye except on the last part of the last whorl, where it is conspicuously malleated. Under the microscope the dullness is seen to be caused by extremely fine hair-lines, mainly longitudinal in direction, but forming a close mesh over the whole surface. There are also faint growth-lines and weak traces of spiral bands of vertical wrinkles. Whorls barely 4, the first convex, those following only weakly so. The last whorl has the form of a long ellipse. Aperture ovate. Parietal film scarcely perceptible. Columella slender, slightly concave, dilated above, the dilatation thin and adnate.

Length 11.9, diam. 6.3 mm.; aperture 7.3 mm. long.

Near the base of the Andes in drying pools on a high divide, 50 miles north of the Rio Chico.

This species is apparently related to *L. peregrina* Clessin of southern Brazil and Uruguay, but differs conspicuously by the very weak development of spiral sculpture, that species being even more copiously striate spirally than the North American *L. columella*.

A few immature specimens of another thin, fragile species, probably related to *L. andeana*, were taken in small streams on the Rio Chico, 10 and 25 miles above the Sierra Oveja.

**PLANORBIS Peregirus d'Orbigny.**


Rio Negro, Bahia Blanca, etc. (d'Orbigny); lakes along the Rio Negro (Roca Exped.).

**PLANORBIS ANATINUS d'Orbigny.**

*Planorbus anatius* d'Orb., t. c., p. 351 (Parana river, Prov. Entrerios, Argentina).

Lakes along the Rio Negro (Roca Exped.).

Family **ANCYLIDÆ.**

**ANCYLUS CONCENTRICUS BONARIENSIS** Strobel.

*A. c. var. bonariensis* Strobel, Materiali, etc., p. 51, pl. 2, f. 4 (around Buenos Aires).
A. c. bonæriensis Strobel, Doering, Informe Oficial de la Comision científica agregada al estado mayor general de la Expedition al Río Negro, bajo las órdenes del General D. Julio A. Roca, Zoologia, p. 71, 1881.

Rio Negro near the mouth of the Río Neuquen (Roca Exped.).

Family CHILINIDÆ Dall.

Chilinidae Dall, Annals of the Lyceum of Natural History of New York, IX, 1870, p. 357.

CHILINA Gray.

Chilina Gray, Specilegia Zoologica, p. 5, July 1, 1828 (for Auricula fluctuosa Gray).

Dombeia d’Orbigny, Voyage dans l’Amérique Méridionale, Mollusques, planche 43 (1843?).


Acyrogonia Mabille et Rochebrune, Mission Scientifique du Cap Horn, VI, 1889, Mollusques, p. 25.

The apex in Chilina differs from that of all Lymnaeid snails in the initial half whorl of the embryo, which is tilted up, as shown in fig. 5. Growth of the shell seems to be upward at first, the nucleus lying below the summit. At the end of the third whorl, in C. fulgurata and several other species, the color-pattern begins weakly. Previous to this the shell is uniform corneous-brown. The columellar fold is present at a very early stage, but my material does not show when it first appears.

Fig. 5.

Chilina fulgurata Pils. Young specimen 3.8 mm. long, composed of 3½ whorls.
The growth of the shell in Patagonian species is periodic, growth-arrest periods being marked by streaks interrupting the normal pattern. On resumption of growth, the zigzag pattern is sometimes replaced by irregular streaks; but in a later growth-period the original pattern may be resumed.

The subgenus *Pseudochilina* was based upon a form shaped about like fig. 7 of Plate XLIII. The irregular or fibrous surface, which served to characterize the subgenus, seems to me to be wholly due to erosion, the cuticle or periostracum being lost from the unique type in the National Museum. In other characters the shell is a typical *Chilina*.

*Acyrogonia* of Mabille and Rochebrune is a *Chilina* in which the columellar plait is wanting. I have found this plait variable in development in some forms of *Chilina* from the Rio Chico. In *C. fulgurata oligophyta* it approaches the condition described in *Acyrogonia*.

**Distribution of Chilina.**

*Chilina* occupies the temperate and cold zones of South America from the Tropic of Capricorn to Cape Horn. No member of the group, either living or fossil, has been found outside of these limits.\(^1\) It is noteworthy that no trace of the group has been found in other Austral lands—Tasmania and New Zealand having sufficiently similar climatic conditions to favor the survival of *Chilinidae*, if the family ever had a wider range in the Antarctic area.

Within their area, the *Chilinidae* are abundant snails in all suitable stations, as *Physidae* are in the north. They swarm in springs, small streams, lakes, and in some places the margins of rivers. They are most abundant southward, becoming rarer and local toward the northern borders of their range.

The species from west of the Andes are in all cases, so far as we know, distinct from those east of the divide. In the cold temperate and cold zones at least, the widely diverse physical features on opposite sides of the Andes would lead us to expect different snail faunas.

\(^1\) *Chilina olivula* Repelin, Ann. Mus. d'Hist. Nat. de Marseille, VII, p. 69, of the Cenomanian of central France, has no columellar fold, and is clearly a Lymnaeid snail with no relations whatever to *Chilina*. *Chilina* in Europe, like *Partula*, *Polygyra*, *Glandina*, etc., is one of those myths of European palaeontology which astonish and amuse the investigator using modern methods with Pulmonate snails.
The eastern fauna, with which alone we have now to deal,\(^1\) inhabits a comparatively arid region, poorly watered by roughly parallel streams flowing southeastward into the Atlantic. Each of the principal river systems has its own series of freshwater mollusks, in large part distinct specifically or racially from those of other rivers. The \textit{Chilinidae} of the several drainages have been enumerated on pp. 514–5.

**Chilina patagonica** Sowerby.


Patagonia (Sowerby). Puerto Bridges, Picton Island and Puerto Montt (Strebel, various forms taken by Michaelson and Lau).

Mr. Smith has given valuable information on this species in his paper of 1881. Strebel includes in it some very diverse forms, the pertinence of which to \textit{patagonica} seems open to doubt.

The specimens figured by Strebel from Gente Grande Bay, under the name "\textit{Chilina fluviatilis} Gray," are obviously not \textit{Chilina fluviatilis} (Maton) of the La Plata drainage. What they are, remains uncertain.

**Chilina amena** E. A. Smith.

\textit{Chilina amena} E. A. Smith, P. Z. S., 1881, pp. 37, 846, pl. 4, f. 18, 18a.

"This species is remarkable for its fragility, the slenderness of its form and the vividness of the markings."

Length 26, diam. 11, aperture 14.5 mm.

Tom Bay (Coppinger).

**Chilina fuegiensis** E. A. Smith.


A very slender species, length 24, diam. 10, aperture 13.5 mm., apparently related to the preceding.

Rio Marazzi, Useless Bay, Tierra del Fuego.

\(^1\) Mr. E. A. Smith has published a catalogue of \textit{Chilina} in Proceedings of the Zoological Society of London, 1881, to which the student is referred for information on the species of Chili.
Chilina fusca Mabille.


*Acyrogonia fusca* Mabille et Rochebrune, Miss. Sci. du Cap Horn, VI, 1889, p. 25.

The shell is fragile, brownish-corneous, ornamented with a few brown spots; columella white, somewhat twisted, a little thickened, but without a fold. Length 16 to 17, diameter 8 mm.

Punta Arenas (Lebrun).

This species is the type of the group *Acyrogonia* described as a new genus of *Chilinidae*, with the following characters: "Shell thin but quite strong, the general shape acutely oval, spire projecting but not very slender; columella arcuate, twisted but little, without the columellar folds characteristic of *Chilina*, and descending to the base of the aperture."

This group is known only by the original account. Neither of the two species has been figured. I do not think it generically distinct from *Chilina*. In some species of that genus the columellar fold is reduced to an inconspicuous vestige.

Chilina nervosa (Mabille et Rochebrune).


A more compact, ventricose species than *C. fusca*, with the aperture wider, the columella thick, arcuate, impressed in the middle and without a fold. Length 16, diam. 10 mm.

Punta Arenas, in pools (Lebrun).

Chilina falklandica Preston.

*Chilina falklandica* Preston, Annals and Magazine of Natural History (8), V, January, 1910, p. 111, pl. 4, fig. 2.

Near *C. amaena*. Length 15, diam. 8, aperture 9.5 mm.

Falkland Islands.

Chilina strebeli sp. nov.

(Plate XLIV, Figs. 24-28.)

The shell is elliptical, with a short, conic and acute spire; rather solid. Sculpture of rather coarse and unequal wrinkles along growth-lines and

1 *Acyrogonia* Jules Mabille et Rochebrune, Mission Scientifique du Cap Horn, VI, Mollusques, p. 25, 1889.
minute, indistinct spiral striae. The ground-color is rather bright yellow on the last whorl, copiously marked with purplish-brown zigzag streaks, each with 4 principal angles projecting forward, and more or less widened at the angles. On the latter part of the whorl the streaks disappear, leaving four bands of spots. The spire is dark blue, with dusky brown zigzag markings on the penultimate and next earlier whorls, those above being uniform purplish-brown or dull blue. Whorls between 5½ and 6, convex, regularly increasing, the last elliptical, widest in the middle. The aperture is nearly vertical, white, rich brown deep in the throat, showing the external markings as purplish-brown spot-bands. Columella rather broad, white, bearing a rather stout oblique fold above, a slight spirally entering prominence below it (in most examples scarcely showing in front view). Parietal callus thin, bearing a low, spirally entering fold at its lower third, usually hardly visible in a front view.

Fig. 24. Length 25, diam. 14.2, length of aperture 18 mm.

<table>
<thead>
<tr>
<th>Whorl</th>
<th>Length</th>
<th>Diam.</th>
<th>Aperture</th>
</tr>
</thead>
<tbody>
<tr>
<td>25</td>
<td>25.2</td>
<td>14.5</td>
<td>18</td>
</tr>
<tr>
<td>26</td>
<td>23.5</td>
<td>13.2</td>
<td>16</td>
</tr>
<tr>
<td>24</td>
<td></td>
<td>13</td>
<td>16</td>
</tr>
</tbody>
</table>

Mount of Observation, 40 miles south of Santa Cruz River.

This fine species was collected in some quantity. It is distinguished from *Chilina puelcha* d'Orb. by the presence of a parietal fold, among other peculiarities. No other species from south of the Rio de La Plata drainage has this fold developed. In the young stages (figs. 27, 28) the color-streaks are less distinctly defined, fading at their edges,¹ and the parietal fold is present only as a very thin whitish callus.

**Chilina smithi** sp. nov.

(Plate XLIII, Figs. 1–4.)

The shell is oblong-ovate, solid, minutely rimate, rather rudely sculptured, with wrinkles of growth and more or less distinct spiral lines; always more or less deeply eroded in the adult stage. The color of the cuticle is olive, or in the newly-formed band behind the outer lip it is yellow. In adults a large part of the cuticle is wanting, exposing the calcareous layer beneath, which is blue and gray, or when deeply worn (as in figures 3 and 4), it is white. The spire is worn, whorls convex, the last one distinctly shouldered, compressed laterally, widest at the middle or below it. The

¹ They are represented entirely too sharply defined in figures 27 and 28.
aperture is nearly vertical, very dark chestnut-colored within in adults, less dark in younger shells, fleshy-whitish near the lip-edge, which is thin and acute. The columella is not very wide, flat, white or flesh-tinted, more or less concave, and bears a rather small, very oblique fold above. Parietal callus very thin, transparent.

Fig. 1. Length 41, diam. 22, length of aperture 24 mm.

```
<table>
<thead>
<tr>
<th>Fig.</th>
<th>Length</th>
<th>Diam.</th>
<th>Length of Aperture</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>39.5</td>
<td>20</td>
<td>22</td>
</tr>
<tr>
<td>3</td>
<td>31.2</td>
<td>19</td>
<td>21.8</td>
</tr>
<tr>
<td>4</td>
<td>35.2</td>
<td>17.2</td>
<td>21.6</td>
</tr>
</tbody>
</table>
```

Springs on the Rio Chico, 15–25 miles above the Sierra Oveja.

This is one of the largest species of the genus, remarkable for its solid, inornate shell, shouldered at the last whorl (a feature not very well shown in the figures), and very dark chestnut or purplish-chestnut interior. Typically the spire is well produced, as in figs. 1, 3, but the lot contains also shortened forms, such as fig. 4.

The shouldered last whorl, solidity and color distinguish this species from *C. parchappii* d’Orb. It also attains a larger size. Named in honor of Mr. E. A. Smith, to whom we owe a very useful catalogue of the genus.

Young shells up to 22 mm. long show faint traces of waved longitudinal brown streaks on the last whorl, but in older ones these disappear, though faintly indicated spot-bands may persist up to 30 mm. long in some examples. Figures 8, 9, 10 of Plate XLIII represent young shells 17.2, 16 and 14.5 mm. long respectively. At this stage there are 5½ to 6 whorls. The spire is acuminate and the apex perfect in some individuals.

On a yellow ground there are chestnut streaks, which show three (figs. 8, 9) or four (fig. 10) forwardly projecting angles, with a row of spots just below the suture.¹

**Chilina lebruni** Mabille.


An unfigured form, probably related to *C. fulgurata*. Length 10 to 13 mm., diam. 6 to 9 mm.

Santa Cruz (Lebrun).

¹The pattern is not very well rendered in the drawings, and the outlines of the markings are too definite.
PILSBRY: NON-MARINE MOLLUSCA OF PATAGONIA.

CHILINA FULGURATA SP. NOV.

(Plates XLIII, Figs. 11-15; XLIIIa, Fig. 4.)

The shell is imperforate, elliptical, with short, conic spire, thin. Fully grown shells are in large part dull gray from loss of the cuticle on the back, but what remains in front is dull pale yellowish, with numerous dusky brown, angular streaks (fig. 15). Younger shells (fig. 11, length 12 mm., and fig. 12, length 13.2 mm.) are densely marked with reddish-chestnut, zigzag stripes on a whitish or in places yellow ground, the penultimate whorl with a blue ground. In an older stage (figs. 13, 14, length 16 mm.) the ground color on the back and spire is blue, but whitish at the base. The brown stripes have four forwardly projecting angles. The apices are more or less eroded in the type lot, but there are evidently not less than 5 whorls. The aperture shows the external marking on a ground more or less suffused with rich light chestnut in shells not fully adult, but in old shells the markings are not seen, and the throat becomes chestnut, fading to whitish near the lip. The columella is rather narrow, white, straight, or only slightly arcuate, and bears a small and rather thin, very oblique lamella above.¹

Fig. 15. Length 19, diam. 10.7, length of aperture 12.9 mm.

13-14. " 16, " 8.9, " 10.9 "

Small stream on the Rio Chico, 5 miles above the Sierra Oveja, type locality; also northward to the foothills of the Andes, in various springs and streams.

This species has the elaborate color-pattern of Chilina puelcha d'Orbigny, but differs from that by its comparatively narrow contour. The dimensions of the type of C. puelcha are, length 20, diam. 15 mm. C. fulgurata is probably related more closely to C. parchappii d'Orb., a more slender and lengthened species, deficient in color-ornamentation.

The type of C. fulgurata is drawn in Plate XLIII, figs. 13, 14, and Plate XLIIIa, fig. 4.

In springs twenty-five miles above the Sierra Oveja, a large, thin form of fulgurata was found. The elaborate color-pattern persists through the period of maturity, but fails in the aged or gerontic stage. The surface has minute axial plicae and distinct spiral lines, giving it a decussate-

¹This lamella, while correct as to outline in figures 13 and 15, is represented as more massive than it really is.
granular appearance, more or less developed in different examples. The
columella is flat, vertical, nearly straight, with a small, compressed and
acute fold above. Pl. XLIIIa, figs. 6, 6a, represent an old shell deeply
eroded in places. Length 18 (spire largely eroded), diam. 11, length of
aperture 13 mm. In this lot the cuticle persists over most of the surface.

At 30 miles above the Sierra Oveja similar large shells were found in a
spring. In even the largest, the color-pattern and sculpture persist to
the lip-edge. Pl. XLIIIa, fig. 7, represents an area immediately below the
termination of the suture. The shell measures, length 20.7, diam. 11,
length of aperture 13.4 mm. The apex is eroded.

In a small running stream on the south side of the Rio Chico, 25 miles
above Sierra Oveja, two forms of Chilina were found: numerous small C.
fulgurata, the largest 10 to 11 mm. long, and probably not fully adult;
and three examples of a very elongate form, one of them figured in Pl.
XLIV, fig. 23. In this shell the waved streaks appear only on the last
half of the last whorl, being preceded by two bands of small spots. The
columella is Lymnaeid. Sculpture as in the large decussate C. fulgurata.
Axis rimate. Length 17, diam. 8, length of aperture 10 mm. The sig-
nificance of these examples is doubtful.

Small specimens which seem to be C. fulgurata were taken in a spring
on the south side of the Rio Chico, seven miles above the Sierra Ventana.

Chilina fulgurata oligoptyx subsp. nov.

(Plate XLIV, Figs. 18, 18a, 20–22a.)

The shell is oval, inflated, with short but acuminate spire of between
5 and 6 whorls. The cuticle is extremely thin and deciduous, but more
or less usually remains on the face and behind the outer lip. It is corneous,
or slightly yellowish (somewhat too yellow in figs. 20, 21, 22), with faint
reddish-brown streaks. Where the epidermis is removed, the shell is ash
colored, or livid purplish or fleshy, sometimes showing traces of the waved
color-markings, the spire often dark purple (as in fig. 22a). The colum-
mella is only moderately arched, and either has no fold (fig. 18) or a
small fold may be seen above, in an oblique view, sometimes somewhat
stronger than in fig. 22. The outer lip is somewhat thickened within,
in adult shells.

1 The scattered dots shown in fig. 23 are ferrous deposits, foreign to the shell.
Fig. 18. Length 15, diam. 8, length of aperture 10 mm.

<table>
<thead>
<tr>
<th>Type</th>
<th>Length</th>
<th>Diam.</th>
<th>Aperture</th>
</tr>
</thead>
<tbody>
<tr>
<td>21, 22</td>
<td>12</td>
<td>7</td>
<td>8.8</td>
</tr>
<tr>
<td>22a</td>
<td>12.5</td>
<td>7</td>
<td>9</td>
</tr>
<tr>
<td></td>
<td>12</td>
<td>7.1</td>
<td>8.6</td>
</tr>
<tr>
<td></td>
<td>13.5</td>
<td>7.3</td>
<td>9</td>
</tr>
<tr>
<td></td>
<td>12.2</td>
<td>7.9</td>
<td>9.5</td>
</tr>
</tbody>
</table>

Spring on the north side of the Rio Chico near the Sierra Ventana. Types No. 88,686 A. N. S. P. Also taken in springs 20 and 25 miles below the Sierra Ventana.

By its shorter form, weak or wanting columellar fold, and the less developed color-pattern, this race differs from *C. fulgurata*. Some examples from 25 miles below the Sierra Ventana are more fully colored, resembling *C. fulgurata* in this respect; and it may be said that dead shells which retain the cuticle also show the color-pattern more distinctly than living shells.

**CHILINA FULGURATA LIVIDA subsp. nov.**

(Plates XLIII, Figs. 5-7; XLIV, Figs. 16, 17, 19.)

The spire is longer than in *fulgurata*, acuminate, and consisting of fully 6½ whorls; spiral striae distinct. In the adult stage the surface, where unworn, is livid purplish on the back, and color-streaks are wanting or very weak, though one to three faint spot-bands are generally retained. The eroded spots have the appearance of mould, the edges under a hand-lens, appearing fuzzy or fibrous. The columellar fold is usually well developed, though often appearing weak or blunt in a face view. The interior is dark purplish-brown.

Fig. 5. Length 20.5, diam. 10.25, length of aperture 12.1 mm.

<table>
<thead>
<tr>
<th>Type</th>
<th>Length</th>
<th>Diam.</th>
<th>Aperture</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>20</td>
<td>10</td>
<td>12</td>
</tr>
<tr>
<td>7</td>
<td>16</td>
<td>8</td>
<td>9.8</td>
</tr>
<tr>
<td></td>
<td>23.8</td>
<td>12.9</td>
<td>15.4</td>
</tr>
</tbody>
</table>

Spring 15 miles above the Sierra Oveja. Types no. 88,662 A. N. S. P. The young stage down to 14 mm. long, is colored like fig. 7, but occasional specimens of larger size show some faint, waved color-streaks.

Another lot which I refer to *livida* (Pl. XLIV, figs. 16, 17, 19) was taken in a small stream 5 miles above the Sierra Oveja. The half grown stage (Pl. XLIV, fig. 19) is elaborately zigzag-striped with reddish-brown

---

1 Immature.
on a buff ground. In older shells (figs. 16, 17) the pattern is very indistinct or lost by erosion.

Fig. 16. Length 21.8, diam. 10, length of aperture 12 mm.

Fig. 17. " 18 " 9 " 10.9 "
Fig. 19. " 13.1 " 6.9 " 8 "

**CHILINA FULGURATA ANDICOLA subsp. nov.**

(Plate XLIIIa, Figs. 5, 5a.)

A series of three quite young shells from under stones along a small running stream near the mouth of the Rio Belgrano, and a single shell, perhaps adult, from a spring 50 miles north of the Rio Chico, at an elevation of 1750 ft., indicate that a special race inhabits the Andean foothills, though the material at hand is hardly sufficient for its full characterization. The cuticle is rather bright yellow, with a full development of the *fulgurata* pattern in young shells. This pattern begins about the middle of the third whorl.

In the larger shell (Pl. XLIIIa, figs. 5, 5a), from the second locality, the ground is olive or greenish-yellow. The first half of the last whorl has the usual *fulgurata* streaks, but the last half (following a growth-arrest period) has the streaks broken, leaving four spot-bands. The yellow ground also has many fine olive lines. The aperture is like that of *fulgurata*. The apex is eroded. Length 8.5, diam. 5, length of aperture 6.8 mm.

**CHILINA FULGURATA HATCHERI subsp. nov.**

(Plate XLIIIa, Figs. 3, 3a.)

The shell is thin, of a dilute dull red color, variegated with four bands of spots, more or less indistinct, often hardly noticeable. There are also some obscure red-brown longitudinal streaks. The spire is darker, acuminate above, its surface more or less eroded. There would be over 5 whorls if the apex were perfect. Surface glossy, with fine growth-lines and very delicate spiral striæ, much as in *C. fulgurata* from 30 miles above Sierra Oveja, but much more delicate. Columella straight and flattened below, acutely folded above, similar to large forms of *C. fulgurata*.

Fig. 3. Length 19, diam. 10, length of aperture 13.4 mm.

" 3a. " 17.5 " 8.8 " 11.5 "
Arroyo Eke, near the headwaters of Spring Creek (north of the Rio Belgrano), April 10, 1898.

Except on the spire, the cuticle is generally well preserved. When worn on the last whorl, it is deciduous along the spiral striae, which otherwise are hardly noticeable. These shells are readily distinguishable from any taken at lower levels, along the Rio Chico.

**Chilina campylaxis** sp. nov.

(Plate XLIIIa, Figs. 1–2a.)

The shell is oval, much inflated, thin. Dead individuals, but evidently almost or wholly unchanged in color, are light reddish-brown, with rather faint streaks of chestnut, which are angular and dilated to form three bands of sagittiform spots besides a row of small spots below the suture. These markings are often less fully developed than in the figured specimens, and they are generally removed in part by the erosion of the surface. Where the cuticle is retained behind the outer lip, it is yellow. The surface shows spiral striae more distinct than usual. The aperture is light brown or fulvous inside. The outer lip does not seem to be thickened within, as it is in *C. f. oligoptyx*. The **columella is narrow, deeply concave**, and has a small but distinct fold above (rarely subobsolete.)

Figs. 1, 1a. Length 19, diam. 11.2, length of aperture 13 mm.

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>18.2</td>
<td>11</td>
</tr>
<tr>
<td></td>
<td>12</td>
<td></td>
</tr>
<tr>
<td>2a</td>
<td>18</td>
<td>11</td>
</tr>
<tr>
<td></td>
<td>12.25</td>
<td></td>
</tr>
<tr>
<td>17</td>
<td>10.8</td>
<td>12.8</td>
</tr>
<tr>
<td>17</td>
<td>11</td>
<td>13</td>
</tr>
<tr>
<td>17</td>
<td>11</td>
<td>13</td>
</tr>
<tr>
<td>17</td>
<td>10.2</td>
<td>12</td>
</tr>
</tbody>
</table>

The numerous specimens vary but slightly in size or other features. They have some resemblance to the Magellanic *C. patagonica*, which however is figured as having a straight columella and a stronger columellar fold.

All of the specimens are “dead” shells. At this spring *C. fulgurata oligoptyx* was also found, both alive and among the dead shells which were preserved separately; the larger individuals have the outer lip noticeably thickened. The shells of *C. campylaxis* differ constantly from the associated *oligoptyx* in various structural features, and must, I think, be regarded as specifically diverse.
Chilina perrieri Mabille.


A short, oval, solid form, apparently near *C. monticola*. Length 12, diam. 8 mm. It has not been figured.

Santa Cruz (Lebrun).

**Chilina monticola** Strebel.


The shell is thin but rather strong, translucent chestnut, with separated, dilute, waved streaks, or spot bands also, mostly indistinct; comparatively broad, with short, acute spire of about 5 whorls. Columella has a very weak fold, not visible in front view.

Length 9.8, diam. 6.9, aperture $8.4 \times 3.9$ mm.

" 8.5 " 6.8 " 7.5 \times 3.2 "

Punta Arenas, in a large mountain lake at an elevation of about 300 meters.

Strebel seems to entertain some doubt as to whether this may not be an immature stage of *C. ovalis* Sowerby. I have not seen specimens.

**Chilina monticola pilula** subsp. nov.

(Plate XLIV, Figs. 29, 30, 30a.)

The shell is very small, shortly oval, with a very short conic spire; thin; glossy when unworn, sculptured with fine growth-striae and indistinct, minute spiral lines. Adult shells are generally dull ashy- or brownish-white from loss of the cuticle, but where preserved, it is yellow or dusky reddish, closely marked with indistinct reddish-brown streaks, upon which there are spots at intervals, forming five spiral bands, one just below the suture, the others at subequal intervals on the last whorl. The longitudinal streaks are scarcely visible on some examples, and the spot-bands are often very faint or reduced to three. The very short spire is eroded in all the specimens seen, the number of whorls being therefore uncertain. The aperture is quite ample and shows the external color through the thin outer lip. The columella is white, rather narrow and weakly
arcuate, having a very small and low fold close to the upper end, and hardly noticeable in most specimens.

Length 5.1, diam. 3.8, length of aperture 4.3 mm.

Springs on the Rio Chico, 25 miles below the Sierra Ventana, Feb. 15, 1899.

This species is known from 40 specimens in two lots, taken the same day in the same neighborhood, but apparently from two springs, the station numbers being different and the condition of the specimens as regards erosion slightly diverse. There is also another individual from a different station, "freshwater spring on the Rio Chico," date and locality not given. They range in size from young shells less than 3 mm. long to slightly over 5 mm. In a shell of 3 mm. there are fully three whorls. All the adults have the spire worn, so that the number of whorls is uncertain, but there are evidently four or more.

The very globose shape of these shells shows that they are not young or dwarf individuals of the larger species of the same region. Moreover, the larger ones have the eroded and old appearance of adult snails. Whether the species attains greater size in the streams running from the springs which they inhabit remains uncertain. I know of several instances of dwarf snails inhabiting springs, having put at least one such case on record.\(^1\) It is evident that the usual explanations of dwarfing in small quantities of water are not pertinent, since in flowing springs there is no lack of aeration and no accumulation of the toxines of metabolism. It seems likely that the dwarfing of snails in springs may be due to the purity of the water, which affords an insufficient supply of diatoms, other algae and vegetable food.

This form is, for the time being, ranked as a subspecies of *Chilina monticola* from Punta Arenas, but I suspect that it is related rather to *C. fulgurata*. Apparently adult shells are only about half the size of *monticola*.

**Chilina tehuelcha** d'Orbigny.

*Chilina tehuelcha* d'Orb., Voy. dans l'Amér. Mérid., p. 336, pl. 43, figs. 6, 7; Strobel, Mat. Malac. Argent., p. 43, with var. *mendozana*, p. 43, pl. 2, fig. 4.

A very obese, solid species with short spire and very large aperture. Length 35, diam. 25 mm.

Rio Negro, thirteen leagues above its mouth, in the channels formed by the river between the numerous wooded islands of the place called San Xavier, in sandy places (d’Orbigny).

The var. *mendozana* Strobel is “smaller, the maximum length 18, diam. 10 mm., six-banded.” It is from San Carlos, province of Mendoza.

**Chilina puelcha** d’Orbigny.

*Chilina puelcha* d’Orb., Voy. dans l’Amér. Mérid., p. 336, pl. 43, figs. 8–12; Strobel, Mat. Malac. Argent., p. 45.

The shell is oval, thick, yellowish-green, very rarely uniform, but generally marked with waved longitudinal streaks, widened at their forward angles to form three spiral spot-bands. Columella thick, having a very strong fold. Length 20, diam. 15 mm.

Rio Negro, 6 or 7 leagues above its mouth, on stones on the shores, very abundant (d’Orbigny).

**Chilina parchappii** (d’Orbigny).

*Limneus parchappii* d’Orb., Magazin de Zoologie, 1835, p. 25.

*Chilina parchappii* d’Orb., Voyage dans l’Amérique Mérid., p. 338, pl. 43, figs. 4, 5.

An elongate, thin species, brownish, with four spot-bands, the spire conic and acute, whorls 5; columella typically having a small fold. Length 33, diam. 15 mm.

Pampas between 38° and 39° S. lat., the typical form from the “*Arroyo Salado*” on the slopes of the Sierra de la Ventana, near Bahia Blanca. In the “*Arroyo de las Achiras*” in the same region a very thin variety of uniform color and without a columellar fold was taken by M. Parchappe.

**Chilina fluminea** (Maton).

(Plate XLV, Figs. 35–39.)


*Voluta fluviatilis* Maton, l. c., fig. 13.


A short-oval, inflated shell, with usually olive ground-color, but sometimes olive-yellow or bright green, and either unicolored or marked with one to five spiral bands of dark chestnut spots, alternating with spots paler than the ground-color. The upper bands are more persistent than those below. Very rarely the pattern is of irregularly zigzag streaks flowing from the suture down, not quite reaching the base (fig. 38). The ample aperture is blue-white within, and usually shows the external markings through. The columellar lamella is very strong, and a long entering callous ridge stands on the parietal wall, and is always well developed in adult snails. The specimens figured from San Gabriel’s Island, opposite Colonia, Uruguay, measure:

Fig. 35. Length 11, diam. 7.9, length of aperture 8.9 mm.
" 36. " 10.25. " 7 " " 8.25 "
" 37. " 12 " 8.5 " " 9.9 "
" 38. " 10.8 " 7.5 " " 9 "
" 39. " 7.8 " 5.6 " " 6.8 "

Some examples from Buenos Aires are larger, 13.25 mm. long. All adult shells seen have the spire eroded.

Fig. 36 has the pattern of the type of C. fluminea. Fig. 35 is the color-form which Maton called fluvatilis, but it has no racial characters.\(^1\) Figures 38 and 39 are color-forms hitherto unrecorded. The spots composing the bands vary in size, and are sometimes reduced to mere dots.

Very young shells, 2.25 mm. long, are plain colored, have no parietal fold, and only a very small columellar fold. With growth, the band at the shoulder appears first. No streaked stage precedes the bands.

La Plata (Maton); Buenos Aires (Phila. Acad. coll.); San Gabriel’s Island (Dr. W. H. Rush); Rio Colorado (Roca Exped.).

Chilina fluminea microdon subsp. nov.

(Plate XLV, Figs. 40-44.)

Chilina fluminea d’Orb., Heynemann, Malak. Blätter, XV, 1868, p. 112, Taf. 5, fig. 11 (teeth).

Chilina fluminea Maton, Martens, t. c., p. 184.

\(^1\)The name Voluta fluvatilis has precedence on Maton’s page, but subsequent authors have preferred that of fluminea.
Shell similar to *fluminea*, but differing by having the parietal lamella very small and deeply placed; columellar fold smaller than in *fluminea*. The color is bright greenish-yellow, uniform or marked with 5 or fewer spot-bands; rarely it is brown or olive-brown.

Fig. 40. Length 10, diam. 7.4, length of aperture 9 mm.

- 

<table>
<thead>
<tr>
<th>Fig</th>
<th>Length</th>
<th>Diam.</th>
<th>Aperture</th>
</tr>
</thead>
<tbody>
<tr>
<td>40</td>
<td>6.1</td>
<td>8.3</td>
<td>7.5</td>
</tr>
<tr>
<td>41</td>
<td>7.7</td>
<td>12.1</td>
<td>10</td>
</tr>
<tr>
<td>42</td>
<td>7.1</td>
<td>11</td>
<td>8.9</td>
</tr>
<tr>
<td>43</td>
<td>7.7</td>
<td>11</td>
<td>9.5</td>
</tr>
</tbody>
</table>

Province of Rio Grande do Sul, Brazil: Guatzbu (H. von Ihering, type loc.); Guahyba at Porto Alegre, common on stones (Dr. Hensel).

Professor von Martens has already referred to the differential features of this race, which inhabits the Jacuhy river system.

As in *C. fluminea*, there is wide variation in the size and prominence of the spire, which may be either very short, as in figs. 40, 41, or wider and much more produced, figs. 42, 43. The tip of the spire is worn away in all the examples seen.

**CHILINA GLOBOSA Frauenfeld.**

(Plate XLV, Fig. 45.)


According to Frauenfeld, this is a round-oval, brownish yellow shell, with three hardly noticeable spot-bands on the last whorl. Columellar lip very thick, covered with a white callus to the upper end, two-toothed. Length 13.8, diam. 10.2 mm.

The example figured is larger, length 16, diam. 12.5, aperture 13.9 mm. long. It is straw yellow, with traces of a spot-band upon a low spiral angle, which crowns the last whorl. It is also stained with iron oxide in front and under the parietal callus. The very heavy columellar callus continues upon the parietal wall, bearing thick, obtuse, parietal and columellar lamellae.

This species is chiefly distinguished from *C. fluminea* by its very heavy parietal callus.

La Plata States (Ffl.d.); La Plata (coll. A. N. S. P.).
Chilina rushii Pilsbry.

(Plate XLV, Figs. 31–34.)


This species is closely related to *C. fluminea*, but differs by the acute keel at the shoulder. This keel arises rather abruptly at the end of the second whorl; and either runs to the end, or after continuing for several whorls, gradually dies out, leaving the last whorl rounded, as in fig. 33. In a young shell 4.3 mm. long, with 3½ whorls, the last whorl only is acutely carinate.

Fig. 31. Length 14.3, diam. 9.5, length of aperture 11 mm.

<p>| | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>32</td>
<td>15.25</td>
<td>11</td>
<td>12.3</td>
</tr>
<tr>
<td>33</td>
<td>11.5</td>
<td>7.8</td>
<td>9</td>
</tr>
<tr>
<td>34</td>
<td>14.5</td>
<td>9</td>
<td>11.3</td>
</tr>
<tr>
<td></td>
<td>22.5</td>
<td>13.5</td>
<td>16</td>
</tr>
</tbody>
</table>

Uruguay River at Fray Bentos, Uruguay (Dr. Wm. H. Rush, U.S.N.).

Chilina parva von Martens.

*Chilina parva* v. Marts., Malakozoologische Blätter, XV, 1868, p. 185.

A small, rather thin, globose form with flat spire; brown, obsoletely lightning-streaked; columella having a distinct columellar tooth and a low dentiform swelling below, the parietal callus distinct.

Length 5½–6, diam. 4½–5 mm.; aperture 4½ mm. long.

Province of Rio Grande do Sul, Brazil, at Rödersberg, in small brooks in the forest (Dr. Hensel).

An unfigured species known by the original description only.

Chilina portillensis Hidalgo.

*Chilina portillensis* Hidalgo, Journal de Conchyliologie, 1880, p. 322, pl. 11, fig. 1.

An ovate, rather solid olive-green shell, marked with darker spiral bands and lines. It has columellar and parietal folds, and evidently is rather closely related to *C. fluminea*. Length 12, diam. 9 mm., length of aperture 9 mm.

Western Argentina at Portillo, 4000 meters elevation.

1 Rush collection.
Family *AMNICOLIDÆ* Tryon.


*Hydrobiinae* Stimpson, Researches upon the Hydrobiinae and Allied Genera, 1865, p. 4.

*Hydrobiidae* Fischer, Manuel de Conchyliologie, 1885, p. 723.

This family of minute river-snails has been but little studied or collected in South America. We have some knowledge of the species of the Rio de La Plata system though the work of d'Orbigny, Doering and Strobel and collections made by Dr. W. H. Rush, U.S.N. In southern Brazil Dr. von Ihering has done good work, though hampered by the want of La Platan material for comparison. In Ecuador K. Miller has described a few forms collected by Wolf and others. In the north, Dr. von Martens has recorded a few Venezuelan species. None are known from the Orinoco or Amazon systems. Through the collections of Mr. Hatcher we are now enabled to add several forms from Patagonia. The opportunity has also been taken fully to describe and figure the known species of *Potamolithus*, part of them new forms, most of the rest hitherto defined only by a brief "key" published in 1892. Only six of the thirty species now known have hitherto been figured.

All of the South American genera and species of *Amnicolidae* are described or referred to below.

The following genera of this family are represented in South America:

- *Amnicola* Gould and Haldeman,
- *Idiopyrgus* Pilsbry,
- *Littoridina* Souleyet,
- *Potamolithus* Pilsbry,
- *Potamopyrgus* Stimpson,
- *Lithococcus* Pilsbry.

Of these genera, *Amnicola* has been found only in the extreme north. *A. ernesti* (Martens) of Lake Valencia, Venezuela, is closely related to *A. panamensis* Tryon and several Mexican species, and is undoubtedly of North American origin.¹

*Potamopyrgus* is the dominant genus of *Amnicolidae* in New Zealand and Tasmania. It is unknown in the Oriental region. In America it extends from Argentina to Venezuela, through Mexico to central Texas and throughout the West Indies. This distribution is explicable on the

supposition that the genus had its origin in Antarctica, or one of the
Austral lands once connected therewith.

Littoridina resembles the Holarctic Paludestrina and the genus Fluviopupa¹ of Australia and the Melanesian Plateau, but until the external genitalia of all can be compared, no well-founded opinion of the affinities of these genera can be formed.

Idiopyrgus is an Archheenic genus, if my estimate of its affinities is correct.

The affinities of Lithococcus are uncertain.

Potamolithus, in the form of the shell, closely resembles the genera assembled by Tryon in the subfamily Lithoglyphinae: Fluminicola of western North America, Lithoglyphus of eastern Europe, Pachydrobia, Lacunopsis and Jullienia of Indo-China. All of these genera differ from Potamolithus by the small number and large size of the cusps of the outer marginal teeth.² Fluminicola has male genitalia of widely different form. The genus Petterdiana of Tasmania and Australia has a strong globular

---

1 Fluvioypupa n. gen., type F. pupoidea (Mousson) of Fiji. The teeth are of the usual shape in Amnicolina, central with the cusp formula ₂₅, admedian with 10 subequal cusps, marginals with about 30, those of the outer marginal very minute. Shell pupiform, with obtuse summit and convex sides, the aperture ovate, vertical or sloping forward below, the long parietal margin straightened. Operculum thin, with nucleus near the base. Penis unknown. Hydrobia petterdi E. A. Smith seems to be congeneric, judging from specimens sent from Manaro, N. S. Wales, by Dr. J. C. Cox. These shells have the appearance of the European Bythinella, but differ from them in dentition.

radula resembles that of *Potamolithus* in the important character of having many minute cusps on the marginal teeth, more than double the number of those on the admedian tooth. It differs from *Potamolithus* by having a single basal cusp or denticle on each side of the central tooth, *Potamolithus* having two or more. I have found the number of basal cusps so variable in many genera that I do not attach much importance to this character. Of all known genera, *Petterdiana* is, in my opinion, the most closely related to *Potamolithus*.

Marginal teeth with a small number of cusps characterize the subfamily *Lithoglyphinae*. The Austral genera *Potamolithus* and *Petterdiana* cannot be included in this subfamily. They may for the present be placed in the *Amnicolina*.

LITTORIDINA Souleyet.


"Littorinida Eydoux et Souleyet" Stimpson, Researches upon the Hydrobiinae, etc., 1865, p. 43; Fischer, Manuel de Conchyliologie, 1885, p. 730.

*Paludestrina* in part, d'Orbigny, 1839; Stimpson, 1865.

*Heleobia* Stimpson, Researches upon the Hydrobiinae, etc., 1865, p. 47. Monotypic: type *P. culminea*.

*Hydrobia* and *Paludina* of some authors.

The shell is small, very narrowly rimate, acutely ovate, thin, smooth or rarely striated spirally, of olive or pale corneous color; whorls usually

FIG. 7.

*Littoridina gaudichaudii*, anterior part of the body, the pallial cavity opened and spread to the left. *a*, anus; *Pen.*, penis. (After Souleyet.)
but slightly convex, rarely carinate; aperture ovate, not very oblique, less than half as long as the shell; peristome thin and simple, continuous or interrupted. The operculum is thin, ovate, paucispiral, the nucleus below the lower third and near the columellar margin. The long penis has several digitate lateral papillæ or simple warts, and is curved at the end. The central tooth of the radula has one to four basal denticles on each side. The marginal teeth have very numerous denticles, more than twice as many as the admedian tooth. The animal is oviparous.

Dentition of Littoridina.

*Littoridina guadichaudii*, the type of the genus, has several, probably four, basal denticles on each side of the central tooth. Souleyet’s figure shows five, but allowance must be made for the difficulty of the object and the date, 1852.

Dr. von Ihering found two basal denticles on each side in *L. australis*. For *L. picium* he gives the number $\frac{9}{4}$ and *L. charruana* $\frac{11}{2}$.

*L. simplex* of the Rio Chico (fig. 8) has a central tooth with the cusp-

![Fig. 8](image)

Central tooth of *Littoridina simplex* Pils.

formula $\frac{5}{6}$. The admedian tooth has 6, 1, 6 cusps, the two marginal teeth many, about 30, cusps.

*L. hatcheri*, Rio Chico, has the cusp formula $\frac{8}{2}$. 8, 25, 30. The cusps of the marginal teeth are so excessively small that their exact number is not certain (fig. 9).

![Fig. 9](image)

Teeth of *Littoridina hatcheri* Pils.

*Littoridina* was based upon a snail from the river of Guayaquil, having
a shell resembling *Paludestrina* or *Bythinella*, but differing by the penis, which is not bifid, and has several lateral papillae or warts.

We owe to Souleyet an excellent account of the anatomy of *L. guadichaudii*, and Dr. von Ihering has published valuable notes on that of several species of southern Brazil. Many other species are referred to *Littoridina* from the resemblance of the shells and their distribution alone. Most of them have been described under genera based upon European types, such as *Paludestrina* and *Hydrobia*, which, so far as we know, differ anatomically from the type of *Littoridina*. Provisionally, therefore, we refer to *Littoridina* all of the smooth, slender and thin oviparous Amnicolinae of South America, having the lip simple.

Most of the species are fresh-water forms, but a few live as well in the brackish water of estuaries, or even in the salt water of sheltered bays. They are known to extend from below the mouth of Santa Cruz River in Patagonia north to Ecuador in the west, and to the state of Rio Janeiro, Brazil, in the east.

Many species of *Littoridina* have been described from the La Plata system and the Sierras of western Argentina (Provinces of Córdoba and Mendoza) by d'Orbigny, Strobel and Doering, but none have heretofore been reported from the southern territories. Mr. Hatcher's collections extend the range of the genus south to the Mount of Observation, below the mouth of the Santa Cruz River.

Several species of *Littoridina* have both slender and stouter forms, with others of intermediate shape, in any large lot. These differences may be sexual, but no observations bearing on the point have been made. In some other species the contour is nearly uniform.

Various authors having referred the Littoridinae to d'Orbigny's *Paludestrina*, it may be well to give some account of that genus.

*Paludestrina* was proposed by A. d'Orbigny in 1839 for *Paludina acuta* of France and the South American rissoids of fresh and brackish water, having the operculum spiral, such as *P. lapidum*, *P. peristomata* and *P. australis*. Various subsequent authors have mentioned or discussed

---

the group, but no type species seems to have been selected until William Stimpson, in 1865, selected *P. auberiana* d'Orb. as type. Bourguignat in January, 1887, named *P. acuta* Drap. as type of the genus. In 1895 Dr. von Ihering proposed to restrict *Paludestrina* to the group now called *Potamolithus*, with *P. peristomata* as type. This course cannot be followed because of Bourguignat's earlier selection. *P. acuta* (Drap.) must stand as the type of *Paludestrina*.

The following names will fall as synonyms of *Paludestrina*: *Littorinella* Braun, 1846, type *L. acuta* (Drap.). *Ecrobia* Stimpson, 1865, type *Turbo minutus* Totten. The preceding live in brackish water, or in sheltered bays or estuaries, or sometimes where the water is fresh. The exclusively fresh-water groups *Bythinella* Moq., 1851, type *B. viridis* Moq., and *Stimpsonia* Clessin, 1878, type *B. nickliniana* (Lea), are indistinguishable from *Paludestrina* in shell, operculum and dentition, but according to Moquin-Tandon the penis of *B. ferrusina* is bifid, while that of *P. minuta* (Totten) was found to be simple by Stimpson. Until the types of these proposed genera are studied and the forms of their penes ascertained, there seems to be little reason for recognizing more than one genus of these slender Amnicoloid snails in North America and Europe, although it is likely that several may ultimately be defined.

In *Paludestrina* (including *Bythinella*) the central tooth has a single well-developed basal denticle on each side, but often a second one is weakly developed.

**Littoridina hatcheri** sp. nov.

(Plate XLII, Figs. 7, 7a, 8, 11–13.)

The shell is minute, imperforate (though slightly rimate), rather solid, olivaceous brown, smooth; in shape ovate or somewhat pupiform. The outlines of the spire are convex; the summit minute, a little obtuse, though the apex is not depressed. Whorls 4, convex, at first slowly, then rapidly widening, the suture therefore descends more rapidly and obliquely in its last volution, and it is also deeper than in those preceding.

1 Researches upon the Hydrobiinæ and allied forms, Smiths. Misc. Coll., No. 201, pp. 45, 46. This selection was not valid for the reason that *auberiana* was not one of the species included in *Paludestrina* in d'Orbigny's original publication, but was added some years later.

2 Étude sur les noms génériques des petites Paludinées à opercule spirescent, pp. 9, 10.


The last whorl is rounded and expands towards the aperture, at the upper angle of which it descends slightly. The aperture is subvertical, symmetrically ovate, narrower but not angular above. The peristome is continuous, of a deep reddish brown color, almost black at the edge. The outer margin is slightly thickened and obtuse; the inner margin is rather heavily calloused, forming a raised ledge across the preceding whorl, from which it is slightly detached above and below.

Length 2.25, diam. 1.2 mm.; length of aperture 1.1 mm. (Pl. XLII, figs. 7, 7a).

Rio Chico de la Sta. Cruz, Territory of Santa Cruz, Argentina, from below the mouth of the Rio Chalia to the mouth of the Rio Belgrano; and northward along the eastern slope of the Andes 65 miles, in springs and small streams. Specimens were taken at the following localities: Spring on the Rio Chico below the mouth of the Rio Chalia (2: 12: '99); spring on Rio Chico, 25 miles below Sierra Ventana (type locality); twenty miles below Sierra Ventana, in a spring; north side of Rio Chico near Sierra Ventana; Rio Chico, 40 miles above Sierra Ventana; small stream 5 miles above Sierra Oveja; small stream on south side of Rio Chico, 50 miles above Sierra Oveja; near the mouth of Rio Belgrano; Rio Blanco, base of the Andes; spring 50 miles north of Rio Chico, elevation 1750 ft.; spring near base of the Andes, 65 miles north of the Rio Chico, elevation 2400 ft. Also several lots from springs on the Rio Chico without exact location.

This small snail is evidently abundant in springs and small streams along the whole course of the Rio Chico de la Sta. Cruz. It is apparently related to L. kuesteri and especially to L. k. cordillera (Strobel), from the Province of Mendoza, but differs from these by its wider, convexly conic spire, the shape of L. hatcheri being rather pupiform, whereas the spire is strictly conic in L. kuesteri and cordillera.

L. hatcheri varies within wide limits in nearly all of the colonies collected. This variation is chiefly (1) in size, nearly every lot consisting of both large and small individuals, the difference being greater than I have ever observed in North American Amnicolidae; and (2) in the degree of descent, lateral deviation or uncoiling of the last whorl. As type I have selected a shell nearly normal in shape, Pl. XLII, figs. 7, 7a, 2.25.

1 Hydrobia kuesteri and var. cordillera Strobel, Materiali per una Malacostatica di Terra e di Acqua dolce dell'Argentina Meridionale, p. 61. Pisa, 1874.
mm. long. Some others in the same lot are smaller and more pupiform, with the parietal callus barely free from the preceding whorl, as in fig. 8, length 1.7 mm. The entire lot from the type locality consists of shells which do not depart much from the normal *Littoridina* contour.

At two stations, 40 and 50 miles above the Sierra Oveja, a considerable proportion of the shells have the last whorl deeply descending to the aperture and becoming free, or partially free near the termination. A series from 40 miles above Sierra Oveja is figured, Pl. XLII, figs. 11, 11a, 12, 13. Fig. 12 represents a nearly normal shell; figs. 11, 11a and 13, those with the last whorl loosening its coil; all are fully mature, but not old snails. The individuals figured measure:

Fig. 11. Length 3.3, diam. 1.7, length of aperture 1.2 mm.; whorls 4 3/4.  
" 12. " 2.7 " 1.6 " " 1.25 " " 4 1/2.  
" 13. " 2.1 " 1.3 " " 1 " " 4 1/2.

The same tendency is well-marked in a lot from far down the river, below the mouth of the Rio Chalia. The other lots of the species resemble the type lot, having the shape nearly normal, but with a variable proportion of individuals in which the peristome is partly or for a short distance free.

*L. hatcheri* is thus a species distinctly aged or gerontic, with this feature much more strongly emphasized in certain colonies.

**Littoridina simplex sp. nov.**

(Plate XLII, Figs. 9, 10.)

The shell is minutely rimate but scarcely perforate, rather thin, ovate-conic, of a very pale olivaceous-yellowish tint, the apex and first whorl reddish in the type lot, smoothish, but lightly marked with growth-lines. The spire is straightly conic, the apex minute and very slightly obtuse. Whorls 4 1/2, all rather strongly convex, regularly enlarging, and joined by an impressed suture, which on the last whorl or two shows a narrow faint margination below caused by transparence. The aperture is ovate, subvertical. Peristome continuous, its edge delicately marked with a brownish line. The outer lip curves forward a little in the middle, and has a very delicate whitish thickening within. Inner margin thickened a little, continuous, in contact with the preceding whorl.

Fig. 9. Length 3, diam. 1.8 mm., length of aperture 1.3 mm.
" 10. " 3 " 2 " " 1.5 "
" 11. " 2.3 " 1.6 " " 1.3 "
" 12. " 2.1 " 1.3 " " 1.2 "
" 13. " 2.0 " 1.2 " " 1.1 "
Springs along the Rio Chico de la Sta. Cruz, at the following places: About 15–20 miles above the mouth of the Rio Chalia; springs 20 and 25 miles below the Sierra Ventana; spring near the Sierra Ventana (type locality); 25 and 50 miles above the Sierra Oveja. Also near Mt. of Observation, on the coast, below the mouth of the Santa Cruz River. Also at the foot of the Andes, 50 miles north of the Rio Chico.

This species resembles several forms of the Rio de La Plata system, but is distinguished by the combination of quite strongly convex whorls and a continuous peristome; its inner margin, though not much thickened, yet forms a distinct ledge across the preceding whorl. The striation is exaggerated in fig. 9, and the umbilical chink is represented too wide and prominent in both figures. The apex is reddish in the type lot, but not in others. L. simplex occurs in the same springs with L. hatcheri along the Rio Chico, but it is apparently less abundant and it does not seem to ascend the river so far.

**Littoridina sublineata sp. nov.**

(Plate XLVIa, Figs. 5, 5a.)

The shell is imperforate, ovate-pyramidal, thin, light brown. Surface faintly marked with growth-lines, and on the last half of the last whorl there are several (four or five in the type specimen) very low spiral cords, grouped in the peripheral region. The spire is rather straightly conic, the summit a little obtuse, the apex rising but little above the level of the first whorl. Whorls 5, convex, the last very indistinctly angular below the periphery, causing the base to appear slightly flattened. The aperture is ovate, very slightly oblique; peristome thin and acute, the outer margin not darkened or thickened. Columella concave, slightly thickened, continued in a thin adnate callus across the parietal wall.

Length 3.6, diam. 2.2 mm., length of aperture 1.5 mm.

Small stream on the Rio Chico, 35 miles above the Sierra Oveja (type locality); also in a spring 25 miles above the Sierra Oveja, and in a “big spring on the Rio Chico,” the exact location of which was not noted on the collector’s label.

It sometimes attains a larger size than the type, a shell from the second lot noted above being 5.4 mm. long with 5½ whorls. This species differs from *L. simplex* by its weakly subangular periphery, marked with a few spiral lines, the less prominent parietal callus and fragile outer lip.
Littoridina australis (d'Orbigny).

(Plate XLI<, Figs. 3-8.)


Paludestrina australis d'Orb., Voyage, p. 384, pl. 48, figs. 4-6 (Bahia Blanca and Bahia de San Blas, Patagonia, on water plants and mud covered by each tide; also at Montevideo); von Ihering, Nachrichtsblatt, XXVII, 1895, p. 123, anatomy (Rio Grande do Sul and Sao Paulo); von Martens, Malak. Blätter, XV, 1868, p. 192 (Porto Alegre).

Melania dubiosa Clessin.

d'Orbigny gives the dimensions, length 6, diam. 3 mm., whorls 7. Fig. 7, drawn from a specimen from Bahia Blanca, the type locality, is of this size. Some examples are narrower (fig. 6), and others much larger, length 8.5 mm. (fig. 5). The whorls are almost flat except in the largest shells, where the last whorl is convex. Under a strong lens very faint spiral striae may be seen on most examples. Figures 5-7 represent bleached shells from Bahia Blanca, the type locality, received from Dr. von Ihering.

At Montevideo, in a creek in the Prado, the shells taken by Dr. Rush are large, olivaceous, with noticeably more convex whors. They measure:

<table>
<thead>
<tr>
<th>Length</th>
<th>Diam.</th>
<th>Aperture</th>
</tr>
</thead>
<tbody>
<tr>
<td>8.3</td>
<td>4</td>
<td>3.5</td>
</tr>
<tr>
<td>8.2</td>
<td>3.9</td>
<td>3.2</td>
</tr>
<tr>
<td>8.4</td>
<td>3.9</td>
<td>3.3</td>
</tr>
</tbody>
</table>

In a small spring back of the Cerro, Montevideo, the shells are similar but smaller, about 5 mm. long with 6½ whors.

Shells from Rio Grande do Sul, sent by Dr. von Ihering, are about 6 mm. long, 2.3 to 2.9 mm. in diameter. The more slender shells are less numerous than the stouter ones, and some are transitional in shape. The color varies from dark to pale olive (Plate XLI<, figs. 3, 4, 8). A small form has been sent also from Ilha Comprida, near Iguape, on the Sao Paulo littoral.

Melania dubiosa Clessin, judging from specimens sent from S. Leopoldo, State of Rio Grande do Sul, by Dr. von Ihering, is identical with the large form of L. australis noticed above from Montevideo.
Littoridina charruana (d'Orbigny).
(Plate XLI, Figs. 1, 2.)

*Paludestrina charruana* d'Orb., Voy., p. 384, pl. 75, figs. 1, 2 (at the embouchure of a stream into the sea north of Montevideo); von Ihering, Nachrbl., 1895, p. 123, anatomy (Iguape, Sao Paulo).

A shorter, stouter snail than *L. australis*, the cuticle olive, with black growth-arrest lines in old shells. It varies widely in shape, as may be seen by figs. 1, 2, which represent average, stout and slender shells from the Rio Cubatao, near Santos, State of Sao Paulo. They measure:

Length 5.8, diam. 3.5, aperture 2.6 mm.; whorls 6.

\[
\begin{array}{c|c|c|c|c}
 & 5.7 & 3.1 & 2.5 & 7. \\
\hline
5 & 2.7 & 2.2 \\
\end{array}
\]

It has also been sent by Dr. von Ihering from the Ribeira at Iguape and from Guatzbu, State of Rio Grande do Sul, where the shells are more slender.

d'Orbigny's type measured, length 5, diam. 3 mm., whorls 6.

Littoridina picium (d'Orbigny).
(Plate XLI, Fig. 13.)


*Paludestrina picium* d'Orb., Voyage, p. 383, pl. 47, figs. 17–21 (Rio de La Plata at Buenos Aires, etc., under stones); von Ihering, Nachrbl., 1895, p. 123, anatomy (Rio Grande do Sul); von Martens, Malak. Blätter, XV, 1868, p. 192 (Rödersberg).

This is smaller and thinner than *L. charruana*, less opaque, of a paler greenish yellow or olive-corneous tint. The whorls are rather strongly convex, the suture well-impressed, having a grayish border below. d'Orbigny gives the size as length 3, diam. 2 mm., whorls 5. Two from San Gabriel's Island, in the Rio de La Plata off Colonia, Uruguay, measure:

Length 4, diam. 2.2, aperture 1.8 mm.; whorls 6.

\[
\begin{array}{c|c|c|c|c}
 & 4 & 2.4 & 1.8 & 5 \frac{3}{4} \\
\hline
\end{array}
\]

Specimens are before me also from the type locality, Buenos Aires, agreeing fully with those figured.

*Littoridina glabra* (Tryon) from Bolivia resembles *L. picium*, but it is somewhat more slender, thinner, the columella less calloused.
LITTORIDINA BERTONIANA SP. NOV.

(Plate XLII, Fig. 9.)

The shell is barely perforate, oblong-turrite, pale olivaceous, the length about double the greatest diameter, and two and one-half times the length of the aperture. Spire rather straightly conic, the apex obtuse. Whorls \(5 \frac{1}{4}\), moderately convex, the last well rounded. Surface delicately marked with very fine spiral striae, usually strongest on the penultimate whorl. The aperture is ovate, angular above. Peristome thin and simple, continuous, the columellar margin narrowly expanded.

Length 3.6, diam. 1.7, length of aperture 1.4 mm.

Puerto Bertoni, Paraguay. Types No. 103,045, A. N. S. Phila., from No. 244 of the Museu Paulista, collected by A. de W. Bertoni.

This species differs from *Potamopyrgus peteningensis* (Gld.) by its much less convex whorls, smaller size and minute spiral striae. *Potamopyrgus scottii* has far more convex whorls and coarser sculpture.

In some specimens from the type locality the spiral striae are extremely minute and weak, yet visible under the compound microscope. These were sent under No. 190 Museu Paulista.

A few other species at present referred to *Littoridina*, such as *L. pedrina* Miller, have spiral sculpture; yet the presence of this unusual feature raises some doubt as to the genus, which can be definitely determined only by examination of the genitalia. *L. bertoniana* may prove to belong to *Potamopyrgus*.

OTHER SPECIES OF LITTORIDINA DESCRIBED FROM SOUTH AMERICA, SOUTH OF THE EQUATOR.¹

LITTORIDINA ISABELLEANA (d’Orbigny). *Paludestrina isabelleana* d’Orb., Voy., p. 385, pl. 75, figs. 4–6. 3 × 1 mm., whorls 6, flat. In a stream near Montevideo and in the Bay of Montevideo at the contact of fresh and salt water.

LITTORIDINA PARCHAPPII (d’Orbigny). *Paludina parchappii* d’Orb., t. c., p. 30; *Paludestrina parchappii* d’Orb., Voy., p. 383, pl. 48, figs. 1–3. 6.5 × 3 mm. with 7 very convex whorls; whitish, aperture not angu-

¹ This list is believed to be a complete catalogue of the genus up to the end of 1909. *Paludina brunnea* and *P. conica* Anton, Verzeichniss, 1839, p. 52, South America, and *Bulimus paludinoides*, Ibid., p. 42, are probably Littoridinae, but the descriptions are totally inadequate and the names should be deleted from the list of species.

**Littoridina kuesteri** (Strobel). *Hydrobia kuesteri* Strobel, Mater. Malac. Argent., 1874, p. 61, pl. 2, fig. 6. 4 × 2.5 mm., 5 whorls, to 3.5 × 2–2.5 mm. San Carlos ed Aguanda, province of Mendoza, in stagnant water. *Hydrobia kuesteri* var. *cordillerae* Strobel, t. c., p. 61, pl. 2, fig. 7. 3 × 1.5–2.5 × 1.33 mm., 4½ whors. Sierra de Mendoza.


**Littoridina occidentalis** (Doering). *Hydrobia occidentalis* Doering, t. c., pp. 466, 471. 6 × 2.7 mm., whorls 6. San Luis, Mendoza, San Juan, Santiago, Argentina.

**Littoridina montana** (Doering). *Hydrobia montana* Doering, t. c., pp. 467, 473. 4.5 × 2 mm., whorls 6. Sierras de Córdoba and S. Luis, Argentina.


**Littoridina atacamensis** (Philippi). *Paludina atacamensis* Philippi, Reise durch die Wüste Atacama, 1860, p. 185, Taf. 7, fig. 15. Length 1½ lines, whorls 5. Tilopozo, Chili, in about 23°, 20’ S. lat.

**Littoridina popoensis** (Bavay). *Paludestrina popoensis* Bavay, Bull. Soc. Zool. France, 1904, p. 154, fig. 5. Conic, 5 × 2.5–3.5 mm., with 6 to 7 rounded whorls. Lake Popo, Bolivia.

**Littoridina cuzzoensis** n. sp. (figs. 10, 11). The shell is minutely perforate or rimate, thin, corneous-white, smooth and glossy. Spire straightly conic, whors 6, moderately convex, the last evenly rounded. Aperture ovate, slightly oblique. Peristome thin and simple.

Fig. 10. Length 4.9, diam. 2.5, length of aperture 1.8 mm. (typical).

"11. "4.8" "2.2" "1.6" (slender phase).
Cuzco, Peru (H. von Ihering).
This species evidently stands close to *L. popoensis* Bavay, of the saline Bolivian Lake Popo; but the spire seems to be of a more turrite shape, the last whorl comparatively shorter in *L. popoensis*, which moreover belongs to a different drainage.

Compared with *L. culminea* of Lake Titicaca, this species differs by the less attenuate spire and fewer whors. *L. cuzcoensis* is not very closely related to the Titicaca species.


**Littoridina andicola**, ecarinate form: *Paludestrina culminea* d'Orb., Voy., p. 386, pl. 47, figs. 10–12. 6 × 3 mm., whors 7, somewhat convex. Lake Titicaca.

Some specimens of the *L. culminea* type, collected by A. Agassiz in Lake Titicaca, are subangular at the periphery, and therefore somewhat intermediate between *L. culminea* and *L. andicola*. Bavay has figured a series of shells showing the intergradation of these supposed species.

**Littoridina guadichaudi** Souleyet, Voyage la Bonite, Zoologie, II, p. 565, pl. 31, figs. 31–33 (living animal, shell and operculum), pl. 32, figs. 9–19 (soft anatomy). 5 × 3 mm., 6 whors. River of Guayaquil, Ecuador.

**Littoridina ecuatoriana** (Miller). *Paludestrina ecuatoriana* Miller,
562  PATAGONIAN EXPEDITIONS: ZOOLOGY.


Littoridina boetzkesi (Miller). Paludestrina boetzkesi Miller, t. c., p. 155, Taf. 8, fig. 4.  4.5×2.4 mm., whorls 6½. S. Domingo and Guayaquil River, Ecuador. Cf. L. guadichaudii.

Littoridina (?) pedrina (Miller). Hydrobia pedrina Miller, t. c., p. 155, Taf. 6, f. 7.  3.5×1.5 to 4×1.8 mm., 5½ to 5¾ whorls. Microscopically granulose. Rio Pedro in the Chillo valley, Ecuador.

POTAMOPYRGUS Stimpson.


Amnicolinae with rather slender, thin, rimate shells of ovate-conic or turrited contour, often armed with a row of spines on a delicate keel at the shoulder of the last whorl or two. They differ from other American genera in being viviparous.

Besides the following species, P. coronatus Pfr. is known from Baranquilla, Colombia, and Lake Valencia, Venezuela. It has a wide range in Mexico and the West Indies. Professor von Martens has figured the shell, teeth and embryonic young. (Die Binnenmollusken Venezuelas, p. 208, Taf. 2, figs. 13a–h.)

POTAMOPYRGUS GUARANITICUS (Doering).

Lyrodes guaranitica Doering, Boletin de la Academia Nacional de Ciencias en Córdoba (República Argentina), VII, 1884, pp. 461–463, fig. 2. Length 3.5, diam. 1.9 mm., whorls 5¾, the last encircled by a slender keel at the shoulder, and several spiral striæ on the base.

Rio Barrancas, Corrientes.
Potamopyrgus scottii sp. nov.

(Plate XLIr, Figs. 10, 11.)

The shell is very minutely perforate, turrite, the length about double the greatest diameter and nearly three times the length of the aperture. The spire has straight outlines and an obtuse apex. Whorls 6½, very convex, parted by a deep suture. The first two whorls are smooth; then fine, narrow, thread-like, spiral striæ appear, 6 to 8 in number on the visible part of each whorl, one at the upper third sometimes being more prominent. There are also numerous ripples in an axial direction, on the last two whorls. The last whorl is well rounded and nearly smooth on the base. The aperture is ovate, peristome simple and thin, continuous, the columellar margin concave, narrowly reflexed.

Fig. 10. Length 5, diam. 2.6, length of aperture 1.7 mm.

Fig. 11. “ 3.8 “ 1.9 “ 1.4 “

Buenos Aires. Types No. 10,153 A. N. S. P.

This is a very much lengthened form, larger and longer than P. guaraniticus (Doer.), and differs in sculpture. It is closely related to P. peteningensis (Gld.) which, however, has a smooth surface. The specimens are bleached and apparently fossil, being filled with sandy mud. A minute embryonic shell was obtained from the matrix washed out of one of the specimens figured. This confirms the generic reference to some extent, as all Potamopyrgus species are viviparous.

Named for Professor W. B. Scott, whose work has thrown a flood of light on Patagonian vertebrate palæontology.

Potamopyrgus peteningensis (Gould).

(Plate XLIr, Fig. 12.)

Cingula peteningensis Gould, U. S. Expl. Exped., Mollusca, p. 130, pl. 9, figs. 152, a, b.

Lagoa de Peteninga, near the entrance of Rio Janeiro harbor, in brackish water.

The shell of this species resembles Paludestrina attenuata of the eastern United States by its extremely convex whorls parted by deep sutures. The type, from the Lagoa de Peteninga, was described as smooth, about 8.5 mm. long, 2.5 wide, with 6 whorls. One of the original lot is figured
(fig. 12). It measures 5.4 mm. long, 2.4 wide, the aperture 1.8 mm. long, and is composed of 6½ whorls. The apex is very obtuse. Another lot, received from G. von Frauenfeld, contains shells slightly more slender than that figured. In one of them I found two minute embryonic shells.

IDIOPYRGUS gen. nov.

The shell is perforate, solid, turrité, with long spire of very convex whorls; aperture diagonal, oval, its plane sloping forward below, posterior end rounded, sinused; a small sinus at junction of the outer lip with the basal margin. Lip slightly expanded, thickened within. Operculum paucispiral, with the nucleus at the lower fourth, near the columellar margin. Radula having the formula \( \frac{5}{7}; 7.9.16 \).

Type, *I. souleyetianus*.

The snail for which this genus is proposed differs from all known species of *Littoridina* by its internally thickened, somewhat expanded and bisinuate peristome, the diagonal aperture, and by having fewer cusps on the upper reflection of the central teeth, as well as on the marginal teeth. The scoop-like shape of the outer marginal tooth is also rather peculiar.

*Idiopyrgus souleyetianus*, half row of teeth and an isolated marginal tooth.

*Idiopyrgus* has some resemblance to the Dalmatian genus *Lanzaia* Brusina, and to the Mexican *Pterides* Pilsbry. In all of them the long axis of the aperture stands strongly diagonal to that of the shell, the posterior end of the aperture is rounded, effuse or sinused, the lip expands more or less, and the whorls of the tapering spire are strongly convex. These apertural characters are so unusual in *Amnicolidae*, that I am disposed to view them as indications of real relationship between the three genera, rather than convergent structures in snails otherwise diverse.
Unfortunately *Lanzaia* and *Pterides* are known by dead and bleached shells only, so that the relationship suggested remains hypothetical. It affords no safe basis for deductions concerning the antecedents of the three groups, each known from a single spot, and separated from its supposed relatives by thousands of miles.

The genera are characterized as follows:

Common characters:—Shell turrited, composed of very convex whorls; aperture strongly diagonal to the axis of the shell, oval, the posterior end rounded, spreading or sinused, the basal margin also retracted or effuse; peristome continuous, more or less expanding, running forward below.

a. Shell openly umbilicate, thin, *sculptured with sinuous longitudinal ribs and fine spiral stria*, minute (2 to 3 mm. long, with 6 whorls); the aperture elliptical, lip broadly flaring. Dalmatia. *Lanzaia* Brusina.

b. Shell rimate, thin, *smooth*, minute (2.5 to 3 mm. long, with 7 to 10 whorls); the aperture ovate; lip sinused or spreading above, broadly retracted or spreading at the base. Mexico. *Pterides* Pilsbry.

c. Shell perforate, solid, smooth, of about 7½ whorls; the aperture oval, small, the lip having a rounded sinus above and a smaller one at junction of outer and basal margins, which expand but little. Southeastern Brazil. *Idiopyrgus* Pilsbry.

**Idiopyrgus souleyetianus** sp. nov.

(Plate XLI, Figs. 14, 14a.)

The shell is perforate, solid, turrited, greenish-yellow, opaque. The surface is smooth and glossy, growth-lines very faint. The spire tapers regularly to a small but obtuse apex. Whorls 7½, all strongly convex, joined by deep sutures. The aperture is oval, oblique, the *basal margin being advanced*, the outer lip retracting upward. The peristome is continuous, the outer lip expanded, somewhat thickened within. It has a rounded sinus just below the upper insertion, and a small sinus at the junction of the outer and basal margins. The continuous columellar and parietal margins are arcuate, forming a raised ledge across the parietal wall.

Length 5.3, diam. 2.1 mm., length of aperture with peristome 1.9 mm.

Rio Doce, State of Espirito Santo, Brazil. Types No. 100,534, A. N. S. Phila., from No. 127 Museu Paulista.

In old individuals the spire becomes more or less shortened by erosion of the early whorls. This form differs from the Littoridinas by its peculiar peristome. It is probably a straggler from the fauna of eastern Brazil, of which little is yet known.
POTAMOLITHUS Pilsbry.

Paludestrina in part, d'Orbigny, Voyage dans l'Amérique Méridionale, Mollusques, p. 381.

Lithoglyphus sp., of some authors.


Amnicolidae with the shell imperforate, solid, ovate or globose, smooth or 1-3 carinate, covered with a thick cuticle, which is usually green or olive; aperture ovate or rounded, the peristome continuous; columella concave, more or less heavily calloused.

Operculum lodging some distance within the aperture, corneous, oval, reddish-brown, opaque, with a thinner, yellowish border along the basal, outer and upper margins. It is composed of about 2 whorls, the nucleus near the lower third, and nearer the columellar side. The outer face is slightly concave and rather strongly striate. Inner face is glossy except for a long dull scar of attachment near the columellar margin (P. rushii).

Penis simple, terminating in a small glans surrounded by a fleshy preputial ring.

The radula has teeth of the form usual in Amnicolidae, central tooth with 2 to 4 basal cusps on each side, admedian tooth armed with 8 to 10, marginal teeth having many cusps, 17 to over 30.

Type P. rushii Pilsbry.

Distribution, La Plata drainage and faunally similar streams draining into the Atlantic in Sao Paulo and Rio Grande do Sul, Brazil.

The soft anatomy is known from A. d'Orbigny's figures of living P. lapidum and H. von Ihering's description and figures of a form from near the mouth of the Santa Maria River, of the Rio dos Sinos drainage, identi-
fied as *P. lapidum*. In this form “the penis is inserted nearly on the median line of the back of the neck (fig. 13). It was not found for a long time, because the number of females far exceeded the males among the animals examined. It is very broad at the base, provided with an obtuse hump and runs somewhat coiled towards the right side, where its summit lies near the base of the tentacle. It is perforated throughout by the vas deferens, and terminates in a slender conical point, which is encircled by a sort of prepuce.”

**Dentition of *Potamolithus*.” — I have examined the teeth of *P. rushii* and *P. lapidum supersulcatus*. The former (fig. 14) has teeth with the formula $6^5.7.6.4-4.10.33.40$. The middle cusp of the central tooth is long but rather narrow, and the side cusps are small. The cusps of the admedian tooth are of about equal width, but are longer in the middle, as shown in fig. 14, B. On the inner marginal tooth the cusps are extremely small and numerous, and on the outer they are still more numerous.

In *P. lapidum supersulcatus* from Fray Bentos on the Uruguay River (fig. 15) the formula is $5^5.4-4.8^4(4,1,3.)17.18$, or in another radula, the central tooth has the cusp-formula $5^5.3-3^3$. All of the teeth have much larger cusps than in *P. rushii*, and on the admedian tooth the median cusp is much longer than its fellows. All of the teeth have the same general shape as

---

1 Malakozoologische Blätter, n. F., VII, 1885, pp. 96–99.
those of *P. rushii*, the difference in the figures being chiefly due to the side teeth being shown in their natural positions, while in *P. rushii* they are drawn from a frayed radula, as is usually done in allied genera.

The teeth of a form from the Santa Maria River, a tributary of the Sinos, identified as *P. lapidum* (probably not that but an allied species) have been figured by Dr. H. von Ihering, as having two basal teeth on each side. The figure is somewhat diagrammatic, but shows teeth resembling *P. I. supersulcatus*.

The eggs are deposited in plano-convex chitinous capsules about .6 or .7 mm. in diameter, adhering to shells and probably stones. The embryonic shell is smooth, Naticoid or globular in probably all of the species. So far as I can see, it is quite continuous with the neanic stage. In all of the species studied, the earlier portion of the neanic stage is also Naticoid. In some forms this shape persists to maturity, but in others angles or carinae set in, their appearance dividing the period of youth into two or three substages; so that a highly specialized form may pass successively through rounded, singly carinate, bicarinate, tricarinate, and finally varicose stages. The degrees to which these sculpture-conditions are accelerated and the stage finally reached, allow us to fix the relationships and evolutionary grade of the several forms with some degree of accuracy, in species where the young stages are accessible.

These little river snails live on and under stones, at and below low-water mark, often in copious numbers. Up to this time, they have been collected at comparatively few places, yet the range of the genus probably

*Fig. 15.*

*Potamolithus lapidum supersulcatus, A*, the teeth of a half-row in their normal positions. *B*, central and outer marginal teeth of another individual.
embraces the whole La Plata drainage, together with some rivers flowing directly into the Atlantic, but having their rise adjacent to or interposed between the head streams of the Uruguay and Paraná Rivers. Many new forms doubtless remain to be found, since only an inconsiderable part of the waters of the Plata system have been explored for mollusks.

To what extent the specific characters of the forms vary from place to place, we cannot say, since most of them are known from a single locality. *P. lapidum*, which has been assigned a wide range, seems to vary with locality, and probably several species will eventually be recognized in what is now considered *lapidum*. Of most of the forms, many specimens have been studied, some of them by hundreds, and I have been astonished at the absence of intermediate or ambiguous individuals, such as one finds in the fresh-water *Pleuroceratidae* or *Melaniidae*. It is however well known to those who have studied large quantities of fresh-water snails, that the *Amnicolidae* are generally conservative; the specific features are crystallized, while in the Melaniens they are fluid.

**Significance of the Characters of Potamolithus.**

In the *Amnicolidae*, as in the *Viviparidae*, the prevalent genera almost everywhere are smooth-shelled forms with rounded or convex whorls. Such forms have prevailed since the first appearance of these families. In those *Amnicolidae* which are sculptured in the adult stage, the early (embryonic and early neanic) stages are smooth or nearly so. These facts apparently point to the conclusion that smooth, rounded shells are primitive and sculptured shells derivative in these families.

Throughout Neocene time, carinate, varicose or otherwise strongly sculptured species or genera of these families have frequently appeared, but their distribution has been local and their duration brief. In some cases the genesis of these sculptured or distorted forms from smooth and normal types has been traced, as in the case of *Viviparus hoernesi* of the Pliocene of southeastern Europe, and *Viviparus altior* and *limnothauma* of the Floridian Pleistocene. At the present time, sculptured *Viviparidae* and *Amnicolidae* are comparatively rare and confined to small areas. *Margarya* in Lake Tali, *Tulotoma* in the Coosa River, *Pyrgulopsis* in Pyramid Lake, Nevada, and *Tryonia* in a very restricted area in the Southwest, are familiar examples. To these may be added the group of carinate species of *Potamolithus* in the Uruguay River. In all of these
cases, the distribution of the forms is very restricted, often to a single lake, or a few springs; and in some cases, as Pyrgulopsis and Tryonia, we have evidence that the species had a wider range in the Pleistocene and are now apparently approaching extinction.

The facts indicate that in Amnicolidae and Viviparidae, shell-sculpture is a phylogerontic character, showing the approach of senility of the race; strongly developed sculpture in a species signalizes its last incarnation.

The considerations advanced above go to show that the present Potamolithus fauna consists in large part of species which in an evolutionary sense are aged, are more or less distinctly gerontic or senile. Over 80 per cent. of the species have characteristics which indicate, as experience has shown, that they represent side lines of evolution, impotent to continue the phylum, or to give birth to new phyla. There remains also a small group of unspecialized species represented by P. lapidum of the Paraná and its allies in southern Brazil.

I have been unable to find a shred of evidence to connect the development of sculpture in these fresh-water snails with the concentration or increased alkaline content of waters they inhabit, as some conchologists have assumed. It is doubtful whether any such modified forms inhabit alkaline or saline waters, while it is positively known that most of them do not. Amnicolidae which live in brackish or sea water are not strongly sculptured, but as smooth as their congeners in fresh water. Examples of this are found in certain species of Paludestrina (P. minuta (Tott.), P. acuta (Drap.), P. salsa Pils.) and Littoridina (L. australis (d’Orb.), etc.). It is extremely likely that these are forms of fresh-water origin, which have become adapted secondarily to more or less saline waters. Part of them live also in perfectly fresh water.

**INTERRELATIONS OF THE SPECIES OF POTAMOLITHUS.**

The species now known belong to four collateral phyla, each comprising forms in several very diverse stages of specialization. The less differentiated species in each phylum retain in adults a globular or Naticoid shell without keels or angles, and in three of the groups have the lip simple and unspecialized. This type of shell is common to other genera of the subfamily. In all of the phyla some species have developed orthogenetically a varix or crest at the lip; the shape of the shell is profoundly altered by spiral keels in some species. These modifications are more or
less exactly parallel in the several series. I have attempted to express the above ideas graphically in the following diagram, in which the least evolved species of each group are placed below, while the carinate forms are placed above in each group.

```
Outer lip not varicose.

I
- jacuhyensis

II
- intracallosus
- ribeirensis

III
- carinifer
- quadratus
- paysanduanus

IV

<table>
<thead>
<tr>
<th>Lip varicose.</th>
</tr>
</thead>
<tbody>
<tr>
<td>rushii</td>
</tr>
<tr>
<td>philippianus</td>
</tr>
<tr>
<td>iheringi</td>
</tr>
<tr>
<td>conicus</td>
</tr>
<tr>
<td>buschii</td>
</tr>
<tr>
<td>orbignyi</td>
</tr>
<tr>
<td>agapetus-chloris</td>
</tr>
<tr>
<td>microthauma</td>
</tr>
<tr>
<td>hidalgoi</td>
</tr>
<tr>
<td>peristomatus</td>
</tr>
<tr>
<td>lapidum</td>
</tr>
<tr>
<td>dinochilus</td>
</tr>
<tr>
<td>filipponei</td>
</tr>
<tr>
<td>bisinuatus</td>
</tr>
<tr>
<td>sykesi</td>
</tr>
<tr>
<td>gracilis</td>
</tr>
<tr>
<td>simplex</td>
</tr>
</tbody>
</table>
```

[In these diagrams the most primitive, Naticoid species of each group are below; those modified by the development of carinæ above; and the right-hand column contains derivative species having the outer lip varicose. The connecting lines indicate the chief affinities of the forms.]

While the above diagrams are not intended for phylogenetic trees, all the species being contemporaneous, yet it is likely that the ancestral forms in groups II, III and IV did not differ materially from the least differentiated of the recent species. It is significant that the only form known to have a wide distribution, *P. lapidum*, is one of the least specialized of the genus.

The evolution of carinæ and varices in the several groups seems to have been homoplasic. It will be shown below that the keels are superposed
upon the Naticoid form much earlier in some species than in others; and judging from these various degrees of acceleration, it would seem that the specialized species are of unequal antiquity.

**Key to Species and Subspecies of Potamolithus.**

I. Columella wide, having a longitudinal furrow excavated in its face. Latter part of the suture not more rapidly descending; outer lip strengthened by a strong varix.

a. Last whorl dominated by a very strong peripheral keel.  
   P. rushii.

a". Last whorl flattened peripherally, without carina.  
   P. philippianus.

a". Last whorl rounded, conspicuously banded with green.  
   P. iheringi.

II. No longitudinal groove in the face of the columella.

a. Outer lip well expanded or with a prominent varix; not notched or sinuous.

b. Periphery strongly keeled, the keel visible on part of the penultimate whorl.
   c. Three keels on the last whorl.  
      P. microthauma.

   c". Last whorl flattened above and below the peripheral keel.  
      P. hidalgoi.

   c". Last whorl globose, convex above and below the peripheral keel.  
      P. peristomatus.

b. Periphery obtuse or rounded.

   c. Lip-varix very strong; periphery hardly angular, base convex; back with a spiral rib below the suture; no columellar area.  
      P. dinochilus.

   c". Lip-varix narrow; last whorl without keels, except that around the columellar area.  
      I. orbignyi.

a". Outer lip simple or slightly contracted, without an external varix, the edge not sinuous.

b. Last whorl sculptured with spiral keels or angles.

   c. With a single keel or angle at the basal periphery, none above it.

   d. High-trochiform, flattened above and below the strong carina, much higher than wide; columella narrow.  
      P. conicus.

   d". Obliquely trochiform, convex above the peripheral angle, about as wide as high; columella wide.  
      P. buschii.

   c". Trochiform, with a carina at the basal periphery and two contiguous keels on the back above.  
      P. tricostatus.

   c". Trochiform, with a strong carina at the median periphery, the slope above it flat, with a small carina at the upper third; no distinct umbilical area.  
      P. carinifer.

   c". Stout keels at both periphery and shoulder, giving the last whorl a squarish contour; umbilical area ample; spire very short.  
      P. quadratus.

   c". Base and periphery rounded, a shallow sulcus or two low ridges on the back above.  
      P. lapidum supersulcatus.

   c". Back of last whorl with two contiguous angles, the upper one stronger, base rounded, spire rather slender and high.  
      P. hatcheri.

b. Last whorl rounded, without keels, angles or sulci.

   c. Shape approaching globular, the spire short or very short, conic.

   d. Columella narrow; last whorl evenly rounded.

   e. Green or olivaceous; alt. 5, diam. 4 mm.  
      P. lapidum.

   e". Yellow, alt. 3, diam. 3 mm.  
      P. paranensis.
PILSBRY: NON-MARINE MOLLUSCA OF PATAGONIA. 573

d. Three-banded with reddish; alt. 4, diam. 3 mm. Paraná River.  

   
P. petitianus.

d. Columella and especially the parietal wall thick, forming a blackish ledge;  
spire very short.

c. Last whorl swollen below the suture; olivaceous, about 5 x 4 mm.  

   
P. paysanduanus.

c. Last whorl evenly rounded; olive with black markings, alt. and  
diam. 7 mm.  

   
P. doeringi.

d. Columella wide, flat and white; last whorl evenly rounded.  

c. Pale green, diameter nearly equal to the alt., 3 x 2.8 mm.  
P. agapetus.

c. Pale green, higher than wide, alt. 3, diam. 2.5 mm.  

   
P. chloris.

c. Olivaceous, perforate, alt. 5.7, diam. 4.3 mm.  

   
P. catherinae.

c. Reddish brown, alt. 3.5, diam. 3.4 mm.  

   
P. ribeirensis.

c. Naticoid, but with an obtuse prominence on the columella far within.  

   
P. intracallosus.

d. Last whorl noticeably flattened peripherally; solid, brown, becoming  
green at the base and behind the lip; 6 x 5.6 mm.  

   
P. jacuhynensis.

c. Acutely long-ovate in shape, smooth, the ovate aperture not much exceeding  
half the total length; 4.3 x 3 mm.  

   
P. simplex.

d. Outer lip sinuous, nicked or notched.  

b. Trochiform, the periphery very strongly carinate, aperture squarish, umbilical area  
large.  

   
P. filipponei.

b'. Shell nearly globular, the diameter about equal to the alt., smooth, swollen below  
the suture, lip with a sinus above.  

   
P. paysanduanus sinulabris.

b'. Shell globose-conic.  

c. Outer lip strongly expanded, with swollen, thickened and three-notched face.  

   
P. sykesi.

c. The outer lip thin, with deep subsutural and basal sinuses; 4.8 x 3.3 to  
5 x 3.9 mm.  

   
P. bisinuatus.

c. Similar, but with the sinuses shallower, the upper one often inconspicuous.  

   
P. bisinuatus obsoletus.

b'. Shell acutely ovate-conic, about 4.3 x 2.7 mm., the outer lip thin, sinuated, especially  
at the base.  

   
P. gracilis.

GROUP OF P. BISINUATUS.

Smooth, globose-conic or ovate-conic species, with no trace of spiral  
angles or sulci, except in P. filipponei; the outer lip usually sinuous. The  
spire is longer than in other groups of the genus.

POTAMOLITHUS FILIPPONEI von IHERING.  

(Plate XLIa, Figs. 8, 8a.)  

Potamolithus filipponei von Ihering, Nautilus, XXIV, June, 1910, p. 15.  

The shell is imperforate, pyramidal, olive colored, with a weak reddish-  
brown spiral band in the middle of the penultimate whorl. Surface
smoothish, weakly marked with lines of growth. Whorls 5, the first very minute and dark, following whorls strongly convex, the last whorl strongly carinate, concave above and below the carina, convex on the upper surface. The base is excavated or concave between the peripheral keel and a second prominent keel which bounds a large, funnel-shaped umbilical area. The aperture is very oblique. Peristome continuous, the outer lip thin, unexpanded, having small rounded sinuses below the suture, below the peripheral angle, and at the base of the columella. The columella is narrow, very little thickened, straight, much longer than the short, thick parietal margin.

Length 4.4, diam. 4 mm.

Montevideo, Uruguay, type in the Museu Paulista, collected by Dr. Florentino Filippone.

This species has some resemblance to *P. hidalgoi*, from which it differs by the entirely different shape of the aperture, the swelling between keel and suture, etc. The bisinuate outer lip, the texture and color-pattern of the shell, etc., show it to be a carinate member of the group of *P. bisinatus*. Described and figured from the type specimen.

**Potamolithus sykesi** Pilsbry.

(Plate XLI, Figs. 1–2a.)


The shell is imperforate, globose-conic, rather solid, yellowish olive, smooth and glossy, faintly marked with growth lines. The spire is conic, truncate at the summit in adult shells of the type lot, about 3½ moderately convex whorls remaining. The last whorl is evenly convex, smooth, and expands strongly at the lip. There is a narrow umbilical crescent. The aperture is very oblique and subcircular. The outer lip is strongly expanded, built forward and convex beyond the expansion, and then contracted, with three deep notches in its margin, one near the upper insertion, another median, the third wider and basal in position. The columella and parietal wall are moderately calloused, and the whole peristome is dusky or blackish.

Length 4.9, diam. 3.9 mm.

“ 4 “ 3.5 “

Uruguay River at Paysandú.
Development.—The neanic stage in this species is like that of *P. bisinuatus*. The ephebic stage is described above. A single geronic individual before me has built the median region of the outer lip forward, obliterating the median notch of the lip (Pl. XLI, figs. 2, 2a).

This remarkable form is the most advanced of the *bisinuatus* phylum known. It resembles *P. bisinuatus* in contour, and neanic shells of the two species are distinguishable only by the bands of the latter, when these are developed. The ephebic stage differs widely by the strong expansion of the outer lip, its thickened and thrice notched face.

What relation *P. bisinuatus* and *P. sykesi* bear towards *P. petitianus* (d’Orb.) of the Paraná River is unknown, pending the discovery of the adult stage of the latter, the specimen described and figured by d’Orbigny being supposed to be immature. It is likely that *petitianus* will prove to be different from either of the other species.

**Potamolithus petitianus** (d’Orbigny).


Shell short, ovate-inflated, thin, smooth, not umbilicate; spire short, eroded, with obtuse summit, composed of five convex, narrow whorls, parted by a suture which is not very deep. Aperture oval with simple margins. Color green, with three reddish bands, one on the convexity of the spire, the others at the suture and anterior. Alt. 4, diam. 3 mm. *(d’Orbigny).*

Paraná River at San Pedro, Argentina, collector unknown.

This may be the neanic stage of a species allied to *P. bisinuatus*; but in this group of forms (*bisinuatus* and *sykesi*) the neanic stage shows no specific differentiation, the specific characters appearing only in the final stage of development. Until the adult form of *P. petitianus* is collected at the type locality, San Pedro on the Paraná, no good purpose will be served by uniting either of the other species to *petitianus* as its hypothetical adult. There remains also the possibility that *P. petitianus* is a permanently undeveloped form, not passing beyond the neanic stage of the bisinuatae species, and therefore falling more properly in the *lapidum* group. Compare also *P. paranensis*, p. 589.
Potamolithus bisinuatus Pilsbry. 

(Plate XLI, Figs. 6-7a.)


The shell is imperforate, globose-conic, moderately solid, green or pale yellowish-green, sometimes one-colored, but usually begirt with three narrow reddish-brown bands, one bordering the suture, another above the periphery, and on the penultimate whorl visible above the suture, and the third band below the periphery. The nearly smooth surface is weakly marked with lines of growth. The spire is conic and rather high, truncated at the summit in all adult shells seen, by the erosion of the early whorls, about 3½ remaining. These are strongly convex, the last one globose, without keels or angles of any kind, and with no expansion or varix behind the outer lip. There is a distinct and concave but quite small columellar area. The aperture is moderately oblique, round-ovate, white or brownish inside. Its posterior angle is more or less filled with a callous deposit. The peristome is edged with a black line. The thin outer lip has a deep rounded sinus near its posterior insertion, and there is a second sinus, wider and not so deep, at the base, the lip projecting as a broad truncated lobe between the two embayments. The columella is concave, narrowly calloused and the parietal callus is rather thick.

Length 5, diam. 3.9, length of aperture 2.8 mm.

Uruguay River at Paysandú. Types collected by Dr. W. H. Rush, U.S.N., May 7, 1892.

Development.—The shell is of the ordinary simple Naticoid shape throughout the neanic stage, differing from P. lapidum only in having a longer spire. The peculiar Pleurotomoid sinuosities of the peristome have their origin and development wholly in the ephelic stage. In this respect, P. bisinuatus is like Pachycheilus dalli Pils., and differs widely from Gyrotoma and Pleurotoma, in which the anal notch appears very early.

This species is related to P. sykesi, from which, however, it differs totally in characters of the ephelic stage.
Potamolithus bisinuatus obsoletus Pilsbr.

(Plate XLI, Figs. 3-5.)


The shell is more slender than P. bisinuatus, acutely ovate-conic, green, without color bands. The outer and basal margins of the peristome have only shallow sinuses in place of the deep ones of P. bisinuatus; the upper one is often hardly perceptible, and, when developed, is nearer the upper insertion of the lip than in bisinuatus. The inner margin of the peristome is less heavily calloused, and the columellar area is excessively narrow, hardly noticeable. The apices are perfect in the type lot, the shell consisting of 5½ whors.

Length 4.9, diam. 3.5 mm.; aperture 2.8 mm. long.

Rio de La Plata, at San Gabriel's Island, near Colonia, Uruguay. Also Uruguay River, at Fray Bentos, Uruguay.

A large series from the first locality shows this form to be constantly unlike P. bisinuatus. It has the characters of an immature stage of the latter.

Potamolithus gracilis Pilsbr.

(Plate XLI, Figs. 8, 8a.)


The shell is imperforate, acutely ovate-conic, solid but not thick, olive-yellow, becoming reddish-brown on the spire, or dull green; smooth and glossy. The spire is straightly conic, rather acute. Whors 5½, moderately convex, the last symmetrically rounded. The aperture is ovate, subvertical. The outer lip is not expanded, acute, the edge sinuous, being retracted slightly at the suture, a trifle sinuated in the middle, and having a distinct rounded sinus at the base. The columella is concave and narrow, the parietal callus thin. There is no differentiated umbilical area.

Length 4.3, diam. 2.7, length of aperture 2.25 mm.


This species is related to P. bisinuatus, but it is unlike that species in its narrower contour. A long series has been examined. The green specimens predominate.
Potamolithus gracilis viridis Pilsbry.

(Plate XLI, Figs. 9, 9a.)


This form is similar to gracilis in contour, etc., but there is a deeper sinus near the upper termination of the lip, and the basal sinus is well developed. The color is green. The dark maculae shown in the figure are due to the dried soft parts.

Rio de La Plata, at San Gabriel's Island, near Colonia, Uruguay.

Potamolithus simplex sp. nov.

(Plate XXXIX, Figs. 6, 6a.)

The shell is acutely ovate-conic, thin, but rather solid, pale greenish-yellow; the surface glossy, faintly marked with growth-lines. The spire is straightly conic, apex rather acute. Whorls 5½, convex, the last evenly globose, not expanded at the lip. There is a distinct and rather wide flat axial area, bounded by a delicate keel. The suture is deep and descends briefly and rather abruptly close to the aperture. The aperture is oblique and acutely ovate. Peristome simple, thin, black-edged and continuous, its edge even, not in the least sinuous or notched. The columella is very narrow and concave.

Length 4.3, diam. 3, length of aperture 2.25 mm.

Uruguay River at Paysandú.

The slender ovate contour and smooth surface ally this species to P. gracilis, but the total absence of any sinus or notch in the lip, the anterior descent of the suture and the well developed axial or umbilical area are features unlike P. gracilis. No young individuals have been identified, but they probably could not be distinguished from P. gracilis. P. simplex approaches Littoridina in contour, but the anteriorly descending suture and the axial crescentic area are unlike that genus.

Group of P. buschii.

Potamolithus agapetus sp. nov.

(Plate XL, Figs. 10, 10a.)

The shell is imperforate, globular-conic, of a rather light green color. The surface is smoothish, faintly marked with growth-lines. Spire short
and conic, the apex obtuse. Whorls 4, convex, the last evenly rounded, without keels or angles, the suture shortly deflexed at the aperture. There is a moderate or narrow and usually rather conspicuous columellar area. The aperture is oblique, rather broadly ovate. The peristome is thickened within, the basal and outer margins are evenly and strongly arcuate, the outer becoming straightened near the upper angle of the aperture. The inner lip is heavily calloused; columella rather wide and flattened.

Length 3, diam. 2.8 mm.
Rio de La Plata, at San Gabriel's Island, near Colonia, province of Colonia, Uruguay. Types, 69,683, A. N. S. P.

Development.—The young of about three whorls and 2 mm. diameter are essentially similar to the adult stage in shape. The columella is somewhat wider in proportion.

This is the smallest Potamolithus now known. It has the globular shape of P. lapidum, but the wide columella of the neanic stage shows that P. agapetus is related to P. buschii. It differs from P. buschii by the evenly rounded shape of the last whorl, the diminutive size and clear green color, as well as by the total absence of a peripheral angle or keel; but the young stages of P. buschii are not always readily distinguishable from immature P. agapetus.

In some shells the aperture is smaller than in that figured, by reason of a greater descent of the last whorl immediately behind the lip. The columellar crescent varies from quite narrow, almost linear, to quite wide and concave.

**Potamolithus chloris sp. nov.**

(Plate XLIb, Figs. 8, 8a.)

The shell is imperforate, rather solid, ovate conic, light green, the spire paler, summit corneous. The spire is straightly conic, apex minute, slightly obtuse. Whorls 4⅓, convex, the last evenly rounded throughout, expanding near the aperture. The aperture is very oblique, shortly oval. The peristome is slightly expanded, obtuse. Columella and parietal wall heavily calloused, the former flattened, rather wide.

Length 3, diam. 2.5 mm., length of aperture 1.8 mm.
Salto das Cruzes, Rio Tiete, State of Sao Paulo, Brazil. Type, No. 103,046, A. N. S. P. from No. 106 Museu Paulista. Collected by Hase-mann, 1908.
This snail has the texture, color and size of *P. agapetus*, from which it differs by the longer, *Amnicola*-like shape and the small aperture. There is no differentiated umbilical area.

**Potamilithus buschii** (Fild.).

(Plates XL, Figs. 11–14; XLIb, Fig. 3.)

*Lithoglyphus buschii* Dunker, Frauenfeld, Zoologische Miscellen, V, in Verhandlungen der k. k. zoologisch-botanischen Gesellschaft in Wien, 1865, XV, p. 530, Taf. 11, first two figures.

The shell is obliquely trochiform, being flattened below, semiglobose above; moderately solid; green or olive-green with irregular buff flecks or zigzag streaks, and usually a dusky-brown band midway between the periphery and suture. Surface with faint growth-lines and indistinct spiral striae. Spire very short, the apex usually reddish. Whorls 4½, convex, the first one or two usually eroded in adult shells. The last whorl is carinate, strongly angular, or with a rounded angle at the basal periphery, very convex above the keel, and usually having a low ridge on the back a short distance below the suture; there is also, sometimes, a second obtuse ridge below the upper one (fig. 13), much as in *P. lapidum super-sulcatus*. Base flattened, but slightly convex. There is a well developed concave columellar area bounded by an acute ridge. The aperture is very oblique, ovate, the outer lip without a varix, but built downward somewhat near and at the upper angle, contracting the aperture. The columellar and parietal margins are heavily calloused; columella rather wide, concave and flattened.

Length 4.7, diam. 4.6 mm.

" 4.3 " 4 "

Mouth of the Arroyo San Juan, where it empties into the La Plata, Province of Colonia, Uruguay (type locality); San Gabriel's Island in the La Plata, near Colonia, in the same Province, and Fray Bentos on the Uruguay River (Wm. H. Rush).

**Development.**—At the end of the second whorl the periphery begins to be weakly angular, the shell being about 2 mm. in diameter. Before that stage the shape is globose-depressed, with a rounded periphery. At the end of the third whorl the angle is strong. The columella is very broad,
PILSBRY: NON-MARINE MOLLUSCA OF PATAGONIA.

its face concave, throughout the neanic stage. Figs. 11, 11a represent a young shell 3.3 mm. in diameter.

*P. buschii* is related to *P. agapetus*, but it attains a larger size, and differs in the coloration and angular periphery; yet there are some immature specimens in the lot from San Gabriel's Island, which approach very near to *P. agapetus*. It differs from *P. lapidum* and *P. tricostatus* by its wide columella at all stages of growth. It is a very abundant snail at San Gabriel's Island, on the northern shore of the Rio de La Plata.

The figures on Plate XL represent the least angular forms of the species from San Gabriel's Island. The type was a carinate shell, such as that represented in Plate XLI b, fig. 3, from Fray Bentos, on the Uruguay River. The ridge below the suture on the back is usually inconspicuous. Most of the specimens from San Gabriel's Island are similar to those figured on Plate XL, or somewhat more angular, but less so than shells from the mainland. They also have the ridges or sulcus on the back more strongly developed in some examples.

**Potamolithus conicus** (Brot).

(Plate XL, Figs. 8, 9, 9a.)

*Lithoglyphus conicus* Brot, Journal de Conchylieologie, XV, 1867, p. 69, pl. 1, fig. 5 (Uruguay River in the Province of Entrerios).

The shell is high-trochiform, rather straightly conic, solid, green or brownish-olive, variegated with pale green or yellow zigzag streaks. The smoothish surface is rather glossy, with the usual fine growth-lines. The conic spire is longer than in related species, and often eroded at the apex. Whorls nearly 4½, convex. The last whorl slopes steeply and with little convexity to the carinate periphery, which is basal in position. On the back there is sometimes a very weak ridge below the suture and parallel to it, but this is usually wanting. The base is flat, and there is a rather wide crescentic, concave columellar area defined by a sharp angle. There is no varix at the lip. The aperture is very oblique, symmetrically ovate, in fully adult shells is contracted somewhat, being filled in above; with a continuous, black-edged peristome. The columella is concave and narrow.

Length 4.7, diam. 3.7 mm.

" 3.9 " 3.3 "
Uruguay River at Paysandú, Uruguay, under stones at extreme low water.

Development.—The youngest shells at hand lack about one whorl of completion. At this stage the shape is practically that of adults, except that there is no columellar crescent and the columella is wide and flat. The weak subcultural ridge, when developed at all, appears on the back of the last whorl only. The most fully developed shells therefore have the characters of the four-whorled stage in *P. tricostatus*, while most shells, wanting the upper keel, are like *tricostatus* at the three-whorled stage.

*P. conicus* differs from *P. tricostatus* by its smaller size, more highly conic shape, and the less developed sculpture of the last whorl. It is more closely related to *P. buschii*, both having the columella wide during the neanic stage; but in the adult stage *P. buschii* is depressed and *P. conicus* elevated in shape.

The color in life is probably always more or less green. The rich brown tint of those figured may be due to change in alcohol, though I am not sure that this is the case, as the shells were dry when they came into my possession. A lot of *P. buschii* which had been in alcohol have changed to brown, while all of those dried fresh are green.

**Potamolithus orbignyi** Pilsbry.

*(Plate XL, Figs. 1-5.)*


The shell is imperforate, globose, solid and strong. Uniform olive colored, or with brown bands below the suture and in the middle of the last whorl, on an olive or green ground. Surface smoothish, with faint growth-lines and fine, very indistinct spiral striae. The spire is very short and conic. Whorls nearly 4½, strongly convex, the later third of the last whorl descending more rapidly. The last whorl is squarish, obtusely biangular, being shouldered above, flattened in the middle, and more or less angular at the basal periphery. The ample crescentic columellar area is concave and bounded by an angle. The lip is strengthened by a narrow varix, which is blackish and bevelled to the lip-edge. The aperture is very oblique, and rounded-ovate. The outer lip is thickened within, the inner lip heavily calloused. The columella is broad and flattened.
Length 5, diam. 4.8 mm.

Uruguay River, at Paysandú, Uruguay. Types, No. 69,696, A. N. S. P.

In the typical form of the species the flattening of the last whorl is nearly vertical below the shoulder. In other examples (Pl. XL, figs. 2, 3) the flattened surface slopes steeply, and the periphery is somewhat more angular, though still rounded off. Young shells (Pl. XL, figs. 4, 4a) with 3½ whorls, having a diameter of 2.5 mm., have a distinct flattening above the periphery, though less marked than in adults. This was not seen by my artist, who drew the peripheral region of fig. 4 much too regularly rounded. Fig. 5 represents a slightly larger shell, diam. 2.8 mm., the basal aspect drawn to show the very broad, flat, columellar callus. In contour it resembles fig. 2.

_P. orbignyi_ is somewhat related to _P. dinochilus_, but differs in the lower varix, absence of a spiral ridge below the suture, the larger columellar area, broader columella, etc. It is similar to _P. philippianus_ in shape, but lacks the columellar furrow of that species.

**Potamolithus jacuhyensis** Pilsbry.

(Plate XXXIX, Figs. 3, 3a.)

_Potamolithus jacuhyensis_ Pilsbry, Nautilus, XII, p. 113, Feb., 1899.

The shell is globose, solid and strong, smoothish, with the usual slight growth lines and scarcely visible spirals; covered with a strong, rich brown cuticle, becoming more reddish towards the apex, and dark green below the last turn of the suture, behind the lip, and at the base. Spire short and conic. Whorls 4½, those of the spire convex, the last very obtusely biangular, being flattened peripherally, subangular at the shoulder, flattened and sloping above it, and tapering basally. There is in some specimens a well-developed flattened columellar crescent, but in other individuals it is reduced and inconspicuous. The aperture is large and somewhat spreading, moderately oblique and irregularly semicircular. The outer lip is sharp, with a dark line at the edge, not expanded, and not in the slightest degree varicose or contracted. The inner lip is heavily calloused.

Length 6, diam. 5.6 mm.

Jacuhy River, Rio Grande do Sul, Brazil. Types, 61,820, A. N. S. P., collected by Dr. H. von Ihering.
No immature stages are represented in the series before me. The species belongs to the more primitive or youthful group, by its simplicity of form, the absence of varices, and the want of contraction at the mouth. It is not closely related to any of the La Plata drainage forms, but has some resemblance to *P. lapidum*, from which it differs by the obtusely biangular shape, the much larger aperture, and the heavily calloused columella, which allies it to species of the Uruguay system, and those following.

**Potamolithus intracallosus** sp. nov.

(Plate XLlb, Figs. 9, 9a.)

The shell is imperforate, solid, globose with short, conic spire, olive-green, blackish in the axial region. Surface very lightly marked with growth lines. Whorls $4\frac{1}{2}$, convex, the last strongly convex below the suture and at the periphery, which is below the middle, somewhat flattened above the periphery; base convex; an acute keel divides off a crescentic umbilical area. The suture descends slightly near the aperture. The aperture is ample, oblique, very shortly oval. The peristome is black-edged, not expanded. The continuous columellar and parietal margins are very heavily calloused, the columella broad and flattened. In oblique view in the aperture, a broadly rounded prominence is seen in the middle of the columella.

Length 3.7, diam. 3.5 mm., length of aperture 2.7 mm.

Hiririea, Rio Ribeira, State of Sao Paulo, Brazil. Type, No. 103,047, A. N. S. P., from No. 2037 of the Museu Paulista. H. von Ihering.

This small species of the *P. buschii* group is notable for its very broad columella, with an internal node or rounded prominence. This last feature differentiates it from *P. ribeirensis*, which closely resembles *intrapallosus* in shape.

**Potamolithus ribeirensis** sp. nov.

(Plate XLlb, Figs. 6, 7.)

The shell is imperforate, rather solid, globose, red-brown, with a faint olivaceous tint near the outer lip; sculpture of indistinct growth-lines only. Spire short, conic. Whorls $3\frac{1}{2}$, convex, the last globose, most convex at the periphery and just below the suture, the intervening surface somewhat flattened in some examples, but strongly convex in others. The periphery is very indistinctly subangular in front, but in fully adult
shells this is often scarcely noticeable. The base tapers and is not very convex. The suture descends very slightly in front. There is an extremely narrow umbilical area. The aperture is oblique and ample, angular above. The outer lip is thin and acute, and forms a half-circle. The columella is very heavily calloused, its face flat or excavated, with a longitudinal depression. Parietal callus heavy within, thin and adnate at the edge.

Length 3.5, diam. 3.4 mm.; length of aperture 2.7 mm.

Rio Ribeira, Yporanga, State of Sao Paulo, Brazil. Types collected by R. von Ihering, 1908.

This form resembles P. lapidum (d'Orb.) in shape, but differs by its very broad columella and diminutive size. It is rather closely related to P. buschii, though differing by the rounded periphery, which even in immature shells shows the hardly noticeable trace of an angle. P. intracallosus is an allied species.

A series of eight shells from Hiririea, Rio Ribeira, State of Sao Paulo, collected dead, but not bleached, has been submitted by Dr. von Ihering. The cuticle is olive-green or clear green. The shape is about as in ribeirensis. In several shells there is a very narrow umbilical area, defined by a raised line. In the youngest shells, diam. 2 mm., the columella is very wide, as in ribeirensis, but in the largest shells, length 5.2, diam. 4.2 mm., it is quite noticeably narrower. In one shell of this lot (Plate XLIb, fig. 4) there is a wide, lunate, concave umbilical area, defined by an acute black keel, the columella being wide, as in P. ribeirensis. It measures, length 4.2, diam. 4 mm. Further material is needed to show the status of this form, which for the present may be considered a race of P. ribeirensis.

Potamolithus catharinae sp. nov.

The shell is perforate, acutely ovate, solid but strong, covered with an olive-green cuticle. The spire is conic, its lateral outlines straight, the apex small, but somewhat obtuse, entire in adult shells. Whorls 5½, evenly convex, parted by an impressed suture, which descends very briefly at the aperture. The last whorl is strongly convex throughout; near the aperture it dilates a little. The aperture is slightly oblique, ovate, fleshy-gray within, blue-white near the lip. The outer lip is thin and black at the edge, and with the basal lip forms a half-circle; in profile its edge is even. The columella is heavily calloused, the callus extending across the parietal wall, where it is less thickened. There is a distinct umbilical
perforation and a feebly differentiated axial or columellar area, linear in the adult stage, but becoming wider in old shells.

Length 5.7, diam. 4.3, length of aperture 3.8 mm.

Colony of Hammonia, State of Santa Catharina, Brazil. Types, No. 103,048, A. N. S. Phila., from No. 163 of the Museu Paulista.

This is a much more robust species than P. simplex. It differs from P. lapidum by the produced spire and heavier columella. It is unlike all

![Fig. 16. Potamolithus catharinae.](image)

... described forms in having a distinct umbilical perforation. The apex is perfect in all of the shells received, although the oldest of them has the last whorl deeply eroded.

**GROUP OF P. LAPIDUM.**

*Potamolithus lapidum* (d'Orbigny).

*Paludina lapidum* d'Orbigny, Magazin de Zoologie, p. 29 (1835).


*Hydrobia lapidum* Strobel, Materiali per una Malacostatica di terra e di acqua dolce dell' Argentina Meridionale, 1874, p. 59, with var. dunkeri, t. c., p. 59, pl. 2, f. 5.

?*Hydrobia lapidum* d'Orb., E. von Martens, Malakozoologische Blätter, XV, 1868, p. 192 (Guahyba River at Porto Alegre; near Rödersberg; in the forest region and Cima da Serra at the Estancia of Christian Horn, on the plateau, 3–4000 ft. elevation; collected by Dr. Hensel).

?*Lithoglyphus lapidum* d'Orb., von Ihering, Malakozoologische Blätter (neue Folge), VII, 1885, pp. 96–99, figs. 1–3 (dentition, head and...
penis of specimens from the Santa Maria River, near its confluence with the Rio dos Sinos).

?Lithoglyphus lapidum d'Orb., Clessin, Malak. Blätter, n. F., X, p. 170 (Guahyba débris; Santa Maria River).

"Shell inflated-conic, short, thick, smooth, spire conic, acute at the summit; whorls 5, convex, the last whorl usually depressed, all being parted by a deep suture. Aperture round, ample, with thick borders, not reflexed. The columella is calloused. Color uniform green. Operculum corneous, flexible, spiral.

"Alt. 5, diam. 4 mm.

"This species is closely related to the preceding (P. peristomatus) by its short shape; it differs constantly by wanting a carina, and by the non-reflexed peristome" (d'Orbigny).

"P. lapidum inhabits the whole course of the Paraná and La Plata, from well above Corrientes to Buenos Aires, or from 27° to 34° S. lat.; on stones, clinging in great numbers to the under side, at extreme low water. It moves quite actively" (d'Orbigny).

The typical form of P. lapidum, figured by d'Orbigny, has an evenly rounded last whorl, though his phrase, "le dernier [tour] est souvent comme déprimé," indicates that the Paraná shells are frequently compressed around the upper part of the last whorl. Mr. E. R. Sykes, who kindly examined the types of the species for me, states that one specimen is so characterized. The aperture is ample, the lip not in the least contracted and not thickened, the columella only moderately thickened.

The variety dunkeri of Strobel, from the Rio de La Plata at Olivos, near Buenos Aires, seems to differ from P. lapidum only by its small size; length 4, diam. 3.5 mm., with 4 whorls. It was described from a single individual, and probably has no racial significance.

I have not seen typical P. lapidum from the Uruguay River.

In the State of Sao Paulo P. lapidum has been reported by several authors from streams flowing into the Atlantic, as quoted in the references above, which I am unable to control; but I doubt whether the true P. lapidum is found in those waters.

A form of P. lapidum having the spire rather longer than d'Orbigny's type figures is drawn in figs. 4, 5, 5a of Plate XXXIX. It is from the Uruguay River, exact locality not noted.

At Paysandú, Uruguay a race occurs differing somewhat from typical
P. lapidum (Plate XLIb, fig. 5). The shell is solid, globose, with conic spire longer than in P. lapidum, though the apex is eroded in all specimens seen. Aperture smaller than in lapidum, somewhat contracted by an internal thickening and contraction of the lip above. Columella narrow. A very narrow umbilical area is defined by an angle, which runs very close to the columellar lip. This race may be called var. elatior.

Length 4.5, diam. 3.5 mm.

The long spire separates this form at once from P. paysanduannus, which moreover differs in the shape of the last whorl. In old examples the aperture is more contracted than in that figured, and the spire is more worn.

**Potamolithus lapidum supersulcatus** Pilsbry.

(Plates XXXIX, Figs. 7, 7a; XLIa, Fig. 7.)


The shell is like P. lapidum in its globular shape. It is dark green, usually with pale, irregular zigzag markings, sometimes confined to the spire, and there is usually an indistinct brownish band above the periphery. On the last whorl an obtuse ridge revolves not far below the suture, most prominent on the back; this is followed by a concavity, below which there may be a second obtuse angle. The base is quite full and rounded. The suture descends suddenly to the aperture, which is therefore a little contracted, oblique and ovate. The peristome is acute, dark-edged, continuous, without trace of a varix. The columella is narrow and concave, and the parietal wall is only moderately thickened. Whorls $4\frac{1}{2}$.

Length 5.3, diam. 4.7 mm.

" 4.3 " 4 "

Rio de La Plata, at San Gabriel's Island, near Colonia, Uruguay. Also Uruguay River at Fray Bentos, and Paysandú, Uruguay.

*Development.* — The spiral ridges appear only on the last whorl, and usually only on its last half. Up to that time the whorls are rounded and the shape Naticoid. At all stages of growth the columella is quite narrow.

Potamolithus I. supersulcatus is quite closely related to P. tricostatus (Brot), from which it differs chiefly by the weaker spiral ridges, which are only one or two in number, not three, as in P. tricostatus. These ridges are not only less emphatic in supersulcatus, but they do not appear so
early in the development of the individual. The narrow columella is similar in the two species.

The specimens from Fray Bentos and Paysandú (where only a few were taken), have no second angle below the upper spiral ridge on the back. It is a very abundant snail at San Gabriel’s Island. Specimens preserved in alcohol become brown when dried; and this is also true of most, probably all, of the dark green species.

The figures by von Iterson, on Plate XXXIX, represent a very dark green specimen. They are not so characteristic as that on Plate XL1a, which shows the back of an example with the color-pattern fully developed.

**Potamolithus paranensis** sp. nov.

(Plate XL1b, Figs. 10, 11.)

The shell is globose, with conic spire, olive-yellowish, smooth except for fine growth-lines and very fine, indistinct spiral striae. Whorls strongly convex, the last swollen below the suture, in its latter part flattened below the swelling, rounded at the periphery and base. The aperture is very oblique, ovate, outer lip thin and sharp. Columella moderately calloused.

Fig. 11. Alt. 3.3, diam. 3 mm.; 3 whorls remaining, the apex eroded.
" 10. " 2.4, " 2.3 " 4 whorls, the apex perfect.

Rio Paraná at Puerto Bertoni, Paraguay, collected by A. de W. Bertoni, No. 103,049, A. N. S. Phila., from No. 189, coll. Museu Paulista.

From the sharpness of the outer lip, I am disposed to think that none of the specimens is fully mature, though the largest one must be nearly so, as it is eroded like an old shell. It differs from *P. lapidum* by the longer spire, small size and pale color. There are two specimens in the collection of the Academy of Natural Sciences of Philadelphia, three in that of the Museu Paulista.

**Potamolithus doeringi** sp. nov.

The shell is subglobular with a short conic spire, solid and strong, olive-colored, more or less streaked or mottled with black. The surface is dull, lightly marked with fine lines of growth and extremely weak, coarse spirals; 3½ whorls of the spire remain, the apex being eroded in adult shells. The whorls are strongly convex, parted by a deep suture, which descends briefly at the aperture. The last whorl is convex through-
out. Aperture quite oblique, large, white within. Peristome black, a little contracted, more so above, black. Columella and parietal wall

(Fig. 17.)

FIG. 17. *Potamolithus doeringi.*

moderately calloused, the edge black, continuous. There is a concave, crescent-shaped umbilical area defined by an angular ridge.

Length 7, diam. 7 mm.; length of aperture with peristome 5.7 mm.

Salto do Yguassú, Province of Missiones, Argentina, collected by Dr. H. von Ihering, June, 1910.

This is a larger species than *P. lapidum* (d’Orb.), with the last whorl decidedly more dilated, the aperture more oblique, and a crescentic umbilical area developed. When collected, the shells were heavily coated with black ferrous material and most of them bear egg-capsules on the shell.

**Potamolithus paysanduanus** von Ihering.

(Plate XLla, Figs. 1, 1a.)

*Potamolithus paysanduanus* v. Ihering, *Nautilus,* XXIV, 1910, p. 15, with forms *sinulabris* and *impressus.*

The shell is imperforate, solid, subglobular, olive-colored, smooth except for weak growth-lines, shining. The spire is very low, conic, the apical whorls eroded in all the individuals seen; three whorls remaining are strongly convex. The last whorl is *swollen below the suture,* then somewhat flattened, rounded at the periphery and base. The suture descends abruptly to the aperture in fully adult shells. The aperture is somewhat oblique, ovate. The peristome is black, with obtuse, flat edge; the outer and basal margins are narrow; the upper part of the outer lip and the upper angle are wide, and the *columellar and parietal margins are very wide and flat,* black, contracting the aperture.
Length 4.8, diam. 3.9 mm.
Paysandú, Uruguay. Dr. Florentino Filippone. Types, No. 103,070, A. N. S. P.

This form differs from *P. lapidum* by its contracted aperture, the inner and upper margins of the peristome being heavily thickened within, the thickening covered with a blackish cuticle. In *P. lapidum* the aperture is ample, with no such heavy thickening. In the stage immediately preceding maturity the columella has a moderate white callus within, and the parietal callus is quite thin. The type specimen is figured. Six others I have seen show no significant variation.

With these specimens two other forms were sent which seem to be phases or varieties of the same species, but not intergrading in the material examined: Whether they occurred in the same or in separate colonies is not known.

Form *sinulabris* (Plate XLIa, figs. 2, 3). The shell differs from typical *P. paysanduanus* by having a low rounded ridge behind the outer lip, which is black, contracted, and has a rounded sinus above. The basal lip is narrow and a little retracted. The columellar and parietal margins are not so broad as in *paysanduanus*. There is an excavated umbilical area, but it is generally not distinctly defined by an angle. The shape is otherwise as in *P. paysanduanus*.

Length 4.5, diam. 4.9 mm.

Form *impressus* (Pl. XLIa, figs. 4, 4a). The shell resembles typical *paysanduanus* as far as the middle of the last whorl, after which it has an impressed, concave zone a short distance below the suture, and usually a sinus in the upper part of the lip. The outer lip is thin and sharp, with no external varix or swelling. The shell, under the cuticle, is light yellow.

Length 5, diam. 4.8 mm.

Up to the time of reaching the size of adult *P. paysanduanus*, this form grows normally. After that, instead of forming a contracted aperture, it adds a half whorl, which is distorted by a superior concave zone and finally terminates with a thin outer lip. The specimens were sent with typical *paysanduanus*.
POTAMOLITHUS quadratus Pilsbry & von Ihering, sp. nov.
(Plate XLIa, Figs. 6, 6a.)

The shell is solid, imperforate, light olivaceous-brown, lightly marked with growth-lines, shining. The spire is very short, 3 1/2 whorls remaining, the apex being eroded. The penultimate whorl has a strong angle at its upper third, is flat and horizontal above the angle, flat and sloping below it. The last whorl is bicarinate, the peripheral and shoulder carinae being about equally strong, giving it a square appearance. The base tapers to a rather high ridge, which bounds a wide, excavated, umbilical area. The peripheral angle becomes obsolete just behind the outer lip, and it is visible only on the last whorl. The aperture is very oblique, ovate, white within. Peristome a little contracted, its face flat and thickened within, at and above the periphery and in the upper angle; below the periphery it is thin and a little retracted. The columella and parietal wall are moderately calloused, a groove in the face running parallel to their outer margin.

Length 3.9, diam. 4 mm.
Paysandú, Uruguay. Dr. Fl. Filippone.

This snail differs from P. carinifer in the shape of the last whorl, the much stronger upper keel (which is developed earlier) and in having a large umbilical area. It lacks the median keel and variegated coloration of P. tricosatus.

A young shell 2.4 mm. diam. consists of 2 1/2 whorls, the first 1 1/2 are rounded; the keel at the shoulder then begins, rapidly becoming strong. The columella is very wide, its face excavated.

POTAMOLITHUS carinifer sp. nov.
(Plate XLI, Figs. 5, 5a.)

The shell is imperforate, trochiform, solid, blackish-brown in old individuals, the shell of a brick-red tint below the cuticle. Surface lightly marked with growth-lines. The spire is very short, conoidal. Whorls about 4, the earlier ones convex. The first half of the penultimate whorl is convex; then a small carina gradually arises a short distance below the suture, the surface flat and sloping below it; a little later a strongly projecting keel appears just above the lower suture, being uncovered by the descent of the last whorl. The last whorl has a strongly projecting
peripheral keel and a small keel near the suture, the surface flat between the keels. The base is a little convex. The umbilical area is slightly excavated, but not bounded by a ridge or keel. The suture descends slowly in its last third of a whorl, and then rapidly at the aperture. The aperture is very oblique, shortly ovate, flesh-tinted inside. Peristome blunt, not expanded. Columella concave, rather narrow, its face slightly grooved. Parietal wall rather heavy-calloused.

Length 4.2, diam. 4.1 mm.
Paysandú, Uruguay. Dr. Florentino Filippone.

This species closely resembles *P. microthauma*, from which it differs by the entire absence of a varix behind the outer lip; the coloration is also different, but the type is probably abnormally dark, being an old shell which has lost part of the cuticle.

**Potamolithus tricostatus** (Brot).

(Plate XL, Figs. 6, 6a, 6b, 7.)

*Lithoglyphus tricostatus* Brot, Journal de Conchyl., XV, 1867, p. 68, pl. 1, fig. 4 (Uruguay River, Province of Entre ríos).

The shell is trochiform, solid and strong; olive-colored, profusely marked with irregular or zigzag buff spots. The surface is glossy when clean, with the usual weak growth-lines and minute spiral striae. Spire short, convexly conoidal. Whorls 4½, the first three convex. A ridge then gradually appears below the suture, increasing to a strong carina on the back of the last whorl. The last whorl has also a thick, strong keel defining the base, and a short keel, chiefly dorsal, above the middle of the slightly convex surface between the two keels. The base is flattened, but a little convex; a small columellar area is usually distinctly differentiated. The last whorl expands slightly at its termination, and then contracts. The aperture is very oblique, rounded-ovate, bluish-white within. The peristome is continuous, black-edged. The columella is narrow and concave; and, with the parietal wall, is moderately calloused.

Length 5, diam. 5 mm.

"  5.3  "  4.8  "

"  4.7  "  3.9  "

Uruguay River, at Paysandú, Uruguay.

*Development.*—The youngest shells seen have nearly 4 whorls. The
upper and lower keels are already strongly developed near the lip, but there is no trace of the intermediate keel, which in adults is less than one whorl long. The two keels present are very weak at the beginning of the fourth whorl, the basal one stronger there than the upper, so that apparently at 2½ whorls the form must be Naticoid, like *P. lapidum*. The next stage, at about 3 whorls, would have a basal angle only, like *P. buschii*. The columella is narrow, as in *P. lapidum*, throughout the neanic stage. The ephebic stage is marked by a slight expansion, forming a narrow and low varix. Fully adult shells are markedly gerontic by reason of the strong post-variceal contraction.

The figures of this species given by Brot are unsatisfactory from being too small properly to show its characters. The median keel is shown too low in position. The original locality was indefinite, but comprised an area including the river in the neighborhood of Paysandú. Three specimens of the original lot, received from Dr. Brot, agree with those collected by Dr. Rush at Paysandú.

**Potamolithus hatcheri** sp. nov.

(Plate XXXVIII, Figs. 6, 6a.)

The shell is imperforate, turbinate, solid and strong, pale yellowish-green, becoming darker and narrowly streaked with dark green on the later half of the last whorl; on the penultimate whorl the color changes to rich reddish-brown, becoming darker towards the summit. Surface glossy, with faint growth-lines and fine, indistinct spiral striae. Spire conic, high and rather slender, the apex lost in the type, a pit in its place. Three whorls remain, the first two of them evenly convex. The last fourth of the penultimate whorl is very obscurely biangular, the lower angle more distinct than the other. These angles are more pronounced on the face of the last whorl, and on its later half the upper angle rises into a strong keel, the surface above it concave; at the same time, the lower angle loses in prominence, and is quite lost behind the lip. An extremely weak spiral ridge is developed on the back below the suture. The base is rounded. The last third of a volution of the suture descends more rapidly. There is no trace of a varix at the lip. The aperture is quite oblique, as wide as high, almost circular, but slightly angular above. The lip is obtuse, thickened within, with a continuous blackish marginal line. The columella is
very concave, and not wider than the outer lip, and is bounded outside by a linear, hardly noticeable columellar area.

Length 5.5, diam. 4.9 mm.

Uruguay River, at Paysandú, Uruguay. Type, No. 90,218, A. N. S. P.

This species is based upon a single specimen, quite adult and to all appearance perfectly normal, yet so unlike other known species that its relationships are doubtful. The prominent characters of *P. hatcheri* are the elevated and tapering spire and the approximation of the two angles of the last whorl, the upper one finally dominating, while the lower becomes obsolete on the last half of the last whorl. The absence of a lip-varix and of a noticeable columellar area, as well as the rather narrow columella, are features like the *P. lapidum* group. The young shell, up to the middle of the penultimate whorl, must be ovate, without angles; but in the absence of immature specimens, not much can be said of the development of the species.

It is named to honor Mr. J. B. Hatcher.

**Potamolithus dinochilus** Pilsbry.

(Plate XXXVIII, Figs. 5, 7, 7a, 7b, 8.)


The shell is globosely trochoidal, imperforate, very solid and thick; green, profusely marked with irregular, zigzag buff streaks. The surface is smoothish, with the usual faint growth-lines and indistinct fine spiral striae. The spire is conic, rather high when preserved entire (fig. 8), but worn to a blunt summit in all adult shells seen. There are 4½ whorls, but only 2½ to 3 remain in adults. The earlier whors are rounded, but at the beginning of the last a small ridge arises a short distance below the suture. The last whorl is somewhat flattened and slopes steeply to the basal periphery, which is full and narrowly rounded or subangular. The ridge below the suture is narrow, but well developed on the back. The columellar area is ill-defined and very narrow. The lip is strengthened by a varix, which above the periphery is very high, massive and recurred, but becomes weak at the base. The aperture is very oblique, contracted, irregularly rounded, with the margins built out beyond the varix, continuous around the mouth, thick and obtuse. The columella is strongly concave, and moderately calloused, not more than the lip generally.

Length 4.9, diam. 5.2 mm.

" 4.5 " 5 " 
Uruguay River, at Paysandú, Uruguay. Types, No. 69,695, A. N. S. P.

Development. — The series at hand contains no young shells, one only (Pl. 38, fig. 8) has not yet formed the post-variceal contraction. It appears however that, until the last whorl is reached, the shell has the primitive Naticoid shape. The last whorl represents morphologically the second neanic substage of such accelerated forms as *P. microthauma*. The strong post-variceal contraction and heavy thickening of the inner margin of the peristome declare that the last stage is distinctly gerontic.

*P. dinochilus* differs conspicuously from *P. microthauma*, *hidalgoi* and *peristomatus* by the absence of a peripheral keel, and from *P. orbignyi* by the shape of the last whorl and the ill-developed columellar area. It has perhaps more in common with the *P. lapidum* group, especially in the coloration and the persistence of the Naticoid form to the beginning of the last whorl; but the very high, massive lip-varix of *P. dinochilus* is a feature unlike any of the *lapidum* group.

**Potamolithus peristomatus** (d'Orbigny).


"The shell is short, trochoidal, thick, smooth, carinate in front, the carina projecting. Spire conic, short, obtuse at the summit, composed of 5 convex whors, of which the last is keeled in front, the carina forming a border above the suture between the other whors. Aperture round, much expanded, with thick, reflexed borders; the columella wide and flat. Operculum corneous, spiral. Color uniform greenish, paler in front of the mouth.

"Alt. 5, diam. 5 mm." (d'Orbigny).

Parduá River, above its confluence with the Paraguay River, at the villages of Itaty and Iribucua, Province of Corrientes, Argentina, at extreme low water, under stones where the current is strong; living in numerous families (d'Orbigny).

In general shape this species resembles *P. buschii* and *P. conicus*, but it differs from both by the well-expanded peristome. It is known by the original lot only.
POTAMOLITHUS HIDALGOI Pilsbry.
(Plate XXXIX, Figs. 1, 1a, 1b.)


The shell is imperforate, trochoidal, with flattened base and conic spire; moderately solid. The type specimen is dull reddish-brown, somewhat olive-tinted at the base, and olivaceous blackish on the lip-varix; but some immature shells of the original lot are dull olive-colored, darker on the keel. The surface is slightly marked with growth-lines. The spire is conic. There are 4½ whorls, the first 2½ convex; then a keel appears, immediately above and filling the suture. The last two-thirds of the last whorl descends slowly, the peripheral keel projecting above the suture. The last whorl is flat and slopes steeply above the peripheral keel, and is slightly convex below it. A very narrowly crescentic columellar area is defined by an inconspicuous, but acute angle. The outer lip is strengthened by a moderately strong varix, not continued below the termination of the peripheral keel. The aperture is extremely oblique, rounded-ovate, angular above and indistinctly so outwardly, at the termination of the keel. The columella is arcuate and moderately calloused.

Length 5.2, diam. 5 mm.

Uruguay River, at Paysandú, Uruguay. Types, No. 69,687, A. N. S. P.

A very weak ridge below and near the suture may be seen in two immature shells of the type-lot, but this is not developed in the others. The early neanic substage is Naticoid, like the corresponding age in P. microthauma. The rest of the neanic stage is the equivalent of substage 2 in P. microthauma. The deep descent of the last whorl gives a markedly gerontic character to the adult stage. P. hidalgoi is therefore less evolved sculpturally in wanting the third neanic substage, senile characteristics supervening earlier.

The species is named in honor of Dr. J. G. Hidalgo of Madrid, author of a beautiful work on the mollusks of the Spanish Commission to South America, among many other important labors.

POTAMOLITHUS MICROTHAUMA Pilsbry.
(Plate XXXVIII, Figs. 2, 2a, 2b, 3.)


The shell is imperforate, biconic, very solid and strong. The last whorl is olive-green, rather profusely marked with irregular buff maculœ, which
are sometimes absent on the base. The lip-varix is bright green. On the penultimate whorl the ground-color changes to purple-brown and the markings disappear, the earlier whorls being uniform dark purple-brown. The surface shows delicate growth-striae and a very minute, almost effaced spiral striation. The spire is conic, with straight outlines, the apex entire and obtuse, though small. Whorls 5, the early ones convex, the first 2¼ being rounded, without trace of keels. A peripheral keel then begins, strong from the beginning, and projecting flange-like above the suture. The last whorl descends slowly from about its last third and much more rapidly near the aperture. The peripheral keel projects very strongly and is slightly undulating; and a small keel arises below the suture, becomes stronger on the back, then gradually decreases. On the base, midway between the periphery and center, a low keel revolves, the area within it being nearly flat. There is a very narrow crescentic columellar area. The outer lip is strengthened by a very high and massive varix, which is recurved above, with a rib on its face running to the lip-edge, and below passes into the basal keel. The aperture is very oblique, ovate; the outer lip thin at the edge. The columella is narrowly calloused and regularly concave.

Length 5.5, diam. 6 mm.
" 4.6 " 4.7 "

Uruguay River, at Paysandú, Uruguay, under stones at low water, Types, No. 60,689, A. N. S. P.

Development. — The neanic stage is sharply divided into
(1) A lapidum substage, in which the shell is rounded, without keels. comprising the first 2¼ whorls.
(2) A carinate substage, initiated by the almost abrupt rise of the peripheral carina. From a half whorl to a whorl this is the only keel developed. This stage corresponds to the adult P. hidalgoi, and is of brief duration.
(3) The basal and the subsutural carinae begin, weak at first, becoming stronger near the end of the substage.

The ephebic stage is announced by the expansion to form the varix, which, however, is not terminal, the whorl continuing and contracting beyond it, thus assuming gerontic characteristics.

P. microthauma is related to P. hidalgoi and P. peristomatus, but it is a much more evolved form than either, structures added in the second
and third neanic substages of *microthauma* being superposed upon the adult structure of *P. hidalgoi*.

**GROUP OF P. IHERINGI.**

**POTAMOLITHUS RUSHII** Pilsbry.

(Plate XXXVIII, Figs. 1, 1a, 1b, 4.)


The shell is imperforate, wider than high, biconvex, very solid and strong; light green, the last half of the last whorl dusky green, the keels rather bright green; the early whorls being dark reddish-brown. The surface is somewhat glossy, with faint, fine growth-lines and barely perceptible spiral lines. The spire is convex, the apex obtuse. Whorls 4, but the first is eroded, leaving a pit, in all the adult shells seen. The whorls are convex, with seam-like sutures. In the latter part of the penultimate whorl the peripheral keel is usually visible at the suture. The last whorl has a very strong peripheral keel, the surface being concave above and below it. Above the concavity the upper surface is convex, the convexity rising into a hump on the back, then disappearing, the last fourth of the whorl being flat. The base has a thick and prominent keel, defining a concave yellowish columellar area. The outer lip has a high, narrow varix at the edge. The aperture is very oblique, short-ovate, nearly circular, with a continuous, black-edged margin. The oblique columella is very broad, with a gutter or concavity near to and parallel with the inner margin.

Length 4.3, diam. 6.3 mm.

Uruguay River, at Paysandú, Uruguay. Types, No. 69,686, A. N. S. P.

**Development.**—The youngest specimens seen have three whorls and a diameter of 3 mm. They have the depressed contour of adults and are strongly carinate peripherally, but the carina is distinctly weaker in front of the mouth, apparently indicating that it begins when the shell has nearly two whorls and a diameter of about a millimeter. At the 3 mm. stage the columella is very broad, semicircular, with a deep excavation and rod-like inner border (Pl. XXXVIII, fig. 4). Very late in the neanic stage the basal keel appears, the shell then being about 5 mm. in diameter; the columellar area being very narrow, at first linear. The rib or convexity
of the upper surface is also of late appearance, these structures belonging to the third neanic substage, the second, or uncarinate, substage thus occupying the greater part of the neanic stage. The discontinuation of the upper ridge or hump initiates the ephebic substage. The marginal varix and the absence of any tendency of the last whorl to descend or loosen its coil anteriorly, show that this species is at its acme. It has none of the stigmata of senility which are so manifest in *P. microthauma*, *P. hidalgoi*, etc.

There is some variation in the degree of depression of the whole shell, the amplitude of the columellar area and in the prominence of the hump on the back, which is sometimes almost suppressed. The size also varies, one specimen before me with the varix nearly complete measuring only 5 mm. in diameter.

The relationship between *P. rushii* and *P. iheringi* is exceedingly interesting. The two species are similar in general color-scheme, in the varix, absence of more rapid descent of the suture towards the mouth, etc., but are totally diverse in contour, the one being carinate, the other smooth and Naticoid. Yet it is significant that while *P. iheringi* has no trace of a peripheral keel, the green band occupies the same position as that coloring the keel in *P. rushii*.

**Potamolithus iheringi** Pilsbry.

(Plate XXXIX, Figs. 2, 2a.)


The imperforate or rimate shell is globular-conic, very solid and strong, pale olive-yellow, with a sharply defined, bright green band bordering the suture below and another immediately above the periphery, visible as a narrow border on the penultimate whorl above the suture; the columellar area being also dull green. Very faint growth-lines and an almost effaced spiral striation are visible under the lens. The spire is low conoidal, the suture clearly incised but not impressed. Whorls 4½, the first half whorl usually lost in adult shells; the rest are slightly convex, the last whorl being globular, at first regularly rounded, but its last third descends slowly, and is perceptibly flattened obliquely in the peripheral region, being more full and convex below. The base is convex, but there is a concave crescentic columellar area defined by an inconspicuous angle. The outer lip is strengthened by a moderately strong varix, bevelled to the lip-edge,
and weak at the base. The aperture is quite oblique, ovate, subangular above. The outer lip is thick within. The columellar margin is somewhat straightened, the columella very wide, flattened and excavated, a rather deep furrow running parallel with and near to the inner edge.

Length 5, diam. 4.9 mm.

" 4.9 " 4.6 "

Uruguay River, at Paysandú, Uruguay. Types, No. 69,698, A. N. S. P.

Development.—The youngest individuals seen have 3½ whorls, with a length of 2.3 and diam. of 2.8 mm. They are therefore more depressed than the adult stage, and have both green bands well developed. The subsutural green band begins at the end of the second or beginning of the third whorl. The axis is wholly imperforate. The columella is very broad, half-round, with the excavation in its face deeper than in adults. At no stage are there any traces of carinae or protuberances.

I have seen a long series of this species. The characters described above are very uniform, and it is readily known by the Naticoid shape, grooved columella and green bands. Named in honor of Dr. H. von Ihering.

Potamolithus philippianus sp. nov.

(Plate XLIø, Figs. 1, 1ø, 2.)

The shell is globose, solid and strong, light greenish yellow, with a narrow dark green border below the suture, the apex pinkish. The surface is nearly smooth, showing faint growth-lines and fine, very indistinct spiral striae. Spire low, conic, the apex minute, entire. Whorls 4½, convex, the last not more rapidly descending, distinctly flattened peripherally, shouldered above the flattened zone, very obtusely subangular below it, the base convex, with a rather wide, concave and crescentic columellar area, the lower portion of which is bounded by an angle. The outer lip is strengthened by a moderately high varix near the margin, much lower at the base, and continuous with the angle bounding the columellar area. The aperture is very oblique and semicircular, the outer margin being deeply arcuate, the inner somewhat straightened. The columella is rather broad, with a shallow furrow on its face; and the outer edge is somewhat elevated near the insertion, leaving, in the type specimen, a shallow crevice behind it, not visible in younger shells.

Length 5.7, diam. 5.7 mm.
Uruguay River, at Paysandú, Uruguay. Types, No. 103,050, A. N. S. P.

Development.—The smallest specimens seen measure 3 mm. diam., 2.8 high. The peripheral flattening is already weakly perceptible. There is no trace of a basal angle or columellar area, but the columella is very wide, almost semicircular, with a deep excavation in its face. The angle bounding the columellar area is developed very late, appearing only on the last whorl.

This species is described from four specimens, none of them perhaps completely mature. The shell figured is almost mature, but lacks the post-variceal contraction of the lip, which would probably be acquired. Two of the shells have a peripheral brown band, fading out at the edges, and one has a second fainter band on the outer part of the base.

Compared with *P. iheringi*, this species differs by its somewhat biangular shape, the lower varix and the coloration. *P. paysanduanus* differs more radically by its columella.

**LITHOCOCCUS** gen. nov.

Shell globose, thick, sculptured with strongly developed spiral ribs, the upper ones spinose; composed of 4 to 5 convex whorls. Operculum corneous, subcircular, composed of 3 or 4 whorls, the nucleus near the center. Dentition Amnicoloid; central tooth with 5 to 7 denticles on the cusp and 3 basal denticles on each side. Inner lateral tooth with 13–14, next with about 16 denticles. Type *L. multicarinatus*.

This genus differs from the *Lithoglyphina* and *Potamolithus* by the operculum. The penis has not been examined.


**PELECYPODA.**

Family *SPHÆRIIDÆ* Dall.

The family *Sphæridae* is represented in South America by four genera: *Sphærium, Musculium, Eupera* and *Pisidium*. Doubtless the last two genera will prove to be generally distributed and numerous in forms, *Eupera* in tropical, *Pisidium* in temperate and cold regions; but up to this time only a few have been described. The list of species described from
south of the Equator, compiled in the course of work on Patagonian forms, is here given for the convenience of those who have occasion to study the group.

**List of South American Sphæriidæ.**

*Sphærium æquatoriale* Clessin, Malakozoologische Blätter, n. F., I, 1879, p. 176, Taf. 11, figs. 4–6.
Rio Pedro, Val de Chillo, Ecuador. Length 9, alt. 6, diam. 3.5 mm. Referred by Clessin to the group Corneola.

*Musculium argentimum* (d’Orbigny). See below.

*Musculium patagonicum* Pils. See below.

**Eupera bahiensis** (Spix), Testacea Brasil., 1827, p. 32, pl. 25, figs. 5, 6. *Sphærium bahiense* Spix, Prime, Monograph of American Corbiculidæ, 1865, p. 53, fig. 52.
Bahia, Brazil.

Venezuela, Brazil.

**Eupera tumida** (Clessin). *Limosina tumida* Clessin, Syst. Conchylien Cabinet, Cycladeen, p. 246, pl. 46, figs. 5–8.
Bahia, Brazil.

Magellan Straits, in 61 fathoms; Rio Chico to base of the Andes.

**Pisidium observationis** Pils. See below.

**Pisidium patagonicum** Pils. See below.

Montevideo, Uruguay. Length 6, alt. 5, diam. 3.8 mm.

Maldonado, Uruguay. Length 3 mm.

Montevideo, Uruguay. Length 2.6, alt. 2.4, diam. 2 mm. Near the following species, but shorter.


Taguara, State of Rio Grande do Sul, Brazil. Length 3, alt. 2.5, diam. 2 mm.


Concepcion, Chili. Length 5 mm.


Bolivia alta (Forbes); Lake Titicaca (Raimondi). Length 7.5, alt. 6.5, diam. 4 mm.

Pisidium boliviense Sturany, Nachrichtsblatt d. deutschen Malakozoologischen Gesellschaft, 1900, pp. 56, 57, Taf. 1, figs. 1–7.

Bolivia, at Machacamac, between Chililaya and La Paz (Countess von Bayern).

Length 7.8, alt. 6.4, diam. 3.6 mm.

6.7 5.5 3.2
5.7 4.7 2.7

Near P. forbesii, but lower, more oval, with less projecting beak.


Lake Lauricocha, at head of the Marañon River. Length 7, alt. 6, diam. 4 mm.


Rio Pedro, Val de Chillo, Ecuador. Length 5, alt. 4, diam. 2.5 mm. Very inequilateral.


Chanchan River, Ecuador. Length 5, alt. 4, diam. 2.7 mm.
**Musculium patagonicum** sp. nov.

(Plates XLVIa, Fig. 8; XLVII, Figs. 1-7.)

The shell is thin, nearly equilateral, pale straw-yellow, glossy, finely striate. The beaks are low and broad, the embryonic stage marked off by a contraction or gutter. Anterior end almost symmetrically rounded; posterior end slightly flattened or subtruncated. Hinge-line arched. Cardinal teeth very minute, double in the right, single in the left valve. Lateral teeth very short, triangular, single in the left, double in the right valve.

Figs. 6, 6a. Length 8, alt. 6.6, diam. 4.3 mm. 35 miles above Sierra Oveja.

Springs and small streams along the Rio Chico de la Santa Cruz, from 15 to 50 miles above the Sierra Oveja. Types from 50 miles above the Sierra Oveja (Pl. XLVIa, fig. 8).

This species is closely related to *Musculium argentinum* (d’Orbigny), but constantly differs from that by having the posterior end less abruptly truncated, and the beaks flatter, not so full. Figs. 2, 3, 5 are not very good. Figs. 6, 6a and 7 show the shape better. Fig. 1 well shows the teeth as seen in a partly open shell. Eight lots are before me, from as many springs and streams, at distances of 15, 25, 30, 35 and 50 miles above the Sierra Oveja. The examples from farther up are the largest and are remarkably well developed in every way (Pl. XLVIa, fig. 8).

**Musculium argentinum** (d’Orbigny).

(Plate XLVIa, Figs. 6, 7, 7a.)

*Cyclas argentina* d’Orbigny, Mag. de Zool., 1835, p. 44; Voy. dans l’Amér. Mérid., Mollusques, p. 568, pl. 83, figs. 5-7 (Montevideo).


Not *Pisidium argentinum* Clessin, Conchyl. Cab., p. 63, fig. 2a.

D’Orbigny’s figures of this species are very unsatisfactory. Clessin has, I believe, entirely misunderstood them. His *Pisidium argentinum* may possibly be *P. sterkiannum* Pils. For the purpose of affording a basis for comparison with Argentine and Patagonian species, I figure two topotypes, an adult and a half-grown shell, collected by Dr. W. H. Rush, U.S.N., from a creek in the Prado, Montevideo.
The shell is fragile, olive-gray when full-grown, the young ones grayish, with a yellow zone at the basal edge. The ends are more abrupt than in *M. patagonicum*, and the beaks fuller. The teeth are decidedly more delicate and compressed than in *M. patagonicum*.

Pl. XLVIa, fig. 7, 7a. Length 9, alt. 7.8, diam. 5 mm.

" XLVIa, " 6. " 5.3 " 4.2 " 2.9 " (immature).

Strobel reports this species from San Carlos, Province of Mendoza, Bahia Blanca and Carmen de los Patagones. He gives the measurements, length 9, alt. 7.5, diam. 6 mm., for an example from the last named locality.

From the Rio Camaguan, Rio Grande do Sul, Dr. von Ihering sent a single specimen similar to *M. argentinum*, except in being shorter and more globose; length 7.9, alt. 7, diam. 5.2 mm. If such proportions characterize a race in that river, it will probably be considered as specifically distinct.

**Pisidium magellanicum** (Dall).

(Plate XLVII, Figs. 12-16.)


"Shell small, whitish, with an olivaceous smooth periostracum, low, wide beaks and polished surface, with faint concentric indications of three or four resting stages; form inequilateral, anterior end shorter, bluntly subtruncate; base evenly rounded; posterior end slightly attenuated and rounded; external sculpture of faint incremental lines, chiefly obsolete between resting stages; interior smooth, white; hinge of right valve with a single feeble horizontal tooth directly under the beak, and two well-developed lateral teeth rather distant from the beak, the posterior lateral stronger. Length of shell 3.5, of posterior end of shell 1.8; height 2.5; diameter (of both valves) 2 mm." (Dall).

Magellan Straits in 61 fathoms, "Albatross" Station 2778. "A single right valve, evidently washed into the sea from some stream" (Dall).

Springs on the Rio Chico de Santa Cruz, fifteen (Pl. XLVII, figs. 15, 16) and twenty-five miles above the Sierra Oveja; Rio Blanco, at base of the Andes; springs near base of the Andes, 65 miles north of the Rio Chico, 2400 ft. elevation (Pl. XLVII, figs. 12-14).

Dr. Dall, who kindly compared specimens from the last locality mentioned above with the type of *P. magellanicum*, states that they agree almost exactly and, in his judgment, are the same species.
In the fresh specimens from 65 miles north of the Rio Chico the right valve has below the beak a horizontal arcuate tooth, with a straight oblique tooth above it nearer the anterior (short) end. The laterals appear to be smooth. The left valve has a rather long slender tooth, lower and angulated in the middle, the anterior ramus stouter and longer than the posterior. The lateral teeth arise under the visible part of the umbones (while in *P. patagonicum* they arise beyond it). They are high and triangular in profile (fig. 16). The shells are light olive externally, with several darker concentric streaks. The largest shells measure, length 4.9, alt. 4, diam. 2.7 mm.

Specimen from a spring 25 miles above the Sierra Oveja are similar, except that the lower cardinal tooth of the right valve is stouter. One opened contained eleven young ones about 1.6 mm. long, almost filling the cavity.

The teeth are practically identical in specimens from six lots examined.

**Pisidium patagonicum** sp. nov.

(Plate XLVII, Figs. 8–10.)

The shell is pale buff, glossy, very finely striate, with low, wide, smooth and glossy beaks; strongly inequilateral, the anterior end very short and rounded, base evenly convex, posterior end narrow and somewhat produced. Interior white. Cardinal teeth are excessively weak and low, nearly effaced. There is a very low, horizontal, rudimentary tooth in the
right valve, a low short one in the left, with the scarcely discernible trace of another anterior to it. These teeth, especially the anterior one, are too distinctly defined in fig. 10. Lateral teeth very short and moderately strong, distant from the beaks.

Length 4.9, alt. 4.3, diam. 3 mm.

Springs on the Río Chico, fifteen miles (type loc.) and thirty miles above the Sierra Oveja; twenty-five miles below the Río Belgrano; and in the Arroyo Eke, near the head waters of Spring Creek, 2400 ft. elevation.

This clam differs from *P. magellanicum* by the shorter anterior end, short lateral teeth remote from the cardinals, the anterior laterals standing at an angle approaching 100° with the posterior laterals, on account of the curvature of the anterior margin. In *P. magellanicum* the angle of divergence of the teeth is decidedly greater, and they are longer. The cardinal teeth are almost obsolete in *P. patagonicum*, not projecting above the level of the hinge.

In the type lot, as well as in all the specimens from springs recorded above, the surface is straw-yellow and the striation fine and even, without periodic lines indicating growth-arrest. In specimens from small streams in the same region the shell attains a greater size, up to length 6.9, alt. 5.8 mm., and is marked externally with several darker concentric streaks, indicating periods of growth-arrest; the color is generally paler. This form, which may be called var. *zonifer*, is figured on Plate XLVIa, fig. 9. It is from small streams on the Río Chico fifteen and twenty-five miles above the Sierra Oveja.

**Pisidium observationis** sp. nov.

(Text fig. 19.)

The shell is inequilateral, the beaks low and wide, anterior end very short, broadly rounded, posterior end narrow, rounded. Surface glossy, olive, drab or yellowish, marked with several impressed and darker resting periods. Interior bluish-white. Cardinal teeth: in the right valve there are two narrow teeth, parallel, oblique and contiguous. In the left valve there is one nearly straight horizontal tooth, lower and thinner near the middle. The lateral teeth are rather long and not remote from the beaks, single in the right, double in the left valve. The interlocking surfaces of these teeth are more or less granulous.

Length 4.8, alt. 4, diam. 3 mm.; sometimes larger, length 5.1 mm.
Near the Mount of Observation (below the mouth of Santa Cruz River). This species is chiefly distinguished by its cardinal teeth, which differ constantly from those of the other Patagonian Pisidia.

Fig. 19.

*Pisidium observationis.* Interior of right and left valves.

Family *MUTELIDÆ.*

Genus *ANODONTITES* Bruguière.


*Glabaris* Simpson, Synopsis of the Naiades, p. 916.

*Patularia* Dall, Nautilus, XX, 1906, p. 39 (type *P. ovata* Swains. implied).

*Anodontites puelchanus* (d’Orbigny).

Rio Negro: Marsh of San Xavier (d'Orbigny); 12 leagues from Chichinual (Roca Exped.).

Genus DIPLODON Spix.

**DIPLODON PATAGONICUS** (d'Orbigny).

*Unio patagonica* d'Orb., Voyage dans l'Amér. Mérid., p. 610, pl. 70, figs. 1-4.

Rio Negro.

**DIPLODON FRENZELII** (Ihering).

*Unio fenzellii* v. Iher., Archiv für Naturgeschichte, 1893, p. 3, pl. 4, fig. 12.

Rio Negro.

It may be well here to correct the nomenclature of an allied genus of the La Plata and Amazon basins, formerly known as *Castalia* Lam., 1819. This name was believed to be preoccupied by Savigny, in *Vermes*, and *Tetraplodon* Spix, 1827, has been substituted for it.

The late Professor Eduard von Martens wrote to me under date of 18 Oct., 1893, as follows: "Concerning *Castalia*, the date of Savigny's genus of Annelids is given as 1817 in Agassiz's 'Nomenclator,' it is true, but I am not sure that this is correct. I find Savigny's genus first in his System of Annelids, which is said to have been published in 1820, whereas *Castalia* Lamarck was published in 1819, vol. V, part I, of Lamarck's first edition [of the *Animaux sans Vertèbres*].

"P. S. I have consulted in these days the original edition of L. Agassiz's Nomenclator and I find concerning *Castalia* the note:

"'Castalia' Sav., Syst. annélid., 1817. Savigny Système des Annelides, présenté à l'Acad. des Sci. en 1817, publié en 1826.'

“It is true that there is also an edition of the same work, in folio, which makes part of the large ‘Description de l’Egypte,’ and to which in Engelmann's Bibliotheca Zoologica, vol. I, p. 581, the date 1820 is given. By general consensus the date of publication and not the date of finishing a manuscript and presenting it to a learned body is accepted as fixing the priority. I come to the conclusion that *Castalia* Lam., 1819 can stand for the shell, and *Castalia* Sav. among the Annelids is to be changed."
II.

NOTES UPON THE CHARACTERISTICS AND ORIGIN OF THE NON-MARINE MOLLUSCAN FAUNA OF SOUTH AMERICA.¹

In the following synopsis I have limited myself to a brief consideration of data derived solely from mollusks. This course is not due to any underestimation of the value of other groups in biogeographic work; but rather because conclusions drawn from a group known to me at first hand have a certain value which would not attach to borrowed data. The classification used herein is that of the Manual of Conchology so far as the groups have been considered in that work.²

It must constantly be borne in mind by those comparing the distribution of non-marine mollusks with that of vertebrate groups, that not only has evolution proceeded more slowly in the former, but migrations have been slower. Thus, when a Pliocene communication was established between North and South America, there was a rapid and extensive invasion of both areas by mammals; but the molluscan invasion was very much slower and never extended nearly so far. Land and fresh-water mollusks are restrained by conditions which affect mammals and birds far less, such as areas with little forest, unsuitable or very scanty rock on the surface, or short river systems, not well connected.

Any inquiry into the antecedents of a fauna leads to the question of where its component groups had their rise. The rarity of land and fresh-water shells as fossils, and the great antiquity of the family groups, renders this question very intricate. The origin of many groups is still quite unknown; yet most of the larger families of land-snails, and a few of the fresh-water groups may be traced back with considerable certainty, if not to definite centers, at least to extensive areas of evolution.

The several origins of air-breathing gastropods from marine groups—from the Opisthobranch stock, the Rhipidoglossa and the Tænioglossa

²The family groups of land snails almost all differ widely in contents and limits from those of Fischer's Manuel and other systematic works; a fact of first importance in dealing with the distribution of the groups, and the relationships of faunas.
—reach far back in Palæozoic time. We have no data bearing upon either the time or place of these events.

I. We have first to do with a fauna composed mainly of the Orthurethrous land-snails¹—forms which are structurally but a step removed from the aquatic pulmonates, and now forming an insignificant element in continental faunas, though still dominant in the islands of the central Pacific. The families Valloniidae, Enidae, Pupillidae, Partulidae, Ferussacidae, Amastridae, Achatinellidae and Tornatellinidae are remnants of this fauna, which was doubtless once nearly or quite world wide, and probably attained its acme in Palæozoic time. The Heterurethra (Succineidae, etc.) doubtless existed in this early fauna, as well as the Aulacopoda (Endodontidae are known from the Carboniferous), and the Helicidae. Of the freshwater forms probably represented in this fauna, we may mention the ancestral stock of fresh-water pearly mussels, the Cyrenacea, the ancestral Melanopsideae and Melaniidae, and the Lymneidae. With the rise of the Sigmurethrous snails, the land-snails of this primitive fauna declined in all continental areas.

One of the most remarkable features of the South American fauna is the extreme scarcity of these primitive Orthurethrous land-snails. This group is represented only by a few Pupillidae and Ferussacidae, probably derived from Middle America in the Tertiary, and closely related to Antillean and Mexican species.

The origin and early differentiation of the Sigmurethrous land-snails is unknown. At the time of their appearance as fossils, in the late Cretaceous and Eocene, the modern families were already more or less clearly blocked out, so far as they are represented by known fossils. From the evidence at hand, derived from the distribution of the groups in the recent fauna, and as Cretaceous and Tertiary fossils, it appears that the evolution of these families had proceeded during Mesozoic time in two chief areas, for which we may use terms proposed in another connection by Dr. Theodore Gill.

II. Cænogaeic or northern fauna, occupying old land areas in North America, Asia and Europe,—what is now the Holarctic and part of the Oriental realm, with part of the Neotropical (the Antillean-Central American continent). Leading families evolved on this area or areas follow;²

² The groups of low type continued or derived from the preceding fauna are not included.
those which appear to have radiated from the Antillean Continent are indicated by the letter A.


Unionidae, Megaspiridae, Urocoptidae A, Testacellidae, Zonitida, Limacidae, Arionida, Philomyidae, Oleacinida A.

III. Eogaic or Southern fauna, which occupied chiefly the Gondwana continent, including a large part of South America, tropical and south Africa, and stretching in a great arch, possibly at no time perfect, to peninsular India and Australia. Here were evolved the families:

Mutelidae, Achatinidae.
Etheridae, Aperidae.
Ampullariidae, Rhytididae.
Chilinidae, Streptaxidae.
Acavida, Circinariida.
Strophocheilidae, Veronicellidae.
Bulimulidae.

The South American fauna is largely made up of groups of typically Eogaic or Southern origin, but there are also northern forms, derived from Middle America ("Antillia"), and a few groups of ancient and unknown origin. These several elements are as follows.

I. PRIMITIVE GROUP.

Families of very Ancient and Unknown Origin and World-wide Distribution, and Isolated Autochthonous Families of Eogaic Origin.

Circinariidae. Northern South America and temperate North America.
Bulimulidae. Autochthonous; formerly spread to Australasia and now invading North America.
Strophocheilidae. Autochthonous.
Endodontidae. World-wide, on all continents and islands.

1 Primitive Zonitida were probably evolved at a very early time, but the group attained its main development in the Cenogaeic faunas.
Succineidae. World-wide, on all continents and islands.

Chilinidae. Autochthonous.

Amnicolidae. On all continents.

The ancestral stocks of these families probably formed the earliest fauna of non-marine mollusks in South America. Some of the families are known, in other regions, to have been established in Palæozoic times; and it is likely that as early as that they were already found in South America. All of them are sharply isolated groups.

The Circinariidae seem to have remote affinity to Rhytididae and Strep- taxidae—both of which evolved in the southern hemisphere of the Old World. In North America this family is probably intrusive, being represented by a single genus also found in South America.

The Strophocheilidae have relations—though not close— with a series of genera (Acavidae) now found in south Africa, Madagascar, the Seychelles, Ceylon, Moluccas, Australia and Tasmania. The radiation of this scattered group from the Palæozoic Gondwana continent of Neumayr seems a reasonable, in fact the only tenable, hypothesis.

The Bulinulidae have descended from the Holopod stock, probably also of Gondwana Land, since we have no evidence of any other ancestry.

Endodontidae and Succineidae are world-wide groups, even on the most remote islands. Their early presence in South America is therefore likely.

The Chilinidae represent an isolated branch of the primitive Basommatophora. No scrap of evidence has been brought to light to show that they ever existed elsewhere than in South America; and at present we have every reason to believe that there they invaded fresh water from the sea.

The Pectinidens group of Lymnaeidae and the Ancylidae are evidently traceable to some very early radiation. Adequate data upon the soft anatomy and relationships of the forms of the southern hemisphere do not now exist.

II. The Archhelecnic Group.

Families which for the Greater Part are Represented in the Tropical African Fauna by a far Greater Diversity of Forms than in the South American.

The hypothesis of an Africo-Brazilian continent of Palæozoic and Mesozoic times, first sketched out on purely palæontological grounds, and ably
advocated by Dr. von Ihering from the evidence of the fresh-water fauna, is essential to any rational explanation of the distribution of land and fresh-water mollusks.

The following South American groups are common to the tropical African radiation center. Terrestrial groups are marked with an asterisk (*).

*Streptaxidae* (fig. 21).
*Achatinidae* (fig. 20).
*Veronicellidae.*

*Planorbinae* (South American *Planorbis* and *Plesiophysa* close to African *Planorbis* and *Isidora*).
*Ampullariidae* (genera with corneous opercula, fig. 22).
*Melaniidae* (nearest to African forms).
*Mutelidae* (fig. 23).
*Etheriidae* (fig. 24).
*Sphæriidae,* of the genus *Eupera.*

Such of these groups as are represented in the West Indies and sub-tropical North America, have evidently, from their distribution, relationships and the greatly diminished number of genera and species, been derived from South America, rather than from some common source, such as Archhelenis. None of them are present as Mesozoic or Tertiary fossils in North America,¹ and nearly all of them are likewise absent from European deposits.

There is a good deal of evidence that most of the above groups arose in the eastern hemisphere and migrated westward, and little evidence or none that any of them moved in the opposite direction.

The *Streptaxidae, Achatinidae, Ampullariidae, Melaniidae* and *Mutelidae* are far more diversified in Africa than in South America. It seems that several Gondwana subfamilies were not present in the fauna of Archhelenis, or at least did not extend so far west as to reach South America, though they must date back at least as far as some other subfamilies which are represented both in South America and Africa.

The primitive stock of fresh-water mussels seems to have early split into two phyla: the one, *Mutelidae,* evolving in the south, on the Gondwana-Archhelenis continent, the other, *Unionidae,* in the north, in North America.

¹The *Planorbinae* are found on all continents, but those of South America are obviously most closely related to the African forms.
and Asia. The occurrence of both families in the same waters is evidently due to migrations, which ensued after the families had become differentiated. The *Mutilidae* attain their northernmost point in the Panuco River, in northeastern Mexico, where the family is represented by one species of the South American genus *Anodontites*.

Simpson and Germain refer a few African forms to the South American genus *Diplodon*, and Germain has called attention to the similarity of the African *Pseudavicularia* to the South American *Prisodon* or *Hyria*. If the resemblance of the shells proves to be supported by the soft anatomy, then this family at least will be evidence of an eastward migration in Archheilenis. At present the evidence is insufficient. The possibility of convergence in shell-form must be taken into account. Most if not all African *Unionidae*, like the African *Cyclostomatidae*, *Zonitidae*, etc., are clearly of Oriental derivation. These are northern *Cænogæic* families which have invaded Africa during the Tertiary.

The maps following illustrate the distribution of part of the Archheilenic groups.

**FIG. 20.**

Distribution of the land-snail family *Achatinidae*. The numerals represent the number of genera in each area.

The autochthonous families, together with the Archheilenic group, make up the mollusk fauna of the Brazilian plateau; but the more isolated and peculiar, presumably older, genera have outlying forms in the Guiana-Colombian center, indicating a former unity of the northern and southern
massifs. This connection of the Brazilian and Guiana-Colombian areas must have persisted long after the Archheleonic period, for distinctively

**Fig. 21.**

Distribution of the land-snail family \textit{Streptaxidae}.

**Fig. 22.**

Distribution of fresh-water snails of the family \textit{Ampullariidae}, having the operculum wholly corneous.

American genera had been differentiated. It was interrupted prior to the union with the Antillean-Mexican continent, since the genera of that area
Fig. 23.

Distribution of the bivalve family *Mutilidae*.

Fig. 24.

did not gain access to the eastern Brazilian plateau. If the conclusion that the Amazon valley was a Cretaceous bay or strait connecting the Atlantic and Pacific be well-founded, then the common dispersion center of this old fauna may have been in land now lost under the Atlantic. The facts

**FIG. 25.**

Distribution of *Tomigerus, Anostoma* and *Auris*, three old genera common to the Brazilian and Guiana-Colombian centers (probably all are more widely distributed inland).

**FIG. 26.**

**FIG. 27.**

Distribution of *Odontostomus*. Distribution of (1) *Macrodontes*, (2) *Anctus*, (3) *Hyperaulax* and *Bonnanius*.

of molluscan distribution favor the view that in Archhelenic times the Amazon valley formed a gulf *opening westward*, wherein Cretaceous deposits were laid down; eastern Brazil north to Guiana bounding this gulf on the east, until the depression of the Atlantic basin marked the close of Mesozoic
time. Such a hypothesis finds support in the presence of genera of the old Brazilian type on the island of Fernando Noronha. Numerous very peculiar land-shell genera, such as those tabulated in fig. 25, have a distribution not readily explicable on any other hypothesis; while in still other cases, allied but generically distinct groups are similarly distributed. It may be noted that Bates has remarked that the Para insect fauna is essentially Guianian.¹

Figs. 26, 27 show the distribution of several old land-snail genera of the Brazilian center. Fig. 25 that of several genera common to the Brazilian and Guianian centers.

That the Amazonian valley ever formed an upper Cretaceous strait connecting the south Atlantic and Pacific, as claimed by Dr. Ortmann,² seems rather improbable.

The Guiana-Colombian elevation has been a secondary radiation center for a number of genera of autochthonous South American families, chiefly the Bulimulide. The arboreal groups Oxystyla and Corona have spread south of the Amazon into eastern Brazil (fig. 28), while numerous other genera from this center are restricted to the north and west as in fig. 29. The Guiana-Colombian area also served as a secondary center for Antillean and Mexican groups, entering by way of the Caribbean elevation and that in the Panamic region. These groups have spread southward as in figs. 30–34.

A hypothesis has been advanced by Dr. Ortmann³ that Archhelenis of the Lower Cretaceous was succeeded in the Upper Cretaceous by a land bridge from tropical Africa to an area covering Guiana, the Caribbean Sea and the Mexico-Antillean region (the so-called Mesozonia), separated from the Brazilian island. By this hypothesis, Antillia should be as rich in African or Archhelenic types as Brazil, and in fact should show a closer resemblance to the African fauna due to the later connection. This is

² Proc. Amer. Philos. Soc., XLI, p. 381, and in later articles. Dr. Ortmann’s palæogeographic maps incline strongly towards what Fiske would call the “wet theory.” It is not likely that all beds reported as Upper Cretaceous were below the sea at any one time. To map an Upper Cretaceous epicontinental sea to include all the exposures of a formation which included so long a period of time is not warranted by our present slight knowledge of the stages of the South American Cretaceous.
exactly contrary to the actual facts of molluscan distribution. All African or Archhelenic forms which exist in the Antilles are unequivocally of the South American type, and certainly indicate that there was no later migration or communication from Africa in the north. There seems little evidence

Fig. 28. Distribution of *Orthalicinae*. *Oxystyla* spreads throughout the black area except in the Antilles. Number of genera in each district indicated by numerals.

Fig. 29. Distribution of *Plekocheilus*, a genus of Guiana-Colombian origin, spreading southward in the late Tertiary.

for the Upper Cretaceous "Mesozonia," mapped by Dr. Ortmann, and there are very strong reasons for holding that no such land existed.

Dr. von Ihering\(^1\) holds that the subsidence of the Brazil-Ethiopian continent began in the north during the Cretaceous.

\(^1\) Archhelenis und Archinitis, p. 337.
III.

Middle American (Mexico-Antillean) Forms, of Later Date in South America than the Archheleonic Group, in Some Cases Generically Differentiated from their Northern Ancestors, but more often Belonging to the Same Genera; Therefore Doubtless Traceable to both Earlier and Later Migrations Southward.

*Helicidae*¹ (figs. 31, 32).  *Physidae.*

*Urocopitidae* (fig. 33).  *Cyclophoridae* (fig. 34).

*Oleacinidae* (fig. 30).  *Cyclostomatide.

*Pupillide.*  *Proserpinide.*

*Ferussacidae.*  *Helicinidae.*

*Lymneiade* (of the *Galba* group).

These intrusive forms from middle America are characteristic of the Guiana-Andean region, though a few have attained a wider distribution. Streams of migration from and to the Antilles are indicated by the way of

¹The belogonous and epiphallogonous *Helicidae* of South America are clearly of northern origin. Whether such extremely peculiar genera as *Solaropsis, Psadara* and *Macrocycis* also belong in the same category, seems somewhat uncertain, although such competent malacologists as von Ihering and Fritz Wiegmann place these genera in the *Epiphallogona.*

The heavy, large Helices of the Eocene of southern Europe, such as *Deutellocaracolus, Prothelidemon, Galactocheilus* and *Fridolina,* may perhaps belong to the group Epiphallogona of my arrangement, rather than to the *Helicinæ* where I formerly placed them; yet if so, I think the supposed relationship to West Indian forms is not especially close. Like the American and European species of *Adelopoma,* the Epiphallogona probably reached both Europe and America from eastern Asia, and from opposite directions.

Dr. von Ihering (Verhandlungen k. k. zoologisch-botanischen Gesellschaft in Wien, LIX, 1909, pp. 420–428) has recently referred the belogonous *Helices (Epiphragnophora)* of Argentina and southern Brazil to the European genus *Helicigona* (*Campylium auct.); but I do not believe that this classification can be sustained. So far as I know, the South American Epiphragmophorae have the spermathecal duct very short, whereas *Helicigona,* like all other European Belogona, has a *very long duct,* bearing a long diverticulum, which is bound by a membrane to the oviduct. These are important differences, quite sufficient to show that *Epiphragnophora* is not at all closely related to *Helicigona,* aside from the different shape of the mucous glands, and their removal in *Epiphragnophora* from the vagina, *upon which they are invariably inserted in all European Belogonous Helicidae.*

By its short spermatheca, *Epiphragnophora* differs strongly from all other known belogonous *Helicidae.* In other features it stands nearer to Antillean and North American forms than to European. My former treatment of the genus was too inclusive. I would now restrict *Epiphragnophora* to forms having the spermatheca short, removing all of the Mexican and North American species (which have a long spermathecal duct) from the genus.
the Caribbean Islands on the east, and on the west the region of the Isthmus of Panama, where the interchange of forms has continued to the present time. That the middle American elements are far younger in South America than the Archhelenic, is shown by their close relationships to Antillean and Mexican forms, very few special genera having evolved. In

![Distribution of the Oleacinidae](image)

Fig. 30.

Distribution of the Oleacinidae. The dotted area stands for the genus *Euglandina* only, which also occupies Mexico and Central America. Vertical shading in Europe for Tertiary, black for recent species of *Poiretia.*

most of the families only one or very few genera have invaded South America out of a large number in the parent lands. Moreover, it is notable that they have not extended far south in the east, where the Amazon valley has proved a barrier to land-snails. Their distribution has been along the Andes, spreading eastward in Bolivia and southern Brazil.

Figures 30 to 34 illustrate the distribution of middle American groups of land-snails incursive in South America.
In molluscan distribution, there is strong evidence against the view of Ortmann (1902, p. 347) that the northern margin of South America formed part of the Antillean continent. Schuchert's representation of the Caribbean Sea as an old permanent basin seems preferable; but his representation of the total submergence of the Antilles in the Middle Cretaceous

![Image](https://example.com/map.png)

**Fig. 31.**

Distribution of *Helicidae* of the group Belogona Euadénia (one species extends westward to eastern Europe).

and again in the Upper Oligocene\(^1\) cannot, I think, be sustained. The rich Oligocene beds of Jamaica (Bowden) and Santo Domingo, carrying a marine fauna of littoral type, occur at very low levels; and no deposits actually known to be Oligocene are found on the higher mountains, which I believe were islands in both Cretaceous and Oligocene times.

The primary region of radiation of the middle American families named above is a subject too large for adequate discussion in this place. So much is clear: the fauna contains three groups of diverse genesis. The

\(^{1}\)Bull. Geol. Soc. Amer., XX, Pl. 95, 97, 1910.
autochthonous group, such as Oleacinidae, Urocoptidae, Cerionidae, Sagdinae Cyclostomatidae, Helicinidae, contains many phylogerontic lines, signalized by shells with more or less detached or uncoiled later whorls, sculptured embryonic whorls, highly developed, often spinose sculpture, complicated internal armature, and the like. These first families of Antillia, now in their old age, are related to the families of the northern or Cænogæic area of land-mollusk evolution. Some of them, and the ancestors of all, doubtless had a much wider range in Mesozoic times. A few, such as the Oleacin-

**Fig. 32.** Distribution of Epiphallologonous Helices in America (exclusive of Solaropsis and Macrocyclis).

**Fig. 33.** Distribution of Urocoptidae. Shaded area Eucolodiinae and Holospirinae; black area Urocoptinae.

**Fig. 34.** Distribution of Cyclophoridae in America.

**idae** and **Cyclostomatidae**, were abundantly developed in Europe as late as the Miocene, or even linger in a few forms in the recent fauna. These European forms cannot, in my opinion, be looked upon as ancestral to the Antillean, but rather as parallel descendants of a common stock derived from the north, where the old Scandinavian and North American land areas were, at least from time to time, united.

A second element of the Mid-American lands consists of groups derived from the Chinese or east-Asiatic center. Prominent members are the dart-bearing and the Epiphallologonous Helicidae, the Cyclophoridae, Dip-
*lommatinidae* (*Adelopoma*), *Clausiliidae*, etc. These forms never have the old-age stigmata of the preceding group. They are developed in wonderful abundance and virility. Being known in characteristic genera of American type (*Pleurodonte, Cepolis*) in the Floridian Oligocene island, the advent of the group in middle America must have been much earlier. It could hardly have been later than the beginning of the Eocene, and probably was not later than the Upper Cretaceous.¹

Finally, we have as the latest faunal element in the Antillean-Mexican area, a series of South American forms — *Achatinidae, Bulimulidae, Ampullariidae, Melaniidae, Mutelidae* and some North American forms, *Unionidae, Pupillidae, Zoneidae, Polygyrinae*, etc. These are, with very few exceptions, unchanged generically, and some are specifically identical with existing South or North American forms. It is very evident that such Archhelenic forms as exist in the Antilles and Mexico were not derived directly from the Archhelenic area; they migrated in the later Tertiary and Pleistocene from the Guiana-Colombian center.

Antillia has not been an evolution center for fresh-water mollusks or fishes, evidently because it has never been a very large area, and has been an unstable one, at one time in form of a continent, again an archipelago, hence without river systems of great extent or duration, such as are essential to the evolution of a fresh-water fauna.

There is absolutely nothing in the distribution of mollusks suggesting that either South or North America was at any time connected with the supposed South Pacific continent, or the Hawaiian group. Even Juan Fernandez has a land-snail fauna of Pacific and not South American type. The Hawaiian and Polynesian connections with America mapped by Arldt (1907) seem quite impossible.

¹The American *Clausiliidae* are thought by Professor Boettger to be related to the European Miocene and recent Pyrenean group *Laminifera*, but they seem to me even closer to the genus *Garnieria*, of the Indo-Chinese center. The *Helicinidae* may have arisen in Middle America from an aquatic rhipidoglossate stock, but the very wide distribution of the group in Polynesia and eastern Asia suggests that it is a very old one, which probably appeared among the first land-snails.

The Belonogous *Helices* still exist in high latitudes on both sides of the Pacific, being known from Sitka on the American and the Kuril Islands on the Asiatic side.
ARCHIPLATA AS AN EVOLUTION-CENTER.

Wallace in 1876\(^1\) showed that the South American fauna is divisible into two subregions which he called the Tropical or Brazilian and the South Temperate or Chilian. He calls attention to the affinities of the Chilian diurnal Lepidoptera and the Carabidae to North Temperate forms.\(^2\) Dr. H. von Ihering in numerous papers\(^3\) has recognized the two subregions of Wallace as distinct evolution centers. He concludes that these centers, Archiplata (that is, Patagonia, southern Brazil, Chili and western Peru) and Archibrazil, were long isolated from one another by an arm of the sea. As primitive elements of the Archiplatan fauna he mentions the fresh-water crab \(\textit{Aeglea}\), the genus \(\textit{Parastacus}\), and the mollusks \(\textit{Diplodon}\) and \(\textit{Chilina}\). Negative characteristics are found in the absence of the dominant Amazonian genera of mussels and \(\textit{Ampullariidae}\) (which seem to have invaded the La Plata drainage area comparatively lately, probably in the Pliocene) to which many groups of land-snails might be added.

The geology of the regions involved is so imperfectly known that we have no positive data for or against the hypothesis that an arm of the Cretaceous sea extended across the continent, as von Ihering claims. This is a question only to be settled by geological exploration of the region, which may perhaps show a Cretaceous transgression similar to that which involved eastern Mexico and the region northward in the middle Cretaceous. Yet the fact remains that, so far as molluscan groups are concerned, there is but little evidence of such an isolation of the Archiplatan area. The barriers to migration imposed by climate have not been taken into account. The \(\textit{Ampullariidae}\) are snails that have never, in any region, been able to extend beyond a subtropical climate. The \(\textit{Chilinidae}\) (fig. 36) are apparently, like the large \(\textit{Lymnaeas}\) in North America, snails which cannot exist in a subtropical or even a warm temperate environment, however favorable may be the conditions of migration. It is instructive, in this connection, to compare the \(\textit{Lymnaeidae}\) faunas of Minnesota and Arkansas, which show great

\(^1\) Geographical Distribution of Animals, II, frontispiece and Chapter XIV.

\(^2\) Dr. Scharff has suggested an explanation of this peculiarity (American Naturalist, September, 1909, p. 513), but his hypothesis explains only a few facts. It would involve us in problems more intricate than those which it solves. Possibly the systematic relations of the insects in question have not been rightly estimated.

\(^3\) The more important of these articles have been reprinted in his “Archhelenis und Archiplatanis,” Leipzig, 1907.
diversity, although favorably situated for migration. Another group which is widely distributed in the Archiplatan area, though not confined to it, is the Amnicolid genus *Littoridina* (fig. 35). The absence of Amnicolidae in the Amazon system is probably apparent rather than real, since practically no collecting of small or minute mollusks of any kind has been done in that vast area. It is likely that Amnicolidae will be found there in abundance. *Diplodon*, another genus which Dr. von Ihering considers Archiplatan, is found almost all over the continent, and cannot fairly be claimed as of Archiplatan origin. It no doubt arose from the same Brazilian (and ultimately Archhelenic) stock as *Hyria*, etc.; but like *Unio* in the northern hemisphere, it is a hardy stock not highly evolved in its phylum, hence probably old. Compare in this connection the Unionid and Pleuroceratid fauna of Alabama with that of Georgia and the Carolinas. In these adjacent areas, which have been continuous land since very early times, we have as much difference in the fresh-water faunas as has been shown to exist between Archibrazil and Archiplata. Rich faunas of fresh-water mussels and gastropods are rarely found in regions like

1 At Davenport, Iowa, I have found *Lymnaea stagnalis* on logs rafted down the river from Minnesota, but the species has not been able to gain a place in this fauna there or farther south; nor have many of the other northern Lymnaeidae, which must yearly be brought down on drift wood during the spring floods.
southern South America, drained by numerous short, independent rivers, owing to the difficulty of migration and the relative impermanence of the individual streams.

The presence of peculiar and strongly individualized land snails of Brazilian type (Scalarinella, Plagiodontes, etc.) in the Sierras of western Argentina and the now isolated Sierra Ventana, shows that long ago the Brazilian fauna extended at least as far south as Bahia Blanca, where a fragment has persisted, isolated since the Pliocene at least.1

Taking into consideration the climate, the rarity of large forest areas, the aridity of large tracts, and the short, unconnected rivers, we are not inclined to give much weight to Dr. von Ihering's contention that many Brazilian groups are wanting in "Archiplata." So far as mollusks are concerned, that area has very slight claims to rank as an evolution center. I regard the Chilian and Patagonian fauna as an impoverished and slightly modified extension of the fauna of the old Brazilian continent. The evidence for an Archiplatan center may be stronger in the case of Crustacea, Oligochæta, plants and insects; but I prefer to leave the discussion of these groups to those having first-hand knowledge of them.

Connected with the Archiplata hypothesis is that of Antarctica, which may here be examined briefly.

AUSTRAL ELEMENTS IN THE SOUTH AMERICAN FAUNA.

The Austral or Antarctic relationships of the South American fauna have been somewhat fully discussed in other volumes of this series, and a map illustrating the Antarctic continent and its hypothetical former extensions may be found in volume IV. I have to deal here with the evidence afforded by the non-marine mollusks, which, taken by itself, leads to the following conclusions: (1) There is no evidence that Antarctica was ever an evolution or radiation center for non-marine mollusks, though there is some evidence showing that it served as a highway for migration. (2) There is some evidence of migration from South America to Australasia, but at present no evidence of a counter movement to South America. (3) Nothing in the distribution of mollusks would lead to the hypothesis

1Dr. Ortmann agrees with von Ihering in isolating a Chilian and southern Patagonian land mass of Cretaceous age, but he views it as an extension of Antarctica. The difference is rather one of names than of things. Proc. Amer. Philos. Soc., 1902, pp. 379, 381.
that South Africa has ever been connected with Antarctica and thereby indirectly with southern South America.

Non-marine mollusks having an Antarctic distribution belong to three families. The evidence in each case is briefly as follows:

1. The *Bulimulidae*, land snails of South American origin, of which one genus (*Bothriembrion*) is found in Tasmania and southwestern Australia, another (*Placostylus*) in New Zealand, New Caledonia, the islands of Melanesia and as far east as Fiji. Both of these genera are distinct from South American forms, but they are undoubtedly related to the more generalized of the South American genera.

![Figure 37](image)

Distribution of the land snail family *Bulimulidae*. The number of genera in each area is indicated by figures.

The presence of *Bulimulidae* in Australia and Melanesia proves that the part of South America connecting with Antarctica was, or had been, connected with the old Brazilian evolution center.

2. The *Amnicolidae*, a family of fresh-water snails, has one genus, *Potamopyrgus*, in New Zealand, Tasmania and South America. Another South American genus, *Potamolithus*, has its nearest ally in the genus *Petterdiana* of Tasmania and Australia. Both of these genera are exclusively fresh-water groups. See pp. 548–550 of this report.
3. The Naiades or fresh-water mussels found in all of the continents, are represented in Australia, Tasmania and New Zealand only by species which have been referred to the genus Diplodon. This genus is widely distributed in South America, especially southward. It is a relatively primitive genus and probably arose in South America, which, from the number of autochthonous genera, was evidently an old evolution center of Naiades. Diplodon is unknown in the northern continents. Whether the relationship with South American forms claimed for the Australia-New Zealand group is well-founded, remains to be confirmed by careful comparison of the soft anatomy.

The family Endodontidae, and Gundlachia of the Ancylidae, have been considered “Antarctic” groups, but on evidence of slight value. The Endodontidae are an ancient group, world-wide in distribution. No close relationship has been shown to exist between the South American and the Australian genera. The former are unknown anatomically, and the relations of Australian and New Zealand forms, so far as positively made out, are with the groups of Polynesia and Micronesia (Charopa, Thaumatodon, etc.). Certain Tasmanian species may prove to belong to the American genus Radiodiscus Pils. See p. 516.

Gundlachia is found in Australasia, South America, the Antilles, Mexico, temperate North America and also the Miocene of central Europe. This wide distribution suggests that the genus may have reached the southern lands from the north. In the United States it has been found in California, Illinois, Ohio, New York, etc., but only at remote intervals and in very narrowly restricted areas. It is likely that it will turn up sooner or later in the Oriental region and Africa. I hesitate to claim Gundlachia as an inhabitant of Antarctica.

Pond snails of the family Lymnaeidae also occur in all the Austral lands, but South American forms do not seem especially related to Australasian. While Endodontidae, Gundlachia and Lymnaea may have inhabited Antarctica, no data upon them now in our possession goes far towards proving that they did.

I can find no evidence to support Hedley’s contention that the Macro- ogona (Acavidae) of Tasmania and Australia, and the Rhytididae of the same regions, New Zealand, New Caledonia, etc., are “of Antarctic origin.”

These groups must have attained their distribution from South Africa to

---

Australia by way of the Gondwana continent, leaving isolated genera by the way in Madagascar, the Seychelles, Ceylon and the Moluccas. To this Palæozoic and early Mesozoic land the South African *Endodontidae*, *Peripatus*, etc., may also belong. The evidence for an isthmus connecting South Africa and Antarctica, as sketched by Forbes, Ortmann and some other palæogeographers, seems unsubstantial. Nothing in the distribution of non-marine mollusks lends it support.

![Map showing sources of the South and Middle American mollusk faunas. Early Mesozoic and earlier migrations in heavy lines, late Mesozoic lighter lines, Tertiary and later migrations in dotted lines.](image)

The rather large size of the fresh-water mussels and *Bulimulidae* precludes the idea of their distribution as adult organisms except by actual land connection. Some embryonic *Unionidae* are probably carried by water birds, but we do not know that this is the case with *Diplodon*; moreover only short distances can be so traversed, since unionid embryos are known to die quickly out of water. It is hardly conceivable that Bulimulid eggs, which are smooth and not viscid, should be so carried. The same is true
of the egg-capsules of _Amnicolidae_. It would be absurd to suppose that they could ever be spread by aquatic birds.

Such evidence as we have favors the view that the connection of South America with Antarctica was transitory, hence taken advantage of by but few genera of mollusks, all belonging to families richly developed in the South American center. So far as non-marine mollusks show, the migration from South America of a few species belonging to three families will account for all the common elements in the austral lands of the two hemispheres. The strong generic differentiation of all the common austral groups, with the exception of _Potamopyrgus_ and probably _Diplodon_, indicates that the connection was of considerable antiquity, probably, as Dr. Ortmann holds, not later than Eocene.

**Summary.**—The South American molluscan fauna is traceable to two sources: an ancient southern continent lying across the south Atlantic and enduring from at least Palæozoic to near the end of Cretaceous time, and to Miocene and Pliocene to recent connections with the middle American area. Antarctica was not an evolution center for mollusks, but there is strong evidence that a few groups passed by the Antarctic route to Australasia. "Archiplata," owing to its physical diversity from the Brazilian and Colombian areas, has became a Tertiary evolution center for a few groups of Brazilian origin.

Middle America (Antilles + Central America and part of Mexico) has the characteristics of an old evolution center of the northern faunal group, its primitive fauna coming from the north, and now showing phylogerontic features; a later (probably late Cretaceous) element was derived from the East Asiatic fauna. Both elements contributed, during the last half of the Tertiary, to the South American fauna, and received immigrants in return.

The "Nearctic Realm," so far as the genesis of its faunas is concerned, is composite.
PART VI.

CRUSTACEA OF SOUTHERN PATAGONIA.

BY

A. E. ORTMANN,

LETTER OF TRANSMITTAL.

Sir:

I have the honor to transmit herewith the report on the recent Crustacea collected in Patagonia by Mr. J. B. Hatcher.

The collection is a small one, and contains, of marine forms, only such as are more or less well known, adding, however, for some of them new localities on the eastern coast of Patagonia, a region that scarcely has been properly investigated.

The most valuable part of the collection consists of freshwater Crustaceans found by Mr. Hatcher in the interior of southern Patagonia: among them are several very important new and rare species.

Very respectfully, your obedient servant,

ARNOLD E. ORTMANN, PH.D

DR. W. B. SCOTT,
Professor of Geology,
Princeton University.

INTRODUCTION.

The collections of Crustaceans made by Mr. J. B. Hatcher in southern Patagonia are partly marine, partly freshwater. The following are localities from which marine forms have been secured: they are all close to the shore, in shallow water, and are situated—with the exception of the first—on the eastern coast of Patagonia.

1. Punta Arenas, Straits of Magellan.
2. Gallegos, at the mouth of the Gallegos River, South Patagonia.
3. Cape Fairweather, entrance of Gallegos Bay, northern side.

635
4. Mount of Observation, about 50 miles southwest of Santa Cruz.
5. Mouth of Santa Cruz River, situated at about 50° S.
6. San Julian, about 50 miles northeast of Santa Cruz.

Freshwater material has been collected at numerous localities in the interior. This has been numbered by Mr. Hatcher according to stations, and the character and description of each station is given in the text under each species. All these stations are situated in the region of the Rio Chico (northern tributary of the Santa Cruz River), from near the ocean up to the foothills of the Cordilleras, in 47–50° S. The localities Sierra Oveja and Sierra Ventana are on the Rio Chico. Arroyo Gio is in the foothills of the Cordilleras.¹ The highest altitude at which specimens were obtained is at about 2,000 feet.

LIST OF SPECIES REPRESENTED IN THE COLLECTION.

CIRRIPEDIA.
1. Lepas anatifera L.
2. Elminius kingi Gr.

COPEPODA.
4. Pseudoboeckella longicauda (Dad.).
5. Pseudoboeckella entzi (Dad.).

BRANCHIOPODA.
6. Herpetocypris obliqua Dad.
7. Eucypris sarsi Dad.
8. Daphnia hastata Sars.
9. Lepidurus hatcheri sp. nov.

ISOPODA.
11. Iais pubescens (Dan.).
12. Edotia tuberculata (Guér.).
13. Rocinela australis Sch. & Mein.
14. Exosphæroma gigas (Leach).
15. Exosphæroma lanceolatum (Wh.).
16. Cymodocea darwini Cunn.
17. Dynamene eatoni Mrs.
18. Cassidina emarginata M.–E.

19. *Serolis paradoxa* (Fabr.).

**Amphipoda.**

20. *Hyalella patagonica* sp. nov.

**Decapoda.**

22. *Paralomis granulosa* (Jacq.).
24. *Munida gregaria* (Fabr.).
26. *Halicarcrinus planatus* (Fabr.).
27. *Hypopeltarium spinosulum* (Wh.).

Further, there are a few marine *Amphipoda*, and some *wood-lice* in the collection, but the material is too scanty to justify an attempt at identification.

**Order CIRRIPIEDIA.**

Family *LEPADIDÆ* Darwin.

**LEPAS** Linnaeus.

**LEPAS ANATIFERA** Linnaeus.

1851 *L. a.*, Darwin, Mon. Cirr. Lep., p. 73, pl. i, f. 1.
1897 *L. a.*, Weltner in: Arch. f. Naturg., v. 1, p. 244.

*Locality.*—Mouth of Santa Cruz River, two small colonies of young individuals upon fragments of kelp.

*Distribution.*—Almost cosmopolitan.

Family *BALANIDÆ* Darwin.

**ELMINIUS** Leach.

**ELMINIUS KINGI** J. E. Gray.

1897 *E. k.*, Weltner in: Arch. f. Naturg., v. 1, p. 256.

*Locality.*—Punta Arenas, 1 specimen.

*Distribution.*—Falkland Islands; Tierra del Fuego; Chiloé; Chili.

Shallow water.
BALANUS da Costa.

BALANUS LÆVIS Bruguière.


**Locality.**—Punta Arenas, numerous specimens.

**Distribution.**—Tierra del Fuego and Straits of Magellan; Chili; Peru; California. On the Atlantic coast of South America northward to Rio Grande do Sul, South Brazil. 0–20 fathoms.

**Remarks.**—All our specimens represent the typical variety of this species.

**Order COPEPODA.**

Family CENTROPAGIDÆ Giesbrecht.

PSEUDOBOECKELLA Mrazek.

The original genus Boeckella of Guerne and Richard (1889, p. 151), created for the preoccupied Boeckia of Thomson (1883) was divided by Mrazek (1901) and von Daday (1902) into several genera. Of course, Mrazek's names have the priority. Unfortunately both divisions do not completely agree, and the names chosen by either author are apt to give origin to confusion. Generally, we may say that Pseudoboecckella of Mrazek corresponds to Boeckella of v. Daday, and *vice versa*, although Mrazek puts *B. bergi* Rich. into a separate genus (*Boeckellopsis*), while it is included in v. Daday's *Pseudoboecckella*; and although *B. brevicauda* Brad., which is included in v. Daday's *Boeckella*, forms the genus *Para- boeckella* of Mrazek.

The two species mentioned here have been described by v. Daday under *Boeckella* (sens. strict.), and seem to belong to *Pseudoboecckella* of Mrazek.

PSEUDOBOECKELLA LONGICAUDA (Daday).

1902 *B. l.*, v. Daday, ibid., v. 25, p. 243, pl. 6, f. 10–14, 16.

**Localities.**—Stat. 2

- 2 ♂ about 25 ♀

- Stat. 6

- 2 ♀

- Stat. 34

- 1 ♀
Distribution.—Swamp near Amenkelt, lower Rio Santa Cruz, Patagonia (about 50° S., 69° W.).

Remarks.—Our specimens agree perfectly with v. Daday's description.

**Pseudoboekella entzi** (Daday).


1902 *B. e.*, v. Daday, ibid., v. 25, p. 239, pl. 6, f. 3-9.

Localities.—Stat. 4. Pool, drying up, 10 miles above Sierra Ventana. 6 ♂ 13 ♀
Stat. 26 5 ♂ 5 ♀

Distribution.—Known from swamps and pools of several localities in the region near the mouth of the Santa Cruz River, Patagonia (about 50° S., 68–69° W.).

Order **Branchiopoda**.

Suborder **Ostracoda**.

Family **Cypriidae**.

**Herpetocypris** Brady.

**Herpetocypris obliqua** Daday.

1902 *H. o.*, v. Daday in: Term. Füz., v. 25, p. 296, textf. a, b, pl. 15, f. 8–13.

Localities.—Stat. 2 27 spec.
Stat. 6 about 10 empty shells.
Stat. 34 3 spec.
Stat. 53 24 spec.

Distribution.—Swamps near Amenkelt, lower Santa Cruz River, Patagonia.

**Eucypris** Vavra.

**Eucypris sarsi** Daday.


Locality.—Stat. 4 Pool, drying up, 10 miles above Sierra Ventana, Rio Chico. 14 specimens.

Distribution.—Swamp near Amenkelt, lower Santa Cruz River, Patagonia (about 50° S., 69° W.).
Remarks.—As v. Daday states, only young individuals possess the peculiar sculpture of the shell by longitudinal ridges represented in the figures 1 and 2 on v. Daday’s plate 15.

Suborder Cladocera.

Family Daphnidae Dana.

Daphnia O. F. Mueller.

Daphnia hastata Sars.


1902 D. hastata v. Daday in: Term. Füz., v. 25, p. 279, pl. 11, f. 11, 12.

Localities.—Stat. 4 Pool drying up, 10 miles above Sierra Ventana. 40–50 specimens, all ♂.

Stat. 26 a few ♂.

Distribution.—D. pulex var. hastata is found, according to Richard, in Europe (Austria, Russia, Norway). The Patagonian form has been recorded by v. Daday from Misionaros on the lower Santa Cruz River (49° 59′ S., 68° 33′ W.).

Remarks.—Our specimens correspond to the Patagonian form described under this name by v. Daday. As v. Daday himself admits, this is not exactly the same form as that described by Richard as D. pulex var. hastata.

Suborder PhyllopoDA.

Family Apodidae Burmeister.

Lepidurus Leach.

Lepidurus hatcheri sp. nov.

(Plate XLVIII, Figs. 1a and 1b.)

Locality.—First water hole north of basalt ridge, 50 miles from Rio Chico. 1,950 feet. 26 Febr., 1899.—2 ♂. (Foothills of Cordilleras, about 47–48° S.)

Description.—Scutum large, suboval, emarginate behind, covering about two thirds of the body. Of the abdomen, 9 or 10 segments (including telson) are uncovered. Eyes elliptic, closely approaching one another in
front, diverging behind. First cervical furrow almost straight, second one strongly curved backward in the middle, and slightly shallower in the middle, but distinct. Median keel indistinct anteriorly, very distinct posteriorly. Lateral margins smooth, only near the posterior corners, for a short distance, very finely crenulated. Posterior emargination with small, somewhat irregular spinules, the median one (end of median keel) the largest. Supra-antennal keel slightly sinuate, apparently smooth, but under the lens there are fine and minute granulations.

Flagella of first pair of feet short, unequal, slightly depressing the margins of the scutum. Free abdominal segments spinulose, about 6–8 spinules on upper side; these are larger, straight, and arranged somewhat irregularly; those of the ventral side are smaller, numerous.

Telson (fig. 16) on upper side, near base of cercopoda, on either side with a small, spinulose tubercle. Caudal flap elongate, over twice as long as wide at the base, with parallel margins, sublanceolate at the end and rounded; distal half of margin spinulose, with the strongest spine at the end. Upper surface with a median, longitudinal keel bearing four strong spinules.

Cercopoda almost as long as the rest of the body, thickly covered with bristles.

Color deep green, lower parts pale greenish, mandibles brownish.

Size: Length of body 40 and 46 mm. Total length of larger individual (including cercopoda), 77 mm.

Remarks.—At first there seemed to be no doubt to me that our specimens ought to be referred to *L. patagonicus* Berg (1900), which comes from near the same region (Territ. of Chubut), but a careful comparison of our specimens with Berg's description reveals the following discrepancies:

1. Of the abdomen, only 10 segments are exposed in our species, while in *L. patagonicus* 15–16 are seen. Thus the abdomen of the latter appears to be longer.

2. In *L. patagonicus* the eyes are said to be suboval, and not to approach one another anteriorly, while in our species they are elliptic and distinctly convergent in front.

3. The lamina caudalis, in *L. patagonicus*, is one third longer than broad; in our species it is distinctly more than twice as long as broad. This is the most striking difference. Through the kindness of Mr. A. J.
Pendola of the museum in Buenos Aires, I possess sketches of the caudal flap of Berg’s species, which show that it is only very slightly longer than broad.

4. There seems to be more of a ferrugineous color on the lower side of the body in *L. patagonicus*.

5. The size of *L. patagonicus* is smaller, body 30–35 mm., and including cercopoda, 43–46 mm., while our species, without cercopoda, reaches 46 mm.

Berg describes a male, while our specimens are females, but I hardly believe that the above differences are due to sex, since it is characteristic in this family that ♂ and ♀ hardly differ, except for the smaller size of the ♂, and the larger caudal flap of the ♂. While the first character would apply to this case, the second does not, the caudal flap being much larger in our ♀. On the other hand, the longer abdomen in the ♂ would agree with the same condition found in the ♂ of *L. bilobatus*.

For the rest, our species resembles *L. angasi* Baird (1866, p. 122, pl. 12, f. 1) from South Australia (Adelaide). Here the general form of the body and the characters of the various parts are almost identical, and I find only the following differences:

1. *L. angasi* is much smaller (1 inch = 25 mm.).
2. The body is of horn-color instead of green.
3. The spinules of the abdomen are curved downward in *L. angasi*, while they are straight in our species.

In all other respects, both species are closely allied, especially the following important characters agree:

1. Number of exposed abdominal segments: 12 in *L. angasi* (according to figure), 10 in our species.
2. Eyes of the same size and shape (according to figure of *L. angasi*).
3. Keel of scutum, and fine dentations on posterior part of lateral margins similar in both.
4. Cervical furrows identical (according to figure of *L. angasi*).
5. Caudal flap absolutely identical in form, but it seems that the margins are denticulated all around in *L. angasi*.

The apparently close affinity of our species with the South Australian *L. angasi* demands an investigation of the relationship of it with the other known species of the genus, and we may state the following:

1. *L. glacialis* (Kr.) (see Simon, 1886). Arctic regions.
For a comparison with our species this is out of the question, on account of the short flagella of the first legs, and the very short caudal flap.

2. *L. lubbocki* (Brauer), from Sicily and Algiers, and *L. macrurus* Lilj. from Archangel, Russia (see Simon, 1886), have a carina of the scutum that is sharp from its beginning at the second cervical furrow down to the hind margin. These two species are closely allied to *L. apus* (L.) from Europe (see below), which is in some degree related to our species, but just in the character mentioned here they deviate more considerably from *L. hatcheri*, than *L. apus* does.

3. Of the North American species (see Packard, 1883), *L. bilobatus* Pack. from Colorado is entirely different in the bilobate caudal flap and the longer abdomen (12 segments exposed in the ♂, 16 in the ♀). *L. couesi* Pack. from Montana and Utah differs in the much shorter abdomen, and the longer and distinctly spatulate caudal flap. *L. packardi* Simon (1886, p. 448) from California differs at once in the very short abdomen, in the second cervical furrow, which is interrupted in the middle, and in the median keel of the caudal flap, which has 7–8 spines.

4. Of the other Australian species (aside from *L. angasi*), *L. viridis* Baird (1850, p. 254, pl. 17, f. 1) from Tasmania has a distinct carina of the scutum, and the caudal flap is oval (narrower at the base). *L. viridulus* Tate (1876, p. 136, and Brady, 1886, page 88, textfig. E) from Adelaide has the abdomen very short, and the caudal flap is distinctly spatulate.

5. The two New Zealand species, *L. kirki* and *compressus* Thomson (1879, p. 260, pl. 11, f. 4, 5) are also distinctly different: in *L. kirki* a much larger part of the abdomen is covered, and, although the caudal flap resembles somewhat that of *L. hatcheri*, it is shorter. *L. compressus* is entirely different in the shape of the scutum, which is oval and narrow, keeled only posteriorly; the caudal flap is much shorter and the margin of the scutum is smooth.

Thus there only remain for comparison *L. apus* from central and northern Europe, and *L. angasi* from South Australia. Of these, *L. apus* (L.) resembles our species in general form, length of abdomen (8 exposed segments), in the character of the carina of the scutum; but it differs:

1. In the second cervical furrow, which is interrupted in the middle.
2. In the caudal flap, which is oval, narrower at the base, and about twice as long as wide.
3. In the eyes, which are said to be reniform.

*L. angasi* is still more closely allied to *L. hatcheri*, as has been demonstrated above, especially the caudal flap is almost identical. This close relation of these two species is especially interesting from a zoögeographical point of view.

Family *BRANCHIPODIDÆ* Baird.

*BRANCHINECTA* Verrill.

*BRANCHINECTA GRANULOSA* Daday.

(Plate XLVIII, Fig. 2.)

1902 *B. g.* von Daday in: Term. Füz., v. 25, p. 288, pl. 13, f. 3–14, pl. 14, f. 1, 2.


(All these localities are in the region of the Rio Chico, in about 49° S., and 70–71° W.)

*Distribution.* — Swamp near Amenkelt (lower Santa Cruz River), Patagonia (50° S., 69° W.).

*Description.* — Allied to *B. coloradense* Packard (1883, p. 338, textfig. 19) from Colorado and (according to Lilljeborg) Fresno, California, and still more closely to *B. iheringi* Lilljeborg (1891, p. 424, and v. Ihering, 1895, p. 178) from Rio Grande do Sul, Brazil.

The chief differences are found in the male claspers (second antennæ) (fig. 2), which are very robust and long (extended, almost as long as the anterior portion of the body). Basal joint subcylindrical, slightly curved, with a distinct tubercle (knob) at the base on inner side. Inner margin in the distal half with a prominent crest, the edge of which is finely dentate. The inner margin of first joint, between this crest and the basal knob, is concave. Second joint almost as long as the first, compressed and lamelliform, and a little narrower than the first joint, with nearly parallel margins; slightly concave on under side (if this joint is stretched out, the concave side is the outer side), curved, and near apex strongly bent, where the margins form a distinct lobe on each side, rendering the end of the second joint trilobate, the middle lobe being strongly deflected from the general plane.
In the female the claspers are very short, stout, straight, slightly tapering and suddenly truncated at the end, with the outer margin produced into a short spine. Ovisac very long, two thirds as long as the abdomen, reaching to the penultimate abdominal segment; its end pointed.

Caudal appendages, in both sexes, rather long, about twice as long as the terminal segment.

Length of body (in male and female), about 15 mm.

Remarks.—I had drawn up the above description, before I became acquainted with von Daday's paper. After having seen the latter, I was at once convinced that our specimens belong to this species, although my description does not agree completely with that given by von Daday, but this seems to be due to a different interpretation we have given to the microscopic image, and after a renewed examination, I do not see any reason why I should alter my original account.

The description of B. iheringi, given by Lilljeborg, applies in some degree, as far as it goes, to our species. Lilljeborg says that there are a few small spinules on the inner side of the first joint of the male claspers, and that the second joint has, at the apex, a tubercle on the posterior margin, and a tuberosity on the anterior side. While this structure appears to be similar to that found in our species, the spinules of the first joint are, in the latter, represented rather by a denticulate crest, and, further, Lilljeborg does not mention the peculiar laminate form of the second joint, which, in our species, has no tubercles or tuberosities at the apex, but rather lamelliform lobes. (The peculiar shape of this joint is, in my opinion, not quite correctly understood by von Daday.) Finally B. iheringi is smaller than our species, only 8 mm. the ♀, 11 mm. the ♂, while B. granulosa attains, according to our material, 15 mm., and according to von Daday 15–18 mm. Thus B. granulosa seems to be different from B. iheringi, although closely allied to it.

Order ISOPODA.

Family JANIRIDÆ Sars.

IAIS Bovallius.

IAIS PUBESCENS (Dana).

1891 I. ♀, Dollfus, in: Miss. Cap Horn, v. 6, p. 70, pl. 8, f. 13.
Locality. — Punta Arenas, 29 specimens (parasitic on Exosphæromas gigas).

Distribution. — Falkland Islands; Tierra del Fuego; Straits of Magellan; South Georgia; New Zealand, Tasmania; Kerguelen Islands.

Family EDOTIIDÆ Dana.

EDOTIA Guérin-Ménéville.

EDOTIA TUBERCULATA Guérin-Ménéville.

1883 E. t., Miers in: Journ. Linn. Soc. v. 16, p. 72, pl. 3, f. 3–6.
1891 E. t., Dollfus in: Miss. Cap Horn. v. 6, p. 69, pl. 8a, f. 12.

Localities. — Punta Arenas, 7 sp.; Mouth of Santa Cruz River, 3 sp.; San Julian, 18 sp. (most of the latter young).

Distribution. — Falkland Islands; Tierra del Fuego; Straits of Magellan.

Family CYMOTHEIDÆ Hansen.¹

ROCINELA Leach.

ROCINELA AUSTRALIS Schioedte & Meinert.

1898 R. a., Richardson in: Pr. Amer. Philos. Soc., v. 37, p. 11.

Localities. — Gallegos, 1 ♀ adult.

Distribution. — Straits of Magellan.

Family SPHÆROMIDÆ White.

EXOSPHÆROMA Stebbing.

EXOSPHÆROMA gigas (Leach).

1891 Sparoma g., Dollfus in: Miss. Cap Horn, v. 6, p. 62, pl. 8a, f. 6.


²Sphæromas lanceolatum of Dana, Cunningham, Miers, belongs to this species. Studer (1884), who had specimens from Kerguelen and New Zealand, as well as from the Straits of Magellan, keeps both sets separate, and calls the first by the name of S. gigas, the second by that of S. lanceolatum, but he does not give any characters, so that it is impossible to decide, whether his S. lanceolatum is really that of White.
Locality.—Punta Arenas, several hundred specimens, young and adult.

Distribution.—Falkland Islands; Tierra del Fuego; Straits of Magellan. Shallow water. This species also has been reported from New Zealand, Auckland Islands, Australia, and Kerguelen Islands.

Remarks.—Our largest individuals attain the length of about 25 mm., by a width of about 15 mm. They all agree in the essential characters, and represent the typical form of *E. gigas*, as described and figured by Stebbing, with the only exception that in Stebbing’s figure of the whole animal (pl. 39) the outer ramus of the uropods is broader than in our individuals, in which it is distinctly narrower, the end being sometimes subacute, sometimes rounded. In this respect, our specimens correspond better with the figure given by Dollfus, yet Dollfus says that there are variations in this respect.

**Exosphæroma lanceolatum** (White).


1891 *S. calcarea* Dollfus in: Miss. Cap Horn, v. 6, p. 64, pl. 8a, f. 7.


Localities.—Mouth of Santa Cruz River, 1 smooth, 14 sculptured specimens; San Julian, 3 smooth, 2 sculptured specimens.

Distribution.—Falkland Islands and Tierra del Fuego (region of Cape Horn). Shallow water to 95 m.

Description.—This species differs from the foregoing in the following particulars:

1. In the smaller size. While *E. gigas* attains 25 mm., Dollfus gives, for this species, only 12 mm., and our largest is 14 mm. White gives 3/4 to 1 inch (18–25 mm.), but these measurements apparently include *E. gigas*.

2. In the epimera of the peræon-segments, which are abruptly bent down, so as to form a sharp angle with the middle of the back, which is sometimes cariniform. This character is very important, and never found in *E. gigas*.

3. In the sculpture of the posterior peræon-segments, of the pleon and telson. This sculpture varies considerably, but in *E. gigas* there is no sculpture at all.
4. In the more narrowed apex of the telson, which may be called sub-acute, and which is a little more produced than in *E. gigas*.

Remarks.—As regards the third character, given above, the original description of White says that the last joint of the abdomen has, near the base, a slight elevation, grooved in the middle. Stebbing says that there is, on the telson of the specimen he is inclined to refer to this form, a longitudinal groove between two elevations, and then a carina running to the end. I have asked for further information from Mr. Stebbing, and, in a letter, he kindly has furnished the additional character, that the last three segments of the peráon have, along the hind margin of each, four small tubercles.

Among our material, those specimens called the "smooth form," show exactly the characters given by White and Stebbing: a low elevation on the telson, divided by a groove, and an indistinct median keel running backward, so that there is no doubt that they belong to White's *S. lanceolatum*. I do not see, however, the four tubercles observed by Stebbing on the peráon-segments. The pleon and telson of these individuals possess fine granulations.

As regards *S. calcarea* of Dollfus, the chief characters are, beside the double keel in the anterior part of the telson, and the single median keel in the posterior, the distinct and prominent granulations on the posterior part of the body, chiefly on the telson. This character is strongly pronounced, among our specimens, in those that have been called above the "sculptured form." These granulations are somewhat irregular, and assume sometimes an almost vermiculate appearance. This form also shows the four little tubercles on the hind margins of the three posterior peráon-segments, observed by Stebbing. There is much variety in the degree of development of the granulations.

The fact that Dollfus mentions a smooth form, and that these two forms, the smooth and the sculptured, also have been found associated by Mr. Hatcher at Santa Cruz and San Julian, while the typical *E. gigas* is found not at all at these localities; and further, the fact that among the large number of *E. gigas* collected by Hatcher at Punta Arenas not a single individual of these forms has been discovered, is much in favor of the view that they really belong together, that is to say, to White's *S. lanceolatum*. All our specimens from Santa Cruz and San Julian differ in the same four characters, mentioned above, from *S. gigas*, and further,
Mr. Stebbing informs me that Dollfus' *S. calcarea* might very well be a form of that, which he is inclined to take for White's *S. lanceolatum*.

The question remains, whether Dollfus was justified in calling his species by the name of *S. calcarea* Dana. Dana's species came from Tierra del Fuego, but his description and figure (1852, p. 776, pl. 52, f. 2) do not give any characters that warrant this identification, and considering the adverse conditions by which Dana was hampered in the preparation of his figures and diagnoses (see Stebbing, 1900, p. 528), we had better disregard *S. calcarea* Dana altogether.

As regards the outer ramus of the uropods, which is given by White as an additional distinctive character of *S. lanceolatum*, I cannot say that it is very distinct from that of *E. gigas*. It is lanceolate, mostly rounded at the apex, but sometimes subacute, and offers about the same shape and variations as in *E. gigas*.

This species also belongs to the genus *Exosphaeroma* as defined by Stebbing.

**CYMODOCEA** Leach.

**CYMODOCEA darwinii** Cunningham.

1891 *C. d.* Dollfus in: Miss. Cap Horn, v. 6, p. 65, pl. 8, f. 8.

**Localities.** — Mouth of Santa Cruz River, 1 sp. — San Julian, 1 sp.

**Distribution.** — Falkland Islands; Tierra del Fuego; East coast of S. Patagonia (off Port Desire, 47° S.); Kerguelen Islands. 0-127 fathoms.

**DYNAMENE** Leach.

**DYNAMENE eatoni** Miers.

1879 *D. e.* Miers in: Philos. Trans., v. 168, p. 203, pl. 11, f. 2.
1891 *D. e.* Dollfus in: Miss. Cap Horn, v. 6, p. 66, pl. 8, f. 9.

**Locality.** — San Julian, 1 sp.

**Distribution.** — Tierra del Fuego (region of Cape Horn); Kerguelen Islands.
PATAGONIAN EXPEDITIONS: ZOOLOGY.

CASSIDINA Milne-Edwards.

CASSIDINA EMARGINATA Milne-Edwards.

1887 C. e. Pfeffer in: Jahrb. Hamburg. Wiss. Anstalt., v. 4, p. 103, pl. 2, f. 9, 10, pl. 5, f. 23-30, pl. 6, f. 1-10.

1891 C. e. Dollfus in: Miss. Cap Horn, v. 6, p. 67, pl. 8, f. 10.


Localities. — Punta Arenas, 1 ♂; Mouth of Santa Cruz River, 12 sp. (♂ and ♀); San Julian, 7 sp. (♂ and ♀).

Distribution. — Falkland Islands; Tierra del Fuego; Straits of Magellan; Channels of western Patagonia; South Georgia; Kerguelen Islands. 0–120 m.

Family SEROLIDÆ Dana.

SEROLIS Leach.

SEROLIS PARADOXA (Fabricius).


1891 S. † Dollfus in: Miss. Cap Horn, v. 8, p. 61, pl. 8a, f. 4 (ne † f. 5).

Locality. — Punta Arenas, 34 sp.

Distribution. — Falkland Islands; Tierra del Fuego; Straits of Magellan. Shallow water.

Remarks. — On Dollfus' plate 8a, the figures 4 and 5 are transposed, fig. 4 representing this species, while fig. 5 is S. schythei Ltk. (In the explanation of the plate, p. 76, the opposite is stated.)

Order AMPHIPODA.

Family ORCHESTIIDÆ Dana.

HYALELLA S. J. Smith.

HYALELLA PATAGONICA spec. nov.

(Plate XLVIII, Figs. 3, a–h.)

Localities. — This species seems to be very abundant in southern Patagonia. Hatcher has collected it at about 30–35 localities in the region of the Rio Chico (47–50° S.), from near the coast to the Cordilleras (highest altitudes: 1,750 and 2,000 feet). It is found in springs, small streams and pools of fresh water, sometimes slightly alkaline (Arroyo Gio).
DISTRIBUTION.—Although a new species, some previous references might possibly belong to it. As we shall see below, a locality from which Faxon mentions H. dentata inermis, may belong to this species, namely: Puerto Bueno, Smyth Channel, Straits of Magellan. The same form, H. inermis has been mentioned by Wierzejski (1892, p. 187) from a stream that issues from a lagune near Mendoza (northern Argentina), the water of which has an odor of sulphur. However, what this form really is, remains to be seen.

Cunningham (1871, p. 498, pl. 59, f. 14) mentions Allorchestes patagonicus from a freshwater stream near Punta Arenas. He does not give any description, since his single specimen was considerably injured, and the figure is quite poor, and, no doubt, even incorrect. It is possible that our species was intended, but we have no means of deciding this, and Allorchestes patagonicus must remain a "nomen nudum."

DESCRIPTION.—Body rather robust, general form agreeing with that of H. dentata inermis Sm. Eyes small, black, rounded, about twice their diameter distant from one another.

Antennulae longer than the stalk of the antennæ, a little more than half as long as the whole of the antennæ. First and second joint of peduncle of the same length, third a little shorter. Flagellum with 10–12 joints in the ♂, and with 8–10 joints in the ♀.

Antennæ about one third as long as the body, or even shorter. The first joint of the peduncle short, the second a little longer, the third distinctly longer than the second. Flagellum with 12–17 joints in the ♂, and with 9–14 joints in the ♀.1

Maxillipeds (fig. 3, a) of the usual form, but all the joints are more slender than in H. dentata inermis.

First gnathopod of the ♂ (fig. 3, b): Meropodite with a blunt prominence on the inferior margin, which is beset with a number of setæ. Carpopodite about twice as long as meropodite (measured from the middle of the articulation with meropodite to the middle of articulation with propodite), upper margin with a sharp spine near the distal end, which has a group of setæ; lower margin with a very prominent, lobiform, rounded projection, the margin of which is fringed with stiff setæ. Propodite almost triangular, almost as wide as long, and about as long as carpopo-

1 The number of joints of the flagella of both antennulae and antennæ varies with age: it is less in young individuals, greater in adults. Often the number differs on either side; this difference, however, is always slight, only amounting to one or two joints.
dite; palmar margin oblique, nearly straight, with several rows of setæ, which become spine-like at the outer end; just below this end there is a group of more numerous setæ. There is no excavation to receive the tip of the dactylus. Outer surface of palm with an oblique row of setæ. Dactylopodite slender, slightly curved.

First gnathopod of ♂ (fig. 3, c) similar to that of the ♂, but propodite less distinctly triangular, and accordingly, less wide in proportion to length.

Second gnathopod of ♂ (fig. 3, d'): meropodite with a triangular, pointed prominence on the lower margin. Carpopodite about as long as meropodite, with a narrow, pointed prolongation of the lower margin, which is longer than the width of the rest of the carpopodite. Palm (measured along the upper border) about 4 times as long as carpopodite, triangular, swollen, in general form very similar to that of _H. dentata inermis_.

Palmar margin oblique, very slightly sinuous, with a series of small spines; the lower (outer) end with a depression to receive the tip of the dactylopodite, and around this depression with 2-3 stronger spines. Dactylopodite slender and curved.

Second gnathopod of ♀ (fig. 3, e) similar to the first gnathopods of ♂ and ♀, but meropodite with the prominence of the under margin more pronounced (but not triangular and pointed, as in the second gnathopod of the ♂); process of lower margin of carpopodite a little longer than that of the first gnathopod, and palm still more elongated, distinctly longer than the carpopodite, and less triangular than that of the first gnathopod of the ♀. (This is very dissimilar to that of _H. dentata inermis_.)

Peraeopods: First (fig. 3, f), second and third of about the same length, fourth longer than third, fifth (fig. 3, g) about as long as fourth. The last (fifth) extends backward a little beyond the tip of the first uropod. Basipodite of third to fifth enlarged, oval, that of fifth pair larger than those of the third and fourth. Hind edge of third, fourth and fifth serrated, most distinctly so in the fifth. Accessory branchiae on the first to the fifth peraeopods. No ordinary branchiae on fifth.

Uropods (fig. 3, h): First and second with spines on both rami. Third uropods: ramus about as long as the peduncle, only slightly extending beyond telson.

Telson (fig. 3, h), almost semicircular, or, more correctly, half-elliptic, with a pair of fine setæ on the rounded hind margin.
Color (in alcohol) whitish or grayish.
Length of large $\varphi$: 14–16 mm.

Remarks.—The following species of *Hyalella* have been described, which approach more or less closely the present one:

1. *H. dentata* Smith (1874, Geol. Surv., p. 608, pl. 1, f. 3–6, and Rep. Fish Comm., p. 645, pl. 2, f. 8–10), United States.¹
2. *H. inermis* Smith (1874, Geol. Surv., p. 609, pl. 1, f. 1, 2). Colorado, Utah, Florida.

This form is given by Faxon (1876, p. 373, textfig. 35) as *Allorchestes dentatus* var. *inermis* from the region of Lake Titicaca, from San Antonio, Peru (saline water, 3,300 feet above the sea), and from Puerto Bueno, Smyth Channel, Strait of Magellan (probably fresh water).

Faxon further describes (1876, pp. 374, 375, textfigs. 36, 37):

3. *Allorchestes dentatus* var. *gracilicornis* Fax., from near Campos (Rio de Janeiro), Brazil.
4. *Allorchestes longistilus* Fax., from the same locality.

Wrezesniowski (1879, pp. 176, 177, 199) describes:

5. *Hyale jelskii* Wrz., from Peru, east side of Cordilleras, 8,000 feet (Pumamarca).
6. *Hyale lubomirskii* Wrz., from Peru, west side of Cordilleras, 8,000 feet (Pacasmayo).
7. *Hyale dybowskii* Wrz., from Peru, west side of Cordilleras, 7,000 feet (Paucal, Montana de Nancho).

Finally, Stebbing (1899, pp. 406, 407, pl. 32, A, B) describes:

8. *Hyalella warmingi* Stebb., from Lagoa Santa (Prov. Minas Geraes, Brazil).
9. *Hyalella meinerti* Stebb., from "Laguna di Espino."²

All these forms belong to the genus *Hyalella*, founded by S. J. Smith (1874), and more sharply defined by Stebbing (1899, pp. 397–398) in his key to the genera of the family *Orchestiidae*.

*H. dentata* from the United States differs from our species (and all the

¹As has been surmised by Smith and Faxon, this species is very likely identical with *Allorchestes knickerbockeri* Bate (1862, p. 36, pl. 6, f. 1) from New York, and possibly with *Amphithoe aztecus* Saussure (1858) from Vera Cruz, Mexico. If the latter should prove to be true, the specific name of *aztecus* should be used.

²I have tried to locate "Laguna di Espino," but have been unable to do so. Places called by the name of "Espino" are found in Honduras and Venezuela (prov. Guarico), but no "Laguna di Espino" is known to me.
rest) in the spiniform prolongation of the segments of the pleon. This character, however, seems to be of minor importance, since there are intergradations in this respect between the typical *H. dentata* and *H. inermis* in the United States (see Smith, 1874, Fish Comm., p. 647; specimens from Florida). Faxon regards *H. inermis* only as a variety of *H. dentata*.

In all other characters, *H. dentata* as well as *H. inermis* are closely allied to our species, especially the following characters agree:

1. General shape of body and eyes.
2. Length of antennulae and antennæ. In *H. dentata* and *H. inermis* these are considerably shorter than half of the body.
3. Shape of the second gnathopod of the ♂. Especially the propodite is directly identical, as will be seen by comparing our figure (3a') with the figure of this joint of *H. dentata* (♂ ad.) given by Smith (1874, Geol. Surv., pl. 1, f. 3).
4. Relative length of the pereopoda.
5. Shape of uropods and telson.

The chief differences are the following:

1. The number of joints of both antennulae and antennæ is greater in our species. Although these parts are about as long as those of *H. dentata* and *inermis*, the number of joints is slightly greater in *H. patagonica* (in *dentata* and *inermis*, 7–9 in the antennulae, 8–12 in the antennæ; in *H. patagonica*, 8–12 in the antennulae, 9–17 in the antennæ). The joints of the peduncles are a little different in length; while of those of the antennulae, in *H. dentata* and *inermis*, the two distal ones are about alike, the last joint, in our species, is a little shorter than the second. In the antennæ, the second and third joints are alike in *H. dentata* and *inermis*, while, in *H. patagonica*, the third is distinctly longer than the second. These differences, however, seem to be of minor importance.

2. In the first gnathopod of the ♂ as well as the ♀, the propodite is, in *H. patagonica*, distinctly broader and more triangular; the propodite has a distinct lobiform prominence, which is much more developed than in *H. dentata* and *inermis*, and, consequently, the carpopodite appears shorter and broader in our species.

3. The same is true of the second gnathopod of the ♀: the carpopodite and propodite are shorter and comparatively broader in our species, and the process of the carpopodite is more pronounced. The propodite in *H. dentata* and *inermis* is much longer than in our species.
4. In our species, the meropodite of the second gnathopod of the ♂ has a triangular, pointed prominence on the lower margin, while in *H. dentata* and *inermis* this process is blunt and obtuse.

5. Size of our species much larger, up to 16 mm., while *H. dentata* and *inermis* measure not more than 6 mm.

Thus we see that *H. patagonica* differs from *H. dentata*, and especially from *H. inermis*, in some slight and unimportant features of the antennulæ and antennæ, and in some very marked characters of the first and second gnathopods of the ♂ and ♀, and in size. Nevertheless, these three forms seem to be very closely allied in the general shape of the body, length of antennulæ and antennæ, and the general shape of the chelæ of the second gnathopods of the ♂.

It remains doubtful, whether Faxon's *H. dentata* var. *inermis* from South America is really identical with the form of the United States. Faxon says that his Lake Titicaca specimens exhibit some differences in the shape of the propodite of the second gnathopods of the ♂, but his figure does not reveal them in a sufficient degree. Considering the fact that we possess several hundred individuals of our species, and that they all show a great uniformity in their characters, and that the differences mentioned above are constant among them, it is possible that also the Titicaca form—of which Faxon had only 6 specimens—might be a good species. As to the specimens from Peru and the Straits of Magellan, Faxon does not give any details of their characters, but I suspect very strongly that those from the latter locality really belong to our species.

*H. dentata* var. *gracilirostris* (Fax.) from Brazil differs at once from all others, discussed so far, in the much longer antennæ, which are half as long as the body. There may be other characters that differ, to which Faxon does not refer. He had only one female.

*H. longistilus* (Fax.) from Brazil differs at once in the third uropods, which are much longer, and in the longer antennulæ and antennæ. Carpopodite of second gnathopod of ♂ more oval, and less distinctly triangular.

*H. jelskii* (Wrz.) from Peru differs:

1. Antennulæ and antennæ much longer, and the antennæ of the ♂

1Wrzesniowsky does not give any figures of his species, and consequently we cannot form, in some points, a good idea as to their characters. Nevertheless his descriptions are generally clear, and do mention characters that show conclusively that his species are different from *H. patagonica*.  

ORTMANN: CRUSTACEA OF SOUTHERN PATAGONIA.
are two thirds of the length of the body. Number of joints about the same as in our species (antennae of ♂, 18 joints).

2. Shape of first gnathopod different, the carpopodite large, distinctly longer (1½ times as long as propodite).

3. In the second gnathopods of the ♂, carpopodite about one third of the propodite (expression ambiguous: "dreimal kuerzer"), and propodite apparently shorter than in our species. For the rest, the propodite seems to possess a similar shape, although the spinules of the palmar margin seem to be different.

4. The propodite of the second gnathopod of the ♀ seems to be quite different, being 2½ times as long as broad.

5. No accessory branchiae on the fifth peræopods.

6. Size smaller (5 mm.).

Thus it seems that this species is much more different from *H. patagonica* than *H. inermis*, especially in the shape of the antennule, antennae and gnathopods.

*H. lubomirskii* (Wrz.) from Peru differs from our species:

1. Head shorter, and eyes oval (not round).

2. Antennule and antennae longer (antennae of ♂ over one half of the body). Number of joints slightly greater.

3. Second gnathopods of ♂ apparently similar to our species, but palmar margin cut into two lobes, and meropodite 1½ times as long as carpopodite. In the ♀, the propodite is longer than in our species, almost twice as long as wide.

4. Size smaller (6 mm.).

Here the first gnathopods are apparently more like *H. patagonica* (carpopodite hardly longer than propodite). This species resembles more *H. inermis* in the first and second gnathopods, but head, eyes, antennule and antennae are different.

*H. dybowskii* (Wrz.) from Peru differs from our species:

1. Eyes oval, dilated below.

2. Antennae longer (half as long as body). Number of joints of antennule and antennae near that of our species (antnl. 10–13, ant. 14–15).

3. Carpopodite and meropodite of second gnathopod about one third as long as propodite.\(^1\) For the rest the first and second gnathopods seem

\(^1\)"Zweimal kuerzer." This expression is very ambiguous, in a double sense.
to resemble those of *H. patagonica*, although the description is very short and incomplete.

This species seems to be the most closely allied form among those described by Wrzesniowsky; it differs, however, distinctly in the shape of the eyes and the length of antennulæ and antennæ.

*H. warmingi* Stebb., from Lagoa Santa, Brazil.

This species differs at once and strikingly in the shape of the propodite of the second gnathopod of the ♂, which is more oval, and in the shape of the first gnathopod and the second gnathopod of the ♀. Also the antennæ are much longer, so that we do not need to compare it further.

*H. meinerti* Stebb., from “Laguna di Espino.”

This is entirely different in the third uropods, which resemble those of *H. longistilus* (Fax.), and further, the shape of the first and second gnathopods and the length of the antennæ are quite unlike our species.

Thus we see that the species most closely allied to *H. patagonica* is *H. inermis* of the United States. According to Faxon, this species (or variety) is also found in Peru, near Lake Titicaca, and in the region of the Straits of Magellan. Yet Faxon regards differences in the shape of the first and second gnathopods not as specific characters, and thus it is quite possible that his South American specimens represent good species, different from *H. inermis*. I have said above that the differences of *H. patagonica* from *H. inermis*, although seemingly unimportant, are constant among the large number of our specimens, and consequently, I am forced to regard this Patagonian form as a new and good species.

The fact that the type of fresh-water amphipods, represented in the United States by *Hyalella dentata* and *inermis* extends, apparently, throughout America, over Central and South America to the Straits of Magellan, while this genus is found nowhere else, is very interesting from a zoögeographical point of view.

Order DECAPODA.

Family *LITHODIDÆ* Dana.

*LITHODES* Latreille.

*LITHODES ANARCTICA* (Jacquinot).


Locality.—Punta Arenas, 2 ♂ 1 ♀.
Distribution.—Tierra del Fuego; Straits of Magellan; northward to Chiloé. Shallow water.

PARALOMIS White.

PARALOMIS GRANULOSA (Jacquinot).


Localities.—Punta Arenas, 4 ♂ 3 ♀; Cape Fairweather, 2 ♂ jun.

Distribution.—Falkland Islands; Tierra del Fuego; Straits of Magellan.
On the eastern Patagonian coast this species has been found as far north as Bahia Blanca (Prov. of Buenos Aires), 38° 42' S. (Berg, 1900), while on the western coast it does not seem to go beyond Trinidad Channel (50° S.).

Remarks.—According to Stebbing, the specific name of P. granulosa has to supersede that of P. verrucosa, having been published (on Jacquinot's plate) not later than in 1847, while L. verrucosa of Dana was published in 1852.

The two young individuals from Cape Fairweather correspond closely to L. verrucosa of Dana (1852, p. 428, pl. 26, f. 16). Both have the length of the carapace, 27 mm. The specimens from Punta Arenas are all larger, and most of them seem to be adult; the smallest, a soft shell female, is 61 mm. long (carapace only), and this one is intermediate in sculpture between the young and adult specimens; the tubercles of the surface are more crowded than in the latter, but a little more distant from each other than in the former. The same is true of the granulations of these tubercles, they being less developed than in P. verrucosa, but more strongly than in the adult individuals. Length of adult males: 92, 101, 107 mm.; of an adult female: 72 mm.

This leaves no doubt as to the identity of P. granulosa and verrucosa, the former being only the young stage of the latter, as already Bouvier (1896) maintained.
Family *GALATHEIDÆ* Dana.

**MUNIDA** Leach.

**MUNIDA subrugosa** Dana.


1891 *M. s.* A. Milne-Edwards in: Miss. Cap Horn, v. 6, p. 36, pl. 2, f. 2.

*Localities.* — Punta Arenas, 1 ♂ 1 ♀ (ad.); San Julian, 29 Jun.

*Distribution.* — Falkland Islands; Tierra del Fuego; Straits of Magellan; along the Atlantic coast of Patagonia northward to off Monte Video; on the western coast northward to Messier Channel and Chiloé.

This species is also found in New Zealand, Auckland and Campbell Islands. A variety (var. *australiensis* Henderson, 1888, p. 125, pl. 13, f. 3) is found in Bass Strait, Australia.

Range in depth: southern localities 0–125 fath.; off Monte Video: 600 fath.

*Remarks.* — The specific differences of this species have been set forth best by A. Milne-Edwards, and I have been able to verify them in our material.

Henderson's *M. subrugosa* is the true *M. subrugosa*, although he also gives, among the synonyms, *Grimothea gregaria* (with a ?) : he states expressly (p. 125) that no specimens representing the latter form were taken by the Challenger, and, further, he doubts the correctness of the identification of these two species.

**MUNIDA gregaria** (Fabricius).

1891 *M. g.* A. Milne-Edwards in: Miss. Cap Horn, v. 6, p. 32, pl. 2, f. 1.


*Locality.* — Punta Arenas, 1 ♂ ad.

*Distribution.* — Falkland Islands; Tierra del Fuego; Straits of Magellan.

It is doubtful whether this species is also found in New Zealand, since it has been confounded by some authors with *M. subrugosa*. A form allied to this is mentioned by Filhol (1885, p. 426) from Cook Strait, New Zealand: he distinguishes it well from *M. subrugosa*, but says that it is also not quite identical with "*Grimothea gregaria*," and proposes the name of *Grimothea nova-zelandiae* for it. See also Benedict, l. c.

*Remarks.* — Length of body of our specimen: 54 mm. (about as long
as Milne-Edwards' adult male). It agrees well with the description in every respect, but the spinules of the upper part of the carapace are less distinct, although present. The latter character seems to be not very important, since a variety of *M. subrugosa* (var. *australiensis*) also possesses a larger number of spinules on the carapace than the typical *subrugosa*.

Family *MAJIDÆ* Alcock.

**EURYPODIUS** Guérin-Ménilville.

**EURYPODIUS LATREILLET** Guérin-Ménilville.


*Localities.*—Punta Arenas, 1 ♂ ad. 15 ♀ jun., 1 ♀ ad. 4 ♀ jun.; Mount of Observation (near Santa Cruz) 1 ♂ ad. 2 ♀ jun.; Mouth of Santa Cruz River, 2 ♂ 1 ♀ (all jun.); San Julian, 1 ♀ jun.

*Distribution.*—Falkland Islands; Tierra del Fuego; Straits of Magellan; northward, on the western coast, to Chili and Peru, and on the eastern coast to the Gulf San Matías (Rathbun, Pr. U. S. Mus., v. 21, 1898, p. 571). 0–70 fath.

*Remarks.*—Our series corresponds exactly to the account given of this species by A. Milne-Edwards, showing the identical differences of the characters in the different sexes and ages.

Family *HYMENOSOMIDÆ* Stimpson.

**HALICARCINUS** White.

**HALICARCINUS PLANATUS** (Fabricius).

1852 *H. pubescens* Dana, ibid., p. 386, pl. 24, f. 8.
1891 *H. pl.* A. Milne-Edwards in: Miss. Cap Horn, v. 6, p. 27.

*Localities.*—Punta Arenas, 6 ♂ ad. and half grown, 3 ♂ jun., 10 ♀; Mount of Observation, 1 ♀; Mouth of Santa Cruz River, 14 ♀; San Julian 1 ♂ jun., 7 ♀.

*Distribution.*—Falkland Islands; Tierra del Fuego; Straits of Magellan. It has been found, on the east coast of Patagonia, at Cape Virgin
(entrance of Straits of Magellan), and at Cape Blanco (47–48° S.); on the western coast it seems to extend to Chili.

This species has been recorded from New Zealand, Auckland Islands, Kerguelen Islands, Marion and Prince Edwards Islands. Range in depth: 0–150 fath.

On the Australian coast it is represented by the very closely allied species: H. ovatus Stps. (see Stebbing, l. c.).

Remarks.—The young ♂ from San Julian, and the three young ♂ from Punta Arenas, of the lengths: 2.5–3–3.5–4 mm., agree completely with Dana’s H. pubescens, which is said to be one tenth of an inch long (= 2–3 mm.): the form of the carapace is more rounded (less transverse than in H. planatus), the walking legs (and sometimes the carapace) are slightly pubescent, and the sides of the male abdomen are parallel, with the exception of the last joint. A young ♂, 6 mm. long has the typical form of the male abdomen of H. planatus, but the form of the carapace is less transverse. The pubescence is not present. Larger males (from 10 mm. upward) acquire by degrees the greatly swollen chelipeds. Our largest male has the following measurements: Length 13 mm., width 16 mm.

Family ATELECYCLIDÆ Ortmann.

HYPOPELTARIA Miers.

HYPOPELTARUM spinosulum (White).

1891 Pellerion spinulosum (sic) A. Milne-Edwards in: Miss. Cap Horn, v. 6, p. 17.

Locality. — Punta Arenas, 3 ♂, 17 ♀, 19 jun.
Distribution. — Falkland Islands; Tierra del Fuego; Straits of Magellan; Chiloé; Chili; Valparaiso; Gulf San Matias, Argentina. 0–45 fath.

Remarks. — The specific name spinosulum was used by White in 1843, spinulosum by the same author in 1847; the latter form was accepted by all subsequent writers except Miers (1886) and Stebbing (1900).

The generic name Peltarion Jacquinot is correctly to be transcribed as Peltarium, and this is preoccupied; it has, therefore, to give way to Hypopeltarium Miers.
A. Milne-Edwards describes the rostrum of this species as bifid with two lateral teeth; in most of our individuals, however, it is three-spined, the median spine being entire; only in rare cases there is a slight emargination or notch at its distal extremity.

ZOÖGEOGRAPHICAL REMARKS.

Among the marine forms collected by Mr. Hatcher, four groups are distinguishable according to their geographical range:

1. **Cosmopolitan.**
   - *Lepas anatifera* L.
2. **West American** (California to Patagonia).
   - *Balanus levis* Brug. (also in the Atlantic, northward to southern Brazil).
3. **Antarctic types.**
   1. *Iais pubescens* (Dan.), also: S. Georgia, New Zealand, Tasmania, Kerguelen.
   2. *Exosphæroma gigas* (Leach), also: New Zealand, Auckland, Australia, Kerguelen.
   3. *Cymodocea darwini* Cunn., also: Kerguelen.
   4. *Dynamene eatoni* Mrs., also: Kerguelen.
   5. *Cassidina emarginata* M.-E., also: S. Georgia, Kerguelen.
   7. *Halicarcinus planatus* (F.), also: New Zealand, Auckland, Kerguelen, Marion, Prince Edward.
4. **Local types**, restricted to so called Magellanian province.
   1. *Elminius kingi* Gr.
   4. *Exosphæroma lanceolatum* (Wh.).
   7. *Paralomis granulosa* (Jacqu.).
   10. *Hyopeltarium spinosulum* (Wh.).
We see at once that, while the prevailing features of the southern Patagonian marine fauna are made up chiefly by peculiar species, another large part of the fauna shows unmistakable affinities to other Antarctic countries. Looking more closely upon the peculiar types (group 4), we are able to state the following particulars with regard to their relationship to other parts of the world.

The genera *Elminius*, *Edotia*, and *Eurypodius* do not find any closer relations elsewhere. *Exosphaeroma* and *Serolis* are distinctly Antarctic types, while the affinities of *Rocinela* and *Munida* are more or less cosmopolitan. There remain only the two *Lithodidae* and *Hypopeltarium*. The *Lithodidae* apparently are to be classed with those forms which possess a kind of bipolar distribution, but where the two polar areas are connected along the western coast of America. This has been called by the present writer "meridional distribution," and such cases are not considered to belong to "bipolarity" in the original sense. *Hypopeltarium*, which is represented in European waters by *Atelecyclus*, might be taken for a case of bipolarity, if it were not for the fact that a species of this genus lately has been discovered in the West Indian region. This renders it impossible to regard this case (of *Hypopeltarium* and *Atelecyclus*) as one of bipolarity.

Examining the Antarctic types (group 3), we find that none of them can be regarded as a representative of any characteristic Arctic form, although among the five isopods the generic affinities need further investigation. This much is known, that all five of them are hardly represented in any part outside of the Antarctic regions. The same is true of *Halicarcinus*, while *Munida*, as has been stated above, is cosmopolitan.

Thus, among the forms discussed here, the bulk is to be regarded as peculiar to this region, representing a local Magellanian fauna. A large part of this fauna exhibits characteristic Antarctic affinities, pointing to a former closer connection of the different parts (South America, New Zealand, Australia, Kerguelen, etc.). The remaining small number represent either immigrants from the north, along the western coast of America, or more or less cosmopolitan types.

The Magellanian fauna, according to this material—and this is no doubt a fair representation of the more abundant forms of it—is descended

---


from a general Antarctic fauna, which has developed some peculiar local
types; a few elements of it (Elminius, Edotia, Eurypodius) seem to be
altogether peculiar to these parts, while a few others belong to different
sources; some immigrated from the north, and others are cosmopolitan
forms, the original home of which cannot be traced. No indications of
bipolarity are found, that is to say, in no case are the affinities of any of
these Antarctic forms to Arctic forms closer than to any other region of
the earth.

This points distinctly to the former existence of an Antarctic fauna
peculiar to the shores of the supposed old Antarctic continent, of which
fauna the Magellanian is a slightly modified offshoot, blended with a few
types of different, presumably northern, origin and the view is supported
that the Antarctic fauna, in its origin, is totally different from the Arctic.¹

With regard to the fresh-water fauna we may make the following
remarks.

Most of the species recorded here belong to the class of those small
fresh-water organisms, for which exceptional means of dispersal (passive
transport by wind, water-fowl, etc.) are admissible, and even observed, so
that a more or less cosmopolitan distribution is not astonishing. Although
most of the species (except Daphnia hastata) are peculiar to Patagonia,
the genera are universally distributed.

A very remarkable exception to this is presented by the Copepod genus
Pseudobœckella. The distribution of this and the allied genera (Bœckella,
Bœckellopsis, Parabœckella) is almost exclusively restricted to the Antarct-
ic countries (only in S. America the range extends into Brazil). I give
here a synopsis of the known localities, following Mrazek's (1901) classi-
fication.

The genus Bœckella (typ.) Mraz. contains three species from Australia
and New Zealand (B. triarticulata (Thoms), minuta Sars, robusta Sars).
To these we have possibly to add: B. gracilipes Dad., gracilis (Dad.) and
pygmea Dad., from Patagonia and Chili.²

Pseudobœckella Mraz. contains the following species: brasiliensis (Lubb.),
Patagonia and Brazil; poppei Mraz., S. Georgia and S. Patagonia; longi-
cauda (Dad.) and entzi (Dad.) both from Patagonia; and probably also:
dubia (Dad.) and silvestrii (Dad.) from Patagonia.

²Daday in Term. Fûz., v. 25, 1902, p. 444.
Backellopsis Mraz. possesses only the species *B. bergi* (Rich.) from Buenos Aires and S. Patagonia.

*Parabceckella* Mraz. is made up of *P. brevicaudata* (Brad.) from Kerguelen and Punta Arenas.

This distribution is so remarkable, including only S. America, S. Georgia, Kerguelen, Australia and New Zealand, that this group of genera, which are no doubt closely related to one another, clearly is to be classed with those freshwater and land animals that point to a former connection of these regions. Under the same head comes also *Lepidurus hatcheri* Ortm., of which we have demonstrated above, that it is most closely allied to *L. angasi* Baird of South Australia.

**BIBLIOGRAPHY.**

Baird, W.

Bate, C. Sp.
1862 Catalogue of the specimens of Amphipodous Crustacea in the collection of the British Museum, 1862.

Beddard, F. E.

Benedict, J. E.
1902 Description of a new genus and forty-six new species of Crustaceans of the family Galatheidae, with a list of the known marine species (Proc. U. S. Mus., v. 26, 1902).

Berg, C.

Bouvier, E.-L.

Brady, G. S.

Cunningham, R. O.

PATAGONIAN EXPEDITIONS: ZOOLOGY.

Daday, E. von.
1901 Diagnoses præcursoriæ Copepodorum novorum e Patagonia (Termeszetzajzi Füzetek, v. 24, 1901).
1902 Microscopische Suesswasserthiere aus Patagonia (Termeszetzajzi Füzetek, v. 25, 1902).

Dana, J. D.
1852 Crustacea in U. S. Exploring Expedition, v. 13, part 1, 1852.

Darwin, C.
1851, 1854 A Monograph on the sub-class Cirripedia. Lepadidae, 1851.—Balanidae and Ver-rucidae, 1854.

Dollfus, A.
1891 Crustacés Isopodes in Mission scientifique du Cap Horn, v. 6, Zool., 1891.

Faxon, W.

Filhol, H.
1885 Catalogue des Crustacés de la Nouvelle Zélande, des îles Auckland and Campbell in Mission de l'île Campbell (Passage du Venus sur le Soleil), v. 3, part 2, 1885.

Giesbrecht, W. & Schmeil, O.

Guerne, J. de & Richard, J.

Henderson, J. R.

Ihering, H. von.

Lilljeborg, W.

Miers, E. J.
1886 Report on the Brachyura collected by H. M. S. Challenger (The Voyage of H. M. S. Challenger, Zool., v. 17, 1886).

Milne-Edwards, A.
1891 Crustacés in Mission scientifique du Cap Horn, v. 6, Zool., 1891.

Mrazek, A.

Packard, A. S.

Pfeffer, G.
Richard, J.

Richardson, H.

Schizedte, J. C. & Meinert, F.
1879 Symbolae ad monographiam Cymothoarum Crustaceorum Isopodum familie (Naturhist. Tidskr., ser. 3, v. 12, 1879).

Simon, E.

Smith, S. I.

Stebbing, T. R. R.

Studer, Th.

Tate, R.

Thomson, G. M.

Weltner, W.
1897 Verzeichnis der bisher beschriebenen recenten Cirripedienarten (Arch. f. Naturgesch., 1897, v. 1, Heft 3).

White, A.

Wierzejski, A.

Wrzesniowski, A.
PART VII.
HIRUDINEA OF SOUTHERN PATAGONIA.

BY
J. PERCY MOORE,
UNIVERSITY OF PENNSYLVANIA.

NOTHING whatever was known of the fresh-water leech fauna of the extreme southern end of South America—of the entire region south of Valdivia on the Pacific coast and of Montevideo on the Atlantic side—until the publication in 1890 of Blanchard’s account of the leeches collected by Dr. Michaelsen on the Hamburg Expedition to the Straits of Magellan. In this paper the following species were described from Tierra del Fuego and Punta Arenas on the Straits of Magellan, all having been collected at no great distance from the coast in ponds, lakes and swamps: *Semiscolex variabilis* Blanchard, *Glossiphonia (Helobdella) chilensis* Blanchard, *Glossiphonia (Helobdella) michaelseni* Blanchard, and *Glossiphonia (Helobdella) scutifera* Blanchard.

The material described in the present paper was collected inland along the base of the mountains at elevations as high as 2,500 ft., and particularly from the numerous springs and streams which feed the Rio Chico—a region from which no leeches have hitherto been described. As regards the number of species the collection is small, comprising but six, belonging to only two families. But several of these are represented by a great many examples. Three of the four species recorded by Blanchard from southern Patagonia are represented; and two new species are included, both of which possess functional nuchal glands, which in *Glossiphonia duplicata* are greatly developed. So far as appears in the present very incomplete state of our knowledge of the fresh-water leeches of this region, the most striking feature of the fauna is the predominance of small glossiphonids of the group designated by Blanchard *Helobdella*. Including *G. stagnalis*, which has been found as far south as Valdivia, this fauna includes most of the known species with functional nuchal glands.
SEMISCOLEX.

SEMISCOLEX VARIABILIS R. Blanchard.

(Plates XLIX, Figs. 1–9; L, Fig. 12.)

Except for the narrower prostomium and smaller mouth, the general aspect is similar to Hæmopis, a resemblance which is especially striking in the case of a quite small individual. The larger specimens are somewhat flattened posteriorly and rather sharply constricted at the region of the sexual pores, anterior to which the body is narrower and nearly terete. The arrangement of the eyes is shown in figures 1 and 7. The relative position of the pigment cups and the direction of the axes of the eyes are sufficiently obvious. The pigment cups of the first three pairs are larger and more conspicuous than the others. No sensillæ are discernible.

Sixteen pairs of quite conspicuous nephridial ducts, appearing as short tubes which pass obliquely backward through the integuments, open close to the posterior margin of annulus b2 of every somite from IX to XXIV. The anus is a conspicuous opening with lobed margins as in Hæmopis.

Like Blanchard’s types all three of the specimens studied by me have the male genital orifice situated in the middle of XII b7. In the mature examples it is a rather prominent four-rayed opening, slightly elevated on a broad, low papilla, to support which the annulus is lengthened mesially. In all three of Blanchard’s specimens the position of the female pore differed, ranging from XII a2/b5 to XII b6, being separated from the male pore, therefore, by two and one half, three and one half and four annuli respectively. The intermediate condition was exhibited by an example from Punta Arenas, Patagonia, and to this the three here described are exactly similar. The female pore in all is a minute opening in a depressed area situated at XII b5/b6.

Annulation.—The details of annulation of the best preserved mature example are exhibited in Plate XLIX, figs. 2, 3, 5–8, and of the young example in figure 4.

Somites I, II, III and IV are separated by no distinct furrows, though slight wrinkles may be caused to appear on the median part of the head between the eyes by bending this region upward. These furrows, together with the position of the closely crowded anterior three pairs of eyes, show that the first three somites are uniannulate. Somite IV is apparently so also, or else a3 is very obscurely distinct, for, although the distance
between the third and fourth pairs of eyes is somewhat greater than that
separating any of the preceding pairs, no distinct intervening annulus
can be detected.

V is biannulate; the two annuli — \(a_1 + a_2\) and \(a_3\) — are of about
equal length. The pigment cups of the fourth pair of eyes are at about
the middle of the anterior annulus and placed on the antero-internal face
of the sensory cells. The furrow \(a_1 + a_2\)/\(a_3\) is incomplete in the small
specimen and the pigment cups of the eyes reach into IV, an appearance
due in part to contraction and in part to the position of the head when
drawn.

VI is also biannulate. On the dorsal surface a faint furrow \(a_1/a_2\) is
present, extending about as far as the eyes in the larger example, but
detectable under the compound microscope for the entire width of the
head of the smaller one. The pigment cups of the fifth pair of eyes,
which cover the anterior face of the sensory cells, lie directly beneath this
incipient furrow. The second annulus \(a_3\) is quite distinct all around,
making the somite biannulate ventrally as well as dorsally.

VII is triannulate; \(a_3\) is distinctly longer than \(a_1\) or \(a_2\) which are
obviously more closely associated, the furrow \(a_1/a_2\) being less distinct
than \(a_2/a_3\), especially on the ventral surface.

VIII is quadriannulate. Of the four annuli \(a_1\) is just appreciably longer
than \(a_2\) and shows a faint dorsal furrow, \(b_1/b_2\); \(b_5\) and \(b_6\) are distinctly
shorter than \(a_1\) and \(a_2\), and the furrow \(b_5/b_6\) is a trifle less deep than
the others.

There are sixteen distinctly quinqueannulate somites, IX to XXIV in-
cclusive. In IX the relative lengths of the annuli are represented by the
formula \(b_1 = b_2 < b_5 = b_6 < a_2\); IX \(b_1\) and \(b_2 = VIII b_5\) and \(b_6\). By
about XI the formula becomes \(b_1 = b_2 = b_5 = b_6 < a_2\), which it remains until
about XXII where the somites begin to decrease in relative and abso-
lute length, owing to diminution of the posterior annuli. Here
\(a_2 > b_1 = b_2 > b_5 = b_6\).

XXV is quadriannulate, \(b_1\) and \(b_2\) being smaller than \(a_2\), which is
again slightly smaller than \(a_3\). Across the latter, traces of the furrow
\(b_5/b_6\) may be detected. Following XXV are two small rings between
which the anus is placed. Although there are no visible sensillae to
authenticate the determination, these are interpreted as XXVI and XXVII
respectively.
The small specimen shows immaturity not alone in the condition of the reproductive organs, but in the external annulation. Throughout the middle region of the body the secondary annuli into which $a_1$ and $a_3$ are divided are imperfectly separated. This is expressed not so much in their relative size, which is scarcely appreciably less than in the mature specimen, but very obviously in the relative shallowness of the furrows $b_1/b_2$ and $b_5/b_6$ as compared with $b_2/a_2$ or $a_2/b_5$. Figure 4 is a careful camera drawing of the ventral surface of this specimen when mounted in glycerine, in which medium the ganglia can be seen quite clearly and are also represented in the figure. Generally the ganglia lie principally within $a_2$ throughout the quinqueannulate region. The subcesophageal complex is in VI and VII and the supracesophageal chiefly in VI. On the dorsal surface the furrow $a_2/b_5$ is distinctly deeper than $b_2/a_2$, resulting in the natural division of the five annuli into two groups of three and two respectively.

Alimentary Canal.—The upper lip (prostomium) is somewhat wrinkled below, but lacks any definite and distinct median sulcus. The mouth is small in the preserved specimens, scarcely larger than in a nephelid in the larger, but relatively larger in the smaller one. Jaws are absent, though the median dorsal one is probably represented by a small rounded tubercle occupying the corresponding position and surrounded by a shallow trench, immediately laterad to which is a pair of broad, low, longitudinal muscle columns, and again beyond these a similar pair of narrower ones, but no trace of lateral jaws. Muscles and gland ducts enter the dorsal tubercle, but there are no teeth. A low, narrow fold passes between the buccal chamber and pharynx dorsally, but fades out ventrally.

The pharynx (Plate XLIX, fig. 9) is capacious and extends to the region of the genital pores in the middle of XII. Its inner surface is thrown into slightly marked longitudinal muscular ridges. These begin anteriorly as a dorsal pair and a median ventral one, alternating with three much narrower ones. Each of the larger set almost immediately divides into several, so that for the greater length of the pharynx ten or twelve ridges are recognizable. None of these is strongly marked and the internal surface of the pharynx is nearly smooth and regular, but shows a slight tendency toward a triangular section.

A stomach of very simple character extends from XIII into XIX, where it passes, without any very sharp demarkation, into the intestine. Seven
valves, which correspond in position to the preganglionic muscular sheets, divide it into as many slight sacculations, the posterior ends of the last of which are produced into a pair of quite rudimentary caeca, of such small size and so closely embracing the intestine that they were entirely overlooked upon the first examination. They scarcely extend beyond the limits of the neural annulus of XIX.

The intestine is somewhat distended with food, to which, in contrast to the emptiness of the stomach, the somewhat greater diameter of the former is probably due. Its walls are excessively thin and delicate and somewhat regularly, but slightly, sacculated for the anterior half. It reaches to XXIV, beyond which a short rectum extends to the anus. That this species is not a habitual blood-sucker, but, like our common _Hamopis marmoratus_, subsists chiefly on small invertebrate animals and the organic contents of mud, is shown by the contents of the intestine and stomach, which consist of remains of tubificid worms, rhabdocoele planarians and diatoms.

_Reproductive Organs._—The reproductive organs (Plate L, fig. 12), while approaching in character most closely those of _Hamopis_, yet exhibit, if the single example dissected be entirely normal, a number of striking peculiarities. The pairs of testes occupy the interganglionic intervals from XIV/XV to XXII/XXIII ventrad of the alimentary canal. The first pair presents the ordinary appearance, but the remaining eight are all double, two closely appressed but perfectly distinct spheroidal testes with separate efferent ducts occupying each interval. The actual number of testes is, therefore, at least seventeen pairs and, as the vasa deferentia extend some distance posterior to the last, it is probable that additional material would permit of the demonstration of at least one more pair; and a pair may also occur at XIII/XIV. Both the vasa efferentia and vasa deferentia are excessively slender, but the latter in particular are rendered very conspicuous by a thick covering of pear-shaped groups of gland cells, which are far more thickly clustered dorsally than ventrally. Anterior to the testicular region the glands diminish in number and disappear altogether in somite XII. At the same time the walls of the sperm duct acquire greater firmness and it may be traced as a tortuous tube as far forward as the position of the male pore, where it bends mesially in a recurrent limb.

In somites XIV and XV each vas deferens becomes converted into a closely coiled, twisted and massed tube with thick walls and of irregular
diameter, the epididymis. This passes, without any enlargement into a special sperm sac, into a short thick ductus ejaculatorius which, without any apparent change in its diameter, is lost at once in the substance of the prostate region of the atrium, into which it enters. The atrium is straight—not bent on itself—and is chiefly remarkable for the great size of its prostate region, which projects freely caudal beyond the point of entrance of the ducts for a distance equal to more than one-fourth of the entire length of the atrium, and reaches beyond ganglion XIX. This entire region is covered with a layer of prostate glands. Anterior to the ducts the atrium becomes a thick-walled muscular tube (the penis sheath) which is much narrower than the prostate region and tapers somewhat to the external end. It is unfortunate that no material was available for sectioning to throw light upon the structure especially of the prostate end of the atrium.

The female organs (Plate L, fig. 12) consist of a single ovary (that of the left side being probably abnormally absent) lying in the posterior part of somite XII. The right oviduct (the left being absent) enters a well-marked glandula albuginea, within which it is somewhat coiled. It emerges as the common oviduct, which is not very clearly differentiated from the glandula, and enters the posterior end of the vagina, which is somewhat enlarged but lacks a distinctly separated ovisac at this point. The entire female organ is sharply bent on itself at the point where the oviduct passes into the vagina or uterus. The nerve cord passes to the left of the terminal end of both atrium and vagina.

In following Blanchard in placing this species in Semiscolex, I have simply accepted his determination, as I have never had the opportunity of dissecting any other species of that genus, and Kinberg's description is itself insufficient. Verrill's Semiscolex grandis and Forbes' Semiscolex terrestris are very different and both are true species of Hamopis, though the absence of teeth in the former may be considered by some as a sufficient basis for generic separation. Semiscolex variabilis also evidently stands with Hamopis in the distichodont division of the Hirudinidae, for, although the alimentary canal differs from that of Hamopis and resembles such a nephelid as Trocheta in the rudimentary jaws, valvular stomach and all but absent cæca, it has the proportions of and can readily be derived from that of Hamopis. The reproductive organs resemble the latter genus in the length of the vagina and penis sheath, the enlarged prostate, etc., though in the absence of any special sperm and ovarian sacs on the ducts it rather approaches Hirudo and its allies.
Semiscolex variabilis appears to be a small leech. Blanchard's specimens varied from 10 to 37 mm. in length. The smallest example here described measures 8 mm., the largest, which is poorly preserved, about 23 mm., and the individual which furnished most of these notes and is represented of natural size in fig. I has the following measurements.

<table>
<thead>
<tr>
<th>Measurement</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Length</td>
<td>21 mm</td>
</tr>
<tr>
<td>Anterior end to male pore</td>
<td>6.5 mm</td>
</tr>
<tr>
<td>Width at male pore</td>
<td>2.1 mm</td>
</tr>
<tr>
<td>Greatest width (XX)</td>
<td>3.6 mm</td>
</tr>
<tr>
<td>Diameter of posterior sucker</td>
<td>1.3 mm</td>
</tr>
<tr>
<td>Depth at male pore (about)</td>
<td>.8 mm</td>
</tr>
<tr>
<td>Greatest depth (about)</td>
<td>1.4 mm</td>
</tr>
</tbody>
</table>

Two specimens come from a "large spring 30 miles above Sierra Oveja, Rio Chico, Feb., 1899," Station 22; the third is from a "drying-up pool near Arroyo Eke, Alt. 2100 ft., Feb., 1899," Station 43.

Glossiphonia duplicata sp. nov.

(Plates XLIX, Fig. 10; L, Figs. 16-22.)

This species resembles G. (Helobdella) scutifera R. Blanchard, but is readily distinguished by the distinctly double annuli, the form of the nuchal plate, the metameric color pattern, etc.

Without exception all of the very large number of preserved specimens are stout and thick, less wide and flattened, but much deeper and more strongly convex dorsally than examples of G. scutifera preserved in the same bottles. The anterior end is somewhat slender, the posterior broadly rounded, the greatest width being at about the beginning of the posterior third. The anterior sucker is small, with a contracted opening and thick margin; the prostomium prominent. In almost all of the specimens a low elevation arises from the middle of the sucker, with a deep groove bounding it anteriorly. The mouth is rather large, situated in a thickening which represents the ventral portion of somite III, and is the center of several radiating furrows (Plate L, fig. 18).

The contracted, thick-rimmed posterior sucker is so strongly directed ventrad that it is entirely concealed from above (Plate L, figs. 19 and 20).

Following are the measurements of the type specimen, than which some examples are several millimeters longer, as well as relatively deeper.
Length, 18 mm.
Length to male pore, 5 mm.
Diameter of anterior sucker, 1 mm.
Diameter of its opening, .6 mm.
Diameter of posterior sucker, 2.5 mm.
Diameter of its opening, 1.5 mm.
Width of body at male pore, 3.8 mm.
Depth at male pore, 2.4 mm.
Greatest width (XIX), 6 mm.
Depth at XIX, 4 mm.
Width at anus, 2.5 mm.
Depth at anus, 1.2 mm.

Annulation.—Somites I and II are found in the preocular lobe, across which a very faint furrow can usually be detected and is always quite evident in the larger specimens. III is biannulate, the first annulus larger. IV is also biannulate, the anterior annulus bearing the single pair of eyes, which are generally lightly pigmented and consequently inconspicuous. This somite is usually a trifle longer than III, but in some examples they are equal. The example figured is slightly abnormal, the left half of the furrow IV/V being displaced on the dorsal side. V is likewise biannulate, but is considerably longer dorsally, where the enlarged anterior annulus is quite distinctly subdivided by a furrow, which separates a smaller a1 from a larger a2. This furrow ends at the margins of the lips so that ventrally there is no trace of this subannulation (Plate L, figs. 17, 18 and 22).

Although VI must be reckoned as a triannulate somite both above and below, it does not show the typical condition, inasmuch as a1 and a2 are rather closely united on the ventral side, and a3 is the only annulus which exhibits any trace of that development of secondary annuli which is so characteristic of this species among its close allies, and even this trace is usually wanting.

Somite VII is the first typical one. The three annuli are of about equal size and each is usually distinctly subdivided into two nearly equal secondary rings by a cross-furrow, which is especially well-marked on a1 and a3, and much less distinct or even absent ventrally. These cross-furrows correspond in position with superficial annular lacunæ which encircle each primary ring of the complete somites, and they have a con-
stant relation to the bands of circular muscles. Each primary annulus possesses five of these bands, between the second and third of which the furrow passes on $a_1$ and between the third and fourth on $a_2$ and $a_3$. VII $a_3$ is somewhat swollen at the mid-dorsal line, where also the furrow VII/VIII may become obliterated for a short distance owing to the development of the nuchal gland on the succeeding somite. The nuchal plate may sometimes slightly overlap VII $a_3$, or the latter may be somewhat constricted mesially by the glandular swelling. In some examples the cross-furrows are not visible on VII and they are always less distinct than on the larger annuli of VIII and succeeding somites.

VIII is chiefly remarkable from the presence of the nuchal gland. This is confined to $a_1$, which, as a consequence, is swollen and more or less elongated in the median dorsal region. The horny plate secreted by the gland, which it covers like a scale, is remarkably thick and conspicuous. In color it has a very dark brown center and a paler border. Unlike G. stagnalis it is broader than long, anteriorly very convex, posteriorly slightly convex or straight. It slightly overlaps or just reaches VIII $a_2$ and just reaches the furrow VII/VIII anteriorly. But little change is noticeable in the character of the somites to XXIII inclusive, though the secondary furrows are frequently more distinct on the somites immediately succeeding the region of the genital pores.

On XXIV, which remains triannulate, the secondary furrow is present on $a_1$ only and even there has become less distinct. On the ventral side the annuli of this somite are crowded together by the posterior sucker. XXV is biannulate and of much reduced length. The first annulus is about one half larger than the second and about equal to the contiguous annulus of XXIV. XXVI is faintly biannulate, $a_3$ being very narrow and indistinct. XXVII is uniannulate and is cut into two halves by the anus, which thus lies just posterior to XXVI (Plate L, figs. 19, 20 and 21).

Pigmentation.—From many of the specimens the pigment had faded altogether, but all of those in which this is not the case show a very evident metameric arrangement, resulting in many cases in a strongly annular pattern, which is dependent on the disposition of the muscles. In a typical example (Plate L, fig. 17) the ground color is a faintly mottled, very pale brown, which deepens on the margins and fades to a gray on the ventral surface. Dorsally, two broad, ill-defined, longitudinal bands extend
nearly the entire length. They are indistinct anterior to the nuchal gland but are usually conspicuous from that point to the anus. The median interspace between the bands corresponds to nine longitudinal muscle bundles, the bands themselves to five each (they are formed of six lines of pigment cells corresponding to six intermuscular lines), and the distance separating them from each margin to eleven.

Annulus $a_1$ of each somite from VI to XXVI inclusive is much more heavily pigmented than the others, and the pigment is especially aggregated on its posterior half, the $b_2$ constituent. Thus in such typical cases, the dorsum is marked by well-defined, narrow, metameric, transverse bands, which become fainter anteriorly, where they can seldom be traced beyond VI, and altogether diffuse posteriorly on XXV and XXVI. These transverse bands extend the entire width of the dorsum, both mesiad and laterad of the longitudinal stripes. Other examples are less typical and show the pigment spreading over $a_3$ as well as $b_2$, but the former never becomes so dark and is brown rather than blackish; $a_2$ always remains paler. The characteristic pattern is due to black pigment cells deep-seated between the muscle bands.

Reproductive Organs.—The male pore is situated at XII $a_1/a_2$, the female at XII $a_2/a_3$. The former is the more conspicuous; and in some specimens, but not in the type, is in the center of an elliptical disc, which is wedged between the two contiguous annuli. There are six pairs of testes (Plate XLIX, fig. 10) of globoid form alternating with the gastric caeca and filling up the spaces between these. Dorso-ventrally they are deeper than the caeca, reaching the same dorsal level, but extending to a lower ventral one. Though inter-metameric in position, they probably belong to the somites in which their posterior halves lie, consequently to XIV to XIX inclusive. The vasa efferentia and vasa deferentia are excessively delicate and can be traced only with difficulty. The vas deferens of each side passes dorsad of the caeca and mesiad of the testes. Reaching the posterior end of XII, it bends sharply mesiad, traversing muscles and pharyngeal glands ventrad to the ducts of the latter, and reaches the ventral sinus, through which it extends caudad, increasing, first abruptly and then gradually in diameter. The change from the minute vas deferens to the larger epididymis takes place in XIII. The long epididymal loop (sperm sac) thus formed is very conspicuous, reaching to the posterior end of XIX, and, being considerably convoluted.
and coiled about its fellow, would if straightened out, have a total length somewhat greater than the entire animal. The external limb of the loop has a slightly larger and more uniform diameter than the internal and its walls have a firmer consistency, which increases as the muscular structure of the ductus ejaculatorius is assumed. The difference however is slight. In one specimen the left epididymal loop passes ventrad to the right lateral nerve of XIX and then bends forward dorsad to the nerve cord and reaches to ganglion XVIII. Just before entering the prostate or atrial cornu, the duct becomes constricted for a short distance. The atrium consists of a very small common bursa, opening to the exterior and situated entirely beneath the nerve cord, and of two large globoid-fusiform or broadly ovate cornua, which diverge from beneath the nerve cord and project prominently cephalad, laterad and dorsad within the limits of somite XII. Their somewhat narrowed apices are joined by the sperm ducts (Plate XLIX, fig. 10).

The ovarian sacs (Plate XLIX, fig. 10) have no anterior lobes (or at least none are discernible in several dissections) and the two simple sacs of irregular form lie in close contact in the ventral sinus between the nerve cord and the sperm sacs. In the case where they exhibit the greatest development, the left sac reaches to ganglion XVIII, the right to XVII.

**Alimentary Canal.**—The proboscis (Plate L, fig. 16) is stout, nearly cylindrical but very slightly tapering; the anterior end is but little contracted and truncate with fine denticulations on the margin. It reaches in the retracted state from VII anterior to XII anterior and receives at its slightly enlarged base the pair of thick ducts of the pharyngeal glands. These are a loose, diffuse mass of unicellular glands occupying on each side the lateral portions of somites XII to XIV and to a less extent of XI. There is no median lobe and the bundles of ducts from each side remain independent of each other. A short, thin-walled cesophagus extends through XIII to the stomach beginning in XIV.

The stomach is thin-walled throughout and resembles that of *G. lineata* (Verrill) most closely, the caeca being better developed than is usual in *G. stagnalis*. Six pairs of these caeca occur. The first, in XIV, are very small and may be absent on one side, or otherwise asymmetrically developed. In XV to XVIII are four pairs of slender caeca of simple form, which (when empty) extend nearly half way to the margins of the body. The pair of large, posteriorly directed ones arises in XIX and
extends to XXIV inclusive. The intestine has the usual four pairs of lateral caeca in XX to XXIII inclusive, all of which are dorsad of the large gastric caeca. The first three pairs are sacculated, the last smooth. Each of the gastric and intestinal caeca arises directly over the corresponding ganglion and, with the exception of the last gastric, is confined to the limits of one somite.

This species must be exceedingly abundant throughout the region of Mr. Hatcher's explorations, as the following list of the localities and number of specimens will show.

Station No. 7. "Small running stream south side of Rio Chico, 25 miles above Sierra Oveja, Feb., 1899." 1 specimen.
Station No. 8. Spring at the same locality. 12 specimens.
Station No. 11. "Small running stream south side of Rio Chico, 15 miles above Sierra Oveja." 11 specimens.
Station No. 17. "Small stream running from spring on Rio Chico, 25 miles above Sierra Ventana, Feb., 1899." 8 specimens, one of which bears eggs.
Station No. 25. "Spring on Rio Chico, 15 miles above Sierra Oveja, Feb., 1898." 1 specimen.
Station No. 36. "Spring on Rio Chico, 30 miles above Sierra Oveja, Mar., 1898." 24 specimens.
Station No. 38. "Spring on Rio Chico, 25 miles above Sierra Ventana, Mar., 1898." 1 specimen.
Station No. 40. "Spring on Rio Chico, 25 miles above Sierra Oveja, Mar., 1898." 6 specimens.
"In spring on Rio Chico." Six small specimens of 6–8 mm. which show the divided annuli distinctly.

**Glossiphonia scutifera** (Blanchard).

The reproductive organs of *Glossiphonia (Helobdella) scutifera* are intermediate in character between those of *G. duplicata* and *G. michaelseni* in that the vas deferens does not abruptly enlarge to form the sperm sac immediately after turning caudad, as in the former, nor yet retain its tenuity for several somites further back, as in the latter, but passes first into a region of intermediate diameter before again increasing to the full size of the sperm sac. That these differences are constant, seems certain from the verification of the observation in repeated dissections. The ductus
ejaculatorius is relatively longer than in *G. duplicata* and frequently makes one or even two turns of a spiral in passing to the prostate cornua of the atrium.

With the exception that the gastric caeca are considerably longer, the alimentary canal differs in no important feature from that of *G. duplicata*. There is never any appearance of subdivision of the annuli, although the superficial annular lacunæ are developed as in *G. duplicata*. In all of the specimens examined by me the nuchal plate is thin and transversely elongated, sometimes merely occupying a chink between VII₃ and VIII₄.

Blanchard found this species to be very numerous in the collections from the region bordering on the Straits of Magellan. In the uplands it seems to be less frequent than some of its allies.


No. 19. Large spring at same locality. 2 specimens.

No. 22. "Large spring 30 miles above Sierra Oveja, Rio Chico, Feb., 1899." 35 specimens, some of which are marked by the paired longitudinal dark lines noted by Blanchard.

No. 48. Rio Blanco. 1 specimen.

**Glossiphonia simplex** sp. nov.

(Plates XLIX, Fig. 11; L, Figs. 15, 23, 24.)

The nearest ally of this species is *Glossiphonia lineata* (Verrill), from which it is distinguished by having somites III and IV uniainnulate instead of biannulate, and a single series of cutaneous papillæ present on every annulus instead of three series developed on the neural annuli only, as in *G. lineata*.

*G. simplex* is broad, flat-bodied and thin, in which it contrasts greatly with *G. (Helobdella) michaelseni* R. Blanch., which in annulation and anatomy it closely resembles. The annuli are very distinct, and the margins, especially posteriorly, almost serrated. The oral sucker is small, with thick margins and a rather deeply depressed center, in the anterior part of which the large mouth is situated in somite III. The deeply pigmented eyes are in IV and are very conspicuous, owing to their large size and the nearly color less areain which they lie. A median, slightly enlarged area on annulus VIII₄ represents a small nuchal gland, but there is no nuchal plate, except in two specimens, in which it is very thin
and of nearly the form shown by *G. scutifera*. The posterior sucker is relatively larger than in *G. michaelseni* and, unlike that species, faces ventrad and extends further forwards. At the same time its posterior margin is widely exposed from above. Its surface is roughened with numerous minute papillae (Plate L, fig. 24). A somewhat irregular series of small cutaneous papillae passes along the median dorsal line, usually occurring on every annulus from the genital somite nearly to the anus. Anterior to the genital pores they usually fade out and may be absent from several of the preanal somites also. These papillae form a strictly median series, not a broken double series as in *G. lineata*. They have a nearly constant relative size on the three annuli of a somite, being longest on *a2* and smallest, and sometimes even wanting on *a1*.

**Measurements of Type.**

<table>
<thead>
<tr>
<th>Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total length,</td>
<td>9 mm.</td>
</tr>
<tr>
<td>Length to male pore,</td>
<td>2.5 mm.</td>
</tr>
<tr>
<td>Diameter of anterior sucker,</td>
<td>6 mm.</td>
</tr>
<tr>
<td>Diameter of posterior sucker,</td>
<td>1.2 mm.</td>
</tr>
<tr>
<td>Width of body at male pore,</td>
<td>2 mm.</td>
</tr>
<tr>
<td>Depth at male pore,</td>
<td>.6 mm.</td>
</tr>
<tr>
<td>Greatest width (XVIII),</td>
<td>3.7 mm.</td>
</tr>
<tr>
<td>Depth at XVIII about,</td>
<td>.8 mm.</td>
</tr>
</tbody>
</table>

**Annulation.**—I and II are coalesced. III and IV are uniannulate, the latter containing the eyes. V is biannulate, the first annulus about as long as the entire somite IV, the second (*a3*) about three fifths as long. The furrow *V a1/a2* is sometimes faintly developed. VI is triannulate, *a2* generally, but not invariably, the longest.

The annuli of the complete somites, of which there are nineteen (VI to XXIV), have, with the exception of the first and the last, which may vary, a constant relative size; *a2* is the longest, *a1* the shortest; *a1* has four circular muscle-bands on the dorsal side, *a2* and *a3* have each five, except that in most cases XXIV *a3* has but four. XXV is biannulate both dorsally and ventrally. XXVI and XXVII are uniannulate, the latter deeply cut by the large anus. One distinct postanal annulus is differentiated (Plate L, figs. 23 and 24).

Unlike most of the material in this collection, which was not suitably
preserved for the purpose, many examples of this species exhibit a part of the dorsal sensillæ. In no case could the full number be detected on any one somite and it is possible that the dorso-median series may be wanting. At any rate the pair most median in position are separated by a wide interval, equal to about half the width of the body. Plate L, fig. 24, shows their arrangement on somite XXIV of an individual in which they were especially prominent.

Pigmentation.—The color above is a pale brownish, with a broad median dark area (equal to two thirds of the width of the body) marked by twenty-four fine longitudinal lines of black pigment cells, which correspond to as many intermuscular intervals. The two most mesial of these are much heavier than the others and tend to unite across the median line. All of these lines, and consequently the area, tend to fade out both anteriortly and posteriorly. More superficial than the longitudinal striae are small irregular blotches and transverse dashes which lie between the circular muscles and are more or less thickly scattered over the entire dorsal surface from margin to margin, except anteriorly, where they are very few, and further forward altogether absent. These spots give to the dorsum a speckled appearance not unlike what is seen in many examples of G. scutifera. Of course some individuals are lighter, some darker. Many examples have two or three large irregular whitish spots, from which pigment is nearly or quite absent, in the posterior part of the body. A somewhat unusual feature in members of the genus is the presence on the ventral surface of submarginal series of irregular, more or less confluent dark spots, forming a band on each side. They are confined to the middle third of the body.

Reproductive Organs.—The genital pores are separated by a single annulus, the male being at XII a1/a2, the female XII a2/a3. There are six pairs of testes arranged as in G. duplicata. The vas deferens is dorso-lateral of the testes and is met by the six delicate vasa efferentia, which arise from the dorso-lateral aspect of the testicular walls. After reaching somite XII the vas bends back into a long epididymal loop as in G. duplicata, but, instead of becoming enlarged at once to form the sperm sacs, as in that species, it reaches, without any change in its diameter or the character of its wall, as far caudal as XVI or XVII, at which point it abruptly passes into the sperm sac. The latter may extend as far as XX, and the anterior end of its efferent limb becomes more or less coiled
and looped in XII or even extends into XI. The atrium and ductus ejaculatorius exhibit no features requiring special comment, which is true of the ovaries also (Plate L, fig. 15). The collection includes one specimen of 8 mm., bearing eggs arranged in a compact group at the widest part of the body. Others exhibit indications of having recently borne eggs or young.

_Alimentary Canal._—The pharynx is about as stout as that of _G. lineata_, and when retracted reaches from VIII to XII. Its free end is provided with muscular denticulations. In XIII the thick ducts of the pharyngeal glands open into its posterior end. These ducts are provided with a stout muscular sheath, are single on each side and lack any cross connection. The glands consist of a few cells which are individually of larger size than in _G. duplicata_ and are distributed sparingly over somites XI to XV or even beyond. There are usually only five pairs of gastric caeca, the first four of which are simple and of nearly equal size, the fifth, which arises in XIX, is somewhat spacious and reaches XXII. The intestinal caeca are four pairs, alternately larger and smaller, and, with the exception of the last, curve somewhat cephalad above the last pair of gastric caeca (Plate XLIX, fig. 11).

_G. simplex_ is represented from the following localities:

No. 5. "Spring on Rio Chico 15 miles above Sierra Oveja." 6 specimens.

No. 14. "Rio Chico, 5 miles above Sierra Ventana, Feb., 1899." 15 specimens, several bearing eggs and young.

No. 22. "Large spring 30 miles above Sierra Oveja, Rio Chico, Feb., 1899." 2 specimens.


No. 48. Rio Blanco. 2 specimens.

No. 36. "Spring on Rio Chico 30 miles above Sierra Oveja, Mar., 1898." 1 specimen.

"In spring on Rio Chico." 1 specimen.
Glossiphonia michælsoni (Blanchard).

(Plate L, Figs. 13, 14.)

Among the peculiarities of the reproductive organs (Plate L, fig. 14) the following are noteworthy. There are epididymal loops (sperm sacs) formed by the vasa deferentia as in G. duplicata, G. stagnalis, etc., and usually reaching beyond ganglion XVIII. In one respect they differ strikingly from those of G. duplicata and as closely resemble G. simplex, viz., the vasa deferentia after turning remain of extreme tenuity until reaching XV or XVI, that is, for about half the length of the loops, and then suddenly enlarge into the sperm reservoirs. This is true of all of a considerable number dissected. Before entering the prostates, the duct is thrown into several deep folds, which extend anterior to the atrium even into somite XI.

In the form of the alimentary canal (Plate L, fig. 13), as indeed in many other respects, this species closely resembles Glossiphonia nepheloides (Graf.) (= G. elongata Castle), a not uncommon species in Pennsylvania, New Jersey, and Massachusetts. A striking difference in the digestive tract, however, is the entire absence of the large gastric cæca, which in other Glossiphonie arise in XIX, and in G. nepheloides extend, according to Castle, through two somites.

The mouth, which is of remarkably large size, is in somite III. The pharynx, which, when retracted, reaches from VIII to a point just caudad of the male pore, is stout and may be extended to an unusual distance, in some cases to nearly one third the length of the body. It is nearly cylindrical, but tapers somewhat abruptly at the free end, which is terminated by nine larger muscular denticulations, arranged in three sets of three each and alternating with three smaller ones. Three longitudinal muscular ridges continue these for the entire length of the pharynx and give to its lumen the usual triangular form. They terminate at the point of entrance of the ducts of the pharyngeal glands in XII or XIII. As in most small glossiphonids of the Helobdella group, these glands are strictly paired. In this species they consist of a very few unicellular glands of large size arranged in a loose group confined mainly to XII and XIII, though occasionally extending somewhat into the immediately adjacent somites. The ducts are in one pair, of large size and strongly muscular.

A short cesophagus gradually widens into the thin-walled, somewhat
spacious stomach which reaches from XIV to XIX inclusive. The stomach increases in diameter to about XVII, behind which a constriction occurs, followed by a rather conspicuous sacculation in XIX, probably representing the posterior gastric caeca which, however, do not extend at all caudad. Indeed there are no distinct gastric caeca whatever. Four pairs of short, rather wide intestinal caeca are crowded into XXI and XXII and are followed after a constriction by a somewhat bulbous dilatation.

*G. michaelseni* is represented by a larger number of specimens than any other of the six species included in the collection.

No. 3. "In and near drying-up pools on high divide, 50 miles north of Rio Chico, near base of Cordilleras." 36 specimens.

No. 5. "Spring on Rio Chico, 15 miles above Sierra Oveja." 2 specimens.

No. 11. "Small running stream south side of Rio Chico, 15 miles above Sierra Oveja." 1 specimen.


No. 43. "Drying-up pools near Arroyo Eke, altitude 2,100 ft., Feb., 1899." 30 specimens.


"In spring on Rio Chico." 1 specimen.

**Hemiclepsis tessellata** (Müller) Veydovsky.

A single individual, which is in no wise distinguishable from this well-known European species, was collected on the Rio Chico.

In demonstrating the identity of *Theromyzon pallens* Philippi with this species Blanchard has already shown that its range extends in South America as far south as Chili. Inasmuch as it is widely distributed, though by no means common, in North America, it may now be expected to occur generally over the American continent. *Hemiclepsis tessellata* is an excellent example of the wide distribution which some species of leeches
have attained. An equally notable case is the *Glossiphonia stagnalis* (Linn.). Blanchard has recorded this species from Paraguay\(^1\) and Chili.\(^2\) I have specimens collected by Mr. Trevor Kincaid in Alaska and it abounds in all parts of the United States, Canada and Europe.

No. 32. “Small running stream on Rio Chico, 35 miles above Sierra Oveja, Mar., 1898.” 1 specimen.


\(^2\) Hamburger Magalhaenische Sammelreise. Hirudineen, 1900, p. 8.
ERRATA.

N. B. — Errors in the technical names of Fishes in Part III, pp. 225–374, are entered in the index as synonyms.

Page 2, line 22, for Port Desire, read Santa Cruz.
Page 2, line 25, for Rio Belgrado, read Rio Belgrano.
Page 2, line 27, for Rio Belgrado, read Rio Belgrano.
Page 3, line 8, for Rio Belgrado, read Rio Belgrano.
Page 4, line 36, for Hydrurga, read Hydrurga.
Page 10, line 31, for Creagouros, read Creagouros.
Page 32, line 30, for Viscache, read Viscacha.
Page 38, line 7, for Ctenomys robustus Allen, read Ctenomys osgoodi Allen. (See Postscript, p. 191.)
Page 63, line 2, for Maldonaldo, read Maldonado.
Page 85, line 14, for Matchie, read Matschie.
Page 85, line 16, for O. micropus, read O. microtis.
Page 85, line 28, for Mirounga leoninus, read M. leonina.
Page 90, line 34, for Juan Fernandes, read Juan Fernandez.
Page 114, line 7, for Freizer, read Frazier.
Page 120, line 24, for Gypsophoca, read Gypsophoca.
Page 131, line 26, for Orctocephalus, read Arctocephalus.
Page 133, line 10, for Mas-a-Fuero, read Mas-a-Fuera.
Page 143, line 10, for Galictis vittata, read Grison vittatus.
Page 144, line 6, for Thiosomus, read Thiosmus.
Page 159, line 16, for incensce, read incense.
Page 184, line 6, for Gallagos, read Gallegos.
Page 319, line 20, for Guaina, read Guainia.
Page 373, line 8, for Rio Rebeiro, read Rio Ribeira.
Page 373, line 10, for Rebeiro, read Ribeira.
Page 373, lines 10, 21, 23, 24, 32, for Rebeira, read Ribeiro.
Page 373, line 28, for †, read *.
Page 373, lines 35, 36, for Trichomycterus, read Pygidium.
Page 374, line 1, for Trichomycterus, read Pygidium.
Page 374, lines 1, 7, 8, 10, 14, 17, 21, 22, for Rebeira, read Ribeiro.
Page 374, line 26, for Rebeira, read Ribeira.
Page 374, line 28, for autochthon, read autochthon.
Page 384, col. 1, line 34, for Breviglanis, read Brachyglanis.
Page 384, col. 1, lines 35, 37, 39, 41, for Breviglanis, read Brachyglanis.
Page 384, col. 2, line 17, for Chasmoccephalus, read Chasmocranus.

689
ERRATA

Page 384, col. 2, lines 18, 21, 23, for Chasmocephalus read Chasmocranus.
Page 399, col. 1, line 39, for corduense, read cordovense.
Page 400, col. 2, line 9, for guianensis, read guianense.
Page 404, col. 1, line 8, for commersonii, read commersoni.
Page 405, col. 2, line 11, for HYPOPTOPOMINAE, read HYPOPTOPOMATINE.
Page 408, col. 1, line 1, for N. duseni, read H. duseni Ribeiro.
Page 416, col. 2, line 9, for guianensis, read guianense.
Page 417, col. 1, line 37, for Loricaria dura Linnaeus, read Loricaria dura Bleeker.
Page 421, col. 1, line 23, for Chasmocephalus read Chasmocranus.
Page 422, col. 1, line 34, for Prochilodus hartii, read P. hartii.
Page 434, col. 2, line 42, for Piabina argenteus, read P. argentea.
Page 443, col. 1, line 4, for Myletus, read Myletes.
Page 457, col. 2, line 21, for Labias, read Lebias.
Page 458, col. 2, line 14, for Farlowella acra, read F. acus.
Page 467, col. 1, line 28, for Corduvense, read Cordovense.
Page 468, col. 1, line 15, for Johnius crouvina, read J. corvinus.
Page 468, col. 2, line 10, for Pachyurus schomburgki, read P. schomburgki.
Page 527, col. 2, line 31, for Platex, read Platax.
Page 573, lines 22, 36, for P. filipponei, read P. filipponei.
Page 573, lines 38, 40, for Potamolithus filipponei, read P. filipponei.
Page 574, line 13, for Filippone, read Felippone.
INDEX TO VOLUME III.

Page numbers italicized indicate the most important entry under the heading. The numbers with asterisks refer to text illustrations. Synonyms are in italics. The synonymy of the fishes is in accordance with the catalogue, pp. 376-484. All names of rivers in Latin America are entered under "Rio."

ABBOTT, CAPT. C. C., 88
Abramites, 426
Abrocoma, 33
Abrothrix, 70
Academy, Phila., of Nat. Sciences, 259, 513, 539, 545, 546, 559, 563, 565, 579, 583, 584, 586, 589, 591, 595, 596, 597, 598, 599, 601, 602
Acanthicus, 405, 412
hystrix, 322, 412
Acanthodoras, 393
Acanthophacelus, 458
bifurcus, 458
guppii, 328, 458
melanzonus, 458
reticulatus, 458
Acanthopoma, 246, 401
annectens, 401
Acanthoptere, 463
Acanthopteri, 278
Acarara, 336, 470, 471
adspersa, 476
brasiiliensis, 471
cognatus, 471
compressus, 470, 471
crassa, 473
crassissipinis, 470, 471
desfontainii, 471
diadema, 471
dimerus, 471
dorsigerus, 471
filamentosus, 470, 471
gronovii, 471, 473
gymnopoma, 479
Acaropsis, 470, 471
nassa, 326, 470, 471
Acavide, 613, 614, 631
Acedia, 483
Acentronichthys, 385
coleptii, 348
leptos, 337, 385
surinamensis, 321, 385
Acestra, 416
acus, 416
Acestrocephalus, 447
anomalus, 316, 447
Acestrorhamphine, 256, 447
Acestrorhamphus, 447
abbreviatus, 447
brachycephalus, 350, 447

Acarara hypostictus, 470
lafisfrons, 472
margarita, 470, 473
marginatus, 471, 473
nassa, 470, 471
niloticus, 471
ocellatus, 470, 471
pallidus, 471
planifrons, 470
pulchra, 472
punctatus, 471
rectangularis, 474
surinamensis, 471
tenia, 471
tetramerus, 470, 471
unicolor, 471
viridis, 471
vittatus, 471
Acaropsis, 470, 471
nassa, 326, 470, 471
Acestrocephalus, 447
anomalus, 316, 447
Acestrorhamphine, 256, 447
Acestrorhamphus, 447
abbreviatus, 447
brachycephalus, 350, 447

691
INDEX.

Acestrorhamphus hepsetus, 339, 346, 350, 374, 447
                januarius, 374
                jenynsii, 339, 350, 447
                macrolepis, 338, 447
                oligolepis, 350, 447
                pericoptes, 447
Acestrorhynchus, 335, 447
                falcatus, 325, 447
                falcirostris, 325, 447
                ferox, 346
                hepsetus, 374
                heterolepis, 447
                januarius, 374
                lacustris, 332, 447
                microlepis, 325, 447
Achacache peninsula, 306
Acharnes speciosus, 469
Achatinellidae, 612
Achatinidae, 613, 615, 626
distribution of, *616
Achiropsis, 483
                asphyxiatus, 483
                nattereri, 483
Achirus, 483
                fasciatus, 302, 483
                fischeri, 483
                fonsecensis, 299, 483
                garmani, 483
                jenynsi, 347, 351, 483
                klunzingeri, 483
                lineatus, 351, 483
                lorentzi, 483
                mazatlanus, 299, 483
                ornatus, 483
Acodon, 443
                oligocanthus, 324, 443
Acodon, 70
                suffusus, 70
Aconamys, 33
Acyrogonia, 531, 532, 534
                fusca, 534
                nervosa, 534
Adelopoma, 622, 626
Admiralty Sound, 520
Æginæ, 646
Æglea, 294, 627
Æquidens, 309, 335, 361, 470, 471
                centralis, 351, 472
                ceruleopunctatus, 472
                distribution of, *355
                dorsiagara, 347
                dorsigerus, 471, 472
                equinoctialis, 472
                flavescens, 472
                freniferus, 472
                geayi, 326, 472
                guianensis, 326
                latifrons, 472
                maronii, 326, 472
                minuta, 351
                minutus, 472
                paraguayensis, 347, 472
                portagrensis, 346
                portalegrensis, 351, 472
                pulcher, 472
                pulchrum, 316, 328
                rivulata, 314
                rivulatus, 472
                sapayensis, 314, 472
                subocularis, 472
                syspilus, 472
                tetramerus, 326, 346, 351, 470, 471
                thayeri, 472
                vitata, 326, 347
                vittatus, 471, 472
                zamorensis, 472
Africo-Brazilian continent, 614
Agassiz, A., 305, 561
                L., 330, 487, 494, 610
                & Mrs., 494
Agamysis, 393
Ageneiosinae, 240, 241, 397
Ageneiosus, 335, 397
                armatus, 322, 397
                atronanus, 397
                axilares, 322, 397
                brevifilis, 341, 397
                brevis, 397
INDEX.

Ageneiosus caucanus, 315, 397
dawalla, 322, 397
dentatus, 315, 322, 397
inermis, 322, 397
pardalis, 397
porphyreus, 322, 397
quadrifilis, 397
sebae, 397
ucayalensis, 397
valenciennesi, 341, 348, 397

Ageniosus, 397
Agmus, 379
lyriformis, 379
scabriceps, 379

Agoma, 418
Agonates, 440
halecinus, 324, 440

Agoniatinae, 255, 440

Agonostoma globiceps, 464
Agonostominae, 463
Agonostomus, 297, 299, 363, 463
macracanthus, 463
microps, 463
monticola, 299, 301, 305, 328, 463
nasutus, 463
percoideus, 463
salvini, 463
telfairii, 463

Agriolimax agrestis, 519
argentinus, 519
levis, 519

Ailurichthys, 381

Akodon, 4, 44, 70, 78, 81, 82, 85
arenicola, 76
boliviense, 70
caliginosus, 70, 71
canescens, 65, 71, 72, 73
(Chelemys) macronyx, 79, 85
(C.) michaelseni, 80
(C.) vestitus, 78
hirtus, 77, 78
irazu, 71
longipilis, 78
macronyx, 65, 70, 71, 78, 79, 85
magellanicus, 47

Akodon megalonyx, 71, 78, 80
michaelseni, 65, 71
microps, 60
pulcherrimus, 70, 71
suffusus, 71, 76
teguina, 71
urichi, 71
venezuelensis, 71
vestitus, 71
xanthorhinus, 65, 70, 71, 75, 76, 83

Akodons, long-clawed, 78

Alabama, 628
Alaska, 45, 228, 523, 687
"Albatross," U. S. S., 35, 606
Albemarle Island, 133
Albert, F., 90
Albula maculata, 432
Alburnops, 419
Alessandri, G. de, 501
Alevins, 273

Algansia, 303, 418

Algonsea, 303, 418

Algansea, 303, 418
affinis, 418
dugesi, 303, 418
lacustris, 304, 418
rubescens, 304, 418
stigmatura, 418
tarascorum, 418
tincella, 298, 303, 418

Algiers, 643

Alligators, 295

Allodiscus, 517

Allorchestes dentatus var. gracilicornis, 653
d. inermis, 653
knickerbockeri, 653
longistilus, 653
patagonicus, 651

Alopec, 151

Alpaca, 18

Amastridae, 612

Amblydoras, 393

Amblyopsidae, 227
Amblyopus brasiliensis, 482
mexicanus, 482
INDEX.

Amblyopus oblongus, 482
Amblyiacu, 360, 361
Ameghino, F., 294, 502
Ameiurus, 303, 382
australis, 298, 382
dugesi, 303, 352, 382
meridionalis, 310
mexicanus, 298, 382
pricei, 300, 352, 353, 382
Amenkelt, 639, 644
America, 44, 45, 240, 296, 304, 348, 362, 365, 367, 369, 614, 622, 625, 657
Hawaiian connection with, 626
Polynesian connection with, 626
subarctic, 45
temperate, 225
tropical, 6, 44, 45, 225, 227, 238, 252, 293, 327, 336, 368, 370, 376
west coast of, 663
American continent, 686
Amiurus catus, 382
Amnicola, 548, 580
ernesti, 548
panamensis, 548
Amnicolidae, 513, 514, 515, 548, 554, 564, 566, 569, 570, 614, 628, 630, 633
North American, 554
South American, 548
Amonopleurops, 483
Amphibia, 414
Amphibichthys, 379
Amphidoxa, 518
Amphipeplea glutinosa, 524
Amphipodida, 637, 650
Amphithoe aestuaries, 653
Ampullaria, 514
Ampullariidae, 514, 613, 615, 626, 627
distribution of, *617
Amsterdam Id., 97, 102, 122
Anableps, 457
Anableps lineatus, 457
microlepis, 325, 457
surinamensis, 457
tetrophthalmus, 457
Anacystus, 444
alatus, 445
Anchovia, 451
macrolepidota, 451
Ancistris cirrhosus, 349
Ancistrus, 405, 411
ancistrus dubius, 411
brachyurus, 411
bufonius, 411
chagresi, 411
cirrhosus, 322, 327, 342, 411
c. dubius, 342
dolichoptera, 322
dolichopterus, 411
duodecimalis, 409
guacharote, 411
gymnorhynchus, 411
hoplogenys, 322, 342, 411
lithurgical, 411
longimanus, 408
medians, 408, 411
montana, 308
montanus, 411
multiradiatus alternans, 408
mysiacinus, 411
occidentalis, 411
pictus, 411
rothschildi, 411
scaphirhynchus, 411
stigmaticus, 337, 373, 411
temminckii, 382, 411
trifida, 411
triformis, 308
Anactus, distribution of, *619
Ancylidae, 514, 515, 530, 614, 631
Ancylus, 514
concentricus bonariensis, 531
c. bonariensis, 515, 530
Andersson, L. G., 214, 217
Andean region, 30, 44, 50, 71, 82, 514
Andes, 1, 10, 15, 20, 22, 27, 30, 33, 40, 44, 45.
INDEX.

Anostomus fasciatus, 425
   gracilis, 425
   isognathus, 349
   nasutus, 349
   orinocensis, 323, 425
   plate, 349
   proximus, 425
   salmoneus, 425
   trimaculatus, 425
   uacayalensis, 425
   varians, 425
   v. nitens, 425
   vittatus, 349
Anson, Lord, 115
Antarctic area, 532
   continent, 228, 229, 272, 629, 664
   islands, 123
   lands, 97, 663
   regions, 93, 101, 103, 110, 117, 663
   relations of South American fauna, 629
   seas, 85, 115
Antarctica, 230, 549, 629, 630, 631, 632, 633, 664
Anteaters, 6
Anthony, A. W., 143
Antillean-Central American continent, 612, 613, 617, 628
   continent, 612
   -Mexican area, 626
   continent, 617
   mollusks, 525, 612, 620, 623
Antilles, 621, 622, 623, 624, 626, 631, 633
Antillia, 613, 620, 624, 625, 626
Ants, Bolivian, 294
Aperidae, 613
Aphiocharacinae, 254, 428
Aphiocharax rathbuni, 344
Aphoristia, 483
Aphyocharax, 335, 429
   alburnus, 344, 429
   anisitsi, 344, 429
   dentatus, 344, 429
   eques, 429
   filigerus, 429
   heteresthes, 429
   pusillus, 429

Anomalous, 10
Anostoma, distribution of, 619
Anostomatinae, 254, 425
Anostomoides, 426
   atrianalis, 426
Anostomus, 335, 425
   anostomus, 323, 425

Anisits, 339
Anisitsia, 339
   anguilla, 339
   chrysypa, 339
   Anisitsia, 335, 423
   amazonum, 423
   kappleri, 323, 423
   notata, 423
   notatus, 323
   othonops, 343, 423
Annelids, 610
Anodinae, 253, 420
   Anodonta exotica, 420
   dooriana, 609
   puelchana, 609
Anodontites, 514, 609, 616
   crispatus, 609
   puelchana, 515
   puelchanus, 609
Anodus, 335, 420
   ciliatus, 420
   cyprinoides, 422
   elongatus, 420
   latior, 343, 422
   melanopogon, 420
   notatus, 423
   steatops, 420
Anomalocera, 10
Anostoma, distribution of, 619
Anostomatinae, 254, 425
Anostomoides, 426
   atrianalis, 426
Anostomus, 335, 425
   anostomus, 323, 425

Peruvian, 45
   plateau of, 307
southern, 162
André, 320
Anoëma, 25
Anguilla, 451
   anguilla, 451
   chrysypa, 451
Anguillidae, 451, 484
Antarctic area, 532
   continent, 228, 229, 272, 629, 664
   islands, 123
   lands, 97, 663
   regions, 93, 101, 103, 110, 117, 663
   relations of South American fauna, 629
   seas, 85, 115
Antarctica, 230, 549, 629, 630, 631, 632, 633, 664
Antillean-Central American continent, 612, 613, 617, 628
   continent, 612
   -Mexican area, 626
   continent, 617
   mollusks, 525, 612, 620, 623
Antilles, 621, 622, 623, 624, 626, 631, 633
Antillia, 613, 620, 624, 625, 626
Ants, Bolivian, 294
Aperidae, 613
Aphyocharacinae, 254, 428
Aphyocharax rathbuni, 344
Aphyocharax, 335, 429
   alburnus, 344, 429
   anisitsi, 344, 429
   dentatus, 344, 429
   eques, 429
   filigerus, 429
   heteresthes, 429
   pusillus, 429
INDEX.

Aphyocharax rathbuni, 429
stramineus, 344, 429
Apionichthys, 483
dumerilii, 483
nebulosus, 483
unicolor, 483
Aplesion pottsii, 468
Aplochiton, 454
chrysostegmus, 454
dovii, 454
harti, 454
peruanus, 314, 454
Aplochiton, 228, 229, 277, 462
teniatius, 278, 291, 462
zebra, 277, 278, 291, 462
Aplochitonidae, 227, 228, 271, 277, 462, 484
Aplochiton, 467
grunniens, 297, 467
Apodes, 451
Apodidae, 640
Arapaima, 333, 453
gigas, 325, 339, 453
Arapaimidae, 333, 362, 453, 484
Archamazona, 328, 370, 372
Archamazonia, 293, 294, 295
Archhellenic period, 617, 619
stock, 628
Archhelenis, 293, 294, 549, 611, 614, 615, 616, 617, 619, 620, 621, 622, 623, 626, 627, 628
Archamazonas, 293
Archiatlantica, 294
Archibrazil, 293, 295, 627, 628
Archicheir, 428
minutus, 428
Archiguyana, 293, 295, 305, 307, 363, 370, 372
Archinotis, 611, 621, 627
Archiplata, 293, 294, 295, 363, 369, 627, 628, 629, 633
-Archhelenis theory, 225, 226, 293, 296, 309
hypothesis, 629
Archocentrus, 473
Arctic Ocean, 522
regions, 101, 103, 116, 642
Arctocephale, 104, 118, 120
Arctocephalus, 4, 99, 100, 101, 104, 118, 120, 133, 137, 138, 140, 141
antarcticus, 104, 117, 121, 122
(Arctophoca) gracilis, 126
australis, 122, 123, 124, 132, 135, 136
australis, 136
delalandi, 120
delalandii, 121
falklandicus, var. gracilis, 126
falklandica, 125, 126
falklandicus, 125, 128
forsteri, 102, 122
galapagoensis, 123, 131, 134
gazella, 122
gracilis, 128
grayii, 126, 128
hookeri, 117
lobatus, 102
nigrescens, 120, 126, 128, 129
philippi, 136
philippii, 122, 123, 124, 127, 128, 131, 135, 136
sp., 135, 138
sp. nov., 135
townsendi, 100, 122, 135
ursinus, 104
ursinus, 120, 125
Arctogaea, 295
Arctophoca, 120, 124, 133
falklandica, 125
philippii, 131
Argentina, 1, 3, 8, 23, 30, 44, 50, 57, 62, 63, 93, 120, 129, 130, 143, 148, 150, 152, 164, 182, 186, 187, 188, 189, 233, 247, 253, 276, 277, 293, 360, 514, 530, 547, 548, 552, 554, 560, 575, 590, 596, 605, 622, 629, 651, 661
Arges, 305, 308, 312, 360, 371, 416
brachycephalus, 417
güntheri, 417
homodon, 417
Argidae, 241
Argiidae, 333, 369
Argyreia, 280
notata, 280
Ariinae, 381
Ariomidae, 613
INDEX.

Aristomata, 412

Arius, 336, 340, 382
  agassizi, 348, 382
  carcharias, 242, 292, 381
  longibarbis, 390
  microperthus, 243, 292, 381
  multiradiatus, 382
  nasutus, 381
  papillosus, 242, 291, 381
  squalus, 243, 292, 381
  synodon, 243, 292, 381
  villosus, 243, 292, 381

Arizona, 177, 516

Arkansas, 627

Arldt, T., 611, 626

Armadillo, 4, 5, 8, 9

Armadillos, 6, 213

Arneberg, T., 171

Arroyo de las Achiras, 544
  "Eche" (Aike), 2
  Eke, 521, 528, 541, 608, 675, 686
  Gio, 636, 650
  Salado, 544, 560
  San Juan, 580

Artedi, P., 485

Arvicolam amphibius, 48

Asia, 354, 368, 612, 616, 622, 626

Asiphonichthys, 350, 444

Asolene, 514

Aspidoras, 402
  rochali, 402

Aspredinichthys, 380
  tibicen, 381

Aspredinidae, 362, 379, 484

Aspredininae, 380

Aspredo, 380
  aspredo, 380
  batrachus, 380
  filamentosus, 380
  sexcirrhis, 380
  siciophorus, 380
  spectrum, 380
  tibicen, 380

Astatotilapia desfontainii, 471

Asteromterus, 401

Asterophysus, 395
  batrachus, 395

Asterospondyli, 377

Astotheros, 475

Astroblepus, 371, 417
  grixalvii, 308, 417

Astrodoras, 393

Astronotus, 470, 471
  hypostictus, 470
  ocellatus, 326, 346, 470, 471
  o. zebra, 470

Astyanacinus, 435
  moorii, 435

Astyanax, 227, 229, 330, 257, 260, 334, 336,
  358, 361, 432, 433
  abramis, 260, 262, 263, 264, 342, 344, 349,
  432
  abramoides, 432
  aneus, 267, 268, 301, 302
  albeolus, 433
  alburnus, 267, 350
  alleni, 344
  angustifrons, 433
  anterior, 433
  argentatus, 260, 432, 434
  astictus, 262
  asymmetricus, 432
  atratoensis, 264, 433
  bahiensis, 266, 267, 338
  bairdii, 261
  bartlettii, 264
  bimaculatus, 260, 262, 263, 264, 316, 324,
  328, 338, 345, 350, 432
  b. borealis, 432
  b. lacustris, 332, 433
  b. paraguayensis, 433
  b. vittatus, 433
  bourgeti, 432
  brevirhinus, 338, 433
  brevirostris, 262, 432
  brevoortii, 263
  b. lineatus, 263
  caroline, 266, 433
  caucanus, 264, 316, 433
  colletii, 267
  copei, 267
Index.

Astyanax cordove, 262, 267, 350, 432
Astyanax pelegrini, 261
  pellegrini, 344, 432
  petenensis, 265
  peruanus, 266, 313
  phoenicopterus, 266
  polylepis, 324, 432
  potaroensis, 433
  regani, 433
  riveti, 432
  rubripictus, 350
  rubropictus, 268, 434
  rutilus, 260, 261, 265, 268, 269, 313, 316
  r. aeneus, 265
  r. jequitinhonhe, 265
  r. nicaraguensis, 265
  scabripinnis, 336, 374, 433
  s. intermedius, 338, 433
  s. laticeps, 338, 433
  s. longirostris, 338, 374, 433
  s. rivularis, 332, 433
  simus, 266, 313
  spilurus, 261, 324
  steindachneri, 264
  stilbe, 264, 433
  symmetricus, 432
  tabatingae, 261, 431
  teniatus, 338, 434
  teniurus, 262, 265
  wappi, 265, 324, 433
  zonatus, 432

Asuncion, 339

Atacama desert, 230, 306
Atalapha blossevillei, 188
  bonaerensis, 188, 189
  villosissima, 188, 189
  villosissimus, 191

Atelecyclide, 661
Atelecyclus, 663

Atherina, 279, 464
  evermanni, 464
  hepsetus, 464
  humboldtiana, 464
  japonica, 451
  latilaeva, 280, 283, 291
  menidia, 465
  microlepidota, 282, 291, 465
INDEX.

Atherina regia, 282, 291
Atherinichthys, 280, 464
Atherinoides, 280, 464
Atherinopsis, 227, 279, 293, 465
Auchenipterus, 397
Auchenipterus immaculatus, 396
INDEX.

Atherina regia, 282, 291
Atherinichthys, 280, 464
Atherinoides, 280, 464
Atherinopsis, 227, 279, 282, 465
Auchenipterichthys, 396
brachyurus, 397
dentatus, 397
fordicei, 397
furcatus, 396

Atherina regia, 282, 291
Atherinichthys, 280, 464
Atherinoides, 280, 464
Atherinopsis, 227, 279, 282, 465
Auchenipterus, 397
Auchenipterus immaculatus, 396
lacustris, 396
maculatus, 396
nigripinnis, 341, 397
nuchalis, 322, 397
punctatus, 396
thoracatus, 396

Auckland Ids., 100, 272, 647, 659, 661, 662
Aulacopoda, 613
Auricula fluctuosa, 531
Auris, distribution of, *619
Austral elements in S. A. fauna, 629
Australasia, 532, 549, 631
Austria, 640
Austrocobitis, 271
Awaous, 481
flavus, 481
güntheri, 314
mexicanus, 482
nelsoni, 481
ocularis, 481
taiasicus, 481
transandeanus, 314, 482
Ayers, H., 500
Aygache, 306, 307
Azara, F. de, 31, 33, 185, 186, 189, 190, 191
Azteca, 419
Aztecula, 300, 419
lermae, 304, 419
mexicana, 298, 419
vittata, 300, 303, 419

BAGRINÆ, 239, 297
North American, 241
Bagropsis, 390
reinhardtii, 331, 390
Bagrus barbatus, 381
emphysetus, 382
goliath, 390
nigripunctatus, 396
INDEX.

Bagrus pictus, 390
  punctatulus, 390
  sundaicus, 382
Bahia, 329, 330, 334, 603
  Blanca, 52, 54, 55, 186, 227, 514, 520, 530, 544, 557, 560, 606, 629, 658
  Camerones, 10, 146, 173
Baiostoma, 483
Baird, S. F., & Girard, C., 490
Bajon, 485, 486
Baker, F. C., 524
Balanidae, 637
Balanus, 638
  laevis, 636, 638, 662
Band a Oriental, 151
Banner Cove, 149
Baranquilla, 562
Barbour, T., see Cole, L. J.
Barrett-Hamilton, G. E., 88, 91, 93
Bartlet'tia, 485, 486
Basalt Canons, 2, 3, 26, 54, 59, 61, 63, 75, 77
  146
Basaltic rocks, 213, 219
Basilichthys, 282, 465
  microlepidotus, 282
Basommatophora, 614
Bass Strait, 659
Bat, big-eared, 187
  grey, 189
  red, 189
Bates, H. W., 620
Batis, 377
Batoidei, 377
Batrachians, 211, 215
Batrachoglanis, 383
  parahybae, 383
  pulcher, 383
  raninus, 383
Batrachoididae, 482, 484
Batrachops, 477
  cyanotus, 477
  lacustris, 351
  ocellata, 347
  ocellatus, 477
  punctatulus, 326, 477
  reticulatus, 326, 477
Batrachops scottii, 477
  semifasciata, 347
  semifasciatus, 326, 351, 477
Batrachops, 484
Batrachus guavina, 480
Bats, 4, 186
Batty, J. H., 45
Bavay, A., 561
Bayern, T. von, 500, 501, 504, 604
  "Beagle," H. M. S., 3, 26, 27, 52, 55, 56, 60, 72, 73, 75, 149, 150, 153, 185
  Beagle Channel, 150, 529
Bean, B. A., 226, 503, 509, 510
  T. H., 499, 503
Beanblossom Creek, 312
Beddard, F. E., 117
Bell, T., 221, 222
Belone guianensis, 462, 463
  hians, 463
  maculata, 463
  scolopacina, 463
  scrutator, 462
  taniata, 463
  timucu, 462
  truncata, 462
Belonesox, 457
  belizanus, 301, 310, 457
Belonidae, 462, 484
Belogona, 622
  Euadenia, distribution of, *624
Belonocharax, 446
  beani, 446
Bend, 487
Benedict, J. E., 659
Bennett, E. T., 3, 35, 36, 37
Berg, C., 14, 85, 93, 233, 235, 351, 500, 501
  502, 504, 505, 642, 658
Bergia, 440
  altipinnis, 440
Bergiaria, 389
  platana, 348, 389
  westermannii, 331, 389
Bergiella, 389
Bering Id., 123
Sea, 122, 137, 140
Bertoni, A., 559, 589
INDEX.

Brazilian center, 619, 620, 630
continent, 629
plateau, 333, 334, 347, 616, 617, 619, 620
region, 229
stock, 628
subregion, 627
Bray, W. L., 500
Breviceps, 381
Breviglanis, 384
frenata, 384
melas, 384
phalacra, 384
Bray, W. L., & Haddon, A. C., 499
Briggs, T., 77
British Columbia, 45
Brochis, 402
cœeruleus, 402
dipterus, 402
Brontes, 416
Brookes, J., 33
Brot, A., 594
Brown, B., 1, 5, 8, 14, 15, 17, 19, 23, 35, 110, 130, 146, 150, 159, 160, 162, 170, 172, 174, 175, 178, 180, 184, 185, 186, 187, 213, 214
Browne, J. Ross, 140
Bruehl, C., 491
Bryant, W., 486
Brycinus, 258
Brycochandus, 435
durbini, 435
Brycon, 258, 361, 430
alburnus, 313, 430
atricaudatus, 316, 431
atrocaudatus, 314
bahiensis, 431
breviceps, 430
capito, 431
carpaphagus, 332
carpophagus, 430
ccephalus, 430
dentex, 313, 430
devillei, 338, 430
distribution of, *354
erhythropterus, 430
falcatus, 324, 430, 431
ferox, 338, 430
Brycon guatemalensis, 430
hilarii, 332, 345, 430
insignis, 430
labiatus, 431
lineatus, 350, 430
longiceps, 324, 431
lucidus, 324
lundii, 332, 431
melanopterus, 430
microlepis, 345, 430
moorei, 431
nattereri, 350, 431
opalinus, 431
orbignianus, 345, 350, 431
orthotania, 431
pesu, 324, 431
reinhardtii, 332, 338, 431
rubricauda, 316, 430
schomburgkii, 324, 431
stolzmanni, 431
striatulus, 430
stübellii, 430
Bryconethlops, 258
Bryconanericus, 257, 358, 434
alburnus, 434
astictus, 434
boöps, 434
breviceps, 434
chapadae, 434
diaphanus, 434
eigenmanni, 434
emperador, 434
exodon, 345, 434
heteresthes, 434
hyphessus, 434
iheringii, 345, 350, 434
mænkhauisi, 345, 434
peruanus, 434
phoenicopterus, 434
scleroparius, 434
stramineus, 434
Bryconodon, 430
Bryconops, 258, 435
alburnoides, 435
alburnus, 435
lucidus, 435
INDEX.

Buffalo, 23
Buffon, G. L. de, 103, 115, 117
Bulimula, 514
Bulimulidae, 613, 614, 620, 626, 630, 632
distribution of, 630
Bulimulus, 514
Bulinoidea, 559
Bunocephalichthys, 379
hypsirius, 321, 379
Bunocephalidae, 240, 333, 369
Bunocephalinae, 379
Bunocephalus, 335, 379
aleuropsis, 380
amaurus, 380
bicolor, 380
chamaizelus, 380
dorie, 340, 380
gronovii, 321, 380
hypsirius, 379
iheringii, 340, 348, 380
knerii, 380
melas, 380
rugosus, 340, 380
scabriceps, 379
verrucosus, 380
Bush dog, 151
Byron, Commodore, 112, 115
Bythinella, 552, 553
ferrusina, 553
nickliiana, 553
viridis, 553
Bythinellaceae, 549
Callomys, 5, 50
viscacia, 32
Callomys, 50
Callophysinae, 240, 382
Callophysus, 382
macropterus, 321, 382
Callorhinus, 140
ursinus, 137, 140
Callorhinus, 99
Callotaria, 99, 100, 101, 121
alascana, 123
curilensis, 123
ursina, 123
Calafata bush, 159
Calderon, 360
California, 99, 100, 115, 137, 138, 139, 631, 638, 643, 644, 662
Lower, 99, 100, 122, 124, 135, 137, 138, 140
Callao, 248, 252, 560
Bay, 133
Callichthyidae, 241, 362, 369, 401, 484
Callichthys, 401
adpersus, 402
affinis, 402
albidus, 402
arcifer, 337, 402
asper, 393, 401, 402
barbatus, 401
callichthys, 322, 327, 337, 342, 348, 402
c. asper, 342
c. hemiphractus, 342
chiquitos, 402
calatus, 402
exaratus, 402
hemiphractus, 402
kneri, 402
leviceps, 402
lavigatus, 402
longifilis, 402
loricus, 402
personatus, 402
picus, 402
punctatus, 403
subulatus, 403
sulcatus, 402
tamoata, 402
Callomys, 5, 50
viscacia, 32
Callomys, 50
Callophysinae, 240, 382
Callophysus, 382
macropterus, 321, 382
Callorhinus, 140
ursinus, 137, 140
Callorhinus, 99
Callotaria, 99, 100, 101, 121
alascana, 123
curilensis, 123
ursina, 123
CABANILLAS, PLAIN OF, 306
Cabassous, 6
Cabo San Gregorio, 526
Caceres, 315
Caenogaeic area, 625
Caenotropus, 424
labyrinthicus, 323, 424
Calafata bush, 159
INDEX:

Calomys, 49, 50, 81
Camel, American, 22
Camelidae, 10, 17
Camelus, 17
equinus, 12
glama, 18
guanaco, 19
guanaco, 18
huanaacus, 18
lacta, 18
Camp Ridley, 91
Rosy, 163
Campbell Isds., 659, 662
Campos, 329, 653
Campylaa, 622
Canada, 687
Canelos, 360, 361
Canestrini, G., 273, 493
Canidae, 4, 157, 161
Canids, alopecoid, 160
lupine, 160
South American, 151
thoöd, 160
vulpine, 160
Canis, 151
alopex, 151
antarcticus, 155
anthus, 153
aerius, 151
asara, 154, 155, 158, 159
brasilienisis, 154, 155, 158
concrivorus, 153, 154, 155
familiaris, 151
fulicaudus, 152, 154, 155
fulvipes, 155
gaismanianus, 152
gracilis, 155
griseus, 154, 155, 158, 159
hyæna, 151
jubatus, 152
lagopus, 151
lupus, 151
magellanicus, 154, 161, 162, 163
microtis, 153
microtus, 153
Canis montanus, 162
parvidens, 152, 155
patagonicus, 155
(Pseudalopex) magellanicus, 162
sclateri, 153
sladeni, 152, 154
thous, 153
urostictus, 152
velox, 153
vetulus, 152, 154, 155
vulpes, 151
Cannavierias, 329
Cañon de las Vacas, 180
Canthopomus, 404, 407
genibarbus, 407
pellegrini, 407
Cape Adare, 91
Blanco, 138, 661
Fairweather, 19, 53, 54, 74, 75, 157, 158,
159, 634, 658
Good Hope, 104, 115, 121, 123, 154, 228,
271, 272
Gregory, 35, 36, 38, 526
Hall, 110, 130
Horn, 19, 109, 115, 117, 123, 228, 352,
516, 522, 532, 647, 648, 649
Mendocino, 138
San Roque, 309, 329
Virgin, 660
Capreolus leucotis, 12
Carabidae, 627
Caracas, 248, 311
Caragola, 232, 236, 377
acutidens, 236, 237, 292
lapicida, 236, 237, 291, 377
mordax, 236, 291, 292, 377
Caranchas, 16
Carangidae, 480, 484
Carapus arenatus, 450
brachyurus, 450
inaquilabriatus, 450
sanguinolentus, 450
Carboniferous period, 612
North American, 516
Carcharias lamia, 377
Carcharinus, 377
INDEX.

Carcharinus commersoni, 377
  nicaraguensis, 377
Carcinocyon, 153, 155
  sclateri, 153
Cariacus chilensis, 12, 15, 22
  (Furcifer) chilensis, 12
Caribbean elevation, 620
  islands, 623
  Sea, 311, 624
Carmen de los Patagones, 188, 606
Carnegiella, 439
  strigata, 439
Carnivora, Patagonian, 171
Carolinas, the, 628
Carpiodes, 418
  labiosus, 298, 418
  meridionalis, 297, 301, 418
  tumidus, 298, 418
Cartago, 315
Cassidina, 650
  emarginata, 636, 650, 662
Castalia, 514, 610
Castalia, 610
Castalina, 514
Castelnaud, F. de, 272, 491
Castle, Prof., 685
Cat, Pampa, 167, 185
  spotted, 182
Catabasis, 446
  acuminatus, 350, 446
  depressus, 402
Catfish, mailed, 355, 356, 357, 359
Catfishes, 225, 226, 227, 239, 354, 355, 356,
  357, 359, 368
  North American, 352
  Pacific slope, 353
Catoprinon, 442
  mento, 324, 442
Catopuma, 167
Catostomidae, 297, 418, 484
Catostomus anisurus, 418
  cyprinus, 418
  guzmaniensis, 418
  nebuliferus, 418
Cats, 179
  American, 166
  Eyra, 167
  South American, 180
  spotted, 167, 180
  Yaguarondi, 167
Cattle, Mr., 173
Cavia australis, 25, 27
  [Aneoma] australis, 25
  (Cerodon) australis, 25
  magellanica, 28
  patachonica, 28
Caviidae, 4, 23, 25
Cavy, Patagonian, 28, 29, 30
Cayapas, 602
Cedros Id., 138
Celebes, 363
Cenizas Id., 139
Cenomanian epoch, 532
Central America, 44, 45, 179, 180, 238, 270,
Centrochir, 393
Centromochlus, 335, 395
  aulopygius, 322, 395
  heckelii, 322, 395
  intermedius, 395
  megalops, 395
  oncina, 322
  oncinus, 395
  perugiae, 322, 395
  steindachneri, 395
Centropagidae, 638
Centrophorus, 401
Centropomidae, 466, 484
Centropomus, 466
  affinis, 466
  appendiculatus, 466
  argenteus, 466
  armatus, 466
  armatus, 466
  atridorsalis, 314, 466
  aurooeridis, 466
  boubina, 466
  brevis, 466
  ensiferus, 328, 466
  gabi, 466
  grandoculatus, 466
INDEX.

Ceylon, 614, 632
Cheirothorax, 402
bicarinatus, 402
semiscutatus, 402
taioch, 402
Chaetobranchopsis, 469
australe, 346
australis, 469
orbicularis, 469
Chaetobranchus, 469
brunnus, 469
flavescescens, 326, 469
robustus, 469
semifasciatus, 469
Chaetostomus, 305, 308, 312, 314, 360, 371, 405, 410
alga, 411
anomalus, 410
branickii, 410
brevis, 410
dermorhynchus, 313, 410
distribution of, *359
fischeri, 313, 410
gibbosus, 410
guairiensis, 410
heteracanthus, 409
jelskii, 411
latifrons, 410
leucostictus, 411
loborhynchus, 410
macrops, 410
malacops, 411
marcapatae, 410
marginatus, 410
microps, 313, 410
microps, 410
nigrolineatus, 410
nudirostris, 410
sericus, 411
stanii, 410	
taczanowski, 410
tectirostris, 411
thomsoni, 410
trinitatis, 409
variolus, 411
Chalceus, 439
INDEX.

Chalceus angulatus, 440
  ararapeera, 439
  macrolepidotus, 324, 439
  opalinus, 431
  rhodopterus, 431
  rotundatus, 440
Chalcinopelecus, 440
  argeniinus, 440
Chalcinopsis, 258, 430
  chagrensis, 430
  striatulus, 430
Chalcinus, 335, 440
  albus, 440
  angulatus, 324, 345, 440
  a. curtus, 345, 440
  a. fuscus, 440
  a. signatus, 440
  a. vittatus, 440
  auritus, 440
  brachypomus, 440
  culler, 440
  elongatus, 324, 440
  guentheri, 324, 332, 440
  kneri, 440
  magdalenae, 316, 440
  mulleri, 440
  nematurus, 440
  paranensis, 345, 350, 440
  pictus, 440
  trifurcatus, 440
"Challenger," H. M. S., 109, 129, 659
Chamaigenes, 380
  filamentosus, 380
Chametly Ids., 137, 138
Chaoon, 154
Chapada, 152, 154
Chapalichthys, 456
  encaustus, 304, 456
Characid, 354, 355, 356, 358
Characidae, 229, 238, 252, 297, 362, 363, 366, 368, 369, 370, 376, 420, 484
distribution of, 367
Characidium, 427
  blennoides, 428
  borelli, 344, 427
  brevirostris, 428
Characidium catenatum, 428
  etheostoma, 427
  fasciatum, 323, 333, 338, 344, 349, 374, 427
  laterale, 427
  lateralis, 344
  pellucidum, 428
  pteroides, 428
  purpuratum, 427
  steindachneri, 427
tenue, 427
tenuis, 349
vintoni, 428
zebra, 428
Characinae, 230, 256, 309, 444
Characini, 252
Characinidae, 252
Characinoids, 340
Characins, 225, 226, 253, 260, 354, 355, 356, 357, 358, 359, 375
Characinus amazonicus, 431
calliurus, 346
gibbosus, 325
Characodon, 455
eiseni, 304, 455
encaustus, 456
ferrugineus, 455
furcidens, 300, 456
garmani, 300, 455
geddesi, 455
lateralis, 304, 455
multiradiatus, 304, 455
variatus, 304, 455
Charax, 335, 444
amazonum, 445
argentea, 445
atratoensis, 445
calliura, 445
gibboa, 444
gibbosus, 345
limaesquamis, 444
pauciradiata, 444
planirostris, 422
sanguineus, 445
squamosa, 445
squamosus, 345
Charax tectifer, 444
Charopa, 516, 518, 631
Chase, Capt. G. W., 142
Chasnocephalus, 384
brevior, 384
longior, 384
Chasmodes, 482
maculipinna, 314, 482
Chat pampa, 183, 185
Chauve-souris brun-blanchatre, 191
septième, 189, 191
Cheirodon, 227, 229, 230, 258, 335, 361, 429
agassizii, 429
anneae, 259, 429
callieri, 259
calliiurus, 259, 344, 429
distribution of, *358
insignis, 260, 316, 444, 429
interruptus, 259, 344, 349, 429
micropterus, 429
monodon, 259, 349, 429
nattereri, 259, 344, 429
pequira, 429
piaba, 260, 332, 429
pisciculus, 258, 259, 260, 292, 429
pulcher, 429
ribeiroi, 344, 429
steinbachleri, 429
Chelemys, 44, 78, 80, 81
Chelemys, 70, 71
Chelonians, 294
Chelymys, 44
Cherlichthys asellus, 484
Chichinal, 610
Chiaje, Delia, 489
Chilián land, 629
plateau, 230
subregion, 627
Chililaya, 604
Chilina, 294, 513, 531, 533, 534, 538, 627
amœna, 515, 533, 534
camylaxis, 515, 541
distribution of, 532
falklandica, 515, 534
fluinea, 514, 531, 544, 545, 546, 547
f. microdon, 514, 545
fluinea, 545
fluviatilis, 533
fuegiensis, 515, 533
fulgurata, 515, *531, 536, 537, 539, 540, 543
f. andicola, 515, 540
f. hatcheri, 515, 540
f. livida, 515, 539
f. ologoptyx, 515, 532, 538, 541
fusca, 515, 534
globosa, 514, 546
lebruni, 515, 536
monticola, 515, 542, 543
m. pilula, 515, 542
nervosa, 515, 534
olivula, 532
ovalis, 542
parchappii, 515, 536, 537, 544
parva, 515, 547
patagonica, 515, 533, 541
perrieri, 515, 542
portillensis, 514, 547
puelcha, 515, 535, 537, 544
rushii, 514, 547
smithii, 515, 535
strebeli, 515, 534
tehuelcha, 515, 543
t. mendozana, 515, 543, 544
Chillinae, 513, 514, 515, 531, 532, 533, 534, 613, 614, 627
distribution of, *628
Chillo Valley, 562
Chilodinae, 254, 424
Chilodus, 424
punctatus, 323, 424, 425
Chiloe Id., 186, 514, 637, 658, 659, 661
Chilomyzon, 424
Chinchilla Ids., 113, 133
Chinchilla, 30, 31
INDEX.

Chinchillas, 5
Chinchillidae, 4, 23, 30
Chinese center, 625
Chiriqui, 45
Chiroptera, 186
Chirostoma, 279, 280, 303, 464
ARGE, 304, 464
attenuatum, 304, 464
bartoni, 304, 464
brasiliense, 464
breve, 464
chapale, 304, 465
crystallinum, 304, 465
diazi, 465
estor, 305, 465
grandocule, 304
grandoculis, 465
humboldtianum, 280, 304, 464
jordani, 304, 464
laborce, 304, 464
lerma, 305, 465
lucius, 304, 465
lucius, 465
mauleanum, 280, 292
mequital, 300, 464
ocotlane, 305, 465
patzcuaro, 304, 464
promelas, 304, 465
sphyrrena, 304, 465
sphyrana, 465
zirahuen, 304, 464
Chlamydophorus, 6
Chloromys palagonica, 28
patagonica, 28
Chonophorus, 481
banana, 328
bucculentus, 482
taisicus, 299, 301, 302
Chonos Archipelago, 128, 134, 149
Chorimycterus, 427
Chorinemus occidentalis, 480
Chorology, ichthyic of S. A., 372
theoretical, 319
Chromis dentatus, 477
gibbiceps, 479
Chromis fusco-maculatus, 476
obscura, 479
proxima, 478
tania, 473
unipunctata, 479
Chromys acora, 473
appendiculata, 475
fascia, 475
punctata, 471
tania, 473
ucayalensis, 469
uniocellata, 471
Chrysoctyon, 152
jubatus, 152
Chubut, 54, 55, 56, 57, 76, 641
Cichla, 469
argus, 469
atabapensis, 469
chacoensis, 351, 469
conibos, 469
labrina, 477
monocus, 469
multifascia, 469
niederleinii, 351, 469
ocellaris, 326, 469
orinocensis, 469
temensis, 326, 469
toucounara, 469
tucunare, 469
Cichlasoma, 302, 309, 335, 470, 471, 473
acutum, 473
adspersum, 476
alfari, 475
altifrons, 475
anguliferum, 474
autochthon, 339, 351, 374, 473
balteatum, 475
bartoni, 299, 476
bartoni, 474
beani, 299, 303, 305, 476
bifasciatum, 474
bimaculata, 347
bimaculatum, 326, 328, 470, 471, 473
biocellatum, 473
centrarchus, 474
cinctum, 476
Cichlasoma citrinellum, 475
  coryphænoides, 473
deppi, 474
dorsatum, 475
dovii, 476
eigenmanni, 302, 474
erythraeum, 475
evermanni, 302, 475
  facetum, 339, 351, 473
  facetus, 374
  fenestratum, 474
  festæ, 314, 476
  festivum, 326, 473
  friederichsthalii, 476
  frontale, 477
gadovii, 474
globosum, 473
godmanni, 474
godmannii, 314
  granadense, 475
  griseum, 476
  guntheri, 474
  guttulatum, 474
  hedricki, 302, 473
  heterodontum, 475
  immaculatum, 474
  intermedium, 474
  irregularare, 474
  istlanum, 301, 476
  istlarius, 300
  jenynsii, 351
  krausi, 476
  krausii, 317
  labiatum, 475
  labridens, 474
  latum, 476
  lentiginosum, 476
  lepidota, 351
  lithrinus, 475
  lobochilum, 475
  longimanus, 475
  macracanthus, 475
  maculicauda, 474
  manana, 473
  margaritiferum, 475
  melanurum, 302, 474

Cichlasoma melanurum, 474
  mento, 476
  microphthalmus, 474
  milleri, 473
  mojarra, 476
  multifasciatum, 476
  nebulifer, 302
  nicaraguense, 475
  nigricans, 476
  nigritum, 474
  nigrofasciatum, 473
  oblongum, 473
  oblongum, 474
  oclofasciatum, 473
  ornatum, 476
  parma, 301, 474
  pavonaceum, 297, 474
  psittacum, 326
  psittacus, 476
  punctatum, 471, 477
  robertsoni, 475
  rostratum, 475
  salvini, 301, 476
  septemfasciatum, 473
  severum, 326, 475
  severus, 339
  sexfasciatum, 474
  sieboldii, 474
  spectabile, 476
  spilurus, 473
  spinosissimum, 473
  steindachneri, 299, 476
  teapa, 474
  temporale, 326, 473
  tetracanthus, 476
  torralbasi, 476
  trimaculatum, 476
  urophthalmus, 476
  zonatum, 474

Cichlid, 355
Cichlidae, 297, 336, 363, 366, 368, 370, 469, 484
distribution of, *367
Cichlids, 225, 226
Cichlosoma, 335
Cingula peteningensis, 563
Circinariidae, 613, 614
INDEX.

Cirritidae, 353
Cirripedia, 636, 637
Citharichthys, 482
cayennsis, 482
gilberti, 482
guatemalensis, 482
sumichrasti, 482
spilopterus, 333, 482
Colomesus psittacus, 326, 484
Colonia, 545, 558, 577, 578, 579, 580, 588
Colorado, 176, 177, 178, 643, 644, 653
River, 303, 333
basin of, 312
Colossoma, 335, 444
bidens, 444
hemiarium, 444
mitrei, 350, 444
nigripinnis, 444
oculus, 444
orbignyanum, 444
orbignyanus, 350
Columbia River basin, 312
Commander Ids., 123
Comoro Ids., 363
Conception, 604
Conception Bay, 305
Conejos, 27
Conepatus, 4, 143
castaneus, 144, 145
chinga, 143
humboldti, 143, 144
leuconotus, 143
nasutus, var. chilensis, 144
var. humboldti, 144
Coneys, 29
Conorhynchos, 389
conirostris, 331, 389
glaber, 337, 389
nelsoni, 390
Cook, Capt., 115
Strait, 659
Coosa River, 569
Cope, E. D., 151, 259, 494, 495, 496, 500
Copeina, 428
argyrops, 428
guttata, 428
nattereri, 428
Copepoda, 636, 638, 664
Coppinger, R. W., 151, 515, 517, 519, 533
"Coquille" voyage of, 113, 117
Corbicula, 514
Corbiculidae, 603
Cordilleras, 2, 13, 14, 20, 21, 26, 35, 39, 40, 41, 47, 48, 54, 61, 65, 67, 68, 69, 75, 77, 79,
INDEX.

Cordoba, province of, 30, 41, 57, 360, 552
Cormorants, 149
Corneocyclas davisi, 604
magellanica, 606
magellanicus, 603
Corneola, 603
Corrissa, 307
Corolla, 620
Corrientes, province of, 562, 587, 596
Corriken Aike, 90, 213, 214
Corumba, 339
Corvinâ biloba, 468
grunniens, 468
monacantha, 468
Corydoras, 402
acutus, 403
æneas, 327, 403
tagassisi, 403
ambicus, 403
amphibulus, 403
armatus, 403
aurorubinus, 342, 403
aureale, 342
australis, 403
edentatus, 393
eigenmanni, 403
elegans, 403
eques, 403
geffroy, 402, 403
 hastatus, 403
jullii, 403
juquie, 403
marmoratus, 403
microps, 342, 403
muttereri, 337, 403
paletus, 342, 348, 403
 punctatus, 322, 403
 punctatus, 403
raimundi, 403
treiitii, 403
trilineatus, 403
Corymbophanes, 404
Corynopoma, 438
Corynopoma riisei, 438
veedonii, 438
Coscinonyxron, 440
culer, 440
Costa Rica, 71
Cotylephorus, 380
Cotylopus, 363, 364, 481
acutipinnis, 481
gymnogaster, 481
punctatus, 481
salvini, 481
Coues, E., 62, 66, 67
Cougars, 177
Cox, 96
J. C., 549
Coy Inlet, 54, 75
Crab, 149
Crabs, fresh-water, 294, 627
Crawshay, Capt., 519, 520
Creagoceros, 10
Creagrocres chilensis, 12
Creagrunatus, 258, 308, 361, 435
 affinis, 435
 argenteus, 332
distribution of, *359
 melanzonus, 435
 mülleri, 314, 316, 435
 nasutus, 435
 peruanus, 314, 435
Creatochanes, 257, 435
 affinis, 324, 435
caudomaculatus, 435
gracilis, 435
 melanurus, 324, 345, 435
Crenicara, 477
elegans, 477
 punctulata, 326, 477
Crenicichla, 477
acutirostris, 478
 adspersa, 347, 478
 albopunctata, 477
 anthurus, 477
 argynnés, 477
 cinca, 478
elegans, 477
fasciata, 478
INDEX.

Crenicichla frenata, 477
   funebris, 478
   geayi, 477
   johanna, 326, 478
   j. vittata, 478
   lacustris, 339, 374, 477
   lenticulata, 326, 478
   lenticulata, 478
   lepidota, 347, 477
   lucius, 477
   lugubris, 326, 478
   macrophthalmus, 477
   marmorata, 477
   multispinosa, 326, 478
   obtusirostris, 478
   orinocensis, 469
   ornata, 478
   polysticta, 477
   proteus, 477
   punctata, 477
   saxatilis, 326, 328, 347, 477
   semicincta, 477
   strigata, 478
   wallaci, 326, 477
Crenuchinae, 254, 430
Crenuchus, 430
   spilurus, 324, 430
Cretaceous period, 612, 619, 620, 621, 624, 626, 627, 629, 632, 633
Cricetinae, North American, 44
Cromeria, 271
Crosse, C. H., 524
Crozet Ids., 97, 98, 122
Crustacea, 86, 293, 629, 633
   Antarctic, 662
   cosmopolitan, 662
   fresh-water, 664
   Magellanian, 662
   marine, 635
   Titicacan, 307
   West-American, 662
Ctenobrycon, 435
   alleni, 435
   hauxwellianus, 324, 344, 435
   multifasciatus, 435
   spilurus, 435
Ctenodactyldae, 34
Ctenodactylus, 33, 34
Ctenogobius, 481
Ctenolucius, 446
Ctenomys, 4, 23, 24, 33, 34, 37, 40
   bergi, 41
   boliviensis, 40
   brasiliensis, 34
   colburni, 5, 43
   fueginus, 35, 37
   magellanica, 24, 40, 42
   magellanicus, 34, 37, 38, 40
   mendocina, 43
   neglectus, 35, 36, 37
   osgoodi, 191
   pundti, 41
   robustus, 5, 38, 40, 41, 44, 191
   sericeus, 5, 40, 43, 44
Cuba, 279, 354, 363
Cudajao, 248
Culius, 480
   aquidens, 480
Cumaceen, 646
Cunningham, R., 19, 494, 651
Curico, 285, 288
Curimatella, 335, 420
   alburna, 420
   a. australis, 420
   a. caudimaculata, 421
   a. lineata, 421
   alburnus, 323, 343
   a. australis, 343
   lepidurus, 332, 420
   meyeri, 420
   serpe, 420
   xinguensis, 421
Curimatinae, 253, 420
Curimatopis, 420
   macrolepis, 420
   microlepis, 420
Curimatus, 361, 421
   abramoides, 422
   acutidens, 422
   albula, 421
INDEX.

Curimatus albulus, 421
  albatimonicus, 422
  amazonum, 433
  argenteus, 327, 421
  asper, 422
  aureus, 422
  bimaculatus, 343, 421
  b. sialis, 421
  b. trachystethus, 421
  boulenjeri, 313, 422
  brevipes, 422
  conspersus, 421
  copei, 422
  cyprinoides, 323, 422
  cyprinoides, 420, 422
distribution of, *356
  dobula, 421
dorsalis, 421
elegans, 338, 421
e. bahiensis, 338, 421
e. nitens, 343, 421
e. paraguayensis, 421
essequibensis, 323, 422
falcatus, 422
gilberti, 332, 338, 343, 349, 374, 421
g. brevipinnis, 349, 421
gilli, 343, 421
güntheri, 421
güntheri, 422
günstheri, 422
hypostomus, 422
isognathus, 422
knerii, 323, 422
leuciscus, 422
l. boliviae, 422
leucoctictus, 422
macrops, 422
magdalenae, 313, 316, 421
microcephalus, 323, 421
mivartii, 316, 422
nägeli, 421
nägeli, 338
nasus, 343, 421
nigrotenia, 343, 421
nihons, 421
notatus, 421
ocellatus, 422

Curimatus platana, 349
  platana, 422
  plumbeus, 421
  pristigaster, 420
  rutiloides, 343, 422
  schomburgkii, 323, 422
  simulatus, 422
  spiluroopsis, 421
  spilurus, 323, 343, 421
trochelini, 313, 421
  vittatus, 422
  voga, 421
Curimatus spiluroopsis, 349
Cuttle-fish, 149
Cuvier F., 51, 52, 86, 91, 94, 104, 113, 118, 120, 121, 127
  G., 103, 112, 118, 121, 127, 486
  & Valenciennes, M., 319, 487, 488, 489
Cuyaba, 318, 339
Cuzco, 561
Cychla fasciata, 478
flavo-maculata, 469
nigro-maculata, 469
rubro-ocellata, 470
rutilans, 477
trifasciata, 469
Cychlasoma, 471
Cycladeen, 603, 604
Cylas argentina, 605
chiliensis, 604
forbesii, 604
lauricochea, 604
pulchella, 603
Cyclonarce, 377
Cyclophoridae, 622, 625
distribution of, *625
Cyclopoidea, 416, 484
Cyclopium, 305, 308, 312, 360, 371, 416
  boulenjeri, 417
  brachycephalus, 417
  brachycephalus, 417
  chotte, 417
cyclopium, 417
cyclopium, 416
distribution of, *359
eigenmanni, 416
<table>
<thead>
<tr>
<th>INDEX</th>
<th>715</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Cyclopus eigenmanni</em>, 417</td>
<td><em>Cynopotamus magdalenae</em>, 316, 346</td>
</tr>
<tr>
<td>festae, 417</td>
<td><em>molossus</em>, 445</td>
</tr>
<tr>
<td>fissidens, 417</td>
<td><em>Cyphocharax</em>, 421</td>
</tr>
<tr>
<td>guntheri, 417</td>
<td>Cyprididae, 639</td>
</tr>
<tr>
<td>heterodon, 417</td>
<td>Cyprinidae, 238, 297, 418, 484</td>
</tr>
<tr>
<td>homodon, 417</td>
<td><em>Cyprinodon</em>, 456</td>
</tr>
<tr>
<td><em>humboldti</em>, 416, 417</td>
<td>amazonus, 456</td>
</tr>
<tr>
<td>longifile, 417</td>
<td>bovinus, 456</td>
</tr>
<tr>
<td>marmoratum, 417</td>
<td>dearborni, 456</td>
</tr>
<tr>
<td>orientale, 417</td>
<td>elegans, 456</td>
</tr>
<tr>
<td>peruanum, 417</td>
<td>eximius, 298, 456</td>
</tr>
<tr>
<td>prenadiella, 417</td>
<td>gibbosus, 456</td>
</tr>
<tr>
<td><em>prenadilla</em>, 417</td>
<td>latifasciatus, 300, 456</td>
</tr>
<tr>
<td>retrospina, 417</td>
<td>martae, 456</td>
</tr>
<tr>
<td>sabalo, 417</td>
<td>variegatus, 456</td>
</tr>
<tr>
<td>simonsii, 417</td>
<td><em>Cyprinus cephalus</em>, 448</td>
</tr>
<tr>
<td>taczanowski, 417</td>
<td><em>cylindricus</em>, 448</td>
</tr>
<tr>
<td>theresiae, 417</td>
<td><em>leuciscus</em>, 419</td>
</tr>
<tr>
<td>vaillanti, 417</td>
<td>Cyrenacea, 612</td>
</tr>
<tr>
<td>whymperi, 416</td>
<td>Cyrenidae, 514</td>
</tr>
<tr>
<td><em>whymperi</em>, 417</td>
<td><em>Cyrtocarax</em>, 444</td>
</tr>
<tr>
<td><em>Cyclostoma</em>, 231</td>
<td>Cystophora, 94</td>
</tr>
<tr>
<td><em>Cyclostomata</em>, 231</td>
<td>angustirostris, 97</td>
</tr>
<tr>
<td><em>Cyclostomatidae</em>, 613, 616, 622, 625</td>
<td>cristata, 93, 94</td>
</tr>
<tr>
<td><em>Cylindrosteus</em>, 379</td>
<td>falklandica, 96, 97</td>
</tr>
<tr>
<td><em>Cymodocea</em>, 649</td>
<td>kerguelensis, 96, 97</td>
</tr>
<tr>
<td><em>Cymotheidae</em>, 646</td>
<td>leonina, 96</td>
</tr>
<tr>
<td><em>Cyprinodon</em>, 456</td>
<td>proboscidea, 95, 97</td>
</tr>
<tr>
<td><em>Cyprinus cephalus</em>, 448</td>
<td>Cystophora, 94</td>
</tr>
<tr>
<td><em>Cyprinus cephalus</em>, 448</td>
<td><em>DADAY, E. VON</em>, 638, 639, 640, 643, 664</td>
</tr>
<tr>
<td><em>Cyprinus cephalus</em>, 448</td>
<td>Dajaus, 463</td>
</tr>
<tr>
<td><em>Cyprinus cephalus</em>, 448</td>
<td><em>Dahomica</em>, 463</td>
</tr>
<tr>
<td><em>Cyprinus cephalus</em>, 448</td>
<td>Dall, W. H., 606</td>
</tr>
<tr>
<td><em>Cyprinus cephalus</em>, 448</td>
<td>Dalliidae, 228</td>
</tr>
<tr>
<td><em>Cyprinus cephalus</em>, 448</td>
<td>Dalmatia, 564, 565</td>
</tr>
<tr>
<td><em>Cyprinus cephalus</em>, 448</td>
<td>Dampier, W., 115, 137</td>
</tr>
<tr>
<td><em>Cyprinus cephalus</em>, 448</td>
<td>Dana, J. D., 649, 658, 661</td>
</tr>
<tr>
<td><em>Cyprinus cephalus</em>, 448</td>
<td>Daphnia, 640</td>
</tr>
<tr>
<td><em>Cyprinus cephalus</em>, 448</td>
<td>hastata, 636, 640, 664</td>
</tr>
<tr>
<td><em>Cyprinus cephalus</em>, 448</td>
<td><em>pulex</em>, var. <em>hastata</em>, 640</td>
</tr>
<tr>
<td><em>Cyprinus cephalus</em>, 448</td>
<td>Daphnidae, 640</td>
</tr>
<tr>
<td><em>Cyprinus cephalus</em>, 448</td>
<td>Darien, Gulf of, 311</td>
</tr>
<tr>
<td><em>Cyprinus cephalus</em>, 448</td>
<td>Isthmus of, 309, 310</td>
</tr>
<tr>
<td><em>Cyprinus cephalus</em>, 448</td>
<td>Darwin, C., 3, 19, 20, 22, 26, 27, 29, 33, 45,</td>
</tr>
</tbody>
</table>
INDEX.

52, 54, 55, 56, 58, 59, 60, 61, 64, 72, 75, 149, 153, 185, 186, 211
Darwin Channel, 150

Dasicyon, 153
Dasyatidae, 378, 484
Dasybatis, 377
Dasyoda, 6
Dasyopodidae, 7
Dasyprocta patachonica, 28
patagonium, 28
Dasyproctidae, 4
Dasypterus, 190
ega, 190, 191
e. argentinus, 191
villosissimus, 191
Dasyopus, 6
ciliatus, 5, 7
(Euphractus) minutus, 7
hybridus, 6
minutus, 7
patagonicus, 5, 7
(Tatusio) minutus, 8
Dasyopus, 7

Davalla, 397
Day, F., 499
Dean, B., 504
Decapoda, 637, 657
Decapods, fresh-water, 620
Decapogon, 402
adspersum, 402

Deer, 4, 10, 11
Chilian, 2, 15
Guamul, 14
Patagonian, 10, 22
Virginia, 15

Delfin, F. J., 504, 506
Delalande, 121

Delturus, 335, 405, 409
angulicauda, 337
parahybae, 337, 409

Derby, O., 295
Dermatocheir, 437
catablepta, 437

Dermopteris, 231

Desmarest, A. G., 32, 33, 97, 104, 112, 113, 115, 185

Desolation Id., 130
Deutellocaraculus, 622
Deuterodon, 256, 335, 431
angulicauda, 337
depressirostris, 431
iguape, 338, 374, 431
nasutus, 431
parahybae, 338, 431
pedri, 338, 431
pinnatus, 431
potaroensis, 431
rose, 338, 374
Dianema, 402
longibarbis, 402
Diapoma, 438
speculiferum, 438
speculiferus, 350
Diapominae, 254, 438
Diatoms, 673
Dicrossus, 477
maculatus, 477
Didelphis, 26
Diluvial time, 372
Dionda, 418
amara, 419
couchi, 419
fluviatilis, 419
melanops, 419
Diplodon, 514, 610, 616, 627, 628, 631, 632, 633
frenzellii, 610
patagonicus, 515, 610
Diplolæmus bibronii, 212, 221, 223
darwini, 222
darwini, 212, 221, 222
darwini, 221, 222
Diplolepis, 467
Diplommatinidae, 613, 625
Diplomystax, 242
papillosus, 242
Diplomyste, 227, 229, 239, 240, 242, 381
papillosus, 242, 291, 292, 381
Diplomystes, 242
papillosus, 242
Diplomystidae, 240, 241, 381, 484
Dipneumona, 379
INDEX.

Dipneustes, 369
Dipnoi, 379
Dipturus, 377
Dipus maximus, 31, 32
Disceus, 378
Distichodontinae, 253
Dobson, G. E., 187
Doering, A., 514, 519, 520, 521, 548, 552
Dog, crab-eating, 153
  Falkland Id., 153
  Magellanic, 153
  wild, 159
Dolichotis, 23, 28
  m. centricola, 30
  m. patachonica, 28
  m. patagonica, 28
  salinicola, 30
Dolffuss, A., 647, 648, 649, 650
Dollo, L., 507
Dombeia, 531
Doradinae, 240, 241, 392
Doras, 335, 392
  affinis, 321, 393
  albomaculatus, 321, 392
  armatulus, 321, 393
  asterifrons, 393
  blochii, 393
  brachiatus, 393
  brunneus, 393
  carinatus, 392
  castaneo-ventris, 321, 393
  cataphractus, 321, 393
  costatus, 321, 331, 341, 393
  costatus, 393
  crocodili, 393
  dentatus, 321, 393
  dorsalis, 321, 392
  flavopictus, 393
  granulosus, 341, 348, 392
  grypus, 393
  hancockii, 393
  heckelli, 393
  helicophilus, 321, 392
  humboldtii, 393
  lithogaster, 392
  longipinnis, 315
  longispinis, 392
  maculatus, 341, 392
  marmoratus, 331, 393
  monitor, 393
  murica, 392
  nauficus, 393
  nebulosus, 341, 393
  niger, 393
  oxyrhynchus, 394
  papilionatus, 392
  pectinifrons, 393
  polygramma, 393
  polyrama, 393
  regani, 392
  spinosisimus, 393
  stenopelis, 394
  truncatus, 393
  uranoscopus, 392
  weddellii, 341, 393
Doria, 188
Dormitator, 480
  gundlachi, 480
  lineatus, 480
  maculata, 299
  maculatus, 302, 328, 480
  microphthalmus, 480
Dorosoma, 452
  anale, 301, 452
  chavesi, 452
  exile, 298, 301, 452
  notatum, 452
  petenense, 452
Dorosomidae, 452, 484
Doryhamphus lineatus, 328
Dromedarius, 18
Duméril, A., 490, 493
  M. C., 486, 491
Duopalatinus, 391
  emarginatus, 331, 391
  goeldii, 391
Duplicaria, 531
  bonariensis, 531, 545
Durbin, M. L., 511
Durnford, H., 27, 52, 55, 57, 76, 187
Dusicyon, 153
INDEX.

Dusky Bay, 104
Dybowski, W., 524
Dynamene, 649
eaetoni, 636, 640, 662
Dysichthys, 335, 380
australe, 340
australis, 380
coracoideus, 380

East Asiatic Center, 625
Falkland Id., 45
Eastern Hemisphere, 615
Echimyidae, 34
Echimys, 33
Ecrobia, 553

Ecuador, 58, 666, 670, 694, 305, 307, 311, 312, 315, 335, 353, 360, 361, 371, 548, 552, 561, 562, 602, 603, 604
Edentata, 6
Edotia, 646, 663, 664
tuberculata, 636, 646, 662
Edotidiidae, 646
Eel, gymnotid, 355, 357
synbranchid, 354

Ehlers, E., 500

& Bean, B. A., 509
& Bray, W. L., 500
& Eigenmann, R. S., 247, 319, 375, 498, 499
& Kennedy, C. H., 506
& McAtee, W. L., & Ward, D. P., 509
& Norris, A. A., 347, 504, 505
& Ogle, F., 509
& Ward, D. P., 376, 448

Eigenmannia, 335, 361, 449
axillaris, 449
distribution of, *355
humboldti, 314, 316, 449
microps, 325, 449
trocheli, 449
virescens, 325, 333, 346, 350, 449

Eigenmannina, 420
melanopogon, 420

Eigenmannina orinocensis, 420
Electrophoridae, 362, 369, 459, 484
Electrophorus, 430
electricus, 325, 450
Eleotris, 480
amblyopsis, 480
belizianus, 480
dormitatrix, 480
grandisquama, 480
guarina, 480
gyrinus, 480
laevis, 480
longiceps, 480
mugiloides, 480
omoyaneus, 480
perniger, 480
picta, 480
pictus, 299
pisonis, 480
sima, 480
somnolentus, 480

Éléphant marin, 102
Elligator, 50

Elligatoridae, 4, 5, 44, 50, 56, 57, 58
elegans, 51, 54
gracilipes, 54
griseoflava, 50, 51, 52, 55, 57
g. centralis, 57
g. domorum, 57
lepidida, 82
morganii, 5, 50, 53
typus, 50, 51, 53, 54

Elliot, D. G., 182
Ellipesurus, 378
spicinauda, 321, 378
Elminius, 637, 663, 664
kingi, 636, 637, 662

Elopidae, 453, 484
Elligator, 420
jordani, 420
orinocensis, 323

Endodontidae, 510, 519, 612, 613, 614, 631, 632
Engelmann, 610

Engraulidae, 451, 484

Engraulis dentex, 452
grossident, 452
INDEX.

**Engraulis janeiro**, 452
*macrolepidotus*, 451
Enide, 612
Enterrios, province of, 530
Eobrycon, 336
Eocene epoch, 295, 612, 622, 626, 633
Epapterus, 396
calybites, 397
displurus, 396, 397
Epicyrtus, 444
exodon, 446
gibbosus, 445
*macrolepis*, 444
*microlepis*, 445
Epiphallogona, 622
Epiphragmophora, 622
Equus, 11
*busukus*, 10, 11, 12
“Erebus & Terror,” H. M. S., 89, 90, 92, 93, 119
Eremophilus, 245, 248, 371, 400
mutisii, 308, 400
Erioryzomys, 46
Erosion by rodents, 24, 25
Erythrichys, 475
Erythrinidae, 252
Erythrininae, 256, 447
Erythrinus, 448
*brasilienis*, 447
*brevicauda*, 448
*cinereus*, 448
erythrinus, 323, 338, 448
gronovii, 448
kessleri, 448
longipinnis, 323, 448
*macrodon*, 447
*micrcephalus*, 447
*salmonae*, 448
*trahira*, 447
*unianthus*, 448
*vitatus*, 448
Eslopsarum, 464
Eslopsarum, 280
jordani, 280
Esocidae, 228
*Esox longirostris*, 462
*Esox malabaricus*, 447
*vvinus*, 456
Espino, 653
Espirito Santo, state of, 565
Essequibo, 561
Etchoestoma, 468
flabellare, 468
*micropterus*, 468
pottsii, 300, 352, 353, 468
Etheria, distribution of, 618
Etheriidae, 613, 615
distribution of, *618
Euanemus, 397
*longipinnis*, 397
Eucalodiinae, distribution of, *625
Eucervaria, 166
Euctenogobius *latu*, 482
Eucynopotamus, 443
gulo, 445
humeralis, 445
knerii, 445
magdalenae, 445
Eucypris, 639
sarsi, 636, 639
Euglandina, distribution of, *623
Eulamia, 377
Eumetopias, 99, 100, 104, 122
jubata, 114
Euneomys, 4, 5, 44, 62, 66
.. chinchiiloides, 67, 69
.. petersoni, 5, 67, 68
Eunothocyon, 152, 155
.. parvidens, 152
.. sladeni, 152
.. urostictus, 152
Euotaria, 120, 126
.. *latirostris*, 126, 128, 129
.. nigrescens, 126
Eupera, 602, 615
.. bahiensis, 603
.. modioliformis, 603
.. tumida, 603
Euphractus, 7
.. *minutus*, 8
Europe, 294, 364, 365, 368, 522, 523, 532, 549,
<table>
<thead>
<tr>
<th>Fauna</th>
<th>Mollusca, La Platan</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fauna, Fishes, Caribbean, 293</td>
<td>Magellanic, 515, 529</td>
</tr>
<tr>
<td>Central American, 310, 353</td>
<td>Mexico-Antillean, 622</td>
</tr>
<tr>
<td>Chilean, 295</td>
<td>Middle American, 622, 624, *632</td>
</tr>
<tr>
<td>Colorado River, 333</td>
<td>Northern, 613</td>
</tr>
<tr>
<td>East Brazilian, 309, 329, 373</td>
<td>Patagonian, 513, 629</td>
</tr>
<tr>
<td>Ecuadorian, 293, 353</td>
<td>primitive, 612, 613</td>
</tr>
<tr>
<td>Guianian, 319, 320, 329, 371, 375</td>
<td>Rio Negro, 514</td>
</tr>
<tr>
<td>Mexican, 296, 305, 353</td>
<td>Santa Cruz, 515</td>
</tr>
<tr>
<td>lowland, 371</td>
<td>Pleuroceratid, 625</td>
</tr>
<tr>
<td>plateau, 371</td>
<td>South American, 611, 632, 633</td>
</tr>
<tr>
<td>Neotropical, 239</td>
<td>Southern, 613</td>
</tr>
<tr>
<td>North American, 296, 297, 310, 363</td>
<td>Faunas, fresh-water mussel, 628</td>
</tr>
<tr>
<td>Pacific slope, 309, 352, 361, 362, 363, 370, 371, 376</td>
<td>gastropod, 628</td>
</tr>
<tr>
<td>Paraguayan, 351</td>
<td>Lymnaeid, 627</td>
</tr>
<tr>
<td>Patagonian, 296, 352, 369</td>
<td>Unionid, 628</td>
</tr>
<tr>
<td>Peruvian, 353</td>
<td>Faxon, W., 651, 653, 654, 655, 657</td>
</tr>
<tr>
<td>South American, 296, 305, 309, 310, 353, 369</td>
<td>Felichthys, 381</td>
</tr>
<tr>
<td>South Chilian, 352</td>
<td>bagre, 381</td>
</tr>
<tr>
<td>Southeaster Brazilian, 328, 339, 351, 352</td>
<td>filamentosus, 381</td>
</tr>
<tr>
<td>Transition, 296</td>
<td>marinus, 381</td>
</tr>
<tr>
<td>Trinidad, 327, 371</td>
<td>Felichthys, 396</td>
</tr>
<tr>
<td>tropical, 297</td>
<td>Felidae, 4, 164</td>
</tr>
<tr>
<td>tropical American, 227, 229, 247, 290, 293, 363, 369</td>
<td>Felis, 165, 166, 167, 178, 179, 180, 183</td>
</tr>
<tr>
<td>fresh-water, 293, 295, 614, 626</td>
<td>catus, 166, 167</td>
</tr>
<tr>
<td>African, 294</td>
<td>colocola, 179</td>
</tr>
<tr>
<td>Amazonian, 327</td>
<td>concolor, 164, 167, 168, 172, 174, 178</td>
</tr>
<tr>
<td>autochthonous, 327</td>
<td>c. pearsoni, 169, 170, 174, 178</td>
</tr>
<tr>
<td>Brazilian, 294</td>
<td>c. puma, 167, 168, 172, 173</td>
</tr>
<tr>
<td>Chilean, 295</td>
<td>eyra, 167, 180</td>
</tr>
<tr>
<td>Cretaceous, 295</td>
<td>geoffroyi, 179, 180, 182, 183</td>
</tr>
<tr>
<td>West Indian, 327</td>
<td>guigna, 180, 182, 183</td>
</tr>
<tr>
<td>Mammalia, Patagonian, 294</td>
<td>jaguarondi, 180</td>
</tr>
<tr>
<td>South American, 7</td>
<td>jubata, 166</td>
</tr>
<tr>
<td>Mollusca, African, 614</td>
<td>leopardus, 167, 179</td>
</tr>
<tr>
<td>Amazonian, 514</td>
<td>lynx, 166</td>
</tr>
<tr>
<td>Archhelenic, 614, 622</td>
<td>macroura, 179, 180</td>
</tr>
<tr>
<td>Caenoaeic, 612, 616</td>
<td>melanurus, 179</td>
</tr>
<tr>
<td>Caribbean, 295</td>
<td>mitis, 179</td>
</tr>
<tr>
<td>Ecuadorian, 293</td>
<td>moormensis, 167</td>
</tr>
<tr>
<td>Eogaeic, 613</td>
<td>olympus, 178</td>
</tr>
<tr>
<td>Falkland, 515</td>
<td>onca, 164, 166, 167, 173</td>
</tr>
<tr>
<td>Fuegian, 515</td>
<td>(Oncifelis) geoffroyi, 180</td>
</tr>
<tr>
<td></td>
<td>(Oncoides) geoffroyi, 180</td>
</tr>
<tr>
<td></td>
<td>pajero, 184</td>
</tr>
</tbody>
</table>
Felis pajeros, 167, 180, 183, 185
  *p. concina*, 183, 184, 185
  *pardalis*, 179, 180
  *pardinoides*, 180
  *passerum*, 183
  *pearsoni*, 174
  *planiceps*, 166
  *puma*, 167, 168, 169
  *p. patagonica*, 168, 178
  *p. pearsoni*, 169, 174
  *tigrina*, 179, 180
  *uncia*, 167
  *(Uncia)* *puma*, 167
  *vinerrina*, 179
  *wiedi*, 179
  *yagouaroundi*, 167
Felton, H. S., 187
Fere, 85
Fernando Noronha, 620
Ferrusacidae, 612, 622
Fiji Ids., 549, 630
Filhol, H., 659
Filippone, F., 574, 591, 592, 593
Fischer, G., 103
Fischer, P., 611; & Crosse, 524
Fishes, Atlantic coast, 353
  Brazilian, 307
  cyprinid, 295
  fresh-water, 226, 227, 294, 295, 318, 626
  distribution of S. A., 248
  Mississippi valley, 297
  Pacific coast, 353
  Panama Bay, 353
  Patagonian, 225, 247
Rio Amazon, 329, 333, 339, 351, 353, 371, 376, 484
  Balsas, 300
  Geronimo, 302
  Grande (del Norte), 290, 297, 333, 352
  do Sul, 351, 352
  de La Plata, 229, 347, 351, 352
  Lerma, 333
  Magdalena, 371
  Mezquital, 300, 352

INDEX.

Fishes, Rio Motagua, 371
  Panuco, 230, 298
  Papaloapam, 297, 301
  Paraguay (basin) 339, 340, 371
  Paraná, 347, 352
  Presidio, 294
  Ribeira, 373
  San Francisco, 352, 371, 372
  Verde, 302
  Yaqui, 352
  South American, 299
  Tertiary, 370
  Titicaca, 372
Fiske, 620
Fitzinger, L. J., 488
Fitzroy, Capt., 89, 90, 91
Fitzroya, 457
  *lineata*, 457
  *pyrogramma*, 457
Flagg, H. C., 486
Flammulina, 517, 518
  *(Allodiscus) roblini*, 517
Florida, 45, 569, 653, 654
Floridian Oligocene island, 626
Flower, W. H., 97, 112
  & Lydekker, R., 89
Fluminicola, 549
Fluviopupa, 549
  *pupoidea*, 549
Forbes, 602, 632, 674
Forster, J. R., 102, 103, 104, 114, 115, 117
Fossils, fishes, 336, 340
  land-mammals, 340
  land-snails, Cretaceous, 612
  Mesozoic, 615
  Tertiary, 612, 615
  marine invertebrates, 293
  sharks’ teeth, 340
Fowler, H. W., 280, 506, 508
Fowlerina, 441
  orbicularis, 324, 338, 441
  paraguayensis, 345, 441
Fox, 159, 160, 162
Azara, 153
Cordillera, 164
  gray, 2, 159, 161
Fox, pampa, 160, 163, 164
Foxes, 160, 161
  Aguaara, 154
  gray, of Patagonia, 158
  South American, 158
France, 93, 532, 552
Frauenfeld, G. von, 546, 564
Fray Bentos, 547, 557, 577, 580, 581, 588, 589
Frazier, A. F., 115
Fretins, 273
Freyknet, L., 102
Fridolinia, 622
Fuegians, 149
Fundulus, 307, 363, 364, 368, 453
  balzanti, 346, 454
  cubensis, 454
  extensus, 453
  guatemalensis, 314, 453
  heteroclitus, 298
  labialis, 454
  mudfish, 453
  oxaxce, 453
  oxaxce, 302
  pachycephalus, 454
  paraguayensis, 346, 454
  punctatus, 453
  vinctus, 453
Furcifer, 10
  andinus, 12
  chilenis, 13
  huamel, 12

**GADUS LACUSTRIS**, 382
  Gaimard, G., 487
Galactocheilus, 622
Galapagos Ids., 100, 109, 112, 116, 123, 124, 131, 132, 133, 134, 136, 141
Galatheidae, 659
Galaxia, 271
Galaxias, 228, 229, 271, 462
  alpinus, 273, 291, 292, 462
  alpinus, 275, 276
  attenuatus, 271, 272, 274, 462
  bollansi, 272
  bullocki, 462
  coppingeri, 276, 292, 462
  gracillimus, 273, 274, 275
  grandis, 276, 292, 462
  maculatus, 273, 274, 275, 291, 292, 462
  punctatus, 274
  minutus, 275, 292, 462
  platei, 273, 274, 276, 292, 462
  rhabdophora, 457
  smittii, 462
  titcombi, 276, 292, 462
  truttaceus, 271, 462
Galaxide, 271
Galaxiidae, 227, 228, 271, 272, 462, 484
  distribution of, *364
Galba, 522, 525, 622
Galecynus, 152
  latidens, 152
  lemur, 152
Galei, 377
Galeichthys, 381
  aguadulce, 301, 381
  blochii, 381
  feliceps, 381
  guatemalensis, 381
Galeidae, 377, 484
Galera, 147
Galeus vulgaris, 348
Galictis, 147
  vittata, 143
Gallegos, 235, 283, 635, 646
  Bay, 635
Gambusia, 456
  affinis, 298, 457
  annectens, 456
  bonita, 301, 457
  episcopi, 456
  fasciata, 302, 457
  gracilis, 300, 457
  gracilis, 457, 458
  infans, 304, 457
  modesta, 459
  nicaraguensis, 457
  plumbea, 459
  punctata, 456
  puncticulata, 456
  rhabdophora, 457
INDEX.

Gambusia senilis, 457
speciosa, 457
terrabensis, 457
tridentiger, 457
Garces, M., 499
Garden, A., 485
Garman, S. H., 378, 455, 495, 496, 499
Garmanina, 425
Garneria, 626
Garnieria, 626
Garnot, see Lesson
Gasterodermis, 402
Gasteropelincine, 255, 439
Gasteropelecus, 335, 361, 439
distribution of, *357
fasciatus, 439
maculatus, 314
securis, 439
stellatus, 439
sternicida, 324, 439
strigatus, 439
Gasterotomus, 422
latior, 422
Gastrophysus, 484
Gastropoda, 516
air-breathing, 611
fresh-water, 628
Gastropterus, 279, 362, 370, 464
archaeus, 308, 464
beardsleei, 464
Gay, C., 49, 490
& Gervais, 11
Genidens, 381
cuvieri, 381
genidens, 337, 348, 381
granulosus, 381
Gente Grande, 526
Bay, 533
Geoffroy, 190
Geomyidae, 26, 34, 41
Geophagus, 478
acuticeps, 479
alitifrons, 478
amenus, 478
australis, 479
badispinis, 469
balzanii, 347, 479
Geophagus brachyurus, 351, 479
brasiliensis, 339, 351, 374, 471, 478, 479
brasiliensis, 478
bucephalus, 479
camopiensis, 326, 479
camurus, 479
crassilabris, 317, 479
cupido, 326, 479
demon, 479
duodecimspinosis, 479
ejurupari, 347
gymogenys, 339, 351, 472, 479
jurupari, 326, 479
jurupari, 479
labiatus, 479
leucosticlus, 479
megasema, 478
(mesops) thayeri, 472
pappaterra, 479
pygmaeus, 479
rhabdotus, 479
scymnophilus, 479
steindachneri, 317, 478
surinamensis, 326, 471, 478
Georgia, 628
Geotria, 229, 230, 232, 234, 236, 376
australis, 232, 233, 234, 235, 291, 376
chilensis, 232, 233, 292, 376
macrostoma gallegensis, 292
stenostomus, 233
Germain, L., 616
Gerrard, see Gray, J. E.
Gervais, P., 11, 146, 148, 182
Gestro, R., 226, 286
Giebel, C. G., 495
Gila conspersa, 419
modesta, 419
migrescens, 419
Gilbert, C. H., 353, 497, 504
Gilbertella, 445
Gilbertollus, 445
alatus, 445
Gilbertolus alatus, 445
Gill, T., 89, 90, 104, 137, 141, 228, 234, 236, 411, 450, 470, 471, 491, 492, 494, 495, 496, 497, 499, 500, 501, 506, 612
INDEX.

Gill, T., & Bransford, J. F., 496
Gionionarce, 377
Girard, C., 248, 282, 490, 491
Girardinichthys, 455
innominatus, 455
Girardinus, 458
caucanus, 316, 458
caudomaculatus, 346, 458
creolus, 458
denticulatus, 458
garmani, 458
theringii, 458
januarius, 350, 458
metallicus, 458
Giton, 335, 450
fasciatus, 325, 450
Glabaris, 609
Glacial epoch, 372
Glandina, 532
Glanidium, 395
albescens, 331, 337, 374, 395
Glaridichthys, 457
falcatus, 458
latidens, 457
torralbasi, 458
uninotatus, 457
Glaridon, 457
latidens, 457
Glires, 23
Gloger, C., 94
Glossichthys, 483
Glossiphonia duplicata, 669, 675, 680, 681 683, 684, 685
elongata, 685
(Helobdella) chilensis, 669
(H.) michaelseni, 669, 681, 682
(H.) scutifera, 669, 675, 682, 683
lineata, 679, 681, 682, 684
michaelseni, 680, 682, 685
nepheloides, 685
scutifera, 680, 682, 683
simplex, 681, 685
stagnalis, 669, 677, 679, 685, 687
Glossiphonie, 685
Glossiphonids, 669
Gmelin, J. F., 486
Gobies, 297
Gobiidae, 327, 480, 484
Gobioides, 482
barreto, 482
broussonetti, 482
peruanus, 314, 482
Gobiomorus dormitor, 480
Gobionellus, 481
Gobius, 481
amorex, 480
andreoi, 481
badius, 481
banana, 482
bosci, 481
brunneus, 481
carolinensis, 481
catus, 481
claytoni, 481
cristagalli, 481
cyprinoides, 481
dolichocephalus, 482
fasciatus, 328, 481
güntheri, 482
laceratus, 481
lineatus, 481
mapo, 481
martinicus, 482
microdon, 481
niger, 481
parvus, 481
pisonis, 480
plumieri, 481
soporator, 481
Gældi, E. A., 502, 503, 505
Goeldie, Dr., 130
Goeldiella, 388
eques, 321, 388
Goldsborough, E. L., see Evermann
Gondwana-Archehelenis continent, 615
Gondwana continent, 613, 614, 615, 632
Goniobasis comalensis fontinalis, 543
Gonyodiscus, 516
Goode, G. B., 99
Goodea, 300, 458
atripinnis, 298, 304, 458, 459
INDEX.

Goodea atripinnis, 459
calientis, 459
luitpoldi, 304, 459
toweri, 298, 459
whitei, 300, 458
Goss, D. K., 498
Graham Land, 88
Grammichthys, 483
Grand Chaco, 143
Grandi Id., 19, 20
Grant, W. R. O., 497
Graudos, 419
nigrotaniatus, 419
Gray, J. E., 89, 90, 91, 93, 94, 112, 113, 116, 117, 119, 121, 128, 129, 143, 144, 153, 155, 158, 159, 166, 179, 182, 490
& Gerrard, 490
Great Barrier, 91
Greenshields, 173
Grévy Id., 149
Griffith, R., 487
Grimothea gregaria, 659
novae-zelandiae, 659
Grison, 143, 147
Gronovius, L. T., 485
Gronow, L. T., 490
Guadelupe Id., 100, 122, 124, 135, 136, 137, 138, 139, 140, 141, 142, 143
Guahyba, 546
Guajui, 307
Guamul, 2, 11
Patagonian, 14
Peruvian, 14
Guanaco, 2, 4, 10, 15, 18, 19, 20, 21, 22, 23, 159, 164, 172
Guanaco, 19
Guarico, 653
Guatemala, 252, 361
Guatibu, 546, 558
Guavina, 480
brasiliensis, 480
guavina, 351, 480
Guemul, 11, 371
Guenther, A., 233, 234, 236, 237, 241, 261, 309, 310, 319, 331, 491, 492, 493, 494, 495, 496, 497

Guerne, J. de, 638
-Andean region, 622
British, 319
-Colombian center, 616, 617, 619, 620, 621, 626
French, 319, 360
Guianian center, 620
Guichenot, A., 489, 492
Guisan, 486
Gundlachia, 631
Guyaquil, 372, 562
Bay of, 312
Gymnocharicininae, 254, 425
Gymnocharacinus, 229, 253, 425
bergii, 253, 292, 425
Gymnocorymbus, 437
ternetzi, 344, 437
thayeri, 437
Gymnonotis, 252
Gymnotidæ, 230, 238, 330, 333, 369, 376, 448, 450, 484
Gymnotoids, 226
Gymnotus, 335, 450
aquilabatus, 314, 316
albifrons, 448
albus, 450
brachyurus, 450
carapo, 310, 325, 328, 346, 450
c. pantherinus, 450
carapus, 333, 350, 450
electricus, 450
fasciatus, 450
longirostris, 449
putaol, 450
rostratus, 449
Gypsophoca, 120
Gyrotoma, 576

HABROTHRIX, 70, 81
Haddon, A. C., see Bridge
Haemopis, 670, 673, 674
marmoratus, 673
Haemulide, 467, 484
Hagmann, G., 505
INDEX.

Halarctus, 120
Halicarcinus, 660, 663
ovatus, 661
planatus, 637, 660, 662
pubescens, 660, 661
Halliday's ranch, 54, 75
Hamilton, R., 91, 92, 117, 118, 129
Hamonia, 586
Hancock, J., 487
Hansen, H. J., 646
Haplochilus hartii, 328
Haplochiton, 277, 462
teniatus, 278
zebra, 278
Haplochitonida, 277, 365 (see Aplochitonidae)
distribution of, *365
Haplomi, 227, 270, 453
Hardy Peninsula, 72, 73, 273
Hare, 28, 29, 30
Harttia, 335, 405, 415
brevirostris, 415
kronie, 373, 415
loricariiformis, 337, 415
platystoma, 323, 415
Harvard University, 244
Hassar, 394
Hasemann, 579
Hatcher, J. B., 2, 5, 8, 10, 14, 15, 16, 17, 19,
21, 23, 27, 29, 30, 40, 42, 90, 130, 148, 150,
159, 160, 162, 170, 171, 172, 177, 181, 185,
211, 212, 213, 214, 215, 217, 218, 219, 220,
221, 222, 223, 225, 233, 234, 244, 250, 275,
277, 280, 283, 285, 287, 313, 315, 318,
520, 526, 528, 548, 552, 595, 635, 636, 648,
650, 662, 680
Hatcheria, 227, 230, 243, 248, 399
areolata, 248, 251, 291, 399
macrata, 248, 399
maculata, 248, 249, 291, 399
patagoniensis, 248, 250, 399
Haustor, 382
Hauville, M., 86
Hawaiian Ids., 522, 626
Hay, O. P., 152
Hazay, J., 524
Heckel, J., 470, 471, 488, 489
Heckel, J., 470, 471, 488, 489
Hedley, C., 517, 630
Helenis, 294, 370
Heleobia, 550
Helices, Belogonous, 622, 626
distribution of Epiphallagonoous, *625
Eocene of Europe, 622
Helicidae, 613, 622
Belogonous, 622, 626
dart-bearing, 625
distribution of Belogona Euadenia, *624
Epiphallagonoous, 622, 625
Helicigona, 622
Helicinae, 622
Helicinidae, 612, 622, 625, 626
Heligmodonta, 50
Helicodiscus, 516
Helix lyrata, 518
ordinaria, 519
(Patularia) coppingeri, 517
(P.) magellanica, 517
saxatilis, 519
Heller, E., 109, 123, 134
Helobdella, 669, 685
Helogones, 398
marmoratus, 322, 398
Hemiancistrus, 360, 361, 404, 408
annectens, 313, 408
aspidolepis, 313, 408
bovallii, 408
brachyurus, 408
distribution of, *357
longipinnis, 409
medians, 322, 408
megacephalus, 322, 408
oligospilus, 408
pictus, 408
platyccephalus, 408
scaphirhynchus, 408
schomburgki, 408
schomburgkii, 322
tritinitatis, 327
vittatus, 342, 408
Hemibrycon, 257, 358, 361, 432
distribution of, *358
guppii, 432
Hemibrycon guppyi, 327
  huambonicus, 432
ipanguianus, 432
jelskii, 432
polyodon, 313, 432
tanurius, 327, 432
Hemicyclopsis, 245, 398
candiru, 398
plumbeus, 398
Hemicetopsis, 245, 398
candiru, 398
plumbeus, 398
Hemicetopsis, 245, 398
candiru, 398
plumbeus, 398
Hemiclepsis tesselata, 686
Hemidoras, 394
affinis, 394
bachi, 394
brevis, 394
carinatus, 394
elongatus, 394
fimbriatus, 394
humeralis, 394
leporhinus, 394
lipophthalmus, 394
microcephalus, 394
microstomus, 394
morei, 394
nattereri, 394
notosplius, 394
orestes, 394
paraguayensis, 341, 394
punctatus, 394
stenopeltis, 394
stabellii, 394
trachyparia, 394
trimaculatus, 394
wilderi, 394
Hemigrammus, 257, 335, 435
analis, 436
anisitsi, 344
belotti, 324
boulengeri, 436
callistrus, 344
cœruleus, 436
compressus, 301, 436
cupreus, 436
cylindricus, 436
elegans, 436
eothyrodon, 436
gracilis, 332, 344
INDEX
Hemigrammus hyanuary, 436
  iota, 436
kennedyi, 344, 435
levis, 436
lütkeni, 344, 436
lunatus, 436
matei, 436
micropterus, 323, 436
microstomus, 436
nanus, 332, 435
ocellifer, 436
orthus, 436
riddlei, 323
rodwayi, 436
sántae, 332
schmardae, 436
tridens, 344, 436
ulreyi, 344, 435
unilineatus, 323, 327, 435, 436
Hemiloricaria, 413
Hemiodinae, 423
Hemiodon acipenserinus, 415
depressus, 415
Hemiodontichthys, 335, 405, 415
acipenserinus, 342, 415
Hemiodontinae, 253
Hemiodus, 335, 362, 423
argenteus, 423
crenidens, 423
fowleri, 423
goeldii, 423
gracilis, 322, 423
immaculatus, 323, 423
longiceps, 423
microcephalus, 423
microlepis, 343, 423
quadrimaculatus, 423
semiteniatus, 323, 343, 423
unimaculatus, 323, 343, 423
Hemipsilichthys, 335, 404, 407
calmoni, 373, 407
cameroni, 408
gobio, 337, 407
Hemiplatystoma, 391
Hemirhombus fuscus, 482
Hemisorubim, 391
INDEX.

Hemisorubim platyrhynchos, 321, 391
  platyrhynchos, 341
Henderson, J. R., 659
Henle, J., 487, 488
Henochilus, 257, 335, 430
  wheatlandi, 338, 430
Henonema, 246
Henonemus, 401
  intermedius, 401
  macrops, 401
  maculatus, 348, 401
  punctatus, 401
Hensel, R., 109, 176, 494, 546, 547
Henshaw, S., 226
Heptapterus, 384
  eigenmanni, 384
  multiradiatus, 384
  mustelinus, 321, 340, 348, 374, 384
  mustelinus, 384
Herichthys, 470
  bocourti, 470
  cyanoguttatum, 297, 299
  cyanoguttatus, 470
  geddesi, 470
Heros, 475
  acaroides, 473
  basilaris, 475
  centrarchus, 473
  coryphaeus, 475
  efasciatus, 475
  festivus, 473
  friedrichsthalii, 476
  gibbiceps, 474
  goeldii, 473
  helleri, 472
  heterodontus, 475
  insignis, 473
  jenynsii, 473
  lobochilus, 475
  multipectin, 472
  managuensis, 476
  melanopogon, 474
  modestus, 475
  montezuma, 474
  motaguensis, 476
  multipectin, 475
  triagramma, 476
  troscheli, 476
Herotilapia, 469
  multipectin, 469
Herpailurus, 167, 180
Herpetocypris, 639
  obliqua, 636, 639
Hesperomys, 46, 49, 50, 58, 70, 80, 81, 82
  (Acodon) michaelensi, 80, 85
  (Calomys) canescens, 73
  (C.) coppenigeri, 48
  (C.) magellanticus, 47
  (C.) xanthopygus, 58
  elegans, 51, 52
  griseoflavus, 56
  (Habrothorix) xanthorhinus, 83
  (Habrothirix) longipilos, 76, 78
  (H.) micropus, 60
  (H.) xanthorhinus, 71, 73, 83
  lutescens, 49
  megalonyx, 70, 78
  (Notiomys) edwardsii, 80, 81
  (Oryzomys) longicaudatus, 47
  philippii, 49
  (Phyllostis) xanthopygus, 58
Heterandria, 459
  cubensis, 459
  lutzi, 301, 302, 459
  minor, 459
  nobilis, 457
  pleurospilus, 459
  presidionis, 459
Heterobranchus sextentaculatus, 386
Heterognathi, 252
Heterognathus, 280, 464
  humboldtianum, 280
Heterogramma, 478
  agassizii, 478
  borelli, 347, 478
  corumbae, 347, 478
  pleurotenia, 478
INDEX.

Heterogramma steindachneri, 478
taniatum, 478
trifasciatum, 347, 478
Heteromyidae, 34
Heterosomata, 482
Heterurethra, 612
Hexanematichthys, 382
assimilis, 382
grandoculis, 382
Hidalgo, J. G., 597
Himalaya Mts., 182
Hippocamelus, 10
antisiensis, 14
bisulcus, 12
dubius, 10, 12
Hiririea, 584, 585
Hirudinea, 669
Hirudineen, 687
Hirudinideae, distichodont, 674
Hirudo, 674
Hisonotus, 412
lavior, 413
lepiochilus, 413
Histiotis, 187
velatus, 186, 187
Hoeven, J. van der, 488
Hollandichthys, 247, 335, 432
multifasciatus, 338, 374, 432
Holmberg, E. L., 499
Holobrycon, 431
pesu, 431
Holocanthurus melanopoma, 484
Holochilus, 44
Holopoda, 614
Holoprinon, 429
agassizii, 429
maxillaris, 429
Holopristis, 257, 435
riddlei, 437
Holorthinus, 378
Holosthenes, 335, 429
pequeira, 344
pequira, 429
Holospirinae, distribution of, *625
Home, E., 88, 91
Homodaeus anisitsi, 341

Homodaeus, 246, 401
anisitsi, 401
Honduras, 653
Hood Id., 132, 133
Hoplarchus, 475
pentacanthus, 475, 476
Hoplerytheinus, 448
salvus, 332, 448
unitaeniatus, 323, 327, 338, 343, 349, 448
Hoplias, 391, 447
distribution of, *355
lacerde, 374, 448
malabaricus, 316, 343, 397, 332, 338, 343, 349, 447
m. microphthalmus, 448
microlepis, 315, 447
Hoplosoma, 402
Hoplosana, 402
Hoplosternum, 335, 402
littorale, 322, 327, 343, 348, 402
melapterum, 402
pectoralis, 343, 402
stewardii, 402
thoracatum, 315, 322, 327, 402
Howell, A. H., 144
Huamela, 10
leucotis, 10, 12, 13
Hudson, W. H., 19, 22, 33
Huemul, 11, 164
Humboldt, A. von, 133, 248, 317, 486
Hunt, Capt., 142
Hunter, J., 485
Huron, 143
Hutton, F. W., 272
Huttonia, 562
Hyena, 151
Hyale dybowskii, 653
d. jelskii, 653
lubomirskii, 653
Hyaladella, 650, 653
dentata, 653, 654, 655, 657
d. gracilirostris, 655
d. inermis, 651, 652, 655
dybowski, 656
inermis, 653, 654, 655, 656, 657
jelskii, 655
Hyalella longistilus, 655, 657
lubomirskii, 656
meinerti, 653, 657
patagonica, 637, 650
warningi, 653, 657

Hyalinia, 519

Hybognathus, 418
civilis, 419
episcopa, 419
episcopus, 300, 352, 419
melanops, 419
nuchalis, 418
punctifer, 419
rasconis, 298, 419
serenus, 419

Hybopsis, 303, 419
altus, 304, 419
gracilis, 419

Hybrid, lizard, 223
of Mus rattus & M. alexandrinus, 45

Hydargira, 453

Hydrobia, 550, 552
ameghini, 560
(Amnicola) ernesti, 548
glabra, 560
küsteri, 560
k. cordillera, 560
lapidum, 586
l. dunkeri, 586, 587
montana, 560
occidentalis, 560
parchappii, 560
pedrina, 562
peteri, 549

Hydrobidae, 548

Hydrobiinae, 548, 553

Hydrocyninae, 256, 446

Hydrocyonidae, 255

Hydrocyon, 446
cuvieri, 325, 446
longipinnis, 446
lucius, 446
maculatus, 446
ocellatus, 325, 446

Hydrocyon brevidens, 446
faleatus, 447

Hydrocyon hepsetus, 447
scomberoides, 444

Hydrolycus, 444
copei, 444
pectoralis, 444
scomberoides, 325, 444

Hydrurga, 86
leptonyx, 85, 86

Hydrurgus, 4

Hymenosomidae, 660

Hyperaulax, distribution of, *619

Hyperoartia, 231

Hyperoartii, 231, 376

Hyphessobrycon, 436
anisitsi, 436
bellottii, 436
bentosi, 436
callistus, 436
compressus, 437
copelandi, 436
cos, 437
gracilis, 436
heterorhabdus, 437
inconstans, 437
litkeni, 437
melanzonatus, 436
milleri, 436
minimus, 436
minor, 436
panamensis, 436
riddlei, 436
robustulus, 437
rosaceus, 436
sante, 437
serpe, 436
stictus, 437
stramineus, 436

Hyopeltarium, 661, 663
dextrum, 663
spinosulum, 637, 661, 662

Hypophthalmidae, 241, 244, 362, 369, 398, 484

Hypophthalmus, 398
edentatus, 322, 341, 398
edentulus, 398
fimbriatus, 398
longifilis, 398
INDEX.

Hypothalmus marginatus, 398  
  nuchalis, 397  
  perforatus, 398  
  spixii, 398  
Hypophthalmus, 397  

Hypopomus, 449  
  artedi, 325, 449  
  brevirostris, 316, 346, 449  

Hypoptopoma, 335, 405, 412  
  bilobatum, 412  
  gulare, 412  
  joberti, 412  
  steindachneri, 412  
  thoracatum, 412  

Hypoptopomatinae, 404  
Hypoplophominae, 405  

Hypostomatina, 241  

Hypostomus asperatus, 407  
  auranicus, 409  
  barbatus, 409  
  calamita, 409  
  carinatus, 412  
  cirrhosus, 411  
  cochliodon, 409  
  duodecimalis, 408  
  erinaceus, 410, 411  
  guacari, 403  
  guttatus, 409  
  itacua, 408  
  nigricans, 409  
  nudiceps, 410  
  pantherinus, 406  
  pardalis, 408  
  plecostomus, 406  
  robinii, 404  
  serratus, 412  
  squalium, 406  
  subcarinatus, 404  
  vicinus, 409  

Hyria, 616, 628  

Hyrtl, J., 489, 492  

Hystricodon, 446  

Hystricomorphs, 34  

JAIS, 645  
  pubescens, 636, 645, 662  

Ictalurinae, 382  
Ictalurus, 382  
  albids, 239  
  furcatus, 298, 382  
  meridionalis, 382  
  punctatus, 298, 382  
Ichthyoborinae, 255  
Icticyon, 151  
Idiopyrgus, 548, 549, 564  
  souleynesianus, *564, 565  
Iguanodectes, 430  
  tenuis, 430  
Iguanodectinae, 254, 430  
Iguape, 334, 557, 558  

R. von, 507, 509, 585  

Iheringichthys, 388  
  labrosus, 341, 348, 388  
  megalops, 341, 388  

Iles Decrès, 102  
Malouines, 88, 127 (see Falkland Ids.)  
Ilha Comprida, 557  
Ilisha, 452  
  abnormis, 452  
  altamazonica, 452  
  bahiensis, 452  
  flavipinnis, 325, 350, 452  
  führte, 452  
  panamensis, 452  
Illinois, 631  
Ilyodon, 455  
  paraguayensis, 346, 455  

Imparfinis, 385  
  frenatus, 385  
  piperatus, 348, 385  
  transfasciatus, 385  

Incense bush, 159, 212, 221  
Indians, 19, 20, 22, 23, 27, 36, 146, 147, 161, 311  
  Channel, 150  
  "Codiak," 139  

INDEX.

Indians, Tehuelche, 21, 22, 30
Indo-China, 549
   -Chinese center, 626
Insects, 86, 627, 629
coleopterous, 94
Interoceanic channel, 353, 361, 362, 363
Intrusive fishes, N. American, 230, 297, 300, 302, 310
   S. American, 300, 302
Iowa, 628
   University of, 663
Iribucua, 596
Irisanga, 347, 360
Ischnosoma, 453
Isidora, 615
Isle Eugène, 102
Isogomphodon, 377
Isopoda, 636, 645, 663
   Isopoden, 646
Isospondyli, 451
Istlarius, 300, 382
   balsanus, 300, 352, 382
Itata, 291
Itaty, 596
Iterson, F. von, 589

JACKAL, 153
   Jacquinot, V., 658
   & Pucheran, J., 92, 93
Jaguar, 164, 173
Jaguar group, 166
Jaguarius, 167
Jalapa, 46
Jamaica, Oligocene beds of, 624
Jameson, Prof., 91, 92
Janiridae, 645
Japan, 100
Jardine, W., 91, 118, 129
Jarvis Id., 132, 134
Jenyns, L., 488
Jenynsia, 457
   lineata, 350
Jobertina, 428
   interrupta, 428
John Day beds, 151, 152
   Johnius amazonicus, 468
   Johnius crowsina, 468
   Joinvillea, 431
   rose, 431
Jordan, D. S., 131, 142, 272, 336, 497, 498, 502, 505, 508
   & Eigenmann, C. H., 497, 498
   & Evermann, B. W., 375, 502, 505
   & Gilbert, C. H., 497
   & Goss, D. K., 498
Joturus, 464
   pichardi, 464
   stipes, 463
Juan Fernandez, 90, 96, 97, 110, 122, 123, 132, 133, 134
   land-snails of, 626
Juiz de Fora, 329
Juli, 306
Juliaca, 306
Jullienia, 549
Jupiter Inlet, 45

KAUP, J. J., 491, 492
   Kendall, W. C., see Evermann
Kennedy, C. H., see Eigenmann
Kerguelen Ids., 97, 98, 122, 646, 647, 649, 650, 661, 662, 663, 665
Kerodon, 23, 24, 25, 27
   australis, 25
   kingii, 25
Kerr, J. G., 502, 503, 504, 506, 507
Killik Aike, 283
Kinberg, 674
Kincaid, T., 687
Kindle, E. M., 501
King, Capt., 36, 72, 515, 526
Kner, R., 347, 411, 490, 491, 492
   & Steindachner, F., 493
Kneriidæ, 228
Knox, R., 486
Koelreuter, J. T., 492
Kronichthys, 335, 407
   subteres, 373, 408
Kurile Ids., 122, 626

L
   A PAZ, 604
   La Plata, 546
INDEX.

La Plata district, 294
States, 546
Labidesthes, 279
Labrus *punctatus*, 471, 473
Lacépède, B. G., 486
Lacma, 17
Lacunopsis, 549
Ladrone Ids., 112
Lamelyta, 425
teniata, 425
Lenviraja, 377
Lagidium, 30
Lago Llanquihi, 233
Santa, 653, 657
Lagocephalus, 484
laevigatus, 484
Lagostomus, 31
trichodactylus, 31, 32
viscacha, 32
Laguna de Espino, 653, 657
Lahille, F., 164, 187, 351, 501
Lahiliella, 425
nasuta, 425
nasulus, 343
Lake Arapa, 306
Argentino, 161, 164, 173
Aullagas, 307
Buenos Aires, 2, 3, 10, 15, 43, 75, 146, 161, 163, 164, 212, 213, 215, 217
Lauricoche, 604
Llanquihi, 260, 280
Managua, 310
Maracaibo, 311
Musters, 30
Nicaragua, 310
Popo, 560, 561
Pueyrredon, 170, 213, 281
Pyramid, 569
Swan, 2, 3, 8, 26, 43, 54, 59, 61, 63, 75, 77, 146, 528
Tali, 569
Tertiary, 336
Lake Titicaca, basin of, 297, 305
Traful, 251, 277
Ushe, 518, 521
Valencia, 548, 662
Viedma, 10, 171
Lakes, salt, 212, 213, 222
Lalande, 121
Lama, 17
 glama huanacus, 18
guancaco, 19
 guanacos, 19
 huanachus, 18
 huanacos, 18
Lamarck, J. B., 610
Laminifera, 626
Lamiopsis, 377
Lampa, 306
Lampetra, 306, 376
spadicea, 303, 376
Lampredini, 231
Land-bridge, Africa to S. A., 294, 319, 363, 368, 369, 370, 620
Europe to Centr. America, 294
Lankester, E. R., 500
Lanzaia, 564, 565
Lasiancistrus, 405, 409, 411
guacharote, 409
heteracanthus, 409
mystacinus, 409
pictus, 409
Lasiusurus, 188, 190, 191
borealis, 189, 190, 191
b. bonariensis, 188, 191
cinererus, 189, 190, 191
ega, 190
villosissimus, 191
Lataste, F., 187, 188
Latreille, P. A., 94
Lau, 533
Lebias ellipsioidea, 456
multidentatus, 457
rhomboidealis, 456
Lebiasina, 360, 362, 439
bimaculata, 313, 439
Lebiasininæ, 255, 439
Lebrun, 52, 534, 536, 542
INDEX.

Lecompte, A. A., 88
Leeches, fresh-water, 669
Lehmann, R., 523, 524
Leiarius, 390
Leila, 514
Lenox Id., 20, 130
Leo, 167
brunneus, 183, 185
marinus, 102, 105, 111, 114, 116
Leopardus, 167, 178, 179, 183
ellioti, 179
griseus, 179
horsfieldi, 179
pictus, 179
Lepadidae, 637
Lepas, 637
anatifera, 636, 637, 662
Lepidoptera, 627
Lepidosiren, 379
articulata, 379
assimilis, 379
paradoxa, 379
Lepidosirenidae, 333, 362, 366, 370, 379, 484
distribution of, *366
Lepidosteus, 379
berlandii, 379
viridis, 379
Lepidurus, 640
angasi, 642, 643, 644, 663
apus, 643
bilobatus, 642, 643
compressus, 643
couesi, 643
glacialis, 642
hatcheri, 636, 640, 665
kirki, 643
lubbocki, 643
macurus, 643
packardi, 643
patagonicus, 641, 642
viridis, 643
viridulus, 643
Lepipterus, 468
Lepisosteidae, 379, 484
Lepisosteus, 297, 310, 379
gavialis, 379
Lepisosteus osseus, 298, 379
tristachus, 298, 379
tropicus, 379
Leporideae, 4
Leporellinae, 427
Leporellus, 335, 427
vittatus, 316, 332, 427
Leporinus, 347, 426
affinis, 323, 344, 349, 426
affinis, 426
agassizii, 426
bahiensis, 338, 426
bimaculatus, 338, 426
conirostris, 338, 344, 426
copelandi, 338, 349, 426
eolungatus, 426
eques, 316, 344, 426
fasciatus, 323, 344, 427
federici, 323, 332, 338, 426
friderici, 343, 349, 426
holostistus, 427
hypselonotus, 333, 344, 426
leschenaultii, 313
leschenaultii, 426
macrolepidotus, 338, 426
maculatus, 323, 427
maculosus, 427
marcgravii, 426
margaritaceus, 323, 427
megalepis, 323, 338, 426
megalepis, 426
melanopleura, 338, 426
mormyro, 338, 426
müller, 323, 426
müller, 435
multifasciatus, 427
muyscarum, 426
muyscarus, 316
nattereri, 426
nigrotaeniatus, 323, 427
novemfasciatus, 426, 427
obtusidens, 316, 343, 349, 426
pachyurus, 426
pictus, 427
reinhardtii, 332, 426
semivittatus, 426
INDEX.

Leporinus silvestrii, 426
solarii, 349, 426
steindachneri, 388, 426
striatus, 316, 323, 343, 426
taxiatus, 332, 426
trifasciatus, 344, 426
vitatus, 427
Leptagoniates, 441
steindachneri, 441
Leptodoras, 395
acipenserinus, 395
juruensis, 395
linelli, 395
Leptoglanis, 384
essequibensis, 384
Leptonychotes, 4, 89
weddelli, 85, 89
Leptonyx, 89
leopar dinus, 90
weddelii, 90
weddelii, 89, 90
Leptus chilensis, 30, 31, 32
viscacia, 32
Lesson, R. P., 86, 91, 92, 113, 114, 115, 127, 189, 487
& Garnot, 113, 117, 189
Lethe stole, 279, 465
Lethe stole, 280
esior, 280
Leubold, K. von, 182
Leuckart, K. G. R., 11
Leuciscus, 419
niger, 419
nigrescens, 300, 352, 419
purpureus, 419
vincella, 418
Leucoctyon, 151
Lichtenstein, K. M., 143, 486, 487
Liebre, 30
Lilljeborg, W., 644, 645
Lima, 525
Limacidae, 519, 613
Limax, 519
Limia pectioides, 460
Limnea diaphana, 525, 526
lebruni, 526
patagonica, 528
pictonica, 529
Limnea pachapiti, 544
viator, 525
Limsurgus, 455
variegatus, 455
Limosina tumida, 603
Linnæus, C., 102, 111, 114, 151, 450, 485
Linx, 166
Liolaemus, 214
bibroni, 220
bibronii, 212, 218, 220
fitzingeri, 220
fitzingeri, 212, 218, 220
hatcheti, 211, 212, 217, 218
kingi, 219
kingii, 212, 213, 217, 218, 219
lineomaculatus, 211, 212, 217, 218, 219
magellanicus, 214, 217, 218, 224
melanops, 221, 224
(Saccodeira) proximus, 224
Lion marin, 105, 107, 110
Lion, North American, 172
Patagonian, 171, 172
grey, 172
red, 172
Liposarcus altipinnis, 408
jeanesianus, 408
scrophus, 408
varius, 408
Lithococcus, 548, 549, 602
multicarinatus, 602
Lithodes, 657
antarctica, 637, 657, 662
Lithodidae, 657, 663
Lithodora, 392
lithogaster, 392
Lithogenes, 404
Lithoglyphinae, 549, 550, 602
Lithoglyphus, 549, 602
buschii, 580
conicus, 581
lapidum, 586, 587
INDEX.

Lithoglyphus multicarinatus, 602
Lithoglyphus, 602
Lithoxyx, 405, 412
Lithoides, 412
Littoridina, 514, 548, 549, 550, 559, 564, 565, 570, 578, 628
ameghini, 560
andicola, 561
atacamensis, 560
australis, 515, 551, 553, 557, 558, 570
bertoniana, 559
boetzkesi, 562
charruana, 551, 558
culminea, 561
cumingii, 560
cuzcoensis, 560
dentition of, 551
distribution of, 628
dominicana, 561
glabra, 558, 560
guadichaudii, 550, 551, 552, 561, 562
hatcheri, 515, 551, 553, 556
isabelleana, 559
kuesteri, 554, 560
k. cordillerae, 554
montana, 560
neveni, 561
occidentalis, 560
parchappii, 515, 559
picium, 551, 558
pedrina, 559, 562
popoensis, 560, 561
simplex, 515, 551, 555, 556
sublineata, 515, 556
Littoridina, 552, 559
Littorinella, 553
acuta, 553
Littorivida, 550
Lizards, 213, 214, 215
Llama, 18, 22
Llave, plains of, 306
Lobodon, 4, 92
carcinophaga, 85, 92
carcinophagus, 93
Lobos Id., 109, 120, 129
Lobotes ocellatus, 470
Lomis verrucosa, 658
Lönberg, 450
Loncheres, 33
Long Island Sound, 93
Lophiosilurus, 383
alexandri, 383
Lophogobius, 481
cyprinoides, 481
Loricaria, 360, 405, 413, 414
carta, 337, 414
amazonica, 414
anus, 342, 349, 373, 414
apeltogaster, 342, 415
aurea, 416
bransfordi, 415
brunnea, 322, 415
cadeae, 349, 413
carasensis, 415
carinata, 342, 415
castanea, 414
catatamarcensis, 342, 413
catataphracta, 323, 342, 413, 415
cirrhosa, 415
cubataoensis, 373, 414
distribution of, 355
dura, 413, 415
evansii, 414
filamentosa, 316, 322, 413
filamentosa, 415
flora, 403
grisea, 414
henselii, 373, 414
jaraguenensis, 414
jubata, 313, 413
konopickyi, 337, 413
labialis, 342, 414
lauviscula, 414
lamina, 415
laima, 415
lanceolata, 413
lata, 415
laticeps, 342, 415
latirostris, 349, 373, 414
lima, 337, 373, 413, 414
l. microlepidota, 414
INDEX.

**Loricaria lima**, 414
- macrodon, 342, 415
- macromystax, 415
- macrops, 349, 414
- maculata, 322, 342, 414
- magdalene, 316, 413
- melanoptera, 410
- microdon, 414
- microlepidogaster, 349, 414
- nigricauda, 337, 413
- nudirostris, 414
- nudiventris, 332, 414
- parahemiodon, 414
- parnahybae, 415
- parva, 342, 413
- paulina, 414
- phoxocephala, 342, 413
- piracicabae, 415
- platycephala, 342, 415
- platyura, 323, 415
- plecostomus, 403
- punctata, 414
- rostrata, 416
- setifer, 415
- simillima, 415
- spixii, 337, 349, 414
- steinbachi, 414
- steindachneri, 334, 337, 413
- stewarti, 414
- strigilata, 349, 414
- stubellii, 414
- submarginata, 414
- teffeana, 413
- typus, 320, 342, 414
- uracantha, 313, 413
- valenciennesi, 414
- variegata, 313, 415
- vetula, 349, 415

**Loricariichthys**, 414

**Loricariidae**, 241, 369, 376, 403, 404, 484

**Loricariinae**, 404, 405

**Lott, F. van der**, 485

**Loup marin**, 95, 96, 97, 110

**Luciocharax**, 361, 446
- distribution of, *358
- hujeta, 446

**Luciocharax insculptus**, 314, 316, 446

**Luciopimelodus**, 335, 383
- agassizii, 383
- pati, 321, 348, 383
- platanus, 340, 348, 383

**Lujuan**, 560

**Lütken, C. F.**, 330, 495

**Lütkenia insignis**, 441

**Lund, P. L.**, 152, 155

**Lupinus**, 151

**Lutra**, 4, 143, I48
- brachydactyla, 149
- californica, 149
- chilensis, 148
- felina, 148, 151
- felina, 150, 151
- latifrons, 150
- paraguensis, 150
- paranensis, 148, 150
- peruviensis, 149
- platensis, 150
- solitaria, 150

**Lycalopex**, 153, 154, 155
- azara, 155
- magellanicus, 155
- vetulus, 154

**Lycengraulis**, 452
- batesii, 452
- grossidens, 325, 452

**Lydekker, R.**, 11, 14, 89, 295 (see Flower)

**Lymnaea**, 513, 514, 522, 627
- andeana, 515, 522, 530
- auricularia, 524
- brunneo-flavida, 515, 528
- (Bulimnaea) megasoma, 524
- columella, 530
- cousini, 522
- cubensis, 525
- diaphana, 515, 522, *523, 524, 525, 528
- d. inelegans, 515, 526, 527
- hawaiensis, 524
- patagonica, 515, 522, 528, 529
- p. riochichoensis, 515, 522, *524, 528, 529
- peregrina, 522, 530
- pictonica, 515, 522, 529
INDEX.

Lymnaea stagnalis, *524, 628
  truncatula, 522, 523, 525
  viator, 515, 522, *523, 525
Lymnaeas, 627
  South American, 522
Lymnaeidae, 514, 515, 522, 612, 614, 622, 628, 631
Lymnaeinae, 613

Lynceus, 166

Lynx, 1
  borealis, 166
  canadensis, 166
  rufus, 166
Lynxes, 166

Lynx, 1
  borealis, 166
  canadensis, 166
  rufus, 166

Lynx, 1
  borealis, 166
  canadensis, 166
  rufus, 166

Lynx, 1
  borealis, 166
  canadensis, 166
  rufus, 166
Lynxes, 166

Lyrodes, 562
  guaranitica, 562

Macrhorinus, 94
  byronii, 106
  leoninus, 95
  proboscideus, 96
Macrorhyna, 94
Macrouri, 149
Madagascar, 364, 614, 632
Madre de Dios Id., 517
Magellan, Territory of, 1
Majidae, 660
Malacobagrus, 390
Malacopecterygii, 228
Malacorhinus, 377
Maldonado, 45, 53, 76, 130, 150, 603
Mammalia, 1
Mammals, 295
  African, 295
  Eocene, 294, 295
  migrations of, 611
  placental, 294, 295
  Pliocene, 340
Manacapurru, 360
Manaos, 290, 309, 312, 314, 319, 549
Manaro, 549
Mara, 28
  magellanica, 28
  patagonica, 28
Marcgraviius, G., 485
Margaryy, 569
Margay, 179
Mariana Ids., 112, 118
Marion Id., 661, 662
Markiana, 257, 438
  geayi, 438
  nigripinnis, 350, 438
Marputius, 143, 144
  chilensis, 144
Marsh, M. C., 506
Marsh of San Xavier, 610
Marsipobranchiates, 231
Marsipobranchii, 231, 376
Marsupials, 4
Martens, E. von, 546, 548, 562, 610
Mas-a-Fuera, 97, 122, 123, 133, 134
Massachusetts, 685
Masticura, 578
Mate Negra bushes, 220
Maton, W. G., 545
Matschie, P., 11, 14, 80
Matthew, W. D., 151, 152
Matto Grosso, 152, 154
Mauritius, 363
Mayer Basin, 15, 17, 40
Mazama bisulca, 12
Mazatlan, 299, 375
Meek, S. E., 280, 297, 300, 303, 352, 376, 458, 506, 507, 509, 510, 511
Megalobrycon, 258, 430
cephalus, 430
Megalonema, 383
platycephalum, 383
Megalops attentions, 453
elongatus, 453
ihrissoides, 453
Megaspiridae, 613
Melanesia, 630
Melanesian Plateau, 549
Melania corolla, 562
dubiosa, 557
Melaniidae, 569, 612, 615, 626
Melaniris, 465
balsanus, 301, 465
goldii, 443
hypsauchen, 324, 345, 443
lippincottianus, 443
luna, 443
maculatus, 324, 350, 443
mola, 345, 443
unimaculata, 443
-Antillean region, 620
goeldii, 443
coastal plain of, 302, 303
plateau of, 229, 300, 302, 303
Valley of, 303
Meyen, 487
Mice, 24
Michaelisen, Dr., 669
Michaelson, 515, 533
Micralestes, 258
Microcharax, 428
lateralis, 428
Microdus, 424
labyrinthicus, 424
Microlepidogaster, 405, 413
lophophanes, 337, 413
nigricauda, 349, 413
perforatus, 349, 413
Meridional, distribution, 663
Mesites, 271, 462
alpinus, 291
attenuatus, 274, 291, 462
gracilimus, 273, 274, 275, 292, 462
maculatus, 275, 291
Mesonauta, 473
festivus, 347
Mesops, 478
taniatus, 478
Mesozoic era, 294, 295, 612, 614, 615, 619, 625, 632
Mesozonia, 620, 621
Messier Channel, 659
Metachirus, 5
Meyen, 487
Mice, 24
Michaelisen, Dr., 669
Michaelson, 515, 533
Micralestes, 258
Microcharax, 428
lateralis, 428
Microdus, 424
labyrinthicus, 424
Microlepidogaster, 405, 413
lophophanes, 337, 413
nigricauda, 349, 413
perforatus, 349, 413
Meridional, distribution, 663
Mesites, 271, 462
alpinus, 291
attenuatus, 274, 291, 462
gracilimus, 273, 274, 275, 292, 462
maculatus, 275, 291
Mesonauta, 473
festivus, 347
Mesops, 478
taniatus, 478
Mesozoic era, 294, 295, 612, 614, 615, 619, 625, 632
Mesozonia, 620, 621
Messier Channel, 659
Metachirus, 5
Meyen, 487
Mice, 24
Michaelisen, Dr., 669
Michaelson, 515, 533
Micralestes, 258
Microcharax, 428
lateralis, 428
Microdus, 424
labyrinthicus, 424
Microlepidogaster, 405, 413
lophophanes, 337, 413
nigricauda, 349, 413
perforatus, 349, 413
Meridional, distribution, 663
Mesites, 271, 462
alpinus, 291
attenuatus, 274, 291, 462
gracilimus, 273, 274, 275, 292, 462
maculatus, 275, 291
Mesonauta, 473
festivus, 347
Mesops, 478
taniatus, 478
Mesozoic era, 294, 295, 612, 614, 615, 619, 625, 632
Mesozonia, 620, 621
Messier Channel, 659
Metachirus, 5
Meyen, 487
Mice, 24
Michaelisen, Dr., 669
Michaelson, 515, 533
Micralestes, 258
Microcharax, 428
lateralis, 428
Microdus, 424
labyrinthicus, 424
Microlepidogaster, 405, 413
lophophanes, 337, 413
nigricauda, 349, 413
perforatus, 349, 413
Meridional, distribution, 663
INDEX.

Micronesia, 631
*Microtus*, 70
Middle America, 226, 302, 310, 363, 375, 612, 613, 622, 623, 624, 625, 626, 632, 633
Miers, E. J., 661
Miller, K., 548
Minas, 363, 371
Miers, E. J., 661
Minomus *platyrhynchus*, 418
Minnnesota, 627, 628
Miocene epoch, 7, 151, 152, 625, 626, 631, 633
Mira, da, 489
Mirounga, 4, 94
angustirostris, 138
*elephantina*, 96
leonina, 95, 111
*leoninus*, 85
*patagonica*, 96
*M. proboscidea*, 95
Mission Scientifique du Cap Horn, 4, 48, 68, 73, 151, 152, 625, 626, 631, 633
Miura, 4, 94
angustirostris, 138
*elephantina*, 96
leonina, 95, 111
*leoninus*, 85
*patagonica*, 96
*M. proboscidea*, 95
Molinesia, 460
Jones, 460
latipinna, 460
petenensis, 460
Mollusca, 293
Antarctic, 630
fresh-water, 522, 611, 626
land, 611
Mexican, 612, 620
migrations of, 611
non-marine, of Patagonia, 513
Molucca Ids., 614, 632
Molynesia, 460
Jones, 460
latipinna, 460
petenensis, 460
Montana, 643
Montana di Nauchho, 653
Monteith Bay, 84
INDEX.

Montevideo, 283, 317, 525, 557, 559, 574, 603, 604, 605, 659, 669
Bay of, 559
Moore, J. P., 669
Moquin-Tandon, 553
Mordacia, 236, 377
acutidens, 237
lapicida, 237
mordax, 236
Morrell, Capt., 138
Mortimer, 96
Morunga, 94
elephantina, 95
proboscidea, 95
Mount Frias, 161
of Observation, 2, 75, 518, 521, 535, 552, 556, 609, 636, 660
Moxostoma, 303, 418
austrium, 300, 303, 418
Mrazek, A., 638, 664
Mugil, 463
brasiliensis, 328, 463
cephalus, 302, 463
curema, 463
petrosus, 351, 351, 351, 463
platanus, 328
trichodon, 328
xinguensis, 463
Mugilidae, 279, 365, 365, 463, 484
Mugiline, 463
Müller, J., 113, 115, 450, 490
& Henle, J., 488
& Troschel, F. H., 319, 489, 490
Mülleria, distribution of, 361
Munida, 659, 663
gregaria, 637, 659, 662
subrugosa, 637, 659, 660, 662
s. australiensis, 659, 660
Murana humbricius, 451
Muridae, 3, 4, 5, 23, 44, 46, 82
American groove-toothed, 62
New World, 50
Murie, J., 109, 117, 119
Mus, 44, 50, 57, 58
(Abróthrix) longipilus, 70
alexandrinus, 45
Mus bimaculatus, 50
canecens, 72, 73
decumanus, 45
elegans, 51, 54
gracilipes, 54
griseoflavus, 56
laniger, 31
magellanicus, 47
micropus, 60
musculus, 45, 55, 57
m. jalapae, 46
norvegicus, 45
(Oxymycterus) nasutus, 82
pachycepalus, 61
palustris, 46
(Phyllostis) darwini, 58
(P.) griseoflava, 55
(P.) xanthopygus, 58
rattus, 44, 57
xanthopygus, 58
xanthorhinus, 71, 72, 73
Musculus, 514, 602
argentinus, 603, 605
patagonicum, 515, 516, 604, 605, 606
Museum, American, of Nat. Hist., 1, 3, 13, 35, 152, 175, 184
Berlin, 115, 116
British, 1, 3, 6, 59, 61, 72, 73, 75, 77, 88, 90, 112, 115, 116, 119, 143, 159, 179, 214, 226, 270
Buenos Aires, 93, 642
Carnegie, Pittsburgh, 635
Comparative Zoology, 108, 116, 226, 244, 247, 249, 250, 251
Edinburgh, Royal, 91, 117
Science & Art, 91
University, 129
Field Columbian, 376
Hunterian, 112
La Plata, 93
Leverian, 29, 111
Royal College of Surgeons, 112, 118
Royal Society, 127
Victoria, B. C., 178
Vienna, 226
Museums, London, 115
Paris, 115, 121
Mussels, Amazonian, 627
fresh-water, 294, 295, 612, 628, 631, 632
Mustela barbara, 147
brasiliensis, 147
felina, 148
lutra, 148
(Lutra) chilensis, 148
(Putorius) brasiliensis, 147
quiqui, 147
Mustelidae, 4, 143, 151
Mustelus, 377
canis, 377
Mutelidae, 514, 515, 609, 613, 615, 616, 626
distribution of, *618
Mylesinus, 442
macropterus, 443
schomburgkii, 442
Myletes, 258
albiscopus, 444
auriventris, 444
brachypomus, 443
divaricatus, 443
doidyadoxon, 443
filosus, 443
* kypsauchen, 443
leppincottianus, 443
oculus, 444
pacu, 443
palometa, 443
Myletus oligocanthus, 443
Myileus, 335, 443
altripinnis, 332, 443
asterias, 325, 345, 443
discoideus, 325, 443
ellipticus, 324, 443
knerii, 324, 443
levis, 345, 443
micans, 332, 443
orbicularis, 444
orinocensis, 444
Myleus parma, 443
rhomboidalis, 325, 443
rubripinnis, 325, 443
schomburgkii, 324, 443
setiger, 324, 443
tiete, 350, 443
torquatus, 324, 443
Myline, 255, 333, 347, 442
Myliobatidae, 378, 484
Myliobatis, 378
Myleus parma, 443
rhomboidalis, 325, 443
rubripinnis, 325, 443
schomburgkii, 324, 443
setiger, 324, 443
tiete, 350, 443
torquatus, 324, 443
Myline, 255, 333, 347, 442
Myliobatidae, 378, 484
Myliobatis, 378
Myleus parma, 443
rhomboidalis, 325, 443
rubripinnis, 325, 443
schomburgkii, 324, 443
setiger, 324, 443
tiete, 350, 443
torquatus, 324, 443
Myleus parma, 443
rhomboidalis, 325, 443
rubripinnis, 325, 443
schomburgkii, 324, 443
setiger, 324, 443
tiete, 350, 443
torquatus, 324, 443
INDEX.

Narcine brasiliensis, 377
  corallina, 377
  nigra, 378
  umbrosa, 378
Narcobatidae, 377, 484
Nassau-Siegen, Prince John of, 154
Natterer, J., 339, 484
Navarín Id., 517, 518, 520
Navidad beds, 293
N. digneti, 463
Neboux, Dr., 119
Nectomys, 23, 24
Neetroplus, 469
  carpintis, 470
  nematopus, 469, 470
  nicaraguensis, 470
Nehring, A., 36, 37, 128, 130
Neiva, 315
Nelson, Capt., 142
  E. W., 139
Nematestilidae, 353
Nematogenys, 227, 229, 245, 246, 398
  inermis, 246, 398
  nigricans, 246, 247, 398
  pallidus, 246, 247, 398
Nematognathi, 238, 239, 247, 309, 379, 403
  South American, 403
Nematognaths, 225
Nematophoma, 438
  searlesi, 438
Nemuroglanis, 390
  lanceolatus, 390
Neotene time, 569
Neochanna, 228, 271
Neolebiinae, 252
Neoplecostominae, 404, 405
Neoplecostomus, 405, 416
  granosus, 323, 337, 416
Neotoma, 44, 50
Neotroplus carpintis, 299
Nepheilid, 674
Netuma, 381
  barbus, 348, 381
  upsulonophorus, 348, 381
Neumayr, M., 614
Nevada, 569

New Caledonia, 630, 631
  England, 45
  Georgia, 88
  Jersey, 685
  South Wales, 228, 549
  Year’s Id., 130
  York, 631, 653
  Zealand, 88, 97, 104, 122, 228, 229, 232
  253, 271, 272, 274, 275, 277, 363, 532
  348, 630, 631, 643, 646, 647, 659, 661
  662, 663, 664, 665
Nile, 230
  White, 271
Nilsson, S., 94, 112
Noctifelis, 180
Nordenskiöld, O., 214, 217
Norris, A. A., see Eigenmann
North America, 34, 44, 100, 228, 279, 297, 303
  312, 352, 353, 363, 365, 368, 522, 530
  548, 549, 553, 554, 611, 612, 613, 614
  615, 622, 625, 626, 627, 631, 643, 686
  Carolina, 93
Northern Hemisphere, 101, 252, 524, 628
Norway, 640
Nothocyon, 151, 152
Notiomys, 4, 44, 80, 85, 94
  edwardsii, 81
Notoglanis, 385
Notophthalmus, 398
Nototropis, 419
Notropis, 300, 303, 419
  atherinoides, 419
  aztecus, 419
  boucardi, 300, 419
  calientis, 304, 419
  forlonensis, 298, 419
  ornatus, 300, 352, 419
Nutria felina, 148

OCELOT, 167
  Octodon, 33
Octodontidae, 4, 23, 33
Octodontinae, 33
Odontesthes perugiae, 464
Odontoestilbe, 335, 429
  fugitiva, 429
INDEX.

Odontostilbe microcephala, 429
paraguayensis, 344, 429
pulcher, 327, 429
trementiae, 344, 429
Odontostomus, 514
distribution of, *619
Ogle, F., 509
Ogmorhinus, 86
carcinocephagus, 92
leptonyx, 87
Ogmorhinus leptonyx, 87
Ohio, 631
Oken, L., 5, 31, 32, 185
Old World, 44, 614
Oleacinidae, 613, 622, 625
distribution of, *625
Olfers, J. F., 487
Oligocene epoch, 624, 626
Oligochaeta, 629
Oligoplites, 480
palometta, 480
Oligoryzomys, 46
Oligosargus, 447
argenteeus, 447
Olivos, 587
Ommatophoca rossii, 85
Onca, 167
Oncifelis, 179, 180
Oncoides, 178
goffroyi, 180
pardalis, 182
Ontaria molossina, 107
Onychomus, 44
Onychomys, 44, 81
Ophioccephalops, 448
Ophisternon, 450
Opisthobranch stock, 611
Orange Bay, 48, 68, 149, 518, 519, 520
Harbor, 518, 519
Orbigny, A. d', 146, 148, 182, 514, 520, 525,
544, 548, 552, 553, 557, 558, 566, 575, 587,
596, 605, 610,
Ocella, 419
Orchestia, 307
Orchestidæ, 650, 653
Orectocephalus galapagoënsis, 131
Oregon, 152
Oreogobius, 481
rosenbergii, 308, 481
Orestias, 305, 307, 308, 370, 372, 373, 461
agassizii, 461
albus, 461
baïrdii, 461
cuvierii, 461
elegans, 461
frontosus, 461
humboldti, 461
ince, 461
jussiei, 461
jussiensi, 461
luteus, 461
luteus, 461
mulleri, 461
müllerii, 461
nevenii, 461
olivaceus, 461
ortonii, 461
owenii, 461
owenii, 461
pentlandi, 461
pentlandi, 461
tirapatæ, 461
tschudi, 461
Orestiasiformes, 461
Orestiastini, 461
Orthalicinae, distribution of, *621
Orthurethra, 612
Ortmann, A. E., 293, 611, 620, 621, 624, 629,
632, 633, 635, 663, 664, 665
Orycterogale, 143
Oryzomys, 4, 44, 46, 69, 81
cherriei, 46
coppingeri, 48
magellanicus, 47
monochromos, 46
navus, 46
phaeopus, 46
Osborn, H. F., 294
Osgood, W. H., 191
Ostariophysi, 238, 239, 379
Ostariophysiae, 309
Osteogaster, 403
INDEX.

Osteogaster eques, 403
splendens, 403
Osteglossidæ, 333, 362, 366, 453, 484
distribution of, 366
Osteglossum, 453
arrowana, 453
bicirrhosum, 453
bicirrosum, 325
minus, 453
vandelli, 453
Ostracoda, 639
Otaria, 4, 91, 99, 100, 101, 103, 111, 112, 114,
118, 122, 133
albicollis, 102
(Arctocephalus) cinerea, 120
(Arctophoca) argentata, 131, 134
(A.) falklandica, 125
(A.) nigrescens, 126
(A.) philippii, 120, 131
argentata, 131
aurita, 131, 133
australis, 124
brachyactyla, 126, 128, 134
byronia, 5, 101, 105, 107, 122
chilensis, 107, 113
cinerea, 102, 120
falklandica, 125
flavescens, 106, 111, 112
forsteri, 120
fulva, 108, 113
godefroyi, 108, 113, 119
guerin, 107
hauvillii, 125, 127
hookeri, 107, 117
jubata, 96, 103, 111
jubata, 101, 102, 103, 105, 107, 109, 112,
113, 114, 117, 118, 119
leolina, 101, 102, 103, 104, 106, 111, 114,
119
leucostoma, 131, 134
minor, 108, 113
molossina, 107, 113, 117, 119
nigrescens, 126
pernetyi, 107, 113
philippii, 131, 133
platyrhincus, 113
Otarias, 91
Otaria, 101, 102
de Delalande, 121
Guerin, 113
de Péron, 125, 127
Otaries, 102, 103, 104, 122
Otariidæ, 4, 5, 99, 102, 133
Otary, 111
Othophanes, 258, 431
labiatus, 316, 431
Otocinclus, 405, 412
affinis, 337, 412
arnoldi, 413
bilobatus, 412
fimbriatus, 412
flexilis, 349, 412
gibbosus, 373, 413
gleucofrenatus, 373, 412
maculicrassa, 413
notatus, 337, 412
paulinus, 413
tietensis, 413
vestitus, 412
vittatus, 342, 412
Otias, 101, 103
Oter, 143, 148, 149, 150
Ouliphocaceae, 100
Ounces, 167
Ours marin, 105, 121
Owen, R., 93, 489
Owl, burrowing, 23
short-eared, 23
Oxidoras niger, 331
Oxydoras, 335, 393
acipenserinus, 395
amazonum, 394
carinatus, 322
<table>
<thead>
<tr>
<th><strong>INDEX</strong></th>
<th>747</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oxydoras dorbignyi, 348</td>
<td>279, 288, 296, 297, 299, 302, 303, 309, 312, 314, 352, 353, 360, 361, 362</td>
</tr>
<tr>
<td>d’orbignyi, 394</td>
<td>Pacini, 490</td>
</tr>
<tr>
<td>eigenmanni, 341, 394</td>
<td>Packard, A. S., 643</td>
</tr>
<tr>
<td>knerii, 341, 394</td>
<td>Pacu, 424</td>
</tr>
<tr>
<td>niger, 321, 393</td>
<td>Pajeros, 183</td>
</tr>
<tr>
<td>orestes, 394</td>
<td><em>pampanus</em>, 183</td>
</tr>
<tr>
<td>Oxygona, 151</td>
<td>Palaeozoic era, 612, 614, 632, 633</td>
</tr>
<tr>
<td>Oxylabrax, 466</td>
<td>Pallas, P. S., 485</td>
</tr>
<tr>
<td>Oxyloricaria barbata, 416</td>
<td>Palmer, T. S., 11, 31, 86, 103, 152, 165</td>
</tr>
<tr>
<td>Oxymycterus, 4, 44, 81, 82, 84, 85</td>
<td>Paludestrina, 549, 552, 570</td>
</tr>
<tr>
<td>apicalis, 82, 83</td>
<td>acuta, 553, 570</td>
</tr>
<tr>
<td>inca, 82, 83</td>
<td>andicola, 561</td>
</tr>
<tr>
<td>juliae, 82, 83</td>
<td>attenuata, 563</td>
</tr>
<tr>
<td>lanosus, 82, 83, 84, 85</td>
<td>asuberiana, 553</td>
</tr>
<tr>
<td>microplus, 85</td>
<td>australis, 552, 557</td>
</tr>
<tr>
<td>microtis, 83, 84</td>
<td>boetzkei, 561</td>
</tr>
<tr>
<td>Oxypopsis, 405, 412</td>
<td>charruana, 558</td>
</tr>
<tr>
<td>carinatus, 412</td>
<td>culminea, 550, 561</td>
</tr>
<tr>
<td>guntheri, 412</td>
<td>cumingii, 560</td>
</tr>
<tr>
<td>inexpectatum, 342</td>
<td>ecuadoriana, 561</td>
</tr>
<tr>
<td>inexpectatus, 412</td>
<td>isabelleana, 559</td>
</tr>
<tr>
<td>wrightiana, 412</td>
<td>lapidum, 586</td>
</tr>
<tr>
<td>Oxystyla, 620</td>
<td>minuta, 553, 570</td>
</tr>
<tr>
<td>distribution of, *621</td>
<td>parchappii, 559</td>
</tr>
<tr>
<td>PAAHI, 30</td>
<td>peristomata, 553, 596</td>
</tr>
<tr>
<td>Pacasmayo, 653</td>
<td>peristomatus, 587</td>
</tr>
<tr>
<td>Pachycheilus dalli, 576</td>
<td>petitiana, 575</td>
</tr>
<tr>
<td>Pachydobia, 549</td>
<td>picium, 558</td>
</tr>
<tr>
<td>Pachyops, 468</td>
<td>popoënsis, 560</td>
</tr>
<tr>
<td>adspersus, 339, 468</td>
<td>salsa, 570</td>
</tr>
<tr>
<td>furcraeus, 326, 468</td>
<td>Paludestrina, 550, 566</td>
</tr>
<tr>
<td>trifilis, 326, 468</td>
<td>Paludicola bufonia, 212, 214</td>
</tr>
<tr>
<td>Pachyurus, 468</td>
<td>bufonina, 214</td>
</tr>
<tr>
<td>bonariensis, 346, 351, 468</td>
<td>Paludina, 550</td>
</tr>
<tr>
<td>corina, 468</td>
<td>acuta, 552</td>
</tr>
<tr>
<td>francisci, 333, 468</td>
<td>andicola, 561</td>
</tr>
<tr>
<td>lundii, 468</td>
<td>alacamesis, 560</td>
</tr>
<tr>
<td>natleri, 468</td>
<td>australis, 552, 557</td>
</tr>
<tr>
<td>schomburgkii, 326, 346, 468</td>
<td>brunnea, 559</td>
</tr>
<tr>
<td>squamipinnis, 333, 468</td>
<td>conica, 559</td>
</tr>
<tr>
<td>Pacific coast, 101, 282, 317, 669</td>
<td>cumingii, 560</td>
</tr>
<tr>
<td>islands, 101, 612</td>
<td>lapidum, 552, 586</td>
</tr>
<tr>
<td>Ocean, 100, 116, 122, 133, 203, 302, 310, 311, 372, 422, 619, 620, 626</td>
<td>parchappii, 559</td>
</tr>
<tr>
<td>Slope, 2, 49, 61, 77, 229, 230, 248, 255, 259</td>
<td>peristomata, 552, 596</td>
</tr>
<tr>
<td></td>
<td>picium, 558</td>
</tr>
</tbody>
</table>
INDEX.

Pampas, 211, 217, 544, 560
Pampean formation, 560
Panama, 45, 261, 309, 310, 312, 315, 353, 359, 360, 361, 372
Bay of, 353
Isthmus of, 360, 361, 371, 623
Panamic region, 620
Parana, 405, 410
cochliodon, 315, 410
dentex, 410
gibbosus, 410
nigrolineatus, 410
Panthera, 167, 179
Pantosteus, 418
plebeius, 300, 352, 418
Par, 160, 260, 317, 333, 360, 361
falls of, 320
insect fauna, 620
Parabocckella, 638, 664, 665
brevicaudata, 665
Paraca Bay, 132
Paracetopsis, 245, 360, 361
Paradiplomystes, 381
coruscans, 381
Paradon, 362
Paragambusia, 457
nicaraguensis, 301, 437
Paragoniates, 441
alburnus, 441
microlepis, 338, 441
müllerii, 441
Paraguay, 3, 8, 23, 30, 59, 57, 63, 143, 150, 152, 153, 165, 186, 188, 189, 191, 360, 514, 519, 589, 687
Parahemiodon, 413
Paralomis, 658
granulosa, 637, 658, 662
verrucosa, 658
Parana, 340, 369
formation, 340
Parancistrus, 405, 409
aurantiacus, 409
niveatus, 409
punctatissimus, 409
Paraneetroplus, 469
bulleri, 469
Parapetenia, 476
Parastacus, 294, 627
Paratrygon, 378
strongylopterus, 321, 378
Parauchenipterus, 395
Parchappe, M., 544
Pardalina, 179
warwickii, 179, 180
Pardalis, 179
Paradoxodon, 246, 401
microps, 401
Pariolias, 245, 398
armillatus, 398
Parodon, 335, 422
affinis, 349, 423
buckleyi, 423
caliensis, 423
gestri, 343, 423
hilarii, 423
nasus, 423
paraguayensis, 343, 423
piracicaba, 349, 423
suborbitalis, 332, 343, 422, 423
tortuosus, 343, 349, 423
Parodontinae, 422
Parotocinclus, 335, 405, 413
maculicauda, 337, 373, 413
Parra, 486
Partula, 532
Partulidae, 532
Pastinaca humboldtii, 378
Patula coppingeri, 517
leptotera, 518
michaelseni, 518
rigophila, 518
Patularia, 609
ovata, 609
rotundatus, 609
trapesialis, 609
Paucal, 653
Paulesca, 335
Paulicea, 391
jahu, 348, 391
lütkeni, 391
Paulo Alfonso, 330
Payenia, 519
Payenia ordinaria, 519
  saxatilis, 519
Paysandu, 574, 576, 577, 578, 582, 583, 587, 588, 589, 591, 592, 593, 594, 595, 596, 597, 599, 599, 601, 602
Payta Tumbez beds, 293
Pebas, 361
Pectinidens, 522, 525, 614
Pelecypoda, 602
Pellegrin, J., 319, 376, 469, 504, 505, 506, 507, 509, 510, 511
Pellegrinina, 439
  heterolepis, 439
Pellona, 452
  castelnaana, 452
  orbigniana, 452
Peltapleura, 421
Peltarion, 66
  spinosulum, 661
  spinulosum, 661
Peltarium, 661
Pellerion spinulosum, 661
Pendola, A. J., 642
Pennant, T., 29, 115, 127
Pennsylvania, 685
  University of, 669
Perca lavis, 285, 291, 467
  pocha, 288, 292, 467
  segelhi, 290, 292
  trucha, 284, 291, 467
Percesoces, 279
Percichthys, 227, 229, 284, 336, 467
  altipinnis, 284, 290, 292, 467
  chilensis, 285, 292, 467
  lavis, 285, 287
  melanops, 284, 288, 292, 467
  pocha, 288
  trucha, 284, 287, 288, 289, 291, 292, 467
  vinciguerrae, 284, 286, 292, 467
Percidae, 458, 484
  North American, 252
Percilia, 227, 229, 284, 290, 467
  gillissi, 290, 292
  gillissii, 467
  gracilis, 290, 292
Percoid, Pacific slope, 353
Percomorphi, 283
Percopsideae, 227
Percosoma melanops, 288
Peripatus, 632
Pernetty, A. J., 97, 104, 110, 111, 113, 114, 115, 116, 120
Peromyscus, 44
Péron, F., 96, 102, 103, 111, 114
Perugia, A., 287, 318, 346, 351, 499, 502
Perugia, 383
Pescaderias, 315
Pescadores, 521
Petalosoma, 456
  cultratum, 456
Petenia, 470
splendida, 470
Peters, M., 494, 496
  W., 86, 97, 105, 112, 113, 119, 122, 124, 131, 132, 133, 134
Petersius, 257
Peterson, O. A., 1, 2, 5, 13, 14, 17, 19, 26, 39, 40, 41, 43, 47, 53, 54, 60, 61, 64, 65, 69, 72, 74, 75, 77, 79, 83, 84, 157, 158, 170
Petromyzon, 235
  acutidens, 237, 292, 377
  anwandteri, 237, 292, 377
  fluviatilis, 376
  macrostomus, 334, 335, 292, 376
  mordax, 236, 291
Petromyzonidae, 227, 228, 229, 231, 297, 376, 484
distribution of, *364
Petromyzontidae, 123, 364
Petterdiana, 549, 550, 630
tasmanica, *549
Pfieffer, 604
Phaginae, 255
Phallopterus, 458
caudomaculatus, 458
Phalloptychus, 458
januarius, 458
INDEX.

Phenacogaster, 431
  bairdi, 431
  megalostictus, 431
  microstictus, 431
  pectinatus, 431
Phenacogrammus, 258
Philippi, R. A., 37, 71, 113, 118, 120, 128, 134, 183, 191, 243, 276, 491, 492, 493, 500
Philomyidae, 613
Philypnus, 480
dormitor, 328
dormitor, 299, 302, 480
  lateralis, 480
  maculatus, 480
Phoca, 94, 102, 114
  ansonii, 96
  ansonina, 96
  antarctica, 120, 121
  australis, 124, 127
  byronia, 101, 106, 107, 112, 113, 118
  byronii, 106, 112, 113
carcinophaga, 92
costi, 95, 97
cristata, 94
dubia, 96
elephantina, 95, 96
  falklandica, 120, 124, 125, 127
  flavescens, 106, 111, 112
  homei, 88
  jubata, 102, 105, 108, 110, 111, 114, 116
  leonica, 94, 95, 96, 101, 104, 106, 111, 114
  leopardina, 90, 92
  leporina, 87
  leptonyx, 86, 87, 88
  porcina, 95
  porcina, 95, 131, 133
  proboscidea, 94, 95, 96, 102
  pusilla, 103
  resima, 96
  ursina, 102, 103, 104, 120, 121, 127
  vitulina, 93
Phocarctos, 99, 100, 118
  hookeri, 112
Phocidae, 4, 85, 101
Phocids, 85, 97, 100, 101, 102
Phoche, jaune de Shaw, 103
Phoque, petit, 115
Septonyx, 91
  à trompe, 102
Phoques à oreilles extérieures, 103
Phoxinopsis, 439
typicus, 439
Phractocephalus, 390
  bicolor, 390
  hemiliopterus, 321, 390
Phreatobius, 387
cisternarum, 387
Phyllopoidea, 640
Phyllotis, 4, 44, 50, 51, 54, 56, 57, 67, 69
  boliviana, 58
  bolivienisis, 67
  cachinus, 57
  chacoensis, 57
  darwini, 50, 60
  griseoflavus, 56, 57, 60
  micropus, 60
  pictus, 67
  xanthopygus, 50, 58, 68
Physa, 514
Physidae, 514, 532, 622
Physogaster, 484
Physopyxis, 392
  lyra, 392
Physorhinus, 94
Piabina, 434
  argentea, 435
  argenteus, 434
  piquiria, 434
Piabucina, 362, 439
  astrigata, 313, 439
  elongata, 439
  erythrinoides, 439
  festae, 439
  panamensis, 439
  pleurotæna, 439
  uniteniatiana, 439
  uniteniatus, 323
Piabucininae, 255, 439
Piabucus, 335, 440
dentatus, 342, 440
  melanostoma, 350
  melanostomus, 444
INDEX.

Piabucus purusii, 440
spilurus, 440

Piaractus, 335, 443
brachypomus, 345, 350, 443
macropomus, 324, 443

Pichia Laguna, 280

Picton Id., 529, 533

Pilsbry, H. A., 513, 524

Pimelodella, 334, 360, 388
brasiliensis, 389
buckleyi, 389
chagresi, 389
cristata, 388
cristatus, 337, 348, 389
distribution of, *356
eigenmanni, 337, 348, 389
eigenmanni, 389
elongata, 312, 389
gracilis, 321, 341, 348, 389
grisea, 312, 389
hartii, 337, 389
lateristriga, 331, 337, 341, 348, 389
lateristriga, 389
macturkii, 389
meeki, 389
megalops, 389
modesta, 312, 389
mucosa, 341, 389
pectinifer, 337, 389
teniophora, 389
teniophorus, 341
vittata, 331, 389
wesselli, 321, 389
yuncensis, 312, 389

Pimelodina, 383
flavipinnis, 383
goeii, 383
nasus, 383

Pimelodine, 239, 240, 241, 297, 309, 383

Pimelodus, 334, 335, 340, 364, 388
agassizii, 388
albicans, 340, 388
altipinnis, 321, 388
arekaima, 386, 388
argenteus, 388

Pimelodus arius, 382
bahirianus, 386
barbancho, 383
blochii, 388
bufontius, 384
chilensis, 242
charus, 384
cinerascens, 386
clarias, 312, 315, 321, 331, 340, 348, 374, 388
commersoni, 381
corirostris, 389
coruscans, 381
cristatus, 388
ctenodus, 383
cupreus, 382
cyuaba, 386
cyanoistigma, 388
eques, 388
furi, 331, 341, 348, 388
grosskopf, 388
grosskopfi, 315
holomelas, 385
insignis, 383
labrosus, 388
macronema, 388
macrostoma, 388
maculatus, 388
microstoma, 388
muelleri, 385
musculus, 385
mustelinus, 384
nigribarbis, 388
ophilhamicus, 388
ornata, 340
ornatus, 321, 388
pati, 383
pictus, 388
pirinampu, 383
quadrimaculatus, 388
quelen, 385
q. cuprea, 386
raninus, 383
rigidus, 388
salvini, 310
sellonis, 386
INDEX.

Pimelodus spegazzinii, 388
  steglichii, 385
  valenciennis, 331, 341, 348, 388
  versicolor, 381
  westermanni, 389
  wucheriai, 386
  zungaro, 384
Pimelonotus, 385
Pimelotropis, 382
  lateralis, 383
Pinnipedia, 4, 85, 113, 134
  of South America, 115
  of Southern Hemisphere, 115
Pinarampus pirinampu, 340
Pinirampus, 383
  pirinampu, 321, 340, 383
  typus, 383
Piramutana, 390
  macrospila, 388
Pirapora, 330
Piratinga, 390
  pira-aiba, 390
Pisces, 237, 377
Pisiciriga, 464
Pisidium, 513, 514, 602
  argentinum, 605
  boliviense, 604
  chiliense, 604
  davisi, 604
  diaphanum, 603
  dorbignyi, 603
  forbesii, 604
  globulus, 604
  lauricochea, 604
  magellanicum, 515, 603, 606, *607, 608
  moquinianum, 603
  observationis, 515, 603, 608, *609
  patagonicum, 515, 603, 607
  p. zonifer, 608
  sterklanum, 603, 605
  vili, 603
  wolfi, 604
  wolffii, 604
Piso, G., 485
Pithecocharax, 425
Placostylus, 630
  Plagiodontes, 629
  Plagioscion, 467
  auratus, 468
  heterolepis, 325, 468
  squamosissima, 325
  squamosissimus, 468
  surinamensis, 325, 468
  ternetzi, 346, 468
  Plagusia, 483
  brasiliensis, 483
  tesselata, 483
  Planarians, rhabdocoele, 673
  Planorbinae, 615
  Planorbis, 514, 615
  anatinus, 515, 530
  peregrinus, 515, 530
  Platax scalaris, 479
  Plataxoides dumerili, 479
  Plate, L., 236, 502, 506
  Platopterus, 377
  Platycephalus dormitator, 480
  Platydoras, 392
  Platygaster, 452
  Platynematichthys, 390
  araguayensis, 390
  punctatulus, 321, 390
  Platyodon, 377
  Platypsectilus, 459
  cuizenoensis, 454
  maculatus, 301, 459
  mentalis, 459
  nelsoni, 301, 459
  spilonotus, 459
  tropicus, 459
  variatus, 298
  Platyrynqueta, 104, 118
  Platyrrhyncus, 101, 104, 113
  leoninus, 104
  molossinus, 107
  urania, 107, 113
  Platyryncheta, 118
  Platystacus, 380
  aspredo, 321
  cotylephorus, 321, 380
  filamentosus, 321
  levis, 380
INDEX.

Platystacus nematophorus, 321, 380
   sicuephorus, 321
tibicen, 321
   verrucosus, 379
Platystoma
   affine, 390, 391
   artedii, 392
   emarginatum, 391
   forskhammeri, 392
   luceri, 392
   mucosa, 392
   orbignianum, 390, 392
   artedii, 392
   emarginatum, 391
   forschhammeri, 392
   luceri, 392
   mucosa, 392
   orbignianum, 390, 392
   pardalis, 392
   platyrhynchos, 391
   punctatum, 392
   punctifer, 391
   sturio, 392
   truncatum, 391
   vaillantii, 390
   verrucosum, 390
Platystomatichthys, 392
   sturio, 241, 392
Platystomus, 340
Pleacinidae, 625
Plecostominae, 404
Plecostomus, 360, 403, 404
   affinis, 405
   alatus, 331, 406
   albopunctatus, 407
   anna, 406
   aspilogaster, 404
   atropinnis, 406
   aurorustatus, 331, 407
   bicirrhosus, 403, 406
   biseriatus, 406
   borelli, 341, 406
   boulenieri, 404
   brasiliensis, 404
   brevicauda, 406
carinatus, 406
   commersoni, 331, 341, 349, 373, 405
   commersonii, 404
cordoveae, 406
distribution of, *356
   emarginatus, 315, 322, 406
   festae, 312, 406
   flagellaris, 415

Plecostus francisci, 406
garmani, 331, 349, 406
goyazensis, 407
guttatus, 409
hemius, 407
hermanni, 349, 406
heylandii, 407
horridus, 407
iheringii, 407
johni, 341
johnii, 407
laplate, 406
latirostris, 406
latirostris, 407
lima, 406, 407
limosus, 404
lütkeni, 337, 407
macrops, 331, 406
margaretifer, 407
micros, 416
obtusirostris, 373, 407
officinis, 405
pantherinus, 406
paulinus, 349, 406
plecostomus, 322, 327, 341, 348, 403
punctatus, 337, 404
punctatus, 405
regani, 348, 406
robini, 349
robini, 327, 341, 406
robini, 406
scabriceps, 405
scopularius, 406
seminudus, 404
spiniger, 404
spinosisimus, 312, 405
strigaticeps, 407
tenuicauda, 406
ternetzi, 406
tietensis, 406
tretensis, 349
une, 337, 406
unicolor, 407
vaillanti, 331, 341, 406
vermicularis, 407
verres, 406

753
INDEX.

Plecostomus villarsi, 406
virescens, 406
wertheimeri, 404, 407
wuchereri, 331, 337, 342, 406
Plecosoma velatus, 187
Plectognathi, 484
Plectospondyli, 238, 252, 418
Pleistocene epoch, 33, 569, 570, 626
Plekocheilus, distribution of, *621
Pleistocene epoch, 627, 629, 633
Poeche, F., 595
Pocket Gophers, 34, 51
Poeboides dayii, 316
Pecilasomatops, 427
Pecilia, 459
amates, 460
amazonica, 460
boucardi, 460
branneri, 460
butleri, 299, 459
caudata, 460
chisoyensis dovii gillii, 460
decemmaculata, 458
dominicensis, 460
elongata, 460
feste, 314, 460
gillii, 460
heteristia, 460
latipunctata, 298, 459
limantouri, 460
lineolata, 460
melanogaster, 460
mexicana, 460
multilineata, 460
occidentalis, 304
orubensis, 458

Pecilia petenensis, 460
presidionis, 299
punctata, 460
punctata, 457
reticulata, 458
retropinna, 460
salvatoris, 460
schneideri, 460
sphenops, 298, 301, 302, 459, 460
spilurus, 460
surinamensis, 460
tenuis, 460
thermalis, 460
thermalis, 460
unimaculata, 460
vandepolli, 458
vittata, 459
vivipara, 374, 459, 460
v. parce, 460
vivipera, 325
Pecilliidae, 228, 270, 271, 297, 298, 334, 363
366, 367, 368, 370, 453, 484
distribution of, *368
Pecilobrycon, 427
auratus, 427
eques, 427
erythrurus, 427
harrisoni, 427
ocellatus, 427
trifasciatus, 427
unifasciatus, 427
Pecilocharax, 430
bovallii, 430
Pecakeiloides, 456
Pecilophoca, 89
weddelli, 90
Pecilourichthys, 432
brevorii, 260, 432
unilineatus, 435
Pecilourichthys, 460
Pogonocharax, 428
rehi, 428
Pogonopoma, 335, 404, 407
wertheimeri, 337, 407
Point Desire, 60
Poirer, J. C., 549
INDEX.

Potamolithus carinifer, 571, 572, 592
  catherineae, 573, 585, 586
  chloris, 571, 573, 579
  conicus, 571, 572, 581, 596
  dentition of, 567
  dinochellus, 571, 572, 583, 595
  doeringi, 573, 589
  filipponei, 571, 573, 590
  gracilis, 571, 573, 577, 578
  g. viridis, 578
  hatcheri, 571, 572, 594
  hidalgoi, 571, 572, 574, 596, 597, 598, 599, 600
  iheringi, 571, 572, 599, 600, 602
  intracallosus, 571, 573, 584, 585
  jacuhyensis, 571, 573, 583
  lapidum, *566, 567, 568, 569, 570, 571, 572, 575, 576, 579, 581, 584, 585, 586, 588, 589, 590, 591, 595, 596
  l. elatior, 588
  l. supersulcatus, 567, 568, 571, 572, 580, 588
  microthauma, 571, 572, 593, 596, 597, 600
  orbignyi, 571, 572, 582, 596
  paranensis, 572, 575, 580
  paysanduanus, 571, 573, 588, 590, 602
  p. impressus, 590, 591
  p. sinulabris, 573, 590, 591
  peristomatus, 571, 572, 587, 596, 598
  petitianus, 573, 575
  philippianus, 571, 572, 583, 601
  quadratus, 571, 572, 592
  ribeirensis, 571, 573, 584
  rushii, 566, 567, 568, 571, 572, 599
  simplex, 571, 573, 578, 586
  sykesi, 571, 573, 574, 575, 576
  tricostatus, 571, 572, 581, 582, 588, 592, 593
  Potamopyrgus, 514, 548, 559, 562, 630, 633
  corolla, 562
  coronatus, 562
  guaraniticus, 562, 563
  peteningensis, 559, 563
  scotti, 559, 563
  Potamorhina, 420
  pristigaster, 420
<table>
<thead>
<tr>
<th>INDEX.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Potamorrhaphis</strong>, 463</td>
</tr>
<tr>
<td><em>guianensis</em>, 325, 346, 463</td>
</tr>
<tr>
<td><strong>Potamotrygon</strong>, 378</td>
</tr>
<tr>
<td><em>brachyurus</em>, 348, 378</td>
</tr>
<tr>
<td><em>d’orbignyi</em>, 321, 378</td>
</tr>
<tr>
<td><em>dumerilii</em>, 340, 378</td>
</tr>
<tr>
<td><em>humboldtii</em>, 378</td>
</tr>
<tr>
<td><em>hystrix</em>, 321, 340, 348</td>
</tr>
<tr>
<td><em>magdalenae</em>, 315, 378</td>
</tr>
<tr>
<td><em>motoro</em>, 321, 378</td>
</tr>
<tr>
<td><em>reticulatus</em>, 321, 378</td>
</tr>
<tr>
<td><strong>Prenadilla</strong>, 305</td>
</tr>
<tr>
<td><strong>Pribiloff Isds.</strong>, 122, 123, 137, 140</td>
</tr>
<tr>
<td><strong>Prince Edward Isds.</strong>, 97, 661, 662</td>
</tr>
<tr>
<td><strong>Prinodon</strong>, 456</td>
</tr>
<tr>
<td><strong>Priodontes</strong>, 6</td>
</tr>
<tr>
<td><strong>Prisodon</strong>, 616</td>
</tr>
<tr>
<td><strong>Pristella</strong>, 437</td>
</tr>
<tr>
<td><em>auñayi</em>, 437</td>
</tr>
<tr>
<td><em>riddiei</em>, 437</td>
</tr>
<tr>
<td><strong>Pristigaster</strong>, 452</td>
</tr>
<tr>
<td><em>cayanus</em>, 325, 452</td>
</tr>
<tr>
<td><em>effulgens</em>, 314, 452</td>
</tr>
<tr>
<td><em>martii</em>, 452</td>
</tr>
<tr>
<td><em>phaetón</em>, 452</td>
</tr>
<tr>
<td><strong>Pristipoma</strong>, 467</td>
</tr>
<tr>
<td><em>cultriferum</em>, 467</td>
</tr>
<tr>
<td><em>humile</em>, 467</td>
</tr>
<tr>
<td><em>labiaciforme</em>, 467</td>
</tr>
<tr>
<td><strong>Prochilodinus</strong>, 253, 424</td>
</tr>
<tr>
<td><strong>Prochilodus</strong>, 361, 424</td>
</tr>
<tr>
<td><em>affinis</em>, 332, 424</td>
</tr>
<tr>
<td><em>argenteus</em>, 343, 424</td>
</tr>
<tr>
<td><em>asper</em>, 424</td>
</tr>
<tr>
<td><em>asper</em>, 424</td>
</tr>
<tr>
<td><em>binotatus</em>, 323, 424</td>
</tr>
<tr>
<td><em>brama</em>, 323, 424</td>
</tr>
<tr>
<td><em>brevis</em>, 338, 424</td>
</tr>
<tr>
<td><em>caudofasciatus</em>, 313, 424</td>
</tr>
<tr>
<td><em>cephalotes</em>, 424</td>
</tr>
<tr>
<td><em>costatus</em>, 424</td>
</tr>
<tr>
<td>distribution of, *356</td>
</tr>
<tr>
<td><em>dobulinus</em>, 424</td>
</tr>
<tr>
<td><strong>Prochilodus hartii</strong>, 338, 424</td>
</tr>
<tr>
<td><em>humboldtii</em>, 423</td>
</tr>
<tr>
<td><em>humeralis</em>, 313, 424</td>
</tr>
<tr>
<td><em>insignis</em>, 323, 424</td>
</tr>
<tr>
<td><em>lacustris</em>, 424</td>
</tr>
<tr>
<td><em>laticeps</em>, 323, 424</td>
</tr>
<tr>
<td><em>lineatus</em>, 343, 349, 424</td>
</tr>
<tr>
<td><em>longirostris</em>, 316, 424</td>
</tr>
<tr>
<td><em>magdalenae</em>, 316, 424</td>
</tr>
<tr>
<td><em>nigriceps</em>, 349, 424</td>
</tr>
<tr>
<td><em>niger</em>, 424</td>
</tr>
<tr>
<td><em>oligolepis</em>, 424</td>
</tr>
<tr>
<td><em>ortonianus</em>, 424</td>
</tr>
<tr>
<td><em>platensis</em>, 349, 424</td>
</tr>
<tr>
<td><em>reticulatus</em>, 349, 424</td>
</tr>
<tr>
<td><em>rubrotaeniatus</em>, 316, 323, 424</td>
</tr>
<tr>
<td><em>scrofa</em>, 338, 343, 349, 424</td>
</tr>
<tr>
<td><em>steindachneri</em>, 424</td>
</tr>
<tr>
<td><em>tæniurus</em>, 424</td>
</tr>
<tr>
<td><em>vimboides</em>, 338, 424</td>
</tr>
<tr>
<td><strong>Prochilus</strong>, 480</td>
</tr>
<tr>
<td><strong>Proctotretus bibronii</strong>, 220</td>
</tr>
<tr>
<td><em>fitsingeri</em>, 220</td>
</tr>
<tr>
<td><em>kingii</em>, 217, 219</td>
</tr>
<tr>
<td><strong>Promecoccephalus</strong>, 484</td>
</tr>
<tr>
<td><strong>Pronghorn</strong>, 20</td>
</tr>
<tr>
<td><strong>Propterygia</strong>, 377</td>
</tr>
<tr>
<td><strong>Proserpinide</strong>, 613, 622</td>
</tr>
<tr>
<td><strong>Prothelidomus</strong>, 622</td>
</tr>
<tr>
<td><strong>Protisius</strong>, 362</td>
</tr>
<tr>
<td><strong>Protistius</strong>, 279, 371, 464</td>
</tr>
<tr>
<td><em>semotilus</em>, 308, 464</td>
</tr>
<tr>
<td><strong>Prototroctes</strong>, 228, 277</td>
</tr>
<tr>
<td><strong>Province</strong>, Amazonian, 309, 317, 330</td>
</tr>
<tr>
<td>Central American, 309</td>
</tr>
<tr>
<td>Chilian, 293</td>
</tr>
<tr>
<td>Coastal, 334</td>
</tr>
<tr>
<td>East Brazilian, 328, 370, 373</td>
</tr>
<tr>
<td>Ecuadorian, 293</td>
</tr>
<tr>
<td>Guianan, 309, 317</td>
</tr>
<tr>
<td>La Platan, 309, 339, 373</td>
</tr>
<tr>
<td>Magdalenan, 309, 315</td>
</tr>
<tr>
<td>Magellanian, 662, 663</td>
</tr>
<tr>
<td>Northern, 305, 307, 308</td>
</tr>
<tr>
<td>Pacific, 309, 310, 315, 334</td>
</tr>
<tr>
<td>Patagonian, 293,</td>
</tr>
</tbody>
</table>
INDEX.

Province, San Franciscan, 330
Southeastern, 309, 328, 351
Southern, 305, 308
Sub-Andean, 187
Titicacan, 305, 308
Trinidad, 309, 327
Prozaedius, 6
Psadara, 622
Psectrogaster, 335, 420
amazonicus, 420
auratus, 420
ciliatus, 323, 420
curviventris, 343, 420
rhomboides, 420
Psectrogrammus, 435
kennedyi, 435
Pseudacanthicus, 405, 412
fordii, 322, 412
hystrix, 412
serratus, 322, 412
spinosus, 412
Pseudageneiosus, 397
Pseudalopex, 154, 155
antarcticus, 154
azara, 154
gracilis, 154
griseus, 154
magellanicus, 154, 162
Pseudancistrus, 405, 409
barbatus, 342, 409
depressus, 409
güntheri, 409
nigrescens, 409
setosus, 409
Pseudariodes, 388
pantherinus, 388
Pseudachenipterus, 364, 396
affinis, 337, 396
flavescens, 331, 396
guppi, 327, 396
jequitinhonhae, 337, 396
nodosus, 322, 337, 396
pacea, 396
Pseudavicula, 616
Pseudoboeckella, 638, 664
brasiliensis, 664
Pseudoboeckella dubia, 664
entzi, 636, 639, 664
longicauda, 636, 638, 664
poppei, 664
silvestrii, 664
Pseudocallophysus, 322
Pseudocetopsis, 245, 398
gobioides, 398
macrotronema, 398
ventralis, 398
Pseudochalcopus, 257, 360, 432
affinis, 374, 432
lineatus, 315, 432
perstriatus, 374, 432
Pseudochilina, 531, 532
limnaformis, 531
Pseudocorynopoma, 440
dorie, 350, 440
Pseudodoras, 393
Pseudohemiodon, 413
Pseudohypophthalmus, 398
Pseudoloricaria, 414
Pseudomulleria, distribution of, *618
Pseudopimelodus, 384
acanthochira, 384
agassissi, 383
albomarginatus, 384
bufonius, 384
charus, 383
cottoides, 340, 348, 384
parahybae, 337
raninus, 321, 337
villosus, 384
zungaro, 315, 331, 340, 348, 374
zungaru, 321
Pseudoplatystoma, 334, 335, 391
coruscans, 331, 348, 391
fasciatum, 315, 321, 391
f. brevifile, 391
f. intermedium, 391
f. nigricans, 391
f. reticulatum, 391
tigrinum, 321, 391
Pseudoplatystomus coruscans, 341
Pseudorhamdia, 338
piscatrich, 388
INDEX.

Puma concolor, 170
  hippolestes, 176, 177, 178
  patagonica, 178
  Pearson, 170, 177
  pearsoni, 170, 174, 178
  puma, 170, 177
  p. patagonica, 167
  Rocky Mt., 178
  silver-grey, 173

Puma, 183
Pumamarca, 653
Pumas, 167
  North American, 177
Puno Bay, 306
Pupillidae, 612, 622, 626
Putnam, F. W., 495
Putois du Chili, 147
Putorius, 143
Pygidiidae, 241, 244, 369, 398, 484
Pygidiinae, 245, 398
amazonicum, 400
areolatum, 251
barbouri, 400
borelli, 348
borelli, 341, 400
brasiliensis, 331, 337, 341, 348
brasiliense, 399
b. itatiagae, 399
burmeisteri, 400
cordovensis, 341
cordovense, 399
dispar, 308, 400
distribution of, 359
eigenmanni, 308, 400
fuscum, 247, 399
goeldii, 400
guianensis, 400
immaculatum, 400
knerii, 308, 399
knerii, 400

Pseudostegophilus, 246, 400
  nemurus, 400
Pseudoxiphophorus, 456
  bimaculatus, 301, 456
  bimaculatus, 456
  b. tanganicus, 456
  jonesi, 456
  pauciradiatus, 456
  reticulatus, 456
Pterengraulis, 451
  atherinoides, 325, 451
Pterides, 564, 565
Pterodiscus, 439
  laevis, 439
Pterodoras, 392
Pterolebias, 455
  longipinnis, 455
Pteronotus, 385
Pterophyllum, 479
  altum, 326, 479
  scalare, 479
Pterygoplichthys, 404, 408, 409
  anisitsi, 342, 408, 409
  barbatus, 322
  depressus, 322
  etentaculatum, 322, 331
  etentaculatus, 408
  gibbeiceps, 408
  gigas, 342, 409
  guentheri, 322
  juvens, 342, 429
  lituratus, 331, 408
  multiradiatus, 322, 342, 408
  punctatus, 409
  undecimalis, 316, 408
Pucheron, see Jacquinot
Puerto Bertoni, 559, 589
  Bridges, 528, 533
  Bueno, 519, 651, 653
  Ensenada, 93
  Gallegos, 214, 217
  Montt, 237, 250, 260, 275, 278, 533
  Puchero, 339
Puget Sound, 178
Pulmonates, aquatic, 612
Puma, 22, 163, 167, 174

INDEX.

Puma concolor, 170
  hippolestes, 176, 177, 178
  patagonica, 178
  Pearson, 170, 177
  pearsoni, 170, 174, 178
  puma, 170, 177
  p. patagonica, 167
  Rocky Mt., 178
  silver-grey, 173

Puma, 183
Pumamarca, 653
Pumas, 167
  North American, 177
Puno Bay, 306
Pupillidae, 612, 622, 626
Putnam, F. W., 495
Putois du Chili, 147
Putorius, 143
Pygidiidae, 241, 244, 369, 398, 484
Pygidiinae, 245, 398
amazonicum, 400
areolatum, 251
barbouri, 400
borelli, 348
borelli, 341, 400
brasiliensis, 331, 337, 341, 348
brasiliense, 399
b. itatiagae, 399
burmeisteri, 400
cordovensis, 341
cordovense, 399
dispar, 308, 400
distribution of, 359
eigenmanni, 308, 400
fuscum, 247, 399
goeldii, 400
guianensis, 400
immaculatum, 400
knerii, 308, 399
knerii, 400

Pseudostegophilus, 246, 400
  nemurus, 400
Pseudoxiphophorus, 456
  bimaculatus, 301, 456
  bimaculatus, 456
  b. tanganicus, 456
  jonesi, 456
  pauciradiatus, 456
  reticulatus, 456
Pterengraulis, 451
  atherinoides, 325, 451
Pterides, 564, 565
Pterodiscus, 439
  laevis, 439
Pterodoras, 392
Pterolebias, 455
  longipinnis, 455
Pteronotus, 385
Pterophyllum, 479
  altum, 326, 479
  scalare, 479
Pterygoplichthys, 404, 408, 409
  anisitsi, 342, 408, 409
  barbatus, 322
  depressus, 322
  etentaculatum, 322, 331
  etentaculatus, 408
  gibbeiceps, 408
  gigas, 342, 409
  guentheri, 322
  juvens, 342, 429
  lituratus, 331, 408
  multiradiatus, 322, 342, 408
  punctatus, 409
  undecimalis, 316, 408
Pucheron, see Jacquinot
Puerto Bertoni, 559, 589
  Bridges, 528, 533
  Bueno, 519, 651, 653
  Ensenada, 93
  Gallegos, 214, 217
  Montt, 237, 250, 260, 275, 278, 533
  Puchero, 339
Puget Sound, 178
Pulmonates, aquatic, 612
Puma, 22, 163, 167, 174
INDEX.

Pygidium laticeps, 308, 399
  macrazi, 249
  maculatum, 249, 308
  marmoratum, 399
  minutae, 308, 399
  minutum, 399
  nigricans, 400
  nigromaculatum, 400
  oroyae, 399
  palleum, 399
  pardus, 312, 400
  poeyanum, 308, 399
  proops, 400
  punctatissimum, 399
  punctulatum, 312, 400
  quechuorum, 308, 400
  retropinnis, 400
  riojanum, 399
  rivulatum, 308, 399
  schmidti, 399
  schmidtii, 348
  spegazini, 348, 399
  taczanowskii, 308, 400
  tenue, 399
  tigrinum, 399
  vittatum, 400

Pygocentrus, 335, 442
  altus, 442
  bidorsalis, 442
  bilineatus, 442
  calmoni, 442
  dulcis, 442
  melanurus, 442
  nattereri, 324, 345, 350, 442
  niger, 324, 442
  nigricans, 442
  notatus, 442
  piraya, 324, 332, 345, 442
  scapularis, 324, 442
  striolatus, 442
  ternetzi, 442

Pygopristis, 335, 441
  denticulatus, 324, 441
  fumarius, 441

Pygopristis serrulatus, 345, 441

Pyramidula patagonica, 517

Pyrgoborus, 562

Pyrgula neveni, 561

Pyrgulopsis, 569, 570
  spinosa, 562

Pyrrhulina, 335, 428
  argyrops, 428
  australis, 428
  brevis, 343, 428
  filamentos, 323, 428
  lacta, 428
  maxima, 428
  melanostoma, 428
  semifasciata, 428
  semifasciata, 428

Pyrrhulininae, 256, 428

QUEENSLAND, 228, 277
  Quelch, J. J., 500, 502
  Quelé-Curá, 221
  Quilichao, 315
  Quoy, J. R., 487
  & Gaimard, P., 113, 487

RABBITS, 27
  Radcliffe, L., 511
  Radiodiscus, 516, 631
  coppergeri, 517
  magellanicus, 517
  millecostatus, 516
  patagonicus, 517
  Rañesquiellus, 468
  Raimondi, 604
  Raja, 377
    aquila, 378
    batis, 377
    microps, 348, 377
    platana, 348, 377
  Rajidae, 377, 484
  Ranfuly, Earl of, 272
  Ranzani, A. C., 488, 489
  Raphiodon vulpinus, 346
  Rat, 57
    black, 44
INDEX.

Rat, brown, 45
  long-tailed, 52
  roof, 45
  wharf, 45
  white-bellied, 45
Rathbun, R., 226, 660, 663
Rats, 23
  spiny, 23, 33, 34
Realm, see Region
Reganella, 405, 415
  depressa, 415
Reganina, 444
Region, Æthiopian, 294
  Andean, 297, 305, 312
  Archhelenic, 295
  Brazilian, 229, 297, 309
  Holarctic, 295, 516, 549, 612
  Mexican, 297, 303
  Nearctic, 516, 633
  Neotropical, 239, 240, 612
  Oriental, 548, 612, 631
  Palaearctic, 523
  Patagonian, 228, 229, 247, 252, 259, 260, 297, 336
  Transition, 297, 352
Regions, ichthyogeographical, 296
Reinhardt, J., 490, 491, 493
Reithrodon, 4, 44, 58, 62, 66, 67, 69
  alstoni, 62
  chinchilloides, 62, 66, 67
  cuniculoides, 62, 63, 64, 65, 66, 67, 68, 69
  c. obscurus, 5, 64
  (Euneomys) chinchilloides, 67
  hatcheri, 5, 65
  pictus, 58
  typicus, 62, 63
Reithrodontomyis, 44, 62
Rengger, J. R., 150, 189, 190, 191
Reptiles, 211
Reptilia, 217
Retroculus, 478
  boulenleri, 478
  lapidifer, 478
Reunion Id., 364
Rhamdella, 334, 385, 386
  eriarcha, 348, 386
  exsudans, 337
  ignobilis, 374
  jenynsii, 337, 348
  microcephala, 331
  minutum, 331, 337
  notata, 321
  straminea, 348
Rhamdia, 307, 334, 360, 385
  argentina, 385
  barbata, 387
  baronis mülleri, 387
  bathyurus, 385
  boucardi, 386
  brachycephalus, 387
  brachyptera, 301
  brachypterus, 386
  transforoi, 386
  breviceps, 385
  cinerascens, 312, 386
  depressa, 386
  distribution of, *354
  dorsalis, 386
  eriarcha, 387
  exsudans, 387
  foina, 321, 386
  gilli, 387
  godmani, 387
  grunniens, 385
  guatemalensis, 387
  heteracanthus, 386
  hilarii, 331, 348, 386
  humilis, 385
  hypelurus, 387
  ignobilis, 387
  jenynsii, 387
  laukidi, 321, 385
  laukidi, 381
  laticauda, 387
  longicauda, 387
  managuensis, 387
  microcephalus, 386
  micropterus, 387
  minutum, 337, 387
INDEX.

Rhamdia motaguensis, 387
multiradiata, 386
multiradiatus, 321
nicaraguensis, 387
notata, 386
oaxacae, 391, 387
obesa, 385
parryi, 387
parvani, 386
pentlandi, 308, 386
petenensis, 387
poeyi, 386
policaulus, 387
quelen, 337, 340, 348, 386
regani, 386
rogersi, 386
sacrificii, 387
salvini, 387
straminea, 387
tenella, 386
underwoodi, 387
velifer, 385
vilseni, 385
wagneri, 312, 386
Rhamdioglanis, 385
transfasciatus, 374
Rhamphichthys, 449
blochii, 449
elegans, 449
lineatus, 449
marmoratus, 325, 346, 350, 449
mirabilis, 449
müllerii, 449
pantherinus, 449
reinhardti, 346, 449
rostratus, 325, 449
schneideri, 449
schomburgkii, 449
Rhaphiodon, 444
vulpinus, 325, 350, 444
Rhea, 21, 22
Rheitrodon, 62
Rhencus, 467
Rhinelepis, 404, 407
acanthicus, 412
agassizii, 407
aspera, 331, 407
genibarbis, 407
microps, 407
parahybae, 337, 407
strigosa, 407
Rhineloricaria, 413
Rhinodoras, 393
priononomus, 393
teffeanus, 394
Rhinogobius contractus, 482
Rhinophoca, 94
Rhinophora, 94
Rhipidoglossa, 611
Rhipidoglossate stock, 626
Rhipidomys, 44
Rhihrodon, 62
Rhodeoides vaillanti, 453
Rhomboganoidea, 379
Rhoniscus, 467
Rhytidiidae, 613, 614, 631
Rhytiodus, 425
argenteo-fuscus, 425
microlepis, 425
Ribeiro, S. de M., 373, 506, 507, 508, 509, 510
Richard, J., 638, 640
Richardson, J., 489
Rincon de Boca, 20
Rio Aguapehy, 317
Alegre, 317
Alto da Serra, 329
basin of, 330, 334, 340, 347, 610
valley, 293, 295, 340, 353, 370, 371, 619, 620, 623
Apini, 319
Araguary, 319
Araguay, 318, 328
Arrasauhy, 329
INDEX.

Rio Atabapo, 319
Atrato, 311, 361
valley of, 311, 371
Balsas, 300, 303
Barrancas, 562
Belgrano, 2, 3, 24, 27, 42, 170, 277, 521,
529, 540, 541, 554, 608
Berbice, 319
Blanco, 250, 554, 606, 681, 684, 686
Branco, 317, 319, 320
Cachi, 57
Cachipur, 319
Camaguan, 606
Canelos, 361
Caroni, 319
Cassiquiare, 317, 318, 319
Cauca, 311, 315
Caura, 319, 320
Cayenne, 319
Chagas, 309, 312, 360, 361
Chalita, 8, 521, 554, 555, 556
Chauchan, 604
Chepo, 310
Chia, 311
Chico de Santa Cruz, 2, 8, 13, 14, 23, 24,
26, 27, 29, 30, 35, 39, 40, 41, 42, 44, 47,
53, 54, 59, 60, 61, 65, 67, 68, 69, 74, 75,
77, 78, 79, 83, 84, 170, 213, 219, 277,
513, 514, 518, 521, 523, 525, 526, 527,
528, 529, 530, 532, 536, 537, 538, 539,
540, 541, 543, 551, 554, 556, 603, 605,
606, 607, 608, 636, 639, 640, 644, 650,
669, 675, 680, 681, 684, 686, 687
Chubut, 51, 57, 187
Cipo, 330
Colorado, 165, 290, 514, 519, 545
Comajo, 251
Contas, 329
Corentine, 319
Coy, 2, 20, 59, 60, 64, 74, 77, 158, 169,
174, 175
Coyle, 314
Cubatao, 373, 558
Cuyaba, 318
Cuyuni, 319
Daule, 311
Rio Demerara, 319
Desaguaderos, 307
Deseado, 30
Doce, 328, 329, 565
Dulce, 150
Esmeralda, 311
Essequibo, 319
Estivado, 318
Fenix, 161, 163, 164
Gallegos, 2, 22, 54, 75, 145, 146, 157,
158, 182, 184, 185, 187, 235, 236, 283,
635
Geronimo, 302
Grande [Brazil], 372
[Texas], 230, 297, 299, 333, 352
basin of, 297, 300, 302, 363
[Tierra del Fuego], 214
de Minas, 339
de Santiago, 300, 303
do Sul, 254, 336, 339, 352
State of, 128, 130, 351, 514, 546,
547, 557, 558, 566, 583, 604,
606, 638, 644
Guiana, 319
Guaporé, 317, 339
Guayaquil, 361, 551, 561, 562
Guayas, 311
Huallaga, 311, 361
Iguape, 329
Itapajuna, 329
Itata, 290
Jacuhy, 546, 583
Janeiro, 329
city of, 130, 230, 329, 334, 351, 563
State of, 552, 653
Jauru, 317
Jequetepec, 311
Jequitinhonha, 328, 329
Jundiahe, 329
Jurua, 360
La Plata, 76, 86, 93, 109, 120, 130, 150,
230, 233, 235, 240, 241, 244, 252,
259, 263, 294, 317, 318, 319, 320,
327, 328, 339, 334, 336, 339, 340,
351, 360, 361, 362, 372, 513, 514,
533, 535, 545, 548, 552, 556, 558,
INDEX.

566, 569, 577, 578, 579, 580, 581, 584, 587, 588, 610
Rio de La Plata, basin of, 240, 259, 318, 327, 330, 334, 335, 336, 333, 610
district, 294, 627
-Paraguay valley, 295
valley of, 371
Las Minas, 215
Lerma, 300, 333
basin of, 296, 303
Limay, 251
Macahe, 329
McClelland, 519
Madeira, 317, 328, 339
Magdalena, 259, 309, 311, 312, 315, 334, 335, 360, 361
basin of, 315, 317
Mamoni, 310
Mana, 319
Mapocho, 249, 251
Marafon, 311, 312, 604
Marazii, 533
Maroni, 319
Maullin, 233, 260
Mazaruni, 319
Mezquital, 299, 300, 352
Motagua, 310, 361, 371
basin of, 309
Mucury, 329
Muriahe, 329
Napo, 361
basin of, 296
valley of, 516
Neuquen, 288, 290, 531
Orinoco, 317, 318, 319, 327, 362, 548
valley of, 371
Oiapoc, 319
Pampa, 329
Panuco, 230, 296, 298, 300, 303, 353, 375, 616
basin of, 298
Rio Papaloapam, 301, 302
Paraguassu, 329
Paraguay, 150, 230, 317, 318, 319, 339, 347, 351, 361, 362, 596
basin of, 339, 340, 347
Parahyba, 230, 298, 328, 329, 330, 333, 335, 374, 373
valley of, 336
Paraná, 150, 182, 230, 317, 328, 339, 340, 347, 351, 352, 361, 530, 569, 570, 575, 587, 589
basin of, 329
Pardo, 329
Parduá, 596
Patia Mira, 311, 312
Paute, 312
Pedro, 562, 602, 603
Piabahna, 329
Pirahy, 329
Presidio, 299, 375
Preto, 329, 330
Quenda, 329
Ribeira, 373, 558, 584, 585
Rimac, 311
Ruben, 236
Rupununi, 319
Salado, 151, 560
Salsa, 329
San Antonio, 329
San Francisco, 239, 309, 320, 328, 329, 330, 333, 334, 335, 340, 355, 360, 361, 362
basin of, 329, 330, 333, 336
plateau of, 339
San Juan, 310, 311, 312, 361
del Rio, 296, 303
San Matheos, 329
Santa, 311
Santa Maria, 566, 568
Santos, 329
Sinos, 566, 568
INDEX.

Rio Surinam, 319
Tacutu, 319
Tapajos, 318, 328, 339
Tieté, 329, 330, 372, 579
Tombador, 318
Traful, 276, 277
Tramanduhy, 130
Trombetas, 319
Tucuma, 182
Tumbey, 311
Turbio, 236
Uruguay, 339, 346, 350, 445
Ucayale, 311
Usumacinta, 310
das Velhas, 330, 361
Ventuari, 319
Verde, 320
Xingu, 328
Yaqui, 299, 352
Yari, 319
Rissoids, South American, 552

**Rithodon, 62**

**Rivulus, 454**
atratus, 454
brasiliensis, 454
breviceps, 455
cylindraceus, 454
elegans, 316, 454
fiabellicauda, 454
fenatus, 455
gayi, 325
godmani, 454
holmiæ, 455
isthmensis, 454
lanceolatus, 455
micropus, 325, 454
obscurus, 325, 454
ocellatus, 454
ornatus, 454
poeyi, 454
punctatus, 346, 454
stagnatus, 455
tenuis, 455

**Rivulus urophthalmus, 325, 454**
waïmacui, 455
Robertson Bay, 91
Rochebrune, A. T. de, see Mabille
Rocinela, 646, 663
australiensis, 662
australis, 636, 646
Rodents, 2, 4, 5, 23, 24, 25
North American, 26
Rœboides, 335, 445
affinis, 325, 445
bicornis, 445
bonariensis, 346, 350, 445
dayii, 445
francisci, 445
guatemalensis, 445
microlepis, 325, 346, 445
microlepis, 445
myersii, 445
prognathus, 346, 445
rubrivertex, 445
xenodon, 332, 445
Rödersberg, 547
Rostes, 335, 445
alatus, 445
molossus, 346, 445
Rogenia, 452
"Romanch," 149
Rookeries, sea-lion, 110
Roosevelt, T., 178
Ross's Sea, 91
Rozier, 496
Rudd ranch, 75
Ruminants, 4
Rusby, W. H., 513, 525, 545, 548, 557, 576, 577, 580, 594, 605
Russia, 640, 643
Ryder, J. A., 239

**Sacalius, 151**
Saccodon, 360, 362, 423
craniocephalum, 313, 423
wagneri, 313, 423
Sacramento River, basin of, 312
Sagdinae, 625
St. Ambrose Id., 133
INDEX.

St. Barbara Id., 139
Clement Id., 139
Felix Id., 133
Mary’s Id., 133
Miguel Id., 139
Paul Id., 97, 102, 122
Paul d’Amsterdam, 96
Pierre, 96
Rosa Id., 139
Salientia, 214
Salinas, 212, 217
Salminus, 335, 446
affinis, 316, 446
brevidens, 332, 346, 350, 446
brevidens, 446
cuvieri, 446
hilarii, 325, 332, 350, 446
maxillosus, 350, 446
orbignyanus, 446
Salmo anostomus, 425
argentinus, 440
cyprinoides, 421
dentulus, 421, 422
falcatus, 447
fasciatus, 426
gasteropelecus, 439
gibbosus, 444
melanurus, 435
rhombeus, 442
unimaculatus, 423
Salmonoids, 228
Salto das Cruzes, 579
Gran, de Guaira, 339
do Yguassu, 590
San Antonio, Peru, 653
Augustin, 315
Benito Id., 138, 139, 140
Carlos, 544, 606
ed Aguanda, 560
Diego, 141, 142
Domino, Ecuador, 562
Fernando, 187
Francisco, 142
Gabriel Id., 545, 558, 577, 578, 579, 580, 581, 588, 589
Ignacio de Peruchue, 188
San Isidro, 85, 93
Juan, 560
Julian, 64, 173, 636, 646, 647, 648, 649, 650, 659, 660, 661
Lorenzo Id., 133
Luis, 560
Mathias, Gulf of, 660, 661
Pedro, 575
Rafael, 77, 79
Xavier, 544
Sandwich Ids., 130
Sandy Point, see Punta Arenas
Sangiorgi, D., 505
Santa Barbara Id., 138
Catherina, State of, 109, 373, 586
Clara, 329
Cruz, 4, 35, 44, 60, 64, 65, 72, 73, 75, 82, 145, 146, 173, 174, 175, 178, 185, 186, 188, 213, 217, 329, 518, 536, 542, 636, 648, 660
beds, 6, 7
Territory of, 1, 218, 521, 554
region, 72
Rosa, 306
Santiago, 560
de Chile, 168, 169, 177, 187, 225, 229, 230, 242, 243, 259, 285, 305, 525
Santo Domingo, Oligocene of, 624
Santos, 309, 558
Sao Leopoldo, 557
Paulo, 168, 347, 514, 557, 558, 566, 584, 585, 587
State of, 336, 514, 579
Saraca, 479
operculensis, 479
Sarchirus, 379
Sarcodacinae, 256
Sarcura, 377
Satanoperca, 479
acuticeps, 479
balzanii, 479
macrolepis, 479
pappaterra, 326, 347, 479
Sauria, 217
Sauvage, M. H., 496
Savigny, 610
INDEX.

Scalarinella, 629
Scammon, Capt., 139, 140
Scandinavia, 625
Scapteromys, 81
Scarus pavoninus, 477
rufescens, 477
Scharff, R. F., 627
Schilling, 494
Schinz, H. R., 5, 31
Schizodon, 347, 425
borelli, 425
borellii, 343
dissimilis, 425
elongatus, 425
fasciatus, 323, 343, 425
isognathus, 343, 425
knerii, 425
nasutus, 425
platae, 425
Sagittarius, 425
taniatus, 425
vittatus, 425
Schizodontopsis, 425
Schlosser, M., 294
Schomburghk, R., 320, 488, 489
Schonbein, C. F., 488
Schreber, J. von, 102, 110, 111, 114, 116
Schreiner, C., & Ribeiro, A. de M., 507
Schuchert, C., 624
Schultze, M., 490
Sciadeichthys, 382
albicans, 382
Sciades, 390
marmoratus, 390
pictus, 341, 390
Sciadichthys, 390
Sciadoides, 390
Scianidae, 365, 467, 484
Scissor, 256, 431
Scissor macrocephalus, 323, 431
Scirridae, 4
Sclater, P. L., 14, 53, 88, 117, 182
Scleromystax, 401
barbatus, 337, 401
Scleropages, 453
Scomber saurus, 480
Scopeilidae, 228
Scott, A. W., 128
W. B., 5, 6, 108, 513, 563
Sea-bear, 102, 114
Steller's, 120, 123
Sea-bears, 102, 103, 110, 114, 115
southern, 108
Sea-elephant, 85, 94, 96, 97, 102, 111, 113, 114, 115, 139, 140
Californian, 96, 97, 138
southern hemisphere, 97
Sea Gull Bay, 149
Sea-horses, 139
Sea-leopard, 88, 89, 90, 139
Sea-lion, 102, 105, 107, 110, 111, 113, 114, 118, 119
Anson's, 96, 110
Auckland Id., 105
Californian, 105, 138
Falkland Id., 104, 110, 113, 114, 116
Forster's 105, 114
Hooker's, 117
"islands Falkland," 86, 88, 118
northern, 102, 109, 111, 114, 115, 116
Patagonian, 104
Pernetty's, 107, 114, 115
southern, 5, 102, 103, 104, 105, 108, 109, 111, 114, 115, 116, 118, 119
Steller's, 101, 104, 114, 118
Tinian Id., 106, 112
Sea-lions, 102, 103, 110, 111, 114, 115, 117
Sea-lyon, 95
Sea-otter, 139
Sea-wolves, 110
Seal, 95
crab-eating, 85, 93
crested, 93
eared, 106, 115, 116, 133
INDEX.

Seal, fur, 111, 114, 120, 121, 129, 130, 133, 138, 139, 140
Alaska, 138
Arbitration, 133, 137, 138, 141
Cape of Good Hope, 104, 121
Falkland Id., 120, 123, 124, 127, 129
Galapagos, 123, 134, 138
Guadalupe Id., 136, 137, 141, 142, 143
Lobos Id. 142
New Zealand, 102, 103
northern, 103, 116, 127, 131, 137, 140
southern, 103, 121, 123
hair, 90, 133, 139
harbor, 93
hooded, 94
leopard, 85
leopardine, 90, 91, 92
New Georgia, 87, 88
Ross's, 85
Weddell's, 85, 90, 91
Sealeina, 443

Seals, 102, 119, 138, 149
eared, 99, 101, 102, 103, 116, 122, 128
earless, 85, 101
fur, 99, 100, 102, 103, 104, 122, 130, 134, 138, 139
herds of, 122, 123, 149
North Pacific, 99, 142
northern, 103, 123, 129
South American, 123, 126
southern, 99, 121, 122, 127
hair, 122
Seba, A., 485
Secondary period, 239
Selachii, 377
Selenaspis herzbergii, 327
Semiscolex, 670, 673, 674
grandis, 674
terrestris, 674
variabilis, 669, 670
Semitapicis, 422
laticeps, 422
latior, 323
planirostris, 422
Serolidae, 650
Serolis, 650, 663
paradoxa, 637, 650, 662
schythei, 650
Serra da Bocaina, 336
do Espinhaco, 329
da Mantiqueira, 329, 336
Mar, 339
Tuila, 329
Serrano, Lieut., 37
Serranidae, 283, 336, 365, 467, 484
Serrasalmo, 335, 442
aesopus, 442
aureus, 442
brandtii, 442
denticulatus, 441
elongatus, 442
gibbus, 442
gymogenys, 324, 345, 442
humeralis, 345, 442
humeralis, 442
immaculatus, 442
iridopsis, 442
iridopsis, 442
iritans, 442
maculatus, 442
marginatus, 324, 332, 345, 350, 442
meno, 442
nigricans, 442
paraensis, 442
paranha, 442
piraya, 442
punctatus, 441
rhombeus, 324, 345, 442
spilopleura, 324, 345, 442
Serrasalmoninae, 230, 235, 330, 333, 347, 441
Severtzow, N., 166, 180
Seychelles, 614, 632
Shaw, G., 111, 153, 486
Sheep, Rocky Mt., 21
Siberia, 228
Sicily, 643
Sicya, 481
Sicydium, 481
altum, 481
multipunctatum, 481
Sicily, 643
Sicydium, 481
altum, 481
multipunctatum, 481
INDEX.

Sicydium pittieri, 481
plumieri, 481
stragus, 481
Sierra de Córdoba, 519, 560
Madre, 299
de Mendoza, 560
Oveja, 518, 521, 525, 526, 527, 529, 539, 536, 537, 538, 539, 540, 554, 555, 556, 605, 606, 607, 608, 636, 644, 675, 680, 681, 684, 686, 687
de San Luis, 560
Ventana [Argentina], 514, 520, 544, 545, 554, 556, 636, 639, 640, 644, 684, 686
Sierras, Argentine, 552, 629
Sievers, 311
Sigmodon, 44, 69
Sigmodontine, 50
Sigmodontinae, 50
Sigmodontini, 50
Sigmurethra, 612
Siganosida, 452
atchafalaya, 452, 453
mexicana, 298, 301, 452
Siluridae, 240, 241, 366, 368, 369, 370, 381, 484
African, 368
branchiolaria, 244
epistomothea, 244
South American, 368
Silurinae, 239
Siluroidei irichomycteriformes, 244
Silurus bagre, 381
candiru, 398
carinatus, 392
cataphractus, 393
chilensis, 242
crinas, 388
cuculliens, 398
costatus, 392
fasciatus, 391
hexadactylus, 380
lima, 392
sapipoca, 386
Simon, E., 642, 643
Simpson, C. T., 616
Siphostoma starksi, 299

Sisson, 141
Sitka, 626
Skiffia, 459
bilineata, 304, 459
lerme, 304, 459
multipunctata, 304, 459
variegata, 304, 459
Skunk, 143, 146
Brazilian, 143
Chilian, 143
Skunks, bare-nosed, 143
Central American, 144
Mexican, 143
South American, 144
Sloths, 6
Smith, E. A., 533, 536
Hamilton, 152, 153, 154
J. P. G., 490
S. J., 653, 654
Smith's ranch, 174, 175
Smitt, F. A., 234, 236, 273, 277, 280, 503, 505
Smyth Channel, 651, 653
Snails, Amnicoloid, 553
Bolivian land, 294
Brazilian land, 629
families of, 611
land, 519, 623
Lymnaeid, 531, 532
Middle American, 623
Orthurethrous, 611
Patuloid, 516, 518
Pond, 631
Pulmonate, 532
river, 548
Sigmurethrous, 612
South American, 518
Tasmanian, 516
Socorro Id., 139
Solaropsis, 622, 625
Soleidae, 483, 484
Soleotalpa, 483
Sorubim, 335, 392
caparary, 392
infraoculcaris, 392
jandia, 392
lima, 315, 321, 341, 348, 392
INDEX.

Sorubim prianaca, 392
Sorubimichthys, 392
  gigas, 392
  orioni, 392
  planiceps, 321, 392
  spatula, 392
Souleyet, — 488, 550, 551, 552
South America, 1, 6, 34, 44, 45, 100, 101, 110,
  112, 113, 115, 130, 143, 153, 154, 180,
  186, 214, 225, 226, 227, 228, 232, 233,
  238, 248, 252, 260, 270, 271, 272, 279,
  284, 293, 294, 295, 296, 297, 302, 303,
  318, 319, 339, 340, 353, 363, 364, 365,
  368, 369, 370, 375, 519, 522, 532, 548,
  552, 559, 602, 611, 612, 613, 614, 615,
  616, 620, 621, 622, 623, 624, 626, 627,
  628, 629, 630, 631, 632, 633, 655, 657,
  663, 664, 665, 669, 686
Atlantic coast of, 339, 638, 659, 662, 669
  coast of, 109, 110, 111
cold, 532
  non-marine Mollusca of, 611
Pacific coast of, 97, 100, 119, 122, 132, 669
temperate, 519, 532
tropical, 364, 369, 370, 522
South American center, 633
South Georgia, 97, 98, 110, 122, 123, 130, 646,
  650, 662, 664, 665
Orkneys, 91
Pacific continent, 626
Sea, 363
Shetlands, 91, 98, 110, 123, 129, 130
Temperate subregion, 627
“Southern Cross,” H. M. S., 88, 89, 91, 93, 110
Southern Seas, 96, 100, 116
  Hemisphere, 85
Sowerby, G. B., 533
Speroma, 646
Spalacopus, 33
Sparks, 353
Sparus surinamensis, 478
Speothos, 151
  venaticus, 151
Sphaeriidae, 513, 514, 515, 602, 615
  South American, 603
Sphaerium, 602
  argentimum, 605
  bahiense, 603
  equatoriale, 603
  modioliforme, 603
Sphaeroma calcarea, 647, 648
  gigas, var. lanceolata, 647
  lanceolatum, 646
Sphaeromidae, 646
Sphyraena, 447
Spring Creek, 521, 528, 541, 608
Spix, J. B. von, 487
Squalus mustelus, 377
Squamata, 217
Squirrels, 23
Stanley Harbour, 88
Starks, E. C., 509
Staten Land, 97, 130, 149
Steatogenys, 449
elegans, 449
Stebbing, T. R. R., 647, 648, 649, 653, 658, 661
Stegophiline, 241, 245
Stegophillus, 246, 335, 401
  insidiosus, 331, 401
  intermedius, 401
  nemurus, 400
  reinhardtii, 401
Steindachner, F., 226, 263, 270, 280, 282, 315,
  330, 373, 413, 493, 494, 495, 496, 497,
  498, 499, 501, 502, 503, 507, 509, 510,
  511
  & Bayern, Th. von, 501
Steindachneria, 335, 391
  amblyura, 337, 391
doceana, 337, 391
  parahybae, 337, 391
Steindachnerina, 421
Steenmann, G., 372
Stejneger, L., 211
Steller, G. W., 102, 103, 104, 111, 114, 116,
  121, 127
Stenorhincus, 86
  leptonyx, 87
Stenorhinque, 86, 91
INDEX.

Stenorynchotes, 86
Stenorynchus, 86, 91
  carcinophagus, 92
  leptonyx, 92
  serridens, 92, 93
  weddellii, 89
Stenorynchus weddellii, 89
Stenotatus, 6
Stephanoda, 516, 518
  leptotera, 518
  lyrata, 518
  michaelensi, 518
  patagonica, 517
  rigophila, 518
Stenarchella, 448
  balaenops, 448
  schotti, 448
Stenarchogiton, 448
  nattereri, 448
  sachsi, 325, 448
Sternarchorhamphus, 449
  macrostomus, 449
  müller, 449
  tamanudu, 449
Sternarchorhynchus, 449
  curvirostris, 449
  mormyrus, 449
  müller, 449
  oxyrhynchus, 325, 449
Sternarchus, 448
  albifrons, 325, 346, 350, 448
  bonapartii, 448
  brasiliensis, 333, 348
  lacepedii, 448
  macrolepis, 448
  maximilliani, 448
  müller, 449
  nattereri, 448
  oxyrhynchus, 449
  schotti, 448
Sternoppygidae, 347
Sternoppygus, 361, 450
  aequilabiatuus, 450
  æ. nigriceps, 450
  distribution of, 357
  humboldti, 449

Sternopygus limbatus, 449
  lineatus, 449, 450
  macrurus, 333, 346, 450
  marcgravii, 450
  microstomus, 449
  obtusirostris, 450
  tumifrons, 449, 450
  viridescens, 450
Stethapron, 441
  chrysemus, 441
  erythrops, 441
Stethaproninae, 255, 441
Stevardia, 438
  alipinnis, 438
Stevardiinae, 255, 438
Stichanodon, 441
  insignis, 441
Stichanodontinae, 441
Stimpson, W., 553
Stimpsonia, 553
Stolephorus, 451
  brevirostris, 451
  clupeoideaes, 325, 350, 451
  jannarius, 451
  manjuba, 451
  nattereri, 451
  olidus, 346, 350, 451
  peruanus, 451
  poeyi, 314, 451
  spinifer, 325, 451
  surinamensis, 451
  tapiurus, 451
  vaillanti, 451
Stomatopoden, 646
Stomias variegatus, 275
Strait, Cretaceous in Amazon valley, 619, 620
  of Le Maire, 130
Straits of Magellan, 22, 26, 27, 35, 36, 38, 68,
  71, 84, 85, 109, 111, 122, 123, 130, 132, 143,
  148, 149, 151, 159, 186, 188, 212, 214, 215,
  217, 280, 518, 526, 529, 541, 603, 606, 635,
  638, 646, 647, 650, 651, 653, 655, 657, 658,
  659, 660, 661, 669, 681
Streams, Atlantic, 373
  Pacific, 362
<table>
<thead>
<tr>
<th>Name</th>
<th>Page Numbers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strebel, H.</td>
<td>517, 519, 520, 526, 528, 533, 542</td>
</tr>
<tr>
<td>Streptaxidae</td>
<td>613, 614, 615</td>
</tr>
<tr>
<td>distribution of</td>
<td>*617</td>
</tr>
<tr>
<td>Strobel, P.</td>
<td>548, 552, 587, 606</td>
</tr>
<tr>
<td>Strophocheilidae</td>
<td>613, 614</td>
</tr>
<tr>
<td>Strophocheilus</td>
<td>514</td>
</tr>
<tr>
<td>Studer, T.</td>
<td>646</td>
</tr>
<tr>
<td>Sturisoma</td>
<td>335, 360, 405, 416</td>
</tr>
<tr>
<td>barbata</td>
<td>342</td>
</tr>
<tr>
<td>barbatum</td>
<td>416</td>
</tr>
<tr>
<td>distribution of</td>
<td>*357</td>
</tr>
<tr>
<td>frenata</td>
<td>313</td>
</tr>
<tr>
<td>frenatum</td>
<td>416</td>
</tr>
<tr>
<td>güntheri</td>
<td>416</td>
</tr>
<tr>
<td>lyra</td>
<td>416</td>
</tr>
<tr>
<td>panamensis</td>
<td>313</td>
</tr>
<tr>
<td>panamense</td>
<td>316, 416</td>
</tr>
<tr>
<td>robusta</td>
<td>342</td>
</tr>
<tr>
<td>robustum</td>
<td>416</td>
</tr>
<tr>
<td>Strygogenes</td>
<td>416</td>
</tr>
<tr>
<td>humboldtii</td>
<td>417</td>
</tr>
<tr>
<td>Subregion</td>
<td>Brazilian, or Tropical, 627</td>
</tr>
<tr>
<td>Chilian, or South Temperate, 627</td>
<td></td>
</tr>
<tr>
<td>Succinea</td>
<td>510, 522</td>
</tr>
<tr>
<td>avara</td>
<td>521</td>
</tr>
<tr>
<td>burmeisteri</td>
<td>520</td>
</tr>
<tr>
<td>lebruni</td>
<td>519, 520</td>
</tr>
<tr>
<td>magellanica</td>
<td>520</td>
</tr>
<tr>
<td>meridionalis</td>
<td>520</td>
</tr>
<tr>
<td>m. cornea</td>
<td>520</td>
</tr>
<tr>
<td>ordinaria</td>
<td>520</td>
</tr>
<tr>
<td>patagonica</td>
<td>519</td>
</tr>
<tr>
<td>Succineideae</td>
<td>510, 612, 614</td>
</tr>
<tr>
<td>Sudis</td>
<td>453</td>
</tr>
<tr>
<td>gigas</td>
<td>453</td>
</tr>
<tr>
<td>pirarucu</td>
<td>453</td>
</tr>
<tr>
<td>Surinam</td>
<td>319</td>
</tr>
<tr>
<td>Swain, J.</td>
<td>497</td>
</tr>
<tr>
<td>Swainson, W.</td>
<td>470, 471, 488</td>
</tr>
<tr>
<td>Sykes, E. R.</td>
<td>587</td>
</tr>
<tr>
<td>Symbranchus</td>
<td>333</td>
</tr>
<tr>
<td>marmoratus</td>
<td>310, 314, 328</td>
</tr>
<tr>
<td>Symphurus</td>
<td>483</td>
</tr>
<tr>
<td>nigrescens</td>
<td>483</td>
</tr>
<tr>
<td>plagusia</td>
<td>351, 483</td>
</tr>
<tr>
<td>Symphysodon</td>
<td>479</td>
</tr>
<tr>
<td>Sympyodon discus</td>
<td>479</td>
</tr>
<tr>
<td>d. aquifasciatus</td>
<td>479</td>
</tr>
<tr>
<td>Synbranchia</td>
<td>450</td>
</tr>
<tr>
<td>Synbranchidae</td>
<td>450, 484</td>
</tr>
<tr>
<td>distribution of</td>
<td>*365</td>
</tr>
<tr>
<td>Synbranchus</td>
<td>333, 361, 363, 450</td>
</tr>
<tr>
<td>distribution of</td>
<td>*354</td>
</tr>
<tr>
<td>döringii</td>
<td>451</td>
</tr>
<tr>
<td>fuliginosus</td>
<td>451</td>
</tr>
<tr>
<td>hieronymi</td>
<td>451</td>
</tr>
<tr>
<td>immaculatus</td>
<td>450</td>
</tr>
<tr>
<td>marmoratus</td>
<td>316, 325, 339, 346, 350, 450</td>
</tr>
<tr>
<td>nigrinus</td>
<td>451</td>
</tr>
<tr>
<td>transversalis</td>
<td>451</td>
</tr>
<tr>
<td>vitatus</td>
<td>451</td>
</tr>
<tr>
<td>Synentognathi</td>
<td>462</td>
</tr>
<tr>
<td>TABATINGA</td>
<td>314, 333</td>
</tr>
<tr>
<td>Tachisurinae</td>
<td>240, 241, 368</td>
</tr>
<tr>
<td>Tachisurus laticeps</td>
<td>327</td>
</tr>
<tr>
<td>Tadpoles</td>
<td>212, 215, 216</td>
</tr>
<tr>
<td>Teenioglossa</td>
<td>611</td>
</tr>
<tr>
<td>Taenionema</td>
<td>391</td>
</tr>
<tr>
<td>platynema</td>
<td>391</td>
</tr>
<tr>
<td>steerii</td>
<td>391</td>
</tr>
<tr>
<td>Tanura henlei</td>
<td>378</td>
</tr>
<tr>
<td>mulleri</td>
<td>378</td>
</tr>
<tr>
<td>Taguara</td>
<td>604</td>
</tr>
<tr>
<td>Tapacari</td>
<td>57</td>
</tr>
<tr>
<td>Tarapaca, province of, 191</td>
<td></td>
</tr>
<tr>
<td>Tarpon</td>
<td>453</td>
</tr>
<tr>
<td>atlanticus</td>
<td>453</td>
</tr>
<tr>
<td>Tasmania</td>
<td>122, 228, 233, 237, 271, 272, 274, 275, 522, 582, 548, 549, 614, 630, 631, 643, 646, 662</td>
</tr>
<tr>
<td>Tate, R.</td>
<td>643</td>
</tr>
<tr>
<td>&amp; Brady, G. S.</td>
<td>643</td>
</tr>
<tr>
<td>Tatou pickiy</td>
<td>7</td>
</tr>
<tr>
<td>Tatu</td>
<td>6</td>
</tr>
<tr>
<td>hybridus</td>
<td>6</td>
</tr>
<tr>
<td>Tatusia hybrida</td>
<td>8, 9</td>
</tr>
<tr>
<td>minuta</td>
<td>7</td>
</tr>
<tr>
<td>Taubaté</td>
<td>329, 330, 336, 339</td>
</tr>
<tr>
<td>Tayra</td>
<td>147</td>
</tr>
<tr>
<td>barbara</td>
<td>143</td>
</tr>
</tbody>
</table>
INDEX

Tehuantepec, Isthmus of, 296, 297, 301, 309, 310, 363, 376
Teleostomi, 379
Temnocephala, 294
Tenison-Woods, J. E., 549
Ternetz, 339
Terns, 149
Testacellidae, 613
Tetrabranchus, 450
Tetragonopterinae, 252, 253, 255, 256, 309, 430
Tetragonopterus, 256, 257, 336, 438
aneus, 270
agassizii, 437
alosa, 433
anomalus, 438
dragenteus, 344, 344, 438
arteñii, 438
bahiensis, 433
barilellii, 432
belizianus, 433
branckii, 422
brevimanus, 433, 434
caudimaculatus, 432
chalceus, 324, 349, 438
cobanensis, 433
compressus, 441
copei, 433
cuieri, 433
fasciatus, 269, 434
finitimus, 433
fulgens, 334
gibbicervix, 435
gibbosus, 338, 438
gronovii, 432
hauxwellianus, 435
huberi, 438
humilis, 433
interrupta, 437
jacuhiensis, 432
jenynsii, 433
jeguatinhonhe, 270
latus, 443

Tetragonopterus lineatus, 437
linnet, 432
longipinnis, 441
mexicanus, 300
microphthalmus, 434
microstoma, 270, 432, 433
moorii, 435
multifasciatus, 432
nigripinnis, 438
nitidens, 434
oaxacanensis, 433
obscurus, 432
oerstedii, 433
orbignianus, 432
orientalis, 432
ortoni, 438
panamensis, 433
pectinatus, 431
petenensis, 261, 434
pliodus, 434
rufipes, 438
ruilus, 261, 269, 433
sana, 438
scabripinnis, 270
schomburgki, 438
simus, 434
streeti, 434
taniatus, 269
viejita, 433
xinguensis, 437
Tetragonopterus, 336
Tetranematichthys, 397
quadrifilis, 397
Tetraodontidae, 365, 484
Tetraplodon, 610
Tetrodon, 484
curvis, 484
gocephalus, 484
lineolatus, 484
mathematicus, 484
pennani, 484
psittacus, 484
Texas, 548
Thalassophryne, 482
amazonica, 482
maculosa, 482
INDEX.

Thalassophryne nattereri, 482
Thaumatodon, 631
Thayeria, 437
obliqua, 437
Theraps, 474
irregularis, 474
Theromyzon palleus, 686
Thiosmus, 143, 144
Thomas, O., 3, 6, 11, 18, 27, 31, 47, 48, 50, 52, 54, 55, 56, 57, 62, 70, 73, 76, 77, 78, 79, 80, 81, 83, 84, 85, 143, 144, 151, 152, 153, 178, 185, 189, 190, 191
Thominot, A., 497, 498
Thomson, G. M., 638
Thoracocharax, 361, 439
distribution of, *357
maculatus, 440
pectorosus, 440
stellatus, 324, 345, 439
Thorichthys, 302, 472, 473
affinis, 472
aureus, 472
callolepis, 472
elliotti, 302, 472
helleri, 302
Thos, 151
Thous, 153
mesomelas, 154
Thous, 153, 155
Thricomycterus, 248, 400
macræi, 248
maculatus, 249, 251
Thrycomycterus, 247, 248
Thunberg, K. P., 104, 121
Thyrina, 465
crystallina, 279, 465
evermanni, 465
guatamalensis, 465
meeki, 465
sardina, 465
Thysanocara, 411
Tiahuanaco, 307
Tierra del Fuego, 1, 3, 20, 21, 22, 23, 33, 35, 37, 46, 48, 63, 67, 69, 72, 93, 97, 110, 130, 149, 150, 162, 174, 187, 214, 217, 272, 273, 276, 278, 302, 513, 516, 517, 519, 520, 533, 637, 638, 646, 647, 649, 650, 658, 659, 660, 661, 669
Tigris, 167
Tilapia nilotica, 471
Tilopozo, 560
Timana, 315
Tinian Id., 112, 118
Tiogoma pulchella, 419
pulchra, 419
Titcomb, J. W., 277
Tocantins, 328, 329
Tolypeutes, 6
Tom Bay, 48, 517, 519, 533
Tomba Point, 51
Tometes, 443
trilobatus, 443
Tomoeurus, 461
gracilis, 461
Tomigerus, distribution of, *619
Tomocichla, 470
underwoodi, 470
Tornatellinidae, 612
Torpedo bancrofti, 378
brasiliensis, 377
pictus, 378
Tortoise, 138
Townsend, C. H., 35, 124, 131, 136, 137, 140, 141, 142
Toxus, 458
riddlei, 458
Tracheliopterus coriaceus, 341
Trachelyopterichthys, 395
teniatus, 395
Trachelyopterus, 395
coriaceus, 322, 395
maculosus, 395
teniatus, 395
Trachycorystes, 395
analis, 396
brevibarbus, 396
ceratophythus, 322, 396
galeatus, 322, 331, 341, 396
gabler, 322, 395
insignis, 315, 396
isacanthus, 396
Trachycorystes magdalense, 315, 396
obscurus, 322, 396
paeae, 327
porosus, 396
robustus, 322, 396
striatulus, 337, 341, 396
Trachycorystes, 396
typus, 395, 396
Trachypoma, 400
marmoratum, 400
Traill, T. S., 487
Tres Marías Isds., 137, 138
Trichomycteridae, 244
Trichomycterus, 247, 248
areolatus, 251, 291
barbatula, 399
brasiliensis, 373
dispar, 373
gracilis, 399
inca, 399
inermis, 246, 291, 398
maculatus, 249, 291
nigricans, 247
penlandii, 399
pictus, 399
proops, 374
pusillus, 401
Trichophocaceae, 100
Tridens, 245, 400
brevis, 400
melanops, 400
Trifasciatus riverrudni, 456
Trinectes, 483
Trinidad, 45, 263, 311, 327, 354, 355, 356, 358, 361
Channel, 519, 658
Triportheus, 440
flavus, 440
Tristan d'Acunha, 97
Triurobrycon, 430
Trocheta, 674
Troschel, F. H., 450, see also Müller, J.
Trygon ariera, 378
garrae, 378
henlei, 378
hystrix, 378
INDEX.

Trygon orbicularis, 378
Tryon, G., 549
Tryonia, 569, 570
Tschudi, J. J. von, 113, 117, 133, 489
Tuco-Tuco, 24, 34, 42
Tulotoma, 569
Turin, University of, 687
Turner, W., 109, 129, 130
Turtle, 138
Tylomys, 44
Tylosurus, 462
acus, 462
almeida, 325, 462
amazonicus, 346, 462
cantraini, 462
fluvatiilis, 314, 462
marinus, 301, 462
microps, 325, 462
scapularis, 462
Typhlobagrus, 335, 387
kronel, 374, 387
Uaru, 469
amphiacanthoides, 326, 469
imperialis, 469
obscurum, 469
Uarus centrarchoides, 475
Ulrey, A. B., 301
Uncia, 167
Uncia, 167
Unger, F., 294
Ungulata, 10
Unibranchapterura, 450
grisea, 451
lineata, 451
Unio, 294, 628
frenzelli, 610
patagonica, 610
Unionidea, 293, 514, 515, 613, 615, 616, 626, 628, 632
United States, 45, 46, 143, 230, 252, 260, 279, 297, 361, 563, 631, 653, 654, 655, 657, 687
Uroptera, 377
Urocoptidae, 613, 622, 625
distribution of, *625
INDEX.

Urocoptinae, distribution of, *625
Ursus marinus, 104, 120, 121, 123, 127
Uruguay, 129, 153, 293, 295, 514, 525, 530, 545, 547, 558, 574, 577, 578, 580, 582, 583, 587, 588, 591, 592, 593, 595, 596, 597, 598, 599, 601, 602, 603, 604
Useless Bay, 533
Ushuaia, 517, 519
Uspullatuo, 249
Utah, 643, 653
Val de Chillo, 603, 604
Valdivia, 183, 187, 669
Valenciennes, A., 248, 351, 489
M., see Cuvier, G.
Valentin, G., 489
Valentini, R., 272
Valloniidae, 612
Valparaiso, 227, 242, 282, 283, 285, 291, 296, 560, 661
Vancouver Id., 178
Vandellia, 246, 401
cirrhosa, 401
plazaii, 322, 401
Vastres, 453
agassizii, 453
arapaima, 453
cuvieri, 453
mapa, 453
Velasia, 232, 234, 276
chilensis, 233, 235, 292
Venezuela, 153, 293, 305, 327, 360, 548, 562, 603, 653
“Venus,” cruise of, 119
Vera Cruz, 143, 653
Veragua, 309
Vermes, 610
Veronicellidae, 613, 615
Verrill, A. E., 674
Vespertilio, 187
blossevillii, 188
bonariensis, 188, 189
capucinus, 188
Vesperilus chiloensis, 186
magellanicus, 187
velatus, 187
villosissimus, 188, 189, 190, 191
Vespertilionidae, 186
Vesperugo magellanicus, 188
velatus, 187
Vesperus magellanicus, 187
velatus, 187
Victoria Land, 88, 91
Vicuña, 18, 22
Viscaccia, 5, 23, 30
americana, 31, 32
chilensis, 5, 32
maxima, 5, 32
Viscacha, 5, 30
Argentine, 5, 31, 33
Viscacia, 30, 31
Viverra vittata, 147
Viviparidae, 569, 570, 613
Viviparus altior, 569
hoernesi, 569
limnothauma, 569
Vizcache, 31, 32, 33
Argentine, 32
Vizcacia, 31
maxima, 32
pamparum, 32
viscacia, 32
viscacia, 32
Voles, 44, 50
Voluta fluminea, 544, 545
fluviatilis, 544, 545
Volute-shell, 149
Vulpes, 151
griseus, 155
magellanicus, 154, 161
Vulpicanis, 151
WAGLER, J., 94
Waiteina, 444
Wallace, A. R., 627
Ward, D. P., see Eigenmann
Waring, 173
Washington, State of, 116, 141
Waterhouse, G., 3, 26, 33, 35, 36, 37, 51, 52,
INDEX.

55, 56, 58, 59, 60, 61, 62, 64, 66, 67, 68, 72,
73, 75, 150, 153, 184, 185, 187
Water-Vole, 48
Weasel, 143, 148
Weddell, Capt., 91, 92, 115, 129
Wentworth, Capt., 142
Wertheimeria, 335, 395
maculata, 337, 395
West Indian region, 663
Indies, 297, 363, 367, 375, 548, 562, 615, 622
Weyenberg, H., 496
Whales, 119
White, A., 646, 647, 648, 649, 661
Whitfield, R. P., 524
Wiegmann, F. A., 487, 622
Wierzejski, A., 651
Williamson, H., 485
Willoughby, 485
Wilson, E. A., 89, 90, 93
Wolf, T., 548
Wolf, Antarctic, 153
Cordillera, 163, 164
Magellan, 161
maned, 152
Wollaston, 149
Wolves, 160
Wood-lice, 637
Woodward, A. S., 336, 340, 498, 499, 503, 505
Woolman, A. J., 500, 501
Worms, tubificid, 673
Wortmann, J. L., 151, 152
Wright, R. R., 498
Wrzesniowski, A., 653, 655, 657
Wyman, J., 491

XEBEROS, 360
Xenatherina, 465
Lisa, 465
Xendaphus, 10, 11
bisulcus, 12
huamel, 10
leucoïs, 12, 13
Xenendium, 458
caliénte, 459
xalisco, 459
Xenocara, 405, 410
brevispinnis, 373
gymnorhynchus, 322, 342, 410
latifrons, 405, 410
Xenomysterus gobio, 407
Xenorhynchichthys, 463
stipes, 464
Xiphophorus, 460
bimaculatus, 456
brevis, 461
guentheri, 461
heckelii, 457
helleri, 301, 310, 460, 461
helleri, 461
jalape, 461
montezumae, 299, 461
obscurus minor, 457
strigatus, 461
Xiphorrhampus, 447
anomalus, 447
ferox, 447
hepsetus, 447
Xiphorrhynchus, 447
Xiphostoma, 446
cuviéri, 446
lateristriga, 446
oseryi, 446
tedo, 446
Xystrosus, 418
popoche, 418
YPORANGA, 585
Yucatan, 261, 363
Yunguyo, isthmus of, 307
Yuriria, 419
ZACHÆNUS ROSEUS, 224
Zaëdyus, 6, 7
ciliatus, 5, 7
ciliatius, 7
minutus, 8
Zalophus, 99, 100, 104, 122, 132, 141
californianus, 117, 138, 139
Zathorax, 392
Zibethailurus, 179
Zimmermann, 127
INDEX.

Zone, Austral, 515
  Boreal, 515
  cold, 532
  cold temperate, 532
  La Platan, 514, 515
  Patagoniañ, 514, 515
  Transition, 515
Zones, life, North American, 515
Zonitidae, 519, 613, 616, 626
Zoogoneticus, 304, 454
  cuitzenoënsis, 454
  cuitzzezensis, 304
  diazi, 304, 454
  du ii, 304, 454
    maculatus, 304, 454
    miniatus, 454
    pachycephalus, 454
    robustus, 454
Zungaro, 384
  humboldtii, 384
  mangurus, 384
  zungaro, 384
Zungaropsis, 383
  multimaculatus, 383
Zygodontomys, 46
EXPLANATION OF PLATE XXXVIII.

<table>
<thead>
<tr>
<th>Fig.</th>
<th>Description</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1, 1a, 1b</td>
<td>Potamolithus rushii Pils. Adult stage. Type</td>
<td>599</td>
</tr>
<tr>
<td>2, 2a, 2b, 3</td>
<td>Potamolithus microthauma Pils. Type and a smaller specimen</td>
<td>597</td>
</tr>
<tr>
<td>4</td>
<td>Potamolithus rushii Pils. Neanic stage, diam. 3 mm.</td>
<td>599</td>
</tr>
<tr>
<td>5</td>
<td>Potamolithus dinochilus Pils. Adult, seen obliquely from above</td>
<td>595</td>
</tr>
<tr>
<td>6, 6a</td>
<td>Potamolithus hatcheri Pils. Type</td>
<td>594</td>
</tr>
<tr>
<td>7, 7a, 7b</td>
<td>Potamolithus dinochilus Pils. Three views of the type (fig. 5 represents the same specimen)</td>
<td>595</td>
</tr>
<tr>
<td>8</td>
<td>Potamolithus dinochilus Pils. Neanic stage</td>
<td>596</td>
</tr>
</tbody>
</table>

(vol. III)
EXPLANATION OF PLATE XXXIX.

Figs. 1, 1a, 1b. Potamolithus Hidalgoi Pils. Three views of type 597
Figs. 2, 2a. Potamolithus Heringi Pils. Two views of type 600
Figs. 3, 3a. Potamolithus Jacuhyensis Pils. Two views of type 583
Fig. 4. Potamolithus Lapidum (d'Orb.) Neanic stage. Uruguay R. 587
Figs. 5, 5a. " " " Adult " 587
Figs. 6, 6a. Potamolithus Simplex Pils. Two views of type 578
Figs. 7, 7a. Potamolithus Lapidum supersulcatus Pils. Front and profile views 588
# EXPLANATION OF PLATE XL.

<table>
<thead>
<tr>
<th>FIGS.</th>
<th>DESCRIPTION</th>
<th>PAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1, 2, 2a</td>
<td>Potamolithus orbignyi Pils. Cotypes, adult stage</td>
<td>582</td>
</tr>
<tr>
<td>3</td>
<td>Small individual approaching the adult stage</td>
<td>582</td>
</tr>
<tr>
<td>4, 4a, 5</td>
<td>Neanic stages</td>
<td>582</td>
</tr>
<tr>
<td>6, 6a, 6b</td>
<td>Potamolithus tricostatus (Brot). Three views of adult stage</td>
<td>593</td>
</tr>
<tr>
<td>7</td>
<td>Gerontic individual</td>
<td>593</td>
</tr>
<tr>
<td>8, 9, 9a</td>
<td>Potamolithus conicus (Brot). Adult stage</td>
<td>581</td>
</tr>
<tr>
<td>10, 10a</td>
<td>Potamolithus agapetus Pils. Two views of the type</td>
<td>578</td>
</tr>
<tr>
<td>11, 11a</td>
<td>Potamolithus buschii (Ffld.). Two views, neanic stage</td>
<td>580</td>
</tr>
<tr>
<td>12, 12a, 13, 14</td>
<td>Adult individuals</td>
<td>580</td>
</tr>
</tbody>
</table>

(vol. III)
EXPLANATION OF PLATE XLI.

<table>
<thead>
<tr>
<th>Figs.</th>
<th>Description</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1, 1a, 1b</td>
<td>Potamolithus sykesi Pils. Three views of type.</td>
<td>574</td>
</tr>
<tr>
<td>2, 2a</td>
<td>&quot; &quot; &quot; Gerontic individual</td>
<td>574</td>
</tr>
<tr>
<td>3, 4, 5</td>
<td>Potamolithus bisinuatus obsoletus Pils. Cotypes</td>
<td>577</td>
</tr>
<tr>
<td>6, 6a</td>
<td>&quot; &quot; &quot; Pils. Two views of type</td>
<td>576</td>
</tr>
<tr>
<td>7, 7a</td>
<td>&quot; &quot; &quot; Two views of a gerontic individual.</td>
<td>576</td>
</tr>
<tr>
<td>8, 8a</td>
<td>Potamolithus gracilis           Two views of the type.</td>
<td>577</td>
</tr>
<tr>
<td>9, 9a</td>
<td>&quot; &quot; &quot; viridis Pils. Two views of the type.</td>
<td>578</td>
</tr>
</tbody>
</table>

(vol. iii)
EXPLANATION OF PLATE XLIA.

| Figs. 1, 1a. Potamolithus paysanduanus Iher. Front and profile views of the type | 590 |
| Figs. 2, 3. " " Sinulabris Iher. Type and a larger specimen. | 591 |
| Figs. 4, 4a. " " Impressus Iher. Front and profile views of the type | 591 |
| Figs. 5, 5a. Potamolithus carinifer Pils. Front and back views of the type. | 592 |
| Figs. 6, 6a. Potamolithus quadratus " " " profile " " " | 592 |
| Fig. 7. Potamolithus lapidum supersulcatus. Back view " " | 588 |
| Figs. 8, 8a. Potamolithus filiponei Iher. Profile and front views of the type | 573 |

(vol. III)
EXPLANATION OF PLATE XLI.B.

<table>
<thead>
<tr>
<th>Figs. 1, 1a, 1b</th>
<th>POTAMOLITHUS PHILIPPIANUS Pils.</th>
<th>Front and back views of the type</th>
<th>PAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fig. 2</td>
<td>POTAMOLITHUS BUSCHII (Ffl.d.)</td>
<td></td>
<td>580</td>
</tr>
<tr>
<td>Fig. 3</td>
<td>POTAMOLITHUS RIBEIRENSIS (?)</td>
<td></td>
<td>584</td>
</tr>
<tr>
<td>Fig. 4</td>
<td>POTAMOLITHUS LAPIDUM ELATIOR</td>
<td></td>
<td>588</td>
</tr>
<tr>
<td>Figs. 5, 6</td>
<td>POTAMOLITHUS RIBEIRENSIS Pils.</td>
<td></td>
<td>584</td>
</tr>
<tr>
<td>Figs. 7, 7a</td>
<td>POTAMOLITHUS CHLORIS</td>
<td></td>
<td>579</td>
</tr>
<tr>
<td>Figs. 8, 8a</td>
<td>POTAMOLITHUS INTRACALLOSUS</td>
<td></td>
<td>584</td>
</tr>
<tr>
<td>Figs. 9, 10</td>
<td>POTAMOLITHUS PARANENSIS</td>
<td></td>
<td>589</td>
</tr>
</tbody>
</table>

(VOL. III)
EXPLANATION OF PLATE XLIC.

<table>
<thead>
<tr>
<th>Fig.</th>
<th>Image Description</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1, 2</td>
<td>LITTORIDINA CHARRUANA (d'Orb.)</td>
<td>558</td>
</tr>
<tr>
<td>3, 4, 8</td>
<td>LITTORIDINA AUSTRALIS (d'Orb.) Montevideo</td>
<td>557</td>
</tr>
<tr>
<td>5, 6, 7</td>
<td>&quot; &quot; &quot; Bahia Blanca</td>
<td>557</td>
</tr>
<tr>
<td>9</td>
<td>LITTORIDINA BERTONIANA Pils. Face of type.</td>
<td>559</td>
</tr>
<tr>
<td>10, 11</td>
<td>POTAMOPYRGUS SCOTTI &quot; &quot; &quot; two cotypes</td>
<td>563</td>
</tr>
<tr>
<td>12</td>
<td>POTAMOPYRGUS PETININGENSIS (Gld.). Topotype from the original lot</td>
<td>563</td>
</tr>
<tr>
<td>13</td>
<td>LITTORIDINA PICIUM (d'Orb.)</td>
<td>558</td>
</tr>
<tr>
<td>14, 14a</td>
<td>IDIOPYRGUS SOULEYETIANUS Pils. Profile and face of the type.</td>
<td>565</td>
</tr>
</tbody>
</table>
Littoridina Potamopyrgus Idiopyrgus
EXPLANATION OF PLATE XLII.

| Figs. 1, 1a, 1b. | Radiodiscus patagonicus (Suter). On the Rio Chico, 50 miles above the Sierra Oveja | 517 |
| Figs. 2, 3. | Succinea burmeisteri Doering. Rio Chico, 50 miles above the Sierra Oveja | 520 |
| Figs. 4–6. | " " Doering: Seven miles above the Sierra Ventana | 520 |
| Figs. 7, 7a, 8. | Littoridina hatcheri Pils. | 553 |
| Figs. 9, 10. | Littoridina simplex Pils. Cotypes | 555 |
| Figs. 11, 11a, 12, 13. | Littoridina hatcheri Pils. 40 miles above Sierra Oveja | 555 |

(vol. III)
RADIODISCUS, SUCCINEA & PALUDESTRINA
EXPLANATION OF PLATE XLIII.

Figs. 1, 1a, 1b, 2, 3, 4. CHILINA SMITHI Pils. Cotypes. 535
Figs. 5, 6, 7. CHILINA FULGURATA LIVIDA Pils. Cotypes. 539
Figs. 8, 9, 10. CHILINA SMITHI Pils. Immature specimens 536
Figs. 11, 12, 13, 14, 15. CHILINA FULGURATA Pils. Cotypes 537

(VOL. III)
EXPLANATION OF PLATE XLIIIA.

<table>
<thead>
<tr>
<th>Figs. 1, 1a, 2, 2a.</th>
<th>Chilina campylaxis Pils.</th>
<th>Cotypes.</th>
<th>541</th>
</tr>
</thead>
<tbody>
<tr>
<td>Figs. 3, 3a.</td>
<td>Chilina hatcheri</td>
<td>Type</td>
<td>540</td>
</tr>
<tr>
<td>Fig. 4.</td>
<td>Chilina fulgorata</td>
<td>Profile of type</td>
<td>537</td>
</tr>
<tr>
<td>Figs. 5, 5a.</td>
<td>Chilina andicola</td>
<td>Front and profile views of the type</td>
<td>540</td>
</tr>
<tr>
<td>Figs. 6, 6a.</td>
<td>Chilina fulgorata</td>
<td>Form from 25 miles above the Sierra Oveja.</td>
<td>538</td>
</tr>
<tr>
<td>Fig. 7.</td>
<td>&quot;</td>
<td>Sculpture of last whorl below the suture, specimen from 30 miles above the Sierra Oveja.</td>
<td>538</td>
</tr>
</tbody>
</table>

(vol. iii)
PATAGONIAN EXPEDITIONS: ZOOLOGY.

EXPLANATION OF PLATE XLIV.

<table>
<thead>
<tr>
<th>Figs.</th>
<th>Species</th>
<th>Location</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>16, 17, 19</td>
<td>Chilina fulgurata livida Pils.</td>
<td>Five miles above the Sierra Oveja</td>
<td>539</td>
</tr>
<tr>
<td>18, 18a, 20, 21, 22, 22a</td>
<td>&quot; fulgurata oligoptyx Pils. Cotypes.</td>
<td>&quot; Twenty-five miles above the Sierra Oveja.</td>
<td>538</td>
</tr>
<tr>
<td>23</td>
<td>&quot; fulgurata Pils. (?) Cotypes.</td>
<td></td>
<td>538</td>
</tr>
<tr>
<td>24, 24a, 24d, 25, 26</td>
<td>Chilina strebeli Pils. Cotypes.</td>
<td></td>
<td>534</td>
</tr>
<tr>
<td>27, 28</td>
<td>&quot; &quot;</td>
<td></td>
<td>534</td>
</tr>
<tr>
<td>29, 30, 30a</td>
<td>Chilina pilula Pils. Cotypes.</td>
<td></td>
<td>542</td>
</tr>
</tbody>
</table>
Chilina
EXPLANATION OF PLATE XLV.

<table>
<thead>
<tr>
<th>Figs. 31, 32, 33, 34.</th>
<th>Chilina Rushii Pils.</th>
<th>Cotypes</th>
<th>PAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Figs. 35–39.</td>
<td>Chilina Fluminea (Maton), San Gabriel’s Island, opposite Colonia, Uruguay.</td>
<td></td>
<td>544</td>
</tr>
<tr>
<td>Figs. 40–44.</td>
<td>“Fluminea Microdon Pils.</td>
<td>Cotypes.</td>
<td></td>
</tr>
<tr>
<td>Fig. 45.</td>
<td>Chilina Globosa Fild.</td>
<td>La Plata</td>
<td></td>
</tr>
</tbody>
</table>

(vol. III)
EXPLANATION OF PLATE XLVI.

Figs. 1, 2, 4, 6. *Lymnaea diaphana* inelegans n. subsp. Spring on the Rio Chico, 25 miles above Sierra Oveja . 527

Figs. 3, 7, 9. " " King. Spring on the Rio Chico, fifteen miles above the Sierra Oveja . 525

Fig. 5. " " inelegans. Stream 35 miles above the Sierra Oveja . 527

Fig. 8. *Lymnaea viator* d'Orbigny. Pool on the bank of the Rio Chico de la Santa Cruz, a mile west of the Sierra Oveja . 525

Figs. 10, 11. *Lymnaea patagonica riochicoensis* n. subsp. Rio Chico, 25 miles below the confluence of the R. Belgrano . 528
EXPLANATION OF PLATE XI.VI.A.

<table>
<thead>
<tr>
<th>Figs.</th>
<th>Description</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1, 2, 3</td>
<td>Lymnaea diaphana inelegans Pils. Form from Swan Lake</td>
<td>528</td>
</tr>
<tr>
<td>4, 4a</td>
<td>Lymnaea andeana Pils. Type. Near base of the Andes</td>
<td>530</td>
</tr>
<tr>
<td>5, 5a</td>
<td>Littoridina sublineata Pils. Type</td>
<td>556</td>
</tr>
<tr>
<td>6, 7, 7a</td>
<td>Musculium argentinum (Orb.) Montevideo.</td>
<td>605</td>
</tr>
<tr>
<td>8</td>
<td>Musculium patagonicum Pils. Type</td>
<td>604</td>
</tr>
<tr>
<td>9</td>
<td>Pisidium patagonicum zonifer Pils. Type</td>
<td>608</td>
</tr>
</tbody>
</table>
LYMNÆA, LITTORIDINA, MUSCULUM, PISIDUM.
## EXPLANATION OF PLATE XLVII

<table>
<thead>
<tr>
<th>Figs.</th>
<th>Description</th>
<th>Location</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1, 2, 3, 4, 5.</td>
<td><strong>Musculium patagonicum</strong> n. sp.</td>
<td>Rio Chico, twenty-five miles above the Sierra Oveja</td>
<td>604</td>
</tr>
<tr>
<td>6, 6a, 7.</td>
<td>&quot; &quot;</td>
<td>Rio Chico, thirty-five miles above the Sierra Oveja</td>
<td>604</td>
</tr>
<tr>
<td>8, 9, 10.</td>
<td><strong>Pisidium patagonicum</strong> n. sp.</td>
<td>Spring on the Rio Chico, fifteen miles above the Sierra Oveja</td>
<td>607</td>
</tr>
<tr>
<td>11, 12, 13, 14.</td>
<td><strong>Pisidium magellanicum</strong> Dall.</td>
<td>Sixty-five miles north of the Rio Chico, in a spring near the base of the Andes</td>
<td>606</td>
</tr>
<tr>
<td>15, 16.</td>
<td>&quot; &quot;</td>
<td>Dall. Spring on the Rio Chico, fifteen miles above the Sierra Oveja</td>
<td>606</td>
</tr>
</tbody>
</table>

*(Vol. III)*
1. Musculium
2. Musculium
3. Musculium
4. Musculium
5. Musculium
6. Musculium
7. Musculium
8. Musculium
9. Musculium
10. Musculium
11. Musculium
12. Musculium
13. Musculium
14. Musculium
15. Musculium
16. Musculium

MUSCULIUM & PISIDIUM
EXPLANATION OF PLATE XLVIII.

Fig. 1. Lepidurus hatcheri sp. nov.
1. a. Dorsal view of entire animal, nat. size
1. b. Dorsal view of last abdominal segment and caudal flap

Fig. 2. Branchinecta granulosa Daday
Front view of head of male with claspers, about \( \frac{1}{10} \)

Fig. 3. Hyalella patagonica sp. nov.
3. a. Maxilliped of male, about \( \frac{3}{10} \)
3. b. First gnathopod of male, about \( \frac{1}{8} \)
3. c. First gnathopod of female, about \( \frac{1}{8} \)
3. d. Second gnathopod of male, about \( \frac{1}{8} \)
3. e. Second gnathopod of female, about \( \frac{1}{8} \)
3. f. First pereopod of male, about \( \frac{1}{4} \)
3. g. Fifth pereopod of male, about \( \frac{1}{4} \)
3. h. Upper view of telson, and second and third uropods, about \( \frac{1}{4} \).
EXPLANATION OF PLATE XLIX.

Fig. 1. Semiscolex variabilis: Dorsal view of one of the larger specimens, \( \times \frac{1}{4} \) ... 670

Fig. 2. " " Dorsal view of twelve anterior somites, same specimen, \( \times \frac{1}{4}^{\frac{8}{8}} \) ... 670

Fig. 3. " " Ventral view of same, \( \times \frac{1}{4}^{\frac{8}{8}} \). Figs. 2 and 3 are somewhat diagrammatic ...

Fig. 4. " " Ventral view of anterior thirteen somites of a young example, accurately drawn to show the relative development of the annuli and position of the ganglia, \( \times \frac{1}{4}^{\frac{8}{8}} \).

Fig. 5. " " Dorsal view of posterior end of specimen shown in Fig. 1, \( \times \frac{1}{4}^{\frac{8}{8}} \) ...

Fig. 6. " " Ventral view of same, \( \times \frac{1}{4}^{\frac{8}{8}} \) ...

Fig. 7. " " Lateral aspect of anterior end of same, \( \times \frac{1}{4}^{\frac{8}{8}} \).

Fig. 8. " " Lateral aspect of posterior end of same, \( \times \frac{1}{4}^{\frac{8}{8}} \).

Fig. 9. " " A somewhat diagrammatic outline, showing the chief peculiarities of the alimentary canal, \( \times \) about \( \frac{1}{4}^{\frac{8}{8}} \) ... 672

Fig. 10. Glossiphonia duplicata: Reproductive organs dissected and viewed from above; surface texture of testes shown on left side, \( \times \frac{2}{4}^{\frac{1}{2}} \) ... 678

Fig. 11. Glossiphonia simplex: General features of alimentary canal, dorsal view, \( \times \frac{1}{4}^{\frac{8}{8}} \) ... 681

Lettering: a, anus; at, atrium (penis sheath or prostate cornua); de, ductus ejaculatorius; ep, epididymis; gan, ganglion, the neuromere indicated by a Roman numeral; ge, gastric cæca; ga, glandula albuginea; ic, intestinal cæca; m, mouth; n, nephropore; odc, common oviduct; ov, ovary; ph, pharynx; phg, pharyngeal glands; pg, prostate glands; t, testes, the serial number of which is indicated by a numeral; va, vagina; vd, vas deferens. The somites are numbered with the usual Roman characters, the annuli with their symbols.
SEMISCOLEX & HELOBDELLA
EXPLANATION OF PLATE L.

Fig. 12. *Semiscolex variabilis*: Dorsal aspect of reproductive organs in situ, the vagina only being slightly displaced to the right. From a dissection of specimen shown in Fig. 1. The position of the vasa efferentia is somewhat doubtful, as they could not be distinguished with certainty from the folds of the vas deferens, $\times \frac{2}{4}$.  

Fig. 13. *Glossiphonia michaeiensi*: Alimentary canal, $\times \frac{15}{2}$.  

Fig. 14. Reproductive organs from above; testes and left ovary omitted, $\times \frac{2}{4}$.  

Fig. 15. *Glossiphonia simplex*: Reproductive organs, from above. In this specimen the two sperm ducts are crossed and the one displaced to the left in reality belongs to the right side. The ovaries are also crossed. Testes of right side omitted, $\times \frac{2}{4}$.  

Fig. 16. *Glossiphonia duplicata*: General character of alimentary canal, dorsal view, $\times \frac{15}{2}$.  

Fig. 17. Dorsal view of anterior twelve somites, showing color-pattern as exhibited by a heavily marked example, but the longitudinal stripes are somewhat too prominent, $\times \frac{2}{4}$.  

Fig. 18. Ventral view of same, $\times \frac{2}{4}$.  

Fig. 19. Dorsal view of posterior end of same (type) specimen, $\times \frac{2}{4}$.  

Fig. 20. Ventral view of same, $\times \frac{2}{4}$.  

Fig. 21. Lateral view of posterior end of same, $\times \frac{2}{4}$.  

Fig. 22. Lateral view of anterior end of same, $\times \frac{2}{4}$.  

Fig. 23. *Glossiphonia simplex*: Dorsal aspect of anterior end, $\times \frac{2}{4}$.  

Fig. 24. Dorsal aspect of posterior end, $\times \frac{2}{4}$.

Sensillae are shown on somite XXIV.  

LETTERING: As in Plate XLIX.