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UNITED STATES NATIONAL MUSEUM.

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WASHINGTON:
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1875.

CHECK-LIST

OF

NORTH AMERICAN BATRACHIA AND REPTILIA;

WITH A

SYSTEMATIC LIST OF THE HIGHER GROUPS,

AND AN

ESSAY ON GEOGRAPHICAL DISTRIBUTION.

BASED ON

THE SPECIMENS CONTAINED IN THE U. S. NATIONAL MUSEUM.

By EDWARD D. COPE.

WASHINGTON:
GOVERNMENT PRINTING OFFICE.
1875.

ADVERTISEMENT.

This work is the first of a series of papers intended to illustrate the collections of Natural History and Ethnology belonging to the United States and constituting the National Museum, of which the Smithsonian Institution was placed in charge by the act of Congress of August 10, 1846.

It has been prepared at the request of the Institution, and printed by authority of the honorable Secretary of the Interior.

JOSEPH HENRY,
Secretary Smithsonian Institution.

SMITHSONIAN INSTITUTION,
Washington, November, 1875.

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INTRODUCTORY REMARKS.

The present contribution to North American Herpetology is a prodromus of a general work on that subject, undertaken some years ago at the request of the Secretary of the Smithsonian Institution. The material which has been accumulating in the museum of that Institution has offered great advantages for the investigation of the questions of anatomical structure, variations of specific characters, and geographical distribution. It is believed that these subjects are much elucidated by the study of the *Batrachia* and *Reptilia*, since these animals are especially susceptible to physical influences; since, also, they are unable, like birds, and generally not disposed, as are mammals, to make extended migrations, their habitats express nearly the simplest relations of life to its surroundings.

In prosecuting these investigations, it has become necessary to adapt the nomenclature to the results obtained by study of many specimens as to the variation of species. It is a common observation that the better a species of animal is represented in our collections, the wider do we discover its range of variation to be, and the greater the number of supposed distinct species does it become necessary to reduce to the rank of varieties. The definition of a species being simply a number of individuals, certain of whose physical peculiarities belong to them alone, and are at the same time exhibited by all of them, it is evident that, since it is impossible, in the present state of our knowledge, to predicate what those "certain peculiarities" shall be, the only test of specific definition is the constancy of those characters. Hence it is that the most diverse forms of one species may differ more from each other than two recognized species. In the investigation of North American cold-blooded *Vertebrata*, I have observed that many species are represented by well-marked geographical varieties, which, following the example of some ornithologists, I have called *subspecies*. Many of these have been heretofore regarded as species.

In illustration of these remarks, certain species of the genus *Ophibolus* may be selected. The most northern and the most southern forms of the

genus, the *O. triangulum* and *O. coccineus*, have always been regarded as distinct species; and so numerous are their differential characters, in coloration, size, and squamation, that this view would seem to rest on a satisfactory foundation. I find, however, that individuals exist which represent every stage of development of each character which distinguishes them, although certain types appear to be more abundant than the intermediate ones. *O. triangulum* is a species of larger size, with two temporal plates, a row of large dorsal spots, and other smaller ones on the sides, on a grayish ground; with a chevron, and often other marks on the top of the head, and a band posterior to the eye. *O. coccineus* is a small snake with a small loreal plate and one temporal shield; color red, with pairs of black rings extending round the body, and no markings on the head excepting that the anterior ring of the anterior pair crosses the posterior edge of the occipital shields, forming a half collar. The transition is accomplished thus: The lateral borders of the dorsal spots of *O. triangulum* break up, and the lateral spots become attached to their anterior and posterior dark borders. The chevron of the top of the head first breaks into spots, and then its posterior portions unite with each other. The borders of the old dorsal spots continue to the abdomen, where the remaining lateral portions finally meet on the middle line, forming a black line. This breaks up and disappears, leaving the annuli open; and these are then completed in many specimens. The general colors become more brilliant and the size smaller. The head is more depressed; in immediate relation to this form, the loreal plate is reduced in size, and the two temporal shields of *O. triangulum* are reduced to one. Every form of combination of these characters can be found, which represent six species of the books (in North America), viz: *O. triangulum*, *O. doliatus*, *O. annulatus*, *O. gentilis*, *O. amaurus*, and *O. coccineus*. The oldest name is the *O. doliatus*, Linn. Another series of specimens resemble very closely those of the subspecies *coccineus;* in fact, are identical with them in color. The loreal shield is, however, extinguished, and the rows of scales are reduced by one on each side. These specimens simply carry one degree further the modifications already described. Yet, on account of the constancy of these characters, I am compelled to regard these individuals not only as a distinct species, but, on account of the absence of the loreal plate, as belonging to another genus. This is the *Calamaria elapsoidea* of Holbrook; the *Osceola elapsoidea* of Baird and Girard. It affords an illustration of the principle, which I have elsewhere insisted on, "that adjacent species of allied genera may be more alike than remote

species of identical generic characters," which indicates that generic characters originate independently of the specific.*

The classification of the present list is illustrated by the above remarks. I now briefly allude to the rules I have followed in adopting a nomenclature. These rules are those in general use in the United States, as based on the revision of the rules of the British Association for the Advancement of Science by a committee of the American Association, and elaborated in more detail by W. H. Edwards,† after Thorell and Wallace; in other words, the law of priority is followed under the following definitions:

(1) A specific name given by an author must relate to a description or plate of the object intended.

(2) A generic name of a species must be accompanied by a separate definition of the genus intended, by reference to some of its distinctive features.

NOTE.—These two rules are properly regarded as the safeguards of nomenclature, since they offer the only means by which the writings of authors in the sciences concerned can be intelligible. The necessity of these rules will become increasingly apparent, since, as the systematic sciences become more popular, sciolists may publish pages of names in any of their departments, with the effect, should such names be authoritative, of indefinitely postponing the cultivation of the subject. A generic diagnosis is not necessarily perfect in the early stages of the classification of a science, and may be found later to embrace more than one generic type; hence, the following additional rule has been found necessary:

(3) In the subdivision of a genus, names of the new genera are to be adopted in the order of priority of the definition of the divisions to which they refer; the remaining natural generic group retaining the original name, unless the latter has been already given to one of the divisions, as prescribed.

(4) Priority reposes on date of publication, and not on date of reading of papers.

Of course, consistently with the above rules, as divisions of high rank must be defined in order to be understood, names of these unaccompanied by definitions are not binding on the nomenclator.

In regard to orthography, the same code of rules has been followed, viz, in the Latinization of all words of Greek derivation. This has been

* Origin of Genera, Philadelphia, 1868.

† The Canadian Entomologist, 1873, p. 32.

applied especially to the compounding of family-names. Thus, if the generic name is spelled according to Latin rule, the family-name derived from it must be so also; hence, I write *Scaphiopidae*, not Scaphiopodidae; *Rhinoceridae*, not Rhinocerotidae.

In the check-list, the correct name of each species and subspecies is given with reference to a good description. To each is added its geographical range.

PART I.

ARRANGEMENT

OF

THE FAMILIES AND HIGHER DIVISIONS

OF

BATRACHIA AND REPTILIA.

[ADOPTED PROVISIONALLY BY THE SMITHSONIAN INSTITUTION.]

Class BATRACHIA.

Order ANURA.

(Anura, Duméril; Salientia, Merrem, Gray.)

Raniformia.

(Raniformia, Cope, Nat. Hist. Rev., v, 114, 1865.[1])

Ranidae = Ranidae, Cope, N. H. Rev., v, 114–119, 1865.[2]

Colostethidae = Colostethidae, Cope, P. A. N. S. Phila., 1866, 130.[3]

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[1] Raniformia, partim, Dum. et Bib., Erp. Gén.

[2] Ranidae, Cope, Jour. Acad. Nat. Sci. Phila., n. s., vi, 189, 1867; Ranidae, Polypedatidae, and Cystignathidae, pars, Gthr., Cat. Bat. Salien., 1858, 4–26.

[3] Colostethidae, Cope, Jour. Acad. Nat. Sci. Phila., n. s., vi, 197, 1867; "Calostethidae," Mivart, Proc. Zoöl. Soc. London, 1869.

Firmisternia.[4]

(Bufonoid Raniformia, Cope, Jour. Acad. Nat. Sc. Phila., n. s., vi, 190, 1867.)

Dendrobatidae = Dendrobatidae, Cope, N. H. Rev., v, 103–104, 1865.[5]

Phryniscidae = Phryniscidae, Cope, J. A. N. S. Phila., n. s., vi, 190, 1867.[6]

Engystomidae = Engystomidae, Cope, J. A. N. S. Phila., n. s., vi, 190, 1867.[7]

Brevicipitidae = Brevicipitidae, Cope, J. A. N. S. Phila., n. s., vi, 190, 1867.[8]

Gastrechmia.

(Gastrechmia, Cope, J. A. N. S. Phila., n. s., vi, 198, 1867.)

Hemisidae = Hemisidae, Cope, J. A. N. S. Phila., n. s., vi, 198–199, 1867.[9]

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[4] Firmisternia. Believing the arciferous or raniform sternal structure to have about equal systematic value with the presence or absence of teeth, I have separated the toothless families with raniform sternum under the name of Firmisternia. It is not impossible that this group may turn out to be inseparable from the Gastrechmia. The toothed Aglossa must be distinguished on the same principle from Pipa, and the suborder is accordingly named Odontaglossa.

[5] Hylaplesiidae, Gthr., Cat. Bat. Salien., 1858, 124–126.

[6] Brachycephalina, pars, Gthr., Cat. Bat. Salien., 1858, 42.

[7] Engystomidae, Cope, N. H. Rev., v, 100–101, 1865; Michrylidae, Brachymeridae, Engystomatidae, Hylaedactylidae, Gthr., Cat. Bat. Salien., 1858.

[8] Brachymeridae, Cope, pars, N. H. Rev., v, 101–102, 1865.

[9] Hemisidae; Rhinophrynidae, Cope, pars, N. H. Rev., v, 100, 1865; Rhinophrynidae et Phryniscidae, pars, Mivart, Proc. Zoöl. Soc. London, 1869, 281–288.

Bufoniformia.

(Bufoniformia, Duméril et Bibron, partim; Cope, partim.)

Rhinophrynidae = Rhinophrynidae, Gthr., Cat. Bat. Sal. B. M., 127, 1858.[10]

Bufonidae = Bufonidae, Cope, N. H. Rev., v, 102–103, 1865.[11]

Batrachophrynidæ = Batrachophrynus, Peters, Monatsb. Pr. Akad. Wiss., 1873, 411.

Aglossa.

Pipidae = Pipidae, Gthr., Cat. Bat. Sal. B. M., 2–3, 1858.[12]

Odontaglossa.

Dactylethridae = Dactylethridae, Gthr., Cat. Bat. Sal. B. M., 1–2, 1858.[13]

Arcifera.

(Arcifera, Cope, N. H. Rev., v, 104, 1865.[14])

Cystignathidae = Cystignathidae, Cope, N. H. Rev., v, 105, 1865.[15]

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[10] Rhinophrynidae, Cope, N. H. Rev., v, 100, 1865, pars, nec Mivart; Cope, Jour. Acad. Nat. Sci. Phila., vi, 189, 1867.

[11] (Bufonidae) Chelydobatrachus, Gthr., Cat. Bat. Salien., part., 1858, 51, 53–54.

[12] Pipidae, Cope, N. H. Rev., v, 98–99, 1865; Pipidae, Mivart, Proc. Zoöl. Soc. London, 1869, 287, 295.

[13] Dactylethridae, Cope, N. H. Rev., v, 99, 1865; Dactylethridae, Mivart, Proc. Zoöl. Soc. London, 1869, 295.

[14] Arcifera, Cope, Jour. Nat. Sci. Phila., vi, 67–68, 1866.

[15] Cystignathidae, Ranidae partim, Cystignathidae, Uperoliidae, Bombinatoridae partim, Alytidae partim, Hylodidae, Gthr.; Ranidae partim, Polypedatidae partim, Discoglossidae partim, Mivart, Proc. Zoöl. Soc. London, 1869.

Hemiphractidae	= Hemiphractidae, Cope, J. A. N. S. Phila., n. s., vi, 69, 1866.
Hylidae	> Hylidae, Gthr., Cat. Bat. Salien., 96, 1858.[16]
Scaphiopidae	= Scaphiopodidae, Cope, J. A. N. S. Phila., n. s., vi, 69, 1866.[17]
Pelodytidae	= Pelodytidae, Cope, J. A. N. S. Phila., vi, 69, 1866.[18]
Asterophrydidae	= Asterophrydidae, Cope, J. A. N. S. Phila., n. s., vi, 79–80.[16a]
Discoglossidae	= Discoglossidae, Cope, N. H. Rev., v, 105–107, 1865.[19]

Order STEGOCEPHALI.

(Stegocephali, Cope, P. A. N. S. Phila., 1868, 209.[20])

Labyrinthodontia.

Baphetidae	= *Baphetidae*, Cope, MSS.
Anthracosauridae	= *Anthracosauridae*, Cope, MSS.

Ganocephala.

Colosteidae	= Colosteidae, Cope, MSS.[21]

[16] Hylidae, Cope, T. A. N. S. Phila., vi, 83–85, 1866.

[17] Scaphiopodidae partim, N. H. Rev., v, 107–108, 1865.

[18] Pelodytidae. Scaphiopodidae pars, Cope, olim, Jour. Acad. Nat. Sci. Phila., vi, 69, 1866.

[19] Discoglossidae, Cope, Jour. Acad. Nat. Sci. Phila., vi, 69, 1866; Discoglossidae partim, 34, Bombinatoridae partim et Alytidae partim Gthr., Cat. Bat. Salien., 40, 57, 1858; Mivart, Proc. Zoöl. Soc. London, 1869, 294-295

[20] Stegocephali, Cope, Trans. Am. Phil. Soc. 1870, 6-7.

[21] Colosteus, Cope.

Microsauria.

Phlegethontiidae = *Phlegethontiidae*, Cope, MSS.[21a]

Molgophidae = *Molgophidae*, Cope, MSS.[22]

Ptyoniidae = *Ptyoniidae*, Cope, MSS.[23]

Tuditanidae = *Tuditanidae*, Cope, MSS.

Peliontidae = *Peliontidae*, Cope, MSS.[24]

Order GYMNOPHIDIA.

(Gymnophiona, Müller.)

Caeciliidae = Caeciliidae, Gray, Cat. Bat. Grad. B. M., 57, 1850.

Order URODELA.

Pleurodelidae = { Seiranotidae, / Pleurodelidae, } Gray, P. Z. S. London, xxvi, 137–143, 1858.

Salamandridae[25] = Salamandridae, Gray, P. Z. S. London, xxvi, 142–143, 1858.

Hynobiidae[26] = Hynobiidae, Cope, J. A. N. S. Phila., n. s., vi, 107, 1866.

Desmognathidae = Desmognathidae, Cope, J. A. N. S. Phila., n. s., vi, 107, 1866.

Thoriidae = Thoriidae, Cope, P. A. N. S. Phila., 1869, 111–112.

[21a] Phlegethontia, Cope.

[22] Molgophis, Cope.

[23] Lepterpetou, Huxl.; Oestocephalus, Cope; Urocordylus, Huxl.

[24] Pelion, Wyman.

[25] Salamandridae, Cope, Jour. Acad. Nat. Sci. Phila., vi, 107–108, 1866.

[26] Hynobiidae, Cope; Molgidae, Gray, 1850.

Plethodontidae[27] = Plethodontidae, Cope, J. A. N. S. Phila., n. s., vi, 106–107, 1866.

Amblystomidae[28] = Amblystomidae, Cope, J. A. N. S. Phila., n. s., vi, 105–106, 1866.

Menopomidae = Protonopsidae, Gray, Cat. Bat. Grad. B. M., 52–54, 1850.

Amphiumidae = Amphiumidae, Cope, J. A. N. S. Phila., n. s., vi, 104–105, 1866.

Cocytinidae = *Cocytinidae*, Cope, MSS.[29]

Order PROTEIDA.

Proteidae = Proteidae, Gray, Cat. Bat. Grad. B. M., 64–67, 1850.

Order TRACHYSTOMATA.

Sirenidae = Sirenidae, Gray, Cat. Bat. Grad. B. M., 67–69, 1850.

Class REPTILIA.

Order ORNITHOSAURIA.

(Ornithosauria, Bonaparte, Fitzinger, Seeley.[30])

Dimorphodontidae = Dimorphodontidae, Cope, P. A. A. A. S. 1870, 234, 1871.[31]

[27] Plethodontidae, Cope, Jour. Acad. Nat. Sci. Phila., vi, 106, 1866, partim Gray, 1850.
[28] Amblystomidae. Plethodontidae partim, Gray, 1850.
[29] Cocytinus, Cope, Trans. Am. Philos. Soc. Phila., 1874.
[30] Ornithosauria = Pterosauria, Owen.
[31] Dimorphodontae, Seeley.

Pterodactylidae = Pterodactylidae, Cope, P. A. A. A. S., xix, 234, 1871.[32]

Order DINOSAURIA.

(Dinosauria, Owen, Cope, Seeley; *Pachypodes,* Meyer; Ornithoscelida, Huxley.)

Symphypoda.

(Symphypoda, Cope; Compsognatha, Huxley.)

Compsognathidae = *Compsognathidae*, Cope, P. A. A. A. S., xix, 234, 1871[33] (name only).

Ornithotarsidae = *Ornithotarsidae*, Cope, P. A. A. A. S., 234, 1871[34] (name only).

Goniopoda.

(Goniopoda, Cope; Harpagmosauria, Haeckel.)

Megalosauridae = *Megalosauridae*, Cope, P. A. A. A. S., xix, 234, 1871 (name only).[35]

Teratosauridae = *Teratosauridae*, Cope, P. A. A. A. S., xix, 234, 1871 (name only).[36]

Orthopoda.

(Orthopoda, Cope; Therosauria, Haeckel.)

Scelidosauridae = *Scelidosauridae*, Cope, T. A. P. S., n. s., xiv, 91, 1869.[37]

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[32] Rhamphorhynchae et Pterodactylae, Seeley, loc. cit.

[33] Compsognathidae = Compsognathus, Wag.

[34] Ornithotarsidae = Ornithotarsus, Cope.

[35] Megalosauridae, Huxley.

[36] Teratosaurus, Plateosaurus, Meyer, etc.

[37] Scelidosauridae, Huxley, Journ. Geol. Soc. London, 1870.

Iguanodontidae = *Iguanodontidae*, Cope, T. A. P. S., n. s., xiv, 91, 1869.[38]

Hadrosauridae = *Hadrosauridae*, Cope, T. A. P. S., n. s., xiv, 91–98, 1869.[39]

Order CROCODILIA.

(Crocodilia et Thecodontia, partim, Owen, 1841.)

Parasuchia.

Belodontidae = *Belodontidae*, Cope, P. A. A. A. S., xix, 234, 1871 (name only).[40]

Amphicoelia.

Teleosauridae = *Teleosauridae*, Cope, P. A. A. A. S., xix, 234, 1871 (name only).

Goniopholididae = *Goniopholis*, Owen, etc.

Procoelia.

Thoracosauridae = *Thoracosauridae*, Cope, P. A. A. A. S., xix, 235, 1871 (name only).[41]

Crocodilidae = Crocodilidae, Cope, P. A. A. A. S., xix, 235, 1871 (name only).[42]

Order SAUROPTERYGIA.

(Sauropterygia, Owen.)

?*Placodontidae* = *Placodontidae*, Cope, P. A. A. A. S., xix, 235, 1871 (name only).[43]

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[38] Iguanodontidae, Huxley, Journ. Geol. Soc. London, 1870.

[39] Hadrosauridae, Huxley, Journ. Geol. Soc. London, 1870.

[40] Thecodontia, Owen, pt.; Cope, Tr. A. P. S., 1869, 32.

[41] Thoracosaurus, Leidy, Cope.

[42] Crocodilidae + Alligatoridae, Gray, + Gavialidae, Gray, + Holops and Thecachampsa, Cope, etc., Pr. A. A. A. S., xix, 235, 1871.

[43] Placodus, Agass.

Plesiosauridae = *Plesiosauridae*, Cope, P. A. A. A. S., xix, 235, 1871 (name only).[44]

Elasmosauridae = *Elasmosauridae*, Cope, Tr. A. P. S., n. s., xiv, 1869, p. 47.[45]

Order ANOMODONTIA.

(Anomodontia, Owen.)

Dicynodontidae = *Dicynodontidae*, Cope, P. A. A. A. S., xix, 235, 1871 (name only).[46]

Oudenodontidae = *Oudenodontidae*, Cope, P. A. A. A. S., xix, 235, 1871 (name only).[47]

Order ICHTHYOPTERYGIA.

Ichthyosauridae = *Ichthyosauridae*, Cope, P. A. A. A. S., xix, 235, 1871.

Order RHYNCHOCEPHALIA.

Protorosauridae = *Protorosauridae*, Cope, P. A. A. A. S., xix, 235, 1871 (name only).[48]

Sphenodontidae = Sphenodontidae, Cope, P. A. A. A. S., xix, 235, 1871.[49]

Rhynchosauridae = *Rhynchosauridae*, Cope, P. A. A. A. S., xix, 235, 1870 (name only).[50]

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[44] Nothosaurus, Pistosaurus, Plesiosaurus, Pliosaurus, etc.
[45] Elasmosaurus, Cimoliasaurus, etc.
[46] Dicynodontidae, Owen, Paleontology.
[47] Cyptodontia, Owen, Paleontology.
[48] Protorosaurus, Meyer (elongate sacrum).
[49] Hatteriidae, Cope, Proc. Acad. Nat. Sc. Phila., 1864, 225-7.
[50] Rhynchosaurus, Owen.

Order TESTUDINATA.

ATHECAE.

(Athecae, Cope, P. A. A. A. S., xix, p. 235, 1870.)

Sphargididae = Sphargididae, Gray, Ann. Philos., 1825.[51]

Protostegidae = Protostega, Cope, Proc. A. P. S., 1872, 413.

CRYPTODIRA.

Cheloniidae = Cheloniidae, Gray, Annals Philosophy, 1825.[52]

Propleuridae = *Propleuridae*, Cope, Am. Jour. Sc. and Arts, l, 137, 1870.

Trionychidae = Trionychidae, Gray, Annals of Philosophy, 1825.[53]

Emydidae = Emydidae, Agassiz, Cont. Nat. Hist. U. S., i, p. 351.[54]

Chelydridae = Chelydridae, Agassiz, Contrib. N. H. U. S., i, 341.[54a]

Cinosternidae = Cinosternidae, Agassiz, Cont. Nat. Hist. U. S., i, 347.

Testudinidae = Testudinidae, Cope, P. A. N. S. Phil., 1868, p. 282.[55]

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[51] Sphargididae, Bell, Fitzinger, Agassiz.

[52] Cheloniidae, Gray, Ann. Phil., 1825; Agass., Cope, P. A. A. A. S., xix, 235, 1871.

[53] Trionychidae, Bell, Wiegmann, Dum. et Bibr., Agass.

[54] Emydidae—Chelydridae, Cope, P. A. A. A. S., xix, 235, 1871 (name only).

[54a] Chelydra, Cope, P. A. N. S. Phila., 1872.

[55] Testudinidae, Gray, Agass.

Pleurosternidae = *Pleurosternidae*, Cope, P. A. N. S. Phila., 1868, 282 (name only).

Adocidae = *Adocidae*, Cope, P. A. P. S., 1870, 547.

Pleurodira.

(Pleurodira, Dum. et Bibron; Chelyoidae, Agass.)

Podocnemididae = Podocnemididae, Cope, P. A. N. S. Phila., 1868, 282.

Chelydidae = Chelydidae, Gray, P. Z. S. London, 1869, pp. 208–209.

Hydraspididae = Hydraspididae, Cope, P. A. N. S. Phila., 1868, 282.

Pelomedusidae = Pelomedusidae, Cope, P. A. N. S. Phila., 1865, 185; 1868, p. 119.

Sternothaeridae = Sternothaeridae, Cope, P. A. N. S. Phila., 1868, 119.

Order LACERTILIA.

(Lacertilia, Owen; Cope, P. A. A. A. S., xix, 236, 1870.)

Rhiptoglossa.

(Acrodonta Rhiptoglossa, Wiegmann, Fitzinger, Cope; Chamaeleonida, Müller.)

Chamaeleontidae = Chamaeleontidae, Gray, Cat. Lizards B. M., 1845, 264 (name only).[56]

[56] Wiegmann, Gray, etc.

Pachyglossa.

(Pachyglossa, Cope; Acrodonta Pachyglossa, Wagler, Fitzinger, Cope, P. A. N. S. Phila., 1864, 226–227.)

Agamidae = Agamidae, Gray, Cat. B. M., 1845, 230.

Nyctisaura.

(Nyctisaura, Gray, Cat. Lizards B. M.; Cope, P. A. N. S. Phila., 1864, 225.)

Gecconidae = Gecconidae, Gray, Cat. Lizards B. M., 1845, 142.[57]

Pleurodonta.

(Pleurodonta, Cope, P. A. N. S. Phila., 1864, 226.)

a. *Iguania.*

Anolidae = Anolidae, Cope, P. A. N. S. Phila., 1864, 227, 228.

Iguanidae = Iguanidae, Cope, P. A. N. S. Phila., 1864, 227, 228.[58]

b. *Diploglossa.*

Anguidae = Anguidae, Cope, P. A. N. S. Phila., 1864, 228.

Gerrhonotidae = Gerrhonotidae, Cope, P. A. N. S. Phila., 1864, 228.[59]

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[57] Cope, Pr. A. A. A. S., xix, 236, 1871.

[58] Iguanidae pars auctorum.

[59] Zonuridae, pt., Gray.

Xenosauridae = Xenosauridae, Cope, P. A. N. S. Phila., 1866, 322.

Helodermidae = Helodermidae, Gray, Cat. Lizards B. M., 1845.[60]

c. *Thecaglossa.*

(Thecaglossa, Wagler, Fitzinger, Cope.)

Varanidae = Varanidae, Cope, P. A. A A. S., xix, 237, 1870.

d. *Leptoglossa.*

(Leptoglossa, Wiegmann, Fitzinger, Cope.)

Teidae = Teidae, Cope, P. A. A. A. S., xix, 237, 1871.[61]

Lacertidae = Lacertinidae, Gray, Cat. Lizards B. M., 26–44, 1845.[62]

Zonuridae = Zonuridae, Cope, P. A. A. A. S., xix, 237–241, 1871.[63]

Chalcidae = Chalcidae, Gray, Cat. Lizards B. M., 57–58, 1845.[64]

Scincidae = Scincidae, Gray, Cat. Lizards B. M., 70–120, 1845.[65]

Sepsidae = Sepsidae, Gray, Cat. Lizards B. M., 121–126, 1845.[66]

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[60] Helodermidae, Cope, Proc. Acad. Nat. Sc. Phila., 1864, 228; 1866, 322.

[61] Teidae and Ecpleopodidae, Peters, Cope (Proc. Acad. Nat. Sci. Phila., 1864, 229); Teidae, Anadiidae, Cercosauridae, Riamidae, Gray.

[62] Lacertidae, Cope, Proc. Acad. Nat. Sci. Phila., 1864, 228; Lacertidae et Cricosauridae, Peters; Xantusiidae, Baird.

[63] Zonuridae, pt., Gray; Lacertidae pt., Cope.

[64] Chalcididae, Cope, Proc. Acad. Nat. Sci. Phila., 1864, 228.

[65] Scincidae, Cope, Proc. Acad. Nat. Sci. Phila., 1864, 228.

[66] Sepsidae, Cope, Proc. Acad. Nat. Sci. Phila., 1864, 228.

e. *Typhlophthalmi.*

(Typhlophthalmi, Cope, P. A. N. S. Phila., 1864, 228.[67])

Feyliniidae = Anelytropidae, Cope, P. A. N. S. Phila., 1864, 230.[68]

Acontiidae = Acontiadae, Gray, Cat. Lizards B. M., 126–127, 1845.[69]

Aniellidae = Aniellidae, Cope, P. A. N. S. Phila., 1864, 230.

Opheosauri.

(Opheosauri, Cope, P. A. N. S. Phila., 1864, 226.[70])

Amphisbaenidae = Amphisbaenidae, Gray, Cat. Tort. Croc., etc. B. M., 69, 1844.[71]

Trogonophidae = Trigonophidae, Gray, Catal. Tort. Croc., etc. B. M., 68, 1844.[72]

Order PYTHONOMORPHA.

(Pythonomorpha, Cope, T. A. P. S., n. s., xiv, 175–182, 1870.[73])

Mosasauridae > *Mosasauridae*, Cope, T. A. P. S., n. s., xiv, 182–211, 1870.

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[67] Typhlophthalmi, pars., Dum. et Bib., Erp. Gen.

[68] Typhlinidae, Gray.

[69] Acontiidae, Cope, Proc. Acad. Nat. Sci. Phila., 1864, 230.

[70] Ophisauri, Merrem; Annulati, Wiegmann; Ptychopleures Glyptodermes, Dum. et Bib.; Amphisbaenoidea, Müller.

[71] Amphisbaenidae, Wiegmann.

[72] Trogonophes, Wiegmann, Fitzinger.

[73] Pythonomorpha, Cope, Proc. Bost. Nat. Hist. Soc., 1869, 251; Lacertilia Natantia, Owen, Paleontographical Soc. Cretaceous Reptiles.

Order OPHIDIA.

Scolecophidia.

(Scolecophidia, Dum. et Bib.[74])

Typhlopidae = Typhlopidae, Cope, P. A. A. A. S., xix, 237, 1871 (name only).[75]

Stenostomidae = Stenostomidae, Cope, P. A. A. A. S., xix, 237, 1871 (name only).[76]

Tortricina.

(Tortricina, Müller.[77])

Tortricidae = Tortricidae, Cope, P. A. N. S. Phila., 1864, 230.

Uropeltidae = Uropeltidae, Cope, P. A. N. S. Phila., 1864, 230.[78]

Asinea.

(Asinea, Müller, Cope.)

a. *Peropoda.*

(Peropoda, Müller.)

Xenopeltidae = Xenopeltidae, Cope, P. A. N. S. Phila., 1864, 230.[79]

Pythonidae = Pythonidae, Cope, P. A. N. S. Phila., 1864, 230.[80]

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[74] Scolecophidia et Catodonta, Cope, Proc. Acad. Nat. Sci. Phila., 1864, 230.
[75] Epanodontiens, Dum. et Bib.
[76] Catodontiens, Dum. et Bib.; Catodonta, Cope, olim.
[77] Tortricina, Cope, Proc. Acad. Nat. Sci. Phila., 1864, 230.
[78] Uropeltacea, Peters; Rhinophidae, Gray.
[79] Xenopeltidae, Gthr., Reptiles British India.
[80] Holodontiens, Dum. et Bib.

Boidae = Boidae, Cope, P. A. N. S. Phila., 1864, 230.[81]

Lichanuridae = Lichanuridae, Cope, P. A. N. S. Phila., 1868, 2.

b. *Colubroidea.*

Achrochordidae = Achrochordidae, Cope, P. A. N. S. Phila., 1864, 231.[82]

Homalopsidae = Homalopsinae, Cope, P. A. N. S. Phila., 1864, 167.[83]

Colubridae = Colubridae, Cope, P. A. A. A. S., xix, 238, 1870.[84]

Rhabdosomidae = Rhabdosomidae, Cope, P. A. A. A. S., xix, 238, 1870.[85]

PROTEROGLYPHA.

a. *Conocerca.*

Elapidae = Elapidae, Cope, P. A. N. S. Phila., 1864, 231.[86]

Najidae = Najidae, Cope, P. A. N. S. Phila., 1864, 231.[87]

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[81] Aproterodontiens, Dum. et Bib.

[82] Achrochordiens, Dum. et Bib.

[83] Natricidae, pars, Gthr., Cat. Col. Snakes B. M., 1858, 50–84, Potamophilidae, Jan.

[84] Asinea, Group *β–bb*, Cope, Proc. Acad. Nat. Sci. Phila., 1864, 231; Calamaridae, Olgodontidae, Coronellidae, Colubridae, Dryadidae, Dendrophidiidae, Dryiophidiidae, Psammophidiidae, Lycodontidae, Scytalidae, Dipsadidae, etc., Gthr., Cat. Col. Snakes B. M., 1858, et op. alt.

[85] Calamaridae partim, Gthr., Cat. Col. Snakes B. M., 1858, 2–22.

[86] Elapidae (pars), Gthr., Cat. Col. Snakes B. M., 1858, 209–237.

[87] Elapidae (pars altera), Gthr., Cat. Col. Snakes B. M., 1858, 209–237.

b. *Platycerca.*

Hydrophidae = Hydridae, Gray, Cat. Snakes B. M., 2, 35, 40, 1849.[88]

SOLENOGLYPHA.[89]

(Solenoglypha, Dum. et Bib.)

Atractaspididae = Atractaspididae, Gthr., Cat. Snakes B. M., 239, 1858.[90]

Causidae = Causidae, Cope, P. A. N. S., Phila., 1859, 334.

Viperidae = Viperidae, Gray, Cat. Brit. Mus., p. 18.[91]

Crotalidae = Crotalidae, Gray, Cat. Brit. Mus.[92]

[88] Hydridae, Gray; Hydrophidae, Schmidt, Fischer; Cope, Proc. Acad. Phila., 1859 333.

[89] Viperidae, Cope, Proc. Acad. Nat. Sci. Phila., 1859, 333.

[90] Atractaspidinae, Cope, Proc. Acad. Nat. Sci. Phila., 1859, 334.

[91] Viperinae, Cope, Proc. Acad. Nat. Sci. Phila., 1859; Günther.

[92] Crotalinae, Cope, Proc. Acad. Nat. Sci. Phila., 1859; Günther, Cat. Col. Snakes B. M. et auctorum.

PART II.

CHECK-LIST

OF

THE SPECIES OF BATRACHIA AND REPTILIA

OF

THE NEARCTIC OR NORTH AMERICAN REALM.

BATRACHIA.

TRACHYSTOMATA.

SIRENIDAE.

SIREN, Linn.

Siren lacertina, Linn.; Holbrook, N. Am. Herpetology, vol. v, p. 101. The Austroriparian region; extreme points North Carolina, Florida, Matamoras, Mexico, and Alton, Illinois.

PSEUDOBRANCHUS, Gray.

Pseudobranchus striatus, LeConte; Holbrook, American Herpetology, vol. v, p. 109. Georgia.

PROTEIDA.

PROTEIDAE.

NECTURUS, Raf.

Necturus lateralis, Say; Holbrook, Am. Herp., vol. v, pp. 111, 115. Eastern region except New England and eastern Middle States; from a few points in the Austroriparian.

Necturus punctatus, Gibbes. Eastern South Carolina.

CADUCIBRANCHIATA.

AMPHIUMIDAE.

AMPHIUMA, Linn.

Amphiuma means, Linn.; Holbrook, Am. Herp., v, p. 89. Austroriparian region, from North Carolina to Mississippi.

MURAENOPSIS, Fitzinger.

Muraenopsis tridactylus, Cuvier; Holbrook, Am. Herp., v, p. 93. Mississippi and Louisiana.

MENOPOMIDAE.

MENOPOMA, Harl.

Menopoma allegheniense, Harl.; Holbrook, Am. Herp., v, p. 95. All tributaries of the Mississippi, and streams of the Louisianian district to North Carolina.

Menopoma fuscum, Holbrook, Am. Herp., v, p. 99. Headwaters of the Tennessee River.

AMBLYSTOMIDAE.

AMBLYSTOMA, Tschudi.

Amblystoma talpoideum, Holbrook; Cope, Proceedings Academy Philadelphia, 1867, p. 172. Austroriparian region; mountains of South Carolina.

Amblystoma opacum, Gravenhorst; Cope, Proceed. Acad. Phila., 1867, p. 173. From Pennsylvania to Florida, to Wisconsin, and to Texas.

Amblystoma punctatum, Linn.; Cope, loc. cit., 1867, p. 175. United States, east of the plains; Nova Scotia.

Amblystoma conspersum, Cope, loc. cit., 1867, 177. Pennsylvania to Georgia.

Amblystoma bicolor, Hallowell; Cope, loc. cit., 178. New Jersey.

Amblystoma tigrinum, Green; Cope, loc. cit., 179. United States, east of the plains.

Amblystoma mavortium, Baird; Cope, loc. cit., 184. United States, in the Central, Sonoran, and Pacific regions.

Amblystoma mavortium, Baird; subspecies *californiense*, Gray; Cope, loc. cit., p. 187. Pacific region.

Amblystoma obscurum, Baird; Cope, loc. cit., p. 192. Iowa.

Amblystoma xiphias, Cope, loc. cit., p. 192. Ohio.

Amblystoma trisruptum, Cope, loc. cit., p. 194. New Mexico.

Amblystoma jeffersonianum, Green, subspecies *jeffersonianum*, Green; Cope, loc. cit., p. 195. Pennsylvania and Ohio, and northward.

Amblystoma jeffersonianum, Green, subspecies *laterale*, Hallowell; Cope, loc. cit., p. 197. Canada and Wisconsin, and northward.

Amblystoma jeffersonianum, Green, subspecies *fuscum*, Hallowell; Cope, loc. cit., 197. Indiana and Virginia.

Amblystoma jeffersonianum, Green, subspecies *platincum*; Cope, loc. cit., p. 198. Ohio.

Amblystoma macrodactylum, Baird; Cope, loc. cit., p. 198. Pacific region.

Amblystoma paroticum, Baird; Cope, loc. cit., p. 200. Vancouver's Island and Washington Territory.

Amblystoma aterrimum, Cope, loc. cit., p. 201. Northern Rocky Mountains.

Amblystoma tenebrosum, Baird and Girard; Cope, loc. cit., p. 202. Pacific region of Oregon and California.

Amblystoma texanum, Matthes; Cope, loc. cit., p. 204. Texas.

Amblystoma cingulatum, Cope, loc. cit., p. 205. South Carolina.

Amblystoma microstomum, Cope, loc. cit., p. 206. Austroriparian and Eastern regions, west of the Alleghany Mountains.

DICAMPTODON, Strauch.

Dicamptodon ensatus, Eschscholz, Zoölogical Atlas, part v, p. 6, pl. xxii. Pacific region.

PLETHODONTIDAE.

BATRACHOSEPS, Bonap.

Batrachoseps attenuatus, Eschscholz, Hallowell, Jour. Acad. Phila., 1858, p. 348. Pacific region.

Batrachoseps nigriventris, Cope, Proceed. Acad. Phila., 1869, p. 98. Fort Tejon, California.

Batrachoseps pacificus, Cope, Proceed. Acad. 1865, p. 195. Santa Barbara, Cal.

HEMIDACTYLIUM, Tschudi.

Hemidactylium scutatum, Schlegel; Duméril et Bibron, Erp. Générale, ix, p. 118–9. Rhode Island to Illinois, and to the Gulf of Mexico.

PLETHODON, Tschudi.

Plethodon cinereus, Green, subspecies *cinereus*, Green; Cope, Proceed. Acad. Phila., 1869, p. 99. Eastern region.

Plethodon cinereus, Green, subspecies *erythronotus*, Green; Holbrook, N. Am. Herp., v, p. 43. Eastern region.

Plethodon cinereus, Green, subspecies *dorsalis*, Baird, MSS. Louisville, Ky.; Salem, Mass.

Plethodon intermedius, Baird, Proceed. Acad. Phila., 1857, p. 209. Vancouver's Island.

Plethodon glutinosus, Green; Cope, loc. cit., 1869, p. 99. Eastern and Austroriparian regions.

Plethodon oregonensis, Girard; Cope, loc. cit., p. 99. Pacific region.

Plethodon flavipunctatus, Strauch., Mem. Acad. Sci. St. Petersburg, 1871, xvi, 71. ? New Albion, Cal.

Plethodon croceater, Cope, loc. cit., 1857, p. 210. Lower California.

STEREOCHILUS, Cope.

Stereochilus marginatum, Hallowell; Cope, loc. cit., 1869, 101. Georgia.

MANCULUS, Cope.

Manculus remifer, Cope, Report of Peabody Academy, Salem, Mass., 1869, p. 84. Florida.

Manculus quadridigitatus, Holbrook, N. Am. Herp., v, p. 65. North Carolina to Florida.

SPELERPES, Raf.

Spelerpes multiplicatus, Cope, Proceed. Acad. Phila., 1869, p. 106. Arkansas.

Spelerpes bilineatus, Green; Cope, loc. cit., p. 105. Eastern and Austroriparian regions, excepting Texas.

Spelerpes longicaudus, Green; Cope, loc. cit., p. 105. Eastern and Austroriparian regions, except Texas.

Spelerpes guttolineatus, Holbrook; Cope, loc. cit., p. 105. North and South Carolina, Georgia, and Alabama.

Spelerpes ruber, Daudin, subspecies *ruber*, Daudin; Cope, loc. cit., 1869, 105. Eastern and Austroriparian regions.

Spelerpes ruber, subspecies *sticticeps*, Baird, MSS. South Carolina.

Spelerpes ruber, Daudin, subspecies *montanus*, Baird; Jour. Acad. Phila., vol. i, p. 293. Alleghany Mountains, from Pennsylvania to South Carolina.

GYRINOPHILUS, Cope.

Gyrinophilus porphyriticus, Green; Cope, Proceed. Acad. Phila., 1869, p. 108. Alleghany Mountains, from New York to Alabama.

ANAIDES, Baird.

Anaides lugubris, Hallowell; Cope, loc. cit., 1869, p. 109. Entire Pacific region.

Anaides ferreus, Cope, loc. cit., 1869, p. 109. Oregon.

DESMOGNATHIDAE.

DESMOGNATHUS, Baird.

Desmognathus ochrophaea, Cope, Proceed. Acad. Phila., 1869, p. 113. Alleghany Mountains, from New York to Georgia.

Desmognathus fusca, Rafinesque; Cope, loc. cit., 115; subspecies *fusca*, Raf.; Cope, loc. cit., 116. Essex County, Massachusetts, to Biloxi, Mississippi.

Desmognathus fusca, Raf., subspecies *auriculata*, Holbrook; Cope, loc. cit., p. 116. South Carolina to Louisiana.

Desmognathus nigra, Green; Cope, loc. cit., p. 117. Alleghany Mountains, from Pennsylvania southward.

PLEURODELIDAE.

DIEMYCTYLUS, Rafinesque.

Diemyctylus torosus, Eschscholz; Girard, U. S. Expl. Exped., 1858, p. 5. Pacific region.

Diemyctylus miniatus, Raf., subspecies *miniatus*, Raf.; Hallowell, loc. cit.; Holbrook, N. Am. Herp., v, p. 57. Eastern and Austroriparian regions.

Diemyctylus miniatus, Raf., subspecies *viridescens*, Raf.; Holbrook, N. Am. Herp., v, p. 77. Eastern and Austroriparian regions.

ANURA.

BUFONIFORMIA.

BUFONIDAE.

Bufo, Laurenti.

Bufo punctatus, Baird; Girard, U. S. Mex. Bound. Surv., ii, p. 25. Sonoran and Lower Californian regions.

Bufo debilis, Girard; Baird, U. S. Mex. Bound. Surv., ii, p. 26 (*B. insidior*). Sonoran region.

Bufo halophilus, Baird; Girard, U. S. Mex. Bound. Surv., ii, p. 26. Pacific region.

Bufo columbiensis, Baird; Girard, Herpetology U. S. Expl. Exped., 77. Pacific region and Montana.

Bufo alvarius, Girard, U. S. Mex. Bound. Surv., ii, p. 26. Sonoran region.

Bufo microscaphus, Cope, Proc. Acad. Nat. Sci. Phila., 1866, p. 301. Sonoran region.

Bufo speciosus, Girard, U. S. Mex. Bound. Surv., ii, p. 26. Lower Rio Grande (Sonoran).

Bufo lentiginosus, Shaw, subspecies *frontosus*, Cope, Proc. Acad. Phila., 1866, p. 301. Sonoran region.

Bufo lentiginosus, subspecies *cognatus*, Say; Holbrook, N. Am. Herp., v, p. 21. Texan district.

Bufo lentiginosus, subspecies *americanus*, LeConte; Holbrook, Girard, U. S. Mex. Bound. Surv., ii, p. 25. Eastern and Austroriparian regions to the plains.

Bufo lentiginosus, subspecies *lentiginosus*, Latr.; Holbrook, N. Am. Herp., v, p. 7. Austroriparian region.

Bufo lentiginosus, subspecies *fowlerii*, Putnam, MSS. Massachusetts to Lake Winnipeg.

Bufo quercicus, Holbrook, N. Am. Herp., v, p. 13; Cope, Proc. Acad. Phila., 1862, p. 341. Floridan and Eastern Lousianian districts to North Carolina.

Bufo valliceps, Wiegmann; Girard, U. S. Mex. Bound. Surv., ii, p. 25, pl. xl, figs. 1–4 (*B. nebulifer*, Girard). Texan district (also Mexico).

FIRMISTERNIA.

ENGYSTOMIDAE.

ENGYSTOMA, Fitzinger.

Engystoma carolinense, Holbrook, N. Am. Herp., v, p. 23. Austroriparian region.

ARCIFERA.

HYLIDAE.

ACRIS, Dum., Bibr.

Acris gryllus, LeConte, subspecies *gryllus*, Holbrook, N. Am. Herp., iv, p. 131. Austroriparian region.

Acris gryllus, LeConte, subspecies *crepitans*, Baird, U. S. Mex. Bound. Surv., ii, p. 28. Eastern and Central regions.

CHOROPHILUS, Baird.

Chorophilus triseriatus, Wied, subspecies *clarkii*, Baird, U. S. Mex. Bound. Surv., p. 28. Texan district.

Chorophilus triseriatus, subspecies *triseriatus*, Wied. Central and Eastern regions.

Chorophilus triseriatus, subspecies *corporalis*, Cope, MSS. New Jersey.

Chorophilus nigritus, LeConte; Holbrook, N. Am. Herp., iv, p. 107. South Carolina and Georgia.

Chorophilus angulatus, Cope (*Cystignathus ocularis*), Holbrook, N. Am. Herp., iv, p. 137. South Carolina.

Chorophilus ocularis, Daudin (*Cystignathus ornatus*), Günther, Cat. Bat. Salien. Brit. Mus., p. 29. South Carolina and Georgia.

Chorophilus ornatus, Holbrook, N. Am. Herp., iv, p. 25. South Carolina; Georgia.

HYLA, Laurenti.

Hyla curta, Cope, Proc. Acad. Phila., 1866, p. 313. Lower Californian region.

Hyla regilla, Baird; Girard, U. S. Expl. Exped., p. 60. Pacific region.

Hyla eximia, Baird, U. S. Mex. Bound. Surv., p. 29. Sonoran region.

Hyla andersonii, Baird; Cope, Proc. Phila. Acad., 1862, 154. New Jersey to South Carolina.

Hyla squirella, Daudin; Holbrook, N. Am. Herp., iv, pl. 30. Austroriparian region.

Hyla carolinensis, Pennant; Holbrook, N. Am. Herp., iv, p. 29. Austroriparian region.

Hyla carolinensis, Penn., subspecies *semifasciata*, Hallowell, Proc. Acad. Phila., 1856, 306. Texan district.

Hyla pickeringii, Holbrook, N. Am. Herp., iv, pl. 34. Eastern region.

Hyla femoralis, Daudin; Holbrook, N. Am. Herp., iv, p. 31. Eastern part of Austroriparian region.

Hyla versicolor, LeConte; Holbrook, N. Am. Herp., iv, p. 28. Eastern and Austroriparian regions.

Hyla arenicolor, Cope; Baird, U. S. Bound. Surv., 29. Sonoran region.

Hyla cadaverina, Cope; Hallowell, U. S. P. R. R. Surv., x, Williamson's Report, 21. Pacific region.

Hyla gratiosa, LeConte, Proc. Acad. Phila., 1856, 146. Florida; Lower Georgia.

SMILISCA, Cope.

Smilisca baudinii, Dum., Bibr.; Baird, U. S. Bound. Surv., p. 29, pl. xxxviii, figs. 1–3. Lower Rio Grande, Mexico.

CYSTIGNATHIDAE.

LITHODYTES, Cope.

Lithodytes ricordii, Dum., Bibr.; Cope, Proc. Acad. Phila., 1862, 153. Southern Florida (Bahamas; Cuba).

EPIRHEXIS, Cope.

Epirhexis longipes, Baird, U. S. Mex. Bound. Surv., pl. xxxvii, figs 1–3. Lower Rio Grande.

SCAPHIOPIDAE.

SPEA, Cope.

Spea bombifrons, Cope, Proc. Acad. Phila., 1863, p. 53. Central region.

Spea hammondii, Baird; Cope, Proc. Acad. Phila., 1863, p. 53. Pacific region to San Diego.

Spea multiplicata, Cope, loc. cit., p. 52. Near city of Mexico.

SCAPHIOPUS, Holbrook.

Scaphiopus varius, Cope, subspecies *varius*, Cope, loc. cit., p. 52. Lower California.

Scaphiopus varius, Cope, subspecies *rectifrenis*, Cope, loc. cit., p. 53. Sonoran region.

Scaphiopus couchii, Baird; Cope, loc. cit., p. 52. Sonoran region.

Scaphiopus holbrookii, Harlan; Cope, loc. cit., p. 54. Eastern and Austroriparian regions.

RANIFORMIA.

RANIDAE.

RANA, Linn.

Rana arcolata, Baird and Girard, subspecies *capito*, LeConte, Proc. Acad. Phila., 1855, p. 425. Floridan district.

Rana areolata, Baird and Girard, subspecies *areolata*, Bd. Gir., U. S. Mex. Bound. Surv., 28, pl. xxxvi, figs. 11–12. Texan district.

Rana montezumae, Baird, U. S. Mex. Bound. Surv., p. 27. Mexican plateau.

Rana halecina, Kalm; Holbrook, N. Am. Herp., iv, p. 91; subspecies *halecina*, Hallowell, Proc. Acad. Phila., 1856, pp. 141, 250. Eastern coast-countries of Eastern and Austroriparian regions.

Rana halecina, Kalm, subspecies *berlandieri*, Baird, U. S. Mex. Bound. Surv., p. 27. Entire Interior of North America; Mexico.

Rana palustris, LeConte; Holbrook, N. Am. Herp., iv, p. 95. Eastern region.

Rana septentrionalis, Baird, Proc. Acad. Phila., 1854, p. 61 (*R. sinuata*, Bd.). Canada to Montana.

Rana clamitans, Merrem.; Holbrook, N. Am. Herp., iv, pp. 85–87. Eastern region, Louisianian district.

Rana catesbiana, Shaw; Holbrook, N. Am. Herp., iv, p. 77. Eastern and Austroriparian regions.

Rana temporaria, Linn., subspecies *aurora*, Bd.; Gird., U. S. Expl. Exped. Herp., p. 18.

Rana temporaria, Linn., subspecies *silvatica*, LeConte; Holbrook, N. Am. Herp., iv, p. 24. Eastern region.

Rana temporaria, Linn., subspecies *cantabrigensis*, Baird, Proc. Acad. Phila., 1854, p. 61. Canadian district of Eastern region to Rocky Mountains.

Rana pretiosa, Baird; Girard, U. S. Expl. Exped. Herp., p. 20. Pacific subregion.

OPHIDIA.

SOLENOGLYPHA.

CROTALIDAE.

APLOASPIS, Cope.

Aploaspis lepida, Kennicott, Proc. Acad. Phila., 1861, p. 206. Western Texas.

CROTALUS, Linn.

Crotalus pyrrhus, Cope, Proc. Phila., 1866, p. 308. Central Arizona.

Crotalus mitchellii, Cope, loc. cit., 1861, p. 293. Lower California.

Crotalus cerastes, Hallowell; Baird, U. S. Mex. Bound. Surv., vol. ii, p. 14. Arizona.

Crotalus tigris, Kennicott, U. S. Mex. Bound. Surv., vol. ii, p. 14. Arizona.

Crotalus enyo, Cope, Proc. Acad. Phila., 1861, p. 293. Lower California.

Crotalus horridus, Linn.; Holbrook, N. Am. Herp., iii, p. 9. Eastern and Austroriparian regions.

Crotalus adamanteus, Beauvois, subspecies *adamanteus*, Beauvois; Baird and Girard, N. Am. Serpents, p. 3. North Carolina to Florida.

Crotalus adamanteus, Beauvois, subspecies *atrox*, Baird and Girard, Cat., p. 5. Indian Territory and Texas to Sonora and Southern and Lower California.

Crotalus adamanteus, Beauvois, subspecies *scutulatus*, Kennicott, Proc. Acad. Phila., 1861, p. 207. Arizona.

Crotalus lucifer, Baird and Girard, Cat., p. 6. Pacific subregion; mountains of Arizona.

Crotalus polystictus, Cope, Proc. Acad. Phila., 1865, p. 191. Table land of Mexico.

Crotalus confluentus, Say; Baird and Girard, loc. cit., p. 8. Central and Sonoran regions, entering Texan district of the Austroriparian.

Crotalus molossus, Baird and Girard, Cat., p. 10. Sonoran region, entering the Texan district.

CAUDISONA, Laurenti.

Caudisona rava, Cope, Proc. Acad. Phila., 1865, p. 191. Table land of Mexico.

Caudisona miliaria, Linn.; Baird and Girard, Cat., p. 11. Austroriparian region and Sonora.

Caudisona edwardsii, Baird and Girard, Cat., p. 15. Sonoran region.

Caudisona tergemina, Say; Baird and Girard, Cat., p. 14. Eastern region west of the Allegheny Mountains; Georgia.

ANCISTRODON, Beauvois.

Ancistrodon piscivorus, Lacépède, subspecies *piscivorus*, Lacépède; Baird and Girard, Cat., 19. Austroriparian region, except Texas.

Ancistrodon piscivorus, Lacépède, subspecies *pugnax*, Baird and Girard, Cat., p. 20. Texan district.

Ancistrodon contortrix, Linn.; Baird and Girard, Cat., p. 17. Entire Eastern and Austroriparian regions.

Ancistrodon atrofuscus, Troost.; Holbrook, N. Am. Herp., iii, p. 43. Mountains of Tennessee and North Carolina.

PROTEROGLYPHA

ELAPIDAE.

ELAPS, Schneider.

Elaps fulvius, Linn., Baird and Girard, Cat., p. 21; subspecies *fulvius*. Austroriparian region.

Elaps fulvius, Linn., subspecies *tener*, Baird and Girard, Cat., p. 22. Texas.

Elaps euryxanthus, Kennicott, Proc. Acad. Phila., 1860, p. 337. Sonoran region.

Elaps distans, Kennicott, loc. cit., p. 338. Chihuahua; Florida.

ASINEA.

COLUBRIDAE.

CARPHOPHIOPS, Gervais.

Carphophiops helenae, Kennicott, Proc. Acad. Phila., 1859, p. 100. Southern Illinois; Mississippi.

Carphophiops amoenus, Say; Baird and Girard, Cat., p. 129. Massachusetts to Louisiana and Illinois.

Carphophiops vermis, Kennicott, Proc. Acad. Phila., 1859, p. 99. Missouri; Kansas.

VIRGINIA, Baird and Girard.

Virginia harperti, Dum., Bibr., Erpétologie Générale, vol. vi, p. 135. Texas; ?Georgia.

Virginia valeriae, Baird and Girard, Cat., p. 127. Maryland to Illinois and North Carolina.

Virginia elegans, Kennicott, Proc. Acad. Phila., 1859, p. 99. Southern Illinois; Arkansas.

HALDEA, Baird and Girard.

Haldea striatula, Linn.; Baird and Girard, Cat., p. 122. Virginia to Texas.

TANTILLA, Baird and Girard.

Tantilla planiceps, Blainville; Baird and Girard, Cat., p. 154. Lower California.

Tantilla gracilis, Baird and Girard, Cat., p. 132. Texas.

Tantilla hallowellii, Cope, Proc. Acad. Phila., 1861, p. 7. Texas.

Tantilla nigriceps, Kennicott, Proc. Acad. Phila., 1860, 328. Texas; New Mexico; Arizona.

Tantilla coronata, Baird and Girard, Cat., p. 131. Georgia; Mississippi.

ABASTOR, Gray.

Abastor erythrogrammus, Dandin; Baird and Girard, Cat., 125. North Carolina to Alabama.

FARANCIA, Gray.

Farancia abacura, Holbrook; Baird and Girard, Cat., p. 123. Austro-riparian region.

CHILOMENISCUS, Cope.

Chilomeniscus stramineus, Cope, Proc. Acad. Phila., 1860, p. 339. Lower California.

Chilomeniscus ephippicus, Cope, Proc. Acad. Phila., 1867, p. 85. Owen Valley, California (Sonoran subregion).

Chilomeniscus cinctus, Cope, Proc. Acad. Phila., 1861, p. 303. Sonora.

CHIONACTIS, Cope.

Chionactis occipitalis, Hallowell, U. S. Pacific R. R. Survey, vol. x, Williamson's Report, p. 15. Fort Mojave, Arizona.

Chionactis occipitalis, Hallowell, subspecies *annulata*, Kennicott, U. S. Mex. Bound. Surv., vol. ii, p. 22. Colorado Desert, Arizona.

CONTIA, Baird and Girard.

Contia mitis, Baird and Girard, Cat., p. 110. Pacific region.

Contia isozona, Cope, Proc. Acad. Phila., 1866, p. 304. Utah; Arizona.

Contia episcopa, Kennicott, U. S. Mex. Bound. Surv., ii, p. 22. Texas.

Contia pygaea, Cope, Proc. Acad. Phila., 1871, p. 222. Florida.

SONORA, Baird and Girard.

Sonora semiannulata, Baird and Girard, Cat., p. 117. Sonora.

LODIA, Baird and Girard.

Lodia tenuis, Baird and Girard, Cat., p. 116. Washington Territory.

GYALOPIUM, Cope.

Gyalopium canum, Cope, Proc. Acad. Phila., 1860, 243. Arizona.

CEMOPHORA, Cope.

Cemophora coccinea, Blumenbach, Baird and Girard, Cat., p. 118. Austroriparian region.

RHINOCHILUS, Baird and Girard.

Rhinochilus lecontei, Baird and Girard, Cat., p. 120. Sonoran and Southern Pacific regions.

OSCEOLA, Baird and Girard.

Osceola elapsoidea, Holbrook; Baird and Girard, Cat., p. 133. Virginia to Florida.

OPHIBOLUS, Baird and Girard.

Ophibolus doliatus, Linn., subspecies *coccineus*, Schlegel; Baird and Girard, Cat., p. 89. Florida to New Mexico; Kansas.

Ophibolus doliatus, Linn., subspecies *amaurus*, Cope, Proc. Acad. Phila., 1860, p. 258.

Ophibolus doliatus, Linn., subspecies *gentilis*, Baird and Girard, Cat., p. 90. Arkansas.

Ophibolus doliatus, Linn., subspecies *annulatus*, Kennicott, Proc. Acad. Phila., 1860, p. 329. Kansas; Arkansas and Texas.

Ophibolus doliatus, Linn., subspecies *doliatus*, Linn.; Cope, Proc. Acad., 1860, p. 256. Maryland and Virginia to Kansas; Arkansas, Louisiana, and Texas.

Ophibolus doliatus, Linn., var. *triangulus*, Boie; Baird and Girard, Cat., p. 87. From Virginia northward to Canada, Iowa, and Wisconsin.

Ophibolus multistratus, Kennicott, Proc. Acad. Phila., 1860, p. 328. Nebraska.

Ophibolus pyrrhomelas, Cope, Proc. Acad. Phila., 1866, p. 305. Arizona and California.

Ophibolus getulus, Linn., subspecies *boylii*, Baird and Girard, Cat., p. 82. Pacific and Sonoran regions.

Ophibolus getulus, Linn., subspecies *conjunctus*, Cope, Proc. Acad. Phila., 1861, 301. Lower California.

Ophibolus getulus, Linn., subspecies *splendidus*, Baird and Girard, Cat., p. 83. Sonoran region.

Ophibolus getulus, var. *sayi*, Holbrook; Baird and Girard, Cat., p. 84. United States, between the Allegheny and Rocky Mountains, from the Gulf of Mexico to Illinois.

Ophibolus getulus, Linn.; subspecies *getulus*, Linn.; Baird and Girard, Cat., p. 85. From Maryland to Florida and Louisiana, east of the Alleghenies.

Ophibolus californiae, Blainv.; Baird and Girard, Cat., p. 153. Lower California.

Ophibolus rhombomaculatus, Holbrook; Baird and Girard, Cat., p. 86. North Carolina to Georgia.

Ophibolus calligaster, Say; Cope, Proc. Acad. Phila., 1860, p. 255. Illinois to Kansas and Arkansas.

DIADOPHIS, Baird and Girard.

Diadophis punctatus, Linn., subspecies *punctatus*, Linn.; Baird and Girard, Cat., p. 112. United States and Canada, east of the plains and Texas.

Diadophis punctatus, Linn., subspecies *stictogenys*, Cope, Proc. Acad. Phila., 1860, p. 250. Texas.

Diadophis punctatus, Linn., subspecies *amabilis*, Baird and Girard, Cat., p. 113. Pacific and Sonoran regions; occasional in Texan district and Central and Eastern regions as far as Ohio.

Diadophis dysopes, Cope, Proc. Acad., 1860, p. 251. Habitat unknown.

Diadophis arnyi, Kennicott, Proc. Acad., 1859, p. 99. Illinois and Kansas.

Diadophis regalis, Baird and Girard, Cat., p. 115. Arizona; Sonora.

CONIOPHANES, Hallowell.

Coniophanes imperialis, Girard, U. S. Mex. Bound. Surv., vol. ii, p. 23. Chihuahua.

HYPSIGLENA, Cope.

Hypsiglena ochrorhyncha, Cope, Proc. Acad., 1860, 246. Lower California north to San Diego.

Hypsiglena ochrorhyncha, Cope, subspecies *chlorophaea*, Cope, loc. cit., 1860, p. 247. Arizona.

SIBON, Fitzinger.

Sibon annulatum, Linn., subspecies *septentrionale*, Kennicott, U. S. Mex. Bound. Surv., vol. ii, p. 16. Southwestern Texas.

TRIMORPHODON, Cope.

Trimorphodon lyrophanes, Cope, Proc. Acad. Phila., 1860, p. 343. Lower California and Arizona.

PHIMOTHYRA, Cope.

Phimothyra grahamiae, Baird and Girard, Cat., p. 104. Lower California and Sonoran regions to Utah and Texas.

Phimothyra grahamiae, Baird and Girard, subspecies *hexalepis*, Cope, Proc. Acad. Phila., 1866, p. 304.

Phimothyra decurtata, Cope, Proc. Acad., 1868, p. 310. Lower California.

DROMICUS, Bibron.

Dromicus flavilatus, Cope, Proc. Acad. Phila., 1871, p. 223. Coast of North Carolina.

CYCLOPHIS, Günther.

Cyclophis vernalis, DeKay; Baird and Girard, Cat., p. 108. Eastern and Austroriparian regions; rare in the latter.

Cyclophis aestivus, Linn.; Baird and Girard, Cat., p. 106. Austroriparian region, and the Eastern as far as New Jersey, Maryland, and Southern Illinois.

COLUBER, Linn.

Coluber emoryi, Baird and Girard, Cat., p. 157. Texas and the Mississippi Valley to Kansas and Illinois (*C. calligaster*, Kenn.; *C. rhinomegas*, Cope).

Coluber lindheimerii, Baird and Girard, Cat., p. 74. Texas and Arkansas.

Coluber vulpinus, Baird and Girard, Cat., p. 75. Massachusetts to Michigan, Kansas and northward (*C. spiloides*, D. & B.).

Coluber quadrivittatus, Holbrook; Baird and Girard, Cat., p. 80. North Carolina to Florida.

Coluber obsoletus, Say, Kennicott, Proc. Acad. Phila., 1860, p. 330; subspecies *obsoletus*, Say; Baird and Girard, Cat., p. 73. Entire Eastern United States, from Middle Texas to Massachusetts.

Coluber obsoletus, Say, subspecies *confinis*, Baird and Girard, Cat., p. 76 (*C. rubriceps*, D. & B.). Austroriparian region; Western Missouri.

Coluber guttatus, Linn.; Baird and Girard, Cat., p. 78. Austroriparian region to Central Virginia.

SPILOTES, Wagler.

Spilotes couperii, Holbrook; Baird and Girard, Cat., p. 92. Georgia.

Spilotes erebennus, Cope; Baird and Girard, Cat., p. 158. Texas to Alabama (*Georgia obsoleta*, B. & G.).

PITYOPHIS, Holbrook.

Pityophis melanoleucus, Daudin; Baird and Girard, Cat., p. 65. New Jersey to South Carolina and Ohio.

Pityophis sayi, Schlegel, subspecies *sayi*, Schlegel; Baird and Girard, Cat., p. 151. Illinois to Kansas and northward.

Pityophis sayi, Schlegel, var. *mexicanus*, Duméril et Bibron, Erp. Gén., vol. vii, p. 236. Sonoran and Central regions, entering the Texan district.

Pityophis sayi, Schlegel, var. *bellona*, Baird and Girard, Cat., p. 66. Sonoran and Pacific regions, with Nevada and Utah.

Pityophis catenifer, Blainville; Baird and Girard, Cat., p. 69. Pacific region.

Pityophis vertebralis, Blainville; Cope, Proc. Acad. Phila., 1860, p. 342 (*P. haematois*, Cope). Lower California.

Pityophis elegans, Kennicott, U. S. Mex. Bound. Surv., p. 18. Sonoran region.

BASCANIUM, Baird and Girard.

Bascanium constrictor, Linn.; Baird and Girard, Cat., p. 93. Central, Austroriparian, and Eastern regions.

Bascanium constrictor, Linn., subspecies *vetustum*, Baird and Girard, Cat., p. 97. Pacific region.

Bascanium anthicum, Cope, Proc. Acad. Phila., 1862, p. 238. Louisiana (?).

Bascanium flagelliforme, Catesb., subspecies *flagelliforme*, Baird and Girard, Cat., p. 98. South Carolina to Florida.

Bascanium flagelliforme, Catesb., subspecies *piceum*, Cope, MS. Camp Grant, Arizona.

Bascanium flagelliforme, Catesb., subspecies *testaceum*, Say; Baird and Girard, Cat., pp. 99 and 150. Lower Californian and Sonoran regions, with Nevada, Utah, and Texas.

Bascanium taeniatum, Hallowell, subspecies *laterale*, Hallowell, Proc. Acad. Phila., 1853. Sonoran and Pacific regions.

Bascanium taeniatum, Hallowell, subspecies *taeniatum*, Hallowell; Baird and Girard, Cat., pp. 103 and 160. Pacific and Sonoran regions; Utah and Nevada.

Bascanium taeniatum, Hallowell, subspecies *ornatum*, Baird and Girard, Cat., p. 102. Western Texas.

Bascanium aurigulum, Cope, Proc. Acad. Phila., 1861, p. 301. Lower California.

CHILOPOMA, Cope.

Chilopoma rufopunctatum, Cope, Report on Reptiles of Wheeler's Survey west of one hundredth meridian, 1875 (MS.). Sonoran district.

EUTAENIA, Baird and Girard.

Eutaenia saurita, Linn.; Baird and Girard, Cat., p. 24. Austroriparian and Eastern regions.

Eutaenia sackenii, Kennicott, Proc. Acad. Phila., 1859, p. 99. Floridan district.

Eutaenia faireyi, Baird and Girard, Cat., p. 25. Mississippi Valley, from Louisiana to Wisconsin.

Eutaenia proxima, Say; Baird and Girard, Cat., p. 25. Valley of the Mississippi, from Wisconsin to Louisiana; Texas; Northeastern Mexico.

Eutaenia radix, Baird and Girard, Cat., p. 34. Central region to Lake Michigan; Oregon.

Eutaenia macrostemma, Kennicott, subspecies *megalops*, Kennicott, Proc. Acad. Phila., 1860, p. 330. Sonoran region.

Eutaenia hammondii, Kennicott, Proc. Acad. Phila., 1860, p. 332. Pacific region.

Eutaenia marciana, Baird and Girard, Cat., p. 36. Arkansas, Texas, and entire Rio Grande Valley.

Eutaenia vagrans, Baird and Girard, subspecies *vagrans*, Baird and Girard, Cat., p. 35. Central, Pacific, and northern parts of Sonoran regions.

Eutaenia vagrans, Baird and Girard, subspecies *angustirostris*, Kennicott, Proc. Acad. Phila., 1860, p. 332. Southern Sonoran region.

Eutaenia elegans, Baird and Girard, Cat., p. 34. California.

Eutaenia cyrtopsis, Kennicott, Proc. Acad. Phila., 1860, p. 333. Lower Californian and Sonoran regions.

Eutaenia ornata, Baird, U. S. Mex. Bound. Surv., p. 16. Valley of the Rio Grande del Norte.

Eutaenia sirtalis, Linn., subspecies *dorsalis*, Baird and Girard, Cat., p. 31. Entire North America.

Eutaenia sirtalis, Linn., subspecies *ordinata*, Linn.; Baird and Girard, Cat., p. 32. Northern part of Eastern region; Nova Scotia; North Alabama.

Eutaenia sirtalis, Linn., subspecies *sirtalis*, Linn.; Baird and Girard, Cat., p. 30. North America, excepting the Sonoran, Lower Californian, and southern half of Pacific regions.

Eutaenia sirtalis, Linn., subspecies *parietalis*, Say, Long's Exped. Rocky Mts., i, p. 186. Central and Pacific regions; Illinois.

Eutaenia sirtalis, Linn., subspecies *obscura*, Cope, MS. Eastern subregion north of Washington; northern part of Pacific region.

Eutaenia sirtalis, Linn., subspecies *dorsalis*, Baird and Girard, Cat., p. 31. North America, except the Sonoran and Lower Californian regions.

Eutaenia sirtalis, Baird and Girard, subspecies *pickeringii*, Baird and Girard, Cat., p. 29. Pacific region; Minnesota; Texas.

Eutaenia sirtalis, Linn., subspecies *tetrataenia*, Cope, MS. Pitt River, California.

Eutaenia atrata, Kennicott, Cooper and Suckley's Zoöl. Wash. Terr., p. 296. California.

Eutaenia cooperii, Kennicott, in Cooper and Suckley's Nat. Hist. Wash. Terr., p. 296. Washington and Oregon.

STORERIA, Baird and Girard.

Storeria occipitomaculata, Storer; Baird and Girard, Cat., p. 137. Eastern region; South Carolina; Georgia.

Storeria dekayi, Holbrook; Baird and Girard, Cat., p. 135. Central, Austroriparian, and Eastern regions.

TROPIDOCLONIUM, Cope.

Tropidoclonium storerioïdes, Cope, Proc. Acad. Phila., 1865, p. 190. Plateau of Mexico.

Tropidoclonium lineatum, Hallowell, Proc. Acad. Phila., 1856. Kansas to Texas.

Tropidoclonium kirtlandii, Kennicott, Proc. Acad. Phila., 1856, p. 95. Illinois; Ohio.

TROPIDONOTUS, Kuhl.

Tropidonotus clarkii, Baird and Girard, Cat., p. 48. Texas.

Tropidonotus grahamii, Baird and Girard, Cat., p. 47. The Mississippi Valley, from Louisiana to Wisconsin; Michigan.

Tropidonotus leberis, Linn.; Baird and Girard, Cat., p. 45. Austroriparian and Eastern regions, including Texas.

Tropidonotus rigidus, Say; Baird and Girard, Cat., p. 46. Pennsylvania to Georgia, east of the Allegheny Mountains.

Tropidonotus validus, Kennicott, subspecies *validus*, Kennicott, Proc. Acad. Phila., 1860, p. 334. Lower Californian and Sonoran regions; Utah.

Tropidonotus validus, Kennicott, subspecies *celaeno*, Cope, Proc. Acad. Phila., p. 341. Lower California.

Tropidonotus compsolaemus, Cope, Proc. Acad. Phila., 1860, p. 368. Florida.

Tropidonotus compressicaudus, Kennicott, Proc. Acad. Phila., 1860, p. 335. Florida.

Tropidonotus ustus, Cope, Proc. Acad. Phila, 1860, p. 340. Florida.

Tropidonotus fasciatus, Linn.; Baird and Girard, Cat., p. 39. Austroriparian region.

Tropidonotus sipedon, Linn., subspecies *sipedon*, Linn.; Baird and Girard, Cat., p. 38. Eastern and Austroriparian regions, excepting Texas.

Tropidonotus sipedon, Linn., subspecies *woodhousei*, Baird and Girard, Cat., p. 42. Texas to Missouri.

Tropidonotus sipedon, Linn., subspecies *couchii*, Kennicott, Proc. Acad., 1860, p. 335. Sonoran region.

Tropidonotus sipedon, Linn., subspecies *erythrogaster*, Shaw; Baird and Girard, Cat., p. 40. Austroriparian region, except Texas; Michigan and Kansas.

Tropidonotus taxispilotus, Holbrook; Baird and Girard, Cat., p. 43. North Carolina to Georgia.

Tropidonotus rhombifer, Hallowell; Baird and Girard, Cat., p. 43. Louisiana to Illinois and Michigan.

Tropidonotus cyclopium, Dum. et Bibron; Cope, Proc. Acad., 1861, p. 299. Florida.

HELICOPS, Wagler.

Helicops allenii, Garman, Proc. Bost. Soc. Nat. Hist., 1874, p. 92. Floridan district.

HETERODON, Beauv.

Heterodon platyrhinus, Latreille; Baird and Girard, Cat., p. 51. Entire Austroriparian and Eastern regions.

Heterodon platyrhinus, Latr., subspecies *atmodes*, Baird and Girard, Cat., p. 57. North Carolina to Georgia.

Heterodon simus, Linn., subspecies *simus*, Baird and Girard, Cat., p. 59. Austroriparian region, excepting Texas.

Heterodon simus, Linn., subspecies *nasicus*, Baird and Girard, Cat., p. 61. Sonoran and Central regions and Texas.

BOIDAE.

CHARINA, Gray.

Charina bottae, Blainv., Nouvelles Annales Mus. Hist. Nat., iii, 1834, 57. Lower Californian region.

Charina plumbea, Baird and Girard, Cat., p. 139. Pacific region; ? Nevada.

LICHANURIDAE.

LICHANURA, Cope.

Lichanura trivirgata, Cope, Proc. Acad. Phila., 1861, p. 304. Lower California.

Lichanura myriolepis, Cope, Proc. Acad. Phila., 1868, p. 2. Lower California.

Lichanura roscifusca, Cope, Proc. Acad. Phila., 1868, p. 2. Lower California.

SCOLECOPHIDIA.

STENOSTOMIDAE.

STENOSTOMA, Wagl.

Stenostoma dulce, Baird and Girard, Cat., p. 142. Sonoran region; Texas.

Stenostoma humile, Baird and Girard, Cat., p. 143. Pacific region.

LACERTILIA.

OPHEOSAURI.

AMPHISBAENIDAE.

RHINEÜRA, Cope.

Rhineüra floridana, Baird; Cope, Proc. Acad. Phila., 1861, p. 75. Floridan district.

PLEURODONTA.

TYPHLOPHTHALMI.

ANIELLIDAE.

ANIELLA, Gray.

Aniella pulchra, Gray. Pacific region, from San Francisco southward.

LEPTOGLOSSA.

SCINCIDAE.

OLIGOSOMA, Girard.

Oligosoma laterale, Say; Holbrook, N. Am. Herp., ii, p. 133. Austroriparian region; Northwest South Carolina.

EUMECES, Wiegmann.

Eumeces septentrionalis, Baird, Proc. Acad. Phila., 1858, p. 256. Minnesota and Nebraska.

Eumeces egregius, Baird, Proc. Acad. Phila., p. 256. Florida.

Eumeces onocrepis, Cope, Report of Peabody Academy, Salem., 1869, p. 82. Florida.

Eumeces tetragrammus, Baird, Proc. Acad. Phila., 1858, 256. Lower Rio Grande.

Eumeces anthracinus, Baird, Jour. Acad. Phila., i, p. 293. Pennsylvania to Texas, in mountains.

Eumeces inornatus, Baird, Proc. Acad. Phila., 1856, p. 256. Nebraska.

Eumeces multivirgatus, Hallowell, Proc. Acad. Phila., 1857, p. 215. Central region.

Eumeces leptogrammus, Baird, Proc. Acad. Phila., 1858, p. 256. Central region.

Eumeces obsoletus, Baird and Girard, Proc. Acad. Phila., 1852, p. 129. Sonoran region, and borders of Central and Austroriparian.

Eumeces guttulatus, Hallowell; Sitgreaves's Report on Zuni, p. 113. Sonoran region and Western Texas.

Eumeces skiltonianus, Baird and Girard; Baird in Stansbury's Report Salt Lake, p. 349. Pacific region.

Eumeces fasciatus, Linn.; Holbrook, N. Am. Herp., ii, p. 117, and pp. 121, 127. Central, Austroriparian, and Eastern regions.

Eumeces longirostris, Cope, Proc. Acad. Phila., 1861, p. 313. Bermuda Islands.

LACERTIDAE.

XANTUSIA, Baird.

Xantusia vigilis, Baird, Proc. Acad. Phila., 1856, p. 255. Pacific subregion.

TEIDAE.

CNEMIDOPHORUS, Wiegmann.

Cnemidophorus maximus, Cope, Proc. Acad. Phila., 1863, p. 104. Lower California.

Cnemidophorus grahamii, Baird and Girard, Proc. Acad. Phila., 1852, p. 128. Eastern Sonoran region.

Cnemidophorus sexlineatus, Linn.; Holbrook, N. Am. Herp., ii, p. 109. Sonoran and Austroriparian regions, to Southeast Virginia.

Cnemidophorus inornatus, Baird, Proc. Acad. Phila., 1858, p. 255. Southern Sonoran region.

Cnemidophorus octolineatus, Baird, Proc. Acad. Phila., 1858, p. 255. Southern Sonoran region.

Cnemidophorus perplexus, Baird and Girard, Proc. Acad. Phila., 1852, p. 128. Rio Grande Valley.

Cnemidophorus tessellatus, Say, subspecies *tessellatus*, Say; Baird, U. S. P. R. R. Surv., x, Beckwith's Report, p. 18. Southern Colorado.

Cnemidophorus tessellatus, Say, subspecies *tigris*, Baird and Girard; Stansbury's Report Salt Lake, p. 338. Pacific and Sonoran regions to Utah.

Cnemidophorus tessellatus, Say, subspecies *melanostethus*, Cope, Proc. Acad. Phila., 1863, p. 104. Southeast Arizona.

Cnemidophorus tessellatus, Say, subspecies *gracilis*, Baird and Girard, Proc. Acad. Nat. Sci. Phila., 1852, 128. Southeast Arizona.

VERTICARIA, Cope.

Verticaria hyperythra, Cope, Proc. Acad. Phila., 1863, p. 103. Lower California to San Diego.

DIPLOGLOSSA.

ANGUIDAE.

OPHEOSAURUS, Daudin.

Opheosaurus ventralis, Daudin; Holbrook, N. Am. Herp., ii, p. 139. Austroriparian region; Tennessee; Kansas.

GERRHONOTIDAE.

BARISSIA, Gray.

Barissia olivacea, Baird, Proc. Acad. Phila., 1858, p. 255. Southern California.

GERRHONOTUS, Wiegmann.

Gerrhonotus nobilis, Baird and Girard, Proc. Acad. Phila., 1852, p. 129. Sonora.

Gerrhonotus principis, Baird and Girard, Proc. Acad. Phila., 1852, p. 175. Northern Pacific region.

Gerrhonotus multicarinatus, Blainville (*G. formosus*), Baird and Girard, Proc. Acad. Phila., 1852, p. 175. Pacific and Lower Californian regions.

Gerrhonotus grandis, Baird and Girard, Proc. Acad. Phila., 1852, p. 176. Pacific region.

Gerrhonotus scincicaudus, Skilton, Am. Jour. Sci. Arts, 1349, p. 202. Pacific and Lower Californian regions.

Gerrhonotus infernalis, Baird and Girard; Cope, Proc. Acad. Phila., 1866, 322. Western Texas.

HELODERMIDAE.

HELODERMA, Wiegmann.

Heloderma suspectum, Cope; Baird, U. S. Bound. Surv., plate xxvi. Sonoran region.

IGUANIA.

IGUANIDAE.

HOLBROOKIA, Girard.

Holbrookia maculata, Girard, subspecies *maculata*, Girard; Stansbury's Report, 1852, p. 342. Central and Sonoran subregions.

Holbrookia maculata, Girard, subspecies *propinqua*, Baird and Girard, Proc. Acad. Phila. 1852, p. 126. Texas.

Holbrookia texana, Troschel; Baird and Girard, Proc. Acad. Phila., 1852, p. 125. Sonoran region; Western Texas.

CALLISAURUS, Blainville.

Callisaurus dracontoides, Blainv., subspecies *ventralis*, Hallowell; Sitgreave's Report Zuñi, p. 117. Sonoran region.

Callisaurus dracontoides, Blainv., subspecies *gabbii*, Cope, MS. Northern Lower California.

Callisaurus dracontoides, Blainv., subspecies *dracontoides*, Blainv., Nouv. Ann. de Mus., p. 426. Southern Lower California.

UMA, Baird.

Uma notata, Baird, Proc. Acad. Phila., 1858, p. 253. Sonora region.

SAUROMALUS, Duméril.

Sauromalus ater, Duméril; Baird, U. S. and Mex. Bound. Surv., p. 6. Sonoran region.

CROTAPHYTUS, Holbrook.

Crotaphytus collaris, Say; Holbrook, N. Am. Herp., ii, p. 79. Sonoran region; Central region to latitude 40°.

Crotaphytus wislizenii, Baird and Girard, Stansbury's Report Salt Lake, p. 340. Pacific and Sonoran regions; Nevada, Utah.

Crotaphytus reticulatus, Baird, Proc. Acad. Phila., 1858, p. 253. Western Texas.

DIPSOSAURUS, Hallowell.

Dipsosaurus dorsalis, Baird and Girard, Proc. Acad. Phila., 1852, p. 126. Lower Californian, Southern Pacific, and Sonoran regions.

UTA, Baird and Girard.

Uta thalassina, Cope, Proc. Acad. Phila., 1863, p. 104. Lower California.

Uta graciosa, Hallowell, Proc. Acad. Phila., 1854, p. 92. Pacific region.

Uta nigricauda, Cope, Proc. Acad. Phila., 1864, p. 176. Lower California.

Uta schottii, Baird, Proc. Acad. Phila., 1858, p. 253. Southern California.

Uta ornata, Baird and Girard, Proc. Acad. Phila., 1852, p. 126. Sonoran region.

Uta stansburiana, Baird and Girard, Stansbury's Report Salt Lake, p. 345. Pacific, Lower Californian, and Sonoran regions; Nevada, Utah.

SCELOPORUS, Wiegmann.

Sceloporus ornatus, Baird, U. S. Mex. Bound. Surv., p. 5. Southeastern Sonoran region.

Sceloporus jarrovii, Cope, MS., Zoöl. Wheeler's Expl. west of the 100th merid., 1875. Sonoran region (Southern Arizona).

Sceloporus poinsettii, Baird and Girard, Proc. Acad. Phila., 1852, p. 126. Sonoran region.

Sceloporus torquatus, Peale and Green, Proc. Acad. Phila., ii, p. 131. Southern Sonoran region.

Sceloporus couchii, Baird, Proc. Acad. Phila., 1858, p. 254. Southern Sonoran region.

Sceloporus marmoratus, Hallowell, Proc. Acad. Phila., 1852, p. 178. Sonoran region; Utah.

Sceloporus biseriatus, Hallowell, U. S. P. R. R. Surv., x, Williamson's Report, p. 6. ?Habitat.

Sceloporus undulatus, Harlan, subspecies *undulatus*, Harlan; Holbrook, Am. Herp., ii, p. 73. North America, except Sonoran and Lower Californian regions.

Sceloporus undulatus, Harlan, subspecies *thayerii*, Baird and Girard, Proc. Acad. Phila., 1852, p. 127. California, Utah, New Mexico, and Rio Grande Valley.

Sceloporus consobrinus, Baird and Girard; Marcy's Report Red River, 1853, p. 237. Sonoran and Central regions; Oregon and Texas.

Sceloporus scalaris, Wiegmann, Herpetologia Mexicana, 1834, p. 52. Sonora.

Sceloporus floridanus, Baird, Proc. Acad. Phila., 1858, p. 254. Florida.

Sceloporus spinosus, Wiegmann, Herpetologia Mexicana, p. 50. Texas.

Sceloporus clarkii, Baird and Girard, subspecies *clarkii*, Baird and Girard, Proc. Acad. Phila., 1852, p. 127. Sonoran and Southern Pacific regions.

Sceloporus clarkii, Baird and Girard, subspecies *zosteromus*, Cope, Proc. Acad. Phila., 1863, p. 105. Lower California.

PHRYNOSOMA, Wiegmann.

Phrynosoma modestum, Girard, Stansbury's Rept. Salt Lake, p. 365. Sonoran region.

Phrynosoma platyrhinum, Girard, Stansbury's Rept Salt Lake, p. 361. Utah and Nevada.

Phrynosoma maccallii, Hallowell; Baird, U. S. Mex. Bound. Surv., p. 9. Desert of Gila and Colorado.

Phrynosoma regale, Girard, U. S. Mex. Bound. Surv., p. 9. Desert of Gila and Colorado.

Phrynosoma planiceps, Hallowell, Proc. Acad. Phila., 1852, p. 178. Southern Sonoran region.

Phrynosoma cornutum, Harlan; Girard, Stansbury's Rept. Salt Lake, p. 360. Texas.

Phrynosoma hernandezii, Girard, Herp. U. S. Expl. Exped., p. 395. New Mexico; Rio Grande Valley.

Phrynosoma douglassii, Bell, subspecies *ornatissimum*, Girard, Herp. U. S. Expl. Exped., 1858, p. 396. Sonoran region.

Phrynosoma douglassii, Bell, subspecies *douglassii*, Bell; Girard, Herp. U. S. Expl. Exped., p. 398. Entire Central region; Oregon and Washington.

Phrynosoma blainvillei, Gray; Girard, U. S. Expl. Exped. Herp., p. 400. Pacific region.

Phrynosoma coronatum, Blainville, Nouv. Mém. Museum, iv, p. 28. Lower California.

CYCLURA, Harlan.

Cyclura hemilopha, Cope, Proc. Acad. Phila., 1863, p. 105. Lower California.

ANOLIDAE.

ANOLIS, Merrem.

Anolis principalis, Linn.; Holbrook, N. Am. Herp., ii, 67. Austroriparian region.

Anolis cooperii, Baird, Proc. Acad. Phila., 1868, p. 254. ?California.

NYCTISAURA.

GECCONIDAE.

COLEONYX, Gray.

Coleonyx variegatus, Baird, U. S. Mex. Bound. Surv., p. 12. Sonoran region.

SPHAERODACTYLUS, Cuv.

Sphaerodactylus notatus, Baird, U. S. Mex. Bound. Surv., p. 12. Key West, Fla. (Cuba).

PHYLLODACTYLUS, Gray.

Phyllodactylus tuberculosus, Wiegmann, Nova Acta. K. L. C. Acad., xvii, p. 241. Sonoran region.

Phyllodactylus xanti, Cope, Proc. Acad. Phila., p. 102. Lower California.

DIPLODACTYLUS, Gray.

Diplodactylus unctus, Cope, Proc. Acad. Phila., 1863, p. 102. Lower California.

TESTUDINATA.

ATHECAE.

SPHARGIDIDAE.

SPHARGIS, Merrem.

Sphargis coriacea, Rondelet; Holbrook, N. Am. Herp., ii, p. 45. Atlantic coast to Massachusetts.

CRYPTODIRA.

CHELONIIDAE.

THALASSOCHELYS, Fitz.

Thalassochelys caouana, Linn.; Holbrook, N. Am. Herp., ii, p. 33. Entire Atlantic coast.

ERETMOCHELYS, Fitz.

Eretmochelys imbricata, Linn.; Holbrook, N. Am. Herp., ii, p. 39. Southern Atlantic coast.

Eretmochelys squamata, Linn.; Agassiz, Cont. Nat. Hist. U. S., i, p. 382. Pacific coast.

CHELONIA, Brong.

Chelonia mydas, Schw.; Holbrook, N. Am. Herp., ii, p. 25. Atlantic coast south of Long Island.

Chelonia virgata, Schw.; Agassiz, Cont., i, p. 379. Pacific coast.

TRIONYCHIDAE.

AMYDA, Agassiz.

Amyda mutica, Lesueur, Mém. du Mus. d'Hist. Nat., xv, p. 263. Middle and northern tributaries of the Mississippi, and the Saint Lawrence.

ASPIDONECTES, Wagl.

Aspidonectes ferox, Schweigger; Holbrook, N. Am. Herp., ii, p. 11 Georgia to Western Louisiana.

Aspidonectes spinifer, Lesueur, Mém. de Mus. d'Hist. Nat., xv, p. 258. Middle and northern tributaries of the Mississippi, and Saint Lawrence.

Aspidonectes asper, Agassiz, Cont. Nat. Hist. U. S., i, p. 405. Lower Mississippi tributaries.

Aspidonectes nuchalis, Agassiz, Cont. Nat. Hist. U. S., i, p. 406. Cumberland and Upper Tennessee Rivers, Tennessee.

Aspidonectes emoryi, Agassiz, Cont. Nat. Hist. U. S., i, p. 407. Texas.

CHELYDRIDAE.

CHELYDRA, Schw.

Chelydra serpentina, Linn.; Holbrook, N. Am. Herp., i, p. 139. From Canada to Ecuador. Wanting in the Pacific subregion.

MACROCHELYS, Gray.

Macrochelys lacertina, Schweigger; Holbrook, N. Am. Herp., i, p. 147. Tributaries of the Gulf of Mexico, from Florida to Western Texas, extending to Missouri in the Mississippi.

CINOSTERNIDAE.

AROMOCHELYS, Gray.

Aromochelys odoratus, Latreille; Holbrook, N. Am. Herp., i, p. 133. Austroriparian and Eastern subregions.

Aromochelys carinatus, Gray; Agassiz, Cont., i, p. 423. Louisianian district.

CINOSTERNUM, Wagl.

Cinosternum pennsylvanicum, Bosc, subspecies *pennsylvanicum*, Bosc; Holbrook, N. Am. Herp., i, p. 127. Austroriparian (?Texas) and Eastern subregions.

Cinosternum pennsylvanicum, Bosc, subspecies *doubledayi*, Gray, Cat. Tort., Crocod., and Amphisb. B. M., p. 33. Southwestern United States.

Cinosternum sonoriense, LeConte, Proc. Acad. Phila., 1854, p. 183. Arizona.

Cinosternum flavescens, Agassiz, Contrib. Nat. Hist. U. S., i, p. 430. Arizona.

Cinosternum henrici, LeConte, Proc. Acad. Phila., 1854, p. 182. Sonoran subregion.

EMYDIDAE.

PSEUDEMYS, Gray.

Pseudemys rugosa, Shaw; Holbrook, N. Am. Herp., i, p. 55. New Jersey to Virginia.

Pseudemys concinna, LeConte; Holbrook, N. Am. Herp., i, pp. 119, 65. Austroriparian region (?Texas).

Pseudemys mobiliensis, Holbrook, N. Am. Herp., i, p. 71. Florida to the Rio Grande of Texas.

Pseudemys hieroglyphica, Holbrook, N. Am. Herp., i, p. 111. Middle, Western, and Gulf States.

Pseudemys scabra, Linn.; Holbrook, N. Am. Herp., i, p. 49. North Carolina to Georgia.

Pseudemys troostii, Holbrook, N. Am. Herp., i, p. 123. Valley of the Mississippi to Illinois.

Pseudemys elegans, Wied.; Holbrook, N. Am. Herp., i, p. 115. Central region and Texan district.

MALACOCLEMMYS, Gray.

Malacoclemmys geographicus, Lesueur; Holbrook, N. Am. Herp., i, p. 99. Mississippi Valley to Pennsylvania and New York.

Malacoclemmys pseudogeographicus, Holbrook, N. Am. Herp., i, p. 103. Mississippi Valley to Wisconsin and Northern Ohio.

Malacoclemmys palustris, Gmelin; Holbrook, N. Am. Herp., i, p. 87. Coast from New York to Texas.

CHRYSEMYS, Gray.

Chrysemys picta, Herm.; Holbrook, N. Am. Herp., i, p. 75. Eastern region; Louisiana, Mississippi.

Chrysemys oregonensis, Harlan; Holbrook, N. Am. Herp., i, p. 107. Central region.

Chrysemys reticulata, Bosc; Holbrook, N. Am. Herp., i, p. 59. Gulf States.

CHELOPUS, Rafinesque.

Chelopus guttatus, Schneider; Holbrook, N. Am. Herp., i, p. 81. Eastern region east of Ohio.

Chelopus muhlenbergii, Schweigger; Holbrook, N. Am. Herp., vol. i, p. 45. New Jersey and Eastern Pennsylvania.

Chelopus insculptus, LeConte; Holbrook, N. Am. Herp., i, p. 93. Eastern region east of Ohio.

Chelopus marmoratus, Baird and Girard; Hallowell, U. S. P. R. R. Surv., x, Williamson's Report, p. 3. Pacific region.

EMYS, Brong.

Emys meleagris, Shaw; Holbrook, N. Am. Herp., i, p. 39. Alleghenian district of Eastern region to Wisconsin.

CISTUDO, Flem.

Cistudo clausa, Gm., subspecies *clausa*, Gm.; Holbrook, N. Am. Herp., i, p. 31. Eastern region and Louisianian and Floridan districts.

Cistudo clausa, subspecies *triunguis*, Agass., Contrib., i, p. 445. Austro-riparian region to Georgia; Eastern Pennsylvania.

Cistudo ornata, Agass., Contrib., i, p. 445. Central region.

TESTUDINIDAE.

TESTUDO, Linn.

Testudo carolina, Linn.; Holbrook, N. Am. Herp., i, p. 25. Austroriparian region, not north of South Carolina.

Testudo agassizii, Cooper, Proc. Calif. Acad. Sci.* Southern Pacific and Western Sonoran regions.

CROCODILIA.

CROCODILIDAE.

ALLIGATOR, Cuv.

Alligator mississippiensis, Daudin; Holbrook, N. Am. Herp., vol. ii, p. 53. Austroriparian region.

CROCODILUS, Cuv.

Crocodilus americanus, Seba.; Dum. et Bib., Erp. Gén., iii, p. 119. Floridan district.

Enumeration of genera and species.

	Genera.	Species.	
BATRACHIA.			
Trachystomata	2	2	
Proteida	1	2	
Urodela	15	49	
Anura	11	48	
	29		101
REPTILIA.			
OPHIDIA.			
Solenoglypha	4	18	
Proteroglypha	1	3	
Asinea	36	109	
Scolecophidia	1	2	
	42	132	
LACERTILIA.			
Opheosauri	1	1	
Pleurodonta	22	76	
Nyctisaura	3	5	
	26	82	
TESTUDINATA.			
Athecae	1	1	
Cryptodira	16	40	
	17	41	
CROCODILIA	2	2	
			257
Total species			358

* Referred to, vol. for 1870, p. 67.

PART III.

ON GEOGRAPHICAL DISTRIBUTION

OF THE

VERTEBRATA OF THE REGNUM NEARCTICUM,

WITH ESPECIAL REFERENCE TO THE

BATRACHIA AND REPTILIA.

I.—THE FAUNAL REGIONS OF THE EARTH.

As is well known, the life of the different regions of the earth presents marked peculiarities. The differences are, in some measure, connected with the geographical and topographical relations of the continents. To each of them, peculiar divisions of animals are found to be confined; and the sum of these, or the "fauna," is found in each case to present marked characters. The districts thus marked out are the *Australian* (which includes Australia, Van Diemen's Land, New Guinea, etc.); the *Neotropical*, including South America, the West Indies, and Mexico; the *Nearctic*, or North America; the *Ethiopian*, or Africa south of the Desert of Sahara; the *Palaeotropical*, which embraces India and the adjacent islands; and, lastly, the *Palaearctic*, or Asia north of the Himalaya, Europe, and Africa north of the Great Desert. These six districts are variously related by common forms, as well as distinguished by different ones. The name of "realms" has been given to them.

The Australian realm is peculiar in the absence of nearly all types of mammalia, except the *Ornithodelphia* and the Marsupials; in the presence of various Struthious birds; in great development of the *Elapid* serpents, and absence of the higher division of both snakes and frogs (*i. e.*, *Solenoglypha* and *Raniformia*); in the existence of *Dipnoi* (*Ceratodus*) and certain Characinid fishes. On the other hand, many of the lizards and birds are of the higher types that prevail in India and Africa, viz, the *Acrodonta* and the *Oscines*.

The polar hemispheres each possess certain common forms which are not found in the other. Thus, in the southern, which is here understood as embracing the three realms called Australian, Neotropical, and

Ethiopian,* the *Sirenian* mammalia; *Struthious* birds; *Elapid* and *Peropodous* snakes; *Dipnoan*, *Chromid*, and *Characin* fishes; and *Pleurodire* tortoises, are universal, and not, or very sparsely, found in the northern. Of other groups peculiar to the Southern or Equatorial regions, the *Edentate* mammalia belong to the Neotropical and Ethiopian; the *Osteoglossid* fishes to the Neotropical, Palaeotropical, and Australian; while monkeys occur in the southern faunae, except the Australian, and in the Palaeotropical. The Ethiopian shares many peculiarities with the Northern. Thus, Insectivorous mammals, Viperine snakes, and Raniform frogs, are only found here in the southern hemisphere.

The Neotropical realm only possesses exclusively the Platyrhine monkeys and the great majority of the humming-birds. It shares with other Southern regions the Edentate and Tapiroid mammals; Struthious, Pullastrine, and Clamatorial birds; Elapid snakes; Arciferous frogs; and Characin, Chromid, Osteoglossid, and Dipnoan fishes. It has but few types of the Northern regions; these are numerous pleurodont Lacertilia, the Acrodonts being entirely absent; and a few bears, deer, and Oscine birds.

The Ethiopian realm is that one which combines the prevalent features of the Palaearctic region with the southern-hemisphere types already mentioned, together with some found elsewhere only in the Palaeotropical, and a very few peculiar. The two latter classes not being mentioned elsewhere, they may be here enumerated. This region shares, with the Indian alone, the Catarrhine monkeys, the *Elephantidae Rhinocerotidae*, and Chamaeleons. Its peculiar types are the *Lemuridae*, *Hippopotamidae*, and *Cameleopardalidae*, among mammals, and *Polypteridae* and *Mormyridae* among fishes.

The Northern realms of the earth agree in possessing all the earless seals; but most of its common characters are shared by India and Africa. With these regions they possess most all of the Ruminant and Insectivorous mammals, and all the Raniform frogs. The Palaearctic and Palaeotropical are very much alike, and ought probably to be united. The latter differs in possessing monkeys, elephant, rhinoceros, and tapir, *Elapid* serpents (cobras), and *Osteoglossid* fishes. In other respects, as in mammalia generally, Oscine birds and fresh-water fishes, and reptiles generally, it agrees with Northern Asia and Europe.

The Nearctic or North American realm is that with which we have here to do. It extends from the Arctic regions to a line drawn across Northern Mexico, and includes the peninsula of Lower California. It

* "Eogaea" of Gill, characterized in his article "On the geographical distribution of Fishes", in the "Annals and Magazine of Natural History" (4), xv, 255.

agrees in many points with the northern fauna of the Old World, and has been united with it by some authors; but its peculiar types, and those which it shares with South America, are too numerous for such an arrangement. Its relations are exhibited in the following table:

Agrees with Palaearctic in—	Differs from Palaearctic in—	
	Peculiar forms.	Neotropical forms.
Mammalia in general		Bassaridae.
		Procyonidae.
	Antilocapra	Megadermatidae.
	Mephitis	Dicotyles.
		Didelphys.
Birds except		Cathartidae.
		Tanagridae.
		Icteridae.
		Clamatores in general.
		Trochilidae.
	Meleagridae	Odontophorinae.
		Alligators.
		Amivid and Gerrhonotid lizards.
		Iguanid lizards.
Emyd tortoises	Chelydra	Cinosternidae.
		Solenoglyph and Elapid venomous snakes.
Raniform frogs	Scaphiopodidae	Arcifera.
	Plethodontidae.	
	Amblystomidae.	
Diemyctylus.		
Megalobatrachus	Trachystomata.	
	Necturus.	
	Amphiumidae.	
Percid fishes	Aphredoderidae	Siluridae.
Cottidae.		
Haplomi	Hypsaeidae.	
Accipenseridae.		
Spatulariidae.		
Cyprinidae	Plagopterinae.	
Gasterosteidae.	Catostomidae.	
	Amiidae.	
	Lepidosteidae.	
Petromyzon.		

The special peculiarities of the Nearctic region are then chiefly seen in the Fishes and Batrachia. In Birds and Mammals, its prominent divergences from the northern regions of the Old World are seen in the numerous representatives of forms which are characteristically South

American. Of these, the birds offer many genera peculiar to North America, while the few Mammalia are of Neotropical genera. The greatest resemblance between the North American and Palaearctic region is seen in the Mammalia. Around the Arctic regions as well as further south, several species, both of Mammalia and Birds, are identical.

Among Mollusks there is also much resemblance. *Anodonta*, *Unio*, and *Succinea* are common to both the northern faunae, but have no common species; all three greatly predominate in numbers in North America. The snails of the west coast are very European in character, but there are but few *Pupae* in the Regio Nearctica, and no *Clausiliae*, and *Bulimus* is represented by few species.

II.—NUMBER OF SPECIES.

The numbers of the Vertebrata found in the Nearctic realm are nearly as follows:

MAMMALIA:			
Monotremata		0	
Marsupialia		1	
Edentata		1	
Rodentia		139	
Insectivora		28	
Chiroptera		23	
Cetacea		42	
Sirenia		1	
Hyracoidea		0	
Proboscidea		0	
Perissodactyla		0	
Artiodactyla	*Omnivora*	1	
	Ruminantia	14	
Carnivora	*Pinnipedia*	13	
	Fissipedia	46	
Primates		1	
			310
AVES:			
Passeres	*Oscines*	306	
	Clamatores	33	
Zygodactyli		36	
Syndactyli		20	

AVES—Continued.

Psittaci	1	
Accipitres	61	
Pullastrae	12	
Gallinae	22	
Brevipennes	0	
Grallae	81	
Lamellirostres	49	
Steganopodes	13	
Longipennes	71	
Pygopodes	51	
		756

REPTILIA:

Crocodilia	2	
Testudinata	41	
Lacertilia	82	
Ophidia	132	
		257

BATRACHIA:

Anura	48	
Urodela	49	
Gymnophidia	0	
Proteida	2	
Trachystomata	2	
		101

PISCES:

Percomorphi	*Pharyngognathi*	12
	Labyrinthici	0
	Distegi	178
	Rhegnopteri	2
	Epilasmia	18
	Scyphobranchii	77
	Haplodoci	3
	Anacanthini	36
	Heterosomata	22
Plectognathi		30
Pediculati		8
Hemibranchii		20
Lophobranchii		7
Synentognathi		10
Percesoces		13

PISCES—Continued.		
Haplomi	34	
Isospondyli	70	
Plectospondyli	150	
Scyphophori	0	
Nematognathi	27	
Notacanthi	0	
Glanencheli	0	
Ichthyocephali	0	
Holostomi	0	
Enchelycephali	2	
Colocephali	3	
Halecomorphi	2	
Ginglymodi	15	
Glaniostomi	30	
Selachostomi	1	
Holocephali	2	
Plagiostomi	46	
Dipnoi	0	
		816
DERMOPTERI		8
LEPTOCARDII		1
Total species of Vertebrata		2,249

This number is considerably below the truth, as many of the fishes, both of the ocean and of the fresh waters, remain undescribed.

It is more difficult to state the number of species of the inferior divisions of the animal kingdom. It is asserted that 8,000 species of Coleopterous insects have been discovered in the Nearctic region, and that this is probably about two-thirds of the whole. This would give 12,000 species of this the most numerous order, and the *Lepidoptera*, *Hymenoptera*, and *Diptera* will follow at no great distance. Probably 50,000 is below the mark as an estimate of the number of species of insects of this region. One thousand species are to be added for the remaining *Arthropoda*—say, 200 *Myriopoda*, 400 *Arachnida*, and 400 *Crustacea*. Of worms of land and water there are numerous species, the greater proportion of which are not yet known to science.

The number of the *Mollusca* and *Molluscoida* from the coasts and interior of the North American region is about 1,824, of which only 400 are marine. Of the remainder, 1,034 live in the numerous rivers and lakes,

and 400 are terrestrial and air-breathers. They are distributed among the classes as follows:

CEPHALOPODA		25
PULMONATA		400
PROSOBRANCHIATA	Fresh-water	438
	Marine	297
HETEROPODA		28
OPISTHOBRANCHIATA		53
PTEROPODA		25
SCAPHOPODA		4
LAMELLIBRANCHIATA	Fresh-water	596
	Marine	377

MOLLUSCOIDA.

BRACHIOPODA	10
ASCIDIA	30
BRYOZOA	39

The remaining divisions of the animal kingdom may be estimated to number nearly as follows:

ECHINODERMATA (123).

	East coast.	Interior.	West coast.
HOLOTHURIDA	32	....	4
ECHINOIDEA	50	....	18
CRINOIDEA	2	...	....
ASTEROIDEA	17	....	?

COELENTERATA (144).

MEDUSAE:			
Discophora	80	....	22
Siphonophora	3	....	2
CTENOPHORA	12	....	2
POLYPI	13	....	7
HYDROIDEA	....	3	....

The divisions of *Protozoa* are well represented in our waters, but the numbers of our *Spongiida*, INFUSORIA and RHIZOPODA, have not yet been ascertained.

III.—RELATIONS TO OTHER REALMS.

It has been already remarked that several species of *Vertebrata* are common to our northern regions and Europe, Asia, etc. Thus, the

wolf extends throughout the northern hemisphere; the same may be said of the fox, the ermine, and, perhaps, of the beaver. It is not improbable that our buffalo (*Bos americanus*) is a variety only of the *B. bison* of the Old World, and that the grizzly bear (*Ursus horribilis*) bears the same relation to the European brown bear (*U. arctos*). There are also certain corresponding or representative species; thus, our red fox (*Vulpes fulvus*) is nearly related to the European fox (*V. vulgaris*), and the red squirrel (*sciurus hudsonicus*) to the *S. vulgaris* of Europe. The elk and moose (*Cervus canadensis* and *Alces americanus*) respectively answer to the *C. elaphus* and *Alces europaeus.*

The majority of American deer belong to a peculiar group (*Cariacus*) mainly characteristic of the Nearctic realm; while the species of the orders *Rodentia* and *Insectivora* are mostly of characteristically distinct species or higher groups.

Among birds, similar relations prevail. The singing-birds are the most characteristic of any continent, and here we find in North America the greatest number of species, genera, and families of birds which differ from those of the Old World. Of the latter, true thrushes, swallows, shrikes, and crows occur, but in limited numbers; while the genera of finches are mostly distinct, and the vireos, tanagers, wood-warblers, Icteridae, and mock-thrushes, which form the bulk of our avifauna, do not exist in the Old World. On the other hand, starlings, flycatchers, and warblers are absent from North America.

As we direct our observation to birds of extended flight, as the *Accipitres* and water-birds, cases of identity of species of opposite continents become more frequent. This is mostly confined here, also, to the northern regions. The marsh-hawk (*Circus cyaneus*), peregrine falcon, fish-hawk, and golden eagle are examples among Falconidae. Among owls, the cases are still more numerous; such are *Nyctea nivea*, *Surnia ulula*, *Otus brachyotus*, *Strix flammea.* Some of these present geographical varieties. Corresponding species are common here, *e. g.*, the American—

Haliaëtus leucocephalus to *H. albicilla* of Europe;
Buteo swainsonii to *B. vulgaris;*
Falco sparverius to *F. tinnunculus;*
Falco columbarius to *F. aesalon;*
Bubo virginianus to *B. maximus;*
Otus vilsonianus to *O. vulgaris;*
etc., etc.

The Nearctic realm possesses a peculiar family, the *Cathartidae* (turkey-buzzards), which the Old World lacks, but has no vultures properly so-called.

There are several wading-birds common to the two continents; and cases of identity among the ducks, gulls, and divers are relatively still more numerous. The Gallinae are, on the other hand, entirely distinct, though not without a few corresponding species.

Among lower Vertebrata, specific identity is unknown, except in one frog (*Rana temporaria*) and a few marine fishes, with one of fresh-water, the northern pike (*Esox lucius*). The numerous tortoises of North America remind one especially of Eastern Asia and India, but the western regions of our continent are as deficient in this form of animal life as the corresponding part of the Palaearctic region. *Chelydra* is peculiarly North American, and the *Cinosternidae* are Mexican in character.

The principal Crocodilian is our alligator, which presents only minor differences from the South American caimans. The lizards are all of Neotropical families, except the scines (*Eumeces*), which are found elsewhere chiefly in Africa and Australia. The genera are nearly all peculiar, or extend a short distance into the northern parts of the Neotropical, Mexico, and the West Indies. Some families have, however, a correspondence with those of the Old World, as follows: The Nearctic—

Teiidae to Lacertidae;
Gerrhonotidae to Zonuridae;
Iguanidae to Agamidae.

The *Batrachia* present relations to the Europeo-Asiatic fauna in the species of one genus (*Rana*) of frogs, and one genus (*Notophthalmus*) of salamanders. In other respects, the Nearctic batrachian fauna is highly peculiar. The cosmopolitan genus *Hyla* (tree-frogs) exists in numerous species, several of which are terrestrial. The burrowing-frogs (*Scaphiopidae*) are nearly all peculiar to this fauna. The toads are of a peculiar division of the all but cosmopolitan genus *Bufo*. The salamanders present the greatest peculiarities. The large family of *Plethodontidae* is represented by various forms, mostly terrestrial; while the genera *Desmognathus* and *Amblystoma*, each alone in its family, present curious structural modifications. To the latter belong the Siredons, or larval *Amblystomae*, which reproduce without regard to their metamorphosis, sometimes completing it and sometimes remaining unchanged.

As permanent gill-bearing *Batrachia*, *Necturus* represents the Palaearctic *Proteus*, and Siren is quite peculiar to North America. The *Amphiuma*, or snakelike Batrachia, calls to mind the similar extinct forms of the Coal-Measures; while *Protonopsis* is represented by living species in Eastern Asia, and by a fossil genus in the Miocene of Germany.

The marine fishes embrace some species which range both coasts of the North Atlantic. Such are the salmon, the haddock, the mackerel, etc., which furnish food and occupation for a numerous population on the northeastern coast. Farther south, the mullet (*Mugil albula*) is a valued food-fish, and is caught and packed in great numbers. The fishes of the Pacific coast are mostly distinct from those of the Atlantic, except a few circumpolar forms, as *Gasterosteus aculeatus;* but several (as *Gadus vachna*, Pall.) are found also on the Asiatic coast. On the warmer coasts, a few species are common to both oceans, while others exist which have a great range over several seas, noticeable among which are certain species of *Plectognathi*, particularly of *Diodon*, *Balistes*, etc.

The fresh-water fishes embrace many families characteristic of the northern hemisphere, as the cods (*Gadidae*), *Percidae* or perch, the sculpins (*Cottidae*), pike (*Esocidae*), chubs (*Cyprinidae*), the salmon, and herring, eel, sturgeon, and lamprey families. In the catfishes, the region reminds us of the tropical and southern regions; though it is a singular fact that one of our genera (*Amiurus*) is represented by single species in China.

The suckers (*Catostomidae*) are very abundant and characteristic in all fresh waters; but here, again, a single species (*Carpiodes sinensis*) has been detected in China. This is paralleled by the genus *Polyodon* (paddle-fish), of which one species is found in the Mississippi Valley, and one in the Yang-tse-kiang. The most striking peculiarity of the Nearctic waters is the presence of the family of *Lepidosteidae*, or bony gars, which is represented by two genera and numerous species. No form at all resembling these exists in any other country, excepting again one species in China, and one other which is found in the adjoining Neotropical region. Not less peculiar are the species of dog-fish (*Amia*), type of the order *Halecomorphi*, which have some remote affinities with South American forms.

The relations to the Neotropical realm are in part indicated in the table on page 57. But few species are common to the Nearctic and

Southern Neotropical realms. But one mammal (the cougar, *Felis concolor*), and no reptiles, batrachians, nor fresh-water fishes, extend into Brazil; but a number of birds are permanent residents throughout both realms. These are mostly waders, as follows:

Rallus crepitans.
Limosa fedoa.
Tryngites rufescens.
Actiturus bartramius.
Heteroscelus brevipes.
Symphemia semipalmata.
Ereunetes petrificatus.
Aegialitis vilsonius.
Nycterodius violaceus.

To these must be added the turkey-vulture, *Cathartes aura*. Then certain marine birds and a few fishes extend along the coasts of both regions, but their number is comparatively small.

The number of species of the Nearctic realm which occur in the Mexican region is rather greater. The red lynx and raccoon are examples of mammals, and several species of wood-warblers, vireos, and hawks represent the birds as far south as the Isthmus of Darien. The only reptiles are the snapping-tortoise and the ringed snake *Ophibolus doliatus;* the only batrachian is the *Rana halecina berlandieri*. A few other species, as *Eutaenia sirtalis*, extend for a shorter distance into the same region.

In the higher groups of the genus and family, we have greater community with the Neotropical realm. But few genera of *Batrachia* and *Reptilia* extend to its Brazilian region, but there are a few common genera of *Mammalia* (*Mephitis*, *Procyon*, *Ursus*, *Sciurus*, *Hesperomys*, and *Didelphys*), and a number of birds, especially among the lower orders, and the scansores, syndactyli, and clamatores, particularly the *Tyrannidae*. The number of genera which enter Mexico and Central America is much greater, and I select the following from the mammals, reptiles, and batrachians, as these are incapable of the migrations performed by birds. Cosmopolitan genera and those common to both the American realms are omitted.

MAMMALIA.

Lynx.
Urocyon.
Putorius.
Bassaris.
Geomys.
Thomomys.
Ochetodon.
Arvicola.
Neotoma.
Sigmodon.
Cariacus.
Antilocapra.

REPTILIA.

Crotalus.
Candisona.
Ancistrodon.
Tropidoclonium.
Tropidonotus.
Eutaenia.
Trimorphodon.
Hypsiglena.
Ophibolus.
Phimothyra.
Pityophis.
Coluber.
Tantilla.
Chilomeniscus.
Cinosternum.
Chelydra.
Pseudemys.
Chelopus.
Sceloporus.
Phrynosoma.
Heloderma.
Barissia.
Gerrhonotus.
Oligosoma.
Eumeces.
Cnemidophorus.

BATRACHIA.

Amblystoma.
Spelerpes.
Spea.
Rana.

Of fishes, the common genera of the fresh waters are few. They are *Girardinus*, *Gambusia*, *Haplochilus*, and *Fundulus* of Cyprinodontidae, and *Atractosteus* of the bony gars. The southward distribution of the above genera terminates at various points; but those which belong to the Austroriparian region, as distinguished from the Sonoran, are mainly confined to the Mexican plateau. The presence of these, together with a number of peculiar forms, indicates another region of the Nearctic, which is in many respects allied to the Austroriparian. This subject will be considered in a subsequent paper.

In comparing the Nearctic realm with the West Indian region of the Neotropical, much less resemblance can be detected, especially in the Reptiles and Batrachia. The only identical species is the *Anolis principalis*, which is common to the Austroriparian region and Cuba, and there are three others of West Indian origin found in the southern part of Florida. The *Anolis* is the only reptilian genus of wide distribution in the Nearctic realm which occurs in the West Indian region. The West Indian genus *Dromicus* is represented by one species, a rare snake from the coast of North Carolina. In Batrachia, there is no community of species and none of genera, excepting in the case of the cosmopolitan genera *Bufo* and *Hyla*.

IV.—THE REGIONS.

We may now consider the variations exhibited by the component parts of the Nearctic fauna. The distribution of types indicates six principal subdivisions, which have been called the Austroriparian, Eastern, Central, Pacific, Sonoran, and Lower Californian. The Austroriparian region extends northward from the Gulf of Mexico to the isothermal of 77° F. It commences near Norfolk, Va., and occupies a belt along the coast, extending inland in North Carolina. It passes south of the Georgia Mountains, and to the northwestward up the Mississippi Valley to the southern part of Illinois. West of the Mississippi, the boundary extends south along the southern boundary of the high lands of Texas, reaching the Gulf at the mouth of the Rio Grande.

The Eastern is the most extended, reaching from the isothermal line of 77° F. north and from the Atlantic Ocean to the elevated plains west of the Mississippi River. Many of its forms extend up the bottoms of the rivers which flow to the eastward through "The Plains." The Central region extends from the limit of the Eastern as far west as the Sierra Nevada, and south on the mountains of Nevada, and along the mountains of New Mexico. The Sonoran includes parts of Nevada, New Mexico, Arizona, and Sonora in Mexico. It does not cross the Sierra Nevada, nor the Mojave desert, nor extend into the peninsula of Lower California. It sends a belt northward on the east side of the Sierra Nevada as far as, including Owen's Valley in Eastern California, latitude 37°, and enters other valleys in Nevada in the same way. It occupies the lower valley of the Rio Grande, and extends into Texas as far as the desert east of the Rio Pecos. It extends southward in Western Mexico as far as Mazatlan. The Lower Californian region occupies the peninsula of that name as far north as near San Diego.

The peculiarities of these regions are well marked. The two regions included in Eastern North America differ from all the others in the abundance of their turtles and the small number of their lizards. Prolific of life, this area is not subdivided by any marked natural barriers. Hence, though its species present great varieties in extent of range, it is not divided into districts which are very sharply defined. The warmer regions are much richer in birds, reptiles, and insects than the cooler; and as we advance northward many species disappear, while a few others are added. The natural division of the eastern part of the continent is then in a measure dependent on the isothermal lines which traverse it. In accordance with this view, the following districts have been proposed, viz: The Carolinian; the Alleghanian; the Canadian; and the Hudsonian.

The *Austroriparian region* includes the Floridan, Louisianian, and Texan districts. It possesses many peculiar genera of reptiles not found elsewhere, while the region north of it possesses none, its genera being distributed over some or all of the remaining regions. The number of peculiar species in all departments of animal life is large. It presents the greatest development of the eastern reptile life. Sixteen genera of Reptiles and eight of Batrachia do not range to the northward, while ninety-nine species are restricted in the same manner. The peculiar genera which occur over most of its area are—

LIZARDS.

Anolis.
Oligosoma.

SNAKES.

Haldea.
Cemophora.
Tantilla.
Spilotes.
Abastor.
Farancia.

TORTOISES.

Macrochelys.

CROCODILES.

Alligator.

BATRACHIA.

Engystoma.
Manculus.
Stereochilus.
Muraenopsis.
Siren.

I have omitted from this list ten genera which are restricted to one or the other of its subdivisions. The *Siren*, the *Cemophora*, the *Anolis* (chameleon), and the *Alligator*, are the most striking of the above characteristic genera. No genus of lizards is peculiar excepting *Anolis* and *Oligosoma*, which have their greatest development in other than the Nearctic continent. Among serpents, a few genera of Neotropical character extend eastward along the region of the Mexican Gulf, as far as the Atlantic coast, which are not found in any of the Northern regions; such are *Spilotes*, *Tantilla* (occurs in Lower California), and *Elaps* (also in the Sonoran). On the other hand, *Celuta*, *Virginia*, *Haldea*, and *Storeria*, embrace small serpents which it shares with the Eastern region.

This region is the headquarters of the Batrachia, especially of the tailed forms. The majority of species of the tailless genera are found here, especially of *Hyla* (tree-toads), *Rana*, and *Chorophilus*.

There are no less than nine genera of birds which do not, or only accidentally, range northward of this district. They are—

Plotus.
Tantalus.
Platalea.
Elanus.
Ictinia.
Conurus.
Chamaepelia.
Campephilus.
Helmitherus.

All these genera, excepting the last, range into South America or farther.

Among mammals, but few species and one genus (*Sigmodon*) are confined to it. *Lepus aquaticus* and *L. palustris*, the cotton-rat, the Florida *Neotoma*, etc., and a few others, are restricted by it. The fish-fauna is very similar to that of the Eastern region, under which it will be considered.

The *Eastern region* differs from the Austroriparian almost entirely in what it lacks, and agrees with it in all those peculiarities by which it is so widely separated from the Central region. No genus of mammals is found in it which does not range into the Central or other region, excepting *Condylura* (star-nosed mole); but numerous species are confined to it, not extending into the *Austroriparian.* These number from twenty to twenty-five. Among birds, the following genera are shared with the more southern region only: *Quiscalus*, *Seiurus*, *Oporornis*, *Helmitherus*, *Protonotaria*, *Parula*, *Mniotilta*, *Ortyx.* No genus of Reptiles, and but one of Batrachians (*Gyrinophilus*), is confined to this region; but it shares all it possesses with the Austroriparian. It has but three genera of lizards, viz, *Cnemidophorus*, *Eumeces*, and *Sceloporus*, which are universally Nearctic. The Batrachian genera not found in the Central are—

Scaphiopus.
Gyrinophilus.
Spelerpes.
Plethodon.
Hemidactylium.
Desmatognathus.
Menopoma.
Necturus.

The characteristics of the fish-fauna of Eastern Nearctica are much more marked; two entire orders, represented by the gar (*Ginglymodi*) and dog-fish (*Halecomorphi*), are confined to it, and a series of genera of *Percidae*, embracing many species, known as *Etheostominae*, have the same range. The *Siluridae* all belong here, as well as a great majority of the genera of *Cyprinidae* and *Catostomidae*. In all of these divisions, the region is very rich in species, owing to the abundance of everflowing rivers and streams which drain it. The *Polyodontidae* (spoon-bill or paddle-fish) are not found in any of the other regions.*

The *Central* region is characterized by the general absence of forests, as compared with the Eastern. It presents two distinct divisions, each peculiar in its vegetation: the division of the plains, which extends from the eastern border to the Rocky Mountains; and the Rocky Mountain region itself, which extends to the Sierra Nevada. The former is covered with grass, and is almost totally treeless; the latter is covered with "sage-brush" (*Artemisia*), a short stout bush, which forms extensive areas of treeless brush. The grass-covered plains are the range of the bison, though it formerly sought also the tracts of grass occasionally found among the *Artemisia*. The region, as a whole, is distinguished from the Eastern by the possession of several genera of ruminating Artiodactyles, *i. e.*, *Antilocapra*, *Haplocerus*, and *Ovis*, as well as certain species of the same group, *i. e.*, *Cariacus macrotis* (black-tailed deer) and *C. leucurus*. Other genera of mammals which distinguish it from the Eastern are *Taxidea*, *Cynomys*, *Spermophilus*, *Dipodomys*, *Perognathus*, and *Lagomys*. A few species of *Spermophilus* extend into the northwestern portion of the Eastern; while the extensive genus *Geomys* (the subterranean gophers) range over the Central subregion, and into the Western and Gulf States the Austroriparian as far as the Savannah River. A great many species of birds are peculiar to the Central region, and the following genera:

Oroscoptes.
Hydrobata.
Myiadestes.
Neocorys.
Salpinctes.
Picicorvus.
Chondestes.
Calamospiza.
Embernagra.
Centrocercus.
Pediocetes.

* Excepting the course of the Mississippi, and perhaps the Rio Grande.

The game-birds of the Central region are larger than those of the Eastern. Such are the sage-cock, *Centrocercus urophasianus;* the *Pediœcetes phasianellus*, or cock of the plains; the *Tetrao obscurus*; several ptarmigan (*Lagopus*); and *Bonasa;* the last three Palaearctic genera also.

The reptiles are not numerous, and tortoises are especially rare. Besides the genera of lizards characteristic of the Eastern district, it adds *Phrynosoma*, *Crotaphytus*, and *Holbrookia*. Among snakes, no genus is peculiar, and the moccasins and *Elaps* are wanting. There is but one, possibly two, species of rattlesnake. Batrachians are few; most of the genera of *Anura* are found, except *Hyla*. Among salamanders, the only genus is *Amblystoma;* but this is abundant, its large larvae developing in the temporary pools of many arid regions. The burrowing-frog, *Spea bombifrons*, ranges the same region, and breeds in much the same way. No genus of Batrachians or Reptiles is peculiar to the Central region.

Fishes are few in families and species, largely in consequence of the poverty of the region in rivers and streams. In the Western Colorado and the Humboldt, perch, pike, Siluridae, herring, cod, eels, gar, dog-fish, and sturgeon are entirely wanting. *Cyprinidae*, *Catostomidae*, *Salmonidae*, and *Cottidae* are the only families abundant in individuals and species. The same remarks apply in great part to the Columbia River, where, however, the *Salmonidae* have a great development. These salmon are principally marine species, which ascend the river to deposit their spawn. They belong to many species, all peculiar to the region, and embrace incredible numbers of individuals.

The *Pacific* region is nearly related to the Central, and, as it consists of only the narrow district west of the Sierra Nevada, might be regarded as a subdivision of it. It, however, lacks the mammalian genera *Bos* and *Antilocapra*, and possesses certain peculiar genera of birds, as *Geococcyx* (ground-cuckoo or chaparral-cock), *Chamaea*, and *Oreortyx* (mountain-partridge). Of marine mammalia, there are several peculiar types, as the eared seals (*Otariidae*) and sea-otter (*Enhydra*). There are some genera of reptiles, *e. g.*, *Charina*, related to the Boas, *Lodia*, *Aniella*, *Gerrhonotus*, and *Xantusia*, which do not occur in the Central subregion. There are three characteristic genera of *Batrachia*, all salamanders, viz, *Anaides*, *Batrachoseps*, and *Dicamptodon;* while the Eastern genera *Plethodon* and *Diemyctylus* re-appear after skipping the entire Central district. The other types of Eastern *Anura* are found here, there being two species of *Hyla*.

A single species of tortoise (*Chelopus marmoratus*) exists in the Pacific region.

The fresh-water fish-fauna is much like that of the Central district in being poor in types. It adds the viviparous *Pharyngognathi* of the family of *Embiotocidae*, which is represented by a number of species. The marine fauna differs from that of the east coast in the great number of species of *Salmo* and *Sebastes* and the variety of types of *Cottidae*. In its northern regions, the genus *Chirus* and allies have their peculiar habitat. The singular genus *Blepsias* (related to *Cottus*) exists on the same coast, and several valuable species of cods (*Gadus auratus*, *G. periscopus*, and *Brachygadus minutus*), with the peculiar form *Bathymaster*, belong especially to the northern coasts.

The *Sonoran* region is strongly marked among the faunae already described. It is deficient in the species of ruminating Mammalia found in the Central, and possesses a smaller number of species of mammals than any of the others. Of birds, a few genera and several species are different from those of the Central; such are *Callipepla* (partridge), *Cichlopsis*, *Mitrephorus* (*Tyrannidae*), *Campylorhynchus*, and *Geococcyx*. Most of these genera occur in Mexico, and the last-named in California also. It is in Reptiles that the great peculiarity of this region appears. The following genera are not found in any of the other regions described:

LIZARDS.

Heloderma.
Sauromalus.
Uma.
Coleonyx.

SERPENTS.

Gyalopium.
Chionactis.
Sonora.
Rhinochilus.
Chilopoma.

Eight other genera of Reptilia are peculiar to this fauna and that of the Lower Californian region, under which they are enumerated. *Heloderma*, *Coleonyx*, and allies of *Gyalopium* of the above list are more largely developed in species and individuals in the Mexican region of the Neotropical realm. Every one of the five genera of serpents of the Sonoran

region is characterized by a peculiar structure of the rostral plate, which is produced either anteriorly or laterally to an unusual degree; two of the genera (*Phimothyra* and *Chilomeniscus*), common to the Lower Californian region, present the same peculiarity.

This region is the headquarters of the rattlesnakes, there being no less than nine species found in it, of which six are peculiar. It also possesses a majority of the species of horned toads (*Phrynosoma*); only four of the North American species being unknown there. The Testudinate fauna is very poor, possessing a few species of Nearctic character, and three *Cinosterna*, two of them of Mexican type.

The Batrachian fauna exhibits but one genus of *Urodela*, but several of the *Anura*. Appropriately to its arid character, there is but one *Rana*, but six species of toad (*Bufo*), this being the headquarters of that genus in the Regnum Nearcticum. The eastern genus *Scaphiopus* appears here, instead of the *Spea* of the other western regions. There is one species of tree-frog.

Two species of turtles of the *Cinosternidae* have been found. The fresh-water fish-fauna is very poor, and but little known. In the Colorado River proper, the *Salmonidae* and *Cottidae* appear to be wanting, leaving only *Cyprinidae* and *Catostomidae*. A strongly-marked division of the former, the *Plagopterinae*, which embraces three genera, is mainly restricted to the Colorado River drainage, and is the most striking feature of the fish-fauna of the Sonoran region.

The *Lower Californian* region much more nearly resembles the Sonoran than the *Pacific* region. It possesses, however, many peculiar species of birds and reptiles. Scincs appear to be wanting, but other lizards abound. The following genera of reptiles have been found here, which do not occur in any other region of Nearctica:

LIZARDS.

Verticaria.
Diplodactylus.
Cyclura.

SNAKES.

Lichanura.

These, except the last, have been found in Mexico or South America. It shares with the Sonoran only, the following:

LIZARDS.

Dipsosaurus.
Callisaurus.
Uta.
Phyllodactylus.

SNAKES.

Trimorphodon.
Hypsiglena.
Phimothyra.
Chilomeniscus.

These genera constitute the most characteristic feature of the two faunae, not occurring in any other part of North America. *Trimorphodon*, *Hypsiglena*, and *Phyllodactylus* are well represented in Mexico.

Of Batrachians we have, like the Sonoran, *Hyla*, *Scaphiopus*, and *Bufo*, but, on the other hand, *Plethodon*, as in the Pacific and Eastern. Of the fresh-water fish-fauna, nothing is known; the streams are few and small. This region extends northward to the southern boundary of California.

Among the Invertebrata, the *Mollusca* present facts of distribution similar in significance to those derived from the study of the *Vertebrata*. Thus the Eastern, the Middle, and the Pacific districts are plainly marked out in the fresh-water and land Mollusca. To the former are entirely confined the *Streptopomatidae* and the great majority of the *Unionidae*, which together constitute more than two-thirds the species of the Nearctic realm. Of land-shells, the great series of toothed snails (*Mesodontinae*), which embraces many genera and species, is almost confined to the Eastern subregion. The same is true of the snails of the group of *Gastrodontinae* and of the genera *Hyalina* and *Hygromia*. The Central subregion is characterized by its poverty in all that respects Mollusca, while several genera of land-snails are peculiar to the Pacific region, and are largely represented by species there. One hundred of the four hundred land-shells described from the Regnum Nearcticum belong to the western coast. Among snails, the genera *Aglaja*, *Arionta*, and *Polymita* are represented by handsome species. *Macrocyclis* and *Binneya* belong especially to this region.

As is to be supposed, the *Insects* indicate a greater number of subdivisions than the other animals. The fresh-water *Crustacea* have been but sparingly studied. They seem, however, to have a wide distribution; thus *Cambarus* (craw-fish) and *Artemia* are found everywhere where physical conditions are suitable.

V.—THE AUSTRORIPARIAN REGION.

V[a]. Reptiles whose distribution corresponds with the area of the Austroriparian region—24:

Trachystomata.

Siren lacertina.

Anura.

Engystoma carolinense.
Acris gryllus gryllus.
Hyla squirella.
Hyla carolinensis.

Ophidia.

Caudisona miliaria.
Ancistrodon piscivorus.
Elaps fulvius.
Haldea striatula.
Farancia abacura.
Cemophora coccinea.
Ophibolus doliatus coccineus.
Coluber obsoletus confinis.
Coluber guttatus.
Tropidonotus fasciatus.

Lacertilia.

Oligosoma laterale.
Cnemidophorus sexlineatus sexlineatus.
Opheosaurus ventralis.
Anolis principalis.

Testudinata.

Macrochelys lacertina (except Atlantic slope).
Pseudemys mobiliensis (except Atlantic slope).
Pseudemys concinna.
Testudo carolina.

Crocodilia.

Alligator mississippiensis.

As already remarked, this fauna is composed of the Floridan, Louisianian, and Texan districts.

The *Floridan* district contains either peculiar species of animals, or those of West Indian or South American character. The characteristic birds are chiefly of the latter character, but among reptiles the following are confined to it:

V^{b}. Species confined to the Floridan district of the above—18:

Urodela.

Manculus remifer.

Anura.

Hyla gratiosa.
Lithodytes ricordii (Cuba; Bahamas).
Rana areolata capito.

Ophidia.

Elaps distans (Sonoran also).
Contia pygaea.
Eutaenia sackenii.
Tropidonotus compsolaemus.
Tropidonotus compressicaudus.
Tropidonotus ustus.
Tropidonotus cyclopium.
Helicops allenii.

Lacertilia.

Rhineura floridana.
Eumeces egregius.
Eumeces onocrepis.
Sceloporus floridanus.
Sphaerodactylus notatus (Cuba).

Crocodilia.

Crocodilus americanus (Cuba).

Of the above, the species of *Crocodilus*, *Sphaerodactylus*, and *Lithodytes* only, have been found in the Antilles. The genera of the above list which are peculiar to the Floridan district of the Nearctic fauna are—

Lithodytes.
Helicops.
Rhineüra.
Sphaerodactylus.

A venomous snake, the *Elaps distans*, is common to this district and the Sonoran fauna.

Some small mammals are confined to this region also. The genera of birds that do not range north of it are—

Certhiola.
Zenaeda, *Oreopelia*, *Starnaenas* } Pigeons.
Rostrhamus, *Polyborus* } Raptores.
Aramus, *Audubonia* } Waders.
Phoenicopterus.
Haliplana, *Anoüs* } Terns.

The *Louisianian* district possesses the peculiarities of the austroriparian fauna already pointed out, minus those of Florida and Texas. Of *Mammalia*, the genera *Alces*, *Mustela*, *Jaculus*, *Arctomys*, *Fiber*, and *Condylura* are wanting, as well as the red-squirrel, Canada lynx, gray-rabbit, etc. Its most remarkable birds are the nonpareil finch, ivory-billed woodpecker, parrakeet, etc., while its *Elaps fulvius*, or coral-snake, is one of the most beautiful of the order. A large and dangerous rattlesnake is also confined to it, viz, *Caudisona adamantea*, and the well-known moccasin *Ancistrodon piscivorus* does not range outside of its boundaries. A species of the West Indian *Dromicus* (serpents) has been found on the Atlantic coast.

V^{c}. Species confined to the Louisianian district—36: (E confined to the Eastern portion; W to the Western, as far as known).

Trachystomata.

Pseudobranchus striatus. E.

Proteida.

Necturus punctatus. E.

Urodela.

Amphiuma means.
Muraenopsis tridactyla. W.
Amblystoma talpoideum. E.
Amblystoma cingulatum. E.

Stereochilus marginatum. E.
Manculus quadridigitatus. E.
Spelerpes guttolineatus. E.

Anura.

Bufo lentiginosus lentiginosus.
Bufo quercicus.
Chorophilus nigritus.
Chorophilus angulatus.
Chorophilus oculatus.
Chorophilus ornatus.

Ophidia.

Crotalus adamanteus adamanteus.
Virginia harperti.
Virginia elegans. W.
Tantilla coronata.
Abastor erythrogrammus.
Osceola elapsoidea. E.
Ophibolus rhombomaculatus.
Coluber quadrivittatus. E.
Spilotes couperii. E.
Bascanium flagelliforme flagelliforme. E.
Bascanium anthicum. W.
Tropidonotus taxispilotus.
Heterodon simus simus.

Testudinata.

Aspidonectes asper. W.
Aspidonectes ferox.
Aromochelys carinatus.
Pseudemys hieroglyphica. (?)
Pseudemys scabra.
Chrysemys reticulata.
Cistudo clausa triunguis. (Penna.)

A number of the genera of the above catalogue are not yet known to extend their range into the Floridan or Texan districts, as follows:

Pseudobranchus.
Muraenopsis.
Virginia.
Abastor.
Osceola.

The genus *Virginia* occurs within the State of Texas, but whether within the Texan district is not certain, as the line separating the latter from the Louisianian district is not well known. The *Spelerpes multiplicatus*, a rare salamander from Western Arkansas, is in the same way, of uncertain reference.

The species of the following list have a peculiar range, some of them (marked E) extending beyond the borders of the Austroriparian region V^{d}. Species which range along the Mississippi Valley and not eastward of it—13:

Urodela.

Amblystoma microstomum (E.).

Ophidia.

Carphophiops helenae.
Virginia elegans.
Ophibolus calligaster (E.).
Coluber emoryi (E.).
Eutaenia faireyi (E.).
Eutaenia proxima.
Tropidonotus grahamii (E.).
Tropidonotus rhombifer.

Testudinata.

Macrochelys lacertina.
Pseudemys troostii.
Malacoclemmys geographica (E.).
Malacoclemmys pseudogeographica (E.).

The *Texan* district of the *Austroriparian* region is not the range of any genus not found elsewhere, but possesses the peculiar genera of the Louisianian district, many of which are represented by corresponding and peculiar species. Seventeen such species of reptiles may be enumerated, besides a salamander and a toad. Several species of mammals are also peculiar to it, *i. e.*, five rodents and two skunks. Of birds, three appear to be, so far as known, peculiar, *Ortyx texanus*, *Vireo atricapillus*, and *Milvulus forficatus*. Many Mexican birds are found on the Rio Grande, while a few enter Texas to a greater distance, as *Icterus parisorum*. The high northwestern regions of the State should be assigned to the Sonoran fauna, as the range of the two partridges (*Callipepla squamata* and *Cyrtonyx massena*) and the finch (*Peucaea cassinii*).

Several genera of mammals, birds, and reptiles exist in the Texan region, which constitute its chief claim for distinction from the Louisianian; these are—

MAMMALS.

Dicotyles (Nt.).
Bassaris (P. Nt.).

BIRDS.

Geococcyx (P. S.).

REPTILES.

Holbrookia (C. S.).
Phrynosoma (C. S. P.).
Stenostoma (Nt. P.).

None of these are peculiar: those marked (P.) being also found in the Pacific; (C.) the Central; (S.) the Sonoran; and (Nt.) the Neotropical region. Two striking species of mammals range through the Texan district, viz, the jaguar and the peccary.

V^e. Species confined to the Texan district—21:

Caducibranchiata.

Amblystoma texanum.

Anura.

Bufo valliceps (also Mexico).
Chorophilus triseriatus clarkii.
Hyla carolinensis semifasciata.
Rana areolata areolata.

Ophidia.

Crotalus adamanteus atrox.
Ancistrodon piscivorus pugnax.
Elaps fulvius tener.
Tantilla gracilis.
Tantilla hallowellii.
Tantilla nigriceps.
Contia episcopa.
Ophibolus doliatus annulatus.
Diadophis punctatus stictogenys.
Coluber iindheimerii.

Eutaenia marciana (extends W.).
Tropidonotus clarkii.
Tropidonotus sipedon woodhousei.

Lacertilia.

Holbrookia texana.
Phrynosoma cornutum.

Testudinata.

Aspidonectes emoryi.

VI.—THE EASTERN REGION.

This fauna presents four districts, viz, the Carolinian; the Alleghenian; the Canadian; and the Hudsonian. These are distinguished by the ranges of mammals and reptiles, and the breeding-places of birds. The Carolinian fauna extends in a belt north of the Louisianian, and south of the isothermal of 71°. Its northern boundary is said to extend from Long Island, south of the hill-region of New Jersey, to the southeastern corner of Pennsylvania, and thence inland. It embraces a wide belt in Maryland and Virginia, and all of central North Carolina, and then narrows very much in passing round south of the Alleghenies of Georgia. It extends north again, occupying East Tennessee, West Virginia, Kentucky, Indiana, the greater parts of Illinois and Ohio, and the southern border of Michigan. It includes also Southern Wisconsin and Minnesota, all of Iowa, and the greater part of Missouri. The Alleghanian embraces the States north of the line just described, excepting the regions pertaining to the Canadian fauna, which I now describe. This includes Northern Maine, New Hampshire, and Vermont, with the Green Mountains; the Adirondacks and summits of the Alleghany Mountains as far as Georgia. It includes Canada East and north of the lakes. The Hudsonian fauna is entirely north of the isothermal of 50°. It has great extent west of Hudson's Bay, and is narrowed southeastward to Newfoundland.

VI[a]. Species peculiar to the Eastern region—34:

Proteida.

Necturus lateralis.

Caducibranchiata.

Menopoma fuscum.
Amblystoma bicolor.

Amblystoma xiphias.
Amblystoma jeffersonianum.
Spelerpes ruber montanus.
Gyrinophilus porphyriticus.
Desmognathus ochrophaea.
Desmognathus fusca fusca.
Desmognathus nigra.

Anura.

Bufo americanus fowlerii.
Chorophilus triseriatus corporalis.
Hyla pickeringii.
Rana palustris.
Rana temporaria silvatica.
Rana temporaria cantabrigensis
Rana septentrionalis (nearly).

Ophidia.

Caudisona tergemina.
Virginia valeriae.
Ophibolus doliatus triangulum.
Cyclophis vernalis (rare south).
Coluber vulpinus.
Pityophis sayi sayi.
Storeria occipitomaculata.
Eutaenia sirtalis ordinata.
Tropidoclonium kirtlandii.

Lacertilia.

Eumeces anthracinus.

Testudinata.

Aspidonectes spinifer.
Amyda mutica.
Pseudemys rugosa.
Chelopus guttatus.
Chelopus muhlenbergii.
Chelopus insculptus.
Emys meleagris.

The *Carolinian* fauna is not so marked among reptiles as among birds. One genus of the former, *Cnemidophorus* (swift lizard), does not range north of it, with the genera *Virginia*, *Cyclophis*, *Haldea*, and *Pityophis* among serpents. Species confined in their northern range by the same limit are—

Ophibolus doliatus doliatus.
Ophibolus getulus.
Tropidonotus sipedon erythrogaster.
Pseudemys rugosa.
Malacoclemmys palustris.
Hyla andersonii.

Genera of birds restricted in the same way are—

Guiraca.
Helmitherus.
Mimus.
Polioptila.
Gallinula.
Herodias.
Florida.
Himantopus.
Recurvirostra.

The *Alleghanian* district includes nearly all of the remaining species of Reptiles and several Batrachians. The genera of these which do not extend north of it are the following:

LIZARDS.

Sceloporus.
Eumeces.

SNAKES.

Carphophiops.
Coluber.
Cyclophis.
Tropidonotus.
Ophibolus.
Heterodon.
Caudisona.
Crotalus.
Ancistrodon.

BATRACHIA.

Chorophilus.
Hyla.
Hemidactylium.
Desmognathus.
Menopoma.
Necturus.

The species thus restricted number twenty-six. The genera of birds which do not range north of this fauna are numerous. They are—

Sialia.
Vireo.
Pyranga.
Harporhynchus.
Troglodytes.
Cyanospiza.
Pipilo.
Ammodromus.
Sturnella.
Icterus.
Zenaedura.
Cupidonia.
Ortyx.
Meleagris.
Ardetta.
Rallus.

The catamount, red-squirrel, jumping-mouse, gray-rabbit, star-nosed mole, and elk, do not range south of this fauna.

The *Canadian* fauna is distinguished for its few reptiles (there being only seven species) and Batrachia, as follows:

TORTOISES.

Chelydra serpentina.
Chelopus insculptus.
Chrysemys picta.

SNAKES.

Bascanium constrictor.
Eutaenia sirtalis.
Diadophis punctatus.
Storeria occipitomaculata.

FROGS.

Rana temporaria cantabrigensis.
Rana septentrionalis.

SALAMANDERS.

Desmognathus ochrophaea.
Desmognathus nigra.
Spelerpes ruber.
Spelerpes bilineatus.
Spelerpes longicauda.

This fauna extends south along the crests of the Alleghenies, where we find the catamount, snow-bird, red-squirrel, and brook-trout (*Salmo fontinalis*), and *Desmognathus ochrophaea*, as far as Georgia.

Several mammals are restricted in northward range by the boundary of this fauna; such are the buffalo, raccoon, skunk, wild-cat, panther, star-nosed mole, etc.; and the moose, caribou, wolverine, and fisher do not range, according to J. A. Allen, south of it.

VI[b]. Species confined to the Canadian district, or nearly so:

Urodela.

Amblystoma jeffersonianum laterale.

Anura.

Bufo lentiginosus fowlerii.
Rana septentrionalis.
Rana temporaria cantabrigensis.

In the *Hudsonian* district there are no reptiles, and the fresh waters begin to present various new species of *Salmo* and *Coregonus* (trout and white-fish). The catamount, fisher, ermine, black-bear, red-squirrel, ground-hog, etc., do not range north of it. The following singing-birds breed there:

Anthus ludovicianus.
Saxicola oenanthe.
Ampelis garrula.
Aegiothus linaria.
Plectrophanes lapponica.
Plectrophanes nivalis.
Plectrophanes picta.
Leucosticte tephrocotis.

The first and last two are the only species not also found in Europe. Numerous waders and swimming-birds breed in this region, the whole

number being thirty-six; while ninety-six species of birds do not wander north of it. To this category many of the common species of the Middle States belong.

North of this the species of vertebrates are circumpolar or arctic.

The ichthyological fauna of the two Eastern subregions remains to be considered. For the present, they will be united, though the distribution of fresh-water fishes is governed by laws similar to those controlling terrestrial vertebrates and other animals, in spite of the seemingly confined nature of their habitat. With this general principle in view, we may revert briefly to this distribution over this district of the Nearctic region. This large area is characterized by the distribution of several species in all its waters, or nearly so, so far as yet examined—those of *Semotilus*, *Ceratichthys*, *Hypsilepis*, *Catostomus*, etc., or by the universal recurrence of the same in suitable situations; and by the representation of these and other genera by nearly allied species in its different portions. The fauna of the tributaries of the Mississippi constitutes, it might be said, that of our district; while the slight variations presented by the Atlantic-coast streams might be regarded as exceptional. The fauna of the great lakes combines the peculiarities of both, possessing as a special peculiarity, (1), which belongs to the Lake region, which, in the district, commences at latitude 42° and extends to the Arctic regions, the range of the genus Coregonus. The peculiarity of the Atlantic subdistrict (II) may be said to be the abundance of *Esox*, *Salmo*, and *Anguilla*, and the absence of *Haploidonotus*. The first two are abundant in the Lake region, while *Anguilla* and *Haploidonotus* have but a partial distribution there. In (III), the Mississippi basin, *Esox* is represented by but few species, and remarkably few individuals. *Salmo* occurs abundantly in the upper parts of the Missouri tributaries, exists in the western mountain-streams of the Alleghanies, becoming rare in those of the Kanawha, and only occurring near the highest summits in those of the Tennessee, south to the line of South Carolina. It is especially characterized by the paddle-fish (*Spatularia* or *Polyodon*), the shovel-sturgeon (*Scaphirhynchops*), and the alligator-gar (*Atractosteus*); also by the buffalo (*Bubalichthys*), the *Cycleptus*, etc., among suckers, and the fork-tailed catfish (*Ichthaelurus*). Among Percomorphs, the *Haploidonotus* is the characteristic genus; and among those allied to the herring, the genus *Hyodon*. Numerous species are confined to its affluents. The gradation from the Mississippi grouping of species to the Atlantic is very gradual, and takes place in successional order from

those emptying into the Gulf of Mexico toward the east and northeast, until we reach the rivers of Massachusetts and Maine, where the greatest modification of the fauna exists. The latter fact has been pointed out by Agassiz, who calls this region a "zoölogical island," and enumerates the characteristic Nearctic genera which are wanting there. I give now a list showing the points at which Mississippi genera cease, as we follow the rivers of the Gulf and Atlantic coasts, so far as our present knowledge extends.

Gulf rivers: *Haploidonotus* has not yet been indicated from eastward of these, except in the Lake area.

Roanoke: *Campostoma* ceases here.

James: *Micropterus* and *Ambloplites* cease.

Potomac: *Pomoxys*, according to Professor Baird (verb. commn.), ceases here.

Susquehanna: *Ceratichthys*, *Exoglossum*, *Chrosomus*, *Carpiodes*, cease.

Delaware: *Clinostomus*, *Hypsilepis analostanus*, *Enneacanthus*, and *Lepidosteus* cease.

Hudson: *Semotilus corporalis*, according to F. W. Putnam (verb. commn.), ceases.

The types remaining in the Atlantic waters of the New England district (IV) are first, then, *Salmo*, *Esox*, *Anguilla*, *Perca*; and, secondly, the general types *Boleosoma*. *Semotilus*, *Hypsilepis*, *Stilbe*, *Hybopsis* (*bifrenatus*), *Fundulus*, and *Amiurus*; and the Lake types *Lota* and *Coregonus*

VII.—THE CENTRAL REGION.

VII[a]. Species peculiar to the Central region—12:

Anura.

Spea bombifrons.

Ophidia.

Ophibolus multistratus.
Eutaenia radix.
Eutaenia vagrans vagrans.
Eutaenia sirtalis parietalis.

Lacertilia.

Eumeces septentrionalis.
Eumeces inornatus.
Eumeces multivirgatus.
Holbrookia maculata maculata.
Phrynosoma douglassii douglassii.

Testudinata.

Pseudemys elegans.
Chrysemys oregonensis.
Cistudo ornata.

VIII.—THE PACIFIC REGION.

VIII[a]. Species confined to the Pacific region—44:

Urodela.

Amblystoma macrodactylum.
Amblystoma paroticum.
Amblystoma tenebrosum.
Amblystoma aterrimum.
Dicamptodon ensatus.
Batrachoseps attenuatus.
Batrachoseps nigriventris.
Batrachoseps pacificus.
Plethodon intermedius.
Plethodon oregonensis.
Anaides lugubris.
Anaides ferreus.
Diemyctylus torosus.

Anura.

Bufo halophilus.
Hyla regilla.
Hyla cadaverina.
Spea hammondii.
Rana temporaria aurora.
Rana pretiosa.

Ophidia.

Crotalus lucifer.
Contia mitis.
Lodia tenuis.
Pityophis catenifer.
Bascanium constrictor vetustum.
Eutaenia hammondii.
Eutaenia elegans.
Eutaenia sirtalis pickeringii.

Eutaenia sirtalis concinna.
Eutaenia sirtalis tetrataenia.
Eutaenia cooperii.
Eutaenia atrata.
Charina plumbea.
Stenostoma humile.

Lacertilia.

Aniella pulchra.
Eumeces skiltonianus.
Xantusia vigilis.
Barissia olivacea.
Gerrhonotus principis.
Gerrhonotus grandis.
Gerrhonotus scincicaudus.
Uta graciosa.
Uta schottii.
Phrynosoma blainvillei.

Testudinata.

Chelopus marmoratus.

Gerrhonotus multicarinatus is common to the Pacific and Lower California regions.

IX.—THE SONORAN REGION.

IX[a]. Species confined to the Sonoran region—68:

Anura.

Bufo alvarius.
Bufo debilis.
Bufo microscaphus.
Bufo speciosus.
Bufo lentiginosus frontosus.
Hyla eximia. (Mexico also.)
Hyla arenicolor.
Scaphiopus varius rectifrenis.
Scaphiopus couchii.

Ophidia.

Crotalus pyrrhus.
Crotalus cerastes.
Crotalus tigris.

Crotalus adamanteus scutulatus.
Crotalus molossus.
Caudisona edwardsii.
Elaps euryxanthus.
Chilomeniscus ephippicus.
Chilomeniscus cinctus.
Chionactis occipitalis.
Contia isozona.
Sonora semiannulata.
Gyalopium canum.
Rhinochilus lecontei.
Ophibolus pyrrhomelus.
Ophibolus getulus splendidus.
Diadophis regalis.
Hypsiglena ochrorhyncha chlorophaea.
Phimothyra grahamiae.
Bascanium flagelliforme piceum.
Chilopoma rufipunctatum.
Eutaenia macrostemma.
Eutaenia vagrans angustirostris.
Tropidonotus validus validus.
Tropidonotus sipedon couchii.
Stenostoma dulce.

Lacertilia.

Eumeces obsoletus.
Eumeces guttulatus.
Cnemidophorus grahamii.
Cnemidophorus inornatus.
Cnemidophorus octolineatus.
Cnemidophorus tessellatus gracilis.
Cnemidophorus tessellatus melanostethus.
Gerrhonotus nobilis.
Gerrhonotus infernalis.
Heloderma suspectum.
Callisaurus dracontoides ventralis.
Uma notata.
Sauromalus ater.
Crotaphytus reticulatus.
Uta ornata.

Sceloporus ornatus.
Sceloporus jarrovii.
Sceloporus poinsettii.
Sceloporus torquatus.
Sceloporus couchii.
Sceloporus marmoratus.
Sceloporus clarkii.
Phrynosoma modestum.
Phrynosoma maccallii.
Phrynosoma regale.
Phrynosoma planiceps.
Phrynosoma hernandezii.
Coleonyx variegatus.
Phyllodactylus tuberculatus.

Testudinata.

Cinosternum sonoriense.
Cinosternum henrici.
Cinosternum flavescens.
Testudo agassizii.

Phrynosoma platyrhinium has as yet been observed in Nevada only.

X.—THE LOWER CALIFORNIAN REGION.

X[a]. Species peculiar to the Lower Californian region—27:

Urodela.

Plethodon croceater.

Anura.

Hyla curta.

Ophidia.

Crotalus enyo.
Crotalus mitchellii.
Tantilla planiceps.
Chilomeniscus stramineus.
Ophibolus californiae.
Ophibolus getulus conjunctus.
Hypsiglena ochrorhyncha ochrorhyncha.
Phimothyra decurtata.
Pityophis vertebralis.
Bascanium aurigulum.

Tropidonotus validus celaeno.
Charina bottae.
Lichanura trivirgata.
Lichanura myriolepis.
Lichanura roseofusca.

Lacertilia.

Phyllodactylus unctus.
Phyllodactylus xanti.
Cnemidophorus maximus.
Verticaria hyperythra.
Callisaurus dracontoides.
Uta thalassina.
Uta nigricauda.
Sceloporus clarkii zosteromus.
Phrynosoma coronatum.
Cyclura hemilopha.

XI.—RELATION OF DISTRIBUTION TO PHYSICAL CAUSES.

The first observation with regard to the Batrachian and Reptilian fauna of North America is the usual one, viz, that the number of specific and generic types exhibits a rapid increase as we approach the tropics. Of the area inhabited by these forms of animals, less than one-fourth is included in the three Southern regions—the Austroriparian, the Sonoran, and the Lower Californian; yet these contain more than half of the entire number of species, and all but eight of the genera are found in them. Of this number, forty-two genera, or one-third of the total, is confined to within their boundaries. It is a truism directly resulting from the very small production of animal heat by these animals, that temperature, and therefore latitude, has the greatest influence on their life and distribution. This is exhibited in other ways than in multiplication of forms. It is well known, that although plainly-colored reptiles are not wanting in the tropics, brilliantly-colored species are much more abundant there than in temperate regions. Although the Regnum Nearcticum does not extend into the tropics, its southern districts are the habitat of most of the species characterized by bright colors. This is most instructively seen in species having a wide range. Such is the case with the southern subspecies of *Desmatognathus* among salamanders, and *Hyla* among frogs. So with snakes of the genera *Crotalus*, *Caudisona*, *Ophibolus*, *Bascanium*, and *Eutaenia*. It is

also true of the lizards of the genera *Phrynosoma*, *Holbrookia*, and *Sceloporus*. *Eutaenia* and *Sceloporus* become metallic in the Mexican subregion, as is also the case with the Anoles. The North American species of *Anolis* does not display metallic luster, while a large part of those of Mexico and a smaller proportion of those of the West Indies exhibit it.

Another important influence in the modification of the life in question is the amount of terrestrial and atmospheric moisture. In the case of the Batrachia, this agent is as important as that of heat, since a greater or less part of their life is, in most species, necessarily spent in the water. The reptiles are less dependent on it, but, as their food consists largely of insects, and as these in turn depend on vegetation for sustenance, the modifying influence of moisture on their habits must be very great.

The Central region combines the disadvantages of low temperature, due to its elevation above the level of the sea, and of arid atmosphere; hence its poverty in *Batrachia* and *Reptilia*. There are but nine species of both classes peculiar to it, while a few others enter from surrounding areas.

The distribution in the other regions is evidently dependent on the same conditions. Thus the well-watered, forest-covered Eastern and Austroriparian regions are the home of the salamanders, the frogs, the tree-toads, and the turtles. The dry and often barren Sonoran and Central regions abound in the lizards and the toads. The Pacific region, which is intermediate in climatic character, exhibits a combination of the two types of life; it unites an abundant lizard-fauna with numerous frogs and salamanders, while there is but one tortoise.

Another character of the reptilian life of arid regions is to be seen in a peculiarity of coloration. This, which has been already observed by the ornithologists, consists of a pallor, or arenaceous hue of the body, nearly corresponding with the tints of dry or sandy earth. This prevails throughout the Batrachia and Reptilia of the Sonoran region, although it is often relieved by markings of brilliant color, of which red is much the most usual. This peculiarity doubtless results immediately from the power of metachrosis, or color-change, possessed by all cold-blooded Vertebrata, by means of which they readily assume the color of the body on which they rest. That a prevalent color of such bodies should lead to a habit of preference for that color is necessary, and as such habits become automatic, the permanence of the color is naturally established.

Another peculiarity of the Sonoran region, and which it shares with a part of Mexico, is the predominance of snakes which possess an extraordinary development of the rostral shield either forward or outward. This has also been observed by Professor Jan, who referred such genera to a group he termed the *Probletorhinidae*, but which has not sufficient definition to be retained in the system. Of ten genera of snakes in the Nearctic region which possess the character, nine are found in the Sonoran subregion, five are peculiar to it, and it shares two with the Lower Californian subregion only. One of the latter (*Phimothyra*) is closely imitated by a genus (*Lytorhynchus*) which occurs on the borders of the African Sahara. The *Heterodon* of the Eastern States, though not confined to the sandy coast-regions, greatly abounds there; and the South American species skip the forest-covered Amazon Valley and reappear on the plains of the Paraguay and Parana. As the Sonoran region embraces a number of desert areas, it is altogether probable that the peculiar forms in question have a direct relation to the removing of dry earth and sand, in the search for concealment and food. A modification of foot-structure, supposed to have relation to the same end, is seen in the movable spines on the outer side of the foot in the genus *Uma*, a character exhibited in higher perfection in the South African genus *Ptenopus*.*

The abundance of Bufones is doubtless due in part to their adaptation to life in dry regions. They are mostly furnished with tarsal bones especially developed for excavating purposes.

* Proc. Acad. Phila., 1868, p. 321.

PART IV.

BIBLIOGRAPHY.

The present list only includes the titles of works and memoirs which embrace discussions of systematic or distributional relations of the reptiles of the Regio Nearctica. Those embracing descriptions of species only will be added at a future time.

The subject of general geographical distribution has been especially investigated by Sclater, Huxley, and the writer; while Baird, Agassiz, LeConte, Verrill, Allen, and the writer have devoted themselves especially to the distribution of the animals of the fauna Nearctica. In 1856, Dr. Hallowell remarked the rarity of salamanders and turtles in the Sonoran region,* and Professor Baird has especially demonstrated the complementary relation exhibited in the distribution of lizards and turtles in North America. Professor Verrill and J. A. Allen have defined the faunal subdivisions of Eastern North America with great success, basing their conclusions on the distribution of birds and *Mammalia*. The writer subsequently defined the Sonoran and Lower Californian regions, and elevated the Austroriparian area to the same value, adopting, also, the districts of Verrill and Allen. In the present essay I am greatly indebted to the learned work of J. A. Allen for information on the distribution of birds, as well as to the previous essay of Professor Baird on the birds and mammals.

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Department of the Interior:

U. S. NATIONAL MUSEUM.

— 4 —

BULLETIN

OF THE

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No. 4.

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1876.

ADVERTISEMENT.

This work is the fourth of a series of papers intended to illustrate the collections of Natural History and Ethnology belonging to the United States, and constituting the National Museum, of which the Smithsonian Institution was placed in charge by the act of Congress of August 10, 1846.

It has been prepared at the request of the Institution, and printed by authority of the honorable Secretary of the Interior.

JOSEPH HENRY,
Secretary Smithsonian Institution.

SMITHSONIAN INSTITUTION,
Washington, February, 1876.

BIRDS

OF

SOUTHWESTERN MEXICO.

COLLECTED BY

FRANCIS E. SUMICHRAST

FOR THE

UNITED STATES NATIONAL MUSEUM.

PREPARED BY

GEORGE N. LAWRENCE.

WASHINGTON:
GOVERNMENT PRINTING OFFICE.
1875.

CATALOGUE OF BIRDS COLLECTED BY PROF. FRANCIS SUMICHRAST, IN SOUTHWESTERN MEXICO, AND NOW IN THE NATIONAL MUSEUM AT WASHINGTON, D. C.

By George N. Lawrence.

A few years since, an arrangement was made by Prof. Joseph Henry, Secretary of the Smithsonian Institution, with Prof. Francis Sumichrast, for an extended exploration of the Pacific side of the Isthmus of Tehuantepec, Southwestern Mexico, for the purpose of procuring specimens of its natural history

At the request of Professor Henry, I undertook the examination of the birds contained in these collections; and they have been forwarded to me from the Smithsonian Institution, from time to time, when received.

During the past four years, four instalments have been sent me, containing 321 species, represented by more that 1,700 specimens.

Circumstances occurred which prevented quite so full an exploration of the isthmus as was at first intended; however, the specimens sent (which are of a remarkably fine character) bear testimony to Professor Sumichrast's efficiency as an industrious and energetic collector, and the many valuable notes manifest his accuracy and intelligence as an observer.

In answer to a remark in one of my earlier letters to him, expressing my surprise that so few new species had been obtained, he says: "I am not astonished at the small number of new species that my first two collections contain. The region of the Pacific is comparatively much poorer than that of the Atlantic. This must be attributed to the extreme dryness of the soil; to the scarcity of vegetation and of insect life; and to the duration of the winds from the northeast and southwest, which there prevail with great violence."

Professor Sumichrast sent me some valuable notes on geographical distribution, which are given below.

He has sent also biographies of many species, which are in their proper places in the catalogue. Finding that these biographies did not

extend through all the families, I wrote him for an explanation, and got the following reply: "I regret to be unable to tell you certainly which are the biographies and notes that I forwarded to the Institution. Almost all my books and papers were carried off in 1871 during the pillage of my house in Juchitan, and I cannot verify the dates of my invoices to the Institution."

In December, 1871, Professor Sumichrast was obliged to leave Juchitan on account of the revolutionary state of the country, and made his residence at Santa Efigenia, which he writes me is "a *hacienda* thirty leagues or so south of Tehuantepec, at the foot of the Cerro de la Gineta, and on the border of the State of Chiapas." Tapana, a locality often given, he says is "a village in the neighborhood of Santa Efigenia."

All communications from him are designated by quotation-marks.

"NOTES ON THE GEOGRAPHICAL DIVISION OF THE BIRDS IN THE ISTHMUS OF TEHUANTEPEC.

"The contraction of the American continent between the ninety-fourth and ninety-fifth degrees of longitude west from Greenwich forms what is called, quite improperly perhaps, the Isthmus of Tehuantepec, whose width between the mouth of the Rio Coatzacoalcos and the Bay of Ventosa is about one hundred and eighty miles.

"In a physical point of view, the isthmus may be considered as divided into three parts, first, an eastern, extending from the Gulf of Mexico to the Puerta; secondly, a central, from the Puerta to the Chivela; and, thirdly, a western, from the Chivela to the Pacific. The eastern part, formed principally of alluvial land and watered by the Coatzacoalcos and its affluents, has its largest portion covered with thick and damp forests, whose vegetation rivals the greatest beauties of tropical nature. The central region presents an undulating surface, embossed with innumerable *lomas*, or hills, which, rising gradually, unite on the western side with the mountains of the Sierra de los Mijes, and, toward the east, with those of the Sierra de Chimalapa. Although watered by numerous streams, it presents, nevertheless, but a scanty vegetation, essentially characterized by oaks on the side of Sarabbia, and palm-trees on the plateau of Chinela. The western division, or plains of the Pacific, is very dry, and its vegetable physiognomy presents a striking contrast to the rich plains on the Atlantic slope. Of the few rivers which flow through it, the most important are the Tehuantepec, Juchitan, Chicapa, and the Ostula. These are so low during part of the dry season that the inhabitants of the villages and *ranchos* situated on their banks have

no drinking-water but that which they draw out of holes dug in the sand.

"From that it can be easily explained how the number of animal forms, as well as the vegetable, decreases perceptibly in proportion as you advance from the Atlantic to the Pacific.

"In a zoölogical point of view, the preceding division into three regions is modified in this sense, that the central part or mean does not present any distinguishing forms which can characterize it.

"A line drawn on the map through the villages of Santa Maria, Chimalapa, and San Juan Guichicovi would indicate quite correctly enough the boundary-lines between the two zoölogical provinces or regions which divide the isthmus, and almost that of a division of the waters which flow to the Atlantic and the Pacific. Several places situated on the crest of this line present, as might be expected, a mixture of forms belonging to each littoral; thus, in the neighborhood of Barrio, *Conurus aztec* and *petzi*, *Chrysotis autumnalis* and *albifrons*, *Psilorhinus morio*, and *Calocitta formosa*, &c., are found together.

"It is to be noticed that, while the species belonging to the western province seldom or never leave it to spread in the opposite direction, several of those in the eastern province advance, on the contrary, to within a short distance of the shores of the Pacific. To quote as examples: *Turdus grayi*, *Attila citreopygia*, *Muscivora mexicana*, *Rhynchocyclus cinereiceps*, *Oncostoma cinereigulare*, *Chiroxiphia linearis*, *Chrysotis levaillanti*, *Pteroglossus torquatus*, *Penelope purpurascens*, *Crax globicera*, *Tinamus sallæi*, &c.; all of them species whose place of development is without contradiction in the limits of the Atlantic region, but which are found in the immediate neighborhood of the Pacific, (Santa Efigenia).

"The difference in the level of the ground, which exerts elsewhere in Mexico such a great influence over the geographical distribution of animal species, only exists in a slight degree in the Isthmus of Tehuantepec; one of the culminating points of this territory, the Cerro de Mazahua, is not elevated probably more than from 500 to 2,800 feet above the level of the sea. We must not, therefore, expect to find in the isthmus properly so called any of the indigenous species which elsewhere characterize alpine regions. The few species of that region which are found in my collections have been gathered out of the isthmus; some in the Sierra of Oaxaca, others in the mountains of Gineta and of Zapotitlan.

"If, in order to establish a sort of parallel between the two ornitho-

logical *horizons* of the isthmus, we seek what especially distinguishes the western province from that of the Gulf, we will find—

"I. That it is less remarkable for the number of forms that belong to it than for the absence of others which predominate in the eastern part, to which they give their own physiognomy, and, if I may so express it, one more essentially neotropical.

"II. That it presents, in relation to the preceding, a marked numerical inferiority in the following families: *Turdidæ*, *Tanagridæ*, *Fringillidæ*, *Momotidæ*, *Trogonidæ*, *Ramphastidæ*, *Picidæ*, *Columbidæ*, *Perdicidæ*, and *Tinamidæ*.

"III. That it is remarkable for the almost entire absence of the families *Dendrocolaptidæ*, *Formicaridæ*, and *Pipridæ*.

"Up to this time, I have only found two native species of Thrushes in the plains of the Pacific. The first, *Turdus flavirostris*, does not go southeast of the city of Tehuantepec, where it appears at distant intervals, at a period when certain fruits are ripe (*Achras*, *Spondias*, &c.) It is probable, as Professor Baird indicates (Review of North American Birds, p. 31), that its center of propagation is in the neighborhood of Colima. The second, *Mimus gracilis*, is very abundant on the dry plains which extend from Tehuantepec to Tonala. We can give an account, it appears to me, of the numerical inferiority of the *Turdidæ* in the west of the isthmus by considering that Thrushes in general are more especially attached to cold and mountainous countries, and, as it has been seen, the same characteristics do not exist in the isthmus properly so called. Besides, the plains of the Pacific have but a scanty vegetation, formed for the greatest part of leguminous plants, which birds whose natural diet is berries (as for example *Planesticus*) seek for but little. This latter circumstance explains also the absence of several genera of *Tanagridæ*, such as *Rhamphocelus*, *Phanicothraupis*, *Lanio*, &c.

"*Trogon citreolus* is the most common Trogon in the west of the isthmus. It is less sylvicoline than its congeners; and the yellow color of its iris is not found, to my knowledge, in any other Trogon of Mexico.

"*Ramphastos carinatus* belongs to the eastern part of the isthmus, in the *terres chaudes*. *Aulacorhamphus prasinus* is not found, from what I am called upon to believe, in the isthmus proper, but only in the mountainous and temperate parts, which border it on the northwest and southeast. As to *Pteroglossus torquatus*, I have not found it elsewhere than at Santa Efigenia.

"*Momotus mexicanus* is the only species of the family that is resident

in the province of the Pacific. *M. lessoni* and *Eumomota superciliaris* occasionally appear; but they are considered to be wanderers from the province of the Gulf, where *Hylomanes momotula* also occurs.

"The resident species of *Picidæ*, on the plains of the Pacific, are *Campephilus guatemalensis*, *Dryotomus scapularis*, and *Centurus aurifrons*.

"The genera *Geotrygon*, *Lepidœnas*, and *Talpacotia*, of the eastern coast, are not found on the western shore of the isthmus.

"A species of *Ortyx* (*O. coyolcos*) represents the family of the *Perdicidæ* on the plains of the Pacific, which, in the eastern province, on the contrary numbers several representatives.

"The specimen of *Tinamus sallæi* in my collection comes from Santa Efigenia, a spot which may be considered as extra-isthmique.

"Notwithstanding my assiduous researches, I have been unable to meet with but a single representative of *Dendrocolaptidæ*, *Dendrornis eburneirostris*.

"*Chiroxiphia linearis* in my collection comes from Santa Efigenia.

"In exchange for the numerical inferiority in regard to the above-mentioned families, we observe a greater development in those of the *Sylviidæ*, and perhaps also of the *Tyrannidæ*, particularly the genera *Polioptila* and *Myiarchus*. The eastern coast of Mexico has furnished, up to this time, but a single species of *Polioptila* (*P. cærulea*), and, moreover, it probably only resides there in winter; on that of the Pacific we find, besides the preceding, two species with a black head, *P. nigriceps* and *P. albiloris*, both indigenous. *Myiarchus lawrencii* is the only species of the genus which can be called common on the coast of the Gulf of Mexico. On the opposite shore, the *Myiarchi* are abundant, and are dispersed almost everywhere in the forests and on the plains.

"The following table, although very incomplete, will give a sort of parallelism of the most characteristic species of each of the two ornithological regions of the isthmus.

"CÔTE ORIENTALE.	"CÔTE OCCIDENTALE.
"*Turdus grayi.*	"*Turdus flavirostris.*
"*Campylorhynchus zonatus.*	"*Campylorhynchus humilis.*
"*Thryothorus maculipectus.*	"*Thryothorus pleurostictus.*
"*Granatellus sallæi.*	"*Granatellus venustus.*
"*Hæmophila rufescens.*	"*Hæmophila ruficauda.*
"*Cyanospiza parellina.*	"*Cyanospiza leclancheri.*
"*Cassiculus prevosti.*	"*Cassiculus melanicterus.*

" *Icterus mesomelas.*	" *Icterus pectoralis.*
" *Psilorhinus morio.*	" *Calocitta formosa.*
" *Momotus lessoni.*	" *Momotus mexicanus.*
" *Trogon caligatus.*	" *Trogon citreolus.*
" *Piaya cayana.*	" *Piaya mexicana.*
" *Conurus aztec.*	" *Conurus petzi.*
" *Chrysotis autumnalis.*	" *Chrysotis finschi.*
" *Ortalida vetula.*	" *Ortalida poliocephala.*
" *Ortyx pectoralis.*	" *Ortyx coyolcos.*

"The preceding remarks apply exclusively to indigenous species. It would be interesting if I could record here some facts relative to the distribution of the species which reside in the isthmus in the winter-season, or only during their flight; but this study would require several years of continued observations which were made simultaneously on both coasts. This part of Mexico is, moreover, less favorable than any other for observations of this kind. The shrinking of the continent, the absence of natural barriers, there make the dispersion of traveling-birds, from east to west and *vice versa*, very easy. Another cause, which must bring several migratory species on the shores of the Gulf of Tehuantepec in winter, is the prevalence of northeast winds in the isthmus. These winds, which blow there with extreme violence from the month of October, undoubtedly force a large number of birds that are traveling along the Atlantic shore toward Central America to swerve from this line, and push them toward the opposite coast. An analogous cause, the prevalence of southeast winds from the month of March, that is to say, that the time that the emigrant species return to the north, operates with an inverse action, by bringing the species coming from the south along the eastern shore toward the coasts of the Gulf of Mexico. I will limit myself to state here the presence in winter of *Dendræca graciæ* in the mountains of Tehuantepec, and the extraordinary abundance at the same time of *Chondestes grammaca* and *Euspiza americana* on the plains of the Pacific.

"The shores of the Gulf of Tehuantepec, or, to speak more properly, those of the salt-lakes communicating with the ocean, which extend from Ventosa nearly to Tonala, are inhabited by a great number of aquatic birds. Although belonging, for the most part, to northern species, it is probable that a large number of them make their nests there. I have found there in August, a time when the migratory birds have not

yet made their appearance in Mexico, examples of *Numenius*, *Limosa*, *Calidris*, *Ereunetes*, &c.

"An interesting fact to be observed is that the greater part of the *Laridæ* which I have gathered on the shores of the Gulf of Tehuantepec are identical with those of the Atlantic. I will give as examples *Chroicocephalus atricilla*, *Sterna anglica*, *Sterna antillarum*, *Hydrochelidon fissipes*, and *Rhynchops nigra*.

"Professor Baird (Review of North American Birds, p. 267, and Distribution and Migration of North American Birds) has already mentioned, as a fact worthy of notice, the presence of the first three of these species at Mazatlan. He speaks of the *S. antillarum* as a winter resident at Mazatlan, Colima, and Manzanillo. It is curious that on the shores of the Gulf of Tehuantepec the opposite appears to take place. At San Mateo del Mar, a village eight leagues from Tehuantepec, I have not seen, in the months of February and December, 1869, and February, 1870, a single bird of this species (*S. antillarum*); while in August, 1869, they appeared there in considerable numbers. The natives have assured me that in the month of June this *Sterna* makes its nest on the sand-banks which intersect the lakes in the neighborhood."

Fam. TURDIDÆ.

1. Catharus occidentalis, Scl.

"Sierra Madre, *près* Zapotitlan; January, 1870."

2. Turdus mustelinus, Gm.

"Tehuantepec City."

3. Turdus swainsoni, Cab.

"Tehuantepec (Tapana); April 14, 1869.

"Iris brown; bill black; base of lower mandible whitish; feet pale brownish."

4. Turdus grayi, Bp.

"Tehuantepec (Santa Efigenia); December, 1868.

"Iris brown; bill greenish-olive; feet livid fleshy.

"I have only observed this species at Santa Efigenia, where it is not very abundant, and where its presence is explained probably by the neighborhood of the Sierra de Chimalapa."

5. Turdus flavirostris, Sw.

"Tehuantepec City; November, 1869.

"Iris cinnamon; bill yellowish, tip dusky; feet dull flesh-color."

This is an abundant species in Western Mexico, to which section it seems to be restricted; common at Mazatlan, and also obtained on the Tres Marias Islands by Colonel Grayson.

6. Melanotis cærulescens (Sw.).

"Sierra Madre, *près* Zapotitlan; January, 1870."

7. Harporhynchus curvirostris (Sw.).

"Tehuacan (Puebla); August, 1868.

"Iris orange; bill black; feet livid blue; vulgar name Cuitlacochi."

8. Mimus polyglottus var. **caudatus,** Baird.

"Tehuantepec City; October, 1869.

"Iris orange-yellow; bill and feet black."

9. Mimus gracilis, Cab.

"Tehuantepec City; October, 1869.

"Iris orange-yellow; bill and feet black."

There are six specimens which I consider to be this species. They differ from examples from Yucatan in being rather smaller and more slender; in having the wings and tail brownish black, and the color of the upper plumage of a brownish ash. In Yucatan specimens, the wings and tail are deep black, and the upper parts bluish ash. These last agree closely with Cabanis's description of *M. gracilis*. The specimens under examination were collected in October. The differences in color may be seasonal.

Fam. SYLVIIDÆ.

10. Polioptila cærulea, Linn.

"Tehuantepec (Santa Efigenia), Juchitan; August and December, 1868.

"Iris brown; upper mandible brownish, lower whitish; feet black.

"This species, which is not uncommon in the neighborhood of Santa Efigenia, only resides there perhaps in winter, or during the flight. I have not seen it there since the month of March."

11. Polioptila albiloris, Scl.

"Tehuantepec (Santa Efigenia), Tehuantepec City; May and December.

"Iris dark brown; bill black, except two-thirds of basal portion of lower mandible, which is light plumbeous; feet plumbeous."

12. Polioptila nigriceps, Baird.

"Tehuantepec (Tapana, Santa Efigenia); Quiotepec (Oaxaca); April.

"Iris brown; basal half of lower mandible plumbeous, upper mandible and tip black; feet plumbeous.

"Common almost everywhere in the west of the isthmus and in the dry and warm districts of the State of Oaxaca; frequents the ravines and the thin woods; goes almost always in pairs."

Fam. TROGLODYTIDÆ.

13. Campylorhynchus zonatus, Less.

"Tehuantepec (Guichicovi); September.

"Iris cinnamon-red; upper mandible black; lower horny; feet yellowish olive."

14. Campylorhynchus jocosus, Scl.

"Dondominguello (Oaxaca); August, 1868.

"Iris red brown; bill blackish; feet dusky ash."

15. Campylorhynchus humilis, Scl.

"Tehuantepec (Santa Efigenia); Tehuantepec City.

"Iris bright brick-red; bill blackish; basal half of lower mandible and feet light plumbeous.

"This is the most common species of the genus that I have met with on the shores of the Gulf of Tehuantepec. It advances toward the northeast to San Carlos, on the route from Tehuantepec to Oaxaca. It is a very lively bird, whose song at the time of mating is agreeable and varied; except at this time, when it lives in pairs, it is almost always seen in small flocks."

16. Salpinctes obsoletus (Say).

"Tehuantepec (Cacoprieto); June, 1872."

17. Cyphorinus leucostictus, Cab.

"Tehuantepec (Guichicovi); September, 1869.

"Iris brown; bill black; feet dark plumbeous."

18. Thryothorus maculipectus, Lafr.

"Tehuantepec (Guichicovi); September, 1869.

"Iris brown; upper mandible black, lower horn-color; feet dark ashy-blue."

19. Thryothorus pleurostictus, Scl.

"Tehuantepec (Santa Efigenia), Guichicovi, Tapana; March to October.

"Iris brown; upper mandible brownish-black, lower light bluish-fleshy; feet light-brown."

"One of the indigenous birds, the most dispersed in the woody localities on the west of the isthmus, and the only sylvicoline wren that I have there met with up to this time. Endowed with extreme vivacity, it is continually in motion, running along the ground and climbing the shrubs and creepers, in search of insects; and this occupation is always enlivened by the cries of pleasure or the animated trills of the male bird, which reveal his distant position in the interior of the wood. Besides, it is quite tame, and may be easily approached; the report of a gun, even, does not appear to frighten it much. In very woody spots, several couples of them are often seen devoting themselves with ardor to the chase, or busy carrying materials destined for the construction of their nests. This nest, made with skill, is woven with dry grasses, whose stems are fine and elastic. It has the form of a retort, and is fixed horizontally around the stem of a bush, often at the fork of two branches. From the beginning of May to the middle of July, I have found these nests, containing from 3 to 5 eggs of a beautiful greenish-blue color, clear, and of a diameter of about 22 millimeters. The bottom of the nest, where the eggs rest, is lined with hairs, mingled with the fine down of certain seeds of *Bombacées*."

20. Thryothorus bewickii var. **leucogaster,** Baird.

"Puente Colorado; August, 1868.

"Iris brown; bill and feet dusky."

Fam. MOTACILLIDÆ.

21. Anthus ludovicianus (Gm.).

"Tehuantepec City; November, 1869.

"Bill blackish; base of lower mandible dull yellowish; feet brownish."

Fam. MNIOTILTIDÆ.

22. Sciurus auricapillus (Linn.).

"Tehuantepec (Guichicovi); September, 1869.

"Iris brown; upper mandible blackish-brown, lower and feet light-fleshy."

23. Sciurus noveboracensis (Gm.).

"Tehuantepec (Tapana); April, 1869.

"Iris brown; bill black; base of lower mandible paler; feet light-brown."

24. Sciurus ludovicianus (Aud.).

"Tehuantepec (Barrio, Santa Efigenia); September and January.

"Iris brown; bill blackish; lower mandible paler; feet pale-fleshy."

25. Mniotilta varia (Linn.).

"Tehuantepec (Guichicovi); September, 1869.

"Iris brown; upper mandible black, lower fleshy; tarsi dark olivaceous; toes olivaceous yellow."

26. Parula americana (Linn.).

"Tehuantepec (Santa Efigenia), Tehuantepec City; October and January.

"Iris brown; upper mandible brown, lower whitish-brown at tip; feet brownish."

27. Helminthophaga ruficapilla (Wils.).

"Tehuantepec (Santa Efigenia); December and January.

"Iris brown; bill bluish-ash, culmen dusky; feet olive-brown."

28. Helminthophaga peregrina (Wils.).

"Tehuantepec (Santa Efigenia); December and January.

"Iris brown; bill ashy, culmen and tip dusky; feet dull olive."

29. Dendræca æstiva (Gm.).

"Tehuantepec (Barrio, Chihuitan, Guichicovi, Santa Efigenia), Dondominguillo (Oaxaca); August to December, January and February.

"Iris brown; upper mandible black, lower light plumbeous; feet light brownish-yellow."

30. Dendræca virens (Gm.).

"Tehuantepec (Santa Efigenia); December and January.

"Iris brown; bill and feet brownish."

31. Dendræca coronata (Linn.).

"Tehuantepec (Santa Efigenia); December and January.

"Iris brown; bill and feet black."

32. Dendræca blackburniæ (Gm.).

"Tehuantepec City."

33. Dendræca castanea (Wils.).

"Tehuantepec City; October, 1869.

"Iris brown; upper mandible brownish, lower yellowish; feet brownish-yellow."

34. Dendrœca maculosa (Gm.).

"Tehuantepec (Santa Efigenia); December and March.

"Iris brown; bill ashy; culmen and a line along the lower mandible dusky; feet brownish, toes tinged with yellow."

35. Dendrœca dominica var. **albilora,** Baird, Am. Nat., 1873, p. 606.

"Chiapas (Gineta Mountains); January, 1869."

36. Dendrœca graciæ, Coues.

"Sierra Madre, *près* Zapotitlan; January, 1870."

37. Oporornis formosus (Wils.).

"Tehuantepec (Guichicovi); September, 1869.

"Iris brown; upper mandible brownish-black, lower brownish-black, except at base, which, with the feet, are light fleshy."

38. Myiodioctes cærulescens (Gm.).

"Tehuantepec (Barrio, Guichicovi); September, 1869.

"Iris brown; upper mandible brownish, lower paler; feet light brownish-yellow."

39. Myiodioctes pusillus var. **pileolatus** (Pallas.). See Ridgway, Am. Nat., 1873, p. 808.

"Tehuantepec (Guichicovi); September, 1869.

"Iris brown; bill brownish, lower mandible yellowish; feet light-brown."

40. Basileuterus rufifrons (Sw.).

"Tehuantepec (Guichicovi); September, 1869.

"Iris brown; bill black; feet fleshy."

41. Setophaga ruticilla (Linn.).

"Tehuantepec (Santa Efigenia); April, 1871."

42. Setophaga picta, Sw.

"Chiapas (Gineta Mountains); January, 1869."

43. Setophaga miniata, Sw.

"Sierra Madre, *près* Zapotitlan; January, 1870."

44. Granatellus venustus, Dubus.

"Tehuantepec (Santa Efigenia); January, 1869.

"Iris brown; upper mandible brownish-black, lower plumbeous ash; feet dull ashy-brown."

45. Geothlypis philadelphia var. **macgillivrayi** (Aud.).

"Tehuantepec (Chihuitan); Tehuantepec City; November, 1868.

"Iris brown; bill blackish, most of lower mandible pale; feet light flesh."

46. Icteria virens (Linn.).

"Tehuantepec (Chihuitan, Santa Efigenia); November and January.

"Iris brown; upper mandible blackish, lower whitish; feet dull ashy."

Fam. HIRUNDINIDÆ.

47. Progne leucogaster, Baird.

"Tehuantepec (Barrio); October, 1868.

"Iris dark-brown; bill black; feet brownish."

48. Hirundo horreorum, Barton.

"Tehuantepec City; October. Tehuacan (Puebla); August.

"Iris brown; bill brownish-black; feet brown."

49. Petrochelidon swainsoni, Scl.

"Tehuantepec City; October, 1869.

"Iris and bill dark-brown; feet grayish-brown."

50. Cotyle riparia (Linn.).

"Tehuantepec City; October, 1869."

Fam. VIREONIDÆ.

51. Vireosylvia flavoviridis, Cass.

"Tehuantepec (Tapana, Santa Efigenia); April and May.

"Iris red; bill dusky above, light ash beneath; feet light brownish-ash."

52. Vireosylvia gilva var. **swainsoni,** Baird.

"Tehuantepec (Santa Efigenia); January, 1869, April, 1871."

53. Vireo noveboracensis (Gm.).

"Tehuantepec (Santa Efigenia); December, 1868."

54. Vireo flavifrons, Vieill.

"Tehuantepec (Santa Efigenia); Chiapas (Gineta Mountains); December and January.

"Iris brown; bill bluish-ash, culmen and tip of both mandibles dusky; feet bluish-ash."

55. Lanivireo solitarius (Wils.).

"Tehuantepec (Santa Efigenia); Tehuantepec City; Chiapas (Gineta Mountains); October and January.

"Iris brown; bill plumbeous, culmen and tip dusky; feet plumbeous."

56. Vireo belli, Aud.

"Tehuantepec (Santa Efigenia); Tehuantepec City; October and December.

"Iris brown; upper mandible brownish, lower and feet light plumbeous."

57. Vireo hypochryseus, Scl.

"Quiotepec (Oaxaca); August, 1868."

58. Hylophilus decurtatus (Bonap.).

"Tehuantepec (Chimalapa); March, 1869.

"Iris brown; feet light-brown."

59. Cyclorhis flaviventris, Lafr.

"Tehuantepec (Guichicovi, Petapa); September, 1869.

"Iris cinnamon; upper mandible light-brownish fleshy, lower bluish; feet fleshy."

Fam. LANIIDÆ.

60. Collurio ludovicianus var. **excubitoroides** (Sw.).

"Tehuantepec City; October, 1869.

"Iris brown; bill black; base of lower mandible paler; feet dull grayish-ash."

Fam. AMPELIDÆ.

61. Ampelis cedrorum (Vieill.).

"Tehuantepec."

Fam. TANAGRIDÆ.

62. Euphonia affinis (Less.).

"Tehuantepec (Barrio); Tehuantepec City; October, 1868.

"Iris brown; bill black, bases of both mandibles light-bluish; feet dark lead-color."

63. Euphonia hirundinacea, Bp.

"Tehuantepec (Guichicovi); September, 1869.

"Iris brown; upper mandible and tip of lower black, rest of lower bluish; feet ashy-plumbeous."

64. Chlorophonia occipitalis (Du Bus.).

"Chiapas (Gineta Mountains); January, 1869."

65. Tanagra abbas, Licht.

"Tehuantepec (Guichicovi); September, 1869.

"Iris brown; bill black; feet dark-plumbeous."

66. Pyranga æstiva (Gm.).

"Tehuantepec (Chihuitan, Santa Efigenia); November and January.

"Iris brown; bill light fleshy-brown; culmen dusky; feet brownish."

There are four specimens (two of each sex), which do not differ from specimens of *P. æstiva* from the Atlantic States. The variety named *P. cooperi* by Mr. Ridgway thus appears to range farther to the north.

67. Pyranga hepatica, Sw.

"Tehuantepec (Guichicovi); Chiapas (Gineta Mountains); September and January.

"Iris brown; bill bluish, culmen and tip of lower mandible dusky; feet light brownish-ash."

68. Pyranga ludoviciana (Wils.).

"Tehuantepec (Ishuatlan, Santa Efigenia); December and January.

"Iris brown; bill yellowish, culmen dusky; feet dark ashy."

69. Phænicothraupis rubicoides (Lafr.).

"Tehuantepec (Guichicovi); September, 1869.

"Iris brown; bill and feet hazel-brown."

70. Phænicothraupis fuscicauda, Cab.

"Tehuantepec (Guichicovi); September, 1869.

"Iris brown; bill black, tip yellow; feet light-brown."

71. Lanio aurantius, Lafr.

"Tehuantepec (Guichicovi); September, 1869.

"Iris brown; bill black; feet grayish."

72. Saltator grandis (Licht.).

"Tehuantepec (Santa Efigenia); January, 1869."

73. Saltator atriceps, Less.

"Tehuantepec (Guichicovi, Santa Efigenia); September, December, and February.

"Iris brown; bill black; feet brownish."

Fam. FRINGILLIDÆ.

74. Hedymeles ludovicianus (Linn.).

"Tehuantepec (Santa Efigenia); January, 1869."

75. Cardinalis virginianus var. **carneus,** Less.

"Huamelula."

76. Guiraca cærulea (Linn.).

"Tehuantepec (Chihuitan); Huitzo, near Oaxaca; August and November.

"Iris brown; bill and feet dusky."

77. Guiraca parellina (Licht.).

"Tehuantepec City, Huallago; October and December.

"Iris brown; bill and feet grayish-brown."

78. Volatinia jacarina (Linn.).

"Tehuantepec (Guichicovi); September, 1869.

"Iris brown; bill black, most of lower mandible bluish; feet blackish."

79. Phonipara pusilla (Sw.).

"Dondominguillo (Oaxaca); August, 1868.

"Iris brown; bill black; feet light-brown."

80. Cyanospiza cyanea (Linn.).

"Tehuantepec (Santa Efigenia); December, 1868.

"Iris brown; bill dull fleshy; feet brownish."

81. Cyanospiza ciris (Linn.).

"Tehuantepec (Santa Efigenia); Tehuantepec City; November and December.

"Iris brown; bill and feet brownish."

82. Cyanospiza leclancheri (Lafr.).

"Tehuantepec (Tapana); Tehuantepec City; April and October.

"Iris brown; upper mandible brown, lower fleshy; feet brownish."

83. Cyanospiza rositæ, Lawr. Ann. Lyc. N. Y., vol. x, p. 397.

"Tehuantepec (Cacoprieto); January, 1872.

"Iris brown; upper mandible blackish; lower pale-bluish; feet livid-plumbeous. Total length, 14 centimeters; wing, 72 millimeters; tail, 55 millimeters."

Since my description of the male of this species, the missing specimens, fortunately, have been received. An examination of the male shows no point of difference from my description worthy of comment.

There is but a single specimen of the female (the only one as yet obtained), of which a description is now given.

Plumage above of a dull ochreous-brown, tinged with blue on the

head and lower back; rump and upper tail coverts dull light-blue; middle tail-feathers dull blue, the outer webs of the other tail-feathers similar in color, the inner webs blackish-brown; quill-feathers dark-brown; the smaller wing-coverts and the outer edges of the larger quills pale-blue; the other wing-coverts and the tertiaries have margins the color of the back; chin grayish; under plumage of a dull brownish rose-color, paler and clearer on the abdomen and under tail-coverts; bill and feet similar in color to those of the male. Types in National Museum, Washington, D. C.

84. Euspiza americana (Gm.).

"Tehuantepec (Juchitan, Guichicovi); Tehuantepec City; September and October.

"Iris brown; bill brownish, tinged with yellow; feet hazel-brown."

85. Passerculus savanna var. **alaudinus,** Bp.

"Tehuantepec City; November, 1869.

"Iris brown; upper mandible brownish, lower mandible and feet fleshy."

86. Zonotrichia mystacalis, Hartl.

"Tehuacan (Puebla); August, 1868.

"Iris reddish-brown; upper mandible black, lower light-blue; feet fleshy."

87. Spizella socialis (Wils.).

"Chiapas (Gineta Mountains); January, 1869.

88. Spizella socialis var. **arizonæ,** Coues.

"Tehuantepec (Guichicovi); September, 1869.

"Iris brown; upper mandible brown, lower mandible lighter; feet brownish flesh."

89. Spizella atrigularis, Cab.

"Chapulco (Puebla); January, 1868.

"Iris brown; bill brownish-orange; feet brownish."

90. Peucæa ruficeps var. **boucardi,** Scl.

"Puente Colorado (Puebla); August, 1868.

"Iris brown; upper mandible horny-brown, lower bluish; feet fleshy."

91. Coturniculus passerinus (Wils.).

"Tehuantepec City; November, 1869.

"Iris brown; upper mandible dusky, lower light-bluish; feet fleshy."

92. Embernagra rufivirgata, Lawr.

"Huamelula."

93. Hæmophila rufescens, Sw.

"Tehuantepec (Guichicovi); September, 1869.

"Iris brown; upper mandible black, lower bluish; feet dark flesh-color."

94. Hæmophila ruficauda (Bonap.).

"Tehuantepec (Juchitan, Santa Efigenia); Tehuantepec City.

"Iris light reddish-brown; upper mandible black, lower bluish-fleshy; feet fleshy-brown."

95. Hæmophila sumichrasti, Lawr., Ann. N. Y. Lyc., vol. x, p. 6.

"Tehuantepec (Juchitan); September, 1868.

"Iris brownish-red; upper mandible blackish, lower mandible and feet fleshy."

96. Pipilo maculatus, Sw.

"Cieneguilla (Oaxaca, alpine region)."

97. Pipilo albicollis, Scl.

"Huitzo, near Oaxaca; August, 1868.

"Iris brown; upper mandible brownish, lower bluish-ash; feet grayish-brown."

98. Chondestes grammaca (Say).

"Tehuantepec (Chihuitan, Santa Efigenia); November, December, and January.

"Iris brown; bill bluish; culmen and tip dusky; feet fleshy."

99. Chrysomitris notata (Du Bus.).

"Chiapas (Gineta Mountains); January, 1869.

"Iris brown; upper mandible blackish-brown, lower dull-ashy; feet brownish."

Fam. ALAUDIDÆ.

100. Eremophila alpestris var. **chrysolæma** (Wagl.).

"Tehuantepec (San Mateo); August, 1869.

"Probably resident on the Pacific plains, where it seems to be abundant in July and August.

Fam. ICTERIDÆ.

101. Cassiculus melanicterus (Bp.).

"Tehuantepec (Barrio, Chihuitan); Tehuantepec City; October, November, and December.

"Iris brown; bill greenish-white; feet blackish-brown.

"This bird (called by the Creoles *Tordo de fierro* (Iron Thrush), and by the Zapotèques *bigoseguiba*, which has the same meaning), although proper to Western Mexico, often wanders from the coast. A few years ago I found it near Tehuacan (State of Puebla). In the isthmus it is especially abundant near Chihuitan and Huallaga. Like *Cassicus prevosti*, it has a disagreeable smell, and is generally infested with vermin."

102. Cassicus prevosti (Less.).

"Tehuantepec (Guichicovi, Santa Efigenia); May and September.

"Iris light-yellow; bill yellowish-white; feet bluish-ash."

103. Icterus prosthemelas (Strickland).

"Tehuantepec (Chihuitan); December, 1868."

104. Icterus melanocephalus (Wagl.).

"Tehuantepec (Guichicovi); September, 1869.

"Iris brown; bill black; base of lower mandible and feet bluish-ash."

105. Icterus mesomelas (Wagl.).

"Tehuantepec (Guichicovi); September, 1869.

"Iris brown; bill black; base of lower mandible and feet bluish-ash."

106. Icterus gularis (Wagl.).

"Tehuantepec (Barrio, Chihuitan, Juchitan, Santa Efigenia).

"Iris brown; bill black, with the base of the lower mandible and feet bluish-ash."

107. Icterus pectoralis (Wagl.).

"Tehuantepec (Juchitan, Santa Efigenia); June and September.

"Iris dark-brown; bill black; base of lower mandible bluish; feet bluish-ash."

108. Icterus formosus, Lawr., Ann. N. Y. Lyc., vol. x, p. 184.

"Tehuantepec (Santa Efigenia, Juchitan); June, September, and December.

"Iris brown; bill black; base of lower mandible and feet light-plumbeous."

109. Icterus spurius var. **affinis,** Lawr.

"Tehuantepec (Chihuitan, Santa Efigenia); Tehuantepec City.

"Iris brown; upper mandible black, lower ashy-blue; feet dark ashy-blue."

110. Molothrus æneus (Wagl.).

"Tehuantepec (Tapana); April, 1869.

"Iris red; bill and feet black."

111. Molothrus pecoris var. **obscurus** (Gm.).

"Tehuantepec City; October, 1869.

"Iris brown; feet black."

112. Sturnella magna var. **mexicana,** Scl.

"Tehuantepec (Barrio, Santa Efigenia); September and February.

"Iris hazel-brown; feet light fleshy-brown."

113. Quiscalus macrurus, Sw.

"Tehuantepec (Barrio, Juchitan); September and October.

"Iris pale-yellow; bill and feet black."

114. Quiscalus mexicanus, Cass.

"Tehuantepec (Guichicovi); September, 1869.

"Iris brown; bill and feet black; inside of bill yellow."

Fam. CORVIDÆ.

115. Cyanocitta coronata (Sw.).

"Cieneguilla (Oaxaca, alpine region); August, 1868.

"Iris brown; bill and feet black."

116. Cyanocitta californica var. **sumichrasti,** Ridg.

"Nacaltepec (Oaxaca); August, 1868.

"Iris brown; bill and feet black."

117. Calocitta formosa (Sw.).

"Tehuantepec (Juchitan); Tehuantepec City; August, September, and November.

"Iris brown; bill and feet black.

"This is the most widely scattered and the greatest busybody of all the birds of the isthmus. You cannot take a step out of inhabited localities without being assailed by the vexatious scoldings of these *Chavis* (that is the name which is given to them). Not content with

hooting at you as you pass, they torment you, follow you, cross the road in front of you, and accompany these gymnastic performances by clapping their bills, by whistling, by scolding in every tone and on every key. Excessively bold, it does not fear to approach farms and feed upon the meat which is put out to dry in the sun (*tasajo*), in company with species of *Cathartes* and *Quiscalus*. If an animal, a horse or an ox, for example, should fall exhausted from the effects of a wound, the *Chavis* make no scruple of attacking the wounded spot, either to carry off the pieces of flesh which are loose, or perhaps to obtain the larvæ of carnivorous flies which are developed there."

118. Xanthura guatemalensis (Bp.).

"Tehuantepec (Santa Efigenia); December and January.

"Iris yellow; bill black; feet ashy-blue."

119. Psilorhinus morio (Licht.).

"Tehuantepec (Guichicovi); September, 1869.

"Iris brown; bill yellow; feet black, mixed with yellow."

120. Corvus corax var. **carnivorus,** Bartram.

"Tehuantepec (Barrio, Tapana); April, 1869.

"Iris brown; bill and feet black."

Fam. DENDROCOLAPTIDÆ.

121. Dendrornis eburneirostris (Sw.).

"Tehuantepec (Guichicovi, Ishuatlan, Tapana, Santa Efigenia).

"Iris brown; bill whitish horn-color; sides of upper mandible brownish; feet dull-olive."

Fam. TYRANNIDÆ.

122. Attila citreopygius (Bp.).

"Tehuantepec (Santa Efigenia); May, 1871.

"Iris cinnamon; bill horny; feet plumbeous."

123. Sayornis sayus (Bp.).

"Chapulco (Puebla); August, 1868.

"Iris brown; bill and feet black."

124. Sayornis nigricans (Sw.).

"Tanatepec."

125. Todirostrum schistaceiceps, Scl.

"Tehuantepec (Guichicovi); September, 1869.

"Iris brown; bill black, extreme tip whitish; feet light-bluish."

126. Oncostoma cinereigulare, Scl.

"Tehuantepec (Guichicovi, Cacoprieto, Tapana, Santa Efigenia); April to September.

"Iris grayish-white; bill black; medial face of lower mandible whitish; feet fleshy."

127. Ornithion incanescens (Max.); (**Camptostoma imberbe,** Scl., see P. Z. S., 1873, p. 577).

"Tehuantepec (Santa Efigenia); December and January.

"Iris brown; bill black; base of lower mandible yellowish; feet blackish-ash; commissure and mouth orange."

128. Myiozetetes texensis (Giraud).

"Tehuantepec (Juchitan, Barrio, Chihuitan, Santa Efigenia).

"Iris brown; bill and feet black."

129. Rhynchocyclus cinereiceps (Scl.).

"Tehuantepec (Tapana, Santa Efigenia); January to May.

"Iris pearl-gray; upper mandible blackish; lower mandible and feet dull flesh-color; interior of mouth black."

130. Pitangus derbianus (Kaup).

"Tehuantepec (Chihuitan, Tapana, Santa Efigenia).

"Iris brown; bill and feet black."

131. Myiodynastes luteiventris, Bp.

"Tehuantepec (Tapana); April, 1869.

"Iris brown; bill black; extreme base of lower mandible dull-fleshy; feet dark brownish-ash."

132. Megarhynchus mexicanus (Lafr.).

"Tehuantepec (Guichicovi, Chihuitan, Santa Efigenia).

"Iris brown; bill and feet black."

133. Muscivora mexicana, Scl.

"Tehuantepec (Tapana, Santa Efigenia); June and December.

"Iris brown; bill black; central part of lower mandible yellowish; feet fleshy-yellow."

134. Pyrocephalus rubineus var. **mexicanus,** Scl.

"Tehuantepec (Santa Efigenia); Tehuantepec City.

"Iris brown; bill and feet black."

135. Empidonax minimus (Baird).

"Tehuantepec (Chihuitan, Santa Efigenia, Tapana, Guichicovi); Tehuantepec City; Chiapas (Gineta Mountains).

"Iris brown; upper mandible brownish-black, lower dull-fleshy; feet black."

136. Empidonax flaviventris (Baird).

"Tehuantepec (Guichicovi, Santa Efigenia); December and January.

"Iris brown; upper mandible brownish-black, lower yellowish; feet blackish."

137. Empidonax traillii var. **pusillus** (Sw. et Rich.).

"Tehuantepec City; October, 1869.

"Iris brown; upper mandible black, lower light-brownish; feet black."

138. Empidonax hammondi (De Vesey).

"Chiapas (Gineta Mountains); January, 1869.

"Iris brown; upper mandible blackish, lower light-brownish; feet black."

139. Contopus borealis (Sw.).

"Tehuantepec (Icacoprieto); September, 1872."

140. Contopus pertinax, Cab. et Heine.

"Chiapas (Gineta Mountains); January, 1869."

141. Contopus virens (Linn.).

"Tehuantepec (Tapana); April and May.

"Iris brown; upper mandible black, lower dull-yellow; feet black."

142. Contopus virens var. **richardsonii** (Sw.).

"Tehuantepec (Tapana); Tehuantepec City; April, May, and October.

"Iris brown; upper mandible black, basal half of lower brownish-yellow; feet black."

143. Myiarchus crinitus (Linn.).

"Tehuantepec City; October, 1869.

"Iris brown; bill black, lighter at the base of lower mandible; feet blackish."

144. Myiarchus crinitus var. **cooperi** (Kaup).

"Tehuantepec (Tapana, Santa Efigenia); April and December.

"Iris brown; bill black; feet dark ashy-brown."

145. Myiarchus cinerascens (Lawr.).

"Tehuantepec (Tapana, Santa Efigenia); Tehuantepec City; Chiapas (Gineta Mountains); April, October, November, and January.

"Iris brown; bill black; extreme base of lower mandible dull-fleshy; feet blackish."

146. Myiarchus lawrencei (Giraud).

"Tehuantepec (Santa Efigenia); Dondominguillo (Oaxaca)."

147. Myiarchus flammulatus, Lawr., Ann. Lyc. N. Y., vol. xi, p. 71.

"Tehuantepec (Cacoprieto); June, 1872."

148. Tyrannus melancholicus var. **satrapa** (Licht.).

"Tehuantepec (Chihuitan, Tapana, Barrio); Dondominguillo (Oaxaca).

"Iris dark-brown; bill black; feet brownish."

149. Tyrannus crassirostris, Sw.

"Tehuantepec (Chihuitan); Los Cues (Oaxaca).

"Iris dark-brown; bill and feet blackish."

150. Tyrannus carolinensis (Gm.).

"Tehuantepec (Tapana); May, 1869.

"Iris brown; bill black; feet dark-plumbeous."

151. Milvulus forficatus (Gm.).

"Tehuantepec (Chihuitan); Tehuantepec City.

"Iris brown; upper mandible blackish, lower paler; feet brown."

Fam. COTINGIDÆ.

152. Tityra personata, Jard. and Selb.

"Tehuantepec (Tapana, Santa Efigenia); March, April, and January.

"Iris dull cinnamon-red; bill black at end for half its length; basal half of bill, lores, and orbits pale-carmine; feet ashy-brown."

153. Hadrostomus aglaiæ (Lafr.).

"Dondominguillo (Oaxaca); August, 1868.

"Iris brown; upper mandible blackish, lower bluish horn-color; feet ashy-blue."

Fam. PIPRIDÆ.

154. Chiroxiphia linearis (Bonap.).

"Tehuantepec (Tapana); June, 1869.

"Iris dark-brown; bill black; feet orange.

"This Manakin, the only one that I have found in the western part of the isthmus, dwells only in certain localities, thickly wooded, at the foot of the Cordilleras, on the banks of streams, and still it is only in the solitary ravines and the most shady nooks that they need be looked for. Very difficult to discover at any other time in the midst of the thick forests that they choose for their dwelling, their retreat is easily discovered in the breeding-season by the loud and continuous cries made by the males during the greater part of the day. Two males are almost always found together, perched side by side on the same branch; a curious fact which I have a long time wondered at, but the following observation enlightened me. A female, pluming herself, is perched a few steps away from these two gallants, who, anxious to please her, begin a loving joust the most diverting, ascending and descending with their wings half-closed, their feathers disheveled, and their throats inflated with pleasure and the effort of singing. This continues sometimes for more than a quarter of an hour, and recommences after a few minutes' rest, during which the female shows her pleasure by the trembling of her body and the fluttering of her wings. Nothing can be more graceful than this picture when a ray of sunlight, piercing the dark vault of the forest, enlivens the scene and brings out the bright tints of black velvet, of azure and purple that adorn the coats of these little feathered actors. With an excessive natural confidence, the *Chiroxiphia* allow themselves to be approached very near without showing any fear, and the sound of a gun hardly frightens them."

Fam. MOMOTIDÆ.

155. Momotus lessoni, Less.

"Tehuantepec (Guichicovi, Chimalapa); March and September.

"Iris red; bill black; feet blackish."

156. Momotus mexicanus (Sw.).

"Tehuantepec (Chihuitan, Barrio, Santa Efigenia); Los Cues (Oaxaca); August to December.

"Iris red; bill black; base of lower mandible whitish horn-color; feet dull-cinereous.

"This is very common in all the western regions of the isthmus from Barrio to the Pacific. It comes from there through the State of Oaxaca to Tehuacan (Puebla), where it is not rare. It is almost universally called *guarda-barranca* or *garde ravin*, because it generally lives in ravines, and digs its nest along the sides."

157. Eumomota superciliaris (Sandb.).

"Tehuantepec (Tapana, Cacoprieto); April and May.

"Iris dark-brown; bill black; feet grayish-black."

Fam. ALCEDINIDÆ.

158. Ceryle torquata (Linn.).

"Tehuantepec (Chihuitan, Santa Efigenia); November and December.

"Iris dark-brown; bill black; base of both mandibles grayish; feet light olive-green."

159. Ceryle alcyon (Linn.).

"Tehuantepec (Santa Efigenia); December, 1868.

"Iris dark-brown; bill black, basal half of lower mandible whitish horn-color; feet dusky."

160. Ceryle amazona (Lath.).

"Tehuantepec (Chihuitan, Santa Efigenia); November, December, and January.

"Iris dark-brown; bill and feet black."

161. Ceryle americana var. **cabanisi,** Tsch.

Tehuantepec (Chihuitan, Santa Efigenia); November, December, and January."

162. Ceryle superciliosa (Linn.).

"Tehuantepec (Santa Efigenia); April, 1871.

"Iris brownish-black; bill black; base of lower mandible fleshy; feet dark-brown."

Fam. BUCCONIDÆ.

163. Bucco dysoni, Gray.

"Tehuantepec (Santa Efigenia); May, 1871.

"Iris dark purplish-red; feet dull-plumbeous; bill black."

Fam. TROGONIDÆ.

164. Trogon puella, Gould.

"Tehuantepec (Guichicovi, Chimalapa); March and September.

"Iris brown; bill yellow; feet yellowish."

165. Trogon braccatus, Cab. et Heine.

"Tehuantepec (Guichicovi); September, 1869.

"Iris dark-brown; bill ashy-blue; orbits yellow; feet plumbeous."

166. Trogon citreolus, Gould.

"Tehuantepec (Chihuitan, Ventosa, Tapana, Santa Efigenia).

"Iris yellow; eyelids violet-blue; bill bluish-ash; feet cinereous."

Fam. CAPRIMULGIDÆ.

167. Chordeiles texensis, Lawr.

"Tehuantepec (San Mateo, Santa Efigenia); August and January, 1869.

"Iris dark-brown; bill brownish; feet dull-brown.

"At Santa Efigenia, where I killed most of the specimens of this Night-hawk, they live during the day hidden at the foot of mountain in woods and thickets. They come out a short time after sunset, and then appear in great numbers above inundated places and savannas. Their flight is easy and graceful; but it is quite difficult to shoot them, because they easily escape from sight on account of their dark color and the feeble light of the twilight."

168. Antrostomus vociferus (Wils.).

"Tehuantepec City; November, 1869."

169. Nyctidromus albicollis (Gm.).

"Tehuantepec (Chihuitan, Santa Efigenia); November, December, and January.

"Iris dark-brown; bill pale-brown, tip dusky; feet dull-fleshy.

"This species is very common in all the warm and temperate lands of Southern Mexico, where it is known under the name of *Tapas camina* (*conore chemin*) or *Ataja camina* (*qui embarrasse le chemin*), derived from the custom it has of lying flat on the roads. Its cry, which is of two kinds, may be expressed by the syllable *piou - piou - piou - piou—pu - e - i - ou.* The latter part, uttered with force, is probably a cry of appeal (or challenge). The second, which it repeats from time to time, is shorter, *ou - i - iou.*"

170. Nyctibius jamaicensis (Gm.).

"Tehuantepec (Santa Efigenia)."

Fam. CYPSELIDÆ.

171. Chætura vauxii (Towns.).

"Tehuantepec (Guichicovi); September, 1869.

"Iris dark brown; bill black; feet blackish."

Fam. TROCHILIDÆ.

172. Campylopterus hemileucurus (Licht.).

"Chiapas (Gineta Mountains); January, 1869."

173. Lampornis prevosti (Less.).

"Tehuantepec (Santa Efigenia); December, January, and February.

"Iris dark brown; bill and feet black."

174. Trochilus colubris, Linn.

"Tehuantepec (Santa Efigenia); Tehuantepec City; October, November, and December.

"Iris brown; bill and feet black."

175. Heliomaster pallidiceps, Gould.

"Tehuantepec (Santa Efigenia); December and January."

176. Heliomaster leocadia (Bourc.).

"Tehuantepec City; October and November, 1869.

"Iris, bill, and feet black."

177. Heliomaster constanti (Delatt.).

"Chiapas (Gineta Mountains); January, 1869."

178. Cyanomia cyanocephala (Less.).

"Tehuantepec (Guichicovi); September and January.

"Iris black; upper mandible black, lower bright carmine, with the tip black; feet black."

179. Cyanomia violiceps (Gould).

"Tehuantepec (Tapana, Santa Efigenia); May, December, and January.

"Iris brown; bill rosy-red, tip black; feet plumbeous."

180. Pyrrhophæna cinnamomea (Less.).

"Tehuantepec (Santa Efigenia); December and January.

"Iris black; bill bright carmine-red, tip black."

181. Pyrrhophæna devillei (Bourc.).

"Chiapas (Gineta Mountains); January, 1869."

182. Pyrrhophæna riefferi (Bourc.).

"Tehuantepec (Guichicovi); September, 1869."

183. Thaumatias candidus (Bourc. et Muls.).

"Tehuantepec (Guichicovi); September, 1869.

"Iris black; upper mandible black, lower light carmine, with the tip black; feet black."

184. Circe doubledayi (Bourc.).

"Tehuantepec (Chihuitan); November, 1868."

A single specimen of this rare species is in the collection, and the only one I have ever seen. Mr. Gould, in his monograph of *Trochilidæ*, says but two specimens were known. Since that time, however, others may have been obtained. I wrote two years since to Professor Sumichrast to endeavor to procure more examples, but he has not as yet been able to do so. Its locality is now determined, which, at the time it was described by Mr. Bourcier, was thought to be the "Rio Negro," though Mr. Gould states that his specimen was marked as from "Chimantla, Mexico," which he thought was correct, as its allies, "with obscure tippings to their tails, such as *latirostris*, *caniveti*, *auriceps*, &c., were denizens of that country."

185. Chlorolampis canaveti (Less.).

"Tehuantepec (Guichicovi); September, 1869.

"Iris and feet black; basal two-thirds of bill carmine-red, terminal third black."

Fam. CUCULIDÆ.

186. Crotophaga sulcirostris, Sw.

"Tehuantepec (Juchitan); September, 1868.

"Iris dark brown; bill and feet black."

187. Diplopterus nævius (Linn.).

"Tehuantepec (Santa Efigenia)."

188. Piaya cayana (Linn.).

"Tehuantepec (Chihuitan, Barrio); September and November.

"Iris red; bill, lores, and orbits light olivè-green; feet bluish-ash."

189. Piaya ridibundus (Gm.).

"Tehuantepec City."

190. Morococcyx erythropygia (Less.).

"Tehuantepec (Chihuitan), Tehuantepec City; October and December.

"Iris brown; bill orange-brown; culmen blackish; orbital skin greenish-yellow before the eye and azure-blue behind the eye; feet dull fleshy.

"Similar to *Geococcyx mexicanus* in its terrestrial habits. Indeed, it never alights except on the lowest bushes; woody places, *les bejucales* (places full of entangled creepers), and hedges are its favorite spots. It runs very quickly, and easily escapes from sight. Its flesh, like that of the *Geococcyx*, has an unsavory and disagreeable odor."

191. Geococcyx mexicanus (Gm.).

"Tehuantepec (Juchitan); August and September.

"Iris brown, separated from the pupil by a narrow golden ring; orbital skin blue and red; bill bluish-gray, culmen dusky; feet livid-bluish.

"This bird, quite common in the west of the isthmus, there bears the name of *Corre-camino* (Spanish) or *Ceré-quidja* (Zapotique)."

Fam. RAMPHASTIDÆ.

192. Pteroglossus torquatus (Gm.).

"Tehuantepec (Santa Efigenia); January and March.

"Iris yellow; orbital skin red; feet greenish-olive.

"Common in the woods at the foot of the Cordilleras at Santa Efigenia, at Tapana, at Tanatepec, &c. I have been told that *Ramphastos carinatus* is found at times in the same localities. I have not there met with it."

193. Campephilus guatemalensis (Hartl.).

"Tehuantepec (Chihuitan), Tehuantepec City; November and December.

"Iris light yellow; bill horny-white; feet ashy."

194. Dryocopus scapularis (Vig.)

"Tehuantepec (Chihuitan, Santa Efigenia); November and December.

"Iris white; bill white; feet dark ashy-blue."

195. Picus scalaris, Wagl.

"Puente, Colorado (Puebla); August, 1868.

"Iris brown; bill blackish; feet greenish."

196. Sphyrapicus varius (Linn.).

"Tehuantepec (Santa Efigenia), Chiapas (Gineta Mountains); January, 1869.

"Bill horny; feet dull greenish."

197. Chloronerpes æruginosus (Licht.).

"Tehuantepec (Tapana, Guichicovi); Chiapas (Gineta Mountains); April, September, and January.

"Iris brown; bill black; feet bluish-ash."

198. Melanerpes formicivorus (Sw.).

"Tehuantepec (Guichicovi); Chiapas (Gineta Mountains); September and January."

199. Centurus aurifrons (Wagl.).

"Tehuantepec (Chihuitan, Juchitan, Santa Efigenia); September, November, and January.

"Iris red; bill blackish; feet dull greenish-ash."

200. Centurus hypopolius (Wagl.).

"Chapulco (Puebla); August, 1868.

"Iris brown; bill blackish; feet ashy-blue."

This seems to be a rare species, as there is but a single specimen in the collection, and I have not met with it in collections from other parts of Mexico or from Guatemala.

Fam. PSITTACIDÆ.

201. Ara macao (Linn.).

"Tehuantepec (Santa Efigenia); Tehuantepec City, December.

"Iris yellow; upper mandible whitish, lower black; skin of cheeks rosy-white; feet black.

"Excessively common in all the western part of the isthmus, especially between Niltepec and Tapana. It ascends very high on the sides of the Cordillera, where it is even seen in the pine-forests."

202. Ara militaris (Linn.).

"Mountains north of Tehuantepec."

203. Conurus aztec, Souancé.

"Tehuantepec (Guichicovi); September, 1869.

"Iris reddish-yellow; bill whitish; feet black."

204. Conurus petzii (Leibl.).

"Tehuantepec (Juchitan, Chihuitan, Santa Efigenia); September, November, and December.

"Iris and orbital skin yellow; bill yellowish-white; feet yellowish, marbled with brownish.

"Everywhere abundant; this species lives indifferently in the woods, on plains, and in the neighborhood of inhabited places. It is the same with *Chrysotis albifrons*."

205. Brotogerys tovi (Gm.).

"Tehuantepec (Tapana); June, 1869.

"Iris brown; cere whitish; bill light brown; feet fleshy.

"This little paroquet appears confined in the west of the isthmus to the neighborhood of the villages of Zanatepec and Tapana, where it is called *Catarina* or *Gachupina*. It never leaves the thick woods, where it keeps on the largest and highest trees, which makes its capture quite difficult, because it is confounded with the foliage. It is sought as a pleasure bird on account of its small size and the ease with which it may be tamed. The Indians of the valley of Oaxaca, who come to trade in the State of Chiapas, bring a great number to sell in the interior."

206. Chrysotis farinosa (Bodd.).

"Santa Maria (Chimalapa).

"Another species of *Chrysotis*, although it may be rare, lives in the neighborhood of Tapana (its body is entirely green, the nape of the neck and at times the forehead are spotted with yellow, its beak is blackish, its size that of *C. ochroptera*). I regret that I have been unable as yet to procure specimens of it. I have only seen it in captivity."

207. Chrysotis auropalliata (Less.).

"Tehuantepec (Santa Efigenia); May, 1871.

"Iris orange-red; bill blackish; cere black; feet grayish."

208. Chrysotis levaillantii, Gray.

"Tehuantepec (Barrio, Petapa); October, 1868.

"Iris orange; bill and feet dirty white."

209. Chrysotis autumnalis (Linn.).

"Tehuantepec (Barrio); September, 1868.

"Iris orange-yellow; bill dull yellowish, blackish along the cutting-edges; feet light greenish-ash."

210. Chrysotis albifrons, Sparrm.

"Tehuantepec (Chihuitan, Juchitan); Tehuantepec City; October and November.

"Iris yellowish-white; bill light yellow; cere and feet dull white."

211. Chrysotis finschi, Scl.

"Tehuantepec City; October, 1869.

"Iris orange; bill dirty-white; feet light gray."

Fam. STRIGIDÆ.

212. Glaucidium ferrugineum (Max.).

"Tehuantepec (Santa Efigenia); Tehuantepec City; Chiapas (Gineta Mountains); October, January, and March.

"Iris yellow; bill, cere, and feet greenish-yellow."

213. Glaucidium gnoma (Wagl.).

"Tehuantepec (Tapana); Tehuantepec City; May and October.

"Iris yellow; bill, cere, and feet greenish-yellow."

214. Speotyto cunicularia var. **hypogæa** (Bp.).

"Tehuantepec (Juchitan); January, 1870."

215. Bubo virginianus (Gm.).

"Tehuantepec City; October, 1869.

"Iris yellow; bill blackish; feet dull grayish; nails blackish."

216. Ciccaba nigrolineata, Scl.

"Tehuantepec City."

217. Ciccaba squamulata (Licht.).

"Tehuantepec City; November, 1869."

Upper plumage dark brown, mottled with pale rufous; head, neck, and upper part of back rather sparsely marked with small fulvous-white spots; tail blackish-brown, crossed with six white bars, which are more or less clouded with light brown, ends of tail-feathers white; quills blackish-brown, with faint lighter bars on the inner webs and pale fulvous bars on the outer; inner webs of secondaries clear, very pale fulvous; under lining of wings dark reddish-fulvous; larger wing-coverts ending with reddish-fulvous; under surface white, tinged with fulvous, the feathers marked with conspicuous shaft-stripes of clear dark brown; sides and thighs of a light clear fulvous; bill dusky horn color, the end light yellow; toes brownish-yellow.

Length (skin), 14½ inches; wing, 9½; tail, 6½; tarsi, 2¼.

I feel confident of being correct in referring the bird before me to *Syrnium squamulatum*, and thereby establishing its validity. By late writers, it has been considered identical with *S. virgatum*, Cass. This specimen is clearly distinct from Mr. Cassin's species, in which the coloring is much darker throughout, having the throat and breast of a dark brown, which in *S. squamulatum* are white; the light markings on the upper plumage of *S. virgatum* are rufous and in wavy lines, not, as in the other, in distinct whitish spots; the sides are dull fulvous; the thighs dark reddish-fulvous, with irregular narrow brownish bars; in *S. squamulatum* the thighs are of a very pale clear fulvous and immaculate. There are but five bars on the tail of *S. virgatum*, the other having six. The two species do not differ materially in measurements, except that the tarsi of *S. squamulatum* are much longer.

The only description I have found of this species is by Bonaparte (Cons. Av. i, p. 53), with which the specimen under examination agrees closely. Bonaparte was not acquainted with *S. virgatum*, but probably noticed in Mr. Cassin's description some similarity to that of *S. squamulatum*, as he has, *l. c.*, "*Quid Syrnium virgatum*, Cass."

218. Pulsatrix torquata (Daud.).

"Tehuantepec (Santa Efigenia); January, 1869.

"Iris brownish-orange; bill light greenish-horny; last scutellæ of toes ashy."

219. Strix flammea var. **pratincola,** Bp.

"Tehuantepec City."

Fam. FALCONIDÆ.

220. Spizaëtus manduyti (Daud.).

"Tehuantepec (Santa Efigenia); January, 1869.

"Iris orange-yellow; cere and lorum greenish-yellow; toes yellow.

"Quite common in the large forests of the eastern coast of Mexico; it appears very rarely in the plains of the Pacific, where probably isolated individuals alone are found. This bird has the habits of the buzzards; it never leaves the woods, awaits its prey perched, and lives principally upon rats and other small quadrupeds."

221. Spizaëtus melanoleucus (Vieill.).

"Tehuantepec (Santa Efigenia)."

222. Pandion haliætus var. **carolinensis** (Linn.).

"Tehuantepec (Chihuitan); Ventosa Bay; January, 1871.

"Iris yellow; feet bluish-ash."

223. Thrasaetus harpyia (Linn.).

"Tehuantepec (Almoloya); October, 1868.

"Iris dark brown; cere and bill black; feet yellowish-white.

"The Harpy Eagle is exceedingly rare in Mexico, of which there is probably not a native bird; and its capture is truly a work of chance. The isolated birds which have been found there up to this time have probably been brought by some atmospheric disturbance, which has driven them beyond the natural limits of the zone in which they live."

224. Hypotriorchis albigularis (Daud.).

"Tehuantepec (Tapana); Oaxaca; June and August.

"Iris dark brown; bill blackish-blue; cere, lores, and orbits yellow; feet orange-yellow.

"Quite universally dispersed in the warm and temperate districts of Mexico; this falcon mounts at times up to the cold regions. It is quite rare in the dry plains which border upon the Gulf of Tehuantepec, and becomes more common as you approach the mountains. It is a resident. It mainly attacks other birds, and vigorously hunts pigeons."

225. Hypotriorchis femoralis (Temm.).

"Tehuantepec City."

226. Tinnunculus sparverius (Linn.).

"Tehuantepec City; October, 1869.

"Iris dark brown; cere, orbits, and feet yellowish."

227. Asturina plagiata (Licht.).

"Tehuantepec (Chihuitan, Santa Efigenia); Tehuantepec City; October to January.

"Quite common on the two coasts. It frequents thin woods, shores of rivers, and lives upon rats, birds, and insects."

228. Rupornis magnirostris var. **griseocauda,** Ridg., Proc. Bost. Soc. of Nat. Hist., xvi, 87.

"Tehuantepec (Chihuitan, Almoloya near Barrio, Santa Efigenia); May, October, November, and December.

"Iris bright orange-red; cere and feet yellow; bill bluish-ash; base of lower mandible greenish-yellow; feet yellow."

229. Geranospiza nigra (Du Bus).

"Tehuantepec (Santa Efigenia); June, 1871.

"Iris bright red; upper mandible black, plumbeous at base, lower mandible light plumbeous; cere black; feet orange.

"Common enough on both sides of Mexico. This beautiful hawk resembles in its colors the Urobitingas, and by the lightness of its shape the Micrasturs, whose characteristics for the most part it possesses. It never leaves the woods, where, gliding with rapidity among the thickets of vines, it gives chase to the small lizards, tree-frogs, insects, &c. It is bold enough, and will allow itself to be approached carefully, but if slightly wounded it takes to flight on the ground with the greatest rapidity."

230. Micrastur semitorquatus (Vieill.).

"Tehuantepec (Santa Efigenia); Tehuantepec City; April, July, and November.

"Iris dark brown; bill black; cere, lores, and orbits, olive-green; feet yellow.

"This species, as one might judge at first sight from the shortness of its wings and the length of its tarsi and tail, is a very bad navigator. It is found almost always in the midst of thickets in the interior of great woods, never in exposed places. The only use he makes of his wings is to fly from one tree to another. Different from most birds of prey, who seek for their victims sometimes wheeling, sometimes perched on the top of dead trees, this one rarely leaves the shelter of the thickest foliage. It has sometimes the habit of squatting along the branches like the *Caprimulgidæ*. In this position, it is easily seen by the hunter. Its voice is strong and its cry analogous to that of *Herpetotheres cachinnans;* resounding for a long distance, it sounds like the syllables *kā - hă - ā*, *kā - hă - hā*, given with the full strength of its voice. A popular prejudice makes the repetition of this cry an indication of a change of weather, whence the common name of *Llama-norte* is given to *M. brachypterus*, the name which it shares on the Pacific coast with *Herp. cachinnans*. The name which they bear in common on the Atlantic coast is that of *Vaquero*.

"The food of *M. brachypterus* is composed principally of reptiles and above all of saurians. Hidden in the foliage, he waits for the young iguanas, lizards, &c. The *Cyclures* with the pointed tail (*Ctenosaura acanthura et quinquecarinata*) seem to be favorite game for him; his gizzard and his stomach almost always contain the remains. He attacks, also, young birds and insects.

"Notwithstanding the delicacy of his appearance, he is endowed with remarkable tenacity of life. It is rare that the first shot kills him outright. If, wounded in the wing, he falls to the ground, he flutters away

at so rapid a rate that a dog can scarcely follow him; and if he finds in his way a mass of dead branches, a hole, or a thicket of vines, he hides himself so well that it is difficult to find him.

"The young (of the first year?) are distinguished from the adults, not only by the plumage barred with black underneath, but also by the color of the bill. With the adults, this latter is black; with the young, it is of a greenish-olive, darker on the culmen; the cere and the lores are of a yellowish-green, and the feet of the young are of a more lively yellow. At all ages, the iris is of a reddish-brown."

231. Herpetotheres cachinnans (Linn.).

"Tehuantepec (Tapana); Tehuantepec City; October and December.

"Iris dark brown; bill blackish; cere yellowish; feet dull white.

"Dispersed on the two coasts of Mexico, this bird is known under the name of *Vaquero* at Vera Cruz and *Llama-norte* at Tehuantepec. It frequents with preference savannas, clearings, or the border of woods. Its large head, the custom that it has of ruffling its plumage when some object attracts its attention, and the grotesque gestures that it sometimes makes, give it a certain likeness in physiognomy to the owls. Its cry, which is very loud, is heard from a distance, and in the opinion of the natives forebodes the approach of rain or the north wind. Its food is principally composed of snakes, lizards, and grasshoppers."

232. Accipiter fuscus (Gm.).

"Tehuantepec (Santa Efigenia); Tehuantepec City; November and January.

"Iris reddish-orange; cere greenish-yellow; feet yellow."

233. Accipiter cooperi, Bp.

"Tehuantepec (Santa Efigenia)."

234. Buteo borealis (Gm.).

"Tehuantepec City; Cacoprieto; January, 1872.

"Iris clear yellowish-brown; cere olivaceous; bill plumbeous; tarsi clear yellowish-green."

235. Buteo pennsylvanicus (Wils.).

"Tehuantepec (Santa Efigenia); December, 1868.

"Iris hazel-brown; cere yellowish-green; feet yellow."

236. Buteo pterocles (Temm.).

"Tehuantepec (Tapana); July, 1869.

"Iris hazel-brown; cere greenish; feet yellow."

237. Buteo minutus, Pelz.

"Tehuantepec City; October, 1869.

"Iris brown; bill black, extreme base of both mandibles bluish; cere greenish-yellow; lores greenish; feet yellow."

238. Antenor unicinctus var. **harrisi** (Aud.)

"Tehuantepec City; October, 1869.

"Iris hazel-brown; cere, lores, and orbits yellow; bill light bluish-ash, tip dusky; feet orange-yellow."

239. Urubitinga zonura (Shaw).

"Tehuantepec (Santa Efigenia, Barrio); Tehuantepec City; Chiapas (Gineta Mountains); October to February.

"Iris brown; cere greenish-yellow; feet yellow."

240. Urubitinga anthracina (Licht.).

"Tehuantepec (Tapana, Santa Efigenia); December, January, February, and May.

"Iris brown; cere and lores greenish-yellow; feet yellow.

"These two species of *Urubitinga*, of habits almost analogous, are essentially river-birds, like the species of *Cymindis;* that is to say, they prefer the borders of rivers and of streams and wooded localities to all other places. In Mexico, they never leave warm and temperate latitudes, and even in the latter they are always rare. The kind of food is varied; being naturally voracious, they despise no living prey, and I have taken out of their stomachs small quadrupeds, young birds, reptiles, crustacea, and insects. They are fond of fish, and on the borders of shallow brooks they easily catch the smaller kinds. When they are at rest, their appearance is heavy and resembles that of the buzzards, but on the wing their flight is easy and graceful. On fine days, they can be seen wheeling at a great height, sometimes together, describing large circles and giving out sharp cries from time to time. On the ground, they are not wild and are easily approached. They make their nest, coarsely formed of small sticks, at the forks of the branches of the highest trees. Toward the 15th of April I have found the young, recently fledged and covered with a white down."

241. Cymindis cayennensis (Gm.).

"Tehuantepec (Santa Efigenia); April, 1871.

"Iris brown; upper mandible black, the lower, cere, lores, eyelids, and feet bluish-ash, the cere spotted with black.

"This bird prefers the forest for its dwelling above all other places, but it goes almost always near seas and rivers. It is evidently a resident of Central Mexico, for toward the middle of May of this year 1871) I killed a female, whose ovary contained eggs developed enough to lead one to believe that they were just ready to be laid. It gives preference to trees of the thickest foliage; it is rarely seen on naked branches. Very fond of mollusks, like others of his tribe, he hunts often on the ground and on the damp soil of forests bordering the sea, or the sides of brooks, searching for gastropods, either of land or water. From this habit, his bill, his feet, and his feathers are often much soiled."

242. Cymindis uncinatus (Ill.).

"Tehuantepec (Chihuitan, Santa Efigenia); January and May.

"Iris white; cere and lores green; spot below nostril and the eye yellow; feet orange-yellow.

"Notwithstanding the great difference of plumage between the old and young of this species, their identity is easily recognized, in a fresh state, by the beautiful yellow appearance of the naked skin between the eye and the bill. The habits of this species are almost identical with those of *C. cayenensis;* that is to say, that they prefer the woods in the vicinity of water. Its food is composed principally of mollusks, and I have found their stomachs almost always full of the remains of a large species of *Orthaticus*, a land gastropod very abundant in the woods of Western Mexico."

243. Ictinia plumbea (Gm.).

"Tehuantepec (Chimalapa); March, 1869.

"Iris brown; bill horny; feet brownish.

"It comes from Chimalapa, where, as on the coast of Vera Cruz, it is only a bird of passage. I observed a few years ago, near San Andres, Ticatla, several bands or companies of these birds traveling toward the north."

244. Circus Cyaneus var. **hudsonius** (Linn.).

"Tehuantepec City; winter."

245. Polyborus tharus var. **audubonii,** Cass.

"Partout universel."

Fam. CATHARTIDÆ.

246. Cathartes papa (Linn.).

"Partout universel."

247. Rhynogryphus aura (Linn.).

"Partout universel."

248. Catharista atrata (Bartr.).

"Partout universel."

Fam. COLUMBIDÆ.

249. Columba flavirostris, Wagl.

"Tehuantepec (Tapana); December, 1868.

"Iris reddish-orange; orbits and feet carmine; bill whitish, base rosy-red.

"Common at the foot of the Gineta Mountains, Santa Efigenia, Tapana, &c. Perches always on the highest trees."

250. Zenaidura carolinensis (Linn.).

"Chiapas (Gineta Mountains); January, 1869."

251. Chæmepelia passerina (Linn.).

"Tehuantepec City; November, 1869.

"Iris light brown; bill dull carmine, tip dusky; feet light fleshy."

252. Scardafella inca (Less.).

"Tehuantepec City; October, 1869.

"Iris bright red; bill black; feet carmine."

253. Melopelia leucoptera (Linn.).

"Tehuantepec City; October, 1869.

"Iris orange; orbital skin bluish; bill black; feet dark carmine."

254. Leptoptila albifrons, Bp.

"Tehuantepec (Santa Efigenia); Tehuantepec City; October and January.

"Iris orange; bill black; orbital naked skin bluish; feet carmine.

"Quite common in the west of the isthmus; frequents the woods with preference; perches little, and goes almost always in pairs."

Fam. CRACIDÆ.

255. Crax globicera (Linn.).

"Tehuantepec (Tapana); June, 1869.

"Iris brown; feet ashy; cere yellow.

"Known throughout Mexico under the name of pheasant. It only frequents the forests, and is seen only alone and in pairs."

256. Penelope purpurascens, Wagl.

"Tehuantepec (Santa Efigenia); December, 1868.

"Iris, lower part of gular skin, and acrotarsus carmine-red; upper part of gular skin, orbital, and loral skin violaceous-black; bill black.

"Common name *Pava* at Tehuantepec, *Faison griton* or *Cajolite* at Vera Cruz. Abundant in all the thick woods of the isthmus. It goes generally in small flocks. It is good game, and the flesh is less dry and more savory than that of the Hocco. Its bones, it is said, give attacks of epilepsy to the dogs who have eaten them, and even kill them. Like the Hocco, the Pava is easily tamed."

257. Ortalida poliocephala, Wagl.)

"Tehuantepec (Tapana, Barrio); Tehuantepec City; April, September, and November.

"Iris hazel-brown; orbits and gular skin carmine; bill light plumbeous; feet ashy.

"This species belongs properly to the coast of the Pacific, where it bears, as elsewhere, the name of *Chachalaca.* Is abundant everywhere."

258. Ortalida vetula, Wagl.

"Tehuantepec (Guichicovi); September, 1869.

"Iris brown; gular naked skin carmine; bill and feet bluish-ash.

"This species is more abundant on the eastern coast of the isthmus."

Fam. PERDICIDÆ.

259. Ortyx coyolcos, Gm.

"Tehuantepec (Tapana, Santa Efigenia); May, June, and December.

"Iris brown; upper mandible brownish, lower lighter; feet light brownish-gray.

"Common in all the plains on the west of the isthmus, where it is called *Codorniz.* It alights sometimes in trees when pursued."

Fam. CRYPTURIDÆ.

260. Nothocercus sallæi, Bp.

"Tehuantepec (Santa Efigenia); December, 1868.

"Iris hazel-brown; upper mandible brownish, lower pale; feet red.

"Killed near Santa Efigenia. It never appears in the plains."

Fam. CHARADRIIDÆ.

261. Œdicnemus bistriatus, Wagl.

"Tehuantepec (Tapana); December, 1868.

"Iris greenish-yellow; bill black, base of lower mandible yellowish-green; feet pale-greenish."

262. Sqatarola helvetica (Linn.).

"Tehuantepec (San Mateo); February, 1869.

"Iris dark brown; bill black; feet dark ashy."

263. Ægialitis vocifera (Linn.).

"Tehuantepec (Santa Efigenia); January, 1869."

264. Ægialitis semipalmata (Bp.).

"Tehuantepec (San Mateo); August and February.

"Iris dark brown; bill black, extreme base orange; feet dull yellowish."

265. Ægialitis collaris (Vieill.).

"Tehuantepec City; October and November.

"Iris dark brown; bill black, extreme base of lower mandible fleshy; feet light flesh-color."

Fam. HÆMATOPIDÆ.

266. Hæmatopus palliatus, Temm.

"Tehuantepec (San Mateo, San Francisco); February and April.

"Iris chrome-yellow; bill and orbits bright coral-red; feet pale flesh-color."

267. Strepsilas interpres (Linn.).

"Tehuantepec (San Mateo); August, 1869.

"Iris brown; bill black; feet orange-red."

Fam. RECURVIROSTRIDÆ.

268. Himantopus nigricollis, Vieill.

"Tehuantepec (San Mateo); August, 1869.

"Iris carmine-red; bill black; feet light carmine."

Fam. PHALAROPIDÆ.

269. Lobipes hyperboreus (Linn.).

"Tehuantepec (Ventosa); October, 1869.

"Iris dark brown; bill black; feet dark plumbeous."

Fam. SCOLOPACIDÆ.

270. Macrorhamphus griseus var. **scolopaceus** (Say.).

"Tehuantepec (San Mateo); August and February, 1869.

"Iris dark brown; bill dull olivaceous, greenish at the base; feet greenish."

271. Micropalama himantopus, Bp.

"Tehuantepec (San Mateo); February, 1869.

"Iris brown; bill black; feet yellowish-olive."

272. Ereunetes pusillus var. **occidentalis,** Lawr.

"Tehuantepec (San Mateo); Tehuantepec City; August, October, and February.

"Iris dark brown; bill black; feet dark olivaceous (nearly black)."

273. Actodromas minutilla (Vieill.).

"Tehuantepec City; October, 1869.

"Iris dark brown; bill black, its extreme base and feet greenish."

274. Actodromas maculata (Vieill.).

"Tehuantepec City; October, 1869.

"Iris brown; bill blackish, dirty yellowish-green at base; feet dull yellowish-green."

275. Calidris arenaria (Linn.).

"Tehuantepec (San Mateo); August and February.

"Iris brown; bill black; feet dark olivaceous (nearly black)."

276. Limosa fedoa (Linn.).

"Tehuantepec (San Mateo); August and February.

"Iris brown; basal half of bill flesh-colored, apical half dusky; feet dark ashy."

277. Symphemia semipalmata (Gm.).

"Tehuantepec (San Mateo).

"Iris brown; bill blackish, at the base grayish; feet ashy."

278. Gambetta melanoleuca (Gm.).

"Tehuantepec (San Mateo); February, 1869.

"Iris brown; basal half of bill grayish, terminal half dusky; feet yellow."

279. Gambetta flavipes (Gm.).

"Tehuantepec (San Mateo); February, 1869.

"Iris brown; bill black; feet yellow."

280. Rhyacophilus solitarius (Wils.).

"Tehuantepec (Tapana); Tehuantepec City; October and April.

"Iris dark brown; terminal half of bill black, basal half greenish; feet light olivaceous-green."

281. Tringoides macularius (Linn.).

"Tehuantepec (San Mateo, Santa Efigenia); Tehuantepec City; August, October, and December."

282. Numenius longirostris, Wils.

"Tehuantepec (Juchitan); December, 1868.

"Iris brown; upper mandible blackish-brown, lower mandible lighter; feet ashy."

283. Numenius hudsonicus, Latham.

"Tehuantepec (Ventosa Bay); December, 1869.

"Iris brown; bill black, basal half of under mandible fleshy; feet ashy."

Fam. TANTALIDÆ.

284. Tantalus loculator, Linn.

"Tehuantepec (Santa Efigenia); December, 1868."

285. Ibis alba, Linn.

"Tehuantepec (San Mateo); August, 1869.

"Iris light-blue; naked skin of face fleshy-red; bill and feet fleshy."

Fam. CANCROMIDÆ.

286. Cancroma cochlearia, Linn.

"Tehuantepec (Santa Efigenia); December and January."

Fam. PLATALEIDÆ.

287. Platalea ajaja, Linn.

"Tehuantepec (Santa Efigenia); February, 1869.

"Iris and feet carmine-red."

Fam. ARDEIDÆ.

288. Ardea herodias, Linn.

"Tehuantepec City."

289. Garzetta candidissima (Gm.).

"Tehuantepec (Santa Efigenia); Oaxaca; August and December.

"Iris yellow; bill black; basal half of lower mandible light-bluish; extreme base of upper mandible and lores orange-yellow; tarsi black; toes yellow."

290. Demiegretta leucogastra var. **leucoprymna** (Licht.).

"Tehuantepec City; October, 1869.

"Iris straw-yellow; lores yellow; upper mandible black, lower clay-yellow; feet green."

291. Demiegretta rufa (Bodd.).

"Tehuantepec (San Mateo); August, 1869.

"Iris yellow; bill blackish, grayish at the base; feet black."

292. Demiegretta pealei, Bp.

"Tehuantepec City; October, 1869.

"Iris yellowish-white; lores light-yellow; bill fleshy, along culmen and at tip black; feet black."

293. Florida cærulea (Linn.).

"Tehuantepec (Santa Efigenia)."

294. Butorides virescens (Linn.).

"Tehuantepec (Barrio, Santa Efigenia); Tehuantepec City; October and December.

"Iris yellow; lores, orbits, and nearly all the lower mandible yellow; upper mandible brownish-black; feet olive-green."

295. Nyctiardea grisea var. **nævia** (Bodd.).

"Tehuantepec City; November, 1869.

"Iris red; upper mandible and tip of lower black; lores, most of lower mandible, and feet greenish."

296. Ardetta exilis (Gm.).

"Tehuantepec City; October, 1869.

"Iris light straw-yellow; bill yellowish, except upper surface of upper mandible, which is blackish; upper surface of tarsus and toes greenish, under surface yellow."

297. Tigrisoma cabinisi, Heine.

"Tehuantepec (Tapana, Chihuitan, Santa Efigenia); Tehuantepec City; Venta Salada (Puebla); April, August, October, and February.

"Iris yellow; orbits, lores, gular sac, and feet greenish; upper mandible black, lower greenish-yellow."

Fam. RALLIDÆ.

298. Aramus scolopaceus var. **giganteus,** Bp.

"Tehuantepec (Santa Efigenia); February, 1869."

299. Aramides albiventris, Lawr.

"Tehuantepec (San Francisco); April, 1869.

"Iris reddish; basal half of bill reddish, terminal half greenish; feet carmine."

300. Gallinula galeata, Licht.

"Tehuantepec City; November, 1869.

"Iris brown; frontal plate and bill dark brownish-olive; apical third of bill olive-green; feet greenish."

301. Fulica americana, Gm.

"San Mateo."

Fam. PARRIDÆ.

302. Parra gymnostoma, Wagl.

"Tehuantepec (Santa Efigenia, Zonatepec); March and April.

"Iris dark-brown; bill, alar spurs, and frontal leaf bright-yellow; upper base of bill bluish-white, the space between it and the nasal leaf dark-carmine; feet greenish."

Fam. ANATIDÆ.

303. Dendrocygna autumnalis (Linn.).

"Tehuantepec (Tapana); June, 1869.

"Iris brown; bill bright-fleshy, tinged with yellow near the nostrils; feet light-fleshy."

304. Cairina moschata (Linn.).

"Tehuantepec (Tapana, Santa Efigenia); March, May, and December.

"Iris clear chestnut-brown; bill bluish-white, with transverse black spots; nasal caruncle and sides of head black; caruncles carmine-red; feet black."

Fam. PELECANIDÆ.

305. Pelecanus fuscus, Linn.

"Ventosa Bay."

306. Pelecanus erythrorhynchus, Gm.

"Tehuantepec (San Mateo)."

Fam. GRACULIDÆ.

307. Graculus mexicanus, Brandt.

"Tehuantepec (Santa Efigenia); December, 1868.

"Iris green; bill dark-fleshy; culmen and tomia dusky; gular sac brownish; feet deep-black."

Fam. PLOTIDÆ.

308. Plotus anhinga, Linn.

"Tehuantepec (Santa Efigenia); December, 1868."

Fam. TACHYPETIDÆ.

309. Tachypetes aquilus (Linn.).

"Tehuantepec (Ventosa Bay); November, 1869.

"Iris dark-brown; orbits and gular skin dark-plumbeous, with a tinge of violaceous; feet carmine."

Fam. LARIDÆ.

310. Larus delawarensis, Ord.

"Tehuantepec; February and March."

311. Larus californicus, Lawr.

"Tehuantepec (San Mateo); February, 1869.

"Iris hazel-brown; bill grayish-white, behind the yellowish-white tip a black vitta; feet dull greenish-white."

312. Chroicocephalus atricilla (Linn.).

"Tehuantepec (Juchitan, Ventosa, San Mateo); February, August, November, and December.

"Iris dark-brown; bill and feet reddish, tip of bill bright-red, preceded by a dusky spot or vitta; inside of mouth light-sanguine."

313. Gelochelidon anglica (Montagu).

"Tehuantepec (San Mateo); August and February.

"Iris dark-brown; bill black; feet brownish-black."

314. Thalasseus maximus (Bodd.).

"Tehuantepec (San Mateo); August and February.

"Iris dark-brown; bill bright orange-red; feet dark-brown; under surface of toes brownish-yellow."

315. Thalasseus cantiacus (Gm.).

"Tehuantepec (San Mateo); August and February.

"Iris dark-brown; bill black, with the tip yellow; feet dark-brown; under surface of toes yellowish."

316. Sterna forsteri, Nutt.

"Tehuantepec (San Mateo, Ventosa Bay); December and February.

"Iris dark-brown; bill black, its extreme tip whitish; feet dark-orange."

317. Sterna dougalli, Mont.

"Tehuantepec (Ventosa Bay)."

318. Sterna antillarum, Less.

"Tehuantepec (San Mateo); August, 1869.

"Iris dark-brown; bill yellow, tip dusky; feet dull orange-yellow."

319. Hydrochelidon fissipes (Linn.).

"Tehuantepec (San Mateo); August, 1869.

"Iris dark-brown; bill black; feet dark-brown."

320. Rhynchops nigra, Linn.

"Tehuantepec (San Mateo); August, 1869.

"Iris brown; basal half of bill coral-red, terminal half black; feet coral-red."

Fam. PODICIPIDÆ.

321. Sylbeocyclus dominicus (Linn.).

"Tehuantepec (Juchitan); September, 1868.

"Iris orange; bill black, tip whitish; feet black, tinged with grayish."

ALPHABETICAL INDEX.

Department of the Interior:
U. S. NATIONAL MUSEUM.

— 5 —

BULLETIN

OF THE

UNITED STATES NATIONAL MUSEUM.

No. 5.

PUBLISHED UNDER THE DIRECTION OF THE SMITHSONIAN INSTITUTION.

WASHINGTON:
GOVERNMENT PRINTING OFFICE.
1876.

ADVERTISEMENT.

This work is the fifth of a series of papers intended to illustrate the collections of Natural History and Ethnology belonging to the United States and constituting the National Museum, of which the Smithsonian Institution was placed in charge by the act of Congress of August 10, 1846.

It has been prepared at the request of the Institution, and printed by authority of the honorable Secretary of the Interior.

JOSEPH HENRY,
Secretary Smithsonian Institution.

SMITHSONIAN INSTITUTION,
Washington, November, 1875.

CATALOGUE

OF THE

FISHES OF THE BERMUDAS.

BASED CHIEFLY UPON THE COLLECTIONS OF THE UNITED STATES NATIONAL MUSEUM.

By G. BROWN GOODE, M. A.

ASSISTANT CURATOR U. S. NATIONAL MUSEUM.

WASHINGTON:
GOVERNMENT PRINTING OFFICE.
1876.

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List of species—Continued.

INTRODUCTORY REMARKS.

A visit to the Bermudas during the months of February and March, 1872, afforded opportunities for collecting the notes and specimens upon which the present paper is based. The enumeration of species here attempted, although necessarily far from exhaustive, is believed to indicate, with some degree of accuracy, the character of the ichthyological fauna of the group; and it is hoped that this list, with its annotations, may not be without interest as a contribution to geographical zoology. Surprisingly little has been done by naturalists in the investigation of the marine life of this region, interesting as it is likely to prove on account of its isolated, mid-atlantic position, the peculiarities of its climate, and its proximity to the Gulf Stream, rendering so easy observations upon the influence of ocean-currents in the distribution of living forms. The ichthyologist finds here the best of opportunities for the study of pelagic and migratory species. A broad field lies before some resident naturalist who will do for the ichthyology of the Bermudas what Poey and Bleeker have done and are doing for that of the East and West Indies. Comparatively little could be done in two months, least of all in winter and early spring, when stormy weather rendered explorations of the reefs impracticable, and often prevented the fishermen from leaving their moorings in the harbors. At the time of my visit, only seven species of fishes had been recorded from this locality; and the only authentic information regarding the fish-fauna was contained in one chapter, which was unfortunately very short, of Mr. Jones's admirable little work,* the author at that time not having turned his attention to the study of this class. The list given by Godet† should

*The Naturalist in Bermuda; a sketch of the geology, zoology, and botany of that remarkable group of islands; together with meteorological observations. By John Matthew Jones, esq. (of the Middle Temple), assisted by Maj. J. W. Wedderburn (late 42nd Roy. Highlanders) and J. L. Hurdis, esq.—With a map and illustrations.—"Every kingdom, every province, should have its own monographer."—Gilbert White. London: Reeve & Turner, 238, Strand.—1859. 12mo, pp. xii, 200.

†Bermuda, its History, Geology, Climate, Products, Agriculture, Commerce, and Government. By T. L. Godet. London, 1860. 12mo.

be ignored, as it is taken almost bodily from Gosse's "Naturalist in Jamaica."

In the present list, I enumerate seventy-five species, most of which were personally observed; for convenience of reference, all species known to occur in this locality have been included. In working up my notes, I have endeavored to supplement previous descriptions by (1) descriptions of the colors of the fishes *while living*, (2) notes on size and proportions, (3) observations on habits, (4) hints in reference to the origin and meaning of their popular names, (5) notes upon modes of capture and economic value. The meaning of the specific names employed has been defined by partial synonymies, to which critical notes are occasionally appended. To make the list a more complete contribution to chorological knowledge, a brief note has been given upon the geographical distribution of each species.

The scheme of classification proposed by Professor Gill * has been followed throughout. I am indebted to Professor Gill for valuable suggestions and the identification of two or three of the more doubtful species.

TOPOGRAPHY OF THE ISLANDS.

The general topography of the Bermudas is so well known that no detailed account will be necessary. It may not be out of place, how-

* Arrangement of the Families of Fishes or Classes Pisces, Marsipobranchii, and Leptocardii. Prepared for the Smithsonian Institution by Theodore Gill, M. D., Ph. D. Washington: published by the Smithsonian Institution, November, 1872. 8vo, pp. xlvi, 50. (Smithsonian Miscellaneous Collections, 247.)

Catalogue of the Fishes of the East Coast of North America, by Theodore Gill. < Report on the Condition of the Sea Fisheries of the South Coast of New England in 1871 and 1872, by Spencer F. Baird, Commissioner, &c. pp. 779–822.

Catalogue of the Fishes of the East Coast of North America, by Theodore Gill, M. D. Ph. D. Washington. Published by the Smithsonian Institution, 1873. 8vo, pp. 50. (Smithsonian Miscellaneous Collections, 283.—A reprint of the preceding).

On the Limits of the Class of Fishes. By Theodore Gill, M. D., Ph. D. < American Naturalist, vol. vii, pp. 71–77, February, 1873. (Reprinted with repagination, 8vo, pp. 9; no title-page.)

The Number of Classes of Vertebrates and their Mutual Relations, By Prof. Thedore Gill. (Abstract of a Communication to the National Academy of Sciences, made October 29, 1873.) < American Journal of Science and Arts, vi, December, 1873, pp. 432–436. Reprinted with repagination, 8vo, pp. 4; no title-page;) also reprinted Annals and Magazine of Natural History, (London,) xiii, pp. 71–73, Jan. 1874.

Article *Fish* and descriptions of the various families, prepared by Professor Gill, as associate editor in the department of zoology, &c. < Johnson's New Universal Cyclopædia and Popular Treasury of Useful Knowledge. * * * A. J. Johnson & Son, New York.

ever, to refer to those features which bear more particularly upon the homes of the fishes. The sunken atoll, which is the foundation of the group, is shaped like an ellipse, its major axis twenty-five miles in length, its minor axis thirteen. The major axis runs in a northeast and southwest direction, the chain of main islands lying on the southeast edge of the ellipse, and forming a nearly continuous line twenty-six miles long, the lower or western end curving, nearly in the shape of a shepherd's crook or a fish-hook, to the southernmost focus of the supposed curve. The main islands, five in number, are separated by narrow channels, fifteen or twenty feet in depth, and their shores are deeply indented by shallow bays and lagoons. The reef, which approaches within a few hundred yards of the shore of the main islands on the south, is distant on the north and northwest from five to nine miles; the intervening space is crossed and recrossed by submerged reefs and ledges of coral limestone, and dotted in the neighborhood of the main islands by smaller islands and emerging ledges to the number of three hundred or more. The harbors are not particularly calm, but there are many broad bays whose surface the severest storms scarcely ripple. Within the encircling reef the depth of water rarely exceeds twelve and fourteen fathoms, while beyond this reef the bottom rapidly slopes to the level of the Atlantic bottom. Twenty miles to the southwest by west are two or three ledges, to which the fishermen resort for line-fishing in fine weather.

FISHERIES AND FISH-MARKETS.

The Bermudian fisheries have always been famous. A large number of the poorer islanders, particularly the negroes, are professional fishermen, and are bold and skillful sailors, though their ambition only suffices to keep them at work when purse and larder show signs of exhaustion. Every cottage has its little garden, where bananas and sweet-potatoes grow for the trouble of planting, so that the fishermen are not entirely dependent upon their occupation for support, and the supply of fish often falls far short of the demand, and this is especially the case in the winter, when the landing of a boat is the signal for a general rush to the shore. The people of Bermuda, over twelve thousand in number, are dependent chiefly upon the fisheries for their animal food. Large shipments of cattle and sheep are received from the United States, but these are monopolized by the wealthier classes and by the garrison, so that their flesh rarely finds its way to the tables of the negroes, who number over seven thousand, or of the poorer white colonists, who constitute more than one-half of the remaining population.

The fishing-boats are built in the English style, drawing five or six feet of water, deep-keeled, sloop or schooner rigged, and usually provided with a large well in the hold, in which the fish are brought in alive.

The only market is the water's edge. In the large towns, Hamilton and St. George's, the quay is lined nearly every morning at sunrise by a long row of fish-boats. The fish swim in the wells until customers are found for them; when one is selected, it is taken up in a landing-net or by a gaff-hook, and quickly killed by thrusting a sharp awl into the base of the brain; it is then bled, skinned (rarely scaled), eviscerated, and delivered into the hands of the purchaser, a loop of palmetto fiber always being attached for convenience in carrying. At an early hour the fares are disposed of, and the boats are under weigh for the fishing-grounds. At almost any time, however, row-boats filled with small seined fish may be found at the quay. Those who live in the country-parishes watch the return of their neighbors' boats at night-fall, and thus secure their supplies of fish.

Fish from such a market cannot fail to be fresh, and the excellence of the Bermuda food-fishes is due to this, and to the fact that they are never allowed to die of suffocation in the air, but are killed quickly and bled. The Angel-fish (*Holacanthus ciliaris*) is perhaps the most highly esteemed; next in rank are the various species of *Pristipomatidæ*, *Serranidæ*, and *Sparidæ*, with the Hog-fish (*Lachnolæmus falcatus*). All others are regarded inferior in quality. The price of fish is fixed by law at fourpence a pound, an advance of one penny having been made within a few years.

Most of the line-fishing is done among the outer reefs or on the outer banks, twenty miles distant. The favorite baits are the flesh of the "Bermuda lobster" (*Palinurus americanus*) and the "Spanish lobster" (*Scyllarus æquinoxialis*), and that of some of the larger fishes, such as the "Mackerel" (*Orcynus alliteratus*), and the Morays (*Muræniдæ*). The Pilchard (*Harengula macrophthalma*), Shad (*Eucinostomus gula* and *E. Lefroyi*), and the Robin (*Decapterus punctatus*), are used as "full-baits," as are also the various kinds of "fry" (*Atherina* and *Engraulis* sp.). The "Scuttle," a large *Octopus*, very common on the reefs, is also frequently used, its toughness making it a very lasting bait. Many of the choicest and largest species, such as the *Pristipomatidæ*, *Serranidæ*, and *Scombridæ*, are taken exclusively with lines.

The *Sparidæ*, *Labridæ*, *Scaridæ*, the smaller *Serranidæ*, and many others, with great quantities of the large crustaceans so much in demand for bait, are captured in basket-work fish-pots constructed of split cane.

These are built on the same principle with the lobster-pots in use on the New England coast, but are very peculiar in shape. A fair idea of one of them may be gained by imagining two crockery-crates placed together, with the ends at an angle so as to form a very thick capital letter V, with arms about four feet square, the entrance being through a funnel-shaped aperture placed in the inner angle. Smaller and more portable pots, made after the same model in annealed wire, are also in use. Such pots are baited with fish or lobsters, and anchored in two or three fathoms of water.

Shallow seines, a hundred yards or so in length, are plied in the bays, and with them are taken vast numbers of the smaller school-fishes, such as *Sargus variegatus*, *Pimelepterus Boscii*, *Mugil liza*, *Eucinostomus gula*, *Eucinostomus Lefroyi*, *Hemirhamphus Pleii*, *Decapterus punctatus*, &c. These seines are usually tanned with the bark of the mangrove-tree, (*Rhizophora mangle.*)

Circular casting-nets, ten feet in diameter, are used with much dexterity in capturing small fish for bait.

The "grains," a heavy, two-pronged instrument, resembling an ordinary fish-spear or gig, is carried in every boat, and used in striking large fish. The skillful grainsman seldom misses his mark, and in these waters, clear as crystal, this instrument is effective at the depth of ten or twelve feet.

During the winter months, recourse is had to the fish-ponds, which are stocked with the surplus of the summer's catch. These are of simple construction, usually natural pools in the rocks, or protected coves, inclosed by loosely-laid stone walls. Hundreds, sometimes thousands, of large fishes are here stored up for seasons when the severity of the weather is such as to prevent the usual visits to the fishing-grounds. The largest of these, the "Devil's Hole," on Harrington Sound, is visited by almost all the strangers on the islands, a small fee being charged for the privilege of seeing the fishes feed. Several hundred large Groupers and Hamlets (*Epinephelus striatus*) are usually confined here; and, when bait is thrown into the pond, the visitor can see only a close array of widely-stretched hungry mouths, each six or eight inches in diameter.

THE RELATIONS OF THE BERMUDIAN FISH-FAUNA.

These islands, considered in reference to their marine fauna, lie on the extreme northern and eastern boundary of the West Indian "Region." All the more characteristic fishes of this "Region" are represented in Bermudian waters, and the invertebrate fauna, as far

as investigated, appears to have very similar relations. The reef-building polyps find here their farthest northern remove from the equator. That the subtropical character of the marine fauna and flora is determined to a great extent by the influence of the Gulf Stream is rendered very evident by comparing the life on the land with that of the surrounding waters. The latter is much the more tropical and West Indian in character; while the former, although many West Indian species are represented in the flora, is a curious assemblage of forms brought together from various quarters by winds, ocean-currents, and the agency of man. Drift-wood and seeds from the Antilles are cast up in great quantities with the flotsam and jetsam of the shore, and many of the commonest plants of the Bermudas are supposed to have found their way thither in this manner. Thus the transporting power of the Gulf Stream appears to have been quite as important in the introduction of tropical forms of life to this group as has been its thermal effect in rendering it a suitable home for them. Since the Bermuda atoll is comparatively recent in origin, it is not difficult to believe that it has thus been supplied with living forms. Many fishes of the West Indian fauna have been found in the waters of the Azores, Canaries, Madeira, the Cape Verde Islands, and other points in the Eastern Atlantic; it appears easy to account for their wanderings by an extension of the action of the same transporting agent.

The occurrence of several strictly European species is also to be noted. All of these appear to be powerful, rapid swimmers, with the exception, perhaps, of *Synodus lacerta*.

The subjoined tables are intended to exhibit the geographical relations of the fishes observed in Bermudian waters. Several of the species mentioned in the paper are not included, since confusion in their synonymy has rendered their limits of distribution doubtful.

The total number of species enumerated is 75. Of these, 18 are so widely distributed as to be of little importance in a comparison of this nature. Of the 57 remaining, 50, or 86 per cent. (68, or 89 per cent. of the whole number, 75), are common to the Bermudas and the West Indies; 18 species, or 32 per cent. of the whole, or 37 per cent. of those common to the two faunas compared above, occur on the coast of Brazil, only 2, however, south of Bahia; 8 species, or 14 per cent., are found on the eastern coast of the United States north of Georgia; 4 of these are undoubtedly accidental there, while 2, *Decapterus punctatus* and *Paratractus pisquetus*, have a range along the coast from Rio de Janeiro to Cape Cod, and the seventh, *Anguilla bostoniensis*, is not sufficiently

established in its specific relations to warrant generalizations; 13 species, or 23 per cent., occur in the Eastern Atlantic; 3 of these have not been recorded west of the Bermudas, and I prefer for the present to consider them as wanderers from the Mediterranean fauna. The relations, faunally, of others, such as *Balistes capriscus* and *Pimelepterus Boscii*, are somewhat problematical.

Four species of marine fishes and one inhabiting brackish water are known to be peculiar to the group.

Species common to the Bermudas and West Indies.

Ostracium triquetrum.
Pseudoscarus superbus.
Pseudoscarus cœruleus.
Chœrojulis radiatus.
Lachnolæmus falcatus.
Eucinostomus Lefroyi.
Acanthurus cœruleus.
Sarothrodus bimaculatus.
Calamus megacephalus.
Calamus orbitarius.
Lutjanus caxis.
Mesoprion aya.
Trisotropis guttatus.
Epinephelus striatus.
Epinephelus guttatus.
Hypoplectrus puella.
Mugil liza.
Auostoma coloratum.
Hemirhamphus Pleii.
Exocœtus exiliens.
Megalops thrissoides.
Sardinella anchovia.
Harengula macrophthalma.
Echidna catenata.
Zonichthys fasciatus (South Carolina).

Common to the Bermudas, West Indies, and Eastern Atlantic.

Chilomycterus reticulatus (Saint Helena).
Chilichthys Spengleri (Madeira, Cape Verdes, and Western Africa).
Ostracium quadricorne (Saint Helena, Western Africa, Cape of Good Hope).
Sphyræna picuda (river Niger).

Common to the Bermudas, Brazil, Cape Verdes, and Ascension Island.

Salarias textilis.

Common to the Bermudas, West Indies, and Northern Brazil.

Malthe vespertilio.
Scarus radians.
Eucinostomus gula.
Hypeneus maculatus (Rio de Janeiro).
Holocentrum sogo.
Pareques punctatus.
Hæmylum capeuna.
Hæmylum chrysopterum.
Trisotropis undulosus.
Hemirhamphus Pleii.

Common to the Bermudas, West Indies, Brazil, and the Eastern Atlantic.

Labrosomus nuchipinnis (Gorea).
Harpe rufus (Saint Helena, Rio de Janeiro).
Glyphidodon saxatilis (Cape Verde Islands; accidental in New England).
Enneacentrus punctatus (Cape Verde Islands).
Gymnothorax moringa (Saint Helena).

Common to the Bermudas, West Indies, Brazil, and the east coast of the United States.

Acanthurus nigricans (South Carolina).
Decapterus punctatus.
Paratractus pisquetus.

Common to the Western Atlantic and Western Pacific??

Anguilla bostoniensis.

Common to the Bermudas, Mediterranean, and Eastern Atlantic.

Sargus variegatus (Madeira).
Sphyræna spet (Canaries).
Synodus lacerta (Madeira).

Common to the Bermudas, West Indies, Madeira, and the Mediterranean.

Pimelepterus Boscii (accidental at New York).

Common to the Bermudas, West Indies, east coast of United States, Madeira, Mediterranean, and the Pacific.

Balistes capriscus.

Pelagic: Atlantic.

Hippocampus, sp.
Dactylopterus volitans (Mediterranean).
Exocœtus, sp.
Mustelus canis.
Isuropsis punctata.

Pelagic: both hemispheres.

Paradiodon hystrix.
Alutera scripta.
Antennarius marmoratus.
Trachurops crumenophthalmus.
Orcynus alliteratus.
* Naucrates ductor.
Coryphæna hippurus.
* Leptecheneis naucrates.
* Ptheirichthys lineatus.
Regalecus gladius.
* Sphyrna zygæna.
* Reniceps tiburo.

* Not personally observed.

Peculiar to the Bermudas.

Syngnathus Jonesii.
Lefroyia bermudensis.
Engraulis chœrostomus.
Fundulus bermudæ.

Acclimated.

Carassius auratus.

POPULAR NAMES.

The names in use among the fishermen afford some curious studies. Where practicable, hints in regard to their origin have been given.

I observe that of the thirty-three names given by Catesby* as in use in the Bahamas at the time of his visit to those islands, one hundred and fifty years ago (1724–25), twenty-six are applied to common species in the Bermudas. Nearly all of these are applied to fishes of the same family or genus, and most of them to the same species. This may perhaps be explained by the common origin of the colonists of the two regions. It is an interesting instance of the persistency of common names. Many of these names are in use at the present time in the southern Atlantic States, though usually applied to different species.

Subjoined is a list of names in use among the fishermen, to the application of which I can give no clew:—

Glare-eye Squirrel.	Shad Porgy.	Sunburnt Shark.
Black Jack.	Scotch Porgy.	Rainbow.
Deer Grouper.	Red-tail.	Thumper.
Spanish Hog-fish.	Bone-fish.	Mermaid.
Black Hog-fish.	Grubble.	Skip-jack.
Clucker.	Yellow Tang.	Slippery Dick.
Sand-eel.	White Belly.	Prickly Hind.
Runner.	Blue Belly.	Sardine.
Blue-bone Porgy.	Permit.	Sand Mullet.
White-bone Porgy.	Sand Shark.	

* The Natural History of Carolina, Florida and the Bahama Islands; containing The Figures of Birds, Beasts, Fishes, Serpents, Insects and Plants: Particularly the Forest-Trees, Shrubs and other Plants not hitherto described or very incorrectly figured by Authors. Together with their Descriptions in English and French. To which are added, Observations on the Air, Soil and Waters: With Remarks upon Agriculture, Grain, Pulse, Roots, &c. To the Whole is Prefixed a new and correct Map of the Countries Treated of. By MARK CATESBY, F. R. S. London * * * * MDCCCXXXI-XLIII. 2 vols. folio.

The English names given to the species in this paper are those which are commonly applied to them by the islanders, and no others are employed.

The following identifications of Catesby's species are suggested in connection with the plates of fishes given in the second volume. These conclusions were reached after a careful examination of the synonymy of the names here proposed as adopted by later writers, especially Linné, who appears to have founded several species upon these figures and descriptions. In many cases, comparative measurements have been made with these plates and the fishes they are supposed to represent, so as to make the identification as accurate as might be. A casual comparison will show the reader how closely the local names correspond to those in use in the Bermudas:—

T. 1. Umbla minor, marina, &c. (Barracuda) is *Sphyræna picuda*.
Vulpis Bahamensis is *Albula conorhynchus*.

T. 2. Perca marina gibbosa, &c. (The Margate Fish) is (?) *Hæmylum chrysopterum*.
Saurus ex cinereo nigricans (The Sea Sparrow Hawk) is *Synodus fœtens*.

T. 3. Perca marina, pinna dorsi divisa (The Croker) is *Micropogon undulatus*.
Perca marina rubra (The Squirrel) is *Holocentrum sogo*.

T. 4. Perca marina rhomboidalis (The Pork Fish) does not agree with *Lagodon rhomboides*, to which it has been referred. The figure is too indefinite for determination and does not agree with the author's description.
Perca marina pinnis branchialibus carens (The Schoolmaster) is equally indefinite; the pectoral fins were evidently an afterthought of the artist.

T. 5. Perca marina venenosa, &c. (The Rock Fish) is *Trisotropis guttatus*, or some allied species.

T. 6. Perca marina capite striato (The Grunt) is some species of *Hæmylum*, perhaps *H. arcuatum*.
Albula bahamensis (The Mullet) is *Mugil* sp.

T. 7. Perca marina puncticulata (The Negro Fish) is *Enneacentrus ouatalibi*.
Perca cauda nigra (The Black-tail) is very like *Ocyurus chrysurus*.

T. 8. Hirundo (The Flying Fish) is unidentifiable, but is probably the common Barbados species, perhaps *Exocœtus Roberti*, M. & T.
Perca marina sectatrix (The Rudder Fish) cannot be recognized, but is probably one of the *Stromateidæ*.
Perca fluviatilis gibbosa ventre luteo (The Fresh-water Pearch) is *Pomotis vulgaris*.

T. 9. Turdus pinnis branchialibus carens (The Mangrove Snapper) is quite unrecognizable, the grotesque figure without pectoral fins being evidently imaginary.

T. 10. Turdus rhomboidalis (The Tang) is *Acantharus nigricans*.
Turdus cauda convexa (The Yellow Fish) is probably *Enneacentrus ouatalibi*. *Compare* T. 7, *supra*.

T. 11. Turdus flavus (The Hog Fish) is perhaps *Harpe rufus;* is certainly a Labroid.
Turdus cinereus peltatus (The Shad) is a *Eucinostomus*, and closely resembles the new Bermuda species *E. Lefroyi*.

T. 12. Turdus oculo radiato (The Pudding-wife) is a young specimen of *Chœrojulis radiatus*.
Alburnus americanus (The Carolina Whiting) is clearly *Menticirrus alburnus*, with which its shape and the barbels on the chin would place it, in spite of the manifest omission of the second dorsal fin.

T. 13. Mornnyrus ex cinereo nigricans (The Bone-fish) I am unable to identify, though the name is in use at the present day in the Bahamas.

T. 14. Cugupuguacu Brazil (The Hind) is *Epinephelus guttatus*.
Saltatrix (Skipjack) is *Pomatomus saltatrix*.

T. 15. Suillus (The Great Hog-fish) is *Lachnolæmus falcatus*.

T. 16. Aurata Bahamensis (The Porgy) is probably *Chrysophrys auratus* or *C. orbitarius*.

T. 17. Salpa purpurescens variegata (The Lane Snapper) I cannot place.
Petimbuabo Brazil (The Tobaccopipe-fish) is *Fistulari tabaccaria*.

T. 18. Novacula cœrulea (The Blue-fish) is *Pseudoscarus cœruleus*.

T. 19. Unicornis, Piscis Bahamensis (The Bahama Unicorn-fish) is *Alutera scripta*.

T. 20. Muræna maculatus, nigra et viridis (The Muray) closely resembles *Gymnothorax rostratus*.

T. 21. Muræna maculata nigra (The Black Muray) is not clearly identified.

T. 22. Turdus oculo radiato (The Old Wife) is *Balistes vetula*.

T. 23. Bagre, &c. (The Cat-fish) somewhat resembles *Noturus flavus*.

T. 24. Harengus minor Bahamensis (The Pilchard) is some small Clupeoid.

T. 25. Anthea quartus, Rondeletii (The Mutton-fish) is a *Lutjanus*, perhaps *L. aya* or some allied form.

T. 26. Remora (The Sucking Fish) belongs of course to *Echeneididæ*, though lack of detail will not allow even generic identification.

T. 27. Solea lunata et punctata (The Sole) I do not know.

T. 28. Orbis lævis variegatus (The Globe Fish) is *Chilichthys turgidus*.

T. 29. Psittacus piscis viridis, Bahamensis (The Parrot Fish) is *Pseudoscarus Catesbyi*.

T. 30. Acus maximus squammosa viridis (The Green Gar-fish) is *Lepidosteus osseus*.

T. 31. Acarauna major pinnis cornutis (The Angel Fish) is *Holacanthus ciliaris*.

FISHES OF THE BERMUDA ISLANDS.

LIST OF SPECIES.

MALTHEIDÆ.

MALTHE VESPERTILIO, (*Linn.*) *Cuv.*, subspecies VESPERTILIO.

DEVIL-FISH.

Lophius fronte unicorni, LINNÉ, Mus. Ad. Fried. 1, 1754, 55.—ARTEDI, Syn. Pisc. 1788, 88.

Guaperva, BROWN, Hist. Jamaica, 1756, 457, pl. 48, f. 3.

Rana piscatrix americana, SEBA, Locup. Rer. Nat. Thes. Desc. 1, 1758, 118, tab. lxxiv, f. 2.

Lophius vespertilio, LINNÈ, Syst. Nat. ed. 10, 1, 1758, 236; ed. 12, 1, 1766, 402.—GMELIN, Linn. Syst. Nat. 1, 1788, 480 (*partim*).—BLOCH, Ichth. iv, 1787, 8, taf. cx. (on a drawing by Plumier).—SCHNEIDER, Bloch, Syst. Ichth. 1801, 140.—LACÉPÈDE, Hist. Nat. Poiss. 1, 1798, 302–315.

Malthe vespertilio, CUVIER, Règne Anim. 1817.—MÜLLER & TROSCHEL in Schomburgk, Hist. Barbados, 1848, 678.—GÜNTHER, Cat. Fish. Brit. Mus. iii, 1861, 200 (*partim*).—POEY, Mem. ii, 1861, 382; Rep. Fis.-Nat. Cuba, ii, 1868, 406.—COPE, Trans. Am. Phil. Soc. 1870, 480.—GILL in Baird's Rep. Sea Fisheries of New England, 1873, 792.

Malthea vespertilio, CUV. & VAL., Hist. Nat. Poiss. xii, 1837, 440.—STORER, Syn. Fish. N. Amer. 1846, 131.—GILL, Cat. Fish. E. Coast N. Amer. 1861, 47.—LÜTKEN, Nat. Foren. Vid. Med. 1865, 5.

Malthœa vespertilio, DEKAY, New York Fauna, Fish, 1842, 452.

A single specimen of this species was noticed in the collection of Mr. John T. Bartram, of Stocks Point, Saint George's Island. It is recorded from various points in the West Indies. Dr. Günther has united all described species, except *Malthe cubifrons*, Richardson, under the name *Malthe vespertilio*. The species thus limited is very variable in respect to the length of snout, which in some individuals equals one-sixth of the entire length of the fish, in others reduced to one-twentieth or one twenty-fifth. Professor Lütken recognizes three species within these limits; *Malthe vespertilio*, represented by the synonymy given above;

Malthe longirostris, Cuv. & Val., the Guacucuja of Marcgrave;* and *Malthe notata*, Cuv. & Val. These species seem to correspond with certain limits of variation, and are probably entitled to subspecific rank, particularly since these limits of variation are correlated with their geographical distribution. The form designated as *vespertilio* corresponds to section (δ) of Günther, having the snout one-ninth or one-tenth of the total length, and is recorded from Cuba, Jamaica, Santo Domingo, Porto Rico, and Martinique.

M. longirostris corresponds to section (α) of Günther, having the snout one-sixth of the total length, and is recorded from Bahia and Para.

M. notata was described from Surinam, and, according to Dr. Günther, from young specimens. Dr. Günther identifies it with a Demerara specimen, and refers it to section (ε), having the snout one-thirteenth of the total length.

M. angusta, corresponding to section (η) of Günther, with the snout one-twentieth to one twenty-fifth of the total length, represents the minimum development of snout, and is known from Brazil.

Malthe cubifrons, Richardson, is undoubtedly entitled to full specific rank.

ANTENNARIIDÆ.

PTEROPHRYNE PICTA, (*Val.*) *Goode.*

DEVIL-FISH; MARBLED ANGLER.

Lophius histrio, var. *b, pictus*, SCHNEIDER, Bloch, Syst. Ichth. 1801, 124.
Chironectes pictus, CUV. & VAL., Hist. Nat. Poiss. xii, 293, pl. 364.
Antennarius marmoratus, var. *a, picta*, GTHR., Cat. Fish. Brit. Mus. iii, 1861, 186.

A single specimen was given me by C. C. Keane, esq., of Hamilton, and I saw several others. The fish is pelagic, occurring only in the warmer parts of the Atlantic. Its home is among the floating masses of Gulf-weed (*Sargassum bacciferum*). It is often brought ashore in the beds of this alga, which is thrown up among the rocks in great heaps after the winter storms. I have seen its curious nest, consisting of a bunch of eggs adhering in glutinous masses to the *Sargassum*, the whole cluster large enough to fill a quart measure. One of these was thrown ashore in February, and is now in the collection of J. Matthew Jones, esq., of Halifax, Nova Scotia.

* Historia Naturalis Brasiliæ, 1648, p. 143.

DIODONTIDÆ.

PARADIODON HYSTRIX, (*Linné*) *Bleeker.*

Sea Hedgehog; Sea Porcupine.

Guamajacu Guara, Marcgrave, Hist. &c. Brazil. 1648, 158.

Diodon Hystrix, Linné, Syst. Nat. ed. 10, 1, 1758, 335; ed. 12, 1, 1766, 413 (not Gmelin) Linné, Syst. Nat. 1, 1788, 449, according to Barneville, Revue zoologique 1846, 141).—Poey, Mem. ii, 1861, 361.—Günther, Cat. Fish. Brit. Mus., viii, 1870, 306.—Cope, Trans. Am. Phil. Soc. 1870, 480.

Paradiodon hystrix, Bleeker, Atl. Ichth. v, 1865, tab. ccvii, f. 2.—Poey, Rep. Fis. Nat. Cuba, ii, 1868, 430.

Erizo, Parra, Desc. Dif. Piez. Hist. Nat. Cuba, 1787, 60, lam. xxix, f. 1-2.

Diodon atinga, Bloch, Ichth. iv, 1787, 75, taf. cxxv, (not Linné).—Gmelin, Linné, Syst. Nat. 1, 1788, 1449.—Schneider, Bloch, Syst. Ichth. 1801, 511.—Lacépède, Hist. Nat. Poiss. ii, 1801, 1-3.—Shaw, Gen. Zool. v, 1804, 434.—Müll. & Trosch. in Schomburgk, Hist. Barbados, 1848, 677.—Kaup, Wiegmann's Arch. Naturg. xxi, 1855, 227.—Jouan, Anim. Nouv. Caledonie, Mem. Soc. Imp. Sci. Nat. Cherbourg, 1861-'63, 18.—Bleeker, Enum. Pisc. Arch. Ind. 1859, 203.

Diodon attinga, Ruppell. Verzeichn. Senckenb. Mus. Fisch. 18[illegible]2, 35.

Diodon Plumieri, Lacépède, op. cit. ii, 1, 1801, 1-10, pl. iii, f. 3.

Diodon Brachiatus, Schneider, op. cit. 213 (founded on Parra's figure No. 1, cited above.)

Diodon punctatus, Cuvier, Mem. Mus. Hist. Nat. iv, 1818, 132, and Règne Animal, 1817, p.—. —Bleeker, Verhandl. Bat. Gen. xxiv, Blootk. Vissch. 1852, 19.

This species, common in the West Indies, recorded also from the Pacific and the Indian Archipelago, is occasionally found here, and, on account of its bristly skin, is greatly prized by curiosity-hunters. It is never eaten. I saw four specimens, each about eighteen inches long.

CHILOMYCTERUS RETICULATUS, (*Linn.*) *Bibron.*

Orbis muricatus et reticulatus, Willughby, Ichthyographia, 1685, 155, tab. J, No. vii.—Seba, Locup. Rer. Nat. Thes. Desc. iii, 1758, 58, tab. xxiii, f. 3.

Ostracion subrotundus, aculeis undique brevibus triquetris raris, Artedi, Gen. Pisc. 1738, 52, No. 16.

Diodon reticulatus, Linné, Syst. Nat. 1, 1758, 334.—Gmelin, Linné, Syst. Nat. 1, 1788, 1449.

Chilomycterus reticulatus, Bibron *apud* Barneville, Revue Zoologique, 1846, 141.—Bleeker, Atl. Ichth. v, 1865, 54.—Günther, Cat. Fish. Brit. Mus. viii, 1870, 313.

Diodon atringa β, Linné, op. cit. ed. 12, 1, 1766, 413.

? Diodon atinga, Poey, Mem. ii, 1861, 361; Rep. Fis. Nat. Cuba, ii, 1868, 429.—Cope, Trans. Am. Phil. Soc. 1870, 480.

Dr. Günther records a single specimen from the Bermudas. Another, in the University Museum at Middletown, Connecticut, is said to have come from the same locality.

Additional data are necessary in order to determine the true relations of Linné's *Diodon atringa* (*atinga*). Barneville and Bleeker consider it identical with *Diodon orbicularis* of Bloch. Günther does not commit himself decidedly, although he cites, under *Chilomycterus geometricus*, Marcgrave's *Guamajacu atinga*, upon which the species of Linné is presumably founded. The relations of the species *D. atinga* are important as throwing light upon the relations of the genus *Diodon*, of which it must be considered the type; there can be little doubt, however, that Bleeker is right is retaining in this genus those forms which have three rather than two roots to their spines.

TETRODONTIDÆ.

CHILICHTHYS SPENGLERI, (*Bloch*) *Goode.*

SWALLOW; PUFF-FISH.

Tetrodon Spengleri, BLOCH, Ichth. iv, 1787, 134, taf. cxliv.—SCHNEIDER, Bloch, Syst. Ichth. 1801, 504.—LACÉPÈDE, Hist. Nat. Poiss. i, 1798, 476–501.—SHAW, Gen. Zool. v, 1804, 445.—GÜNTHER, Cat. Fish. Brit. Mus. viii, 1870, 284.—COPE, Trans. Am. Phil. Soc. 1870, 479.

Tetrodon Plumieri, LACÉPÈDE, op. cit. 476–504, pl. xx, f. 3 (on a drawing by Plumier).

Tetrodon marmoratus, RANZANI, Nov. Comm. Acad. Bonon. iv, 1840, 72, pl.x, f. 1.—LOWE, Trans. Zool. Soc. ii, 1841, 193.—VALENCIENNES in Webb and Berthelot, Hist. Nat. Canaries, Poiss. 1836, pl. xx, f. 2.

A single specimen of two inches was found on the beach at Bayley's Bay. The species ranges from Madeira and Northwestern Africa to the Caribbean, and no doubt frequently occurs about the Bermudas. Bloch, in his description, figures the species with the imperforate nasal tentacles of the genus *Arothron*, giving the East Indies as its habitat. Making due allowances for the notorious carelessness of early ichthyologists in fixing the localities of specimens, and for the lack of detail in their drawings, we believe that the present name should be retained, since the fish figured by Bloch is unmistakably the one before us. Should time render it necessary to adopt another name, that of Ranzani, who described the species accurately, may be substituted.*

Color.—Above, light chestnut; beneath, clear white; a lateral band

* *Tetrodon marmoratus*, RANZANI, Novi Commentarii Acad. Sci. Inst. Bonon iv, 1840, p. 72, pl. x, fig. 1.

of tawny white, from chin to base of caudal rays, where it is confluent with a ring of the same color around the extremity of the caudal peduncle; beneath this lateral band a row of brown spots, of irregular size and fifteen in number, three being on the caudal peduncle; above a similar row, often very obscure. Caudal brown, with broad, median transverse band of yellow; other fins immaculate.

When inflated with air, the diameter of the belly is considerably greater than half the entire length of the fish.

Its habits are doubtless very similar to those of *Chilichthys turgidus* (Mitch.) Gill, common on the east coast of North America from Cape Cod to the Antilles, which it much resembles, and which is very likely to occur in the Bermuda waters.

OSTRACIIDÆ.

OSTRACIUM TRIQUETRUM, *Linn.*

Cuckold.

Ostracion triangulus, tuberculis, exiguis numeris aculeis carens, Artedi, Gen. Pisc. 1738, 57; Syn. Pisc. 1738, 85.

Ostracion polyodon inermis triqueter, Linné, Mus. Ad. Fried. 1, 1754, 60.

Ostracion triqueter, Linné, Syst. Nat. ed. 10, 1, 1758, 330; ed. 12, 1, 1766, 407.—Bloch, Ichth. iv, 1787, 106, taf. cxxx.—Gmelin, Linné, Syst. Nat. 1, 1788, 1441.—Schneider, Bloch, Syst. Ichth. 1801, 498.—Lacépède, Hist. Nat. Poiss. 1, 444.—Shaw, Gen. Zool. v, 1804, 420.—Müll. & Trosch. in Schomburgk, Hist. Barbados, 1848, 677.—Hollard, Ann. Sci. Nat. 1857, 154.—Günther, Cat. Fish. Brit. Mus. viii, 1870, 256.

Ostracion triquetrum, Poey, Mem. ii, 1861, 361; Rep. Fis.-Nat. Cuba, ii, 1868, 442.

Ostracium triquetrum, Cope, Trans. Am. Phil. Soc. 1870, 475.

Rhinesomus triqueter, Swainson, Nat. Hist. Fish. & Rept. ii, 1839, 324.

Common, as it also is throughout the West Indies and the Gulf of Mexico. Its length seldom exceeds eight inches. Its habits are sluggish, and it hugs very closely the bottom, where it is frequently taken in fish-pots.

The locomotion of the trunk-fishes is very peculiar, and I found an excellent opportunity for observing the movements of a Cuckold confined in my aquarium. The propelling force is exerted by the dorsal and anal fins, which have a half-rotary, sculling motion resembling that of a screw-propeller; the caudal fin acts as a rudder, save when it is needed for unusually rapid swimming, when it is used as by other fishes. The chief function of the broad pectorals appears to be that of fanning a

current of water through the gills, thus aiding respiration, which would otherwise be difficult on account of the narrowness and inflexibility of the branchial apertures.

When taken from the water, one of these fishes will live for two or three hours, all the time solemnly fanning its gills, and when restored to its native element seems none the worse for its experiences, except that, on account of the air absorbed, it cannot at once sink to the bottom. The Cuckold is not valued for food, though I am unable to learn that its use is ever followed by fatal results such as attend it in some of the West Indies.*

The local name is not applicable, and has probably been transferred from some other fish, as, for instance, the following species, which is known in Jamaica as "the cuckold."

Color.—Dark brown, thickly studded with circular spots of yellowish-white, each about two lines in diameter. The epidermis is often abraded, leaving the shell uniform tawny-white.

OSTRACIUM QUADRICORNE, *Linné.*

Cow-fish.

Piscis triangularis cornutus Clusii, Willughby, Hist. Pisc. 1686, xiv, tab. J.

Ostracion triangularis 2 aculeis &c., Artedi, Syn. Pisc. 1738, 85, No. 9.

Ostracion quadricornis, Linné, Syst. Nat. ed. 10, 1, 1758, 331; ed. 12, 1, 1766, 408.—Bloch, Ichth iv, 1787, 113, taf. cxxxiv.—Gmelin, Linné, Syst. Nat. 1, 1788, 1442.—Schneider, Bloch, Syst. Ichth. 1801, 499.—Lacépède, Hist. Nat. Poiss. 1, 1798, 442, 468.—Shaw, Gen. Zool. v, 1804, 424.—Kaup, Wiegmann's Arch. Naturg. xxi, 1855, 218.—Hollard, Ann. Sci. Nat. 1857, 148.—Bleeker, Poiss. Guinea, 1863, 20.—Günther, Cat. Fish. Brit. Mus. viii, 1870, 258.

Ostracion quadricorne, Poey, Mem. ii, 1861, 362; Rep. Fis.-Nat. Cuba, ii, 1868, 439.

Ostracion (*Acanthostracion*) *quadricornis*, Bleeker, Atl. Ichth. 1865, 32.

Ostracium quadricorne, Cope, Trans. Am. Phil. Soc. 1870, 474.

Lætophrys quadricornis, Swainson, Hist. Nat. Fish. & Rept. ii, 1839, 324.

Chopin, Parra, Desc. Dif. Piez. Hist. Nat. Cuba, 1787, 31, lam. xvii.

Ostracion Lister, Lacépède, op. cit. 468, pl. xxiii, f. 2.

Ostracion sexcornutus, Mitchill, Amer. Month. Mag. ii, 1818, 328.

Lactophrys sexcornutus, Storer, Syn. Fish. N. Am. 1846, 246.

Ostracion cornutus, Müll. & Troschi. in Schomburgk, Hist. Barbados, 1848, 677 (not Linné or Bloch).

Ostracion maculatus, Hollard, op. cit. 149.

Common; its habits much like those of *Ostracium triquetrum*. Its range is much wider, including Saint Helena, Guinea, the Cape of

* Schomburgk, History of Barbados, p. 677.

Good Hope, and Charleston, S. C. Its occurrence in the Indian Archipelago is extremely doubtful, as Bleeker himself admits. This species is extremely variable, in length, breadth, and height of body, length of tail, and length of caudal, and these variations seem to be individual as well as related to age. Hollard's *Ostracion maculatus* * and the various *species dubia* of Poey † will probably prove to be forms of this species.

The presence of plates upon the caudal peduncle is apparently accidental. They may possibly have some relation to sex, but certainly none to age. Out of fourteen specimens examined, five had plates above and below, one had two above, and six had none. In none of the specimens can I distinguish traces of the spine in the middle of the dorsal ridge mentioned by Dr. Günther. The color of young specimens is well described by Günther; the bands on the cheek are, however, of a bright blue. Adult specimens are colored in a rich bright blue, which quickly vanishes after death. In some individuals, the color is worn from the ridges of the carapace, leaving patches of light brown. The largest specimens are twenty-one inches long.

The Cow-fish is, I was told, much esteemed for food, and is frequently baked whole in its shell. The popular name, like the Cuban "*toro*" and the Jamaican "cuckold," refers to the two horn-like supra-orbital spines.

BALISTIDÆ.

BALISTES CAPRISCUS, *Gmelin.*

Turbot.

Balistes capriscus, Gmelin, Linné, Syst. Nat. 1, 1788, 1471.—Schneider, Bloch, Syst Ichth. 1801, 476.—Lacépède, Hist. Nat. Poiss. 1798, 1, 372, pl. xiii, f. 3.—Shaw, Gen. Zool. v, 1804, 411—Risso, Ichth. Nice, 1810, 51.—Yarrell, Brit Fish. ii, 1841, 472.—Hollard, Ann. Sci. Nat. 1854, 309.—Günther, Cat. Fish. Brit. Mus. viii, 1870, 217.—Gill, in Baird's Rep. on Sea Fisheries of Southern New England, 1873, 793.

Balistes fuliginosus, DeKay, New York Fauna, Fishes, 1842, 339, pl. lvii, f. 188.—Storer Syn. Fish. N. Am. 1846, 243.

Capriscus fuliginosus, Gill, Cat. Fish. E. Coast N. Am. 1861, 56.

Common. Very erratic in its distribution, having been observed in the Pacific at Panama, at Madeira, in the Mediterranean, and on the coast of Great Britain. DeKay figures a specimen taken in New York Harbor; the

*Annales des Sciences Naturelles, vii, p. 148.

† Repertorio Fisico-Natural de la Isla de Cuba, ii, pp. 439-440.

United States National Museum has specimens from Wood's Hole, Mass., Charleston, S. C., and the Tortugas; it is not recorded from the West Indies. The Turbot attains a weight of five or six pounds; its flesh is not unpalatable, and its tough, shagreen-like skin is used for polishing purposes. It has a habit of swimming on its side, just at the surface, like the Sunfish (*Mola rotunda*), and, from this habit as well as perhaps a fancied similarity of its form to that of the European Turbot (*Rhombus maximus*), its name appears to have been derived. It no doubt breeds in these waters; I have seen young individuals not exceeding three inches in length. The species should be compared with *Balistes sobaco*, Poey. No other species of this subfamily were observed.

I suppose the "Old-wife," "Ocean-turbot," and "Black-turbot" of the fishermen to correspond respectively to *Balistes vetula*, Linné, *Canthidermis maculatus*, (Gmelin) Bleeker, and *Melichthys buniva* (Lacépède), all of which, as well as *Balistes ringens*, Linné, are quite certain to occur in these waters.

ALUTERA SCRIPTA, (*Osbeck*) *Bleeker*.

Unicornis Piscis Bahamensis, CATESBY, Nat. Hist. Carol. Florida, and the Bahama Islands, ii, 1743, 19, tab. 19.

Balistes scriptus, OSBECK, Iter. Sin. 1765, 144.—GMELIN, Linné, Syst. Nat. 1, 1788, 1463.

Aluteres scriptus, BLEEKER, Ned. Tyds. Dierk. iii, 1865, 28; Ichth. 1865, 141, tab. ccxxvii, 4.

Monacanthus scriptus, GÜNTHER, Cat. Fish. Brit. Mus. viii, 1870, 252.

Lija Trompa, PARRA, Desc. Dif. Piez. Hist. Nat. Cuba, 1787, 46, lam. xxii, f. 1.

Balistes Lævis, BLOCH, Ichth. xii, 1797, 63, tab. cccexiv.—SHAW, Gen. Zool. v. 1804, 405.

Aluterius lævis, CUVIER, Règne Animal, 1817.—CANTOR, Cat. Malayan Fish. 355.—BLEEKER, Verhandl. Batav. Gen. xxiv (Balistidæ), 21.—HOLLARD, Ann. Sci. Nat. 1855, 15.—DAY, Fish. Malabar, 1865, 355.

Alutera lævis, SWAINSON, Nat. Hist. Fish. & Rept. ii, 1839, 327.

Aleuteres lævis, RICHARDSON, Voy. H. M. S. Sulphur, 1845, 131, pl. lxi, f. 3.

Balistes Monoceros, var. *Lævis*, SCHNEIDER, Bloch, Syst. Ichth. 1801, 463.

Balistes ornatus, PROCÉ, Bull. Philom. 1822, 131.

Aluteres pareva, LESSON, Voy. Coquille, ii, 1830, 106.

Aluterus venosus, HOLLARD, op. cit. 14, pl. 1, f. 3.

Alutera picturata, POEY, Proc. Acad. Nat. Sci. Phila. 1863, 183; Rep. Fis.-Nat. Cuba, ii, 438.

Aleuteres picturatus, COPE, Trans. Am. Phil. Soc., 1870, 476.

A specimen twenty-one inches long was taken off the islands in April, 1872. The occurrence of the species is so unusual that it has no common name. It appears to be strictly pelagic, and is recorded from China, the Indian Archipelago, Tahiti, New Ireland, Coromandel, the Canaries, the West Indies, Brazil, and South Carolina.

HIPPOCAMPIDÆ.

HIPPOCAMPUS, *sp.*

SEA-HORSE.

Two specimens, apparently of different species, were secured; but, owing to the unsatisfactory nature of the published descriptions, it is impossible at present to identify them. One agrees tolerably with *H. antiquorum*, Leach.

SYNGNATHIDÆ.

SYNGNATHUS JONESII, *Günther.*

Syngnathus Jonesii, GÜNTHER, Ann. & Mag. of Nat. Hist. 1874.

This species was deservedly dedicated to J. Matthew Jones, esq., F. L. S., who is doing so much toward elucidating the natural history of these islands. Pipe-fishes are not uncommon. *S. pelagicus*, Osbeck, is likely also to occur.

AULOSTOMIDÆ.

AULOSTOMA MACULATUM, *Valenciennes.*

TRUMPET-FISH.

Trompetero colorado, PARRA, Descr. Dif. Piez. Hist. Nat. Cuba, 1787, 63, lam. xxx, f. 2.

Aulostoma maculatuus, VALENCIENNES in Cuvier, Règne Animal, 1817; ill. ed. Poiss. 1829, pl. xcii, f. 2.

Aulostoma coloratum, MÜLL. & TROSCH. in Schomburgk's Hist. Barbados, 1848, 173.—GÜNTHER, Cat. Fish Brit. Mus. iii, 1861, 536.—POEY, Rep. Fis.-Nat. Cuba, ii, 1868, 386.—COPE, Trans. Am. Phil. Soc. Phila. 1870, 480.

A dried head of this species was shown me by C. C. Keane, esq., of Hamilton. The fishermen speak of two Trumpet-fishes found here, one of them designated the Black Trumpet-fish. One of these is probably *Fistularia tabaccaria*, Liuné. Mr. J. Matthew Jones informs me of the capture, in 1874, of a specimen of *Fistularia serrata*, Cuv., hitherto known only from the Indian and Pacific Oceans.

FIERASFERIDÆ.

LEFROYIABERMUDENSIS, *Jones.*

Lefroyia Bermudensis, JONES, Zoologist, Jan., 1874, 3838.

A single specimen four and one-half inches long was taken by Governor Lefroy in the summer of 1873.

"Total length rather more than 4½ inches. Greatest depth at the ver-

tical of the pectorals, three lines and one-half. The length of the head is slightly more than one-seventh of the total length. The greatest width of the head is rather less than one-third of its length. Body naked, attenuate, compressed. Facial outline rugose. Eye moderate; horizontal diameter of the eye-cup, one and three-quarter lines; vertical diameter, one and one-quarter lines. Gape of mouth wide. Lower jaw shorter, and received within the upper. Cardiform teeth of irregular size in both jaws, vomer, and palatines; those of the latter largest. Branchiostegals seven, inflated, united below. Vent thoracic. Pectorals originating at the upper angle of the operculum, three lines in extent, of delicate soft rays. Dorsal indistinct, commencing in a groove at about the vertical of the twentieth anal ray, continuous to caudal extreme; when in conjunction with the anal, it forms a small filamentous tip. Anal prominent, commencing immediately behind the vent, in advance of the vertical to the upper angles of the operculum, and extending to the caudal extreme. About its centre, it is equal in depth to that of the body at the same position. Owing to the delicate texture of the fins, it is impossible to determine the number of rays, but those of the anal exceed one hundred and forty. Color when dried, out of spirit, golden-yellow. The body transparent, showing the vertebra within, a condition, according to General Lefroy, equally observable in life."—*Jones.*

The genus proposed by Mr. Jones has not yet been defined, and the name *Lefroyia* can be adopted only provisionally.

BLENNIIDÆ.

LABROSOMUS NUCHIPINNIS, (*Quoy & Gaimard*) *Poey.*

MOLLY MILLER.

Clinus nuchipinnis, QUOY & GAIMARD, Voy. Uranie et Physicienne, Zool. 1824, 255.—GÜNTHER, Cat. Fish. Brit. Mus. iii, 1861, 262.

Labrosomus nuchipinnis, POEY, Rep. Fis.-Nat. Cuba, ii, 1868, 308.

Clinus pectinifer, CUV. & VAL., Hist. Nat. Poiss. xi, 1836, 374 (female).—MÜLL. & TROSCH. in Schomburgk's Hist. Barbados, 1848, 671.—CASTELNAU, Anim. Nouv. &c. Amérique du Sud, 1855, Poiss. 26.

Labrisomus pectinifer, SWAINSON, Nat. Hist. Fishes &c. 1839, 277.—COPE, Trans. Am. Phil. Soc. 1870, 473.

Labrosomus pectinifer, GILL, Proc. Acad. Nat. Sci. Phila. 1860, 105.—POEY, Mem. Hist. Nat. Cuba. ii, 1861, 381.

Clinus capillatus, CUV. & VAL., op. cit. 377 (male).—MÜLL. & TROSCH., l. c.

Labrisomus capillatus, SWAINSON, l. c.

Labrosomus capillatus, GILL, op. cit. 107.—POEY, l. c.

Lepisoma cirrhosum, DEKAY, New York Fauna, Fishes, 1842, 41, pl. xxx, f. 94.—STORER. Syn. Fish. N. Am. 49.

Very common under stones in tide-pools and in crevices; their habits closely resembling those of the "Rock-eel" (*Murænoides mucronatus*), so familiar to naturalists on the New England coast. Some individuals are brilliantly colored with red beneath, while others are gray. These differences are most probably sexual. My largest specimens are four inches long. The species is recorded from the Antilles, Bahia, Gorea, and the National Museum has specimens from Florida.

SALARIAS TEXTILIS, *Q. & G.*

Salarias textilis, QUOY & GAIMARD, MS.—CUVIER & VALENCIENNES, Hist. Nat. Poiss. xi, 307.

? Salarias vomerinus, CUV. & VAL., op. cit. 349.

Salarias vomerinus (CUV. & VAL. ?) JENYNS, Zool. Voy. H. M. S. Beagle, Fishes, 1842, 88, pl. 17, f. 3.

This species, found in tide-pools in company with the preceding, appears to be identical with that brought by Quoy and Gaimard from the Isle of Ascension. The measurements do not agree precisely with those given by Valenciennes (which are expressed in very general terms); its colors, however, are precisely the same. It agrees in many points with the specimens collected by Darwin at Porto Praya, and provisionally referred by Jenyns to *Salarias vomerinus*, C. & V.

The Bermuda specimens have the vomerine teeth and the four ventral rays, the omission of which in the description of *Salarias textilis* was Jenyn's chief reason for not referring the Cape Verde specimens to that species. The affinities of *S. textilis* and *S. vomerinus*, always considered close, have some light thrown upon them by the discovery of vomerine teeth in the former. The question of their identity, however probable it may seem, must be decided by the comparison of a larger series of specimens. Such study will probably result in the establishment of a new genus for the reception of the species at present referred to *Salarias*, which possess vomerine teeth.

A detailed description of the Bermuda specimens is given for convenience in future comparisons. The greatest height of the body, at the beginning of the dorsal, is slightly less than one-sixth (0.16) of the extreme length, and is four-fifths of the length of the head; the height of the lowest part of the caudal peduncle equals one-half the greatest height of the body (0.08). The head measures one-fifth (0.20) of total

length. The eye is slightly elliptical, and its longitudinal diameter equals the length of the snout, or one twenty-fifth (0.04) of the total length. The interorbital space equals half the diameter of the orbit, and is concave. The profile is very obtuse, and the eye is situated just within the angle formed by profile and crown. There are two broadly-palmated superciliary filaments, not so long as the diameter of the orbit; two similar but smaller ones at the nostrils; also two short filaments, one on either side of the nape. The lips are crenated at the sides of the mouth, though not anteriorly. In addition to the row of numerous small movable teeth common to all the species of the genus, there is a long recurved canine tooth on each side of the lower jaw, behind the series of small teeth; also, a transverse row of minute teeth on the anterior portion of the vomer.

The dorsal fin originates just behind the nuchal filaments, at a distance from the snout (0.22) slightly greater than the length of the head; its spinous portion nearly equals its soft portion, the former measuring 0.30, the latter 0.31. A deep notch almost separates the two parts.

The anal fin originates at a distance from the snout equal to one-half the length of the body exclusive of the caudal (0.42). Its first ray measures 0.07, its penultimate ray 0.12, its ultimate ray 0.05. The caudal is four twenty-fifths (0.16) of the total length, and is slightly rounded at the extremity. The pectorals equal the head in length (0.20), and barely reach to the vent. The distance from the snout to the upper axilla of the pectorals equals the distance to the origin of the ventrals, and also the length of the ventrals (0.11).

The lateral line is faintly indicated by a delicate line, arching above the pectorals, then running straight along the middle.

The radial formula is as follows:—D., XII–15; A., II, 15$\frac{1}{1}$; C., 3–6–5–3; P., 14; V., I–4.

The color is greenish above, becoming white beneath. Twelve or fourteen brownish-violet cross-bands, arranged in pairs, and in part interrupted by three series of whitish dots, so as to form a row of quadrate blotches just above the lateral line. The third row of white dots is more pronounced, the dots becoming short lines, and is situated on the lateral line; a fourth series, less pronounced, may be seen near the lower edge of the body.

A Y-shaped figure of brown upon the chin, the arms extending forward, and three other fine brown lines on each side of the throat, extending transversely upward and backward, continued upon the cheek and opercle by lines of fine brown dots. A row of similar dots may be seen

a little below the base of the anterior part of the dorsal. The fasciæ upon the sides extend on the dorsal, where they take an oblique direction backward. They are most pronounced at the base of the dorsal, forming a series of squares at the point of its junction with the body. The caudal has five or six irregular vertical lines. The anal is pale at its base, the tips of the rays dark brown, pectorals and ventrals dusky.

Measurements.

Extreme length, 0m.062	1.00
Body: Greatest height	.16
Head: Length	.20
Greatest width	.14
Length of snout	.04
Width of interorbital area	.02
Eye: Diameter	.04
Dorsal (spinous): Distance from snout	.22
Length of base	.31
Greatest height	.08
(soft): Length of base	.30
Greatest height	.31
Anal: Distance from snout	.42
Height at first ray	.11
Height at last ray	.05
Pectoral: Distance from snout at axilla	.11
Length	.20
Ventral: Distance from snout	.11
Length	.11

TRIGLIDÆ.

DACTYLOPTERUS VOLITANS, (*Linné*) *Cuv.*

Pirapebe or *Miivipira*, Marcgrave, Hist. &c. Brasil, 1648, 162.

Trigla volitans, Linné, Syst. Nat. ed. 10, 1, 1758, 302; ed. 12, 1, 1766, 498.—Gmelin, Linné, Syst. Nat. 1, 1788, 1346.—Bloch, Ichth. x, 1797, 93, taf. cccli.—Schneider, Bloch, Syst. Ichth. 1801, 12.—Shaw, Gen. Zool. iv, 622, pl. xci.

Dactylopterus volitans, Cuv. & Val., Hist. Nat. Poiss. iv, 1829, 117.—DeKay, New York Fauna, Fish. 1842, 49, pl. xvii, f. 46.—Müller & Troschel, Schomburgk, Hist. Barbados, 1848, 667.—Guichenot, Explor. Scient. Algérie, Rept. & Poiss. 1850, 41.—Castelnau, Anim. Nouv. &c. Amérique du Sud, Poiss. 1855, 26.—Poey, Mem. ii, 1861, 367; Rep. Fis.-Nat. Cuba, ii, 1868, 304.—Gill, Cat. Fish. E. Coast N. Am. 1861, 43; Baird's Rep. on Sea Fisheries of Southern New England, 1873, 799.—Günther, Cat. Fish. Brit. Mus. ii, 1861, 222.—Baird, Rep. on Sea Fisheries of Southern New England, 1873, 824.

Morcielago, Parra, Descr. Dif. Piez. Hist. Nat. Cuba, 1787, 25, lam. xiv.

Polynemus sexradiatus, MITCHILL, Amer. Month. Mag. 1818, 323 (figured as "The Six-rayed Polyneme," Trans. Lit. & Phil. Soc. N. Y. 1815, pl. iv. f. 10).

Dactylopterus communis, OWEN, Descr. Cat. Ost. Series, Roy. Soc. Surg. 1, 1853, 56.

Gonocephalus macrocephalus, GRONOW, Cat. Fish. (1780), ed. Gray, 1854, 106.

Rare and without a common name. The Colonial Museum at Hamilton and Mr. Bartram's collection at Saint George's each contain a dried specimen. Mr. Jones secured one in Hamilton Harbor in October, 1851.

The species ranges from Newfoundland to Rio de Janeiro, throughout the West Indies, and to the Cape Verde Islands, and the Mediterranean, where it is comparatively common.

SCARIDÆ.

SCARUS RADIANS, *Valenciennes.*

SPANISH PORGY.

Scarus radians, CUV. & VAL., Hist. Nat. Poiss. xiv, 1839, 207.—STORER, Syn. Fish. N. Am. 1846, 147.—GÜNTHER, Cat. Fish. Brit. Mus. iv, 1862, 207.—GUICHENOT, Mem. Soc. Imp. Sci. Nat. Cherbourg, 1865, 10.—COPE, Trans. Am. Phil. Soc. 1870, 462.

Labrus radians, CASTELNAU, Anim. Nouv. &c. Amérique du Sud, 1855, 29.

Common, occurring in large schools. The greatest length observed was eight inches. Though seined in quantity, the Spanish Porgies are not eaten, their flesh, like that of the other members of this family, being dry and flavorless.

The species is recorded from Bahia, Mexico, and Saint Martin's. Specimens from Barbados and Jamaica are in the National Museum. Bermuda appears to be the northern limit of its range.

Color.—Above, olive, tinged with reddish-brown; beneath, rose-color; head, upper part of body, and dorsal marbled with brown; caudal irregularly banded with black, the extremity and spots on the membrane white; anal immaculate (in six specimens); base of pectorals black; chin white.

PSEUDOSCARUS VETULA, (*Schneider*) *Gill.*

MUD FISH.

Vieja, PARRA, Descr. Dif. Picz. Hist. Nat. Cuba, 1787, 58, lam. 28. fig. 1.

Scarus vetula, BLOCH-SCHNEIDER, Syst. Ichth. 1, 1801, 289 (description founded on Parra's figures).—CUV. & VAL., Hist. Nat. Poiss. xiv, 1839, 193.—STORER, S n. Fish, N. Amer. 145.—MÜLLER & TROSCHEL in Schomburgk's History of Barbados, 1848, 674.—COPE, Trans. Am. Phil. Soc. 1870, 461.

Pseudoscarus vetula, GILL, MS.

Scarus superbus, POEY, Mem. Hist. Nat. Cuba, ii, 1860, 218.

Pseudoscarus superbus, GÜNTHER, Cat. Fish Brit. Mus. iv, 1862, 218.—POEY, Rep. Fis.-Nat. Cuba, ii, 1868, 346.

Pseudoscarus psittacus, GÜNTHER, op. cit. 225.

The Mud-fish is very common, its gorgeous colors making it very conspicuous as it swims. The young may be seen by the hundred in the shallow rock-pools, while in the deeper waters the larger fish are sailing about with the precision and regularity of a squadron of cavalry under drill. Though its flesh is not unpalatable, this fish is not often brought to market; the enormous scales are much used in fancy work. The species is recorded from several Antilles.

The young fish differ much from the adult in coloration, their markings closely approximating those of *Pseudoscarus sanctæ-crucis* (Schn.) Gthr. Since no specimens of the latter species measuring more than eight or nine inches are on record, and none of *P. vetula*, in adult coloring, less than eighteen inches in length have fallen under my observation, it seems possible that the two species may be the same in different stages of growth, particularly since both are usually recorded from the same locality. The question of their identity may be easily decided by the Bermudian naturalists.

As is indicated in the synonymy, *vetula* is the specific name properly belonging to this species. Parra (l. c.) gives an excellent figure of the fish under the name *Vieja*, and on this figure Schneider founded his *Scarus vetula*, the specific name being a translation of Parra's *Vieja*. Of this fact, Valenciennes was aware, and by it he was guided in adopting the name of Schneider. Professor Poey renamed the species with the remark: "C'est à tort que M. Valenciennes rapport la figure de Parra au *Sc. vetula*," seemingly forgetful that Schneider's name was founded not upon specimens, but upon Parra's figure solely. Dr. Günther, adopting the views of Prof. Poey, cites *Scarus vetula* as a synonym of *Pseudoscarus psittacus*, (Linn.) Gthr.

PSEUDOSCARUS CÆRULEUS, (*Bloch*) *Günther*.

"CLAMACORE" OR "KILMAGORE."

Novaculx cærulea, CATESBY, Nat. Hist. Carolina, Florida and the Bahama Islands, ii, 1743, 18, pl. 18.

Coryphæna cærulea, BLOCH, Ichth. v, 120.—GMELIN, Linné, Syst. Nat. 1, 1788, 1791.

Scarus cærulcus, SCHNEIDER, Bloch, Syst. Ichth. 1, 1801, 288.

Pseudoscarus cœruleus, GÜNTHER, Cat. Fish. Brit. Mus. iv, 1862, 227—GUICHENOT, Proc. Soc. Imp. Sci. Nat. Cherbourg, 1865, 24.—POEY, Rep. Fis. Nat. Cuba, ii, 1861, 348.

Trompa, PARRA, Descr. Dif. Piez. Hist. Nat. Cuba, 1787, 57, lam. xxvii, f. 2.

Loro, PARRA, l. c. f. 1.

Scarus loro, SCHNEIDER, op. cit. 288.

Scarus trilobatus, LACÉPÈDE, Hist. Nat. Poiss. iv, 1803, 21.

Sparus holocyanosus, LACÉPÈDE, op. cit. 45.

The "Clamacore" or "Kilmagore" is very unusual in Bermudian waters; a single specimen of thirty-six inches was taken outside the reefs in April, 1872, and was an object of much curiosity. The color in life was brilliant turquoise-blue, fading to olive-green in alcohol. The species is recorded from Cuba and some of the adjoining islands.

Dr. Günther suggests that this species is probably only the adult stage of one of the other species, such as *Pseudoscarus chloris*,* but an ex-

* The study of the synonymy of this species has brought to light an error, which may be referred to here. It appears that Parra's *Vieja*, No. 3, and Schneider's *Scarus chloris*, founded upon the figure of Parra, belong, not to *Pseudoscarus*, as is intimated by Dr. Günther, but to *Scarus;* such is the judgment of Professor Poey after consulting the type of Parra's description, preserved in the Museum in Madrid. M. Guichenot, after an examination of the types in the Musée d'Histoire Naturelle, Paris, retains in this genus *Scarus virens*, Valenc. There now remains only *Scarus quadrispinosus*, Val., as a synonym of Günther's *Pseudoscarus chloris*, and, of these names, that of Valenciennes has undoubted priority. The reversed synonymy should stand then somewhat as follows:—

SCARUS CHLORIS, *Schn.*

Vieja, PARRA, Descr. Dif. Piez. Hist. Nat. Cuba, 1787, 59, lam. 28, f. 3.

Scarus chloris, SCHNEIDER, Bloch, Syst. Ichth. 1801, 289 (on Parra's figure).—COPE, Trans. Am. Phil. Soc. 1870, 461.

Pseudoscarus chloris, GÜNTHER, Cat. Fish. Brit. Mus. iv, 1862, 227.

Scarus virens, CUV. & VAL., Hist. Nat. Poiss. xiv, 1839, 203.—STORER, Syn. Fish. N. Am. 1846, 146.—MÜLLER & TROSCHEL in Schomburgk's Hist. Barbados, 1848, 674.

Scarus chrysopterus, SCHNEIDER, op. cit. 286, pl. lviii.—CUV. & VAL., op. cit. 185.—STORER, op. cit. 143.—COPE, op. cit. 462.

Scarus lateralis, POEY, Mem. Hist. Nat. Cuba, 1860, ii, 219; Rep. Fis. Nat. 1, 1867, 337, 375.

HABITAT.—Cuba, Santa Cruz, Saint Christopher's, Saint Thomas, Martinique, Porto Rico, Barbados.

PSEUDOSCARUS QUADRISPINOSUS, (*Valenc.*) *Guichenot.*

Scarus quadrispinosus, CUV. & VAL., Hist. Nat. Poiss. xiv, 1839, 197.—STORER, Syn. Fish. N. Am. 1846, 144.

Pseudoscarus quadrispinosus, GUICHENOT, Proc. Soc. Imp. Sci.-Nat. Cherbourg. 1865, 27.

? *Scarus obtusus*, POEY, Mem. Hist. Nat. Cuba, ii, 1860, 217; Rep. Fis.-Nat. ii, 1868, 349.

Pseudoscarus chloris (not Bloch), GÜNTHER, Cat. Fish. Brit. Mus. iv, 1862, 227.—COPE, Trans. Am. Phil. Soc. 1870, 461.

HABITAT.—Saint Thomas, Cuba, Jamaica, Bahamas.

amination of specimens has convinced me that this is not the case. In the National Museum are two well-characterized specimens of *Pseudoscarus cœruleus*, measuring nine and fifteen inches respectively, both of which have the hump upon the profile well developed, though not so prominent as in the adult specimen of thirty-six inches. Parra's two figures (lamina xxviii) named "Loro" and "Trompa" represent different ages of this species, the prolonged caudal lobes as well as the additional size of the caudal lobe being characters of age.

LABRIDÆ.

CHŒROJULIS RADIATUS, (*Linné*) *Goode.*

BLUE-FISH.

Turdus Oculo radiato (Pudding-wife), CATESBY, Nat. Hist. Carol. &c. 1743, ii, 12, tab. xii, fig. 1.

Sparus radiatus, LINNÉ, Syst. Nat. ed. 12, 1, 1776, 472.—GMELIN, Linné, Syst. Nat. 1, 1788, 1278.

Doncella, PARRA, Desc. Dif. Piez. Hist. Nat. Cuba, 1787, 95, lam. xxxvii, fig. 1.

Julis cyanostigma, CUV. & VAL., Hist. Nat. Poiss. xii, 1839, 391 (type 6 inches long).—MÜLL. & TROSCH. in Schomburgk's Hist. Barbados, 1848, 673.—STORER, Syn. Fish. N. Am. 1846, 139.

Platyglossus cyanostigma, GÜNTHER, Cat. Fish. Brit. Mus. iv, 1862, 161.—COPE, Trans. Am. Phil. Soc. 1870, 464.

Chœrojulis cyanostigma, POEY, Rep. Fis. Nat. Cuba, ii, 1868, 334.

Julis Principis, CUV. & VAL., op. cit. 402, (type 11 inches long).—STORER, op. cit. 140,

Platyglossus principis, GÜNTHER, op. cit. 164.

Julis patatus (partim), CUV. & VAL. op. cit. 398 (types 13 to 15 inches long).—STORER op. cit. 140.

The Blue-fish is frequently taken in the pots, though not valued as food. My largest specimen measures sixteen inches. The common name refers to the color of the adult fish. The species is recorded from several of the West India islands.

Color.—In the adult, a brilliant azure-blue, each scale edged with bright pearly-green. A longitudinal band on anal and the margin of the dorsal light blue. In the young, the prevailing hue is brownish, a large light-blue spot on the base of each scale. Head with spots and longitudinal stripes of light blue. Dorsal with broad margin, and four lines of spots and blotches, longitudinally arranged, of the same color. Caudal with broad white margin, outer rays blue to the extremity, the base of the fin thickly spotted with the same. Anal with border and two longitudinal lines of blue, the fin being thus divided into three

nearly equal parts, a large circular spot of the same color at the base of each ray except the first. Pectoral with the first five rays and a narrow transverse line across the base from the fourth ray blue.

My notes on the colors of young and adult specimens of this species have led me to believe that the different ages have been described under several different specific names, as the synonymy given above would indicate. *Julis cyanostigma* was the name given by Cuvier and Valenciennes to specimens six inches in length, *Julis principis* to those of eleven inches, while those ranging from thirteen to fifteen inches are included under *Julis patatus*. The specimens of larger size ("*l'individus à plus de quinzes pouces*"), included under the latter name, probably belong to another species. The 'Mudian fishermen recognize the difference in color to be caused by age.* I have seen specimens with the colors of immaturity, which had attained the length of ten inches. It will probably be found that the change of color is not restricted to any fixed period in the growth of the fish. Should farther investigations sustain the opinion of Dr. Günther† that Linné's *Sparus radiatus* is a different species from that figured by Catesby, the specific name *cyanostigma* should be retained.

LACHNOLÆMUS FALCATUS, (*Linné*) *Val.*

Hog-fish.

Suillus (Great Hog-fish), Catesby, Hist. Carol. Florida and the Bahama Islands, ii, 1743, 135, tab. xv.

Labrus falcatus, Linné, Syst. Nat. ed. 10, 1, 1758, 284; ed. 12, 1, 1766, 475.—Gmelin, Linné, Syst. Nat. ed. 1, 1788, 1287.—Lacépède, Hist. Nat. Poiss. &c. iii, 1803, 425, 463.

Lachnolaimus falcatus, Cuv. & Val., Hist. Nat. Poiss. xiii, 276.—Günther, Cat. Fish. Brit. Mus. iv, 1862, 87.—Poey, Rep. Fis.-Nat. Cuba, ii, 1868, 330.—Cope, Trans Am. Phil. Soc. 1870, 464.

Lachnolaimus aigula, Cuv. & Val., op. cit. 277, tab. 388 (type 11 inches long).—Storer, Syn. Fish. N. Am., 136.

Lachnolaimus dux, Cuv. & Val., op. cit. 285 (type 8 inches long).—Storer, l. c.

Lachnolaimus suillus, Cuv. & Val., op. cit. 286 (type 24 inches long).—Storer, l. c.

Lachnolaimus caninus, Cuv. & Val., op. cit. 288 (type 10 inches long).—Storer, l. c.

Lachnolaimus psittacus, Cuv. & Val., op. cit. 291.—Storer, l. c.

Very common here, as it is throughout the West Indies. Hog-fish

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*Since the above was written, I find that very similar conclusions have been reached by Professor Poey, who gives under *Chœrojulis cyanostigma* a synonymy much like the above.

†Cat. Fish. Brit. Mus. iv, p. 164, note.

Ledge, at the entrance to Hamilton Harbor, is marked by a pyramid of stone, called the "Hog-fish Beacon," which is surmounted by a huge iron image of a Hog-fish.

The long streamer-like appendages or continuations of the vertical fins give to the Hog-fish as it swims a singularly graceful appearance. The beauty of those exposed in the market is frequently marred, however, by having had these ornaments bitten off by the craw-fish and lobsters confined with them in the wells of the boats.

The Hog-fish attains the weight of twenty pounds, and is among the choicest of table-fish; its hard, white, exquisitely-flavored flesh has never been found injurious here, though in some parts of the West Indies it is regarded with suspicion. The common name refers to the swine-like profile and dentition.

HARPE RUFUS, (*Linné*) *Gill.*

Spanish Lady-fish.

Pudiano vermellio, Marcgrave, Hist. &c., Brasil, iv, 1648, 145.

Turdus flavus (Hog-fish), Catesby, Nat. Hist. Carol. Florida and the Bahama Islands, ii, 1743, 11, tab. xi, f. 1.

Labrus rufus, Linné, Syst. Nat. ed. 10, 1, 1758, 284; ed. 12, 1, 1766, 475.—Gmelin, Linné, Syst. Nat. 1, 1788, 1287.—Schneider, Bloch, Syst. Ichth. 1801, 244.—Lacépède, Hist. Nat. Poiss. iii, 1803, 427.

Cossyphus rufus, Günther, Cat. Fish. Brit. Mus. iv, 1862, 108.—Cope, Trans. Am. Phil. Soc. Phila. 1870, 463.

Harpe rufus, Gill, Proc. Acad. Nat. Sci. Phil. 1863, p. 222.

Bodianus rufus, Poey, Rep. Fis.-Nat. Cuba, ii, 1868, 331.

Perro colorado, Parra, Descr. Dif. Piez. Hist. Nat. Cuba, 1787, 3, lam. iii, fig. 1.

Bodianus bodianus, Bloch, Ichth. vii, 1797, 24, tab. ccxxiii.

Cossyphus bodianus, Cuv. & Val., Hist. Nat. Poiss. xiii, 1839, 103.

Lutjanus verres, Bloch, op. cit. tab. cclv.

Sparus verres, Shaw, Gen. Zool. iv, 1803, 414.

Cossyphus verres, Castelnau, Anim. Nouv. ou Rares, Amérique du Sud, Ichth. 1855, 27.

Sparus falcatus, Bloch, op. cit. tab. cclviii.

Bodianus Blochii, Lacépède, Hist. Nat. Poiss. iv, 1803, 279, 290.

Harpe cœruleo-aureus, Lacépède, op. cit. 426, 427, tab. viii. fig. 2.

Labrus semiruber, Lacépède, op. cit. iii, 428.

Not common. The species is also recorded from various of the West India Islands, the Gulf of Mexico, Bahia, Rio de Janeiro, and Saint Helena. Closely-related species are known in the Spanish and French Antilles under the names "Doncella" and "Demoiselle," and the Bermu-

dian name may perhaps be interpreted to mean "the fish which the Spanish call Lady-fish." The name is not inappropriate, for the species is remarkable for the grace of its form and the beauty and elegance of its colors. My specimens measure eight inches.

Color.—Head and upper half of body to the third ray of the soft dorsal rich chestnut-brown; the remainder, including the lower half of the operculum, bright golden-yellow.

The lips have conspicuous folds. The pre-operculum is *very perceptibly denticulated.* The two anterior ventral rays and the soft dorsal and anal and the caudal lobes are much produced, the dorsal and anal prolongations extending to the middle of the median caudal rays; the outer caudal rays are twice as long as the median.

POMACENTRIDÆ.

GLYPHIDODON SAXATILIS, (*Linné*) *Cuvier.*

COW-PILOT; SERGEANT-MAJOR.

Jaguacaquare, MARCGRAVE, Hist. &c. Brasil. iv, 1648, 156.

Sparus fasciis quinque transversis fuscis, LINNÉ, Amœn. Acad. i, 1749, 312.

Chætodon fasciis quinque albis, cauda bifurca, LINNÉ, Mus. Ad. Fried. i, 1754, 54.

Chætodon saxatilis, LINNÉ, Syst. Nat. ed. 10, 1, 1758, 277; ed. 12, 1, 1766, 466.—GMELIN, Linné, Syst. Nat. 1, 1788, 1253.—BLOCH, Ichth. vi, 1787, 71, tab. ccvi, f. 2.

Glyphisodon saxatilis, CUV. & VAL., Hist. Nat. Poiss. v, 1830, 446.—MÜLLER & TROSCHEL Schomburgk's Hist. Barbados, 1848, 674.—CASTELNAU, Anim. Nouv. ou Rares, Amérique du Sud, 1855, 11.

Glyphidodon saxatilis, GÜNTHER, Cat. Fish. Brit. Mus. iv, 1862, 36.—POEY, Rep. Fis.-Nat. Cuba, ii, 1868, 329.—COPE, Trans. Am. Phil. Soc. 1870, 461.

Chætodon Marginatus, BLOCH, op. cit. tab. ccvii.—LACÉPÈDE, Hist. Nat. Poiss. iv, 1803, 451, 463.

Chætodon Mauritii, BLOCH, op. cit. tab. ccxiii, f. 1.—SCHNEIDER, Bloch, Syst. Ichth. 1801, 234.—LACÉPÈDE, op. cit. 452, 470.

Chætodon sargoides, LACÉPÈDE, op. cit. 453, 471, 472.

Very common in sheltered waters. The largest, six to eight inches in length, frequent the shallow shaded coves in company with *Pseudoscarus vetula*, *Holacanthus ciliaris*, and *Sarothrodus bimaculatus.* The young may be seen basking in every shallow tide-pool. The origin of the common name is not apparent, unless it refers to some supposed relation between this species and the Cow-fish (*Acanthostracium quadricorne*), such as *Naucrates ductor* is supposed by sailors to hold with the Sharks. The fish is sometimes called the "Sergeant-major," in allusion to the chevron-like bands of yellow on the sides. The species is very common through-

out the West Indies, and has been observed as far south as Bahia and east to the Cape Verde Islands. Its accidental occurrence at Newport, R. I., has been recorded.

Color.—Adults golden-green, young golden-yellow, with five black cross-bands, which are not as broad as the interspaces between them, the first from a point in front of the origin of the dorsal to the base of the pectoral; the second below the third and fifth dorsal spines; the third from the eighth and tenth dorsal spines toward the vent; the fourth from the twelfth and thirteenth dorsal spines to the middle of the anal; the fifth below the end of the soft dorsal and continued on the posterior rays of the dorsal and anal.

The ventrals, soft dorsal, and anal are produced; the fourth and fifth rays of soft dorsal and the fifth and sixth of anal longest. Dorsal and anal prolongations in young reaching to a point half-way between the posterior angle of dorsal and the base of caudal rays; in adults reaching quite beyond the base of caudal rays. External caudal rays twice the length of median.

GERRIDÆ.

EUCINOSTOMUS GULA, (*Cuv. & Val.*) *Goode.*

SHAD.

Gerres gula, CUV. & VAL., Hist. Nat. Poiss. vi, 1830, 464.—JENYNS, Zool. Voy. H. M. S. Beagle, 1842, 58.—GÜNTHER, Cat. Fish. Brit. Mus. iv, 1862, 255.—MÜLLER & TROSCHEL, Schomburgk, Hist. Barbados, 1848.—POEY, Mem. Hist. Nat. Cuba, ii, 1861, 368.

Diapterus gula, POEY, Rep. Fis.-Nat. Cuba, ii, 1868, 323.

Common and secured in quantity in the shallow bays, with *Decapterus punctatus*, *Eucinostomus Lefroyi*, and *Trachurops crumenophthalmus*. The largest specimens seen, which were apparently adult, measure six inches in length; intermediate sizes down to one inch were observed.

The species has also been seen about Martinique, Santo Domingo, Cuba, Jamaica, and Bahia. The "*Turdus cinereus peltatus*" of Catesby,* for which he gives the common name of "Shad," seems to be identical with this species or the closely-allied *Eucinostomus aprion*, if not with the following species.

EUCINOSTOMUS LEFROYI, *Goode.*

LONG-BONED SHAD.

Diapterus Lefroyi, GOODE, Amer. Journ. Sci. & Arts, viii, 1874, (Aug.) 123.

This species is distinguished from all other members of the family and genus by its relatively greatly-elongated form. The body is fusiform,

* Natural History of Carolina, Florida, and the Bahamas, ii, p. 11, tab. xi, fig. 1.

compressed; its greatest height, at the thoracic region, being a little less than one-fourth (0.23) of the total length, and a little more than one-fourth (0.27) of the length without caudal (0.89). In *Eucinostomus aprion*, the most elongated of the species hitherto described, the greatest height is but one-third of the length.

The height of the body is uniform under the spinous portion of the dorsal, sloping gently, and at a nearly uniform angle above and below, to the middle of the caudal peduncle. The height of the body behind the dorsal (0.10) is less than one-half, that of the least height of the tail (0.06) is one-fourth of the greatest height of the body.

The scales are large, measuring 0.03 and 0.04 in height, and 0.02 and 0.03 in length; they form about forty-five oblique transverse rows between the head and the caudal, four and a half longitudinal rows between the back and the lateral line, and ten longitudinal between rows the lateral line and the belly.

The length of the head (0.22) equals the greatest height of the body, and is double the greatest width of the head (0.11); the height at the pupil (0.14) is double the width of the interorbital space (0.07). The length of the snout (0.06) equals the length of the operculum (0.06); when the mouth is protruded, the length of the snout is doubled (0.12), and when retracted, the posterior extremity of the intermaxillary process extends to the vertical through the center of the pupil. The nasals are very prominent, and the nostrils are nearer to the orbit than to the extremity of the jaw. The orbit is circular, its diameter (0.08) one-third the length of the head.

The origin of the dorsal is slightly behind that of the ventral; its distance from the snout (0.31) twice the length of its base (0.16). The dorsal spines are graduated nearly in the proportion (I = 0.02; II = 0.12; III = 0.11; IV = 0.10; V = 0.09; VI = 0.085; VII = 0.725; VIII = 0.05; IX = 0.04). The notch between the spinous and soft portions is very deep, and the connecting membrane barely perceptible. In the soft dorsal, the fifth ray is the longest (0.09), and equals the fifth spine; the succeeding rays diminishing regularly to the last, which equals the ultimate spine (0.04); the length of its base (0.20) is greater than that of the spinous dorsals. The anal begins behind the center of the body (0.56); the first spine is very short (0.01), one-fifth the length (0.05) of the second, which is slender; the first ray is the longest (0.08); the succeeding rays regularly diminishing in length to the last (0.03). The lobes of the caudal are equal; the outer rays in length (0.21) five times the inner ones (0.04). The extremity of the pectoral reaches the vertical from the last dorsal spine; its distance

from the snout at the axilla (0.25) is nearly equal to the length of the body. The ventral spine resembles the fifth dorsal spine in shape and size. The length of the longest ray (0.11) slightly exceeds one-third of the distance from the snout to the ventral axilla (0.30); the axillary appendage consists of four lanceolate scales, the first and the longest as long as the last ventral ray.

Color.—Silvery, with a bluish tint above; axils of the pectorals and extremity of snout brownish. Radial formula: D. IX, 10; A. II, 8, P. 12; V. I, 5; C. 3, 9, 9, 3.

The unit of measurement used above is the one-hundredth of the total length, which in an average specimen is 7.29 inches ($0^{m}.185$). The species is common in the protected inlets about the islands, in company with the preceding species, the "Shad." The "Long-boned Shad" are in much demand for bait, and are easily seined in large quantities.

The species is dedicated to his excellency Maj. Gen. J. H. Lefroy, F. R. S., governor of the Bermudas, a gentleman of well-known scientific attainments and reputation, who, while doing so much for the social and political welfare of the islands, is also taking an active part in the development of their natural history.

Since the publication of the preliminary description of this fish, I have had the opportunity of comparing specimens from the Bermudas with others sent from Havana to the National Museum by Professor Poey, by whom the species had been recognized as new, and described in MS. under the name of *Eucinostomus productus*. The specimens are precisely the same, and coincide in having only two anal spines; a character in which they differ from the remainder of the genus, and which may prove to be, as suggested by Professor Poey, an indication of generic distinction.

TEUTHIDIDÆ.

ACANTHURUS NIGRICANS, (*Linné*) *Gill.*

DOCTOR-FISH.

Turdus rhomboidalis, CATESBY, Nat. Hist. Carolina, Flor. and the Bahama Islands, ii, 1743, 10, tab. x, fig. 1.

Chætodon nigriscens cauda albescente æquali utrinque aculeata, ARTEDI, Desc. Spec. Pisc. 90.

Chætodon nigricans, LINNÉ, Syst. Nat. ed. 10, 1, 1758, 274; ed. 12, 1, 1766, 462.—GMELIN, Linné, Syst. Nat. 1, 1788, 1245.

Acanthurus nigricans, GILL in Baird's Report Sea Fisheries of Southern New England, 1873, 801.

Acanthurus cœruleus, Schneider, Bloch, Syst. Ichth. 1801, 214.—Cuv. & Val., Hist. Nat. Poiss. x, 1835, 179.—Guichenot, Poiss. in Sagra, Hist. Nat. Cuba, 1845, 121.—Storer, Syn. Fish. N. Amer. 1846, 112.—Castelnau, Anim. Nouv. ou Rares, Amérique du Sud, 1855, 25, pl. 12, f. 2.—Günther, Cat. Fish. Brit. Mus. iii, 1861, 336.—Poey, Rep. Fis.-Nat. Cuba, ii, 1868, 355.—Cope, Trans. Am. Phil. Soc. 1870, 474.

Not uncommon. The species extends through the West Indies, and has also been observed on the coasts of Florida and South Carolina. Its quick nervous movements, as it plays about the recesses in the reef, are very characteristic. The local name has reference to the lancet-like processes on the sides of the caudal peduncle. The "Barbero" and "Barbeiro" of Cuba and Brazil, and the "Chirurgien-bleu," "Porte Lancette," and "Saigneur" of the French Antilles, are names of similar origin.

Color.—Bluish-brown; dorsal and anal with numerous obliquely longitudinal lines of light blue. Caudal spine amber-colored, glassy, posteriorly half as long as anteriorly. A prominence in front of orbit; profile of snout slightly concave. Operculum, pre-operculum, and scapular bones with deep striæ. Upper jaw with seven, lower with eight five to eight lobed incisors.

ACANTHURUS CHIRURGUS, (*Bloch*) *Schneider.*

Doctor-fish.

Chætodon nigricans, Bloch, Ichth. vi, 1787, 60, tab. cciii (not Linné).

Acanthurus nigricans, Schneider, Bloch, Syst. Ichth. 1801, 211.

Chætodon chirurgus, Bloch, op. cit. tab. ccviii.—Gmelin, Linné, Syst. Nat. 1788, 1259.

Acanthurus chirurgus, Schneider, op. cit. 214.—Cuv. & Val., Hist. Nat. Poiss. x, 1835, 168.—Guichenot, Poiss. in Sagra, Hist. Nat. Cuba, 1845, 120.—Storer, Syn. Fish N. Am. 1846, 112.—Castelnau, Anim. Nouv. ou Rares, Amérique du Sud, 1855, 24.—Günther, Cat. Fish. Brit. Mus. iii, 1861, 329.—Poey, Rep. Fis. Nat. Cuba, ii, 1868, 355.—Cope, Trans. Am. Phil. Soc. Phila. 1870, 474.—Gill in Baird's Rep. Fisheries of Southern New England, 1873, 801.

Acronurus fuscus, Gronow, Cat. Fish. (1780), ed. Gray, 1854, 191.

This species undoubtedly occurs, associated as it always is with the preceding. The name "Tang," found in the list of local names, is probably applied to one or both, if we can judge from the remarkable correspondence of the local names in the Bermuda and Bahama groups.

CHÆTODONTIDÆ.

SAROTHRODUS BIMACULATUS, (*Bloch*) *Poey.*

Four-eyed Fish.

Chætodon bimaculatus, Bloch, Ichth. vii, 1797, tab. ccxix, f. 1.—Schneider, Bloch, Syst. Ichth. 1801, 225.—Cuv. & Val., Hist. Nat. Poiss. vii, 1831, 67.—Storer, Syn. Fish. N. Am. 1846, 86.—Günther, Cat. Fish. Brit. Mus. ii, 1861, 9.—Poey, Mem. Hist. Nat. Cuba, ii, 1861, 371.

Sarothrodus bimaculatus, Poey, Rep. Fis. Nat. Cuba, ii, 1868, 353.—Cope, Trans. Am. Phil. Soc. 1870, 474.

The "Four-eyed Fish" is usually seen in sheltered coves, lazily swimming a few feet below the surface, under the shadow of some high rock. Its local name has reference to the eye-like spots near the tail, which the fishermen believe to be a true pair of eyes. The species is also recorded from the northern West Indies.

Color.—Pearly-gray; snout, posterior edge of operculum, base of pectoral, the anal, caudal, and dorsal bright yellow, blending into the gray of the body. A band, black, edged with yellow, extends from a point in front of and below the first dorsal spine across the eye to the margin of interoperculum; soft dorsal with a large round indistinct black spot at its base between the fifth and twelfth rays, and a small spot of deep black at its angle; soft dorsal with narrow marginal line of black; soft anal with narrow, submarginal band of light blue, anteriorly edged with black; caudal with terminal band of bluish-white, with bright-yellow center; base of ventrals blotched with yellow.

HOLACANTHUS CILIARIS, (*Linné*) *Lacépède.*

Angel-fish.

Acarauna major pinnis cornutis, Catesby, Nat. Hist. Carolina, Florida, and the Bahama Islands, ii, 31, tab. xxxi, 1743.

Chætodon griseus fasciis quatuor fuscis, Linné, Mus. Ad. Fried. 1, 1754, 62, tab. xxxiii, f. 1.

Chætodon ciliaris, Linné, Syst. Nat. ed. 10, 1, 1758, 276; ed. 12, 1, 1766, 465.—Gmelin, Linné, Syst. Nat. 1, 1788, 1252.—Bloch, Ichth. vi, 1788, 83, taf. ccxiv.—Schneider, Bloch, Syst., Ichth. ed. 1801, 218.

Holacanthus ciliaris, Lacépède, Hist. Nat. Poiss. iv, 1803, 527–534.—Cuv. & Val. Hist. Nat. Poiss. vii, 1831, 154.—Günther, Cat. Fish. Brit. Mus. ii, 1861, 46.—Poey, Mem. Hist. Nat. Cuba, ii, 1861, 371; Rep. Fis.-Nat. Cuba, ii, 1868, 351.—Gill, Baird, Rep. on Sea Fisheries of Southern New England, 1873, 802.

Gabelita, Parra, Desc. Dif. Piezas Hist. Nat. Cuba, ii, 1787, 11, tab. vii, f. 1.

Chætodon Parræ, Schneider, op. cit. 235 (on Parra's figure).

Chætodon squamulosus, SHAW, Nat. Misc. ——, 275.
Chætodon Catesbeii, SHAW, Gen. Zool. iv, 1, 1803, 325.
Chætodon cornutus, DESMAREST, Déc. Ichthyol.
Chætodon aculeatus, GRONOW, Cat. Fishes (1780), ed. Gray, 1854, 72.

Common. The species is found, also, in the West Indies, at Bahia, and on the coasts of Mexico. The Angel-fish is partial to sheltered parts of the reef, where it may be seen lazily and gracefully swimming or floating a few feet below the surface. Its motions are very slow, and it frequently swims upon its side, or, sinking to the bottom, swims perpendicularly to the surface, where its bright colors flash for a moment as it floats broadside upward. I have frequently seen them grazing upon the alga-covered rocks. The Angel-fish attains the weight of four pounds, and as far surpasses all the other fishes of the region in its delicious flavor as in its lovely hues. The largest I have seen measured fifteen inches from snout to extremity of soft dorsal.

Color.—Brown with a shade of olive-green, each scale edged with a lighter tint; on the dorsal and anal fins, the brown has reddish tinge. Chin, nape, base of pectoral, borders, and spines of operculum and preoperculum, bright cobalt-blue. Extremity of pectorals, bright yellow. Borders of dorsal and anal bright blue, passing through a vivid green to bright yellow on the slender streamers formed by the prolongations of the soft dorsal and anal fins. Caudal bright yellow, with narrow border of greenish blue. Base of ventrals blue, passing through green into yellow at the extremities. Young and half-grown individuals are ornamented with three or four broad transverse bands of blue and yellow.

My specimens, some twelve in number, differ from all descriptions in the absence of the spot of brown, encircled with blue, on the nape. I have examined numerous West Indian specimens and find it universally present. Should this character prove constant, the Bermuda Angel-fish may be considered a geographical variety, *Holacanthus ciliaris*, var. *Bermudensis*.

HOLACANTHUS TRICOLOR, (*Bloch*) *Lacépède.*

BLACK ANGEL-FISH.

Aearauna, EDWARDS, pl. 583, f. 4.
La Veuve Coquette, DUHAMEL, Trait. Gén. Pesch. 1782, pt. 2, pl. 13, f. 1.
Catalineta, PARRA, Descr. Dif. Piez. Hist. Nat. Cuba, 1787, 12, lam. vii, f. 2.
Chætodon tricolor, BLOCH, Ichth. xii, 1797, tab. 425.—SCHNEIDER, Bloch, Syst. Ichth. 1801, 219.

Holacanthus tricolor, LACÉPÈDE, Hist. Nat. Poiss. iv, 1803, 525-530.—CUV. & VAL., Hist. Nat. Poiss, vii, 1831, 162.—CASTELNAU, Anim. Nouv. ou Rares, Amér. du Sud, 1855, 19.—GÜNTHER, Cat. Fish. Brit. Mus. ii, 1861, 49.—POEY, Mem. Hist. Nat. Cuba, ii, 1861, 371; Rep. Fis.-Nat. Cuba, ii, 1868, 352.

Occasional. Mr. Jones captured a specimen in 1871, and the name occurs on the local list. The species occurs throughout the West Indies, and is also recorded from Bahia and Trinidad.

Chætodon arcuatus, (Linn.) Cuvier, is also likely to occur in these waters.

XIPHIIDÆ.

The name of "Sword-fish" occurs on the local list. The common Sword-fish (*Xiphias gladius*, Linn.) must occur in Bermuda waters, and probably also *Tetrapturus albidus*, Poey, and *Histiophorus americanus*, Cuv. & Val.

The following reference to the Sword-fish occurs in "Newes from the Bermudas," a pamphlet dated Burmuda, July, 1609, and reprinted in "Force's Historical Tracts," vol. ii.

Whale, Sword-fish & Threasher.—"The sword fish swimmes under the whale, & pricketh him upward: The Threasher keepeth above him, & with a mighty great thing like unto a flaile, hee so bangeth the whale, that hee will roare as though it thundered, & doth give him such blowes, with his weapon, that you would thinke it to be a crake of great shot."—(Page 22.)

SCOMBRIDÆ.

ORCYNUS ALLITERATUS, (*Rafinesque*) *Gill.*

MACKEREL.

Scomber alliteratus, RAFINESQUE, Caratteri &c. Anim. Sicilia, 1810, 46.

Orcynus alliteratus, GILL, Baird, Rep. Sea Fisheries of Southern New England, 1873, 802.—BAIRD, Rep. Sea Fisheries of Southern New England, 1873, 825.

Maquereau à Quatre Points, GEOFFR. ST. HILARIE, Desc. Egypt. Hist. Nat. 1813, pl. xxiv, f. 3.

Thynnus Leachianus, RISSO, Hist. Nat. Eur. Merid. iii, 1827, 414.

Thynnus thunnina, CUV. & VAL., Hist. Nat. Poiss. viii, 1831, 104.—BLEEKER, Verhandl. Batav. Genootsch. xxiv, 1851, 36.—TEMM. & SCHLEG., Fauna Japonica Poiss. 1850, 95, pl. 48.—GUICHENOT, Rept. et Poiss. Exp. Scient. Algérie, 1850, Poiss. 57.—GÜNTHER, Cat. Fish. Brit. Mus. ii, 1861, 364.

Orcynus thunnina, POEY, Rep. Fis.-Nat. Cuba, 1, 1867, 321; ii, 1868, 362.

Thynnus Brasiliensis, CUV. & VAL., op. cit. 110.—POEY, Mem. Hist. Nat Cuba, ii, 1861, 373.

Thynnus vagans, LESSON, Voy. Coquille, Zool. ii, 1830, 162, pl. cxxxii.

Large schools were observed in March. This large and powerful pelagic fish has been observed in the Mediterranean, on the east of Norway, in the East Indies, on the coasts of Brazil and Cuba, and was found in 1871 by Professor Baird in large numbers at Wood's Hole, Mass., and several have since been taken on the shores of Southern New England. It is highly valued for bait, but is the only large fish which is not thought good to eat; though rather oily, I think it superior to many of the Bermuda food-fishes. It attains the length of two feet and a half.

CARANGIDÆ.*

DECAPTERUS PUNCTATUS, (*Agassiz*) *Gill.*

Round Robin.

Scomber hippos, Mitchill, Amer. Month. Mag. 1818, 246 (not Linné), (figured as "The Hippos Mackerel," Trans. Lit. & Phil. Soc. N. Y. 1815, pl. 5, f. 5).

Caranx punctatus, Agassiz, Selecta Gen. et Spec. Pisc. Brasil, coll. Spix, 1829, 108, pl. lvi *a*, f. 2.—Cuv. & Val., Hist. Nat. Poiss. ix, 1833–38.—DeKay, New York Fauna, Fish, 1842, 122, pl. 73, f. 123 (copied from Mitchill).—Storer, Syn. Fish. N. Am. 1846, 101.—Günther, Cat. Fish. Brit. Mus. ii, 1861, 446.

Decapterus punctatus, Gill, Proc. Acad. Nat. Sci. Phila. 1862, 432; and in Baird, Rep. on Sea Fisheries of Southern New England, 1873, 803.—Poey, Rep. Fis.-Nat. Cuba, ii, 1868, 368 (see, also, Mem. ii, 374).—Baird, Rep. on Sea Fisheries of Southern New England, 1873, 825.

Very common. This species ranges along the coast from Brazil to Cape Cod, and has been seen at Cuba and Martinique. The Round Robin is seined in great numbers in Hamilton Harbor, in company with the various species of *Clupeidæ* and *Gerridæ*, and is sold from row-boats along the quay at the legal rate of four-pence a pound. The largest measure six inches. "Jigging robins" is a favorite amusement of the little negroes. A few bread-crumbs are thrown over the dock, and the little fish collect in such numbers that a line with a bare fish-hook jerked rapidly through the group seldom fails to impale one or more. The local name seems to be fanciful in origin; at Barbados, it is given to the allied species *Decapterus macarellus*, which perhaps also occurs at the Bermudas.

Color.—Above, olive-brown; beneath, white, with pearly reflections. A golden stripe along the lateral line, studded with small black spots, which cease at the commencement of the lateral plates. Eye yellow, with black iris.

TRACHUROPS CRUMENOPHTHALMUS, (*Bloch*) *Gill.*

GOGGLER; GOGGLE-EYE.

Scomber crumenophthalmus, BLOCH, Ichth. x, 1797, 65, taf. cccxliii.

Caranx crumenophthalmus, LACÉPÈDE, Hist. Nat. Poiss. iv, 1803, 107.—CUV. & VAL., Hist. Nat. Poiss. ix, 1833, 62.—GÜNTHER, Cat. Fish. Brit. Mus. ii, 1861, 429.

Trachurops crumenophthalmus, GILL, Proc. Ac. Nat. Sci. Phila. 1862, 432; and in Baird, Reps. on Sea Fisheries of Southern New England, 1873, 803.—POEY, Rep. Fis. Nat. Cuba, ii, 1868, 367.—BAIRD, Rep. on Sea Fisheries of Southern New England, 1873, 825.

Scomber balantiophthalmus, SCHNEIDER, Bloch, Syst. Ichth. 1801, 29.

Scomber plumieri, BLOCH, op. cit. tab. cccIxiv.—SCHNEIDER. op. cit. 30.

Caranx plumieri, CUV. & VAL., op. cit. 65.—MÜLL. & TROSCH., Schomburgk, Hist. Barbados, 1848, 669.—GUICHENOT, Poiss. in Sagra, Hist. Nat. Cuba, ii, 1845, 110.

Caranx Daubentonii, LACÉPÈDE, op. cit. iii, 59, 71.

Caranx macrophthalmus, RÜPPELL, Atlas, Reise Nord-Africa, Fische, 1828, 97, tab. xxv, f. 4 (not Agassiz).

Caranx macrophthalmus, AGASSIZ, in Spix, Select. Gen. & Spec. Pisc. Brasil, 1829, 107, pl. lvi *a*, f. 2 (not Rüppell).

Caranx mauritianus, QUOY & GAIMARD, Voy. Uranie & Physicienne, Zool. 1824, 359.

Common; the species, like the preceding, is found in the West Indies and on the coast of the United States to Southern Massachusetts; it is found also at Mauritius, in the Pacific and Indian Oceans, the Red Sea, and on the coast of Guinea. The Goggler reaches the weight of a pound, is found with the preceding, and is used for food. The local names refer to its great, staring eyes.

Color.—Above, bluish; beneath, silvery white.

PARATRACTUS PISQUETUS, (*Cuv. & Val.*) *Gill.*

JACK; BUFFALO JACK.

Caranx pisquetus, CUV. & VAL., Hist. Nat. Poiss. ix, 1833, 97.—POEY, Mem. Hist. Nat. Cuba, ii, 1861, 373.

Paratractus pisquetus, GILL, Proc. Ac. Nat. Sci. Phila. 1862, 432; Baird's Rep. Sea Fisheries of Southern New England 1873, 803.—POEY, Rep. Fis. Nat. Cuba, ii, 1868, 365.—BAIRD, Rep. Sea Fisheries of Southern New England, 1873, 825.

Caranx chrysos, DEKAY, Fishes, New York Fauna, 1842, 121, pl. xxvii, f. 85 (not *Scomber chrysos*, Mitchill).—BAIRD, Fishes New Jersey Coast, 1855, 22.

Carangus chrysos, GIRARD, Ichth. U. S. & Mex. Bound. Surv. 1859, 23.

Caranx hippos, HOLBROOK, Ichth. South Carolina, 1856, 88, pl. xii, fig. 2 (not *Scomber hippos*, Linné).

Carangus hippos, Gill, Cat. Fish. E. Coast N. Am. 1861, 36.

Trachurus squamosus, GRONOW, Cat. Fish. (1780), ed. Gray, 1854, 125.

The Jack, or Buffalo Jack, is common, occurring also in the West

Indies and on the coast of Brazil, and the United States as far north as Cape Cod. Its habits closely resemble those of the preceding species. My largest specimen is nine inches long; the fishermen claim that the species attains the weight of five or six pounds, but they probably confound this with some other species of the same family.

Color.—Above, light slate; beneath, pearly white; snout and line over the orbit blue. Second dorsal margined with black. Base of lateral plates and tip of caudal light brown.

NAUCRATES DUCTOR, (*Linné*).

PILOT-FISH.

Gasterosteus ductor, LINNÉ, Syst. Nat. ed. 10, 1, p. 295.
Naucrates ductor, CUV. & VAL., Hist. Nat. Poiss. viii, p. 312, pl. 332.

This universally-distributed species occasionally finds its way into the hands of the Bermudian fishermen.

ZONICHTHYS FASCIATUS, (*Bloch.*) Swainson.

BONITO.

Scomber fasciatus, BLOCH, Ichth. x, 61, taf. cccxli, 17; Syst. Ichth. ed. SCHNEIDER, 29.
Seriola fasciata, CUV. & VAL., Hist. Nat. Poiss. ix, 211, 1833.—GÜNTHER, Cat. Fish. Brit. Mus. ii, 464.
Zonichthys fasciatus, SWAINSON, Nat. Hist. Fish. & Rept.—GILL, Cat. Fish. E. Coast N. Am. 1861, v, 36, and in Rep. U. S. Com. Fish. 1871, 803.
Halatractus fasciatus, POEY, Rep. Fis. Nat. Cuba, ii, 373, 1868.

Not uncommon; recorded also from Cuba and South Carolina. A specimen was taken near New York in October, 1875, and is now in the National Museum. The Bonito is an excellent table-fish, and reaches the length of two feet or more.

The "Amber-fish," the "Guelly," or "Cavally" (Caballa ?), the "Slippery Dick," and the "Skip-jack" of the fishermen probably belong to this family; but, as I secured no specimens, they cannot be identified. The "Skip-jack" is perhaps an *Oligoplites*, and the "Amber fish" is doubtless a *Seriola*.

CORYPHÆNIDÆ.

CORYPHÆNA HIPPURUS, *Linn.*

DOLPHIN.

Coryphæna hippurus, LINNÉ, Syst. Nat. ed. 12, i, 446.

I observed a Dolphin, measuring five or six feet, playing about our steamer in the Gulf Stream, about two hundred miles northwest of the Bermudas. The Dolphin is well known to the fishermen.

MULLIDÆ.

HYPENEUS MACULATUS, (*Bloch*) *Cuv.*

Goat-fish.

Pira metara, Marcgrave, Hist. &c. Brasil, 1648, 156, 181.

Mullus maculatus, Bloch, Ichth. x, 1797, 79, tab. 348.—Schneider, Bloch, Syst. Ichth. 1801, 78.

Upeneus maculatus, Cuv. & Val., Hist. Nat. Poiss. iii, 1829, 478.—Storer, Syn. Fish. N. Am. 1846, 48.—Poey, Mem. Hist. Nat. Cuba, i, 1853, 223; ii, 1861, 367.—Castelnau, Anim. Nouv. &c. Amérique du Sud, Pois. 1855, 6.—Günther, Cat. Fish. Brit. Mus. i, 1861, 408.—Cope, Trans. Am. Phil. Soc. 1870, 471.

Mullhypeneus maculatus, Poey, Rep. Fis.-Nat. Cuba, ii, 1868, 307.

I did not secure a specimen, but was told that a fish of this description is common among the reefs. Godet, in his "History of Bermuda," gives a description of color which is apparently taken from specimens by him, which renders the identification sufficiently certain. The species is also recorded from Cuba, Jamaica, Martinique, and Rio de Janeiro.

BERYCIDÆ.

HOLOCENTRUM SOGO, *Bloch.*

Squirrel.

Jaquaraca, Marcgrave, Hist. &c. Brasil, 1648, 147.

Perca marina rubra, Catesby, Nat. Hist. Carolina, Florida, and the Bahama Islands, ii, 1743, 2., tab. ii, f. 2.

Bodianus pentacanthus, Bloch, Ichth. vii, 1797, 29, tab. ccxxxv (a badly-distorted copy of Marcgrave's figure).

Holocentrus sogo, Bloch, op. cit. 46, tab. ccxxxii.

Holocentrum sogho, Gill, Cat. Fish. E. Coast N. Am. 41, 186; and in Baird's Rep. on Sea Fisheries of South. New England, 1873, 804.

Holocentrus rubellus laminis branchiostegis serratis etc., Brown, Hist. &c. Jamaica, 1799, 447.

Sogo holocentrus, Shaw, Gen. Zool. v. 1803, 555.

Bodianus jaguar, Lacépède, Hist. Nat. Poiss. &c. iv, 1803, 286.

Sciæna rubra, Schneider, Bloch, Syst. Ichth. 1801, 82 (not Forskål).

Holocentrum longipinne, Cuv. & Val., Hist. Nat. Poiss. iii, 1829, 181.—Storer, Syn. Fish. N. Am. 1846, 46.—Günther, Cat. Fish. Brit. Mus. i, 1861, 28.—Cope, Trans. Am. Phil. Soc. 1870, 465.

Common; its bright color and nervous darting motions rendering it one of the most conspicuous denizens of the rock-pools. It is found

throughout the West Indies and south to Brazil. Their voracity is very great, and the tyro in angling usually finds his first prize to be a "Squirrel." They are not often eaten. They breed plentifully about the islands, and reach a length of fifteen inches; the lobes of the vertical fins becoming proportionally more and more produced with age. The local name is the same as that given by Catesby, and refers to a grunting noise uttered by them, which resembles the bark of a squirrel.

The Cuban form seems to be nearly the same; but Professor Poey hesitatingly places it in a distinct species.

SCIÆNIDÆ.

Genus PAREQUES, *Gill*, MS.*

PAREQUES ACUMINATUS, (*Schneider*) Gill.

Carrub.

Grammistes acuminatus, Schneider, Bloch. Syst. Ichth. 1801, 184.

Eques acuminatus, Castlenau, Anim. Nouv. &c. Amérique du Sud, Poiss. 1855, 11.—Günther, Cat. Fish. Brit. Mus. ii, 1861, 280.—Poey, Mem. Hist. Nat. Cuba, ii, 1861, 370; Rep. Fis.-Nat. Cuba, ii, 1868, 325.—Cope, Trans. Am. Phil. Soc. 1870, 471.

Eques lineatus, Cuv. & Val., Hist. Nat. Poiss. v, 1830, 169.

Common here, though of rare occurrence elsewhere, having been observed only at Cuba, Santa Cruz, and Bahia; not valued for food. My specimens measure eleven inches. The name "Carrub" is inexplicable, unless it be a corruption of "Carp."

Color.—Tawny-yellow; extremities of fins and base of pectorals and ventrals blackish-brown; head blotched with the same. Two specimens have seven straight, longitudinal lines upon the side; the third is without any traces of such markings. Whether this difference is sexual, I have no means of determining. The first dorsal is one-fourth the height of the body, measured immediately below it.

* The genus *Pareques* is distinguished, according to Professor Gill, by the development of the spines of the first dorsal fin in normal number, (ten or eleven,) as well as other osteological characters.

SPARIDÆ.

CALAMUS MEGACEPHALUS, *(Swainson) Poey.*

Goat's head Porgy.

Pagellus calamus, Cuv. & Val., Hist. Nat. Poiss. vi, 1830, 206, pl. 152.—Poey, Mem. Hist. Nat. Cuba, ii, 1861, 367.

Sparus calamus, Poey, Rep. Fis.-Nat. Cuba, ii, 1868, 308.

Calamus megacephalus, Swainson, Nat. Hist. Fish, ii, 1839, p. 222.—Guichenot, Mem. Soc. Imp. Sci. Nat. Cherbourg, xix, 1868, 112.—Poey, Ann. Lyc. Nat. Hist. x, 1874, 178.

Common; found also in the West Indies, reaching south to Bahia. My specimens measure from six to eighteen inches.

CALAMUS ORBITARIUS, *Poey.*

Sheep's-head Porgy.

Pagellus orbitarius, Poey, Mem. Cuba, ii, 1860, 201; 1861, 367.

Sparus orbitarius, Poey, Rep. Fis.-Nat. Cuba, ii, 1868, 308.

Calamus orbitarius, Poey, Ann. Lyc. Nat. Hist., N. Y., x, 1874, 79.

Common; recorded also from Cuba. This species very closely resembles the preceding in form and habits, but is easily distinguished by the shortness of the snout, which gives it a very abrupt profile. In *S. calamus*, the diameter of the orbit is contained twice in the distance from the extremity of the snout to the perpendicular from the anterior border of the orbit; in *S. orbitarius*, once and one-half. The height of the two specimens before me is the same; and, in *S. calamus*, the height is contained in the length twice and three-quarters; in *S. orbitarius*, twice and one-half. The specimens measure sixteen and fifteen inches, respectively.

Color.—Both species, greenish-olive, with golden longitudinal stripes.

The names Goat's-head and Sheep's-head no doubt refer to the enormous pre-orbital bones which impart an ovine physiognomy to the fish. The Porgies are taken with the hook in large quantity, and rank among the most salable kinds. They live in deep water; and, when brought to the surface, their bellies are greatly expanded from the removal of pressure, giving them a very comical appearance.

SARGUS VARIEGATUS, (*Lacépède,*) *Goode.*

CHUB.

Sparus Sargus, LINNÉ, Syst. Nat. ed. 10, 1, 1758, 278; ed. 12, 1, 1766, 469.—GMELIN, Linné, Syst. Nat. 1, 1788, 1270.—BLOCH, Ichth. viii, 1797, 31, tab. cclxiv.—SCHNEIDER, Bloch, Syst. Ichth. 1801, 270.—LACÉPÈDE, Hist. Nat. Poiss. iv, 1803, 27, 77.—RISSO, Ichth. Nice, 1810, 236.

Sargus variegatus, LACÉPÈDE, op. cit. iv, 1803, 207 (from HAÜY, Encyclopédie Méthodique.)

Sargus raucus, GEOFFROY ST. HILAIRE, Descr. de l'Égypte, Poiss. 1813, pl. xviii, f. 1.

Sargus Rondeletii, CUV. & VAL., Hist. Nat. Poiss. vi, 1830, 14, pl. cxli.—VALENCIENNES. Webb & Berthelot, Hist. Nat. Canaries, Poiss. 1836, 28.—GUICHENOT, Expl. Scient. Algérie, Poiss. 1850, 46.—GÜNTHER, Cat. Fish. Brit. Mus. 1861, 44.

Very abundant; occurring in large schools in company with *Pimelepterus Boscii*, which it closely resembles in form and habits. It is strictly European, and is especially common in the Mediterranean, but has not been found west of Madeira and the Canaries. I have carefully compared Bermudian specimens with Mediterranean specimens in the Bonaparte collection labeled *Sargus Rondeletii*. The Chub is seined in vast quantities in Hamilton Harbor and other secluded bays. My specimens measure from ten to twelve inches.

PIMELEPTERIDÆ.

PIMELEPTERUS BOSCII, *Lacépède.*

BREAM.

Chætodon cyprinaceus, BROUSSONET, MS.—GMELIN, Linné, Syst. Nat. 1, 1788, 1269, note

Pimelepterus Boscii, LACÉPÈDE, Hist. Nat. Poiss. iv, 1803, 429.—CUV. & VAL., Hist. Nat. Poiss. vii, 1831, 258.—VALENCIENNES, in Webb & Berthelot, Hist. Nat. Canaries, 1836, pl. xix.—DEKAY, Zool. N. Y. Fishes, 1842, 100, pl. xx, fig. 56.—STORER, Syn. Fish. N. A. 1846, 89.—GÜNTHER, Cat. Fish. Brit. Mus. i, 1861, 497.—GILL, Cat. Fish. E. Coast N. Am. 1861, 31.—POEY, Rep. Fis.-Nat. Cuba, ii, 1868, 323.—GILL, in Baird's Rep. on Sea Fisheries of S. New England, 1873, 805.—BAIRD, Rep. Sea Fisheries of S. New England, 1873, 824.

Pimelepterus incisor, VALENCIÈNNES, op. cit. 805.

Common. The Bream is always found in company with the preceding species, to which it is very like in size, shape, and habits, and is taken with it in large numbers and brought to the market. It is easily distinguished from the Chub, as far as it can be seen under water, by the large black spot just behind the dorsal. It is also recorded from Madeira,

the Canaries, Jamaica, and Cuba. A single specimen was taken in the spring of 1873, at Staten Island, New York Harbor, by Mr. C. L. Copley, and sent by him to the Smithsonian Institution.

Color.—Golden-brown, with a longitudinal stripe of gold along the center of each row of scales, a silvery streak along the preorbital.

PRISTIPOMATIDÆ.

HÆMYLUM CAPEUNA, (*Lichtenstein*) *Goode.*

White Grunt.

Capeuna Brasiliensibus, Marcgrave, Hist. &c. Brasil, i, 1648, 155, f. 163.

Grammistes trivittata, Schneider, Bloch, Syst. Ichth. 1801, 188 (on Marcgrave's figure)

Serranus capeuna, Lichtenstein, Abhandl. Berl. Akad. 1820–1, 288 (on Marcgrave's figure).

Hæmulon quadrilineatum, Cuv. & Val., Hist. Nat. Poiss. v, 1830, 288, pl. cxx.—Storer, Syn. Fish. N. Am. 1846, 75.—Günther, Cat. Fish. Brit. Mus. i, 1861, 316.—Poey, Rep. Fis.-Nat. Cuba, ii, 1868, 319.—Gill, in Baird's Rep. Sea Fisheries of S. New England, 1873, 806.

Hæmulum quadrilineatum, Cope, Trans. Am. Phil. Soc. 1870, 471.

Hæmulon quinquelineatum, Poey, Mem. Hist. Nat. Cuba, ii, 1861, 419; Rep. Fis.-Nat. Cuba, i, 1867, 310; ii, 1868, 162.

Common, occurring in schools. My specimens measure four inches. Cuvier's description of the color is excellent; but Günther, in quoting it, fails to mention, either in generic or specific diagnoses, the brilliant red of the lips and mouth, which Cuvier thought of sufficient importance to found upon it his generic name *Hæmulon*. I have made use of the specific name *capeuna*, because it seems to have priority over that usually accepted. The name *trivittata* can scarcely stand, since it is not only inapplicable, but sure to mislead, as is evident from the two other names which have been given to the species, viz, *quadrilineatum* and *quinquelineatum*.

The species is recorded from Brazil, San Domingo, and Cuba.

HÆMYLUM CHRYSOPTERUM, (*Linné*) *Cuvier.*

Margate-fish.

Perca marina gibbosa cinerea (Margate-fish), Catesby, Hist. Carolina, Florida, and Bahamas, ii, 1743, 2, pl. ii, f. 1.

Perca chrysoptera, Linné, Syst. Nat. ed. 12, 1766, 485.—Gmelin, Linné, Syst. Nat. 1, 1788, 1314.

Lutjanus chrysopterus, Lacépède, Hist. Nat. Poiss. iv, 1803, 186, 226.

Hæmulon chrysopteron, Cuv. & Val., Hist. Nat. Poiss. v, 1830, 240—DeKay, New York Fauna, Fishes, 1842, 85, pl. vii, f. 22.—Storer, Syn. Fish. N. Am. 1846, 75.—Holbrook, Ichth. South Carolina, 1855, 120, pl. xvii, f. 1.—Günther, Cat. Fish. Brit. Mus. i, 1861, 313.—Gill, in Baird's Rep. Sea Fisheries of S. New England, 1873, 806.

The Margate-fish of the fishermen is probably this species. It is common in summer, but was not to be found in the markets at the time of my visit. The species is recorded from the West Indies and Brazil. The fishermen recognize several others, as the Yellow, Streaked, Spotted, and Black Grunts, all of which probably belong to this family, if not to this genus.

LUTJANUS CAXIS, (*Schneider*) *Poey*.

Gray Snapper.

Caxis, Parra, Descr. Dif. Pie. Hist. Nat. Cuba, 1787, 14, lam. viii, f. 2.

Sparus Caxis, Schneider, Bloch, Syst. Ichth. 1801, 284.

Lutjanus Caxis, Poey, Rep. Fis.-Nat. Cuba, i, 1867, 269; ii, 1868, 293.—Gill, in Baird's Report on Sea Fisheries of S. New England, 1873, 806.

Bodianus Vivanet, Lacépède, Hist. Nat. Poiss. iv, 1803, pl. iv, f. 3 (on a figure by Plumier).

Sparus tetracanthus, Bloch, Ichth. viii, 1797, 279, 930 (on a figure of Plumier).

Cichla tetracantha, Schneider, op. cit. 338.

? Bodianus striatus (*Fasciatus*), Schneider, op. cit. 335, tab. lxv.

Lutjanus acutirostris, Desmarest, Déc. Ichth. pl. ii, f. 1 (fide Cuvier).

Mesoprion griseus, Cuv. & Val., His. Nat. Poiss. ii, 1829, 471.—Storer, Syn. Fish. N. Am. 1846, 34.—Günther, Cat. Fish. Brit. Mus. i, 1861, 195.

Very common; distributed also throughout the Caribbean Sea and the Gulf of Mexico, and, according to Günther, who considers it identical with *Mesoprion goreensis* Cuv. & Val., extending east to the African coast. It breeds abundantly, and hundreds of individuals from four feet to four inches in length may be seen in almost any sheltered nook. It is one of the most delicious of food-fish, its flavor not unlike that of the Blue-fish (*Pomatomus saltatrix*). Its extreme cunning renders it very difficult to capture with either hook, pot, or grains, and has gained it the *soubriquet* of "Sea Lawyer". The market-name is "Gray Snapper".

Color.—Dark gray, changing but slightly in spirits.

The synonomy of this and the allied forms is much ensnarled, and a careful study of a full series of specimens is desirable.

LUTJANUS AYA, (*Bloch*) *Gill.*

YELTING; GLASS-EYED SNAPPER.

Acara aya, MARCGRAVE, Hist. &c. Brasil, 1648, 167.

Bodianus aya, BLOCH Ichth. 1797, 33, tab. ccxxvii (on a figure by Prince Maurice).—LACÉPÈDE, Hist. Nat. Poiss. iv, 1803, 286.

Mesoprion aya, CUV. & VAL., Hist. Nat. Poiss. ii, 1829, 457.—? GUICHENOT, Sagra's Hist. Nat. Cuba, Poiss. 1845, 24.—GÜNTHER, Cat. Fish. Brit. Mus. i, 1861, 198.

Lutjanus aya, GILL, MS.

Bodianus ruber, SCHNEIDER, Bloch, Syst. Nat. ed. 1801, 330.

Common. It probably breeds, as individuals of all ages occur; the largest weigh ten pounds or more, and are much esteemed as food. Its abrupt profile and large eyes give it a very sparoid appearance; to the latter feature it no doubt owes one of its popular names, a similar epithet being applied to the large-eyed *Stizostedium americanum*, the Wall-eyed or Glass-eyed Pike of the great lakes and the Mississippi Valley. The name "Yelting" is very puzzling.

Color.—Brilliant rose-red, fading in spirits to grayish-olive, with black blotch along the base of the soft dorsal; base of pectoral deep black.*

The species is peculiarly West Indian. Large specimens are sometimes brought in winter to the Washington market, in lots from Florida.

The Schoolmaster Snapper and Silk Snapper of the fishermen probably belong to this genus. The Spot Snapper and the Yellow-tail correspond doubtless to *Mesoprion uninotatus* (Cuv. & Val.) Gill, and to *Ocyurus chrysurus* (Bl.) Gill. *Lutjanus cynodon* (Cuv.) Gill probably also occurs. All these species are peculiarly West Indian.

SERRANIDÆ.

TRISOTROPIS UNDULOSUS, (*Cuvier*) *Gill.*

ROCK-FISH.

Perca marina venenosa punctata (Rock-fish), CATESBY, Nat. Hist. Carolina, Florida, and Bahamas, ii, 1743, 15, tab. xv.—CUV. & VAL., Hist. Nat. Poiss. ii, 1829, 386.

Serranus undulosus, CUV. & VAL., op. cit. 295.—GÜNTHER, Cat. Fish. Brit. Mus. i, 1861, 143.

Trisotropis undulosus, GILL, Proc. Acad. Nat. Sci. Phila. 1865, 105.

Serranus brunneus, POEY, Mem. Hist. Nat. Cuba ii, 1860, 1314.

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* Dr. Günther, in the "Synopsis of the Species", which serves as a key to the genus places this and the preceding species under the head "*aa. Ground-color olive, with a yellow, green, or brown shade.*" This is certainly very apt to mislead, and illustrates the difficulty of drawing correct ideas from the study of distorted and discolored museum-specimens.

Trisotropis brunneus, GILL, l. c.—POEY, Rep. Fis.-Nat. Cuba, ii, 1868, 156, 284; Annals Lyc. Nat. Hist. N. Y. ix, 1870, 305.

Serranus arara, POEY (not CUV. & VAL.), Mem. ii, 1860, 132.

Serranus decimalis, POEY, Mem. ii, 1860, 138.

Serranus cyclopomatus, POEY, Mem. ii, 1861, 353; Rep. ii, 1868, 284.

Serranus latepictus, POEY, Mem. ii, 1861, 353.

Very common; recorded also from the West Indies and the coast of Brazil. The Rock-fish attains the length of four or five feet, and is one of the choicest of table-fishes, though Catesby declares that his "Rock-fish", which seems most probably the same, "has the worst character for its poisonous quality of any other among the Bahama Islands".

Color.—Brown, thickly mottled with large, irregularly quadrilateral spots of brownish-violet. The sides of the head are marked with wavy, irregular lines of deep violet. Dorsal broadly margined with black; caudal, anal, and ventral tipped with deep black, which gradually shades into the color of the body; pectorals tipped with orange.

It may be regarded as somewhat doubtful whether the species of Cuvier is identical with that whose diagnosis is given by Dr. Günther under the same name, since the former makes no allusion to the yellow tips of the pectorals. Professor Poey, after an examination of one of Cuvier's types, pronounces it distinct from his *Serranus brunneus* by reason of a slightly-rounded caudal. The *Serranus undulosus* defined by Günther coincides with Poey's *Serranus brunneus* in its truncated caudal and in other respects. I have provisionally accepted Günther's identification of Cuvier's species. Catesby's figure disagrees in its slightly-forked caudal, but in other respects corresponds with the specimen before me; and, since no conjecture has been offered as to its relations, I have, after making allowances for the carelessness which the artist manifests in many of the other plates, ventured to refer it to the same species.

TRISOTROPIS GUTTATUS, (*Schneider*) *Gill.*

RED ROCK-FISH.

Bonacé cardenal, PARRA, Descr. Dif. Piez. His. Nat. Cuba, 1787, 29, lam. xvi, f. 1.

Johnius guttatus, SCHNEIDER, Bloch, Syst. Ichth. 1801, 77 (on Parra's figure).

Trisotropis guttatus, GILL, Proc. Acad. Nat. Sci. Phila. 1865, 105.

Serranus cardinalis, CUV. & VAL., His. Nat. Poiss. ii, 1829, 378 (on Parra's figure).—STORER, Syn. Fish., N. Am., 1840, 27.—GÜNTHER, Cat. Fish. Brit. Mus. i, 1861, 57, note 19.—POEY, Rep. Fis.-Nat. Cuba, i, 1867, 200.

Trisotropis cardinalis, POEY, op. cit. ii, 282; Annals Lyc. Nat. Hist. N. Y. ix, 1870, 303.

Serranus rupestris, CUV. & VAL., op. cit. ix, 1833, 437.—STORER, op. cit. 29.—GÜNTHER, op. cit. 145.

With some doubt I refer to this species the Red Rock-fish of the Bermuda market. In habits, form, and dimension, it much resembles the preceding. It is recorded from Saint Bartholomews, Cuba, and San Domingo, and at the latter place is called by the same name as in Bermuda.

EPINEPHELUS STRIATUS, (*Bloch*) *Gill.*

HAMLET; GROUPER.

Cherna, PARRA, Desc. Dif. Piez. Hist. Nat. Cuba, 1787, 50, lam. xxiv.

Anthias striatus, BLOCH, Ichth. ix, 1797, 109, tab. 324 (on a figure by Plumier).

Lutjanus striatus, LACÉPÈDE, Hist. Nat. Poiss. iv, 1803, 324.

Serranus striatus, CUV & VAL., Hist. Nat. Poiss. ii, 1829, 288.—STORER, Syn. Fish. N. Am. 1846, 27.—GUICHENOT, Sagra's Hist. Nat. Cuba, Poiss. 1850, 12.—GÜNTHER, Cat. Fish. Brit. Mus. i, 1861, 110.

Epinephelus striatus, GILL, Proc. Acad. Nat. Sci. Phila. 1865, 105.—POEY, Rep. Fis. Nat. Cuba, ii, 1868, 285.—COPE, Trans. Am. Phil. Soc. 1870, 466.

Anthias cherna, SCHNEIDER, Bloch, Syst. Ichth. ed. 1801, 310 (on Parra's figure).

Sparus chrysomelanurus, LACÉPÈDE, op. cit. 160. (on a bad copy of Plumier's figure).

Very common; found also throughout the Caribbean Sea and the Gulf of Mexico. The Grouper attains an enormous size; and, on account of its abundance and the ease of capturing, it is used as food more than any other species. Its flesh is rather inferior in flavor and coarse in texture, especially that of large individuals. Great numbers are caught off the islands, and are brought in the wells of the smacks to the artificial ponds along the shore, where they are kept for the market, and are fed on fish and lobsters.

The "Devil's Hole" is a large natural pool near the center of the main island, and about one hundred feet from the south shore of Harrington Sound. Here a large number of Groupers may usually be found confined, and the place is much visited by strangers. At feeding-time, when one looks into the clear waters of the pool, nothing can be seen but an array of great open mouths. When the food is thrown in, a scene of indescribable commotion and splashing ensues. They are very fierce, and rush savagely at anything which looks eatable. I have seen two large ones, each four feet in length, seize the opposite ends of a cuttle-fish arm tugging for several minutes at the tough morsel before the question of ownership could be decided.

The young fish are called Hamlets; but, after reaching a length of eighteen or twenty inches, are known as Groupers; the latter name is a corruption of the Portuguese *Garoupa*, which is applied to a similar fish found at Madeira.

Color.—Adult fishes range from a light-slate color to a deep chestnut-brown. In some individuals a narrow band of black extends from the tip of the snout to a point between the eyes, where it divides; the branches extending, one to the origin of the dorsal and the other to the angle of the operculum, and upward to unite with the first at the origin of the dorsal. The lips and throat are bright vermilion.

A great variation is apparent in the color of different individuals, which has not yet been satisfactorily explained, though it is no doubt due to the depth of water or color of the bottom in the place where they are taken, as is suggested below under *Enneacentrus punctatus.* The fishermen claim that the color of individuals confined in the ponds changes from one extreme to the other within the period of a few weeks. I have myself seen very considerable variation in color in the course of a week in fishes confined in shallow fish-ponds. The young fish are always slate-color and are also marked with six or seven broad, transverse bands of light brown and a large quadrangular black blotch across the back of the tail behind the dorsal.

EPINEPHELUS GUTTATUS, (*Gmelin*) *Goode.*

Hind.

? *Cugupuguacu*, Marcgrave, Hist. &c. Brasil, 1648, 169.—Sloane, Voyage aux Îles de Madère, des Barbades, de St. Christophe, et de la Jamaique, 1727, tab. ccxlvii.—

Cugupuguacu Brazil, Catesby, Nat. Hist. Carolina, Florida, and Bahamas, ii, 1743, 14, tab. xiv (the Hind).

Perca guttata, Gmelin, Linné, Syst. Nat. 1, 1788, 1315 (on a figure by Catesby).—Cuv. & Val., Hist. Nat. Poiss. ii, 1828, 372.

Bodianus apua, Bloch, Ichth. vii, 1797, 37, tab. ccxxix (on a figure by Prince Maurice).—Lacépède, Hist. Nat. Poiss. iv, 1803, 296.

? *Serranus apua*, Cuv. & Val., op. cit. 287 (citing as a synonym *Piratiapia*, Marcgrave, op. cit. 158).

Serranus apua, Günther, Cat. Fish. Brit. Mus. i, 1861, 140.

Bodianus marginatus, Schneider, Bloch, Syst. Ichth. 1801, 331.

Very common; recorded also from Jamaica, and probably from Brazil. The Hind is readily sold in the market, where specimens two feet in length are sometimes seen.

The name Hind perhaps refers to the spotted markings as similar to those of the deer. The name is found in nearly all the English West Indian islands, applied to the spotted species of this family.

Color.—Brownish, red, or rosy-white, with numerous small circular spots of deep rose-color, fading to brown in spirits. Vertical fins broadly margined with black.

The Hind is subject to great variations of color, specimens from the "white water", where there is a bottom of white sand, being nearly white, while others have the ground-color a dusky reddish-brown.

The descriptions of Gmelin and Bloch were both founded upon drawings, and their relations are somewhat doubtful. The former has been preferred, since the figure of Catesby agrees precisely with the Bermuda "Hind", except in the smaller number of dorsal spines, a matter of detail not likely to have been noticed by Catesby, judging from his other figures. The Bermudian form is much more likely to be identical with that from the Bahamas and Jamaica than that from Brazil, if, indeed, they are not all identical. Günther records from Jamaica his *Serranus apua*, which is, beyond a doubt, the Bermuda species, thus furnishing another argument for its identity with that figured by Sloane.

ENNEACENTRUS PUNCTATUS, (*Linné*) *Poey.*

BUTTER-FISH or CONEY (*yellow variety*); NIGGER-FISH (*red variety*).

Carauna, MARCGRAVE, Hist. &c. Brasil, 1648, 147.—LICHTENSTEIN, Abhandl. Akad. Berl. 1820–1, 278.

Perca marina puncticulata (Negro-fish), CATESBY, Nat. Hist. Carolina, Florida, and Bahamas, ii, 1743, 7, pl. vii.

Perca punctata, LINNÉ, Syst. Nat. ed. 10, i, 1758, 291; ed. 12, 1766, 485 (on Catesby's figure).

Enneacentrus punctatus, POEY, Rep. Fis.-Nat. Cuba, ii, 1868, 288.

Guativere, PARRA, Descr. Dif. Piez. Hist. Nat. Cuba, 1787, 7, lam. v, f. 1, 2.

Holocentrus auratus, BLOCH, Ichth. vii, 1792, 57, tab. ccxxxvi.—SCHNEIDER, Bloch, Syst. Ichth. 1801, 314.

Gymnocephalus ruber, SCHNEIDER, op. cit. 346, tab. lxvii (on a figure by Prince Maurice).

Serranus ouatalibi, CUV. & VAL., Hist. Nat. Poiss. ii, 1829, 381.—STORER, Syn. Fish. N. Am. 1846, 56.—GUICHENOT, Sagra's Hist. Nat. Cuba, Poiss. 1845, 15.—MÜLL. & TROSCH., Schomburgh's Hist. Barbados, 1848, 665.—GÜNTHER, Cat. Fish. Brit. Mus. i, 1861, 120.—POEY, op. cit. 202.—COPE, Trans. Am. Phil. Soc. Phila. 1870, 446.

Epinephelus ouatalibi, GILL, Proc. Acad. Nat. Sci. Phila. 1865, 105.

Bodianus guativere, SCHNEIDER, Syst. Ichth. Bloch, 1801, 336 (on Parra's figures).

Serranus guativere, CUV. & VAL., op. cit. 383 (limited to Parra's f. 2).—STORER, l. c.—MÜLL. & TROSCH., l. c.—COPE, l. c.

Serranus carauno, CUV. & VAL., op. cit. 384 (on a drawing by Prince Maximilian).—CASTELNAU, Anim. Nouv. ou Rares, Amérique du Sud, Poiss. 1, pl. 1, fig. 1.

Common; recorded also from the West Indies, Brazil, and the Cape Verde Islands. Its small size and the softness of its flesh render it of little economic value. In this species, as in the preceding, the range of color is very great; some individuals are orange-yellow, with blue

spots confined to the head and anterior part of the body; others are red, slightly dingy above, and thickly studded throughout with black dots, each of which has a blue center. The specimens examined were not very fresh; and, from the rapidity with which the colors change, I can readily believe that in life they were as brilliant as is indicated in the description of Cuvier.* The yellow form corresponds to the typical *Perca punctata* or *Serranus guativere*, and is known as the Butter-fish or Yellow Coney; the red form corresponds to *Serranus ouatalibi*, and is known as the Nigger-fish.

Professor Poey suggests that the former inhabits shallow and the latter deep waters, and thus explains the variations of color. These would seem, however, to depend more upon the color of the bottom than upon the depth. On the coast of Maine, the bright-red variety of the Cod (*Gadus morrhua*, Linné) is found only on bottoms covered with Red Algæ, such as *Ptilota serrata*, *Delesseria sinuosa*, and *Rhodymenia palmata*.

The names Butter-fish and Nigger-fish are in use also at Barbados, Saint Thomas, and the Bahamas, as applied to this and an allied species. The first refers to the color and soft, oily feeling of the yellow variety; the latter probably also to color.

The Black Hind, Prickly Hind, and Black Coney are probably allied species, but not having seen them I can only surmise their character.

A "Soap-fish" also occurs, probably either *Rhypticus saponaceus* (Bloch) Cuvier, or *Promicropterus maculatus* (Holbrook) Gill.

HYPOPLECTRUS PUELLA, (*Cuvier*) *Gill.*

Cataphebe.

Plectropoma puella, Cuv. & Val., Hist. Nat. Poiss. ii, 1829, 405, pl. xxxvii.—Guichenot, Sagra's Hist. Nat. Cuba, Poiss, 1845, 18.—Storer, Syn. Fish. N. Am. 1846, 31.—Poey, Mem. Hist. Nat. Cuba, i, 1852, 62, lam. ix, f. 2.—Günther, Cat. Fish. Brit. Mus. i, 1861, 165.

Hypoplectrus puella, Gill, Proc. Acad. Nat. Sci. Phila. 1862, 236.—Poey, Rep. Fis.-Nat. Cuba, ii, 1868, 290.

Plectropoma vitulinum, Poey, Mem. Hist. Nat. Cuba, i, 1852, 68.

Common in the rock-pools; recorded also from Martinique and Jamaica. My specimen measures three inches. The name seems to be peculiar to Bermuda, and its origin is not apparent.

Color.—Olive, with six violet-black cross-bands; the third very broad and conspicuous and below the fourth and tenth dorsal spines. A line

* Cuvier and Valenciennes, Histoire Naturelle des Poissons, ii, 381

around the orbit, another from posterior nostril across anterior edge of orbit to lower limb of preoperculum, then broken, then continued to base of ventral; and two others across the operculum; the anterior extending over the base of pectoral to belly, blue. Several blue spots between the orbit and snout. Fins yellowish.

ECHENEIDIDÆ.

Fishes of this family are freqently taken, clinging to sharks or to the shells of turtles.* The sharks thus encumbered are frequently much emaciated. *Leptecheneis naucrates* (Linn.) Gill, *L. naucrateoides* (Zuiew) Gill, and *Ptheirichthys lineatus* (Menz.) Gill are probably the most common species of "Suck-fish" found here.

SPHYRÆNIDÆ.

SPHYRÆNA SPET, (*Haüy*) *Goode.*

Barracuda.

Esox dorso dipterygio Linné, Mus. Ad. Fried. ii. 1754, 100.

Esox sphyræna, Linné, Syst. Nat. ed. 10. i, 1758, 313, ed. 12; i, 1766, 115; Gmelin, Linné, Syst. Nat. i, 1788, 1389.—Bloch, Ichth. xi, 1797.

Sphyrna sphyræna, Bloch, Ichth. 1797, taf. ccclxxxix.—Schneider, Bloch, Syst. Ichth. 1801, 109.—Risso, Ichth. Nice, 1810, 332.

Esox spet, Haüy, Encyclopédie Méthodique, iii, Poissons, 7187.

Sphyræna spet Lacépède, Hist. Nat. Poiss. v, 1803, 326-8.—? Bonaparte, Iconografia della Fauna Italica, iii, Pesci, plate with part 152.

Sphyræna becuna, Lacépède, op. cit. 327-9, pl. ix, f. 1.—Cuv. & Val., Hist Nat. Pois. iii, 1829, 340 (part); and vii, 1831, 507.

Sphyræna vulgaris, Cuv. & Val., op. cit. iii, 1829, 327.—Günther, Cat. Fish. Brit. Mus. ii, 1861, 334.

Sphyræna viridensis, Cuv. & Val., sc., op. cit. 339.

Common; frequently found in the markets, and eaten with impunity, as far as I could learn. My specimens measured nearly two feet, and it is said to attain a much greater size. This is not the Barracuda of the West Indies, but the common species of the Mediterranean known by the Spanish as *Espeto* and by the Italians as *Sfireña* and *Luzzo*. Its occurrence so far west has, I believe, never before been observed. Günther

* All four species of the pelagic turtles of the Atlantic are common, and were observed by me, viz:—*Sphargis coriacea*, *Chelone mydas*, *Eretmochelys imbricata*, and *Thalassochelys caouana*. These, with a small saurian, *Eumeces longirostris*, Cope, make up the reptilian fauna of the Bermudas.

considers the *Sphyræna borealis* of DeKay,* described from specimens eight inches long taken in New York Harbor, to be the same. This might be inferred from the somewhat loose language of the description; but the figure shows it to be closely allied to, if not identical with, *Sphyræna picuda*. The origin of the first dorsal is shown by the artist to be situated almost directly above the extremity of the pectorals and far in front of the middle of the fish. The locality, New York, given by Dr. Günther for his specimen "purchased of Mr. Brandt" must, I fear, be placed in the same category with that of Lake Champlain given for specimens of *Chilomycterus geometricus* and *Tetrodon turgidus*,† and with some of the cases of reptiles described as North American by Duméril and Bibron from collections professedly North American.

SPHYRÆNA PICUDA, *Schneider.*

Sennet.

Barracuda, Sloane, Voyage aux îles de Madère et de la Jamaique, ii, 1727, 185, pl. ccxlvii, f. 3.

Umbla minor marina maxillis longioribus (Barracuda), Catesby, Hist. Carolina, Florida, and the Bahamas, ii, 1743, 1, tab. 1.

Picuda, Parra, Descr. Dif. Piez. Hist. Nat. Cuba, 1787, 90, lam. xxxv, f. 2.

Sphyræna sphyræna, var. *picuda*, Schneider, Bloch, Syst. Ichth. ed. 1801, 110, tab. xxix, f. 1.—Müller & Troschel, Schomburgk's Hist. Barbados, 1848, 667.—Günther, Cat. Fish. Brit. Mus. ii, 1861, 336.

Esox barracuda, Shaw, Gen. Zool. v, 1804, 105.

Sphyræna barracuda, Cuv. & Val., Hist. Nat. Poiss. iii, 1829, 343, pl. lxvi.—Storer, Syn. Fish. N. A. 1846, 47.—Müller & Troschel, l. c.—Cope, Trans. Am. Phil. Soc. Phila. 1870, 472.

Common; breeding plentifully. The young may be seen basking in the sun in the shallows, where they are seined in large numbers. My largest specimens measured over two feet in length. Both this and the preceding species are eaten with impunity, though the former is regarded with suspicion on the Mediterranean and the latter has to answer for several well-attested cases of *ciguatera*, though in some of the West India Islands it is eaten freely.

The popular name is also in use at Barbados, where it is applied to the same or an allied species. Schomburgk spells it *Sinnet*.

The species of this genus are not yet very accurately defined. Professor Cope‡ takes exception to the supposed identity of *S. picuda* and

* Zoology of New York, Fishes, 39, pl. lx, f. 196.

† Cat. Fish. Brit. Mus. viii, 285.

‡ Proc. Amer. Phil. Soc. Phila. 1870, 472.

S. barracuda. The latter may be easily distinguished from the preceding by observing the situation of the first dorsal. In *S. spet*, this begins in the middle of the body and far behind the extremity of the pectorals; in *S. picuda*, on the anterior half of the body and above the extremity of the pectorals. The first is much the slenderer, and has nearly double the number of scales in the lateral line.

TRACHYPTERIDÆ.

REGALECUS GLADIUS, (*Walbaum*) *Cuv. & Val.*

Spada marina, IMPERATI, 587.

Cepola gladius, WALBAUM, Artedi Gen. Pisc. iii, 1792, 617.

Regalecus gladius, CUV. & VAL., Hist. Nat. Poiss. x, 1835, 352, pl. ccxcviii—GÜNTHER, Cat. Fish. Brit. Mus. iii, 1861, 308.—HUTTON, Fishes of New Zealand, 35.

Gymnetrus longeradiatus, RISSO, Hist. Nat. Eur. Merid. iii, 1827, 296.

? *Gymnetrus capensis*, CUV. & VAL., op. cit. 376.

Regalecus Jonesii, NEWMAN, Zoologist, 1860, 7019.

This is the great "Sea-serpent" which came ashore at Hungary Bay in the winter of 1860, the capture of which has been recorded by Mr. J. Matthew Jones.*

Portions of this specimen, which measured 16 feet and 7 inches in length, are preserved in the British Museum.

This specimen is thought by Günther to "probably belong" to the species given above. The well-identified specimens of the species are all from the Mediterranean, the largest 9½ feet long, while the relations of the specimens from New Zealand and the Cape of Good Hope are conjectural. The data are not sufficient to warrant the adoption of Newman's species, founded on the Bermuda specimen as a good one.

MUGILIDÆ.

MUGIL LIZA, *Valenciennes.*

MULLET.

Mugil liza, CUV. & VAL., Hist. Nat. Poiss. xi, 1836, 86.—JENYNS, Zool. Voyage H. M. S. Beagle, Fish, 80.—GÜNTHER, Cat. Fish. Brit. Mus. iii, 1861, 423.—POEY, Rep. Fis.-Nat. Cuba, ii, 1868, 388

Very common, especially in Hamilton Harbor and other shallow bays; breeding. They are seined, and brought to market in large numbers.

* Bermuda Royal Gazette, Jan. 24 and Jan. 31, 1860.—Proc. Zool. Soc. London, 1860, 185.

I have some hesitation in referring the Bermuda Mullet to this species, though it appears to be identical with that taken at Bahia Blanco and Monte Video by Darwin and described by Jenyns.* Poey considers his *Mugil lebranchus*† separated from this species by characters of doubtful value.

BELONIDÆ.

The Hound-fish of the fishermen is a *Belone;* but as I could get no specimens for careful examination, it is not possible to say to which of the nineteen West India species it belongs, or whether two or three species are not confounded under the same name.

SCOMBERESOCIDÆ.

HEMIRHAMPHUS PLEII, *Valenciennes.*

GAR-FISH.

Hemirhamphus Pleii, CUV. & VAL., Hist. Nat. Poiss. xix, 21, 1846.—GÜNTHER, Cat. Fish. Brit. Mus. vi, 268.—COPE, Trans. Am. Phil. Soc. Phila. 1870, 481.

Common; recorded also from various points in the West Indies and from Bahia. The Gar-fish occurs in enormous schools, and is seined in quantity for the market. I observed two sizes, the smallest averaging eight inches, the larger twenty inches. The fish of different sizes swam in separate schools.

The name *Gar*, applied so indiscriminately to fishes with long slender beaks, is probably the old Saxon word *gar*, which means a weapon, a lance. The name Half-beak usually given to fishes of this family is much more appropriate.

EXOCŒTUS EXILIENS, *Gmelin.*

Exocœtus exiliens, GMELIN, Linné, Syst. Nat. 1, 1788, 1400.—CUV. & VAL., Hist. Nat. Poiss. xix, 1846, 114.—RICHARDSON, Fauna Boreali-Americana, iii, 129.—GÜNTHER, Cat. Fish. Brit. Mus. vi, 1861, 291.—GILL, in Baird's Rep. on Sea Fisheries of Southern New England, 809.

Exocœtus fasciatus, LESUEUR, Journ. Acad. Nat. Sci. Phila. ii, 1821, 8, pl. iv, f. 2.

A single specimen was brought me March 1 by some negro fishermen who had caught it in Hamilton Harbor by holding a tin pail ("kettle") under it when it leaped from the water. I kept it alive for some hours,

* Zool. Voyage H. M. S. Beagle, Fish, 1842, 80.

† Memorias sobre la Historia Natural de la Isla de Cuba * * * ii, 1861, 260, tab. 18, f. 3; Rep. Fis.-Nat. Cuba, ii, 1868, 388.

and had an opportunity to observe its motions. Its favorite position was on the bottom of the dish, where it would remain with its pectorals and ventrals widely expanded, looking very like a large butterfly sunning itself on a flower. When disturbed, it would fold its fins close to the sides of its body, and swim about with great velocity by rapid, long, sweeping strokes of the tail and posterior half of the body. The extent to which it flexed its body was quite remarkable, almost reminding one of the motions of a Shark. When much excited, it would rise into the air with a sudden spring, its pectorals and ventrals expanded, seeming to have no difficulty in leaving the water in a space less than a foot in diameter: I am inclined to believe that the impetus from the action of the caudal is all that is used in leaving the water, and that the motion of the pectorals in flying-fishes is not begun until the fish is fairly in the air. It seemed very timid and watchful, and any quick motion of the hand within its sight would start it into rapid, nervous action.

The figures given by Lesueur and Edwards* are very accurate; but all published descriptions fail to mention the most striking character, viz, the deep notch in the membrane between the second and third pectoral rays, which seems the more apparent from the fact that the second ray is longer than the third, and projects in a spine-like process; the membrane between the third and fourth rays is slightly emarginate. The fourth ray is much the longest and the rays posterior to that regularly decrease in length.

The Bermuda fishermen recognize two kinds of flying-fish, the pelagic variety and this, which they believe to live among the sea-weed and seldom leave the water. The specimens of this species on record are all quite small: Gmelin describes his as "*at vix digito longior*"; Lesueur's was three inches long; Valencienne's was "*petite*"; and Edwards's figure indicates that his was diminutive. They may prove to be the young of some other species; but this is not probable, since no other form has pectorals of such peculiar form. The absence of barbels, if this be a character of immature *Exocœtidæ*, is also noteworthy.

A detailed description is given below:—

Radial formula: D. 12; A. 12; P. 18; V. 6; L. lat. 48.

The body is slender, its height being less than one-eighth (0.12) of the total length. Viewed from above, its outline is that of a narrow wedge, with its base at the nape and its apex at the extremity of the lower caudal lobe. The greatest width of the body is at the nape, where it is

* Gleanings in Natural History, pl. ccx.

equal to the greatest height, which occurs at the same point. The length of the head is one-sixth (0.17) of total length, and its greatest width equals that of the body. The orbit is circular, and its diameter equals the interorbital space, which is half the length of the head. The snout is very short, equaling one-sixth the length of the head; the lower projects far beyond the upper jaw. The interorbital space is deeply concave. The dorsal and anal fins begin at a point slightly behind the middle of the body, and are nearly alike in shape and in the length of the base and of the longest rays. The pectorals measure three-fifths (0.58) of the total length, extending nearly to the base of the caudal fin. The first ray is half as long as the second, which projects far beyond the margin of the membrane in a spine-like process; the third ray equals the second, while the fourth is much longer. The membrane between the second and third rays is deeply, between the third and fourth slightly, emarginated. The rays succeeding the fourth gradually decrease in length. The ventrals begin slightly in advance of the middle of the body, in length equaling a third (0.31) of total length. The five posterior rays are bifid nearly to the base. The tips of ventral and pectoral fins are equidistant from the snout. The upper lobe of the caudal measures two-thirds the length of the lower lobe.

Color.—Back bluish, shading into the silvery white of the belly; five broad lateral transverse bands. The snout transparent white. Two yellow spots upon the nape. Pectorals and ventrals black at base and at margin, and with broad, irregular bands and blotches of black and dark blue; where unspotted, clear, colorless, and transparent. Caudal lobes each with a terminal spot of black; the lower with spot of same color on its outer margin half-way from the body to its extremity.

Extreme length, $0^{m}.073$	100
Body:	
Greatest height	.12
Greatest width	.12
Height at ventrals	.10
Height of tail behind dorsal fin	.06
Head:	
Length	.17
Distance from snout to nape	.15
Greatest width	.12
Width of interorbital area	.10
Length of snout	.03
Eye:	
Diameter	.08

Dorsal:	
Distance from snout	.56
Length of base	.13
Greatest height	.13
Anal:	
Distance from snout	.56
Greatest height	.14
Caudal:	
Length of upper rays	.15
Length of lower rays	.23
Pectoral:	
Distance from snout at upper axilla	.16
Length	.58
Distance of tip from snout	.80
Ventral:	
Distance of base from snout	.45
Length	.32
Distance of tip from snout	.78

The *Exocœtus exiliens* of Bloch is totally different.

I observed numerous specimens of the pelagic species in the vicinity of the islands, both on going and return. I take from my note-book some observations on their flight.

"*February* 10, 1871.—Several flying-fishes were observed on approaching the islands; usually they were single, but often a school of half a dozen or more started out from under the side of the brig. The distance of flight varied from six to one hundred yards. When they leave the water, the pectorals assume a rapid vibration, reminding one of the flight of a grouse, the tail also rapidly vibrating. The fins soon assume a rigid position, and the fish rises over the crests and falls in the trough of the waves, following their motion; sometimes it dashes through the crest, and on re-appearing the fins are again in motion. They seem unable to fly except in a straight line (I afterwards saw them veering considerably from a straight line, taking a direction nearly at right angles with their first course), but are not dependent on the direction of the wind. The motion is very bird-like, but the illusion is dispelled by the decidedly piscine splash with which the fish plunges into the water. It was a truly beautiful sight as the fishes emerged from the waves, their silvery fins quivering and glistening in the light."

I am convinced that at the moment the fish leaves the water the mode of propulsion changes from a true swimming motion to a true flying motion. The leap with which it leaves the water is due to the former, and is analogous to the spring from the ground or from a perch, made by some birds in the act of taking wing.

CYPRINODONTIDÆ.

FUNDULUS BERMUDÆ, *Günther.*

Fundulus Bermudæ, GÜNTHER, Ann. & Mag. Nat. Hist., 1874.

Very common in the brackish water of the swamps and in ditches. Attains the length of four inches.

SYNODONTIDÆ.

SYNODUS LACERTA, (*Valenciennes*) *Goode.*

SNAKE-FISH.

Salmo Saurus, LINNÉ, Syst. Nat. 2 ed. 11, 511, 1766; Gmelin, Syst. Nat. 1, 1376.
Saurus lacerta, CUV & VAL., Hist. Nat. Poiss. xxii, 463, 1849 (not Risso).
Saurus griseus, LOWE, Trans. Zool. Soc. ii, 188, 1841.—GÜNTHER, Cat. Fish. Brit. Mus. v, 395.

A specimen, seventeen inches long, was taken off the "ducking-stool" in March, by a line fisherman. Its occurrence in this part of the Atlantic is very novel, but it agrees closely with a specimen of *Saurus griseus* sent to the United States National Museum by Dr. Günther. Its color was dusky-gray above, yellow below. Its formulæ are as follows:—

Branchiostegals, 16–17 (on opposite sides). D. 12; A. 12. Lateral line, 60. Transverse line, $\frac{3\frac{1}{2}}{6}$.

ELOPIDÆ.

MEGALOPS THRISSOIDES, (*Bloch*) *Günther.*

TARPUM.

Camaripucuagu, MARCGRAVE, Hist. &c. Brasil, 1648, 179.
Clupea cyprinoides, BLOCH, Ichth., xii, 1797, 24, tab. cccciii.
Clupea thrissoides, SCHNEIDER, Bloch, Syst. Ichth. 1801, 424.
Megalops thrissoides, GÜNTHER, Cat. Fish. Brit. Mus. vii, 1868, 472.—GILL, in Baird's Rep. on Sea Fisheries of Southern New England, 1873, 810.
Clupea apalike, HAÜY, Encyclopédie Méthodique.—LACÉPÈDE, Hist. Nat. Poiss. v, 1803, 425, 461.
Clupea gigantea, SHAW, Gen. Zool. v, 1803, 173.
Megalops atlanticus, CUV. & VAL., Hist. Nat. Poiss. xix, 1846, 398.—MÜLLER & TROSCHEL, Schomburgk's Hist. Barbados, 1848, 676.—POEY, Rep. Fis.-Nat. Cuba, ii, 1868, 423.

Extremely rare; a single skin about six feet long was shown me in the collection of John T. Bartram, of Saint George's. The species

is recorded from the Gulf of Mexico, Demerara, Trinidad, Guadaloupe, Santo Domingo, Porto Rico, Martinique, and Cuba.

The species is very abundant on the eastern coast of Florida and in the Saint John's River, where it is known as the Jew-fish. Several specimens were taken on the southern coast of New England and New York in 1874.

The name is inexplicable, but may have some connection with the name "Caffum", which is given to the same fish in Barbados.

CLUPEIDÆ.

SARDINELLA ANCHOVIA, *Valenciennes.*

ANCHOVY.

Sardinella anchovia, CUV. & VAL., Hist. Nat. Pois. xx, 1847, 269.
Clupea anchovia, GÜNTHER, Cat. Fish. Brit. Mus. vii, 1868, 421.

I refer with some doubt to this species a small fish which occurred in great schools during the month of March, and were seined together with *Decapterus punctatus*, and sold in quantities along the quay. Their average length was about five inches.

HARENGULA MACROPHTHALMA (*Ranzani*).

PILCHARD.

Clupea macrophthalma, RANZANI, Novi Commentarii Acad. Scient. Inst. Bononiensis, v, 1842, 320, tab. xxiii.—GÜNTHER, Cat. Fish. Brit. Mus. vii, 1868, 421.—COPE, Trans. Am. Phil. Soc. Phila. 1870, 483.
Harengula sardina, POEY, Mem. Hist. Nat. Cuba, ii, 1863, 310; Rep. Fis.-Nat. ii, Cuba. 1868, 418.

Common; also recorded from various islands in the West Indies. Great quantities were seined during the month of March, and sold from row-boats at the water's edge. Their average length was nine inches. Poey's *Harengula sardina* appears to be the same. The name is derived from England, where an allied species, *Clupea pilchardus*, Walbaum, is commonly known as "the Pilchard".

OPISTHONEMA THRISSA, (*Linné*) *Gill.*

HERRING.

Clupea minor, radio ultimo pinnæ dorsalis longissimo, BROWN, Civ. and Nat. Hist. Jamaica, 1756, 443.
? Clupea corpore ovato, LINNÉ, Amœn. Acad. v, 251.

Clupea thrissa, LINNÉ, Syst. Nat. ed. 10, 1, 1758, 318; ed. 12, 1, 1750, 524; GMELIN, Linné, Syst. Nat. 1, 1788, 1405 (part).—BROUSSONET, Ichth. 1, tab. x.—?BLOCH, Ichth. xii, 1797, 27, taf. cccciv (from a drawing by Plumier).—SCHNEIDER, Bloch, Syst. Ichth. ed. 1801, 424.—GÜNTHER, Cat. Fish. Brit. Mus. vii, 1868, 432.

Meletta thrissa, CUV. & VAL., Hist. Nat. Poiss. xx, 1847, 380.

Opisthonema thrissa, GILL, Proc. Acad. Nat. Sci. Phila. 1861, 37; Cat. Fish. E. Coast N. Am. 1861, 54; and in Baird's Rep. on Sea Fisheries of S. New England, 1873, 811.

Opisthonemus thrissa, POEY, Rep. Fis. Nat. Cuba, ii, 1886, 419.

Clupanodon thrissoides, SPIX, MÜLL., & TROSCH., Schomburgk's Hist. Barbados, 1848, 676.

Megalops thrissoides, AGASSIZ, in Spix's Selecta Gen. et Spec. Pisc. Brazil, 1829, 45, pl. xxii.

Megalops oglina, LESUEUR, Journ. Acad. Nat. Sci. Phila. 1, 1817, 359.

Chatoessus oglina, GRIFFITH, Cuvier's Animal Kingdom, x, 1835, 439.—DEKAY, New York Fauna, Fishes, 1842, 265.—STORER, Syn. Fish. N. Am. 1846, 209.

Chatoessus signifer, DEKAY, op. cit. 264, pl. xli, f. 132.—STORER, op. cit. 210.—BAIRD, Fishes of New Jersey Coast, 1855, 35.—JONES, Naturalist in Bermuda, 103.

Chatoessus eumorphus, GOSSE, Naturalist's Sojourn in Jamaica, 1851, 290 (notes).

This species was taken in great numbers during the month of March. They occurred in schools in two distinct sizes; the smaller, perhaps the young of the previous year, measured four inches on an average; the adults, ten. The species is common in the West Indies, and has been taken as far north as Newfoundland.

ENGRAULIDIDÆ.

ENGRAULIS CHŒROSTOMUS, *Goode.*

HOG-MOUTH FRY.

Engraulis chœrostomus, GOODE, Amer. Journ. Science and Arts, viii, 1874 (Aug.), 125.

Common in the bays in large schools; used extensively for bait. Its enormous mouth has given it the name of "hog-mouth fry."

This species closely resembles *Engraulis surinamensis* (Blkr.) Günther, differing from it, however, in several respects. The height of the body (0.16) is a little greater than two-thirds of the length of the head, and is contained six times in the total length, and slightly more than four times in the length to the end of middle caudal rays (0.90); the height at the ventrals is less (0.13). The scales are large, in thirty-eight oblique rows between the head and the caudal. The length of the head (0.22) is less than one-fourth of the total, and is double its height at the pupil (0.11); its greatest width (0.08) is about one-third of its

length. The orbit is nearly circular, and its diameter (0.05) equals the length of the snout (0.05) and the width of the interorbital area (0.05). The snout projects far beyond the lower jaw, the extremity of which just passes the vertical from the anterior margin of the orbit. The maxillary is dilated above the mandibular joint, rather tapering behind, and extends to the gill-opening. The gill-rakers are fine, setiform, not longer than the eye (0.05); about twenty-five on the lower branch of the outer branchial arch.

The origin of the dorsal fin is in front of the middle of the body (0.45 from the snout), and directly above the extremities of the ventrals. The length of the first ray (0.06) is half that of the second (0.12), which nearly equals the length of the base (0.11). The origin of the anal is at the middle of the body (0.51 from the snout), and below the posterior dorsal rays; its greatest height (0.11) nearly equals that of the dorsal. The length of the middle caudal rays (0.08) is two-fifths of that of the outer rays (0.20). The length of the pectorals (0.11) equals the length of the base of the dorsals (0.11), the extremities reaching to the origin of the ventrals. Length of ventrals, 0.09; and their distance from snout, 0.35.

Color:—Back and sides brownish; belly white; a broad, clearly-defined lateral band of silver as wide as the diameter of the orbit (0.05).

Radial formula:—D. 13-14, A. 23-24. Length, 2.68 inches ($0^{m}.63$).

CYPRINIDÆ.

CARASSIUS AURATUS, (*Linné*) *Bleeker*.

GOLD-FISH.

Cyprinus auratus, LINNÉ, Syst. Nat. ed. 10, i, 1758, 323.—JONES, Naturalist in Bermuda. 1863, 103.

Carassius auratus, BLEEKER, Cyprin. 255.—GÜNTHER, Cat. Fish. Brit. Mus. vii, 1868, 32,

Common in the brackish water of the ditches. Mr. Jones states that it was introduced from Demerara many years ago.

ANGUILLIDÆ.

ANGUILLA BOSTONIENSIS, (*Lesueur*) *Ayres*.

EEL.

Muræna bostoniensis, LESUEUR, Journ. Acad. Nat. Sci. Phila. i, 1817, 81.

Anguilla bostoniensis, AYRES, Boston Journ. Nat. Hist. iv, 1842, 279.—GÜNTHER, Cat. Fish. Brit. Mus. viii, 1870, 31.—GILL, in Baird's Rep. Sea Fisheries Southern New England, 1873, 811.—BAIRD, Rep. Sea Fisheries Southern New England, 1871, 826.

Common in the ditches and dikes of the salt-marshes. Mr. Jones states* that it attains the weight of two or three pounds, and is very destructive to young ducklings. It is not eaten.

I obtained a specimen measuring five inches, which I refer with some hesitation to the above species, as measurements made from specimens contracted by strong alcohol are not satisfactory. The length of the head is contained once and a half in the distance between the gill-opening and the dorsal, twice in the distance between the gill-opening and the vent. The distance between the origins of the dorsal and anal is contained once and a half in the length of the head.

MURÆNIDÆ.

GYMNOTHORAX MORINGA, (*Cuvier*) *Goode.*

Speckled Maray.

Muræna maculata nigra (Black Murey), Catesby, Nat. Hist. Carolina, Florida, and Bahamas, ii, 1743, 21, tab. 21, 174.

Muræna moringa, Cuvier, Règne Animal, 1817.—Storer, Syn. Fish N. Am. 1846, 235

Muræna moringua, Richardson, Voy. H. M. S. S. Erebus & Terror, Ichth. 1846, 89.—Kaup, Cat. Apod. Fish. Brit. Mus. 1856, 89.

Gymnothorax rostratus, Agassiz, in Spix's Selecta Gen. et Spec. Brasil, 1829, 91, tab. 1, *a*.—Müll & Trosch., Schomburgk's Hist. Barbados, 1848, 676.—Poey, Rep. ii, 1860–1, 259, 427.—Cope, Trans. Am. Phil. Soc. Phila. 1870, 483.

Murenophis rostratus, Castelnau, Anim. Nouv. ou Rares, Amérique du Sud, 1855, 80, pl. xlii, f. 1.

Murenophis curvilineata, Castelnau, op. cit. 81, pl. xlii, f. 2.

Occasional: the species occurs throughout the West Indies, at Bahia and at Saint Helena. My specimen measures three feet, and has the vertical fins edged with white. These fishes are said to attain a length of five or six feet, and are considered excellent food by the lower classes: I am told, however, that serious cases of poisoning have been occasioned by their use. The Speckled Maray is not rare, but by no means as common as the Green Maray. I saw a single specimen of the latter, but as I could not obtain it for study I was unable to determine its specific relations. It resembles closely the "Muray" of Catesby,† which I have reason to believe is not identical with his "Black Muray", as is generally supposed.

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* Naturalist in Bermuda, p. 103.

† Nat. Hist. Carolina, Florida, and Bahamas, 20, pl. xx—*Muræna maculata nigra and viridis.*

ECHIDNA CATENATA, (*Bloch*) *Bleeker.*

Gymnothorax catenatus, BLOCH, Ichth. xii, 1797, 69, taf. ccccxv.
Muræna catenata, RICHARDSON, Voyage H. M. S. S. Erebus & Terror, Ichth. 1846, 95.—GÜNTHER, Cat. Fish. Brit. Mus. viii, 1870, 131.
Pœcilophis catenatus, KAUP, Cat. Apod. Fish. Brit. Mus. 1856, 100.
Echidna catenata, BLEEKER, Ned. Tyds. Dierk. ii, 242.

Dr. Kaup (*l. c. sup.*) gives Bermuda as a locality for this species; it also occurs at many of the West India Islands, at Trinidad, and on the coast of Dutch Guiana at Surinam.

RAIÆ.

The names Sting Ray and White Ray would indicate the occurrence of one or more species of this order. *Ætobatis narinari* (Euphrasen) Müll. & Henle is likely to occur here.

LAMNIDÆ.

Mr. Jones records a specimen nearly eight feet long taken in March, 1850, which he believes to be the *Lamna punctata* figured by DeKay.*

SPHYRNIDÆ.

The Hammer-head Shark known to the fishermen is probably the *Sphyrna zygæna* (Linné) Müller & Henle.

SCYLLIIDÆ.

The large Shark confined in the Devil's Hole is probably *Ginglymostoma cirratum* (Gmelin) Müll. & Henle.

GALEORHINIDÆ.

MUSTELUS CANIS, (*Mitch.*) *DeKay.*

NURSE SHARK.

Squalus canis, MITCHILL, Trans. Lit. and Phil. Soc. N. Y., 1, 486, pl. lxiv, f. 209.
Mustelus canis, DEKAY, Zool. N. Y. Fish, 1842, 355, pl. lxiv, f. 209.—STORER, Syn. Fish. N. Am. 253.—BAIRD, Fishes New Jersey Coast, 39, 1854; Rep. U. S. Com. Fish, 1871, 827.—GILL, Cat. Fishes E. Coast N Am. 59; and in Baird's Rep. U. S. Com. Fish, 1871, 813.—POEY, Rep. Fis.-Nat. Cuba, ii, 453.

Common. My specimen measured three feet, and one of the oviducts contained a young one eight inches long. It agrees exactly with specimens of *Mustelus canis* from Wood's Hole, Mass.

The Nurse is considered excellent food; after it has been boiled until tender, and then fried in its own fat. The sharks are rarely eaten, however, except by the negroes.

* Zoology of New York, Fish, 352, pl. lxiii, f. 206–207.

APPENDIX.

ADDITIONAL SPECIES OBSERVED BY MR. J. MATTHEW JONES.

After the preceding pages were in type, I received from Mr. Jones a list of the species collected by him in the Bermudas. In order to represent as fully as possible the present state of knowledge in reference to the fish fauna of these islands, I venture to give below the names of those species cited by Mr. Jones which have not fallen under my personal observation. Many species are of course included both in his collection and my own. The specific names below are given on the authority of Mr. Jones, who employs the nomenclature of Dr. Günther's "Catalogue of the Fishes in the British Museum".

LIST.

Diodon maculatus.
Tetrodon rostratus.
Ostracion trigonus.
Balistes maculatus.
Monacanthus aurantiacus.
Syngnathus Jonesii.
Centriscus, sp.
Fistularia serrata.
Rhomboidichthys lunatus.
Hemirhombus aramaca.
Lefroyia bermudensis.
Brotula barbata.
Centronotus, sp.
Blennius crinitus.
Gobius soporator.
Scorpæna Plumieri.
Scarus Catesbyi.
Pseudoscarus psittacus.
Pseudoscarus sanctæ-crucis.*
Platyglossus bivittatus.
Glyphidodon cælestinus.
Acanthurus chirurgus.
Chætodon capistratus.
Holacanthus tricolor.
Caranx dentex.
Caranx carangus.
Caranx chrysos.
Thyrsites prometheus.
Auxis Rochei.
Seriola Dumerilii.
Seriola zonata.
Trachynotus ovatus.
Coryphæna pelagica.
Coryphæna hippurus.
Mullus barbatus.
Sargus argenteus.
Mesoprion chrysurus.
Hæmulon macrostoma.

* [Probably the young of *Pseudoscarus vetula;* see discussion on page 32, *supra.*]

Hæmulon xanthopterum.
Serranus coronatus.
Rhypticus saponaceus.
Apogon imberbis.
Priacanthus macrophthalmus.
Regalecus gladius.
Belone hians.
Exocœtus lineatus.
Saurus fœtens.
Saurus myops.
Albula conorhynchus.
Ophichthys acuminatus.
Muræna miliaris.
Muræna maculipinnis.
Muræna sanctæ-helenæ.
Acipenser sturio.*
Carcharias obscurus.
Ætobatis narinari.

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