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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 promem 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

†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 geo-
graphical 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.)


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

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

* Firmisternia. Believing the arciforous 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 Gastrochmia. The toothed Aglossa must be distinguished on the same principle from Pipa, and the suborder is accordingly named Odontaglossa.

* Brachycephalina, pars, Gthr., Cat. Bat. Salien., 1858, 42.
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


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

Hemiphractidae = Hemiphractidae, Cope, J. A. N. S. Phila., n. s., vi, 69, 1866.

Hylidae > Hylidae, Gthr., Cat. Bat. Salien., 96, 1858.16

Scaphiopidae = Scaphiopidae, 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.
21 Colosteus, Cope.
Phlegethontiidae  =  Phlegethontiidae, Cope, MSS.  
Molgophidae  =  Molgophidae, Cope, MSS.  
Ptyoniidae  =  Ptyoniidae, Cope, MSS.  
Tuditanidae  =  Tuditanidae, Cope, MSS.  
Peliontidae  =  Peliontidae, Cope, MSS.  

Order GYMNOPHIDIA.  

(Gymnophiona, Müller.)  


Order URODELA.  

Pleurodelidae  =  { Seiranotidae, } Gray, P. Z. S. London, xxvi, 137–143, 1858.  
Hynobiidae  =  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 Lepteron, Huxl.; Oestocephalus, Cope; Urocordylus, Huxl.  
24 Pelion, Wyman.  
26 Hynobiidae, Cope; Molgidae, Gray, 1850.
Plethodontidae $^7$ = Plethodontidae, Cope, J. A. N. S. Phila., n. s., vi, 106–107, 1866.


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

Cocytinidae = Cocytinidae, Cope, MSS. $^9$

Order PROTEIDA.


Order TRACHYSTOMATA.


CLASS REPTILIA.

Order ORNITHOSAURIA.

(Ornithosauria, Bonaparte, Fitzinger, Seeley. $^{30}$)

Dimorphodontidae = Dimorphodontidae, Cope, P. A. A. A. S. 1870, 234, 1871. $^{31}$
Pterodactylidae = Pterodactylidae, Cope, P. A. A. A. S., xix, 234, 1871.33

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, 187133 (name only).

Ornithotarsidae = Ornithotarsidae, Cope, P. A. A. A. S., 234, 187134 (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

32 Rhamphorhynchae et Pterodactylae, Seeley, loc. cit.
33 Compsognathidae = Compsognathus, Wag.
34 Ornithotarsidae = Ornithotarsus, Cope.
35 Megalosauridae, Huxley.
36 Teratosaurus, Plateosaurus, Meyer, etc.
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

40 Thecodontia, Owen, pt.; Cope, Tr. A. P. S., 1869, 32.
41 Thoracosaurus, Leidy, Cope.
42 Crocodilidae + Alligatoridae, Gray, + Gavialidae, Gray, + Holops and Thecachamps, Cope, etc., Pr. A. A. A. S., xix, 235, 1871.
43 Placodus, Agass.
Order ANOMODONTIA.

(Anomodontia, Owen.)

**Plesiosauridae** = *Plesiosauridae*, Cope, P. A. A. A. S., xix, 235, 1871 (name only)."'

**Elasmosauridae** = *Elasmosauridae*, Cope, Tr. A. P. S., n. s., xiv, 1869, p. 47.45

Order ICHTHYOPTERYGIA.


Order RHYNCHOCEPHALIA.

**Protorosauridae** = *Protorosauridae*, Cope, P. A. A. A. S., xix, 235, 1871 (name only).42

**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 Cyptonota, Owen, Paleontology.
48 Protorosaurus, Meyer (elongate sacrum).
50 Rhynchosaurus, Owen.
Order TESTUDINATA.

**Athecae.**

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

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<td>Testudinidae</td>
<td>=Testudinidae, Cope, P. A. N. S. Phil., 1868, p. 282.</td>
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51 Sphargididae, Bell, Fitzinger, Agassiz.
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 Eibron; Chelyoidae, Agass.)

Podocnemididae = Podocnemididae, Cope, P. A. N. S. Phila., 1868, 282.
Hydraspididae = Hydraspididae, Cope, P. A. N. S. Phila., 1868, 282.
Pelomedusidae = Pelomedusidae, Cope, P. A. N. S. Phila., 1865, 185; 1868, p. 119.
Sternotheridae = Sternotheridae, Cope, P. A. N. S. Phila., 1868, 119.

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

Rhipitoglossa.
(Acrodontia Rhipitoglossa, 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.

NYCTISURA.

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

Geckonidae = Geckonidae, 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

57 Cope, Pr. A. A. S., xix, 236, 1871.
58 Iguanidae pars auctorum.
59 Gerrhonotidae, 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. S., xix, 237, 1870.

d. Leptoglossa.

(Leptoglossa, Wiegmann, Fitzinger, Cope.)

Teiidae = Teiidae, Cope, P. A. A. S., xix, 237, 1871. 61

Lacertidae = Lacertinae, Gray, Cat. Lizards B. M., 26–44, 1845. 62


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

63 Zonuridae, pt., Gray; Lacertidae pt., Cope.
c. *Typhlophthalmi.*

* (Typhlophthalmi, Cope, P. A. N. S. Phila., 1864, 228.67)

Feyliniidae = Anelytropidae, Cope, P. A. N. S. Phila., 1864, 230.68

Acontiidae = Acontiidae, Gray, Cat. Lizards B. M., 126-127, 1845.69


**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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68 Typhliniidae, Gray.
70 Ophisauri, Merrem; Annullati, Wiegmann; Ptychopleures Clypulodermes, Dum. et Bib.; Amphisbaenoides, Müller.
71 Amphisbaenidae, Wiegmann.
72 Trogonophes, Wiegmann, Fitzinger.
Order OPHIDIA.

Scolecodiphia.

(Scolecodiphia, Dum. et Bib.\textsuperscript{74})

Typhlopidae $= \text{Typhlopidae, Cope, P. A. A. A. S., xix, 237, 1871 (name only).}$\textsuperscript{75}

Stenostomidae $= \text{Stenostomidae, Cope, P. A. A. A. S., xix, 237, 1871 (name only).}$\textsuperscript{76}

Tortricina.

(Tortricina, Müller.\textsuperscript{77})

Tortricidae $= \text{Tortricidae, Cope, P. A. N. S. Phila., 1864, 230.}$

Uropeltidae $= \text{Uropeltidae, Cope, P. A. N. S. Phila., 1864, 230.}$\textsuperscript{78}

Asinea.

(Asinea, Müller, Cope.)

a. Peropoda.

(Peropoda, Müller.)

Xenopeltidae $= \text{Xenopeltidae, Cope, P. A. N. S. Phila., 1864, 230.}$\textsuperscript{79}

Pythonidae $= \text{Pythonidae, Cope, P. A. N. S. Phila., 1864, 230.}$\textsuperscript{80}


\textsuperscript{75} Epanodontiens, Dum. et Bib.

\textsuperscript{76} Catodontiens, Dum. et Bib.; Catodonta, Cope, olim.


\textsuperscript{78} Uropeltaceae, Peters; Rhinophidiae, Gray.

\textsuperscript{79} Xenopeltidae, Gthr., Reptiles British India.

\textsuperscript{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

81 Aproterodontiens, Dum. et Bib.
82 Achrochordiens, Dum. et Bib.
85 Calamuridae partim, Gthr., Cat. Col. Snakes B. M., 1858, 2-22.
87 Elapidae (pars altera), Gthr., Cat. Col. Snakes B. M., 1858, 209-237.
b. *Platycerca*.

Hyrophidae = 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

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PART II.
CHECK-LIST
OF
THE SPECIES OF BATRACHIA AND REPTILIA
OF
THE NEARCTIC OR NORTH AMERICAN REALM.

BATRACHIA.
TRACHYSTOMATA.

SIRENIDAE.

SIREN, Linn.

The Austroriparian region; extreme points North Carolina, Florida,
Matamoras, Mexico, and Alton, Illinois.

PSEUDOBANCHUS, Gray.

*Pseudobranchus striatus*, LeConte; Holbrook, American Herpetology,

PROTEIDA.

PROTEIDAE.

NECTURUS, Raf.

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.


MURAENOPSIS, Fitzinger.


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.


AMBLYSTOMIDAE.

AMBLYSTOMA, Tschudi.


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 obscurum, Baird; Cope, loc. cit., p. 192. Iowa.
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., p. 197. Indiana and Virginia.
Amblystoma jeffersonianum, Green, subspecies platineum; Cope, loc. cit., p. 198. Ohio.
Amblystoma macrodactylum, Baird; Cope, loc. cit., p. 198. Pacific region.
Amblystoma aterrimum, Cope, loc. cit., p. 201. Northern Rocky Mountains.
Amblystoma texanum, Matthes; Cope, loc. cit., p. 204. Texas.

DICAMPTODON, Strauch.

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

PLETHODONTIDAE.

BATRACHOSEPS, Bonap.

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

HEMIDACTYLIUM, Tschudi.

Plethodon, Tschudi.

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.

Sterechilus, Cope.


Manculus, Cope.

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

Spelerpes, Raf.

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.

GYRINOPHILUS, Cope.


ANAIDES, Baird.


DESMOGNATHIDAE.

DESMOGNATHUS, Baird.

Desmognathus fusca, Rafinesque; Cope, loc. cit., 115; subspecies fusca, Raf.; Cope, loc. cit., 116. Essex County, Massachusetts, to Biloxi, Mississippi.
Desmognathus nigra, Green; Cope, loc. cit., p. 117. Alleghany Mountains, from Pennsylvania southward.

PLEURODELIDAE.

DIEMYCTYLUS, Rafinesque.

ANURA.

BUFONIFORMIA.

BUFONIDAE.

Bufo, Laurenti.


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


FIRMISTERNIA.
ENGYSTOMIDAE.


ARCIFERA.
HYLIDAE.

Acris, Dum., Bibr.


Chorophilus, Baird.


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

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


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


Hyla squirella, Daudin; Holbrook, N. Am. Herp., iv, pl. 30. Austro-
riparian region.

Hyla carolinensis, Pennant; Holbrook, N. Am. Herp., iv, p. 29. Austro-
riparian region.


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 cadaverina, Cope; Hallowell, U. S. P. R. R. Surv., x, Williamson's 

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

SMILISCA, Cope.

xxxviii, figs. 1–3. Lower Rio Grande, Mexico.

CYSTIGNATIDAE.

LITHODYTES, Cope.

Southern Florida (Bahamas; Cuba).

EPHRAXIS, Cope.

Lower Rio Grande.

SCAPHIOPIDAE.

SPEA, Cope.


region to San Diego.

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

SCAPHIOPIUS, 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.


OPHIDIA.

SOLENOGLYPHA.

CROTALIDAE.

APLOASPIS, Cope.


Crotalus, Linn.


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


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


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


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

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

CAUDISONA, Laurenti.

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

Caudisoma edwardii, Baird and Girard, Cat., p. 15. Sonoran region.

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

Ancistrodon, Beavoirs.

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

Ancistrodon piscivorus, Lacépède, subspecies pugnae, 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.

PROTEROGLYPHAs

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.


ASINEA.

COLUMBRIDAE.

Carphophiops, Gervais.


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

VIRGINIA, Baird and Girard.


HALDEA, Baird and Girard.

Haldea strictula, 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 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.

CHILONEMISCUS, Cope.


CHIONACTIS, Cope.


CONTIA, Baird and Girard.

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

SONORA, Baird and Girard.

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

LODIA, Baird and Girard.


GYALOPiUM, Cope.


CEMOPHORA, Cope.

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

RHINOCHILUS, Baird and Girard.

Rhinocilus 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 gentilis, Baird and Girard, Cat., p. 90. Arkansas.

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


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


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


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

Coniophanes, Hallowell.


Hypsiglena, Cope.


Sibon, Fitzinger.


Trimorphodon, Cope.


Phimothyra, Cope.

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


Dromicus, Bibron.


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 enoryi, Baird and Girard, Cat., p. 157. Texas and the Mississippi Valley to Kansas and Illinois (C. calligaster, Kenn.; C. rhinomelas, 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 quadriovittatus, Holbrook; Baird and Girard, Cat., p. 80. North Carolina to Florida.


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 couperi, 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. 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.


BASCANUM, Baird and Girard.

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


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

Bascanum flagelliforme, Catesb., subspecies piceum, Cope, MS. Camp Grant, Arizona.

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


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

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


CHILOPOMA, Cope.


EUTAENIA, Baird and Girard.


Eutaenia fairegyi, Baird and Giraud, Cat., p. 25. Mississippi Valley, from Louisiana to Wisconsin.

Eutaenia proxima, Say; Baird and Giraud, 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.


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

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


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


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


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

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

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

Entacnia sirtalis, Linn., subspecies tetrataenia, Cope, MS. Pitt River, California.


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, Australriparian, and Eastern regions.

TROPIDOCOLON, Cope.


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. Australriparian and Eastern regions, including Texas.

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


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

Tropidonotus sipedon, Linn., subspecies erythrogaster, Shaw; Baird and Girard, Cat., p. 40. Austro-riparian 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.


Heterodon, Beauv.

Heterodon platyrhinus, Latreille; Baird and Girard, Cat., p. 51. Entire Austro-riparian and Eastern regions.

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

Heterodon simus, Linn., subspecies simus, Baird and Girard, Cat., p. 50. Austro-riparian region, excepting Texas.

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

BOIDAE.

Charina, Gray.


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

LICHIANURIDAE.

Lichanura, Cope.


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.

RHINEURA, Cope.


PLEURODONTA.

TYPHLOPHTHALMI.

ANIELLIDAE.

ANIELLA, Gray.

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

LEPTOGLOSSA.

SCIINIDAE.

OLIGOSOMA, Girard.


EUMECES, Wiegmann.


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


**LACERTIDAE.**

*Xantusia*, Baird.


**TEIDAE.**

*CNEMIDOPHORUS*, Wiegmann.


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


Verticaria, Cope.


DIPLOGLOSSA.

ANGUIDAE.

Opheosaurus, Daudin.


GERRHONOTIDAE.

Barissia, Gray.


Gerrhonotus, Wiegmann.


Pacific and Lower Californian regions.

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,  

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

CALLISATORUS, Blainville.

Callisaurus dracontoides, Blainv., subspecies centralis, Hallowell; Sit-  
greave's Report Zuñi, p. 117. Sonoran region.

Callisaurus dracontoides, Blainv., subspecies gabbii, Cope, MS. North-  
ern Lower California.

Callisaurus dracontoides, Blainv., subspecies dracontoides, Blainv., Nouv.  

UMA, Baird.


SAUROMALUS, Duméril.

Sonoran region.

CROTAPHYTUS, Holbrook.

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


DIPSOSAURUS, Hallowell.


UTA, Baird and Girard.


SCELORPUS, Wiegmann.


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


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


4 π

CYCLURA, Harlan.


ANOLIDAE.

ANOLIS, Merrem.


NYCTISAURA.

GECCONIDAE.

COLEONYX, Gray.


SPHAERODACTYLY, Cuv.


PHYLLODACTYLY, Gray.


DIPLODACTYLY, Gray.


TESTUDINATA.

ATHECAE.

SPHARGIDIDAE.

SPHARGIS, Merrem.

CRYPTODIRA.

CHELONIIDAE.

THALASSOCHELYS, Fitz.


*Eretmochelys*, Fitz.


CHELONIA, Brong.


TRIONYCHIDAE.

AMYDA, Agassiz.


ASPIDONECTES, Wagl.


CHELYDRIDAE.

CHELYDRA, Schw.

MACROCHELYS, Gray.

Macrochelys laeectina, 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 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.


EMYDIDAE.

PSEUDEMYX, Gray.


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


MALACOCLEMYS, Gray.


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.


CHELOPUS, Rafinesque.

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


EMYS, Brong.


CISTUDO, Flem.

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


TESTUDINIDAE.

Testudo, Linn.


CROCODILIA.

CROCODILIDAE.

Alligator, Cuv.


Crocodilus, Cuv.


Enumeration of genera and species.

<table>
<thead>
<tr>
<th>Genera</th>
<th>Species</th>
</tr>
</thead>
<tbody>
<tr>
<td>BATRACHIA.</td>
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</tr>
<tr>
<td>Trachystomata</td>
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<tr>
<td>Proteida</td>
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</tr>
<tr>
<td>Urodela</td>
<td>15</td>
</tr>
<tr>
<td>Anura</td>
<td>11</td>
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<tr>
<td>REPTILIA.</td>
<td></td>
</tr>
<tr>
<td>OPHIDIA.</td>
<td></td>
</tr>
<tr>
<td>Solenoglypha</td>
<td>4</td>
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<td>Proteroglypha</td>
<td>1</td>
</tr>
<tr>
<td>Asineaa</td>
<td>36</td>
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<tr>
<td>Scolecophilida</td>
<td>1</td>
</tr>
<tr>
<td>LACERTILIA.</td>
<td></td>
</tr>
<tr>
<td>Opheosauri</td>
<td>1</td>
</tr>
<tr>
<td>Pleurodonta</td>
<td>22</td>
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<tr>
<td>Nyctisaura</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>26</td>
</tr>
<tr>
<td>TESTUDINATA.</td>
<td></td>
</tr>
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<td>1</td>
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<tr>
<td>Cryptodira</td>
<td>16</td>
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<tr>
<td></td>
<td>17</td>
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<tr>
<td>CROCODILIA</td>
<td>2</td>
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<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Total species</td>
<td></td>
</tr>
</tbody>
</table>

*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 Palaeartic, 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 mammals, 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 Sirenia mammalia; Struthious birds; Elapid and Peropodous snakes; Dipnoan, Chromid, and Characin fishes; and Pleurodine 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 Tapiraceous mammals; Struthious, Pallastrine, 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 Palaeaeartic 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 Palaeaeartic 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

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*"Eogaena" 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:

<table>
<thead>
<tr>
<th>Agree with Palaearctic in—</th>
<th>Differs from Palaearctic in—</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Peculiar forms.</td>
</tr>
<tr>
<td>Mammalia in general</td>
<td>Bassaridae.</td>
</tr>
<tr>
<td></td>
<td>Procyonidae.</td>
</tr>
<tr>
<td></td>
<td>Megadermatidae.</td>
</tr>
<tr>
<td></td>
<td>Dicotyles.</td>
</tr>
<tr>
<td></td>
<td>Didelphys.</td>
</tr>
<tr>
<td>Birds except</td>
<td>Cathartidae.</td>
</tr>
<tr>
<td></td>
<td>Tanagridae.</td>
</tr>
<tr>
<td></td>
<td>Icteridae.</td>
</tr>
<tr>
<td></td>
<td>Clamator or in general.</td>
</tr>
<tr>
<td></td>
<td>Trochiidae.</td>
</tr>
<tr>
<td>Emyd tortoises</td>
<td>Meleagridae.</td>
</tr>
<tr>
<td></td>
<td>Chelydra.</td>
</tr>
<tr>
<td>Raniform frogs</td>
<td>Scaphiopodidae.</td>
</tr>
<tr>
<td></td>
<td>Plethodontidae.</td>
</tr>
<tr>
<td></td>
<td>Amblystomidae.</td>
</tr>
<tr>
<td>Diemyctylus.</td>
<td>Trachystomata.</td>
</tr>
<tr>
<td>Megalobatrachus</td>
<td>Necturus.</td>
</tr>
<tr>
<td></td>
<td>Amphilimidae.</td>
</tr>
<tr>
<td>Percid fishes</td>
<td>Aphreloderidae.</td>
</tr>
<tr>
<td>Cottidae.</td>
<td>Hypsaicidae.</td>
</tr>
<tr>
<td>Hatolom.</td>
<td>Acipenseridae.</td>
</tr>
<tr>
<td>Acrasii.</td>
<td>Cypriidae.</td>
</tr>
<tr>
<td>Gasterosteididae.</td>
<td>Plagopterinae.</td>
</tr>
<tr>
<td></td>
<td>Catostomidae.</td>
</tr>
<tr>
<td>Petromyzon.</td>
<td>Amiidae.</td>
</tr>
<tr>
<td></td>
<td>Lepidosteididae.</td>
</tr>
</tbody>
</table>

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 Neartica, 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:**

<table>
<thead>
<tr>
<th>Class</th>
<th>Number</th>
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<tbody>
<tr>
<td>Monotremata</td>
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<tr>
<td>Marsupialia</td>
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</tr>
<tr>
<td>Edentata</td>
<td>1</td>
</tr>
<tr>
<td>Rodentia</td>
<td>139</td>
</tr>
<tr>
<td>Insectivora</td>
<td>28</td>
</tr>
<tr>
<td>Chiroptera</td>
<td>23</td>
</tr>
<tr>
<td>Cetacea</td>
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<tr>
<td>Sirenia</td>
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</tr>
<tr>
<td>Hyracoidea</td>
<td>0</td>
</tr>
<tr>
<td>Proboscidea</td>
<td>0</td>
</tr>
<tr>
<td>Perissodactyla</td>
<td>0</td>
</tr>
<tr>
<td>Artiodactyla</td>
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</tr>
<tr>
<td>Carnivora</td>
<td>14</td>
</tr>
<tr>
<td>Carnivora</td>
<td>13</td>
</tr>
<tr>
<td>Carnivora</td>
<td>46</td>
</tr>
<tr>
<td>Primates</td>
<td>1</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>310</strong></td>
</tr>
</tbody>
</table>

**Aves:**

<table>
<thead>
<tr>
<th>Order</th>
<th>Number</th>
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<tbody>
<tr>
<td>Passeres</td>
<td>306</td>
</tr>
<tr>
<td>Oscines</td>
<td></td>
</tr>
<tr>
<td>Clamatores</td>
<td>33</td>
</tr>
<tr>
<td>Zygodactyli</td>
<td>36</td>
</tr>
<tr>
<td>Syndactyli</td>
<td>20</td>
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</table>
Aves—Continued.

<table>
<thead>
<tr>
<th>Order</th>
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<th>Count</th>
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<td>Psittaciformes</td>
<td>Psittaci</td>
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<tr>
<td>Accipitriformes</td>
<td>Accipitres</td>
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<tr>
<td>Falconiformes</td>
<td>Pullastrae</td>
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<tr>
<td>Gruiformes</td>
<td>Gallinae</td>
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<tr>
<td>Corvidae</td>
<td>Brevipennes</td>
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<tr>
<td>Gruiformes</td>
<td>Grallae</td>
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<tr>
<td>Ciconiiformes</td>
<td>Lamellirostres</td>
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<tr>
<td>Ciconiiformes</td>
<td>Steganopodes</td>
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<tr>
<td>Charadriiformes</td>
<td>Longipennes</td>
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<tr>
<td>Charadriiformes</td>
<td>Pygopodes</td>
<td>51</td>
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<tr>
<td></td>
<td></td>
<td><strong>756</strong></td>
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Reptilia:

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</thead>
<tbody>
<tr>
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<tr>
<td>Testudinata</td>
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<td>41</td>
</tr>
<tr>
<td>Lacertilia</td>
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<tr>
<td>Ophidia</td>
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<td>132</td>
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<tr>
<td></td>
<td></td>
<td><strong>237</strong></td>
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Batrachia:

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<td>Anura</td>
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<tr>
<td>Urodela</td>
<td></td>
<td>49</td>
</tr>
<tr>
<td>Gymnophidia</td>
<td></td>
<td>0</td>
</tr>
<tr>
<td>Proteida</td>
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<td>2</td>
</tr>
<tr>
<td>Trachystomata</td>
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<td>2</td>
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<td></td>
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Pisces:

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<tr>
<td>Distegi</td>
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<td>Rhenopteri</td>
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<td>Percomorphi</td>
<td>Epilasmia</td>
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<td>Scyphobranchii</td>
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<td></td>
<td>Haplodoci</td>
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<tr>
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<td>Anacanthini</td>
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<td>Heterosomata</td>
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<td>7</td>
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<tr>
<td>Synentognathi</td>
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<tr>
<td>Percesoces</td>
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<td>13</td>
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<td></td>
<td></td>
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</table>
PISCES—Continued.

<table>
<thead>
<tr>
<th>Class</th>
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<tr>
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<tr>
<td>Isospodyli</td>
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<tr>
<td>Plectospondylia</td>
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<tr>
<td>Seyphophori</td>
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<tr>
<td>Nematognathi</td>
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</tr>
<tr>
<td>Notacanthi</td>
<td>0</td>
</tr>
<tr>
<td>Glanencheli</td>
<td>0</td>
</tr>
<tr>
<td>Ichthyophophali</td>
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<tr>
<td>Holostomi</td>
<td>0</td>
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<tr>
<td>Enchelycephi</td>
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<td>Colocephali</td>
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<tr>
<td>Halecomorphi</td>
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<td>Ginglymodi</td>
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<td>Glaniostomi</td>
<td>30</td>
</tr>
<tr>
<td>Selachostomi</td>
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</tr>
<tr>
<td>Holocephali</td>
<td>2</td>
</tr>
<tr>
<td>Plagiosostomi</td>
<td>46</td>
</tr>
<tr>
<td>Dipnai</td>
<td>0</td>
</tr>
</tbody>
</table>

| Total                      | 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 Molluscanida 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:

<table>
<thead>
<tr>
<th>Class</th>
<th>Fresh-water</th>
<th>Marine</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>CEPHALOPODA</td>
<td>25</td>
<td></td>
<td>25</td>
</tr>
<tr>
<td>PULMONATA</td>
<td>400</td>
<td></td>
<td>400</td>
</tr>
<tr>
<td>PROSOBRANCHIATA</td>
<td></td>
<td>438</td>
<td>297</td>
</tr>
<tr>
<td>HETEROPODA</td>
<td>28</td>
<td></td>
<td>28</td>
</tr>
<tr>
<td>OPISTHOBRANCHIATA</td>
<td>53</td>
<td></td>
<td>53</td>
</tr>
<tr>
<td>PTEROPODA</td>
<td>25</td>
<td></td>
<td>25</td>
</tr>
<tr>
<td>SCAPHOPODA</td>
<td>4</td>
<td></td>
<td>4</td>
</tr>
<tr>
<td>LAMELLIBRANCHIATA</td>
<td></td>
<td>596</td>
<td>377</td>
</tr>
<tr>
<td>MOLLUSCOIDA</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BRACHIOPODA</td>
<td>10</td>
<td></td>
<td>10</td>
</tr>
<tr>
<td>ASCIDIA</td>
<td>30</td>
<td></td>
<td>30</td>
</tr>
<tr>
<td>BRYOZOA</td>
<td>39</td>
<td></td>
<td>39</td>
</tr>
</tbody>
</table>

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

**ECHINODERMATA (123).**

<table>
<thead>
<tr>
<th>Class</th>
<th>East coast</th>
<th>Interior</th>
<th>West coast</th>
</tr>
</thead>
<tbody>
<tr>
<td>HOLOTHURIDA</td>
<td>32</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>ECHINOIDEA</td>
<td>50</td>
<td>18</td>
<td></td>
</tr>
<tr>
<td>CRINOIDEA</td>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ASTEROIDEA</td>
<td>17</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**COELENTERATA (144).**

<table>
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<th>Class</th>
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<th>Interior</th>
<th>West coast</th>
</tr>
</thead>
<tbody>
<tr>
<td>MEDUSAE:</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Discophora</td>
<td>80</td>
<td>22</td>
<td></td>
</tr>
<tr>
<td>Siphonophora</td>
<td>3</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>CTENOPHORA</td>
<td>12</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>POLYPI</td>
<td>13</td>
<td>7</td>
<td></td>
</tr>
<tr>
<td>HYDROIDEA</td>
<td>3</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The divisions of Protozoa are well represented in our waters, but the numbers of our Spongida, 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 fulva) is nearly related to the European fox (V. vulgatilis), 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 (Cariacu) 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 cyanus), 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—

Haliaetus 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 Gallinææ are, on the other hand, entirely distinct, though not without a few corresponding species.

Among lower Vertebrae, 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 Crocoidian is our alligator, which presents only minor differences from the South American caimans. The lizards are all of Neotropical families, except the scincs (*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—

Teiidæ to Lacertidæ;
Gerrhonotidæ to Zosteridæ;
Iguanidæ to Agamidæ.

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 (*Scaphiopodidae*) 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 last belong the Sirexons, 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 Palaeoarctic *Proteus*, and Siren is quite peculiar to North America. The *Amphiuma*, or snake-like 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 altula*) 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, whilst 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*), clubs (*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 Neartic 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 (*Ammia*), 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 Neartic 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 bartramiius*
- *Heteroscelus brevipes*
- *Symphemia semipalmata*
- *Ereunetes petricatus*
- *Aegialitis Tilsonius*
- *Xyoth crodius rolaeus*

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 doliius*; 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, Scinurus, Hesperomys*, and *Didelphys*), and a number of birds, especially among the lower orders, and the scansores, synaactyi, 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.

5 II
Mammalia.

Lynx.
Urocyon.
Putorius.
Bassariscus.
Geomys.
Thomomys.
Ochotodon.
Arvicola.
Neotoma.
Sigmodon.
Cariacus.
Antilocapra.

Reptilia.

Crotalus.
Candisona.
Ancistrodon.
Tropidoclonium.
Tropidonotus.
Eutaenia.
Vipera.
Trimorphodon.
Hypsiglena.
Ophisaurus.
Phimothyra.
Pityophis.
Coluber.
Tantilla.
Chilomeniscus.
Cinosternum.
Chelydra.
Pseudemys.
Chelopus.
Seloporus.
Phrynosoma.
Heloderma.
Barisia.
Gerrhonotus.
Oligosoma.
Eumeces.
Chelidophorus.
Batrachia.
Amblystoma.
Spelepes.
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 north of the Georgia Mountains, and to the northward 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 Floridian, 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.*

*Maneulus.*

*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, Eumecces, and Sceloporus, which are universally Nearctic. The Batrachian genera not found in the Central are—

Scaphiopus.
Gyrinophilus.
Spelerpes.
Plethodon.
Hemidactylium.
Desmatocephalus.
Menopoma.
Necturus.
The characteristics of the fish-fauna of Eastern Nearctica are much more marked; two entire orders, represented by the gar (Glyconidom) 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 overflowing 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 "sagebrush" (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:

Oroscopites.
Hydrobata.
Myiadestes.
Neocorys.
Salpinectes.
Piciorus.
Chondestes.
Calampisora.
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 *Pedicetes phasianellus*, or cock of the plains; the *Tetrao obscurus*; several ptarmigan (*Lagopus*); and *Bosasa*; 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*, dogfish, 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 mammals, 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, *Lolita*, *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 *Diacamptodon*; while the Eastern genera *Plethodon* and *Dicymyctylus* 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), Campylorhynchos, 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. Scines 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:
These genera constitute the most characteristic feature of the two faunae, not occurring in any other part of North America. Trimorphodon, Hypsiglena, and Phyllophryne 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, Arianta, and Polymita are represented by handsome species. Macrocyclis and Bub. neya 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 Cambdrus (craw-fish) and Artemia are found everywhere where physical conditions are suitable.
V.—THE AUSTRORIPARIAN REGION.

V. 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.*

Caudisoma miliaria.
Ancistrodon piscivorus.
Elaps fulvius.
Haldea striatula.
Farancia abacura.
Cemophora coccinea.
Ophibolus dolius coccinens.
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:

Vth. 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 pygcaea.*

*Eutaenia sackenii.*

*Tropidonotus compressoracmus.*

*Tropidonotus compressicaudus.*

*Tropidonotus ustus.*

*Tropidonotus cyclopium.*

*Helicops allenii.*

**Lacertilia.**

*Rhineura floridana.*

*Eumecces egregius.*

*Eumecces onocrepis.*

*Sceloporus floridanus.*

*Sphaerodactylus notatus* (Cuba).

**Crocodilia.**

*Crocodilus americanus* (Cuba).

Of the above, the species of *Crocodilus, Sphaerodactylus,* and *Litho
dytes* 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.*

*Rhineura.*

*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*  
- *Starnaeæas*  
- *Rostrhamus*  
- *Polyborus*  
- *Aramus*  
- *Audubonia*  
- *Phoenicopterus*.  
- *Haliplana*  
- *Anoîs*  

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, Arectomys, Fiber*, and *Condylyura* are wanting, as well as the red-squirrel, Canada lynx, gray-rabbit, etc. Its most remarkable birds are the nonpareil finch, ivory-billed woodpecker, parrot, etc., while its *Elaps fulvius*, or corr. 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.

Ve. 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.**

- *Nectarus punctatus*. E.
- *Urodelà.**

- *Amphiuna 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.
Chorophillus nigritus.
Chorophillus angulatus.
Chorophillus oculatus.
Chorophillus ornatus.

**Ophidia.**

Crotalus adamanteus adamanus.
Virginia harperti.
Virginia elegans. W.
Tantilla coronata.
Abastor erythrogrammus.
Osceola elapsoidea. E.
Ophibolus rhombomaculatus.
Coluber quadriguttatus. E.
Spilotes couperi. E.
Basecanium flagelliforme flagelliforme. E.
Basecanium anthicium. W.
Tropidonotus taxispilotus.
Heterodon simus simus.

**Testudinata.**

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

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

*Pseudobranchochus.*
*Muracnopsis.*
*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 Austroiriparian region. 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 geographic* (E.).

*Malacoclemmys pseudogeographica* (E.).

The Texan district of the *Australiriparian* 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 *Milara 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 (*Peregrine cassini*).
Several genera of mammals, birds, and reptiles exist in the Texan region, which constitute its chief claim for distinction from the Louisiana; 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.

Ve. 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 hallowelli.
Tantilla nigricaps.
Contia episeopa.
Ophibolus doliatus annulatus.
Diadophis punctatus stictogenys.
Coluber lindheimerii.
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 Alleghelian; 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 south-eastern 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.

VIa. Species peculiar to the Eastern region—34:

Proteida.

Necturus lateralis.

Caducibranchiata.

Menopoma fuscum.
Amblystoma bicolor.
In an area of southern Ohio, Indiana, and Illinois, a wide variety of birds, mammals, and reptiles is described. These include the southward extension of species found in West Virginia, Ohio, and Wisconsin. The area described is largely in Vermont, the Allegheny Mountains, and northern Pennsylvania.

**Amphibia.**

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

**Anura.**

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

**Ophidia.**

- *Caudisoma 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 inceulpitus.*
- *Emys melagris.*
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, Hildea, 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.
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.**

- *Bassianium constrictor.*
- *Eutaenia sirtalis.*
- *Diadophis punctatus.*
- *Storeria occipitomaculata.*
Frogs.
Rana temporaria cantabrigensis.
Rana septentrionalis.

Salamanders.
Desmognathus ochrophaeus.
Desmognathus nigra.
Spelcrpes ruber.
Spelcrpes bilineatus.
Spelcrpes longicaudus.

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 ochrophaeus, 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.

VF. Species confined to the Canadian district, or nearly so:

Urodela.
Amblystoma jeffersonianum laterale.

Anura.
Bufo lentiginosus fowleri.
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 ocanthe.
Ampelis garrula.
Aegithus liniaria.
Plectrophanes lapponica.
Plectrophanes nicalis.
Plectrophanes pieta.
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, (I), 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 Esoc, 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, Esoc 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 (Spatanura or Polyodon), the shovel-sturgeon (Scaphirhynchops), and the alligator-gar (Atractosteus); also by the buffalo (Diphiichthys), the Cycleptus, etc., among suckers, and the fork-tailed catfish (Ichthaeetus). 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 "zoological 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: *Pomorys*, according to Professor Baird (verb. commun.), ceases here.

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

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

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

**VIIa. 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.**

VIIIa. Species confined to the Pacific region—41:

**Urodela.**

Amblystoma macrodactylum.
Amblystoma paroticum.
Amblystoma tenebrosum.
Amblystoma aterrimum.
Dicamptodon ensatus.
Batrachoseps attenuatus.
Batrachoseps nigriventris.
Batrachoseps pacificus.
Plethodon intermedius.
Plethodon oregonensis.
Anaides lugubris.
Anaides ferrens.
Diemytýlus torosus.

**Anura.**

Bufo halophilus.
Hyla regilla.
Hyla cadaverina.
Spea hammondii.
Rana temporaria aurora.
Rana pretiosa.

**Ophidia.**

Crotalus lucifer.
Contia mitis.
Lodia tenuis.
Pityophis catenifer.
Basecanium constrictor vetustum.
Entaenia hammondii.
Entaenia elegans.
Entaenia sirtalis pickeringii.
IMAGE EVALUATION
TEST TARGET (MT-3)
Eutaenia sirtalis concinna.
Eutaenia sirtalis tetrataenia.
Eutaenia cooperii.
Eutaenia atrata.
Charina plumbea.
Stenostoma humile.

_Lacertilia._

Aniella pulchra.
Eume ces 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*. 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.
Caudisoma 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.
Dascanium flagelliforme piceum.
Chilopoma ruhipunctatum.
Eutaenia macrostemma.
Eutaenia vagrans angustirostris.
Tropidontotus validus validus.
Tropidontotus 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 conchii.
Sceloporus marmoratus.
Sceloporus clarkii.
Phrynosoma modestum.
Phrynosoma maccallii.
Phrynosoma regale.
Phrynosoma planiceps.
Phrynosoma hernandezii.
Coleonyx variegatus.
Phylodactylus tuberculatus.

Testudinata.

Cinosternum sonoriense.
Cinosternum henrici.
Cinosternum flavescens.
Testudo agassizii.

Phrynosoma platyrhiniun has as yet been observed in Nevada only.

X.—THE LOWER CALIFORNIAN REGION.

X*: Species peculiar to the Lower Californian region—27:

Urodeia.

Plethodon croceater.

Anura.

Hyla curta.

Ophidia.

Crotalus enyo.
Crotalus mitchelli.
Tantilla planiceps.
Chilomeniscus stramineus.
Ophibolus californiæ.
Ophibolus getulus conjunctus.
Hypsiglena ochrorhyncha ochrorhyncha.
Phimothyra decurtata.
Pityophis vertebralis.
Bascanium aurigulum.
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 Entaenia. It is
also true of the lizards of the genera \textit{Phrynosoma}, \textit{Holbrookia}, and \textit{Scole-loporus}. \textit{Eutaenia} and \textit{Scoleloporus} become metallic in the Mexican sub-region, as is also the case with the Anoles. The North American species of \textit{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 \textit{Batrachia} and \textit{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 Anstroriparian 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.

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 Neartica. 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 Neartica. 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.

A.—Works on the classification of Batrachia and Reptilia.

1826 (June). Fitzinger. Neue Classification der Reptilien.

1853. Duménil. Prodrome de la Classification des Reptiles Ophidiens Institut de France.


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<td>1870</td>
<td>Gray</td>
<td>Supplement to the Catalogue of Shield Reptiles in the British Museum</td>
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<td>1872</td>
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<td>Anatomy of the Vertebrata</td>
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<td><strong>B — Works treating of the geographical distribution of North American</strong></td>
<td><strong>Batrachia and Reptilia.</strong></td>
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<td>1866</td>
<td>Cope</td>
<td>On the Reptilia and Batrachia of the Sonoran Province of the Nearctic Region.</td>
<td>Proceedings of the Philadelphia Academy, p. 300 (October)</td>
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<td>1869</td>
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