

**THE BATRACHIANS
AND REPTILES OF THE
STATE OF INDIANA**

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The Batrachians and Reptiles of the State of Indiana by Oliver Perry Hay

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OLIVER PERRY HAY

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STATE OF INDIANA.

— BY —

OLIVER PERRY HAY, A. M., Ph. D.

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PREFACE.

The Batrachia and Reptilia of the State of Indiana form the subjects of the following pages. In the body of this work I have endeavored to include all the species known to inhabit the State, and to exclude all that are not known to occur within our limits. Since, however, there are several species which are, judging from their geographical distribution, likely hereafter to be taken within the State, I have added their names in an appendix.

Of all the species mentioned in this paper I have given as accurate descriptions as I have been able to prepare; and I have endeavored to state also the most important facts known regarding their habits. It is to be hoped that this endeavor will incite others to study our lower vertebrates with respect to their manner of life, since too little is known about even the commonest species.

I am indebted to many friends for aid in preparing this work, so many that I can not here mention all their names. Under each species I have tried to give due credit for specimens and notes. I must here, however, acknowledge the liberality of Dr. Leonhard Stejneger, Curator of Reptiles in the National Museum, Washington, D. C., in giving me free access to the large collections there; also the kindness of Prof. B. W. Evermann, who allowed me to examine a considerable collection made by himself, mostly in the vicinity of Terre Haute. This collection is the property of the State Normal School. To Prof. S. S. Gorby I owe the opportunity to examine the specimens in the State Museum. Some years ago I had occasion to study a collection made at New Harmony by the late Mr. James Sampson, of that place. For the opportunity of doing this I am indebted to Prof. John Collett. The writings of Agassiz, Cope and other naturalists have been consulted in the earnest desire to obtain a correct idea of our batrachian and reptilian fauna. Nevertheless, I have at times doubtless fallen into error.

The following is a summary of the species of each group known to occur in Indiana:

Tailed Batrachians	18 species.	
Tailless Batrachians	12 species.	
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Total Batrachians		30 species.
Snakes	28 species.	
Lizards	5 species.	
Turtles	18 species.	
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Total Reptiles		51 species.
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Total of both classes		81 species.

THE AUTHOR.

IRVINGTON, IND., Sept. 1, 1892.

West, Dec. 27, 1892. 11. 7. 1.

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THE BATRACHIANS AND THE REPTILES OF INDIANA.

On the part of people who have not made a scientific study of animals no distinction is made between the group of creatures here called *Batrachians* and that group called *Reptiles*. The amphiuma and the snakes, the salamanders and the lizards, the common toad and the turtles are all called "reptiles." Nor is this strange when we consider how closely members of both groups resemble one another in outward form and in habits. It is indeed only recently that zoologists, who endeavor to found their systems on more important differences than appear on the outside, have agreed to regard the frogs, salamanders, and newts, as fundamentally different from the lizards, turtles, and snakes. In reality, the batrachians are more closely related to the fishes than to the reptiles, while the latter are more nearly akin to the birds. The batrachians form a class standing intermediate between the class of fishes and the class of reptiles.

Nevertheless, since zoologists have almost universally associated the two classes in their works, and since people do not usually distinguish the one kind of animals from the other, they are here described together.

The batrachians differ from the reptiles in several important respects. The skin of the former is usually smooth and moist, sometimes raised up into warts, as in the toads, but never disposed in overlapping scales or regular plates. Scales and plates, such as are seen in the lizards and snakes, and tortoises, are almost universal among the reptiles. No Indiana reptile is without such a covering, except our soft-shelled turtles. The life-history of the members of the two groups is also widely different. The batrachians almost always lay their eggs in the water, and the young pass their early days there as tadpoles. They respire by means of gills until the time of their metamorphosis approaches, when lungs are developed, the gills are absorbed, and the animal leaves the water and lives to a greater or less extent on the land. Reptiles, on the contrary, lay their eggs on land, the young are hatched with the form of the adults, and they never have gills. A few batrachians retain their gills life-long, breathing both by means of these and their lungs. Other differences exist, but since their determination would require dissections, they are not thought suitable for consideration in a work of this kind.

Since the animals herein described are a source of discomfort and alarm to many people, it may be well to say here that of all the batrachians and reptiles known to inhabit Indiana, but four, the yellow-banded rattlesnake, the prairie rattlesnake, the coral snake, and the copperhead, are poisonous. It is possible that the poisonous southern moccasin, or cottonmouth, may yet be found in the southwestern part of the State; if so, we shall have five poisonous species, and five only.

KEY TO THE CLASSES.

- A. Skin usually smooth and soft, sometimes rough and warty, never forming scales that overlap or are arranged in regular rows; eggs usually laid in the water and giving origin to tadpoles. (Water-dogs, salamanders, frogs and toads.)
Batrachia, p. 5.
- AA. Skin usually having epidermal scales or large regular plates; these usually arranged in a regular manner, often overlapping. Eggs laid on land. Young with form of adults. (Snakes, lizards, turtles, alligators, etc.)
Reptilia, p. 73.

BATRACHIA.

The Batrachia include a great variety of animals that are found living in all except the coldest parts of the earth and the salt water. As already stated, they are, with rare exceptions, hatched in the water, where they spend at least a portion of their lives. A few forms retain their gills throughout life, and seldom or never leave the water. In a few cases the eggs are laid on the land, under sticks and stones; the young from such eggs may have very rudimentary gills and consequently never enter the water. Such species closely approach, in their habits, the reptiles. The gills may be either internal or external; usually they are of the latter kind. The external gills are attached to processes of the skin, and not to the branchial arches. The internal gills of the tadpoles or frogs grow out from the branchial arches, as in fishes.

The skin of the batrachians is richly provided with glands. These secrete a milky fluid, which is often acrid, and sometimes poisonous to the enemies of the species producing it. It thus serves as a means of defense to these animals, which are otherwise almost helpless. Often the glands are collected into groups, as in the case of those on the back of the head of the common toad. In some species the skin forms a fin on the upper and lower sides of the tail; but in such fins there are no rays, such as are found in the fins of fishes.

When limbs are present they have the same skeletal elements as the limbs of reptiles and mammals. Some batrachians are devoid of limbs. All of our species have the anterior limbs present; most of them have also the posterior pair. The anterior limbs never have more than four fingers; the posterior may have five toes.

Not much can be said here regarding the skeleton. The vertebræ are usually either amphicæalous or opisthocæalous. Ribs are often absent; when present they do not connect with a sternum below. In the lower forms as many as four branchial arches may be present; in the higher species the number is reduced. There may be teeth on the maxillaries, premaxillaries, vomers, and dentaries; more rarely on the palatines, the pterygoids and the splenials. A band of teeth may be found in some cases supported by the parasphenoid. The teeth are almost always very simple in structure, pointed, and grown fast to the supporting bones.

Breathing is effected in the adult by drawing the air into the mouth through the nostrils, then closing these, contracting the cavity of the mouth, and thus forcing the air into the lungs. Hence, a frog may be suffocated by holding its mouth open.

For additional information on the anatomy of the Batrachia the student should consult Prof. Huxley's article, "*Amphibia*," in the *Encyclopedia Britanica*; also for the Urodela, Dr. R. Wiedersheim's work, "*Kopfskelet der Urodelen*."

The living species of Batrachia have been divided by Prof. E. D. Cope (51, 13) into four orders, viz: Proteida (*Necturus*), Urodela, Trachystomata (*Siren*), and Salientia. I prefer here to retain the genera *Necturus*, *Proteus* and *Siren* under the Urodela.

KEY TO THE ORDERS OF *Batrachia*.

- A. Limbs present or absent; when present, the hinder pair not much more strongly developed than the anterior. Tail developed or not; present in all our species. Animals fitted for creeping on or burrowing in the earth or for swimming in the water. *Urodela*, p. 6.
- AA All four limbs present and the hinder pair greatly developed. Tail wholly absent in the adult. Animal, when on land, usually progressing by leaping. *Salientia*, p. 48.

Order URODELA.

Batrachia having a lizard-like, eel-like, or serpent-like form. All limbs, as well as the supporting girdles, absent in the extralimital *Cœcolidae*. At least the fore limbs and the shoulder girdle present in all our forms; and usually also the hinder limbs. Posterior limbs never conspicuously

larger than the anterior. Proximal elements of the tarsus not elongated. Vertebrae numerous, at least 14 in front of the sacrum; these either amphicoelous or opisthocelous. Ribs present, short. Maxilla present in all except *Necturus* and *Siren*. Teeth present on maxillaries, vomero-palatines, and on the dentaries, except in *Siren*. No tympanic cavities or eustachian tubes. Cloaca opening externally by a longitudinal slit.

The Urodela include about 133 species, distributed principally north of the equator. North America furnishes 54 species, 18 of which, at least, are found in Indiana.

The order as here defined contains 10 families. Of these, two, the Cœcilidæ and the Thoriidæ, are not natives of North America.

KEY TO THE N. A. FAMILIES OF *Urodela*.

- A. Maxillary bone wanting. External gills present at all times of life.
- a. Body eel-like. No posterior limbs. *Sirenidae*, p. 8.
 - aa. Body lizard-like. Two pairs of limbs. *Proteidae*, p. 10.
- AA. Maxillary bone present. No gills in the adult state. All four limbs present.
- a. Body extremely elongated. Both pairs of limbs very rudimentary. *Amphiumidae*, p. 12.
 - aa. Body lizard-like. Anterior and posterior limbs well developed.
 - b. A branchial slit on each side of the neck. Vomero-palatine teeth close to and parallel with those of the premaxillaries and maxillaries. *Cryptobranchidae* p. 15.
 - bb. No branchial slits on the side of the neck. Vomero-palatine teeth considerably behind the premaxillary teeth.
 - c. Parasphenoidal teeth present, forming two brush-like bands along the roof of the mouth. *Plethodontidae*, p. 31.
 - cc. No parasphenoidal teeth.
 - e. Vomero-palatine teeth in a transverse row between, or just behind, the choanæ. *Ambystomatidae*, p. 17.
 - ee. Vomero-palatines in two longitudinal rows along roof of the mouth, on two prolongations backward of the vomers. *Salamandridæ*, p. 44.