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NORTH AMERICAN

HERPETOLOGY;

OR,

A DESCRIPTION

OF THE

REPTILES INHABITING THE UNITED STATES.

BY JOHN EDWARDS HOLBROOK, M. D.

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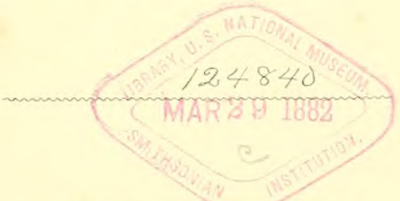

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PREFACE.

The publication of the fourth volume of North American Herpetology affords me another opportunity to thank those gentlemen who have aided me in the prosecution of this work.

To Dr. S. Barker of South Carolina, I am indebted for many living specimens of the Serpents of the lower section of the state, and especially for a magnificent specimen of the Pituophis melanoleucus, or Pine Snake.

Colonel James Ferguson has also procured me several fine specimens of the Water-snakes inhabiting Cooper river.

To Dr. Wurdeman I am indebted for many Serpents found among the mountainous parts of our state, in the neighbourhood of Greenville.

Dr. Edmund Ravenel has done much for me in Ophidiology; he has not only furnished me with a great number of Serpents, but has made some excellent remarks on their habits.

To our distinguished Icthyologist, D. Humphries Storer, M. D., of Boston, I owe many thanks for his aid in this volume, and especially for a living Tropidonotus niger, or Water Adder, of Massachusetts.

J. Hamilton Couper, Esq., of St. Simon's Island, Georgia, has also furnished me with several Serpents of that state; and to him I owe a knowledge of the Gopher Snake, perhaps the largest and most beautiful of our Serpents.

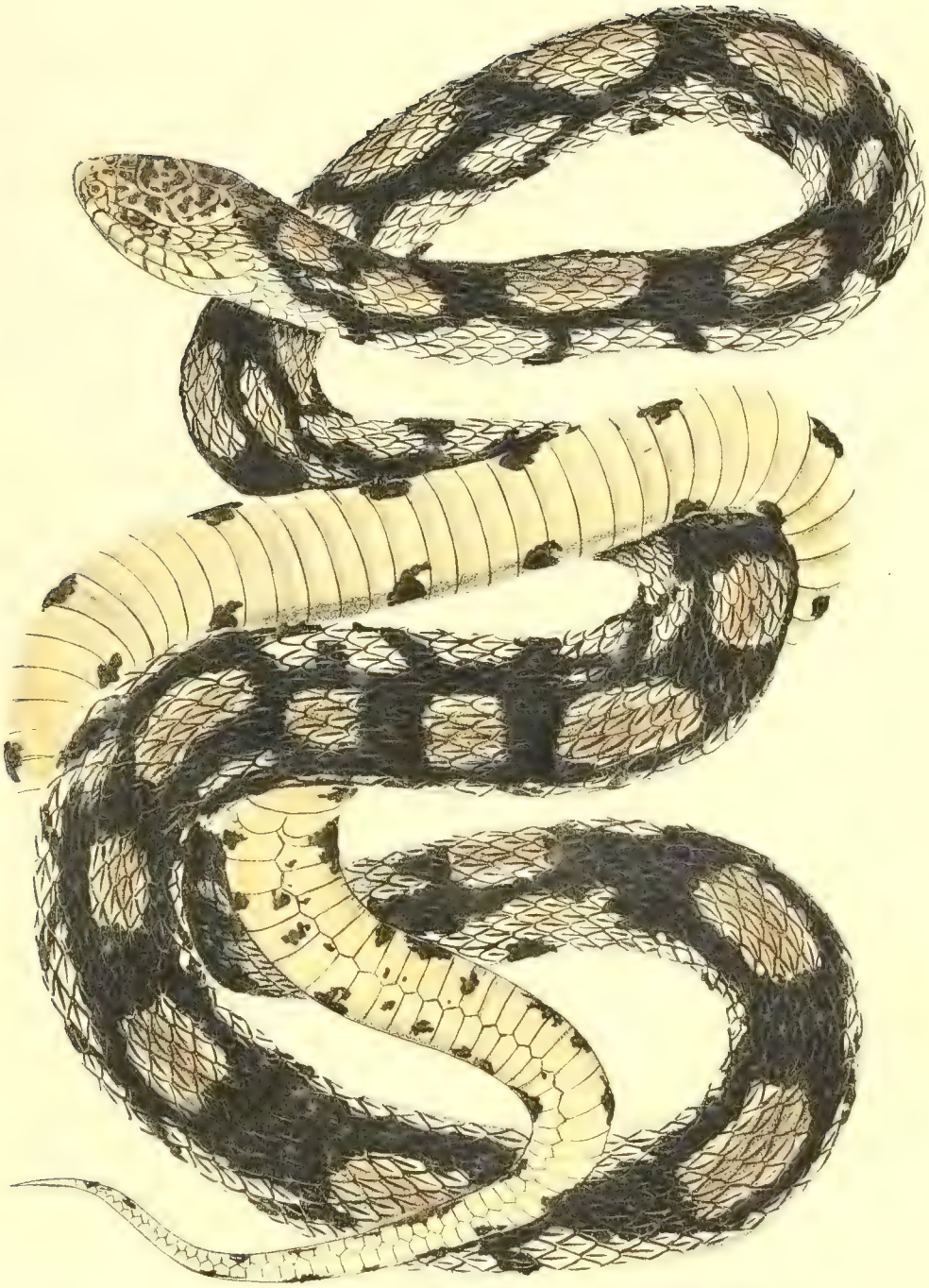
Professor Troost of Nashville, to whom I owe so much in other departments of Herpetology, has sent me several Serpents, and furnished we with a drawing of his Trigonocephalus atrofuscus.

My friend Dr. Dekay has also procured me a good many Serpents, and furnished me with some excellent remarks on their habits.

To Professor Kirtland of Ohio, I give my thanks for a beautiful undescribed Rattlesnake of the western country.

JOHN EDWARDS HOLBROOK.

Medical College, Charleston, South Carolina, 1842.



Pituophis melanoleucus

P.S. Duval, Lith. Phila.

NORTH AMERICAN

HERPETOLOGY.

PITUOPHIS.—*Holbrook.*

Genus Pituophis.—Characters. Head elongated, oval, four sided, with the snout prolonged; frontal plates four, in a transverse row; rostral plate an isosceles triangle, basis rounded and prolonged, its apex pointed and received between the anterior frontal; loral plate single; two anterior and three posterior orbital plates; maxillary teeth large and numerous, arched backwards, nearly all of the same size, rather smaller behind; body large, long, sub-cylindrical, scales carinated.

PITUOPHIS MELANOLEUCUS.—*Daudin.*

Plate I.

Characters. Head elongated, oval; rostral plate large, shaped like an isosceles triangle, prolonged and rounded anteriorly; body, above white, more or less clear, and marked with sub-round black or dusky blotches, and covered with strongly carinated scales. Pl. 216. Sc. 60.

Synonymes. Pine Snake or Bull Snake, *Bartram*, Travels in Florida, &c., p. 276.
Coluber melanoleucus, *Daudin*, Hist. Nat. des Rept., tom. vi. p. 409.
Coluber melanoleucus, *Harlan*, Med. and Phys. Res., p. 122.
Pine Snake or Bull Snake, *Vulgo.*

Description. The head is rather oval, and small for the size of the animal, with the snout elongated and projecting. The vertical plate is very large, pentagonal, broad before, where it is joined to four frontal, narrow and pointed behind, where it passes slightly in between the occipital. The superior orbital are broad, projecting over the eye, of the same length as the vertical, and of an irregular pentagonal form, larger behind and smaller before, with two facets, one for the external frontal, and the other for the anterior orbital. The occipital are polygonal, and most extensive in the transverse direction, and behind them are placed several plates. There are four frontal plates, all elongated, quadrilateral, a little larger anteriorly, and all nearly of the same breadth, but the two internal are longest, the external descend between the anterior orbital and posterior nasal, to join a small quadrilateral loral plate; the anterior frontal are trapezoid, and two in number. The rostral plate is an isosceles triangle, with its base in front greatly prolonged, rounded, hollow below, and its apex directed upwards and backwards, separating the nasal, and deeply received between the anterior frontal plates. There are two nasal plates, the anterior small, irregularly quadrilateral, concave above and lunated behind; the posterior oblong, hexagonal, and concave in front for the nostril. The anterior orbital plate is large, pentagonal, and slightly concave behind, and with an acute angle above projecting between the superior orbital and frontal plates. There are three small, quadrilateral, posterior orbital plates; the inferior wall of the orbit is completed by the fourth labial plate, of which there are eight on each side; the anterior is triangular; the second is pentagonal, and the remaining are quadrilateral.

The eyes are of moderate size, but seem small on account of the projecting superior orbital plate, with a dusky pupil and grey iris. The nostrils are near the snout, large, lateral, and open outwards and backwards. The neck is contracted, and is covered behind the occiput with small smooth scales; soon, however, they become carinated, and increase in size.

The body is very long, though sufficiently robust to make it a strong snake; and is covered above with large, hexagonal, strongly carinated scales on the back, and smooth, though still larger scales low down on the flanks; the belly is

covered with very large and broad plates. The tail is terminated by a horny excrescence or point.

Colour. The plates of the head above are dusky in their centre, often tinged with olive, and are margined with dirty-white; the lips are white, with an olive or dusky bar at the junction of each plate; the throat is white.

The body and tail above are milky-white, more or less clouded, and marked with a vertebral series of oblong black blotches; a second series of blotches of similar colour and of equal length, but much more narrow, is placed on the flanks; the abdomen is pale cream-colour, with a regular series of sub-quadrate black blotches on each side near where the plates join with the scales; these blotches occupy portions of two abdominal plates, and are placed in general opposite each other, and usually at intervals of three plates; these blotches become more irregular at the tail, and finally disappear altogether.

Dimensions. Length of head, 2 inches; length of body to vent, 6 feet 2 inches; length of tail beyond vent, 13 inches: total length, 7 feet 3 inches; greatest circumference, 6 inches. They however reach a greater size: I have seen one 9 feet in length. In the specimen here described there were 216 abdominal plates and 60 sub-caudal bifid plates.

Habits. The Pituophis melanoleucus inhabits the pine forests along the sea coast, but I believe is not found far in the interior of the Atlantic states, though I have heard of its existence west of the Alleghanies. It feeds on rabbits, squirrels, birds, &c., and is timid and "inoffensive with respect to mankind." Although a large animal, it moves with great celerity, and is taken alive with much difficulty, as they frequently have large holes in the earth, to which they precipitately retreat when danger is apprehended. Bartram says, in the season of "*incubation*," it makes "a terrible hiss, resembling distant thunder;" which I have never heard, though I am well acquainted with the animal.

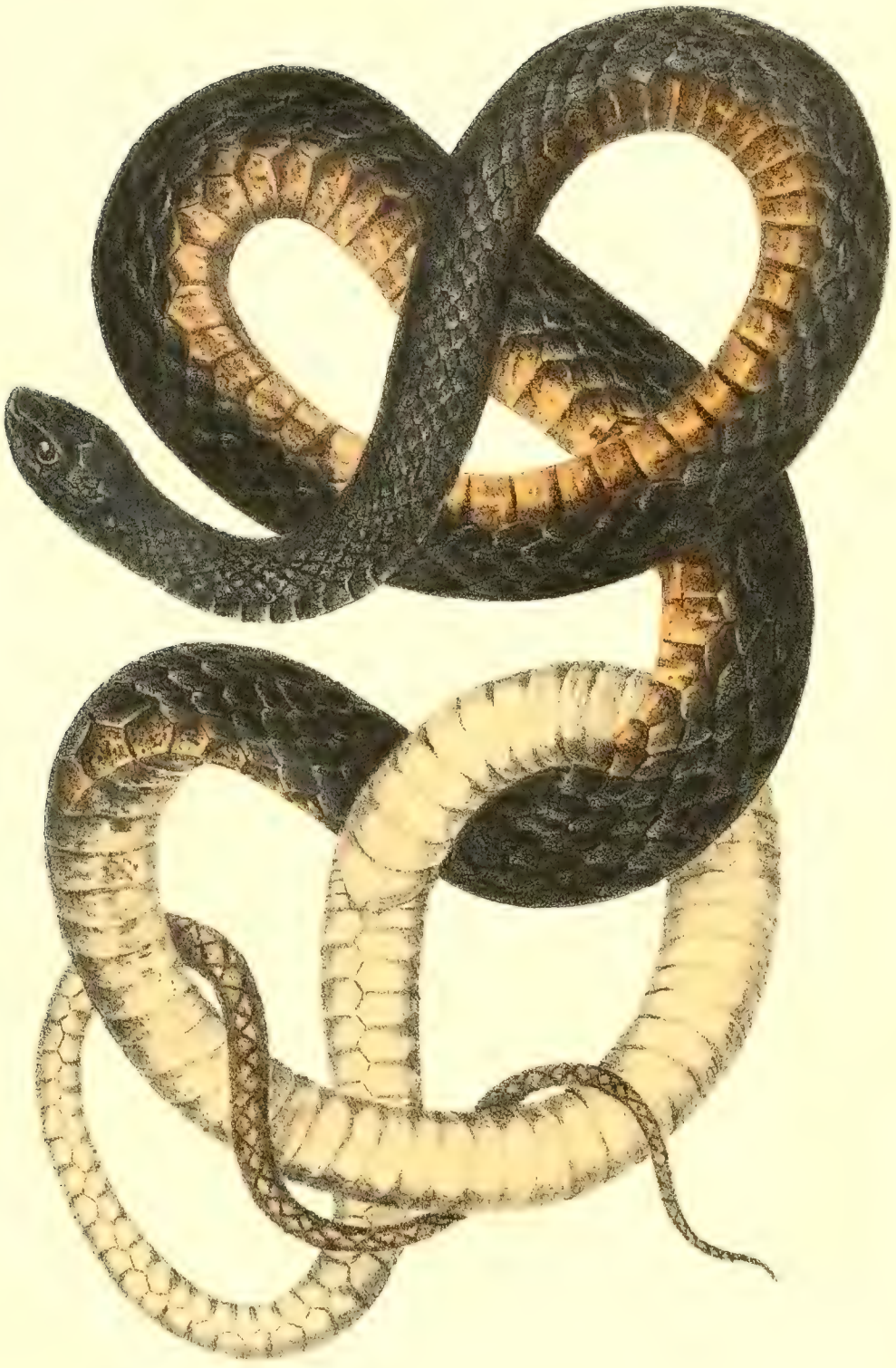
Geographical Distribution. This serpent abounds in the pine forests of New Jersey; though Daudin says Pallisot de Beauvais never saw it in Pennsylvania; where it is, however, common enough. From Jersey, which seems to be its northern limit, it passes through Maryland, Virginia, the Carolinas, Georgia and Florida, always preferring the same pine districts, from which circumstance its common name is derived. How far south-west it may reach, I cannot say, but it certainly has been observed in some of the states beyond the Mississippi river.

General Remarks. A good deal of doubt has arisen as to the propriety of continuing the specific name melanoleucus of Daudin, as his description is copied from Bartram, and is thought to be too short and imperfect to characterize any animal with certainty; hence Cloquet and others have proposed to erase it altogether from our catalogue of reptiles; yet it seems to me that, by proper investigation, it can be made clear to what animal Bartram applied the epithet "*Pine Snake*," and thus the name may be retained. Bartram travelled in Carolina and Florida, where he saw a large snake—"perhaps the largest in North America,"—"pied black and white,"—and called "Pine Snake or Bull Snake;" all this agrees perfectly well with the animal now under consideration, and with no other.

1. It is perhaps the largest snake known to inhabit the United States.

2. Its colour, when the skin has been lately shed, is "pied black and white."

3. The common name Pine Snake is still applied to this serpent wherever it is found.



Psammophis flagelliformis.

PSAMMOPHIS.—*Boie.*

Genus Psammophis.—Characters. Head much elongated, sub-oval; snout prominent, but rounded; loral plate single, long, and large; superior orbital greatly projecting; posterior orbital plates, two; anterior, one; nostrils lateral, near the snout; eyes very large; body long, slender; tail very long.

PSAMMOPHIS FLAGELLIFORMIS.—*Catesby.*

Plate II.

Characters. Head elongated; superior-orbital plate projecting over the eye; body very long and slender; the anterior part shining black, both above and below; the middle mixed brown and white; the posterior part and tail whitish or tawny-colour. Tail one-fourth of total length. Pl. 203. Sc. 109.

Synonymes. Anguis flagelliformis, Coach-whip Snake, *Catesby*, Carolina, &c., vol. ii. tab. 54.
Coach-whip Snake, *Bartram*, Travels in Carolina and Florida, &c., p. 219.
Coluber flagellum, *Shaw*, Gen. Zool., vol. iii. p. 475.
Coach-whip Snake, *Vulgo.*

Description. The head is elongated and narrow, the upper jaw projecting; the vertical plate is pentagonal, larger in front, long and narrow, presenting an acute angle backwards; the occipital plates are triangular, large, covering nearly the whole of the posterior part of the head; the superior-orbital are large, somewhat quadrilateral, and projecting greatly over the eye; the posterior orbital are two in

number, the superior one extending upwards on the supra-orbital projection; and immediately behind these are several scales, taking the place of a temporal plate; the anterior orbital are two in number, the lower very small, the upper also small and expanding on the supra-orbital projection; the loral is short and wide; the frontal plates are quadrilateral; the nasal nearly of the same form; the rostral plate is very small, triangular, and rounded in front.

The nostrils are lateral, large, placed at the junction of two plates, and very near the snout; the eyes are very large, but appear sunken in consequence of the projection of the superior-orbital plate; the pupil is black, the iris dark grey.

The neck is small, the body very long; the tail is long, attenuated like a whip-chord, which it further resembles in the braided appearance produced by the large scales and their dusky margins. The scales are all destitute of a carina, and in general have two points at the apex; those on the upper part of the neck are quite small; on the fore part of the body they are rhomboidal, narrow, and elongated, and on the tail and lower part of the body they are short, broad and sub-rhomboidal.

Colour. The superior surface of the head and neck, and nearly one-third of the body, is glossy raven-black, gradually becoming paler on approaching the tail, which is of a very light brown or tawny-colour; the scales on the tail are rendered conspicuous by their dark margins. The inferior surface of the neck and anterior part of the abdomen is bluish slate-colour; the posterior part white, clouded with brown; some parts of the abdomen are white and shining, as well as the inferior surface of the tail. This snake varies however in colour, or rather in shade; Bartram has seen them of a cream-colour, clay-coloured, and sometimes almost white, but always raven-black near the head.

Dimensions. Length of the head, to the small scales, $1\frac{1}{4}$ inches; of the head and body, 45 inches; of the tail, 16 inches: circumference, $2\frac{1}{4}$ inches: total length, 5 feet 1 inch. Abdominal plates in the specimen figured, 203, and 109 pairs of

sub-caudal scales. This is the measurement of the specimen from which the accompanying plate was taken; it is said they sometimes reach the length of seven feet.

Habits. This beautiful animal is remarkable for the swiftness of its motions, "seeming almost to fly over the surface of the ground."* It feeds on young birds, but only destroys for food. It is inoffensive in its manners, but defends itself with great dexterity when attacked, by twining its long body round the enemy. Bartram gives the following account of it:—"I observed a large hawk on the ground in the middle of the road; when coming up near him, I found him bound up by a very long Coach-whip Snake, that had wreathed itself several times round the hawk's body, who had but one of his wings at liberty. Beholding their struggles awhile, I alighted off my horse with the intention of parting them; when, on coming up, they mutually agreed to separate, each seeking his own safety, probably considering me as their common enemy."

Geographical Distribution. The Coach-whip Snake is found in South Carolina, Georgia, and Florida, but is rare. During a seven years' search I have never seen but one living specimen, which was sent me by Dr. Hay, of Barnwell district, South Carolina.

General Remarks. Of all the species found east of the Mississippi, the Black Snake (Coluber constrictor) is the only one hitherto known that can be compared with the Coach-whip, in the scales, the disposition of the plates on the head, and in its general form.

There is great confusion in the works of European naturalists with regard to this snake. Catesby first made it known under the name "Coach-whip Snake," and gave an excellent figure of it—one of the best in his work; yet it has been

* Bartram, Travels in Carolina, &c., p. 219.

confounded with the Chicken Snake, the Black Snake, the Green Snake, and by some herpetologists has been overlooked altogether.

Linnæus describes a Coluber filiformis,* which some naturalists have considered as our Coach-whip Snake, but it agrees with it neither in colour, the number of its plates, nor in its geographical distribution.

Laurenti next gave a Natrix flagelliformis;† this cannot be the Coach-whip Snake, for he refers to tab. 47 of Catesby, which is the Bluish-green Snake, (Dryinus mycterizans,) and is not an inhabitant of the United States.

Daudin, under his Coluber flagelliformis,‡ adds still more to the confusion; for he refers to the mycterizans, and to tab. 57 of Catesby, which is the Green Snake, that he says is "called by the Anglo-Americans Coach-whip Snake;"—his description, then, of the Coach-whip is taken from the Green Snake! During all this time the plate and description of Catesby were overlooked, till Shaw called the attention of naturalists to them in his General Zoology.

Merrem§ gives a Coluber flagelliformis, but refers to the filiformis of Linnæus and the Natrix filiformis of Laurenti as synonymes; here we find a second reference to Catesby's animal, but it is given doubtingly.

Even that excellent ophidiologist Schlegel has fallen into a similar error with respect to the common name flagelliformis, by supposing it applicable to the animal represented in Catesby's 47th table,‖ which is the Bluish-green Snake, and he applies to the Coach-whip Snake of Catesby what he (Catesby) says of the Bluish-green Snake:—"Ce voyageur dit que le Coach-whip Snake est aussi agile qu'innocent, qu'il habite les arbres et qu'il vit d'insectes," &c.

* Syst. Nat., vol. i. p. 383.

† Synop. Rept., p. 79.

‡ Hist. Nat. des Rept., vol. vi. p. 380.

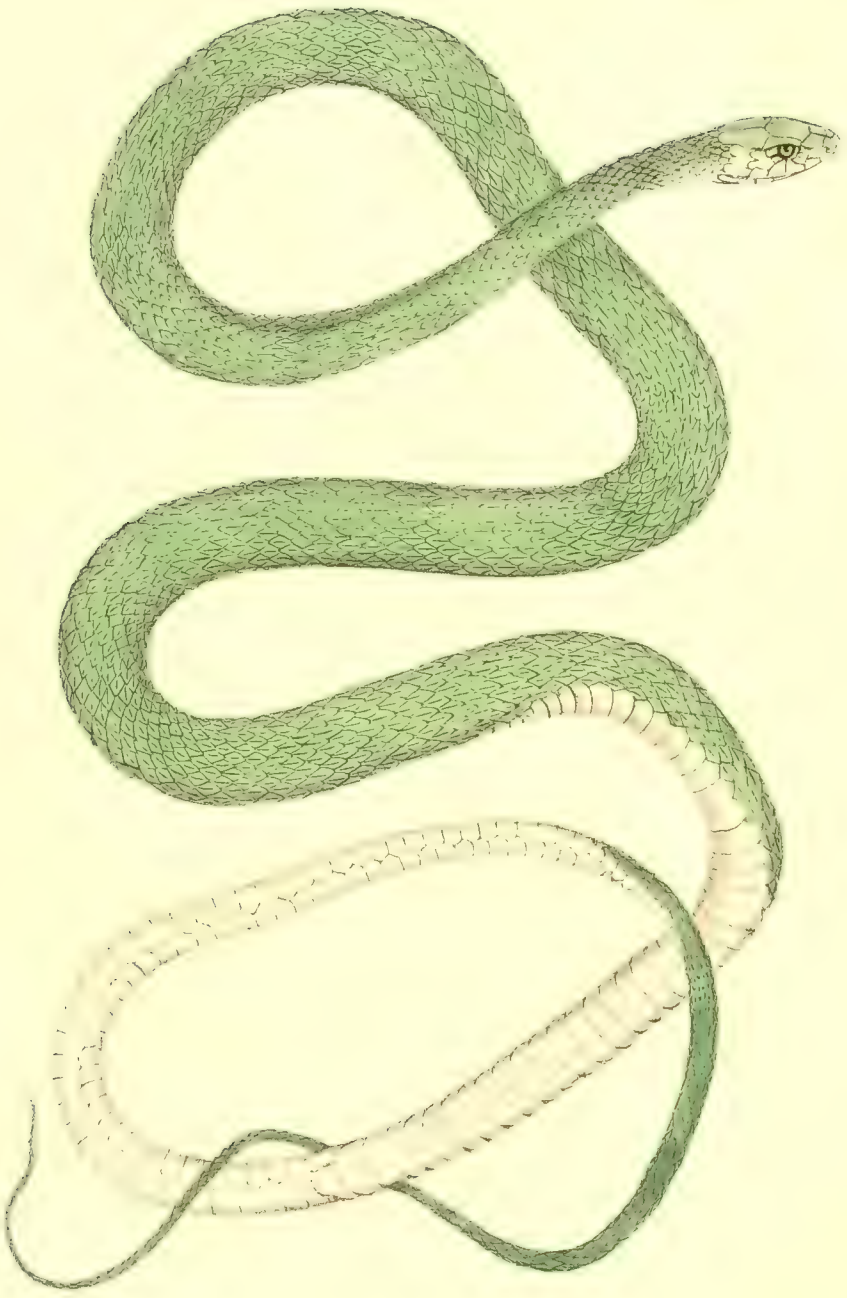
§ Versuch eines Syst. der Amphib., p. 116.

‖ Dryophis Catesbyi, Schlegel, Phys. des Serp., tom. ii. p. 252.

Foreign naturalists have all been deceived in supposing the application of the term of Coach-whip Snake to be much more extended than it really is. Thus Schlegel says that it is applied, without distinction, to several long and slender snakes, which is certainly not the case, for no term is more restricted among our common names of serpents, not even the Black Snake, and has been in common and universal use since the time of Catesby. It is not called Coach-whip Snake from the extreme tenuity of its body, but from the form of the tail, and the manner in which the scales upon it are arranged; these are very large, rhomboidal, slightly imbricated, so as to appear only juxta-posed, which give it precisely the appearance of a whip-cord, and from this is the common name derived.

We have other serpents equally attenuated as the Black Snake, but that is called a Racer, or the Leptophis æstivus, and that is called Green Snake.

It seems, then, that the Coluber flagelliformis has not been described, or even referred to properly, by any systematic writer on natural history, except Shaw; and even his name must yield in priority to that of Catesby.



Leptophis æstivus.

J. H. Richard del.

P. S. Duval, Lith. Phil.ª

LEPTOPHIS.—*Bell.*

Genus Leptophis.—Characters. Head much elongated, sub-oval, narrow, covered with plates, as in Coluber; loral plate single; one anterior orbital and two posterior orbital plates; body long and very slender, covered with sub-hexagonal carinated scales; tail very long.

Remarks. The genus Leptophis was very properly separated by Mr. Bell from that of Coluber, because of its extremely long and attenuated body, length and slenderness of tail, breadth of abdominal plates, &c. &c.

LEPTOPHIS ÆSTIVUS.—*Linnæus.*

Plate III.

Characters. Head long, narrow, sub-oval, pointed in front, and covered with plates; body and tail both very long, slender, above green, below yellowish-white; scales carinated. Pl. 160. Sc. 140.

Synonymes. Green-snake, *Catesby*, Carolina, &c., vol. ii. p. 57, pl. lvii.
Coluber æstivus, *Linnæus*, Syst. Nat., vol. i. p. 387.
Coluber æstivus, *Gmelin*, Syst. Nat. Lin., vol. i. pars iii. p. 1114.
La verdâtre, *Lacépède*, Hist. des Serp., tom. ii. p. 313.
Coluber æstivus, *Latreille*, Hist. des Rept., tom. iv. p. 140.
Coluber æstivus, *Daudin*, Hist. Nat. des. Rept., tom. vii. p. 101.
Coluber æstivus, *Harlan*, Med. and Phys. Res., p. 121.
Green-snake, *Vulgo.*

Description. The head is much elongated, oval, narrow, and rather pointed in front, and covered with plates, of which the vertical is elongated, pentagonal, broadest in front and pointed behind. The superior orbital is oblong, quadrilateral, and projects slightly over the eye. The occipital plates are very large and irregularly pentagonal. The frontal plates are pentagonal, and narrow externally, where they descend to join a small, quadrilateral, loral plate. The anterior frontal are quadrilateral, with their posterior and external angles prolonged. The rostral plate is semicircular, concave below and convex above. The nasal plate is single on each side, regularly quadrilateral, and perforated in the centre for the nostril. There is one anterior orbital plate, large, quadrilateral, concave behind, and two smaller posterior orbital plates. The inferior margin of the orbit is completed by the third and fourth labial plates, which are six in number; the last is a parallelogram, and very large.

The nostrils are large, and placed laterally. The eyes are large; the pupil black, the iris golden. The neck is much contracted. The body is greatly elongated, and covered with carinated scales above and on the sides; the two or three inferior rows only are smooth. The tail is very long, cylindrical, and pointed at the tip.

Colour. The colour of the whole animal above is golden-green, more or less bright, according to the age of the animal or season of the year; below it is a milky-white.

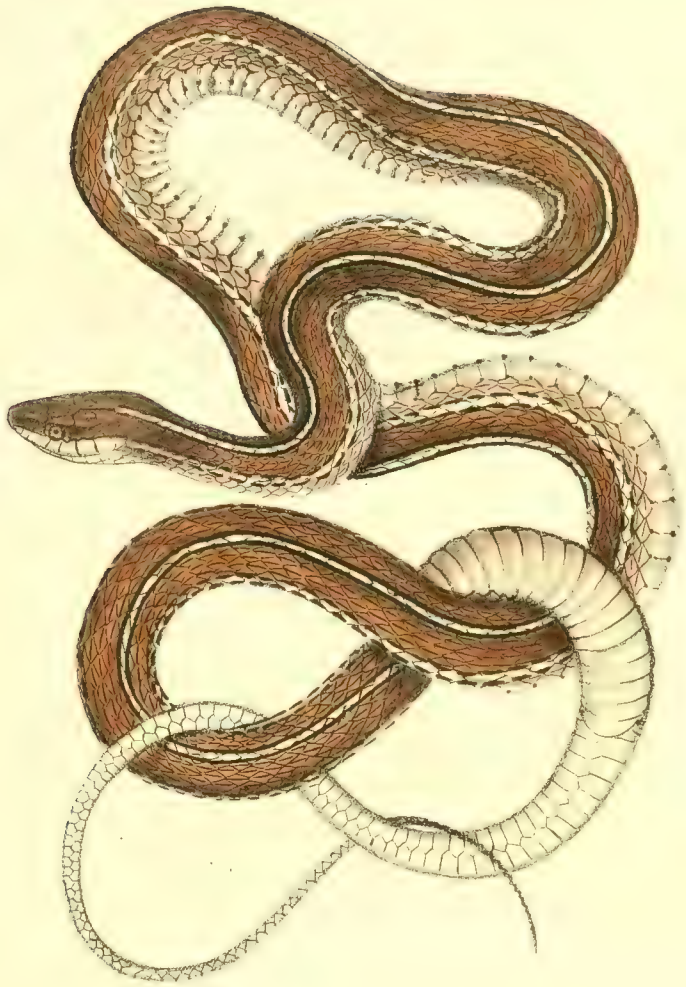
Dimensions. Length of head, 10 lines; greatest breadth of head, 4 lines; length of body, 22 inches; length of tail, 12 inches; circumference of body, 1 inch. In the individual here described there were 160 abdominal plates and 140 sub-caudal bifid plates.

Habits. This beautiful snake is perfectly harmless and gentle, easily domesticated, and takes readily its food from the hand. I have seen it carried in the pocket, or twisted round the arm or neck as a plaything, without ever evincing

any disposition to mischief. In its wild state it lives among the branches of trees and shrubs, shooting with great velocity from bough to bough, in pursuit of the insects which serve as its nourishment. Its green colour, similar to the leaves among which it lives, afford it protection against those birds which prey upon it.

Geographical Distribution. This animal abounds in Carolina, whence it extends through the southern and south-western states to Texas; how much further south or west it may be found, cannot at this time be said. The northern limit of the Coluber æstivus is also uncertain; Professor Geddings has seen it near Baltimore, and Dr. Pickering has "been credibly informed of its existence not far from Philadelphia." Beyond this latitude it probably does not reach, its place farther north being supplied by the Coluber vernalis of Dekay, an animal to which it bears much resemblance.

General Remarks. There is no doubt that this animal was first made known to naturalists by Catesby, who called it the Green Snake, and described its habits very accurately. Linnæus, however, gave the first scientific description of it, from a specimen sent him by Dr. Garden, and called it Coluber æstivus, by which name it has since been generally known.



Leptophis sauritus.

Richart del. *P.S. Duval Lith. Phil.*

LEPTOPHIS SAURITUS.—*Linnæus.*

Plate IV.

Characters. Head oval, much elongated; snout prolonged, though rather rounded at the apex; body very long, slender; tail very long, thin, pointed at the tip; colour, above dusky brown, trilineate, vertebral line pale yellow, often tinged with green; lateral lines clouded yellowish-white; abdomen pale yellow, tinged with green, immaculate. Pl. 165–167. Sc. 117–121.

Synonymes. Riband Snake, *Catesby*, Carol., &c., vol. ii. p. 50, pl. 1.
Coluber saurita, *Linnæus*, Syst. Nat., tom. i. p. 385.
Coluber saurita, *Gmelin*, Syst. Nat. Lin., tom. i. pars iii. p. 1109.
Le saurite, *Lacépède*, Hist. Nat. des Serp., tom. ii. p. 308.
Coluber saurita, *Latreille*, Hist. Nat. Rept., tom. iv. p. 178.
Coluber saurita, *Daudin*, Hist. Nat. des Rept., tom. vii. p. 104, pl. 81, fig. 2.
Coluber saurita, *Shaw*, Gen. Zool., vol. iii. part ii. p. 532.
Natrix saurita, *Merrem*, Versuch eines Syst. der Amph., p. 122.
Coluber proximus, *Say*, Long's Exped. to Rock. Mount., vol. i. p. 187.
Coluber saurita, *Fitzinger*, Neue Class der Rept., p. 53.
Coluber saurita, *Harlan*, Med. and Phys. Res., p. 115.
Coluber proximus, *Harlan*, loc. cit., p. 116.
Riband Snake at the south, Swift Garter Snake at the north, *Vulgo.*

Description. The head is ovoid, very long, and rather large in proportion to the body, with the snout somewhat prolonged, though rounded at its apex. The vertical plate is large, elongated, and hexagonal; the superior orbital are of equal length with the vertical, quadrilateral, narrow, broader behind, and projecting over the eye. The occipital are irregularly triangular, with all their angles

rounded, and are broadest before. The frontal plates are broad and pentagonal, broadest within, narrow without, where they descend to a small, quadrilateral, loral plate; the anterior frontal are irregularly quadrilateral, narrow in front, with their posterior and external angles pointed and prolonged. The rostral plate is rather small and pentagonal; there are two nasal plates, the anterior of which is small and regularly quadrilateral; the posterior is also small, and irregularly pentagonal, and hollowed before for the nostril. The anterior orbital plate is single, very long, pentagonal, slightly curved behind, and ascending to the plane of the forehead; there are three small posterior orbital; and the inferior wall of the orbit is completed by the fourth and fifth superior labial, of which plates there are seven, all large: the anterior pentagonal; the second quadrilateral; the third, fourth and fifth pentagonal; the sixth again quadrilateral; and the seventh triangular.

The nostrils are near the snout, lateral, but open obliquely upwards. The eyes are of moderate size; the pupil is dusky, with the iris yellowish-grey and brilliant. The neck is contracted, much smaller than the head, and covered with small, hexagonal, carinated scales.

The body is very long, slender, and covered above with scales of similar form to those of the neck, but larger, all carinated, notched behind, and with plates below. The tail is very long, thin, and terminates in a point.

Colour. The head above is light olive-brown; the labial plates have a greenish-yellow tinge, marked at their place of union with a dusky line; each occipital plate is marked with a small yellow spot; this mark is, however, not constant: I have never seen it wanting in the southern animal, but it is not always found in the northern, and in some rare examples it is double: the large anterior orbital plate is olive in front, but its posterior half is yellow, which gives a peculiar physiognomy to the serpent.

The body above is dusky if seen at a distance, but if examined closely and in a

certain light appears to be brown, often tinged with olive, and marked with three longitudinal lines. The vertebral one begins between the occipital plates, is of pale greenish-yellow, and becomes obsolete an inch or two from the tail; this line occupies the vertebral scale, and the half of one scale on each side, and has a straight border throughout its whole extent. The lateral lines or bands are broader, more or less distinct, including two scales or more, with margins less regular; they are of dirty yellowish-white, tinged with green; on each side of these lines are dusky or black small rhomboidal spots, sometimes arranged in a row. The abdomen is shining milky white, with a tinge of green. The tail is coloured like the body, but the lateral lines only continue for a short distance behind the vent.

Dimensions. Length of head 10 lines; length of body, 23 inches; length of tail, 12 inches: total length, 35 inches 10 lines. This animal at times reaches the length of nearly four feet; in general, however, they are found between two and three feet long. In the specimen here described, there were 165 abdominal plates, and 117 sub-caudal scales; but this number is by no means constant, as I have seen by comparing several animals—among others the following, now in the Museum of the Academy of Natural Sciences at Philadelphia:

1. A specimen from Missouri, given by Mr. Eckhart: abominal plates, 156; sub-caudal scales, 121.—2. One from Pennsylvania, by Dr. Allison: abdominal plates, 150; sub-caudal scales, 112.—3. One from Delaware, by Dr. Green: abdominal plates, 156; sub-caudal scales, 93; tail imperfect.—4. One from Key West: abdominal plates, 160; sub-caudal scales, 125.—5. One from South Carolina: abdominal plates, 147; sub-caudal scales, 117.

Geographical Distribution. The Leptophis sauritus has a widge range. I have seen it in most of the states from Maine to Georgia; and have received specimens from Louisiana, Arkansas and the far west; and, if I am correct in supposing this animal identical with the Coluber proximus of Say, which I doubt not, then does it reach the very foot of the Rocky Mountains. It only differs

from our animal, according to Say, "in the numerical proportion that its sub-caudal scales bear to its abdominal plates;" which is not sufficient of itself to distinguish animals so closely allied.

General Remarks. The first account of this serpent may be seen in Catesby's History of Carolina, &c.; where it is figured and described under the name of Riband Snake; which it bears to the present time with us among all classes of people. Linnæus received it into the twelfth edition of the Systema Naturæ, and applied to it the specific name saurita, which has been universally adopted by naturalists; nor can there be a doubt of his meaning, for his only references are to Catesby and to Dr. Garden: although the number of sub-caudal scales he gives does not agree with my observations, yet this might have been the result of accident in the specimen that he examined.

Tropidonotus fasciatus

Sera pinxt

5.

TROPIDONOTUS.—*Kuhl.*

Genus Tropidonotus.—Characters. Head oblong-ovate, depressed, distinct; two nasal plates; eyes moderate, pupil round; loral plate single; anterior orbital the same; scales sub-hexagonal, elongated, and strongly carinated.

Remarks.—The genus Tropidonotus includes a great many species, even in this country. Those with us resemble each other so nearly, except in colour, that they might be described as almost simple varieties of the same animal. These are mostly water-snakes, and are remarkable for their strongly carinated scales. In this genus again is seen that peculiar arrangement of the ribs, by means of which the animal can flatten itself during life.

TROPIDONOTUS FASCIATUS.—*Linnæus.*

Plate V.

Characters. Head large, sub-oval, elongated, flattened, broader behind, rounded at the snout; body elongated, thick, covered with carinated scales, dusky, with about thirty oblong or triangular marks of red on the flanks.

Synonymes. Coluber fasciatus, *Linnæus*, Syst. Nat., vol. i. p. 378.
Coluber porcatus, *Latreille*, Hist. Nat. Rept., tom. iv. p. 82, pl. xxix. fig. 1.
Coluber porcatus, *Daudin*, Hist. Nat. des Rept., tom. vii. p. 204.
Coluber porcatus, *Bosc*, Nouv. Dict. d'Hist. Nat., tom. viii. p. 264.
Coluber porcatus, *Harlan*, Med. and Phys. Res., p. 119.

Description. The head is flattened and much elongated, broader behind, and rounded at the snout; its superior surface is covered with plates. Of these, the vertical is pentagonal, largest in front, and pointed posteriorly; the superior orbital are elongated and quadrilateral, with their outer margins prominent; the occipital are very large, irregularly oblong, broadest internally. The frontal plates are pentagonal, smallest without, where they join a single quadrilateral loral plate; the anterior frontal are smaller, trigonal, with their apices directed forwards, and truncate. The rostral is semicircular, concave below, convex above. The two nasal plates are quadrilateral; the anterior concave behind, and the posterior concave in front. There is but one anterior orbital plate, which is very large, quadrilateral, and reaches from the frontal to the labial line. There are two posterior orbital plates; the superior is the largest. There are eight labial plates, increasing in size to the sixth, and then diminishing.

The nostrils are lateral, large, and near the snout. The eyes are large and bright, the pupil black, the iris grey, with a tinge of red. The neck is smaller than the head, and covered with carinated scales. The body is long, but thick, and covered with very strongly carinated scales above, which give it an exceedingly rough appearance; all the scales are notched at their posterior extremity. The tail is moderate and thick, and rather triangular.

Colour. The head is dark brown, with the superior labial plates dirty reddish-white, marked with darker lines that distinguish the junction of the plates. The body above is very dark brown, with irregular oblong or triangular purplish-red spots on the flanks, which are insensibly lost about midway between the abdomen and vertebral line. These, however, are more extensive in the young than in the adult, as well as much brighter. In old animals they become nearly obsolete, so that the whole superior and lateral surface becomes of a brownish colour; it then requires washing to bring out the red spots; and even this may not succeed, unless the animal has recently shed its skin.

Dimensions. Length of head, 1 inch 6 lines; greatest breadth of head, 11 lines;

length of body, 20 inches; length of tail, 8 inches; circumference of body, 5 inches. In the specimen described there were 140 abdominal plates, and 42 pair of subcaudal scales.

Habits. The Tropidonotus fasciatus lives most of its time in water, or about the banks of ponds and rivers, preying on frogs and other smaller reptiles that frequent the same localities. It swims with great rapidity, and hundreds at a time may be seen darting through the water in all directions, constantly protruding their tongues, as if to feel the objects before them. It is a bold animal, even in confinement, and is one of the very few snakes that will, in such a situation, readily devour its prey. In summer it rests on the lower branches of such trees as overhang the water, like the Trigonocephalus piscivorus.

Geographical Distribution. I would assign, for the present, North Carolina or southern Virginia for the northern limit of the Tropidonotus fasciatus; beyond that its place is supplied by the Tropidonotus sipedon. How far south and west it may reach cannot be stated with certainty; I have received it from Louisiana, and all the intermediate states.

General Remarks. There is, in my opinion, no doubt that this is the animal sent by Dr. Garden to Linnæus, and by him described as the Coluber fasciatus, as the general colouring, the particular marks, its habitat, and the carinated scales, all go to prove. Linnæus himself seems to have hesitated to which of Catesby's animals he should refer the one sent by Dr. Garden, for he quotes the Wampum-snake with doubt, which it cannot be, as in this the scales are carinated, and in that, which is probably the Coluber abacurus, they are smooth; yet in this reference he has been almost universally followed by naturalists.

My belief is, that he should have referred it to the Brown Viper of Catesby,* which was probably drawn from a specimen imperfectly coloured; for not unfre-

* Catesby's Carolina, &c., vol. ii. pl. xlv.

quently the old Tropidonotus fasciatus, before it has shed its skin, resembles nearly Catesby's plate, with the exception of the fangs.

Another reason for believing that the animals are identical, is that after twelve years' search, both in Carolina and in Virginia, where he represents the Brown Viper as abounding, under the name Truncheon Snake, I have never seen any animal bearing the least resemblance to Catesby's figure, except the Tropidonotus fasciatus; and my friend Professor Geddings, who, during a residence of some years in the lower districts of Carolina, where he observed these animals closely, is of the same opinion.

The fangs of Catesby's figure, and the "bite venomous as any" of his description, must go for nothing; for he saw the same thing and figured similar fangs for the Black Viper, where they never exist, and which is now known to be a harmless animal. If this opinion be correct, and the animals are identical, and of that I have little doubt, then the Brown Viper must be stricken from the list of serpents, and its synonymes transferred to the Tropidonotus fasciatus, as the Coluber tisiphone, Scytalus tisiphone, &c. &c.

Tropidonotus sipedon

TROPIDONOTUS SIPEDON.—*Linnæus.*

Plate VI.

Characters. Head large, sub-oval, flattened above; snout rounded; body dusky above, with a row of sub-quadrate reddish-brown blotches on the flanks, connected by a transverse dirty white bar, margined with black. Pl. 145. Sc. 67.

Synonymes. Coluber sipedon, *Linnæus*, Syst. Nat., tom. i. p. 379.
La sipéde, *Lacépède*, Hist. Nat. des Serp., tom. ii. p. 305.
Coluber sipedon, *Gmelin*, Syst. Nat. Linn., tom. i. pars iii. p. 1098.
Coluber sipedon, *Latreille*, Hist. Nat. Rept., tom. iv. p. 177.
Coluber sipedon, *Daudin*, Hist. Nat. des Rept., tom. vii. p. 148.
Coluber sipedon, *Shaw*, Gen. Zool., vol. iii. part ii. p. 496.
Natrix sipedon, *Merrem*, Versuch eines Syst. der Amphib., p. 124.
Coluber sipedon, *Harlan*, Med. and Phys. Res., p. 114.
Coluber cauda schistosus, *Harlan*, Med. and Phys. Res., p. 124.
Water Snake, *Vulgo.*

Description. The head is large, sub-oval, flattened above, with the snout rounded; the vertical plate is pentagonal, broad, and nearly of the same size throughout, only a little smaller behind; the superior orbital are elongated, narrow, quadrilateral, broadest behind, and project over the eye; the occipital plates are very large, oblong, and broadest before; the frontal are sub-pentagonal and large, smaller where they descend to a single large rhomboidal, loral plate; the anterior frontal are smaller, and of sub-trapezoidal form; the rostral plate is hexagonal, short, small, truncated in front, rounded above and concave below; there are two quadrilateral nasal plates, the anterior lunated behind, and the posterior crescentic in front, to form the nostril; the anterior orbital plate is single, irregularly

pentagonal, elongated, most extensive vertically, passing in between the frontal and superior orbital, though it does not completely separate them; there are three sub-round posterior orbital, behind which are two oblong, large temporal; the inferior wall of the orbit is completed by the fourth and fifth labial, of which plates there are eight on each side, all more or less regularly quadrilateral.

The nostrils are lateral and near the snout. The eyes are rather large, the pupil black, with the iris grey. The neck is contracted, and covered with small, sub-hexagonal, strongly carinated scales.

The body is long but robust, and covered with scales similar to those of the neck, but much larger, and slightly notched posteriorly, and with broad plates below. The tail is large and triangular in form, broader below and narrower above.

Colour. The head is dusky above; the jaws are olive, tinged with yellow, and varied with dusky at the junction of the labial plates; the lower jaw is of lighter colour. The body above is dark brown, and on each flank is a series of large sub-quadrate, reddish-brown spots, extending to the abdominal plates; from the superior margin of these blotches runs a light coloured transverse band to connect them with the spots of the opposite side; these bands are margined with black both before and behind; in the young snake the bands are very beautiful, but in the adult they become more or less indistinct, but can always be seen in the middle when the serpent has lately cast its skin. The throat is dirty white; the ground colour of the belly is dirty white, often with a reddish-brown tinge, the different plates being marked with small waving lines, clouded with dusky, and most so near the tail, where the markings both above and below are finally lost.

Dimensions. Length of head, $1\frac{1}{4}$ inches; length of body, 28 inches; length of tail, 8 inches: total length, $37\frac{1}{4}$ inches. They are not unfrequently seen of greater dimensions. In the specimen here described there were 145 abdominal plates, and 67 sub-caudal bifid plates.

Habits. The Tropidonotus sipedon is not unlike the Tropidonotus fasciatus of the south in its habits, of which indeed it seems the northern representative; it feeds on frogs, toads, fish, &c.; is commonly found in damp places in or near water, and is often seen resting on the low branches of trees that overhang the water.

Geographical Distribution. This serpent is common in the stagnant or slow moving waters of the northern or middle states; I have seen them on the Atlantic border from New Hampshire to Delaware.

General Remarks. I have often doubted whether this serpent were the Coluber sipedon of Kalm; for his description is so short and imperfect as to characterize no one animal with certainty; and besides, imperfect as it is, it by no means applies in general to the serpent now under consideration, as may be seen by a reference to the colours above. The only way in which we can reconcile Kalm's description with the animal, is to suppose that he observed such snakes as had the transverse bars indistinctly marked, which not unfrequently happens in old animals; but then these bars may even then be seen if the skin be carefully washed.

Tropidonotus erythrogaster

C.S. Duval, Lith. Phil.

TROPIDONOTUS ERYTHROGASTER.—*Shaw.*

Plate VII.

Characters. Head elongated; body long, covered with carinated scales above; whole superior surface of animal brick-dust colour, with a tinge of green at the sides; abdomen and tail uniform copper colour. Pl. 147. Sc. 60.

Synonymes. Coluber erythrogaster, *Shaw*, Gen. Zool., vol. iii. p. 458.
Copperbellied-snake, *Catesby*, Carolina, &c., vol. ii. p. 46.
Copperbelly, *Vulgo.*

Description. The head is large, but elongated and rather pointed at the snout, and covered with large plates. The vertical plate is regularly pentagonal, broadest in front; the superior orbital are quadrilateral, elongated, narrow. The occipital are irregularly pentagonal, broadest anteriorly. The frontal plates are quadrilateral and large; the anterior frontal are of similar shape, but small. The rostral is large and semicircular, concave below, convex above. There are two nasal plates, quadrilateral, and nearly of the same size; the anterior is concave posteriorly, and the posterior lunated in front. There is but one anterior orbital plate, and two posterior, smaller, and nearly quadrilateral. The inferior wall of the orbit is completed by the fourth and fifth labial plates, which are eight in number, quadrilateral, and largest posteriorly.

The nostrils are lateral, and very near the snout. The eyes are large and bright; the pupil dark, the iris grey, with a tinge of red. The neck is contracted; the body very stout, and covered with strongly carinated scales, notched on their

posterior part. The tail is long, compressed, triangular, and terminates in a point; covered with carinated scales above, and bifid plates below.

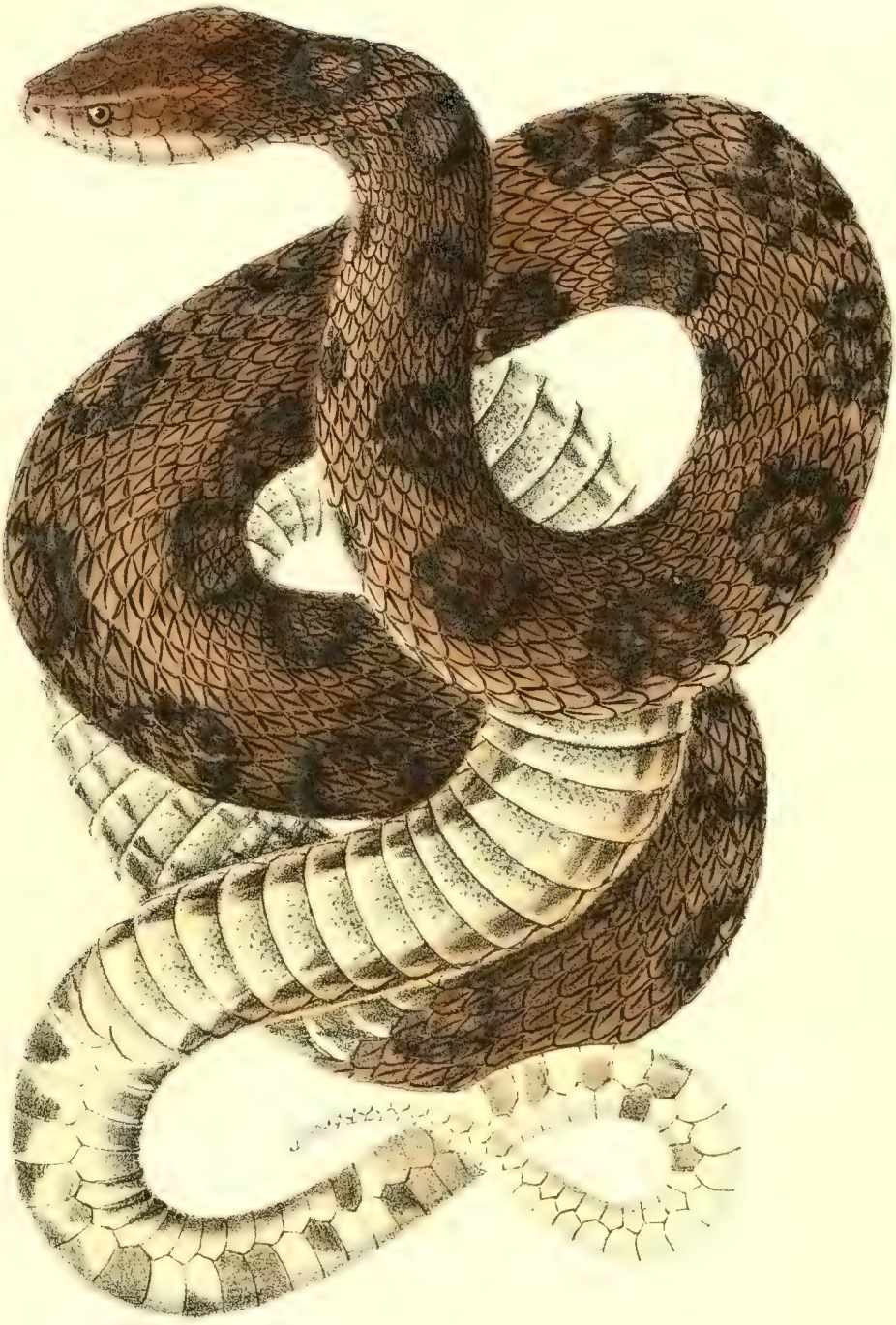
Colour. The whole superior surface of the animal, body, head, neck, and tail, is brownish-red, or brick-dust colour; the sides are tinged with green near the abdomen; the whole inferior surface is uniform copper colour.

Dimensions. Length of head, 1½ inches; greatest breadth of head, 11 lines; length of body, 32 inches; length of tail, 11 inches. The specimen described had 147 abdominal plates, and 60 pair of sub-caudal bifid plates.

Habits. The habits of the Tropidonotus erythrogaster seem closely allied to those of the Tropidonotus fasciatus; they are found in similar localities, and live on similar food, though the former is less numerous than the latter.

Geographical Distribution. I have never hitherto heard of the existence of this snake northward of South Carolina; its range extends through that state, Georgia, Alabama, and along the northern shores of the Gulf of Mexico. Professor Green, of Philadelphia, has in his possession a specimen taken as far west as Amity county, Louisiana.

General Remarks. This animal was first described by Catesby, under the name of Copperbellied Snake, who gave also a pretty good drawing of it; and Foster, in his catalogue appended to Catesby, called it Coluber erythrogaster; since which work it has been overlooked by some naturalists, and by others referred to the Coluber porcatus of Bosc.



Tropidonotus taxispilotus

J H Richard, del

P S Duval, Lith Phil.ª

TROPIDONOTUS TAXISPILOTUS.—*Holbrook.*

Plate VIII.

Characters. Head sub-oval, elongated, covered with large plates above; body elongated, but thick, light chocolate-brown, with a triple series of sub-quadrate and oblong black spots. Pl. 144. Sc. 79.

Description. The head is elongated, sub-oval, flattened above, and covered with large plates. The vertical plate is very regularly quadrilateral; the superior orbital is irregularly oblong, obtusely pointed anteriorly. The occipital are broad, rounded, and notched irregularly posteriorly; behind these are two large temporal plates on each side. The frontal are regularly hexagonal; the anterior frontal elongated and triangular, with their apices truncated. The rostral plate sub-pentagonal, rounded above, concave below. There are two nasal plates, quadrilateral; the anterior hollowed behind, and the posterior concave in front, to form the nostril. There are two quadrilateral posterior orbital plates, nearly of the same size; there is but one anterior orbital, nearly a parallelogram. The inferior wall of the orbit is completed by the superior labial plate; there are eight of these, quadrilateral, the smallest anterior.

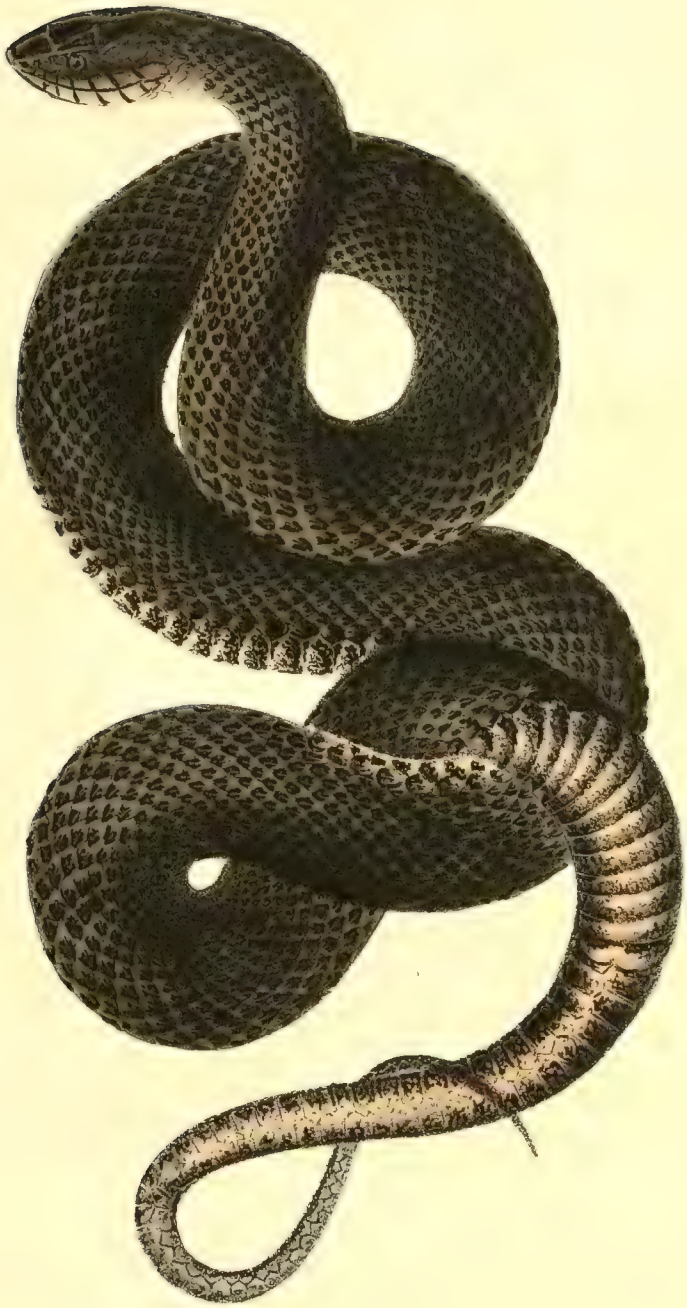
The nostrils are large, and open upwards and outwards, and near the snout. The eyes are large and prominent, the pupil dark, the iris gray. The posterior part of the head and neck is covered with small carinated scales. The neck is much contracted. The body is elongated, but large, and covered with hexagonal and very strongly carinated scales, notched posteriorly. The tail is thick at the root, sub-triangular, and long.

Colour. The head is dark brown; the whole superior surface of the neck and body is a light chocolate-brown. Along the vertebral line is a series of sub-quadrate black spots, lighter in the centre, and on each flank a row of oblong spots or blotches of the same shade—the different series of spots are occasionally confluent, so as to form bars. The abdominal plates are dirty white, most of them with a black spot near the extremity, and the centre dotted minutely with black.

Dimensions. Length of head, 1 inch 5 lines; length of body, 28 inches; length of tail, 5 inches 6 lines: total length, 35 inches. The individual here described had one hundred and forty-four abdominal plates, the posterior bifid, and seventy-nine sub-caudal bifid plates.

Habits. This animal is quite new to me; consequently I am ignorant of its habits. Dr. Geddings, however, informs me that it is a water-snake.

Geographical Distribution. As yet only two specimens of this serpent have come under my observation; one from the sea-board of South Carolina, the other from the neighbourhood of the Altamaha river in Georgia.



Tropedinotus niger

TROPIDONOTUS NIGER.—*Holbrook.*

Plate IX.

Characters. Head large, sub-oval; body elongated, rather slender, above dusky brown, at times almost black; throat and neck milky-white; abdomen and tail beneath, slate colour, more or less relieved in the centre with milky-white. Pl. 143. Sc. 64.

Description. The head is large, sub-oval, with the snout rounded. The vertical plate is hexagonal, broadest before, and with an acute angle behind; the superior orbital are oblong, quadrilateral, largest behind, and project over the eye. The frontal plates are broad, hexagonal, and descend outwardly to a large quadrilateral loral plate; the anterior frontal are rhomboidal and small. The occipital plates are large and pentagonal; the temporal are two in number, and the anterior larger. The rostral is hexagonal, and hollowed out on its inferior face; there are two nasal plates, quadrilateral, the one concave behind and the other before, to accommodate the nostril. There is a single large anterior orbital and two small posterior orbital plates; the inferior portion of the orbit is completed by the fifth and sixth labial plates, of which there are eight, quadrilateral and large.

The nostrils are near the snout, and open a little upwards and outwards. The eyes are large, with the pupil black, and the iris smoky-grey. The neck is contracted.

The body is long and more slender than in any other of our water-snakes, and is covered above with hexagonal, carinated scales, notched at their posterior extremities. The tail is long and triangular.

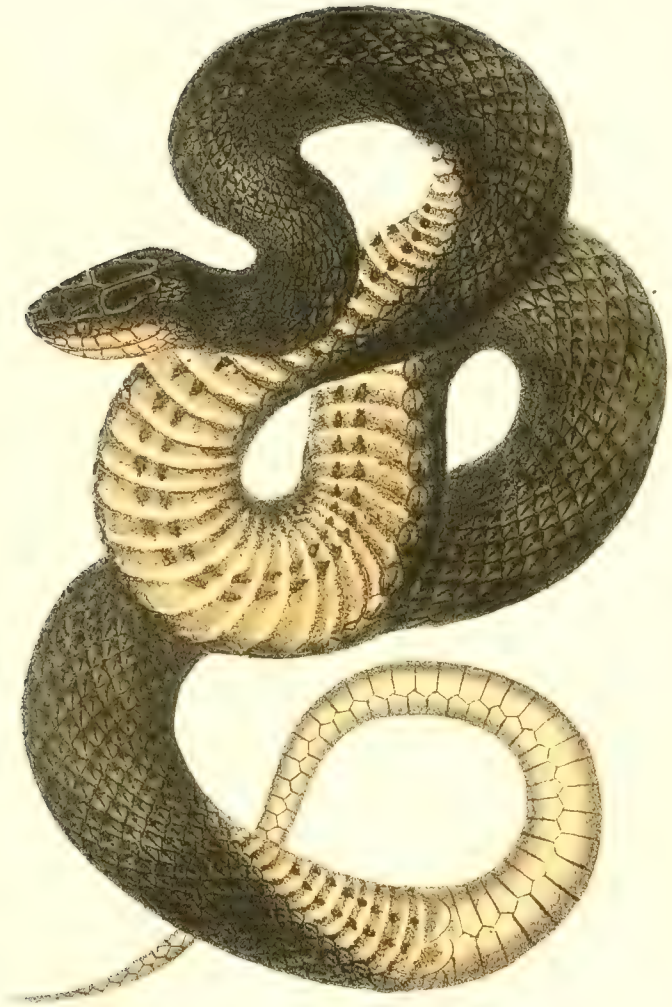
Colour. The whole superior surface of the animal is dusky-grey; the throat milky-white; the abdomen and under surface of the tail is slate colour, more or less relieved in the centre by milky-white.

Dimensions. Length of head, 1 inch; length of body, 20 inches; length of tail, 8 inches: total length, 2 feet 5 inches. In the specimen here described, there were 143 abdominal plates and 64 pair of sub-caudal bifid plates.

Habits. The Tropidonotus niger feeds on small reptiles, as frogs, toads, &c., and is a harmless snake, although commonly considered venomous.

Geographical Distribution. The Tropidonotus seems to be peculiarly a northern animal, never having as yet been observed in Pennsylvania, though abundant in the New England states, where it is known under the name of Water Adder. The beautiful specimen, from which the accompanying plate was taken, was sent to me by Dr. Storer, of Boston, who informs me that it was captured at Cambridge.

General Remarks. This animal in New Hampshire represents the Tropidonotus fasciatus of the south, and Tropidonotus sipedon of the middle states.



Tropidonotus rigidus

P.S. Duval, Lith. Phil.ª

TROPIDONOTUS RIGIDUS.—*Say.*

Plate X.

Characters. Body above, brown; abdomen brownish-yellow; each plate with two oblong dark spots near the centre, so disposed as to make two longitudinal lines. Pl. 133. Sc. 51.

Synonymes. Coluber rigidus, *Say*, Journ. Acad. Nat. Scien. Philad., vol. iv. p. 239.
Coluber rigidus, *Harlan*, Med. and Phys. Res., p. 118.

Description. The head is sub-oval, with a rounded snout. The vertical plate is hexagonal and large, broadest before, and acute-angled behind. The superior orbital are oblong, quadrilateral, broader behind, and projecting over the eye. The occipital plates are pentagonal and large. There are two temporal plates, of which the anterior is larger. The frontal are hexagonal and descend to a single square loral plate. The anterior frontal are small and trigonal, a little truncated in front. The rostral plate is rather small, pentagonal, and concave below. There are two nasal plates, quadrilateral, the one concave behind, and the other before, for the nostril. There are two anterior orbital plates, of which the superior is larger, and two posterior, small and quadrilateral. The inferior portion of the orbit is completed by the third and fourth labial plates, of which there are seven, large and mostly quadrilateral.

The nostrils are near the snout, lateral, but open upwards and outwards. The eyes are large, the pupil black, and iris reddish-grey. The neck is contracted. The body is rather slender, and covered above with hexagonal, strongly carinated

scales, notched at their posterior extremities; the inferior row of scales on each side is smooth. The tail is rather long, and compressed or triangular.

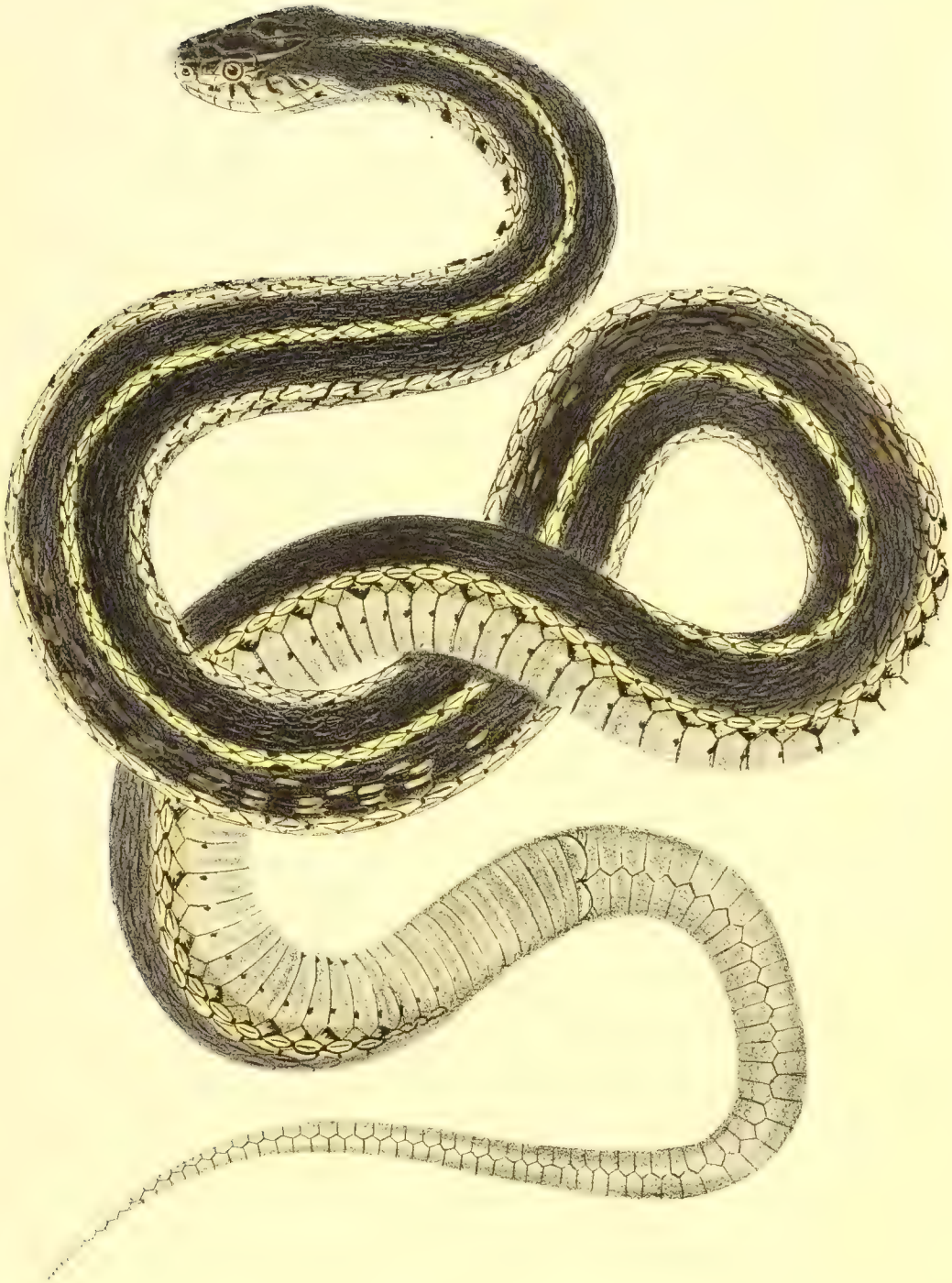
Colour. The whole superior surface of the Tropidonotus rigidus is brown, slightly tinged with red. The abdomen is yellow, slightly shaded with reddish-brown;—each plate being marked near the centre with two oblong dusky spots, which do not extend throughout the whole plate; these spots are so disposed as to form two parallel dark lines on the belly, which terminate at the vent.

Habits. I am unacquainted with the habits of this reptile, having never seen but one or two alive.

Dimensions. Length of head, 1 inch; length of body, 14 inches; length of tail, 6 inches: total length, 21 inches. In the specimen here described, there were 133 abdominal plates and 51 sub-caudal bifid plates.

Geographical Distribution. The Tropidonotus rigidus first appears in the neighbourhood of Philadelphia, where it is exceedingly rare. In Louisiana and Mississippi it is abundant, doubtless, as I have seen a great many specimens from the former state.

General Remarks. Say first observed this reptile in Pennsylvania, and gave a very good description of it in the Journal of the Academy of Natural Sciences of Philadelphia.



Tropidonotus sirtalis

TROPIDONOTUS SIRTALIS.—*Linnæus.*

Plate XI.

Characters. Head sub-oval, broad, a yellow spot on each occipital plate; body thick, dusky above, marked with three longitudinal yellow lines; abdomen greenish-yellow, plates with a black blotch near their lateral extremities. Pl. 145. Sc. 70.

Synonymes. Coluber sirtalis, *Linnæus*, Syst. Nat., tom. i. p. 383.
Coluber bipunctatus, *Latreille*, Hist. Nat. Rept., tom. iv. p. 85, pl. 30, fig. 2.
Coluber sirtalis, *Gmelin*, Syst. Nat. Lin., tom. i. pars iii. p. 1107.
Coluber sirtalis, *Latreille*, Hist. Nat. Rept., tom. iv. p. 69.
Coluber sirtalis, *Daudin*, Hist. Nat. des Rept., tom. vii. p. 146.
Coluber sirtalis, *Shaw*, Gen. Zool., vol. iii. part ii. p. 535.
Natrix sirtalis, *Merrem*, Versuch eines Syst. der Amph., p. 132.
Coluber sirtalis, *Harlan*, Med. and Phys. Res., p. 116.
Striped Snake, *Vulgo.*

Description. The head is moderately large, flattened, sub-oval, elongated, with the snout rounded. The vertical plate is pentagonal, broad in front, and rounded where it joins the frontal, and with an angle posteriorly to touch the occipital; the superior orbital are single, oblong and projecting, narrowest in front. The occipital are large and pentagonal, broad in front, and joined to the superior orbital, as well as to the two upper posterior orbital plates. The frontal are large, broad, and pentagonal; the anterior frontal are also broad, but quadrilateral, with their posterior and inferior angle prolonged. The rostral plate is heptagonal, concave on its inferior margin, for the mouth; there are two nasal

plates, of which the anterior is largest and semilunated, the posterior is pentagonal; behind this is a loral plate, connected above to the frontal, and posteriorly to the anterior orbital, which is very large and oblong, ascending up between the superior orbital and the frontal plates. There are three small posterior orbital, irregularly quadrilateral, and nearly of the same size; the upper one passes in between the superior orbital and the occipital plates; the inferior border of the orbit is made up of the third and fourth labial, of which plates there are seven on each side, quadrilateral and large, the fourth and fifth largest; there are two temporal plates, the anterior larger.

The nostrils are lateral and large. The eyes are large, the pupil black; the iris yellowish-grey. The neck is contracted.

The body is long, but tolerably robust, covered with strongly hexagonal carinated scales above and with broad plates below. The tail is long, thick at the root, but soon becomes round, and terminates in a point.

Colour. The head above is dusky, with a tinge of olive; each occipital plate being marked with a minute yellow spot; the upper lip is greenish-straw colour, and marked with a dark line at the junction of the labial plates.

The body and tail above is dusky, with a tinge of olive, lighter on the sides, with three longitudinal lines of pale yellow; the vertebral begins at the distance of three or four scales from the occipital plates, and terminates about midway on the tail, and includes one whole scale, and the half of the two adjoining scales on each side; the lateral lines begin behind the temples, and are smaller, including the half of two adjoining scales only; between the vertebral and lateral lines are numerous small, quadrate, black spots, disposed in longitudinal series, the spots of the different series alternating with each other, and when the scales are separated white specks appear between them; beneath the lateral lines the colour is paler.

The abdomen is pale straw colour, with a tinge of green; and each plate is

marked with a small black spot near its junction with the scales; these spots form a longitudinal series; sometimes there are two rows of these black spots on each side, the smaller being the inner one.

Dimensions. Length of head, 13 lines; length of body, 22 inches; length of tail, $8\frac{1}{4}$ inches: total length, 29 inches 6 lines. This animal at times reaches the length of nearly four feet; in general, however, they are found between two and three feet long. In the specimen here described there were 145 abdominal plates, and 70 sub-caudal bifid plates.

Habits. This serpent is extremely gentle in its disposition, and can be handled without the least fear of injury; indeed, I have never known it attempt to bite. It prefers shady places for its abode, and is often found among high grass, feeding on toads and other small reptiles, &c.

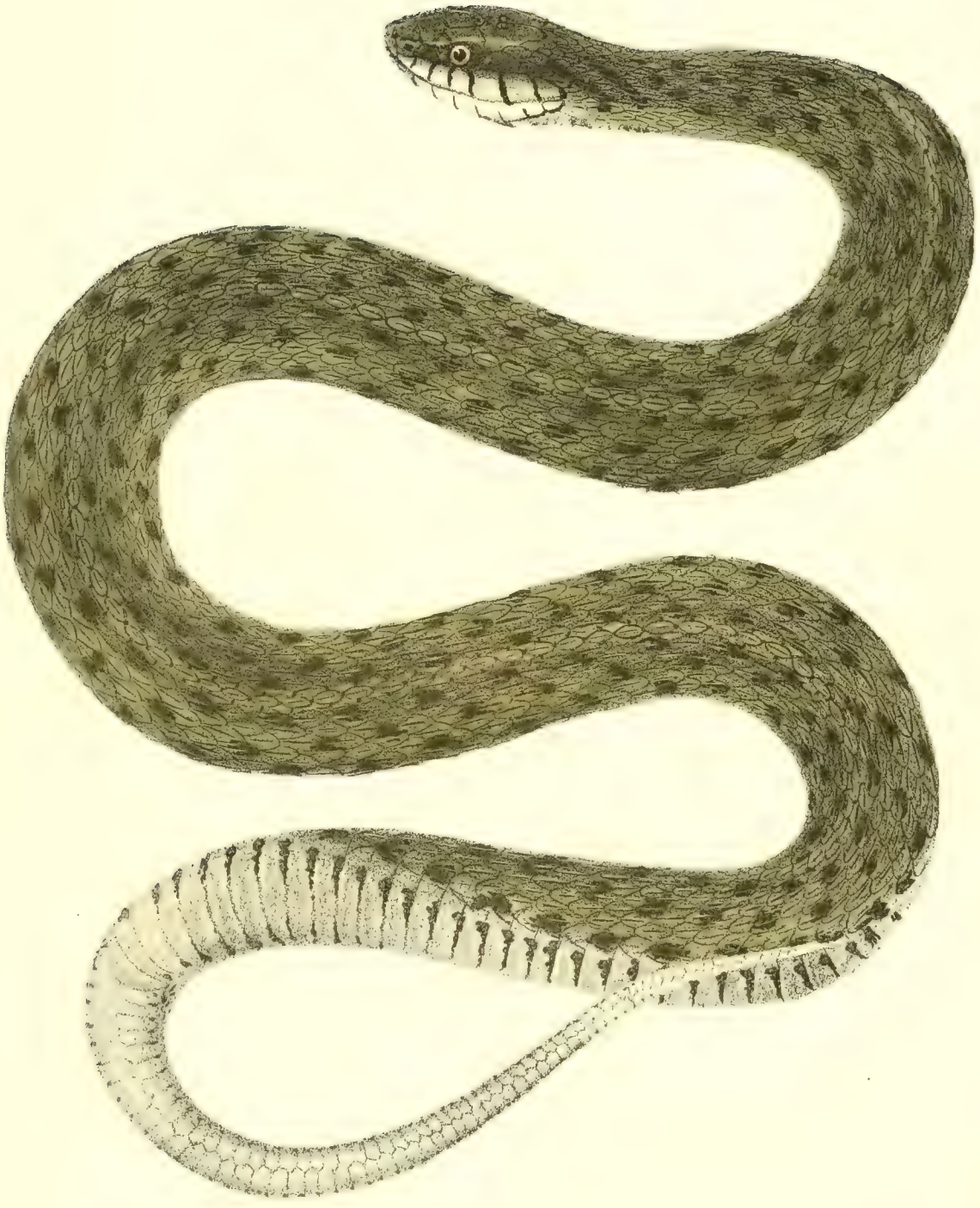
Geographical Distribution. The Tropidonotus sirtalis is found in all the Atlantic states, from Maine to Florida inclusive; it inhabits also the country west of the Alleghany mountains. Say observed this animal high up the Missouri river; and I have seen specimens from Mississippi, Louisiana, Arkansas, &c.

General Remarks. The first notice of this serpent is in the tenth edition of the Systema Naturæ of Linnæus, who described it on the authority of Kalm. His account is so short and unsatisfactory that many herpetologists have thought it advisable to expunge this name altogether from the catalogue of North American reptiles; yet if we follow the early history of this animal we shall find the specific name sirtalis sufficiently intelligible, and thus avoid the inconvenience of a new one.

Kalm travelled over a certain portion of the United States, in which, to this time, only two snakes have been found marked with three yellow longitudinal lines; and the herpetology of this section of our country is perhaps as well known as that of France.

Now Linnæus himself gave the specific name sirtalis to one; and many years after that, of saurita to the other, well knowing both; of the latter animal there can be no doubt, as his only references are to Catesby and Garden; consequently the specific name sirtalis can only be applied to the serpent now under consideration.

Schoepff, doubtless, had the Tropidonotus sirtalis in view when describing his Coluber tænia (Die Band Schlange); but his name cannot be retained, as that of Linnæus has the right of priority.



Tropidonotus ordinatus

TROPIDONOTUS ORDINATUS.—*Linnæus.*

Plate XII.

Characters. Head moderate, flattened; body robust, greenish-olive above, with five longitudinal series of small sub-quadrate black spots, the series alternating with each other; abdomen pale green, tinged with yellow, a dark spot near the lateral extremity of each plate. Pl. 143. Sc. 66.

Synonymes. Little Green Garter-snake, *Catesby*, Carolina, &c., vol. ii. p. 53, pl. liii.
Coluber ordinatus, *Linnæus*, Syst. Nat., tom. i. p. 379.
Coluber ordinatus, *Gmelin*, Syst. Nat. Linn., tom. i. pars iii. p. 1097.
L'Ibibe, *Lacépède*, Hist. des Serp., tom. ii. p. 322.
Coluber ordinatus, *Latreille*, Hist. Nat. Rep., tom. iv. p. 71.
Coluber ibibe, *Daudin*, Hist. Nat. des Rept., tom. vii. p. 181.
Coluber ordinatus, *Merrem*, Versuch eines Syst. der Amphib., p. 93.
Coluber ordinatus, *Fitzinger*, Neue Class der Rept., p. 53.
Coluber ordinatus, *Harlan*, Med. and Phys. Res., p. 113.
Grass Snake, *Vulgo.*

Description. The head is flattened, oval, with the snout rather truncated; the vertical plate is pentagonal, broadest before; the superior orbital are oblong, quadrilateral, broadest posteriorly; the occipital are large, irregularly pentagonal, and broadest anteriorly. There are two regular pentagonal frontal plates, broadest internally, and two anterior frontal, irregularly triangular, with their bases rounded and directed outwards; the rostral is short and irregularly pentagonal, most extensive and concave below. There are two nasal plates, the anterior larger, quadrilateral, and truncated posteriorly; the posterior is smaller and crescentic in form; there is a single anterior orbital plate, pentagonal, and

most extensive vertically, projecting in between the superior orbital and frontal plates; there are three small quadrilateral posterior orbital; the inferior wall of the orbit is completed by the third and fourth labial, of which plates there are seven on each side, quadrilateral to the fourth; the fifth and sixth are pentagonal, the seventh triangular and smaller; the loral plate is quadrilateral and large.

The nostrils are near the snout, and open outwards, upwards, and backwards. The eye is rather large, the pupil dusky, and the iris greenish-yellow. The neck is contracted.

The body is elongated, but robust, flattened, and covered with strongly carinated hexagonal scales above, and with plates below.

Colour. The head is dusky above, tinged with green; the lips are lighter, with a black or dusky bar at the place of junction of the plates. The body and tail above are green, tinged with olive, sometimes with an indistinct vertebral line of lighter colour, which does not seem to be the result of age; there are five longitudinal series of small quadrate black spots, generally including parts of two or three adjoining scales; the spots of the different series alternate with each other, or are arranged in a regular quincunx; at the tail they are less regular. The throat and abdomen are greenish-yellow, and each plate is marked near its lateral extremities with a semicircular black spot; which, as they are placed in regular succession, make two longitudinal series along the abdomen. The tail is clouded yellow below, becoming more and more dusky towards the tip.

Dimensions. Length of head 1 inch; length of body to vent, 18 inches; length of tail beyond vent, $6\frac{1}{2}$ inches: total length, $25\frac{1}{2}$ inches. In the animal here described, there were 143 abdominal plates, and 66 sub-caudal scales.

Habits. The Tropidonotus ordinatus prefers meadows and pastures, where the grass is luxuriant, and preys on such insects or small reptiles as may select the same localities.

Geographical Distribution. This animal inhabits the southern states, as far north as Maryland; beyond this I have no evidence of its existence.

General Remarks. The first positive notice of this serpent may be seen in Catesby's History of Carolina, &c., where it is described and figured as the Green Spotted Snake. The figure is tolerable, though it represents the animal with a well-marked light-coloured vertebral line, which certainly is not very common.

Catesby says it grows to nearly four times the size of his figure, which would make it a serpent of nearly four feet in length. He is doubtful about considering it different from the Spotted Riband-snake (Pl. li.), which latter I have not been able to identify certainly with any of our serpents, though it seems most to resemble the Tropidonotus Dekayi. Catesby, as usual with most of his snakes, makes it a "great robber of hen-roosts—sucking eggs," &c., which is doing great injustice to the animal.

Daudin says, "without doubt the Couleuvre biponctuée of Bosc must be referred to this animal," to which I can by no means consent, never yet having seen the two occipital spots that characterize the animal described by Bosc, while they are always present in the Tropidonotus sirtalis, which was most probably the serpent from which he took his description of the Coluber bipunctatus.

Tropidonotus leberis

TROPIDONOTUS LEBERIS.—*Linnæus.*

Plate XIII.

Characters. Head moderate, elongated, sub-oval; neck contracted; body above dusky olive-brown, with three black lines; abdomen pale yellow, with four dusky lines; scales strongly carinated. Pl. 143. Sc. 70.

Synonymes. Coluber leberis, *Linnæus*, Syst. Nat., tom. i. p. 216, ed. x.
Coluber leberis, *Gmelin*, Syst. Nat. Lin., tom. i. pars iii. p. 1086.
Vipera leberis, *Latreille*, Hist. Nat. Rept., tom. iv. p. 8.
Vipera leberis, *Daudin*, Hist. Nat. des Rept., tom. vi. p. 218.
Coluber leberis, *Shaw*, Gen. Zool., vol. iii. part ii. p. 433.
Coluber septemvittatus, *Say*, Journ. Acad. Nat. Scien. Philad., vol. iv. p. 420.
Coluber septemvittatus, *Harlan*, Med. and Phys. Res., p. 118.

Description. The head is rather small, elongated, sub-oval and with the snout rounded at the tip. The vertical plate is regularly pentagonal, and broadest before; the superior orbital are of the same length as the vertical, but very narrow, elongated, and quadrilateral. The frontal plates are irregularly hexagonal, broadest transversely, descending far on the side of the head to join the loral; the anterior frontal are quadrilateral, but irregularly so, broader behind and narrower before. The rostral plate is heptagonal, short, and rounded in front as well as above, and concave below; the occipital are pentagonal, smaller, and notched behind. The nasal plates are two in number, quadrilateral, and nearly of the same size; the anterior lunated behind and the posterior crescentic in front, to accommodate the nostril. There are two small, elongated, quadrilateral anterior orbital; and in front of them is a large pentagonal, loral plate; there are

two posterior orbital, the inferior smaller and quadrilateral, the superior larger and crescentic; behind these is a single oblong temporal plate; the inferior wall of the orbit is completed by the third and fourth labial, of which plates there are eight on each side, all large and nearly quadrilateral.

The nostrils are lateral near the snout, and open a little upwards. The eyes are large, the pupil dusky, and the iris golden, with a few black specks. The neck is contracted, and covered with small sub-hexagonal carinated scales.

The body is elongated, rather slender, and covered above with large hexagonal, strongly carinated scales, slightly notched at their posterior extremity, and with broad plates below. The tail is long, slender, and slightly sub-triangular and compressed at the sides.

Colour. The superior surface of the head is olive-brown; the lips are straw-colour. The body above is olive-brown, with three longitudinal dusky lines; the belly is pale yellow, with four dusky longitudinal, parallel lines on the plates; those near the lateral extremities are largest, those near the centre of the abdomen smaller. The tail is coloured above like the back, though the lines disappear long before they have reached the tip; below, the lateral lines are continued for some distance, the central ones giving only a waving clouded appearance at the junction of the sub-caudal bifid plates.

Dimensions. Length of head, 1 inch; length of body, 19 inches; length of tail, 7 inches: total length, 27 inches. Dr. Green informs me that he has specimens in his possession much larger than the dimensions above given. In the specimen here described there were 143 abdominal plates, with the anal double, and 70 bifid plates under the tail.

Habits. Not much is known of the habits of the Tropidonotus leberis. Mr. Peale, however, informs me that it is a water-snake; and this might almost

have been inferred from the form of its scales, which are precisely like those of our common water-snakes, if its tail were not round.

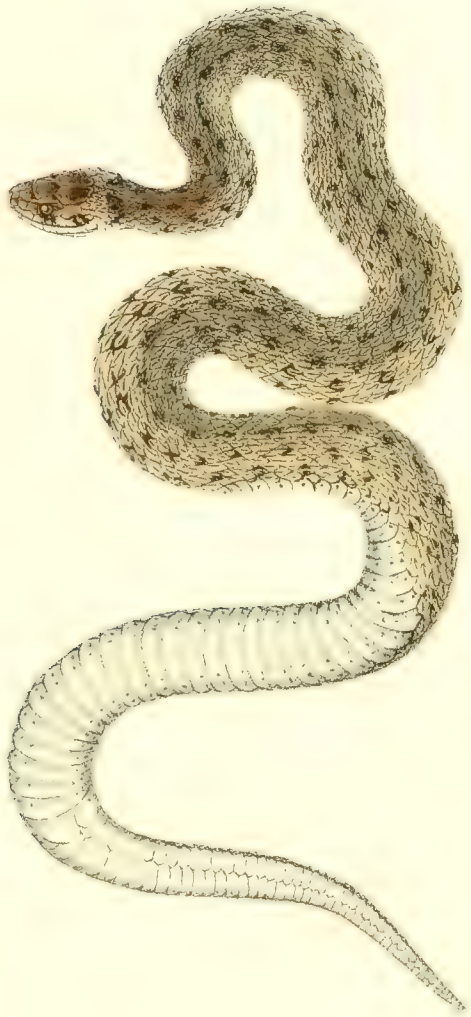
Geographical Distribution. This serpent inhabits Pennsylvania, Ohio, Michigan, New Jersey and New York, and doubtless will be found in many others. To Dr. Green I am indebted for several fine specimens; and to Mr. Haldeman for the living animal.

General Remarks. I am happy in being able to restore this long lost species to its proper place in the catalogue of Northern American reptiles, as I have no doubt of its being the Coluber leberis of Linnæus, as may be made plain by following its early history.

Kalm, who first discovered this animal and furnished the description, resided for a short time in Delaware and Pennsylvania, and from thence he travelled to Canada: now the only serpent marked with dusky lines "fasciæ lineares nigræ," ever yet found in the section of country over which he passed, is the animal now under consideration. It is true he represents it as a viper, and in this he is followed by many naturalists, but they are excusable, as they never saw the animal; and Kalm's observations must have been superficial, and consequently not to be relied on. He was informed the snake was poisonous, and he believed it; as Catesby was told the Heterodon niger was venomous, and he of course represented it in his work with fangs.

It is enough to say that no poisonous snakes have been found in the country that Kalm examined, except the Rattlesnake and Copperhead; and the herpetology of this region is perhaps better known than any other part of the United States.

Say next described this serpent, and gave it the very appropriate specific name "septemvittatus," from the number of its longitudinal dusky lines; his name, however, cannot be retained, as that of Linnæus has the right of priority, which should be adhered to rigidly.



Tropidonotus Dekayi.

J.H.Richard. del.

P.S.Duval. Lith. Phil.a

TROPIDONOTUS DEKAYI.—*Holbrook.*

Plate XIV.

Characters. Head elongated; snout rounded; body olive-brown above, with a pale vertebral line, on each side of which is a double series of small sub-quadrate or rounded black spots; abdomen straw colour, with a tinge of green; and each plate marked with four minute black dots, arranged to form four irregular longitudinal rows, which terminate at the tail; no loral plate. Pl. 139. Sc. 46.

Description. The head is rather large, narrow, and with the snout rounded. The vertical plate is pentagonal, broad before and pointed behind; the occipital plates are very long and pentagonal, broader before and narrower behind; the superior orbital are quadrilateral, very long, and projecting; the frontal plates are broad and pentagonal, with their superior border longest and their inferior shortest; narrow externally where they pass down to join with the posterior nasal plate; the anterior frontal are rhomboidal, with their inferior and posterior angles prolonged; the rostral plate is large, rather pentagonal, and pointed above; the nasal plates are two in number, nearly quadrilateral, with an opening between them for the nostril; the anterior orbital is single, quadrilateral, and large; there are two posterior orbital plates, nearly of the same size, but much smaller, and the inferior walls of the orbit are completed by the third and fourth superior labial plates, of which there are six, all quadrilateral, the fourth and fifth being longest.

The nostrils are lateral and very near the snout. The eyes are rather large, the pupil black, with the iris of dark grey. The neck is contracted, and covered with small carinated scales.

The body is elongated, but rather stout for the size of the animal, and covered above with carinated hexagonal scales, and with broad plates on the abdomen. The tail is slender, round, one-fourth the length of the body.

Colour. The superior surface of the head is dusky-olive, with a darker spot below each eye, and another at the angle of the mouth, with two oblong, nearly black spots on the sides of the occiput. The body above is olive-brown, and marked with a pale yellowish vertebral line, extending from the head to near the extremity of the tail, on each side of which is a double series of rounded or subquadrate black spots, the superior most distinct; and each abdominal plate has several minute black dots, which are so disposed as to form four series, not very regular, on the belly, and terminate at the tail.

Dimensions. Length of head, 8 lines; length of body to vent, 14 inches; length of tail beyond the vent, $3\frac{1}{4}$ inches: total length, 15 inches 10 lines.

Habits. The Tropidonotus Dekayi frequents meadows and places where the grass is of luxuriant growth, and feeds on various insects, as crickets, grasshoppers, &c.

Geographical Distribution. This animal has a very wide range; Dr. Pickering found it in Massachusetts, Dr. Dekay in New York, Dr. Pitcher has seen it in Michigan, and Professor Green has specimens from Louisiana.

General Remarks. Dr. Pickering several years since furnished me with an individual of this species, which, until that time, had been very generally considered as the young of the Tropidonotus ordinatus or Tropidonotus sirtalis, from which, however, it is perfectly distinct in colour, form, and in wanting a loral plate. Recently my friend Dr. Dekay, gave me a fine specimen of this serpent, with a beautiful drawing, done from life, and proposed calling it Coluber dorsalis: the name is appropriate enough, but has been applied to another animal by Fitzinger.

Though the animals of the last described genus form a very natural group in having all nearly the same form of head, with cheeks well developed, and the body sub-triangular, which, as well as the head, the animal can flatten at will, when the ribs are elevated and drawn forwards, and scales sub-hexagonal, carinated, notched posteriorly, &c. &c.; yet from the form of the tail they can be readily arranged in two sections—1. Those with the tail compressed laterally and triangular, like the water-snakes of our country, as Tropidonotus fasciatus, &c. 2. Those with the tail more or less cylindrical, that live on land, as Tropidonotus sirtalis, &c. The only exception to the last, would perhaps be the Tropidonotus leberis, where the tail is cylindrical; and yet Mr. Peale once saw it in the water, which, however, does not prove that it seeks its food in that element, as do those with a triangular tail.

The scales of this group are remarkably rough, and for what purpose is not easily determined; yet it is certain that most of our serpents that are covered with this form of scales either live in water or near it. This circumstance seems still more curious, when it is remembered that few fish have carinated scales, as in Dactylopteri, (Lacépède.)

Heterodon simus.

HETERODON.—*Palisot de Beauvais.*

Genus Heterodon.—Characters. Head large, flat; the rostral plate a trihedral pyramid, with a ridge above and pointed at the tip; posterior maxillary teeth largest; loral plate single; orbit surrounded with small plates, with the exception of the superior orbital. Body and neck distensible.

HETERODON SIMUS.—*Linnæus.*

Plate XV.

Characters. Head very short, flattened; snout elongated, turned up or slightly recurved; azygous plate between the frontal, surrrounded by six or eight smaller plates; body grey, with a vertebral series of sub-quadrate or rounded black spots or transverse bars; tail fawn colour. Pl. 132. Sc. 39.

Synonymes. Hog Nose Snake, *Catesby*, Carol., &c., vol. ii. p. 56, pl. lvi.
Coluber constrictor, *Linnæus*, Syst. Nat., ed. x. tom. i. p. 216.
Coluber simus, *Linnæus*, Syst. Nat., ed. xii. tom. i. p. 375.
La camuse, *Lacépède*, Hist. des Serp., tom. ii. p. 284.
Coluber simus, *Gmelin*, Syst. Nat. Lin., tom. i. pars iii. p. 1086.

Description. The head is short, flattened and triangular, with the snout turned upwards, and rather recurved. The vertical plate is irregularly triangular, with its basis broad and turned forward, and its apex directed backwards; there is a single, very large quadrilateral superior orbital plate, projecting somewhat

over the eye; the rest of the orbit is completed by ten or eleven small quadrilateral plates, the inferior of which rests on the superior labial. The occipital plates are pentagonal, and very large; the frontal are pentagonal and broad; the anterior frontal plates are rounded and smaller; between these frontal plates, and on the mesial line, is a long, slender, intermediate or azygous plate, extending from the vertical to the rostral, and surrounded on each side with six or eight scales or small plates that separate it completely from the frontal. The rostral plate is very large, and represents a three sided pyramid, with its broadest surface directed forwards, and with its summit turned upward, and rounded, unlike the pointed snout in the Heterodon platirhinos, which gives to this animal a peculiar aspect, and much more like the snout of a hog. There are three nasal plates, the posterior one large and triangular, with its basis lunated for the nostril, and connected behind by a large loral plate with the orbit of the eye; the anterior nasal are quadrilateral and smaller, and in some individuals are consolidated into one plate; the superior labial plates are eight in number on each side, quadrilateral, and very small anteriorly, but much larger posteriorly, and of these the sixth and seventh are largest.

The nostrils are lateral and near the snout. The eyes are rather large, the pupil black, with the iris light grey. The neck is not contracted, and is covered above with small sub-hexagonal scales. The body is elongated, but tolerably robust, though flattened, and covered above with similar scales, carinated. The tail is short and thick.

Colour. The head is dusky-brown above the snout, with a black band extending transversely between the anterior part of the orbits. The vertical plate, as well as the centre of the superior orbital plate, is lightest brown, so as to present the appearance of a white band across the vertex; the occipital plates are black, and from them descends laterally on each side of the neck an elongated black blotch, increasing in descent, and having a white blotch between them in the mesial line —these two lateral marks represent the expanded wings of an insect, while the centre black spot on the occipital plates form the body. The upper jaw and

cheeks are light grey, with a dusky narrow band descending from the posterior and inferior part of the orbit to the angle of the mouth.

The body is light grey, with a triple series of dusky or black spots, the vertebral range largest, generally sub-quadrate, though they vary in form and size, and are separated from each other by a transverse light-coloured bar; the lateral series are much smaller, generally rounded, and placed at the extremities of the light-coloured bars, so as to alternate with the dorsal series. The throat and abdomen in general are dirty white, marked with numerous small black dots, though the colour is liable to variations. The tail is fawn colour, with transverse bands a shade or two darker.

Dimensions. Length of head, 9 lines; breadth of head when not flattened, 7 lines; length of body, 11 inches; length of tail, $1\frac{3}{4}$ inches: total length, $13\frac{1}{2}$ inches. In the individual described there were one hundred and thirty-two abdominal plates, and one hundred and thirty-six sub-caudal bifid plates, with a small compressed and pointed scale at the tip of the tail.

Geographical Distribution. The Heterodon simus is found about the sea islands of Georgia and South Carolina, and may even be seen as far north as southern Virginia; but I have no evidence of its existence beyond lat. 35° in the Atlantic states.

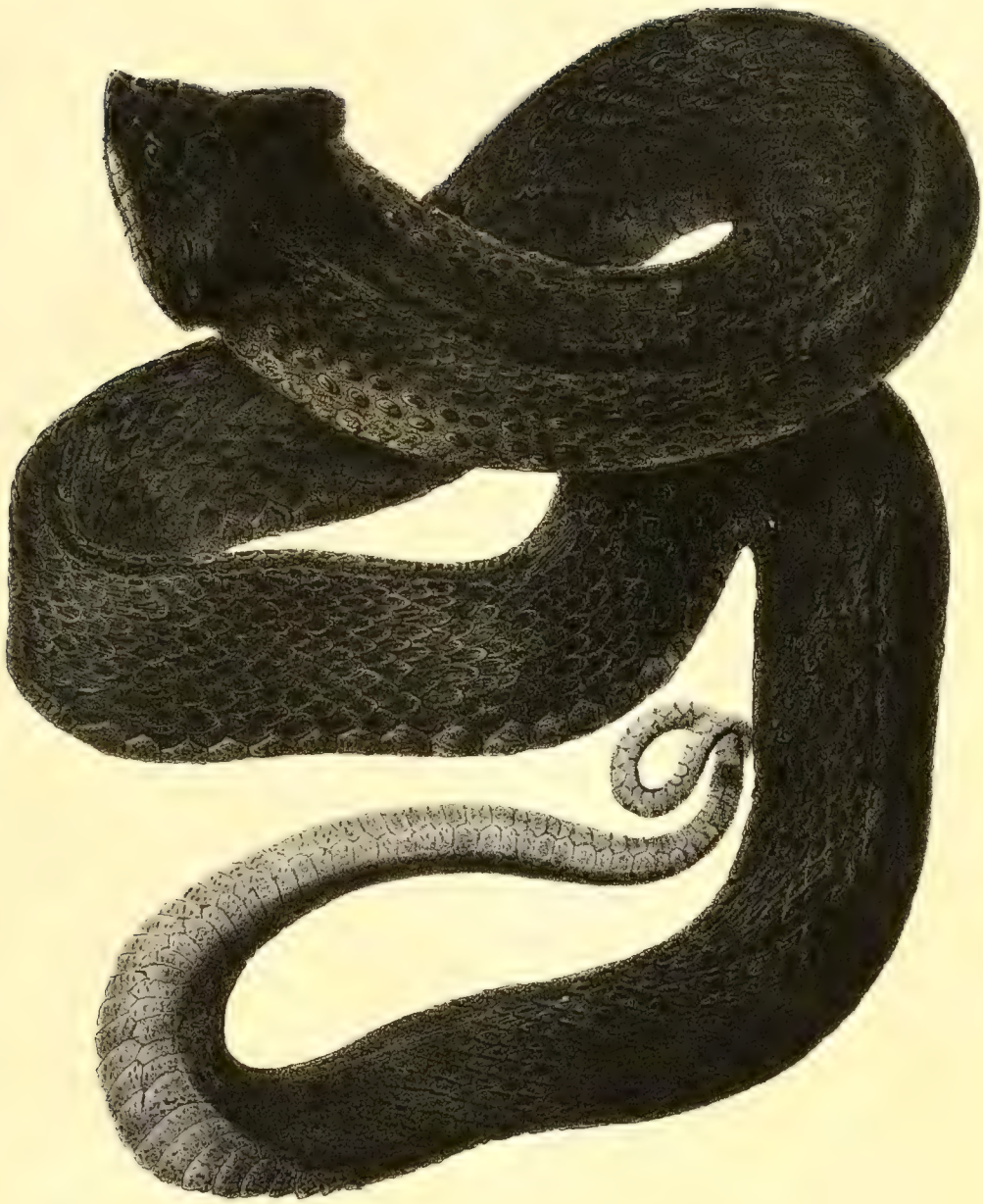
General Remarks. It is most probable that the Coluber simus is the animal represented in Catesby's work as the Hog Nose Snake, though he gave no description by which it can be distinguished from the Heterodon platirhinos of Beauvais. I believe the animals to be identical: first, because the Heterodon simus is common in the section of country visited by Catesby, while the Heterodon platirhinos is there seldom, if ever, seen; I never met with it in Carolina, save in the interior of the state: and secondly, Linnæus drew up his description of the Coluber simus from an individual furnished him by Garden, from the immediate neighbourhood of Charleston, where this species abounds.

This serpent, it would seem, was first admitted into the tenth edition of the Systema Naturæ as the Coluber constrictor, and Kalm is given as authority for its existence in Canada, where, by the way, it is never seen. The description is, on the whole, good: "Maxillæ apex simus triqueter," &c. Yet Linnæus attributes to this species the habits of another and an entirely distinct species, the Black Snake, as derived from Kalm: "adoritur homines circum pedes sese convolvens," &c., which the Coluber simus never does. Linnæus here certainly confounded two very dissimilar animals; and of this he himself was afterwards aware, for he corrects the error in his twelfth edition, and gives excellent descriptions of both these animals, the Hog Nose and the Black Snake: of the former (Heterodon simus) he says, "Caput sub-rotundum, simum gibbum," &c., and to the latter (Coluber constrictor) he properly enough gives the habits attributed to it by Kalm, "Adoritur homines," &c.

The remarks of Cuvier on the Heterodon simus are curious; he says "Linnæus indicated this serpent in his tenth edition under the name Coluber constrictor, and it is not known why in the twelfth he changed it to that of Boa contortrix."* Linnæus, it appears to me, never made the change supposed by Cuvier. The Coluber constrictor of the tenth edition probably represented our animal, and certainly disappears in the twelfth, and is replaced by two new species, the Hog Nose and the Black Snake, and not by the Boa contortrix, for in the account of this latter animal, Linnæus does not preserve a single character of his original Coluber constrictor, neither the "maxillæ apex simus triqueter," nor the "adoritur homines," &c. nor the number of plates—nor the same geographical distribution; the one belongs to Canada, the other he received from South Carolina. The one he considers an innocuous animal, the other as a poisonous one. "Sacculos venenatos habet," &c. Why he should have given Catesby's Hog Nose as

* Linnæus avait bien indiqué ce serpent dans sa dixième édition sous le nom de Coluber constrictor, on ne scait pourquoi il l'a changé dans sa douziéme en Boa contortrix.—Regne Animal, tom. ii. p. 82.

synonymous with his Boa contortrix I cannot determine, for the only thing they have in common more than any other snake is their geographical distribution, and this in fact only applies to some of the southern states, for the Boa (Trigonocephalus) contortrix has a wide range, while that of the Heterodon simus is limited.



Heterodon niger.

16.

Sera pinx.t

P.S. Duval, lith.r Phil.

HETERODON NIGER.—*Catesby.*

Plate XVI.

Characters. Head flattened, triangular, covered with plates in front and with scales behind; snout pointed, and turned upwards at the tip; whole animal black above and bluish slate-colour below. Pl. 127. Sc. 50.

Synonymes. Black viper, *Catesby*, Carol., &c., vol. ii. p. 44, pl. xliv.
Scytale niger, *Daudin*, Hist. Nat. des Rept., tom. v. p. 342.
Coluber cacodemon, *Shaw*, Gen. Zool., vol. iii. p. 377, pl. cii.
Pelias niger, *Merrem.*
Coluber thraso, *Harlan*, Med. and Phys. Res., p. 120.
Scytalus niger, *Harlan*, Med. and Phys. Res., p. 130.
Heterodon niger, *Troost*, Ann. Lyc. Nat. Hist. N. Y., vol. iii. p. 186.

Description. The head is large, flattened, triangular, broader behind, narrow and pointed in front, covered with scales posteriorly and with plates anteriorly. The vertical plate is pentagonal, broadest in front; the superior orbital are irregularly quadrilateral, broadest behind, with their outer margins projecting. The occipital plates are rhomboidal; the frontal elongated, hexagonal, and narrow externally; the anterior frontal triangular, their bases inwards, and their apices reaching almost to the nostrils; between their bases is an additional long, narrow plate, elevated above to form a ridge. The rostral plate is triangular, the base directed downwards, the apex upwards and pointed, with an elevated ridge on its upper surface. The nasal plates are two; the anterior is round in front and above, and concave behind; the posterior is narrow and lunated in front, to complete the opening of the nostril. The loral plate is single, pentagonal, and

very large. The anterior orbital plates are four in number, and nearly quadrilateral; the superior is largest. There are four inferior orbital and three posterior orbital, all quadrilateral. The upper jaw has eight lateral plates, all quadrilateral, and increasing in size to the seventh, which is the largest.

The nostrils are large, lateral, and near the snout. The eyes are large, the pupil black, the iris very dark gray. The neck is the size of the head, and covered with carinated scales.

The body is elongated, but short, thick, and rounded above, flattened at the abdomen, covered above with larger scales than those of the neck; these are carinated, but less distinctly than those of the Heterodon platirhinos. The tail is long, small, cylindrical, and pointed at the tip.

Colour. The colour above is uniformly black; below it is whitish at the throat, and bluish slate-colour on the abdomen and tail.

Dimensions. Length of head, 1 inch 3 lines; breadth of head, when not flattened, 9 lines; length of body, $15\frac{1}{2}$ inches; length of tail, $4\frac{1}{2}$ inches; circumference of body, 3 inches 2 lines.

Habits. The Heterodon niger has similar habits to the Heterodon platirhinos, but in general it seems to choose drier places for its abode, and are not uncommon in the pine barren districts. It has the same power of flattening the head and neck, and "threatening with a horrid hiss;" its dark colour, its sinister look and menacing attitude, have led to the common belief of its being a venomous snake. Even Catesby represents it as "having the like fangs of destruction as the Rattlesnake." It is, however, a harmless snake, feeding on smaller reptiles, insects, &c.

Geographical Distribution. The Heterodon niger is rarely found as far north as Pennsylvania, but is one of the most common snakes in the lower part

of Carolina and in Georgia. I have also received it from Alabama and Louisiana, and there can be little doubt of its existence throughout the western country, as I have Professor Troost's testimony in proof of its belonging to Tennessee.

General Remarks. There can be no doubt that this animal was first described by Catesby; later naturalists having only copied his description, or his plate, which is one of the best in his work.

Daudin and others speak of a black variety of Heterodon, which has reference no doubt to this animal. I cannot, however, consider it as a variety of any Heterodon, but as a distinct and separate species. It cannot be a variety of the Heterodon simus, because the plates of the head are so entirely different; besides it is a much larger animal. It bears more resemblance to the Heterodon platirhinos; from which it differs, however, considerably, in the number of its abdominal plates and in its colour, which is so constant that it must be taken as an essential character in distinguishing the species.

It differs furthermore from the Heterodon platirhinos in its habits, preferring dry places; while that seems to select rocky, shady, and damp situations.

Finally, there would appear to be a difference of geographical distribution; at least in some parts of the United States. Thus, in Carolina the Heterodon platirhinos is common in the upper districts of the state, and I have never heard of the Black Viper being found there; while the reverse is true of the sea-board: here the Heterodon niger is very common—the Heterodon platirhinos seldom found.

Heterodon platirhinos.

Sera pinx.

17

HETERODON PLATIRHINOS.—*Latreille.*

Plate XVII.

Characters. Head short, flattened, triangular, turned up and pointed at the snout, a strong ridge on the rostral plate above; body greyish or yellowish-grey above, with large blotches or transverse bars or oblong spots of black; abdomen dirty-white. Pl. 144. Sc. 42.

Synonymes. Coluber heterodon, *Latreille*, Hist. Nat. Rept., tom. iv. p. 32, figs. 1, 2, 3.
Coluber heterodon, *Daudin*, Hist. Nat. des Rept., tom. vii. p. 153, fig. of head, pl. lx. fig. 28.
Coluber heterodon, *Say*, Amer. Jour. Arts and Scien., vol. i. p. 261.
Coluber heterodon, *Harlan*, Med. and Phys. Res., p. 120.
Hog-nose Snake, *Vulgo.*

Description. The head is large, flat, triangular, broad behind, with the snout pointed and elongated at the tip; it is covered with scales on the posterior part, and with plates on the anterior and on the vertex. The vertical plate is regularly pentagonal, with its broadest part directed forwards; the superior orbital are quadrilateral, elongated, and broadest posteriorly, with their outer margins projecting over the eye, which gives a sinister look to the animal. The occipital plates are rhomboidal. The frontal are quadrilateral, with their anterior inferior angles very much prolonged; the anterior frontal are triangular, with their bases directed inwards, and their apices rounded and turned to the nostrils. Between the anterior frontal, to prevent them coming in contact with each other, is a narrow, elongated, azygous plate, reaching from the posterior frontal to the

rostral plate, with a ridge on its upper surface continuous with that of the rostral plate.

The rostral plate is triangular, with its basis below and the apex very pointed above, and recurved, with a strong carina or ridge on the upper surface. The nasal plates are two on each side; the anterior is irregularly quadrilateral, lunated on the posterior margin, with its anterior and inferior angle greatly prolonged; the posterior is narrow, and concave in front to complete the nostril. There are twelve orbital plates, the superior of which have been already described; besides these, there are three anterior orbital plates, which are quadrilateral, the largest being above; the inferior orbital are five and the posterior orbital three in number, all of which are quadrilateral. The upper jaw has eight labial plates, quadrilateral, and increasing in size to the sixth, which is largest.

The nostrils are very large, near the snout, and lateral. The eyes are large, the pupil dark, the iris light grey. The neck is the size of the head when the animal is quiet, but when roused or irritated it flattens it more than twice its ordinary breadth. The body is elongated, thick, rounded above, but flattened at the abdomen, covered with scales strongly carinated above, the three inferior lateral rows being ecarinate, and with plates below. The tail is long, narrow, and terminating in a point, with scales or bifid plates on its under surface.

Colour. The head above is dusky, with a light band between the orbits; behind the occiput is a dusky spot; a dark band begins at the back of each nostril, which increases in size as it descends, and forms a large blotch on the side of the neck. The body is iron-grey, or sometimes brownish-yellow, and marked with a triple series of black or dark grey spots—those of the vertebral series being sub-quadrate and elongated transversely; the spots of the lateral rows are rounded, and many of them correspond with those of the vertebral line, while others alternate with them. Sometimes the spots of the lateral and vertebral lines are confluent, so as to give the appearance of bands.

Dimensions. Length of head, 18 lines; breadth of head, when not disturbed, 1 inch; length of body, 27 inches; length of tail, 5 inches; circumference of body, $4\frac{1}{2}$ inches. In the individual here described, there were one hundred and forty-four abdominal plates entire, and two bifid plates near the vent, and forty-two pair of sub-caudal bifid plates.

Habits. The Heterodon platirhinos is a harmless snake, choosing moist places and feeding on toads, small reptiles, and insects. Though a harmless, yet it is a bold animal when disturbed; it coils itself after the manner of the Rattlesnake, though not so closely, assumes a threatening attitude, by flattening the head and three or four inches of the neck, which it lifts and waves with an undulating motion, hissing loudly at the same time, and projects the head with a sudden motion, as if to bite any object presented.

It is remarkable, however, that I have never seen it bite or lay hold of any object offered it, in the many times that I have tried the experiment. It may be worried with the end of a walking-stick or cane, or pushed roughly from place to place, yet cannot be provoked to open its mouth, though it often advances its head with a threatening air towards the object of its annoyance.

At times it exhibits the instinct of some insects, and remains perfectly quiet and motionless, as if dead, to elude its tormentor; in this state it will remain several minutes. The first time this phenomenon came under my observation, I thought the animal had been unintentionally killed by rough handling; and it was only after witnessing the same thing in many instances that I came to the conclusion that it was done at will.

Geographical Distribution. The Heterodon platirhinos is found in all the Atlantic states from New Hampshire to Florida. I have also received specimens from Alabama and Louisiana, and it no doubt inhabits the western states generally, as Dr. Pickering informs me that it has been observed as far west as Engineer Cantonment on the Missouri. It is probable that the Heterodon

annulatus of Troost* is only a variety of this, for it is not uncommon to see individuals more or less annulated.

General Remarks. There can be no doubt that this is the Heterodon platirhinos of Latreille, from his description, as well as from the geographical distribution he gives it. This species of Heterodon is found in New Jersey, where Palisot de Beauvais first observed it, and from which state the animal here described was also received.

It seems to me very clear that we have three species of Heterodon in the Atlantic states—Heterodon platirhinos, Heterodon niger, and Heterodon simus—which latter differs in several respects from the two former; as in size, in having the neck smaller, in colour and markings, in the form of the rostral plate, and in having the azygous plate between the anterior frontal plates surrounded with small scales; as well as in being confined to the southern and western states.

The animals of this genus have the power of flattening the head and body still more than in that of Tropidonotus; in which respect they approach the Cobra de Capello of India.†

* Ann. Lyc. N. Y., vol. iii. p. 188.

† See anatomical part of this work for an account of this structure.

Order IV. BATRACHIA. *Brogniart.*

The many and great differences that exist between this and the three preceding orders of reptiles, have led several excellent herpetologists of our day to arrange the animals it includes as a distinct class, named Amphibia; as they are in fact, at one time, animals that live in water, and respire by means of gills, like fishes, and at another they breathe atmospheric air with lungs, like mammalia.

CHARACTERS.

1. The body is depressed, round, or elongated, and with or without a tail; the skin is soft, naked, or without a shell, and most commonly without apparent scales, (cœcilia.)

2. The extremities vary in number and proportion, or are entirely wanting. The fingers and toes are destitute of nails, and are rarely provided with a horny sheath, (Datylethra.)

3. There is no neck distinct from the body, and the head is joined to the vertebra by two condyles.

4. There are in general three movable eyelids, and no visible external meatus of the ear, though the tympanum is often very distinct.

5. The sternum is distinct in most species, but is never joined to the ribs, which are either very short or entirely wanting.

6. The heart has a single ventricle, and apparently a single auricle, which is, however, subdivided into two chambers.

Remarks. Although the order Reptilia embraced but few animals in the time of Linnæus, yet the numerous discoveries of recent herpetologists of new species, made it necessary to subdivide this order into three very natural families, from the great difference in their external forms, which is always attended with a corresponding internal organization.

These sub-orders were well named by Oppel—Apoda, Ecaudata, and Caudata.

Of the first, or Apoda, there are none in the United States.

Sub-order II. ECAUDATA. *Oppel. Dumeril et Bibron.*

CHARACTERS.

1. There is no vestige of a tail.

2. The head is large and flattened; the opening of the mouth extensive, often reaching behind the cranium.

3. The upper jaw and palate bones are sometimes armed with teeth, which are always small, little developed, and are all nearly of the same size.

4. The lower jaw is destitute of teeth.

5. The tongue is fleshy, adherent in front, more or less movable at its posterior extremity, and sometimes exsertile.

6. The body is short, thick, and covered either with a smooth or warty skin, which does not adhere to the muscles beneath, but envelopes them loosely, like a sack.

7. The extremities are four in number and of unequal length; the anterior are smaller and rounded; the posterior are much larger, flattened, and often palmated.

8. They are oviparous, and the eggs are commonly united in a glairy mass, or in

mucilaginous chords, and when hatched they produce Tadpoles or animals unlike the parents.

9. Tadpoles have very large heads, confounded with a short, thick body, and have long compressed tails, and breathe with gills. They undergo a complete metamorphosis; the tail disappears and is succeeded by anterior and posterior extremities; the gills disappear, and their place is supplied by lungs, &c.; and these changes are always accompanied by alterations equally important in the internal organization of the animal. At first the Tadpole is aquatic and breathes with gills, like a fish; but after its metamorphosis it respires atmospheric air only, by means of lungs. As a Tadpole, it lives on vegetable matter, and its organization is in accordance; as a perfect animal it is carnivorous, its food being different; the alimentary canal is now shortened and otherwise altered in its arrangement, and it is wonderful to observe the ease with which nature changes an herbivorous to a carnivorous animal.

The Ecaudate batrachian animals have been arranged in two sections. 1. Those without a tongue (Aglossæ), of which none exist in our country; and 2. Those furnished with a tongue (Phaneroylossæ), which are very numerous, and may well be grouped in three families—Ranoidea, Hyloidea, and Bufonoidea.

Family I. RANOIDEA.

CHARACTERS.

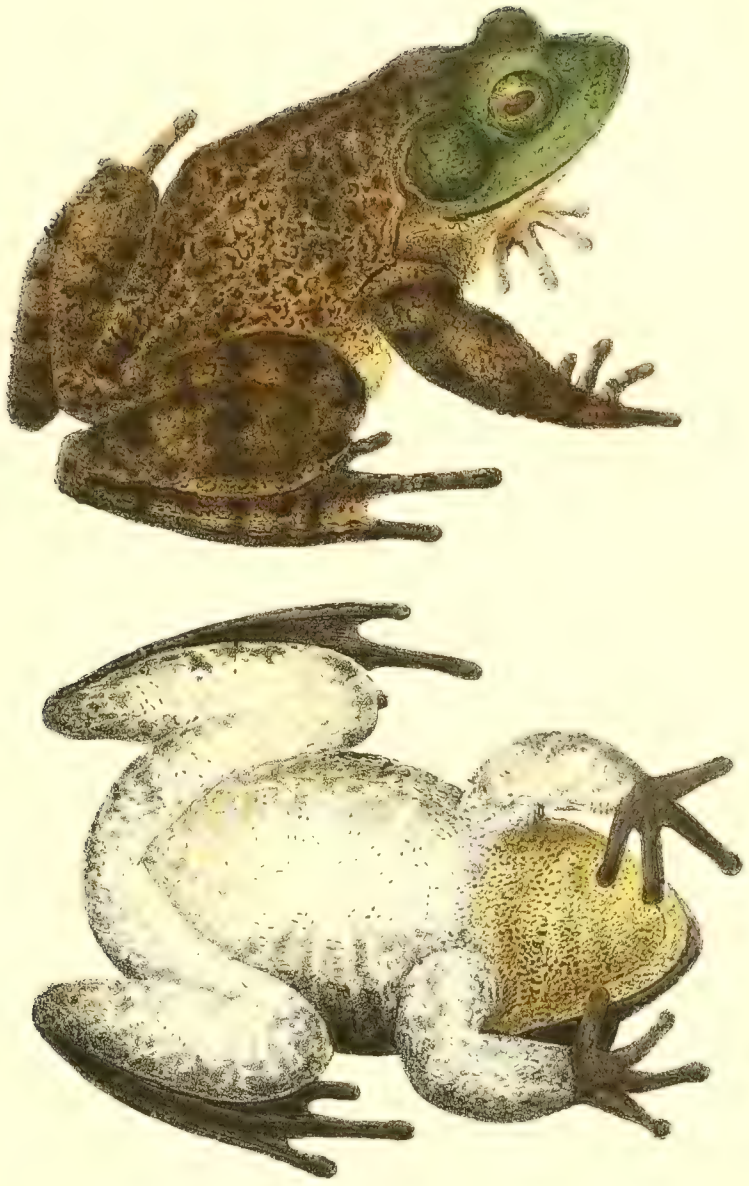
I. There are always teeth in the upper jaw and palate, between the posterior nares; the latter are minute, and variously grouped.

II. The extremities of the fingers and toes are free, and never dilated into a disk.

III. The tympanum is always visible.

IV. The males are provided with vocal vesicles at the throat, communicating internally with the mouth, and in some they pass out of openings at the sides of the jaws when distended, but not in others.

Remarks. This family embraces a great many genera, three only of which have as yet been observed as inhabitants of the United States—Rana, Cystignathus, and Scaphiopus.



Rana pipiens.

R A N A .—*Linnæus. Dumeril et Bibron.*

Genus Rana.—Characters. Tongue large, fleshy, oblong, slightly contracted before, notched behind, where it is alone movable; maxillary and palatine teeth minute, the latter placed between the posterior nares; tympanum distinct; male with two vocal vesicles either external or internal; fingers and toes sub-round, the former free, the latter palmated.

RANA PIPIENS.—*Latreille.*

Plate XVIII.

Characters. Head large, green above, yellowish-white below; body large, green in front, dusky olive behind, with irregular black blotches; abdomen yellowish-white, sometimes with dusky marks; extremities dusky, with black bars.

Synonymes. Bull-frog, *Catesby*, Carolina, &c., vol. ii. p. 72, pl. lxxii.
Bull-frog, *Kalm*, Travels, &c., Forster's translation, vol. ii. p. 175.
Rana pipiens, *Latreille*, Hist. Nat. Rept., tom. ii. p. 153.
Rana Catesbeiana, *Shaw*, Gen. Zool., vol. iii. p. 106, pl. xxxiii.
Rana mugiens, *Merrem*, Versuch eines Syst. der Amphib., p. 175.
Rana pipiens, *Cuvier*, Reg. An., tom. ii. p. 106.
Rana pipiens, *Harlan*, Med. and Phys. Res., p. 101.
Rana scapularis, *Harlan*, loc. cit., p. 103.
Rana mugiens, *Dumeril et Bibron*, Hist. Nat. des Rept., tom. viii. p. 370.
Bull-frog, *Vulgo.*

Description. The head is very large, broader than it is long, olive above, with the snout green and rounded in front; the upper jaw is green, the lower white, with dusky marks; the throat is clouded yellow. The mouth is very large, and the interval between the palatine teeth is consequently large. The nostrils are lateral and nearer the snout than the orbit. The eyes are very large and prominent, the pupil black, the iris of a beautiful golden, reticulated with black. The vocal vesicles are internal, and the orifice by which the air enters them is under the Eustachian tube. The tympanum is large, finely bronzed, with a small yellow spot in the centre. The body is large and thick, smooth above, green in front, dusky, with only a greenish tinge behind, and marked with irregular blotches of dark brown. The thorax and abdomen are smooth, yellowish-white, and often clouded with dusky.

The anterior extremities are short, thick, dusky above, with a tinge of green, and marked with a dark brown oblong spot at the shoulder, and a similar one at the elbow; their lower surface is yellowish-white; the fingers are four in number, short, very stout, and not palmated. The posterior extremities are exceedingly long and large, dark green above, with numerous dusky brown oblong spots, or transverse bars, as far as the external toe. The under surface of the thigh is yellowish-white, the posterior part granulated; the nates are yellowish-white, mottled with black; the under surface of the leg is silver-white; there are five long, but stout, fully palmated toes; these, as well as the fingers, increase in size a little at their tips.

Dimensions. This is the largest of our frogs, reaching even to the length of 21 inches. Dimensions of the individual from which the accompanying figure was taken:—Length of body, 5 inches; of thigh, 2 inches 3 lines; of leg, 2 inches 4 lines; of tarsus and toes, 3 inches 5 lines: total, 13 inches.

Habits. Bull-frogs are found about stagnant ponds or sluggish rivers, and in general are solitary in their habits, only collecting together in the breeding season, at which time hundreds may be seen in some small pond, and then the croak

uttered by the males is so loud as to resemble the distant roaring of a bull, and can be heard on still evenings at the distance of half a mile. During the day they are generally quiet, and only begin their noise at the approach of twilight, or in dark cloudy weather.

They cannot be said to abound, but are found commonly enough sitting half immersed in water, or on the banks of ponds, waiting for their prey. If alarmed, they leap suddenly into the water, like the Rana fontinalis and Rana halecina; but, unlike them, they do not conceal themselves at once, but frequently skim along the surface for several yards before they dive below it.

They are the most aquatic of all our frogs; indeed, I have known them to live in wells for years, where they could not rest a moment on solid ground above the water, consequently they are among the best swimmers of the tribe; and for this their organization is perfect—the thighs and legs are very strong and muscular, and the broad palmated foot makes an excellent paddle.

They are also exceedingly active on land, and leap to a great distance; Kalm gives an amusing story of one that beat a swift running Indian at a "foot race." They feed on various insects, and the smaller animals that live about water, as a species of crawfish, (Astacus Blandingii,) two of which I have found at a time in the stomach of a large Bull-frog; and Dr. Storer informs me that he has often found their stomachs filled with snails, (Helix albolabris.) Like all other frogs, they only seize their prey when it is alive or in motion; they even take the hook readily, springing upon the bait with great avidity, when it is moved gently before them.

Geographical Distribution. This animal is found in almost every part of the United States; Kalm even met with it as far north as Quebec, in latitude 47°. I have seen it in all the Atlantic states, and have received specimens from the more southern states; and there is no doubt of its being in the great valley of the west, as Say observed it in Ohio.

General Remarks. In no one of our frogs is there more difficulty in ascertaining its original specific name. Clayton, in the Philosophical Transactions* for 1694, simply mentions it as a large frog, "bigger than any in England, which makes a noise something like the bellowing of a bull."

Catesby, whose description is very correct, calls it the Bull-frog, under which name it is now universally known, and says, "the noise they make has caused their name, for at a few yards distance their bellowing sounds very much like that of a bull a quarter of a mile off."

Kalm, though he calls it by the same name, began the confusion by referring it to the Rana ocellata of Linnæus, from which it is perfectly distinct; for this Rana ocellata first appears in the tenth edition of the Systema Naturæ, and is easily identified, as Linnæus gives but a single reference, Brown's History of Jamaica; and in his description he says, "plantæ pentadactylæ sub-palmatæ," which certainly cannot apply to the Bull-frog. Kalm, however, insisting on the identity of the Rana ocellata and Bull-frog, perhaps led Linnæus, in the twelfth edition of the Systema Naturæ, to give two other references for the animal, the Rana halecina of Kalm, and the Rana maxima, &c. of Catesby, and never were three frogs more distinct.

Gmelin, in his edition of the Systema Naturæ, copies the errors of Linnæus, and adds another reference to Seba, whose animal is not even the real ocellata, which is found on the seventy-fifth, and not on the seventy-sixth plate, as he supposes.

The specific name, pipiens, was not applied by Linnæus to any Frog, but was first used by Gmelin, so far as I know, and given to a very different animal, the Water-frog of Catesby, the common Shad-frog, which had previously been

* Vol. xviii. p. 125.

called Rana halecina; and this leaves the name pipiens unapplied, at least so far as Gmelin is concerned.

It is next used by Schneider in his "Historia Amphibiorum;" his whole description, however, refers to the halecina of Kalm, or the Water-frog of Catesby.

Latreille was the first who used the specific name pipiens without synonymes, or reference to any author, stating only that the animal was called, in Carolina, the Bull-frog; his description is correct, and applicable to the Bull-frog in every particular but one: he speaks of a light-coloured vertebral line, which I have never seen in any individual of this species.

Latreille separates it from the Rana ocellata, which he describes as a distinct animal, and says, furthermore, that his Rana pipiens must not be mistaken for that of Schneider (Gmelin), which we have seen is the Rana halecina of Kalm; consequently then to Latreille is due the merit of first definitely applying the specific name pipiens to our Bull-frog.

It is singular that Daudin should not have followed his example, but far from it; he, under his Rana pipiens, gives three animals entirely distinct from each other, and his plate makes a fourth, for it represents an Indian animal, and not the American Bull-frog.

N. B. Though Gmelin quotes Schneider, he does not quote the name he gives the animal.

Rana horiconensis.

Serapino

P. S. Duval Lith.r Phila.

RANA HORICONENSIS.—*Holbrook.*

Plate XIX.

Characters. Head large, snout rather pointed, upper lip light bronze, with dark bars, above this is an irregular, indistinct, clouded white band under the tympanum to the shoulder; body very robust, dark olive, with irregular black spots, and a cutaneous fold on each side. Length, 3½ inches.

Description. The head is large, broad, with the snout rather pointed, the whole dusky green above. The mouth is very large, and the interval between the palatine teeth considerable. The nostrils are lateral, and nearer the snout than the orbits. The eyes are very large, prominent, and beautiful, with the pupil black and the iris golden, reticulated with black. The tympanum is large, bronzed, with a lighter spot in its centre. The upper lip is light bronze colour, with dusky bars; above this is an indistinct band of bluish-white, interspersed with black spots, which extends from near the snout, under the orbit and tympanum, to the shoulder. The lower jaw, chin, and throat, are white. The body is very robust, dark olive, interspersed with irregular black spots, with an elevated cutaneous fold on each side, of lighter colour, from the orbit to the posterior extremities; the abdomen is silver-white.

The anterior extremities are stout, dusky above and white below; there are four fingers, distinct, thick, dusky above and below. The posterior extremities are greatly developed, dark olive above, marked with transverse black bars. The anterior part of the under surface of the thighs is smooth and silver-white, the posterior is granulated and flesh-coloured; there are five toes, long, and very fully palmated to the tips, dusky above and below.

Dimensions. Length from snout to rump, 3½ inches; length of thigh, 1 inch 8 lines; of leg, 1 inch 8 lines; of tarsus and toes, 2 inches 2 lines.

Habits. Nothing peculiar is known of the habits of the Rana horiconensis.

Geographical Distribution. The only place where this animal has been observed is at the outlet of Lake George, where I found it in 1834.

General Remarks. There can be little doubt that this is a distinct species of frog. It differs from the Rana fontinalis in colour as well as in size; in the latter respect it approaches the Bull-frog, from which, on the other hand, it differs in being provided with two ridges, or cutaneous folds, along the back; nor can it be the Rana melanota of Rafinesque, as it wants the "yellow streak on the sides of the head." Another reason for believing this to be an undescribed species of frog is its geographical distribution, which is just at that point where the waters run north to the St. Lawrence, instead of going south to the Hudson river.

The name I have given it marks its habitat, Horicon being the ancient Indian name of that beautiful sheet of water now called Lake George.

Rana clamitans.

RANA CLAMITANS.—*Bosc.*

Plate XX.

Characters. Head elongated, snout rather pointed, upper jaw green; body slender, olive colour in front, very dusky behind; throat and abdomen silver-white. Length, 3 inches.

Synonymes. Rana clamitans, *Latreille*, Hist. Nat. Rept., tom. ii. p. 157.
Rana clamata, *Daudin*, Hist. Nat. des Rain., p. 54, pl. xvi. fig. 2.
Rana clamata, *Daudin*, Hist. Nat. des Rept., tom. viii. p. 104.
Rana clamitans, *Bosc*, Nouv. Dict. d'Hist. Nat., tom. xiii. p. 476.
Rana clamitans, *Cuvier*, Reg. An., tom. ii. p. 106.
Rana clamata, *Harlan*, Med. and Phys. Res., p. 101.

Description. The head is elongated, and bronzed above; the snout is pointed. The upper jaw is bright green, which colour is continued under the eye and tympanum to the shoulder. The lower jaw is white, marked with dusky spots or bars; these form an indistinct band that is lost about the anterior extremity. The mouth is large, with two distinct groups of small teeth in the palate between the posterior nares.

The nostrils are lateral, and rather nearer the snout than in the Rana fontinalis. The eyes are large and prominent, the pupil is black, the iris golden, beautifully reticulated with black, and has an inner margin of bright yellow. The tympanum is very large, bronzed, with a small spot of lighter colour in its centre. The body is long, slender and delicate; olive colour or bronzed in front, and dusky, approaching to black, behind, where it is slightly granulated; a cutaneous

fold, elevated to form a ridge, begins behind each orbit, runs along the body, and is lost near the posterior extremities. The whole surface of the throat and abdomen is silver-white.

The anterior extremities are olive above and delicate white below; there are four fingers distinct, not palmated; and the thumb of the male is furnished with a tubercle at certain seasons. The posterior extremities are very long, dusky above, with transverse bars or blotches of darkest brown; the inferior surface of the thighs is silver-white, the posterior half granulated; the nates are mottled black and white, the former colour predominating. The inferior surface of the legs is white; there are five toes, well palmated, but not to their extremities, the fourth very long.

Dimensions. Length of body, 3 inches 2 lines; of thighs, 1 inch 7 lines; of leg, 1 inch 8 lines; of tarsus and toes, 2 inches 2 lines: total, 8 inches 7 lines.

Habits. The Rana clamitans lives in water, or on the banks of ponds and rivers, far from which it is never seen. It is exceedingly timid, and makes enormous leaps from the banks into the water when disturbed, and utters, at the same time, a short cry. Bosc says it is the most active of all our frogs, and if once made prisoner and allowed to escape, it cannot again be easily retaken.

Geographical Distribution. The Rana clamitans is found in the low countries of Carolina and Georgia, farther north than this I have never seen it, though Dr. Harlan says it is common in Pennsylvania. This is most probably a southern species, and reaches to the Gulf of Mexico, where it represents the Rana fontinalis, which is a northern animal.

General Remarks. The Rana clamitans was first described by Bosc, from specimens taken in the neighbourhood of Charleston, in manuscript notes communicated to Latreille, who published it under the name it here bears.

Rana fontinalis.

Sera pinx.t

RANA FONTINALIS.—*Leconte.*

Plate XXI.

Characters. Body above green, with dusky spots behind; throat and abdomen yellow; posterior extremities dark green, with transverse dusky bars; a cutaneous fold, elevated into a ridge, from the orbit to the posterior extremities.

Synonymes. Rana fontinalis, *Leconte,* Ann. Lyc. Nat. Hist. N. Y., vol. i. p. 282.
Rana flavaviridis, *Harlan,* Med. and Phys. Res., p. 103.

Description. The head is short, but rather pointed; the nostrils are lateral, and nearly midway between the eyes and the snout. The eyes are very large and prominent; the pupil is dark, with a golden iris, beautifully reticulated with black, and having an inner circle of bright yellow. The tympanum is very large, bronzed, with a lighter spot near its centre. The mouth is large, with two groups of small palatine teeth. The head above is bright green; the upper jaw is green, the lower yellowish-white, with a few dusky marks. The throat is bright yellow. The body is elongated, but full and large, with a cutaneous fold elevated into a ridge on each side, extending from the orbit to near the thighs. The anterior half of the body is light green; the posterior very dark green, sometimes with a tinge of olive, and is always marked with dusky spots, varying in size and disposition. The animal is sometimes seen more dusky than the one figured in this work, but only in cold weather—the colours I have observed most brilliant when the weather is hottest. The inferior part of the flanks is yellowish-white, mottled with black spots. The anterior half of the abdomen is bright yellow; the posterior half yellowish-white.

The anterior extremities are pale green above, yellowish-white below, with irregular dark blotches on the posterior part of the arm and fore-arm; there are four fingers, moderately long and not palmate, yellowish before and dusky behind. The posterior extremities are very long, dark green above, with dusky transverse bars or blotches; the inferior surface of the thigh is yellow, with its posterior half granulated; the nates are mottled yellow and black; the inferior surface of the leg is pale flesh colour, with a few minute black spots; there are five very long and well palmated toes, but not to their tips, which, as well as the webs, are lighter above and dusky below.

Dimensions. Length from snout to vent, $3\frac{1}{2}$ inches; length of head, $10\frac{1}{2}$ lines; length of thigh, 1 inch 4 lines; length of leg, 1 inch 4 lines; length of tarsus and toes, 2 inches 5 lines: total length, from the snout to the tip of the toes, 8 inches 7 lines.

Habits. The Rana fontinalis inhabits springs of cold water or the neighbourhood of running streams; it passes much of its time on land, but leaps into the water when disturbed. Its food is small worms, or such insects as may come within its reach—these it never seizes unless they are in motion.

Geographical Distribution. The Rana fontinalis is common from Maine to Virginia, but I am not aware of its existence in the more southern or in the western states.

General Remarks. Leconte first pointed out the characters of this animal in his "Remarks on the genus Hyla and Rana." Although he gave no description, still the characters he assigns are sufficient easily to distinguish it; therefore his name, which is a very good one, as giving the habits of the animal, must be continued.

Harlan next calls this animal Rana flavaviridis—a name that cannot be retained, as Leconte's has the right of priority.

It is possible that this animal may prove to be the Rana viriscens of Kalm, quoted by Gmelin and other naturalists, although it cannot now be positively affirmed, as I have hitherto been unable to find any animal described by Kalm, bearing this name, either in his "Travels" or in those works where many of his observations were published, as the Swedish Transactions, &c.; so the specific name given this animal by Leconte must, for the present, be used.

Dumeril and Bibron consider this animal as identical with the Rana clamitans, from which, however, it differs in having the head shorter and less pointed; the tympanum is smaller, the body is shorter and rounder, and the colour, as well as geographical distribution, are very different.

Rana halecina

RANA HALECINA.—*Kalm.*

Plate XXII.

Characters. Body green above, with ovate spots of dark brown, margined with yellow; yellowish-white beneath.

Synonymes. Rana aquatica; Water-frog, *Catesby*, Carolina, &c., vol. ii. tab. 70.
Rana halecina, *Kalm*, Iter. Amer., tom. iii. p. 46.
Shad-frog, *Bartram*, Travels in Carolina, Florida, &c., p. 278.
Rana pipiens, *Gmelin*, Syst. Nat., tom. iii. p. 1052.
Rana pipiens, *Bonnaterre*, Erpetologie, p. 5, tab. 4, fig. 3.
Rana halecina, *Daudin*, Rainettes, p. 63—Hist. Nat. des Rept., tom. viii. p. 122.
Rana pipiens, *Shaw*, Gen. Zool., vol. iii. p. 105.
Rana pipiens, *Merrem*, Versuch eines Syst. der Amphib., p. 175.
Rana utricularia, *Harlan*, Silliman's Journ., vol. x. p. 60.
Rana halecina, *Harlan*, Med. and Phys. Res., p. 102.
Rana palustris, *Guerin*, Iconographie du Regne Animale—Reptiles, pl. 26; non *Leconte*.
Shad-frog, *Vulgo.*

Description. This is one of our most beautiful species. The head is rather small and pointed, with an ovate black spot on the top of each orbit: a very bright bronze line* begins at the nose and runs to the eye; a second line of yellowish-white extends from the nose to the shoulder; the latter is less extensive in the male animal, ending at the vocal sac. The upper jaw is dark-coloured, with several yellowish-white spots, the lower jaw is almost white.

* This line is yellowish in the young.

The nostrils are lateral, and placed half way between the anterior part of the orbit and the snout. The mouth is large, and the palate armed with two groups of small teeth. The eyes are large and prominent; the pupil is black, the iris of a brilliant golden colour, with a longitudinal black band passing through it. The tympanum is large, and finely bronzed, with a yellowish spot on its centre. In the male, the skin at the angles of the mouth is loose and folded over the vocal vesicle on each side.

The superior surface of the body is bright yellowish-green, marked with ovate spots of dark olive, margined with bright yellow: these spots are disposed in two rows on the back, and in two others less distinct and less extensive on the sides. From the posterior part of each orbit runs an elevated line or cutaneous fold, of a bright yellow, terminating near the posterior extremity of the body. The inferior surface is silver-white at the throat, and yellowish-white on the abdomen.

The anterior extremities are bronze-green above, marked with several blotches of dark olive, one of which is very regularly found at the elbow; their inferior surface is whitish. The fingers are four in number, and distinct; the thumb of the male animal is furnished with a tubercle. The posterior extremities are very long, bright green above, marked with dark olive oblong blotches and transverse bars; the inferior surface is pale flesh-colour and quite smooth, except at the posterior part of the thigh, where it is granulated. The toes are five in number, and well palmated, but not to their tips, as in the Bull-frog; the fourth is of great length.

Dimensions. Length of body from the snout to the vent, 3 inches 2 lines; of the thigh, 1 inch 7 lines; of the leg, 1 inch 8 lines; of the tarsus and toes, 2 inches 2 lines.

Geographical Distribution. The Rana halecina is perhaps the most widely distributed of all the Frogs of the United States, and may be regarded as the representative of the Common Frog (Rana esculenta) of Europe. I have observed it in all the Atlantic states, from the White Mountains of New Hamp-

shire to Georgia: Leconte has seen it in the south-western states; Lesueur on the Wabash, and Say even at the Lake of the Woods, in lat. 49°.

Habits. This is a lively, active animal, leaping the distance of eight or ten feet when disturbed; it feeds on insects, and is commonly found in damp places, or on the margins of pools of fresh water. Bosc says it is seldom seen far from water; but I have frequently met with it in meadows and clover fields, when the dew was abundant, in search of insects, at a great distance from its accustomed haunts.

General Remarks. The history of this Frog is a good deal obscured by reference to very dissimilar animals in the works of naturalists; yet by taking the earlier descriptions, it may be made clear. Catesby certainly first described the Rana halecina under the name Water-frog, and accompanied his description with a very good figure.

The next mention made of this animal is by Kalm,* a Swedish traveller, an accurate observer, and excellent naturalist, who called it the Shad-frog, and believed it to be identical with the Rana ocellata of Linnæus. He has described its habits, observing that it appears in Pennsylvania in the spring of the year with the shad and herring, and hence the Swedes who settled on the Delaware called it "Sill hoppetosser," or herring hopper: in his "Travels" it is called Rana halecina, "halec" being an Indian name for shad or herring. Linnæus† probably considered the Rana halecina, from Kalm's description of it, as identical with his Rana ocellata, to which it bears but a slight resemblance; both are certainly ocellated, but the spots are not disposed in the same manner; the Rana ocellata is more than twice the size of the Rana halecina, is peculiar to the West Indies and South America, and has never been found in the United States. Linnæus gave a still more remarkable reference to the Rana maxima Americana aquatica of Catesby, which is certainly the Bull-frog, and entirely unlike the Rana halecina.

* Kalm's Travels in North America, Forster's translation, vol. ii. p. 88.

† Linnæus, Syst. Nat., vol. i. p. 356.

Gmelin, in his edition of the Systema Naturæ, gives the name Rana pipiens to this frog, but for what reason and on what authority I know not, as he refers at the same time to the original name, halecina. Daudin separated this frog, not only from the Rana ocellata, but from all others, and described it under the name Rana halecina, the original one given by Kalm.

Schlegel* believes our animal to be identical with the Rana esculenta of the old world, of which it is only the representative here, and from which it really differs in many particulars:

1. The Rana halecina is the smaller animal.

2. The head is larger in proportion.

3. The toes are less extensively palmated.

4. There are no *openings* on the sides of the jaws, at the angle of the mouth, out of which the vocal vesicles pass when distended with air, as in the Rana esculenta.

* Revue Zoologique, No. xii. 1838, p. 321.

Rana palustris

On Stone by S Cichowski

P S Duval, Lith Phil^a

RANA PALUSTRIS.—*Leconte.*

Plate XXIII.

Characters. Body pale brown above, with two longitudinal rows of square spots of a dark brown colour on the back and on each flank, yellowish-white beneath; posterior half of the thighs bright yellow, mottled with black.

Synonymes. Rana palustris, *Leconte*, Ann. Lyc. N. Y., vol. i. p. 282.
Rana pardalis, *Harlan*, Silliman's Journ., vol. x. p. 50.
Rana palustris, *Dumeril et Bibron*, Hist. Nat. des Rept., tom. viii. p. 356.
Pickerel-frog, *Vulgo.*

Description. The Rana palustris is a slender and delicately formed animal. The head is short and rather obtuse, with a dark brown spot on the top of each orbit, and another near the snout, with an indistinct dark line extending from the nostrils to the orbit of the eye. The upper jaw is yellowish-white, spotted with black; the lower is white, and spotted in like manner. The mouth is large, and the palate is armed with two distinct groups of minute teeth between the posterior nares, less extensive in the antero-posterior direction than in the Rana halecina.

The nostrils are nearly midway between the orbit and snout, a little nearer the latter. The eyes are large and prominent, the pupil black, with the iris of a golden colour; the tympanum is moderate, though smaller than in the Rana halecina; its colour is bronze, with a spot of a darker shade in the middle. A yellow line begins at the eye, and runs below the tympanum to the base of the anterior extremities.

The superior surface of the body is pale brown, almost covered by oblong square spots of very dark brown, arranged symmetrically in two lines along the back: we sometimes find two of these squares confluent. A bright yellow longitudinal line, but not raised in a cutaneous fold, as in Rana halecina, begins behind each orbit, and extends to the posterior extremity of the body; below this line, on each flank, are two other rows of square brown spots, the superior row beginning on a level with and behind the tympanum; the inferior row is less regular, frequently consisting only of small spots, disposed without order. The inferior surface of the neck and abdomen is yellowish-white, except at the posterior part, where the yellow is more decided.

The anterior extremities are short, yellowish-brown above, marked with a few very dark blotches; their lower surface is silver-white; the fingers are four in number, free, of a light brown colour on the upper, and yellow on the lower surface. The posterior extremities are very long, brownish above, with transverse bands of dark brown continued to the toes; the inferior and posterior parts of the thigh are granulated, and of a bright yellow, with black spots; the inferior surface of the leg and tarsus is yellow. The toes are palmated, but the web does not reach their tips, and the fourth toe is longest.

Dimensions. Length of the body and head, $2\frac{3}{4}$ inches; of the thigh, $1\frac{4}{10}$ inches; of the leg, $1\frac{1}{2}$ inches; of the tarsus and toes, $2\frac{2}{10}$ inches.

Geographical Distribution. This animal is found in the Atlantic states from Maine to Virginia, which state must be considered for the present its southern limit. Leconte has observed that it is the only one of our frogs that frequents the neighbourhood of salt marshes, hence its name palustris. It is however by no means confined to such situations, being common throughout the interior of the northern and eastern states. I have observed it among the White Mountains of New Hampshire, in Massachusetts and Vermont, and in the valley of the Connecticut.

Habits. The Rana palustris is very similar in its habits to the Rana halecina; it is generally found in the neighbourhood of ponds or rivers, yet I have often seen it in the morning after heavy dews, at a great distance from water.

General Remarks. Leconte first called the attention of naturalists to this frog, and established it as a distinct species, under the specific name Rana palustris. It is singular that this very common animal should have been so long overlooked, and especially by so accurate a naturalist as Kalm: it may have been confounded with the Rana halecina, from which it can be distinguished by the more obtuse head, the absence of cutaneous folds on the back, the different form of the spots, and by its peculiar, strong and disagreeable odour.

Preserved in alcohol this animal bears much resemblance to the Rana halecina, but no one would confound the living animals. The flesh of this frog is very delicate; and is much used by anglers as bait for pike, whence its common name of Pickerel-frog.

Rana sylvatica

RANA SYLVATICA.

Plate XXIV.

Characters. Body above pale reddish-brown, beneath yellowish-white; head with a very dark brown stripe, extending from the snout through the eye, and including the tympanum.

Synonymes. Rana sylvatica, *Leconte*, Lyc. Nat. Hist. N. Y., vol. i. p. 282.
Rana Pennsylvanica, *Harlan*, Silliman's Journ., vol. x. p. 60.
Wood-frog, *Vulgo.*

Description. The superior surface of this frog is of a pale reddish-brown colour, with a slight tinge of green. The head is small, narrow, and pointed. A very dark brown stripe, narrow before and broader behind, begins at the snout and extends to near the shoulder, including the nostrils, the pupil, the inferior half of the eye, and the tympanum, which is of moderate size; below this dark vitta is a yellowish-white line, extending to the shoulder: a black spot is usually present at the base of the anterior extremities. The upper jaw is bronzed, and mottled with dark brown; the lower is nearly white, having only a few black spots. The palate is armed with minute teeth, in two groups between the posterior part of the posterior nares. The nostrils are placed nearer the point of the snout than in Rana halecina. The eyes are large, the pupil is black, and oval in shape; the iris is very dark brown below, but the portion above the pupil is golden. The tympanum is small, and very dark brown.

The back is pale reddish-brown, with two cutaneous folds or elevated longitudinal yellow lines, often interrupted with black spots, extending from the orbit to

the posterior extremity of the body. The flanks below these lines are mottled in front, greenish-white in the middle, and yellow near the thighs. The inferior surface is silver-white at the throat and anterior part of the abdomen; yellowish-white on the posterior part, and yellow near the thighs.

The anterior extremities are short, coloured above like the back, with a dark-brown band running from the humerus towards the lower jaw, and another interrupted black line on its posterior border. The fore-arm is blotched, or banded with dusky: the palms are more tuberculous than usual; there are four fingers, distinct, flesh-coloured on their inferior surface. The posterior extremities are extremely long, coloured like the back, with regular transverse bands of darker brown continued to the feet; beneath, the thigh is flesh-coloured and granulated behind, white and smooth in front, and yellow near the abdomen. There are five toes, well palmated, but not to their tips, dark above and flesh-colour below. The tips of the fingers and toes are slightly enlarged and obtuse.

Dimensions. Length of the body from the snout to the vent, $1\frac{7}{8}$ inches; of the thigh, 1 inch; of the leg, $1\frac{1}{8}$ inches; of the tarsus and toes, $1\frac{5}{8}$ inches: total length, from the snout to the extremities of the toes, $5\frac{5}{8}$ inches.

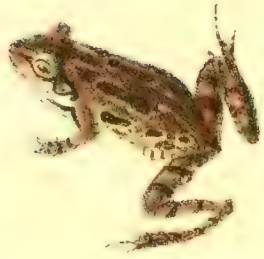
Geographical Distribution. The Rana sylvatica I thought was confined to the Atlantic states, from New Hampshire to Virginia, but Dr. Kirtland informs me that they are common in the woods of Ohio and of Michigan.

Habits. This frog is found, though not abundantly, in the woods of the northern and middle states, choosing thick forests of oak. It is active, and when pursued, conceals itself among dried leaves, the colour of which it so nearly resembles as to be discovered with difficulty. In general it is found far from water, which it only approaches in the breeding season.

General Remarks. I cannot find any notice of this frog previous to the memoir of Leconte, in which it is indicated under the very appropriate name of

Rana sylvatica, but not fully described. Harlan nearly at the same time published a detailed and satisfactory account of it in the tenth volume of Silliman's Journal.

Schlegel supposes this animal identical with the Rana temporaria of Europe, to which it bears a strong resemblance—yet it is always a smaller animal, with the head more pointed, and with a smaller tympanum. I am not disposed to make an exception in favour of this animal to the general rule, that there is not a reptile in Europe identical with any one of the United States.



Cystignathus ornatus

CYSTIGNATHUS.—*Wagler.*

Genus Cystignathus.—Characters. Tongue large, oval, rounded behind or slightly notched, or cordiform, fixed in front, and movable behind; maxillary and palatine teeth minute, latter in two groups, between or behind posterior nares; Eustachian tube very small; a sub-gular vocal vesicle communicating with the mouth on each side of the tongue; tympanum very small; fingers four, toes five, all distinct.

CYSTIGNATHUS ORNATUS.

Plate XXV.

Characters. Head small; body rather short and thick, dove-colour above, with oblong spots of dark brown, margined with yellow; toes not palmated, and the two outer ones united only at their base.

Description. The head is small, with a broad, indistinct, triangular spot between the orbits, the apex of which is directed backwards. A black line extends from the snout to the orbit of the eye, including the nostrils; below this black line is a yellowish blotch, covering most of the upper jaw. The lower jaw is cinereous above and white below. The mouth is small, and the palate is armed with two groups of exceedingly minute teeth between the posterior nares.

The nostrils are placed on a slight prominence. The eyes are large and projecting, the pupil very dark, the iris of a golden colour. The tympanum is

small, very dark coloured, and placed in a dark vitta, or blotch, which extends from behind the orbit to within a short distance of the shoulder.

The body is short, of a delicate dove-colour above, with two or more oblong spots of dark brown, margined with yellow, on each side of the vertebral line; below these, and on each flank, are three smaller spots, likewise margined with bright yellow, the anterior one being the largest; these, with a smaller one above the vent, form a triangle on each flank; several bright yellow spots, also disposed in a triangular form, with the apices directed forwards, are concealed by the thighs. The inferior surface of this animal is silver-white, and except on the throat, every where granulated; about the throat are a few indistinct points of black; the anterior and middle parts of the abdomen are white, with a slight tinge; the posterior third approaches to flesh-colour.

The anterior extremities are short, dove-coloured above, with a few distinct dark bands placed transversely on the fore-arm, and a black spot at the elbow; a black line runs from the inferior and upper part of the shoulder towards the lower jaw; the fingers are four in number, distinct, nearly equal, and the thumb seems less inclined to turn backwards than usual. The posterior extremities are also rather short, dove-coloured above, with transverse bands of dark brown: on the anterior part of the thigh are several small yellow spots; on the posterior surface these spots are so numerous and so closely approximated, as to resemble at first view a yellow waving line. The whole under surface of the thighs is flesh-coloured and granulated; the inferior surface of the legs is also flesh-coloured, with a few yellow dots; the toes are five in number, not palmated, the two outer ones only are united at the base.

Dimensions. Length of body from the snout to the vent, $1\frac{1}{4}$ inches; of the thighs, $\frac{1}{2}$ an inch; of the leg, $\frac{1}{2}$ an inch; of the tarsus and toes, nearly $\frac{7}{8}$ of an inch.

Geographical Distribution. This animal has hitherto been found only in

South Carolina, and as yet only in one locality, about four miles from Charleston, between the Cooper and Ashley rivers, where it abounds.

Habits. Little can be said of the habits of this animal, but that it seems to resemble very much those of the Rana sylvatica. I have always found it on land, and in dry places, and frequently in corn-fields after light summer showers. It is very lively and active, making immense leaps when pursued, and consequently is taken with great difficulty. An individual thrown into water floated, struggling with its limbs extended, as though altogether unacquainted with the art of swimming. I have never heard it produce any sound.

General Remarks. The great beauty of this little animal, the number and variety of its spots and bars, leads me to give it the specific name of ornata. It is remarkable for having its hinder feet not palmated, the toes being very nearly, if not altogether, destitute of a connecting web; in which respect it agrees with several South American species, forming the genus *Cystignathus* of Wagler.

Schlegel* supposes this to be a young animal, and perhaps the young of the Rana sylvatica, which it cannot be, as one has the toes well palmated and the other has not. It is, doubtless, an adult animal, for of the many that I have seen in the last seven or eight years, I have never observed one of greater dimensions than those represented in the figure; and, besides, we have no larger frog with the toes not palmated except the Cystignathus nigritus.

* Revue Zool., No. 12, 1838, p. 322.

Cystignatus nigritus

Sera pinx^t

P S Duval, Lith

CYSTIGNATHUS NIGRITUS.—*Leconte.*

Plate XXVI.

Characters. Head elongated, snout rather pointed, upper lip white; body above speckled with small white granulations; back olive-brown, with a tinge of yellow, and an interrupted black vertebral line; beneath whitish, granulated; extremities ash coloured above, with several transverse dusky bars or oblong blotches.

Synonymes. Rana nigrita, *Leconte*, Ann. Lyc. Nat. Hist. N. Y., vol. i. p. 282.
Rana nigrita, *Harlan*, Med. and Phys. Res., p. 105.

Description. The head is elongated, and ash coloured above, with the snout rather pointed. The nostrils are lateral, and nearer the snout than the orbits. The eyes are large and prominent, the pupil black, the iris golden above and grey below. The mouth is rather large, and the palate is armed with two thick groups of minute teeth, placed between the posterior nares and disposed a little "en chevron." The tympanum is dusky and very small. The upper jaw is yellowish-white, which colour is continued below the anterior extremities; above this is an irregular black blotch, beginning near the snout, including the greater part of the eye, and reaching to the shoulder.

The body is slender, olive brown above, with a tinge of yellow, and an interrupted black vertebral line from the snout to the rump. The abdomen is yellowish-white, and granulated posteriorly.

The anterior extremities are slender, and coloured above like the back, with

spots and transverse bars of black, and dusky yellowish-white below; there are four long and delicate fingers. The posterior extremities are very long, and coloured both above and below, like the anterior; there are five toes, not palmated.

Dimensions. Length, 1 inch 6 lines; of thigh, 8 lines; of leg, 8½ lines; tarsus and toes, 10 lines.

Habits. But little is known of the habits of the Cystignathus nigritus; but, from the form of the posterior extremities and the arrangement of its toes, it would seem to be a land animal, and closely allied with the Cystignathus ornatus.

Geographical Distribution. This animal has as yet only been found in Georgia and Carolina; Leconte observed it in the former state, and I have seen it in the latter.

General Remarks. Leconte gave the specific name nigrita to this animal in his "Remarks on the genus Hyla and Rana;"* and although he does not describe it in detail, yet the characters he assigns are sufficient at all times to distinguish this frog from all others, consequently his name must be retained.

* Ann. Lyc. Nat. Hist. N. Y., vol. i. p. 282.

Scaphiopus solitarius

On Stone by S. Cichowski

P. S. Duval Lith. Phil.ᵃ

SCAPHIOPUS.—*Holbrook.*

Genus Scaphiopus.—Characters. Body short, thick, swollen; head short, minute teeth in the upper jaw and on the palate, in two groups between the posterior nares; tympanum distinct, though small; parotid gland small, from which a watery fluid can be pressed; posterior extremities short, stout, and muscular; leg shorter than the thigh; a spade-like horny process occupies the position of a sixth toe, and is used by the animal in excavating his retreat; males with a sub-gular vocal sac.

SCAPHIOPUS SOLITARIUS.—*Holbrook.*

Plate XXVII.

Characters. Back olive coloured and somewhat warty, with two lines of pale yellow extending from the orbits to the vent; beneath yellowish-white.

Synonyme. Scaphiopus solitarius, *Dumeril et Bibron*, His. Nat. des Rept., tom. viii. p. 473.

Description. This singular animal approaches nearly to the toad in form. The head is short, the snout obtuse. The upper jaw is greenish-yellow, the lower yellowish-white. The nostrils are very near the extremity of the snout, and placed on a rounded prominence. The eyes are large and very prominent, almost resembling warts or excrescences; the pupil is black, the iris golden, very brilliant, and subdivided into four portions by two black lines. The tympanum is small,

and yellowish-green; behind the tympanum is a small parotid gland, from which minute jets of watery fluid can be pressed.

The back is yellowish-green, clouded with dark-brown blotches, and covered with small warts of different sizes; many of these are of a dark-brown colour; others, reddish or orange. Two decurved lines of pale yellow extend from the orbits to the vent; on each flank is another line of the same colour, but less distinct and shorter, reaching only from the shoulder to the thigh. The inferior surface of the throat is yellowish-white; the abdomen dirty-white, and granulated posteriorly.

The anterior extremities are long, their colour yellowish-green, clouded with a few blotches of brown on the upper surface,—a reddish tinge on the lower, approaching to flesh colour. The fingers are four in number, short and distinct. The male is distinguished by having the two inner ones black above. The posterior extremities are short, but very muscular, and have the leg conspicuously shorter than the thigh; they are yellowish-green on the upper surface, marked with a few blotches and transverse bands of dark brown, and sometimes with a few small reddish spots. The lower surface of the thighs is flesh-colour, and granulated. The toes are five in number, and fully palmated. On the internal margin of the metatarsus is a horny spade-like process, containing a bone, which moves by an imperfect joint: the breadth of this process is about a line and a half, its length one line; the cutting edge is jet black.

The skin is very delicate, and though warty or granulated after exposure, when first taken from its hole the Scaphiopus presents the etiolated appearance of a real subterraneous animal.

Dimensions. Length of body, $2\frac{1}{4}$ inches; of the thigh, rather less than an inch; of the leg, $\frac{3}{4}$ of an inch; of the tarsus and toes, $1\frac{1}{4}$ inches; of the fore-arm, with carpus and fingers, nearly an inch.

Geographical Distribution. Its range is more extended than I at first apprehended. It is found in Carolina and Georgia. Dr. Troost has sent me a specimen from Tennessee, and Dr. Dekay has observed it in the state of New York.

Habits. This is a strange animal—an odd mixture of toad and frog, having the teeth of the one, and the rudimental post-tympanal glands of the other; it approaches, however, nearest the toad in its form and habits, as it never ventures in water except at the breeding season: it lives in small holes about six inches deep, excavated by itself in the earth, which for a long time I mistook for holes of insects; here it resides, like the ant-lion, seizing upon such unwary insects as may enter its dwelling. It never leaves its hole, except in the evening, or after long continued rains. It shows great dexterity in making this dwelling, sometimes using the nates, and fastening itself by the spade-like process; at others it uses the legs with these processes, like a shovel, and will in this way conceal itself with great rapidity. In progression its motions are not very lively, and its powers of leaping but feebly developed. It appears early in March, after the first heavy rains of spring, and at once seeks its mate. I have met them even in very cold weather, with snow on the ground.

General Remarks. This animal is perhaps somewhat allied to the Ceratophris of South America, which has teeth, the posterior extremities short, and the hind feet furnished with a movable unarmed tubercle. The Rana cultripes of Cuvier* would seem to be furnished with a process more nearly resembling that of our animal.

The animals of the family Ranoidea delight in the sun, and may at all times be seen sitting half emersed in water, even when his rays are the most intense. They are all diurnal, or seek their food in the day time, with one exception only, the Scaphiopus solitarius, which passes its days in holes prepared by itself, and feeds on such insects as may unwarily enter its dwelling.

* Cuvier, Regne Animale, tom. ii. p. 105.

Family II. HYLOIDEA.

CHARACTERS.

I. This family differs greatly from the last, in having the extremities of the toes and fingers enlarged into a disk or viscous pellet, by means of which they can sustain themselves on smooth surfaces, as leaves, glass, &c. This is indeed an important character, and influences their whole mode of existence, as it enables them to live on trees or shrubs, or plants, where they are always found except in the breeding season.

II. They differ also from the family Ranoidea again in having the inferior surface of the belly in general covered with small granulations, with glandular openings; in all other respects they are similar, as in the teeth, tongue, &c. &c.

This family includes several genera, two only of which have hitherto been observed in the United States, viz: Hyla and Hylodes.

Hyla Versicolor.

On Stone by S. Cichowski

P.S. Duval, Lith. Phila

HYLA.—*Laurenti.*

Genus Hyla.—Characters. Tongue elliptico-circular, nearly entire, or but slightly notched behind, and movable only at its posterior extremity; teeth in upper jaw and palate, the latter either between posterior nares or a little before or a little behind; tympanum distinct; male with a vocal vesicle; fingers four; toes five, slightly depressed, the former free, the latter more or less palmated, and all terminating in enlarged disks or viscous pellets.

HYLA VERSICOLOR.—*Leconte.*

Plate XXVIII.

Characters. Resembling the toad in form, but more flattened; body short, and warty above; colour varying at times from the palest ash to dark brown, marked with several large irregular blotches of brown and frequently tinged with green, white and granulated beneath; abdomen yellow near the thigh; leg shorter than the thigh.

Synonymes. Hyla versicolor, *Leconte*, Lyc. Nat. Hist. N. Y., vol. i. p. 281.
Hyla versicolor, *Harlan*, Med. and Phys. Res., p. 108.
Tree-toad, *Vulgo.*

Description. This is a beautiful species of Hyla; its colours seeming almost to vary at the will of the animal. The head is short, broad and obtuse, with a dark brown spot on each orbit. The upper jaw is brown, marked with white spots; the lower is entirely white. The mouth is large, the tongue sub-circular,

notched, and free posteriorly; the palate is armed with two groups of minute teeth between the posterior nares, and interrupted in the middle slightly.

The nostrils are rather near the snout. The eyes are large and brilliant, the pupil black, the iris of a bright golden-yellow. The tympanum is moderately large and circular, brown, surrounded by a circle of a lighter shade. The throat of the male becomes inflated while uttering its note.

The superior surface of the body is covered with minute warts and granulations, an unusual character in this genus: its colour is changeable, passing in a short time through every intervening shade from dark brown to the palest ash-colour, becoming in some parts perfectly white; it is marked with large irregular blotches of dark brown; and we often find between the shoulders one of these blotches cruciform; they disappear, however, almost entirely when the animal assumes its lightest tint. The inferior surface of the body is white, with large granulations; a small portion of the sides and posterior part of the abdomen is bright yellow.

The anterior extremities are ash-coloured above, with a few small blotches of brown; the fingers are four in number, cleft, and terminating in rounded pellets, by means of which the animal adheres to smooth surfaces. The posterior extremities are moderately long, and ash-coloured above, with a few transverse bars of dark brown, continued even to the toes; the under surface of the thighs is granulated and yellow near the abdomen, white in the middle, and yellow near the legs; the inferior surface of the leg is yellow, and of the foot brown. The toes are five in number, palmated four-fifths of their extent, and terminating in pellets, like the fingers. The skin above these pellets presents quite obviously the appearance of the "human nail," spoken of by Linnæus in other species.

Dimensions. Length of the body from the snout to the vent, 2 inches; of the thigh, nearly an inch; of the leg, $\frac{9}{10}$ of an inch; of the tarsus and toes, $1\frac{2}{5}$ inches.

Geographical Distribution. The Hyla versicolor is found abundantly in all

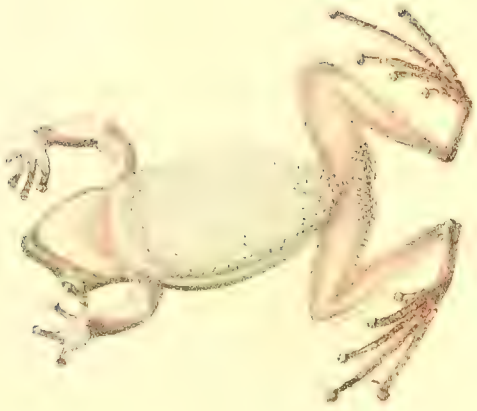
the northern and middle states, as far as lower Virginia, which state must for the present be considered its limit to the south. I cannot determine its geographical distribution west of the Alleghanies; it seems however widely extended, for Lesueur observed it on the Wabash, and Professor Troost furnished me with several fine specimens from the banks of the Cumberland river.

Habits. This animal is commonly found on trees and about old stone fences, overgrown with mosses and lichens, the colour of which it so closely resembles that it frequently escapes observation, even when sought for. It very commonly chooses old and decaying plum trees for its abode, probably because the insects on which it feeds are most abundant in such situations. It is very noisy towards evening, in cloudy weather, or before rain, its voice consisting of a liquid note, terminating abruptly, like l-l-l-l-l-l-luk. At the close of spring, and during great part of the summer, when the toad has become silent, this note may be heard, especially in the evening, from various shallow pools, to which the animal resorts for the purpose of depositing its spawn. Harlan* mentions an instance of one being dug up at the root of an apple tree, during the winter season, several feet beneath the surface of the ground.

General Remarks. The vericose body of this Hyla, and its rounded shape, give it the appearance of a toad; the skin also is moist and viscid, exuding an acrid fluid, which has led many persons to believe it poisonous; and certainly the secretion afforded by the glands of the cutaneous organs is more acrid than that given off by any other toad or frog which I have seen in a living state.

It is remarkable that an animal so common and so very noisy should have so long escaped the attention of naturalists. The first mention made of it is in Kalm's "Travels in North America:" he however only describes its habits, and refers to the Rana arborea of Linnæus, to which it bears but a slight resemblance. Leconte was certainly the first who minutely and accurately described it, and established its claim to be considered as a new and distinct species.

* Medical and Physical Researches, p. 109.



Hyla viridis.

Sera pinx.t 21. F.S. Duval, Lith. Phil.

HYLA VIRIDIS.—*Laurenti.*

Plate XXIX.

Characters. Body above bright green, beneath yellowish-white, and granulated; a lateral line of straw-colour extends from the upper jaw over the shoulder and along the flanks.

Synonymes. Green Tree-frog, *Catesby*, Carolina, &c., vol. ii. p. 71, pl. lxxi.
Hyla viridis, *Laurenti*, Synops. Rept., p. 33, *variety* B.
Cinereous Frog, *Pennant*, Arct. Zool., vol. iii. p. 42.
Rana arborea, *Gmelin*, Syst. Nat. Lin., *variety* B. tom. i. p. 1054.
Calamita cinerea, *Schneider*, Hist. Amphib., fas. i. p. 174.
Hyla lateralis, *Latreille*, Hist. Nat. Rept., tom. ii. p. 180.
Hyla lateralis, *Daudin*, Hist. Nat. des Rain., &c., p. 16. pl. ii. fig. 1.
Hyla lateralis, *Daudin*, Hist. Nat. des Rept., tom. viii. p. 27.
Calamita lateralis, *Merrem*, Versuch eines Syst. der Amphib., p. 171.
Hyla lateralis, *Leconte*, Ann. Lyc. Nat. Hist. N. Y., vol. ii. p. 279.
Hyla lateralis, *Dumeril et Bibron*, Hist. Nat. des Rept., tom. viii. p. 587.
Hyla lateralis, *Harlan*, Med. and Phys. Res., p. 107.

Description. The head is short and flattened; above it is of a bright grass-green colour, as well as at the sides; the snout is obtuse; the upper jaw is green in front, but dull white behind. The mouth is moderate in size, the tongue is large and sub-cordiform, and the palate is armed with a transverse row of minute teeth between the posterior nares, interrupted in the middle. The nostrils are nearer the snout than to the orbit. The eyes are large and prominent, the pupil dark, with a beautiful golden iris; the tympanum is small, but very distinct, and green like the body. The body is stout and depressed, of a lively grass-green, with

occasional spots of brightest gold colour; a pale straw-coloured line begins under the anterior part of the orbit, runs beneath the eye and tympanum, and is continued above the shoulder along the flanks to near the posterior extremities; this line is partially visible on the posterior part of the upper jaw, giving it a whitish appearance. The throat is yellowish-white; the thorax silvery; the abdomen yellowish-white, and granulated.

The anterior extremities are coloured like the body above, white below, with a pale yellow line along the posterior border of the humerus, fore-arm, and carpus, to the external finger; this line becomes very distinct only near the elbow; there are four fingers, palmated to about one-sixth of their length, each ending in a rounded pellet, by which the animal can sustain itself on smooth places. The posterior extremities are very long, and green on the upper surface; the thigh is yellow beneath, and granulated; the nates are flesh-colour, with a few dusky spots; the leg is pale flesh-colour below, with a yellow line before and behind, which is continued along the tarsus to the outer toe; there are five toes, palmated to four-fifths of their length, the two external green above, the three internal dirty yellow, each terminates in a rounded pellet, similar to those of the fingers.

Dimensions. Length from snout to vent, $1\frac{3}{4}$ inches; of thigh, 8 lines; of leg, $8\frac{1}{2}$ lines; of tarsus and toes, 1 inch 2 lines.

Habits. These animals are found on trees, but most commonly about the broad-leaved plants, as the Pontederia cordata, Nymphæa, &c.; they are also very numerous in fields of Indian corn (Zea maïs), where they conceal themselves from their enemies by passing in between the broad green leaves of the plant, the colour of which is so nearly their own, that it is not easy to find them. Here they remain quiet and motionless during the heat of the day, but in the morning or evening, or before a shower, they emerge from their hiding-places and become very brisk and noisy.

Their noise proceeds from a single note, which, at a little distance, is not unlike

the sound of a small bell; and there seems in general to be one leader of their orchestra, and when he raises his note, hundreds take it up from all parts of the cornfield, and when he stops, the concert is at an end, until he again begins.

They feed on various insects, especially the common fly, which they seize with great adroitness, leaping a foot or more to secure it. At certain seasons they may be seen on the ground on their way to pools of water; they are then exceedingly active, leaping at times eight or ten feet.

Geographical Distribution. For the present we must set down latitude 33°, on the Atlantic coast, as the northern limit of the Hyla viridis; thence it extends through Georgia, Florida and Alabama to Mississippi, but I have no evidence of its existence further west.

General Remarks. The first notice of the Hyla viridis, now under consideration, is in Catesby's History of Carolina, &c.; he there calls it the Green Tree-frog, and gives a very good detailed account of its habits, accompanied with a tolerably accurate drawing.

Linnæus seems to have regarded this animal as a variety of the common Rana arborea, which he says, incorrectly however, inhabits both Europe and America.

The next account of the Hyla viridis is found in the Synopsis Reptilium of Laurenti, who first separated the genus Hyla from that of Rana. He called the Tree-frog of Europe "Hyla viridis," and considered the Tree-frog of Catesby as a variety under the same name. Now, the specific name of viridis cannot be used for the Tree-frog of Europe, inasmuch as Linnæus and other naturalists had previously imposed upon it that of arborea; and this leaves the specific name viridis unapplied, and consequently it may be used for our animal, as given it by Laurenti, who seemed to consider it as very distinct from the common Tree-frog of Europe; nor can there be any doubt of his meaning, for he refers expressly to Catesby's seventy-second plate of the second volume, saying, "Corpore tereti,

linea, utrinque flava, sed recta, distinguitur clamore, tschit, tschit, tschit, dum nostro (Hyla arborea) clamat ra-ra-ra."*

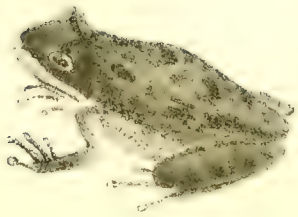
The next account of the Hyla viridis is in the supplement to Pennant's Arctic Zoology, where it is described as the Cinereous Frog, with a white line along the flanks; the green colour doubtless had become cinereous, owing to the action of alcohol on the specimen which he examined.

Gmelin, in his edition of the Systema Naturæ, goes back to the opinion of Linnæus, and considers the Hyla viridis as only a variety of the Rana (Hyla) arborea; but he adds a reference to Catesby.

Schneider also calls it a variety of his Calamita arborea, though he says, "non solum linearum diversa disectio, sed vox etiam distinguit."

Bosc observed the living animal in Carolina, and gave a detailed and accurate account of it to Latreille and Daudin, under the name Hyla lateralis, which was afterwards published in their respective works. This name, however, cannot be retained in this work—that of Hyla viridis having the right of priority.

* Laurenti, Synops. Rept., p. 33.



Hyla squirella.

On Stone by J.s Queen

P.S. Duval, Lith. Phil.a

30.

HYLA SQUIRELLA.—*Bosc.*

Plate XXX.

Characters. Body olive-green above, marked with dark brown blotches, irregularly disposed; a transverse dusky band between the orbits; whitish beneath and granulated; head short, with a white line extending along the upper lip to the shoulder.

Synonymes. Hyla squirella, *Daudin*, Rainettes, p. 18, t. 3, f. 1—Hist. Nat. des Rept., tom. viii. p. 34.
Calamita squirella, *Merrem*, Versuch eines Syst. der Amphib., p. 171.
Hyla squirella, *Leconte*, Ann. Lyc. N. Y., vol. i. p. 279.
Hyla squirella, *Harlan*, Med. and Phys. Res., p. 107.
Auletris squirella, *Wagler*, Natürlich. Syst. der Amphib., p. 201.
Hyla squirella et femoralis, *Dumeril et Bibron*, Hist. Nat. des Rept., tom. viii. p. 589.

Description. The head is short, with a dark band between the orbits, the line from each orbit being directed backwards, so as to meet at an angle; the snout is obtuse, with an indistinct dark band extending from the nostrils to the eyes, below which is a white line along the margin of the upper lip, reaching to the shoulder; the lower jaw is almost white. The mouth is large; the tongue large, sub-circular, and slightly notched posteriorly. The palate is armed with a transverse row of teeth, between the posterior nares, largely interrupted in the middle.

The nostrils are placed near the extremity of the snout; the eyes are prominent, the pupil black, the iris golden; the tympanum is moderate, bronzed, circular, and surrounded by an indistinct circle of dark brown.

The skin is smooth; the body short and depressed while living; the back is olive-brown, with irregular blotches of darker olive; the flanks are grey. The inferior surface of the body is granulated, greenish-white in front, with a few dark spots at the throat; the posterior part of the abdomen is darker.

The anterior extremities are olive-brown above, with occasional dusky spots, and flesh-coloured beneath; the fingers are four in number, distinct, and each terminating in a viscous pellet. The posterior extremities are long, greenish above, obscurely blended with dark brown, and flesh-coloured beneath, tinged with yellow externally; the lower surface of the thigh is granulated; the toes are five in number, and semi-palmated.

Dimensions. Length of body and head, $1\frac{1}{4}$ inches; of the thigh, $\frac{4}{5}$ of an inch; of the leg, $\frac{4}{5}$ of an inch; of the tarsus and toes, $\frac{9}{10}$ of an inch.

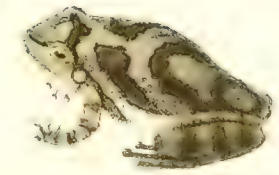
Geographical Distribution. Its most northern limit must be considered as latitude 34°, as I have no evidence of its being found farther north. It abounds in South Carolina, Georgia, and Florida;—how far west of these states it may exist cannot at present be determined.

Habits. This animal is found on trees, often seeking shelter under the bark of such as are decaying; it frequently chooses old logs for its place of hibernation. Often I have found it about old houses, and under logs and boards.

General Remarks. The colours of this animal are even more changeable than in any species with which I am acquainted—I have seen it pass in a few moments from a light green, unspotted and as intense almost as that of Hyla lateralis, to ash-colour, and to a dull brown with darker spots; the spots also at times taking on different tints from the general surface. The markings, too, vary exceedingly in different individuals, the white line on the upper lip and the band between the orbits alone are constant. Daudin remarks that the leg is

"shorter than the thigh;" I have found them nearly equal in length, and this character is by no means so conspicuous as in Hyla versicolor.

Daudin first described this animal, and gave a figure of it from a drawing furnished him by Bosc. Leconte has given the latest and most detailed account of it, establishing three principal varieties, in one of which the spots, as well as the yellow on the thighs, disappear altogether.



Hyla femoralis.

J H Richard, del

P S Duval Lith Phil^a

HYLA FEMORALIS.—*Daudin.*

Plate XXXI.

Characters. Head small, somewhat obtuse; body cinereous, marked with darker spots or blotches; a triangular blotch between the eyes; abdomen whitish, granulated; thighs dusky on their posterior part, and marked with seven or eight bright yellow spots, nearly in a line.

Synonymes. Hyla femoralis, *Daudin*, Hist. Nat. des Rain., &c., p. 19, pl. iii. fig. 1.
Hyla femoralis, *Daudin*, Hist. Nat. des Rept., tom. viii. p. 32.
Hyla femoralis, *Leconte*, Ann. Lyc. Nat. Hist. N. Y., vol. i. p. 280.
Hyla femoralis, *Harlan*, Med. and Phys. Res., p. 107.

Description. The head is rather small, and somewhat obtuse at the snout, cinereous, with a large triangular dusky spot between the orbits; its apex behind and truncated. The mouth is moderate, and the palate is armed with two groups of minute teeth, placed between the posterior nares. The nostrils are lateral, and nearer the snout than the orbit. The eyes are large and prominent, with a black pupil and a golden iris, finely reticulated with brown. The tympanum is of moderate size, and olive-brown in colour. The body is rather slender, cinereous above, and marked with large dusky blotches, without any constant and determinate form. The abdomen is pale white, and granulated at its posterior part.

The anterior extremities are short, cinereous, with dusky spots above and dirty white below; there are four toes, distinct, each terminating in a bulb.

The posterior extremities are well developed, cinereous above, with dusky transverse bars more or less distinct, and milky-white below. The under surface of the thighs is granulated; the posterior is dusky, and marked with six or eight

sub-triangular spots of brightest yellow, arranged without order, but nearly in a line. There are five toes, semi-palmate, and each terminating in a disk, like the fingers.

Dimensions. Total length, 1 inch 6 lines.

Habits. This little animal lives in the deep forests of Carolina and Georgia; it chooses trees for its residence, and is sometimes found even thirty feet from the ground, feeding on such insects as choose the same localities.

Geographical Distribution. I have never heard of the existence of the Hyla femoralis out of Carolina, Georgia, and Florida, though doubtless it may exist along the northern borders of the Gulf of Mexico.

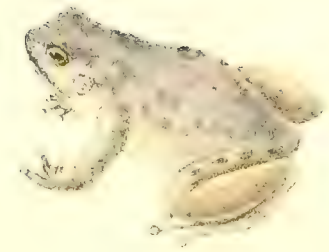
General Remarks. Bosc was the first naturalist that observed this little animal, and he sent a very good description of it to Latreille, under the specific name femoralis, from the bright yellow spots along the thighs. Daudin next gave a good description but a sorry plate of it in his "Histoire des Rainettes," and Leconte finally gave a more detailed account in the New York Lyceum of Natural History.

Dumeril and Bibron consider this animal as identical with the Hyla squirella, from which it is, however, perfectly distinct:

1. It is about two-thirds the size.

2. Its general colour and markings are different; there is no white line along the upper lip, and the yellow spots on the thigh always exist there, and never in the Hyla femoralis.

3. It differs in habits—for it is never found near out-houses, or about fences and in old fields.



Hyla delitescens.

J.W. Richard' del. *P.S. Duval, Lith. Phil.ª*

HYLA DELITESCENS.—*Leconte.*

Plate XXXII.

Characters. Head short; snout rather rounded; body above cinereous, with irregular dusky spots, smooth; abdomen granulated, yellowish-white; inferior surface of anterior and posterior extremities yellow.

Synonymes. Hyla delitescens, *Leconte*, Ann. Lyc. Nat. Hist. N. Y., vol. i. p. 281.
Hyla delitescens, *Harlan*, Med. and Phys. Res., p. 108.

Description. The head is short, somewhat obtuse in front, cinereous, with a few irregular black spots above, and the lips are speckled white and brown. The mouth is rather large, and the palate is armed with two groups of minute teeth, placed on a line with the posterior nares. The nostrils are rather near the snout. The eyes are large and prominent, with a black pupil and a bright golden iris. The body is rather robust, cinereous above, though variable, and marked with irregular dusky spots. The abdomen is yellowish-white, and granulated.

The anterior extremities are coloured like the back above, but below, especially on their posterior part, they are bright yellow. There are four fingers, free, each ending in a bulb or viscous pellet. The posterior extremities are well developed, coloured above like the back, but below they are of a bright yellow, and granulated posteriorly. The toes are five, semi-palmated, and terminate each in a bulb.

Dimensions. Length, $1\frac{1}{2}$ inches.

Habits. The Hyla delitescens is an inhabitant of Georgia; it lives in the

forest, and is most commonly found under the bark of dead trees. It feeds on insects.

Geographical Distribution. Hitherto this little animal has been observed only in Georgia.

General Remarks. Leconte first observed and described the Hyla delitescens. It is closely allied in form, and somewhat in colour, to the Hyla versicolor, but it is a much smaller animal, and the skin of the back is smooth.

Hylodes gryllus.

HYLODES.—*Fitzinger, non Dumeril et Bibron.*

Genus Hylodes.—Characters. Mouth large, and furnished with a large subcordiform tongue, free and movable in its posterior half; teeth in the superior maxillary and palate bones, the latter in two groups between the posterior nares; tympanum visible; extremities slender, tips of fingers and toes terminating in slightly developed tubercles.

HYLODES GRYLLUS.—*Leconte.*

Plate XXXIII.

Characters. Head elongated, pointed, a triangular dusky spot between the orbits; body above cinereous, with a green, or sometimes red, vertebral line, and three oblong black spots, margined with white on the sides. Length, 18 lines.

Synonymes. Savannah Cricket, *Bartram*, Trav., &c., p. 278.
Rana gryllus, *Leconte*, Ann. Lyc., Nat. Hist. N. Y., vol. i. p. 282.
Rana gryllus, *Harlan*, Med. and Phys. Res., p. 104.
Rana dorsalis, *Harlan*, loc. cit., p. 105.
Acris gryllus, *Dumeril et Bibron*, Hist. Nat. des Rept., tom. viii. p. 507.

Description. The head is elongated and rather pointed at the snout, greenish above, with a black triangular spot between the orbits of the eyes, with its apex backwards. The mouth is large, and the palate is armed with two thick groups of minute teeth, situated on a line with the posterior border of the posterior nares, and widely separated.

The nostrils are lateral, and nearly midway between the orbits and the snout. The eyes are large and prominent, the pupil black, the upper half of the iris brightest golden, the lower black. The upper jaw is dusky, with a yellowish-white line from the posterior and inferior border of the orbit to the axilla. The chin and throat are yellowish-white.

The body is much elongated, slender, and dusky above, with a vertebral line of bright green, or sometimes reddish-brown, which bifurcates at the occiput and runs to the superior part of the orbits of the eyes. On each side of this vertebral line are two or three large oblong spots, with white margins. The flanks are grey; the thorax and abdomen are silver-white.

The anterior extremities are small and delicate, dusky above, with a black blotch near the elbow; beneath they are clouded white; there are four fingers, distinct, very delicate, and slightly developed at the extremities. The posterior extremities are very long, dusky above, and barred with black; the lower surface is dirty flesh-colour; there are five toes, long, and fully webbed, with their extremities still more rounded and developed.

Dimensions. Length, 1 inch 6 lines; of thigh, 7 lines; of leg, 8 lines; of tarsus and toes, 1 inch 1 line.

Habits. This is a merry little frog, constantly chirping like a cricket, even in confinement; it frequents the borders of stagnant pools, and is often found on the leaves of aquatic plants, and rarely on the branches of such low shrubs as overhang or dip in the water. It feeds on various kinds of insects, and makes immense leaps to secure its prey, or to escape its pursuers. It can easily be domesticated, and takes its food readily from the hand; I have kept several for months in a glass globe on a few sprigs of purslain, (portulacca oleracea,) feeding them occasionally with flies. Their chirp, at times, was incessant, and sprinkling them with water never failed to render them more lively and noisy.

Geographical Distribution. The Hylodes gryllus is found on the Atlantic coast from latitude 43° to the Gulf of Mexico, and is very abundant in Carolina and Georgia; but as yet I have no evidence of its existence west of the Alleghany mountains.

General Remarks. The first notice of this animal is found in Bartram's Travels in Carolina and Florida; he calls it the Savannah Cricket, and gives a tolerable account of its manners. This animal forms a good connecting link between the genus Rana and Hyla, and seems to partake of the habits of both, for though it likes water at all times, yet it may be found on aquatic plants waiting for its prey; and it has the power of adhering to smooth surfaces like the Hylæ, but much less perfectly, as it can never sustain itself on the under surfaces of leaves, &c.

For the present I am disposed to arrange this animal with the Hylodes of Fitzinger: for 1. The extremities are slender, with the fingers and toes only slightly swelled at the tips; and, 2. It cannot belong to the genus Rana, as it wants a bony sternum, &c.*

Dumeril and Bibron have established a new genus, Acris, for the reception of this animal and the Cystignathus nigritus; but I see no reason for removing it from that of Hylodes, especially as thier genus is characterized by having the toes free.

* See the Anatomical part of this work.

Hylodes Pickeringii

J.H. Richard, del

P.S. Duval, Lith. Phil.ª

HYLODES PICKERINGII.—*Holbrook.*

Plate XXXIV.

Characters. Head rather short; body yellowish-brown, with small, dusky, rhomboidal spots, and lines of same colour, sometimes arranged in form of a cross; abdomen pale flesh-colour; throat tinged with yellow. Length, $11\frac{1}{2}$ lines.

Description. The head is short, yellowish-brown above, with the snout rather pointed. The tongue is large, long, and slightly notched posteriorly. The palate is armed with two groups of exceedingly minute teeth in a range with the posterior nares.

The nostrils are lateral, and nearer the snout than the orbit, with an indistinct dusky line extending from each to the eye. The eyes are large and prominent; the pupil is black, and the iris brilliant gold colour, with a tinge of green. The snout is pale yellow; the body is short and delicately formed, fawn colour, marked with small rhomboidal dusky spots and lines of the same colour, which latter are sometimes arranged in a cruciform manner; one line is at times very distinct, and extends from the back of the orbit to the flanks; the abdomen is pale flesh-colour.

The anterior extremities are coloured like the back, and marked with transverse dusky bars, and terminate in four distinct fingers; these, as well as the bulbs at the tips, are proportionally less developed than in the genus Hyla; the posterior extremities are long, with five toes, palmated, and terminating like the fingers in small bulbs.

Dimensions. Length of head and body, 11½ lines; length of thigh, 5½ lines; length of leg, 5½ lines; length of tarsus and toes, 9½ lines.

Habits. The Hylodes Pickeringii is most commonly found on the ground, though at times I have seen it waiting for its prey on the leaves of shrubs and plants growing near the water, as Cephalanthus occidentalis, Osmunda cinnamomea, &c. It feeds on small insects, as flies, &c.

Geographical Distribution. This animal is found in Massachusetts, and is particularly abundant, according to Dr. Pickering, in the vicinity of Salem. Dr. Dekay and Mr. Cooper have observed it in New York, and there is a specimen in the Museum of the Academy of Natural Sciences, found in the neighbourhood of Philadelphia.

General Remarks. Dr. Pickering several years since called my attention to this animal as one undescribed, and to him I have dedicated the species. It seems hitherto to have been confounded by some naturalists with the Hyla squirella, from which it may at all times be distinguished, by the absence of the white line reaching along the upper lip to the fore-shoulder; by the difference of marking about its back; by its smaller size; by its extremities being less proportionably developed; and by the wide difference in its geographical distribution. Others again have considered it a remarkable variety of the Hyla versicolor, from which, however, it is specifically distinct, never reaching half the size of that animal, and never having the skin granulated.

Hylodes ocularis.

HYLODES OCULARIS.—*Holbrook.*

Plate XXXV.

Characters. Head long; snout pointed; upper jaw white, which colour is continued to the anterior extremity, above this a black band runs over the shoulder and terminates on the flanks; body short, chestnut-brown or bronzed; abdomen yellowish-white.

Description. The head is long, narrow, and the snout pointed; the mouth is large, and the palate armed with two groups of minute teeth placed between the posterior nares.

The nostrils are lateral, and rather nearer the snout than the orbits. The eyes are small, but prominent, the pupil black, and the iris grey, with a tinge of red. The upper lip is white, and this colour is continued in a line to the axilla; above this is a black blotch, which begins very narrow and becomes broad under the orbit, passes over the shoulder, and there terminates. The chin and throat is yellowish-white.

The body is small, elongated and delicate, uniform chestnut-brown or bronze-coloured above, and yellowish-white below. The anterior extremities are small, brown above, and clouded-white below; there are four fingers, distinct, and slightly enlarged at their tips. The posterior extremities are very long, reddish-brown above, barred with dusky, and obscure white below; there are five toes, webbed, and enlarged at their extremities.

Dimensions. Length, 11 lines; thighs, 3½ lines; leg, 3½ lines; tarsus and toes, 6½ lines.

Habits. This beautiful little animal, the smallest of the frog kind with which I am acquainted, is closely allied to the Hylodes gryllus in its habits, choosing the same damp places for its abode, and is not unfrequently found on the leaves of such low shrubs as inhabit the same localities, as the myrtle (Myrica cerifera); and like the Hylodes gryllus, too, it has the power of adhering to smooth surfaces, though not so perfectly as the Hylæ.

Geographical Distribution. South Carolina and Georgia can only, for the present, be given as the abode of the Hylodes ocularis, although doubtless it will be found to have a much wider range.

General Remarks. I have chosen the specific name Ocularis for this animal, from the black spot along the eye; and this has been done the more willingly, as it is possible this animal may in the end prove to be the Hyla ocularis of Bosc and Daudin, which Leconte thinks, however, is most probably only a variety of the Hyla squirella; and yet, as this animal is not unfrequently found on low bushes, or leaps upon them when pursued, it is not impossible that Bosc might have supposed it to be a real Hyla. Should it then turn out to be the Hyla ocularis of Bosc, an additional synonyme will be saved; but if it is an undescribed animal, which I believe, then the denomination Hylodes ocularis is well enough, as it belongs to another genus.

The members of this genus, like those of the last, are all diurnal in their habits, or seek their food by daylight. They all delight in the heat of the sun, and the brighter its rays, the more merry and noisy are they. They are all found near water, or in darkish places, like the Ranoida, but are never observed sitting half immersed in it, though they will conceal themselves by diving to the bottom when pursued.

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