

SOME AMPHIBIANS AND REPTILES FROM REELFOOT LAKE¹

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Records for the following annotated list are based on the author's collections of April 26-28, 1935, April 19-20, 1936, and May 29, 1936, while on trips to Walnut Log, Obion County, Tennessee; and on the author's and others' work during the 1936 summer session of the Reelfoot Lake Biological Station. Through the courtesy of Mr. Edwards Parks of Union City, Tennessee, several trips were made to the vicinity of the Obion River, twelve miles southeast of Union City, in late July, 1936. The results of those trips are included, though the locality is not considered a part of the Reelfoot Lake region. This means is taken of thanking Dr. C. L. Baker, Associate Director and Resident Biologist, for his cooperation in producing the set of illustrations. Frank R. Brown, Fred R. Cagle, and Wendell Whittemore have materially assisted in making collections.

Most of the collecting was, of course, done in the vicinity of Walnut Log and the Reelfoot Lake Biological Station, located near the north-eastern border of Reelfoot Lake, but a number of trips were made in the direction of Samburg, Obion County, Tennessee. The hills one to two miles east of Walnut Log were thoroughly worked. Dip nets and a minnow seine were used occasionally, but collecting was done usually by hand and at night with the aid of a headlight.

Some cultivated land is to be found in the bottoms between Reelfoot Lake and the hills, but most of the remainder of the bottoms is heavily forested, in many places a thick undergrowth of buttonbush and other shrubs. There is some cultivated land in the hills and a considerable number of the highest ridges is bare of trees, but the majority of the hills near Walnut Log have a deciduous forest stand. There are a few permanent springs and one continually-flowing gravelly brook, Vann's Creek, on the lakeward slopes. Reelfoot Creek and Indian Creek did not flow above ground during the summer of 1936, except after rains, in their lower courses. Reelfoot Lake itself is well known for its many cypress stumps and trees, but also much of the northern part is filled with *Ceratophyllum*, an underwater weed, and duckweed covers the surface in sheltered places. A thick growth of "saw grass" lines the shores, and the bottom has a deep, soft layer of muck. These conditions are less noticeable as one goes southward on the lake, until at the south end there are many areas

¹Contributions from the Reelfoot Lake Biological Station No. 3. The study here reported on was made possible by a grant from the Reelfoot Lake Biological Station of the Tennessee Academy of Science, to whom the author wishes to express his appreciation.

of bare sand along shore, covered only by the cypress trees. The Bayou du Chien at Walnut Log is motionless in summer except after rains, when it flows generally southwest, part of the water going out of the channel through the "saw grass" to Reelfoot Lake at Walnut Log. In the vicinity of the Reelfoot Lake Biological Station and below, the Bayou du Chien contains much *Cabomba*. This winter Buttercup and the duckweed cover the surface.

In this list, the common names given in quotation marks, are those in use by the residents at Walnut Log. Collection records are mentioned where the investigations were not extensive enough to warrant general statements or where very few specimens were taken. For such species as are not already available in museums, representative specimens will be deposited in the Museum of Zoology of the University of Michigan. An effort is being made to compile a list of all other collections made at Reelfoot Lake and other specimens in museums, so that a complete list of the amphibians and reptiles of Reelfoot Lake may be published.

CLASS AMPHIBIA

THE TAILED AMPHIBIANS, SALAMANDERS, ORDER CAUDATA

Congo Snake, "Lamper Eel" (*Amphiura tridactylum* Cuvier)

The Congo Snake is, with the possible exception of the Hellbender (*Cryptobranchus alleganiensis* (Daudin)), the largest American salamander. Dark grayish brown or blackish above, abruptly lighter beneath, it is often hard to distinguish from the dead leaves and beds of trashy muck in the sloughs and bayous it frequents. The tiny fore and hind legs are entirely useless, but the smooth, cylindrical body allows a snakelike progression which can be remarkably swift. Like other salamanders, *Amphiura* is not venomous except for the secretions of the skin. The mucus of some salamanders is mildly toxic. However, *Amphiura* has strong jaws, sharp teeth, and an uncertain temper, as well as a rotary twist of the body when something is seized which might cleanly remove a sizeable piece of flesh. With reasonable care, though, large numbers may be handled safely.

The "Lamper Eel" eats crayfish, particularly in the spring, when large numbers are consumed at a time. Mussels have also been reported as food. A medium sized specimen was observed at night in vegetation in the shallow water of Bayou du Chien with the leaf of a deciduous tree in its mouth. It retained the leaf when it first tried to escape. On a summer afternoon at the Washout, four miles south of Reelfoot Lake, the fore part of an *Amphiura* was observed protruding from a hole in tree roots at the water line. The animal was chewing industriously, but slowly, on a coffee can imbedded in mud just below the surface of the water. Examination of the can showed an area four or five inches in diameter cleaned of a black, slimy growth that otherwise covered the exposed portion.

In past years several nests of these salamanders have been found by natives of Walnut Log. One nest was twelve feet or more from the bayou, under a log in dry soil. Others were near the water and under logs also. In all cases an adult was under the log, once at the opposite end and twice coiled with the eggs. Two of the nests were found in August, one in September, and another was reported in midwinter. In the spring a specimen about 12 mm. long and 4 mm. in diameter was found at the base of a cypress tree at the edge of Bayou du Chien between Walnut Log and the Reelfoot Lake Biological Station. In summer a specimen slightly smaller than a lead pencil was seen in the Obion River bottoms.

Narrow-Mouthed Salamander (*Ambystoma texanum* (Matthes))

A little larger than any of the following salamanders, this one has a proportionally smaller mouth, head, eyes, limbs, and toes. It is stout-bodied, with a tapering, medium length tail. The color is blackish, sometimes with lead-colored or faint whitish specks, especially along the sides. A number of these salamanders was found under logs and stones in the wooded bottoms near Walnut Log during the spring trips, and one specimen was collected from under a log near the top of the wooded hills. One night in early September, after showers, an adult was found hurrying along the middle of the graveled Walnut Log road.

Slimy Salamander (*Plethodon glutinosus* (Green)) (Fig. 1, A)

The most common salamander, abundant under logs and in damp leaf mats in summer in the forested hills from Walnut Log to Samburg. It is a plump, round-tailed animal, black with yellow or white specks, sometimes with grayish mottling covering the sides. Under stress, it secretes an abundant sticky mucous matter. The tail breaks off easily. This and most of the other salamanders are most easily fed on earthworms, though a considerable variety of arthropods is eaten in the wild state.

"Spring Lizard" (*Eurycea longicauda* (Green)) (Fig. 1, B)

This plethodontid is slender, long-tailed, with an immaculate, light-colored belly. Otherwise, it is yellow or nearly orange, with irregularly black spotted sides and black spots on the back which usually form a middorsal line (but not in the Reelfoot Lake specimens). The tail is vertically barred with black. The animal is not at all rare in the wooded hills from Walnut Log to Indian Creek. It has been found concealed along the edges of brooks below springs, in the thicker leaf mats, and under rock slabs along creeks.

Dusky Salamander (*Desmognathus fuscus fuscus* (Rafinesque))

From young *Eurycea*, this species may be distinguished by the mottled belly, plumpness, and the tongue being attached in front.

Old adults are uniform brown above, others have a wide yellow dorsal stripe, usually with zigzag edges. Several juveniles were collected on April 26-27, 1935, under wet leaves in the large ravine in the hills just east of Walnut Log.

Mud Eel, Siren (*Siren intermedia* Le Conte) (Fig. 1, C)

External gills and absence of hind legs, as well as smaller size, distinguish this genus from *Amphiuma*. The color is dark plumbeous or blackish, sometimes with faint specks of black or rarely gray. Two larvae were raked up in trash from Bayou du Chien in summer.

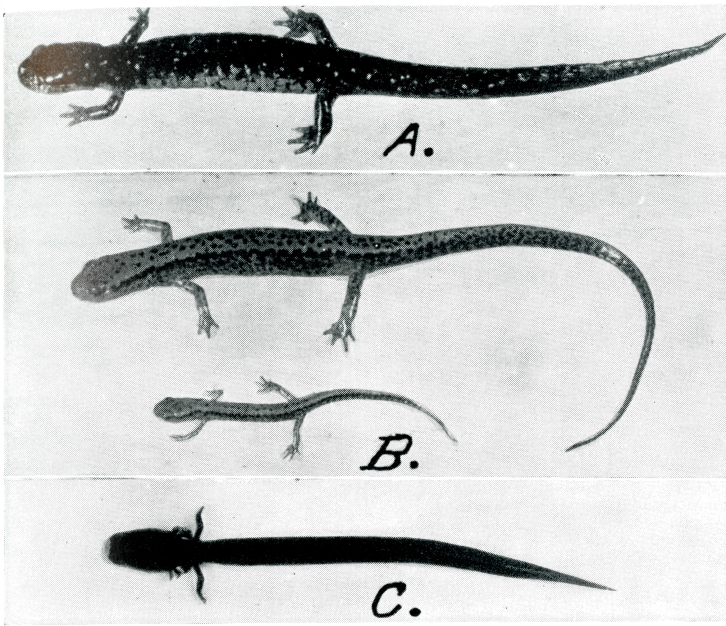


Fig. 1. A, Slimy Salamander (*Plethodon glutinosus* (Green)). The profusely sticky mucus doubtless keeps this animal from being eaten as often as other kinds. B, The "Spring Lizard" (*Eurycea longicauda* (Green)). Adult and young. Lungless, this salamander's moist skin is all that is needed for respiration. C, Mud Eel or Siren (*Siren intermedia* Le Conte) larva. This genus has lost the hind legs but the external gills of the tadpoles are retained throughout life.

THE FROGS AND TOADS, ORDER SALIENTIA

Common Toad, American Toad (*Bufo americanus americanus* Holbrook)

This toad may usually be distinguished from *Bufo fowleri* by the reddish coloration, spinosity, and greater size of warts, enlarged warts on hind legs, spotted underparts, and preaprotoid crests. The maxi-

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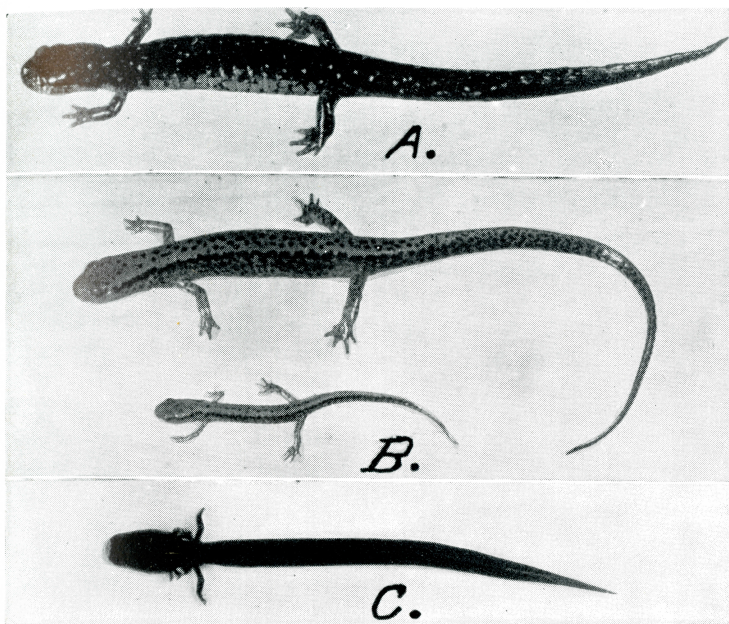


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imum length is about 115 mm., or four and a half inches. Only one specimen was found, a rather small female collected on June 30, at night. It was in a lane between a forest and cotton field several hundred yards southwest of the Reelfoot Lake Biological Station during a drizzle of rain. Heavy showers had occurred previously.

Fowler's Toad, "Toad-Frog" (*Bufo fowleri* Hinckley)

This common toad does not reach a length greater than 85 mm., or three and three-eighths inches. It was found practically everywhere collections were made. On June 26 toads were assembled, calling in several localities on Bayou du Chien, northeast of Walnut Log. A few clasping pairs were secured, of which one laid eggs in the laboratory that night. Some were singing at a roadside pool in Obion River bottoms on July 19. Toads were seldom found during latter July and the first half of August.

Cricket Frog (*Acris gryllus* (Le Conte))

This smallest frog of the region has a black triangle between the eyes and longitudinal stripes on the rear of the femur. A tree frog with very small discs on toes, it looks like a small *Rana*. The call is high, rapid, and grating, a crepitation or rattle like the striking together of two pebbles. *Acris* is abundant throughout the bottoms, those living on the open duckweed areas of lake and bayou being most easily collected. One specimen was found in a small marshy spot below a spring on a semi-open hillside south of Vann's Creek. Two or three were seen in late summer in the wooded hills east of Walnut Log. Several of the females collected April 19-20, 1936, contained well-developed eggs.

Three-Lined Tree Frog, Swamp Tree Frog (*Pseudacris nigrita triseriata* (Wied.))

This frog has small discs on the toes, usually three stripes down the back, and is smaller than the *Hylas*. It breeds very early in the year, coming out with *Hyla crucifer*, usually by the end of February, and practically disappears before the middle of May. A flooded meadow pond is the favored breeding ground. On August 8 one specimen was collected in leaves damp from the morning's shower, in a wooded valley east of Walnut Log.

Bird-Voiced Tree Frog (*Hyla avivoca* Viosca)

Although not as large as the common tree frog, this frog closely resembles it in coloration. However, the rear femoral markings are not definitely reticulated or netted, and the markings on the back never form a clearly-defined cross or star. There is also no femoral orange or yellow, the greenish tint being quite different from *H.*

versicolor. The call is quite distinctive, resembling that of the Pileated Woodpecker, but smoother, more liquid, and more rapid. It is a high whistle of six to fourteen notes occupying two and a half to three and a half seconds. Often the last two or three notes are slower than the others. Sometimes also the first note is slow. These slow notes resemble the call of *Hyla crucifer*.

The calls of *H. avivoca* were first noted on the night of June 27, when four or five were located in high, thick bushes bordering Bayou du Chien a half mile southwest of the Reelfoot Lake Biological Station. Rain fell three and four days later, and on the nights of July 2 and 3 many were calling across Bayou du Chien from the Biological Station. Some were at the edge of the clearing, but most were back in the forest a short distance. They were on trees or bushes, perched on stem or leaf, from one to seven feet above the water. On the night of July 12 several were again calling in high, thick bushes along Bayou du Chien southwest of the Reelfoot Lake Biological Station. A few were heard calling at the edge of the woods just northeast of Upper Blue Basin in the late afternoon of July 18. Considerable rain fell on September 1 and 2, and through September 9-11, *H. avivoca* called daily at intervals from the woods across Bayou du Chien from the Biological Station. It was reported that they called a few times at night.

Green Tree Frog, Bell Frog (*Hyla cinerea cinerea* (Schneider))

The back of this large, long-legged tree frog is usually green, often with several yellow specks, but is sometimes almost yellowish or occasionally nearly black. Unlike the other two *Hylas*, the back is smooth. The call is a clear, ringing "quonk" or "wank" repeated in quick succession. Particularly at a distance, it is bell-like, resembling a cowbell according to Wright and Wright (1933). The Green Tree Frog is here preeminently a creature of the saw grass areas, but it is also found along Bayou du Chien in bushes and cypress tangles. The calls could be heard nearly every night and often in the daytime during the summer until the middle of July, after which they were seldom heard through September 11. A few were collected on the spring trips.

Common Tree Toad (*Hyla versicolor versicolor* (Le Conte)) (Fig. 2)

The color varies from brownish to light gray or green, with markings usually darker brown or black. On the back is usually an irregular star or cross and there are dark reticulations on the orange or yellow of the rear of femur. "The call is a loud resonant trill, ending abruptly, ten or eleven calls in half a minute." (Wright and Wright 1933.) On the night of April 27, 1935, a number was found in plowed field a short distance northeast of Walnut Log, in water

by recent rain. Among them were a few clasping pairs, and several of the females laid eggs later that night in the laboratory. More were collected in July, 1936, and from the many calls heard the species is evidently common from Samburg north along the eastern border of Reelfoot Lake. They quit calling in early August.

Bullfrog (*Rana catesbeiana* Shaw)

Common everywhere about Reelfoot Lake and along Bayou du Chien and the larger creeks. Bullfrogs had stopped calling by the middle of July, but started again after the rains of September 1 and 2. Specimens were collected at Grove's Creek, Union City, Tennessee, and the Obion River bottoms.



Fig. 2. The Common Tree Toad (*Hyla versicolor versicolor* (Le Conte)). The color of this animal not only changes according to temperature, humidity, and light, but the shape of the markings on the back also vary.

Green Frog, Pond Frog, Spring Frog (*Rana clamitans* Latreille)

The Bullfrog has webs to the tip of the fourth toe, while the fourth toe of *R. clamitans* has two joints free. The Green Frog may nearly always be distinguished by the presence of incomplete dorsolateral folds. Particularly abundant along Bayou du Chien, the Green Frog is also found in the hills, even along temporary streams. The call is a deep, vibrating "chug," usually repeated several times. They did not call in August, but started again in September.

**Southern Leopard Frog, "Spring Frog" (*Rana sphenocephala*
(Cope))**

The author has been unable with any constancy to distinguish this form from *Rana pipiens*, but has followed the suggestion of Mr. K. P. Schmidt in assigning all the Leopard Frogs from Reelfoot Lake to this species. It is less common on Bayou du Chien than *R. clamitans*, but the numbers are more nearly equal in the hills and along the larger streams. On damp nights specimens were often found on the gravel roads near Walnut Log and in bushes away from water, so that in actual numbers it was one of the most abundant frogs. This species is only recorded as calling after the rains of September 1-2, at the southern end of Brewer Basin. The species was found in the Obion River bottoms.

CLASS REPTILIA

SUBCLASS DIAPSIDA

ORDER SQUAMATA

LIZARDS, SUBORDER SAURIA

**Fence Lizard, Pine Lizard (*Sceloporus undulatus* (Latreille))
(Fig. 3, A)**

This is the rough, grayish, plump-bodied lizard of the woodlands. It is probably more abundant in the hills than in the lowlands. The males show a bluish patch on each side of abdomen and throat. One was collected July 29 in the lowland woods near Vann's Creek and other specimens were taken or seen in the hills and bottoms near Walnut Log during the summer.

Brown Lizard, Ground Skink (*Leiopisma unicolor* (Harlan))

This little lizard was quite commonly found among the leaves of the forests in both hills and lowlands. Juvenile specimens were seen on several occasions in the hills in latter August. One small specimen was collected on August 24. The scales are smooth, the eggs quite small. The sides are deep brown and the back is a paler shade, usually with dark flecks. Like the other two species, it is insectivorous.

**Five-Lined Skink, Red-Headed "Scorpion" (*Eumeces fasciatus*
(Linné)) (Fig. 3, B)**

The young of this species have a brilliant blue tail and five whitish stripes on a black body, the outer stripes being on the sides. As the lizard reaches maturity, the blue of the tail disappears, and the body turns brownish. In females the stripes fade but do not entirely dis-

appear. The stripes disappear in males and the head turns fiery red, widening across the temples.

This skink is the most abundant lizard, though even more restricted to the forests than the other two kinds. It is found on logs out past the borders of Reelfoot Lake itself, and sometimes takes refuge in water when pursued. In early August a female and about half a dozen recently-hatched young were dug out of a log in the woods at the north end of Upper Blue Basin. No specimens were collected south of Vann's Creek.

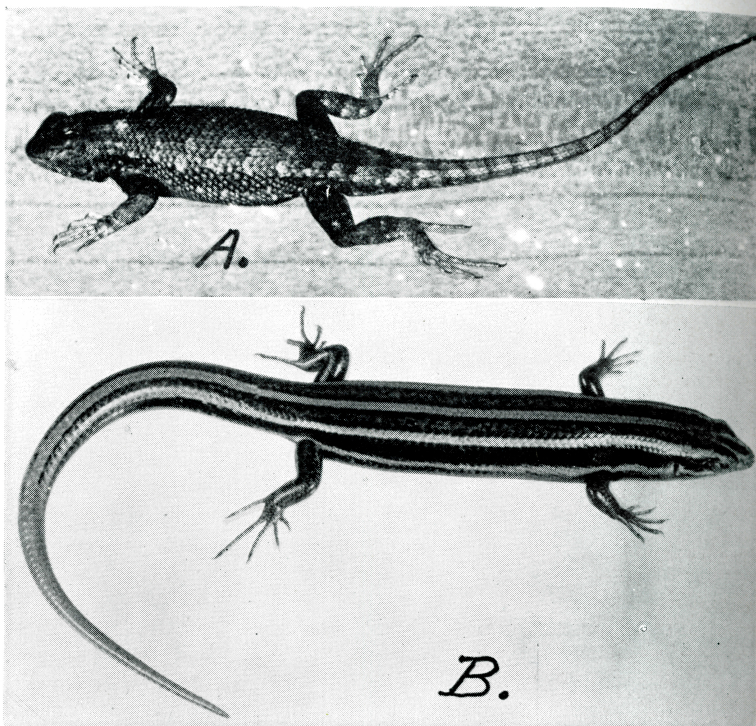


Fig. 3. *A*, Fence or Pine Lizard (*Sceloporus undulatus* (Latreille)). This lizard likes to bask in the sun on logs or stumps. *B*, Five-lined Lizard or Red-headed "Scorpion" (*Eumeces fasciatus* (Linné)). Due to notable color change, the adults and young of this species were known under distinct scientific names for a long time.

SNAKES, SUBORDER SERPENTES

Worm Snake, Thunder Snake (*Carphophis amoena helenae* (Kennicott))

A small, cylindrical, smooth-scaled snake, ten or twelve inches long, it is a glossy chestnut-brown above and salmon-pink beneath, with the belly color extending up on the lower scale rows. A burrow-

ing snake, it is usually found in logs or leaf mold around stones, occasionally coming out and wandering on the surface of the ground after thunder showers. As might be expected, the food is mostly earthworms and soft-bodied grubs. One specimen was found in a small rotten log near the top of the first wooded hill slope east of Walnut Log on April 20, 1936.

Horn Snake, "Stinging Snake" (*Farancia abacura* (Holbrook))
(Fig. 4)

This snake, classed as extremely poisonous throughout the Southern States, is really absolutely harmless. There is no stinger of any kind in the tip of the tail, nor does the snake possess the conventional



Fig. 4. Horn or "Stinging" Snake (*Farancia abacura* (Holbrook)). This snake is popularly believed to have an extremely venomous stinger in its tail. However, it is absolutely harmless.

hollow fangs and venom sacs. As a matter of fact, the Horn Snake does not offer to bite under any circumstances. The tail exhibits prehensile tendencies, so that when the snake is picked up its tail curls around any support offered. The horn on the end of the tail, present in all snakes, but sharper in the Horn Snake, may then occasionally inflict a very superficial scratch on the skin, but no ill effects follow. This handsome snake, occasionally reaching a length of six feet, is a mud burrower, and is to be found about the water and especially in swampy places, most often where there is an accumulation of trash. Its principal food is *Amphiuma* and *Siren*, but it probably also feeds occasionally on tadpoles. The dorsal color is a brilliant blue-black and the belly is bright vermilion. The ventral color extends up on the sides, sometimes more than half way

to the top, in bars of several scales width. The throat is sometimes yellowish.

Horn Snakes are apparently not rare on Bayou du Chien, as several specimens were secured. On April 28, 1935, a dead adult was found by the highway near the Spillway at the south end of Reelfoot Lake. One was collected in the Obion River bottoms on July 19, 1936.

Ring-Necked Snake (*Diadophis punctatus stictogenys* Cope)
(Fig. 5, A)

This smooth-scaled constrictor seldom attains a length of more than a foot and a half. It is shiny bluish-black above and pale orange beneath, with a prominent yellow neck ring about two scales wide. On the belly are many semicircular black spots, usually tending to fuse into a single midventral line. Scale rows are fifteen. The snakes feed on earthworms, small salamanders, lizards, and snakes.

On July 16 a half-grown specimen was collected and another was seen under damp leaves near the bottom of a ravine in the hills east of Walnut Log. On July 28 two eggs were found in a deep layer of damp leaves in a small side gully near the head of another ravine. The eggs were measured and kept in damp leaves. On July 29 egg number 1 measured 25.5 x 12 mm. and egg number 2, 23.5 x 9.5 mm. On August 6 egg number 1 measured 26 x 11 mm. and egg number 2, 24 x 9.5 mm. The larger egg was opened on August 6 and found to contain a fully-formed embryo beginning to pigment. A week later the other was opened and found sterile.

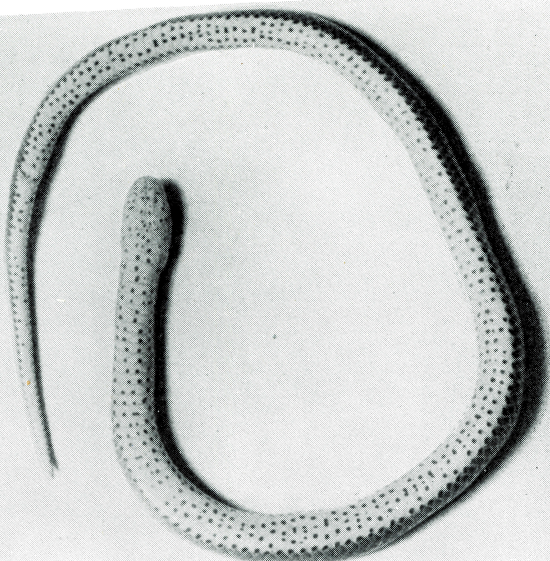
Rough-Scaled Green Snake (*Opheodrys aestivus* (Linné))
(Fig. 5, B)

A slender snake, reaching a length of two and a half feet, it is bright leaf-green above and yellowish beneath. The scales are keeled. On July 30 a specimen was collected on a fence on the hill slope four and a half miles south of Walnut Log. According to reports, this snake is not at all rare, especially in the bushy highlands. It eats insects and is fed most easily in captivity on spiders, crickets, and green, hairless caterpillars.

Blacksnake, "Blue Racer" (*Coluber constrictor constrictor* (Linné)) (Fig. 6)

The Blacksnakes have been assigned to this form, rather than the western *C. c. flaviventris* (Say), because there is no tinge of olive or green in the dorsal coloration nor yellow in the ventral. The species occurs in the lowlands near Walnut Log, but is more common in the hills. It may be distinguished from the succeeding snakes by

A.



B.

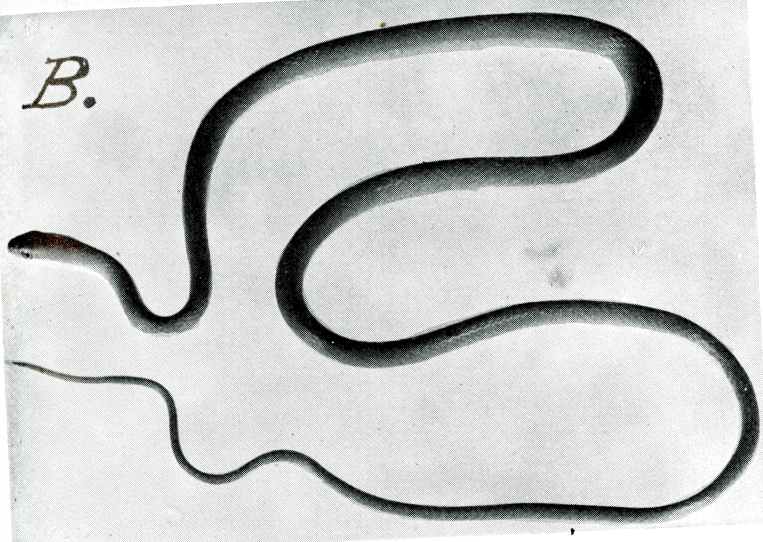


Fig. 5. A, The Ring-Necked Snake (*Diadophis punctatus stictogenys* Cope). Small and secretive, it nevertheless constricts its prey just as the King Snakes do. The arrangement of belly spots is more typical of *D. p. arnyi* (Kennicott). B, The Rough-Scaled Green Snake (*Ophiodrys aestivus* (Linné)). One of the few snakes with a wholly insectivorous diet.

the smooth scales and the metallic bluish coloration. The Blacksnakes do not constrict their prey, which is rodents, small birds, lizards, small snakes, frogs or, rarely, fish.

Pilot Blacksnake, "Chicken Snake" (*Elaphe obsoleta obsoleta* (Say)) (Fig. 7)

The weakly-keeled scales are in twenty-five or twenty-seven rows. The dorsal color is glossy black, usually with a series of dorsal blotches faintly outlined. The throat is milky white, the belly checker-boarded with black and white, occasionally black and reddish, with the darker color greatly predominating toward the tail. This species is one of the most abundant, as well as largest, of the land snakes,



Fig. 6. The Blacksnake or Blue Racer (*Coluber constrictor constrictor* (Linné)). Despite its scientific name, this snake does not constrict its prey.

and shows little aversion to water in its wanderings. In June one was found in a bush growing in a stump out past the saw grass area in Reelfoot Lake at Walnut Log. One juvenile was found in a wooded hill valley. A rather small adult found crossing Bayou du Chien at the Reelfoot Lake Biological Station on July 9 laid seven eggs in a cage the night of July 11. The eggs were placed in damp rotted wood pulp and measured at intervals. Average measurements at the beginning were 53.8 x 22 mm. and at the end were 52.8 x 25.6

mm. Three eggs, one of which was sterile, were opened at intervals. The remainder hatched the middle of September.

Spotted Chicken Snake (*Elaphe obsoleta confinis* (Baird and Girard))

In early July there was brought in a large specimen which had twenty-seven scale rows and distinct dorsal blotches. As the ground color is grayish, the snake must be referred to this subspecies.

Salt and Pepper Snake, Speckled King Snake (*Lampropeltis getulus holbrooki* (Stejneger))

A powerful constrictor, not quite reaching six feet in length, this snake feeds freely on other snakes, including the venomous ones, as

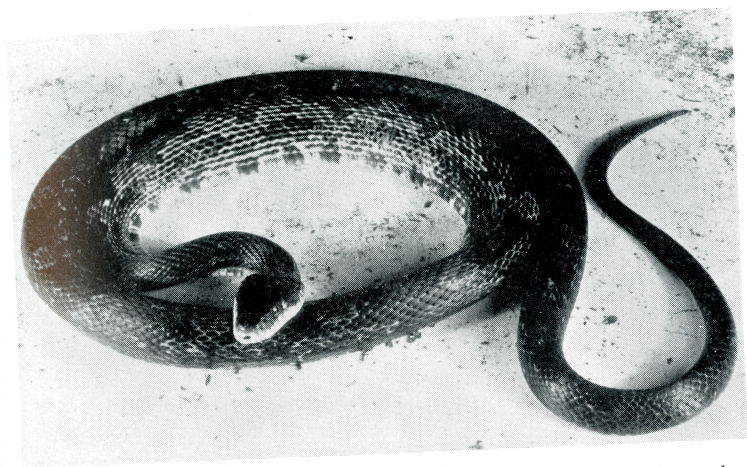


Fig. 7. Pilot Blacksnake or "Chicken Snake" (*Elaphe obsoleta obsoleta* (Say)). This snake stays around barns and outbuildings in order to catch rats and mice. The good it does far outweighs the loss of an occasional chicken or egg.

well as rodents, birds, and lizards. The color is blackish, with a yellow, green, or white spot, round or oval, on each scale. Reelfoot Lake is in the area of intergradation of this snake with *L. g. nigra* (Yarrow), which is the predominant subspecies in the county to the eastward. *L. g. nigra* has lost most of the dorsal light spots and the remainder are fused to form fifty to ninety narrow crossbands which fork on the sides and join alternate short vertical side-bars.

A specimen collected in June at Walnut Log, photographed and released before the author's arrival, could not, from the photograph, be definitely assigned to either variety by the author.

Green Water Snake (*Natrix cyclopion cyclopion* (Duméril and Bibron)) (Fig. 8)

Unlike all the preceding snakes, the watersnakes give birth to young instead of laying eggs. They feed on fish, tadpoles, frogs, and toads.

From *Natrix rhombifera*, the Green Water Snake may be distinguished by the presence of several small scales between the eye and upper labials, the brown or purplish ventral blotches, and a breaking up of the lateral blotches into two rows. The dorsal blotches are indistinct and not connected with the lateral ones. Although large and stout-bodied, this species has a long, tapering tail. On June 26, 1936, a specimen was found in the channel near Bayou du Chien at Walnut Log. A slightly smaller one was found August 21 at Samburg, on the Reelfoot Lake shoreline, eating a sunfish

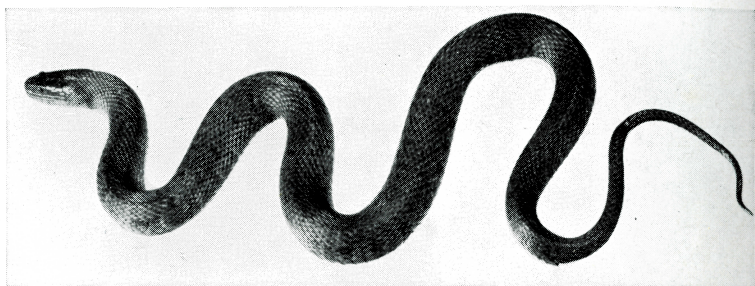


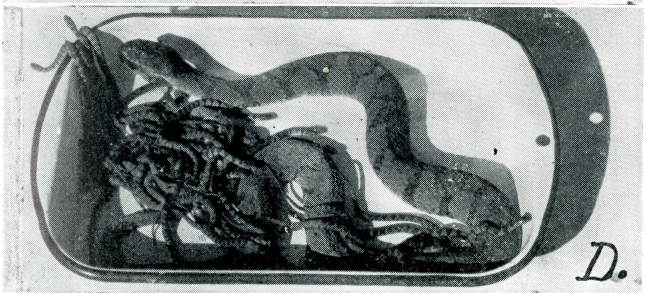
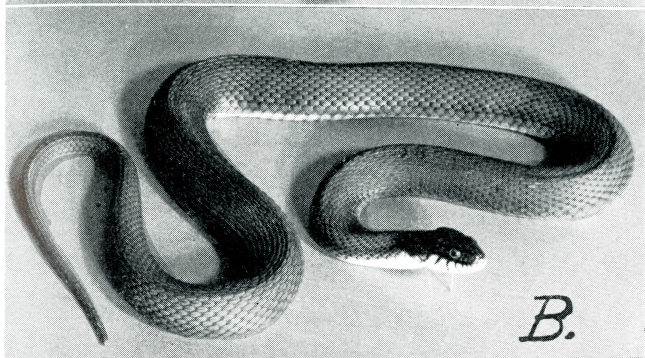
Fig. 8. The Green Water Snake (*Natrix cyclopion cyclopion* (Duméril and Bibron)). Nowhere abundant, this water snake prefers lakes and bayous to rivers and creeks.

(*Apomotis*) about as large as the snake could swallow. Since the northern portion of Reelfoot Lake was worked thoroughly without turning up more specimens, and since a number has been found at the southern end, it is probable that *N. c. cyclopion* is more abundant in the southern part.

Copper Bellied Water Snake (*Natrix erythrogaster erythrogaster* (Forster)) (Fig. 9, A and B)

Young specimens show a pattern of blackish saddles anteriorly and alternating dorsal and lateral blotches posteriorly. These markings

Fig. 9. A, A Juvenile Copper Bellied Water Snake (*Natrix erythrogaster erythrogaster* (Forster)). The ventral surface is plain and greenish, yellowish, or reddish. B, A Copper Bellied Water Snake Adult. C, The Diamond-Backed Water Snake or "Water Moccasin" (*Natrix rhombifera* (Hallowell)). The most uniformly abundant water snake of the Mississippi Valley. D, Adult Water Snake and Young (*Natrix sipedon sipedon* (Linné)). Thirty-five young at a birth is a number above the average, even for water snakes.



practically disappear before the snake reaches maturity. The belly is plain yellow or reddish, except for dusky mottlings on the ends of the ventral plates. Scale rows are usually twenty-three. A half dozen specimens had a ventral plate count of 146 to 151. This species is fairly common about Bayou du Chien near Walnut Log. Specimens were also collected at the south end of the Washout, four miles south of Reelfoot Lake, and in the Obion River bottoms. One specimen collected near Walnut Log was forced to disgorge three *Rana sphenoccephala*, one *Rana clamitans*, and one unidentified frog, all of fair size. This species of *Natrix* also seems to feed more readily on *Bufo* than do the other water snakes.

**Blotched Water Snake (*Natrix erythrogaster transversa*
(Hallowell))**

On July 2 a specimen was collected at Walnut Log which must be referred to this subspecies. Although the snake is adult, the dorsal markings still show distinctly, and the alternating side blotches continue to the first saddle on the snake's neck. The scales are in twenty-five rows and there are 155 ventral plates.

Diamond-Backed Water Snake, "Water Moccasin" (*Natrix rhombifera* (Hallowell)) (Fig. 9, C)

The most plentiful water snake on Reelfoot Lake, this is doubtless the most abundant snake. It has been found in all localities in which other water snakes have been taken except the north end of Upper Blue Basin. Excepting *Agkistrodon piscivorus*, the venomous water moccasin, it is the largest water snake, reaching a length of five feet. Specimens have been taken in Johnson Basin, Reelfoot Creek, and a roadside pool in Kentucky, just northwest of Reelfoot Creek. During the last few days of August, 1936, while the author was absent, two snakes from Brewer Basin gave birth to young.

Common Water Snake, "Moccasin" (*Natrix sipedon sipedon* (Linné)) (Fig 9, D)

The Common Water Snake has the dorsal blotches and alternating side blotches posteriorly of the young of *N. e. erythrogaster*, but in colors of tan and red-brown or dark gray and blackish. It is sometimes almost entirely black above, but the belly has numerous black-edged red half-circles. Eight or nine specimens were collected in the Obion River bottoms and several more in Grove's Creek near Union City, Tennessee. A specimen from the former locality gave birth to thirty-five young on the night of August 26. On the night of August 10 two were collected in Vann's Creek, a short distance west of the Samburg-Walnut Log road. Vann's Creek would be a typical Middle Tennessee habitat for this species.

Banded Water Snake, "Highland Moccasin" (*Natrix sipedon confluens* (Blanchard)) (Fig. 10)

On a gray, yellow, or dingy orange-red background is a series of irregular blotches covering the back and most of the sides of this snake, and numbering eleven to eighteen. The belly is yellow or pale reddish, with large squarish black or red blotches. This species is common on Bayou du Chien and Reelfoot Lake near Walnut Log, but was not found elsewhere in the vicinity of Reelfoot Lake.

DeKay's Snake (*Storeria dekayi* (Holbrook))

This snake reaches a length of one foot or a little more. The color is grayish brown, with a gray dorsal stripe bordered by small dark spots, and a dark blotch behind each temple. Scale rows are seventeen.



Fig. 10. The Banded Water Snake or "Highland Moccasin" (*Natrix sipedon confluens* (Blanchard)). The wide transverse body bands make this snake resemble the venomous cottonmouth.

In captivity it eats earthworms, but in the wild state it probably also feeds upon insects and grubs. Like the water snakes, this and the three following species are ovo-viviparous. On April 26, 1935, a half-grown specimen was found in a roadside ditch northeast of Walnut Log.

Eastern Ribbon Snake (*Thamnophis sauritus sauritus* (Linné))

Brown or black above, with a mid-dorsal yellow stripe and another on each side covering the third and fourth scale rows. Beneath the lateral stripes the sides are lighter brown. The upper labials are usually seven in number. (The Western Ribbon Snake, *T. s. proxima*, usually has eight upper labials and has greenish lateral stripes, while the dorsal stripe is orange-yellow.) The Eastern Ribbon Snake is the most slender of the genus and grows to a length of one yard. It is semi-aquatic and feeds on frogs, toads, and fish. A specimen was

found at the south end of the Washout and another under a log on the wooded shore of Reelfoot Lake at Lake Center.

Common Garter Snake (*Thamnophis sirtalis sirtalis* (Linné))

From the preceding species, the Garter Snake may be distinguished by its stouter body, shorter tail, and the presence of two rows of squarish blotches on each side between the stripes. The lateral stripes of *T. sirtalis* are on the second and third rows of scales and the stripes are not yellow. The back is olive to black. The Garter Snake does not reach as great a length as the Ribbon Snake, but becomes much heavier. One specimen was collected at Tiptonville about the last of August.

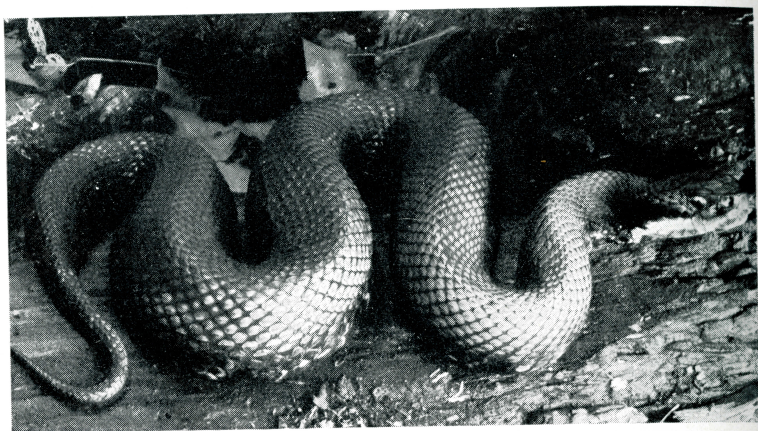


Fig. 11. Water Moccasin or Cottonmouth (*Agkistrodon piscivorus* (Lacépède)). A dangerous reptile, the only venomous water snake in the United States.

Water Moccasin, Cottonmouth (*Agkistrodon piscivorus* (Lacépède)) (Fig. 11)

This venomous snake may be distinguished from the harmless water snakes by the deep pit between eye and nostril, the squarish black blotches on the white ventral surface, and the undivided caudal plates of a large part of the under tail surface. The Moccasin is a large, olive or black snake, indistinctly barred with wide bands. It reaches a length of four feet in the extreme southern part of its range. Here it attains a length of four, rarely four and a half, feet. It feeds on frogs, fish, birds, young snakes, and occasionally mice. The Moccasin is common and well-distributed in the northeastern part of Reelfoot Lake and is certainly the most abundant snake in the saw grass areas bordering Upper Blue Basin and in the open waters of the Basin. On April 20, 1936, a juvenile which had recently gorged on an *Eumeces fasciatus* was found more than halfway up the wooded hill slope, a mile east of Walnut Log, and far from water. On the night

of August 27 one of the smaller specimens at the Reelfoot Lake Biological Station gave birth to four young, three of them still-born, and passed one sterile egg.

SUBCLASS SYNAPSIDA
TURTLES, ORDER TESTUDINATA

Musk Turtle, Stinkpot, "Stinkin' Jim" (*Sternotherus odoratus* (Latreille)) (Fig. 12)

The dark, globular, elongated shell is sometimes spotted, sometimes black. In all, except very old individuals, there are two yellow stripes on each side of the head, one just above each eye, the other



Fig 12. Musk Turtle or Stinkpot (*Sternotherus odoratus* (Latreille)). A foul-smelling, evil-tempered, miniature snapper.

below. The head is large. The turtles are scavengers and roam the lake, bayou, and creek bottoms day and night in search of food. Possibly the most abundant turtle, this species was found nearly everywhere collections were made. Several specimens were found in hill ravines east of Walnut Log, even after the streams there were dry except for occasional pot holes. In early July about forty-five nests were found on the wooded southern shore of Brewer's Bar, and some were found in the vicinity of Walnut Log. Most were in rotten logs. The eggs hatched through August and early September.

Mud Turtle (*Kinosternon subrubrum subrubrum* (Lacépède))
(Fig. 13, A)

Though resembling the preceding turtle in shape, size, and color, this one may be distinguished by the wider, hinged plastron, which resembles that of the box turtle. *Sternotherus* from beneath resembles a miniature snapping turtle (*Chelydra*). The more open mud flats about sloughs are favored localities of the Mud Turtle. On August 8 a specimen was collected on the Samburg-Walnut Log road, east of Walnut Log.

Common Snapping Turtle (*Chelydra serpentina* (Linné))
(Fig 13, B)

This species reaches a weight of forty pounds, and may be distinguished from the Alligator Snapper (*Macrochelys*) by the smaller dorsal keels, the presence of two rows of scales on the underside of the tail, and the head being covered with naked skin. The Alligator Snapper has many small imbricated scales on the under tail surface and the head is covered with plates. The Snapper's head and neck are very large and the jaws are hooked and very powerful, so that the turtle could amputate a finger without difficulty. Abundant in the vicinity of Walnut Log, this turtle has even been found in the smaller hill streams east of Walnut Log. On a night trip to nearly-dry Brewer Basin on August 15 more than a dozen large specimens were observed in the small remaining body of water.

Box Turtle, "Dry-Land Terrapin" (*Terrapene carolina* (Linné)) (Fig. 13, C)

The carapace is high and globular, very variably marked with black and yellow. The iris of the male is red, and there is usually red on the forelegs. The plastron is hinged and closes tightly, concealing the head and feet. The feet are not webbed. On the hind feet are four toes (the western *T. triunguis* has three toes). The usual habitat is damp woods, and the animal feeds on berries, succulent herbage, and worms. In captivity it eats lettuce, tomatoes, etc., as well as meat. Several specimens were found during the summer in the hills east of Walnut Log. They were in bottoms of ravines, burrowing in damp leaves, or in beds of small streams.

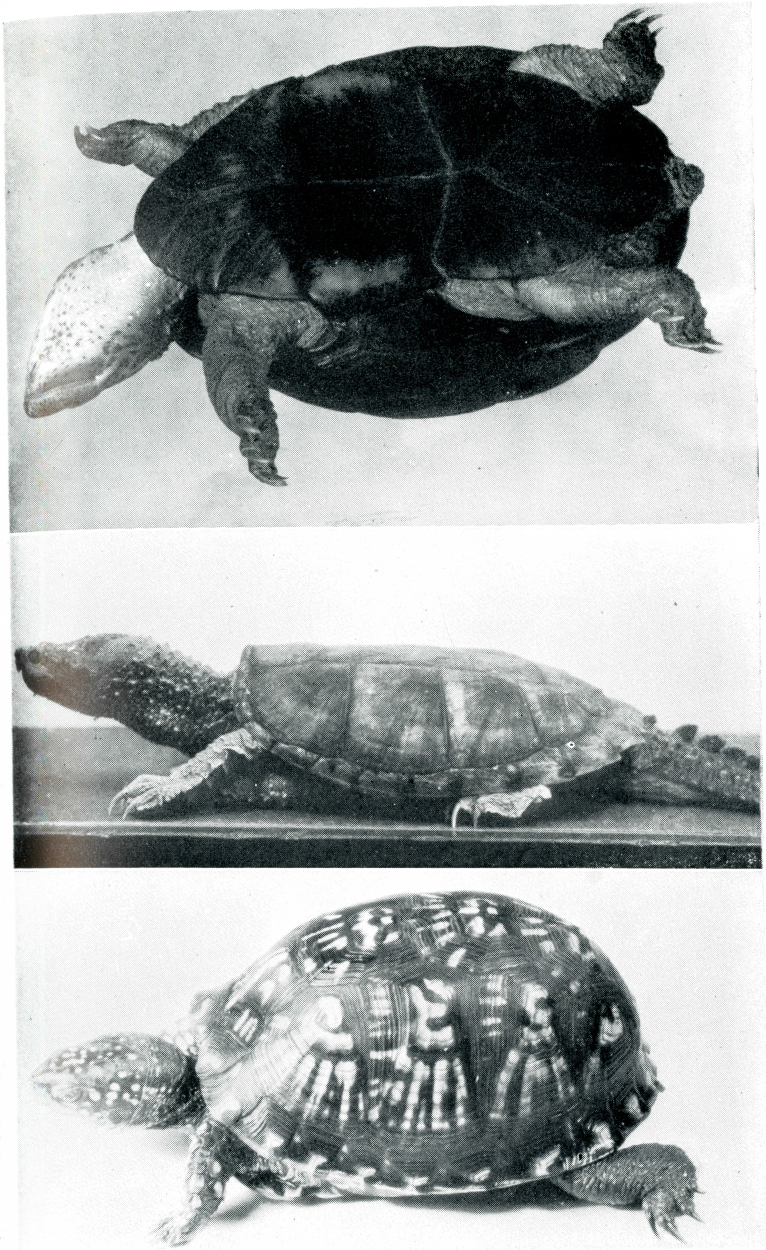


Fig. 13. (Above) Mud Turtle (*Kinosternon subrubrum subrubrum* (Lacépède)). The ventral view shows the hinged plastron which easily distinguishes the genus from *Sternotherus*. (Center) Common Snapping Turtle (*Chelydra serpentina* (Linné)). A powerful and vicious turtle that even preys on adult waterfowl by seizing their legs and drowning them. (Below) Box turtle or "Dry-Land Terrapin" (*Terrapene carolina* (Linné)). A harmless woodland turtle, practically helpless in the water.

Map Turtle, "Hackleback" (*Graptemys pseudogeographica pseudogeographica* (Gray)) (Fig. 14)

Dark gray above, with large black spots in several rows; beneath yellowish, often marbled with dark gray. There are yellow stripes on the head, neck, and legs and a yellow crescent behind each eye. The mid-dorsal keel is prominent, knobbed at the posterior end of each plate and projecting over the following plate. This is a fairly common turtle at Bayou du Chien and Reelfoot Lake near Walnut Log. On July 28 three dead specimens were seen at the south end of the Washout. In captivity the young of *G. p. pseudogeographica*, *C. p. dorsalis*, and *P. troostii* will eat insects and green aquatic vegetation in addition to bits of meat.



Fig. 14. Map Turtle or "Hackleback" (*Graptemys pseudogeographica pseudogeographica* (Gray)). The vernacular name comes presumably from the knobbed keels down the middle of the back.

Painted Turtle (*Chrysemys picta dorsalis* (Agassiz)) (Fig. 15)

A flattened turtle, often brilliantly marked with red, yellow, and black in scalloped pattern about the edge of carapace. Down the middle of the back is a narrow yellow or red stripe. Possibly less abundant on Reelfoot Lake near Walnut Log, it is a little more abundant on Bayou du Chien. The turtles were laying eggs during latter June. One was seen in a trap at the south end of the Washout, and a juvenile was collected in a roadside pool just northwest of Reelfoot Lake, in Kentucky. Specimens were seen in Indian Creek and in Reelfoot Lake at Samburg.



Fig. 15. Painted Turtle (*Chrysemys picta dorsalis* (Agassiz)). This turtle may be recognized by the narrow red or yellow line down the middle of the back.

Pseudemys texana Baur (Fig. 16)

May be distinguished from *P. troostii* by the absence of red behind the eye, no pronounced melanism in adult males, and the immaculate yellow plastron. More than half a dozen of these turtles have been found dead in Upper Blue Basin, so the species cannot be rare. Two juveniles were taken in early summer near Walnut Log. The carapace of a specimen collected July 2 on the gravel road between Samburg and Walnut Log measured 305 mm. in length—about the

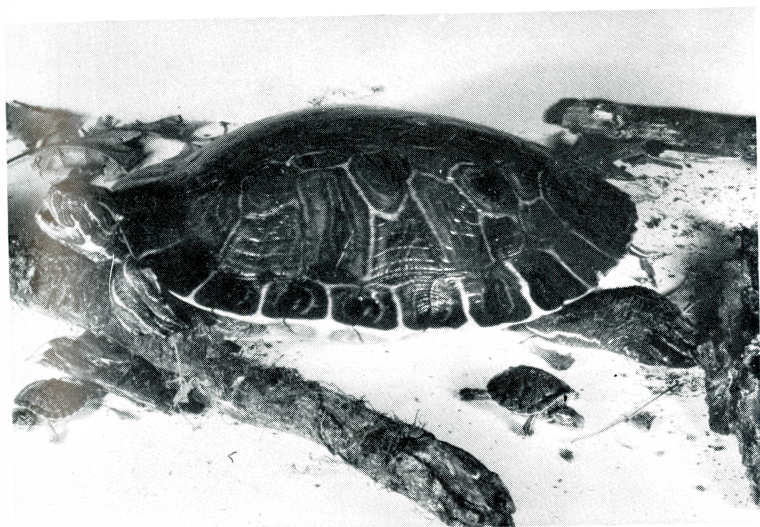


Fig. 16. Slider (*Pseudemys texana* Baur). According to Strecker (1927), this turtle "... feeds almost entirely on *Mollusca* ... *Sphaerium*, *Planorbis*, and *Limnaea* ..."

same as a specimen taken in northeastern Arkansas in 1934—so the species evidently reaches a greater size than is generally supposed.

Red-Eared Turtle, "Slider" (*Pseudemys troostii* (Holbrook))
(Fig. 17)

Females and young are recognizable by the red streak behind each eye and the dark splotch on each plastral plate. The adult males are melanistic, all markings darkened and obscure (Viosca, 1933). With *Sternotherus odoratus*, this is the most abundant Reelfoot Lake turtle, and is the most important commercially. The eggs of *Pseudemys* and *Chrysemys* are used as trot line bait, while young specimens are sold to pet shops and novelty dealers. Collection of adults for ship-



Fig. 17. Red-Eared Turtle or "Slider" (*Pseudemys troostii* (Holbrook)). The female (left) and the male (right) are entirely different in coloration.

ment to food markets is one of the most important winter occupations of Reelfoot Lake fishermen.

Of about fifty adult turtle shells on the shore of Bayou du Chien below the Reelfoot Lake Biological Station, two were males, all the others females, yet of a number of adults taken in early September from Upper Blue Basin, the percentage of males to females was about one to three. This species has been found in several of the hill ravines east of Walnut Log in both spring and summer. Specimens were found in the Obion River Bottoms also. Throughout July the females laid eggs near Walnut Log.

Spiny Soft-Shelled Turtle (*Amyda spinifera* (Le Sueur))
(Fig. 18)

The soft, leathery integument covering the turtle distinguishes this genus from all the others. The soft-shelled turtles are very flat, and this, with the broadly-webbed feet, equip them best of all fresh water turtles for an aquatic habitat. The fleshy lips cover keen mandibles and strong jaws which these turtles readily employ in defense. Young *A. spinifera* have many round black spots on the carapace. The belly is plain, unmarked white, and there is a dark stripe extending forward on each side of the head to fuse on the snout some distance in front of the eyes. A prominent longitudinal ridge is present on each side of the nasal septum. The Spiny Soft-

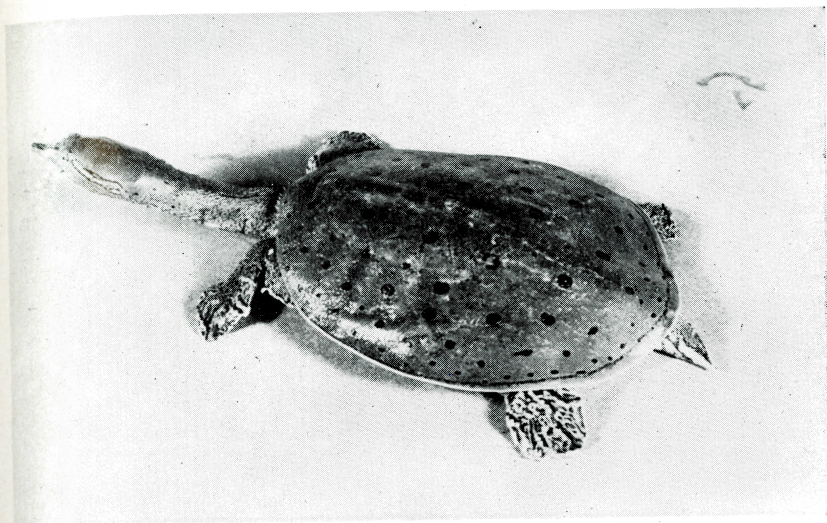


Fig. 18. The Spiny, Soft-Shelled Turtle (*Amyda spinifera* (Le Sueur)). Despite its soft appearance, this active turtle has strong jaws and sharp teeth which it employs readily in defense.

Shelled Turtle is found in Bayou du Chien, but rarely seen in Reelfoot Lake near Walnut Log. On August 13 an *Amyda*, presumably of this species, was seen in Indian Creek. The soft-shell turtle has a recognized food value for man.

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