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THE REPTILES OF CHEROKEE COUNTY, KANSAS

A Thesis Submitted to the Graduate Division in
Partial Fulfillment of the Requirements for the
Degree of Master of Science

By
Myron Alec Hurd

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KANSAS STATE TEACHERS COLLEGE

Pittsburg, Kansas

July, 1936

ACKNOWLEDGMENTS

APPROVED: *I hereby certify that the student has completed the requirements for the degree of*

Thesis Adviser..... *Harry H. Hall*.....

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The Reptiles of Cherokee County, Arkansas.

Byron Allen Ward

Department of Biology

July, 1934

ACKNOWLEDGMENT

The writer wishes to acknowledge his indebtedness to Dr. Harry H. Hall, under whose supervision this study was conducted, for his assistance, direction, and constructive criticism.

The mean annual temperature is 54 degrees Fahrenheit. The three summer months average 77 and the 3 winter months average 36 degrees Fahrenheit. The mean annual precipitation is 42.25 inches. The area has a growing season of 195 days.

In the list of reptiles are enumerated the species which have been seen and collected by the writer during the period from September 1933 to July 1934, with notes on their habits and habitats which would be of value.

The reptiles have been placed in four groups: reptiles of open grasslands, reptiles of forest, reptiles of lakes, rivers, creeks, and ponds, and reptiles of scrub areas. There are 25 species of reptiles belonging to 13 genera.

ABSTRACT

The Reptiles of Cherokee County, Kansas.

Myron Alec Hurd

Department of Biology

July, 1936

Cherokee County has an area of 585 square miles. The greater part is covered with hydrophytes and mesophytes, but there are some Xerophytic areas. A large part of its area is covered with typical prairie grassland. Thickets of plum, sumac, persimmon, hawthorne, blackberry, and buck brush occur in pastures and wastelands. Along the streams may be found the elm-ash-oak associations and other plants. Along the embankments may be found blackberry, sumac, and wild rose. Surrounding the ponds and marsh areas are rushes, reeds, button willows, and willows.

The mean annual temperature is 56 degrees fahrenheit. The three summer months average 77 and the 3 winter months average 35 degrees fahrenheit. The mean annual precipitation is 43.25 inches. The area has a growing season of 195 days.

In the list of reptiles are enumerated the species which have been seen and collected by the writer during the period from September 1926 to July 1936, with notes on their habits and habitats which would be of value.

The reptiles have been placed in four groups; reptiles of open grasslands, reptiles of forest, reptiles of lakes, rivers, creeks, and ponds, and reptiles of marsh areas.

There are 38 species of reptiles belonging to 28 genera

10 families, and 3 orders, which have been identified. There are 8 species of Testudinata or turtles, 7 species of Lacertilia or lizards, and 23 species of Serpentes or Snakes.

The reptiles of widest habitat distribution are the box turtles, garter snakes, blotched king snakes, pilot black snakes, and glass snakes or legless lizards.

The reptiles of greatest economic value are the box turtles, striped race runners, blotched king snakes, green snakes, bull snakes, black snakes, and blue racers. The most harmful reptiles are the water turtles, water snakes, and pit vipers.

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INTRODUCTION

This paper contains the results of a study of the reptiles of Cherokee County, Kansas, during the year of 1935, and the spring and early summer of 1936. The author has, for many years, been interested in reptiles and has collected and studied specimens found in the county since 1926.

It was estimated by checking the ranges, as given by eminent herpetologists, for the various species in the United States that approximately 44 species might be found in Cherokee County. In this study an attempt has been made to verify the ranges of these reptiles and to collect, classify, and describe all of the species and varieties of reptiles found in the county; to determine their feeding, breeding, nesting, hibernating, and other habits of life; to determine the number of species and how they compare in relative abundance; to determine the economic importance of the various species; to know if the climate and habitats found here are favorable for a large reptilian fauna; and, if possible, to check the effect of the establishment of recreational centers upon the number of reptiles.

For identification purposes and nomenclature the check list of the American Society of Herpetologists and the following references have been used: Blanchard (1925), Ditmars (1933), Ortenberger (1926), Jordan (1929), and other herpetologists of note.

In order to determine the number of species in the

county, the relative abundance of the members of each species, and the habitats most favorable to each, certain areas were selected for surveys and studies. Areas were selected which would show a cross section of the representative types of habitats of the county, with consideration given to all of the climatic, edaphic, and biotic factors.

The strictly terrestrial animals were easily captured, but the aquatic, secretive, and burrowing forms were difficult to find and were often in inaccessible places. The two water terrapins were easily caught in traps. The snapping turtle, soft-shelled turtle, mud turtle, and musk turtle were occasionally caught in seines, but this method could not be relied on, as the animals often retreat into holes in the banks. Baited hooks were used, but this was a slow method of obtaining specimens. Most of the specimens were obtained by shooting them. The aquatic reptiles often sank and it was necessary to dive to the bottom to obtain them. The secretive and burrowing forms were obtained by digging under rocks and logs.

During the spring, before the vegetation had made much growth and the mating season was on, the animals could be seen with less difficulty. During the summer many animals were killed as they basked in the sun. A few specimens were captured in the fall when they were congregating around the hibernating quarters. Some of the water snakes were easily taken in the early morning while they were rather sluggish in movement after feeding.

All of the specimens were identified at the time of

collecting, and then embalmed or preserved for future study. The snakes and lizards were preserved in jars containing a solution of 40% formaldehyde. The turtles were either mounted or embalmed with a 40% solution of formaldehyde and shellacked to prevent rapid dessication. An attempt was made to make all of the specimens look as life-like as possible.

Records of the weather, temperature, soil conditions, habits, and habitats were taken at the time the specimens were collected.

An attempt has been made to present this work to the reader in a manner and language that will be readily understood by persons without advanced training in biology. It is hoped that this work may be of interest to many teachers and students in the field of biology, and that it may help to stimulate a greater interest in reptiles as well as other wild life. It is felt that more work of this type should be done in order to determine more nearly the bounds of the regional varieties and species.

The writer has no knowledge that any similar survey has ever been made in southeastern Kansas.

PHYSICAL FEATURES

Cherokee County is situated in the extreme southeastern corner of the state. It forms an almost perfect square, being $23 \frac{1}{4}$ miles from north to south, and slightly over 25 miles from east to west. It comprises 585 square miles or 374,400 acres.

The elevation ranges from 780 feet above sea level in the Neosho River bottoms in the southwest corner of the county to 1100 feet above sea level on the ridge south of Columbus and the Ozark uplift east of Baxter Springs. Most of the county consists of residual prairie country, but the western extension of the Ozark uplift covers about 35 square miles in the southeastern part. The upland part of the county consists of undulating to gently rolling prairie, with occasional ridges and hillocks. The stream bottoms and terraces are usually level. In general the county consists of a broad plain, with broad, shallow, flat-bottomed valleys along the larger water courses.

There are two chief drainage divisions which are separated north and south by a divide most pronounced from the Oklahoma line to Columbus. The western section is drained by the Neosho River and the eastern section by Spring River. The principal tributaries of Neosho River are Lightning Creek, Deer Creek, Cherry Creek, and Fly Creek. These streams flow in a southwesterly direction, and with Tarr Creek and Four-mile Creek which flow south, drain the entire western half of the county. Spring River with its principal tributaries, the Cow Creek, Shawnee Creek, Brush Creek, and

Willow Creek from the west, and Short Creek, Shoal Creek, and Killaboo Creek from the east, drain the eastern half of the county. All but the larger streams are dry most of the summer. Spring River is fed by the springs in the limestone hills of the Ozarks, and the water is nearly always clear. The Neosho flows through the prairie country and is usually muddy because of its soft mud bottoms and banks.

An area equal to that of an entire township is subject to overflow from the Neosho River. Spring River also overflows frequently, but does not cover nearly as much territory during such periods as does the Neosho. The large creeks have comparatively wide beds, and these, as well as the river bottoms, are inundated after heavy rains.

All of the creeks and rivers are heavily timbered, except where some land has been cleared. Many of the rocky hills of the county are covered with scrub oak, persimmon, and other hardy trees. Near Mineral, Seamon, Weir, and Columbus much coal mining has been done, and the mounds resulting from these operations are overgrown with cottonwood, wild cherry, maple, and catalpa trees. Practically all of the prairie land is meadow, pasture, or in cultivation.

CLIMATE

The climate of Cherokee County is not typical of Kansas nor of the other two states that meet at the southeastern corner of the county. It has a longer growing season than any other county of the state. Extreme temperatures vary from 19 degrees below zero in winter to 112 degrees

above zero in summer. The average annual rainfall is 43.25 inches, which is higher than in any other part of Kansas. It is fairly well distributed throughout the year, and over half of the total precipitation occurs in the spring and summer. Periods of drought are quite common, however, in July and August.

The average, maximum, and minimum temperature and precipitation, as recorded at Columbus for a period of 44 years, 1891 to 1934 inclusive, are given in Table 1.

LIFE ZONES

Cherokee County not only differs in climate from the rest of Kansas and Missouri, but it also differs in the life zones. It is in the Lower Austral Life Zone while the rest of the state and the state of Missouri on the east are in the Upper Austral Zone. Being, as it is, on the transition line, it might easily have a richer faunal life than most areas of similar dimensions. It would normally be inhabited by the Austroriparian fauna, yet the Carolinian fauna undoubtedly extends over the line.

TABLE I

THE AVERAGE MONTHLY RAINFALL AND TEMPERATURE OF CHEROKEE COUNTY FOR A PERIOD OF 44 YEARS, 1891 to 1934, INCLUSIVE

Month	Rainfall in inches	Temperature Degrees F.
January	1.92	34.40
February	1.95	36.60
March	3.38	46.90
April	4.59	56.70
May	5.42	65.70
June	6.09	74.70
July	4.10	78.80
August	3.93	78.30
September	4.10	71.20
October	3.30	59.50
November	2.35	47.30
December	2.12	36.00
Annual	43.25	57.20
Maximum annual	58.30	60.10
Minimum annual	29.26	54.10

GENERAL DISCUSSION

The reptiles are cold blooded, air-breathing, vertebrates whose bodies are covered with horny scales or plates. The limbs, when not rudimentary or wanting, have claws on the digits and are well developed and adapted for running, climbing, burrowing, and swimming. The skeleton is well developed and ossified. Reptiles are oviparous or ovoviviparous. The eggs are large and are laid in or on land and incubated by the heat of the sun. The young resemble the parents when born or hatched. There is no postnatal metamorphosis.

The following characteristics distinguish the reptiles from other vertebrates: They differ from the amphibians in having gastrocentrous vertebrae; a skull which articulates with the atlas by one condyle; respiration which is effected by lungs; kidneys which have no nephrostomes, each kidney having one separate ureter; eggs which are meroblastic; and amnion and allantois formed during development. They differ from the amphibians and mammals in having mandibles which consist of many pieces and which articulate with the cranium through the quadrate bone, and an ilio-sacral connection which is post-acetabular.

They differ from the birds and mammals in having a great paucity of glands, and neither hair nor feathers on the body; a poikilothermous temperature; a heart divided into two atria; an incompletely divided ventricle; the right and left aortic arches are complete and functional.

They differ from the mammals in having nucleated, biconvex and oval red blood-corpuscles.

There are three orders of reptiles in Cherokee County, the Testudinata or turtles, Lacertilia or lizards, and Serpentes or snakes. There are two orders of modern reptiles, the Crocodilini and Rhynchocephalia, without local representatives. In the Mesozoic age, known geologically as the "Age of the Reptiles" there were 17 orders of these animals which included the fish-like, the bird-like, and the mammal-like dinosaurs. Of these 17 orders only the highly generalized crocodiles, turtles, lizards, and snakes are in existence today.

The three orders of reptiles in the county are divided into 10 families, 28 genera, and 38 species. It is probable that several species have been exterminated in the county in the last 50 years, due to man's wanton destruction of the animals and of their native habitats. The horned toad, collared lizard, and many others that are highly beneficial to the farmer are nearly extinct because of the tilling of the soil. Some of the least desirable reptiles, such as the snapping turtle and water snakes have been able to live and maintain their numbers, largely because their habits do not conflict with man, and because the water affords protection for them. Six species of terrestrial lizards and snakes that were listed by authorities as inhabitants of this section were not found in this study. The wanton, ruthless killing of snakes by men in general is the chief factor in

causing the extermination of many.

Cherokee County usually has no extremes of temperature injurious to reptiles. The sub-zero temperatures are usually of short duration and the ground seldom freezes to a depth of one foot. High temperatures are favorable for the growth of reptiles.

A great variety of habitats is found in the county. Neosho River, Spring River, Deer Creek, Lightning Creek, Cherry Creek, Fly Creek, Four-mile Creek, Tarr Creek, Shawnee Creek, Brush Creek, Cow Creek, Shoal Creek, and Killaboo Creek have a permanent supply of running water. The water in these streams is rich in lime and other minerals needed to support the growth of algae and fresh water animals such as crustaceans, mollusks, fish, amphibians, and aquatic reptiles. Refuges are common along banks where the following vegetation affords protection: *Polygonum* (smartweed), *Ambrosia* (greater ragweed), *Vernonia* (iron weed), *Bidens* (beggar ticks), *Salix* (willow), *Betula* (birch), *Platanus* (sycamore), *Ulmus* (elm), and *Cephalanthus* (button bush).

The smaller streams have many holes of water with a depth of three to four feet, and seldom go dry. They often become stagnant during the summer. The shallow parts often have algae, *Sagittaria* (arrowhead), *Nymphaeae* (water lilies), *Hibiscus* (swamp mallow), or *Lemna* (duckweed) growing in them, which provide food and shelter for many of the fresh water animals. Along the banks of these streams are found the *Juncus* (rushes), grasses, *Cephalanthus*, *Salix*, *Betula*,

and other woody plants. Thickets of *Prunus* (wild plum), *Cornus* (dog wood), *Gleditsia* (honey locust), *Crataegus* (hawthorne), *Rubus* (blackberry), and other woody plants are common.

The larger lakes such as Mineral Lake, Horse Shoe Lake, Riverton Lake, Hime's Lake, Powder Mill Lake, and Brown's Lake together with thousands of ponds and hundreds of sloughs in the county provide excellent habitats for animals. These larger bodies of water remain cool in the deeper parts, but become very warm and stagnant in the shallow parts which are often overgrown with *Juncus*, *Sagittaria*, *Lemna*, *Typha* (cat-tail), and other herbaceous plants. Along the shores of the lakes are grasses of many kinds, and with the *Salix*, *Cephalanthus*, *Crataegus*, *Rhus*, and *Polygonum* provide food and shelter for animals.

The land habitats are varied. The rich, black, bottom lands have a rank growth of vegetation which supports insects and other animal life. These lands are covered with *Quercus* (oak), *Juglans* (walnut), *Hicoria* (hickory), *Acer* (maple), *Fraxinus* (ash), *Platanus* (sycamore), *Tilia* (linden), and many other trees. The ground below is shaded, moist, and cool, and is covered with much leaf mold and rotting debris.

The Ozark uplift, timber mound, and numerous hills over the county are overgrown with *Quercus* (scrub oak), *Rhus*, *Rosa* (rose), *Rubus*, *Prunus*, *Diospyros* (persimmon), *Crataegus*, and various grasses. The soil is rocky and often semi-arid but is usually rich in humus.

The meadows are low in humus due to continuous cropping by the farmers. The spring vegetation is made up of *Silphium* (rosin weed), *Rudbeckia* (cone flower), and *Baptisia* (false indigo), which mature before the hay has reached maturity. The native grasses, which seldom reach a height of 30 inches, are largely *Agrostis* (red top), *Poa* (blue grass and spear grass), *Festuca* (meadow fescue), and *Dactylus* (Orchard grass). The animals are driven from the meadows in July or August when the hay is harvested. Most of the meadows are burned in March or April.

The pastures vary considerably in fertility and the growth of vegetation, depending upon topography and range management. Most of the pastures are over grazed so that during most of the grazing season the grasses are short. There are usually many weeds and other plants such as *Ambrosia* (annual and perennial rag weed), *Erigeron* (fleabane), *Achillea* (yarrow or milfoil), *Carduus* (thistle), *Baptisia*, *Rubus*, *Rosa*, *Crataegus*, *Rhus*, *Symphoricarpos* (buck brush), and *Toxylon* (osage orange).

One of the best natural habitats in the county, and the one that is least disturbed by man, is the narrow strip of land along each side of the highways. In addition to many of the plants already listed for the meadows and pastures, the genera of *Aster* (asters), *Solidago* (golden rod), *Helianthus* (sunflowers), and *Bidens* (tick seed) may be found. This soil is fertile, rich in humus, and harbors a great variety of vertebrate and invertebrate animals.

The semi-arid sections are fewer in number, but there are no reptiles in the county entirely dependent upon this type of habitat. The semi-arid habitats are confined to small areas on hills or in pastures and fields where washing, over grazing, or continuous cropping has denuded the land of vegetation.

Food supply and protection are the two major factors in determining the habitat of animals. The animals which feed upon amphibians are found near water. The species which feed on mice may be found, either in wooded sections where wood mice abound, or in the fields and meadows where meadow mice are numerous. The reptiles which feed upon worms are found in black, rich soil where earthworms are numerous. Those which feed upon insects and birds are either terrestrial or arboreal in habits. Protective coloration makes the animals inconspicuous in their native habitats. The green snake is safe when in the grass or the shrubbery. The copperhead blends with the rocks or dead leaves. The bull snake blends well with dead grass.

The edaphic factors are also important. The burrowing snakes and lizards require loose soil for burrowing. The ground snake, ring-neck snake, and brown-backed skink are found in moist soil, while the hog-nosed snake prefers a dry, sandy habitat. Clefts in rocks or refuges under trees and other places are necessary for the safety of many of the reptiles. If the subsoil is rock or clay and is impervious to water it will not support vegetation, earthworms, and other life essential for food for reptiles.

The basic food supply of the aquatic reptiles is worms, insects, fish, and amphibians, all of which are usually abundant. The burrowing, terrestrial, and arboreal species feed upon worms, insects, amphibians, birds, or their eggs, and mammals. The few reptiles that are partly herbivorous feed upon blackberries, strawberries, poke berries, and other wild fruits. Birds and rodents, which are the prey of some reptiles, find an abundance of wild fruits, grass seeds, weed seeds, and insects as food. The semi-arid species of reptiles feed largely upon insects.

Some of the reptiles such as the blotched king snake, blue racer, bull snake, and black snake are among the best destroyers of rodents. Others such as the green snakes, box turtles, and all of the lizards are enemies of insects. The hog-nosed snake eats toads which are beneficial to the gardener and the farmer. The garter snakes, water snakes, and water turtles destroy amphibians and fish, which are beneficial to man. Four of the species of water turtles are edible. While copperheads and rattle snakes are largely beneficial in their food habits, they are too dangerous, because of their poison, to be allowed to live.

The natural enemies of reptiles are hawks, owls, and carnivorous mammals, but there few of these in Cherokee County. The hawks and owls have been ruthlessly killed by hunters. The fur bearing carnivores, such as the skunk, mink, and weasel have been greatly reduced in numbers.

The aquatic species of reptiles, such as water snakes,

snapping turtles, musk turtles, and cumberland terrapins are distributed over the entire county where water is found. The soft-shelled turtle is rare in the creeks, but is common in the two rivers. The painted terrapin is common in quiet water. The burrowing and secretive reptiles, such as the ring-neck snake, ground snake, and brown-backed skink, are found in the densely wooded sections, mostly on Spring River and Neosho River. The copperheads and rattlesnakes are found in the rocky, wooded habitats of the county, principally along Spring River and in the Ozark uplift in the southeastern part of the county. The prairie rattler which is almost extinct is in meadows or on dry hills.

The garter snake has the widest habitat distribution of any of the reptiles. It feeds largely upon leopard frogs and is found wherever this frog is found. If the season is wet the frog is in the pastures and fields in search of insects for food. If the season is dry it is found near water.

The terrestrial reptiles such as the blue racer, bull snake, black snake, king snake, chicken snake, green snake, legless lizard, and box turtle are found in pastures, fields, meadows, and waste lands all over the county. The hog-nosed snake is distributed over the entire county, but is confined to sandy knolls and is comparatively rare in numbers.

The blue-tailed skink and spiny swift are common in the rocky timber land in the southeastern part of the county, but may be found in similar habitats along Spring River. The horned toad, collared lizard, and striped race runner prefer habitats such as pastures and waste lands that have

sparse vegetation. These animals enjoy high temperatures and find cowpaths and other bare places favorable for basking in the sun or escape from their enemies. The collared lizard likes a more rocky habitat than the other two lizards.

The snapping turtle, cumberland terrapin, and the two box turtles are the most numerous turtles in the county. The glass snake and striped race runner are the most common lizards in the county. The diamond-backed water snake, blotched king snake, blue racer, bull snake, and pilot black snake are the most numerous snakes in the county.

It is interesting to note that the garter snake is usually the most common snake found in any section of the country, but this was not found to be true in Cherokee County. The scarcity of garter snakes in this county may be due to the extreme heat and record-breaking droughts which occurred during the last three years.

The summer of 1934 had over 40 days of temperature which exceeded 100 degrees fahrenheit, during which time no precipitation occurred. All of the smaller and many of the larger holes of water along the creeks became dry. The soil moisture evaporated completely, wells went dry, many trees died, and smaller vegetation became seared. A great concentration of animals around the water holes occurred. This unusual year was followed by a wet spring in 1935, and another drought with high temperatures in the summer of 1935. The winter of 1935 was unusually long and cold for this section and was followed by a very dry spring in 1936. These

conditions probably have resulted in the destruction of large numbers of reptiles and other animals throughout the county.

Compared with the weather or with other animals, man is the worst enemy of the reptiles. If the public could distinguish between the beneficial and harmful reptiles the former would be protected while the latter would be destroyed.

The soft-shelled turtle is formed of large external, ossified, horny plates, which overlie internal, bony plates. The bony plates consist of the distended ribs and trunk vertebrae which articulate with overlying dorsal bony plates. There is no sternum on the ventral side, the plastron consisting exclusively of bony plates. The carapace and plastron are usually firmly united at the sides by side bridges. Two pairs of pentadactyl limbs are present. In all other vertebrates the limbs are external to the body but in the turtles, the limbs, the pectoral girdle, and pelvic girdle are between the right and left rows of ribs.

The head is a solid and compact structure. The jaws are covered by a horny sheath which forms the cutting edge. The eye has an upper and lower lid and a nictitating membrane. The tympanum is at the surface of the body. The neck, which has a procoelous vertebrae, is long and flexible, and with the head, may usually be retracted into the shell. The anterior vertebra is the axis which holds the movable part of the skull in position. The occipital condyle is the point of articulation of the skull with the vertebral column. The occipital condyle is the point of articulation of the skull with the vertebral column. The occipital condyle is the point of articulation of the skull with the vertebral column. The occipital condyle is the point of articulation of the skull with the vertebral column.

ORDER TESTUDINATA (CHELONIA)

Turtles and Tortoises

The representatives of this order, which are found in Cherokee County, have an endoskeleton, and a rather wide and short body inclosed in an exoskeleton or shell. The shell is composed of a dorsal shield, called the carapace, and a ventral shield, called the plastron. The carapace, except in the soft-shelled turtle, is formed of large external, epidermal, horny plates, which overlies internal, bony plates. The bony plates consist of the flattened ribs and trunk vertebrae which coalesce with overlying dermal bony plates. There is no sternum on the ventral side, the plastron consisting exclusively of dermal plates. The carapace and plastron are usually firmly united at the sides by wide bridges. Two pairs of pentadactyl limbs are present.

In all other vertebrates the limbs are external to the ribs but in the turtles, the limbs, the pectoral girdle, and pelvis are between the right and left rows of ribs.

The head is a solid and compact structure. The jaws are covered by a horny sheath which forms the cutting edge. The eye has an upper and lower lid and a nictitating membrane. The tympanum is at the surface of the body. The neck, which has 8 procoelus vertebrae, is long and flexible, and with the head, may usually be retracted into the shell. The anterior vertebra is the atlas which holds the condyle of the skull for articulation. The second vertebra is the axis, which has short transverse processes, and an odontoid process. The other six vertebrae have only transverse

processes. The anterior caudal vertebrae have rudimentary ribs.

Turtles are noted for their tenacity of life. The turtles of Cherokee County, with the exception of the two species of box turtles, are aquatic. They feed on vegetal and animal food, some being strict carnivores, and some are omnivores. There are no strict herbivores in the county.

Turtles breed in the spring or early summer. They are oviparous, the eggs being buried in sand or earth, and incubated by the heat of the sun.

Family Chelydridae

Snapping Turtles.

The snapping turtles have many primitive characteristics, such as a long plated tail, and tuberculated plates on their armored body. This connects them with the paleozoic past, when some turtles were 12 feet long and six feet wide.

The body is large, high in front, and covered with a rough tuberculate carapace, which is composed of 24 marginal, 8 costal, 5 dorsal, and one nuchal plates. The plastron is small, cruciform in shape, and composed of 10 plates and 2 narrow bridges. The head, neck and tail are very large. The jaws are powerful and hooked. There are five slightly webbed toes on each foot. The hind foot has four claws and the front foot five claws.

This family of turtles is represented in Cherokee County by one genus and one species.

Chelydra serpentina

Common Snapping Turtle; Moss Back.

Chelydra serpentina is the largest, most vicious, and most dangerous turtle found in Cherokee County. Its powerful jaws, sharp-edged mandibles, and its habit of snapping blindly when irritated, make it a formidable animal. A large specimen is said to be able to snappoff a man's finger.

The body of the common snapper is olive or dark-brown in color. The dorsal and two rows of costal plates are rather noticeably keeled in young specimens and less so in mature ones. The head is covered with a soft skin. The tail has a dorsal row of tubercles and two rows of scales beneath. The legs are large and powerful.

Old specimens may have a length of 30 inches, with a carapace 12 inches long, and weigh as much as 40 pounds. The author has taken 19 specimens of various sizes. The following measurements are given for the largest, the average, and the smallest sized specimens.

Total length in in.	Carapace		Plastron		Body depth in in.
	length in in.	width in in.	length in in.	width in in.	
21.00	8.50	6.87	6.50	6.50	3.50
13.50	5.50	4.87	4.25	4.62	2.12
7.00	3.00	2.50	2.50	2.50	1.37

length in in.	Head		circumference in in.	Tail length in in.
	width in in.	depth in in.		
3.00	2.25	1.50	7.00	7.00
2.50	1.50	1.12	4.50	4.50
1.00	0.87	0.62	2.60	2.75

The snapping turtle is strictly an aquatic reptile and is a common inhabitant of the lakes, ponds, streams, and marches of Cherokee County. In late fall it crawls into a hole near the bank of a pond or stream and hibernates during the winter, becoming active again about the middle of March. Extensive migration, which occurs during the spring months, is due chiefly to food supply, rainfall, and sex urge. Many specimens have been found a half mile from the nearest water. The greatest migration was noticed after heavy rainfall which fell during the month of May and the first week of June.

In the latter part of May or early June the female leaves the water and selects her nesting site on land, often going quite a distance in order to find moist earth or sand. She makes a large round excavation with her fore feet, crawling into the hole as she digs. The loose earth falls back over her body. After depositing the eggs, she covers them by raising her body at a sharp angle, which permits the loose earth to fall into the hole. The forefeet are used to complete the covering. She may lay her eggs in layers placing a layer of sand between the layers of eggs. The eggs are incubated by the heat of the sun and hatch during the summer or early fall.

She lays from one to three dozen eggs, the usual number being twenty-four. On May 31 one specimen was taken from her nest on the bank of Brush Creek, about 10 feet from the shore. She had in her egg sack when killed 16 spherical eggs which averaged one inch in diameter. The eggs are white and covered with a parchment-like shell, which is tough,

elastic, and slightly calcareous. They have a large orange-colored yolk and thin greenish-white albumen.

In summer the snapping turtle is often found in shallow quiet pools, partially embedded in mud, or hidden behind rocks or vegetation such as water lilies or duck weeds. Its mossy back, which is due to an algae growth on its carapace, enables it to blend with its surroundings so that it is difficult to see. From its position of safety it protrudes its proboscis every three or four minutes in order to breathe.

The snapping turtle is principally nocturnal in its feeding habits yet it is often caught during the day on hooks baited with worms or flesh. It is a strict carnivore and feeds upon fish, frogs, and water fowl. It has a highly developed tactile sense on its cutaneous papillae which enables it to detect the slightest ripple on the surface of the water. It stalks waterfowl, attacks them from beneath, pulls them beneath the surface, and drowns them. It tears its prey to pieces with its jaws and front feet. It kills fish by biting them in the abdomen when they swim close to it. The snapping turtle can eat only under water. It bites off pieces of flesh and washes it with gulps of water into the esophagus, where peristalsis begins. If its prey is killed on land it must be carried to the water before the turtle can eat it.

This turtle is the most destructive enemy of wild life such as waterfowl and fish. It destroys large numbers of domestic and wild ducklings each year. It is common in

small creeks and holes of water. The author found a fair sized snapper in each hole of water in a tributary of Brush Creek which had a depth of one or two feet and a surface area of approximately 200 square feet. Six specimens were taken from a water hole in a tributary of Cherry Creek, which has a maximum depth of four feet and a surface area of approximately 1000 square feet.

When the snapper is approached in the water it either retreats to a more protected spot or withdraws into its shell until danger passes. When handling a live snapping turtle it is safe to hold it by the tail only, as its long flexible neck gives it considerable reach with its jaws. It is very tenacious of life. Most of the specimens taken were drowned by placing them in a large can of water and weighting them down. It was necessary to submerge them for 48 to 60 hours or longer, to kill them.

Family Kinosternidae

Musk and Mud Turtles.

This family of turtles is represented in Cherokee County by two genera with one species in each genus. The musk and mud turtles are small aquatic reptiles. The carapace, which consists of 23 marginal, 8 costal, 5 dorsal, and one nuchal plate, is rather long and narrow in outline with the margins turning downward and inward, rather than flaring outward. The plastron is composed of 11 horny plates, the anterior pair of which have coalesced into one. It is proportionately large and well developed, with movable anterior and posterior lobes. The head is proportionately large and pointed, with

strong jaws, and eyes that set well to the front. The limbs are slender and the feet short with five webbed toes on each foot. There are five claws on the front feet and four on the hind feet. These turtles emit a strong musky odor when disturbed.

These animals are primarily aquatic in habits, yet their box-like shell shows evidence of having reverted to the aquatic abode after a prolonged ancestry upon land. These reptiles are rather clumsy as a terrestrial animal, and if they remain on land for a long period of time, they become light in weight from dessication. When disturbed they act as fierce as the common snapper, opening their mouths and hissing defiantly, but such actions are mostly bluff. They are much smaller than the common snapper, having a total length of less than six inches.

Sternotherus odoratus

Common Musk Turtle; Stinkpot.

The "stinkpot", as it is often called, gets its name from the peculiar, sickening odor emitted by the inguinal glands when disturbed. It has a smooth, rather narrowly-oval and arched carapace, which extends, like eaves, considerably beyond the ends of the plastron in front and behind. In young specimens the plates are imbricated and show a strong dorsal keel and slight costal keels. In mature specimens the plates become non-imbricated, and the keels become blunt and obscure.

The general body color is a pale-brown or olive, blotched

or speckled with a darker color. The plastron is long and narrow and is yellowish or brown in color, and rather smooth. The anterior and posterior lobes are only slightly movable, and, therefore, the animal can only partially close the shell. It has two light yellow lines on the head, one running from the nostril to the neck above the eye, and the other from the nostril to the neck below the eye.

Sternotherus odoratus is a pubnacious carnivore inhabiting the ponds and streams of Cherokee County, where it crawls about on the bottom in search of food. At night it may leave the water and crawl along the shore in search of crustaceans, worms, slugs, and other animal food. It is not very particular about what it eats, at times even becoming slightly herbivorous. Because of its feeding habits, it is seldom seen unless caught on a hook or in a seine. During the first warm days of spring, it may often be seen at the surface in shallow water. In warm weather it may often be seen floating on pond scum, from which position it darts to the bottom upon the approach of man.

In the spring the female leaves the water to deposit two or more china-white, elliptically-shaped, eggs in a depression, about two inches wide and two inches deep, in the mud or sand.

Of the six specimens found by the author, two were taken within the city limits of Columbus, one of which was under normal weight due to dessication; two were taken from a tributary of Brush Creek, one in a pond while respiring at

the surface of the water and one along the shore on Spring River. The following measurements are given for the largest, the average, and the smallest sized specimens.

Total length in in.	Carapace		Plastron		Body depth in in.
	length in in.	width in in.	length in in.	width in in.	
6.37	4.75	2.90	3.50	2.50	1.75
5.50	3.87	2.50	2.50	2.19	1.75
2.10	1.50	1.25	1.05	1.00	0.87

Head				Tail
Length in in.	width in in.	depth in in.	circumference in in.	length in in.
1.37	1.00	0.75	2.87	0.87
1.02	0.87	0.63	2.50	1.00
0.54	0.37	0.32	1.25	0.25

Kinosternon subrubrum

(*Cinosternum pennsylvanicum*)

Common Mud Turtle.

Kinosternon subrubrum is closely related to *Sternotherus odoratus*. The two species have many characteristics in common with about the same feeding and breeding habits. But there are several distinguishing features about the mud turtle not possessed by the musk turtle.

The carapace of the mud turtle is broad, flat, and not much longer than the plastron, which nearly fills the open space below the carapace. The front and rear lobes of the plastron are loosely hinged, making this animal more like the box turtle in its ability to withdraw inside its shell.

The head is not as large or as sharp pointed as in the

musk turtle, and the tail ends in a nail or a claw.

The color of the body is dark-brown or olive with black sutures. The head is usually brown with numerous greenish-yellow spots, with the exception of the jaws which are olive. The plastron is brown or yellow with distinct lines of growth.

These turtles also emit a sickening odor when molested. The writer has discovered several of these specimens along the road during the spring months. When one was placed in the car the musky odor given off by the specimen became so strong that the animal had to be thrown out and the car thoroughly aired. One was caught on a hook, in a tributary of Brush Creek, and put up such a fight that the author mistook it for a good sized fish.

All of the specimens taken were approximately the same size. The following measurements are given for one specimen.

Total length in in.	Carapace		Plastron		Body depth in in.
	length in in.	width in in.	length in in.	width in in.	
6.50	3.87	2.54	3.42	2.42	1.25
length in in.	Head			circumference in in.	Tail length in in.
	width in in.	depth in in.			
1.25	0.87	0.62		2.75	1.30

Family Testudinidae

Box Turtles and Terrapins

This family is represented in Cherokee County by four species of turtles, two of which belong to the genus *Terrapene*, one to the genus *Chrysemys*, and one to the genus *Pseudemys*. These turtles may be described, in general as

having either a highly convex or a depressed, ovate carapace, covered with 5 dorsal, 4 pairs of costal, and 25 marginal plates. The carapace is broadest behind and flares outward at the margin. The plastron, which is large and covers the whole ventral surface, is composed of 12 plates. It is firmly joined to the carapace by wide bridges.

Terrapene ornata

(*Cistudo ornata*)

Painted Box Turtle; Land Terrapin.

This is the common land turtle so often found along the highways by motorists. It is equally at home in a briar patch, meadow, pasture, field, or cultivated garden.

Terrapene ornata has a very high, convex, more or less globular-shaped carapace, which has a ground color of brown or nearly black, with yellow blotches or radiating lines. The plates show distinct lines of growth. The plastron, which is about the same color as the carapace, is large and rounded at both ends, and is attached to the carapace by a ligament. It is divided into two movable lobes by a transverse hinge. The anterior lobe, when closed, rests at a sharp angle and enables the body, in most specimens, to be completely closed. The male usually has red eyes and the female has yellow eyes. The scales on the fore legs are usually a bright red or yellow. The front feet have five toes and the hind feet have four toes.

The following measurements are given for an average sized specimen.

length in in.	Carapace width in in.	Body depth in in.	Tail length in in.
3.87	3.37	2.00	1.37

Terrapene ornata surpasses, in numbers, any other species in the county, except possibly, its close relative, the three-toed box turtle. Large numbers of these animals are killed each year by motor cars and farm machinery, and large numbers of eggs are destroyed in the cultivation of fields, and yet no noticeable decrease occurs in the numbers of these animals. It is well protected from all of its natural enemies, except man. When it withdraws into its shell smaller animals cannot harm it. The author has seen an average sized dog chew on one without seriously injuring it.

The painted box turtle is insectivorous as well as herbivorous. During the threshing season large numbers of these reptiles are found under shocks of grain, where they are attracted, probably, by the ground beetles and crickets which hide there. In some fields the author has found an average of one painted box turtle for each 10 acres of grain threshed.

This turtle is a nomad and moves about during most of the warm weather. It is frequently found during the summer in holes abandoned by skunks or other ground burrowing animals. This animal hibernates in the winter by burrowing to a depth of two or more feet, or it may appropriate an abandoned den or a crevice in rocks. It is thought to live to the age of 40 or 50 years.

The females lay from four to eight eggs in shallow depressions and cover them with loose soil. The eggs are elliptical and white in color. They are laid in May or June and hatch the same summer.

Terrapene carolina triunguis

Three-toed Box Turtle.

The Three-toed Box Turtle is less attractive in appearance than the painted box turtle, having a dull, olive color. Many of the immature, and a few of the old, specimens have yellow markings on the carapace. The plates on the carapace and plastron have marked lines of growth. The head, and the scales on the neck and limbs, are a copper or reddish-brown color. The mandibles are yellow with darker blotches. This animal is larger than the painted box turtle and has a dorsal keel. It has but three toes on the hind foot.

The following measurements are given for the largest, the average, and the smallest sized specimens obtained.

length in in.	Carapace		Body depth in in.	Tail length in in.
	width in in.			
5.50	4.12		2.75	1.37
5.12	3.75		2.63	1.25
1.50	1.12		0.57	0.57

The three-toed box turtle is usually found in a different habitat from that of the painted box turtle. It is more often found in bottom lands where there is a heavy growth of vegetation. The author found many of these animals in weedy, bottom land on Spring River. This turtle, when kept in

captivity, will eat meat regularly. It is probably more of a carnivore than the painted box turtle. The habits are about the same for this animal as for the painted box turtle.

Chrysemys picta belli

Bell's Painted Terrapin.

Bell's Painted Terrapin is a common inhabitant of the lakes, ponds, and quiet streams of Cherokee County. It has a flat, smooth, non-serrated carapace, which is dark-brown or olive in color, with light-yellow reticulations at the margins or centers of the plates. The marginal plates, above and below, are centered with crimson lines or blotches, the color often extending to the margins. The plastron varies in color from crimson to yellow and is characteristically marked with wide black bands which meet at the ends. The head is dark with inconspicuous white lines on the dorsal surface, and with wider white or yellow lines on the sides and beneath the head. The legs are black with three or more white lines extending to the feet. Immature specimens are more brilliantly marked than the mature specimens. The shell of a mature specimen is 6 inches or more in length. The following measurements are given for the largest, and the smallest sized specimens obtained.

length in in.	Carapace	length in in.	Plastron	Body depth in in.	Tail length in in.
	width in in.		width in in.		
6.20	4.50	5.50	3.63	2.00	1.50
3.50	2.87	3.12	2.25	1.25	1.25

Bell's Painted Terrapin was found in several of the

larger bodies of water of the county. Three specimens were caught as they hid in the vegetation along the shore, one coming from Horse Shoe Lake near Oswego, one from Mineral Lake, and the other from the Powder Mill Lake near Turck. Several other specimens have been shot as they floated on the surface in other lakes and ponds of the county. This turtle is often noticed basking on logs, stones, or vegetation.

This terrapin feeds upon aquatic insects, tadpoles, fishes, and water plants. It may feed upon dead fish and other carrion food, which is torn to pieces with its long claws and sharp-edged mandibles. When kept in captivity it eats chopped beef, fish, insect larvae, and earthworms. Its broad, webbed toes make it an excellent swimmer.

The female makes a flask-shaped nest in moist sand along the shore of standing water and deposits from 4 to 8 oval eggs. The eggs are covered and the fine sand pressed down firmly by the knuckles of her hind feet.

This turtle makes an excellent pet for an aquarium, provided it is not placed with fish or other animals. With the possible exception of *Pseudemys troosti* it is the most attractively colored turtle in the county.

Pseudemys troosti (elegans)

Cumberland Terrapin; Troost's Terrapin; Slider.

The Troost's or Cumberland Terrapin is the water turtle most often seen by the average person, either as it is sunning itself on a log, rock, along a bank, or as it comes

to the surface to breathe. It gets the name of "slider" from its habit of sliding into the water when approached by man. The author has found this turtle in every type of water habitat in the county. It is more numerous than any turtle except the two species of box turtles.

This species is difficult to describe because of marked individual variations in shape and colorations. The males differ so much from the females and immature in coloration that the former was formerly listed as *Pseudemys troosti* and the latter as *Pseudemys elegans*.

The carapace is moderately depressed, with or without a noticeable dorsal keel, and has a serrate hinder margin. In the females and immature it is brown with broad, darker lines, and yellowish wavy lines. The plates show distinct lines of growth. The plastron, which is notched behind, is yellow with a black blotch on each plastral plate. The head and neck have yellow lines, and an elongated red spot occurs back of the eye. The legs have white or yellow lines. The feet are broadly webbed, and the toes have long sharp claws. In the male the carapace is a greenish-black with greenish-yellow blotches of varying sizes. The plastron is yellow with the margins of the plates, or the entire plate black in color, and is notched behind. The head is brown or black without markings.

The larger specimens have a carapace which is 10 inches long and 7.5 inches wide. The following measurements are for a male specimen, and the largest, average, and smallest

sized female and immature specimens.

Carapace		Plastron		Body	Tail
length in in.	width in in.	length in in.	width in in.	depth in in.	length in in.
Male					
8.00	6.25	7.12	4.75	2.65	1.62
Female and Immature					
8.32	6.50	7.87	5.00	3.20	1.87
6.24	5.06	5.75	3.75	2.13	1.50
1.83	1.75	1.75	1.33	0.94	0.50

The green carapace and the red head markings make the young cumberland terrapins one of the favorites for use in aquarium jars. When mature it is one of the largest terrapins. It is considered edible, and is sold regularly on eastern markets under the term "slider".

Most of the specimens were obtained by shooting them. This animal has been seen paddling in shallow water, with the hind feet raised high, and churning the water somewhat after the fashion of the old paddle driven steam boats. The largest specimen taken was found wallowing in two inches of water in a rock bottom hole one hundred feet or more from the nearest water hole of any size. It apparently was feeding upon newly hatched tadpoles, minnows, and crayfish. Ten of the specimens came from a hole of water in a tributary of Cherry Creek which has a surface area of about 1000 square feet. Female and immature specimens have been seen or taken in the strip pits north of Columbus, the slush ponds around Treece, and most of the lakes, rivers,

creeks, and ponds in the county. Only one specimen, a male of this species, has been found which answers the description given for Troost's Terrapin. It was found in Brown's Lake and was so covered with algae that it was necessary to scrub it with a wire brush to determine the color.

The Cumberland Terrapin may be caught in great numbers in box or wire traps. The traps are constructed so as to take advantage of the animal's habit of basking in anything which projects above the surface of the water. A trap door lets the animal fall into the net or box below. The box may be baited with carrion.

This turtle has about the same breeding and feeding habits as Bell's Painted Terrapin.

Family Trionychidae

The Soft-Shelled Turtles.

The turtles belonging to this family are large with flat, circular shells, which are covered with a leathery skin instead of horny plates and scales. The ossification of the carapace is not complete. The neck is very long. The head is pointed, and ends in a flexible proboscis-like snout. It has powerful, sharp-edged mandibles covered with fleshy lips. The feet are broadly webbed, and have 5 toes on each foot. Each foot has three toes with nails. This family is represented in Cherokee County by only one species.

Amyda (Trionyx) spinifer

Soft-shelled turtle; Leatherback.

This turtle is different from all of the other species

found in Cherokee County in having a pancake-like shell covered with a soft leathery skin. The carapace is pliable and bends freely at the edges. It is smooth, except for small conical tubercles on the front margins and about two dozen wart-like tubercles on the rump region of the carapace. The color of the carapace is brown in mature specimens. In young specimens the carapace is olive or greenish, with darker circles margined with black. The ventral side is white except for portions of the legs and the tail, which are mottled or blotched with darker colors. The inconspicuous plastron is shield-shaped with lateral plates extending, like arms, to the bridges joining it with the carapace. The crescent-shaped nostrils are on the tip of the proboscis. The nasal septum bears a prominent longitudinal ridge on each side. On the sides of the head are two light stripes which unite at the base of the proboscis. The thin, fleshy lip is a characteristic not found in other turtles. The tail is fleshy with the vent near the end.

The following measurements are for the average and small sized specimens.

Total length in in.	Carapace length in in.	Carapace width in in.	Plastron length in in.	Plastron width in in.	Neck length in in.
18.00	10.50	8.25	6.00	7.00	4.00
4.87	2.87	2.50	1.54	1.90	1.00
length in in.	Head width in in.	Head depth in in.	Head circum- ference in in.	Snout length in in.	Tail length in in.
2.68	1.37	1.13	4.12	0.37	2.54
0.78	0.50	0.32	1.50	0.13	0.37

The soft-shelled turtle is common in all of the larger streams of the county, the writer having seen it in Spring River, Neosho River, Lightning Creek, Brush Creek, Fly Creek, and Shawnee Creek. None has been observed in lakes or ponds. It is ferocious and nearly as dangerous as the snapping turtle. It is very active, strictly aquatic turtle, its flat shape and webbed feet giving it the agility of a fish. It never gets farther than a few feet from the water. It may occasionally be found sunning itself on water soaked logs, or on soft mud-banks along the shore. In either position, it turns around with its head toward the water and upon the slightest hint of danger it scrambles recklessly until it disappears beneath the surface. It often lies in shallow water with only the proboscis and eyes protruding. It camouflages its presence by a film of mud formed by rocking the body from side to side until the ooze is stirred up and settles over it.

The female leaves the water in early summer to lay her eggs. She selects a site in clean moist sand only a few feet from the shore and burrows in until she is entirely covered, except her snout, which is protruded for respiration. She lays from 15 to 25, and occasionally several dozen eggs, covering them so completely that no trace of the nest can be found. The eggs hatch in late summer or early fall. The eggs are white and spherical, with hard, brittle, but very thin shells. They are about $1 \frac{1}{8}$ inches in diameter.

The soft-shelled turtle is a voracious and savage carnivore, feeding upon mollusks, crustaceans, amphibians, fish,

and even waterfowl. This species, like the snapping turtle, must feed beneath the surface of the water. It bites its food off with well defined incisions. Smaller animals, like crustaceans and insect larvae, are swallowed whole.

snakes", *Ophisaurus ventralis*, have two pairs of poisonous fangs. The head of the alligator has a firmer structure than that of the snakes. The skull is not divisible, as the two halves of the lower jaw are immovably bound together, and the upper jaw is firmly joined to the cranium. Neither upper nor lower jaw has teeth, and in some species teeth occur on the gums as well as the jaws. The eyes have an upper and a lower lid and a nictitating membrane. The ear opening is external, but the tympanum is not at the surface, and is often protected by special scales. The tongue is well developed and is protrusile and bifid in most species. The anal opening is a transverse slit. The tail is long and fragile, and easily broken off. It may grow again but the lost vertebrae are not regenerated, and it never attains its former length as before. The ability to lose the tail is a protective measure and is made possible by a thin, uncalcified, transverse region which traverses each caudal vertebra. With one or two exceptions the species found in this country are viviparous. They are largely insectivorous in diet and all are terrestrial in habit. In several species osteostichosis is common. The author has found seven species distributed among seven genera and four families.

ORDER LACERTILIA (SAURIA)

The Lizards

The lizards are elongated reptiles whose bodies are covered with scales, and with the exception of the "glass snake", *Ophisaurus ventralis*, have two pairs of pentadactyl limbs. The head of the lizards has a firmer structure than that of the snakes. The mouth is not dilatable, as the two halves of the lower jaws are immovably bound together, and the upper jaw is firmly joined to the cranium. Either acrodont or pleurodont teeth are present, and in some species teeth occur on the gums as well as the jaws. The eyes have an upper and a lower lid and a nictitating membrane. The ear opening is external, but the tympanum is not at the surface, and is often protected by special scales. The tongue is well developed and is protractile and bifid in most species. The anal opening is a transverse slit. The tail is long and fragile, and easily broken off. It may grow again but the lost vertebrae are not regenerated, and it never attains as great length as before. The ability to lose its tail is a protective measure and is made possible by a thin, unossified, transverse septum which traverses each caudal vertebrae. With one or two exceptions the species found in this county are oviparous. They are largely insectivorous in diet and all are terrestrial in habit. In several species metachrosis is common. The author has found seven species distributed among seven genera and four families.

Family Iguanidae

Iguanas and Swifts

The Iguanidae are represented in Cherokee County by three genera having one species each. These lizards have thick, non-protractile tongues that are fixed to the floor of the mouth, and are not notched in front. The body scalation is fine. The teeth are pleurodont, which means that they are not set in alveoli, but are ankylosed by their sides to the inside edge of the jaw bone. The eye has a round pupil and well developed lids. The lizards belonging to this genus have femoral pores.

Crotophytus collaris

Collared Lizard; Mountain Boomer.

The collared lizard is rarely found in this county, yet it was formerly a common resident here. It has a short, stout body which is covered with small granular scales. It varies from green to gray in color, with white or yellow spots on the dorsal surface and brick-colored spots at the edge of the abdomen. It has two black bands across the shoulders, which are separated by a yellow band. The head is very large and usually darker in color than the body, except for the throat which is orange. The females are less brightly colored than the males, the coloring in both becoming more vivid during the breeding season. The tail is very long, tapering, and crossed with lighter bands.

A large adult specimen may have a body length of 3.75 inches, or a total length including the tail, of 12 inches.

The largest specimen measured 10 inches in length and 1.2 inches in width. The tail was 6 inches in length and the head was 1 inch in width.

The mountain boomer is a pugnacious, greedy, and very active lizard inhabiting dry, rocky habitats. It is frequently seen basking on rocks in the heat of the day. If it is approached it runs rapidly away, proceeding in normal fashion for a distance of a few feet until speed is attained. It then lifts its tail and anterior part of the body like a kangaroo, runs off on its hind feet and jumps over any small obstacles in its path. If cornered it opens its mouth widely in defiance. Its jaws are powerful enough to produce a blood blister on one's finger.

This lizard is omnivorous. It feeds upon blossoms and small fruits, insects, worms, insect larvae, and other reptiles, some of which are nearly as large as itself. Its manner of eating is somewhat like that of the frog which stuffs food into its mouth with the front feet.

The collared lizard makes its home under rocks or shelving stones where it spends the nights and stormy or cloudy days. Breeding and egg laying occurs during late spring or early summer. About a dozen ovoid eggs, which average about a half inch in length and are covered with a thin, soft, papery shell, are deposited in holes in the sand.

Sceloporus undulatus consobrinus

Spiny Swift; Pine Lizard; Fence Lizard.

The yellow striped swift is not common in Cherokee County. The author found one specimen on barren rock cliffs

on Spring River near Lawton. It is one of the smaller swifts having a total length of about 5.5 inches, or a length of 2.25 inches without the tail which is very brittle and easily broken off.

The body is covered with small, heavily keeled scales which have bristling tips. The color is grayish or greenish-yellow with two dorso-lateral, pale-yellow stripes about two rows of scales wide, and separated by about eight rows of scales. The head scales are smooth. A pale band extends backward from the eye on each side.

This lizard inhabits dry, sandy, sparsely wooded areas. It gets its name, Pine Lizard, from its preference for pine woodlands. It is frequently seen running over fences, rocks, and rough or barren ground. It is largely insectivorous in its food habits.

Phrynosoma cornutum

Common Horned Toad; Texas Horned Toad;
Horned Lizard.

The Texas or common horned toad or lizard was at one time a common inhabitant of Cherokee County but now is rarely found here, the author having only four specimens which were found in the county. The cultivation of much of the soil of the county has left few favorable habitats for this lizard.

The horned lizard is unique among the lizards of the county in having a short, wide, heavily armed body, and a short tail. The body is capable of being puffed up quite

large, or depressed until very flat. It is gray spotted with brown, and has a median yellow band extending from behind the head to the tail; a large dark blotch on each side of the nape and three dark rounded spots on each side of the back, usually bordered in the rear with a narrow yellow mark. It is covered with fine scales with a series of about three rows of sharp spines extending from the neck to the tail and two rows of spines on each side of the body. The abdomen is covered with very fine, granular scales. The animal has large head spines consisting of two central or occipital horns which are rounded and turned upward, and on each temple, three successively larger horns directed backwards or outwards. Slightly beneath the labials is a row of enlarged and projecting plates and on each side of the chin is a row of enlarged scales.

The largest specimen had a body length of 6 inches, a body width of 2.37 inches, and a tail 1.87 inches long.

The common horned lizard inhabits dry sandy areas where it lies in the sand or runs about in search of food during the heat of the day. Before sunset it burrows its way into the sand, sometimes to a depth of three inches or more, but usually leaving the back of the head exposed. This act is accomplished by rooting along until a furrow is made and then throwing sand over its back with the spiny shovel-like sides.

This lizard is largely insectivorous, showing a preference for ants, but in captivity it will eat mealworms, soft

bodied grubs, roaches, grasshoppers, and crickets. It captures its food much like the common toad. Instead of making a rush like many lizards do, it approaches its prey, bends its head deliberately, and catches it by protruding its thick viscid tongue. This act, together with its toad-like body probably accounts for the misnomer of "horned toad".

The spiny armament of this animal enables it to be passive to danger, except for the usual tendency found in lizards to run. When the animal is rubbed on the side of the body, it presses its side to the ground, and lies quietly with its eyes closed. If it becomes excited the eyes and lids become very much distended and reddened, and may occasionally spurt from the corner of the eye, a thread-like stream of blood to a distance of two to four feet. It is not known whether or not this act serves in anyway the animal's purpose for protection. It is impossible to induce the animal to open its eyes immediately after this act.

The horned lizard is ovoviviparous, bearing from six to twelve young in a litter. When born the young are incased in a transparent envelope which soon breaks and the young are fully able to take care of themselves. The author had one live female specimen which laid 12 eggs. The eggs were white, ovoid, and averaged 0.62 inches by 0.37 inches.

Family Anguidae

Legless Lizards.

The Anguidae are elongated, often more or less

snake-like lizards, with weak legs or without any. They have a bifid and extensile tongue. The teeth are pleurodont. The body has a conspicuous lateral fold. There are two genera of lizards in this family, only one of which is found in Cherokee County.

Ophisaurus ventralis

Glass Snake; Joint Snake; Legless Lizard.

The only species of this animal in the genus *Ophisaurus* is a common inhabitant of the meadows and pastures of Cherokee County. The glass snake has a body that is snake-like, without legs, hard and glassy in appearance, and is covered with small slick scales. The color is a mottled-brown and greenish-white with a median dark band which has a narrow, yellow stripe in the center and two or three narrow, greenish-white stripes on the sides. The belly is yellow or tan and covered with scales.

The eyelids are well developed and the ears are external and very distinct. The tongue is bifid and protractile. The tail is about twice as long as the rest of the body, but if it has been broken it may appear as a dark-brown, horn-like growth about two inches long.

The total length of the average animal is about 27 inches, but it may attain a length of three feet. The largest specimen found had a total length of 23 inches, including a tail of 14 inches. The head was one inch long and the body diameter was 0.63 inches.

Two specimens have been found within the city limits of

Columbus. Nine specimens have been taken, only two of which have their tails intact. The tail is much more brittle than in most lizards and often breaks into several pieces.

The usual method of progression in this lizard is like that of the snake, but its movements are less rapid. It may be readily distinguished from the snakes, however, by the movable eyelids, the external ear opening, the scales on the belly, and the conspicuous lateral fold on the body.

The legless lizard spends much of its time burrowing. It feeds upon earthworms, slugs, and the larvae and adult of insects. It may occasionally rob a nest of a ground nesting bird, breaking the eggs, and lapping up the contents with its tongue.

Family Teiidae

Striped Race Runners; Swifts.

This group of lizards are elongated saurians with a deeply bifid tongue and sometimes rudimentary legs. There is only one representative of this family in Cherokee County.

Cnemidophorus sexlineatus

Striped Race Runner; Six-lined Race Runner; Swift.

The striped race runner is a common inhabitant of dry sandy embankments, knolls, pastures, and meadows. It is slender and graceful in build, with strong limbs, a long and gradually tapering tail, and rather pointed head. The body is covered above with small granular scales, and beneath with alligator-like plates. The animal is olive-gray or brown with three yellow or white stripes on each side,

and often has a sheen of green on the back and sides. The belly is bluish or greenish in color. The upper portion of the head is covered with large, symmetrical shields. The blackish tongue is elongated and flat, and ends in two long smooth points. It is often used in examining the ground over which the animal walks.

This lizard attains a total length of about 10 inches, the tail accounting for over two-thirds of this length. The largest specimen obtained was 9 inches long including a tail of 6.25 inches. The animal gets its name because of its great swiftness, being almost as fast as man. When pursued, if it is losing ground, it suddenly veers to right or left and enters a hole or hides in the grass.

The striped race runner is found in large numbers along a railroad embankment and gravelled track bed near Columbus where it lives under overhanging rocks or railroad ties. It may often be seen sunning itself on the gravel beds, It uses the cowpaths in pastures for its sunning as well as an avenue of escape. It is found on and around the strip pits north of Columbus. It inhabits an old stone quarry near Riverton. It feeds upon insects and their larvae, and other small ground animals.

Family Scincidae

The Skinks

The skinks are small, active lizards with smooth scales underlaid with bony plates. The head is covered with symmetrical plates. The tongue is free and notched in front.

The eyes have well developed lids and a round pupil. Femoral pores are absent. This family is represented in Cherokee County by two genera with one species in each genus. The local representatives all have legs, although many species in this family are without legs.

Eumeces fasciatus (quinclineatus)

Five-lined Skink; Blue-Tailed Skink; Red-headed Skink; Striped Skink; Scorpion.

The blue-tailed skink is a common inhabitant of certain rocky, wooded habitats of the county. The color of the young differs greatly from that of the adult. When about five inches long, this skink is jet black with a vivid yellow line which forks on the back near the head, and two similar lines on each side. These five stripes extend to the tail which is a brilliant blue. This immature animal is the five-lined or blue-tailed skink. The mature specimens are called red-headed skinks or scorpions. The mature female, which is about 10 inches long, is a dull brown with dull stripes on the sides. The mature male specimen is about the same size as the female and becomes a uniform dull olive-brown on the body and a coppery, or bright red on the head.

The body is moderately stout, and has 28 to 34 rows of glossy scales. The head, in mature specimens, becomes very wide and swollen at the temples. The palate is toothed. The lower eyelid is scaly. The largest specimen obtained was 7 inches in length.

This lizard lives under a fallen tree trunk, in a cavity of a tree, or under a rock. It is strictly diurnal, retiring from sight when the sun goes down. It comes cautiously from its hiding place and always looks for any danger. When basking in the sun or in search of food, it remains near its hiding place, to which it retreats upon hearing the slightest sound.

It feeds upon insects and worms, and occasionally upon the eggs of birds, and the young of field mice. Its jaws are powerful and it is capable of killing smaller prey with ease. If this animal is grasped by the tail this organ breaks and the animal escapes.

The red-headed skink, in reproductive habits, is between the strictly oviparous and the ovoviviparous species. It lays from 4 to 8 very thin-shelled eggs which hatch soon after oviposition. The female coils around the eggs during the short incubation period to protect them. This habit is unusual in reptiles.

This skink is quite common in the rocky, oak-grown land in the southeastern part of the county, where most of the specimens were obtained. Two specimens were found on a rocky cliff on Spring River near Lawton. This animal is difficult to catch during the summer. It may be more readily caught in the evening during the early spring under strips of bark on rotting trees, or in decaying wood at the base of a tree.

Leiolopisma unicolor (laterale)

Brown-backed Skink; Ground Lizard.

The brown-backed skink is rarely seen in Cherokee County. It is secretive in habits, living under logs, leaves, and in the ground. It is a very small lizard with an elongated cylindrical body covered with 28 to 34 rows of slick scales. The tail is as long and nearly as large at its base as the body. The limbs are very small, the animal moving partly by wriggling in serpent fashion. In shape and color it resembles one of the smaller salamanders.

This lizard is olive-brown in color, sometimes irregularly spotted, with a black band edged with white on each side of the body. The abdomen is yellow. The tail is blue beneath. It has a very large exposed ear opening. The palate is toothless. The lower eyelid is covered with a transparent disk. The total length of the animal is about 3 inches.

This skink feeds upon ants and their pupae and the grubs of wood-boring beetles. Its color does not protect it from the young king snake, its principal enemy. This is an ovoviviparous species.

ORDER SERPENTES (OPHIDIA)

THE SNAKES

Snakes are reptiles with elongated bodies, without limbs in most species, and covered with horny, imbricated scales that are devoid of cores. The outer skin is shed in one piece several times each year. The ventral scales are usually broad, band-like plates called gastrosteges or scutes, which are attached at their ends to the ribs and point backwards. When erect these scutes enable the snakes to crawl forward. This method of locomotion is employed in climbing trees, rocks or cliffs. The method of locomotion used by snakes to gain speed is by lateral undulations of the body.

The skeletal system may contain in some snakes, as many as 400 vertebrae and about as many ribs. The vertebrae are procoelus and give the snake great flexibility. All of the vertebrae in front of the anus, except the atlas, bear ribs, and those back of the anus, the caudal vertebrae, have long transverse processes. The limbs and the pectoral and pelvic girdles are absent in most of the species.

Snakes are able, because of the unusual structure of the head, to swallow animals with bodies 5 times the diameter of the neck of the snake. This is made possible because the jaws are connected with each other by elastic ligaments, and by the quadrate bone being loosely articulated with the squamosal bone of the cranium. The jaws bear acrodont teeth, which means that the teeth are not set in alveoli, but are ankylosed to the jaw bone by the base of the teeth. They

are recurved to prevent the escape of the prey and to force the food into the pharynx. When a snake is swallowing its prey the glottis is pulled forward so the snake will be able to breathe.

The long forked tongue is protractile and is an important tactile organ. It is highly sensitive to vibrations and is thought to be an important organ of hearing. A snake can extend the tongue while the jaws are closed, because of a groove in the front part of the jaws.

The sense of hearing is rather poorly developed, there being no tympanum or external ear opening. The columella of the ear has a fibrous pad at the outer end which plays against the quadrate bone so that when this bone is pulled away from the skull, as in swallowing, the columella must be dislocated.

The eyes of snakes have no movable lids. The eyelids have fused over the eyes effecting a watch-glass-shaped membrane which is transparent and is shed when the rest of the skin is molted. The transparent covering of the eye becomes opaque just before shedding the skin and the snake is blind during the days preceding the molt.

The anus of snakes is a transverse slit. The ventral plate covering the anus is often divided. The ventral plates under the tail are called sub-caudals or urosteges.

The copulatory organ of the male is usually covered with recurved hooks and spines which insures prolonged copulation in spite of the writhing of the two bodies.

Most of the snakes are oviparous but a few are ovoviviparous. The eggs in the oviparous species are usually elongated or cylindrical, and covered with a leathery shell. They absorb moisture after oviposition and become at least a third larger before they hatch than at the time they were laid.

The snakes show a higher development than any of the other reptiles, although they show degeneracy in the loss of limbs which remain as vestiges in certain species such as the python. Snakes are closely related to the lizards, and were formerly listed with them under the order squamata. Some of the reasons for separating the two groups are that the snakes do not have the halves of the lower jaws firmly united; they lack a pectoral girdle; they lack a urinary bladder; their brain case does not open anteriorly, and they lack legs.

There are two families of snakes in Cherokee County with a total of 12 genera and 23 species represented. In habits some of them are aquatic, some are arboreal, and some are sub-terrestrial, but the larger number are strictly terrestrial.

Family Colubridae

Colubrine Snakes

The snakes of this family have a single row of ventrals, usually a double row of sub-caudals, and are without rudimentary hind limbs. The top of the head is covered with symmetrical plates. The jaws have many conical, ungrooved

teeth, but are without poison fangs in the front part of the mouth. The eyes are well developed. This family is represented in Cherokee County by 10 genera and 20 species.

Thamnophis

Garter Snakes; Striped Snakes.

The garter snakes are rather small, slender snakes with a distinct head and keeled scales in 17 to 23 rows. There are from 130 to 180 ventrals or abdominal scutes and 7 or 8 labial plates. There are three narrow, yellow, longitudinal stripes upon a gray, brown or black background.

These snakes are semi-aquatic, inhabiting the ponds, lakes, streams, and sloughs of Cherokee County, but often wander far from water in search of food. They feed upon worms when young, but when mature they vary their diet with frogs, toads, fish, and other cold blooded animals.

All of these snakes are ovoviviparous, bringing forth in the month of August, litters varying in numbers from eight to fifty, the average being about twenty. The young are mature when a year old and breed the second spring after birth.

The garter snakes congregate in the fall of the year, in places that afford opportunity for hibernation, such as the sunny, south slopes of hills. During the fall days they bask in the sun and at night they crawl into clefts or burrows. After the first frost they retire for the winter into burrows or dens to a depth of two or three feet. They are among the first snakes to appear in the spring, coming

out early in March. They may often be seen basking in the sun before all the snow has melted. As soon as it is safe for them to leave the hibernating grounds they start crawling over the ground in search of food, and move to the sloughs, streams, and ponds.

In captivity the garter snake will frequently swallow two fair sized leopard frogs for a meal, and will usually eat every two or three days. When the snake catches its prey by the leg, it works its mouth around to the head before commencing to swallow. The prey is eaten alive.

There seems to have been a great decrease in these snakes during the last three years. At one time the garter snakes were the most common serpents in the county, but now it is only occasionally seen. This probably is due to the extreme droughts experienced in the county during the last three years, which may have reduced its food supply. This group of snakes is of questionable importance to the agriculturists, since their food supply is composed largely of animals known to be beneficial to the farmer. There are three species of garter snakes in the county.

Thamnophis sirtalis

Common Garter Snake.

The common garter snake is extremely variable in color pattern. It is quite stout, except in young specimens. It is olive, brown, or greenish-black with a dorsal yellowish-green or whitish stripe, which covers the central row of scales and half a row on each side. The dorsal stripe is

more vivid in color than the stripes on the sides of the body. The lateral stripes cover the second and third scale rows. There are several series of black spots between the lateral rows, which in some cases become almost indistinct. The belly is greenish-white or greenish-yellow.

The maximum length of this serpent is about three feet with a tail about five inches long. The largest specimen obtained measured 23 inches in length, had a tail 4 inches long, and a diameter of 0.50 inches.

Thamnophis sirtalis parietalis

Red-barred Garter Snake.

This species is like *T. sirtalis* except that it is light-brown with a series of vertical red bars on each side, and the belly is a slate color. The yellow stripes are the same as in *T. sirtalis*. In size, feeding and breeding habits, these two serpents are alike. The color pattern of this variety is more attractive than it is in *Thamnophis sirtalis*.

Thamnophis sauritus proximus

Western Ribbon Snake.

The western ribbon snake has a very slender body with stripes that are very bright in color. The dorsal stripe is an orange-yellow and the lateral stripes are a greenish-yellow. Beneath each lateral stripe there is a dark-brown or black band which covers the first and second rows of scales. The abdomen is immaculate greenish-white.

The maximum size usually attained by this snake is about 2.50 feet with a tail of 9 inches. The largest specimen found was 21 inches long, had a tail 5 inches long, and was

0.37 inches in diameter.

The western ribbon snake is often found around small ponds in meadows and shallow, temporary pools where there is much herbaceous vegetation. Its food is principally the leopard frog.

Natrix (Tropidonotus)

The Water Snakes.

The water snakes are thick-bodied, non-poisonous serpents with a distinct head. They have coarsely keeled scales in 19 to 33 rows, and from 120 to 160 ventrals. The usual color is brown. None of the species in the county is highly colored. They all emit a disagreeable odor when disturbed.

The water snakes are common aquatic serpents which inhabit ponds, lakes, and streams of the county, getting both food and protection from the water. They feed upon frogs, fish, and other cold blooded animals. The author examined the stomachs of several specimens and found from one to three partly digested catfish, and one to two perch or frogs in each, the greater number being catfish. Occasionally a water snake is found with an eight or ten inch catfish in its mouth with the pectoral fins of the fish protruding through the sides of the snake's neck. These snakes congregate in small holes of water during dry weather where they gorge themselves on fish which are helpless in shallow water.

The water snakes do most of their feeding during the night or early morning, and then crawl out on the bank, a

pile of brush or a limb to sun themselves and digest their meal. At this time the snakes are rather sluggish in action, but after the meal is digested they become quite alert and active. The water snakes destroy as many fish and amphibians as do the snapping turtles.

Horse Shoe Lake near Oswego is one of the places in the county most heavily infested with water snakes. The author found along 300 yards of east shore front during the month of May an average of one snake for every 3 feet of shore line. Many specimens were killed by waiting quietly until they swam out into the water and shooting them as they protruded their heads to breathe.

Water snakes breed in the latter part of May. At this time a dozen or more specimens may be found coiled together. All of them are ovoviviparous. The litters of eight to fifty young are born in August or September. One medium sized female was killed on Cherry Creek in August which had 8 young in her brood pouch.

The water snakes leave the water in the fall to hibernate in holes and crevices, usually a safe distance above high water level. They become active again in March or early April. When a bridge was built across Spring River during the winter of 1934 a great many specimens were found under rocks or in dens, often fifty yards or more from the water. Three species of water snakes have been found in the county.

Natrix sipedon sipedon

Common Water Snake.

The common water snake is brown with 30 or 40 yellowish or reddish, often indistinct, transverse bars which widen on the sides and become alternating blotches posteriorly. The belly is yellowish or white with or without many half-moon-shaped, red or black spots. The scales are in 23 or 25 rows and there are from 135 to 145 ventral plates.

This species varies greatly in both the dorsal and ventral coloration. One specimen was beautifully colored beneath with bright red and black spots, separated on the ventral-median line by a white stripe. Most of the adult specimens taken were a yellowish-brown crossed by a great many lighter transverse bands edged in black. The transverse bands are often indistinct in older specimens, but usually show just after shedding.

This species attains a length of over three feet. The largest specimen obtained measured 35 inches in length, 1.5 inches in diameter, and had a tail 7 inches long.

Natrix rhombifera

Diamond-backed Water Snake.

The diamond-backed water snake is a large, stout-bodied serpent with a stubby tail, very distinct head, about 50 dorsal rhomboidal blotches, and scales in about 27 rows. The color is dark-brown with a chain of black markings down the back, enclosing diamond-shaped areas of the ground color. A band of black about two scales wide extends from the lower

angle of each diamond down the side of the body. The abdomen is yellow or whitish, with many half-moon-shaped blotches on the ends of each scute.

The lip plates are protruding and swollen, which gives this serpent a ferocious look. The tail is often so stubby that it appears to have been broken off. The eyes are well forward and are in contact with the upper labials. The head may be much flattened. It is vicious acting and cannot be tamed, although it learns readily, when in captivity, to eat fish. It catches fish by swimming after them with its mouth open, or waiting until a feeding fish comes near. The fish is swallowed head first.

Natrix grahami

Graham's Water Snake.

This is the only longitudinally striped water snake in the county. It is brown with a pale-brown dorsal band bordered on each side by two narrow black streaks. On the first three rows of scales on each side of the body is a yellow or straw-colored stripe bordered on its lower portion by a black stripe. The abdomen is white or yellowish with a darker stripe on its central portion.

This is a smaller species than the other two mentioned, the maximum length seldom reaching three feet. The largest specimen obtained measured 23 inches in length, with a tail of 4.75 inches, and a diameter of 0.58 inches.

A pair of breeding snakes was found on the shore of Horse Shoe Lake on May 28. One specimen was killed as it

sunned itself on the banks of Four-mile Creek near the Oklahoma line. This snake is not often found in the county.

Lampropeltis (*Ophibolus*)

The King Snakes.

The king snakes are medium sized, moderately stout-bodied snakes with small indistinct heads. They are non-venomous powerful constrictors. They have smooth scales in 19 to 27 rows. These snakes often are brightly colored, the colors usually arranged in transverse bands. They are terrestrial snakes feeding upon worms, rodents, birds, and other snakes. They feed upon venomous as well as non-venomous snakes being immune to snake venom. The king snakes are harmless looking serpents and are gentle in their actions toward man, but are pugnaciously inclined toward other species of snakes. They may live for many years in captivity. There are three species of king snakes in Cherokee County.

Lampropeltis calligaster

Blotched King Snake; Yellow-bellied King Snake; "Milk Snake"; "Queen Snake".

The blotched king snake is the most common terrestrial snake in Cherokee County. It is a stout-bodied serpent which attains a length of four feet or more. It is gray or light-brown with a series of dark-brown blotches on the back which are 8 or 10 scales wide and 2 or 3 scales long, and bordered faintly with black. There is a smaller alternating row of blotches on the sides, and a yet smaller row at the edges of the abdominal plates. The abdomen is

yellowish, usually with square black blotches in the center. The anterior dorsal blotch is elongated and unites on top of the head. In the center of the head is an arrow-shaped blotch. The scales are in 25 rows.

The largest specimen obtained measured 48 inches in length, had a diameter of 1.50 inches, and a tail 7 inches in length.

These snakes are found in large numbers during the threshing season under shocks of grain. It is an excellent mouser and when kept in captivity will eat either young or mature mice, or young birds, but it is not inclined to cannibalism. The author had a rather unique experience, however, with two snakes of this species. Several had been kept in captivity all winter. In January a mouse was placed in the cage and one blotched king snake started to eat it. A smaller specimen challenged its right to the mouse and a battle ensued, which resulted in the smaller snake being swallowed by the larger one (Plate I, appendix). The victor was only 8 inches longer than the vanquished snake.

This snake is at home throughout the county, in meadows, pastures, fields, and woods, but is more abundant in fields and sparsely wooded sections. It is able to follow the burrows of field mice and other rodents, and destroys large numbers of them each season. It is one of the most valuable serpents to the farmer and is without any serious objectionable habits.

Lampropeltis getulus holbrooki

Say's King Snake; Salt and Pepper Snake.

Say's king snake attains a length of three feet or more. It is stouter and more cylindrical than most snakes, not tapering gradually, but maintaining a more or less uniform thickness for a greater portion of its body. The head is almost indistinct from the body. It varies in color, but the usual phase is black with a pale-green, a yellowish-green, or a greenish-white spot in the center of each scale. The abdomen is yellow with large black blotches. The scales are in 21 rows, and there are 7 upper labials.

Only four specimens of this species have been found in the county, but they were from diverse sections which indicates a wide distribution. The largest specimen is 34 inches long, 1.25 inches in diameter, and has a tail 6 inches long.

While kept in captivity this snake did not show any interest in food, as both mice and snakes were available. This variety is less cannibalistic than the type species, *L. getulus*, yet it will occasionally eat other snakes. It is a constrictor and kills a snake by grasping it by the head and strangling it by wrapping around it tightly. Even when the snake killed is larger than itself it attempts to swallow it.

Lampropeltis triangulum gentilis

Red King Snake; Ringed King Snake.

The red king snake is rarely seen in this section. It is a medium sized snake with 25 to 40 dull red bands above,

broadly bordered with black which encircles the body as a pair of rings. Between the rings is a narrow area of yellow. Usually the entire top of the head is black except the tip of the snout. This is an extremely variable variety and any description given would not fit all specimens taken. It is much like the other king snakes in habits.

Carpophis amoenus

Worm Snake; Ground Snake.

The worm snake is a very small, stout-bodied, non-venomous serpent with smooth, opalescent scales in 13 rows. The head is very small, indistinct from the neck, and has a pointed snout. The eyes are very small and there are no preocular scales, but there are distinct internasal and prefrontal scales. There are from 120 to 131 ventral plates. Adult specimens are a glossy chestnut-brown above and salmon-red on the belly. Younger specimens are usually much darker than the adult, changing the second year to the lighter brown of the adult.

The total length of an adult specimen is about 10 inches, with a diameter of $1/4$ inch. The largest specimen obtained measures 7 inches in length, 0.20 inches in diameter, and has a tail 1.4 inches long.

The worm snake is a burrowing serpent and is seldom seen, even in sections where it is quite common. It may often be plowed up when tilling bottom land and is often found under decaying vegetation or logs in timbered regions. It may be found, after hard rains, wandering over leaves or

the wet ground.

This snake feeds upon earthworms and soft-bodied grubs of insects. The immature specimens feed largely on the pupae of ants. It is mild tempered at all times.

This species is oviparous, laying from 4 to 8 elongated, soft eggs during the latter part of July or the first part of August. The freshly hatched young are about three and one-half inches long and about one-eighth inch in diameter.

Diadophis punctatus

Ring-necked Snake.

The ring-necked snake is a small, slender-bodied serpent with a flat head which is only slightly distinct from the neck, and with smooth glossy scales in 15 or 17 rows. The color varies from dark-gray to blue-black above and is bright orange beneath, except for 2 or 3 rows of black spots on the ventral plates. The underside of the tail is often a brilliant coral-red. It has an orange-red, or reddish-yellow ring, about two scales wide, around the neck. There are about 155 ventral, one loreal, 2 or 3 preocular, and one anterior temporal plates.

Its maximum length is around 14 inches. The largest specimen found is 6 inches in length, 0.15 inches in diameter, and has a 1.5 inch tail.

The ring-necked snake is secretive in habit, hiding under rotting wood, or flat stones, and seldom wanders about except at night. It may often be found under loose bark on a dead tree, and seems to prefer a tree infested with ants.

It is largely carnivorous in diet, eating earthworms and the smaller species of salamanders, lizards and snakes.

This serpent is between the oviparous and the ovoviviparous species in breeding habits. The eggs are elongate, covered by a very thin integument, contain large embryos when deposited, and hatch in about half the time required for the eggs of most serpents to hatch. This snake is quite common in the rocky, wooded country in the southeastern corner of the county.

Opheodrys (Cyclophis) aestivus

Green Tree Snake; Rough-Green Snake;

Green Whip Snake; Magnolia Snake.

The green tree snake is a small, slender serpent with a long, gradually tapering tail. It is a uniform bright-green above and yellowish beneath. The under color extends to the upper and lower labials. It has keeled scales in 17 rows and from 154 to 163 ventral plates. The head is rather indistinct from the neck and has a loreal, preocular, 2 internasal and 7 upper labial plates.

The maximum length reached by this snake is nearly 3 feet. The largest specimen found was 31 inches in length, 0.37 inches in diameter and had a 12 inch tail.

This snake is distinctly arboreal in habits, frequenting bushes and low trees. It is strictly insectivorous feeding upon crickets, grasshoppers, and smaller insects. It is harmless, inoffensive, and a benefit to the farmer. It is inclined to fast when in captivity. When crawling about in search of insects it protrudes the pale, flesh-colored

tongue rigidly from the mouth, without spreading the forked tips.

This green snake is a common resident of Cherokee County, being found in smaller woody plants along the rivers, creeks, roadsides, and in pastures. It is so excellently protected by its leaf-green color that it is not often seen. It may frequently be located by vigorously shaking shrubbery and then watching for the movements of the serpent.

Liopeltis vernalis

Smooth-scaled Green Snake; Green Grass Snake.

This is a shorter, but stouter bodied serpent than the keeled-scaled green snake, and differs from it in having smooth, satiny-lustered scales in 15 rows, instead of rough keeled scales in 17 rows, and is whitish beneath rather than yellowish. The head is elongate, with large eyes, 7 upper labial, a loreal, 2 preocular, and one anterior temporal plates. The ventral plates number about 135 with the anal plate divided.

A fully mature specimen measures nearly two feet, but an average sized specimen is 15 inches in length, with a diameter of 1/4 inch, and a tail 5 inches long.

Liopeltis vernalis is rarely found in Cherokee County. It is less arboreal in habits than the green tree snake. It frequents the grasses and low shrubs, where it crawls about in search of food. It is strictly insectivorous in its feeding habits eating spiders, grasshoppers, crickets, and the larvae of lepidoptera and coleoptera. It spends the nights under stones or in other protected places. It is a gentle

and inoffensive reptile and is beneficial to the agriculturist. It does not fast when kept in captivity, readily eating caterpillars.

This serpent is oviparous, laying from four to twelve eggs in July or August, under a flat stone or other protected area at the edge of a meadow. The eggs are elongated and covered with a thin flexible membrane, and often adhere in pairs. The young snakes hatch in the latter part of August or early September. They are over four inches long and are a dark-olive above and a greenish-white beneath.

Coluber

Black Snakes, Racers, and Whip Snakes.

These snakes are large non-venomous serpents with head distinct from the neck, smooth scales in 15 or 17 rows, and 7 or 8 upper labial plates. They are terrestrial and arboreal animals. They do not constrict their prey but often kill it by pressing it against the ground.

Coluber constrictor flaviventris

Blue Racer; Black Snake,

The blue racer is a variety of the common black snake of the eastern part of the United States. It differs from the black snake in being more slender and smaller in size. It is greenish-blue or a dark-olive above, and yellow on the belly, throat and chin. It has smooth scales in 17 rows, 7 or 8 upper labial, one loreal, 2 or 3 preocular, 2 or 3 anterior temporal, and about 180 ventral plates.

The maximum length reached by a mature specimen is about 4.5 feet. The largest specimen found is 42 inches

long, one inch in diameter, and has a tail 10 inches long.

The blue racer is a terrestrial animal frequenting meadows and fields. It is often found at the edge of a meadow or uncultivated field where it can retreat into weeds or brush for protection when needed. The snake gets the name of "racer" from the speed it displays in crawling to safety when approached. If it is cornered or held against its will it becomes very fierce. A young specimen bites viciously and is not easily tamed. The adult soon gets used to captivity and learns to eat regularly.

This serpent feeds upon mice and other small rodents, young or mature birds and their eggs, and possibly other snakes. It is frequently found under shocks of grain or other places inhabited by mice.

It is an oviparous species, depositing from one to two dozen eggs during the month of June or July. The eggs are frequently hidden under stones, on sunny banks, or in soft moist soil. The eggs are snow-white, elongated, cylindrical, and are 1 $\frac{3}{4}$ inches long and about $\frac{5}{8}$ inches in diameter. They are covered with a tough, leathery shell, which has a smooth, satiny surface sprinkled with what appears to be grains of salt. The eggs hatch the latter part of August. The young are about 8 inches long when hatched, and look like the adult in color. At three weeks of age a young specimen is a pale-gray above and whitish on the sides, with a series of large, grayish-brown saddles on the back, which are larger on the forward portion of the body, and

become narrower and indistinct towards the tail. The anterior third of the body on the sides and the abdominal scutes, is speckled with black. A young specimen about two feet long is gray in color with dorsal transverse bars and lateral spots. The animal matures in three years, when it takes the color of the adult.

Coluber flagellum flagellum

Whip Snake.

The whip snake is a non-venomous serpent with a very slender body and a very long tail. The color is yellowish-brown or dark-brown and is darker anteriorly. The abdomen is white or yellowish. It has about 190 ventral plates. The young animals have dorsal blotches.

A fully mature specimen is nearly 8 feet long. The largest specimen obtained measured 78 inches in length, 1.12 inches in diameter, and had a tail 19 inches long.

The feeding and breeding habits are the same as for the blue racer. This snake is not common in Cherokee County. Two specimens were found near Spring River.

Elaphe

The Rat or Coluber Snakes.

The rat snakes are large, rather stout-bodied, non-venomous snakes with a flat, blunt head. The scales, which are weakly keeled dorsally and smooth laterally, are in 25 to 33 rows. There are from 180 to 210 ventral, a loreal, a preocular, 2 postocular, and 2 internasal plates. The abdomen is flattened so that the crawling surface forms almost right angles with the sides.

These snakes are oviparous, laying about two dozen eggs in June or July. The eggs which are white, about 2 inches long and $7/8$ inches in diameter, and covered with an elastic membrane, are hatched in August or September. This genus is represented in Cherokee County by two species.

Elaphe obsoleta obsoleta

The Pilot Black Snake

The pilot black snake varies greatly in coloration. Some specimens are solid, lustrous black above, while others are black with wide margins of red or white on the dorsal and lateral scales with dark dorsal blotches. The abdomen is black or a mottled black. The upper lip plates, chin, and throat are immaculate-white in all specimens.

The pilot black snake is common throughout the county and except for the bull snake, is the largest serpent to be found here. It may occasionally reach a length of 7 feet but a six foot specimen is seldom found. The largest specimen found is 51 inches in length, 1.25 inches in diameter, and has a tail 8.50 inches long.

This snake frequents rocky cliffs, sandy or rocky embankments and wooded streams, where it crawls about among low bushes and trees or on the ground in search of food. When approached it seeks refuge in dens or crevices under rocks or tree roots. It may often be seen sunning itself on rocks, dead brush piles, or limbs. One specimen was found sunning itself on some dead brush which had been thrown over an old rock-walled well. Three specimens were found in holes along creek or river banks.

This snake feeds upon amphibians, birds, mammals, other reptiles, insects, and the eggs of birds. It is frequently found around barns and granaries where mice and rats are abundant.

It is a vicious acting snake when first handled but soon learns to be quite passive in its manner. Among a number of specimens kept in captivity the author had one which remained vicious and never missed an opportunity to strike when approached.

Elaphe loeta

Emory's Coluber; Spotted Chicken Snake.

Emory's coluber is a gray serpent with a series of 39 to 48 dorsal transverse brown blotches separated by intervals of one or two scales, and alternating with two more or less distinct smaller series on each side. The abdomen is yellowish-white, with dull gray blotches, and has from 211 to 222 ventral plates. A dark band extends from behind the eye past the angle of the mouth to the neck. Another dark bar extends across the head in front of the eyes. Two elongated blotches run from the back portion of the head to the neck. The maximum length reached is about four feet. An average sized specimen has a length of 3 feet, a diameter of $7/8$ inches, and a tail 5 inches long.

This snake is rarely found in the county. It is good climber and may crawl about in bushes seeking bird nests so as to devour the eggs or young. It may often be found in holes in the ground, or in old barns or granaries where rats

and mice are abundant, and if young chickens or eggs are available it will feed on them. It is less addicted to the chicken eating habit than some of the other members of the genus.

Pituophis sayi

Bull Snake; Yellow Gopher Snake.

The bull snake is a very large, stout-bodied, non-poisonous serpent with a long pointed head. The scales are in 25 to 29 rows, the dorsal ones being keeled and the lateral ones smooth. There are 8 or 9 upper labial and about 215 ventral plates, and the anal plate is single. There is a peculiar epiglottis-like membrane in front of the glottis which vibrates when the snake expells air against it, and produces a loud hissing sound, which may be heard 50 feet or more. The ground color is a rich, orange-yellow or a reddish-yellow, with a row of large, square blotches of dark reddish-brown or black on the back, and a series of smaller blotches of a lighter shade along the side. The head is dark yellow with a brown or black band across the top in front of the eyes. Another band extends from the eye to the angle of the mouth. The labial plates are bordered with black. The abdomen is yellow with a series of dark blotches on each side.

The bull snake is the largest American serpent, mature specimens being 9 feet in length. The largest specimen found was 66 inches long, with a diameter of 2 inches, and a tail 8 inches long.

This powerful constrictor snake feeds upon rodents, birds, and bird eggs. An adult specimen is able to eat as many as 6 eggs of a chicken at a meal. The eggs are swallowed and broken before they go into the stomach, either by contractions of the muscles of the pharynx, or by wrapping around a post or limb and squeezing them. It is a terrestrial snake frequenting meadows, pastures, and sparsely wooded areas. It is partly arboreal, being a fair climber. It is able to get to the nests of birds and accomplish the destruction of either eggs or young.

This animal is a favorite with showmen because of its docile nature and ease with which it may be kept. It is one of the most common serpents in the county, being found everywhere.

Heterodon contortrix (platyrhinus)

Common Hog-nosed Snake; Puff Adder; Spreading Adder; Spreading Viper; Blowing Viper.

The hog-nosed snake is a moderate sized, thick-bodied non-poisonous serpent with a stubby tail and scales in 25 rows. The scales are keeled above and smooth on the first three rows. There are about 140 ventral plates and a double anal plate. The head is flat, with a broad up-turned rostral plate or snout, and an extra plate, called the azygous, back of the nostrils.

The body is brown or reddish brown in color, with from 20 to 30 dark-brown or black dorsal blotches between the head and tail, and a series of similar patches on each side alternating irregularly with them. On the tail the blotches

tend to form rings around the body. The belly is yellowish with the edges of the ventral plates blotched with black. A melanistic variety occurs which is plain black. Specimens show considerable variation in colors, some having more red and others having more yellow in their markings.

An adult specimen may reach a length of 3 feet. Two mature specimens from near Lawton averaged 26 inches in length, 1.25 inches in diameter, and have a tail 5 inches long.

The hog-nosed snake lives in dry sandy places, where it flattens itself and basks in the sun. It is able to root in the ground very much like a hog. Its food consists largely of toads, but it may vary its diet with insects.

When alarmed this snake flattens its neck to about three times the normal width and hisses loudly. This action and the formidable looking head instills fear into most animals. If this bluff fails to drive off an enemy the snake feigns death, often turning over on its back and opening its mouth widely as if it were having a convulsion. As soon as danger is passed it turns over and glides away as rapidly as its clumsy body will allow.

This snake is oviparous, depositing about two dozen eggs during the latter part of July. The eggs are elongated and covered with a white leathery shell. They adhere to each other producing a cluster. They become about a third larger and much more spherical before they hatch.

This snake is one of the most feared serpents, yet it is entirely harmless and is easily tamed. When kept in

captivity it readily eats toads. The author saw a one foot specimen swallow a toad fully five times the diameter of its own body.

Opisthoglyph Snakes

The opisthoglyph snakes form a division of the family Colubridae, but are readily separated from the other members of the family by the presence of a pair, or several pairs, of grooved fangs in the rear of the upper jaw, which connect with poison glands in the rear portion of the head. The snake uses these fangs to kill its prey, the venom flowing into the wounds made by the fangs as the serpent holds its prey. The fangs are not used as much in self defense as is the case with the elapine and viperine snakes. On the whole the opisthoglyph snakes are timid and attempt to get away from danger rather than showing fight. There is only one opisthoglyph snake in Cherokee County.

Sonora semiannulata

Sonoran Snake.

The sonoran snake is a small, slender-bodied, poisonous serpent with smooth scales in 13 or 15 rows, and one loreal, one preocular, 7 upper labial, and about 160 ventral plates. It has rear, elongated, grooved, maxillary teeth for injecting venom. The color is ashen or pink, crossed by about 17 to 40 black half-rings, the usual number being about 20. The belly is white or greenish-white.

The length of an adult specimen is about 9 inches. One specimen measured 8 inches in length, 0.25 inches in

diameter, and had a tail 1.50 inches long.

This snake is rarely seen in Cherokee County, which may be due to the small size of the serpent. It is too small to cause serious injury to man.

FAMILY CROTALIDAE

Pit Vipers; Rattlesnakes and Copperheads.

The Crotalidae are stout-bodied, slender-necked, venomous serpents with large, flat, triangular-shaped heads. The upper jaw is without solid teeth, but is provided with one or more long, erectile, perforated, poison fangs on each side in front. These fangs lie against the roof of the mouth when not in use, but are erected and directed forward when the animal strikes. The fangs resemble a hypodermic needle in structure and are covered with a sheath of thin, white, membranous flesh which is never withdrawn from them except in the act of biting. The fangs are shed at intervals of about three months. The new fang grows in beside the old one, and the poison gland becomes connected with it before the old one is shed.

The vipers have a deep pit between the eye and nostril which extends into the excavated maxillary, and an elliptical, vertically-placed pupil in the eye. The scales are keeled and the anal plate and the anterior sub-caudals are undivided.

The function of the pit is unknown, but it is thought to be a receptor organ for a sixth sense. The pit extends backwards toward the eye and widens into a second opening close to the eyeball. The pit is lined with a delicate epidermis, and a well-developed nerve leads from the pit to

the brain.

A new-born pit viper is not venomous, but its gland is abnormally large. The venom develops sometime during the first week after birth. A pit viper usually strikes one-third its length but if it is unusually angry, it may strike two-thirds of its body length.

In most of the species of pit vipers the tail ends in a rattle, which is composed of horny rings made up of the molted skin. It is an unusual structure and probably is an adaptation to enable the viper to startle its prey and cause it to halt momentarily, allowing the serpent to strike and inject the venom. A rattler is occasionally found with from 10 to 14 rattles, but the usual number is five or six. The age of the rattler cannot be determined by the number of rattles. The number formed depends on the number of times the snake molts each year. The snake molts two or three times a year and rattles are frequently lost.

The pitch of the rattle depends upon its natural resonance, and is usually between C and C#, or 128 to 135 vibrations per second. The average time of 53 consecutive vibrations of the tail is about 10 seconds.

Agkistrodon mokasen mokasen

(Ancistrodon piscivorous)

Copperhead; Highland Moccasin.

The copperhead is a medium-sized, venomous serpent. It has strongly keeled scales in 23 or 25 rows and from 130 to 150 ventrals, with the anal and most of the sub-caudal plates undivided. The head is covered with 9 symmetrical plates and there are 8 upper labial and one

loreal plate.

The body is hazel brown above, with from 15 to 25 rich chestnut, transverse bands which are narrow on top and very broad at the sides. The head is a copper color. The belly is whitish with a series of large, dark spots on each side. The lips are of a lighter shade than the top of the head, the line of separation running from the eye to the angle of the mouth. The tongue is usually red at the base and whitish at the forked portions.

The largest copperheads may slightly exceed three feet in length. The largest specimen obtained is 23 inches long, one inch in diameter, and has a tail 4 inches long.

There are a few sections of the country where this viper is far more common than the author ever suspected. A crew of men on a road project in the wooded, rocky, sparsely settled country in the extreme southeastern corner of the county has killed a large number of copperheads during the month of May and June. In its work the crew has covered a strip of timber about 100 yards wide and one and one-half miles long. Copperheads are frequently found on Spring River directly east of Columbus. Several were killed when a bridge was constructed across the river on Kansas Highway 96 in the winter of 1934.

The copperhead frequents rocky ledges or open rocky timber land. It often does not bite unless disturbed. One small specimen was found after several boys had nearly stepped on it as it lay in a path. It will attempt to reach refuge if any is near, but usually keeps its head up ready

to strike if any attempt is made to harm it.

This viper feeds upon mice and other small rodents, birds, frogs, and reptiles. The fangs are employed to kill its prey, which may then be swallowed without a struggle. The stomach contents of two medium sized specimens examined had the remains of two mice in each.

This serpent is an ovoviviparous reptile, giving birth to about 6 to 9 young in the month of August. The young are about 10 inches long when born and have brilliant sulphur-yellow tails which fade the second year and disappear entirely the third year.

Crotalus

The Rattlesnakes.

There are two species of rattlesnakes in the county. These pit vipers differ from the copperhead in having a larger, stouter body, a rattle on the tip of the tail, scales in 23 to 31 rows, 10 to 16 upper labials, and small plates between and in front of the eyes. It has about 175 ventral plates.

Crotalus horridus

Common Rattlesnake; Timber Rattler;

Velvet Tail.

There are two color phases of this rattlesnake. The more common one, and the only one found in Cherokee County, has a sulphur-yellow ground color with about 21 wide dark-brown or black, dorsal cross bands which are wavy or sharply pointed in the rear. They are usually broken into three

chevron-shaped blotches anteriorly, but are united with the lateral spots posteriorly to form zig-zag bands. The tail is black in adults, but banded in the young. Most of the specimens have a rusty red line about three scales wide extending from the base of the head to the base of the tail on the median dorsal surface. The melanistic phase is dark-olive or black, and the dorsal and lateral blotches show very indistinctly, if at all. It has from 167 to 178 ventral plates and 23 to 25 rows of scales.

A mature specimen may reach a length of four feet or more and a diameter of 1 1/2 inches. The largest specimen found was 28 inches in length, 1.30 inches in diameter, and has a tail of 3 inches including five rattles.

The rattler is not common in Cherokee County, yet specimens are occasionally killed on Spring River and Neosho River. One specimen was killed on Brush Creek and another one on Cherry Creek. It frequents rocky ledges and ravines where an abundance of refuges may be found. The so-called "snake dens" are merely crevices which open into cliffs and provide warm hibernating quarters for the winter. The rattlesnakes gather around these dens in the fall before crawling into the cliffs for the winter. They may be seen there again in the spring when they first emerge and during the subsequent breeding season.

This snake feeds upon rodents, birds, amphibians, and smaller reptiles. It is ovoviviparous, giving birth in August or September to a litter of 6 to 12 young which are about a foot long at birth.

Crotalus confluentus confluentus

Prairie Rattler.

The prairie rattler is a rather slender bodied, yellowish-brown or greenish viper with about 40 irregularly rounded white-bordered, brown blotches on the dorsal surface and a pale band from the center of the eye to the angle of the mouth. The belly is dull yellowish and the tail is cross banded. The scales are in 25 to 29 rows and there are from 168 to 197 ventral plates. The maximum length reached by this rattler is slightly over 3 feet.

This viper inhabits the pastures and meadows and often takes refuge in the holes of other animals. It feeds upon the young and adult of rodents such as the ground squirrel, rabbits, mice, and rats. It is ovoviviparous having litters of 6 to 12 young in August.

This dangerous serpent is practically exterminated in Cherokee County. The haying and harvesting crews have left few refuges in the county that are favorable for it.

SUMMARY

The study of the reptiles of Cherokee County indicated that there are three orders of reptiles which are distributed among 10 families, 28 genera and 38 species. Eight of the species are turtles, 7 species are lizards, and 23 species are snakes.

Cherokee County contains favorable habitats for all reptiles except the strictly desert species. The rivers, creeks, lakes, and ponds provide a permanent supply of water for the aquatic species of turtles and snakes. The rich bottom land is loose, fertile, has debris, leaf mold, and a rank growth of plants, which provides shelter for animals. Roadsides, pastures, fields, meadows, and banks along the small and large streams are well covered with herbaceous and woody vegetation which provides protected refuges for animal life and is a source of food for many. Some of the elevated areas are more sparsely covered than others and are semi-arid.

The aquatic vegetation is largely algae, arrowhead, duckweed, cat-tail, and water lilies. The semi-aquatic vegetation is largely rushes, reeds, willows, button willows, and birches. The vegetation of the bottom land is oak, elm, sycamore, walnut, hickory, dogwood, plum, ash, and other trees. The roadside vegetation is osage orange, wild cherry, blackberry, sumac, sunflower, goldenrod, rag weed, spanish needle, and grasses. The meadows and pastures are covered with red top, blue grass, meadow fescue, thistle, rosin weed, and indigo. The pastures may also be overgrown with sumac,

blackberry, osage orange, plum, persimmon, hawthorne, and other trees and shrubs. The semi-arid sections are covered with scrub oak, persimmon, hawthorne, blackberry, sumac, and orchard grass.

The reptiles that are seen most often are those which inhabit the cultivated fields, meadows, roadsides, streams, and other protected areas. The bull snake, blue racer, blotched king snake, and two species of box turtles are often observed in the fields and pastures. The striped race runners, green snakes, and black snakes are often seen in the pastures or waste lands. The water snakes, garter snakes, and water turtles are often seen in the creeks, rivers, and ponds. The burrowing species, such as the small burrowing snakes and lizards, are seldom seen.

The species with the widest habitat distribution is the garter snake. The species that are most often seen and the most widely distributed over the county are the two box turtles, three water snakes, cumberland terrapins, blotched king snakes, snapping turtles, and striped race runners. The soft-shelled turtle is found in the larger streams in the western and eastern part of the county. The mud turtle and musk turtle are found in all of the waters of the county but are less often seen. Bell's painted terrapin is found in quiet waters all over the county. Copperheads, timber rattlers, blue-tailed skinks, brown-backed skinks, fence lizards, ground snakes, and ring-necked snakes are found in the wooded sections in the eastern and southeastern part

of the county, and all of them, except the brown-backed skink and the ground snake, prefer a rocky habitat. Says king snake, glass snake, hog-nosed snake, and others are distributed over the entire county but are less often seen. The reptiles that are most nearly extinct are the horned toad, collared lizard, red king snake, prairie rattler, sonoran snake, brown-backed skink, five-lined swift, ground snake, and green grass snake.

The food habits of the reptiles vary greatly, but all are more or less carnivorous. The aquatic and semi-aquatic species depend upon fish, frogs, worms, and other water animals for their food. The burrowing animals depend upon earthworms and insects for their food. The arboreal species are largely insectivorous. The terrestrial species of turtles and lizards are largely insectivorous and herbivorous. The terrestrial snakes feed upon insects, worms, rodents, birds, and the eggs of birds.

Several of the reptiles are valuable to the farmer in controlling rodent and insect pests. Four species of turtles are edible. About half of the reptiles are destructive to wild life. Three species are dangerous pit vipers.

Cherokee County is in the Lower Austral Life Zone. The climate is different from that found in any other county in the state. The average temperature for the year is about 56 degrees fahrenheit. The county is the wettest in the state and over half of the rainfall occurs during the spring and summer months. Droughts are rather common. The longest

continuous drought on record and the highest temperatures on record prevailed during the summer of 1934.

The climatic, edaphic, and biotic factors are favorable for the growth of an abundant reptilian fauna.

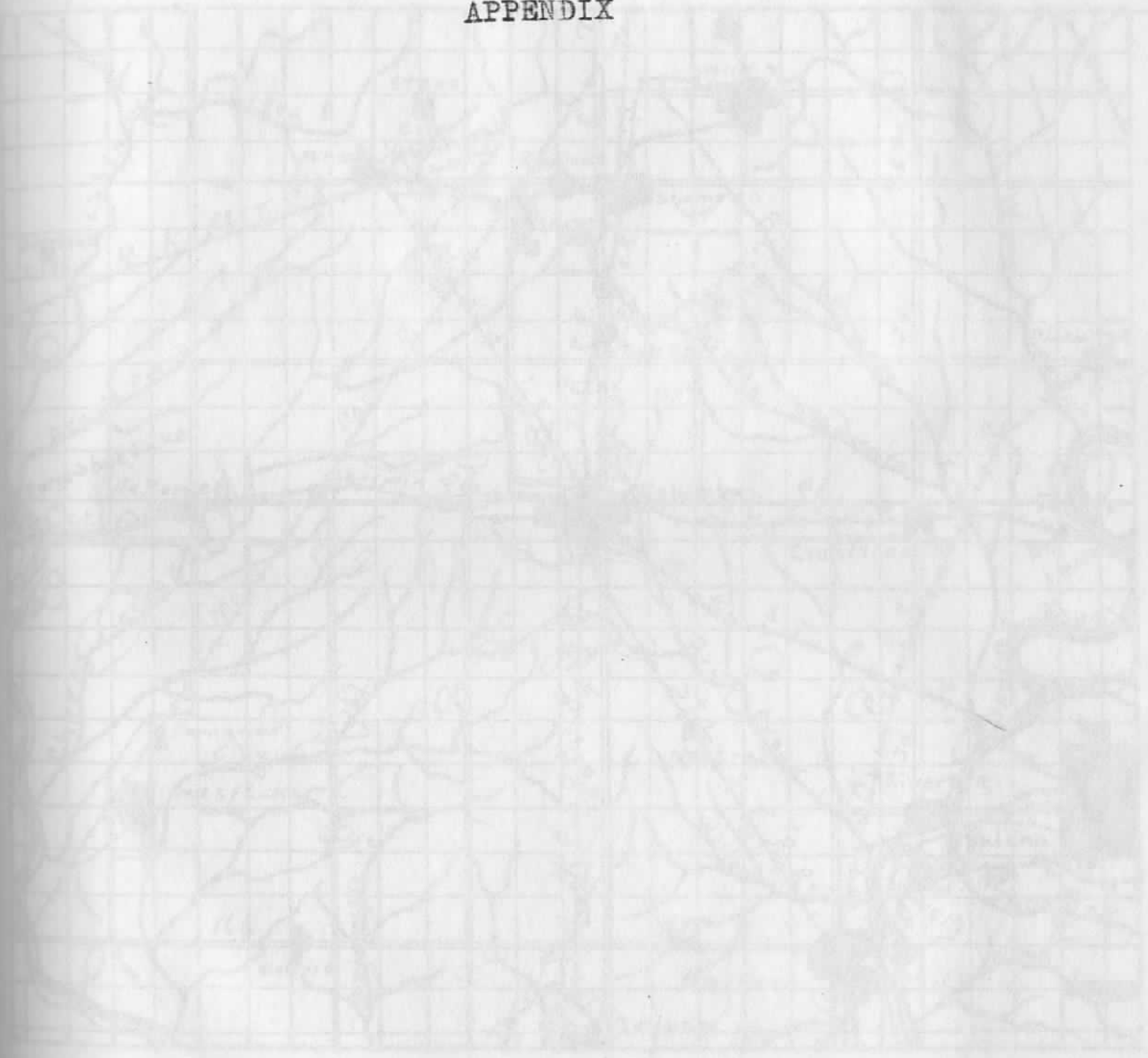
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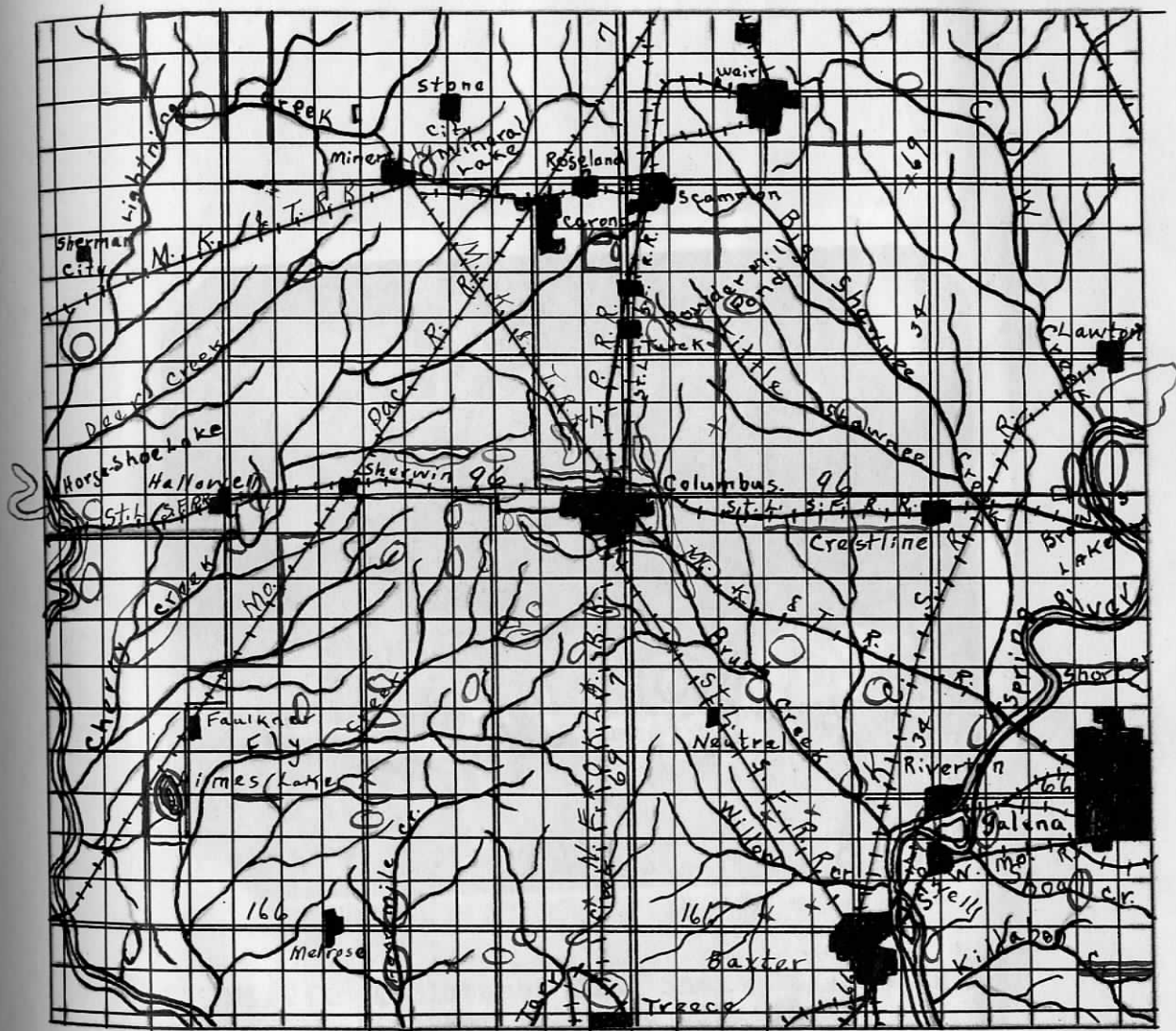
APPENDIX



0 1 mi.

Map 1. Map of Cherokee County Showing Area Surveyed.

CHEROKEE COUNTY



0 1 mi.

Map 1. Map of Cherokee County Showing Areas Surveyed.

PLATE I



Fig. 1 A Blotched King Snake Swallowing
Another Blotched King Snake.

PLATE II



Fig. 2 Horse Shoe Lake. Home of the
Water Snakes and Water Turtles.



Fig. 3 Pond and Slough Habitat. Home of
the Garter Snakes, Water Snakes,
and Water Turtles.

PLATE III



Fig. 4 Small Stream Habitat. Home of the Water Turtles and Water Snakes.



Fig. 5 Meadow and Wood Habitat. Home of the Green Snakes, Blue Racers, Black Snakes, Joint Snakes, and Box Turtles.

PLATE IV



Fig. 6 Forest Habitat. Home of the Brown-backed Skink, Ring-necked Snake, Ground Snake and Three-toed Box Turtle.



Fig. 7 Rocky Ledge Habitat. Home of the Pilot Black Snake, Fence Lizard, Blue-tailed Skink, Copperhead, and Timber Rattler.

PLATE V



Fig. 8 Roadside Habitat. Home of the
Green Snakes, Blotched King Snakes,
Blue Racers, Bull Snakes, and
Glass Snakes.



Fig. 9 Embankment Habitat. Home of the
Striped Race Runners, Blue Racers,
and Blotched King Snakes.