

South Dakota
Geological and Natural History Survey

Freeman Ward, State Geologist

Bulletin 12

Amphibians and Reptiles
of South Dakota

By
William H. Over

Series XXIII

October, 1923

No. 10

Bulletin

University of South Dakota

Entered as second-class matter, May 3, 1902, at the Post Office at
Vermillion, South Dakota, under Act of July 16, 1894.

EXPLANATION

The Survey issues two series of publications as follows:

BULLETINS.—Some subjects have been investigated a longer time, full data have been gathered, such preparatory or experimental work as was necessary has been entirely or nearly finished. In other words, the study of the subject is actually completed or so nearly so that the results can be relied on and published with a degree of confidence as to their value; and the treatment is full and thorough. In such a case the matter is published as a bulletin.

CIRCULARS.—But often during the progress of the work enough information is at hand to be of value to those interested, yet not enough for a complete treatise. A part of a county or a part of a certain subject may be finished, perhaps, and publication waiting for the complete investigation of the whole county or the whole subject. There may be a demand for statistical matter, or lists of references, or current information, etc., which would hardly do for a formal bulletin. Such partial reports, summary reports, reports of progress, lists, or unit fragments of larger subjects, etc., are handled in circulars.

It is planned to publish the circulars frequently and the bulletins at longer intervals. With this arrangement much information will reach the public with a minimum of delay.

Inquiries may be addressed to the State Geologist, Vermillion, S. D.

REGENTS OF EDUCATION

T. W. DWIGHT.....	Sioux Falls
AUGUST FRIEBERG.....	Beresford
J. O. JOHNSON.....	Watertown
ALVIN WAGGONER.....	Phillip
ROBERT DAILEY.....	Flandreau

OFFICERS

T. W. DWIGHT, President.....	Sioux Falls
AUGUST FRIEBURG, Vice-President.....	Beresford
HELEN H. GAMBLE, Secretary.....	Frederick
W. S. O'BRIEN, Treasurer ex-officio, State Treasurer.....	Pierre

SURVEY STAFF

FREEMAN WARD.....	State Geologist
WILLIAM H. OVER.....	Naturalist
E. PAUL ROTHROCK.....	Geologist
GAIL F. MOULTON.....	Geologist

LETTER OF TRANSMITTAL

Vermillion, S. D.,
Oct. 20, 1923.

Hon. T. W. Dwight, President
State Board of Regents.

Dear Sir:

The subject of Reptiles and Amphibians is one that has interested a large number of the citizens of this state. Because of this fact and also because of the economic importance of these animals Mr. Over has prepared the accompanying manuscript which I herewith submit as Bulletin 12.

Respectfully,
FREEMAN WARD,
State Geologist.

PREFACE

This bulletin will treat of amphibia and reptilia of South Dakota.

Amphibians have been separated into two orders: *URODELA* and *SALIENTIA*. The former embraces our salamanders, and the latter our toads, frogs and tree frogs.

Amphibians occupy the position as a connecting link between fishes and reptiles.

Reptiles, to include those occurring in the State, are divided into three orders: *CHELONIA* (turtles, terrapins and box turtles); *LACERTILIA* (lizards, swifts and skinks); *OPHIDIA* (snakes).

As far as known there are in South Dakota seven species or subspecies of toads and frogs, two of salamanders, five of lizards, and sixteen of snakes. More diligent search may add one or two species to each order.

Little effort has been made to study or teach the fauna of South Dakota and the public mind fondles many erroneous theories concerning the life habits and economic importance of reptiles. For instance, people generally have the impression that the bites of all snakes are deadly poison, and with this error in mind all snakes are condemned. The statement that there is in South Dakota but one poisonous snake, the Rattler, seems to meet with considerable astonishment and incredulity, but such is the fact.

The food of eleven of our snakes consists of insects, mice, rats and gophers and a small percentage of birds and bird eggs. The latter is negligible compared with the amount of good they do in destroying rodents. These snakes, with the exception of the Rattlesnake, should not be killed.

Five of our snakes live on toads and frogs; as the food of the latter consists chiefly of insects and most of them in-

jurious to crops, the toads and frogs would be of more value to the farmer than the five species of snakes.

A brief description of species with its life history and economic importance will be found under each individual listed.

Specimens of every form described herein are in the biological collection of the Museum of the University of South Dakota.

In preparing this list no attempt has been made toward a systematic classification.

“The Frog Book,” by Mary C. Dickerson, and “The Reptile Book,” by Raymond L. Ditmars, have been freely consulted. Credit is also extended to Dr. Leonhard Stejneger, of the National Museum, and to Miss Crystal Thompson, of Ann Arbor, Michigan, for determination of specimens.

CONTENTS

EXPLANATION	2
REGENTS OF EDUCATION	3
SURVEY STAFF	3
LETTER OF TRANSMITTAL	4
PREFACE	5
LIST OF ILLUSTRATIONS	8
PART I, BATRACHIANS	
Order Urodela: Salamanders	9
Order Salientia: Toads and Frogs	11
PART II, REPTILES	
Order Chelonia: Turtles	16
Order Lacertilia: Swifts, Lizards and Skinks	18
Order Ophidia: Snakes	21
INDEX	32

LIST OF ILLUSTRATIONS

Plate.

- I. Fig. 1. SPADEFOOT TOAD.
Fig. 2. HERNANDEZ'S HORNED LIZARD.
- II. LEOPARD FROG.
- III. COMMON SNAPPING TURTLE.
- IV. BELL'S TERRAPIN.
- V. LESUEUR'S TERRAPIN.
- VI. Fig. 1. PAINTED BOX TURTLE.
Fig. 2. SIX-LINED LIZARD.
- VII. SOFT-SHELLED TURTLE.
- VIII. PLAINS GARTER SNAKE.
- IX. GREEN GARTER SNAKE.
- X. STRIPED SWAMP SNAKE.
- XI. DEKAY'S SNAKE.
- XII. BLUE RACER.
- XIII. YOUNG BLUE RACER.
- XIV. FOX SNAKE.
- XV. BULL SNAKE.
- XVI. GREEN OR GRASS SNAKE.
- XVII. HOG-NOSED SNAKE.
- XVIII. PRAIRIE RATTLESNAKE.

PART I

BATRACHIANS

ORDER URODELA. SALAMANDERS

These are distinguished from toads and frogs by having elongated bodies and by always retaining their tails. In their life development they pass through the same stages; that is, the eggs are deposited in shallow water from which the larvae hatch, in this respect being similar to tadpoles. Later in the summer the common salamander, *Amblystoma*, loses its gills, develops legs and breathes by means of lungs during its adult life. It usually leaves the water and inhabits damp cellars, caves or old wells.

The Mud Puppy, *Necturus*, develops legs but retains its gills and remains in deep water during adult life.

The larvae of these batrachians are eaten by turtles, water insects and water birds. The adult of the common salamander are eaten by garter snakes and bitterns.

TIGER SALAMANDER

Amblystoma tigrinum (Green)

The common salamander found over the State. It is from six to ten inches in length and variable in color markings; is usually of a dark ashy shade with yellowish stripes or spots on the back and sides. Skin is smooth with a slimy appearance. The head is short and round and nearly as wide as the body. Has four well developed legs, but when moving over the ground seems to sprawl rather than walk. A long, compressed tail.

It is said that while in the larva stage they destroy many "wrigglers" of the mosquito. The adults spend the day in damp places and are active at night in hunting for worms and insects.

This is the "lizard" that makes a noise in your vegetable cave or cellar that suggests the gritting of teeth. It is harmless but when irritated discharges from pores of the

body a milky slime that is very bitter to the taste. For this reason it is seldom attacked by skunks, cats, coyotes, etc.

The salamander probably exercises some degree of hibernation during the winter.

MUD PUPPIES

Necturus maculosa (Radinesque)

This form of salamander is much larger than the latter, reaching a length of twenty inches and being proportionately larger in body. The head is wide but snout depressed. Tail small compared with the rest of its body. Has four well developed legs. On each side of the neck there are three sets of fringed gills which enable it to breathe and live on the bottom of deep lakes, where it spends its adult life. It does not hibernate during the winter, as specimens are frequently caught on baited hooks set for fish. Like the common salamander it is nocturnal in its feeding habits, remaining quiet during the day. It feeds on small fish and their eggs, insect larvae and crustacea.

As far as known it is found in South Dakota only in Big Stone Lake.

ORDER SALIENTIA. TOADS AND FROGS

These are differentiated from the adults of the Order *URODELA* by being tailless. They pass through two life stages in the water but gradually lose their tails, develop legs and during their adult stage are more or less terrestrial.

Our list includes eight toads and frogs, of which the American Toad and the Leopard Frog are the most common and range practically over the entire State. Several of our species are small and are seldom seen by the casual observer.

They all live on insects or insect larvae and are regarded as beneficial to mankind. In the adult stage they are a source of food supply for the hog-nosed snakes, garter snakes, and bitterns or "shite-pokes," as well as many species of fish. The larvae are devoured by small fish, turtles, water insects, salamanders, etc.

The toads hibernate during the winter by burrowing into crevices and holes made by rodents. The frogs hibernate by burrowing in the mud of the bottom of rivers and lakes.

All toads and frogs shed their skins three or four times during the summer.

AMERICAN TOAD

Bufo americanus (Le Conte)

The common toad of the State, found in nearly every county. In size it may reach a length of four inches. It is usually of a yellow or grayish color and conspicuously warty; however, individuals vary so much in their markings that it is difficult to give a general description. There is usually a vertebral stripe of light yellow with radiating bands of the same color. When these are present the toad has a decidedly mottled appearance. During the day toads burrow in loose soil in a cool place, but come out at dusk

and satisfy their hunger by catching insects, on which they feed entirely.

Their eggs are deposited in shallow water in the spring and may be identified by their stringy appearance. In a few days the tiny tadpoles, familiar to every boy, are hatched. Later they develop legs and lose their tails and by early fall are hopping over the ground and breathing by means of lungs instead of gills as in their earlier life.

The hog-nosed snake is the only enemy of toads. However, while in the tadpole stage they are eaten by water birds, salamanders, and water insects.

We would encourage the protection of toads.

WESTERN PLAINS TOAD

Bufo cognatus (Say)

This toad has been found common on the Missouri River flood plain in the central and northern part of the State.

It is slightly larger than the common toad but the head and legs are shorter. In color it is a dull green with numerous white spots; however, in specimens the light portions represent irregular lines instead of spots. When disturbed it inflates its lungs and increases the size of its body.

Its economic importance and life habits are the same as those of the common toad.

SPADEFoot TOAD

Scaphiopus hammondi bombifrons (Cope)

A subspecies of the Western Spadefoot Toad. This is a toad of the plains country and is probably found over the western part of the State, but we have specimens only from Corson County. These were collected in shallow water-holes on the second terrace near the wooded flood plain of the Missouri River. They are particularly common after rains.

It is a small toad, not more than one and three-quarters inches long. The legs are short. This toad may be identi-

fied by the all-webbed or "spade" foot. On the inner sole there is a large, dark tubercle. The body is greenish yellow with irregular dark bands over the head.

CRICKET FROG

Acris gryllus (Le Conte)

A tree frog that is wholly terrestrial in its habits. It is found in South Dakota along the muddy margins of the Big Sioux, Vermillion and James rivers.

This is the smallest of our frogs, averaging not more than one inch in length. In color it is some shade of gray. There is usually a dark spot between the eyes, a light stripe extending from the eyes over the shoulders, and two or more bands running obliquely over the sides. On the back it is covered sparingly with tubercles. The legs are long and used to advantage in retreating from an enemy or in catching insects.

SWAMP TREE FROG

Chorophilus nigrinus triseriatus (Wied)

Slightly larger than the cricket frog. In color our specimens are usually some shade of gray with a triangular dark band between the eyes and broken lines of black extending down the back. There is also a black band extending through the eye to the middle of the side of the body.

Like the tree frog they are tree climbers but like to live in damp cellars, under rocks, etc.

Specimens have been taken at Vermillion, Clay County; Cedar Pass, Jackson County; Mayo, Custer County, and Fort Bennett, Stanley County.

Both of our tree frogs deposit their eggs in shallow water. The males do the singing or "croaking," which is similar to the song of the common eastern tree frog.

LEOPARD FROG

Rana pipens (Shreber)

This is the common frog that may be found in nearly every meadow, marsh, creek, river, pond and lake in the State. They have been found in muddy pools high up in the Badlands.

Our Leopard Frog must not be confused with the Bull Frog of the southern states, as this larger frog does not live in South Dakota.

These Leopard Frogs may be green, gray or brown and more or less covered with irregular rows of dark spots. Owing to the variation in color it is difficult to describe them, as every shade mentioned above may be seen in a dozen individuals around any spring or marsh in the State. Beneath, they are white; above, the skin is nearly smooth. The legs are long and powerful, enabling this frog to become very active in its movements.

In size they rarely reach a length of more than four inches.

Their eggs are deposited in shallow water in masses in early spring, from which the tadpoles emerge in about nine days. Several weeks are spent in water in the larva stage before losing their tails and developing into young frogs.

The adults are used for food as "frogs legs" but far more are used for fish bait. From the lakes and marshes of the northeastern part of the State the business of catching and shipping frogs for fish bait reaches large proportions. They are also eaten by garter snakes, bitterns and skunks.

NORTHERN WOOD FROG

Rana cantabrigensis (Baird)

This species has been found common in the deep, wooded ravines or "coulees" of western Roberts County. They were usually near springs that were surrounded by a lux-

uriant growth of sugar maples and other eastern plants that are found in no other locality in the State. The springs are really the headwaters of the Minnesota River.

These frogs are about one and three-quarters inches in length, which is slightly smaller than the eastern form. The body is flat with a long pointed head. The color is grayish, mingled with numerous dark blotches. A conspicuous black band extends from the snout to the shoulders. There is also a noticeable dark mark under the forearm. Their legs are long.

Their breeding places are probably in the deep pools farther down the creek.

PART II

REPTILES

ORDER CHELONIA. TURTLES

South Dakota has one land and four water turtles. The Snapping Turtle and Bell's Terrapin are well distributed over the State, but the others are local in their range. Our turtles have little economic value. As far as known they are not used for food to any extent. They destroy many fish and perhaps the eggs of fish.

Turtles deposit their eggs in sandy banks near water with only a few inches of covering. The eggs are incubated by the heat of the sun.

The water turtles hibernate during the winter by burrowing in the mud of the bottoms of our rivers and lakes. The land turtles hibernate by crawling into deserted prairie dog or coyote burrows.

Turtles shed their skin at least once during the summer by casting the old epidermis from each plate of the carapace and plastron.

SNAPPING TURTLES

Chelydra serpentina (Linn.)

This is our largest turtle, more or less common over the State, living in ponds, lakes and muddy creeks. The upper shell or carapace may reach a length of fourteen inches. This is ashy gray with three rows of horny tubercles that are more prominent toward the posterior. The rear edge is heavily notched. There is also a row of these horny tubercles along the tail. The head, legs and feet are large, with the toes more or less webbed. The back of the older specimens is usually covered with moss but when cleaned off the shell is nearly smooth.

They are carnivorous, fish constituting the larger portion of their food; however, young fowls are readily taken and it is likely that these turtles destroy many young of our wild ducks during the breeding season. This turtle

never eats except under water but takes its prey on the beach and retreats to the water to devour it.

It is edible.

BELL'S TERRAPIN

Chrysemys belli (Gray)

This is another common turtle and may be found in every county. It is particularly fond of ponds and deep waterholes in sluggish creeks. The carapace of an adult will measure seven inches and is usually smooth. It is olive in color. The shields are often margined with black. The under marginal rim of the carapace is beautifully banded with red and yellow. The head is black with numerous yellow stripes.

It lives on aquatic insects, small fishes and water plants.

This turtle is edible but probably not used for food to any extent.

LESUEUR'S TERRAPIN

Malacoclemmys lesueurii (Gray)

This turtle is slightly larger than the preceding form and is found only in the Missouri River. There it is a source of annoyance to the fishermen with setlines.

The color of its back is a dull olive marked with several large dark blotches. Along the back there is a sharp ridge or keel with three or four horny tubercles. The outer edge of the carapace is deeply serrated.

It is edible.

PAINTED BOX TURTLE

Cistudo ornata (Agassiz)

This is our only "land" turtle and is found in the southwestern corner of the State. It is not found in the Black Hills and as far as is known to the writer it has not

been taken north of Pennington County, nor east of Wash-
abaugh County. Its natural habitat is the sandhill region.

The carapace is about four inches long and nearly as wide. It is oval in shape, almost a half ball. The color is dark brown or gray with radiating yellow lines. This turtle can draw in his head and legs and completely close up his hard shell, rendering himself immune from attack.

Its food consists chiefly of insects. The Sioux Indians use these turtles for food.

It is said that they live to be very old; however, this is probably true of most turtles.

SOFT-SHELLED TURTLE

Trionyx muticus, (Lesueur)

Found along the Missouri River and eastward, but not common in South Dakota.

Ours is the smallest of the soft-shelled turtles, rarely reaching a length of seven inches. Its body is flat and covered with a soft, leathery skin of a dull gray or olive color. Sometimes there are faint spots showing. It has a long neck with a sharp-pointed nose which gives it a very formidable appearance.

They feed on fish, frogs, young fowl and water mollusca.

ORDER LACERTILIA. SWIFTS, LIZARDS AND SKINKS

This order is represented in South Dakota by five species but none of them is common and most of them are local in their distribution. The Black-banded Skink has the widest range and is found over the eastern part of the State.

Little is known of their breeding habits. They subsist on insects and hibernate during the winter.

YELLOW-STRIPED SWIFT

Sceloporus undulatus consobrinus, (Baird and Girard)

This is a variety of the common swift of the western states. Our form lives in the sandhills of Washington County and is fairly abundant. It is about seven inches in length. The ground color is greenish yellow. There are two yellow stripes on each side of its back extending from head to tip of tail. The scales are keeled, which gives it a rough appearance.

HERNANDEZ'S HORNED LIZARD

Phrynosoma douglassii hernandesi (Girard)

It is found locally around Crow Buttes in southern Harding County and along Wounded Knee Creek in Shannon and Washington counties. This is the smallest form of Horned Lizard in the United States, rarely reaching a length of four and one-half inches, including its tail.

In color it is light gray, with two rows of dark spots along the back. The so-called horns are on the ridge or collar around the head, but in this species they are not prominent. There is a row of spiny scales along the sides of the body. It is covered with rough scales above and below, giving it a "horny" appearance.

In its reproduction this form is viviparous, giving birth to seven to nine young.

Its food consists of insects.

SIX-LINED LIZARD

Cnemidophorus sexlineatus, (Linn.)

A small, slim lizard scarcely reaching a length of seven inches. On the back it is dark gray with six yellow stripes running lengthwise. Below it is white. The scales are smooth.

Sometimes called "race runner," for it is difficult to catch without a net. Like all our lizards its food is chiefly insects.

It lives in the sandhills of Washington County.

FIVE-LINED SKINK

Eumeces quinquelineatus, (Linn.)

Also called "red-headed" lizard because of the red spot on its head. It is nearly black, with five stripes along its back. Below and along the sides it has a bluish tint.

A specimen was taken four miles west of Vermillion, in the wooded floodplain of the Missouri River, May 30, 1922.

BLACK-BANDED SKINK

Eumeces septentrionalis, (Baird)

The common lizard of the eastern part of the State. It has been taken as far north as Roberts County. Lives in grassy places near thickets but it is difficult to see by the casual observer.

They reach a length of eight inches and are identified by the four black stripes on the back, bordered by a pair of white stripes along the sides. The underparts are bluish. The tails of all lizards are very frail and it is seldom that a specimen is captured without the loss of part of its caudal appendage. If it escapes, the balance of its life is spent without a tail, as it cannot grow a new one.

Lizards should not be killed, for they subsist on insects.

SNAKES

ORDER OPHIDIA

South Dakota is fortunate in having but one poisonous snake, which is the prairie rattler. This snake lives in the western half of the State but with the settling up of that territory it is not as abundant as formerly. Our other snakes are fairly well distributed over the State. Nearly one-half of our snakes are small and insignificant. There are no water moccasins nor copperheads in South Dakota. There are no snakes that sting with their tail nor their tongue. The hoopsnake stories are myths. The breath of no snake in the State is poisonous. Milk snakes do not milk cows. Every one of these stories has been refuted time and again but we still hear them.

The prairie rattler, red-bellied, and the garter snakes are viviparous and give birth to seven to thirty-five young. The plains garter snake is the most prolific and has been known to produce fifty-four young at one time. Our other snakes are oviparous and deposit leathery, soft-shelled eggs in the ground in gopher or mole burrows or under rocks and logs.

All snakes shed their skin once or twice during the summer. Snakes hibernate during the winter by crawling into crevices, deserted prairie dog and gopher burrows and under rocks.

Our land snakes can live many weeks without water but they do drink occasionally. In their natural haunts they perhaps do not eat oftener than once a week but in captivity they will eat every two or three days. Snakes feed by swallowing whole the toad, frog, mouse, rat, gopher or bird.

PLAINS GARTER SNAKE

Eutaenia radix, (Baird and Girard)

The common garter snake and most abundant snake of the State. It may be found in nearly every county.

It is easily recognized by the three yellow stripes along the back and sides against a dark background. It has a moderately stout body and some attain lengths of thirty-six inches. This snake inhabits low, swampy places or lives near creeks, where it feeds on frogs and small fish. It is not poisonous but evidently the frogs are of more value to mankind. In devouring a frog it may take it first by the head, or the fore or hind leg and proceed to swallow it. It dives under water and catches a fish by claspings it around the middle of the body. The snake then swims to shore and gradually shifts the fish so that it is always taken head foremost.

GREEN GARTER SNAKE

Eutaenia elegans vagrans, (Baird and Girard)

This is the garter snake of the Black Hills and is found mostly along creeks, where it seeks its food consisting of frogs and fish. It is of a dark green color with a small yellow stripe down the back and one on each side. Between the stripes there are two rows of small black spots. As with all our garter snakes there is a wide variation in the markings. A full sized adult would be about thirty-two inches long.

RED-BARRED GARTER SNAKE

Eutaenia sirtalis parietalis, (Say)

This snake is not as common as the Plains Garter Snake but may be found locally over the State.

The ground-color is usually of some dark shade. There is a vertebral yellow stripe and on the sides are numerous red bars. One of these snakes that has recently shed its old skin exhibits a blending of shades that is really beautiful.

Its life habits are the same as those of the other garter snakes.

STRIPED SWAMP SNAKE

Tropidoclonium lineatum, (Hallowell)

A small snake not over twelve inches in length. It is grayish brown usually with three light stripes on the back and sides. Between these stripes there are two rows of dark spots. The abdomen is light yellow bordered with a row of black spots. Lives on worms and insect larvae. Often found under rocks and in crevices in clay banks.

It has been taken in Clay and Minnehaha counties.

DEKAY'S GROUND SNAKE

Storeria dekayi, (Holbrook)

Another small inconspicuous snake, not over ten inches in length. It is grayish brown with two rows of dark spots along its sides. The abdomen is pinkish white.

A single specimen was found on the west shore of Big Stone Lake in 1922.

RED-BELLIED SNAKE

Storeria occipitomaculata, (Storer)

This snake seems to be closely related to the preceding and is about the same size; however, it is easily identified by its red belly and the absence of dark spots along the back. There is usually a yellow spot on each side of the neck just behind the head.

These small snakes are very secretive and spend most of their time under rocks or in grassy places. They feed mostly late in the evening and early in the morning. By watching a dusty road near thickets about sunrise one is apt to observe these little reptiles, at least one may see their tracks.

Their food consists of worms, slugs and insect larvae.

BLUE RACER

Zamenis constrictor flaviventris, (Say)

Our Blue Racer is closely allied to the eastern "Black-snake" but more slender and does not attain as great a length. It is bluish green or olive above and pale yellow below. The scales are smooth, giving it a glassy appearance. Scarcely over three feet long in South Dakota.

The young up to three years of age are grayish tan above with a series of dark blotches along the back and sides. It is likely that the average observer will mistake the young of this species for that of the Bull Snake; however, when compared they can easily be separated.

This snake ranges over the State and prefers open grassy thickets where in case of danger it can readily dart under cover. If you attempt to capture a Blue Racer you will agree at once that it is rightly named for it is indeed a "racer" and simply glides away from you.

Their food is chiefly small rodents, but they will eat insects and occasionally small birds.

FOX SNAKE

Coluber vulpinus, (Baird and Girard))

This snake is fairly common only in the southeastern corner of the State where it lives in the open, feeding upon mice, rats and gophers. From the nature of its food one will readily recognize the value of this snake to a farming community. It is worth fifteen dollars a year to any farmer for it will destroy more destructive rodents around the buildings with less trouble than a dozen traps. As a friend of the farmer it is second only to the Bull Snake and should never be killed.

The Fox Snake rarely attains a length of more than forty inches. It is light brown on the back, which is blotched with numerous dark spots of various sizes. The abdomen is yellow and well blotched with dark markings.

This snake is no doubt often taken for the Bull Snake but may be distinguished by the absence of the yellow and black ground color so prominent in the latter.

BULL SNAKE

Pituophis sayi, (Schlegel)

One of the common snakes of the State. It is also our largest snake, sometimes reaching a length of six feet. In color it may be described as made up of various sizes of black blotches against a yellow background. Below the yellow is more prominent. They become lighter with age.

Bull Snakes should always be protected as the bulk of their food consists of mice, rats and gophers. They are the farmers' friend and are continually devouring the rodents that destroy their grain. It is not an idle statement to say that a full grown Bull Snake is worth \$15 a year on the farm. Encourage them to live around the granaries and sheds and you will not need to be bothered with setting traps.

The Bull Snake is harmless as are all of our snakes in South Dakota except the Rattlesnake. When provoked they have the power of producing a loud hissing or booming noise, hence their name.

In a few instances Bull Snakes have been known to kill Rattlesnakes. Just what is the offense on the part of either one that provokes the attack we do not know. In the University Museum both snakes were kept together for a period of two years without the Bull Snake exhibiting any dislike toward the rattlers. Furthermore, during the month of October, many of us have frequently seen both species coiled up together sunning themselves around the entrance to their winter den or place of hibernation.

GREEN OR GRASS SNAKE

Liopeltis vernalis, (De Kay)

Another of our small snakes, rarely attaining a length of twelve inches. It is green above and greenish white below.

It has been taken in the Black Hills, Harding and Clay counties.

While they are not common, it is likely that they are taken for the young of the Blue Racer but, as stated before, the young of the racer is spotted up to three years of age.

The Green Snake subsists mostly on insects. It is perfectly harmless and should never be killed.

Mr. Raymond Lee Ditmars, Curator of Reptiles in the New York Zoological Park, has this to say about this snake: "A more innocent and more dainty reptile cannot be imagined than one of these creatures, and the spectacle of a tiny green serpent beaten to death on the roadside should provoke a pity for the human individual who so 'bravely' engaged in combat and succeeded in destroying with the aid of a substantial club, about twelve or fourteen inches of diminutive body that would have real difficulty in battling with a fair-sized grasshopper."

RING-NECKED SNAKE

Diadophis regalis, (Baird and Girard)

An authentic record of a specimen of this snake is reported from Springfield, South Dakota, and the writer took a specimen at the mouth of Ponca River just across the Missouri River in Nebraska, which is our authority for listing it here as a South Dakota species.

In color it is slaty or brownish above; below it is yellow with irregular rows of black spots. The neck is as large as the head. There is a wide, white band around the neck and the lips are white. It is never over fifteen inches in length in this region.

SOUTHERN MILK SNAKE

Ophibolus doliatus, (Linn.)

As the name implies this is a southern species but a few specimens have been found in South Dakota and identified as such by Mr. Leonhard Stejneger, Curator of Rep-

tiles, Department of Biology, National Museum, Washington, D. C. A specimen was recently sent to the museum by Mr. G. J. Waterbury of Timber Lake, S. D.

This is a small snake not over twelve inches in length. It is red and yellow with the wide red bands predominating and extending over the back from side to side. The underparts are yellow with numerous black spots. Like most snakes the markings as well as coloration vary and some specimens lack the red bands, and the yellow or light tan predominates, suggesting the shade of cornhusks. The snake is called "Corn Snake" in some localities.

Its food consists of insects and their larvae.

MILK SNAKE: HOUSE SNAKE

Ophibolus doliatus triangulus, (Daudin)

The largest of the Milk Snakes and found only in the southern part of the State. It attains a length of thirty inches. The coloration above is grayish with rows of large reddish brown blotches which are margined with black. These blotches extend the entire length of the back. Below it is white, marked lengthwise with an irregular wide black band.

This snake probably received its name from the fact that it inhabited milk houses in searching for mice and rats which are its principal food. It is harmless and indeed a "house snake" and should be encouraged to live around our outbuildings.

HOG-NOSED SNAKE

Heterodon platyrhinus, (Latreille)

Also known as "spreading adder," "puff adder," "blow snake" and "sand viper." South of the White River they are frequently called "Copperheads," but this is erroneous as the range of the true copperhead is hundreds of miles south of our State line.

The bite of the hog-nosed snake is believed by many to be deadly poison; by others its breath is believed to be

poisonous; still others think it can produce certain death by stinging with its tongue. These are all simply "snake stories." It is probably the most harmless snake of the State, as there is no record that anyone was ever bitten by a hog-nosed snake, and if it should happen, there are no fangs and no venom. Far back on the upper jaw there are teeth, not fangs, which are used to hold its prey.

This snake rarely reaches a length of thirty inches in this region. Most specimens seen are from fifteen to twenty-four inches long. It is a thick-bodied snake with a large head and a neck nearly as wide as the head. The general coloration above is usually of a reddish brown with many dark blotches of various sizes. Below it is light, profusely marked with black spots. But there is a great variation in the color markings; those from the western half of the State will be lighter than those of the eastern part.

Hog-nosed "adders" are slow moving snakes, and with slight provocation will turn on their backs and feign death, remaining in that condition until the enemy has departed.

The food of the "adder" consists of toads. They will rarely take a frog. The toads are swallowed whole by taking them head foremost. As the toads live on insects we cannot say that the hog-nosed snakes are beneficial to mankind. We have known redtailed hawks to feed their young on these snakes.

WESTERN HOG-NOSED SNAKE

Heterodon nasicus, (Baird and Girard)

This snake in shape and habits is similar to the preceding but is smaller. Perhaps twenty inches would be the maximum for length in this territory. They are much lighter in coloration. The back is a light brown or tan, marked with many small dark spots. The head of this species is larger and has two wide bands crossing the crown and extending obliquely on the sides.

This western form is more often found on the sandy floodplains of the Missouri River and in the sandhills south of White River and in the Badlands.

PRAIRIE RATTLESNAKE

Crotalus confluentus, (Say)

In South Dakota there is only one species of Rattlesnake, which is known as the Prairie Rattler. Like most other snakes they vary in coloration. A rattler that has recently cast its skin (and a healthy specimen will shed twice during the summer) will display a bright greenish yellow background; along the back there is a row of large dark blotches, usually round but they may become angular as they approach the head or tail. Along the sides there is a row of smaller dark spots. There is a dark band extending from just below the eye to the rear of the mouth, which is margined by a narrow yellow stripe. The underparts are a dull yellow with obscure dark markings. After they have cast off their old skin and "weathered" for a few weeks the markings become indistinct and they are apt to present a clay-colored appearance which is more in harmony with the light soil of our west river country. Therefore the shedding of their skin has to account for the dark and light phases that suggest the occurrence of two species in that region.

The Prairie Rattler is a poisonous snake and perhaps it is useless to suggest that it should always be killed. It is not safe to handle them but if the wound is properly treated only a small percent of the bites need be fatal. The location of the wound has much to do with the effectiveness of a rattlesnake bite.

They are easily reared in captivity and can be made practically harmless by removing their fangs every three or four months.

The food of the rattlesnake consists of mice, rats, gophers and occasionally birds. During the summer those in captivity will eat a mouse or rat every two days but do not eat during the winter. In their natural haunts they hibernate from late in October until the warm days of April or May. Hibernation takes place in deserted prairie dog burrows or in crevices in the Badlands, rocky bluffs and buttes.

Most of us overestimate the length of snakes that we kill. They are never as long when measured by the slayer's eye as when measured with a yardstick. The writer has spent more than a dozen years in the rattlesnake country and the longest one seen and measured was only forty-two inches. A snake should be measured before it has been stretched several inches.

Rattlesnakes, prairie dogs and burrowing owls do not live in the same hole or burrow. This is one of the silliest notions believed about these creatures, yet at the present time this impression is being continually circulated in our school readers and magazines. Simply because an indifferent observer sees a rattlesnake go into a burrow there is no proof that it is occupied by families of prairie dogs, and burrowing owls: it is a deserted hole and we are jumping at conclusions. In an old prairie dog town one-half of the burrows have been abandoned and a very few of these are used by burrowing owls for nesting purposes and a small number by rattlesnakes for hibernation. There are instances when rattlesnakes have been in the "dog town" during the summer and to escape from an enemy would dart into a dog burrow. If this should happen to be occupied by dogs (which is not likely), then the latter would retreat to the rear of the burrow that may be fifteen feet from the entrance; the rattlesnake would remain near the entrance and soon depart. A prairie dog would no more live with a rattlesnake than we would go to bed with one. While these snakes will eat young prairie dogs this is not their sole reason for frequenting the "dog towns," another reason being that the many deserted holes afford suitable places for retreat and especially for hibernation. It is very seldom that they rear their young in these abandoned burrows for they much prefer the small burrow made by the striped gopher.

In producing their young, rattlesnakes are viviparous and give birth to eight to seventeen young about eight inches long. At the time of birth they possess the "button" which is always the end, as well as the oldest rattle. In

about two weeks the young cast off their old skin, at which time they develop their first true rattle.

Rattlesnakes usually shed their skin twice during the summer and a new rattle is produced each time; therefore the number of rattles does not indicate their age. The growth of new rattles is likened to the development of new nail growth on our fingers.

INDEX

	Page
<i>Acris gryllus</i>	13
<i>Amblystoma tigrinum</i>	9
American Toad	11
Badlands	28, 29
BATRACHIANS'	9
Bell's Terrapin	17
Big Sioux River	13
Big Stone Lake	10, 23
Bittern	9, 11, 14
Black-banded Skink	18
Black Hills	17, 22, 26
Black Snake	24
Blue Racer	24, 26
<i>Bufo americana</i>	11
<i>Bufo cognatus</i>	12
Bullfrog	14
Bull Snake	24, 25
Burrowing Owl	30
Cedar Pass	13
CHELONIA	16
<i>Chelydra serpentina</i>	16
<i>Chorophilus nigritus triseriatus</i>	13
<i>Chrysemys belli</i>	17
<i>Cistudo ornata</i>	17
Clay County	13, 23, 26
<i>Cnemidophorus sexlineatus</i>	19
<i>Cotuber vulpinus</i>	24
Corn Snake	27
Corson County	12
Cricket Frog	13
Crow Buttes	19
Custer County	13
Dekay's Snake	23
<i>Diadophis regalis</i>	26
Ditmars, Raymond Lee	26
<i>Eumeces quinquelineatus</i>	20
<i>Eumeces septentrionalis</i>	20
<i>Eutaenia elegans vagrans</i>	22
<i>Eutaenio radix</i>	21
<i>Eutaenia sirtalis parietalis</i>	22
Five-lined Skink	20
Fort Bennett	13
Fox Snake	24
Frogs, Leopard	11
Frogs, Northern Wood	14
Garter Snake	14, 21
Garter Snake, Plains	21, 22
Garter Snake, Green	22
Garter Snake, Red-barred	22
Grass Snake	25, 26
Green Snake	25
Harding County	19, 26
Hernandez's Horned Lizard	19
<i>Heterodon nasicus</i>	28

	Page
<i>Heterodon platyrhinus</i>	27
Hog-nosed Snake.....	12, 27
Hoopsnake.....	21
Horned Lizard.....	19
House Snake.....	27
Jackson County.....	13
James River.....	13
LACERTILIA.....	18
Leopard Frog.....	11, 14
Lesueur's Terrapin.....	17
<i>Liopeltis vernalis</i>	25
Lizards.....	18, 19, 20
<i>Malacoclemmys lesueurii</i>	17
Mayo.....	13
Minnesota River.....	15
Milk Snakes.....	21, 26, 27
Minnehaha County.....	23
Missouri River.....	12, 17, 18, 20, 26, 28
Mud Puppy.....	9, 10
Nebraska.....	26
<i>Necturus maculosa</i>	10
New York Zoological Park.....	26
<i>Ophibolus doliatus</i>	26
<i>Ophibolus doliatus triangulus</i>	27
Owl, Burrowing.....	30
Painted Box Turtle.....	17
Pennington County.....	18
<i>Phrynosoma douglassii hernandesi</i>	19
<i>Pituophis sayi</i>	25
Plains Garter Snake.....	21
Race Runner.....	20
<i>Rana pipens</i>	14
<i>Rana cantabrigensis</i>	14
Rattlesnake.....	29, 30
Red-barred Garter Snake.....	22
Red-bellied Snake.....	21, 23
Reptiles.....	16
Ring-necked Snake.....	26
Roberts County.....	14, 20
Salamanders.....	9
SALIENTIA.....	11
<i>Scaphiopus hammondii bombifrons</i>	12
<i>Sceloporus undulatus consobrinus</i>	19
Sioux Indians.....	18
Six-lined Lizard.....	19
Skink, Black-banded.....	18, 20
Skink, Five-lined.....	20
Snakes.....	21
Soft-shelled Turtle.....	18
Snapping Turtle.....	16
Southern Milk Snake.....	26
Spadefoot Toad.....	12
Springfield.....	26
Stanley County.....	13
Stejneger, Leonhard.....	26
<i>Storeria dekayi</i>	23

	Page
<i>Storeria occipitomaculata</i>	23
Striped Swamp Snake.....	23
Swamp Tree Frog.....	13
Swift, Yellow-striped	19
Terrapin, Bell's	16, 17
Terrapin, Lesueur's	17
Tiger Salamander	9, 10
Timber Lake	27
Tree Frog	13
Toads	11, 12
<i>Trionyx muticus</i>	18
<i>Tropidoclonium lineatum</i>	23
Turtles, Painted Box.....	17
Turtles, Snapping	16
Turtles, Soft-shelled	18
United States Dept. of Biology.....	27
United States National Museum.....	27
University Museum	25
URODELA	9, 11
Vermillion	13
Washabaugh County	18
Washington County	19, 20
Washington, D C.....	27
Waterbury, G. J.....	27
Western Hog-nosed Snake.....	28
Western Plains Toad.....	12
White River	27, 28
Wood Frog	14
Wounded Knee Creek.....	19
Yellow-striped Swift	19
<i>Zamenis constrictor flaviventris</i>	24

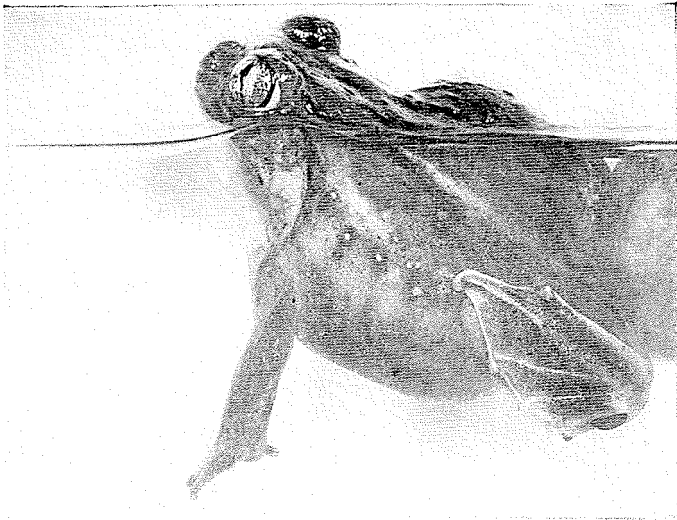


Fig. 1. The SPADEFOOT of the plains, *Scaphiopus hammondi bombifrons*.
Note the spade-like foot. (See Page 12.)

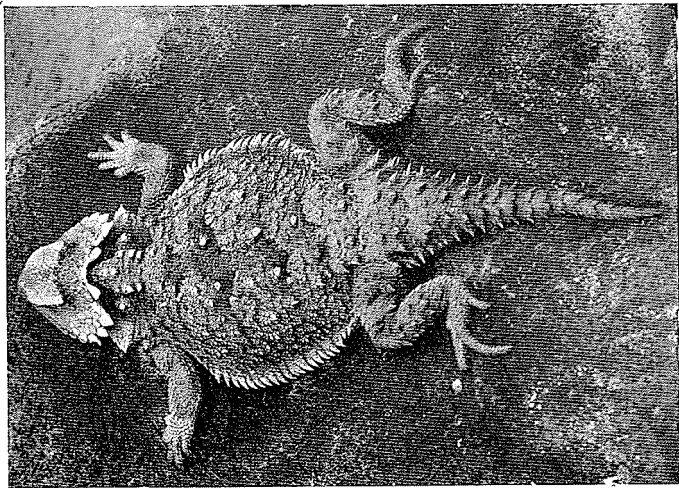
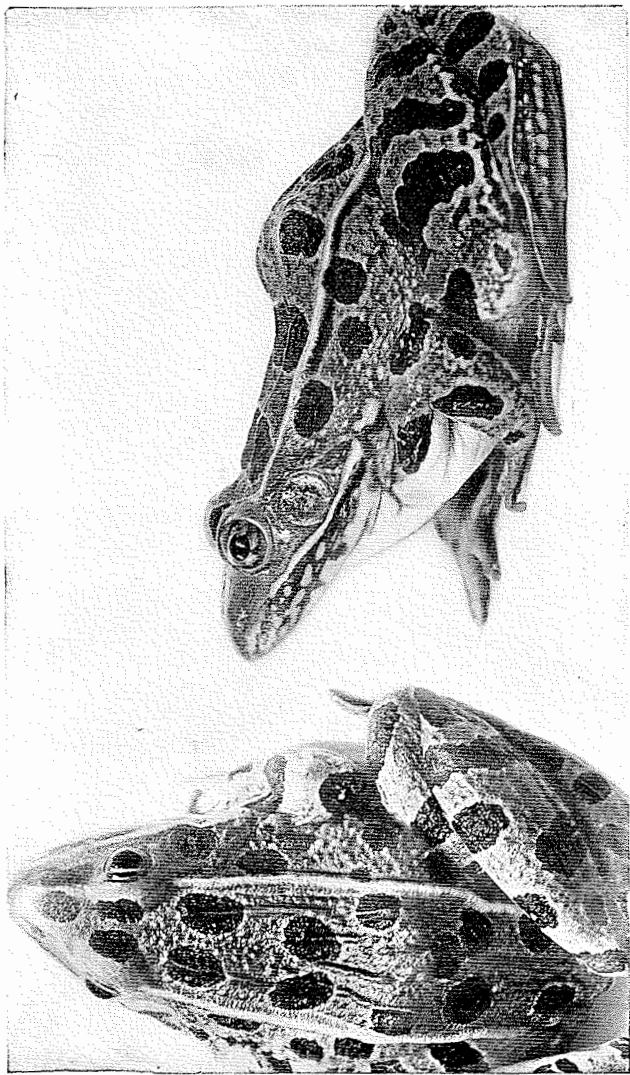
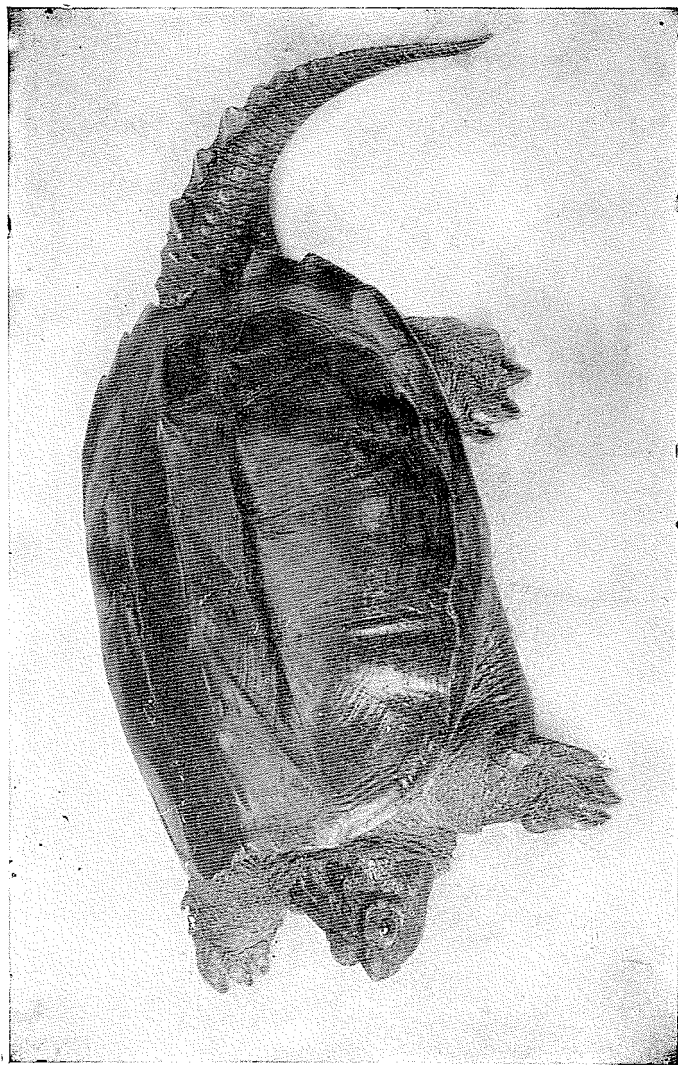


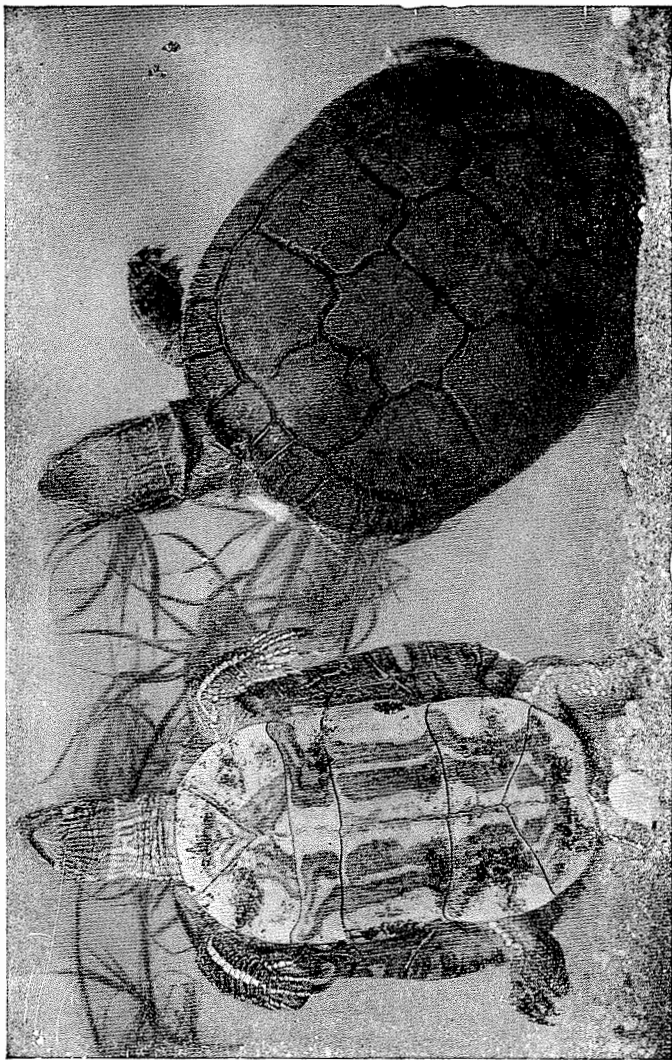
Fig. 2. HERNANDEZ'S HORNED LIZARD, *Phrynosoma douglassii hernandesi*. (See Page 19.)



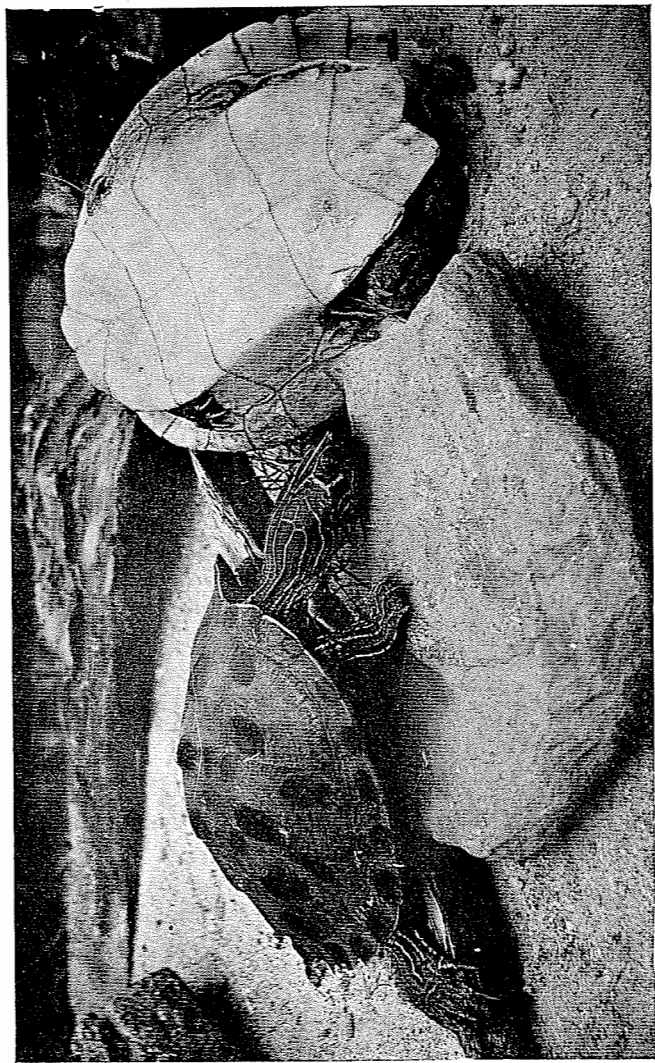
The COMMON LEOPARD FROG, *Rana pipens*.
Inhabits damp meadows around springs, creeks, rivers, and lakes over
the State. (See Page 14.)



COMMON SNAPPING TURTLE, *Chelydra serpentina*.
Found in rivers and lakes over the State. (See Page 16.)



BELL'S TERRAPIN, *Chrysemys belli*.
This is the olive colored, smooth backed Turtle seen in the rivers and lakes of the State. (See Page 17.)



LESUEUR'S TERRAPIN, *Malacoclemmys testudinaria*.
May be recognized by the serrated back and the large black spots.
(See Page 17.)

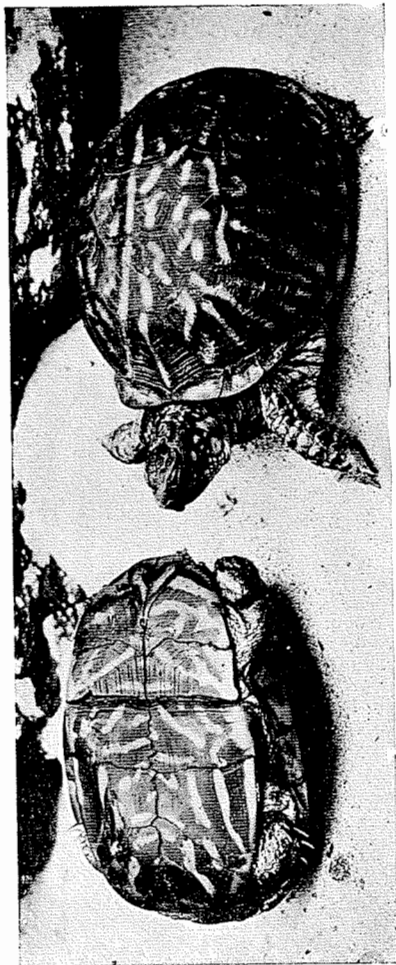


Fig. 1. PAINTED BOX TURTLE, *Cistudo ornata*. (See Page 17.)

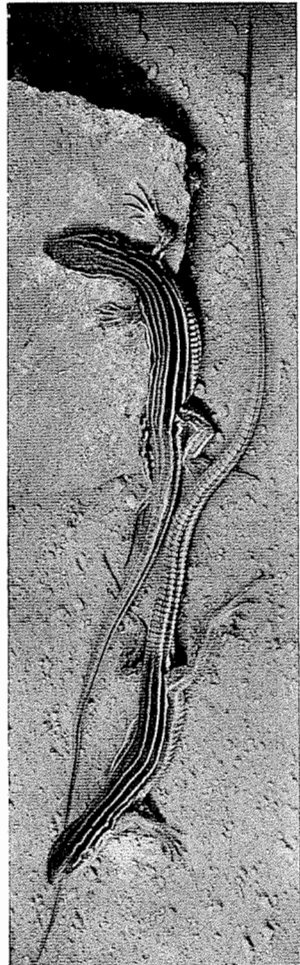
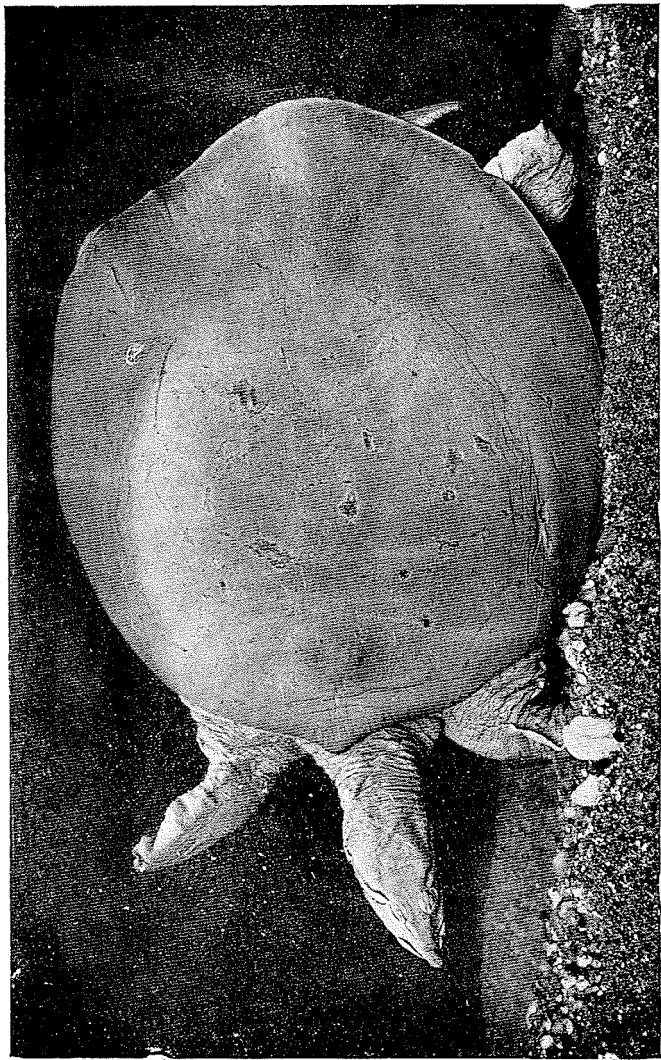
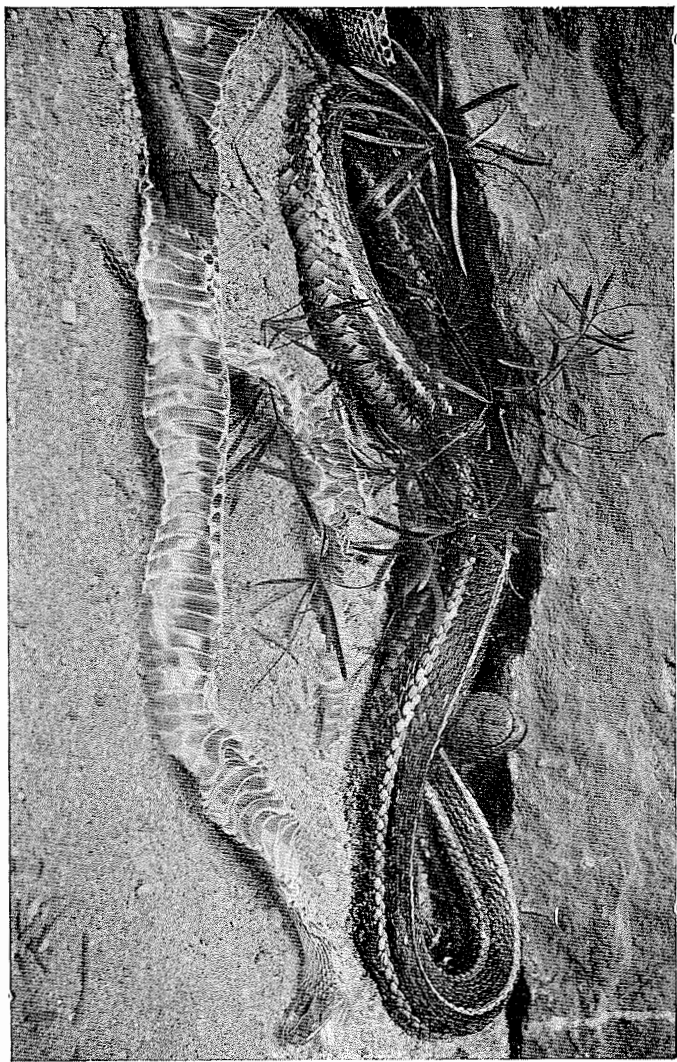


Fig. 2. SIX-LINED LIZARD; RACERUNNER, *Cnemidophorus scutellatus*.
These two forms are found only in the sandhill region south of White
River. (See Page 19.)



SOFT-SHELLED TURTLE, *Trionyx muticus*.
This Turtle has an adapted coloration that admirably matches the muddy river-bottom. (See Page 18.)

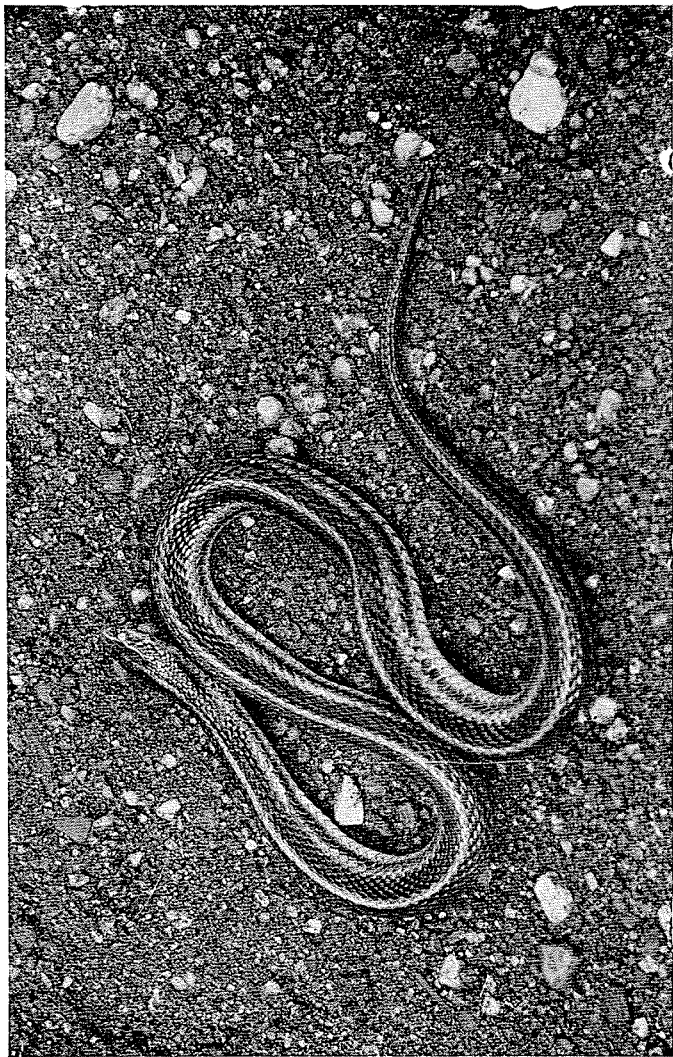


PLAINS GARTER SNAKE, *Entania radiata*.
May be found in damp meadows or along river and lake shores looking
for frogs. (See Page 21.)

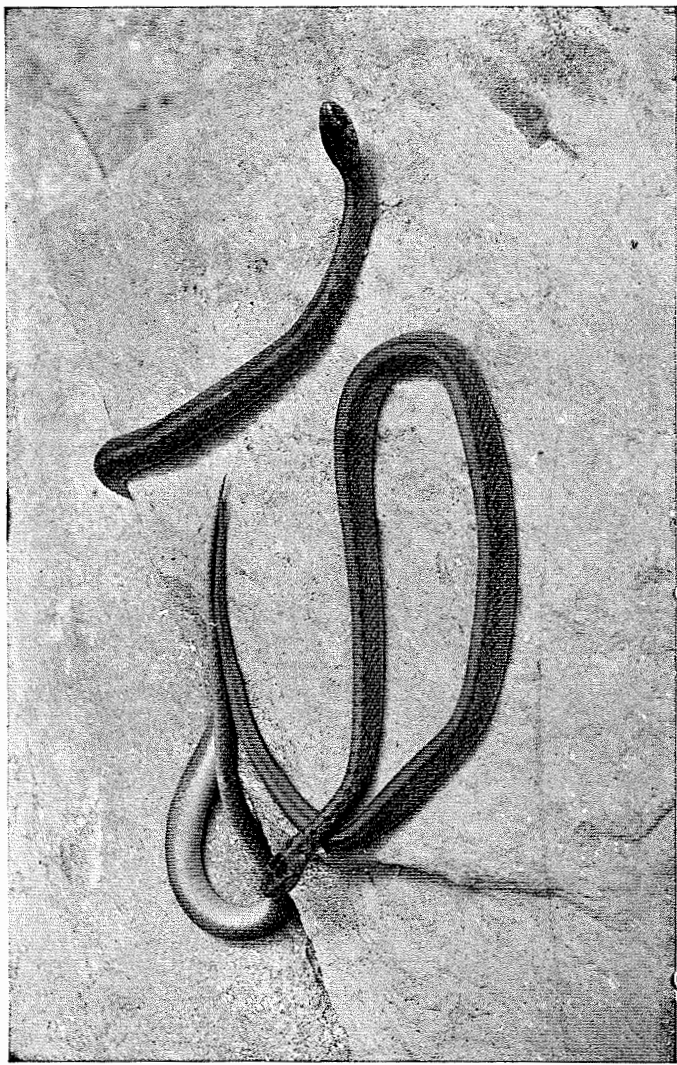


GREEN GARTER SNAKE, *Entania elegans vagrans*.
Found in damp places throughout the Black Hills. (See Page 22.)

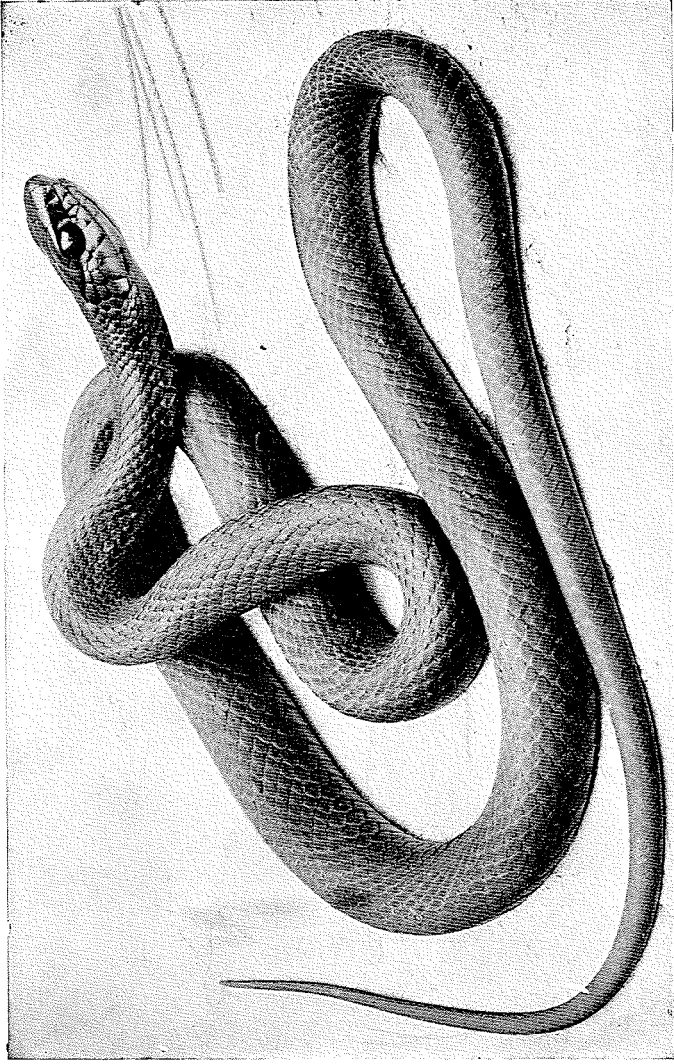
PLATE X



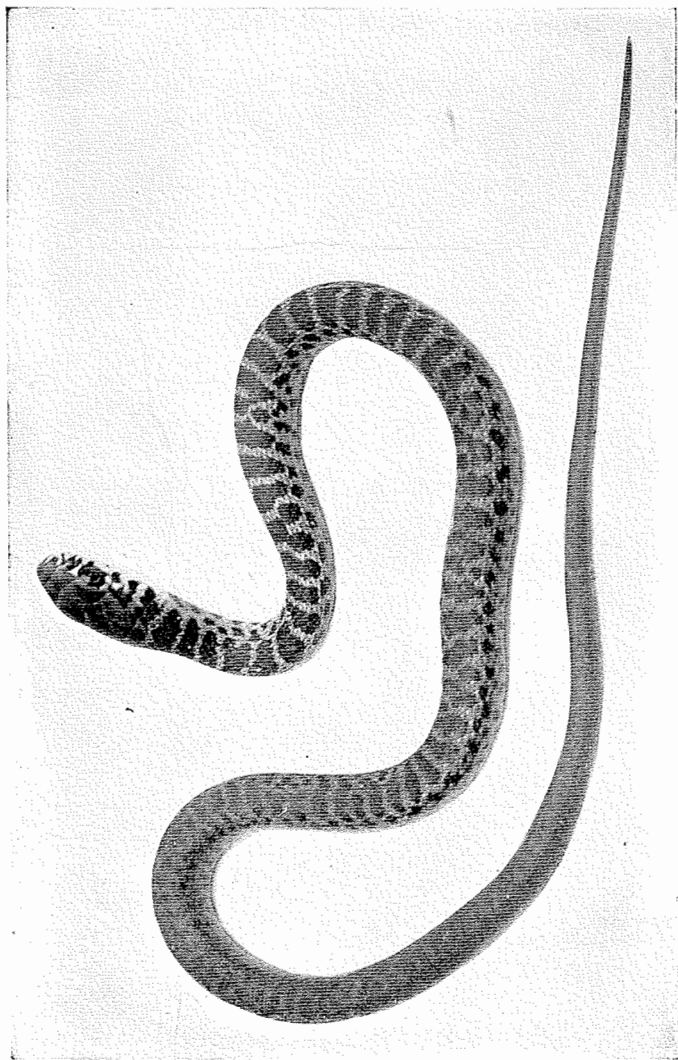
STRIPED SWAMP SNAKE, *Tropidoclonion lineatum*. (See Page 23.)



DEKAY'S SNAKE, *Storeria dekayi*. (See Page 23.)



BLUE RACER, *Zamenis constrictor flaviventris*. (See Page 24.)



YOUNG OF THE BLUE RACER, *Zamenis constrictor flaviventris*
The blotches usually fade into the uniform bluish or greenish shades of
the adult during the second or third summers. (See Page 24.)



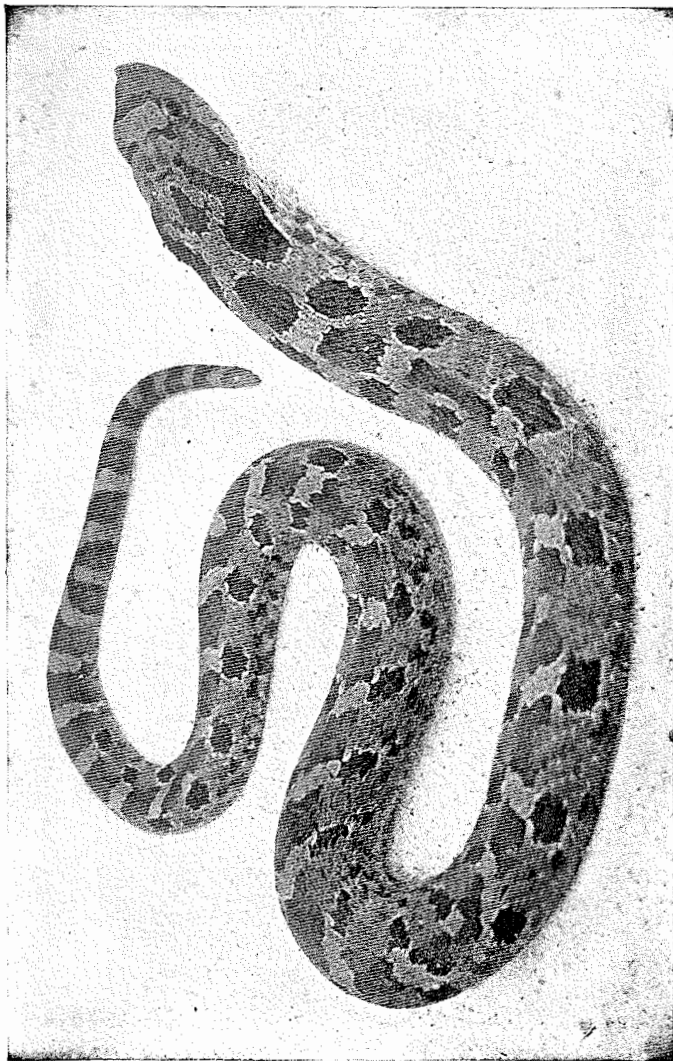
FOX SNAKE, *Coluber vulpinus*.
Inhabits only the southeastern part of the State, where it is often taken
for the Bull Snake. (See page 24.)



BULL SNAKE, *Pituophis sayi*.
May be found in most any environment over the State. (See Page 25.)



GREEN OR GRASS SNAKE, *Liopeltis vernalis*.
Widely distributed over the State but rare. (See Page 25.)



HOG-NOSED SNAKE, *Heterodon platyrhinus*.
May be recognized by its upturned snout. (See Page 27.)



PRAIRIE RATTLESNAKE, *Crotalus confluentus*.
The colors and markings well harmonize with the soil of the western prairies. (See Page 29.)