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Contributions to Texan herpetology.

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CONTRIBUTIONS TO TEXAN HERPETOLOGY

BY JOHN K. STRECKER, JR.
Curator of Baylor University Museum

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Notes on the Herpetology of Burnet County, Texas

BY JOHN K. STRECKER, JR.
Curator of Baylor University Museum

The present list of reptiles and amphibians is based largely on collections made by the writer during the months of August, 1902, and July and August, 1906. On both of my visits to the county, I had exceptional opportunities to collect material and I am under obligations to Messrs. D. G. Sherrard, L. L. Chamberlain, Charles and Hansford Stapp for many courtesies extended to me. These gentlemen kindly provided me with horses and vehicles whenever I needed them and in many other ways displayed an interest in my work.

In the town of Burnet, I examined two small collections of local reptiles. The only specimens of special interest in these two lots were poorly preserved examples of *Zamenis constrictor flaviventris* Say and *Gerrhonotus liocephalus infernalis* Baird, both of which species I failed to secure personally.

Burnet county is located in the south-central part of the State and is bounded on the north by Lampasas, on the east by Bell, Williamson and Travis, on the south by Blanco and on the west by San Saba and Llano Counties. The area is 1,010 square miles. On the west the Colorado River divides Burnet from the south-eastern corner of San Saba and forms most of the boundary line between it and Llano County. A few miles north of the southern boundary of Burnet, the river changes its course south and south-east and flows through the county in the direction of Austin.

My explorations were principally extended along the following tributaries of the Colorado: Hamilton on the right hand and Clear, Spring, Peter's, and Morgan's Creek on the left hand. Honey and Delaware, two small right-hand tributaries of Hamilton Creek were also followed for a considerable distance. The bed of the Colorado, when the river is low, is a wide expanse of red granite with a channel of swift-running water dividing it in the middle and with numerous water-filled hollows scattered along on both sides. A short distance above the mouth of Spring Creek is an island of considerable extent which separates the river into two channels and is sometimes overflowed during heavy rises. About two-thirds of this island is under cultivation, but I have forgotten its area.

Several of the canyons in the hills, through which some of the tributaries of the river flow, are well worth seeing. The Morgan Creek canyon in particular is one of the most beautiful places I have ever visited. Numerous springs

trickle down its damp walls, from under matted masses of many varieties of fern. At one place, near the top of the left hand wall of the canyon, a colony of Cliff Swallows have located their little city of retort-shaped nests. The creek is evidently fed entirely by springs and in some places it is a difficult matter to follow its windings, on account of the narrowness of the canyon and the slipperiness of the moist, fern-covered rocks. A magnificent natural grotto is located about three miles above the mouth.

Another locality famed for its beauty is Mormon Mills, midway between Burnet and Marble Falls. Here the canyon, falls, and deep pool, together with the old water wheel made by the Mormons who settled the county in early days, form a scenic combination worthy of an artist's best efforts. I did not visit Mormon Mills during my second visit but I understand that the old water-wheel is still in existence.

The town of Burnet is located in the central portion of the county and has an elevation of 1,300 feet. Most of the surrounding hills are merely great masses of stone or granite, either covered with a growth of cedar or utterly bare of vegetation. Some of these attain a height of over 1,800 feet. Post Mountain near Burnet is 1,556 feet high.

The reptilian fauna of Burnet County is largely Sonoran, Chihuahuan forms predominating. A careful study of the present list, together with that of the writer's former paper* on the species inhabiting the more eastern county of McLennan, will prove beyond a doubt the correctness of Dr. Arthur Erwin Brown's view** that the boundary between the Austroriparian and Sonoran reptilian faunas lies approximately between the ninety-sixth and the ninety-eighth meridians in Texas.

Taking into consideration the fact that the writer has been collecting reptiles in his home county (McLennan) for more than fourteen years and that his work in Burnet was accomplished in less than three months, it can readily be seen that while the number of Chihuahuan, Basin, and Central species found in both localities is about the same, the typical Austroriparian forms found at Waco out-number those of Burnet three to one.

About one-half of the Sonoran forms recorded from Waco are not known to occur east of that place and several Austroriparian species found at Burnet are not known from west of the granite country. Burnet County marks the eastern boundary to the range of *Uta ornata* B. and G., *Eumeces brevilineatus* Cope and (probably) *Crotalus confluentus* Say and *Zamenis taeniatus* Hallowell. Several of the reptiles and amphibians show the characters of more western forms of the same species. For instance, the chain-snakes (*Lampropeltis getula holbrookii*) are an approach to the variety *splendidus* Cope, and the common toads (*Bufo l. americanus*) are much larger and darker than eastern Texas examples and have noticeably shorter heads. My single *Thamnophis eques* is much like examples from Trans-Pecos Texas (Alpine) and very different from obscurely marked Waco specimens. Only about four out of each half-dozen examples of *Crotaphytus collaris* have a single row of in-terorbitalis.

* Proc. Biol. Soc. Wash. XXI, 1908, pp. 69-84.

** Proc. Acad. Nat. Sci. Phila. 1903, p. 551

REPTILIA.

Crotaphytus collaris Say.

Ring-necked Lizard.

This handsome lizard is more or less common in suitable localities throughout the county but shows a decided preference for limestone districts. None were found on the dark sandstone beyond Clear Creek but a few frequent boulders near Granite Mountain. The food of this species consists largely of crickets, grasshoppers, beetles, and other insects. It also preys on other lizards, especially the species of *Holbrookia* and the smaller *Scelopori*. Blossoms of plants were found in the stomachs of several of my specimens.

Young examples were tolerably common during the early part of July and I could detect no difference between their habits and those of the adults. Each specimen selects some particular boulder or flat rock as a basking place, and gives it up only when driven off by a larger and more powerful member of its species. Large males are wicked fighters, true "bullies" of the lizard tribe. The natives consider this lizard as poisonous as a rattlesnake. Local names, "mountain boomer" and "bull lizard." Specimens were collected in the following localities: Granite Mountain, Burnet (road leading past Post Mountain), Honey Creek, Clear Creek, Llano road (seven miles out from Burnet), Lion Mountain and near Mormon Mills. The largest and finest examples were obtained near Lion Mountain. Here they were found basking on large flat rocks lying along the roadside. As soon as we would drive near a specimen, it would raise the fore part of the body to the fully length of the forelimbs and remain in this pose until one of us attempted to leave the wagon. Then it would scamper off to a hiding place under another rock and when found would be coiled up snake fashion in a small hollow.

In a large series of these lizards from Burnet County only about 40 per cent have the single row of interorbitals of typical *collaris* while the remaining 60 per cent are about equally divided between those with a double row and those in which the two rows are fused. Several of the older examples with double rows have unusually broad heads and are undoubtedly intermediates between the typical subspecies and the variety *baileyi* of Trans-Pecos Texas and the Proplateau of New Mexico and Arizona.

The eggs of this species range from four to twelve in number and are deposited in the ground at a depth of two or three inches. My friend J. D. Mitchell, found *C. collaris* breeding in Llano County during the month of August.

Holbrookia texana Troschel.

Texas Spotted Lizard.

This is one of the most abundant of the Burnet County Lizards. In some sections of the State, these handsome little saurians are confined principally to the rocky banks of certain streams but here they occur indiscriminately. I found them on the mountain sides living among rocks, on the steep cliffs of the canyon at Mormon Mills, among brush along roadsides, and even on the sandy flats where they were burrowing under the roots of shrubs and trees. On the sandstone bluffs beyond Clear Creek I captured several examples of a dark,

reddish form of this species. These specimens, after remaining in spirits for nearly two years, could be readily distinguished from the large series from other localities that were contained in the same jar. When pursued, these lizards make no attempt to escape by entering the burrows of other animals but usually run from rock to rock until after they have been routed out several times and then make a final break for the cover of weeds and brush. I have chased them into water and for a distance of three or four yards they can swim fairly well. Central Texas examples of this species do not display as bright colors as those in the Trans-Pecos region, even during the breeding season.

Cnemidophorus gularis Baird and Girard.

Western Lined Lizard.

This species is as common in the hills as it is along the streams and in the lowlands. Along rocky roadsides it is usually found in company with *Crotaphytus collaris* and *Holbrookia texana*.

On the south side of Post Mountain I shot several adult lined lizards marked exactly like *sexlineatus*, with no traces of light spots between the lines and with fewer femoral pores, but as they had the long muzzles of *gularis* and the ante-brachial plates were present, I refer them to the latter species.

Uta ornata Baird and Girard.

Ornate Lizard.

This handsome little *Uta* is tolerably common on trees and rail fences be-
young Clear Creek. A few examples were collected on rocks near the mouth of Spring Creek. My specimens are probably the first to be recorded from any locality in Central Texas.

Sceloporus consobrinus Baird and Girard.

Marcy's Fence Lizard.

In some localities this interesting species is quite common, in others exceedingly rare. Specimens were collected in the following places: Sherrard's Ranch, Post Mountain, Clear Creek, Morgan Canyon, and at the mouth of Spring Creek.

In August, 1902, a large number of these lizards were collected around the bases of small trees and in brush heaps on Post Mountain, but when I revisited the same place four years later a single immature example was all that I could find.

Sceloporus spinosus Weigmann.

Texas Scaly Lizard.

This tree lizard is common and a large number of examples were collected. These differ greatly from those from the northern part of the State. Examples from the latter section have a dull greenish ground color and the markings are not as well defined. None of the Burnet County specimens show the slightest tinge of green, the lateral stripes vary from white to buff-yellow in different individuals and the markings (especially the transverse bars in the female), are coal black and unusually distinct. Several old specimens collected on rail fences in the woods were almost black.

Phrynosoma cornutum Harlan.

Texas Horned Lizard.

A few examples of this species were collected on the flats near Burnet but

none were observed in the other sections of the county.

Lieiolepisma laterale Say.

Ground Lizard.

Specimens of this slender little saurian were collected in almost every locality visited. They were especially abundant in Peter's Canyon. Toward dusk one evening I caught ten or eleven that were stirred out of the rank water grass growing alongside the creek. They attempted to escape by squirming up the sides of the canyon but were easily captured.

Eumeces brevilineatus Cope.

Short-lined Skink.

This interesting skink lizard is not uncommon and inhabits open woods as well as the more secluded canyons in the hills. In 1902 I saw a number of specimens but only succeeded in capturing one. In 1906 I made a special effort to collect a series and was successful in obtaining eight examples, five adults and three young. Its habits are similar to those of *Lieiolepisma* and I usually found them associated together in the same localities. At the White Eagle Copper Mine I collected both species under the same log in several instances. The average length of five adult specimens is 60 mm. (muzzle to vent). The total length of an adult with perfect tail is 172 mm.

The adult specimen is plumbeous above, light olive below. Tail colored like the body. A light band extends along the upper lip to a short distance behind the axilla, and another from the end of the muzzle over the eye to the corresponding point on the side, separated by two longitudinal rows of scales. In the adult these bands are either white or light cream color.

Young examples are similar to adults in markings but not in color. The upper surfaces vary from plumbeous to brownish olive, the light bands are buff and the tail is bright ultramarine blue. In hunting among dead leaves for these lizards, it is comparatively easy to keep track of young specimens on account of the color of the tail which renders them very conspicuous, but in the case of the adults it is quite different as their more uniform colors harmonize well with their surroundings. Their movements are wonderfully active and on this account, their capture is not an easy task. Their tails are as easily broken as those of *Lieiolepisma* and the least rough usage will cause their scales to slip in patches. Specimens of this skink are still rare in collections and our knowledge of its distribution is very limited. It does not appear to be found outside of Texas. Cope records specimens from two localities, i. e. Helotes, Bexar County and Fort Concho, Tom Green County. Vernon Bailey mentions a single specimen collected at Paisano, Brewster County, by William Lloyd. It doubtless occurs in all of the hill and mountain counties of the west-central and western parts of the State, but it is a species that is likely to be overlooked by any person who is not devoting his whole energies to reptile collecting. The collecting of my small series necessitated the turning over of scores of logs and large stones, and the tearing up of every mass of decaying wood and accumulation of dead leaves along my route. Probably 75 per cent

of the specimens seen by me succeeded in escaping.

This species is less diurnal in its habits than *Eumeces quinquelineatus*.

Eumeces obsoletus Baird and Girard.

Western Skink.

A magnificent example of this fine skink, measuring 348 mm. in total length, was captured on the Atkinson Ranch near the mouth of Spring Creek. It had fallen into a well that Mr. Atkinson was digging and he kindly refrained from disturbing it until he could notify me. It had concealed itself by burrowing and we had some difficulty in locating it, but finally routed it out by stirring the loose earth with a stick.

Eumeces tetragrammus Baird.

Baird's Skink.

A specimen of this skink was found under a log near Honey Creek.

Gerrhonotus liocephalus infernalis Baird.

Texas Gerrhonotus.

Mr. H. Whitney collected one specimen of this rare species at White Bluff, on the Morgan, and it is now in my collection. The collector informed me that it was very pugnacious and when cornered, reared up on its hind legs and snapped at his hands viciously.

Crotalus atrox Baird and Girard.

Texas Diamond Rattlesnake.

An example 750 mm. in length was found under a pile of rocks lying alongside the Fort Mason Road. This was the only one captured by me. Several skins on exhibition in Burnet were considerably over five feet in length.

Crotalus confluentus Say.

Plains Rattlesnake.

In September, 1906, Mr. Chamberlain captured a good-sized example of this species about three miles from Burnet. It must be rare as this was the first one he had ever seen.

Ancistrodon contortrix Linn.

Copperhead.

This species is said to be common, but I did not meet with it personally. I have one example collected at Burnet by Chamberlain.

Ancistrodon piscivorus Lacepede.

Cottonmouth.

Two specimens from Delaware Spring and Morgan Creek. The example from the last named locality was a female containing seven embryos.

Glauconia dulcis Baird and Girard.

Worm Snake.

An August, 1902, I collected a half-grown specimen of this species in a moist place near Delaware Creek. In 1906 an adult was found under a log near White Eagle Copper Mine.

Heterodon platyrhinus Latreille.

Blowing Adder.

A large, brightly marked specimen was killed in the town of Burnet during my second visit. It was of the banded type, in color and markings mimicking *Ancistrodon contortrix*. This locality is well within the range of *H. nasicus*, and I was surprised, when I examined this specimen, to find that it belonged to the eastern species.

Cyclophis aestivalis Linn.

Southern Green Snake.

Seven or eight specimens were observed at different times. The three speci-

mens in my collection were obtained between Burnet and Mormon Mills.

Tantilla gracilis Baird and Girard.

Graceful Tantilla.

Three adult specimens were found under logs near the White Eagle Mine.

Zamenis flagellum Shaw.

Coach-whip Snake.

Abundant, attaining a large size. Specimens were collected or observed in every locality visited. Most of these were gorged with locusts.

Zamenis constrictor flaviventris Say.

Yellow-bellied Racer.

This racer must be rare, as the poorly preserved specimen in one of the local collections before mentioned, is the only one I have seen.

Zamenis taeniatus Hallowell.

Mountain Racer.

Two fine examples from Clear Creek and Morgan Canyon. These specimens are dark, lustrous greenish-olive above, the lateral stripes are white and the lower surfaces excepting on the troat and tail, are closely and minutely blotched with greenish slate. The tail is pink below, the throat white. In the living specimen, the under parts are more or less suffused with red, which soon fades out in the preserving fluid. The color on the under surface of the tail is more lasting and is retained by one of my specimens which has now been in spirits for over eighteen months. The two specimens measure 1600 and 1650 mm. respectively.

The natives know this snake as the black or mountain racer in contra-distinction to the prairie racer as the coach-whip is commonly called. It is very difficult to capture as it readily climbs rocks and trees and is so rapid in its movements that it is almost impossible for one person to follow it close enough to be able to grasp it by hand.

Coluber emoryi Baird and Girard.

Emory's Pilot Snake.

I have one half-grown example from Burnet.

Pityophis catenifer sayi Schlegel.

Bull Snake.

I secured only one example of this widely distributed species. It was captured in a vacant frame building which it had probably entered in quest of rats and mice.

Lampropeltis getula holbrookii Stejneger.

Speckled King Snake.

One half-grown specimen from near Burnet.

Rhinochilus lecontei Baird and Girard.

Le Conte's Snake.

Two specimens. Clear Creek and Morgan Canyon.

Tropidonotus fasciatus transversus Hallowell.

Hallowell's Water Snake.

A large number of specimens of this water snake were obtained at several points along the Colorado River. Small examples were common in Peter's, Delaware, and Spring Creeks. The large specimens were shot while attempting to rob our fish-boxes.

Tropidonotus rhombifer Hallowell.

Diamond Water Snake.

This species is less abundant than *transversus* and only four specimens were collected. Hamilton, Delaware and Morgan Creeks.

Virginia elegans Kenn.

Virginia's Snake.

One specimen was captured near the White Eagle Mine, on Spring Creek.

Thamnophis marcianus Baird and Girard.

Marcy's Garter Snake.

One young example of this checkered *Thamnophis* was captured in a damp path running along the side of Delaware Creek. This species is less aquatic in its habits than the other garter snakes I am familiar with.

Thamnophis eques Reuss.

Reuss Garter Snake.

I captured a very typical example of this rare snake in Morgan Creek Canyon. In this specimen the nuchal blotches are very distinct and on each side of the dorsal line, the spots are fused together, forming a peculiar zigzag longitudinal band.

Thamnophis proximus Say.

Say's Garter Snake.

Specimens of this, the commonest of the Texas species of *Thamnophis*, were collected in every locality I visited. The finest examples were obtained in Peter's Caynon.

Thamnophis sirtalis parietalis Say.

Western Garter Snake.

One adult specimen was collected near the White Eagle Copper Mine.

Elaps fulvius Linn.

Harlequin Snake.

Said to be rather common, but the only specimen I saw living was one that we discovered in our camp on the Morgan. Mr. Chamberlain collected a very fine specimen for me, and I saw two in Mr. Whitney's collection. The local names for this species are "corn snake" and "thunder snake."

Chrysemys elegans Wied.

Elegant Turtle.

Specimens were secured in several of the streams.

Chrysemys texana Baur.

Texan Turtle.

Three examples were seined in Morgan Creek.

Aromochelys tristycha Agass.

Texas Musk Turtle.

I captured an adult specimen of this turtle in the bed of Delaware Creek. It had accidentally fallen into a dry hollow among the rocks and was unable to get out.

Kinosternon flavescens Agass.

Yellow Mud Turtle.

Specimens of this species were collected in Spring and Morgan Creeks and a tank near Post Mountain.

Aspionectes emoryi Agass.

Emory's Soft-shelled Turtle.

Common in the Colorado River.

Terrapene ornata Agass.

Painted Box Tortoise.

Two specimens were found on the flats near Burnet.

Graptemys geographica Le Seur.

Map Turtle.

Two specimens were seined in the Morgan and several shells were found on the banks of Delaware Creek.

Graptemys oculifera Baur.

Baur's Turtle: Ocellated Turtle.

A single example was seined in the Morgan Creek.

AMPHIBIA.

Ambystoma microstomum Cope. Small-mouthed Salamander.
I have one specimen collected near Marble Falls.

Ambystoma tigrinum Green. Tiger Salamander.
Mr. Chamberlain collected an example of this salamander near Burnet.

Scaphiopus couchii Baird and Girard. Couch's Spadefoot.
Near Spring Creek, a single example of this species was found half-buried in moist earth under an old log. It is said to be common in wet weather. This is on the authority of Chamberlain, who has helped me capture specimens of this spadefoot at Waco.

Bufo lentiginosus americanus Le Conte. American Toad.
Somewhat common.

Bufo valliceps Wiegmann. Nebulous Toad.
Specimens were collected at Sherrard's Ranch, White Eagle Mine, Morgan Caynon, and in a dry wash on Post Mountain.

Bufo punctatus Baird and Girard. Spotted Toad.
I found one specimen of this toad in a hollow log on the Sherrard Ranch and a second one was captured in a gutter in Burnet during a heavy shower.

Bufo debilis Girard. Green Toad.
Two immature specimens. One was found hopping along a water-filled rut in the Fort Mason road; the other was found under a stone near the White Eagle Mine.

Bufo compactilis Wieg. Spade-foot Toad.
Near Lion Mountain, a half-grown specimen of this toad was found under a stone lying along the road-side.

Rana pipiens Kalm. Leopard Frog.
Leopard frogs from a tank near Post Mountain are typical *pipiens*.

Rana sphenoccephala Cope. Southern Leopard Frog.
Several leopard frogs collected on the Morgan have the long snout and limbs, white spot in the middle of the tympanum, and peculiar coloration of this species.

Rana catesbiana Shaw. Bull Frog.
I shot a half-grown example in Delaware Creek. This was the only one observed by me.

Acris gryllus crepitans Baird. Western Cricket Frog.
Very abundant along all of the water-courses.

Hyla cinerea Daudin. Green Tree Frog.
One example from near Delaware Spring. It was found at the end of a limb overhanging the water.

Chorophilus triseriatus Wied. Striped Tree Frog.
One specimen was collected near the mouth of Spring Creek.

Reptiles and Amphibians Collected in Brewster, County, Texas

BY JOHN K. STRECKER, JR.

In the Spring of 1905, the writer undertook an exploration of Brewster County in Trans-Pecos Texas, in the interest of the Baylor University Museum. He was accompanied by Mr. William T. Baines of Alpine as guide and Mr. Earle Prade of Waco as taxidermist.

The base of supplies was Alpine, the county seat of this immense tract of land which is one of the largest and, physiographically, the roughest, counties in the State. From the 18th to the 28th of April, we were encamped at Paisano Pass on the border of Presidio County, and on the return trip spent two days at Blackburn's Ranch, between that point and Cathedral Mountain.

On returning to Alpine we spent two days in outfitting and then crossed the county from north to south in an attempt to make the higher elevations of the Chisos Mountains. We first headed in a south-easterly direction, crossing Calamity Creek, passing by Elephant Mesa and through the Santiago Mountains; thence changed our course to the south-west, crossed Terlingua Creek in the Cinnabar Region and then south-eastward again into the foot-hills of the Chisos Range.

Near Paisano, I happened to an accident which placed me on the cripple list for the rest of the trip. In an attempt to scramble over some high rocks while in pursuit of a rare bird, I had the misfortune to slip and fall a distance of nearly thirty feet, landing on my stomach on some jagged rocks. As a result, a large contusion was formed, which, finally developing into an abscess, incapacitated me for very active work for several months.

On the trip to Terlingua and beyond, we suffered greatly from the extremes of heat and cold and from a lack of wholesome drinking water. For several days we were on a diet of canned fruit and tomatoes, these being about the only articles of food which were not saturated with either formalin or kerosene.

As a consequence of these misadventures, the results of the trip were poorer than we had wished for, but we succeeded in obtaining a small but valuable collection of birds, a number of mammals and a fairly representative series of reptiles and amphibians.

After we returned from our attempt to conquer the Chisos, we camped in Du Bois Canyon for several days and then devoted the rest of our stay in the county to collecting in the neighborhood of Alpine. As I look back over the months of misery which followed in the wake of this "hard-luck" trip, many of its incidents recur like remembrances of a long-drawn-out nightmare.

To the indefatigable Prade is due much of the credit for the material collected and the observations recorded and I express my gratitude to him and Baines for their valuable services and cheerful companionship.

In the following list, for the sake of completeness, I have included mention

of those species obtained by members of the United States Biological Survey on their trip through Brewster County. (See Bailey, North American Fauna No. 25; "Biological Survey of Texas.")

REPTILIA.

Crotaphytus collaris baileyi Stejn.

Bailey's Ring-necked Lizard.

This fine lizard was common on the "Big Hill" near Alpine, at Blackburn's Ranch (six miles from Paisano) and near Elephant Mesa. In five females obtained on the "Big Hill," the nuptial coloration was in the form of transverse bands of pink, about four across the body and several on the tail. Dates, May 7th and 8th. All of my examples exhibit a double row of interorbitals, so I consider them typical of this much discussed subspecies.

The Biological Survey examples are from the west base of the Chisos Mountains and Paisano.

Crotaphytus wislizenii Baird and Girard.

Leopard Lizard.

"A fine large individual of this big spotted lizard was shot near Boquillas in the Big Bend of the Rio Grande, by McClure Surber * * * The species is not common and occurs only in the low hot valleys of extreme arid Lower Sonoran Zone." (Bailey).

The Big Bend doubtless marks the eastern limit to the range of this fine species. I saw a large lizard which I supposed to be *wislizenii* in the hot desert strip between Butcherknife and Terlingua, but I was too much crippled to pursue it and the boys were off on a quail hunt and out of call. The breeding colors, in examples from near El Paso, sent me while fresh by Messrs. Townsend and Barber, were gorgeous. The under parts were bright crimson and the upper parts were spotted with the same color.

Holbrookia texana Troschel.

Texan Spotted Lizard.

Inhabits the low, hot desert strips. It was not observed near Alpine but was extremely abundant from Butcherknife to the base of the Chisos Mountains. The examples collected were so brilliantly colored that I could hardly realize that they were of the same species that occurs in Central Texas. Recorded by Bailey from Boquillas and McKinney Spring.

Holbrookia maculata Girard.

Spotted Lizard.

Specimens of this species were obtained at Alpine, Paisano, Du Bois Canyon and Blackburn's Ranch. The Biological Survey specimens are from about the same localities.

The females collected by us are very variable in markings but the upperparts are uniformly of a light clay color. An interesting series of these lizards was received at the Museum from Hockley, Yoakum and Garza Counties in the Plains Region. These are in the breeding colors and are very handsome specimens, although they have now been immersed in formalin for several months. The males are similar to those from Brewster County but the females are very

differently colored. The ground color is less buffy and the back is ornamented with five red stripes, a dorsal and two lateral ones on each side. Between these stripes are numerous, closely placed blotches of the same color.

Uta stansburiana Baird and Girard. Stansbury's Lizard.

Prade collected a single example of this brown-shouldered lizard in the arid strip beyond Elephant Mesa. It was the only one seen by us. Bailey does not record it from any locality in Brewster County.

Uta ornata Baird and Girard. Ornate Lizard.

This species was quite abundant in Du Bois Canyon and at Paisano, where they were living among rocks. Several females captured in Du Bois had the throat colored orange instead of blue, as in the male. Recorded by Bailey from the Chisos Mountains and Altuda.

Sceloporus torquatus poinsettii Baird and Girard. Poinsett's Lizard.

Recorded by Bailey from the Chisos Mountains and fifty miles south of Marathon. We found this fine *Sceloporus* quite common among rocks on the Blackburn Ranch. When pursued these lizards seek refuge in narrow crevices and will permit themselves to be pulled out piecemeal in preference to relinquishing their hold.

Sceloporus spinosus clarkii Baird and Girard. Clark's Lizard.

Boquillas (Bailey). This variety of *spinosus* is confined, in Texas, to the Trans-Pecos Region.

Sceloporus consobrinus Baird and Girard. Marcy's Fence Lizard.

I captured an example of this little fence lizard on an old corral near Paisano Pass. Prade collected a second along the road past Elephant Mesa.

Sceloporus merriami Stejn. Merriam's Lizard.

One specimen from Boquillas is recorded by Bailey.

Phrynosoma cornutum Harlan. Texas Horned Lizard.

We collected specimens of this species near Alpine and in the arid strip beyond Elephant Mesa. Bailey records it from the Grand Canyon of the Rio Grande.

Phrynosoma modestum Girard.

Examples were collected about five miles out from Alpine and at various places along the route to the Chisos.

The ground color, in the series obtained, was very variable, ranging from light buff to rusty brown and almost coal black.

I have every reason to believe that this species, like the horned lizards of the *douglassii* group, is viviparous.

Coleonyx brevis Stejn. Banded Gecko.

I collected a single example of this little Gecko in the Chisos foot-hills. It was running around among rocks on a hillside, just before dusk and on account of its rather feeble movements was easily captured. In the living specimen the bands were brown and sulphur yellow.

Gerrhonotus liocephalus infernalis Baird.

Texas Gerrhonotus.

Bailey records a specimen of this rather rare species from 6,000 feet in the Chisos Mountains. We obtained one example in the foot-hills of the same range.

Cnemidophorus tessellatus Baird and Girard.

Whip-tail Lizard.

Recorded from Boquillas by Bailey. We collected a fine adult example about five miles from Terlingua.

Cnemidophorus perplexus Baird and Girard.

Seven-lined Lizard.

A number of these swifts were collected in the arid strip beyond Elephant Mesa. A few were obtained near Paisano, at Blackburn's Ranch and in Du Bois Canyon.

Cnemidophorus gularis Baird and Girard.

Western Lined Lizard.

Paisano, Du Bois Canyon, and Butcherknife. In life these specimens differ from Central Texas examples by having the light lines buffy yellow instead of green.

Eumeces brevilineatus Cope.

"Lloyd collected a single example at Paisano in a damp fernery at 5,300 feet." (Bailey).

Eumeces tetragrammus Baird.

Baird's Skink.

One example from among rocks, on the road from Paisano to Blackburn's.

Eumeces obsoletus Baird and Girard.

Sonoran Skink.

I saw, but did not succeed in capturing, a large adult specimen of this skink at Blackburn's. It was stirred out from among rocks, only about a quarter of a mile from the ranch-house. As a rule, I do not believe in including records not based on actual specimens in hand, but this species is so conspicuous and so unlike other Texan skinks when adult, that there can be very little possibility of my being in error.

Diadophis regalis Baird and Girard.

Regal Ring-necked Snake.

Bailey records one specimen from the Chisos Mountains at 5,000 feet.

Zamenis flagellum Shaw.

Whip Snake.

Said to be abundant at Paisano and Blackburn's but we saw only a single specimen. Chisos Mountains (Bailey).

Pityophis caternifer sayi Cchlegel.

Bull Snake.

Paisano (Bailey) and Alpine. Said to be common in dog towns.

Chionactis episcopus isozonus Cope.

Bailey records a single example from the Chisos Mountains at 6,000 feet.

Tropidonotus sipedon transversus Hallowell.

Tropidonotus rhombifer Hallowell.

These are probably the only snakes of the genus *Tropidonotus* that occur in this portion of the Trans-Pecos Region. Water-snakes were frequently observed in Calamity Creek but only one specimen of each of these two species

was collected.

Thamnophis marcianus Baird and Girard. Marcy's Garter Snake.
Boquillas (Bailey) Paisano and Alpine.

Thamnophis eques Reuss.

Prade collected a fine adult specimen of this handsome, spotted garter snake at a small tank near Alpine.

Coluber emoryi Baird and Girard. Emory's Pilot Snake.

I found a young example of this species under a fallen tree near Paisano Pass.

Crotalus atrox Baird and Girard. Texan Rattlesnake.
Boquillas (Bailey) and Terlingua.

Crotalus lepidus Kenn. Kennicott's Rattlesnake.
Chisos Mountains and Paisano (Bailey).

We did not see a single rattlesnake at Paisano during the ten days we were camped there but this is easily accounted for by the earliness of the season. This species is sometimes called the green rattlesnake, supposedly on account of the color of the light bands, but Bailey describes his specimens as being dark rusty brown with a pinkish tinge. A specimen in the Baylor Museum from the San Blas Mountains, Chihuahua, when fresh, had the light bands salmon colored.

Chrysemys texana Baur. Texan Turtle.

Chrysemys with yellow head markings were frequently observed in Calamity Creek, and the larger tanks. A half-grown specimen from Calamity is a fairly typical example of the species described by Baur.

Kinosternon flavescens Agass. Yellow Mud Turtle.

This mud turtle is abundant in tanks near Alpine.

Terrapene ornata Agass. Painted Box Tortoise.

Flats near Alpine. Du Bois Canyon.

AMPHIBIA.

Rana pipiens Kalm. Leopard Frog.

Calamity Creek and tanks on Blackburn's Ranch.

Acris gryllus crepitans Baird. Western Cricket Frog.

Same localities as *Rana pipiens* Kalm.

Bufo lentiginosus woodhousii Baird and Girard. Western Toad.

Alpine and Blackburn's Ranch.

Bufo punctatus Baird and Girard. Spotted Toad.

My friend J. D. Mitchell, collected a number of juvenile examples of this toad near Boquillas in the Big Bend of the Rio Grande.

Notes on the Texan Salamander

(*Ambystoma texanum* Matthes)

BY JOHN K. STRECKER, JR.

Five members of the widely distributed salamandrine genus *Ambystoma*, have been recorded from Texas. The habitat of one of these, the *Salamandra texana* of Matthes (*Ambystoma texanum* Cope) is apparently confined within the boundaries of the State. This salamander was first described in 1855 and in the half century that has elapsed since then, less than twenty specimens have been added to collections. Most of these are immature examples and have been recorded from only two definite localities, i. e. San Antonio and Waco. Future explorations will probably disclose the fact that the animal is not uncommon in some portions of the central and southern sections of the State, in river lowlands subject to overflow.

Ambystoma texanum is figured on plate 35 of the Report of the United States and Mexican Boundary Survey (Senate Documents, Thirty-fourth Congress, first and second sessions, 1855-56) with the locality given as "the Lower Río Grande." Cope (Batrachia of North America) describes in detail young examples obtained at San Antonio by Col. J. D. Graham (U. S. National Museum Coll. No. 4044, eleven examples).

In the Proc. Biol. Soc. Wash. for 1908 (page 80) the present writer gave a description of a single example, (presumably a well grown adult) from Waco. In May, 1908, Mr. Julius Hurter of St. Louis collected one example at San Antonio. In the Spring of 1908, I had the pleasure of finding the eggs of this species and of capturing a number of larval specimens and two examples of the mature form which had probably just completed the larval stage.

As nothing has been published regarding the life history of the species, I believe that my meagre notes will prove of interest.

CHARACTER OF THE SPECIES.

At first sight *Ambystoma texanum* shows many points of resemblance to the nearly related *A. microstomum* Cope but it only requires a very cursory examination to convince one that it is a very distinct species.

The proportions in the two species are much the same in some respects but the colors in living specimens are conspicuously different. The light colored underparts of *texanum* and the light yellowish spots between the costal folds readily distinguish it from the more uniformly colored, light speckled and darker *microstomum*. The light spots between the costal folds, like the yellow blotches on the dorsal area of immature Texan examples of the Nebulous Toad (*Bufo valliceps* Wieg.) are not always constant and usually disappear in the preserving fluid. The two young examples collected by me differ from all of the other Texan salamanders in the great contrast between the darker upperparts and the very light colored (almost white) underparts.

The following table will serve to illustrate the principal external differences between *texanum* and *microstomum*. (Based on examples of approximately

the same sizes).

MATERIAL.

Ambystoma texanum.

Three examples (one adult and two young) from Waco, Texas.

A. microstomum.

Thirteen from Waco, Victoria and Laguna, Texas; one from St. Louis, Mo., and one from St. Clair County, Illinois.

COLORATION.

Adults light to dark brown above, yellowish beneath.

Young, brown (1) dull lead color (1) above, underparts almost white with only a slight yellow tinge.

Blackish brown to black, underparts lighter but not forming a sharp contrast.

Essentially the same as that of adults; in most cases young examples are unusually dark.

MARKINGS.

A few light (yellow) spots between the costal grooves. A few on the belly, in one specimen.

Numerous lichen-like specks of gray or plumbeous on the back and especially on the sides. In young examples these spots are almost white.

PROPORTIONS, ETC.

Width of head contained from 4 to 4½ times in distance to groin.

Four intercostal spaces between fore and hind limbs when appressed to sides.

Jaws more deeply cleft.

Dorsal furrow distinct.

Fourteen costal grooves.

Width of head contained from 6½ to 7 times in distance to groin.

Six intercostal spaces between fore and hind limbs when appressed to sides.

Mouth small.

Dorsal furrow slight.

Fourteen costal grooves.

Habitat: My adult specimen of *A. texanum* was collected at a point five miles south of Waco, in a small bottom which is subject to overflows.

About a mile and a half from Waco, on the east side of the Brazos River and lying along the line of the M., K. and T. Railroad, is a tract of land that at one time had formed a marsh for at least eight months of each year. This land is in a hollow basin and the water was supplied by backwater from the Brazos during occasional floods, reinforced by heavy rains during spring and early summer. Some years ago this marsh was thoroughly drained and a dirt levee thrown up and for some time it seemed as though the experiment had proven a perfect success. For four or five years extensive crops of cotton and corn were grown on its site and only isolated small hollows and ditches were water-filled during the spring rains.

In the spring of 1908, this section of Central Texas was the scene of dis-

astrous floods which covered nearly the entire surface of East Waco with water and for a period of ninety days the marsh district reminded one of the days of "Auld Lang Syne." Nearly all of the water composing the newly-formed marsh was backed up from the Brazos River and after the flood waters had largely subsided, river turtles were left stranded in large numbers.

In former years a mud turtle (*Cinosternum louisianae* Baur) was the sole *Chelonian* inhabitant of the old marsh but the new one was filled with numerous examples of *Chrysemys texana* Baur. These turtles were evidently dissatisfied with their quarters, on account of the muddiness of the water, and early displayed a disposition to migrate. One morning I found eighteen dead specimens that had been crushed by passing trains. I must confess that the sight of these mangled specimens made me heartsick, as I had always considered this *Chrysemys* an uncommon species with us.

Living examples of *Cinosternum louisianae* and *C. flavescens* Agass were captured in the ditches alongside the railroad track. The turtles of this genus, however, show a preference for muddy water, and, unlike the *Chrysemys*, had made themselves very much at home.

NOTES ON BREEDING HABITS AND LARVAE.

On the 5th of April, while dipnetting for crayfish along the edges of the marsh and the ditches running into it, I accidentally discovered some salamander eggs attached to an overhanging weed cluster. These eggs resembled those of the small-mouthed salamander (*Ambystoma microstomum*) but I was satisfied that they were not those of that species, which is an unusually early breeder, good-sized larvae often being found as early as the first of February, long before the earliest breeding *Hylidae* go into the water. The large weed cluster to which the eggs were attached was one that had been growing along the edge of the bank and had been stepped upon and broken and was lying along the surface of the water for nearly half its length. The eggs were in seven clusters containing 8, 7, 6, 6, 5, 4 and 4 eggs, respectively, and the gelatin mass was already swollen from contact with the water. They averaged about one-twelfth of an inch in diameter and contained very tiny but well developed, blackish embryos. I judged that they had been deposited some three or four days previously. Attached to some weed stalks about six feet away was an enormous cluster of the eggs of the leopard frog, (*Rana pipiens* Kalm.) nearly four inches in diameter.

On the 1st of May, several young larvae about 13 mm. in length, flabby, tender and with filamentous gills were seined in a fine meshed net, near the place where the eggs were discovered. These specimens were light olive in color, but unlike the larvae of *A. microstomum*, were without blotches along the back.

Later in the month (about the 20th I should say) I used my net in the shallow pools alongside the railroad track and was rewarded by the capture of nearly a dozen larval salamanders each about 45 mm. in total length. These specimens were light olive above with a light dorsal and two light lateral

stripes of a shining, brassy hue. The underparts were white and the branchiae were blackish.

Compared with *microstomum* larvae of approximately the same size, these specimens are slenderer, but with broader heads, and with jaws more deeply cleft. The tails of several of them were badly mutilated by crayfish.

An hour or two later the two young salamanders were discovered on the other side of the ditch where I had discovered the eggs the month before. One was found under a small plank, one end of which was lying in the water. The other was found in the entrance to a deserted crayfish hole. Both were quite active and made strenuous efforts to escape.

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