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THE AMPHIBIANS AND REPTILES OF THE
GUADALUPE MOUNTAINS OF NEW
MEXICO AND TEXASBY WALTER MOSAUER¹

DURING the summer of 1930, I had occasion to spend more than a month in the Guadalupe Mountains, a range which extends from southeastern New Mexico into western Texas as a continuation of the Sacramento Mountains. The opportunity was taken to collect as many different kinds of reptiles and amphibians as possible and to study their habits. Although the number of species obtained is relatively small, it has seemed advisable to publish the results of this work since so far little has been reported on the herpetological fauna of the region. The specimens have been deposited in the Museum of Zoology, University of Michigan.

From July 5 to July 25 my companion and I stayed in Dark Canyon, about 40 miles west of Carlsbad, New Mexico, at an elevation of approximately 5,500 feet. This whole region belongs to the Upper Sonoran Zone of Bailey but includes two very different habitats. a) The arid, rocky canyon walls, partly formed by vertical rocks of considerable

¹ Contribution from the Zoological Laboratory of the University of Michigan.

height, partly by more or less steep slopes on which the typical yuccas, sotol, lechuguilla, ocotillo, several cactuses, etc., are abundant. On the higher ridges grow scattered alligator juniper trees. *b*) The flat, humid canyon bottom, from a hundred feet to about a mile in width. A little stream winds through the grassy meadows, containing a variety of semi-aquatic plants. In many places the stream forms deep pools, some of them several hundred feet long, in which the water is practically stagnant. Algae and higher waterplants grow abundantly in these pools. Groves of numerous deciduous trees, mixed with junipers, extend more or less in continuity throughout the canyon. Where the bottom gradually rises to the rocky slopes, the drier ground is covered by a dense growth of catclaw and other shrubs.

During the second part of our stay in the Guadalupe Mountains (July 26–August 10) our headquarters were south of the New Mexico-Texas boundary line, at Frijole, Texas. Here we collected partly around our camp at about 6,000 feet elevation but took numerous trips also into the plateau region, which is covered by beautiful pine and spruce forests (Bailey's Transition Zone). The habitats found in the Texan part were as follows: *a*) Arid plains at the east base of the southern Guadalupe Mountains. The southern part of the range rises abruptly from very gently sloping plains which are broken up by the canyons coming down from the mountains. The vegetation of the region shows cane cactus, scattered yuccas, sotol, ocotillo, and a number of low forms. The ranch and post office of Frijole, Texas, are located here close to the range. *b*) Arid ridges and slopes, which resemble the slopes of Dark Canyon. This type extends up to the edge of the plateau at about 9,000–9,500 feet elevation where, more or less abruptly, the pine and spruce forest begins. Yuccas, sotol and ocotillo, catclaw, and low dense shrubbery form the typical vegetation. *c*) Narrow canyons, in which the pines of the plateau region come down to 6,000 feet elevation and lower. The canyons, only a hundred feet or less wide, are very steep in the higher part and are filled with huge white

boulders. The dead leaves of the dense timber fill the spaces between the boulders. *c*¹) In one of these canyons, at about 6,000 feet elevation, there was a spring of ice-cold mountain water, which continued for a few hundred feet as a tiny stream, forming miniature ponds. A very abundant growth of delicate ferns and other humidity loving plants followed its course. A dense grove of oaks, maples, and pines rendered the place shady and cool even on the hottest days. *d*) The coniferous forest of the plateau region, Bailey's Transition Zone, which shows pines and Douglas spruce as typical trees. Underbrush and herbaceous plants are abundant. *e*) South of Guadalupe Peak the foothills and plains region at the foot of the range open through the wide Guadalupe Canyon into the lower creosote bush flats. The canyon has rocky slopes and an arid bottom with big boulders. The type of vegetation does not differ considerably from that of the other arid slopes of the region.

The foregoing account shows clearly the very different habitats that are included in Bailey's Upper Sonoran Zone. In order to bring out more clearly the specific distributions of the reptiles in the mountains, the species are referred to the habitats as above outlined rather than to the more inclusive life zones. It would certainly be inexact to speak of *Thamnophis eques* simply as a reptile of the "arid Upper Sonoran Zone" while its typical habitat is the border of streams and ponds in humid canyon bottoms. Similarly it seems unlikely that *Eumeces humilis* occurs anywhere outside of the dense vegetation of canyon bottoms or the plateau forest. It would be misleading to speak of its distribution merely as "Upper Sonoran Zone."

Regarding the numerical distribution of reptiles over the different habitats found in the region, an observation could be made analogous to one made by me concerning the North African deserts. There, typical desert animals were found to be much more numerous in a zone around the oasis than in the vast open stretches of desert. In the Guadalupe Mountains, reptiles which are explicitly rock dwellers or lovers of arid

habitats, are much more common in the lowest zone of the arid slope, close to the canyon bottom. The open, dry, rocky ridges are practically devoid of reptile life. This is almost certainly due to the abundance of insect life near the canyon bottom, and its general scarcity on the ridges.

I am pleased to acknowledge my indebtedness to Professor Frank N. Blanchard for continuous assistance and valuable advice in preparing this paper, to Mrs. Helen T. Gaige of the Museum of Zoology, University of Michigan, for identification of specimens and tireless helpfulness, to Dr. Edward H. Taylor and Mr. H. L. Parker, who assisted in the identification of the skinks, to Mr. M. Livingston, Carlsbad, New Mexico, whose profound knowledge of the Guadalupe Mountains enabled us to choose excellent camping places for our work, and to Mr. Carl O. Grassl, my companion throughout the expedition, who contributed many specimens to the collection.

The following is a list of the reptiles and amphibians collected, with notes on their habitats and habits. Since also Bailey's papers were considered, this represents a summary of the published records of collecting from these mountains.

Ambystoma tigrinum (Green)

Numerous large larvae and some just metamorphosed adults were found in a shallow isolated pond in Dark Canyon (July 23, 1930). The pond was not in connection with the creek and the water was stagnant and very warm. The flat, rocky bottom was covered by a thin layer of fine mud. No aquatic plants were visible. Of three neighboring ponds only the one in the middle contained *Ambystoma* although the others apparently presented the same conditions. No ambystomas were found in the creek or the deep ponds formed by the latter, but they were said to be very common in the water tanks at all the ranches in the region.

The larvae were light greenish. Some of them showed reduction of the gills and a corresponding change from the greenish color to the dark coloration with yellow spots of the adult.

Rana pipiens (Schreber)

This frog was very common along the creek and the ponds in Dark Canyon and in a shallow pond at the foot of the Texas part of the range. A restricted number were found at the spring near Frijole. The frogs escaped capture by hiding under the densely growing water plants in the ponds and between rocks in the fast current of the creek. Frequently at night they could be found roaming about on land much farther from water than they were ever met with in daytime.

Numerous tadpoles of different stages of development were present in Dark Canyon between July 5–July 25, most of them with only the hind limbs showing.

Crotaphytus collaris (Say)

The “mountain boomer” was found to be common at the east base of the southern Guadalupe Mountains, where many specimens basked on isolated rocks along the road from Carlsbad to El Paso.

Holbrookia texana (Troschel)

This lizard was rather common in Guadalupe Canyon. Both adults and young specimens were found basking on boulders along the roadside, in the arid canyon bottom, and on the slopes. They are extremely fast runners, stopping only after a very long run. Capture, even shooting, was difficult.

Bailey records this species from the surroundings of the Carlsbad caverns.

Uta ornata ornata (Baird and Girard)

This small lizard seems to be fairly common anywhere in the region and was found to be abundant in the narrow canyon near Frijole, where almost every one of the huge white boulders seemed to accommodate this species. Its presence is overlooked quite easily because of its stone gray, speckled coloration, small size, and depressed shape. All this renders the lizard so similar to a projection or a shadow on the rock that only a sharp eye can detect it from a distance.

Its great curiosity is striking. The dark colored males especially did not hide permanently when, after my first unsuccessful attempt to catch them, they had taken to a crevice. Soon they were rediscovered unexpectedly at another adjacent point, hanging on the vertical face of the rock, where, with heads inclined, they watched the intruder curiously.

In Dark Canyon they were so shy as to render capture extremely difficult, while in the Texas part of the Guadalupe Mountains these lizards were so tame and confiding that one could approach one's hand to within a few inches of them or even touch them. The males, more active in their reactions than the females, manifested their excitement on such an occasion by lifting the body up out of contact with the rock, rhythmically straightening all four legs (*Sceloporus* erects itself only on the forelegs).

Uta's movements on vertical rocks are extremely agile. In their far reaching jumps from boulder to boulder they remind one of the similarly active *Anolis*.

In Dark Canyon as well as on the slopes of the southern Guadalupe Mountains *Uta o. ornata* was restricted to rocks, while in the gulches of the latter region it was also found on oak and pine trees. No specimen was found on the ground.

This species sometimes lives in pairs. Near our camp we frequently observed several pairs (male and female) on certain places such as fallen trees or rocks. After August 4, tiny, very light colored young appeared in great numbers. Since none were observed before this date, it is to be assumed that the young were just hatched.

The measurements in millimeters for one of these small specimens are as follows: snout to anus, 24.5; tail, 33; snout to ear, 6.4; hind limb, 13.8. The same measurements for the largest adult specimen collected are: 48.8, 75, 12, and 32. Little variation in size among the adult specimens is noticeable, the largest and the smallest specimens differing by a few millimeters only.

The comparison of the size of the young with that of the adult shows the former to be relatively large. This corre-

sponds to the general rule that small animals have relatively large young. (Compare the proportion between adult and young of the large *Sceloporus torquatus poinsetti*.)

Sceloporus torquatus poinsetti (Baird and Girard)

No other lizard of the Guadalupe Mountains was found to be as sharply restricted to a certain habitat as this beautiful, large swift. It was rather common in Dark Canyon, living on big rocks throughout the canyon, but at one place it was especially common. At the foot of a high rocky wall a kind of natural stair was formed by huge horizontal stones; here many specimens were found basking, in color so perfectly harmonizing with the shade of the rock that only the dark and light ringed tails betrayed them. They were very shy and took refuge invariably in the narrow, almost linear fissures and crevices between the stones. They always used the nearest crevice as shelter, which frequently proved too narrow for the whole bulk of the lizard. Even then capture was not easy, since the spiny scales find so much adhesion on the rocks that one could sometimes tear a specimen to pieces before extracting it from a fissure. The conditions described were found at all points where the species was collected. Unlike other lizards it would never hide in a hole under a boulder or in the space between neighboring rocks, but always in linear crevices of a big rock.

Young of this species were found to be fairly common from the beginning of the collecting (July 5). They were not very restricted in their habitat, but rambled over tree stumps near our camp. Once captured, these lizards did not attempt defense or flight, but remained phlegmatically motionless.

Localities: Dark Canyon, rocky slopes near canyon bottom; east slope of southern Guadalupe Mountains, in narrow canyons and gulches and on the open ridges; plateau of southern Guadalupe Mountains, 9,300 feet elevation, within the pine and spruce forest; Guadalupe Canyon, about 6,000 feet elevation.

It has been recorded by Bailey from the south end of Dog Canyon, at about 6,700 feet.

Measurements of the largest specimen collected and of three young specimens, two of average size, and the third the smallest found are:

	Snout to anus	Tail	Snout to ear	Hind limb	Fore limb
Adult	113 mm.	156 mm.	26 mm.	71 mm.	49 mm.
Young	42.3	57	12	26	19
Young	41	59	12.7	25.3	17.8
Young	34.8	47.2	11.3	22.8	18

Sceloporus undulatus thayerii Baird and Girard

Unlike its large relative, *Sceloporus torquatus poinsetti*, this smaller lizard frequents most of the habitats found in the Guadalupe Mountains. It lives in Dark Canyon on the relatively humid canyon bottom as well as on the dry slopes. In the former habitat it frequents typically the alligator juniper trees (*Juniperus pachyphloea*). It was often found on the ground between the exposed roots, whence it would rush up the rough bark of the trunk when alarmed. Some specimens were found in shrubs, and these took to the branches in flight. Other individuals inhabited a high vertical rocky wall near our camp, where they were seen daily running up the smooth rock with the greatest ease.

In the southern part of the Guadalupe Mountains, *Sceloporus u. thayerii* was found on scattered rocks on the plains of the east base as well as on the slopes all the way up to their upper edge, close to the pine and spruce timber at an elevation of 9,400 feet. Since no very small individuals were observed, the hatching period probably falls after the beginning of August.

Phrynosoma cornutum (Harlan)

This horned toad was common at the east base of the southern Guadalupe Mountains, frequenting the gently sloping plain up to the foot of the steep main range, at an altitude

of from 5,500 to 6,000 feet. Several adult and several very young specimens were seen. This species of *Phrynosoma* has been recorded heretofore only from the low plains. Stone and Rehn report: "Common on the plain all about Alamogordo, a typical species of the Eastern Lower Sonoran region and extending well up the Rio Grande Valley in New Mexico." Ruthven also recorded it only from the plains around Alamogordo, and Bailey includes it in his list of reptiles of the Lower Sonoran Zone, but does not mention it for the Upper Sonoran. The locality here reported, however, belongs to Bailey's Upper Sonoran Zone.

Phrynosoma douglassii hernandesi (Girard)

One specimen of this horned toad, which typically inhabits the pine and spruce forests of the New Mexican mountain ranges, was collected by Bailey "at about 7,000 feet altitude in the southern end of the Guadalupe Mountains." I was not fortunate enough to find the species.

Cnemidophorus sexlineatus sackii (Wiegmann)

This graceful lizard was the most frequently seen if not the most common reptile of the Guadalupe Mountains. It was very abundant on the bottom of Dark Canyon, but much less common on the rocky slopes. Everywhere around the shrubs of catclaw it could be seen, restlessly wandering about with nervous, jerky movements, industriously scratching with the forelegs between dry leaves and dead bark of trees, and pushing the pointed muzzle here and there in search of food. Of all American lizards I have observed, *Cnemidophorus* in its nervous agility most reminds me of the Lacertidae of the Old World. Although these lizards were not very shy, giving no heed to one's approach to within six feet or less, they were very difficult to capture among the prickly shrubs. No very small specimens were seen.

Localities: Dark Canyon; southern part of Guadalupe Mountains, plains at the east base and slopes up to 7,500 feet; Guadalupe Canyon.

Eumeces obsoletus (Baird and Girard)

This skink seems to be very common in the Guadalupe Mountains, but due to its secretive habits it escapes attention easily. It lives in crevices of rocks and under logs, under the bark of fallen trees, and in bushes. Several specimens were found between the dry dead leaves of sotol (*Dasyvirion leiophyllum*).

The habit of quietly and slowly moving around the roots of shrubs, slipping out from under one shelter and into another, renders them very inconspicuous.

This is the only species of lizard of which the young seemed to be much commoner than the adults. The young were present at the time of our arrival (July 5). They were all of the type which was formerly known as *Eumeces guttulatus*, *i.e.*, the body was uniformly black, without trace of longitudinal stripes. This skink has already been recorded from this region by Bailey, who collected it "at 6,800 feet in the south end of the Guadalupe Mountains, well toward the upper edge of Upper Sonoran Zone."

Specimens were collected at the bottom of Dark Canyon and on its lowermost slopes. It was also found in the narrow canyon in the southern range and on the adjacent arid slopes.

Eumeces humilis (Boulenger)

Pl. I, fig. 3

This species, not heretofore reported from within the limits of the United States, is represented by two specimens collected in the Texan part of the Guadalupe Mountains.

In the largest specimen (Mus. Zool. No. 70516) the body is elongated, the head small, the snout rather short and blunt, the legs small, and the tail very long, cylindrical, and thick at the base. The rostral is wide, visible from above, and separated by the internasals from the interfrontonasal. The internasals form a short median suture, and are in contact with the nasal, with the small postnasal, and with the preloreal. The interfrontonasal is moderately large, in contact with the preloreal, and does not entirely separate the

prefrontals, which meet in the midplane in a short suture. There is a small postnasal, smaller than the nostril. The loreal is pentagonal, wider than high, and in contact with the second and third upper labials. The preloreal is higher than wide, in contact with the second upper labial. There are two pairs of enlarged occipitals, each as wide as two of the following scale rows. The lower eyelid shows three enlarged, very thin, transparent scales.

Further details of the scutellation are as follows: upper labials 7; lower labials 6; mental followed by an undivided postmental; ear opening rather small, a larger upper and smaller lower whitish granular scale on its anterior edge, 24 longitudinal scale rows around middle of body; 60-61 transverse scale rows from occipitals to root of tail; dorsal scales about uniform in size; median scale row on lower surface of tail slightly enlarged; 2 large preanal scales.

The general body color is bronze-brown above. The adjoining edges of the fourth and medial part of the fifth scale row (counting from the middorsal line) are occupied by a darker brown line, which begins at the nostrils, passes through the eye, occupies the upper third of the last three upper labials, and continues posteriorly above the ear. A second less distinct dark line runs between the fifth and sixth scale row. The lower part of the upper labials and the throat are whitish, the belly and lower surface of tail light bluish.

This specimen was collected in the southern part of the Guadalupe Mountains near Frijole, Texas. There it was found slipping through the moist vegetation at the margin of the miniature pond formed by the spring.

The smaller specimen (Mus. Zool. No. 70103) is so young that the identification is tentative. In scutellation it agrees with the larger specimen except that it has 26 rows of scales around the body. The tail was bright blue. The specimen was taken in Dark Canyon, thus the species, as far as we know, seems to be most abundant in the Guadalupe Mountains in humid habitats with rich vegetation.

The measurements in millimeters of the two specimens follow:

	Snout to anus	Snout to ear	Tail	Foreleg	Hindleg
No. 70516 ...	65	11	114 (perfect)	12	18
No. 70103 ...	26	6	injured	8	10

So far as I am aware this represents the first record of the occurrence of this species north of the Rio Grande. The species was first described by Boulenger (1883) as *E. bocourti*, from specimens collected by Forrer. Since this name was preoccupied the species was renamed *E. humilis* by Boulenger (1887). The type locality is recorded as "Presidio, Mexico," which according to Mr. Parker refers probably to Presidio de Mazatlan on the west coast of Mexico.

Dr. Edward Taylor, of the University of Kansas, who is studying the genus, examined the two specimens of *E. humilis* and the two specimens included under the following species. The larger specimen was sent to the British Museum (Natural History), where Mr. Parker kindly compared it with the types. He writes that it differs from the types in scutellation through the marked median suture of the prefrontals ("in the types these shields are only just in contact"), but that in color it is "almost exactly" like the types.

Eumeces multivirgatus (Hallowell)

Pl. I, figs. 1, 2

The two specimens included under this species have been examined by Dr. Taylor, who has identified the smaller (Mus. Zool. No. 70518) as *multivirgatus*. The larger specimen (Mus. Zool. No. 70517) Dr. Taylor believes may represent an unnamed species, but since there is but one mutilated specimen available for study, and the characters are so nearly those of *multivirgatus* as understood at the present time, I prefer to include it with this species.

No. 70517 has an injury across the back and foreleg, and the tail is regenerated. The head scutellation is typical of *E. multivirgatus* except that the left postnasal is minute and imbedded between the first and second labials, and the right one is missing. Dr. Taylor writes: "On examination of a considerable series of *multivirgatus* I find the postnasal is occasionally absent." There are 24 rows of scales around the body.

The measurements approach those of *multivirgatus* as the species was understood by Cope (1900). The legs are feeble, failing to meet by several scales when adpressed along the body; the hind leg is contained $3\frac{1}{2}$ times in the length of the head and body; when applied thrice forward the hind leg reaches the front of the ear. The measurements follow: snout to anus, 58 mm.; snout to ear 11 mm.; tail (regenerated), 61 mm.; foreleg, 13 mm.; hindleg, 17 mm.

In coloration this specimen approaches Baird's *inornatus*. The ground color is bronze above, the belly is bluish, and the throat yellowish white. A very light stripe, beginning at the last supraocular, passes through the parietal and continues back with diminishing distinctness to the tail. It occupies the center of the third lateral scale row and is edged by two narrow dark lines that follow the edges of the same scale row. Another wider dark line occupies the adjoining edges of the fourth and fifth row, separated by the light medial half of the fourth from the dark line of the third row. Another light stripe occupies the upper labials and mounts above the ear, but is continued behind it from its middle, occupying the sixth and seventh scale rows. Shortly behind the forelimb it becomes indistinct and disappears.

The specimen was seen, together with several others, slipping through the semiaquatic vegetation along the border of the spring at Frijole, Texas. The high and dense plant growth rendered capture extremely difficult, so that only one of the specimens could be secured. In flight it crossed the tiny stream without hesitating.

No. 70518 approaches more nearly in proportions Baird's *leptogrammus*, with its longer head and shorter body. The head scutellation differs from No. 70517 in lacking any trace of the postnasals, though there is a large portion of the nasal visible behind the nostril. The interfrontonasal is larger than in No. 70517, just separating the prefrontals; there is only one large occipital on the right, but there are two on the left; there are 26 rows of scales around the body.

The legs overlap when adpressed along the sides of the body; the hind leg is contained $3\frac{1}{3}$ times in the length of the head and body; applied thrice forward the hind leg reaches just beyond the tip of the snout. The measurements are: snout to anus, 47 mm.; snout to ear, 9.5 mm.; tail, missing; foreleg, 8 mm.; hindleg, 10 mm.

The specimen is very brilliantly colored, showing three light and two white longitudinal stripes on the back, sharply contrasting with a number of very dark stripes. The very long tail was bright blue, but was lost during the transportation from the plateau of the range, where the specimen was captured. A light middorsal stripe occupies the adjoining medial halves of the first dorsal scale rows. This line bifurcates in front, entering the posterior corner of the parietals. A second light stripe occupies the middle third of the second scale row, separated from the middorsal stripe by the adjoining edges of the first and second scale rows, which are black. Laterally the light stripe is bounded by another black line formed by the adjoining edges of the second and third row. The middle third of the latter is occupied by a narrow, very bright, bluish white line, which starts on the lateral edge of the large supraoculars and crosses the parietal. This stripe is apparently the same as the one described in the foregoing specimen. Lateral to that stripe is a very narrow dark stripe, formed by the dark lateral corners of the third row only; a much wider dark stripe, formed by the greatest part of the fourth and by the fifth is separated from it by the whitish medial edges of the fourth row. The same white line as described in the foregoing specimen occupies the lower part of the upper labials,

mounts over the ear, but is continued behind at a lower level on the sixth and seventh scale rows, to disappear above the insertion of the forelimb. The throat is yellowish, the belly bluish.

The specimen was secured in the pine and spruce forest of the plateau region of the southern Guadalupe Mountains.

Masticophis taeniatus girardi (Stejneger and Barbour)

One specimen of this beautiful snake was collected at the spring near Frijole, quite close to the water. Scale rows 15; ventrals 209; caudals 98; total length 85 cm.; tail length 29 cm.

Salvadora grahamiae grahamiae Baird and Girard

One specimen was found near a big rock pile at our camping place near Frijole. It was basking in the morning sunshine at 8 A.M. and tried to escape into the spaces between the rocks. A second specimen was seen at the same place a few days later, but escaped. Scale rows 17; ventrals 191; caudals 87; total length 78 cm.; tail length 19 cm.

Elaphe laeta (Baird and Girard)

A specimen was obtained in the garden of Mr. Smith at Frijole. Scale rows 27; ventrals 213; caudals 63; total length 98 cm.; tail length 15.5 cm.; number of dorsal blotches 70 (52 on body, 18 on tail).

Pituophis sayi sayi (Schlegel)

A specimen about five feet long was collected in the southern Guadalupe Mountains in the coniferous forest of the plateau region. It was found at over 9,000 feet elevation, close to the eastern rim of the plateau. This agrees well with Ruthven's opinion that "this bull snake has a very wide range of habitat. At Alamogordo it was found in the mesquite association on the plains, in the Creosote bush association on the alluvial slope, and in the Piñon-Cedar zone on the mountain slope at an elevation of 6,000 feet. It undoubtedly ranges

higher than this, as Mr. Edwin Walters of Alamogordo informed us that he had observed it in the Pine-Spruce forest of the higher elevations."

Unfortunately the specimen, which showed a beautiful reddish hue, escaped afterwards. Another specimen was found at the east base of the southern Guadalupe Mountains. Its data are as follows: scale rows 31; ventrals 234; caudals 56; total length 117 cm.; tail length 15 cm.; dorsal blotches 59 (47 on body, 12 on tail).

Thamnophis eques (Reuss)

This beautiful garter snake lives in greatest numbers along the small stream in Dark Canyon and the ponds and pools along its course.

Most of the specimens were seen in the water or basking on rocks in the stream, and no specimen was observed farther than a few yards from the water. Three snakes had a certain basking place on the bank close to a miniature fall formed by the stream and could be seen here daily, coiled on the moist grass. One specimen was observed swallowing a decaying fish, which may have been lying for weeks in the cold stream. Another crawled slowly through a drying isolated pool, swallowing as he went large numbers of tadpoles of *Rana pipiens* that were lying helplessly on the wet mud.

One specimen was secured at the spring near Frijole, Texas, a mile and a half distant from the nearest water and many miles from any other permanent water.

About July 20 the creek in Dark Canyon suddenly began to swarm with young *Thamnophis*, apparently newborn. They were of 230-270 mm. total length.

Crotalus atrox atrox (Baird and Girard)

A small specimen was found on the road to Dark Canyon, west of Carlsbad; another, a very large one, run over and badly damaged, was seen on the road from Carlsbad to El Paso, at the foot of the southern part of the range. Both localities are in the Upper Sonoran Zone of Bailey. Appar-

ently rattlesnakes (of all species) are relatively rare in this zone. According to Mr. Livingston of Carlsbad, and the ranchers of the region, this species is much more plentiful in the lower "flats" which belong to the Lower Sonoran Zone of Bailey. Mr. Smith, of Frijole, Texas, had killed four rattlesnakes in the vicinity of his ranch during twenty-four years of residence. Mr. Pepkin, in Dark Canyon, had not seen any rattlesnakes in eight years. Yet there certainly are places in the region included by Bailey in the Upper Sonoran Zone, where both *Crotalus a. atrox* and *C. molossus* are common. In a deep pit in a rocky ridge west of Roswell, New Mexico, two *Crotalus a. atrox* and one *C. molossus* were collected, besides numerous old dried carcasses of both species; a large *C. a. atrox* had been caught the day before in an adjacent canyon. The diamond-back rattlesnake is apparently the one more frequently seen by the people of the region, while *C. molossus*, although common in the higher elevations, is too secretive to be noticed frequently.

Crotalus molossus (Baird and Girard)

Four specimens of this rattlesnake were found, all of which showed a very distinct greenish ground color. Bailey reports the same of his specimens. One of my specimens was found dead and two others were collected after dark by aid of a flashlight. These three specimens were at the openings of a steep, very narrow, side canyon into Dark Canyon, where dense timber grew among big rocks. Between the rocks the ground was covered by a thick layer of dead leaves. Another specimen was collected by Mr. Grassl in the Texan part of the Guadalupe Mountains in the forenoon of a rainy day. The snake was crossing a narrow canyon at about 7,500 feet elevation. Here, too, were big rocks scattered on the leaf-covered ground under timber growth. Our experience was therefore like that of Bailey who states: "We found this snake in August, 1901, in the gulches high up on the range."

It seems probable that in the Guadalupe Mountains the typical habitat of *Crotalus molossus* is represented rather by

narrow canyons and gulches than by open arid ridges and slopes.

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PLATE I

FIG. 1. *Eumeces multivirgatus*. Mus. Zool. No. 70518.

FIG. 2. *E. multivirgatus*. Mus. Zool. No. 70517.

FIG. 3. *E. humilis*. Mus. Zool. No. 70516.

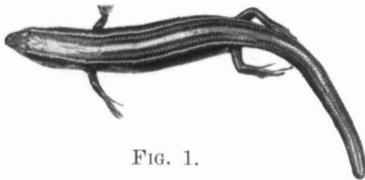


FIG. 1.

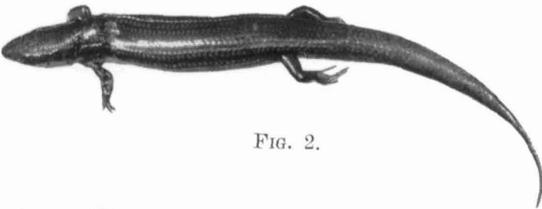


FIG. 2.



FIG. 3.

