OBSERVATIONS ON AMPHIBIANS AND REPTILES OF THE BIG BEND REGION OF TEXAS

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ABSTRACT. Distribution and derivation of the Big Bend herpetofauna is briefly discussed. The general picture is one of a xeric grassland fauna at lower elevations and rock crevice species at higher. Most of the species are characteristic of (1) the arid basins of the southwestern U.S. and northwestern Mexico (2) the Chihuahuan Desert and northern Sierra Madre Oriental. A few species appear to be relics associated with montane forest. Almost one fourth of the species are endemic, show locally differentiated populations, or are isolated to some extent.

Based on personal collecting and literature records, 69 species are known from the area. Notes on variation, habits, and habitat are given for many.

DISTRIBUTION AND DERIVATION OF THE HERPETOFAUNA

The interesting composition of the herpetofauna in the Big Bend Region of southwestern Texas has been known for well over a half century. Increasing numbers of collectors have visited the area as improved transportation has gradually made it more accessible. Qualitatively speaking, the fauna is now tolerably well known, and most of the species are adequately represented in museum collections. There is still need for distributional, ecological, and life history observations as well as for further collecting in the lesser known sections of this rugged and highly diversified country. An annotated list of reptiles and amphibians known from Big Bend National Park and vicinity has been published by Schmidt and Smith (1944). Additional records from Trans-Pecos Texas are found in the papers of Murray (1930), Jameson and Flury (1949), Brown (1950), and Milstead and co-workers (1950).

My observations on the reptiles and amphibians of the Big Bend Region were made from February 16, 1955 to August 8, 1955. During this time I lived with my family on the Rosillos Ranch at the north

1 The author is now on the staff of the Basic Medical Science Institute at Karachi, Pakistan, and did not have the opportunity to read proofs of his paper. (Editor's note.)
base of the Bosillos Mountains. Field work was carried out almost continuously save for about a week in May during which time I was collecting in another section of the state. The area within which nearly all collecting was done is bounded to the north by U. S. Highway 90, to the south by the Rio Grande, to the east by State Highway 227 and the east boundary of the National Park, and the west by State Highway 118 and the west boundary of the National Park. Some 350 reptiles and amphibians were preserved and a number collected alive for zoos and interested individuals. No attempt was made to obtain large series of the more plentiful species.

Sperry and Warnock (1941) have discussed the physiography, climate, and flora of the Big Bend Region. Other faunal papers treating ecological conditions in some detail are those of Borrell and Bryant (1943) on mammals and Tinkham (1948) on Orthoptera. Lewis (1950) has discussed the ecology of reptiles and amphibians in the Tularosa Basin and Organ Mountains of New Mexico, an area comparable to Big Bend in many respects.

The Big Bend Region lies near the eastern margin of the Chihuahuan Desert. It is a land of semiarid plains interrupted by prominent mountain belts. Altitudes range from 1873 feet near Boquillas on the Rio Grande to 7834 feet on Emory Peak in the Chisos Mountains. According to National Park Service data, rainfall in the Chisos Basin from 1950 to 1955 varied from 9.02 inches to 18.01 inches annually, while at Persimmon Gap in the desert flats at the north edge of the National Park annual rainfall varied from 4.24 to 8.28 inches. Most precipitation is during the summer with lesser amounts during late spring, autumn, and early winter. Mean January temperatures in the Chisos Basin range from 50.0° to 56.5° F., and mean July temperatures from 72.9° to 76.5° F. For Boquillas, mean January temperature estimated from incomplete data is 59° F., and mean July temperature 87.5° F. Sudden marked drops in temperature accompany February and March wind storms. As in all arid lands, there is considerable diurnal variation in temperature.

Most of the Big Bend Region lies in the Lower Sonoran life zone, but appreciable portions of the high prairie and the higher mountain ranges extend into the Upper Sonoran. Certain elements of the Transition zone appear on the highest peaks of the Chisos Mountains. As determined by distribution of amphibians and reptiles, I recognize the following five habitat zones:

The Marathon-Alpine Grassland (Upper Sonoran) consists of plains and grassy hills mostly at 4000 to 5000 feet elevation. The soil is rocky, but cliffs and other massive rock formations are not con-
spicuous. Dominant plants are grama and chino grasses (Bouteloua sp.) intermixed with three awn grass (Aristida) and mudly grass (Muhlenbergia). Juniper (Juniperus monosperma) and cholla (Opuntia imbricata) are conspicuous larger plants. Permanent water is represented by some large springs and numerous artificial impoundments; temporary, shallow ponds are formed in many places during the rainy season. Grazing is the chief form of land use.

The Mountain Zone (Upper Sonoran to Transition) is chiefly confined to areas above 5500 feet. It is best developed and known in the Chisos, but exists with certain modifications in the Del Norte and Glass Mountains. Rock slides, cliffs, and other massive rock formations are a very conspicuous feature. Characteristic trees include several species of oaks and junipers, Mexican pinon (Pinus cembroides), and Texas madrone (Arbutus texana). The giant agave (Agave scabrosa) is a typical plant. Local stands of ponderosa pine, Douglas fir, and Arizona cypress represent Transition zone flora. There are a few small meadows of needle grass (Stipa sp.). Permanent water is supplied by small springs.

The Desert foothills and Mesas (Lower Sonoran) comprise most of the mountainous areas below 5000 feet. Their faces are usually rocky and rugged and may be largely stratified sedimentary rocks as in the Santiago and Dead Horse ranges or largely igneous boulders as in the Rosillos and Corazones Peaks. Dominant plants are lechuguilla (Agave lechuguilla), yuccas (Yucca sp.), and sotol (Dasylirion leiophyllum). Trees such as hackberry, oaks, Mexican walnut (Juglans regia), and Mexican buckeye (Ungnadia speciosa) occur in canyons with springs, otherwise forest cover is lacking.

The Desert Flats (Lower Sonoran) is a zone best developed below 3000 feet. The soil is chiefly adobe clay, but some areas are predominantly coarse gravel. Massive rock outcrops are mostly confined to canyons and draws. The dominant plant is creosote bush (Larrea), frequently associated with catsclaw (Acacia greggii), cacti (Opuntia, Echinocereus), yucca, and ocotillo (Fouquieria splendens). Along the larger draws are mesquite (Prosopis), Texas persimmon (Diospyros texana) and desert willow (Chilopsis). Larger trees are absent save for an occasional willow or cottonwood at the few springs or water holes.

The Rio Grande Lowland (Lower Sonoran) consists of the river and its flood plain and the lower parts of larger streams such as Terlingua and Tornillo Creeks. Its width on the U. S. side varies from a few yards to somewhat over a mile. The soil is adobe clay in most places, but there are some areas of almost pure sand. Willows, cottonwood, cane (Phragmites), mesquite, and scrubbean (Strombocarpus) are chara are a few canyons in the use.

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Grasses (*Bouteloua* and muhly grass and cholla (*Opunt*ia*merriami*) are characteristic plants. Parts of the area are under cultivation. There are a few sloughs and occasional natural or artificial ponds. The great canyons of the Rio Grande probably represent a distinct habitat zone in themselves. They have been little investigated zoologically and are not treated in this paper.

The general picture of reptile and amphibian distribution is one of a xeric grassland fauna at lower elevations and a group of cliff or rock crevice species at higher elevations. Only a few species are true desert forms, but the abundance of some, e.g. *Cnemidophorus tigris marmoratus*, suggests that they are on their way to dominance. A few species such as *Gerrhonotus bicolorus*, *Amblyosaurus setiferus*, *Ancistrodon contortrix pictigaster*, and *Crotalus atrox* are evidently associated with remnants of upland forest.

We found no species truly ubiquitous in the Big Bend. Those encountered in the greatest variety of habitats were the large, active snakes, *Masticophis flagellum*, *M. taenius*, and *Pituophis*; the whiptail lizard, *Cnemidophorus sacchi*; and, rather surprisingly, the small geckos, *Coleonyx*. Nearly as widely distributed were *Crotaphytus collagenis*, *Holbrookia teresa*, *Bufo punctatus*, *Phrynosoma modestum*, and *Crotalus atrox*. Most of the species, however, seem restricted to a single biotope.

The Big Bend herpetofauna has clearly been recruited from several sources. According to present distribution of the species (excluding subspecies), I have recognized the influence of six faunae. Eight species (Table 1) have transcontinental or nearly transcontinental ranges. Their origins are uncertain, but many appear to be southwestern. The greatest number of species (Table 2) show a distribution pattern centering in the arid basins of the southwestern United States and northwestern Mexico including a good portion of the west coast. Most of them also occur in Baja California. In general, this group avoids major mountain ranges. A number of the species range extensively into the Great Plains region of the central United States. About half the species in this group are primarily desert animals, while most of the others are grassland-desert forms.

Nine species (Table 3) are typical of the Great Plains and Mexico east of the Sierra Madre Occidental. They show a limited tendency to range westward into more arid regions. Four species (*Trionyx spinifer*, *Natrix erythrurus*, *Ehrele obsolata*, and *Ancistrodon contortrix*) are characteristic of the southeastern United States and in Big Bend approach the extreme western limit of their range. *Syrrophorus marnocki* evidently is characteristic of the Edwards Plateau of Texas,
and the range of *Lampropeltis getula* also seems to center about this region.

The more characteristic reptiles and amphibians of Big Bend include 16 species (Table 4) with distribution centering about the Chihuahuan Desert or the northern Sierra Madre Oriental and extending to west Texas, southern New Mexico, and extreme southeastern Arizona. Eleven of these species are montane or rock crevice animals, and the others desert or grassland-desert inhabitants.

Four species in this group (*Scoloporus merriami, Lampropeltis getula, and Tantilla cuullata*) are considered Big Bend endemics, having their known ranges confined to southern Trans-Pecos Texas and adjoining Coahuila and Chihuahua. An additional 7 species (Table 5) have recognized subspecies largely confined to this region. Additional evidence of endemism is shown by 7 species (Table 6) whose Big Bend populations are isolated and or slightly differentiated. Thus almost one-fourth of the species are endemic, show locally differentiated populations, or are to some degree isolated from their nearest neighbors.

### TABLE 1

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<thead>
<tr>
<th>Amphibia</th>
<th>Urodela</th>
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<tr>
<td>Ambystoma tigrinum</td>
<td>Masticophis flagellum</td>
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<td>Bufo woodhousei</td>
<td>Lampropeltis getula</td>
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<td>Rana pipiens</td>
<td>Diadophis punctatus</td>
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<td>Pseudemys scripta</td>
<td>Pituophis melanoleucus</td>
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### TABLE 2

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<tr>
<th>Reptilia</th>
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<td>Scaphiopus hammondii*</td>
<td>Bufo punctatus*</td>
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<tr>
<td>Scaphiopus couchi</td>
<td>Gastrotheca olivacea</td>
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<td>Bufo debilis*</td>
<td>Hyla arenicolor</td>
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<td>Coleonyx variegatus</td>
<td>Urosaurus ornatus</td>
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<td>Crotaphytus collaris*</td>
<td>Sceloporus magister</td>
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<td>Crotaphytus wislizeni</td>
<td>Cnemidophorus saxatilis</td>
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<td>Holbrookia maculata*</td>
<td>Cnemidophorus tigris</td>
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<td>Uta stansburiana</td>
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Leptophthalmops humilis  
Thamnophis cyrtopsis  
Salvadora hexalepis  
Arizona elegans  
Rhinocheilus lecontei  
Sonora semiannulata  
Hypsiglena torquata  
Crotalus atrox  
Crotalus moxossus  
Crotalus scutulatus  
Crotalus viridiss

**TABLE 3**

Big Bend species with ranges centering in the Great Plains region of the United States and Mexico east of the Sierra Madre Occidental.

Kinosternon flavescens  
Terrapene ornata  
Phrynosoma cornutum  
Leptophthalmops dulcis  
Thamnophis marciatus  
Sce  
Scole  
Eumeces obsoletus  
Hesperotomus nasicus  
Elaphe guttata

**TABLE 4**

Big Bend species with distribution centering about the Chihuahuan Desert, northern Sierra Madre Oriental and mountains of west Texas, southern New Mexico, and extreme southeastern Arizona.

Bufo compactilis  
Holbrookia texana  
Phrynosoma modestum  
Scoloporus merriami  
Salvadora grahamiae  
Masticophis taeniatus  
Elaphe obsoleta  
Lampropeltis alternata  
Ficinia ocellata  
Scoloporus poinsettii  
Cnemidophorus perlplexus  
Cnemidophorus tessellatus  
Gerrhonotus lioceplius  
Tantilla atriceps  
Tantilla cucullata  
Trimorphodon vilkinsoni  
Crotalus lepidus

**TABLE 5**

Subspecies with ranges largely restricted to southern Trans-Pecos Texas and adjoining Mexico.

Pseudemys scripta gaigeae  
Urosaurus ornatus schmidti  
Scoloporus merriami annulatus  
Cnemidophorus saci semifasciatus  
Elaphe obsoleta bairdi  
Sonora semiannulata blanchardi  
Ancistrodon contortrix pictigaster

**TABLE 6**

Species whose Big Bend population is isolated and/or slightly differentiated.

Syrrophilus marnocki  
Diadophis punctatus  
Masticophis flagellum  
Pituophis melanoleucus  
Hyla arenicolor  
Salvadora grahamiae  
Hypsiglena torquata

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ANNOTATED LIST OF SPECIES

In this section are listed all species definitely known from the Big Bend region. I have omitted several for which records are doubtful or indefinite.

For each species I have listed collections made, selected published records, and general remarks on distribution. Material collected has been deposited in the following institutions: The Chicago Natural History Museum (CNHM), University of Michigan Museum of Zoology (UMMZ), Illinois Natural History Survey, Urbana (INHS), and the personal collection of the author (SAM). Specimens designated LPZ were collected by the Lincoln Park Zoo field party or sent alive to the zoo by me. The abbreviation, DOR, is used to designate specimens found dead on the road and not preserved. Most of the localities listed are to be found on the U. S. Geological Survey Quadrangle maps; a few more recent ones on National Park maps. Elevations were estimated with the aid of these maps as well as by reference to bench marks and other local markers.

In scientific nomenclature I have, in general, followed the Check List of North American Amphibians and Reptiles, Sixth Edition (Schmidt, 1953). Departures therefrom are explained under “Notes.” Under this heading I have also included selected scale counts, measurements, and notes on color of live specimens. Personal observations on the food, behavior, and reproduction of the various animals are listed. I have not usually attempted to summarize the observations of others on these topics.

SALAMANDERS (CAUDATA)

AMBLYSTOMA TIGRINUM MAJORUM Baird. BARRED TIGER SALAMANDER. H2 mi. ssw. Marathon (SAM), 12 mi. w. Marathon (UMMZ). Also Alpine and 4 mi. n. Alpine (Brown). Apparently restricted to the prairie.

An adult male (body length 127 mm., total length 239 mm.) was collected about 11 p.m. June 30 in a shallow, greenish pond. There had been a moderate shower shortly after sunset, and the air temperature was 60° F. A fully transformed greenish (body length 79 mm.) was secured in a similar site the night of July 14. In neither case were other salamanders seen in the ponds.

FROGS AND TOADS (SALIENTIA)


Sketch Map of the Big Bend Region showing principal roads and localities mentioned in the text.
mon Gap (CNHM), 15 mi. s. Alpine (CNHM 2), 41/2 mi. ssw. Marathon (CNHM). Also Alpine and Terlingua (Brown). Widely distributed in prairie and desert flats.

Males from breeding choruses were often almost uniform light green; females yellowish green with strong dark reticulation.

Somewhat spadefoots were first noted the night of May 4 during a heavy downpour. They were moving toward a grassy field bordering Nine Point Draw. The following two nights there were moderately heavy choruses from flooded sections of this field, the spadefoots being concentrated in pools free from the sweep of current. They were subsequently heard following every moderate to heavy shower but were not heard when the field was inundated after a heavy rain on the headquarters of the draw without local precipitation. Immature spadefoots were often seen hopping about at dusk, though there had been no rain.

SCAPHIOPUS HAMMONDI HAMMONDI Baird. HAMMONDI'S SPADEFOOT TOAD. 3 mi. w. Marathon (SAM 4), 5 mi. n. Alpine (CNHM 2). Previously recorded in area only from Alpine (Brown). Apparently restricted to the prairies.

Specimens were almost pure black when collected at night. By day they were light greyish brown with a little dark pigmentation around the warts of the back and hind legs.

This species was not noted until July 19 after heavy rains in the Marathon area. A large chorus located July 21 was in a water-filled excavation associated with Bufo debilis insidior and B. compactilis speciosus. The spadefoots lay sprawled on the surface near the center of the pool where the water was 3 to 5 feet deep and dived promptly when alarmed. No females were taken, nor was amplexus observed. About dusk August 3 I saw an immature specimen on the highway and an adult that took refuge in a mammal burrow. Twice after handling these animals I experienced irritation of my nose and eyes resembling the symptoms of moderately severe hay fever. I believe it quite likely that the spadefoots' skin secretion was responsible for my discomfort, although other causes could not be excluded.

BUFO COMPACTILIS SPECIOSUS Girard. TEXAS TOAD. 3 mi. n. Marathon (CNHM 2), between Persimmon Gap and Twin Mills (INHS 3), 8 mi. nw. Hot Springs (INHS), n. base Rosillos Mtns. (UMMZ), Boquillas (LPZ). These records represent a slight extension of the range shown by H. M. Smith (1947). All are for semi-arid situations at low altitudes.

A juvenile was taken February 26 at the edge of a stock pond shortly after dark. Males were seen calling from the bank of a water-filled excavation near Marathon the night of July 21.

BUFO DEBILIS INSIDIOR Girard. WESTERN GREEN TOAD. 8 mi. s. Persimmon Gap (INHS 5), 41/2 mi. ssw. Marathon (SAM 2), 12 mi. w. Marathon (UMMZ 2), n. base Rosillos Mtns. (CNHM 2). Occurrence widespread in the short grass prairie and desert flats.

One was taken March 18 hopping about at dusk. No others were seen until after the first heavy rain April 29. On June 30, July 19, and July 21, they were noted in choruses associated with Scaphiopus couchi, S. hammondii, and Bufo c. speciosus in muddy, temporary ponds. Pairs in amplexus were at these times.


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The following accounts of this field of current. They never but were not headquarters of the species seen hopping around.

FOND'S SPADE-HEMN 2. Previously bred to the prairie every day they were present of the back. At Marathon area, associated with Bufo sp., sprawled on the ground and dived several times. An adult that took its first experienced moderately severe hay fever responsible for the death of the species.

3.8 mi. W. Marathon 1.8 mi. N. W. Hot Springs. These records recorded after dark, near Marathon.

3.8 mi. S. Pecos, N. W. Marathon 1.8 mi. N. Marathon. 3 mi. S. Marathon (CNHM). A. A. Cope. CLIFF FROG. Not collected. The published records are for springs and canyons above 5000 feet in the Chisos Mountains (Schmidt and Smith as S. galagina). The prolonged drought in this region may have accounted in part for our failure to find this frog.

RANA PIPIENS BERLANDIERI Baird, RIO GRANDE LEOPARD FROG. Breeding in Rosillos Mtns. (CNHM 2, UMMZ 1, SAM several tadpoles), 4 mi. SSW, Marathon (CNHM), 3 mi. W. Marathon (CNHM), 15 mi. S. Alpine (CNHM). Plentiful at several points along the Rio Grande and observed in ponds and tanks throughout most of the area. Found about springs in the Rosillos but not in the Chisos above 4000 feet.

Following Schmidt and Smith, I have assigned these leapord frogs to the subspecies berlandieri. Brown's tentative assignment of Trans-Pecos leopard frogs to *brachycerula* is not, in my opinion, sustained by material from the Big Bend. In my material, the males have large and distinct vocal vesicles, the tympanum lacks a distinct light center in preserved specimens but may show such in life, and the snout is short and not upturned. The dorsal spots are variable in size and shape, and light borders are absent or very faint.

In the Big Bend region, leopard frogs apparently breed throughout most of the year. Eggs, large tadpoles, and small tadpoles were observed February 16 at the mouth of Tornillo Creek. When this site was revisited April 25 just before the rains, the mats of algae swarmed with young frogs, in the shallow water were schools of tadpoles and several egg masses, and a few males were calling. On May 10 after two
hard rains had driven the river out of its banks, very few leopard frogs of any size could be found. Such sudden, violent fluctuations in stream level and current evidently take a heavy toll of young frogs and tadpoles.

In a stock pond at the north base of the Rosillos Mountains, leopard frog egg masses were noted February 20. New egg masses appeared until March 15, at which time the earlier masses were hatching; however males continued to call through April and were heard occasionally during June and July. An egg mass and many tadpoles, some nearing transformation, were found April 6 at Goat Spring in the Rosillos. Calling males and egg masses were noted near Alpine on July 21.


Evidence for uniting Gastrophryne olivacea and G. carolinensis seems inconclusive, hence the use of the binomial.

Calls of the narrow-mouthed toad were first heard May 1 in the flooded section of a grassy field and were heard intermittently during the following two months, beginning at twilight. Calling individuals were usually concealed among partly submerged grass stems. They were associated with Scaphiopus couchi and Bufo d. insulorum. The only non-breeding individual was taken on the road at night during rain.

TURTLES (CHELONIA)

KINOSTERNON FLAVESCENS FLAVESCENS Agassiz. YELLOW MUD TURTLE. 3 mi. s. Persimmon Gap (UMMZ), 8 mi. s. Persimmon Gap (UMMZ), 9 mi. s. Marathon (SAM), Dagger Flat (UMMZ 2). Sight records and reports indicate the species is widely distributed at low altitudes.

These turtles inhabit shallow, quiet bodies of water that often are very muddy, contain little aquatic vegetation, and may be dry two to three months each year. During rainy weather, two were found on roads at considerable distances from any known body of water. I have seen them feed on carrion and aquatic invertebrates such as snails, belostomatids, and larval Odonata.

TERRAPENE ORNATA ORNATA Agassiz. ORNATE BOX TURTLE. 6 mi. e. Alpine (UMMZ), 9 mi. ne. Alpine (UMMZ), Marathon (DOR). In the Big Bend apparently restricted to short grass prairie.

The specimens were taken in the open following rains. They differ from specimens collected in Illinois and Indiana only in their slightly greater size.

PSEUDEMYS SCRIPTA GAIGAEAE Hartweg. BIG BEND TERRAPIN, Hot Springs (UMMZ). Boquillas. Seemingly favorable habitats exist only in a few sloughs of the Rio Grande and tanks located within a mile or so of the river. The sudden and marked fluctuations in river level must have an adverse effect on this turtle.

TRIONYX SPINIFERA EMORYI Agassiz. TEXAS SOFTSHELL. Hot Springs (UMMZ, INHS). Sight records for Boquillas Canyon, Castolon, and the mouth of Santa Elena Canyon indicate general distribution along the Rio Grande.

Softshells were frequently seen basking on sand bars. The sighting of several February 16 indicates hibernation probably does not take place in this area. A typical Trionyx egg was found April 26 on a sand bar a few feet from the water. Efforts to find the remainder of the clutch or the female were unsuccessful.

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COLEONYX VARIEGATUS BREVIS Stejneger. TEXAS BANDED GECKO. Rosillos Mountains area (UMMZ 3, CNHM 2), 2 mi. sw. Study Butte (UMMZ), Dog Canyon, Santiago Mtns. (INHS), Government Spring (SAM), Corazones Peaks (CNHM), Hot Springs (SAM), 12 mi. nw. Hot Springs (INHS), 15 mi. s. Alpine (CNHM). As widely distributed as any lizard in the Big Bend. Observed from the banks of the Rio Grande to about 6000 ft. on Casa Grande. Most plentiful in moderately rocky desert.

In February and March, geckos were rather plentiful under boards, rubbish, and thin slabs of rock. They were occasionally seen active by day in rock crevices and trash piles. After May 4, the only ones encountered were under large, deeply embedded rocks or were on roads or trails at night. They seemed most active on still nights just after rain. If cornered, these lizards often depress their head, elevate their tail, and wave it about. Many emit faint squeaks when handled. No gravid females or very young juveniles were seen.

CROTAPHYLTUS COLLARIS BAILEYI Stejneger. WESTERN COLLARED LIZARD, MOUNTAIN BOOMER. Lower slopes Rosillos Mtns. (CNHM, UMMZ), Santiago Mtns. near Persimmon Gap (CNHM), Dog Canyon (CNHM), 10 mi. e. Alpine (UMMZ), 12 mi. s. Alpine (UMMZ). Widely distributed but not found in the Chisos above the lower limit of the oak-pinion forest.

Interribial scales are in two complete series in 4 of 6 specimens, and two pairs of scales in the series are fused in the others. Most specimens showed prominent, narrow, transverse orange bars on the neck and body.

These lizards were often seen along roads and were easily recognized by their size and habit of running bipedally. They were most numerous in rocky, open desert. Juveniles were collected February 28 and March 6 in burrows under rocks, but no adults were positively identified until late April. A female collected July 13 contained large eggs. The stomachs of two specimens contained cicadas, beetles, and grasshoppers.

CROTAPHYLTUS WISLIZENI WISLIZENI Baird & Girard. LEOPARD LIZARD. Base of Rosillos Mtns. (CNHM, UMMZ, SAM), 12 mi. se. National Park Headquarters (DOR). Also Boquillas and San Vicente (Brown). Largely confined to low desert.

Near the Rosillos, leopard lizards were found in sandy washes and open flats, often crowded under prickly pear or catclaw. The lizards could be approached to within a yard or so before disappearing into thicket or mammal burrows. I saw one struggling with an adult gray whiptail (Centrolophus tigris marmonatus) that it subdued and swallowed head first. Another leopard lizard had eaten a ball grown gray whiptail.

HOLBROOKIA TEXANA SCITULA Peters. SOUTHWESTERN EARLESS LIZARD. Rosillos Mtns. area (UMMZ 3, CNHM 2), 5 mi. n. Persimmon Gap (CNHM 2), 5 mi. s. Alpine (CNHM), 18 mi. s. Alpine (UMMZ), National Park Headquarters (UMMZ), Santiago Mtns. near Persimmon Gap (CNHM), Burro Mesa (CNHM). Occurs from the banks of the Rio Grande to elevations of about 2800 ft. in the Rosillos but does not extend into the oak-pinion forest of the Chisos.

Active adult males are among the most colorful of lizards. The general dorsal hue is light gray becoming lavender with fine spotting and reticulation of orange anteriorly. Posteriorly the body is bright grass green to yellow. A spot of blue surrounds...
the black lateral bars. Females are brownish to gray, often with a rosy tinge along
the flanks.
This is one of the most plentiful and frequently observed reptiles in desert and
soil-coloured habitats. It evidently has wide temperature tolerance. It was the only
reptile active after the severe “mother” of March 26-27, yet it is the only lizard
other than the gray whiptail regularly abundant during the milder heat of June and
July. I do not believe any lizard in the area can equal it in speed, and a thoroughly
alarmed individual may run 50 yards or more. It may then take refuge under very
superficial cover such as cardboard or sheet metal. As the lizard runs, the tail is often
curled over the back showing the black and white underside. Sometimes one will run
a short distance and perch on a rock or other object. It then may elevate its tail and
wave it about. I have seen these lizards asleep on the highway or incompletely
buried in loose soil.

The brilliantly colored males were very excitable during late April and early
May. They inflated their bodies, engaged in vigorous bounding, and behaved aggres-
sively toward other males. On May 8, I saw a pair of these lizards in copulation.
The first hatching was found June 29.

**HOLBROOKIA MACULATA APPROXIMANS** Band, SPECKLED EARLESS
LIZARD, 19 mm. s. Alpine (CNHM 5), 15 mm. s. Alpine (CNHM 2), 11 mm. s. Alpine
(SAM 2), 9 mm. n.e. Alpine (UMMZ), Marathon (UMMZ). Apparently confined
to the prairie.

Males have yellowish throats, dusky mottled chins, and a tinge of blue about the
lateral bars. Females have the throat, neck, and lips tinged with yellow and the
flanks suffused with vermillion.

These lizards were usually found about patches of almost bare ground with sparse
grass and scrub. They are strictly terrestrial and less active than *H. terana*.
Numerous burrows are their usual refuges. One of 5 females collected July 15 con-
tained large eggs.

**PHYRNO SOMA CORNUTUM** Harlan, TEXAS HORNS TOAD, 9 mm. n.
Alpine (UMMZ), west base Elephant Mesa (CNHM), 2 mm. w. Marathon (DOR).
Mostly confined to the short grass prairie. Occurrence elsewhere including the Chisos
Basin (Schmidt and Smith) may indicate existence of small colonies on islands of
grassland.

**PHYRNO SOMA MODESTUM** Girard, RAT-TAILED HORNS TOAD, 15 mm.
u. Persimmon Gap (UMMZ 2), base of Rosillos Mtns. (UMMZ, SAM), Green
Gulch (Chisos) (UMMZ), National Park Headquarters (1 MMZ), Marathon
(CNHM), 15 mm. s. Alpine (CNHM), 25 mm. s. Alpine (UMMZ). Occurs in most
of the more arid parts of Big Bend to altitudes of slightly more than 5000 feet.

There is much variation in color. Specimens from the Chisos are pinkish, while
some from the Rosillos are flecked heavily with bluish gray. Those from the line
soils near Marathon are more yellow, while those from the Woodward Ranch south of
Alpine closely match the dark reddish volcanic soil as *Holbrookia terana* and *H.
maculata* in this area.

Although fairly plentiful about the base of the Rosillos, this species was not seen
until April 18. It is most active during mid morning and late in the afternoon. It is
often found in extremely arid and barren situations, its colors making it difficult to
see against the soil. Earl Steele reported finding a pair of these lizards in copulation
on the highway on May 13. A hatching 21 mm. in body length was collected July 13
at the base of the Rosillos.

**SCELOPORUS MAGISTER BIMACULUS** Schlan & Brattstrom, TWIN
SPOTTED SPINY LIZARD, Hot Springs - CNHM, 4. These specimens agree
strongly with 1955. The following:

"Desert tinged with blue; brilliant blue green."

These lizards were terrestrial. Although never to wander far for refuges, I saw one about
in loose soil. On being touched they are more arboricolous. One bare nest another was not.

This species was first taken in a single series, one in summer, one of 70-75 m.
in length and finally adults of 95 taken July 19."

**SCELOPORUS POIN** (UMMZ 2, SAM), Gia Mtns. (SAM), 15 mm. s.
hill in mountains around

Most of the specimen, confused. The speci-
some scales flecked with

These large lizards may be seen basking on
the ground or in mutually exclusive for
the Chisos. Young of the

**SCELOPORUS UNI PRAIRIE LIZARD,** 3 Mtns. Laguna Meadows
Alpine (CNHM, SAM) at 5500 feet, <br>
Colonies of this lizard and support a few tree-
forest. The lizards are.

**Ctenodactylus** and *H.*

Female, containing
Alpine July 13, and a
and 7 eggs July 19. H

**SCELOPORUS M 1 LIZARD,** Dog Canyon (CNHM 1), Hot Spr.
in the Dead Horse-

**SCELOPORUS M 2 LIZARD,** Rosillos Mtns. Chisos Basin (UMZ)
SPOTTED SPINY LIZARD. Base of the Rosillos Mts. (UMMZ 3, CNHM, SAM), Hot Springs (CNHM). Occurrence seems limited to arid situations below 4000 feet.

These specimens agree with the description of the subspecies by Phelan and Brattstrom (1955). The following notes were made of the color of an adult male in life: "Dorsum tinged with blue, sides flocked with bright yellow, throat and belly patches brilliant blue green."

These big lizards were found in rocky situations and about old buildings. Adults are terrestrial. Although not particularly fast, they are exceedingly wary and seem never to wander far from dense thickets, pack rat nests, rock crevices, and other refuges. I saw one about 10 p.m. apparently asleep with its head and shoulders buried in loose soil. On being touched, it ran into a nearby kangaroo rat burrow. The young are more arboreal. One was seen on a tree trunk and took refuge in an abandoned bird nest; another was taken in a thatch roof.

This species was first observed March 3. Spring observations indicated three distinct size groups, one of about 50 mm. body length and clearly young of the previous summer, one of 70-75 mm. apparently individuals a year older and still immature, and finally adults of 95 mm. or more. A hatchling with body length of 33 mm. was taken July 19.

SCELÖPUS POINSETTI Baird and Girard. CLIFF LIZARD. Casa Grande (UMMZ 2, SAM), Chisos Basin (LPZ), base of Emory Peak (UMMZ), Santiago Mts. (SAM), 15 mi. s. Alpine (CNHM). Literature records indicate general distribution in mountainous areas from 2900 to at least 6800 feet.

Most of the specimens were dark brown to dark gray with indistinct dull yellow constrictions. The specimen from the Santiagos, however, was light tan above with some scales flecked with orange and blue.

These large lizards frequent cliffs and other massive rock formations where they may be seen basking or climbing on vertical surfaces. They are occasionally observed on the ground or in trees. Their habitat and that of Scelopus magister seem mutually exclusive for the most part. S. poindatti was first observed March 30 in the Chisos. Young of hatchling size were first noted July 16-18.

SCELÖPUS UNDULATUS CONSObRINUS. Baird & Girard. SOUTHERN PRAIRIE LIZARD. Rosillos Mts. (UMMZ 2, SAM), Chisos Mts., Laguna Meadow (SAM), Kibbee Spring, Casa Grande (CNHM), 10 mi. e. Alpine (CNHM, SAM). Occurrence general in the prairie and in the mountains to at least 6900 feet; elsewhere spotty avoiding more arid situations.

Colonies of this lizard in the Rosillos are located in canyons that contain springs and support a few trees. In the Chisos, the species frequents the pinon and juniper forest. The lizards are often seen on logs or the bases of trees and climb to avoid capture. On the prairie near Alpine, however, they are ground lizards associated with Cononiaspus and Holbrookia maculata.

Females containing large eggs were collected in the Rosillos on April 26 near Alpine July 13. and in the Chisos June 1 and July 10. One from the latter locality had 7 eggs July 19. Hatchlings were observed near Alpine on August 4.

SCELÖPUS MERRIAMI MERRIAMI Stejneger. MERRIAM'S CANYON LIZARD. Dog Canyon, Santiago Mts. (UMMZ 37, INHS 7), Persimmon Gap (CNHM 3), Hot Springs (SAM). Occurs along the Rio Grande and northward in the Dead Horse and Santiago Mountains.

SCELÖPUS MERRIAMI ANNULATUS Smith. BIG BEND CANYON LIZARD. Rosillos Mts. (UMMZ 4, CNHM 4), Corazones Peaks (CNHM 2, SAM), Chisos Basin (UMMZ 2), 1 mi. w. Terlingua (UMMZ 2). Evidently confined to...
the somewhat isolated mountains of the southern Big Bend. Although *merriami* tends to occur at lower altitudes than *amabilis*, the two are not strictly segregated on this basis. I collected *merriami* from about 1500 to 3500 feet and *amabilis* from about 1400 to 5500 feet.

The subspecies *amabilis* was easily differentiated using the criteria of Smith (1946, pp. 188, 190). In addition to these differences in color and pattern, the two subspecies can usually be differentiated in the field by their ground color. *S. m. merriami* is pallid, often appearing quite ashier, with dark dorsal spotting greatly reduced, while *amabilis* is darker, tending to be reddish brown, and well spotted dorsally, often tending to show a dark nuchal collar. A few specimens intermediate between the two subspecies in color, pattern, and scaleation were collected on a rather isolated boulder cone at the northeastern base of the Rosillos and in a small canyon near Terlingua.

No constant differences were noted in the habits of the two subspecies. Both are common on bare rocks. They climb vertical surfaces with ease and sometimes cling to the underside of boulders. They enter crevices when alarmed but are not particularly cautious and often remain within a few feet. One bit a finger poked into its retreat. Specimens were collected early in March when weather was quite cool.

It is doubtful if hibernation takes place, for perhaps at higher altitudes. During the hot months, these lizards are most for two hours after darkness and for a similar period about two hours after sunrise.

Behavior similar to the courtship of *Sceloporus undulatus* was noticed in the Rosillos April 21, but no mating was witnessed. Collections made in early spring show many young lizards with body lengths of 28–34 mm. About mid July, hatchlings with body lengths of about 20 mm, begin to appear. The remainder of the population consists almost exclusively of sexually mature lizards with body lengths of 40 mm or more.

**UROSaurus ornatus** Schmidt, Big Bend UTA. Rosillos Mtns. (CNHM 5, UMMZ), Dog Canyon (UMMZ 2), Chisos Basin (UMMZ), Cattail Falls (NHS 1, 1 mi w. Alpine (SAM), 15 mi s. Alpine (SAM). Occurrence apparently general in mountainous sections from about 2700 to at least 6000 feet.

The entire ventral of males is turquoise blue with little evidence of separate belly patches; females have bluish white bellies and pale orange throats.

This lizard is frequently associated with *Sceloporus merriami* on cliffs and boulders. At higher levels in the Chisos and in some of the canyons, it may also be found on trees. It is moderately secretive and an inveterate climber.

I identified no females of this species until May 6, at which date two from the Rosillos contained large eggs. Males had been observed since March 6 and were numerous earlier in April. By mid June, Rosillos females were mostly spent, but one containing eggs was collected in the Chisos June 16. Very small young were seen in the Rosillos July 4.

A uta living on our porch was seen feeding on insects attracted to the light.


The dorsum of both sexes is spangled with sky blue, more conspicuously so in males. The dorsal stripes are pale yellow to white. The entire underside of males is bluish shading to chin, and throat. Ground utas w. dumps. They live at night. They move about in the moistest area during the day. The few short situations, as clay. EUMECES OS Basin (SAM 2), 1 Grande valley at 1. These big skinks None were seen on rock outcrops or cliffs.

May 4, A young of *Cnemidophorus tahoensis*, Base of R. mi. s. Marathon (CNHM) Dr. on desert flats and usually absent.

Schmidt and 1 specimens are available. The central coloration of the flanks is yellow. The tail is only with combined counts. Despite the absence of additional records, we have not observed any other specimens that resemble this species closely. However, these may be mistaken for other species with similar coloration and overall appearance. Additional records would be helpful to confirm the identity of these lizards.
Although _merriami_ is not strictly segregated from _annulatus_ from the criteria of Smith and pattern, the two subspecies are both quite cool colored and well spotted; specimens intermediate between the two subspecies were collected on a rather narrow canyon near a small canyon near the town of Rosillos. Both are active and sometimes cling to the ground, but not particularly well. The first hatchling was taken June 18, and very small individuals were collected thereafter.

_Eumeles brevislineatus_ Cop. SHORT-LINED SKINK. Goat Spring, Rosillos Mines (CNHM 3). Brown records this species from Alpine and from several localities in the Chisos to 7000 feet altitude. It seems restricted to islands of mesca forest in the Big Bend.

On March 13 and 14, males were seen in pursuit of females, but no mating was recorded. The first hatchling was taken June 18, and very small individuals were collected thereafter.

_Eumeles obsOLEUS_ Baird & Girard. GREAT PLAINS SKINK. Chisos Basin (SAM 2, UMMZ, NHMS), Cattail Falls (CNHM), Recorded from the Rio Grande valley at Hot Springs and Boquillas, rare or absent in the desert.

These species were moderately plentiful in the more humid parts of the Chisos. None were seen until after the first rains in early May. They were seen near rock outcrops or clumps of bealugrilla. Two were found in cation under a large rock slab May 2. A young one with body length of 37 mm. was collected July 15.

_Cnemidophorus tigris marMoratus_ Baird & Girard. GRAY WHIPTAIL. Base of Rosillos Mines (UMMZ 4, CNHM 2), Hot Springs (UMMZ 4), 20 mi. s Marathon (CNHM 2), 3 mi. n. Persimmon Gap (UMMZ), 2 mi. sw. Boquillas (CNHM), Dog Canyon (UMMZ), 1 mi. sw. Terlingua (SAM). Very plentiful on desert flats and sandy areas along Rio Grande. Less abundant in the foothills and rare or absent in the prairie or at elevations above 5000 feet.

Schmidt and Smith, Brown, and others list this species as _C. tessellatus_. Some specimens are almost uniform drab gray, some show light vertical bars on the trunk. The ventral color is pale yellow shading to peach on the chest and throat. Black spotting of the throat is usually sparse or lacking, ventral spotting sparse to moderate. Young differ from adults only in reduced ventral pigment, Femoral pores (combined count) number 12-48.

Despite the abundance of these lizards near our house, none were seen until March 15 when the temperature at midday reached 85° to 90° F. They are active in the intense heat of mid summer, tending to appear later in the morning and disappear earlier in the evening than the other lizards associated with them. Their homes are in mammal burrows at the base of cactus, creosote bush, or other shrubs. Sometimes several whiptails will inhabit the same system of burrows. They seem to have recognizable home ranges and behave aggressively toward other lizards that trespass upon them including individuals of their own species.

A pair of these lizards was observed in copulation July 6. A hatchling was collected August 1, and others had probably been seen during the last week of July.

A large gray whiptail was seen dragging a small _Holbrookia tetraea_ that was dead when released and doubtless would have been eaten. Others were seen feeding upon such large, active insects as robber flies, grasshoppers, and dragon flies.

_Cnemidophorus tessellatus_ Grahami Baird & Girard. CHECK-
ERED WHITTAI. Tres Cucos Mt., between Teltingua and Las Enras (CNHM). Santa Elena Canyon (Texas Cooperative Wildlife Coll. 5). Also Chisos. San Vicente, Burro Mesa (Brown). Occurrence spotty and evidently restricted to arid mountains, mesas, and canyons.

All specimens are females. I have never seen a male of this species from any part of the range. W. G. Degenhardt who collected the Santa Elena Canyon specimens writes, “Common along the river...it is difficult to collect as it is extremely wary and takes cover in the reeds.”

CNEOMIDOPHORUS SACKI SEMIFASCATUS (Cope, BIG BEND STRIPED WHITTAI. Rosillos Mts. (CNHM 6, UMMZ), National Park Headquarters (UMMZ), Green Gulch, Chisos (UMMZ), Laguna Meadow, Chisos (SAM), Chisos Basin (CNHM, LPZ). Caracoles Peaks (CNHM). Santiago Mts. (SAM). A lizard of the mountains and desert foothills, absent at low altitudes except where lava flows or canyons provide suitable rocky habitat. Observed from 2000 to 6000 feet.

The name semiferocis has been applied to this form by most earlier workers, some treating it as a species, others as a subspecies. I find it readily identifiable with semiferocis as redefined by Burger (1950). Characteristics observed in my material: Blackish fields between the dorsal stripes broken up posteriorly by expansion of light spots in them; belly white in both sexes; marked rusty suffusion of rump and proximal portion of tail; femoral separate from loreal in 5 specimens, in contact unilaterally in 2; femoral pores 34-45 (mean 38.25); maximum body length 68 mm.

Very young individuals have body lengths of 36-58 mm. The spots between the stripes are discrete and do not break up the zones of ground color, and the tail is bluish gray.

This lizard is usually observed in rocky situations with sparse vegetation. It rarely climbs on cliffs or other steep rock surfaces but seeks shelter under rocks or in crevices. It is less active than other members of its genus, and its actions suggest those of a skink rather than a whiptail.

A juvenile 44 mm., in body length was collected in the Rosillos March 9, but large adults did not appear in numbers until late April. Females containing large eggs were collected in June and early July. The first individuals of hatching size were noted July 31.

It is my impression that this lizard feeds upon smaller, less active prey than does the gray whiptail. Striped whiptails often root about in ground litter, overturning sticks and rocks with their nose and lapping up small insects thus uncovered.

CNEOMIDOPHORUS SACKI SSP. PRAIRIE STRIPED WHITTAI. 10 mi. s. Alpine (CNHM 3, SAM 21, 31), s. Alpine (UMMZ 2), 18 mi. s. Alpine (CNHM 2). The records are for short grass prairie and grassy hills.

This population is clearly distinct from the population in the southern Big Bend. Some individuals resemble C. sacki galaxis while others are close to C. s. exsanguis. The most conservative solution at present seems to be to treat this population as an intergrade between these two subspecies. Features observed in my material are: Snout brown to olive brown between dorsal stripes; light spots small, discrete, do not break up fields between stripes; no rusty suffusion of rump and tail; males with blue bellies and pink throats; femoral in contact with loreal bilaterally in 5 specimens, unilaterally in 2, separate in 1; head badly damaged in 1; femoral pores 30-49 (mean 38.4); maximum body length 80.3 mm. Intergenerations between this form and semiferocis were not observed.

The specimens were obtained in low, slightly damp, grassy sites and on hills in the sparse juniper, rocky sites. In general a female collectors.

CNEOMIDOPHORUS TAIL, BLUETA (UMMZ 2), National Park Headquarters (CNHM). Name for the higher area.

For the use of specimens have been dark background, are not enlarged maximum body length.

Near Marathon vegetable and is common in an creosote bush cactus is associated with No hatchlings of on March 4.

GERRHONOT LIZARD. Chisos (CNHM), Boot Spruce forest and (Brown).

I obtained the rocks in the oak are very different. Large ones lie stomach of one young alligator.

LEPTOTYPH

SNAKE. Castiles (Klauber, 1946).

The head of r cannot be scales is 224. A count fits daleis from the Chisos to the tail.

The Castiles place near the 1 stake of the same.

LEPTOTYPH SNAKE. Burro.
the sparse juniper-cholla-sotol association. There seems to be no tendency to frequent rocky sites. In general, this form seems more active and alert than *semitasius*. A female collected July 1 contained eggs nearly ready for deposition.

**Cnemidophorus perplexus** Baird & Girard. **Little Striped Whiptail, Bluetailed Racerunner**. Dagger Flat (CNHM 31), 10 mi. E. Alpine (UMMZ 2), Lone Mtn. near National Park Headquarters (SAM), 8 mi. N. National Park Headquarters (UMMZ). Persimmon Gap (CNHM), Marathon (CNFM). Numerous records for the prairie, desert flats, and desert foothills; none for the higher mountains or Rio Grande lowland.

For the use of the name *perplexus* instead of *inornatus* see Milstead (1957). All specimens have bright blue tails and a pattern of 7 bright yellow lines on a uniform dark background. Bellies and faces of males are bright sky blue. Postantehral scales are not enlarged in 3 and slightly enlarged in 6; femoral pores 26–32 (mean 29.1); maximum body length 60 mm.

Near Marathon and Alpine, this whiptail occurs in flat, open places almost devoid of vegetation and seems to be the dominant lizard in such sites. At Dagger Flats, it is common in an area of grass and mesquite but was not noted in the surrounding creosote bush-yucca association. In the desert foothills, it was collected in lechuguilla flats associated with *C. s. semifasciatus* and *C. t. marmoratus* and was not plentiful. No hatchlings of *C. perplexus* were seen; only 30 mm. in body length was collected on March 4.

**Gerrhonotus locepalus infernalis** Baird. **Texas Alligator Lizard**. Chisos Basin (UMMZ 2), Laguna Meadow (SAM 2), Emory Peak (INHS), Boot Spring (UMMZ). Most records for the Chisos above the level of the pinyon forest and to 7500 feet on Mount Emory. Also recorded from Terlingua (Brown).

I obtained the species under logs in needle grass meadows and in the open or under rocks in the oak-pinyon-juniper forest. The slow, sinuous movements of this animal are very different from the skurrying of the desert lizards. The tail is prehensile. Large ones bite powerfully, and the short teeth produce painful scratches. The stomach of one specimen contained a scorpion and several large beetles. A very young alligator lizard, 45 mm. body length, was collected July 17.

**Snakes (Serpentes)**

**Leptotyphlops dulcis dissecta** Cape. **New Mexico Blind Snake**. Castolon (SAM). Chisos Basin (Schmidt & Smith), Oak Creek Canyon (Klauber, 1940).

The head of my specimen is so badly crushed that the supraoculars and supralabials cannot be examined. By the method of Klauber (op. cit.), the actual count of dorsal scales is 224. Assuming 5 to 10 scales were destroyed with the damaged head, this count fits *dulcis* rather than *hamilis*. Dorsal scale counts of two CNHM specimens from the Chisos Basin are 229 and 230. All 3 specimens have 10 scale rows around the tail.

The Castolon specimen was unearthed by road grading machinery in a sandy place near the Rio Grande March 8. Sotero Morin who collected it said another snake of the same kind was found nearby but escaped.

**Leptotyphlops humilis segregus** Klauber. **Trans-Pecos Blind Snake**. Burro Mesa (Schmidt & Smith), Chalk Draw (Klauber, 1940), 15 mi. SW.
Marathon (ibid.), 65 mi. s. Alpine (ibid.). All localities in the desert flats and foothills.

The specimen from Burro Mesa has 271 dorsal scales and 10 scale rows around the tail.

Virtually nothing is known of the ecology and habits of the two species of Leptotyphlops in the Big Bend. There is a slight suggestion from the locality records that L. humilis occurs in more arid situations than L. dalixis.

**Diodophis regalis Blanchardi** Schmidt and Smith, THIMBLE SNAKE, Dog Canyon, Santiago Mtns. (SAM), east base Rossillo Mtns. (CNHM).

Also Chisos Basin and Alpine (Brown), Lost Mine Peak, Chisos (Degenhardt, pers. comm.). May be widespread but occurrence evidently spotty. 2700 to 6800 feet.

Both specimens are females. One has 322 ventrals, 57 subcaudals, total length 519 mm., tail 82 mm.; the other has 226 ventrals, 54 subcaudals, total length 495 mm., tail 72 mm. Neither has a neck ring. In life, one was light greenish gray above, the other medium bluish gray approximating the color of the white works eastern race.

B. punctatiss. Undersurfaces of both bright chrome yellow shading to vermiculation on the tail, diffuse black speckling of entire underside including chin and labials.

Both were collected in the open about two hours after sunrise in desert terrain with sparse, xeric vegetation. Actual site of collection was slightly damp one was about 400 yards from a small spring. When approached, these snakes flattened their heads against the ground and elevated their tightly curled tails showing the bright red underside. With continual annoyance. One rolled belly up with the body tightly kinked and remained so for perhaps a minute.

One collected June 8 laid 5 eggs June 14. They had an average length of 30 mm. and diameter of 9 mm. Several had the slightly curved form of eastern Diodophis eggs. All failed to hatch.

**Heterodon nasica** Kennewick, MEXICAN HOGNOSE SNAKE. None collected. Two in CNHM from 1 and 2 miles east of Alpine, Residents of the Alpine-Marathon prairie know this snake but say it rare. Both specimens are males; ventrals 143 in each; one has 41 subcaudals, tail of other incomplete; body blotches 20 and 29.

**Mastigophis flagellum testaceus** Sax, RED RACER. Base of Rossillo Mtns. (CNHM), 2 mi. s. National Park Headquarters (INHS), 14 mi. s. National Park Headquarters (UMMZ), 5 mi. e. National Park Headquarters (UMMZ), 2 mi. s. Persimmon Gap (UMMZ), Hot Springs (LPZ). Generally distributed to at least 6500 ft. in the Chisos. Most plentiful in desert flats and foothills.

All adults collected or observed were at least somewhat reddish above, varying from pale pinkish tan to bright vermiculation; ventral color dusky salmon to pale peach with dusky motting on chin and throat. The few juveniles seen were straw color above with white, indistinct dark crossbands and yellow bellies. Maslin (1934) restricted *testaceus* to pinkish populations in Colorado, replacing the same *flagellum* for the wide ranging cockroach of the southern Great Plains. Presence of pinkish snakes in the Big Bend casts doubt upon the desirability of this arrangement. Ventrals in my specimens range from 180 to 194 (mean 191.4), lower than reported by Maslin for the Colorado population but probably not significantly so. The largest specimen (male) measured 67 inches and lacked the tip of the tail.

Red racers are diurnal and were most frequently seen during the morning or after showers. They are chiefly terrestrial but occasionally climb into low shrubs. The large one was taken in shallow water at the edge of the Rio Grande. None were seen prior to March, their dispersal of one large rodent is thought to be a vermiculation of the red (ibid.).

**Mastigophis whipsnak** SAM, Lone Dog Canyon at least 6000 feet. In pattern and form Wright 1949 (27, 15).

Nearly all situations; bodies protuberant, were found on snakes but not dead upon it.

A female hatchling with whitish stripe. The head.

**Salvadorina pacifica** NATIONAL PARK (CNHM). Largely red. The gray stripes. The tailored.

(mean 109) and 112; to 10.9 in. The most first observed one way if it was taken as it was.

A female August 27 identical.

**Salvadorina pacifica** NATIONAL PARK (CNHM). Largely red. The gray stripes. The tailored. One for anterior to.
prior to March 13, and most adults were seen during late April and May. As racers go, their disposition is snaky. George Sholly took a pair in copulation on April 30.

Unidentified small mammal remains were found in digestive tracts of three. I saw one large racer enter a burrow at the base of a mesquite. A few seconds later, a wood rat ran from another burrow with the snake in pursuit. One racer was seen eating carrion (lizard?) on the highway.

**MASTICOPHIS TAENIATUS ORNATUS** Baird & Girard. CENTRAL TEXAS

WHIPSNAKE, BLACK SNAKE. Lower slopes Rosillos Mtns. (CNHM, UMMZ, SAM). Lone Mt, near National Park Headquarters (SAM). Chisos Basin (LPZ), Dog Canyon (UMMZ). Characteristic of rocky desert foothills but wide ranging to at least 7,000 feet.

In pattern and color, these snakes conform closely to the description by Wright and Wright (1957, pp. 56-58). Ventrals 202-213; subcaudals in 5 males are 146, 149 (2), 51, and 134, in 3 females 141, 142, and 149.

Nearly all these snakes were taken during March and April in rocky or brushy situations; more were observed than captured. I saw three with the foreparts of their bodies protruding from rocky crevices into which they drew when alarmed. Others were found in brush piles, under rubbish, and in low shrubs. They are trim looking snakes but nervous and had tempered, Local residents told me they had seen them feed upon lizards.

A female collected May 6 deposited 5 eggs June 1. Two hatched August 2. The hatchlings measured 349 and 355 mm. They were dark brown to black with a wide whitish stripe on scale rows 4, 5, and 6. One, narrow, indistinct pale stripes below this. The belly color was yellow to pale orange.


Largely restricted to the foothills and mesas from about 5,000 to 7,500 feet.

The ground color is grayish yellow, richer in hue between the paravertebral stripes. The belly is pinkish. One individual shows a very faint pair of lateral dark stripes. Ventrals in 4 males number 181-189 (mean 185), subcaudals 100-110 (mean 105.2), ventrals in 5 females 188-194 (mean 190.6), subcaudals 110, 110, and 112, upper labials normally 8, 9 in one; lower labials 9 in 4 specimens, 10 or 10-9 in 5.

The mountain patchnosed snake was usually seen on mild, sunny mornings. It was first observed February 26. In the brush, it is quick and often escapes, but on the highway it tends to “freeze” at the approach of a car and is readily caught. One was taken as it was swallowing a ground snake (Sistrurus).

A female collected April 1 deposited 6 eggs May 29. Three of these hatched August 27-28. The hatchlings measured 263, 264, and 267 mm, and were virtually identical with adults in color and pattern.

**SALVADORA HEXALEPIUS DESERTICOLA** Schmidt. BIG BEND PATCHNOSED SNAKE. East base Rosillos Mtns. (UMMZ), Tumillo Flat 11 mi. n. National Park Headquarters (SAM). Also Chisos foothills and Mesa de Anguila (Schmidt & Smith). Evidently replaces S. grahamiae on the desert flats, however both species occur in the foothills and mesas.

One found basking March 6, the other found April 13 in a sandy wash with the anterior quarter of its body buried; both specimens were taken in open places almost
devoid of vegetation. The remains of a third were found in the nest of a redtailed hawk.

ELAPHE GUTTATA EMORYI Baird & Girard. GREAT PLAINS RAT SNAKE. Not collected. Recorded in the Big Bend only at San Vicente in the Rio Grande valley (Brown).

ELAPHE OBSOLETA BAIRDY Yarrow. BAIRD'S RAT SNAKE. Not collected. Published records are for the Chisos above 5500 feet and for Ranger Canyon near Alpine (Wright & Wright, 1957).

Rorrell and Bryant (1941) obtained two of these snakes while trapping mammals at Laguna Meadow in the needle grass-pine agave habitat.


Spring (UMMZ, SAMI), 24 mi. s. Alpine (CNHM), 20 mi. s. Marathon (LPZ), during to 25 or 21 posteriorly; ventrals 204, 202, 200; subcaudals 20, 20, 20, body and tail blotches 21 + 7, 24 + 10, 21 + 9.

Near Government Spring on the north side of the Chisos where this snake appears to be rather plentiful, the habitat is gently rolling, rocky desert with lechuguilla, sedo, and cacti as dominant plants. The elevation is 4500 to 5000 feet. South of Alpine and Marathon, this snake was taken in rocky, sparse grassland with some juniper, cacti, and cacti, and sedo. All my specimens were collected on the highway at night. Three were found about an hour after sunset, a fourth at 11:30. This latter snake had recently swallowed two mice (Peromyscus sp).

PITUOPHIS CATENIFER SAYI Schlegel. BULL SNAKE. North base Rosillos Mtns. (UMMZ, CNHM), Chisos Basin (LPZ), 8 mi. s. Persimmon Gap (UMMZ), Marathon (UMMZ). Widely distributed to at least 6000 feet but nowhere particularly plentiful.

These snakes are decidedly more pallid than specimens from the eastern part of the range. The blottches are reddish to tan on a pale yellow ground color. There is little or no black pigment on the top of the head and labials. The colors suggest those of P. c. affinis rather than sayi, but the rostral is high and narrow as in sayi. Ventral, subcaudal, and blotch counts for Big Bend specimens fall within the normal limits of variation for both affinis and sayi using Klauber's (1947) figures.

Bull snakes were first noted March 31 and were subsequently observed in a variety of habitats, particularly in grassland and the less arid sections of the desert flats. All five were observed by day, but one DOR clearly was killed between sunset and 10 p.m.

ARIZONA ELEGANS ELEGANS Kuenzle. TEXAS GLOSSY SNAKE. Not collected. Reported by Klauber (1946) from between Marathon and Alpine and 4 mi. w. of Government Spring.

LAMPROPELTIS ALTERNA Brown. DAVIS MOUNTAIN KINGSNAKE. Not collected. The only record is for Casa Grande in the Chisos about 6000 feet (Murray).

Fragmentary data on this rare snake indicate it is a rock, crevice inhabiting animal and largely nocturnal. It has been reported to feed upon lizards.


This specimen and another photographed by Steele were on the highway after dark. My specimen is an adult female with 213 ventrals and 18 subcaudals. There are 33 light crossbands on the body, 13 on the tail.

RHINOCHELUS LECONTEI TESSELLATUS Gorman. TEXAS LONGNOSED SNAKE. West base (UMMZ), ne. h. Sprung, Glenn Sp. elevations.

These specimen areas between the tip of the snout to the ventral caudals 21 and 4 blottches 30.

All three were two hours after sunset (Cynops).

NATRIUM ERY SNAKE. Hot Sp. restricted to the Rio Grande.

The belly in the underside of the preserved female has indiuvials.


THAMNOPHIS ERED GARTIE n. base Rosillos A several other lustotes than T. e.

The specimens and pale orange checkered and ible. Female.

This snake was It was not four cyrtophis, homos. SONORA SNAKE. Oak S.
SNake. West base Elephant Mesa (CNHM), 8 mi. e. National Park Headquarters (UMMZ), ne. base Rosillos Mtns. (CNHM). Also reported from Government Springs; Glenn Springs, Persimmon Gap. Evidently restricted to low and moderate elevations.

These specimens differ from specimens collected in central Texas in that the red areas between the black blotches are paler, the rostral less sharply upturned, and the tip of the snout tan rather than reddish. Ventra1s in females 192 and 194, subcaudals 46 and 47, black body blotches 26; Ventra1s in males 196, subcaudals 53, blotches 30.

All three were found in the open in dry, rocky situations; one at dusk, one about two hours after sunset, and one about an hour after sunrise. One had eaten a gray whiptail (Caenomphalus t. marmoratus). NATIVEX ERYTHROGASTER TRANSVERSA Hallowell. BLOTCHED WATER SNAKE. Hot Springs (UMMZ), Boquillas (LPZ). In the Big Bend, evidently restricted to the Rio Grande and its permanent tributaries.

The belly in both specimens was almost white shading to pale flesh color on the underside of the tail. There is no dark pigment at the edges of the ventra1s. A preserved female has 199 ventrala, 65 subcaudals, and 36 body blotches. The anal is undivided.

THAMNOPHIS CYRTOPSIS Kennicott. BLACKNECKED GARTER SNAKE. base of Rosillos Mtns. (CNHM 2, UMMZ), boot Spring, Chisos (UMMZ 2), Chisos Basin (SAM), 5 mi. s. Alpine (DOR), 19 mi. s. Alpine (DOR). Also Terlingua, Glenn Springs, San Vicente (Brown). Chiefly found in wooded canyons and near springs to altitudes of about 7000 feet.

According to Milstead (1951) the Big Bend population is intermediate between the subspecies cyrtopsis and ocellata. All but one of the specimens collected show prominent dark spots on the side of the neck. The median stripe in life is pale orange shading to yellow posteriorly. Ventrala 165–175 (mean 169.3); subcaudals in males 81, 84, in females 73, 76 (2), and 78.

In late July, almost every pool in the little canyon below boot Spring was occupied by 2 to 6 of these snakes. They were sunning on rocks or swimming in pursuit of Hyla arenicolor tadpoles which were found in the stomachs of those collected. The specimens observed in the Rosillos were found at night or late in the evening. Here on June 29, I collected two very small ones about 8 inches in total length and probably only a few days old. This suggests an autumn or winter breeding season.

THAMNOPHIS MARCIANUS NIGROLATERIS Brown. WESTERN CHECKERED GARTER SNAKE. 12 mi. e. Alpine (CNHM), 5 mi. Marathon (CNHM), n. base Rosillos Mtns. (UMMZ), Hot Springs (LPZ). Schmidt and Smith list several other localities along the Rio Grande. Characteristically inhabits lower altitudes than T. cyrtopsis.

The specimens from near Marathon and Alpine have a strongly checkered pattern and pale orange median stripe; those from the Rosillos and Hot Springs are less checkered and have grayish white stripes. Ventrala in males 158, 162; tails incomplete. Female has 156 ventrala, 67 subcaudals.

This snake was collected near prairie ponds and the margins of permanent streams. It was not found in the wooded draws and canyons that are good habitat for T. cyrtopsis, however both species were taken in damp grassland.

SONORASEMIANULATA BLANCHARDI Stickel. TRANS-PECOS GROUND SNAKE. Oak Spring, Chisos (UMMZ), n. base Rosillos Mtns. (UMMZ, CNHM).
3½ mi. s. Persimmon Gap (SAM), 1½ mi. w. National Park Headquarters (SAM), 6 mi. n. National Park Headquarters (SAM). Recorded from numerous desert and semidesert localities from the Rio Grande to Green Gulch at about 5000 feet (Stickel, 1938).

Three varieties were observed. The unicolor phase is light olive to mouse gray above, the centers of the scales darker than their edges and the top of the head slightly darker than the body. The black capped phase is pale orange with the centers of the scales a little darker than the edges and the top of the head grayish brown to black, contrasting sharply with the body color. The ringed phase is light buff with dark brownish gray crossbands extending to the edges of the ventrals. All the specimens collected are males. Scale counts are as follows: Dorsal scales 17-15-14 (3), 17-13-14 (1) or 16-15-13 (2); ventrals 146-153 (mean 150.3); subcaudals 53-59 (mean 57.1).

All these snakes were in arid, open situations in the flats or foothills. The first one was taken March 14 lying in the open about sunset. One seen July 18 was crawling rapidly in the full afternoon sun and disappeared into a crevice. All others were taken at night.

PLICMIA CANA Cope. WESTERN HOOK-NOSED SNAKE. Not collected. Reported from the Chisos (Schmidt and Smith) and from 1 mi. w. Alpine (Wright and Wright, 1957, p. 285). Evidently frequents rocky places at altitudes of 4000 feet or more.

TANTILLA ATRICEPS Gunther. MEXICAN BLACKHEADED SNAKE. Chisos Basin (CNHM 2, UMMZ, INHS), Panther Peak (SAM). All Big Bend records are from the Chisos from the lower limit of the pine forest to at least 6200 feet.

Ventrals in males 135, 137, 138; subcaudals 63, 64; ventrals in females 148 and 152. Tails incomplete in three. In life, the center of the belly is vermilion shading to pearly white on the throat and chin.

First taken March 4 when temperatures in the Chisos were decidedly cool for snakes. All were under rocks in shaded situations except one found dead on the highway after a rain. The stomach of one contained a beetle larva, another contained a centipede. In both cases the prey was quite large in proportion to the size of the snake. A female collected June 1 contained one large egg nearly ready for deposition.

TANTILLA CUCULLATA Minton. BIG BEND BLACKHEADED SNAKE. 6 mi. sse. Alpine (CNHM).

This specimen has been described in detail elsewhere (Minton, 1956). The dark color of the head involves most of the chin and labials, there is no light collar, and the subcaudal count is 82.

Collected on the highway about an hour before sunset and following a light rain. The terrain where it was taken is hilly and the soil a comminuted reddish loam. The vegetation consists of sparse short grass with a little juniper and cholla.


Ventrals in 4 males 163-174; subcaudals 49-59; ventrals in 3 females 172-177, subcaudals 41-52.

body blotches. All these snakes chiefly in rocky March 21. It had one had just eaten an at night. The stone TRIMORPHO Degenhardt and their specimen other at bare gre ANISTRODON PELOS COPPER 4). Also Alpine a Ventral in m. female, 147 ventrals and one 11

All these snakes, canyon traversed buckeye, and the first two cappled. One had eaten a away at the app.

A captive snake August. Toxicity of vapor kilo in contour). The differ.

CROTALUS SNAKE. Base of (CNHM) 11 mi. Hot Springs (C) about 4000 feet. These are pal white. There is a thumb mark subcaudals in the specimens, 24 in.

Diamondback Texas. Our largest they rarely.

Diamondback in a grassy pasture and early April shortly before the initial intake eaten a large prairie fied rodent. Gm.

CROTALUS
The nape blotch is 7-12 scales long and there are 50-61 median body blotches. All have 21 scale rows at mid-body, 17 or 18 at the vent.

These snakes were taken in both creosote bush and lechuguilla associations, chiefly in rocky places but occasionally in sandy washes. The first was obtained March 21. It had been killed by a house cat and apparently was abroad in mid-morning. Another was found about an hour before sunset under a stone. It had just eaten an adult ground ute (Uta stansburiana). The others were collected at night. The stomach of one contained lizard eggs.

TRIOMPHODONT VILKINSONI Gobe, TEXAS LYRE SNAKE. Not collected. Degenhardt and Steele (1955) report it from the Chisos Basin and Grapevine Hills. Their specimens were found burrowing in the open at night, one on the road, the other one near ground near an adobe house.

ANCHORDON CONTORTRIX PICTIGASTER Gloyd and Conant. TRANS-PECOS COPPERHEAD. Northwest side Rodillos Mt. (LMHS, SAM, UMMZ, JLPZ). Also Alpine and localities in the Chisos (Gloyd and Conant).

Venom in males 118, 149; subadults 60 (25 divided) and 58 (33 divided), in females 117 centrals, 56 subadults (30 divided). Two have 13 dark bands on the body and one 14.

All these snakes were taken within an area of a few hundred yards in a small canyon traversed by a spring-fed stream and forested with walnut, oak, Mexican barberry, and other mesophytic plants. On April 16 about mid-morning, I saw the first two copperheads intertwined in a rock crevice. All others were taken at night. One had eaten a mouse (Peromyscus sp.). They seemed inoffensive snakes, gliding away at the approach of a human and not attempting to bite until pinned down.

A captive specimen in the Lincoln Park Zoo gave birth to young during the first week of August.

Toxicity of venom as measured by the subcutaneous L.D. 50 for mice is 22.8 mg. per kilo in contrast with 25.65 mg. per kilo for the eastern copperhead A. c. nelsoni. The difference is probably not significant.

CROTALUS ATROX Baird & Girard. WESTERN DIAMONDBACK RATTLE-SNAKE. Breve of Rodillos Mt. (UMMZ, A. JLPZ 2, SAM 2), 4 mi. s. Persimmon Gap (CNHM 11 mi. n. Persimmon Gap, CNHM), 6 mi. s. Alpine (CNHM), 8 mi. n. Hot Springs (CNHM). Characteristic of the desert flats but occurs in the foothills to about 4000 feet, also found in the prairie.

These are pale grayish brown snakes with darker rhombi narrowly edged with white. There is often a pale orange wash over the posterior part of the body. Dorsal rhombs number 28-38 (mean 32.1), Ventral number 168-182 (mean 177.6); subadults in 6 males 21-26, in 3 females 18-20. Scale rows at mid-body 23 in 8 specimens, 23 in one.

Diamondbacks from the Big Bend are smaller than those in central and southern Texas. Our largest measured 15 inches, and a 15 inch female was gravid. Residents say they rarely find diamondbacks as much as four feet in length.

Diamondback rattlesnakes were found in open desert, about low, rocky bluffs, and in a grassy pasture. They were first seen March 9. These collected March and early April were in the open during the day; later they were taken at night or shortly before sunset. Most were irritable, savage snakes when cornered, although the initial reaction of nearly all was flight rather than combat. One adult snake had eaten a large pack rat (Neotoma albigula); a smaller snake had eaten an unidentified rodent. Gravid females were collected May 14 and June 29.

CROTALUS LEPIDUS LEPIDUS Kenneally. MOTTLED ROCK RATTLE...
SNAKE, Emory Peak, Chisos (SAM), Rosillos Mtns. (UMMZ). 3½ mi. sw. Alpine
(CNRM). Characteristic of rocky areas 4700 to 7500 feet elevation.
A male has 159 ventrals; 26 subcaudals; ventrals in females 157, 160; subcaudals
21 and 20. The ground color in life was light reddish brown to drab gray or olive.
These snakes were obtained near rock slides and ledges cooled in the open on day-
light. All were found on overcast days or after rain. They seem less nocturnal than
the other local rattlesnakes. A very small one, 183 mm. in total length and
apparently only a few days old, was collected near Fort Davis and
sent to the Lincoln Park Zoo gave birth to 3 young on August 23.
The venom is moderately toxic, the L.D. 50 for mice being 11.55 mg. per kilo.
CROTALUS MOLOSISSUS MOLOSISSUS Baird & Girard. BLACKTAILED RATTLESNAKE. Rosillos Mountains (CNHIM 3, LPZ
SAM). 3 mi. s. Government Spring (UMMZ). Croton Spring, Chisos Foothills
(UMMZ). Apparently most plentiful in the foothills and mountains to about 6000
feet but have been recorded from the Rio Grande valley to the higher slopes of
Emory Peak.
Ground color ranges from steel gray to greenish gray. Dorsal scale rows at mid-
body 27 in 6, 29 in one; ventrals 179-190 (mean 185.8); Subcaudals in 5 males 23-27,
in 1 female 20. Dark transverse body bands 29-38 (mean 31.8).
Most were collected in rocky places. They are sometimes found in rock slides but
show less preference for this habitat than C. lepidus. Two were obtained in a pasture
at the base of the Rosillos associated with C. atratus and C. scutulatus; apparently
the blacktails stray into this site from nearby limestone bluffs. One found here had eaten
a young pack rat. These rattlesnakes were collected by day as frequently as at
night. They are generally rather mild tempered, but the disposition of individuals
varies greatly. Most will strike when cornered, but they do not adopt the spectacular
defensive pose of the diamondback.
The venom is of moderate toxicity, the mouse L.D. 50 being 17.4 mg. per kilo.
CROTALUS SCUTULATUS Kennicott. MOJAVE RATTLESNAKE. North base Rosillos Mtns. (CNHM, SAM), 5 mi. s. Marathon (UMMZ). Also Hot
Springs and Persimmon Gap (Brown). Occurs in desert and grassland below
4000 feet.
Ground color of fresh specimens greenish gray: 34 to 35 (2) olive brown rhombi
with distinct white edges. Scale rows at midbody 23 in two specimens, 25 in one.
Ventrals in males 168, 173; subcaudals 25, 26. A female has 174 ventrals, 18
subcaudals.
Two Mojave rattlers were found in the early morning, one late in the afternoon.
One was found in a grassy pasture, one in crossete bush flats adjoining the pasture.
and one in the grassland desert transition zone. A female collected July 4 was
 gravid.
An extremely toxic venom sample was obtained from one of these snakes. The
L.D. 50 for mice is 0.31 mg. per kilo, about ten times as toxic as any other North
American pit viper venom I have tested.
CROTALUS VIRIDIS VIRIDIS Rafinesque. PRAIRIE RATTLESNAKE. 5 mi. n.
Alpine (DOR). Also 5 mi. e. Marathon and Big Bend Park (Brown). Occurrence
rare and spotty, mostly in grassland.
The snake observed near Alpine was putrid and partly devoured by scavengers.
There were at least 30 dark body blotches with narrow, distinct light edges. In
view of the scarcity of this species in Trans-Pecos Texas, the following data from a
specimen collected 5 miles east of Van Horn by Madige and Brooks Minton may be
worthy of record. 10 and 26 subcaudals, with 34 distinct red light
and dark rings.

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worthy of record. This snake is a male with 25 scale rows at midbody, 181 ventrals, and 26 subcaudals. The ground color of the fresh specimen was light greyish brown with 9 distinct reddish blotches narrowly margined with cream and 9 alternating light and dark rings on the tail.

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