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AMPHIBIANS AND REPTILES OF THE
BIG BEND REGION OF TEXASBY KARL P. SCHMIDT
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AND

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The project for a national park in the Big Bend region of Texas has focused attention on the fauna of this region during recent years. The junior author was employed as student technician by the National Park Service during the summer of 1936 and again in 1937 to collect and study the amphibians and reptiles. He drew the senior author into consultation on various problems of identification at the suggestion of a mutual friend, Mr. Walter A. Weber, also of the National Park Service. The senior author visited the Chisos Mountains in April, 1937, in company with Mr. Leon L. Walters of Field Museum and Dr. Alfred E. Emerson of the University of Chicago, and returned to the Big Bend region in July and August, accompanied by Mr. D. Dwight Davis of the Field Museum staff. Mr. Walter L. Necker of the Chicago Academy of Sciences, accompanied by Mr. F. E. Winter, joined this party and paid especial attention to photographing the reptiles and their characteristic habitats. The senior author's sons, John and Robert, and Mr. Bertil Hartelius accompanied the 1937 party and again visited the Chisos in 1938, adding valuable specimens to the collections.

We are indebted to Mr. R. D. Morgan, superintendent of the State Park, for the hospitality of the park during our stay. Dr. A. E. Borell, then Wildlife Technician of the National Park Service, collected a number of specimens of reptiles while engaged in a survey of the mammals of the Big Bend area, and certain other specimens

from this region have been presented to Field Museum by the National Park Service, to further the preparation of a report on the reptiles of the region; several of these were collected by Mr. Tom Carney, who had presented specimens of rattlesnakes and lizards from the Chisos area to Field Museum in 1935. Dr. Ross A. Maxwell, in charge of geological studies in the region, collected specimens of the little horned toad. Of the group of student technicians at the State Park headquarters in 1937, we are especially indebted for specimens and other aid to Messrs. E. G. Marsh, Jr., Rollin H. Baker, James Wilson, and Barton Warnock; and in 1936 Mr. E. C. Niebuhr was a frequent companion of the junior author on collecting trips. The total collection here reported upon amounts to 589 specimens, which include 197 frogs and toads, 9 turtles, 308 lizards and 75 snakes. With the reservation of a series of specimens for the United States National Museum, the National Park Service has presented the major portion of the collection accumulated under its auspices to Field Museum. The collections made by the 1937 party have been shared by the Museum and the Chicago Academy of Sciences.

Various other herpetologists have visited the Big Bend area, notably Mrs. Helen T. Gaige, Dr. and Mrs. A. H. Wright, Drs. E. H. Taylor, Hobart M. Smith, Frank N. Blanchard, and Howard K. Gloyd, and Mr. John K. Strecker and his successor at Baylor University, Dr. Leo T. Murray.

The collections of snakes made by Dr. Blanchard and Dr. Gloyd on their visit to the Chisos region in 1935 have been made available for examination, in connection with our studies, by Dr. Gloyd. Thanks to the courtesy of Mrs. Gaige, we have examined her specimens of frogs of the genus *Syrrophus*, and snakes of the genus *Salvadora* and lizards of the genus *Cnemidophorus* collected by herself and by other field parties of the University of Michigan, whose exploration of the Chisos region began in 1928.

In the limited time available it was obviously impossible to complete a survey of the amphibian and reptile fauna. However, enough specimens were collected to give a fairly comprehensive list, which is set forth in the present paper, together with taxonomic notes. We hope that it will be useful in work on the Trans-Pecos herpetological fauna, and in the preparation of a handbook of the amphibians and reptiles of a future Big Bend National Park.

The principal types of country embraced are the low terraces bordering the Rio Grande, of about 2,500 feet altitude, including irrigated fields at Castolon and at Boquillas; the desert plateaus,

varying in level from 2,500 feet to about 4,000 feet; and the slopes and canyons of the mountain ranges that rise above the desert. Our collections are largely confined to the vicinity of the Chisos, the highest and largest mountain mass in the Big Bend region. The physiographic types of terrain are essentially characterized by the cane and willow association of the river terraces, the creosote bush desert, and the extraordinarily varied low forest of the mountains.

It may be pointed out that the relics of the fauna of a more humid era preserved in the Chisos and Davis Mountains may be expected in the Sierra del Carmen on the Mexican side of the Rio Grande, where forests of considerably greater extent are known to match those of the Chisos. Should this area be set aside as a Mexican national park, the joint international park area, by its great extent, would form a wildlife refuge and a typical desert-mountain area of the greatest importance to ecological studies.

The report on the mammals of the Big Bend area by Adrey E. Borell and Monroe D. Bryant (1942) contains a map of the region, a list of place names, and an excellent brief discussion of the ecological associations. The botanical report by Sperry (1938) gives a more comprehensive glossary of localities.

Reference should be made to the account of the birds of Brewster County by Van Tyne and Sutton (1937), and to the paper by Hubbs (1940) on fishes collected in the Big Bend region by various parties from the University of Michigan. The present paper has been delayed for the appearance of various taxonomic studies dealing with west Texan forms, including revisionary studies of genera (many of them in progress in 1937); these will be found listed in the bibliography.

The amphibians now known from the Big Bend region include six species:

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|-----------------------------------|---------------------------------|
| <i>Bufo insidior</i> | <i>Syrrhopus gaigeae</i> |
| <i>Bufo woodhousii woodhousii</i> | <i>Hyla arenicolor</i> |
| <i>Bufo punctatus</i> | <i>Rana pipiens berlandieri</i> |

Of these only *Syrrhopus gaigeae* is thought to be confined to Trans-Pecos Texas. The tiger salamander, spade foot toad, and robber frog may well be expected in this region. No collection has yet been made during the breeding seasons of the various amphibians.

The reptiles of Trans-Pecos Texas include a number of strikingly distinct forms found nowhere else in the United States and apparently confined to this region and to the adjacent portion of northern

Mexico. The most remarkable of these are the two chicken snakes, *Elaphe bairdi* and *Elaphe subocularis*, and the milk snake, *Lampropeltis alterna*. These snakes were long relatively rare in collections, and the *Lampropeltis* is still known from only five specimens. In addition to this very distinctive faunal element, a number of forms are represented in the area by more or less distinct subspecies of more wide-ranging species; such subspecies are *Sceloporus merriami annulatus*, *Crotalus lepidus lepidus*, and *Agkistrodon mokeson pictigaster*. The Mexican range of this endemic fauna is little understood.

The reptiles of the Trans-Pecos region include four species of turtles, twenty-two of lizards, and twenty-eight of snakes. These are:

TURTLES

Kinosternon flavescens flavescens
Pseudemys scripta gaigeae

Terrapene ornata
Platypeltis emoryi

LIZARDS

Coleonyx brevis
Crotaphytus collaris baileyi
*Crotaphytus wislizenii*¹
Holbrookia texana
*Holbrookia maculata maculata*¹
Uta stansburiana stejnegeri
Uta ornata schmidtii
Sceloporus magister magister
Sceloporus undulatus consobrinus
Sceloporus merriami merriami
Sceloporus merriami annulatus

Sceloporus poinsettii
Phrynosoma cornutum
Phrynosoma modestum
Gerrhonotus infernalis
*Cnemidophorus gularis*¹
Cnemidophorus octolineatus
Cnemidophorus perplexus
Cnemidophorus tessellatus tessellatus
Cnemidophorus grahamii
Eumeces brevilineatus
Eumeces obsoletus

SNAKES

Leptotyphlops humilis segregus
Leptotyphlops dulcis dissectus
Natrix erythrogaster transversa
Thamnophis eques cyrtopsis
Thamnophis marcianus
Diadophis regalis blanchardi
*Heterodon nasicus kennerlyi*¹
Masticophis taeniatus ornatus
Masticophis flagellum testaceus
Salvadora grahamiae
Salvadora hexalepis deserticola
Elaphe bairdi
Elaphe subocularis
Arizona elegans elegans

Pituophis sayi sayi
*Lampropeltis alterna*¹
*Lampropeltis getulus splendida*¹
Rhinocheilus lecontei tessellatus
Sonora semiannulata blanchardi
Ficimia cana
Hypsiglena ochrorhyncha
*Trimorphodon wilkinsonii*¹
Tantilla atriceps
Agkistrodon mokeson pictigaster
Crotalus lepidus lepidus
Crotalus molossus molossus
Crotalus atrox
*Crotalus viridis viridis*¹

Much collecting remains to be done, especially in the adjacent state of Coahuila, Mexico, to define the ranges of the inadequately

¹ Not represented in our collections.

known rare forms. A few snakes in the list above, especially *Heterodon nasicus kennerlyi*, *Lampropeltis getulus splendida*, and *Trimorphodon vilkinsonii*, known from Trans-Pecos Texas, but not as yet from the Big Bend, may be found to occur in the Park area, and the same is true for the three Trans-Pecos lizards not in our collections. *Pseudemys troostii elegans*, well represented in the Rio Grande drainage, does not appear to be recorded from Trans-Pecos Texas. The most obvious taxonomic problem appears to be also an ecological one; the several species of lizards of the genus *Cnemidophorus* overlap in a most confusing way, and require exact observation of habitat and life history (see pp. 85–87).

LIST OF SPECIES

AMPHIBIA: FROGS AND TOADS

Bufo insidior Girard

Bufo insidior Girard, Proc. Acad. Nat. Sci. Phila., 7, p. 88, 1854.

A single specimen of this species was collected at a water-hole made by an earth dam, on the Serna Ranch, about four miles east of Panther Mountain, August, 1937. It was associated with *Bufo punctatus* and *Bufo woodhousii*.

Bufo woodhousii woodhousii Girard

Bufo woodhousii Girard, Proc. Acad. Nat. Sci. Phila., 7, p. 86, 1854.

Bufo woodhousii woodhousii Bailey and Bailey, Iowa State Coll. Journ. Sci., 15, p. 174, 1941.

This species was obtained at Boquillas by Mr. Ernest G. Marsh, Jr., and by the Field Museum party, and at the water-hole on the Serna Ranch, about four miles east of Panther Mountain.

Bufo punctatus Baird and Girard

Bufo punctatus Baird and Girard, Proc. Acad. Nat. Sci. Phila., 6, p. 173, 1852.

This species was obtained at the water-hole on the Serna Ranch, at Boquillas, Tornillo Creek, where the highway crosses, and in Blue Creek Canyon. The transforming young are more frequently seen than the adults, and prove that the species is found everywhere where there is a spring or water of any kind, both on the plateau and in the mountains. The recently transformed juveniles were extremely abundant at the Serna Ranch water-hole on August 4, 1937.

Syrrhopus gaigeae¹ sp. nov.

Type from the Basin, Chisos Mountains, Brewster County, Texas. No. 27361 Field Museum of Natural History. Collected July 24, 1937, by Walter L. Necker.

Diagnosis.—Closely allied to *Syrrhopus marnockii*, from which it is distinguished by smaller size, wider head, and vermiculate instead of spotted dorsal pattern.

Description of type.—Habitus of *Syrrhopus marnockii*, head wider than body, its width equal to the distance from snout to posterior border of tympanum; snout long, the nostril close to the tip; canthus rounded; length of eye much less than its distance from the nostril, about equal to the diameter of the tympanum, which is very distinct; heels overlapping; heel reaching midway between eye and tip of snout; disks of two outer fingers much wider than those of inner fingers; disks of toes small; first finger about equal to second; metacarpal, metatarsal, and subdigital tubercles distinct; skin of back slightly tuberculated; a rounded gland above the insertion of the arm; no glandular fold over tympanum.

Pale brown above, with dark brown reticulation; under surfaces uniform very pale yellow; limbs with broad dark crossbars.

Measurements.—Length 27.3; width of head 10.5; tibia 13.2; forearm 7.5; diameter of tympanum 2.

Notes on paratypes.—The sixteen paratypes agree well with the type. Three were collected by Mr. Necker with the type; two additional specimens were taken in the Basin and one from Pulliam Canyon by the junior author. Ten additional specimens from Juniper Canyon were collected by Mrs. Helen T. Gaige. These range in length from 21 to 28 mm., compared with 25 to 35 in *marnockii*; the ratio of width of head to body length is 0.40 in seventeen *gaigeae* and 0.36 in twenty *marnockii*. The paratypes agree with the type in the tendency to vermiculation and diffuseness of the dorsal pattern.

The new form is admittedly distinguished from *marnockii* by only trivial characters; it is believed, however, that the differences noted characterize a well-isolated population, separated by some 250 miles from the range of *marnockii*, and that these differences indicate that a distinct form is in process of evolution.

¹ Named for Mrs. Helen T. Gaige, in order to associate her name with the herpetological exploration of the Chisos Mountains, in which she had a pioneer part.

Hyla arenicolor Cope

Hyla arenicolor Cope, Journ. Acad. Nat. Sci. Phila., (2), 6, p. 84, 1866.

We obtained several series of these fine hylas in the Chisos Mountains; our localities are Cattail Canyon (the next canyon south of Oak Creek), lower Oak Creek at "the Window," and Pulliam Canyon. A specimen was collected on the north slope of Mount Emory.

Rana pipiens berlandieri Baird

Rana berlandieri Baird, U. S.-Mex. Bound. Surv., 2, Rept., p. 27, pl. 36, figs. 7-10, 1859.

Rana pipiens berlandieri Schmidt, Field Mus. Nat. Hist., Zool. Ser., 22, p. 487, 1941.

This species is represented by numerous specimens from Boquillas. It occurs at larger springs, as at Gano Spring on the west base of the Chisos. It does not range into the mountain canyons.

The name *berlandieri* appears to be available for the large form of *Rana pipiens* found at Brownsville, and it is reasonable to suppose that all of the leopard frogs of the Rio Grande drainage are derived from this center. The senior author is convinced that *Rana sphenoccephala* can be distinguished in the southeastern United States from the northern *pipiens*, and that the essential problem lies in the Trans-Mississippian populations, in which characters distinctive of *pipiens* and *sphenoccephala* in eastern North America appear in various mixtures. In the present state of the *pipiens* problem, it is preferred to employ the earliest name available that is reasonably well associated geographically with our area. Kauffeld's remarks (1937, p. 84) about *Rana austriicola*, *R. pipiens burnsi*, and *R. kandiyohi*, and his choice of *brachycephala* as the name of the northeastern "*pipiens*," are unintelligible to us.

REPTILIA: TURTLES

Kinosternon flavescens flavescens Agassiz

Platythyra flavescens Agassiz, Contr. Nat. Hist. U. S., 1, p. 430, 1857.

Kinosternon flavescens flavescens Hartweg, Occ. Papers Mus. Zool. Univ. Mich., 371, p. 2, 1938.

Five specimens, from five miles west of Marathon, Muskhog Spring, and Garden Spring.

Pseudemys scripta gaigeae Hartweg

Pseudemys scripta gaigeae Hartweg, Occ. Papers Mus. Zool. Univ. Mich., 397, p. 1, 1939.

A single specimen, collected at Boquillas by D. D. Davis, is a paratype.

***Terrapene ornata* Agassiz**

Cistudo ornata Agassiz, Contr. Nat. Hist. U. S., 1, p. 445, 1857.

Terrapene ornata Baur, Science, 17, p. 191, 1891.

Two specimens from eight miles south of Marathon, Brewster County, collected by the junior author, August 11, 1936.

***Platypeltis emoryi* Agassiz**

Aspidonectes emoryi Agassiz, Contr. Nat. Hist. U. S., 1, p. 407, 1857.

Platypeltis emoryi Baur, Proc. Amer. Phil. Soc., 31, p. 220, 1893.

A single specimen, collected at Boquillas by the junior author. The reduction of the costals to seven in the living species of American soft-shelled turtles distinguishes *Platypeltis* from *Trionyx*. Both *Trionyx* and *Platypeltis* are well represented in the Tertiary of North America.

LIZARDS

***Coleonyx brevis* Stejneger**

Coleonyx brevis Stejneger, N. Amer. Fauna, 7, p. 163, 1893.

We collected twenty-four specimens of this interesting lizard, half of which were taken in the Basin at about 5,100 feet. It was obtained also at Government Spring, and in the foothills six miles northeast of the Chisos. Our material agrees excellently with the description by Hobart M. Smith, who records it from Glenn Spring, and from fourteen miles north of Terlingua, in our area.

***Crotaphytus collaris baileyi* Stejneger**

Crotaphytus baileyi Stejneger, N. Amer. Fauna, 3, p. 103, pl. 12, fig. 1, 1890.

Crotaphytus collaris baileyi Stone, Proc. Acad. Nat. Sci. Phila., 55, p. 30, 1903.

We have only four specimens of the collared lizard, from Muskhog Spring and from Crooked Hills, twelve miles east of the Chisos Range.

***Holbrookia texana* Troschel**

Cophosaurus texanus Troschel, Arch. Naturg., 16, pt. 1, p. 389, pl. 6, 1850.

Holbrookia texana Baird and Girard, Proc. Acad. Nat. Sci. Phila., 6, p. 124, 1852.

Thirteen specimens were taken at scattered localities including Boquillas and Santa Helena Canyon on the Rio Grande, Terlingua, Government Spring, Hay's Ridge, the Basin, Ward Spring, Indianola

Peak, the foothills six miles northeast of the Chisos, and Burrow Mesa. It was observed frequently throughout the area, but it is difficult to collect in mid-summer on account of its wariness and speed.

***Uta stansburiana stejnegeri* Schmidt**

Uta stansburiana stejnegeri Schmidt, Amer. Mus. Nat. Hist., Nov., No. 15, p. 1, 1921.

The localities for our nine specimens of this handsome lizard are Santa Helena Canyon, the Basin, Robbers Roost, Ward Spring, Government Spring and Boquillas. It is a relatively uncommon lizard in the Big Bend region.

***Uta ornata schmidtii* Mittleman**

Uta ornata schmidtii Mittleman, Herpetologica, 2, p. 33, pl. 3, fig. 1.

The partition of *Uta ornata* into a great number of subspecies, as proposed by Mittleman, requires the test of further examination of collections, which the writers are unable to undertake in connection with the present paper. We have twenty-eight specimens from the Basin, Juniper Canyon, Willow Spring, and Kibbee Spring.

***Sceloporus magister magister* Hallowell**

Sceloporus magister Hallowell, Proc. Acad. Nat. Sci. Phila., 7, p. 93, 1854.

Sceloporus magister magister Linsdale, Univ. Calif. Publ. Zool., 38, p. 365, 1932.

We collected only three specimens of this form, two at Boquillas and one at Hot Springs, along the Rio Grande.

***Sceloporus undulatus consobrinus* Baird and Girard**

Sceloporus consobrinus Baird and Girard, Marcy's Expl. Red River, p. 237, Zool., pl. 10, figs. 5-12, 1853.

Sceloporus undulatus consobrinus Cope, Ann. Rep. U. S. Nat. Mus., 1898, p. 377, fig. 60, 1900.

This lizard occurs everywhere in the Chisos Mountains. We have it from the Basin, Wade Canyon, the side of Casa Grande, and Mount Baldy.

***Sceloporus merriami merriami* Stejneger**

Sceloporus merriami Stejneger, Proc. Biol. Soc. Wash., 17, p. 17, 1904.

Sceloporus merriami merriami Smith, Proc. Biol. Soc. Wash., 50, p. 86, 1937.

A single specimen from Boquillas Canyon, collected by the junior author, agrees exactly with Smith's diagnosis of the typical subspecies.

Sceloporus merriami annulatus Smith

Sceloporus merriami annulatus Smith, Proc. Biol. Soc. Wash., **50**, p. 83, 1937.

Our twenty-four specimens from the Chisos region agree with Smith's diagnosis in essential characters. We have specimens from the canyon habitat (which he supposes to be characteristic of the typical subspecies), at the lower end of the Basin, as well as from various other places where boulders occur.

Sceloporus poinsettii Baird and Girard

Sceloporus poinsettii Baird and Girard, Proc. Acad. Nat. Sci. Phila., **6**, p. 126, 1852.

Eighteen specimens from the Basin, Casa Grande, Serna Ranch, Boot Spring, Santa Helena Canyon, Mount Emory, Juniper Canyon, and foothills six miles northeast of the Chisos range.

Phrynosoma cornutum Harlan

Agama cornuta Harlan, Journ. Acad. Nat. Sci. Phila., (1), **4**, p. 299, pl. 20, 1825.

Phrynosoma cornutum Gray, Synop. Rept., in Griffith's Anim. Kingd., p. 9, 1831.

This lizard is common in the vicinity of Alpine, but scarce in the Big Bend area. We have a large specimen collected in the Basin at 5,200 feet, and one from Persimmon Gap.

Phrynosoma modestum Girard

Phrynosoma modestum Girard, Stansbury's Expl. Surv. Valley Great Salt Lake, pp. 361, 365, pl. 6, figs. 4-8, 1852.

We have five specimens of this lizard. Dr. R. A. Maxwell obtained two fine adults three miles northwest of Terlingua Aguja, and another was taken in the northern foothills of the Chisos by the Field Museum party. Two immature specimens were collected by the junior author on the desert flats, one near Lone Mountain, and the other at Government Spring.

Gerrhonotus infernalis Baird

Gerrhonotus infernalis Baird, Proc. Acad. Nat. Sci. Phila., **10**, p. 255, 1858.

The alligator lizard is by no means an uncommon resident in the Chisos Mountains and surrounding foothills. Our series of seventeen specimens, all from the Basin, shows that in the juveniles the color pattern is the reverse of that found in the adults, the light

crossbars of the juveniles being converted into the dark bars of the adults (with their intermixed light scales) by invasion of black pigment, the dark brown bars of the juvenile pattern becoming a lighter brown in the adult.

***Cnemidophorus tessellatus tessellatus* Say**

Ameiva tessellata Say, Long's Exp. Rocky Mts., 2, p. 50, 1823.

Cnemidophorus tessellatus tessellatus Cope, Ann. Rep. U. S. Nat. Mus., 1898, p. 575, fig. 107, 1900.

Thirty-two specimens represent this species, which is extremely abundant on the desert plateaus of the Big Bend region. Our localities include Crooked Hills, twelve miles east of the Chisos, Indianola Peak, Tornillo Flat, the Basin, and Boquillas.

***Cnemidophorus grahamii* Baird and Girard**

Cnemidophorus grahamii Baird and Girard, Proc. Acad. Nat. Sci. Phila., 6, p. 128, 1852.

We have a single specimen, collected by the junior author at the Tres Cuevas Mountains, Brewster County, July 27, 1936. The difference in habitat between this canyon-inhabiting species and *Cnemidophorus tessellatus* of the desert flats is sharply defined, as was noted by Strecker. The University of Michigan collection contains numerous specimens of this species from Jeff Davis County, Texas. *Cnemidophorus grahamii*, with enlarged scales on the edge of the collar, bold vertical barring of the sides, and traces of the longitudinal lines, is amply distinguished from *C. tessellatus*.

***Cnemidophorus octolineatus* Baird**

Cnemidophorus octolineatus Baird, Proc. Acad. Nat. Sci. Phila., 10, p. 255, 1858.

The common spotted and lined race runner of the dry lechuguilla-covered slopes of the Chisos is here tentatively referred to *octolineatus*. Following Burt (1931), this lizard has usually been referred to *perplexus*.

Our thirty-three specimens come from the Basin, Green Gulch, Serna Ranch, Grapevine Spring, and Government Spring.

The adults of this species are typically six-lined, with a row of light spots in each of the dark stripes between the lines. A median seventh light line may be present or may be developed in some specimens by fusion of the light spots in the median dark stripe; that this

condition can not be derived from the pattern of true *perplexus* is shown by the fact that the number of granules between the light lines supposed to correspond is twelve to fourteen in *perplexus* and only six to nine in *octolineatus*. We assume that the usually six-lined pattern may be derived from a variant or juvenile eight-lined coloration by loss of the two outer lines. Five of our thirty-three specimens have a median light line and are thus seven-lined. They agree with the six-lined specimens in size, enlarged postantebrachials, and spotted pattern; and essentially in the number of granules between the middle lines.

Our use of the name *octolineatus* is entirely provisional. It is quite evident that the relations of the five species of the genus *Cnemidophorus* found in Trans-Pecos Texas can be clarified only by a renewed revision of available museum specimens, and that such study must be combined with a field study of the ecology and life history of the several forms. Adequate series of the juvenile specimens are not yet available to establish the ontogeny of the pattern in each form. That this is by no means simple is shown by the fact that seven-lined specimens of the larger form occur, and that the number of granules between the lines of the middle pair is somewhat larger than in the six-lined specimens.

Cnemidophorus gularis, the common form of central and southern Texas, is characterized by a broad and diffuse light mid-dorsal stripe, a black chest and belly in adult males, and strongly enlarged postantebrachials. This form reaches Jeff Davis County (University of Michigan collections), but is not represented in collections from the Big Bend area.

For his revision of the genus in 1931 Burt examined the types of both *perplexus* and *octolineatus*, but he does not specifically describe the postantebrachials, and does not mention the fact that specimens with the unspotted seven-lined pattern, only 50 to 60 mm. long, contain large eggs. This is barely two-thirds the length of adults of the form here referred to as *octolineatus*.

***Cnemidophorus perplexus* Baird and Girard**

Cnemidophorus perplexus Baird and Girard, Proc. Acad. Nat. Sci. Phila., 6, p. 128, 1852.

Seven specimens of the small seven-lined race runner, from Government Spring and Serna Ranch, all have seven sharply defined, narrow, and equally spaced light lines on the back and sides. One of these is median, and the line on each side extends

forward across the parietal shields. These specimens do not have conspicuously enlarged postantebrachials, and thus differ sharply from juvenile *gularis* or from the large spotted form commonly identified with *perplexus* on the assumption that the unspotted seven-lined individuals are the young of the larger spotted form. That this is an impossible assumption is shown further by the fact that specimens with the lineate pattern are sexually mature. It is obvious that the recognition of this very distinct dwarf species will require extensive modification of Burt's phylogenetic arrangement of *Cnemidophorus*. We are indebted to the Museum of Zoology of the University of Michigan for the loan of their Trans-Pecos collections of race runners. These fall into five species—*gularis*, *grahamii*, *tessellatus tessellatus*, *perplexus*, and *octolineatus* as here defined. This series had been examined by Burt, who synonymizes *grahamii* with *tessellatus* and our *octolineatus* with *perplexus*.

Eumeces obsoletus Baird and Girard

Plestiodon obsoletum Baird and Girard, Proc. Acad. Nat. Sci. Phila., 6, p. 129, 1852.

Eumeces obsoletus Cope, Bull. U. S. Nat. Mus., 1, p. 45, 1875; Taylor, Univ. Kans. Sci. Bull, 23, p. 304, pl. 24, text figs. 47, 48, 1936.

Eleven specimens of this handsome skink were collected in the Basin, forming a fairly complete series representing the transition from the black juvenile to the olive adult. The species is presumably widely distributed in the Big Bend region.

Eumeces brevilineatus Cope

Eumeces brevilineatus Cope, Bull. U. S. Nat. Mus., 17, p. 18, 1880.

Eighteen specimens of the smaller *Eumeces* of the Chisos region were collected, mostly from under dry sotol plants. We have it from the Basin, Panther Canyon, and Pulliam Canyon.

SNAKES

Leptotyphlops dulcis dissectus Cope

Glauconia dissecta Cope, Amer. Nat., 30, p. 753, 1896.

Leptotyphlops dulcis dissectus Klauber, Trans. San Diego Soc. Nat. Hist., 9, p. 112, 1940.

Three specimens of this species, all collected in the Basin, Chisos Mountains. These agree in having the two preocular labials described and figured by Cope, with three scales in contact with the

posterior border of the postocular. Van Tyne and Sutton (1937, p. 72) record a specimen of this species from the Roberts Ranch, twelve miles southwest of Marathon, under the name *myopica*.

Leptotyphlops humilis segregus Klauber

Leptotyphlops humilis segregus Klauber, Trans. San Diego Soc. Nat. Hist., 9, p. 59, 1939.

Two specimens of this species from the Big Bend area, one from Chalk Draw, collected by Mr. Edgar C. Niebuhr, U.S.N.M. 103670, the type, and one from the east base of Burrow Mesa, collected by A. E. Borell, F.M.N.H. No. 26616, a paratype. A third Texan specimen in Field Museum, collected by Col. M. L. Crimmins near El Paso, agrees with these specimens in essential characters. The dorsal scales in the three specimens number respectively 275, 271, and 267. The seven dorsal scale rows are pigmented.

Natrix erythrogaster transversa Hallowell

Tropidonotus transversus Hallowell, Proc. Acad. Nat. Sci. Phila., 6, p. 177, 1852.

Natrix erythrogaster transversa Taylor, Univ. Kans. Sci. Bull., 19, p. 58, 1929.

Three specimens from Boquillas, collected by R. H. Baker, James Wilson, and Barton Warnock, agree exactly with the definition of this form set forth by Blanchard (1924, p. 10). The single male specimen has 145 ventrals and 83 caudals; the two females each have 142 ventrals and respectively 66 and 67 caudals.

Thamnophis eques cyrtopsis Kennicott

Eutaenia cyrtopsis Kennicott, Proc. Acad. Nat. Sci. Phila., 12, p. 333, 1860—Rinconada, Coahuila, Durango and Gila River; here restricted to Rinconada, Coahuila.

Thamnophis eques cyrtopsis Smith, Zoologica, 27, p. 108, 1942.

Seven specimens, from the Basin, Cattail Canyon, and Sam Nail's Ranch.

Thamnophis marcianus Baird and Girard

Eutainia marciana Baird and Girard, Cat. N. Amer. Rept., pt. 1, p. 36, 1853.

Thamnophis marcianus Ruthven, Bull. U. S. Nat. Mus., 61, p. 58, 1908.

One specimen, from Boquillas, a female, measures 615 mm., tail 140. It has ventrals 154, anal entire, caudals 67, upper labials 8-8, lower labials 10-10, preoculars 1-1, and postoculars 3-3. A specimen of this species was collected by the senior author at the Santa Helena Canyon in April, 1937.

Diadophis regalis blanchardi¹ sp. nov.

Diadophis regalis regalis Blanchard, Occ. Papers Mus. Zool. Univ. Mich., 142, p. 1, 1923 (not of Baird and Girard).

Type from the Basin, Chisos Mountains, Brewster County, Texas. No. 161 Collection of National Park Service. Adult male. Collected August 7, 1936, by Tarleton F. Smith.

Diagnosis.—Differs from *Diadophis regalis regalis* (as defined below) in smaller size, lower number of ventrals, and probably in the uniform absence of a nuchal ring.

Description of type.—Habitus typical of *Diadophis*. Ventrals 219, anal divided, caudals 64, dorsals 17–17–15, upper labials 7–7, lower labials 8–8, preoculars 2–2, postoculars 2–2, temporals 1–1–1 on each side. Color above (in formaldehyde) Deep Neutral Gray,² venter anteriorly Light Ochraceous-Salmon, Coral Pink at mid-body, and Rose Red beneath the tail.

Measurements.—Total length 411, tail 75 mm.

Notes on paratypes.—Two specimens in the National Park Collection, Nos. 201 and 279, and F.M.N.H. No. 25212 include an additional male and two females. The head shields are invariable. In the male the ventrals are 211, and the caudals 61. In the female specimens the ventrals are 224 in both, and the caudals 55 and 59. No. 279, measuring 443 mm., tail 69 mm., is the largest specimen.

Remarks.—We are unable to agree with Blanchard in the nomenclature proposed for the eastern and western subspecies of *regalis*, in which *regalis* is retained as the name for the eastern subspecies and the Arizonan form is referred to Jan's *laetus*, after having been described as *arizonae*. A specimen of *Diadophis* in Field Museum from Basuriachi, Chihuahua, collected by Robert M. Zingg, has a broad neckband, measures more than 700 mm. in length, and has 228 ventrals. In size and ventral count it accordingly agrees well with the type of *regalis* from Sonora, differing from it in the presence of a nuchal ring. Since this specimen, however, comes from a locality east of the type locality, we prefer to regard size and ventral count as more significant than the presence or absence of the nuchal ring, and regard *regalis* as applicable to the larger western race, proposing a new name for the Texan specimens. The geographic relations are not altered if the origin of the type of *regalis* is supposed to be in

¹ Named in honor of the late Dr. Frank N. Blanchard, with special reference to his important contributions to our knowledge of the ring-necked snakes.

² Color names in capitals refer to Ridgway's Nomenclature of Colors.

fact from southern Arizona. It does not seem possible to have *laetus* enclosing the type locality of *regalis*. Since *regalis* was described as without a nuchal ring, our arrangement assumes that this character may be an anomaly in the western race, and that *Diadophis r. arizonae* and *D. r. laetus* are synonyms of *regalis*. The alternative, that *laetus* is a valid form, and distinct from the Sonoran *regalis*, leaves our Chisos Mountain form still amply distinguished from both *regalis regalis* and *regalis laetus*. These notes do no more than reopen the problems connected with the taxonomy of *regalis*, for there appear to be significant differences between the Chisos population and the specimens from Utah reported by Tanner (1941, p. 17).

***Masticophis taeniatus ornatus* Baird and Girard**

Masticophis ornatus Baird and Girard, Cat. N. Amer. Rept., pt. 1, p. 102, 1853.

Coluber taeniatus girardi Stejneger and Barbour, Check List Amer. Rept. Amph., ed. 1, p. 80, 1917.

We have six specimens, three males and three females, from the Big Bend region. Four of these are from the Basin, one from Pine Canyon, and one from Boquillas, on the Rio Grande. The ventrals in males number 201, 202, and 203; in females 204, 205, and 196. The subcaudals are respectively 139, 147, 141; and 141, 146, and 140. Our specimens agree excellently with Ortenburger's description of the species (1928, p. 35), except that the lower labials are 9-10 in one specimen, 10-10 in three, and 11-11 in two. There are traces of the light outlines of the upper head shields, and the broad dark dorsal crossbands that interrupt the lateral light lines are evident. Of two Field Museum specimens collected by E. G. Marsh, Jr., in the Carmen Mountains, Coahuila, in 1936, one agrees excellently with the Chisos specimens, while the second tends, in the absence of dark crossbands and of gular spotting, toward *Coluber taeniatus schotti*. The use of the name *ornatus* for this form appears to be in accord with the opinion of the International Commission of Zoological Nomenclature with regard to secondary homonyms (in press). For the use of *Masticophis*, see Clark and Inger, 1943, p. 142.

***Masticophis flagellum testaceus* Say**

Coluber testaceus Say, Long's Exp. Rocky Mts., 2, p. 48, 1823.

Coluber flagellum testaceus Klauber, Copeia, 1942, p. 93, 1942.

Eight specimens from Maravillas Gap, Neville Springs, turnoff to Nail's Ranch, northwest of the Chisos, and vicinity of Chisos

Mountains. The red racer is a familiar snake on the desert areas surrounding the Chisos; it appears to be the snake most often seen.

Salvadora grahamiae Baird and Girard

Salvadora grahamiae Baird and Girard, Cat. N. Amer. Rept., pt. 1, p. 104, 1853; Schmidt, Field Mus. Nat. Hist., Zool. Ser., 24, p. 144, fig. 13, 1940.

Two specimens from the Basin, collected by the writers in 1937, were discussed by the senior author in his description of the east Texan *Salvadora lineata*. The Chisos population of *grahamiae* is widely isolated from that of southern Arizona, and affords a taxonomic problem for further study.

Salvadora hexalepis deserticola Schmidt

Salvadora hexalepis deserticola Schmidt, Field Mus. Nat. Hist., Zool. Ser., 24, p. 146, fig. 14, 1940.

Four specimens, from Government Spring, Mesa de Anguilla, and desert plateau near the Chisos Mountains.

Elaphe bairdi Yarrow

Coluber bairdi Yarrow, in Cope, Bull. U. S. Nat. Mus., 17, p. 41, 1880.

Elaphe bairdi Stejneger and Barbour, Check List N. Amer. Amph. Rept., ed. 1, p. 82, 1917.

* Three specimens of *Elaphe bairdi* are available from the Chisos region, two collected by the junior author and one by A. E. Borell, and a fourth specimen was obtained by the junior author from Limpia Canyon, Jeff Davis County. There is no clue to a difference between the Chisos and Davis Mountain specimens. The ventrals and caudals in the two male specimens are 248 and 252, and 92 and 103; and in the two females 244 and 248, and 95 and 85.

The coloration differs radically from that described by Yarrow and from Blanchard's diagnosis (Blanchard, 1924, p. 13). The upper parts are dark brown, the venter lighter, clouded with obscure dark markings. Traces of obsolete crossbars can be distinguished only in the smallest specimen (869 mm.); we suspect therefore that the vividly crossbarred pattern of the type is a juvenile character.

Elaphe subocularis Brown

Coluber subocularis Brown, Proc. Acad. Nat. Sci. Phila., 51, p. 492, pl. 29, 1901.

Elaphe subocularis Stejneger and Barbour, Check List N. Amer. Amph. Rept., ed. 1, p. 84, 1917.

Two specimens of this little-known species were collected by the junior author in 1937, one at the Wilson Ranch, at the west base of the Chisos, the other in Juniper Canyon on the other side of the range. The male specimen measures 1,612 mm., tail 198 mm., and has 277 ventrals and 79 caudals. The female, measuring 748 mm., tail 102 mm., has 271 ventrals and 69 caudals. The pattern agrees closely with the original description and with that of the juvenile specimen collected by Col. Crimmins near El Paso and described by the senior author (Schmidt, 1925).

Brown records the ventrals of the type as 270, while in three paratypes they were said to be 240 to 245. This might be thought to be a sex difference, but this is negated by the two Chisos specimens.

Arizona elegans elegans Kennicott

Arizona elegans Kennicott, in Baird, U. S.-Mex. Bound. Surv., 2, Rept., p. 18, pl. 13, 1859.

Arizona elegans elegans Blanchard, Occ. Papers Mus. Zool. Univ. Mich., 150, p. 1, 1924.

The single specimen available from the Big Bend was collected by Tom Carney in 1935 at Government Spring. This specimen, a female, measures 810 mm., tail 114 mm.; ventrals are 224, caudals 52, upper labials 8-8, lower labials 13-13, oculars 1-2, and temporals 2-4, on each side.

Pituophis sayi sayi Schlegel

Coluber sayi Schlegel, Ess. Physion. Serp., 2, p. 157, 1837.

Pityophis sayi sayi Cope, Bull. U. S. Nat. Mus., 1, p. 39, 1875.

Five specimens from the Basin, the largest measuring 1,450 mm. (about 57 inches).

Rhinocheilus lecontei tessellatus Garman

Rhinocheilus lecontei var. *tessellatus* Garman, Mem. Mus. Comp. Zool., 8, No. 3, p. 74, 1883.

Rhinocheilus lecontei tessellatus Klauber, Trans. San Diego Soc. Nat. Hist., 9, p. 302, pl. 12, fig. 2, pl. 13, fig. 3, 1941.

Our single specimen, from five miles south of Persimmon Gap, is a male, with dorsal scales 25-23-19, ventrals 199, anal entire, caudals 50, upper labials 8-8, and lower labials 9-9; total length 692 mm., tail 101.

Sonora semiannulata blanchardi Stickel

Sonora semiannulata blanchardi Stickel, Copeia, 1938, p. 185, 1938.

Our three specimens, all female, exhibit the two color phases that apparently characterize this species. Our annulated example has 33 half-rings and 12 entire caudal rings, as compared with $25 + 6$ in *S. s. semiannulata*. In essential characters all of the specimens agree, the ventrals being 161, 161, and 153 respectively; the caudals are 46, 47, and 51. The two ringless snakes are light olive-brown with dorsal scales broadly tipped with dark brown and the top of the head dark brown.

The ringed brown snake was taken at Terlingua, Texas, by an employee of the Chisos Mining Company; another was secured in September, 1936, at Government Spring by the junior author, and the third specimen was found in the Basin by Mr. A. F. Robinson.

Ficimia cana Cope

Gyalopium canum Cope, Proc. Acad. Nat. Sci. Phila., 12, p. 243, 1860.

Ficimia cana Garman, Mem. Mus. Comp. Zool., 8, pt. 3, p. 83, 1883.

A single specimen from Green Gulch, Chisos Mountains, measures 277 mm., tail 38. The ventrals are 138, anal divided, caudals 29, upper labials 7-7, lower labials 7-6, preoculars 1-1, postoculars 2-2, temporals 1-2 on each side. The dark transverse dorsal blotches number $34 + 11$.

Hypsiglena ochrorhyncha Cope

Hypsiglena ochrorhyncha Cope, Proc. Acad. Nat. Sci. Phila., 12, p. 246, 1860.

Not taken by the writers. Two specimens collected by F. N. Blanchard and Howard K. Gloyd, north of Nugent Mountain and at Government Spring.

Tantilla atriceps Günther

Homalocranium atriceps Günther, Biol. Centr.-Amer., Rept., p. 146, pl. 52, fig. B, 1895.

Tantilla atriceps Blanchard, Field Mus. Nat. Hist., Zool. Ser., 20, p. 372, 1938.

Nineteen specimens from the Basin, Cattail Canyon, and Casa Grande.

The ranges of ventrals and caudals in eight male specimens are 137-146 and 63-73. The largest specimen measures 243 mm., tail 75. The eleven females have ventrals 140-150, and caudals 53-67. The largest specimen measures 221 mm., tail 57.

The species is found beneath rocks and especially beneath the dry heads of the sotol.

We wish to call attention to an unfortunate error in the tabulation of scale characters in Blanchard's posthumous paper on *Tantilla*. Under *Tantilla nigriceps* the range of ventrals in males should be 136 to 150, instead of 146-159.

Agkistrodon mokeson pictigaster Gloyd and Conant

Agkistrodon mokasen Gloyd and Conant, Bull. Chicago Acad. Sci., 7, p. 156, fig. 10, 1943.

Our two specimens, a male and female, type and paratype respectively, came from the same locality, Pulliam Canyon (=Maple Canyon).

Crotalus lepidus lepidus Kennicott

Caudisona lepida Kennicott, Proc. Acad. Nat. Sci. Phila., 13, p. 206, 1861.

Crotalus lepidus lepidus Gloyd, Occ. Papers Mus. Zool. Univ. Mich., 337, p. 4, 1936.

Six specimens from higher levels in the Basin and from rock slides at the west base of the peak of Mount Emory.

Crotalus molossus molossus Baird and Girard

Crotalus molossus Baird and Girard, Cat. N. Amer. Rept., pt. 1, p. 10, 1853.

Crotalus molossus molossus Klauber, Trans. San Diego Soc. Nat. Hist., 8, p. 249, 1936.

Seventeen specimens, compared with five of *Crotalus lepidus* and four of *C. atrox*, indicate that *molossus* is the most abundant rattlesnake of the Big Bend region. It is not confined to the mountains, but ranges into them to the level of the highest rock slides.

Our Big Bend localities are: one mile north of Neville Spring, the Basin, two miles northwest of Solis Ranch, Juniper Canyon, rock slide at west base of peak of Mount Emory (7,400 ft. alt.), and one mile below Mariscal Canyon on the Rio Grande.

Crotalus atrox Baird and Girard

Crotalus atrox Baird and Girard, Cat. N. Amer. Rept., pt. 1, p. 5, 1853.

Four specimens, from the desert flats below the mouth of Green Gulch and from Garden Spring. The aggressive disposition of the desert diamond-back was in startling contrast to the relatively inoffensive behavior of *molossus* in the specimens encountered by our party in 1937.

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