NUMBER 196 OCTOBER 2, 1928

OCCASIONAL PAPERS OF THE MUSEUM OF ZOOLOGY

UNIVERSITY OF MICHIGAN

ANN ARBOR, MICHIGAN PUBLISHED BY THE UNIVERSITY

THE SYNONOMY, VARIATION, AND DISTRIBUTION OF THE COLLARED LIZARD, *CROTAPHYTUS COLLARIS* (Say)[1]

BY CHARLES E. BURT

While at the Kansas State Agricultural College during the years 1923 to 1927 the writer made a study of the lizards of Kansas and became interested in the synonomy and distribution of the collared lizard, *Crotaphytus collaris.* The frequent variations presented by the 300 Kansas individuals examined led to a consideration of the status of the two subspecies commonly recognized at the present time, namely, *C. collaris collaris* and *C. collaris baileyi.*

During the course of this study 1252 collared lizards from thirteen states of the United States and five provinces of Mexico have been examined. Specimens for examination have

[1] Contributions from the Zoological Laboratory of the University of Michigan.

been loaned by numerous institutions[2] and individuals, and it is a pleasure for the writer to express his appreciation to Dr. L. Stejneger and Miss Doris M. Cochran of the United States National Museum; to Dr. A. G. Ruthven and Mrs. Helen T. Gaige of the Museum of Zoology of the University of Michigan; to Mr. C. D. Bunker of the Kansas University Museum; to Mr. D. C. Davies and Mr. K. P. Schmidt of the Field Museum of Natural History; to Dr. Thomas Barbour and Mr. Arthur Loveridge of the Museum of Comparative Zoology; to Dr. Minna E. Jewell and Dr. Robert K. Nabours of the Kansas State Agricultural College; to Dr. A. I. Ortenburger of the Oklahoma University Museum; to Dr. Joseph Grinnell and Dr. Charles L. Camp of the Museum of Vertebrate Zoology of the University of California; to Dr. G. K. Noble of the American Museum of Natural History; to Dr. Barton W. Evermann and Mr. Joseph R. Slevin of the California Academy of Sciences; to Dr. W. L. Burnett of the Colorado State Agricultural College; to Prof. Junius Henderson of the University of Colorado; and to W. H. Burt, L. D. Wooster, William R. Thompson, Ivan R. Burket, H. J. Harnly, W. J. Robinson, A. R. Miller, Floyd Pauley, Harry G. Walker, and H. H. Schwardt. The photographic work was done by Mr. William L. Cristanelli, technical assistant in zoology of the University of Michigan, and the line drawings taken from the photographs were kindly prepared by May Danheim Burt.

The following expresses the present views of the writer in regard to the synonmy of

Crotaphytus collaris (Say)

Agama collaris Say, 1823, Long's Exp. Rocky Mts., 2:252, (type locality, Verdigris River near its union with the Arkansas River, Oklahoma).

[2] Abbreviations used in this paper for the names of museums are as follows: U. S. N. M., United States National Museum; M. V. Z. U. C., Museum of Vertebrate Zoology of the University of California; K. U. M., Kansas University Museum; O. U. M., Oklahoma University Museum; F. M. N. H., Field Museum of Natural History; M. Z. U. M., Museum of Zoology, University of Michigan; M. C. Z., Museum of Comparative Zoology; and Univ. Colo., University of Colorado Museum.

Crotaphytus collaris Holbrook, 1842, N. Amer. Herp., Ed. 2, 2:79.

Crotaphytus bailyei Stejneger, 1890, N. Amer. Fauna, 3: 103 (type locality, Painted Desert, Arizona).

Crotaphytus collaris Cope, 1900, Ann. Rept. U. S. Nat. Mus. for 1898, p. 248.

Crotaphytus collaris baileyi Stone and Rhen, 1903, Proc. Acad. Nat. Sci. Philad., 55:30.

Crotaphytus collaris collaris Stejneger and Barbour, 1923, Check List N. Amer. Amph. Rept., Ed. 2, p. 43.

In the way of review, it is found that Say (1823) described *Agama collaris* as a new species, and that this name was carried forward until Holbrook (1842) placed the lizard in the genus Crotaphytus, which he described as new, with *C. collaris* as the type species. No particular reference was made to the characters later to be specified for *C. baileyi,* until Dumeril and Bocourt (1870–1899) described a specimen from Mexico which resembled the ordinary type in coloration, thus "La tête est un peu plus longue, les écailles sus-céphaliques plus petites, et l'espace interorbitaire est garni d'une double rangée de petites squames." The date of this description was 1874. Later, Stejneger (1890), after examining "A collection of over seventy specimens from nearly thirty different localities in the West" described *C. baileyi* as a new species, using the characters of Dumeril and Bocourt (cited above) in his diagnosis; thus—"Similar to *C. collaris* in coloration, but with at least two rows of interorbital scutellae; supraoculars smaller; head narrower, and snout longer." In addition to this, the species *C. collaris* and *C. baileyi* were separated geographically as follows: "If we plot on a map the exact localities from which we have undoubted specimens, we shall find that our specimens of *C. collaris* hail from Kansas, Indian Territory (now Oklahoma), Arkansas, Texas, and eastern New Mexico, while specimens of *C. baileyi,* with definite localities, are at home in the western portion of the latter territory, in Arizona, Nevada, and northern Mexico. It will be seen that the two forms come very closely together in New Mexico, but they belong to two different drainage systems, at

least in the northern part of the territory, and I do not believe that they will be found anywhere in the same locality."

Dr. Stejneger did not make *C. baileyi* a subspecies of *C. collaris,* because of lack of proof of integradation. However, he pointed out three specimens which he stated "At first sight might seem to indicate intergradation." Cope (1900) neither gave complete recognition to *C. baileyi,* nor made it a synonym or subspecies of *C. collaris.* He wrote that "The examination of the series in the national collection has convinced me of two things—first, that the differences observed by Dr. Stejneger exist, and are mainly characteristic of distinct geographical areas, and, second, that the transitions are so numerous that a distinct subspecific appellation is not practicable, and that even a distinct subspecific name is of doubtful utility." He also found that "The character of the frontal scales (interorbitals) is variable. . . . The supraorbitals are rather large in typical forms of *C. collaris* from the central region, but variability is seen in these quite as often as occurs in the frontal scales. . . . The same form has the widest head, but this character is still less constant than the others."

The first definite step toward making *C. baileyi* a subspecies was made by Stone and Rehn (1903), who wrote that "A series of eleven specimens in Mr. A. E. Brown's collection from Pecos (Texas) represents both forms, so that at least *C. bailyei* must be regarded as a subspecies." Later, Brown (1903) found in a series from Seymour, north central Texas, "Individuals with a single row of interorbitals, and those with them partly divided, to be each about two-fifths of the whole number, and those with a double row about one-fifth. In association with these differences I do not find any constant changes in the size of the supraoculars, in length of snout or breadth of head. The last two proportions vary with age, old examples having much broader heads. These Seymour specimens were all collected together. The chief character of *baileyi* we thus find far outside of the region assigned to it, in company with undoubted *collaris* and intermediates. Two *Crotaphytus* in the Academy's collection, taken at Dry

Canyon, New Mexico, are like the Seymour specimens with double interorbitals. If these specimens are *baileyi,* it occurs prosmiscuously among *collaris;* if they are not *baileyi,* then the chief character of that species occurs as a meaningless variation in *collaris,* leaving the former species to stand upon slight and indefinable differences which vary with age."

Later, Meek (1905) wrote of a western collection of collared lizards as follows: "In all of the specimens taken there are two rows of scales between the supraoculars. . . . Owing to the constancy of the two rows, I follow Dr. Stejneger in using the name proposed by him for this lizard." Bailey (1905) found intergradation in a series of fifteen specimens collected in Texas, nine of which had been assigned by Dr. Stejneger to *C. baileyi.* Thus the western form was admitted to the fauna of the state of Texas.

Ruthven (1907) reported intergradation in a series of eleven individuals from Alamogordo, south central New Mexico, which were referred to *C. collaris baileyi,* as follows: "In seven of the twelve specimens collected the interorbitals are in two distinct rows between the orbital regions; in four, however, one pair is fused into a single scute. In the single specimen collected in the foothills the scales of the head are so rough that it is impossible to determine the arrangement of the interoculars with certainty."

In addition Strecker (1909) found intergradation in Burnett County, central Texas. He stated that "In a large series of these lizards only about forty per cent. have the single row of interorbitals of typical *collaris,* while the remaining sixty per cent. are about equally divided between those with a double row and those in which the two rows are fused. Several of the older examples with double rows have unusually broad heads and are undoubtedly intermediates."

Richardson (1915), writing of a collection from northwestern Nevada, referred eleven specimens with double rows of interorbitals to *C. collaris baileyi.* However, he added the following comment: "Concerning the interocular scales, it might be well to state that there are in the Stanford Univer-

sity collection two specimens, a male from Bisbee, Arizona, and a female from Cedar Ranch, Colorado Canyon, Arizona, each of which has a fused interocular. Meek (1905) mentions a specimen from Winslow, Arizona, showing a like variation, and it would seem that such variants were of quite frequent occurrence in this region.'' Van Denburgh and Slevin (1915) found that a series of sixteen specimens from Utah all had two rows of interorbitals. Likewise, Camp (1916) reported two rows for eight specimens from the Turtle Mountains of southeastern California.

Stejneger and Barbour (1917) recognized the two subspecies of *C. collaris,* listing the range of *C. collaris collaris* as ''Arkansas south to middle-western and northwestern Texas and west to eastern New Mexico,'' and that of *C. collaris baileyi* as ''Southwestern Texas, southern and western New Mexico, Arizona, Utah, Nevada, Idaho, and southwestern California, and northern Mexico.'' Thus again, the two subspecies were definitely separated on the basis of their geographical distribution.

A report of intergradation was given from Nye County, south-central Nevada by Bentley (1919), who found that in a series of eight specimens five had a double row of interoculars, and three had only one.

Schmidt (1922) expressed the opinion that *C. fasciatus* Mocquard (1899) is merely a juvenile color phase of *C. collaris.* He also described a new species, *Crotaphytus dickersonae,* from Tiburon Island, off the coast of western Sonora, Mexico. This species was said to differ from *C. collaris baileyi* by having ''The hind leg considerably (proportionately 1.04 per cent.) longer than the body, a longer, more distinctly compressed tail, and slightly enlarged scales on the mid-dorsal line of the tail.'' It was described from a single specimen with two black collar bars, the anterior extending to meet on the mid-ventral line. *C. dickersonae,* like all other species described from a single specimen, requires confirmation. That it is closely related and perhaps synonymous to *C. collaris* is shown by the following facts: (1) Numerous specimens of *C.*

collaris from the western region, including California, Nevada, Idaho, Utah, Arizona, and Mexico, have the anterior black collar extended ventrally to the median line. U. S. N. M., No. 5062 from Salt Lake, Utah, for instance, possesses this characteristic, as well as the other major details of coloration specified for *C. dickersonae* in its original description. These are—a wide posterior collar, complete dorsally and ending at the insertion of the forearm; and gular and groin patches of reddish brown. (2) The specimen measured for the fourth column of data presented by Van Denburgh (1922, bottom p. 107) had a tail percentage of 70.96, a figure exceeding the 70.0 per cent. attributed to *C. dickersonae.* Twenty-one specimens of *C. collaris* out of 1117 lizards examined had a tail percentage of 70.0 to 72.0. One of these is M. V. Z. U. C., No. 243. (3) The compression of the tail, especially in preserved specimens, is variable. Cope (1900) draws attention to the fact that "In one specimen (Cat. No. 2721) the tail appears unusually compressed." This characteristic, as well as the slight enlargement of scales on the mid-dorsal line of the tail, has been observed by the writer on a number of specimens. (4) The hind leg of *C. collaris,* though usually much shorter than the body, has been found to vary in 374 specimens from 76 to 106 per cent. of the body length, showing that the character is subject to much variability. A medium sized male from Beveridge Canyon, California (F. M. N. H., No. 1183), has the tail percentage of 70.0 and in addition the hind leg is 1.06 the length of the body. If a large series of *C. dickersonae* had been examined, the length of the hind leg as percentage of body length would be expected to intergrade with the condition found in *C. collaris.*

As the case now stands, the status of *C. dickersonae* must await the collecting of more collared lizards in Sonora. If the species is found to be nothing but a synonym of *C. collaris,* as these data indicate, it is nevertheless to be regarded as a capitalization of the *upper extremes* of that species.

A new species of lizard, *Crotaphytus insularis,* was described from Angel de la Gaurdia Island, Gulf of California,

Mexico, by Van Denburgh and Slevin (1921). Van Denburgh (1922) has summed up its distinction from *C. collaris* as follows: "This species differs from *C. c. baileyi* chiefly in the longer snout, narrower head, and single, incomplete black collar." While examining specimens of *C. collaris* from California and Lower California it became evident to the writer that a very close relationship exists between these and the new species that has been described. A male specimen, U. S. N. M., No. 21957, from San Diego County, California, excellently presents the scalation and coloration of *C. insularis.* The major details of the coloration of this valuable specimen are as follows: neck with a single black collar, broken dorsally, but complete ventrally; posterior border of gular region intense black, fading to slatish anteriorly; prominent reticulations covering sides of head, the lines white, and patches brown; a pair of prominent dark brown groin patches present; back crossed by a series of seven complete light bars which are interrupted at the sides of the abdomen. Other data upon this specimen are length of tail, 225 mm.; length of body, 108 mm.; total length, 333 mm.; length of tail as percentage of total length, 67.5; width of head, 23 mm.; and width of head as percentage of body length 21.3. The interorbital scutes are in a double row, and the femoral pores are in a series of 22 on the right side and 23 on the left. The lizard, M. V. Z. U. C., No. 6938, from Riverside County, California, has one black anterior collar which is broken dorsally, whereas, only very faint and small black blotches represent the posterior collar. This condition must be regarded as intermediate between the state of two full black collars (usually broken dorsally and often connected ventrally in western specimens) and the reduction to only one collar. This latter specimen and numerous others that have been examined have the back crossed by transverse white bars. Often these bars will be found to be complete in fully adult specimens, but frequently, also, young specimens are found in which there is hardly a trace of such bars.

In order that genuine specimens of *C. insularis* might be available for comparison with individuals of *C. collaris* during the progress of this study, Dr. Barton W. Evermann and Mr. Joseph R. Slevin have very kindly loaned two specimens of *C. insularis* from the collection of the California Academy of Sciences. Both of these have the essential features of coloration presented by the San Diego County specimen described above. However, No. 50877 has only one complete white bar which extends over the shoulders. The posterior bars are broken up into numerous flecks. There is but one black collar present on this lizard, and it is complete ventrally and incomplete dorsally. The other specimen, No. 50879, has precisely the same coloration as the first, but there is a rather distinct indication of the presence of a posterior black collar. The pigment in this case is more diffuse than in the intermediate specimen from Riverside County, California, cited above. Both of these specimens of *C. insularis* were taken by Mr. Slevin on Angel de la Gaurdia Island in June, 1921. Their measurements are as follows: length of tail 221, 207 mm.; length of body 106, 94 mm.; total length 327, 301 mm.; length of tail as percentage of total length 67.5, 68.8; width of head 25, 19 mm.; and width of head as percentage of body length 23.6, 20.2. Both are males and the interorbital scales are in each case in a double row. The femoral pores are in series of 19 and 20 rows.

In comparing the San Diego County specimen, the Angel de la Gaurdia specimens and a specimen from San Felipe, Lower California, (F. M. N. H., No. 1031), it is found that the snout of the mainland individuals is as long as that of the island form, as shown by computing the length from snout to orbit as percentage of head width, all ranging from 56.0 to 58.0 per cent. The head width computed as percentage of body length in *C. insularis* is 20.2 and 23.6 respectively. In the Californian form it is 21.3 per cent. and in the Lower Californian lizard it is 21.4 per cent. Since all of these specimens are males, no indication of a difference in relative

head widths is here given. Moreover, the tail percentage of all four specimens varies only from 67.5 to 68.8 per cent.

As is the case with *C. dickersonae,* the status of *C. insularis* cannot be truly determined until a larger series of collared lizards from the Sonoran and Lower Californian regions are available for study and comparison. If it were not for the water barrier it would seem reasonable to expect the ultimate placing of *C. insularis* as at least a subspecies of *C. collaris.*

The present work has been a detailed study of variation, in order that the relationships existing between various individuals of *C. collaris* might be more clearly ascertained. Whenever possible the data have been reduced to a mathematical basis, but for the comparison of the supraoculars it is necessary to use illustrations. Figures 12, 2, 8 and 13 show supraoculars of typical lizards from Kansas, Arizona (the type state of *C. baileyi*), Utah, and California, respectively. It will be noted that there is as much difference between the size of the supraoculars of the Arizona and California specimens and that of the Utah specimen, as there is between the Arizona and the Kansas specimens. The supraoculars of a specimen (Pl. III, Fig. 6) from Ft. Bowie, Arizona, are about the same size as those of specimens (Pl. I, Figs. 1 and 2), from the Painted Desert, Arizona. The small supraoculars of the Utah specimen (Pl. IV, Fig. 8) are characteristic of most of the specimens of the northwest, particularily those from Idaho, Nevada, Utah, and Oregon. Series from some geographical localities in the southwest also possess small supraoculars, but the exceptions are very numerous. Although northwestern specimens have almost no enlarged scales near the median part of the supraocular region, those from the southwest do not follow this rule, as illustrated even by the figure of the type specimen of *C. baileyi* shown by Stejneger (1890). Eastern specimens are not found without at least a few enlarged supraoculars.

The variation in the interorbital scutellation may be more clearly presented than that of the supraoculars. Specimens with the characteristic "two rows" of *C. baileyi,* which writers

have emphasized so much in the past, have been reported in the literature or observed by the writer in company with specimens having from one to four single interoculars from the following states: Kansas, Arkansas, Oklahoma, Missouri, Texas, New Mexico, Colorado, Arizona, California, Utah, Nevada, and the Mexican Boundary, which covers the entire area of the distribution of the collared lizard, with the exception of the mainland of Mexico, and the states of Idaho and Oregon, in which very few specimens have been collected. Since, after due consideration, no other method of accurately separating *C. collaris* specimens from those of *C. baileyi* presented itself, the writer has divided the lizards examined into two lots, the "western" or *baileyi* group, and the "eastern" or *collaris* group, using for his criterion the ranges given by Stejneger and Barbour (1923). The following table shows the results of the comparative study of the interorbital scutellation of 1252 specimens.

TABLE OF INTERORBITAL SCUTELLATION

East							West					
	Two-	Singles				Irreg.		Two-	Singles			Irreg.
Loc.	row	1	2	3	4		Loc.	row	1	2	3	
Ind.			1				N. Mex.	25	12	4		1
Mo.	2		4				L. Cal.	4				
Tex.	53	47	26	4		3	Idaho	5				
Okla.	52	99	106	10		8	Mex.	29	5	1		3
Kans.	35	155	156	11	1	4	Utah	28	2			
Ark.	5	22	7			1	Colo.	19	2	6	1	2
							Ariz.	115	12	5		7
							Cal.	89	8	2	1	9
							Nev.	41				1
							Ore.	1				
Total	147	323	300	25	1	16	Total	356	41	18	2	23

In the analysis of the data presented by the table the percentage of intergradation for the eastern region may be obtained by dividing the number of "two-row" specimens

found (147) by the number of those with other conditions of interorbital scutellation (665), the result being 22.1 per cent. Conversely a percentage of intergradation of 19.2 is obtained for the western specimens. From this it is evident that the intergradation of the interorbital scutellation establishes itself at over twenty per cent. throughout the extensive range of the collared lizard. It may be of significance that a condition of two separate rows of scales between the orbits (See Pl. I, Fig. 1) predominates in the west and southwest, for this area, according to our present views of geographical distribution, is the region from which the collared lizard has followed various lines of dispersal. As the species has extended its range natural variations, such as a tendency toward smaller supraoculars, or the fusion of the interoculars into a single row, have had an opportunity to become of some significance. That these natural variations are gradual, yet certain, in their nature is indicated by the fact that even though many more eastern specimens were examined, the combining of the totals for both these and the western forms under each condition of the interorbital scutellation found shows a predominance of the *primitive two-rowed state* (503 specimens). Also, as might be expected, the condition of one single interorbital scale is found in the next largest group (364 specimens), and two singles are found in 318 specimens, three singles in 27 specimens, and four singles in only one specimen. This clearly indicates a tendency toward *progressive fusion* of the interorbitals into a single row, a condition most marked in the eastern specimens. From the standpoint of the interorbital scalation, not two subspecies, but five might be recognized.

It has been found necessary to designate a total of 49 specimens as irregular in their interorbital scutellation, because of definitely intermediate or confusing characters. Two excellent cases of this are shown by specimens figured. U. S. N. M., No. 19447 (Pl. III, Fig. 5) from the Mexican Boundary shows what is evidently a single fused scale, which is almost divided by a transverse line from each side. Both of these lines run forward so as to tend to divide the scale longitudi-

nally. Thus the gaps in the single scale are made so small that two light sweeps of the pen could close them completely, with a resulting two-rowed condition. Another intermediate is U. S. N. M., No. 22207 (Pl. III, Fig. 6), from Ft. Bowie, Arizona, which shows a profuse wrinkling of the upper surface of a single scale.

It often takes a long search to find specimens with two uniform rows of interoculars, even in western individuals. A typical example which shows the unequal size of paired interoculars of many specimens of the *baileyi* type is M. Z. U. M., No. 65010 (Pl. II, Fig. 3). This state has been found to be both more and less marked in many specimens. That the single fused interorbital is subjected to as much variation is readily shown by a comparison of two specimens, U. S. N. M., No. 18321 (Pl. IV, Fig. 8) and M. Z. U. M., No. 65017 (Pl. V, Fig. 10). The latter is relatively about three times as long as the former, though both might be designated as *typical* single scales. The splitting off of approximately one-fourth of a large single interocular by a typical suture is evident in a specimen from Wilson County, Kansas, M. Z. U. M., No. 65013 (Pl. V, Fig. 9). A specimen from California, U. S. N. M., No. 9370 (Pl. VII, Fig. 13), shows three single interoculars, the anterior and posterior of which are broken by short transverse sutures from the side. If these were continued straight across a condition of five singles would be the result. A lizard, M. Z. U. M., No. 65014 (Pl. VII, Fig. 14), has a series of four entire singles, and is the only one of its kind that was found in all of the specimens examined. Thus, it is evident that the interorbital scutellation of *C. collaris* is so highly variable that little systematic importance can be attached to it.

The following table has been prepared from the 1252 collared lizards examined to show further variations in characters presented by eastern and western specimens. All of the measurements have been taken in millimeters and the data for each item are indicated thus—"Minimum-maximum (average)."

TABLE OF MEASUREMENTS

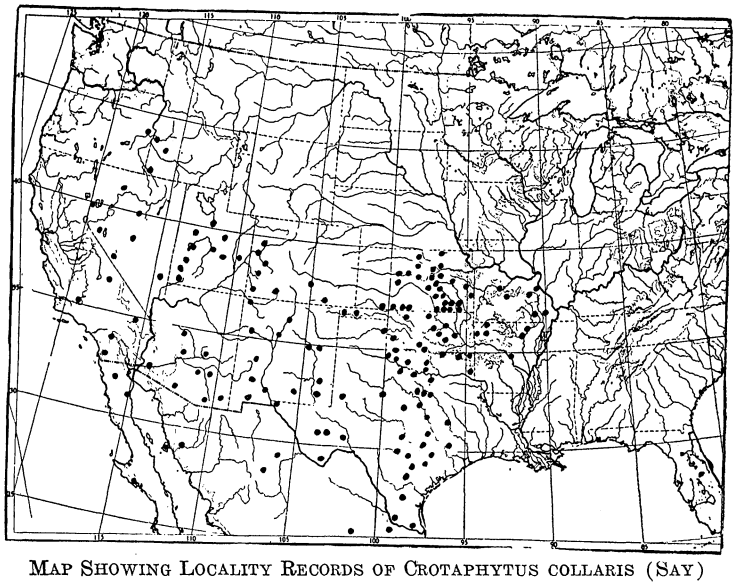
Character	Eastern Group	Western Group
Total length	79 –345 (230)	104 –356 (250)
Length of tail	44 –233 (147.2)	67 –250 (164.4)
Length of body	33 –115 (78)	37 –112 (90.3)
Length of hind leg	35 –103 (73)	35 –110 (72.6)
Width of head	10 – 30 (19.5)	10 – 29 (19.7)
Length of tail as percentage of total length	55 – 72 (64.2)	59 – 72 (65.8)
Length of hind leg as percentage of body length	76 –106.3 (88.9)	79 –106 (89)
Width of head as percentage of body length	17.4– 30.9 (23.4)	17.4– 31 (22.6)
Femoral pores (av.)	14 – 27 (18)	14 – 23 (18)

The average total length, length of tail, and length of body of the series of western specimens measured for the above table exceeds the average in each corresponding eastern figure. Except for a higher maximum in some western specimens and a lower minimum in some eastern specimens (newly hatched young) the ranges are nearly the same. In the length of the hind leg and its computation as percentage of total length few differences are found between the two lots. Similar comment may be offered for the length of tail as percentage of total length and the average number of femoral pores. In the specimen which had an average of 27 femoral pores (eastern) there were five accessory pores present on one side and six on the other. The occurrence of additional femoral pores outside of the usual femoral line is met with occasionally in *C. collaris*. The average of both the actual width of head and its computation as percentage of body length is found to vary less than one unit. That there is a slight tendency toward a narrower head in western specimens may be indicated by a smaller average percentage of head width given for them. However, an elongation of the body in western specimens may account for this difference. No significant geographical variation in the head width has been ascertained, though Texas and Kansas

specimens present a larger average percentage than those from other regions. The head width character is at best very hard to cast into a convenient mode for comparison, except as a percentage of some other unit of body measurement, which in itself may be subjected to as much or even more variation. It seems evident that standing alone or as a tendency only, the comparative head widths of specimens of *C. collaris* from various regions, no matter how computed, do not give sufficient grounds for even subspecific classification. Intergradation between eastern and western forms in this respect, as in others, is the rule rather than the exception.

The distribution of the collared lizard as indicated by the records from specimens examined, and the printed reports of its occurrence, is shown on the accompanying map. The following authors (and others) have given definite locality records for *C. collaris* which seem to be authentic: Brown (1903), Cockerell (1910), Cope (1880, 1888, 1900), Ellis and Henderson (1913), Hurter and Strecker (1909), McLain (1899), Ortenburger (1926), Ruthven (1907), Schmidt (1919), Stone (1903), Strecker (1909, 1915, 1922, 1926, a–b, 1927), and Van Denburgh (1922, 1924).

In apparent addition to what has appeared in the literature the following reports are now available: Arizona, Pinal (U. S. N. M.) and Yuma (M. C. Z.) counties; Arkansas, Independence (U. S. N. M.), Johnson (U. S. N. M.), and Lawrence (M. Z. U. M., F. M. N. H.) counties; Colorado, Archuleta (U. S. N. M.), Huerfano (M. Z. U. M.), Montezuma (Univ. Colo., U. S. N. M.), and Montrose (U. S. N. M.) counties; Idaho, Ada (M. C. Z., M. V. Z. U. C.) and Canyon (M. Z. U. M.) counties; Kansas, reports from 29 counties will appear in the writer's work on "The Lizards of Kansas"; Mexico; Tule, Chihuahua (U. S. N. M.) and Monclova, Coahuila (U. S. N. M.); Nevada, Churchill (U. S. N. M.) County; New Mexico, Chaves (U. S. N. M.), Quay (U. S. N. M.), and Guadalupe (U. S. N. M.) counties; Oklahoma, Adair (O. U. M.), Greer (O. U. M.), Harmon (O. U. M.), Latimer (O. U. M.), Oklahoma (O. U. M.), Roger Mills (O. U. M.), and Sequoyah (O. U. M.) coun-



MAP SHOWING LOCALITY RECORDS OF CROTAPHYTUS COLLARIS (SAY)

ties; Texas, Borden (U. S. N. M.), Burleson (U. S. N. M.), Cameron (K. U. M.), Clay (U. S. N. M.), Cooke (U. S. N. M.), Crane (U. S. N. M.), Crockett (U. S. N. M.), Eastland (K. U. M.), Edwards (U. S. N. M.), Fisher (U. S. N. M.), Gillespie (U. S. N. M.), Hemphill (F. M. N. H.), Jeff Davis (M. Z. U. M.), Llano (U. S. N. M.), Palo Pinto (U. S. N. M.), Roberts (U. S. N. M.), Starr (U. S. N. M.), Tom Green (U. S. N. M.), and Wichita (U. S. N. M.) counties; Utah, Carbon (M. Z. U. M.), Emery (M. C. Z.), Jaub (M. C. Z.), and Utah (M. Z. U. M.) counties.

A collared lizard from Crawford County, Indiana, is in the Museum of Comparative Zoology. Dr. W. S. Blatchley, the collector, does not remember taking this particular specimen, but feels that the data are correct. He adds, in a letter dated October 3, 1927, that "Crawford County is in the extreme southern part of Indiana, and the fauna and flora there belong to the Austroriparian life zone. A number of plants and animals that are found there occur no where else in the state."

C. collaris has been found in eastern Missouri, and thus it seems that the range may have been extended still further eastward. The finding of a second specimen in southern Indiana would be an event of particular interest.

Dumeril and Bocourt (1870–1899), and Frierson (1927) have given reports of the occurrence of the collared lizard in Louisiana, but additional data are required before a state record is established.

LITERATURE CITED

BAILEY, VERNON, 1905. Biological Survey of Texas. N. Amer. Fauna, 25: 1–222.

BENTLEY, GEORGIA H., 1919. Reptiles Collected in the Vicinity of Currant, Nye County, Nevada. Copeia, 75: 87–91.

BROWN, ARTHUR ERWIN, 1903. Texas Reptiles and their Faunal Relations. Proc. Acad. Nat. Sci. Philad., 40: 543–558.

CAMP, CHARLES LEWIS, 1916. Notes on the Local Distribution and Habits of the Amphibians and Reptiles of Southeastern California in the Vicinity of the Turtle Mountains. Univ. Calif. Publ. in Zool., 12: 503–544.

COCKERELL, T. D. A., 1910. Reptiles and Amphibians of the University of Colorado Expedition of 1909. Univ. Colorado Studies, 7: 130–131.

COPE, E. D., 1880. On the Zooglogical Position of Texas. Bull. U. S. Nat. Mus., 17: 1–51.

COPE, E. D., 1888. Catalogue of the Batrachia and Reptilia Brought by William Taylor from San Diego, Texas. Proc. U. S. Nat. Mus., 11: 395–398.

COPE, E. D., 1900. The Crocodilians, Lizards, and Snakes of North America. Ann. Rept. U. S. Nat. Mus. for 1898, pp. 153–1270.

DUMERILL, AUGUSTE, et F. BOCOURT, 1870–1899. Etudes sur les Reptiles et les Batraciens, dans "Mission Scientifique au Mexique et dans L'Amerique Centrale, Zoologie, troisieme partie." Paris. pp. 1–1012.

ELLIS, MAX M., and JUNIUS HENDERSON, 1913. The Amphibia and Reptilia of Colorado. Univ. Colorado Studies, 10: 39–129.

FRIERSON, L. S., JR., 1927. Crotaphytus collaris collaris at Taylor Town, Louisiana. Copeia, 165: 113–114.

HOLBROOK, JOHN EDWARDS, 1842. North American Herpetology. J. Dobson. 2: 1–142.

HURTER, JULIUS, and JOHN K. STRECKER, 1909. The Reptiles and Amphibians of Arkansas. Trans. Acad. Sci. St. Louis. 18: 11–27.

McLAIN, ROBERT BAIRD, 1899. Critical Notes on a Collection of Reptiles from the Western Coast of the United States. Contr. N. Amer. Herp., pp. 1–13.

MEEK, SETH EUGENE, 1905. An Annotated List of a Collection of Reptiles from Southern California and Northern Lower California. Field Columb. Mus. Publ. (Zool. Sur.), 7: 1–19.

ORTENBURGER, A. I., 1926. A Report on the Amphibians and Reptiles of Oklahoma. Proc. Oklahoma Acad. Sci., 6: 89–100.

RICHARDSON, C. H., 1915. Reptiles of Northwestern Nevada and Adjacent Territory. Proc. U. S. Nat. Mus., 48: 403–435.

RUTHVEN, ALEXANDER G., 1907. A Collection of Reptiles and Amphibians from Southern New Mexico and Arizona. Bull. Amer. Mus. Nat. Hist., 23: 483–603.

SAY, THOMAS, 1823. Long's Expedition to the Rocky Mountains. 2: 252.

SCHMIDT, KARL P., 1919. Rediscovery of *Amphiardis inornatus* (Garman), with Notes on Other Specimens from Oklahoma. Copeia, 73: 71–73.

SCHMIDT, KARL P., 1922. The Amphibians and Reptiles of Lower California and the Neighboring Islands. Bull. Amer. Mus. Nat. Hist., 46: 607–707.

STEJNEGER, LEONHARD, 1890. Annotated List of Reptiles and Batrachians Collected by Dr. C. Hart Merriam and Vernon Bailey on the San Francisco Mountain Plateau and Desert of the Little Colorado, Arizona, with Descriptions of New Species. N. Amer. Fauna, 3: 103–118.

STEJNEGER, LEONHARD, and THOMAS BARBOUR, 1917. A Check List of North American Amphibians and Reptiles. Harvard Univ. Press, pp. 1–125.

STEJNEGER, LEONHARD, and THOMAS BARBOUR, 1923. *Ibid.* Ed. 2., pp. 1–171.

STONE, WITMER, 1903. A Collection of Reptiles and Batrachians from Arkansas, Indian Territory, and Western Texas. Proc. Acad. Nat. Sci. Philad., 55: 538–542.

STONE, WITMER, and A. G. RHEN, 1903. On the Terrestrial Vertebrates of Portions of Southern New Mexico and Western Texas. Proc. Acad. Nat. Sci. Philad., 40: 16–34.

STRECKER, JOHN K., JR., 1909. Notes on the Herpetology of Burnett County, Texas. Baylor Univ. Bull., 12: 1–20.

STRECKER, JOHN K., JR., 1915. Reptiles and Amphibians of Texas. *Ibid.*, 18: 3–82.

STRECKER, JOHN K., JR., 1922. An Annotated Catalogue of the Amphibians and Reptiles of Bexar County, Texas. Bull. Sci. Soc. San Antonio, 4: 1–31.

STRECKER, JOHN K., JR., 1926 a. Amphibians and Reptiles Collected in Somervell County, Texas. Contr. Baylor Univ. Mus., 2: 1–2.

STRECKER, JOHN K., JR., 1926 b. A List of the Reptiles and Amphibians Collected by Louis Garni in the Vicinity of Boerne, Texas. *Ibid.*, 6: 3–9.

STRECKER, JOHN K., JR., 1927. Herpetological Records from the Vicinity of San Marcos, Texas, with Distributional Data on the Amphibians and Reptiles of the Edwards Plateau Region and Central Texas. *Ibid.*, 12: 1–16.

VAN DENBURGH, JOHN, and JOSEPH R. SLEVIN, 1915. A List of the Amphibians and Reptiles of Utah, with Notes on the Species in the Collection of the Academy. Proc. California Acad. Sci., Ser. 4, 5: 99–110.

VAN DENBURGH, JOHN, and JOSEPH R. SLEVIN, 1921. Preliminary Diagnoses of New Species of Reptiles from Islands in the Gulf of California, Mexico. *Ibid.*, 11: 95–98.

VAN DENBURGH, JOHN, 1922. The Reptiles of Western North America. Vol. 1, "Lizards." Occas. Pap. California Acad. Sci., 10: 1–611.

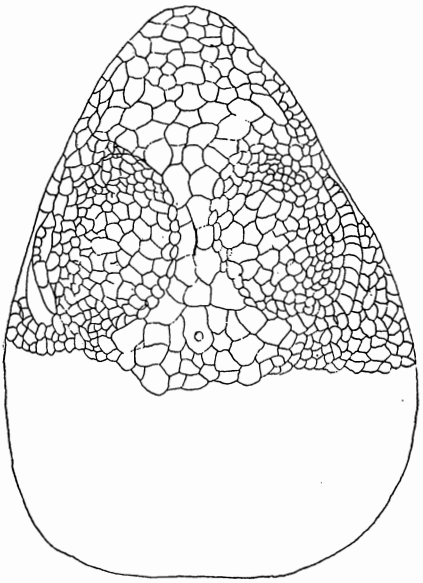


Fig. 1. U. S. N. M. No. 15823. Painted Desert, Arizona.

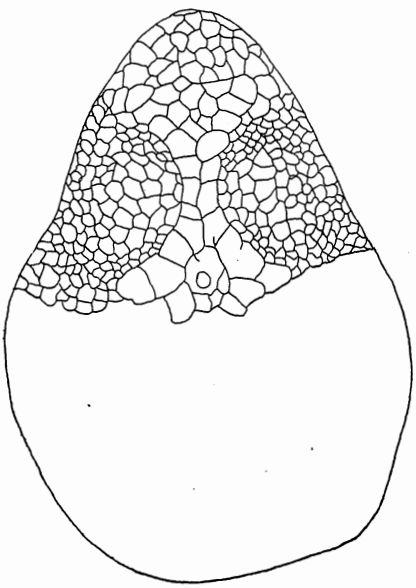


Fig. 2. U. S. N. M. No. 15822. Painted Desert, Arizona.

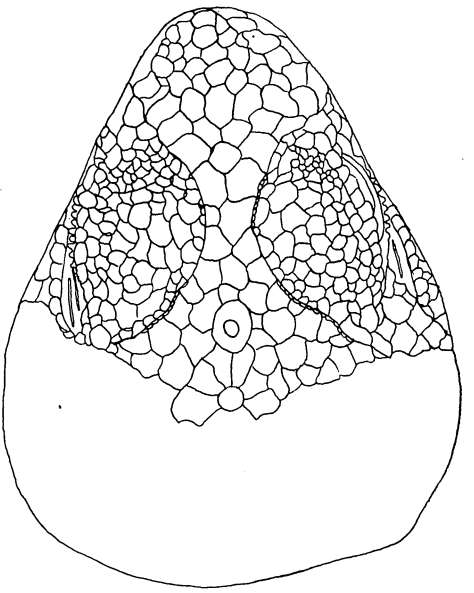


Fig. 3. M. Z. U. M. No. 65010. Manhattan, Kansas.

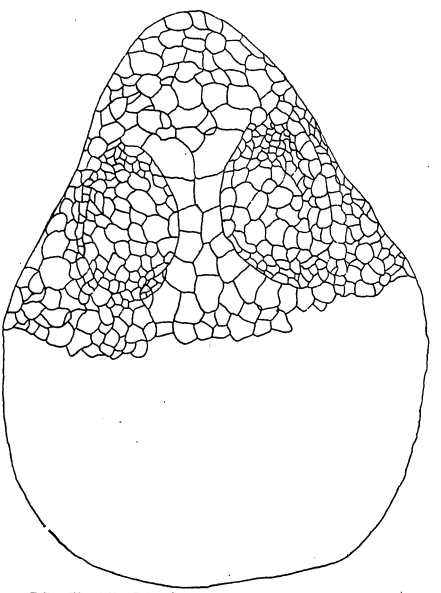


Fig. 4. M. Z. U. M. No. 65016. Neodesha, Kansas.

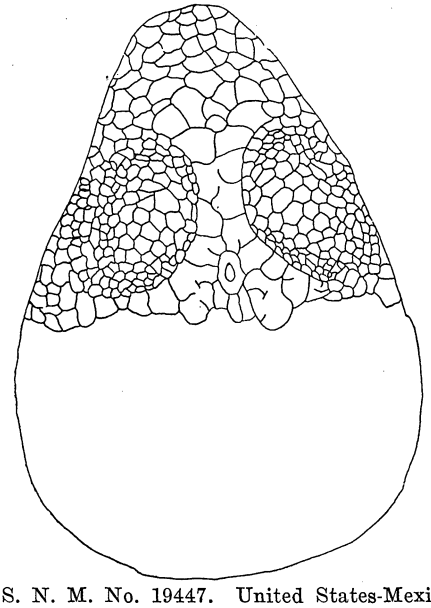


Fig. 5. U. S. N. M. No. 19447. United States-Mexico Boundary.

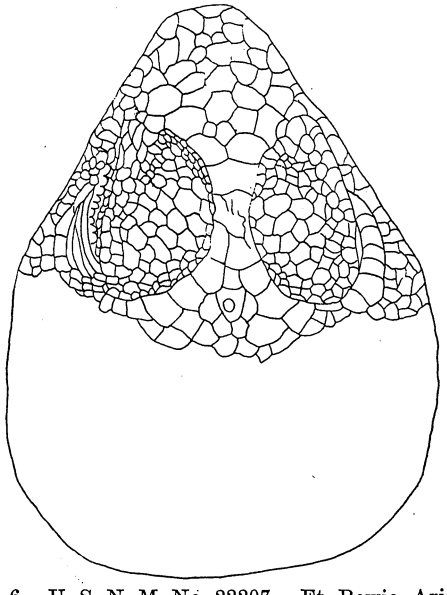


Fig. 6. U. S. N. M. No. 22207. Ft. Bowie, Arizona.

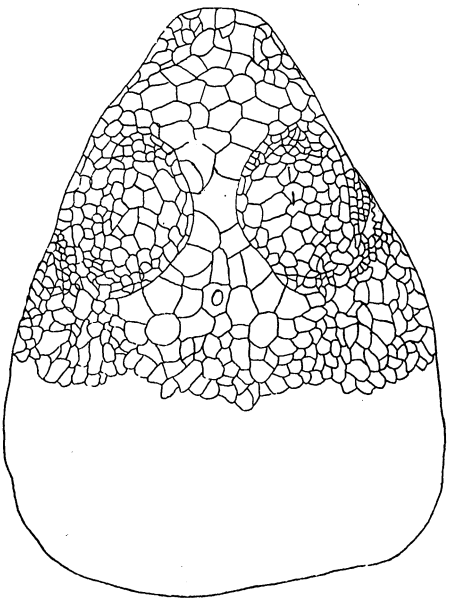


Fig. 7. M. Z. U. M. No. 65012. Manhattan, Kansas.

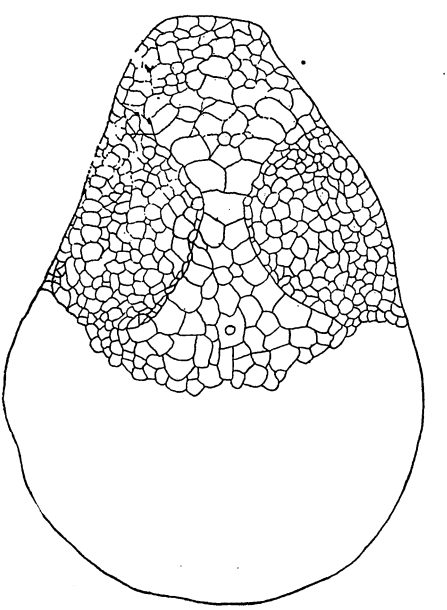


Fig. 8. U. S. N. M. No. 18321. Diamond Valley, Utah.

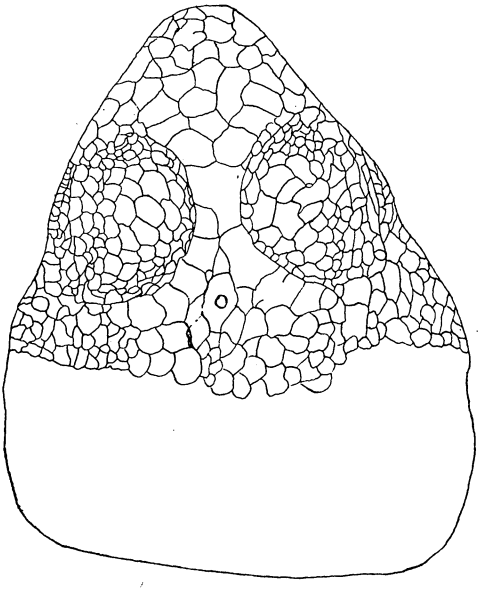


Fig. 9. M. Z. U. M. No. 65013. Neodesha, Kansas.

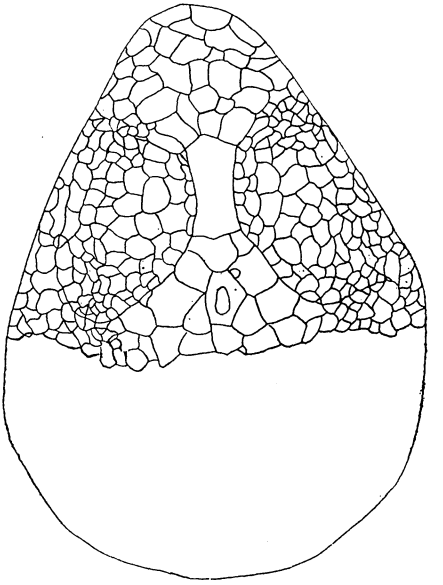


Fig. 10. M. Z. U. M. No. 65017. Manhattan, Kansas.

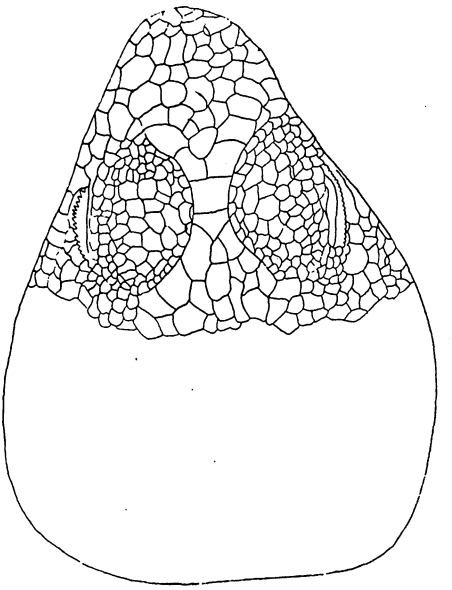


Fig. 11. M. Z. U. M. No. 65008. Waterville, Kansas.

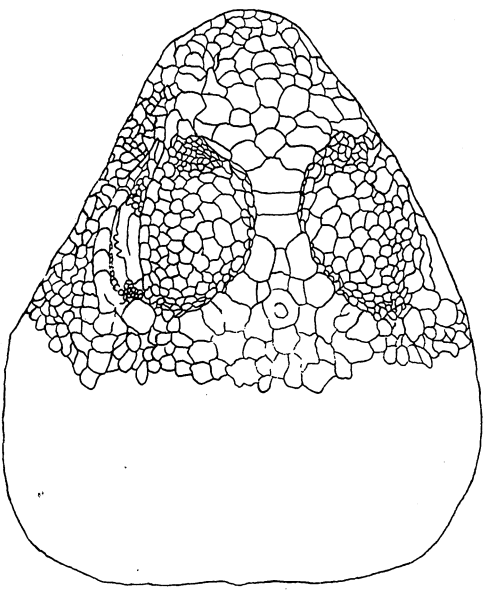


Fig. 12. M. Z. U. M. No. 65011. Manhattan, Kansas.

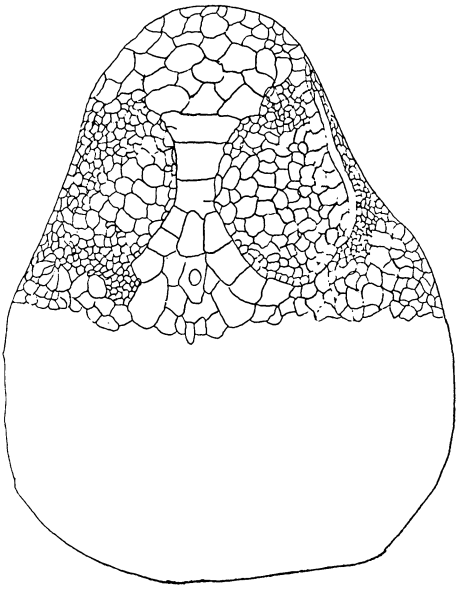


Fig. 13. U. S. N. M. No. 9370. California.

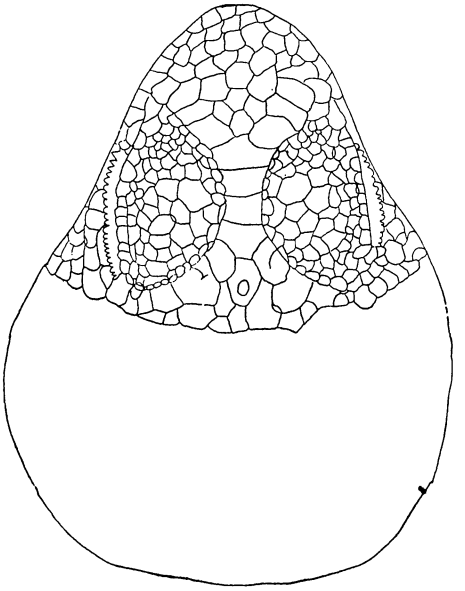


Fig. 14. M. Z. U. M. No. 65014. Manhattan, Kansas.