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A NEW BOX TURTLE FROM SOUTHEASTERN SONORA, MEXICO

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In 1941 Mr. John W. Hilton secured a collection of reptiles and amphibians in southeastern Sonora for the American Museum. All of the specimens were taken in the immediate vicinity of Rancho Guirocoba, which is located in a small valley in the foothills of the Sonoran Sierra Madre, at an elevation of approximately 1500 feet. The collection includes both desert and tropical forms, as might be expected since the region is one of mixed tropical and desert vegetation. Several of the tropical forms included have hitherto been known no farther north than Mazatlan in Sinaloa, whereas a southern extension of the range of desert species is demonstrated in other specimens.

Among the turtles in the collection are four examples of the genus *Terrapene*, representatives of which are uncommon or rare in collections from Mexico. It is obvious that these specimens bear little resemblance to *Terrapene ornata* known from northeastern Mexico and from counties in southeastern Arizona. *T. ornata* seems not to have been recorded from Sonora although a specimen in the American Museum (A.M.N.H. No. 4602) was included in the Lumholtz Collection secured in "Northern Sonora" by F. Robinette. Aside from *ornata* no other *Terrapene* appears to be known from the Pacific drainage except *T. nelsoni* described by Stejneger (1925, p. 463) from "Pedro Pablo, Tepic," a locality in the foothills of the Sierra de Teponahuastla in Nayarit (formerly Territorio de Tepic), Mexico, some 400 kilometers south of Guirocoba.

Stejneger unfortunately gives no dimensions whatever for the type, nor does he provide any description of the pattern. Photographs of the type, however, were published by Ditmars (1934, pp. 39-40, Figs. 31-33), and it seems obvious that

it has pattern characters not found in the Sonoran specimens. *Terrapene goldmani* (Stejneger, 1933, p. 119), a three-toed species known from the holotype taken at Chijoles on the coastal plain not far west of Tacuayalab in southeastern San Luis Potosí, may possess some of the characteristics of the pattern of the Sonoran specimens, but in any case morphological characters readily distinguish it, aside from the fact that the type locality is geographically and faunistically removed from Sonora. Müller (1936) and Smith (1939) believe *goldmani* to be a synonym of *mexicana*.

Comparisons have been made with the four forms of *T. carolina* which Pope (1939, p. 107) considers as subspecies, and with the slightly more distinct *T. ornata* and *T. mexicana yucatanana* represented in the American Museum collection. None of these bears sufficient resemblance to the Guirocoba specimens to warrant use of any name now available, nor is there any evidence that any specimen of the genus is yet known within a radius of 200 miles.

Therefore, I take this opportunity to express my gratitude to Dr. Lawrence M. Klauber, who first directed my interest in herpetology along scientific lines and whose kindly suggestions over a period of fourteen years have been of inestimable value to me. Doctor Klauber's application of statistical methods to herpetological taxonomy has set new standards for such work, and while it is perhaps paradoxical to honor him by associating his name with a species of a genus never subjected to any modern statistical treatment, I do so with the anticipation that quantitative methods eventually will provide the basis for a more adequate understanding of relationships within the genus *Terrapene*.

Terrapene klauberi, new species

DIAGNOSIS.—A box turtle apparently most closely related to *T. nelsoni*. Pattern on carapace and head consisting of small, round or ovoid yellow dots. Hind foot with four claws; digits scarcely webbed; bony zygomatic arch absent; carapace with mere vestiges of median keel,

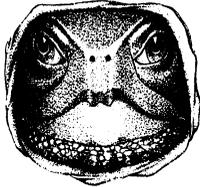


FIG. 1

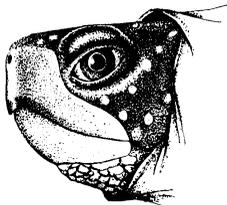


FIG. 2

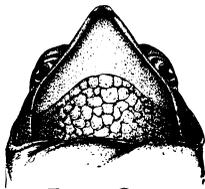


FIG. 3

Figs. 1-3. Anterior, lateral and ventral views of paratype, A.M.N.H. No. 63752 ($\times 1$), to show notch on premaxilla and horny beak, profile, and shallow concavity of posterior extremity of mandibular horny beak. (Drawings by Dimitri Alexandroff.)

ratio of carapace width to carapace length 0.72 (mean); ratio of body height to carapace length 0.45 (mean); anterior lobe of plastron nearly flat, upper jaw hooked, distinctly notched in middle; length of first vertebral lamina much less than width of third vertebral; fourth vertebral much wider than long, as long as or longer than first vertebral.

TYPE.—Adult female, No. 63751 in the collection of The American Museum of Natural History, collected at Rancho Guirocoba, approximately eighteen miles southeast of Alamos, Sonora, Mexico, by John W. Hilton between June 15 and October 15, 1941. Three paratypes from the same locality are A.M.N.H. Nos. 63752-4.

DESCRIPTION OF TYPE.—Nostrils oval, position normal; upper jaw hooked, with well-defined notch on horny beak and with notch on premaxilla. Horny beak of mandible with comparatively shallow posterior marginal concavity. Top of head flat (see Figs. 1-3).

Carapace elongate, rounded in cross section, depressed but not flattened. Vertebral laminae nearly smooth, with mere traces of median keel; fourth vertebral most distinctly convex; costals and marginals with growth ridges. Height of second costal greater than combined length of second and third vertebrae. Plastron comparatively flat, anterior lobe upturned in front no more than posterior lobe turns upward at anal lamina. Combined lengths of interpectoral and interfemoral seams nearly equal to humeropectoral seam.

Fore feet with five toes; hind feet with four toes, digits scarcely webbed, second digit much longer than others, outer toe smallest but well developed. Limbs comparatively slender. Dimensions of the type and paratypes are given below.

PATTERN AND COLORATION.—None of the colors could be satisfactorily matched with those published by Ridgway (1912), but nearest approximations are given. Dorsum between Rood's Brown and Vandyke Brown, with round or ovoid dots averaging 1.5 to 2 mm. in diameter, and separated by an average distance of 4 mm. Plastron approximately Light Ochraceous-Buff around the periphery (see Figs. 6-9), with black and brownish markings in more or less symmetrical arrangement, and with faint roundish dots apparent laterally; under side of marginals same color as lighter portions of plastron. Dorsum and sides of head (except horny jaws) Dresden Brown, with yellowish dots less than a millimeter in diameter, and spaced at an average distance of 2 mm. Horny portions of jaw Ochraceous-Buff; gular region paler, nearly Cream Color; eye with Russet colored iris. Forelimbs with yellowish dot in center of each scale. Hind limbs nearly devoid of markings, but with a paler yellowish area along outer margin of foot, a single yellow dot on the posterior angle of right hind leg near the angle of the foot. Tail slightly paler on sides. (All notes are based on live specimens.)

VARIATION IN THE PARATYPES.—Variation in dimensions is summarized below; variation in rugosity and in pattern is shown in the figures. The smallest specimen shows more trace of a mid-dorsal keel than the others and suggests that much of the rugosity is lost with increasing age.

Two specimens possess markings on the under side of the marginals, and two do not. No. 63752 is darker than the others, with ground color of carapace approximating Mummy Brown, and likewise it is the only

T. klauberi are *nelsoni* and *ornata*. Stejneger's meager description of the former makes adequate comparison with it impossible, but five characters seem to be of significance in separating his holotype

DIMENSIONS IN MILLIMETERS

No.	63751 ♀ (Type)	63752 ♀	63753 ♀	63754 ♀
Length of carapace (straight line).....	140	138	133	108
Width of carapace (at seventh marginal).....	96.7	100.5	94	82
Length of plastron (straight line).....	139	137.5	136.5	111
Width of plastron (at middle of femorals).....	76	79	74	65
Anterior plastral lobe.....	56	52	54.5	42
Posterior plastral lobe.....	83	85.5	82	68
Height of body (at third vertebral).....	61	63	59	54
Length of first marginal.....	20	18	20	18
Length of first vertebral.....	30	32	31	24.5
Greatest width of first vertebral.....	32	29.5	35	29
Greatest width of third vertebral.....	39	39.5	43	34
Length of fourth vertebral.....	32	33	31	24.5
Width of fourth vertebral.....	38	37.7	42	34.5
Interhumeral seam.....	13	9.5	9	8.5
Interpectoral seam.....	18	19	20	12
Width of head.....	25	22.5	22.5	19
Length of tail, anus to tip.....	17	22.1	23	21
Depth of snout, nostril to cutting edge.....	7	8	7	6

specimen with well-developed pattern of dots on the plastron, and a grayish-colored iris; in other specimens the iris is russet colored. No. 63753 has been dissected

from the four specimens of *klauberi*. These may be summarized in tabular form, based on Stejneger's description and on photographs published by Ditmars:

nelsoni

Upper jaw not notched.
Length of first vertebral equals width of third.
Length of fourth vertebral shorter than first.
Mid-dorsal keel pronounced (photograph, in contrast to description).
Pattern with dark margins along carapacial seams; faint dots possibly present on carapace.

klauberi

Notched.
Length of first vertebral less than width of third.
Length of fourth vertebral as long as, or longer than, first.
Keel vestigial, or nearly absent in adults.
No dark margins along carapacial seams; dotted pattern on carapace well developed.

and skeletonized since color notes and dimensions were recorded, and it is a female, with two maturing eggs 15 mm. in diameter in the right ovary. No conspicuous differences suggestive of sexual dimorphism are present in the other three, nor do examinations of cloacae indicate that a male is represented in the present series.

RELATIONSHIPS.—The absence of a bony zygomatic arch and the presence of four toes on the hind foot (both characters possibly variable in forms reaching the Pacific slope of the Continental Divide), together with distributional information, indicate that the closest relatives of

It is not possible, of course, to predict the validity of these differences until additional specimens of *nelsoni* become available, and *klauberi* may prove to be a subspecies of the latter.

Differences between *ornata* and *klauberi* are more pronounced, although each has a notched beak. Variation in pattern of *ornata* is extensive, yet none of the variations appears to include the dotted pattern. Measurements of ten specimens from various localities within the range of *ornata* have been compared with the four specimens of *klauberi*, and these indicate that *ornata* is consistently wider in proportion to length. Ratios of width to length in ten

ornata vary from 0.78 to 0.92, mean 0.86, in contrast to *klauberi* which varies from 0.69 to 0.76 with a mean of 0.72. Mean differences in the relative height of the body are not statistically significant for the small samples tested, the ratio of height to length varying from 0.44 to 0.54, mean 0.50 in *ornata*, and from 0.44 to 0.50 in *klauberi*, mean 0.45. The maximum ratio of height to length in *klauberi* occurs in the smallest individual, and the minimum in the largest, suggesting that a

change in relative proportions accompanies growth, larger specimens tending to be flatter than juveniles. A similar phenomenon of growth is suggested by the data for the series of ten *ornata*, but there is considerable variation, and reliable studies would have to be made on large series of each form. Comparisons of groups of similar size might indicate a statistically significant difference in ratios of height to length for the two forms.¹

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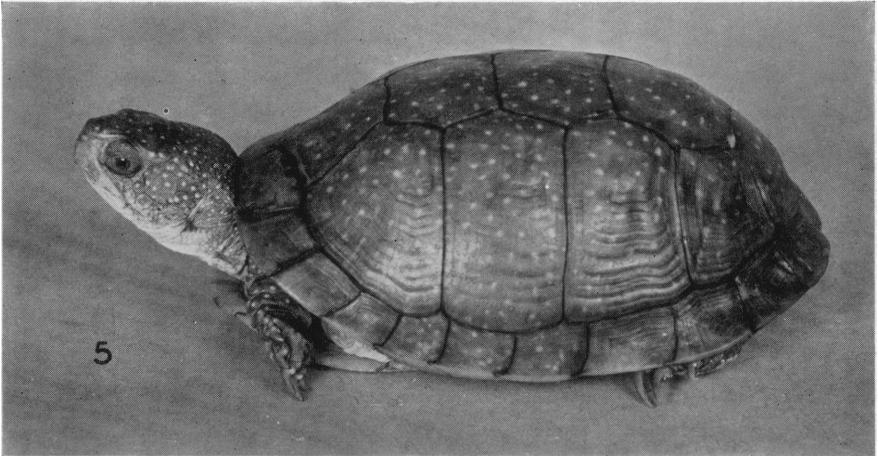
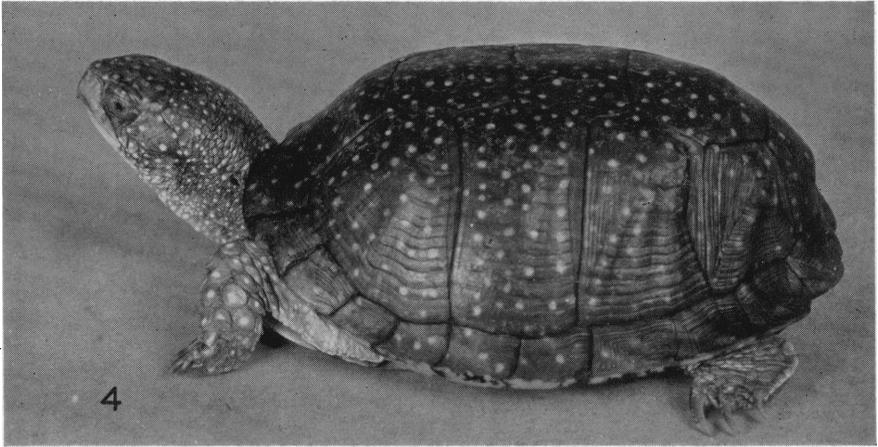
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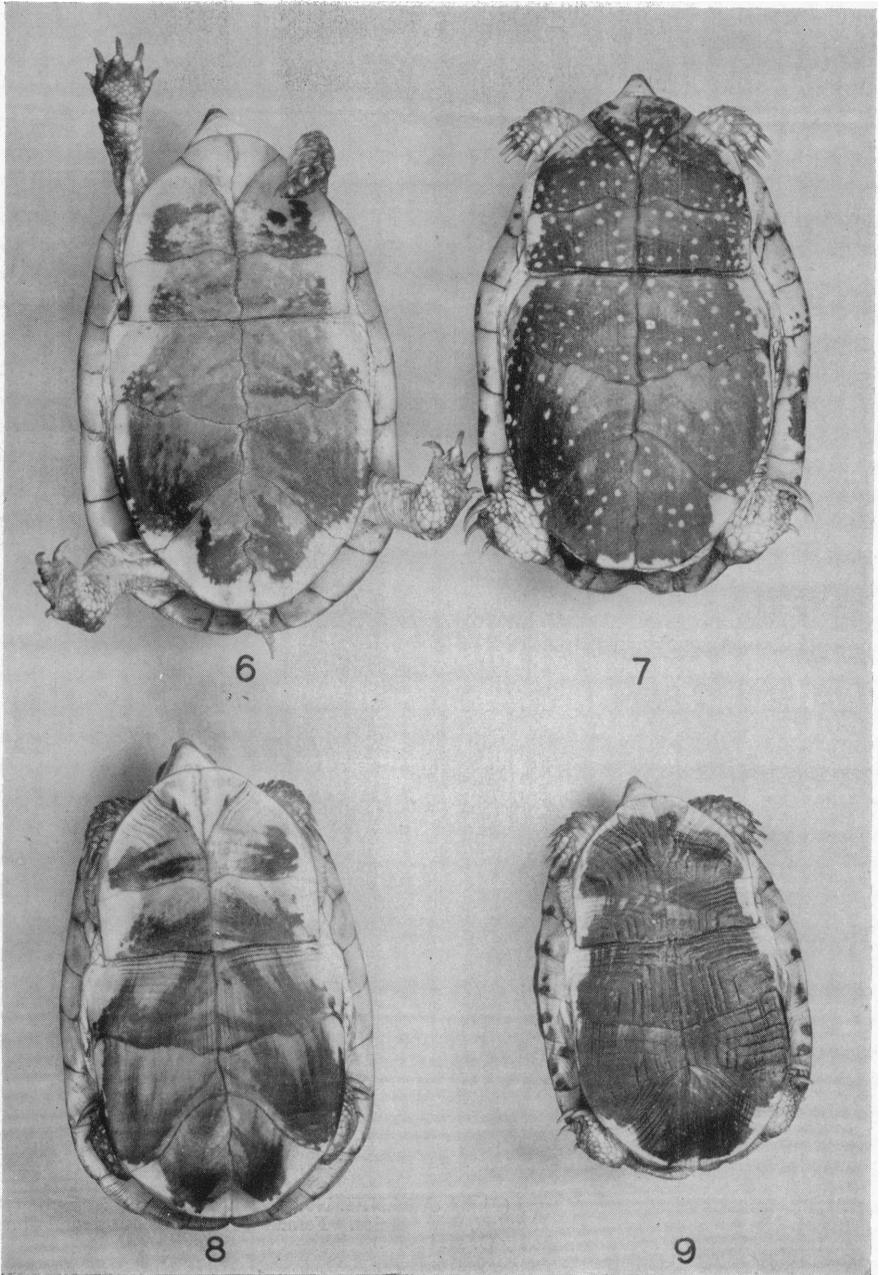
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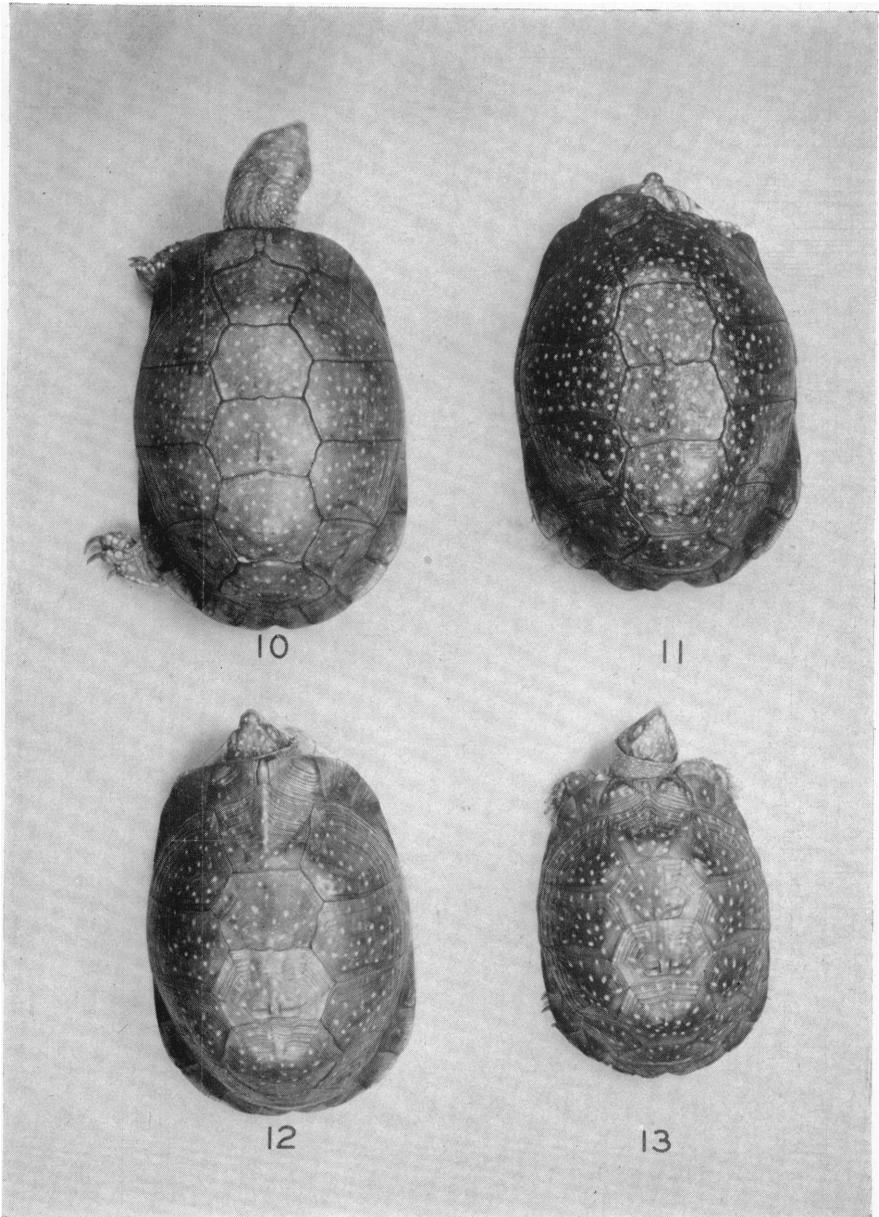
¹ Assistance in the preparation of these materials was furnished by the personnel of the Work Projects Administration Official Project No. OP 265-1-97-16 W. P. 10.



Figs. 4, 5. Latero-dorsal views of type (Fig. 4, A.M.N.H. No. 63751) and largest paratype (Fig. 5, A.M.N.H. No. 63752) of *Terrapene klauberi*, new species. Females, from life; for actual dimensions see text. (A.M.N.H. photographs by C. H. Coles.)



Figs. 6-9. Plastral views of type and paratypes of *Terrapene klauberi*, new species. Females, from life; approximately $\frac{1}{2}$ natural size. Fig. 6, type, A.M.N.H. No. 63751; Fig. 7, A.M.N.H. No. 63752; Fig. 8, A.M.N.H. No. 63753; Fig. 9, A.M.N.H. No. 63754. (A.M.N.H. photographs by C. H. Coles.)



Figs. 10-13. Carapacial views of type and paratypes of *Terrapene klauberi*, new species. Females from life; approximately $\frac{1}{2}$ natural size. Fig. 10, type, A.M.N.H. No. 63751; Fig. 11, A.M.N.H. No. 63752; Fig. 12, A.M.N.H. No. 63753; Fig. 13, A.M.N.H. No. 63754. (A.M.N.H. photographs by C. H. Coles.)

