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A New Turtle from Texas

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The junior author recently discovered in western Texas a population of turtles conspicuously different from any yet described. A single example collected at that time has been supplemented by another obtained through the courtesy of Mrs. W. E. Smith, who has our deepest appreciation for her assistance. We name the new form

Terrapene ornata luteola* Smith and Ramsey, new subspecies.

DIAGNOSIS. Entire shell horn or straw colored, sutures not pigmented; claws greatly thickened, that on hallux about one-third as broad as long; nuchal reduced or absent; sutures deeply etched; gulars raised, prominent; rear corner of corneous upper jaw truncate, not tapered; carapace widest at 8th marginal; width/length ratio 0.81-0.86; nostrils oval; plastron not concave in males; zygomatic arch and quadratojugal completely absent.

HOLOTYPE. Adult male, Texas Christian University Collection no. 1280, secured October 22-24, 1950, 17 miles south of Van Horn, Culberson County, Texas, by W. Elton Smith. *Paratype*. University of Illinois Museum of Natural History, no. 18039, secured on U. S. Highway 80, 12.3 miles west of Van Horn, Hudspeth County, Texas, August 15, 1950, by Louis W. Ramsey.

DESCRIPTION OF HOLOTYPE. Top of head flat; nasal region swollen, forming a protuberance on snout in lateral profile; nostrils oval, diagonal, inner margins separated by 3.2 mm.; margin of upper jaw sinuous, rear corner of cornified portion protuberant,

* Latin, *luteolus*, yellowish.
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rather truncate, not tapered to a point; apex of upper jaw hooked and notched, but no notch discernible (by transmitted light) in premaxilla; lower jaw hooked, lateral margin a smooth arc; several oval scales about angle of jaws, both above and below rictus oris; tympanum discernible as an oval depressed area with a maximum diameter of about 6.5 mm.

Carapace somewhat depressed, broader posteriorly than anteriorly, nearly a third longer than broad, greatest width at Sth marginal; vertebrals with an obtuse keel (much as in *T. ornata*, not sharp as in *T. carolina*); growth ridges present but poorly defined on costals and marginals; marginal scutes, especially the anterior (1-3) and posterior (8-12) projecting by as much as one-fourth their diameter beyond the margins of the underlying marginal plates; all sutures, including those on plastron, very deeply etched; nuchal very short, not reaching anterior margin of carapace at median edge of 1st marginals; vertebrals, except the anterior and posterior, considerably broader than long.

Plastron hinged near middle of bridge; intergular seam a little more than half length of anterior lobe; interpectoral and interfemoral seams subequal; interanal seam about half length of posterior lobe; bridge covered by a relatively broad zone of epidermis of which small areas form irregular scutellae; gulars raised or thickened, their anterior margin projecting a short distance forward from margin of plastron; no central plastral concavity.

Claws heavy, thickened, especially on hallux; 4th claw of pes not twice as long as broad.

Shell above and below a more or less uniform straw color, with a vague, dark olive color showing through a few scutes of the carapace; a scattered, irregular, poorly defined gray suffusion in large areas of the plastron; top of head straw yellow, covering a deeper hue of greenish tint which in some areas replaces the yellow color; scales on limbs a light orange.

VARIATION. The single paratype, an adult female, nearly duplicates features of the type. All details of the type description apply equally to the paratype except: tympanum not readily discernible or measurable; nuchal absent, not evident even on

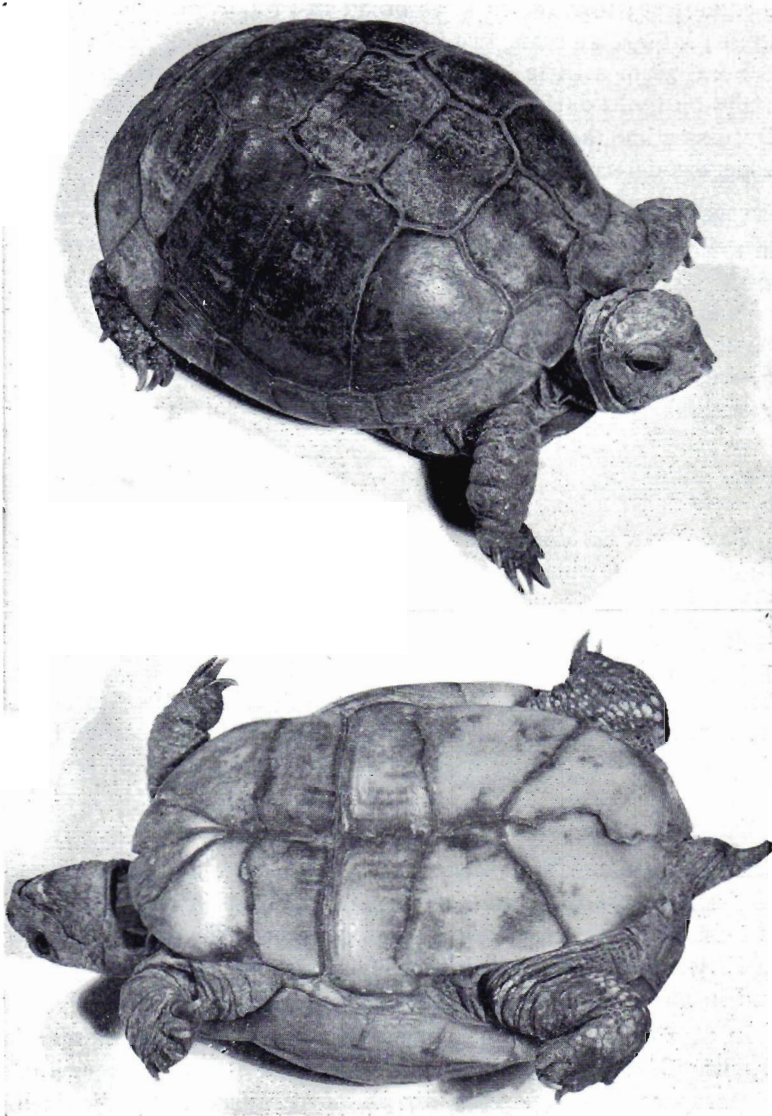


PLATE I

Terrapene ornata luteola, holotype.

ventral side of carapace, first marginals in broad contact on median line; rear vertebral as broad in proportion as preceding three; intergular seam two-fifths length of anterior lobe; inter-femoral seam a little longer than interpectoral; head greenish; scales on limbs dark brown or with a straw-colored central area. By dissection the zygomatic arch as well as the quadratojugal bone was determined to be absent.

COMPARISONS. Eleven species and subspecies are now known in this genus. The specific and subspecific names now recognized are:

<i>T. carolina carolina</i>	<i>T. mexicana mexicana</i>
<i>T. carolina bauri</i>	<i>T. mexicana yucatanana</i>
<i>T. carolina major</i>	<i>T. nelsoni</i>
<i>T. carolina triunguis</i>	<i>T. ornata ornata</i>
<i>T. coahuila</i>	<i>T. ornata luteola</i>
<i>T. klauberi</i>	

Terrapene carolina and its subspecies are restricted to the United States, where in addition occurs only *T. ornata* and its subspecies. Relationships of these forms have not been satisfactorily determined. *Terrapene carolina* does seem rather remotely related to all the other species, but that the others form a natural group of species more closely interrelated than any one species is to *T. carolina* is not obvious. It is at least possible that the forms do comprise two groups, but the osteological studies initiated by Taylor (1895) must be continued in order to reach a satisfactory conclusion.

Pattern alone will distinguish *T. o. luteola* from all other races of *Terrapene* in the United States, in which radiating light lines at least on the carapace are generally present. The exceptions, all in *T. carolina*, differ in addition by possession of round nostrils and in males a concave plastron.

In Mexico, *T. coahuila* is identical in pattern (Schmidt and Owens, 1944), but has much different shell proportions (width of carapace 65-68 percent length of carapace). All Mexican species, as a matter of fact, have longer and narrower shells (maximum ratio width/length 0.79), and all (except *T. coahuila*) with horn-colored shells have dark-pigmented sutures.

One of the most unusual and perhaps distinctive features, other than color, is the thickened claws. No specimens examined of *Terrapene* of equal or even larger size approached the types in development of especially the rear claws. The claw on the 1st digit of the foot is slightly more than one-third as wide (3.5 mm.) as long (9 mm.). Claws on other digits are not quite so broad in proportion, but are visibly broader than in other species examined. This feature may well, of course, be dependent upon the environment or individual variation, as indeed may also be the deeply etched sutures and prominent gular.

Another distinctive character may well be the reduction or absence of the nuchal. Specimens of *T. carolina* have been observed with no nuchal evident on the dorsal surface, but in such individuals the scale is still discernible on the ventral surface to which it is restricted by dorsal junction of the anterior marginals. No specimens of *T. o. ornata* have been observed to lack the scale, however.

RELIABILITY OF DIAGNOSTIC CHARACTERS. One of the most distinctive features of this form, the horn-colored shell, is justifiably assumed to be constant not so much upon the basis of the two specimens available but, equally importantly, upon the basis of observations by Ramsey, who noted about 8 of superficially identical character along a stretch of about 2 miles on the highway near the locality at which the paratype was taken, between Van Horn and Sierra Blanca. Furthermore, Mrs. W. E. Smith of Van Horn, Texas, to whom we are indebted for the type as well as for information on these turtles, reports that the form is common in the area where the type was taken. Apparently it occurs to the exclusion of *T. o. ornata*, which has been taken in many surrounding localities.

Constancy of other possibly diagnostic features cannot be assured on the basis of two individuals.

RELATIONSHIPS AND STATUS. Similarities in proportion and morphology leave little doubt that, despite differences in pattern, the closest relative of the new form is *T. ornata* (as previously understood). The two forms may differ in a number of respects (depth of sutures, truncate rear corner of corneous upper jaw, thickness of claws, growth of marginal scutes beyond underlying

plates, reduction of nuchal, prominence of gulars) but constancy of the differences now apparent, except of color, is questionable. Certainly all except the latter are of a unique type if they do prove constant.

Similarity between *T. o. ornata* and the new form is also indicated by the oval nostrils and flat plastron in males (nostrils round and plastron concave in *T. carolina* and its subspecies). Furthermore, in the species *T. klauberi* and *T. coahuila*, both possibly related to *T. o. ornata*, the greatest width of the carapace occurs at the middle of the body (6th or 7th marginal), whereas in both *T. o. ornata* and the new form the greatest width occurs at the 8th marginal. The relative width and length of the carapace, a very important characteristic in *Terrapene*, is virtually the same in *T. o. ornata* (0.78 to 0.92, mean 0.86, *vide* Bogert, 1943: 4) as in the new form (0.81 to 0.86).

The zygomatic arch, generally completely absent in *T. o. ornata*, unlike the situation in all other species of the genus, is absent likewise in the specimens described here. The character is probably of considerable importance in distinguishing a group, including *T. ornata*, from others of the genus, but is reputedly (Lönnerberg, 1896) more variable than originally supposed (Taylor, 1895).

Assuming as established the close relationship of *T. o. ornata* and the new form, the degree of relationship still remains obscure. That a transition may well occur in *T. o. ornata* toward the characters of the present specimens is suggested by the general tendency toward pattern reduction in many if not all southwestern specimens. Van Denburgh (1922:986) has noted this tendency, and it is exhibited by two specimens at hand from the Huachuca Mountains (UIMNH 17555) and from Bisbee (no. 17554), Arizona, as well as one from 28 miles south of Samalayuca, Chihuahua, Mexico (no. 7072). In all of these, especially the latter, the pattern is dull, and in some areas difficult to discern. The carapace in none, however, is horn-colored, but instead chiefly dark brown. It appears that in them the dark color increases in extent at the expense of the light (yellow) color, whereas in *T. o. luteola* the reverse occurs.

The close similarity of *T. ornata* and the new form, the possible tendency of the former to approach the pattern of the latter in

adjacent areas, and the mutually exclusive yet contiguous ranges of the forms, lead us tentatively to regard the new form as a subspecies of *T. ornata*.

DISTRIBUTION. The holotype of *T. o. luteola* was taken east of the Van Horn Mountains within the "Plains Belt" of the Sierra Vieja Biotic District (Blair and Miller, 1949: 39), which is part of the Chihuahuan Biotic Province of Blair (1950). The "Plains Belt" is more or less equivalent to the Valentine Plain of the U. S. Geological Survey topographic maps. Physiographically the locality falls within the "Salt Basin" of Fenneman (1931: 395) and Atwood (1940: folding map) and the Howard Bolson of Loomis (1938: 285, 288, fig. 173). The paratype was taken in a small bolson, called "Eagle Flats" (Loomis, 1938, fig. 173). Eagle Flats is from five to ten miles wide, and about 25 miles long, extending in a west northwesterly direction between Devil Ridge and the Eagle Mountains on the south and the Sierra Diablo mountains on the north. It is separated on the east from the Valentine Plain by a low ridge and on the northwest from the Diablo Plateau by a similar low ridge. It may logically be considered as an extension of the "Plains Belt" of the Sierra Vieja biotic district of Blair and Miller. Both localities fall within the Sacramento section of the Basin and Range Physiographic Province of Loomis. Atwood (1940: 357, map facing page 12) considers this a part of the Mexican Plateau.

That section of Texas which lies east of the Hueco Mountains, west of the Guadalupe, Delaware, and Davis mountains, and north of the Finlay, Sierra Blanca, Eagle, Van Horn, and Sierra Vieja mountains, includes the Howard Bolson, Eagle Flats, and the Diablo Plateau, and it may roughly outline the range of *T. o. luteola*. So far as we can determine, however, no records of any specimens of *Terrapene* are available from this region in either New Mexico or Texas, except at its periphery. *Terrapene o. ornata* has been recorded at the following localities along the southern edge of the region described above: near the Sierra Vieja range (Jameson and Flury, 1939: 64), Tularosa Basin and Organ Mountains to 4300 ft., New Mexico (Lewis, 1950: 10), 10 miles WSW. of Valentine in Presidio County, Ft. Hancock, and 5 miles NW. of Sierra Blanca in Hudspeth County, and Ft.

Bliss and 7 miles E. of Ysleta in El Paso County (Brown, 1950: 245). At these localities and undoubtedly elsewhere, *Terrapene o. ornata* invades the periphery of the possible range of *T. o. luteola*. Whether the latter race occupies the entire region as here described, or only a limited part, or is even restricted to it, is uncertain. Known facts at least suggest it may be restricted to this area or a part thereof, however, or that it may have differentiated within that area. It is readily obvious that at one time, and perhaps even now, the Salt Basin may have represented a physiological barrier to *T. o. ornata*. Appearance of physiologically adaptive mutants in populations of *T. ornata* in adjacent areas or within the Salt Basin as it acquired its peculiar character, followed by evolution of a "physiological race" capable of survival in the salt plains would be a reasonably possible prelude to further differentiation involving recognizable morphological features such as those here described.

Occurrence of a possibly endemic form in an area so discretely outlined as this definitely suggests the stimulating possibility that other evidence of endemism, none now known to us, may exist. So little has the area been investigated in the past that in view of the possible role as an endemic center the region becomes of prime interest, meriting an intensive biological survey.

REMARKS. The sex of the holotype is not wholly certain. Little sexual dimorphism exists in external characters. The anus in the type is about 10 mm. to the rear of the plastron, and upon dissection of the cloaca penile structures appeared to exist. In the paratype the anus is but about 3 mm. posterior to the plastron. In other species of the genus as well as in other genera of turtles, such differences are correlated with sex, and they probably are also in this case.

Taylor (1895: 585) states that in *T. ornata* "often individuals possessing no color markings are found." This statement is difficult now to justify, for we have never seen a single individual, other than the present two, of this character among the hundreds observed in the field, nor are they mentioned elsewhere in the literature, so far as we are aware.

The discovery of both specimens after showers may be of significance. Lewis (1950: 10) records a similar effect of rainy or

cloudy weather upon the abundance of *T. ornata* in the Tularosa Basin of New Mexico. Burrowing habits obviously would expose the turtles rather fully to the effects, if any, of such labile components of the soil as salts.

TABLE I

Measurements (in mm.) of the paratype (No. 18039) and holotype (No. 1280)

	No. 18039	No. 1280
Length of carapace (straight line).....	131	130
Width of carapace (at 8th marginal).....	113	105.5
Length of plastron (straight line).....	133	127
Width of plastron (at middle of femorals).....	80	73.5
Anterior plastral lobe	53	50
Posterior plastral lobe	83	78
Height of body (at 3rd vertebral).....	59	59
Length of 1st marginal	16	16
Length of 1st vertebral	28.5	28
Greatest width of 1st vertebral.....	30	27
Greatest width of 3rd vertebral.....	39	40
Length of 3rd vertebral.....	25	24.5
Length of 4th vertebral.....	26	29
Width of 4th vertebral.....	37	38
Interhumeral seam	17.5	7.5
Interpectoral seam	15	16
Interabdominal seam	23.5	23.5
Interfemoral seam	18.5	16.5
Width of head.....	24.5	24.0
Length of tail, anus to tip.....	17.5	15.0
Depth of snout, nostril to cutting edge.....	8.3	7.5

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