

A New Subspecies of *Pseudemys floridana*, with Notes on the *floridana* Complex

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SEVERAL points in Le Conte's *Description of the Species of North American Turtles* (1836) I find difficult to reconcile with his evident astuteness as an observer. Among these apparent lapses, his failure to assign a member of the *P. floridana* group to the Atlantic coastal plain is perhaps the most singular. His remarks on the range of *concinna* definitely restrict it to the Piedmont,¹ while of *floridana* he says, "Inhabits in St. Johns river of East Florida." If Le Conte had taken all his data from museum specimens the gap which he left in the range of the group might be attributable to lack of material. But it is evident that his field acquaintanceship with turtles was extensive. Moreover, the neglected region includes the section of southern Georgia (Riceboro, Liberty County) in which the Le Conte plantation was located.² Although I have not been in Liberty County since the days when all turtles were "cooters" to me I recall distinctly that a big brown *Pseudemys* used to be common in the vicinity of Riceboro.

The high-shelled *Pseudemys*, with the upper jaw relatively smooth and entire, inhabiting the coastal plain from northern Florida to North Carolina, has been referred to *floridana*, to *concinna*, or to both by various authors. Brimley (1907), for example, records both from North Carolina. I have seen his specimens, and am convinced that they are phases of a single form, which is a fairly homogeneous coastal plain stock intergrading with *concinna* along the fall line and with a peninsular race in northern Florida.

Since the St. Johns River rises in the range of the peninsular form and invades that of the coastal plain population, and since Le Conte's specimens probably were collected in the lower (northern) reaches of the river, the type might have been a specimen of either race or an intergrade. As I have mentioned previously (1935), the description of *floridana* gives little indication as to which race Le Conte had. However, the failure to mention a fairly conspicuous diagnostic character of the peninsular race—the confluence behind the eye of the supra-temporal and para-median head stripes—may be regarded as slight evidence that the description was based on the more northern form. I propose, therefore, to restrict the name *floridana* to the coastal plain population, and to describe the peninsular terrapin as a new subspecies.

Pseudemys floridana peninsularis, n. subsp.

TYPE.—Museum of Comparative Zoology 43849, adult female. Collected at Crystal Springs, Pasco County, Florida, Feb. 20, 1938, by Lewis Marchand.

DIAGNOSIS.—Differs from *f. floridana*, its nearest ally, as follows: supra-temporal and para-median head stripes confluent behind the eye (or at least

¹ "Inhabits in the rivers of Georgia and Carolina, where the beds are rocky. I have never seen them below Augusta on the Savannah, or Columbia on the Congaree."

² The Riceboro plantation was established in 1810 by Louis Le Conte, brother of John, who was a New Yorker. Louis and his sons were all ardent naturalists, and although I can find no record of John's having visited his brother prior to the publication of his paper, it seems unreasonable to suppose that correspondence regarding the local fauna had not been exchanged.

continuing anteriorly as one line) in *peninsularis*, remaining separated and continuous to snout in *floridana*; a post-orbital stripe, extending from posterior margin of orbit to anterior border of tympanum, usually lacking in *peninsularis*, usually present in *floridana*; cervical portion of supra-temporal stripe usually much broader than para-median in *floridana*, the two usually more nearly equal in width in *peninsularis*; blotches on lower marginal sutures solid in *peninsularis*, with light centers in *floridana*; ground color of plastron very light, greenish white, or very dilute yellow.

DESCRIPTION.—Highest point of carapace usually anterior to middle of its long axis; one or more of the posterior vertebrae slightly keeled; jaws smooth or slightly serrate.

Ground color of carapace black or very dark brown; pattern usually much reduced, but otherwise not essentially different from that of the other races of *floridana*; middle intermarginal sutures bisecting dark blotches, which become obsolescent anteriorly and are often lacking on the posterior sutures; bridge immaculate, or with one or two blotches like those on marginals; plastron unmarked; ground color of head and limbs lustrous sooty black; stripes on soft parts light green, greenish yellow, or greenish white; anterior surface of fore limb with one to four stripes; three (rarely five) stripes on top of head between supra-temporals, at a point above tympana.

Proportionate measurements as follows: length/height males 2.27–2.43, av. 2.38, females 2.14–2.39, av. 2.22; length/width males 1.33–1.88, av. 1.49, females 1.26–1.51, av. 1.39; length/height of bridge at marginal suture six males 5.09–5.93, av. 5.55, females 3.93–7.00, av. 5.22; width/width at marginal suture six, males 1.04–1.14, av. 1.08, females 1.00–1.10, av. 1.03.

PARATYPES.—MCZ³ 43850 (allotype), same data as type; MCZ 44069, near Woodmere, Sarasota Co., Fla., Nov. 18, 1936, A. Carr; MZUM 83358, Marion Co., Fla., near Umatilla, Nov. 3, 1933, A. and T. Carr; MZUM 83359, Charlotte-DeSoto Co. line, Nov. 15, 1936, Stewart Springer; USNM 104389, Crystal Springs, Pasco Co., Fla., Feb. 20, 1938, L. Marchand; USNM 104390, near Umatilla, Lake Co., Fla., March 16, 1934, A. Carr; CM 9875, 9876, and 9877, Crystal Springs, Pasco Co., Fla., Feb. 20, 1938, L. Marchand; Dept. Biol. Univ. Fla. 951, Dade Co., Fla., March, 1937, T. Barbour; same, 927, Manatee Co., Fla., Jan. 18, 1937, A. Carr; same, 1685, Crystal Springs, Pasco Co., Fla., Feb. 20, 1938, L. Marchand.

REMARKS.—The turtles of the genus *Pseudemys*, and particularly those of the *floridana* series, are a notoriously confusing group. Although I have studied them during the last three years, there remain problems which I believe will find solution only in long-time breeding experiments. However, several points which seem to me helpful in understanding relationships within the complex have become evident. These are as follows:

1. Due to inherent genetic instability, or to re-establishment of intercourse between previously isolated stocks, individual variation within a local population (even in a single litter) may result in phenotypes superficially more dissimilar than the actual races. Nevertheless, there are recognizable races, and although their racial characters often appear trivial in comparison with the gamut of individual variation, they are fairly constant and are

³ MCZ = Museum of Comparative Zoology; MZUM = Museum of Zoology, University of Michigan; USNM = United States National Museum; CM = Carnegie Museum.

correlated with geographic provinces.

2. The characters stressed in many existing descriptions are those subject to the above-mentioned individual variation or are involved in sexual dimorphism. Original descriptions are thus largely inadequate.

3. The *floridana* complex constitutes a *Rassenkreis* which extends westward in two limbs from the Atlantic coastal *floridana*—an inland series (*concinna*, *hieroglyphica*, *texana*), and another in the coastal plain (*peninsularis*, *suwanniensis*, *mobiliensis*).

4. Intergradation has been observed between the following: *floridana* x *peninsularis*, *peninsularis* x *suwanniensis*, *suwanniensis* x *mobiliensis*, *floridana* x *mobiliensis*, *floridana* x *concinna*, *concinna* x *hieroglyphica*, *concinna* x *suwanniensis* x *mobiliensis*, *hieroglyphica* x *mobiliensis*, *hieroglyphica* x *texana*. I have seen no specimens from the Gulf coast of Texas, where *mobiliensis* x *texana* intergrades should occur.

5. Although many of the racial characters behave as if they were linked, these same characters occasionally show an apparent crossing over, so that in a given area of intergradation there may be found typical phenotypes of both intergrading races, and series showing both concurrent and independent intergradation of the several characters involved. Moreover, an occasional fortuitous combining, in an individual of one race, of all the characters peculiar to another, may be observed—even in a section of the range well removed from the intergrading area. The interpretation of the occurrence of such examples as overlapping of ranges has, no doubt, been a salient source of confusion.

6. The characters stressed as diagnostic by Holbrook (1842) in his description of *hieroglyphica* are all equally applicable to *concinna*. The type of *hieroglyphica*, taken in the Cumberland River, Tennessee, seems to me to be intermediate between Piedmont *concinna* and a recognizable trans-Mississippi race which is fairly homogeneous throughout Arkansas and eastern Texas. Although contrary to expectations based on physiography, the population between the Appalachians and the Mississippi River does not appear distinguishable racially, but seems rather to comprise a gradient connecting *concinna* with the Arkansas form. Since the type of *hieroglyphica* is slightly closer, both morphologically and geographically, to the Arkansas race than to Piedmont *concinna*, and since the name *texana* must be reserved for what appears to be a strikingly different Texan race, the Arkansas form may logically be referred to *hieroglyphica*.

KEY TO THE RACES OF *P. floridana*

The following key presents an outline of my concept of the *floridana* group. Insofar as it defines, after a fashion, and applies the appropriate available names to the seven different populations recognized, it may be of value. However, several of these populations (and perhaps all of them) must be regarded as hierarchal assemblages of lesser colonies which are isolated to varying degrees, and which together constitute a nodal gradient, the nodes corresponding to the series of lakes, ponds, streams, and stream systems occupied. The marked genetic instability mentioned above, and the disinclination of turtles of this group to wander far overland, have in Florida at least, resulted in an astonishing number of these feebly differentiated colonies.

Despite considerable recent exhortation regarding the proper attitude of the taxonomist toward sub-racial categories of this sort, no widely accepted plan has been proposed. The use of a graded series of polynomials would probably merely introduce inconsistency and confusion, while the designating of each sub-racial colony with the trinomial would serve only to vitiate the significance of the subspecies as a zoogeographic category. Until more material has accumulated, and until it can be determined whether, and to what extent, the local variations are due to ecological rather than to genetic factors, I think taxonomic recognition should be withheld. Thus, Brimley's *P. elonae* (1928) and *P. vioscana* are here regarded as synonyms of *concinna* and *mobiliensis* respectively; *hieroglyphica* is extended to include *P. labyrinthica* (LeSueur); and several distinguishable forms of *peninsularis*, *suwanniensis*, and *floridana* are not given names.

1. Upper jaw with a distinct notch bounded by rounded or sharp cusps; lower jaw with a cusp-like prominence on either side of, and nearly equal in length to, a strong cusp at the symphysis; tubercles on masticating surfaces of alveolar ridges very long; lines on sides of head very numerous, some of them broken to form short bars and spots; a vertical extension of orbito-mandibular stripe often extending through tympanum; outline of carapace elliptical from dorsal aspect. *texana* (Southern Texas and northeastern Mexico. Type, ANSP⁴ 246; San Antonio, Texas.⁵)
Upper jaw entire or emarginate, without cusps; lower jaw toothed at symphysis, but usually without strong auxiliary cusps; alveolar tubercles in upper jaw not extending below cutting edge; lines on sides of head usually unbroken; usually no vertical bar through tympanum 2
2. Upper jaw usually with a slight to strong median emargination; lines on top of head numerous, many of them discontinuous and connected by one to many straight or crescentic transverse bars behind sagittal line; many of the lines (usually 8 or more) on dorsal surface of neck between supra-temporal stripes sub-equal in breadth; plastron very light—often almost white—and usually with a more or less complete dusky, dendritic pattern; carapace low, flattened, short, and oblong—very strikingly so in the female *hieroglyphica* (Central Tennessee, southern Indiana, and southern Illinois to Oklahoma and central Texas. Type, ANSP 217; Cumberland River, Tennessee.)
Upper jaw not emarginate; lines on top of head mostly continuous—not broken, irregular, nor connected by adventitious branches; lines between supra-temporals (at a point above tympana) not subequal in breadth, one pair usually being much the most conspicuous, another pair (and often a single median line) less so, and a variable number of others obsolescent in adults or lacking in old specimens; ground color of plastron deeper yellow to reddish orange, or if very light, then plastral markings always absent; plastral pattern present or absent; carapace never strikingly short, oblong and low 3
3. Plastral markings absent. 4
Plastron with a rudimentary to extensive dusky figure. 5
4. Supra-temporal and para-median head stripes confluent (or nearly so) behind eye, continuing along top of head to snout as one line; lower marginals with solid, smudge-like blotches; plastron (in life) greenish-white or light greenish-yellow. . . . *peninsularis* (Peninsular Florida, from southern Marion County to Key Largo. Type, MCZ 43849; Crystal Springs, Pasco County, Florida.)
Supra-temporal and para-median head stripes separately continuous along top of head; blotches on lower marginals enclosing light areas; plastron (in life) yellow or orange-yellow *floridana* (Coastal plain from North Carolina to Alabama and northern Florida. Type apparently not in existence.)

⁴ ANSP = Academy of Natural Sciences of Philadelphia.

⁵ One paratype of *texana* (USNM 7173), from Old Fort Cobb, Oklahoma, is fairly typical *hieroglyphica*.

5. Length/height ratio, males 3.06–3.46, av. 3.26, females 2.62–3.11, av. 2.87; upper jaw not (or barely) serrate; ground color of soft parts light to dark brown; stripes on head and limbs yellow or orange, occasionally reddish; ground color of carapace brown, light markings usually extensive and conspicuous.....*concinna* (Maryland to eastern Tennessee and northern Alabama in the Piedmont. Type apparently not in existence.)
Length/height ratio, males 1.71–3.16, females 2.28–2.73, av. 2.63; ground color of head, limbs, and carapace black and upper jaw serrate, often strongly so; if upper jaw is not serrate then markings of carapace reduced, the ground color greatly predominating6
6. Ground color of carapace, limbs, and head light to dark brown, stripes and reticulations yellow, orange-yellow, or reddish; four or more lines on outer surface of fore limb; outer surface of hind limb striped; usually seven or more lines between eyes*mobiliensis*⁶ (Gulf Coast from extreme western Florida to eastern Texas. Type, ANSP 242; Mobile, Alabama.)
Ground color of carapace, limbs, and head lustrous, sooty black, stripes and reticulations light greenish-yellow; two or three lines on outer surface of fore limb; outer surface of hind limb not striped; five lines between the eyes.....*suwanniensis* (Rivers of the Gulf drainage and coastal waters in Florida from Citrus and Sumter counties to Apalachicola. Type, MZUM 81673; Suwannee River at Manatee Springs, Dixie-Levy county line.)

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⁶ It seems likely that the cusp-jawed *P. alabamensis* Baur may eventually be shown to be a mutant occurring in *mobiliensis* and *suwanniensis* (Carr, 1938). In the event that this is established, emphasis must be placed on head-stripping in distinguishing between *mobiliensis* and *texana*.