

REHABILITATION OF A HITHERTO OVERLOOKED
SPECIES OF MUSK TURTLE OF
THE SOUTHERN STATES.

By LEONHARD STEJNEGER,
Head Curator of Biology, United States National Museum.

When Holbrook, in 1842, published his splendid five-volume edition of North American Herpetology with colored plates of all the species, he knew only one species of musk turtle, namely, the one Latreille in 1802 had given the name of *Testudo odorata* on account of its musky odor and which Holbrook figured and described as *Sternotherus odoratus*. In 1856, however, J. E. Gray, in his Catalogue of Shield Reptiles in the British Museum, named the same genus *Aromochelys*, also with reference to the odor, adding at the same time a new species, *A. carinatus*, based on specimens from Louisiana. Louis Agassiz, at this very period, was writing his famous Contributions to the Natural History of the United States, but it was not until the first volume which contains the systematic treatment of the North American turtles was passing through the press that he received Gray's work, and found that his conclusions to some extent had been anticipated. In an appendix to the second volume (1857) he therefore synonymized his genera *Goniochelys* and *Ozotheca* (again a reference to the "Stinkpot," one of the favorite popular names of the musk turtle) with *Aromochelys*, and his new species *Goniochelys triquetra*, from Lake Concordia, Louisiana, with *A. carinatus*. But in addition he described two new species *Goniochelys minor* and *Ozotheca tristycha*, which, however, have not been generally accepted by herpetologists. Thus Cope, in 1875, and True, in 1883, completely ignored them. Boulenger, who did not recognize the musk turtles as a separate genus, but placed them in the genus *Kinosternon*, in his Catalogue of Chelonians in the British Museum (1883) placed *O. tristycha* in the synonymy of *Kinosternon odoratum*, and *G. minor* in that of *K. carinatum*, the latter, however, with a query. In this he was followed by Siebenrock, in his monograph of the family, 1907. The same disposition was made of these species in Stejneger and Barbour's Check List of North American Amphibians and Reptiles, published in 1917.

During that year three full-grown specimens of a musk turtle were donated to the United States National Museum by Dr. O. P. Hay, who had collected them many years before near Vicksburg, Mississippi. It was recognized, though too late to be incorporated in the Check List, that they belonged to a species of which the National Museum then did not possess any specimens. Closer examination proved them to be true *Sternotherus carinatus*, and made it clear that all the other specimens so named, which we had from Georgia and Florida, were specifically different. Having now, through the courtesy of Dr. Thomas Barbour, been able to compare our material with Agassiz's cotypes in the Museum of Comparative Zoology, it is evident that the Georgia-Florida specimens are identical with his *Goniochelys minor* and represent a very distinct species which should now be known as *Sternotherus minor* (Agassiz).

The essential differences between *S. carinatus* and *S. minor* are: 1, the flat keelless sides of *S. carinatus*, which form a nearly straight slope from the sharp central keel to the marginals, while in *S. minor* this slope is much more arched, the convexity being usually emphasized by a sharp lateral keel on each side; and 2, the absence, or rarely vestigial presence, of a gular in *S. carinatus*, while in *S. minor* it is always distinct.

An examination of the published records of the specimens attributed to *S. carinatus* resulted in the discovery that nearly all belong to *S. minor* or to the supposed southern form of *S. odoratus* known as *tristychus*, and that *S. minor* occurs principally in Georgia, Alabama, and part of Florida. The reported occurrence of *S. carinatus* in the eastern part of Tennessee¹ was therefore of particular interest, and, thanks to the courtesy of Dr. Henry Fowler, of the Philadelphia Academy Museum, I have had the opportunity of examining the specimen collected by Mr. Rhoads in the Emory River at Harriman, Roane County, Tennessee, a secondary affluent of the Tennessee River. It is unquestionably a young *S. minor* with three-keeled carapace and gular. From Mr. Rhoads's description of the specimen as having "two black bands pass back from the eye across and above tympanum and join on foreneck" it has been surmised that the specimen might rather belong to true *S. odoratus*, a striped head pattern being characteristic of the latter. But the irregularly curving dusky lines exhibited by Rhoads's specimen are entirely different from the dark transocular band, bordered above and below by a narrow well-defined yellow line, of *S. odoratus*. In fact, it is the yellow lines of the latter, not the dark lines, which are characteristic of the young *S. odoratus*, and of these there is no trace in the Emory River specimen.

¹Rhoads, Proc. Acad. Nat. Sci. Philadelphia, 1895, p. 384

But what business has *S. minor* in the upper Tennessee River when it does not occur in the lower reaches of that river nor elsewhere in the Mississippi River drainage? Two articles in *Science* (vol. 12, new series, July 27, 1900) afford a very satisfactory answer to this question. The first one,² by Hayes and Campbell, gives a condensed account of their demonstration, based on purely physiographic evidence, that the Tennessee River some time in late Miocene was captured by the Mississippi drainage, and that before that time the upper Tennessee River flowed into the Alabama River system through the Coosa River. In the second article,³ Mr. Charles T. Simpson showed that he had come to the identical conclusion on the basis of purely biologic evidence, namely the distribution of certain pearl mussels which are specifically identical in the two river systems.

It is then evident that at the time when the Tennessee River flowed directly southward from Chattanooga, and not toward the west as now, emptying into the Mississippi embayment far to the east of the mouth of the Mississippi River, the *S. minor* inhabited the upper drainage of eastern Alabama and western Georgia including the Appalachian Valley at least as far north as east central Tennessee.

We have thus not only a satisfactory explanation of the occurrence of *S. minor* in the upper Tennessee, but the evidence is pretty conclusive that this species existed in its present form as early as the late Miocene, and that the genus *Sternotherus* consequently is much older. The contrary opinion, namely, that the Kinosternons are of very recent origin, because no fossil Kinosternid has been recorded, consequently falls to the ground and proves how dangerous it is to base any conclusions upon the negative fact of no paleontological record. Moreover, the lacking paleontological evidence has recently been furnished by the find of a fossil species of *Kinosternon* in Arizona, collected by Dr. J. W. Gidley and described and figured by Mr. C. W. Gilmore, both of the National Museum.⁴

²The relation of biology to physiography, pp. 131-133.

³On the evidence of the Unionidae regarding the former courses of the Tennessee and other southern rivers, pp. 133-136.

⁴Proc. U. S. Nat. Mus., vol. 62, art. 5, 1923, pp. 1-8, pls. 1-5.