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## NOTES ON NORTH AMERICAN NAIADES. II

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## I

UNIO TENERUS Ravenel, Pl. I, figs. 1-6.

*Unio tenerus* Ravenel, Catalogue, 1834, p. 7; Conrad, Pr. A. N. S. P., VI, 1853, p. 258; H. and A. Adams, Gen. Rec. Moll., II, 1857, p. 492; Simpson, Pr. U. S. N. M., XV, 1892, p. 416, pl. LVIII, figs. 5, 8.

*Margarita (Unio) tenerus* Lea, Syn., 1836, p. 39; 1838, p. 25.

*Margaron (Unio) tenerus* Lea, Syn., 1852, p. 39; 1870, p. 44.

*Lampsilis ogeecheensis* Simpson, (*pars*) Syn., 1900, p. 551;

Desc. Cat., 1914, p. 110.

*Lampsilis modioliformis (pars)* Simpson, Syn., 1900, p. 559;

Desc. Cat., 1914, p. 135.

*Lampsilis tenerus* Mazyck, Cont. Charleston Mus., II, 1913, p. 23.

This species has had a very unfortunate history. It was never described by Ravenel. In his Catalogue of 1834, he

simply cites the name as "new?" and gives the locality as Cooper River, S. C.

Ravenel seems to have found his species in considerable abundance as there are good sets of it in both the Lea Collection in the National Museum and in the Philadelphia Academy, and Dr. James Lewis had five specimens in his collection, now in my possession, which he received from Dr. Lea.

As stated by Lea (Rectification, Rev. Ed., 1872, p. 36), having received the species from Ravenel under the MSS. name of *tenerus*, he recognized it as valid species in all of his synopses from 1836 to 1870, although no description had been published. He never described or characterized it in any way himself.

Conrad in his Synopsis of 1853 (l. c.) recognized the species as a valid one.

H. and A. Adams (l. c.) simply cite the species as a valid one in one of their groups of the Naiades.

Simpson in his Synopsis, 1900, p. 559, gives two references to Hanley's works, which I have not been able to verify.

In his paper on the Unionidae of Florida (1892, l. c.), Simpson figured two specimens from the Lea Collection as *Unio tenerus*, but gave no description. In his Synopsis (l.c.) he states that he was misled in his Florida paper by the fact that Lea had two different species in his collection under the name of "*tenerus* Rav." and that the shells there figured are *prevostianus* Lea=*ogeecheensis* Con. and placed what he considered the genuine *tenerus* under *modioliformis* Lea as a synonym. He pursued the same course in his Descriptive Catalogue of 1914.

In 1913 Mazyck (l.c.), having found two examples in the Ravenel collection, published a short description of the species and remarked: "The shell is very close to *Lampsilis ogee-*

*cheensis* Conrad (*prevostianus* Lea) and is about midway between that species and *L. modioliformis* Lea and may best be considered a variety of the former."

Through the courtesy of Mr. Mazyck I have had the opportunity of examining these specimens and have had them photographed and they are reproduced on pl. I, figs. 1-4.

While in Washington and Philadelphia in 1918 I took occasion to compare the Lewis examples with those in the National Museum and the Philadelphia Academy and found that they agreed exactly with those in these collections.

As stated by Simpson, there are two sets representing different species in the Lea Collection under the name of *tenerus* Rav. One is undoubtedly the *modioliformis* of Lea and the other is the species represented by Ravenel's own specimens and that figured by Simpson in his Florida paper.

Simpson, no doubt, was lead to change his opinion as to what was really Ravenel's *tenerus* by the fact that Lea in his synopses had placed it next to or near his *modioliformis*. But the fact that Lea distributed the other species as "*tenerus* Rav." would go to show that he considered that to be really Ravenel's species.

Both of Ravenel's specimens are females and that represented by figs. 1 and 2, being mature, may be considered as the type. It has written on the inside of the right valve in Ravenel's handwriting, "*U. tenerus* Ravenel—female." It measures: length 52, alt. 32, diam. 21 mm. It is a thin shell, smooth, yellowish-brown with darker rest-marks, deeper brown towards the beaks, faintly rayed with green; the beaks are eroded; the right valve has a thin, triangular and erect pseudo-cardinal tooth and an obsolete second one and a single lateral, low, long, thin and straight; the left valve has two pseudo-cardinals, thin, erect and nearly in the same line and two lat-

erals, thin, straight and close together; nacre bluish-white tinged with salmon towards the beak cavities and iridescent behind.

The other specimen (figs. 3-4) is also a female, about four-fifths grown and is accompanied by Ravenel's original label:

"*Unio tenerus*—distinct—Lea. Indianfield bridge between ———(illegible) and Wantoot, St. Johns, B. C., So. Car." Mr. Mazyck writes: "Wantoot is the name of the old Ravenel Plantation on the Cooper River." It measures: length 41.5, alt. 26.5, diam. 16 mm. The epidermis is a reddish-yellow and is more distinctly rayed than the type. The nacre and hinge are the same.

There are evidently considerable individual differences in coloration. All of the Lewis shells are of a greenish-yellow, distinctly rayed with dark green, the rays being more or less interrupted by the lines of growth. But both at Washington and Philadelphia there are shells similar to the Ravenel specimens as above described and also those colored like the Lewis examples.

In order to complete the exposition of the species I have added figures (figs. 5-6) of the largest male shell (No 15754, Coll. Walker) in the Lewis set. It agrees with the remainder of the set in color and in being more distinctly rayed than Ravenel's types.

As Mr. Mazyck well says (l. c.), the discovery of these shells "seems to solve all doubt concerning the species and set at rest the guess work of students of the American Naiades."

There still remains the question as to its position in the system.

It seems clear that Ravenel's name can not be retained in any event. It must be held to date from 1892 when for the first time it was correctly figured, though not described, by

Simpson. But in 1840 Lea described an entirely different species as *Unio tener*, which is now known as *Lampsilis tenera* (Simpson, Desc. Cat., p. 122). I do not find any Latin adjective as *tenerus*, but if construed as such the feminine form would be *tenera* and, therefore, could not be used either in a specific or varietal sense in *Lampsilis*, although in *Unio* the two names would undoubtedly be considered sufficiently distinct.

It hardly seems possible that *tenerus* could be construed as a word "formed by an arbitrary combination of letters (Code, Art. 8-k), but if so, Mazyck's use of *Lampsilis tenerus* might be retained either in a specific or varietal sense.

I fully agree with Mazyck that Ravenel's species "is very close to *Lampsilis ogeecheensis* Con." and "may best be considered a variety" of that species. Unfortunately our knowledge of Conrad's species is very limited. The types do not seem to be in the collection of the Philadelphia Academy and I am not aware of the existence of any authentic specimens. It is not represented at all in the Lea Collection. We are consequently restricted to the original description and figure.

Then, too, our knowledge of Lea's species, *vaughanianus* from Camden, S. C., *prevostianus* from the Etowah River, Ga., and *proximus* from "Georgia" and their relations to Conrad's species is still too imperfect to enable us to arrive at any definite conclusions at the present time. From an examination of the types I fully concur in a suggestion of Frierson's that *concausus* and *sudus* of Lea should also be included in the same category. In this general uncertainty it is impossible to fix the standing of Ravenel's species any more definitely than Mazyck has done and there seems to be no other way than to leave it for the present in that very unsatisfactory position.

Both Lea and Conrad agree in referring Conrad's *U. tene-*

*brosus* to this species and if it is the same Conrad's name would have precedence. Conrad states that he received two specimens from the Rappahannock, River, Va., and that he found a single specimen in South Carolina. He does not state from which locality his figured type came. No representatives of the species grouping around *ogecheensis* have been found as far north as the Rappahannock and as *L. radiata* Gmel. is found all through that region, Simpson's reference (Desc. Cat. 1914, p. 65) of *tenebrosus* to that species would seem to be probably correct.

## II

## LAMP SILIS MODIOLIFORMIS (Lea). Pl. II, figs. 1-4.

As the preceding species has been referred to this by Simpson (l. c.), it seems well to consider both at the same time.

The type of this species was received by Lea from Ravenel and came from the Santee Canal, S. C. Although Simpson (Desc. Cat., p. 135) extends its range from that locality "south to north Florida; probably west to Mississippi," my own experience agrees with his that "all the valid specimens I have seen are from the Santee Canal, S. C." I have examined the shells from Mississippi doubtfully cited by him as this species and am of the opinion that they should be referred to *L. vibex* Con. In his paper on the Unionidæ of Florida (Pr. U. S. N. M., XV, 1892, p. 414) Simpson referred to this species several of Lea's species and one of Wright's that he subsequently in his Synopsis and Descriptive Catalogue very properly transferred to the synonymy of *L. vibex* Con. It is possible that his retention of the extension of the range of *modioliformis* to Florida may have been a relic of his former opinion in regard to its synonymy.

Lea's figured type is an old female and the posterior ex-

pansion is more developed than in the other specimens I have seen. Figure I on plate II is of a specimen now in the Ravenel collection, kindly forwarded to me by Mr. Mazyck, and better represents the female shell as usually found. It measures: length 58, alt. 33, diam. 20 mm. It is very smooth and of a waxy appearance (which seems to be quite characteristic of the species), brownish-yellow with the rest-marks well indicated, with indistinct, broad, green rays becoming deeper towards the posterior margin; hinge very slight, much as in *L. lienosa* (Con.). Inside of the left valve is written in Ravenel's hand, "*modioliformis*."

The male shell has never been figured. Among the Ravenel shell submitted to me by Mr. Mazyck was one, on the inside of one of the valves of which Ravenel had written, "Distinct from *modioliformis*. Mr. Lea says it is *modioliformis*."

This specimen (Pl. II, figs. 2-3) agrees very exactly with those in the Lea Collection and is unquestionably the male of the species. In Ravenel's time the sexual dimorphism in the Naiades was not well understood and without that appreciation the two forms are so different that Ravenel's opinion can be easily understood.

This shell is of a dark yellowish-brown, very indistinctly rayed posteriorly; smooth, but somewhat ridged along the rest-marks; the hinge is similar to that of the female. It measures: length 53.5, alt. 27.5, diam. 19.5 mm.

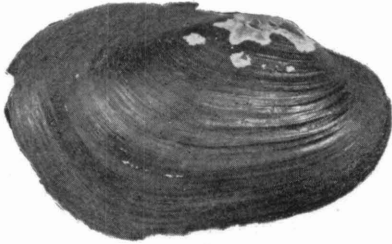
The shell figured on Pl. II, fig. 5, was received by Lea from Ravenel and by him given to Dr. Lewis and is now No. 15,753 Coll. Walker. It is apparently a female, but is more inflated than the Ravenel specimen (fig. 1) and is much less expanded posteriorly. In all other respects it is quite similar. It measures: length 54, alt. 29, diam. 22.5 mm.

Taking only the "valid" specimens into consideration,

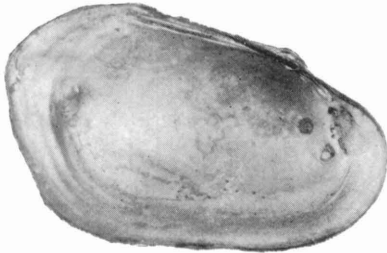
*modioliformis* is a very consistent type and fairly entitled to specific rank.

*Lampsilis delumbis* (Con.), from small streams near Cooper River, S. C., has been considered by both Lea and Conrad as being this species and there was the usual dispute between them on the question of priority. If they are the same, Conrad's name has several months priority. But Simpson (Desc. Cat., p. 52) has considered *delumbis* as distinct and placed it in another group near *L. ochracea*, and until his decision is overruled by sufficient authority that question may be considered as settled to the contrary.





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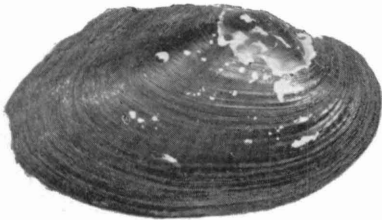
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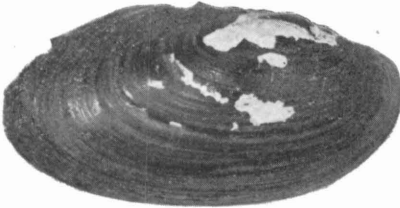




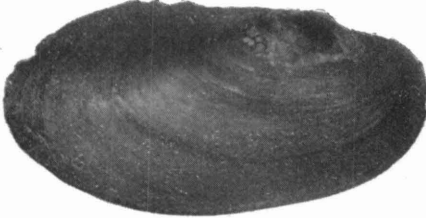
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