Call

A Revision and Synonymy of the Parvus Group of Unionidæ. (With Six Plates.) By R. Ellsworth Call.

The type of this group is a small unionine bivalve from the Fox river, Wisconsin, collected by Mr. H. R. Schoolcraft, while engaged in work on the Northwest Expedition, of the early part of the present century. The type was described by Mr. D. H. Barnes, in 1823, in the following words:*

"Shell oblong-ovate, small, convex, sides rounded; beaks slightly elevated, inside pearly white, iridescent. * * * *

"Diameter, .35—.525; length, .4 - .6; breath, .75—1.2.

"Shell rather thin, beaks placed about one-fourth of the length from the posterior extremity, ligament very narrow, anterior lunule distinct and obsoletely ribbed; basal margin slightly shortened; epidermis brownish; an obtuse, slightly elevated rib from the beaks to the anterior basal margin; lateral tooth rectilinear rounded at the end, and parallel to the base; nacre very brilliant."

Mr. Barnes completes his diagnosis of this form with the remark that it is "the smallest and most beautiful of all the genus yet discovered in America."

In geographic distribution this small mollusk ranges from Western New York and Florida, to Minnesota, Texas and Arkansas. In this wide range there are numerous diverse environmental conditions, and the species appears, in a definite sense, to have responded to these, and thus have been produced a number of variations, which passing through the hands of different naturalists, have been elevated into specific rank. In some cases, indicated below, the sexes have been made to serve as the basis of new species; full series collected over the wide area of distribution confirm the following synonymy, in which the geographic distribution of several of the forms conveys its own argument:

†Unio parvus Barnes.

Am. Jour. of Sci and Arts, 1st series. Vol. vi, 1823, p. 274, Fig. 18; Lea figures the animal in Jour. Phila. Acad. Nat. Sci., 2d series, Vol. iv, Pl. xxix, Figs. 102, 102a; Conrad, Monography of Unio, 1836, Pl. ix, Fig. 1; Reeve, Conchologia Iconica, Vol. xvi, *Unio* Pl. xxxv, Fig. 186, a very poor figure from a specimen in the Museum Cuming. (Pl. i, Figs. 1-3.)

Unio paulus Lea. Trans. Am. Philos. Soc., Vol. viii, 1840, p. 213, Pl. xv, Fig. 29. From the Chattahoochee river, Georgia. (Pl. ii, Figs. 11-13.)

Unio minor Lea. Trans. Am. Philos. Soc., Vol. ix, 1843, p. 276, Pl. xxxix, Fig. 3. From Lakes Monroe and George, Florida.

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* American Jour. of Sci., 1st Ser., Vol. VI, No. 2, p. 274, pl. 13, fig. 18, *outline only*.

† The plate references in parentheses are to the several plates accompanying this article. The sexes are indicated on the plates.

Unio marginis Lea. Jour. Acad. Nat. Sci. Phila., 2d series, Vol. vi, p. 255, 1868, Pl. xxxi, Fig. 69. From Dougherty county, Georgia. (Pl. ii, Figs. 7-9.)

Unio corvinus Lea. Jour. Acad. Nat. Sci. Phila., 2d series, Vol. vi, 1868, p. 310, Pl. xlviii, Fig. 123. From Flint river, Georgia, and Neuse river, North Carolina. (Pl. i, Figs. 4-6.)

Unio vesicularis Lea. Jour. Acad. Nat. Sci. Phila., 2d series, Vol. viii, 1874, p. 37, Pl. xii, Fig. 34. From Lake Ocheechobee, Florida. (Pl. v. Figs. 35-37.)

So few of the animals of the *Unionidæ* have been described that it may not be superfluous to give at this place a description of the animal of *Unio parvus* (plate ii, fig. 10), based upon the examination of a fresh specimen from the Des Moines river in Central Iowa.

Animal of *Unio parvus*. Color of the mass, whitish; tentacular portion of mantle, dark brown, ending in a caruncle; labial palps, large, white, triangular, united at base and partially so over the posterior margin; external ctenidium, smaller than the internal, thicker and larger at the posterior extremity, which is rounded, and on the margin, which is marked by a double row of minute, white papillæ; ctenidia united above throughout their entire length, free below; internal ctenidium, white, ovate.

The mass of the animal within the cavity of the beak is light brown owing to the color of the large liver which shows through the thin tissues separating it from the chamber of the ctenidia.

The chief anatomical peculiarity *is the presence of the caruncle in the female*. This is somewhat separated from the main tentacular mass and is supported by a slender pedicel. Its function is unknown.

To complete the history of this species the following redescription of the shell of *Unio parvus* is presented, based upon specimens collected in the Wabash River, Indiana:

Shell, small, compressed, rather thin, elliptical, rounded anteriorly and slightly thicker, posteriorly triangulate in the male and occasionally sulcate in the female, thinner; *umbonal* slope somewhat depressed; *umbones* rather prominent, with four to five coarse undulations; *epidermis*, thin, olive-green over most of disk, but much lighter on the umbones, striate, especially over the middle disk thence to the margin; in the young two broadening green bands often extend from the umbones over the posterior slope to the posterior margin, otherwise eradiate; *ligament* small, light brown in color, thin, rather long, but very narrow; *hinge teeth* small, all double in the left and single in the right valve, the *cardinals* erect, thin, lamellar, acuminate, crenulate, separating, the *laterals* long, lamellar, straight, smooth, forming a very obtuse angle w
distinct, deep, that of the *protractor* ;
scarcely evident, confluent; *pallial line*
cicatrices irregularly grouped in the
nacre white, iridescent posteriorly.

	Length.	*He*
No. 1.	42.00 mm.	26.0
No. 2.	36.30 mm.	27.5
No. 3.	*36.10 mm.	18.0

Unio texasensis Lea.

Proc. Acad. Nat. Sci. Phila, V
Phila., Vol. iv, pp. 357, 359, 362, I
Genus Unio, Vol. viii, p. 39, Pl. 1
Co., Texas.

Unio bairdianus Lea. Proc. Ac
Jour. Acad. Nat. Sci., Vol. iv, pp.
tions on the *Genus Unio*, Vol. viii, p
Devil's River, Texas.

Unio bealii Lea. Jour. Acad.
Fig. 273, 1866; Observations on the
273 (Pl. vi, Figs. 44-46). Leon Cou

The conchologic characters of thi
the species only comes from Texas, an

The following description may a
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Shell small, very elliptical, espec
rounded before, biangulate posterior
the female, which is somewhat regu
though somewhat thickened anteriorl
young specimens with occasional rath
the posterior umbonal slope; lines of
in old specimens often forming raised
ligament long, smooth, light horn c
scarcely prominent, close together,
being concentrically arranged as see

*This is a large male specimen from
teeth are *double in both valves*; the posterio
very long and thin, its edges are sharply se

smooth, forming a very obtuse angle with the cardinals; *anterior adductor cicatrices* distinct, deep, that of the *protractor pedis* very small; *posterior adductor cicatrix* scarcely evident, confluent; *pallial line* distinct for the anterior two-thirds; *dorsal cicatrices* irregularly grouped in the rather large cavity of the beaks, minute; nacre white, iridescent posteriorly.

	Length.	*Height.*	*Width.*	
No. 1.	42.00 mm.	26.00 mm.	23.00 mm.	Female.
No. 2.	36.30 mm.	27.57 mm.	19.25 mm.	Female.
No. 3.	*36.10 mm.	18.00 mm.	14.60 mm.	Male.

UNIO TEXASENSIS Lea.

Proc. Acad. Nat. Sci. Phila, Vol. ix, p. 84, 1857; Jour. Acad. Nat. Sci. Phila., Vol. iv, pp. 357, 359, 362, Pl. lxi, Fig. 184, 1860; Observations on the *Genus Unio*, Vol. viii, p. 39, Pl. lxi, Fig. 184 (Pl. v, Figs. 38-40). Dewitt Co., Texas.

Unio bairdianus Lea. Proc. Acad. Nat. Sci. Phila., Vol. ix, p. 102, 1857; Jour. Acad. Nat. Sci., Vol. iv, pp. 360, 361, Pl. lxi, Fig. 186, 1860; Observations on the *Genus Unio*, Vol. viii, p. 42, Pl. lxi, Fig. 186 (Pl. vi, Figs. 41-43). Devil's River, Texas.

Unio bealii Lea. Jour. Acad. Nat. Sci. Phila., Vol. v, p. 204, Pl. xxx, Fig. 273, 1866; Observations on the *Genus Unio*, Vol. ix, p. 26, Pl. xxx, Fig. 273; Pl. vi, Figs. 44-46). Leon County and Rutersville, Texas.

The conchologic characters of this form do not widely vary. As may be seen the species only comes from Texas, and contiguous portions of Louisiana.

The following description may assist in understanding the relation which this form sustains to the common and widely distributed type of the group.

Shell small, very elliptical, especially in the female, compressed laterally, rounded before, biangulate posteriorly though this character is less marked in the female, which is somewhat regularly rounded, striate; valves rather thin though somewhat thickened anteriorly; epidermis rather thick, olive-green, in young specimens with occasional rather broad greenish lines along the angles of the posterior umbonal slope; lines of growth numerous, fine and closely arranged, in old specimens often forming raised ridges along the ventral posterior margins; ligament long, smooth, light horn colored and shining, very narrow; umbones scarcely prominent, close together, rather coarsely undulate, the undulations being concentrically arranged as seen in young specimens; in the young the

*This is a large male specimen from the Wabash River, Indiana. In it the cardinal teeth are *double in both valves*; the posterior cardinal in the left valve is curved *dorsad* and is very long and thin, its edges are sharply serrate.

epidermis over the umbones is very light or straw-yellow in color; the dorsal aspect of the posterior umbonal slope is characterized by the presence of two rather indistinct and obtuse angles which extend from the umbones and, reaching the posterior margin, form the characteristic biangulation seen in the male: *cardinal* teeth short, acuminate, single in the right and double in the left valve, the single tooth being flattened and plate-like, the double tooth somewhat more trigonal and heavier, all crenulated on the margins; the posterior teeth are long, slightly curved, and lamellar; plate between the cardinal and posterior teeth scarcely evident; the anterior adductor cicatrices are large, and deeply impressed, entirely distinct from that of the *protractor pedis* impression which is deep and often pit-like; the posterior cicatrices are confluent, scarcely evident, that of the *retractor pedis* muscle being placed at extreme end of the posterior hinge teeth: dorsal cicatrices arranged, usually, in a line of five or more in the shallow cavity of the umbones, though in an occasional specimen they are grouped: the pallial cicatrix is faintly but regularly impressed throughout its entire length; nacre white, with tendency to salmon in the cavity of the umbones, beautifully iridescent posteriorly.

The four specimens on which this diagnosis is based are from Lake Caddo, Louisiana. Their dimensions are the following, the first being that of a female: comparison with the remaining three will evidence the more compressed character of the male shell:

	No. 1.	No. 2.	No. 3.	No. 4.
*Length	40.00 mm.	36.50 mm.	39.50 mm.	38.50 mm.
Height	24.00 mm.	20.00 mm.	22.00 mm.	21.50 mm.
Breadth	18.51 mm.	14.50 mm.	14.50 mm.	13.00 mm.

The habits of this form are quite similar to those of the type of the group. It delights in still water with muddy bottoms, and usually occurs in very great numbers wherever it is found at all.

As may be seen by comparing the figures given in the plates, which are copies of Lea's original figures, this form illustrates the erection of a species name upon characters that are but an expression of sex.

*The anatomy of the animal has been considered, rather than authority, in the terminology adopted. Thus the *length* is the extreme distance from the anterior to posterior margin; the height the distance from ligament to the ventral margin; the width the distance measured by a line drawn through the animal, transversely, from valve to valve. This appears both natural and satisfactory. Say, Kirtland, Barnes, Sowerby and others with them confused the anterior and posterior ends; Lea did not make this blunder, but made others equally reasonless. Thus the distance from valve to valve he calls the *heighth*, as if the normal or proper position of the animal was on one of its valves. Some later writers apparently have such reverence for these blunders that they still employ an obsolete terminology.

UNIO GLANS Lea.

Trans. Am. Philos. Soc.
tions on the *Genus Unio*, V
Figs. 14–16).

Unio pullus Conrad. M
Fig. 2, 1836. Waterce Rive

Unio grandatus Lea. P
Jour. Acad. Nat. Sci. Phil
tions on the *Genus Unio*. Vo
Alabama (Pl. iv. Figs. 23–2

Unio germanus Lea. P
Jour. Acad. Nat. Sci. Phila
tions on the *Genus Unio*. '
bama (Pl. iv. Figs. 26–28).

Unio cromwellii Lea. I
Jour. Acad. Nat. Sci. Phi
vations on the *Genus Unio*,
Albany, Georgia (Pl. iv. F

Unio cylindrellus Lea.
xlviii, Fig. 121, 1868; Ob
xlviii, Fig. 121. East Te
Figs. 17–19).

Unio corrugatus Lea.
Fig. 127, 1868; Observatio
Swamp Creek, Whitfield C

The following concholo
White River, Indiana, where
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Shell small, elliptical, st
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dark greenish, obscurely ra
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female, dorsal portion produ
and posterior *hinge teeth* dou
dinals short, thick, heavy, s

UNIO GLANS Lea.

Trans. Am. Philos. Soc., Vol. iv, p. 82, Pl. viii, Fig. 12, 1830; Observations on the *Genus Unio*, Vol. i, p. 92, Pl. viii, Fig. 12. Ohio River (Pl. iii, Figs. 14–16).

Unio pullus Conrad. Monography Family *Unionidæ*, pp. 100, 101, Pl. lv, Fig. 2, 1836. Wateree River, South Carolina (Pl. v, Figs. 32–34).

Unio granulatus Lea. Proc. Acad. Nat. Sci. Phila., Vol. xiii, p. 60, 1861; Jour. Acad. Nat. Sci. Phila., Vol. vi, p. 48, Pl. xvi, Fig. 46, 1866; Observations on the *Genus Unio*, Vol. xi, p. 52, Pl. xvi, Fig 46. Big Prairie Creek, Alabama (Pl. iv, Figs. 23–25).

Unio germanus Lea. Proc. Acad. Nat. Sci. Phila., Vol. xiii, p. 40, 1861; Jour. Acad. Nat. Sci. Phila., Vol. vi, p. 49, Pl. xix, Fig. 54, 1866; Observations on the *Genus Unio*, Vol. xi, p. 53, Pl. xix, Fig. 54. Coosa River, Alabama (Pl. iv, Figs. 26–28).

Unio cromwellii Lea. Proc. Acad. Nat. Sci. Phila., Vol. xvii, p. 89, 1865; Jour. Acad. Nat. Sci. Phila., Vol. vi, p. 258, Pl. xxxi, Fig. 73, 1868; Observations on the *Genus Unio*, Vol. xii, p. 18, Pl. xxxi, Fig. 73. Kiokee Creek, Albany, Georgia (Pl. iv, Figs. 29–31).

Unio cylindrellus Lea. Jour. Acad. Nat. Sci. Phila., Vol. vi, p. 308, Pl. xlviii, Fig. 121, 1868; Observations on the *Genus Unio*, Vol. xii, p. 68, Pl. xlviii, Fig. 121. East Tennessee, North Georgia, North Alabama (Pl. iii, Figs. 17–19).

Unio carruncula Lea. Jour. Acad. Nat. Sci. Phila., Vol. vi, p. 314, Pl. l, Fig. 127, 1868; Observations on the *Genus Unio*, Vol. xii, p. 74, Pl. l, Fig. 127. Swamp Creek, Whitfield County, Georgia (Pl. iii, Figs. 20–22).

The following conchologic description is based upon material taken in the White River, Indiana, where the species attains its maximum development, both in point of size and abundance.

Shell small, elliptical, striate, rather thick and subangulate posteriorly, much thicker anteriorly and rounded; *umbones* elevated, coarsely undulate, with irregularly crescent-shaped folds, three or four in number; epidermis rather thick, dark greenish, obscurely radiate over the anterior portion of the disk, a character best seen by transmitted light, somewhat polished over the umbonal slope and generally glossy, lighter colored on the umbones; posterior margin sulcate in the female, dorsal portion produced; *ligament* small, horn-colored, thin; both cardinal and posterior *hinge teeth* double in the left and single in the right valve, the *cardinals* short, thick, heavy, serrate; *laterals* rather long, striate, straight, lamellar;

anterior adductor cicatrices distinct, pit-like and deep; *posterior adductor cicatrices* shallow, confluent, that of the *retractor pedis* muscle impressed at tip of the laterals and below; *palliat cicatrix* evident, regularly impressed and linear; *dorsal cicatrices* several, crowded, in the deep cavity of the umbones or on the margin of the plate joining the hinge teeth; *cavity* of the umbones rather deep; nacre purple, with anterior margin usually white, whole posterior region beautifully iridescent.

Number.	Length.	Height.	Breadth.	Sex.
1	34.40 mm.	22.10 mm.	19.51 mm.	Female.
2	28.00 mm.	20.00 mm.	16.12 mm.	Female.
3	28.50 mm.	20.20 mm.	17.00 mm.	Female.
4	37.10 mm.	22.32 mm.	17.24 mm.	Male.
5	37.56 mm.	23.44 mm.	18.50 mm.	Male.
6	33.00 mm.	21.50 mm.	16.88 mm.	Male.
7	30.28 mm.	20.10 mm.	16.50 mm.	Female.
8	34.60 mm.	22.92 mm.	17.10 mm.	Male.

Some interesting features connected with the comparative dimensions of the sexes may be shown from this table of measurements. If the two longest males be selected the ratio of length to height is $\frac{37.56}{23.44} = 1.60 +$ and $\frac{37.10}{22.32} = 1.66$. In these same shells the ratio of length to width is as follows: $\frac{37.56}{18.50} = 2.00$ and $\frac{37.10}{17.24} = 2.15$.

A comparison of the same dimensions for the two longest females develops the following ratios: $\frac{34.40}{22.10} = 1.55$ and $\frac{30.28}{20.10} = 1.50$. Comparing the lengths with the widths the ratio established is $\frac{34.40}{19.51} = 1.76 +$ and $\frac{30.28}{16.50} = 1.83$. The ratios show that the females are much wider than the males, a relation probably due to the requirements of the *ctenidia* of the female shells when functioning as gestatory sacs. So marked, even to casual observation, are these relations that it is an easy matter to select the sexes in any considerable number of shells.

The habits of *Unio glans* are somewhat different from those of *Unio parvus*. It more commonly affects gravelly beds, in shallow running water. The writer has taken the *corvuculus* form in great abundance in the typical locality, whence it was traced into nearly all the streams of north Georgia and Alabama, in the Gulf drainage. The *cylindrellus* form is very abundant in the smaller streams of

south Tennessee and in the
largest and *glans* like forms fr
to the Alabama, just above W
the Cahaba River, in Bibb Co

Unio amgdalum Lea.

Observations on the G
from Lake George, Florida
1, pp. 275, 276. See also S
Nat. Mus. Vol. XV. pl. L
Unio pappyraceus Gould
Florida. Latin diagnosis;

The following description
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Shell small, striate, som
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epidermis striate, light straw
near the ventral margin, fain
characteristic of all the *parv*
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protractor pedis rather large, c
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low, with a row of pit-like
nacre white, pinkish or salmo
iridescent over the entire po
marked on the posterior mar
impressed.

The average dimensions
1.82 mm.

Some specimens of this s
cardinals are much heavier
thicker; in these forms also

south Tennessee and in the Black Warrior River of Alabama. The heaviest, largest and *glans* like forms from the south occur in the Coosa River, a tributary to the Alabama, just above Wetumpka. Similar shells were taken in numbers in the Cahaba River, in Bibb County, also tributary to the Alabama.

UNIO AMGDALUM Lea.

Observations on the Genus Unio, Vol. IV, p. 33, pl. XXXIX, fig. 1, 1843, from Lake George, Florida; Trans. Am. Phil. Soc., 2d Ser., Vol. IX, pl. 39, fig. 1, pp. 275, 276. See also Simpson, "Notes on Florida Unionidæ," Proc. U. S. Nat. Mus. Vol. XV, pl. LXVII, fig. 3, p. 426, 1892.

Unio pappyaceus Gould. Proc. Bost. Soc. Nat. Hist., Vol. II, p. 53, 1845. Florida. Latin diagnosis; no figure.

The following description of *Unio amgdalum* is based upon excellent specimens from the original locality.

Shell small, striate, somewhat inflated, nearly oval in outline, rounded before, subangular posteriorly, viewed dorsally the outline is rounded cuneate posterior to the umbones, female slightly emarginate on the ventral border; epidermis striate, light straw colored over the disk, greenish to greenish-yellow near the ventral margin, faintly rayed on the posterior dorsal slope in the manner characteristic of all the *parvus* group; ligament short, thin, light horn-colored; lines of growth distinct, broad, and much darker than the balance of the disk; anterior or cardinal teeth double in the left and single in the right valve, though an occasional specimen exhibits a tendency to double teeth in both valves, flattened, plate-like, crenate; posterior teeth double in the left and single in the right valve, long, lamellar, straight, striate, particularly toward the extremities; anterior cicatrices distinct, the adductor rather deeper or impressed, that of the *protractor pedis* rather large, oval, but slightly impressed; posterior cicatrices confluent, scarcely impressed, very iridescent; cavity of the beaks rounded and shallow, with a row of pit-like and minute cicatrices just under the dorsal plate; nacre white, pinkish or salmon tinged towards the cavity of the beaks, beautifully iridescent over the entire posterior half, but the play of iris-like colors is most marked on the posterior margin beyond the pallial cicatrix, which is very faintly impressed.

The average dimensions are: Length, 3.1 mm.; width, 1.22 mm.; heighth, 1.82 mm.

Some specimens of this shell approach the form of *Unio minor* Lea in that the cardinals are much heavier than usual and the substance of the shell is much thicker; in these forms also the posterior teeth are inerassate. The *tout ensemble*

of this shell is in no respect dissimilar from forms of *Unio parvus* found in gravelly river bottoms in more northern regions, and it is very doubtful if it can maintain a place in the system as a separate or distinct species. The species belongs to the *parvus* group without a question, though the specimens under examination are eroded and do not exhibit the characteristic coarse undulations on the umbones. In all other particulars my shells are typical.

To complete the history of these small and difficult forms the original diagnoses of Lea, except one, and Conrad have been tabulated and thrown into synoptical form as follows:

SYNOPSIS OF THE SPECIFIC CHARACTERS OF THE PARVUS GROUP.

UNIO.	PARVUS.	CORVINUS.	MARGINS.	PAELUS.	GLASS.	CYLINDRELUS.	CHOWANUS.	GRANULATUS.
Outline	Elliptical, somewhat compressed.	Elliptical, inflated.	Elliptical, inflated.	Elliptical, inflated.	Ovate-elliptical, inflated.	Wholly elliptical, somewhat cylindrical.	Elliptical, somewhat inflated.	Elliptical, somewhat inflated.
Substance of shell	Thin, slightly thicker before.	Somewhat thick, thicker before.	Somewhat thick, thicker before.	Thick, thinner behind.	Rather thick.	Thick, thicker before.	Rather thin, thicker before.	Rather thin, slightly thicker before.
Beaks	Slightly prominent, coarsely and concentrically wrinkled.	A little prominent.	Somewhat prominent.	Somewhat prominent.	Somewhat prominent.	Slightly prominent.	Somewhat prominently, concentrically folded.	A little prominent, undulate, granulate.
Ligament	Small, thin, light green, widened	Short, thin, very dark brown	Small, thin, light brown.	Short, thin.	Small.	Rather long, thin.	Small, thin, rather light brown.	Small, thin, light brown.

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The species belongs to the
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SYNOPSIS OF THE SPECIFIC CHARACTERS OF THE PARVUS GROUP.

UNIO.	PARVUS.	CORVINUS.	MARGINIS.	PAULUS.	GLANS.	CYLINDRELLUS.	CROMWELLII.	GRANULATUS.
Outline	Elliptical, somewhat compressed.	Elliptical, inflated.	Elliptical, inflated.	Elliptical, inflated.	Ovate-elliptical, inflated.	Widely elliptical, somewhat cylindrical.	Elliptical, somewhat inflated.	Elliptical, somewhat inflated.
Substance of shell	Thin, slightly thicker before.	Somewhat thick, thicker before.	Somewhat thick, thicker before.	Thick, thinner behind.	Rather thick.	Thick, thicker before.	Rather thin, thicker before.	Rather thin, slightly thicker before.
Beaks	Slightly prominent, coarsely and concentrically wrinkled.	A little prominent.	Somewhat prominent.	Somewhat prominent.	Somewhat prominent.	Slightly prominent.	Somewhat prominent: concentrically folded.	A little prominent, undulate, granulate.
Ligament	Small, thin, light straw-colored.	Short, thin, very dark brown.	Small, thin, light brown.	Short, thin.	Small.	Rather long, thin.	Small, thin, rather light brown.	Small, thin, light brown.
Epidermis	Yellowish green, lighter on beaks, striated, lines of growth distant, black.	Black, eradiate, subsquamose, growth lines close.	Dark olive striate, obscurely rayed, margin greenish-yellow.	Nearly black.	Black or dark brown, sometimes rayed.	Yellowish, eradiate, lines of growth distant.	Striate, brownish or greenish rayed, growth lines distant, broad.	Dark olive, eradiate, striate, lines of growth distant.
Cardinal teeth	Small, elevated, acuminate, crenulate, double in the left, single in the right valve.	Small, decussate.	Small, sulcate, crenulate.	Small, disposed to be double in both valves.	Rather large, elevated, double in left, single in right valve.	Small, sub-conical, corrugate.	Small, compressed, corrugate, double in both valves.	Small, compressed, crenulate, oblique, double in both valves.
Lateral teeth	Slightly curved, long, lamellar.	Long, somewhat straight.	Rather short, straight.	Long, curved.	Straight, lamelliform.	Long, somewhat curved.	Rather long, somewhat curved.	Long, acicular nearly straight.
Anterior cicatrices	Distinct, moderately impressed.	Distinct, small, well-impressed.	Confluent, small, deeply impres'd.	Distinct.	Distinct.	Distinct, small, well impressed.	Scarcely distinct, large, well imp.	Distinct, rather large, well imp.
Posterior cicatrices	Confluent, slightly impressed.	Confluent, slightly impressed.	Confluent, small, slightly imp.	Confluent.	Confluent.	Distinct, small, slightly imp.	Confluent, rather large, slightly im.	Confluent, rather large, slightly im.
Dorsal cicatrices	Center of cavity of the beaks.	Center of cavity of the beaks.	Center of cavity of shell [beaks].	On inferior part of tooth.	Center of cavity of the beaks.	Center of the cavity of the shell.	Center of cavity of the beaks.	Center of cavity of the beaks.
Cavity of shell	Shallow, white.	Deep, wide.	Rather shallow.	Deep.	* * * *	Deep, wide.	Deep, wide.	Deep, wide.
Cavity of beak	Shallow, rounded.	Shallow, obtusely angular.	Shallow, rounded.	Very small.	Wide, subangulated.	Rather deep, subangular.	Small, obtusely angular.	Shallow, subangular.
Nacre	White, inclined to salmon in cavity of beaks.	White, iridescent.	White, iridescent.	White, iridescent.	Purple.	Purple, iridescent.	Purple, iridescent.	Purplish, iridescent.
Habitat	Ohio river.	Flint River, Ga. Neuse River, N. C.	Dougherty Co., Ga.	Chattahoochee River, Ga.	Ohio River.	E. Tennessee, N. Ga., N. Ala.	Kiokee Creek, Albany, Ga.	Big Prairie Creek, Ala.
Width	0.6 inch.	0.7 inch.	0.5 inch.	0.4 inch.	0.7 inch.	0.7 inch.	0.4 inch.	0.45 inch.
Height	0.8 inch.	0.8 inch.	1.0 inch.	0.6 inch.	0.8 inch.	0.8 inch.	0.7 inch.	0.62 inch.
Length	1.6 inch.	1.3 inch.	1.1 inch.	0.9 inch.	1.3 inch.	1.5 inch.	1.1 inch.	1.10 inch.

SYNOPSIS OF THE SPECIFIC CHARACTERS OF THE PARVUS GROUP.

GERMANUS.	CORVUNCULUS.	PULLUS.	VESICULARIS.	TEXASENSIS.	RAIRDIANUS.	BEADII.	MINOR.
Elliptical, somewhat inflated.	Elliptical, somewhat inflated.	Elliptical, somewhat inflated.	Elliptical, inflated.	Elliptical, sub-compressed.	Elliptical, slightly inflated.	Elliptical, somewhat compressed.	Elliptical, rather inflated.
Somewhat thick, thicker before.	A little thick, thicker before.	* * * *	A little thick, thicker before.	Rather thin, thicker before.	Rather thin, thicker before.	Slightly thickened, thicker before.	Thick, thinner behind.
Rather prominent, concentrically undulate.	A little prominent, concentrically undulate.	Slightly prominent.	Slightly prominent.	Slightly prominent, sub-concentrically undulate.	Slightly prominent, concentrically undulate.	A little prominent.	Rather prominent.
Short, thin, lightish brown.	Short, thin, brown.	* * * *	Rather long and thin.	Small, thin, yellowish-brown.	Small, thin, yellowish-brown.	Short, thin, dark brown.	Short, thin.
Dark brown, radiate, transversely striate.	Blackish, radiate; lines of growth distant.	Dark, olivaceous, wrinkled.	Dark olive, obscurely rayed, growth marks distant.	Dark olive, shining, obsoletely rayed, marks of growth distant.	Dark brown, obsoletely radiate, growth lines distant.	Dark brown or blackish, obscurely radiate, marks of growth distant.	Striate, nearly black.
Small, erect, compressed, crenulate, acuminate.	Small, erect, compressed, crenulate.	Oblique, single in one, double in the other valve.	Small, sulcate, somewhat compressed, double in both valves.	Small, erect, crenulate.	Small, erect, acuminate, crenulate, double in both valves.	Small, compressed, crenulate, pointed, double in both valves.	Rather large.
Thin, somewhat curved.	Rather long, slightly curved.	* * * *	Rather long, lamellar, nearly straight.	Long, lamellar, somewhat curved.	Long, lamellar, somewhat curved.	Very long, slightly curved, lamellar.	Small, curved.
Distinct, small, well impressed.	Distinct, small, well impressed.	* * * *	Distinct, small, well impressed	Distinct, small, well impressed	Distinct, small, somewhat impressed.	Distinct, rather large, moderately impressed.	Distinct.
Confluent, slightly impressed.	* * * *	* * * *	Confluent, rather large, moderately impressed.	Confluent, slightly impressed.	Confluent, slightly impressed.	Confluent, slightly impressed.	Confluent.
Center of cavity of beaks.	Center of cavity of the beaks.	* * * *	Center of cavity of the beaks.	Across the cavity of the beaks.	Across the cavity of the beaks.	Across center of cavity of the beaks.	Center of cavity of the beaks.
Rather deep, wide.	Deep, wide.	Very capacious.	Deep, wide.	Somewhat deep, wide.	Small, wide.	Shallow, wide.	Deep.
Shallow, obtusely angular.	Shallow, obtusely angular.	Very capacious.	Shallow, obtusely angular.	Shallow, obtusely angular.	Shallow, obtusely angular.	Shallow, obtusely angular.	Rather deep, angular.
Purplish, iridescent.	Purple, iridescent.	Chocolate purple.	Whitish, iridescent.	Bluish, very iridescent.	White, very iridescent.	White or pale salmon, iridescent.	Pearly white, iridescent.
Coosa River, Ala.	Swamp Creek, Whitfield Co., Ga.	Wateree River, S. C., Warm Spa, N. C.	Lake Ocheeshobee, Fla.	DeWitt Co., Texas.	Devil's River, Texas.	Leon Co. and Rutersville, Texas.	Lakes Monroe and George, Fla.
0.55 inch.	0.5 inch.	* * * *	0.5 inch.	0.5 inch.	0.4 inch.	0.6 inch.	0.4 inch.
0.82 inch.	0.7 inch.	* * * *	0.7 inch.	0.8 inch.	0.7 inch.	1.0 inch.	0.6 inch.
1.40 inch.	1.2 inch.	* * * *	1.3 inch.	1.4 inch.	1.2 inch.	1.7 inch.	0.9 inch.

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427, pl. LXVIII, figs. 4, 5
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ADDITIONAL NOTE.

Since the work on this group of Unios was completed I have had the opportunity to re-examine a carefully prepared paper by Mr. Chas. T. Simpson on the "Unionidæ of Florida." I must dissent from some of the conclusions Mr. Simpson reaches, though in the main he is, beyond question, correct. That author places *Unio lepidus* Gould and *Unio trossulus* Lea in the *parvus* group. Both these shells are here out of place. *Unio trossulus* has the fine concentric undulations on the umbones which are so characteristic of many Unios typified by *Unio fallax*, *Unio lienosus et cetera*. Both Lea's figure and his description do not permit that this form go into the present group. The character of the radiation, as given by Mr. Simpson in his very poor outline figure of *Unio lepidus* places it elsewhere, for if there is any such thing as a characteristic in the *parvus* group its radiation, when present, is very remarkable and quite uniform. There is no doubt that *Unio trossulus* and *Unio lepidus* are synonyms. The paper of Mr. Simpson is to be commended as marking a distinct advance in the study of the southern representatives of this great family. It appeared in volume XV of the Proceedings of the United States National Museum, 1892, and should be in the hands of every student of *Unio*.

The proofs of this article reached me when consultation of my library on one or two points suggested by careful re-reading was impossible. The synonymy of *Unio parvus* should have included the following:

Unio singleyanus Marsh. Ephemerally described in the Joliet Weekly, a newspaper of Illinois, May, 1891. See also the "Nautilus," Vol. V, p. 29; Simpson, "Notes on Florida Unionidæ," Proc. U. S. Nat. Mus., Vol. XV, pp. 426, 427, pl. LXVIII, figs. 4, 5 (1892). Without doubt a synonym for Lea's *Unio marginis*, itself a southeastern representative of *Unio parvus*.