

MONOGRAPH OF THE FLUVIATILE BIVALVE SHELLS OF THE OHIO RIVER,
CONTAINING TWELVE GENERA AND SIXTY-EIGHT SPECIES

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A NEW TRANSLATION BY AURÈLE LA ROCQUE OF THE
MONOGRAPHIE DES COQUILLES BIVALVES FLUVIATILES DE LA RIVIÈRE OHIO. CONTENANT DOUZE
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TRANSLATOR'S FOREWORD

The "Monographie" is one of Rafinesque's major contributions to North American malacology. It has been translated more than a century ago by C. A. Poulson (1832), without the plates, and with a frontispiece of *U. verucosus* Raf. as noted by Binney (1863, *Smiths. Misc. Coll.*, vol. 5, art. 1, p. 1) but the translation has been criticized as inaccurate from time to time and it has become rather scarce. I have made the following translation purposely without reference to Poulson's in order to test the validity of the criticism. In the work of translating, I have endeavored to be scrupulously faithful to the original, without trying to

polish the English more than necessary. If the reader gains the impression that Rafinesque's style was clumsy, I must enter an emphatic disclaimer here. On the contrary, it is as polished, clear, and elegant as that of any French scientist of his day and remarkably free of the flowers of rhetoric which were then fashionable. I emphasize that any clumsiness of style is due to an effort on my part not to depart too greatly from Rafinesque's meaning in order to construct an idiomatic sentence. The reader may judge for himself of the relative accuracy of the two translations. Page numbers in parentheses are those of the original.

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The numerous fluviatile and terrestrial shells of the interior of North America had not yet been observed and described when I undertook this work in 1818 and 1819. I was surprised and delighted to discover that they were almost all new species, and totally different from those which inhabit the

Atlantic lands; so that it seems that the Alleghany Mountain chain, which separates the two regions, also constitutes a line of demarkation between the fishes and the shells of Ohio Basin waters, and those which flow into the Atlantic Ocean. Although I am far from having exhausted the study of the shells of this region, I have nevertheless already observed, collected and figured

there some 180 species, of which about 70 are fluviatile univalves, 50 terrestrial univalves and 60 fluviatile bivalves. It is the latter which I shall make known in this monograph. The univalves will be described elsewhere; I have already published many and particularly the new genera in my *Prodrome* of new animals of North America.

The greater part of the bivalves of the Ohio are found in most of the rivers that flow into it, such as the Kentucky, Cumberland, Tennessee, Wabash, Miami, Green, Scioto, Licking, Muskingum, Kenhaway, etc. of which many are rivers of considerable size of 5 to 800 miles in

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length (or 2 to 300 leagues). It remains to be seen if they are common to the entire Mississippi Basin, and to the Missouri, Arkansas, etc. I am already sure that a few of them are found there, and it seems probable to me that the shells of this immense basin must be similar, although many particular species may later be discovered in the great western and southern tributaries.

Among the bivalves of the Ohio, most of the species belong to the single genus *Unio*, as it is described. Such a large number of species, which suddenly quadruples this genus, and which presents endless anomalies in form and structure, is a very remarkable fact, which has made me doubtful about the statement of its characteristics. Struck at first by a few differences in the characteristics of the mollusks living in the shells of the Ohio, I had thought I had seen in them a new family or a new genus of bivalves, which I proposed to call *Potamila*. Convinced later that, in spite of slight differences in the animal, the shells agreed entirely with the generic characteristic of *Unio*, but presenting well marked secondary characteristics, such as transverse or longitudinal shells, with elliptical, triangular, square, oboval, rounded forms, etc., and with horizontal, oblique, vertical, straight, curved, flexuous lamellar tooth, etc., I proposed dividing them into 8 sub-genera in my *Prodrome* of

70 new genera. Since then, having increased the number of my species and verified their characteristics, it seems proper to me to group them into several genera and sub-genera, but to placate the naturalists, who hesitate to adopt changes in nomenclature made necessary by discoveries, I shall give the name *Unio* in second place, to all my new species, observing that in including all of them in the genus *Unio*, which would thus become made up of more than 70 species, it would be necessary to repeat in the statement of specific characters, those of the characteristics of my new genera, which would render the definition of the species lengthy and wordy.

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Among the *Unio* of North America already mentioned by authors, there is one discovered by Michaux the son, in the Ohio, and named *U. Ohiensis* in his *Voyage*; but as it is not described there, I cannot identify it with any of my species; at any rate the name *Ohiensis* is not at all apt, and it is strange that Michaux could collect only one species in the Ohio, where there are more than 50! The *U. caroliniana* of Bosc, is incompletely described; however, I assume that it is not identical with any of the species of the Ohio. Among the new species of *Unio* described by Say in the article *Conchology* of Nicholson's dictionary, there are four which are from the Ohio: *U. crassus*, *U. alatus*, *U. ovatus*, and *U. cylindricus*; the description of the first obviously includes several species, wrongly confused.

The other bivalves of the Ohio belong to the genera *Alasmodon*, *Cyclas* and *Notrema*, and include very few species.

All these shells are barely edible; they have an extremely dull and insipid taste, so that they are neglected; however a few of the large species have an appetizing mollusk; the only way to render these mollusks fit for the table, is to allow them to steep in vinegar for a while; they can then be fried or cooked in vinegar. Many fish eat them, especially the *Amblodon grunniens*. Herons also eat them for lack of

fish, and swine like them very much; they are very often seen going in a herd to the rivers in search of them, and they eat them avidly, in spite of the thick, hard shell of many species. The common names of the country vary little; they are all included under the names of muscles, clames, box-shells, snuff-box, etc.

Many species are ornamented with very bright colors on the inside, display several shades of purple, violet, coppery, nacreous, golden, iridescent, etc. although their exte-

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rior is always covered by an epidermis of dark or black, brown, chestnut, rusty, olivaceous, color etc. Many produce pearls or pearly and colored excrescences, some of which are very beautiful; their varied nacre could even be used to advantage. In some places, outside the calcareous region, they are gathered to make lime. The mollusk is commonly white but is sometimes yellow or saffron. It lives for a very long time.

Family PEDIFERIA. Les Pédifères.

Bivalve, equivalve, inequilateral. Mollusk with a large compressed foot, tendinous, not bysiferous; two siphons, very short or replaced by two openings; anus under the ligament; hinge toothed or lamellate.

This family includes all the bivalves of the Ohio, such as the genera *Unio*, *Anodonta*, etc. of authors, as well as my new genera separated from *Unio*. I divide it into several subfamilies, of which 5 live in the Ohio.

I. Subfamily. UNIODIA. Les Uniodés

Shell transverse. Bilobed tooth anterior. Lamellar tooth posterior, horizontal or oblique. Beaks a little oblique. Striae concentric or zonal.

1st Genus UNIO. Mulette

Shell elliptical. Ligament straight. Bilobed

tooth commonly channelled. Lamellar tooth horizontal, often straight, never flexuous. Axis variable. Marginal contour almost always thickened. Three muscular impressions. Mollusk with a large, bilobed, unfringed mantle; siphons barely salient, a flat bilamellar appendix besides each siphon; gills striate, in the shape of a second internal and bilobed mantle.

This is how I define the group to which I leave the name *Unio*, because it seems to be the most numerous, and to be closest to that which bears this name in Europe; however it seems that if they are exactly con-

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generic, the lamellar appendices of the siphons and the mantle-shaped, striated gills should have been observed. Many species have, in addition to the three muscular impressions, a muscular fossula at the tip of the lamellar tooth, which, although sometimes confluent with the single impression on this side, is often distinct from it. If this genus differs in the animal, from the European *Unio*, it will have to be called *Elliptio*, a name which I have applied to one of its subgenera. I divide it into 4 subgenera.

1st Subgenus. ELLIPTIO. Ellipte.

Test elliptical. Axis extra-medial. Tooth channelled. Contour thickened. Ligament corneous. Lamellar tooth straight.

I. Species. *Unio nigra* (*Elliptio nigra*). Mulette noire. Pl. LXXX, fig. 1, 2, 3 and 4 (1)

(1) The drawings having been sent to us uncolored and the shells not being available, we have been unable to show their colors on the plates, and the lithographer has been reduced to the simple role of copier.

Oval-elliptical, little swollen, with a slight angular truncation posteriorly; test thick; epidermis blackish; nacre pinkish; lamellar tooth thick, obtuse, [with] light wrinkles. Length 9/15. Diameter 6/15. Axis 2/5 of the width.

This is one of the large species of the Ohio, since it sometimes attains 6 inches in width. Its nacre is beautiful, sometimes iridescent, the impressions always so. The fossula is distinct. Here is the shape of its hinge and this description will serve for all the other species. Anterior bilobed tooth thick, triquetral, channelled; lobes unequal, the anterior one smaller, in the right valve, the opposite in the left. Lamellar tooth simple in the right valve, fitting into a double lamella in the left valve. Ligament hard, almost calcareous, externally corneous and convex. Two unequal muscular impressions under the bilobed tooth, the second or lower smaller. The fossula forming a sort of fourth muscular impression.

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between the end of the lamellar tooth and its impression which is separate from it. Beaks of the valves with worn epidermis, and often also the test. This character has been used by Conchyologists as specific; but wrongly, for it is present in all the species; save *U. flava*, *U. viridis*, and new-born shells; it is purely accidental and secondary, but inherent to their way of life. In opening and closing its valves, the animal is forced to cause them to rub against the sand or gravel in which it lives, and it gradually wears away their beaks; if it lives in mud, this beak is worn very slowly, whereas among stones, the entire surface of the valves gradually becomes worn and eroded. The contour of the marginal border is on the contrary quite intact, and hermetically closed by a prolongation of the membranous and mobile epidermis which the animal forms by a secretion of its foot. No part of the shell is shining, save in old individuals. To complete the general knowledge of these animals, I shall give the description and figure of the mollusk of *U. nigra*.

All the animals of this family show only slight differences in colors, dimensions and proportions.

Body white or slightly flesh color (fig. 4).

Mantle thin, smooth, lining the valves, bilobed and notched posteriorly, unfringed. Second mantle internal, branchial, obliquely striated, thin, bilobed posteriorly, much smaller than the external one, and enveloping the foot. Foot compressed, muscular, tough, oblong, dilatible. Mouth anterior. Anus posterior, at the end of the ligament. Anterior siphons lateral, equal, one on each side, behind the mouth, shaped like a perforated tubercle; and still farther behind, also on each side, an obtuse bilamellar appendix, with unequal, flat, oval or oblong lamellae; the internal one larger. These are apparently the sexual organs. According to this exact description, which I have checked on more than 20 species

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and 300 individuals, it will be seen that there is a noteworthy difference between these mollusks and those of European *Unios* as they have been described by authors, and notably by Férussac (*Essai d'une méthode conchyologique*) who prides himself on scrupulous exactness in the description of fluviatile mollusks.

These animals live at the surface of the bed of rivers, free and in every attitude, on the side or vertically with the opening uppermost, lowermost or oblique. If need be, they know how to dig into the sand or the soil, particularly in winter and even in summer in the small rivers subject to drying out which they resist very well. Their progressive movement is very slow, by means of their foot which slowly ploughs through the ground. They are hermaphroditic and multiply abundantly. Their eggs are very small, slimy, often yellow. Many young shells are hatched in the shell of their mother.

This species has two varieties.

Var. 1. *Fusca*. Epidermis dark brown; nacre pale.

Var. 2. *Maculata*. With brown spots; nacre almost white.

2. Species. *Unio crassa* (*Elliptio crassa*).
Mulette épaisse.

U. Crassus. Say Conch. Tab. I, fig. 8, spec. 1.

Elliptical; little swollen; test very thick; epidermis brown; nacre white; lamellar tooth thick, obtuse; wrinkles prominent. Length $2/3$, diameter $1/3$, axis $1/5$ of the width.

This species is figured by Mr. Say under this name; but his description, in which, on his own admission, he includes several species, is worthless. The test is here still thicker than in the preceding one; in any case, it resembles it very much; the main difference consists of a more lateral axis and the lack of posterior inclination. Width from 4 to 5 inches.

3. Species. *Unio viridis* (*Elliptio viridis*). Mulette verte.

Elliptical, obliquely truncated posteriorly, little swollen; test not too thick, beaks with flexuous wrinkles; epi-

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dermis smooth, olive-green; nacre a little bluish; bilobed tooth compressed, crenulated, decurrent. Length $5/9$, diameter $7/16$, axis $1/3$ of the width.

Var. 1. *Radiata*. Rayed with pale yellow.

Var. 2. *Fuscata*. Epidermis olivaceous-brown.

A small species, the length an inch and a half at most. Rare in the Ohio, more common in the Kentucky and adjacent small rivers. Its beaks are rarely worn, for they are thickened by flexuous wrinkles, remarkable because the rest of the shell is smooth. The bilobed tooth is narrow and becomes crenulated, instead of channelled. Truncation oblique, convex; impressions little marked; no fossula; lamellar tooth narrow.

4. Species. *Unio fasciata* (*Elliptio fasciata*). Mulette fasciée.

Elliptical, swollen; test little thick; epidermis little wrinkled, olivaceous, ornamented with brown rays; nacre bluish; bilobed tooth roughened, divaricate; lamellar tooth carinate.

Length $2/3$, diameter $1/2$, axis $1/3$ the width.

Var. 1. *Nigrofasciata*. Black rays.

Var. 2. *Alternata*. Greenish, with blackish-green rays, alternately wider and narrower.

Var. 3. *Cuprea*. Coppery, with olivaceous rays; nacre coppery-white.

A pretty species which is close to *U. ochraceus* of Say. Ordinarily small, yet I have seen some more than 3 inches wide. In the Ohio, and the Alleghany, Muskingum, Kentucky, Satt, Green, etc. rivers. Impressions little marked; fossula deep.

Obs. The following species of authors, and perhaps a few others also, should probably be referred to this subgenus

Unio Caroliniana of Bosc.

Unio plicata? of Lesueur. From Lake Erie. Var. of *U. crassa* Say.

Unio purpurea, of Say. tab. 3, fig. 1. From Pennsylvania.

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Unio aurata, N. sp. of the Hudson River. It is elliptical with the posterior part truncated obliquely; test little thick; epidermis brown, blackish, olivaceous, golden; tooth small, roughened. Length $4/7$, diameter $2/7$, axis $1/4$ of the width.

Unio pictorum, etc., etc., etc.

2nd Subgenus. LEPTODEA. Leptode.

Bilobed tooth entire and smooth; that of the right valve simple. Contour not thickened. Ligament membranous. Lamellar tooth lightly arched.

5. Species. *Unio leptodon* (*Elliptio leptodon*). Mulette leptode. Pl. LXXX, fig. 5, 6 and 7.

Elliptical, very compressed attenuate posteriorly; test thin and fragile a little roughened; epidermis brownish; nacre violaceous; bilobed tooth small, obtuse, smooth, tuberculiform; lamellar tooth thin and long. Length $1/2$, diameter $1/6$, axis $1/3$ of the width.

Fairly common in the lower reaches of the

Ohio. usually small, for its test is so fragile, that it easily falls prey to its enemies: however it sometimes attains a length of 3 inches. The impressions are little apparent; fossula apparent confluent. Animal whitish.

Var. 1. *Olivacea*. Epidermis olivaceous.

Var. 2. *Semi-radiata*. Olivaceous with brown half-rays.

6. Species. *Unio fragilis* (*Elliptio fragilis*). Mulette fragile. Elliptical, a little dilated posteriorly; test very thin and fragile, almost smooth; epidermis olivaceous; nacre bluish; bilobed tooth smooth, compressed; lamellar tooth short. Length $2/3$, diameter $1/3$, axis $1/3$ of the length.

Var. *fuscata*. Reddish-brown externally.

This species much resembles the preceding one; but it differs from it by its inflated form, instead of being attenuated; little compressed, inflated, surface almost smooth, etc. The beaks are not prominent. The animal is yellowish. Width about two inches. These two species rather resemble,

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anteriorly, *U. viridis*, *U. fasciata*, *U. aurata* and *U. nasuta*, etc., which also have a fragile shell; but they are easily distinguished from it by their very different teeth; they are smooth, with a slightly arched blade, etc.

7. Species. *Unio nervosa* (*Elliptio nervosa*). Mulette nerveuse. Pl. LXXX, fig. 8, 9 and 10.

Elliptical, wider posteriorly; test rather thin, covered with flexures, concentric, vermiculiform nervures, margins undulate; epidermis brown; nacre bluish. Length $2/3$, diameter $2/5$, axis $1/3$ of the width.

A rare and quite distinct species. I have found it at the Falls of the Ohio. Width one inch and one-half. The bilobed teeth are small, tuberculiform; the lamellar tooth narrow curved, with inconspicuous impressions; the marginal border is a little thickened and undulate or eroded.

3rd. Subgenus. AXIMEDIA. Aximède.

Lamellar tooth a little curved; axis almost median; valves almost equilateral.

8 Species. *Unio elliptica* (*Elliptio elliptica*). Mulette elliptique.

Elliptical, posterior part angular; test thick, almost smooth; epidermis chestnut brown; nacre pale, violaceous; bilobed tooth wrinkled, obtuse; lamella obtuse, thick. Length $3/4$, diameter $3/8$, axis $7/16$ of the width.

Rare; seen near Lewisville and Maysville. Width about two inches. Impressions deep. Valves a little swollen, with prominent, very obtuse beaks.

9. Species. *Unio levigata* (*Elliptio levigata*). Mulette lise. Pl. LXXX, fig. 11, 12 and 13.

Elliptical, rounded, swollen; test thick, smooth; epidermis olivaceous; nacre bluish-white; bilobed tooth a little wrinkled, blade short. Length $5/7$, diameter $4/7$, axis $7/16$ of the width.

A small species, an inch at most, which is close to the genera *Rotundaria* and *Cyclas*. In Kentucky. Beaks rounded, prominent, worn. The blade is a little less oblique. This

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species should perhaps belong to the subgenus *Plagiola* of the genus *Obliquaria*.

10. Species. *Unio zonalis* (*Elliptio zonalis*). Mulette zonale.

Elliptical; test thick, wrinkled; epidermis reddish with brown zones; beaks prominent, swollen. Length $3/5$, diameter $2/5$, axis $2/5$ of the width.

A very rare species: seen once only at the Falls of the Ohio; width more than 2 inches.

4th. Subgenus. EURYNIA. Eurynie.

Valves very transverse or very wide. Axis almost lateral. Ligament very long.

11. Species. *Unio dilatata* (*Elliptio dilatata*). Mulette dilatée.

Elliptical, oblong, a little attenuated posteriorly; test thick, almost smooth; epidermis reddish-brown; nacre violet; teeth obtuse, thick, the blade a little inclined. Length $1/2$, diameter $2/7$ axis $1/4$ of the width.

A pretty, very common species, with very beautiful nacre, often with purple or bluish sheen; width 3 to 4 inches. It varies with brown or reddish epidermis, and with more or less dark or pale nacre. Impressions striated; fossula apparent; bilobed tooth thick, rough, blade obtuse. Mollusk yellowish.

12. Species. *Unio latissima* (*Elliptio latissima*). Mulette large. Pl. LXXX, fig. 14 and 15.

Elliptic-oblong, a little attenuated posteriorly; test thick, smooth; epidermis blackish; nacre encarnadined, contour white; bilobed tooth obtuse, wrinkled, blade carinate, very straight and very long. Length $2/5$, diameter $1/4$, axis $1/4$ of the width.

A large species, sometimes attaining 8 inches in width. It is not as common as the preceding one. Tooth somewhat trihedral; impressions smooth; fossula little marked, blade cariniform, sharp, thick, horizontal. Mollusk white. A similar or closely related species is found in the Susquehanna River.

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13. Species. *Unio solenoides* (*Elliptio solenoides*). Mulette solenoide.

Elliptic-cylindrical, thinned, rounded anteriorly, truncated, retuse posteriorly; test thick, very swollen, with flexuous wrinkles posteriorly; epidermis olivaceous brown; nacre bluish-white; tooth roughened, obtuse, blade very long, horizontal. Length $3/7$, diameter $4/11$, axis $3/11$ of the width.

Very remarkable. I have observed it in the upper part of the Ohio, width about 3 inches; beaks prominent; fossula obvious.

Var. 1. *Interrupta*, with a few blackish lines, interrupted anteriorly.

Var. 2. *Nodosa*. With a few nodosities posteriorly.

Var. 3. *Cylindrica*. Say. Conch. sp. 8, tab. 4, fig. 3. Test very thick; nacre white; beaks very large.

IInd Genus. LAMPSILIS. Lampsile.

Shell oval. Ligament curved. Bilobed tooth channelled Lamellar tooth curved, flexuous. Axis extramedial. Marginal contour thickened. Three muscular impressions. — Mollusk similar to that of the *Unio*; but with apparent, short siphons.

The name is modified from *Lasmacampsilis*, which means flexuolate blade, after the essential character of the genus.

14. Species. *Lampsilis cardium* (*Unio cardium*). *Lampsilis coeur*. Pl. LXXX, fig. 16, 17, 18 and 19.

Oval, widened and inclined posteriorly, very swollen; beaks prominent, heart shaped; test thick; epidermis rusty-brown, rough, blackish posteriorly; nacre white, rosy posteriorly. Length $3/4$, diameter $2/5$, axis $1/3$ of the width.

Beautiful, very swollen shell; width up to 6 inches. Bilobed tooth striated and crenulated; lamellar tooth compressed. Mollusk white; the bilamellar appendices wide; the external lamella larger.

15. Species. *Lampsilis ovata* (*Unio ovata*). *Lampsile ovale*.

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Unio ovatus. Say Conch. sp. 3, tab. 2, fig. 7.

Oval, regular, attenuated posteriorly, swollen; beaks prominent; epidermis corneous, brown on the posterior depression; nacre white; test little thick. Length $3/4$, diameter $3/10$, axis $1/3$ of the width.

Is it a variety of the preceding? It seems to

differ from it mainly by its less swollen and not posteriorly dilated shape.

16. Species. *Lampsilis fasciola* (*Unio fasciola*). *Lampsile fasciole*.

Oval, dilated posteriorly, swollen; test little thick; epidermis olivaceous with radiating, flexuous, unequal, greenish bands. Length $2/3$, diameter $2/5$, axis $1/3$ of the width. Nacre bluish white.

Rare: a species seen in Kentucky; width 2 to 3 inches, bilobed tooth small, channelled on top, smooth and decurrent below; lamellar tooth thin, fluted. (1)

IIIrd Genus. METAPTERA. Metaptère.

Shell oval, triangular, dilated into a wing posteriorly; ligament inclined on the wing. Bilobed tooth crenulated. Lamellar tooth curved, detached from the side of the wing. Axis extramedial. Contour scarcely thickened. Three muscular impressions. — Mollusk similar to that of *Unio*.

The name means posterior wing; I had at first adopted that of *Proptera*, it was by error, because it would have meant anterior wing.

(1) The following two species which I have discovered in the Hudson River must belong to this genus.

Lampsilis rosea. Oval, dilated and obliquely truncated posteriorly; test thick, wrinkled, olivaceous, black posteriorly; nacre roseaceous; very swollen; beaks prominent. Length $5/8$, diameter $1/2$, axis $4/5$ of the width.

Lampsilis pallida. Oval, dilated and rounded posteriorly; test thick, with distant wrinkles; epidermis olivaceous rusty, with a few brown rays, oblique posteriorly; nacre white. Length $3/4$, diameter $1/2$, axis $4/5$ of the width.

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17. Species. *Metaptera megaptera*. (*Unio megaptera*). *Metaptère megaptère*. Pl. LXXX, fig. 20, 21 and 22.

Test thin, compressed; epidermis brown, flexuously rugose; nacre purple; wing very large, smooth internally; lamellar tooth double in the right valve, and with an oblong protuberance at its tip. Length $2/3$, diameter $2/9$, axis $1/4$ of the width.

A beautiful species common in the Ohio, with pretty purple and iridescent nacre, often with pearl-shaped tubercles. Bilobed tooth with almost equal lobes, smooth externally, crenelated, compressed, grooved internally; anterior impressions well marked, striated; the posterior one almost obliterated. Width up to six inches.

The *Unio alatus* of Say. *Conch. sp. 7*, tab. 4, fig. 2, which is found in Lake Erie, seems to come close to this species and to differ from it only by its internally rugose wing; outline marked, flexuous; lamellar tooth simple in the right valve; length $4/5$ of the width, etc. It seems that the following two species of Say will have to be placed in this genus; but he does not indicate that the blade is flexuous.

Unio ochraceus. Say *Conch. sp. 5*, tab. 2, fig. 8.

Unio cariosus. Say *Conch. sp. 4*, tab. 3, fig. 2.

IVth Genus. TRUNCILLA. Truncille.

Shell semi-triangular. Axis almost medial. Ligament oblique. Truncation plane, oblique, posterior. Bilobed tooth smooth, denticulate and compressed. Lamellar tooth compressed, oblique. — Mollusk similar to that of the *Unio*?

The name is derived from the remarkable oblique truncation, which is much more marked than in all the other species of this family.

18. Species. *Truncilla triqueter* (*Unio triqueter*). *Truncille triquètre*. Pl. LXXXI, fig. 1, 2, 3 and 4.

Test not very thick, very swollen, beaks prominent; shape almost trihedral; posterior plane very flat, a little tessellated, warty; epidermis dark olivaceous, rayed with

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brown anteriorly, edges and wrinkles flexuous in the middle, nacre bluish-white. Length $2/3$, diameter $1/2$, axis $2/5$ of the width.

A very remarkable and rare species, which I have observed only at the Falls of the Ohio; its shape is so unusual that it has been given the common and particular name of Snuffbox, which means a snuffbox [Rafinesque here gives the English name and its French translation *tabatière*]. I have not seen the animal which I suspect to differ a little from the *Unio*. Width about one inch and a half. Lamellar tooth short, wide and obtuse. Scars not deep: the posterior one very large, occupying almost the entire flat bottom of the posterior surface of the valves; fossula almost absent, margin of the test very slightly flexuous.

19. Species. *Truncilla truncata* (*Unio truncata*). *Truncille tronquée*. Test not thick, slightly swollen, beaks prominent; epidermis a little squarish; posterior surface truncated, epidermis olivaceous; posterior margins and wrinkles flexuous; nacre bluish white. Length $4/5$, diameter $8/15$, axis $5/12$ of the width.

Much more common than the preceding, and smaller, ordinarily an inch wide. Teeth wide; blade sharp.

Var. 1. *Fusca*. Almost entirely brown.

Var. 2. *Vermiculata*., with flexuous, brown, transverse lines.

Vth Genus *OBLIQUARIA*. *Obliquaire*.

Shell variable, often scarcely transversal and more or less oblique posteriorly. Ligament oblique. Bilobed tooth commonly channelled; lamellar tooth oblique, often straight. Axis variable. Marginal outline thickened. Three muscle scars. — Mollusk similar to that of the *Unio*.

This group has numerous species; it differs from *Unio* or *Elliptio* mainly by its shape, by the oblique ligament and lamellar tooth, etc. It displays many anomalies and secondary

characters which compels me to divide it into six subgenera.

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Ist. Subgenus. *PLAGIOLA*. *Plagiole*.

Axis extra-medial. Lamellar tooth curved. Ligament curved. Shape variable, but not oblique.

20. Species. *Obliquaria decorticata* (*U. decorticata*). *Obliquaire écorchée*.

Test rounded-elliptical, thick and much swollen, beaks prominent; epidermis blackish almost entirely detached, wrinkles distant; nacre white. Length $3/4$, diameter $1/2$, axis about $1/3$ the width.

I have observed this species in the museum of Mr. J. D. Clifford at Lexington; it lives in the Mississippi and apparently in the lower part of the Ohio. It has the shape of the *Lampsilis*, but its lamellar tooth, instead of being flexuous, is curved into an oblique and short arc. Although the animal was alive, almost all its epidermis was destroyed down to the white nacre, and at the beaks could be seen an intermediate smooth, shiny and olivaceous nacre. The wrinkles were deep and distant. A slight oblique talus posteriorly; teeth much channelled; scars very deep; fossula confluent. Width more than 4 inches.

21. Species. *Obliquaria interrupta* (*U. do.*) *Obliquaire interrompue*.

Test oval-elliptic, slightly thick and slightly swollen; epidermis reddish-brown, little wrinkled, with a few transverse, blackish, interrupted bands; nacre bluish white. Length $5/8$ diameter $1/3$, axis $3/8$ of the width.

In Kentucky and Ohio; width about 2 inches; fossula evident; lamellar tooth a little wrinkled, thick, carinate. Beaks not prominent.

22. Species. *Obliquaria depressa* (*U. depressa*). *Obliquaire déprimée*. Pl. LXXXI, fig. 5, 6 and 7.

Test oval-triangular, thick and very depressed;

epidermis wrinkled, olivaceous brown, with black, linear, oblique, scattered dots; nacre bluish, a little truncate posteriorly. Length $2/3$, diameter $2/9$, axis $1/3$ of the width.

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A very rare species, which I have seen only once near Evamville in Indiana. I have deposited my only specimen of it in the museum of Mr. J. D. Clifford in Lexington, with all my other species. The shell is almost flat; width $1\frac{1}{2}$ inch; fossulas evident; teeth striated; carinated blade acute. It is close to the S.G. *Scalenaria*.

23. Species. *Obliquaria lineolata* (U. lineolata). Obliquaire linéolée.

Test almost rounded, thick, slightly swollen, a little truncate posteriorly; epidermis reddish, slightly wrinkled, with a few brown lines; nacre white. Length $4/5$, diameter $1/2$, axis $1/3$ of the width. Beaks slightly prominent.

At the Falls of the Ohio; width about two inches; posterior truncate portion flat, narrow; scars deep, wrinkled, lamellar, short, thick, carinate, wrinkled, almost straight.

2d Sub-Genus. ELLIPSARIA. Ellipsaire.

Axis extra-medial; lamellar tooth straight; ligament straight; shape elliptical.

24. Species. *Obliquaria ellipsaria* (U. ellipsaria). Obliquaire ellipsaire.

Test elliptical, with a posterior diagonal angle; epidermis slightly wrinkled, reddish-olivaceous; nacre white. Axis almost lateral. Length $3/4$, diameter $3/8$, axis $1/5$ of the width.

Var. 1. *Fusca*. Entirely brown.

Width: about 5 inches; no fossula. In Kentucky; it is close to *G. Amblyma*; ligament horizontal.

25. Species. *Obliquaria fasciolaris* (U. fasciolaris). Obliquaire fasciolée.

Test thick, convex, oval-elliptic, attenuated posteriorly; epidermis almost smooth; reddish, with oblique brown bands; nacre white. Length $2/3$, axis $1/4$ of the width.

Var. 1. *Interrupta*. Bands interrupted.

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Var. 2. *Fusca*. Almost entirely brown, bands black.

Var. 3. *Obliterata*. Bands almost obliterated, test very thick.

Var. 4. *Longa*. Length $3/4$ of the width.

A rather common species in the Ohio, Wabash, Kentucky, etc. It seems to be intermediate between the *U. interrupta* (sp. 21), and the *U. nasuta* of Say. Its mollusk is white, similar to that of the *Elliptios*. A remarkable character of this species is the cavity of the valves; it bears a few oblique wrinkles. Ligament slightly oblique; beaks thick, but not prominent; bilobed teeth wrinkled, thick; blade thick, short; fossula evident; impressions deep. Width up to 5 inches.

26. Species. *Obliquaria verrucosa* (U. verrucosa). Obliquaire verruqueuse. Pl. LXXXI, fig. 10, 11 and 12.

Test slightly thick, elliptical, forming an oblique talus posteriorly, with verrucose wrinkles; epidermis reddish-brown; nacre white. Length $2/3$, axis $1/3$ of the width.

A species remarkable for many concentric rows of unequal flattened warts, often white through rubbing. In the Ohio; width 3 inches; bilobed tooth with one very large lobe, wrinkled, the other small and smooth; impressions deep and smooth; lamellar tooth obtuse; ligament horizontal.

27. Species. *Obliquaria cuprea* (U. cuprea). Obliquaire cuivrée. Pl. LXXXI, fig. 8 and 9.

Test thick, elliptical, forming an oblique talus posteriorly; epidermis black, almost smooth; nacre coppery. Length $3/5$, diameter $5/8$, axis $1/3$ of the width.

A very pretty species two inches wide, with peculiar nacre having a brownish fleshy tint, almost coppery, and with purple sheen. I have found it in the Monoukahela and the Potowmack; blade short; no fossula; teeth slightly wrinkled; ligament horizontal (1)

(1) The *Unio nasuta* of Say, Conch. tab. 4, fig. 1, it seems must belong to this subgenus, and the next species which I have observed in

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3rd Sub-Genus. QUADRULA. Quadrule.

Shape squarish, but rounded anteriorly, scarcely transverse.

28. Species. *Obliquaria flava* (U. flava). *Obliquaire jaune*. Pl. LXXXI, fig. 13 and 14.

Test slightly thick, convex in the form of a talus posteriorly; beaks a little prominent, entire, wrinkled; epidermis almost smooth, yellowish brown; nacre flesh colored. Length $5/7$, diameter and axis $2/7$ of the width.

A beautiful species, which is found only in the little rivers flowing into the Kentucky, Salt-rives and Greenriver. Width 2 to 4 inches. The mollusk is dark yellow or orange, with a large circular foot; otherwise similar to that of the *Ellipta*. The shell is almost yellow in youth; carinate blade thin; teeth striated on all sides; ligament oblique, near that of *U. lineolata*, which perhaps must be placed here.

29. Species. *Obliquaria cyphia* (U. cyphia). *Obliquaire cyphie*.

Test thick, swollen, bumpy, margin flexuous, forming a talus posteriorly; epidermis chestnut-brown; tubercles with flexuous wrinkles; nacre white. Length $8/9$, diameter and axis $5/9$ of the width.

Width 2 to 3 inches; test thicker anteriorly, with large wrinkles and a few oblong tubercles; a large oblique, longitudinal bump; thick teeth striated. At the Falls of the Ohio.

30. Species. *Obliquaria metanevra* (U. metanevra). *Obliquaire metanèvre*. Pl. LXXXI, fig. 15 and 16.

Test thick, swollen, bumpy, with two marginal sinuses; one posterior and one terminal, forming a talus and nervate poste-

the Hudson River, state of New York, is very near to it. Is it a variety of it?

Obliquaria attenuata. Elliptical, dilated, attenuated and forming a talus posteriorly. Ligament horizontal; epidermis wrinkled, dark brown; nacre pale rose. Length $1/2$, diameter $1/4$, axis $1/4$ of the width. . . . About 4 inches.

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riorly; epidermis wrinkled, brownish, with blackish spots; nacre flesh-color. Length $4/5$, diameter $7/10$, axis $4/10$ of the width.

A small, rare species; scarcely more than one inch wide; in the Kentucky; test thickened posteriorly; curved, oblique nervures on the dilated margin, posterior; one or two bumps on the oblique elevation; blade short and wide; teeth striated; no fossula.

31. Species. *Obliquaria reflexa* (U. reflexa). *Obliquaire réfléchie*.

Test thick, convex, bumpy, almost rounded, truncate posteriorly, lower margin reflected with a posterior sinus; epidermis reddish, almost smooth, wrinkled posteriorly; nacre white, iridescent. Length $5/6$, diameter $2/3$, axis $5/12$ of the length.

Width an inch and a half; test thinned posteriorly; two bumps on the medial elevation; its end reflected; wrinkles distant, flexuous, in the form of sutures; blade lengthened, carinate, very slightly curved; teeth very striate; fossula evident. In Kentucky and at Letart's Rapids. Perhaps it belongs to the S.G. *Rotundaria*?

32. Species. *Obliquaria retusa* (*Unio retusa*). *Obliquaire rétuse*, Pl. LXXXI, fig. 19 and 20.

Test thick, convex, without elevations, with a small terminal sinus; epidermis olivaceous, with light, distant wrinkles; nacre whitish.

Length $7/8$, diameter $3/8$, axis $1/3$ of the width.

A small species, one or two inches wide; rare; in the Ohio and the Kentucky. Blade short, carinate; fossula not evident.

33. Species. *Obliquaria flexuosa* (U. *flexuosa*). Obliquaire flexueuse.

Test thick, with two slight elevations and a wide flat depression between them, forming a talus posteriorly; epidermis yellowish-brown, lineolated with brown at the base, with flexuous wrinkles, slightly striate; margin flexuous; nacre bluish. Length $6/7$, diameter $3/7$, axis $3/7$ of the width.

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In the Kentucky, Salt-river and Green-river. Width about two inches; blade short, almost double even in the right valve; fossula apparent; lamellar tooth small, striated; impressions deep.

Var. 1. *Bullata*. With a few wide tubercles, which are flat and transverse on the elevations.

34. Species. *Obliquaria nodulata* (U. *nodulata*). Obliquaire nodulée. Pl. LXXXI, fig. 17 and 18.

Test thick, swollen, nodulous, forming a talus posteriorly and truncate vertically; linear longitudinal tubercles on the posterior dilatation; epidermis almost smooth, reddish-brown; nacre iridescent. Length $11/12$, diameter $2/3$, axis $1/3$ of the width.

Width an inch and a half; in the Kentucky; four distant nodosities; tooth bilobed, thick, striate; impressions deep; blade carinate. It resembles the *O. retusa* both of them have a very slightly curved blade.

35. Species. *Obliquaria quadrula* (U. *quadrula*). Obliquaire quadrule.

Test very thick, a little swollen, with an oblique longitudinal elevation, with an oblique groove and a sinus posteriorly; epidermis brown, wrinkled; wrinkles striated and tuberculate an-

teriorly; nacre white, roseate on the margins.

Length $6/7$, diameter $4/7$, axis $1/4$ of the width.

Width 2 to 3 inches; fairly common in the Ohio; a few oblong, transverse tubercles on the elevation; test a little sinuate in front view; blade short, thick, carinate, striate; fossula confluent; tooth large, striate; beaks truncate.

36. Species. *Obliquaria bullata* (U. *bullata*). Obliquaire bullée.

Test thick, convex, slightly swollen, with an oblique groove and a sinus posteriorly, strewn with irregular, confluent tubercles; epidermis reddish, with flexuous, distant wrinkles; nacre white, flesh color. Length $11/12$, diameter $2/3$, axis $1/3$ of the width.

At the Falls of the Ohio, rare; width a little less than 2 inches; teeth and blades as in the preceding; beaks rounded, worn, but not truncate; the tubercles are often worn and whitened, flattened, pustulate, of variable shape.

4th Sub-genus. ROTUNDARIA. Rotundaire.

Shape rounded, scarcely transverse, almost equilateral, axis almost medial; ligament curved, short, corneous; lamellar tooth slightly curved; bilobed tooth scarcely anterior.

37. Species. *Obliquaria tuberculata* (U. *tuberculata*). Obliquaire tuberculée.

Test very thick, swollen, a little truncate posteriorly, strewn with unequal tubercles, save anteriorly; epidermis wrinkled, chestnut-brown; nacre violaceous. Length 10-11, diameter $6/11$, axis $5/11$.

Very common in the Ohio and the adjacent rivers. Width 3 inches at most. Mollusk yellowish; tooth thick, very wrinkled; blade short, carinate; fossula confluent; impressions deep. It varies to bluish or dark-purple nacre.

38. Species. *Obliquaria subrotunda* (U. *subrotunda*). Obliquaire arrondie. Pl. LXXXI, fig. 21, 22 and 23.

Test thick, swollen, convex, perfectly rounded; epidermis almost smooth, fulvous-brown;

nacre bluish-white. Length nearly equal to, diameter $3/4$, axis $7/16$ of the width.

Var. 1. *Maculata*. Strewn with blackish spots.

A very common species in the Ohio and all the rivers flowing into it; remarkable by its shape which is almost equilateral, and not at all transverse; beaks prominent, rounded; teeth thick, channelled; blade carinate, short, a little dotted; fossula confluent; impression anterior, dotted.

39. Species. *Obliquaria pusilla* (Unio pusilla). *Obliquaire petite*.

Test thick, convex, perfectly rounded; epidermis

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smooth, blackish; nacre white. Length 6-7, diameter $2/7$, axis $3/7$ of the width.

Very rare; in the lower part of the Ohio. Width: scarcely more than half an inch; form and appearance of a *Cyclas*; teeth almost smooth; blade linear. Is it a young individual?

5th. Sub-genus. *SCALENARIA*. *Scalénaire*.

Shape triangular oblique, scarcely transversal, but very inequilateral; axis almost lateral; bilobed tooth scarcely anterior; lamellar tooth straight; ligament oblique.

40. Species. *Obliquaria obliquata* (U. obliquata). *Obliquaire obliquée*.

Test very thick, swollen, oval-triangular; the three sides arched; a slight longitudinal, oblique depression; epidermis almost smooth, black; nacre rose-purplish. Length $9/10$, diameter $6/10$, axis $2/10$ of the width.

A pretty species, with beautiful purplish nacre, with iridescent sheen. In the Kentucky. Width 2 to 3 inches; blade long, carinate; fossula large, distinct; teeth wrinkled; impressions deep; beaks prominent, truncate.

41. Species. *Obliquaria triangularis* (U. triangularis). *Obliquaire triangulaire*.

Test very thick, swollen, triangular; poste-

rior surface straight; beaks prominent; no longitudinal depression; epidermis brown, almost smooth; nacre rosy white. Length $3/4$, diameter $1/2$, axis $1/6$ of the width.

Var. 1. *Nigrescens*. Epidermis blackish; nacre white.

Common in the Ohio; width up to 4 inches; teeth very large, channelled; blade large, carinate; impression and fossula deep.

42. Species. *Obliquaria scalenia* (U. scalenia). *Obliquaire scalène*. Pl. LXXXI, fig. 24 and 25.

Test thick, swollen, triangular; the sides almost straight, especially the posterior one which is truncate; angles rounded

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no depression; epidermis smooth, reddish, with a few longitudinal, oblique brown lines; nacre white. Length $7/9$, diameter $5/9$, axis $1/5$ of the width.

Width about 2 inches; in the Kentucky, etc.; teeth and blade channelled; form confluent; lines narrow, distant, radiate.

6th. Sub-genus. *SINTOXIA*. *Sintoxe*.

Shape oval-oblique; lamellar tooth and ligament curved.

43. Species. *Obliquaria lateralis* U. *latéralis*). *Obliquaire latérale*.

Test thick, swollen, oval-oblique, with a slight oblique, longitudinal, curved, narrow depression; epidermis wrinkled, brown; nacre white. Length $4/5$, diameter $3/5$, axis $1/5$ of the width.

Width 2 to 3 inches; teeth large, striated; fossules apparent; blade thick, carinate, a little doubled in the two valves.

44. Species. *Obliquaria sintoxia* (U. sintoxia). *Obliquaire sintoxe*.

Test thick, swollen, oval-oblique, without depression; epidermis black and almost smooth; nacre rosy. Length $9/10$, diameter $6/10$, axis $2/5$ of the width.

In the Ohio; rare; width 2 to 3 inches, very close to *Obovaria pachostea*, *Obliq. obliquata* and *Obliq. triangularis*; teeth as in the latter. By its shape it makes the transition with the next genus, *Obovaria*.

IId. Sub-family. AMBLEMIDIA. Les Amblémides.

Shell longitudinal; bilobed tooth inferior; lamellar tooth inferior, vertical; axis terminal; wrinkles zonal.

Vith. Genus. OBOVARIA. Obovaire.

Shell oboval, nearly equilateral; axis almost medial; ligament curved; bilobed tooth striate; lamellar tooth almost vertical, a little curved; marginal contour thickened; three muscular impressions; mollusk similar to that of *Unio*, but having the anus inferior.

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45. Species. *Obovaria obovalis* (*Unio obovalis*). Obovaire obovale.

Test thick, swollen, rounded below; beaks prominent; epidermis fulvous-brown, wrinkled; nacre white. Lower width 8/9, diameter 2/3 of the length, axis medial.

This species is common in the Ohio and rivers nearby. Length from 2 to 3 inches; teeth wide, thick, roughened; blade carinate, a little oblique; impressions deep.

46. Species. *Obovaria torsa* (*Unio torsa*). Obovaire tordue. Pl. LXXXII, fig. 1, 2, and 3.

Test very thick, swollen, rounded below; epidermis brownish; nacre purplish. Medial width 6/7, diameter 3/7 of the length, axis medial.

Var. *Marginata*. Nacre with white margin.

A rare species in the Ohio, more common in the small rivers. Length 1 to 2 inches. Remarkable for its forward-directed beaks and its large wrinkles often divided into two by a groove; teeth and blades wrinkled; fossula evident; blade a little oblique, almost double, even in the right valve.

47. Species. *Obovaria striata* (*Unio striata*). Obovaire striée

Test thick, swollen, rounded below, with striated wrinkles; beaks scarcely prominent; epidermis brown; nacre white. Medial width 10/11, diameter 6/11 of the length, axis 2/5 of the width.

Var. 1. *Tuberculata*. A few striated tubercles on the wrinkles.

Var. 2. *Rosea*. Epidermis reddish, brown anteriorly; nacre roseate.

Length about 3 inches. In the upper part of the Ohio. Mollusk yellow; blade almost vertical, thick; teeth channelled; fossula evident.

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48. Species. *Obovaria pachostea* (*U. pachostea*). Obovaire pachostée.

Test excessively thick, swollen, rounded and attenuated or flexuous below; beaks a little prominent; epidermis brown, slightly wrinkled; nacre pale violaceous; contour flexuous. Medial width 9/10, diameter 7/12 of the length, oblique axis 2/5 of the width.

A remarkable species, with a very small and wrinkled internal cavity; large cavity under the tooth; it is close to the *S.G. sintoxia*, *G. obliquaria*, by its slightly oblique axis, or by a slight posterior dilatation. In the Kentucky. Length 3 to 4 inches. Blade short, vertical, obtuse; teeth very large and wide, channelled; fossula evident.

49. Species. *Obovaria stegaria* (*Unio stegaria*). Obovaire tuilée. Pl. LXXXII, fig. 4 and 5.

Test thick, swollen, rounded below a little tile-like because of large, distant wrinkles; beaks slightly prominent; epidermis brown; nacre white. Inferior width 12/13 of the length, diameter 2/3 of the width, axis medial.

Var. 1. *Tuberculata*. With a few scattered tubercles.

Var. 2. *Fasciolata*. Fasciolated with greenish brown; nacre roseate.

A pretty species, rarely more than one inch long; blade a little oblique, straight, obtuse;

teeth striated; fossula evident; rather rare in the Ohio.

50. Species. *Obovaria cordata* (Unio cordata). Obovaire cordée. Pl. LXXXII, fig. 6 and 7.

Test thick, swollen, corded below by a sinus and a slight depression; epidermis smooth, brown; nacre white; beaks slightly prominent. Inferior width $11/12$, diameter $2/3$ of the length, axis medial.

Var. 1. *Rosea*. Epidermis blackish; nacre roseate.

A pretty little species about one inch in length; in the Ohio, etc. rare. Blade doubled, sharp, scarcely oblique,

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straight; teeth channelled. It is very close to *Obliquaria retusa*.

VIIth. Genus *PLEUROBEMA*. Pleurobème.

Shell oblong, very inequilateral; ligament straight or rather unilateral; axis entirely lateral or posterior; lamellar tooth vertical; bilobed tooth slightly wrinkled; under the beak, which is superior, terminal; four muscular impressions; mollusk similar to that of *Unio*, but anus and siphon inferior.

51. Species. *Pleurobema mytiloides* (U. *Mytiloides*). Pleurobème mytiloïde. Pl. LXXXII, fig. 8, 9 and 10.

Test thick and swollen above, attenuate at both ends; beaks prominent, entire; epidermis almost smooth, reddish, with a few oblique, black, longitudinal bands; nacre bluish; blade narrow. Width $3/5$, diameter $1/2$ of the length, axis $1/6$ of the width.

A rare species; observed in the Wabash. Length 2 inches; beaks a little angular, very prominent, entire, forming a heart; blade very straight; impression and fossula deep.

52. Species. *Pleurobema cuneata* (U. *cuneata*). Pleurobème cunéiforme.

Test thick and swollen above, oblong-oval, attenuated into a wedge below, rounded above; beaks prominent, truncate; epidermis almost smooth, brown; nacre white, iridescent; blade scarcely straight. Width $5/7$, diameter $1/2$ of the length; axis $1/6$ of the width.

Var. 1. *Maculata*. A few black, scattered, squarish spots.

Var. 2. *Sulcata*. A slight longitudinal depression.

Rather common in the Ohio near Steubenville, Marietta, etc. Length 1 to 3 inches. It differs mainly from the preceding by its shape, its slightly curved blade, etc. Mollusk pale yellowish; impressions deep; the fossula forms a fourth very marked impression.

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VIIIth. Genus. *AMBLEMA*. Amblème.

Shell oval, elliptic or quadrate, very inequilateral; lateral axis posterior; beak lateral, oblique, almost superior; ligament straight; lamellar tooth vertical; bilobed tooth wrinkled, lateral to the beak; three muscular impressions; mollusk similar to that of *Pleurobema*.

53. Species. *Amblyma olivaria* (U. *olivaria*) Amblème olivaire.

Test thick, slightly swollen, oval, elliptical; beaks scarcely prominent, almost superior; epidermis wrinkled, olivaceous; nacre white, iridescent; blade straight. Width $2/3$, diameter $4/9$, axis $1/20$ of the length.

Var. 1. *Dilatata*, with a superiorly dilated base.

Var. 2. *Fasciolaris*, with rayed, brown bands.

In the Kentucky. Length 2 to 3 inches. Intermediate between this genus and the preceding one; fossula evident; teeth slightly wrinkled; blade thick; ligament golden.

54. Species. *Obliquaria rubra* (U. *rubra*). Obliquaire rouge.

Test thick, swollen, a little elliptical; beaks slightly prominent, with a slight oblique or wide

sinus; posterior channel axis almost lateral; epidermis wrinkled, blackish; nacre, red-purplish. Length $5/7$, diameter $4/7$, axis $1/7$ of the width.

Var. 1. *Lineata*. Reddish, lineolated with brown.

Var. 2. *Pallida* Brownish, nacre pale.

In the Kentucky. Length about 2 inches. It has some relations with *Elliptio* and *Obliquaria ellipsaria*. Blade a little obtuse, very slightly oblique; tooth thick rugose; nacre pretty, iridescent, with bluish sheen; no fossula; mollusk yellowish.

55. Species. *Amblema torulosa* (*Unio torulosa*). *Amblème toruleuse*. Pl. LXXXII, fig. 11 and 12.

Test thick, slightly swollen, elliptical-squarish, with a slight oblique depression, and a few nodules, margins flexuous; epidermis olivaceous, with flexuous wrinkles; nacre white-bluish. Width $3/4$, diameter $1/2$, axis $1/5$ of the length.

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Var. 1. *Angulata*. Depression almost absent, contour almost angular.

Length 2 inches. In the Ohio and Kentucky; 2 or 3 nodules on the oblique elevation; blade very straight; no fossula; tooth wrinkled.

56. Species. *Amblema gibbosa* (*Unio gibbosa*). *Amblème bossue*.

Test thick, swollen, oval-elliptical, with two large knotty, oblique ribs, with intermediate depression, margins flexuous; epidermis reddish brown, almost smooth; nacre white. Width 2-3, diameter 4-7, axis 2-9 of the length.

Var. 1. *Olivacea*. Epidermis olivaceous, with flexuous wrinkles.

Var. 2. *Radiata*. With radiating, pale lines.

Var. 3. *Difformis*. With irregular bumps and depressions. Length 1 to 3 inches. Blade short, oblique, obtuse; fossula very evident; teeth wrinkled; beaks prominent, heart shaped. It has very great relationships with the *G. Ob-*

liquaria; but the bilobed tooth is under the beak and almost inferior.

57. Species. *Amblema costata* (*Unio costata*). *Amblème costée*. Pl. LXXXII, fig. 13 and 14.

Test slightly thick, flattened, a little squarish, with wide longitudinal ribs, slightly oblique, flexuous, dilated into a wing under the ligament, with curved oblique ribs, margins undulate; epidermis yellowish, almost smooth; nacre white, iridescent. Width $4/5$, diameter $3/10$, axis $3/20$ of the width.

It is one of the most beautiful shells of the Ohio; it is rare there; it is less so in the small rivers of the Kentucky, etc. It reaches up to 6 inches in length. Its nacre is washed with flesh-color and with violet sheen.

It produces pearls; I have seen an oblong one a quarter of an inch long. Beaks oblique wrinkled, entire; blade long, wide, sharp, compressed, slightly oblique; no fossula; striated tooth inferior. Internal margins undulated. Mollusk yellow.

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III. Sub-family. ANODONTIDIA. Les Anodontides.

Shell transverse. No teeth or blades.

IXth Genus. ANODONTA. Anodonte.

Shell elliptical or oval; ligament straight or curved. Axis extra-medial; three muscular impressions, slightly evident; contour scarcely thickened; mollusk like that of the *Unio*.

This genus can be divided into three very distinct sub-genera.

I. Sub-Genus. ANODONTA. Anodonte

No lamellar wrinkles on the hinge. This S.G. includes most of the species, such as *A. anatina*, *A. cygnea*, *A. radiata*, *A. marginata*, Say *A. cataracta* Say, etc. in addition to the two following species which I have observed in the Hudson River.

Anodonta atra. Test swollen, thin, smooth, elliptical, blackish; nacre white anteriorly, reddish, iridescent posteriorly. Length $1/2$, diameter $5/12$, axis $1/3$ of the width. -- Width up to 6 inches.

Anodonta cuneata. Test slightly swollen, thin, elliptical, attenuate posteriorly; epidermis wrinkled, olivaceous brown; nacre bluish white. Length $1/2$, diameter $1/4$, axis $1/4$ of the width. Width 4 to 5 inches.

2. Sub-Genus LASTENA. Lastène.

Hinge with two transverse, obtuse wrinkles, almost lamelliform, diverging on each side of the beak. Ligament straight, membranous, double, or anterior or posterior.

58. Species. *Anodonta ohiensis* (Lastena ohiensis). *Anodonta de l'Ohio*.

Test very thin, fragile, transparent, swollen, elliptical, a little winged and then truncate obliquely behind; beaks entire, wrinkled; epidermis smooth, olivaceous or brown;

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nacre bluish. Length $5/9$, diameter and axis 1-3 of the width.

Var. 1. *Radiata*. Olivaceous-coppery, with radiating greenish bands.

Var. 2. *Viridis*. Of a beautiful olivaceous green.

Var. 3. *Violacina*. Nacre violaceous.

Var. 4. *Nigrescens*. Blackish-olivaceous.

Very common in the Ohio and all the adjacent rivers. Width from 2 to 4 inches; the lamellar wrinkles are perfectly separated from the edges of the shell. The posterior wing is compressed, angular, forming a talus and brownish. It might have been proper to name this species *A. mutabilis*.

59. Species. *Anodonta lata* (Lastena lata). *Anodonte élargie*. Pl. LXXXII, fig. 17 and 18.

Test very thin, fragile, transparent, convex,

elliptical-oblong; beaks decorticate, almost invisible; epidermis brown, blackish anteriorly; nacre bluish, violet under the beaks. Length $3/8$, diameter $2/9$, axis $1/4$ of the width.

Rare, in the Kentucky, etc. Width 2 to 3 inches. Lamellar wrinkles next to the edge, the anterior one scarcely evident. It must perhaps constitute another *S. G. Hemistena*, or be placed under the first *S. G.*; but the ligament is double, or extended on both sides of the beaks. The Lastenas are close to the *G. Dipsas*.

IV. Sub-family. ALASMIDIA. Les Alasmides.

Shell transverse; one primary anterior tooth; no lamellar tooth.

Xth. Genus. ALASMIDONTA. Alasmidonte.

Shell oval or elliptical; axis extra-medial; three scars or muscular impressions; ligament straight, imbricate, etc.

60. Species. *Alasmidonta marginata*. *Alasmidonte marginée*.

Oval-elliptical, forming a talus posteriorly and with oblique-obtuse wrinkles; epidermis olivaceous brown, radiated with green and

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zonally wrinkled; nacre bluish white, with white contours; tooth simple, compressed, oblique. Length $1/2$ of the width.

This genus and this species were established by Say, in the *Journal of the Academy of Natural Sciences of Philadelphia*, vol. 1, p. 459. He places in it in addition his *Unio undulata*, *Conch*, tab. 3, fig. 3, and the following species must also be added to it. The latter is found in the Scioto River. Length 2 inches and a half. I have not observed it alive, but I have seen it in the cabinet of the Academy.

61. Species. *Alasmidonta costata*. *Alasmidonte costée*. Pl. LXXXII, fig. 15 and 16.

Test thin, elliptical, slightly swollen, a little sinuous anteriorly, blackish posteriorly;

nacre white, washed with flesh-color; bilobed tooth compressed, oblique, crenelated. Length $1/2$, diameter $1/4$, axis $2/9$ of the width.

I have observed this beautiful shell in the museum of Mr. Clifford at Lexington: it has been collected in the Kentucky River, where it seems to be rare. Width nearly five inches. It is decorticate anteriorly; ribs very large below; ligament corneous, scaly, imbricate; tooth decurrent; blade replaced by a little short, oblique angle; small tubercles in the interior.

V. Sub-family CYCLADIA. Les Cycladées.

Shell almost equilateral; two lamellar teeth: one anterior and one posterior; often one or more cardinal teeth, intermediate under the beak.

XIth. Genus CYCLAS. Cyclade.

Two muscular impressions; blades oblique; wrinkles zonal; contour not thickened.

This genus needs to be revised in spite of the work of Meyerle and Férussac. I propose to divide it into four

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sub-genera which could perhaps form as many genera.

1. *Polymesoda*. Many intermediate teeth in both valves; test rounded or a little transversal. Type: *Cyclas caroliniana* Bosc, etc.

2. *Phymesoda*. One intermediate tooth in one valve; test a little transversal. Type: *C. lacustris*, *C. dubia* Say, etc.

3. *Amesoda*. No intermediate tooth in one valve at least; test a little transversal. Type: *C. similis* Say, *C. lasmampsis*, etc.

4. *Corbicula*. (Megesle). Many intermediate teeth in both valves; test triangular or slightly elongate. Type *C. hammalis*. *C. fluviatilis*, etc.

62. Species. *Cyclas lasmampsis* (*Ameroda lasmampsis*). Cyclade lasmampside. Pl. LXXXII, fig. 19, 20 and 21.

Test transparent, swollen, slightly rounded; wrinkles crowded, inequal, more distant and

wider above; blades flexuous, the anterior one twisted, widened; length $3/4$, diameter $1/2$, axis $5/12$ of the width, nacre bluish.

Width $1/3$ or $1/2$ inch; epidermis variable, black, blackish, brown, brownish, olivaceous, reddish, corneous, etc.; beaks rounded, not prominent. In the Ohio and adjacent rivers. No intermediate teeth.

63. Species. *Cyclas equalis* (*Phymesoda equalis*). Cyclade égale.

Test transparent, swollen, rounded; wrinkles crowded, almost equal, obtuse; blades slightly flexuous, short, distant, equal; intermediate tooth oblique, single in each valve; epidermis corneous; nacre bluish; length $4/5$, diameter $2/3$, of the width, axis medial.

A small species; length $1/4$ inch; rare in the Ohio; tooth internal, little evident, obliquely inclined posteriorly; right valve with 2 oblong lamellar fossulas, almost equal; the left with a corresponding lamellar tooth; beaks rounded, not prominent.

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SUPPLEMENT.

I shall describe in this supplement two species which belong only imperfectly to my subject; for one is a trivalve shell and the other a mussel from Louisiana. I shall add a few species which have been omitted in their respective places, or recognized during my work.

XIIth Genus. TREMESIA. Trémésie.

Test trivalve, inequivalve; main valve patelloid, perforate in the center; the small valve closing this hole like an operculum; third valve inferior, lateral; mollusk with a head, the head extensible through the medial opening, with two lateral eyes; no tentacles.

This singular genus seems to be the type of a new family intermediate between the Brachiopods, the *Teredos* and the *Patellas*; it has three valves as in the *Teredos* but a head as in the *Patellas*, and this eyed and tentaculate head is central instead of being terminal.

64. Species. *Tremesia patelloides*. *Tremésie patelloïde*. Pl. LXXXII, fig. 22, 23 and 24.

Main valve rounded, a little conical, striate concentrically and tessellated with curved, oblique transverse striae; aperture round; small valves smooth; the lower one oblique, oboval; mollusk flexuously striate below, pointed opposite the lower valve; head truncate.

Animal very peculiar, which I had noted last year under the faulty name of *Notrema* in the American Monthly Magazine. It is found in the lower part of the Ohio, attached to stones like the *Patellas*, by its base; test fulvous brown; opercular valve brown, shining, mobile; diameter about one inch, height half an inch.

65. Species. *Mytilus recurvus*. Moule *recourbée*.
les of three lengths; epidermis blackish; nacre violet;

NOTE. The last line of page 54 seems to begin with a word or part of a word from a line omitted by mistake in the original. A. L.

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beaks oblique, at a decurrent angle on each side; lower margin and interior striated, crenelated; width $7/12$, diameter $5/12$ of the length, length 1 to 2 inches. It is found in the Mississippi near New Orleans. The striae are often bifid. The gaping part is oblong, lateral.

66. Species. *Unio teres* (*Elliptio teres*). Mulette ronde.

Test slightly thick, swollen, elliptical, widened, truncate below, posteriorly and obliquely; epidermis almost smooth, corneous; nacre white, iridescent; length about $2/5$, diameter $2/3$, axis $1/5$ of the width. Belongs to the sub-genus *Eurynia* (See p. 297).

Width about 3 inches. In the Wabash River,

slightly sinuate below; beaks inconspicuous; blade long, thin; tooth crenelated, decurrent.

67. Species. *Obliquaria sinuata* (*Unio sinuata*). *Obliq. sinuée*.

Test thick, swollen, elliptical, sinuate below. epidermis reddish, wrinkled; nacre white, with deep, oblique, internal channels; length $1/2$, diameter $1/3$, axis $1/4$ of the width. Belongs to the sub-genus *Ellipsaria*. (See p. 303.)

In the Kentucky. Width 4 inches; blade thick, oblique, straight wrinkled; fossula evident. tooth striated.

68. Species. *Obliquaria atroviolacea* (*Unio atroviolacea*) *Obliq. violet-brun*.

Test slightly thick, convex elliptical, oval, attenuate posteriorly; epidermis blackish, almost smooth; nacre very dark violet, border mat-brown; length $1/2$ diameter $1/4$, axis $1/5$ of the width. Belongs to the sub-genus *Ellipsaria*

A pretty species with beautiful nacre; width three inches; in the Kentucky, etc.; blade carinate, straight; fossula confluent; impressions deep; teeth wrinkled.

69. Species. *Obliquaria Cliffordiana* (*Unio Cliffordiana*). *Obliq. Cliffordienne*.

Test thick, swollen, oval, rounded, greater length

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posterior; talus posterior; nacre almost smooth, blackish, pale purple; length $3/4$, diameter $2/5$, axis $1/4$ of the width. Belongs to the sub-genus *Plagiola*. (See p. 302)

In Mr. Clifford's museum; found in the Kentucky; width 3 inches; blade curved, thick, wrinkled; fossula evident; teeth striated; beaks scarcely prominent, decorticate, with flat, saffronate nacre.

REMARKS.

1. The ligament which I have described is the great posterior ligament; besides this there is in all these shells a membranous and foliaceous anterior ligament which is very small and short in the elongate or rounded shells, and larger or oblong in the elliptical or dilated shells.

2. Having better observed Species 48 *Obovaria pachostea* (see p. 312), I have recognized that it belongs to the genus *Amblema*, to which it should be added. Here is its characteristic:

Amblema Antrosa. Test very thick, a little swollen, rounded, flexuous, with a small lateral sinus below; epidermis brown, lamellose; nacre violaceous, pale, undulated and with a large cavity under the bilobed tooth; width $6/7$.

diameter $1/2$ of the length, axis almost terminal.

Translator's Remarks. The translation was made from the American Midland Naturalist reprint, which is a faithful copy of the original, so far as I know. Some typographic errors may not be in the original, but I do not have a copy of that rare work at my disposal at present to permit me to check these points. In a later paper, I hope to compare the translation just given with Poulson's earlier one and to discuss a few points concerning Rafinesque's French and the meanings which have been ascribed to parts of his text.

A. L.

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