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A Synopsis of the Classification of the Fresh-Water Mollusca of North America, North of Mexico,

AND

A Catalogue of the More Recently Described Species, With Notes

BY

BRYANT WALKER

ANN ARBOR, MICHIGAN
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Class LAMELLIBRANCHIA.

Order EULAMELLIBRANCHIA.

Suborder SUBMYTILACEA.

Key to the families of *Submytilacea*.

1. Ligament external ..... 2.
   Ligament internal ..... 5.

2. Hinge with cardinal, anterior and posterior lateral teeth..... 4.
   Hinge with cardinal teeth only .....*Cyrenellidæ*.
   Hinge with lateral teeth only (no true cardinals) or edentate..... 3.

3. Gills with distinct, interlamellar septa, parallel with the gill filaments ..... *Unionidæ*.
   Gills either without distinct, interlamellar septa or, when present, oblique to the gill-filaments .....*Margaritanidæ*.

4. Pallial line simple .....*Sphæriidæ*.
   Pallial line sinuate .....*Cyrenidæ*.

5. Hinge with cardinal and lateral teeth.....*Rangiidæ*.
   Hinge without distinct teeth .....*Dreissensiidæ*.

Family MARGARITANIDÆ.

"Diaphragm incomplete, formed by the gills; posteriorly the outer lamina of the outer gills not connected with the mantle for a considerable distance; anterior end of the inner gills separated from the palpi by a gap; branchial and anal openings ill-defined, and the latter not closed above; no super-anal developed; gills without water-tubes and with scattered interlamellar connections, which in certain places form irregular rows or with continuous septa which run obliquely forwards; marsupium formed by all four gills; larva a small semicircular glochidium, without distinct hooks; shell elongated; sculpture of the beak concentric; hinge-teeth imperfect; epidermis blackish." (Ortmann.)

Genus MARGARITANA Schumacher, 1817.

Shell elongated, usually arcuate, rounded in front, almost lacking a posterior ridge; beaks rather low, sculpture consisting of a few coarse, parallel ridges which follow the growth lines; epidermis concentrically striate, brownish or blackish; hinge-teeth generally imperfect or not fully developed, two more or less perfect pseudocardinals in the left valve and one in the right, often reduced to mere tubercles; laterals short, usually imperfect or wholly wanting: cavity of the beaks rather shallow.

Key to the subgenera of *Margaritana*.

Gills with scattered interlamellar connections forming irregular rows running obliquely forwards.....*Margaritana s. s.*
Gills with continuous septa running obliquely forwards..*Cumberlandia.*

Subgenus MARGARITANA s. s.

Shell as in the genus.

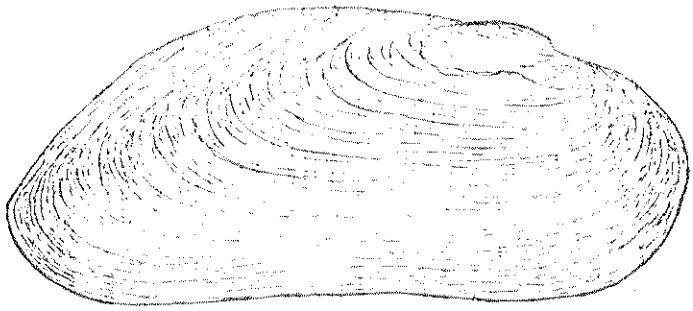

Fig. 140

Animal as in the family, but having the gills without water-tubes and with scattered interlamellar connections which in certain places form irregular rows, running obliquely forwards.

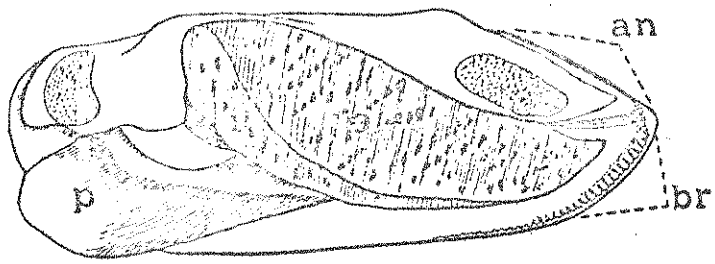

Fig. 141*

Type: *Mya margaritifera* L., fig. 140. Animal, fig. 141.

* The following lettering applies to all the figures of the animals of the Margaritanidæ and Unionidæ except as otherwise stated:

an.—anal opening.
br.—branchial opening.
f.—flaps of margin of mantle.
i.—inner gill.
o.—outer gill.
p.—foot.
pp.—papillæ on margin of mantle.
sa.—supra-anal opening.
mp.—marsupium.

Subgenus CUMBERLANDIA Ortmann, 1912.

Shell as in the genus.

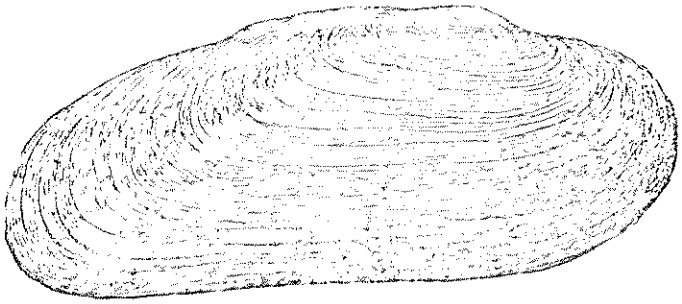

Fig. 142

Animal as in the family, but having the gills with incomplete water-tubes and with continuous septa, which run obliquely forwards.

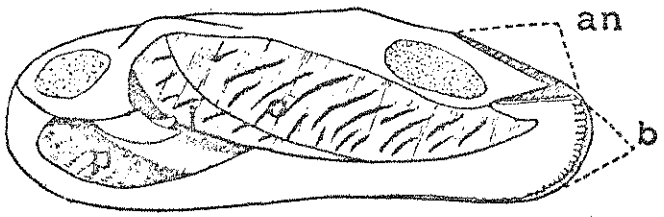

Fig. 143

Type: *Unio monodonta* Say, fig. 142. Animal, fig. 143.

Family UNIONIDÆ.

"Diaphragm complete, formed by the gills; posteriorly the outer lamina of the outer gill connected with the mantle to its posterior end; anterior end of the inner gills separated from the palpi by a gap; branchial and anal openings sharply separated from one another by the diaphragm; anal openings very rarely not closed above and without supra-anal, generally closed and with a supra-anal opening (which very rarely may be obliterated); gills with water-tubes and distinct, interlamellar septa, running parallel to the filaments. Marsupium in all four gills or only in the outer gills; larva a glochidium. Shell of very variable shape; sculpture of the beak more or less reduced, of various types, but originally of the concentric or zig-zag pattern; hinge teeth perfect or imperfect; epidermis plain or with color-markings." (Ortmann.)

Key to the subfamilies of *Unionidæ*.

1. Water-tubes simple in the gravid female 2
   Water-tubes in the gravid female divided into three tubes, of which only the centre one is used as an ovisac ..... *Anodontinæ*.

2. Male and female shells usually alike; edge of the gravid marsupium always sharp and not distending ..... *Unioninæ*.
   Male and female shells usually different; edge of the gravid marsupium distending and bulging out beyond the original edge of the gill ..... *Lampsilinæ*.

Subfamily UNIONINÆ (Swainson, 1840) Ortmann, 1910.

"Inner lamina of the inner gills generally free from the abdominal sac (sometimes, in extralimital forms, connected); supra-anal opening sometimes not separated from the anal, normally present, the closed part rather short; branchial opening well-defined; no papillae nor flaps on the edge of mantle in front; marsupium formed by all four gills or by the outer gills only; edge of marsupium always sharp and not distending; water-tubes not divided in the gravid female; glochidium semielliptic or semicircular, without spines; shell generally heavy and solid, rounded to elongated, mostly with dull-colored epidermis; sculpture of the beak generally rather indistinct, concentric or pustulous or with indications of double loops or zig-zag bars; hinge always complete, with rather strong teeth; generally no difference of sex shown in the shell." (Ortmann.)

Key to the genera of *Unioninæ*.

1. All four gills serving as marsupia ..... 2.
   Outer gills only serving as marsupia ..... 6.

2. Male and female shells alike ..... 3.
   Male and female shells different ..... *Tritogonia*.

3. Hinge with perfect pseudocardinals and laterals ..... 4.
   Hinge teeth rudimentary or wanting ..... *Gonidea*.

4. Surface plicate ..... 5.
   Surface pustulose ..... *Quadrula*.
   Surface smooth ..... *Fusconaia*.

5. Beaks sculptured with coarse, concentric or somewhat double-looped ridges, which do not extend over the surface. *Amblema*.
   Beaks sculptured with strong, zig-zag ridges extending over the upper surface ..... *Megalonaias*.

6. { Surface tuberculous 7
   { Surface smooth or spiny ..... 8.

7. { Nacre deep purple ..... *Rotundaria.*
   { Nacre white or tinged with pink ..... *Plethobasus.*

8. { Hinge with perfect pseudocardinals and laterals ..... 9.
   { Hinge teeth imperfect, vestigial ..... *Lastena.*

9. { Shell short, rounded, quadrate or oblique ..... 10.
   { Shell (usually) elongate and straight ..... 11.

10. { Beak sculpture distinct, subconcentric, rounded upon the posterior slope ..... *Lexingtonia.*
    { Beak sculpture coarser, inclined to be more or less double-looped ..... *Pleurobema.*

11. { Beak sculpture running parallel with the growth-lines and angled on the posterior slope ..... *Elliptio.*
    { Beak sculpture concentric, rounded behind ..... *Uniomerus.*

Genus QUADRULA (Rafinesque, 1820) Agassiz.

Shell triangular, quadrate or rhomboid; solid, inflated with rather coarse prominent beaks, which are generally sculptured with a few coarse, irregular, subparallel ridges that are inflated where they cross the posterior ridge; posterior ridge ordinarily well developed; disk sculptured or smooth; epidermis usually dull-colored, dark and rayless or feebly rayed; hinge plate heavy, wide, flattened; pseudocardinals solid, direct, ragged; laterals double in the left and single in the right valve; cavity of the beaks deep and compressed. Marsupium occupying all four of the gills throughout, the whole smooth and pad-like.

Key to the sections of *Quadrula.*

Posterior slope with a radial furrow above the posterior ridge ..... *Quadrula s. s.*

No radial furrow above posterior ridge ..... *Theliderma.*

Section QUADRULA s. s.

Shell quadrate or rhomboid; surface pustulous, with a high, rounded or sharp posterior ridge, above which on the posterior slope is a decided

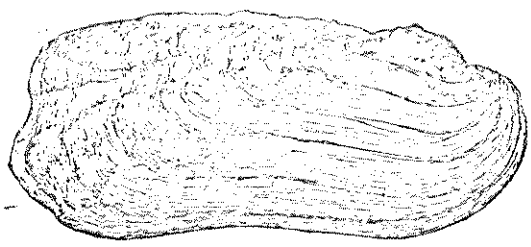

Fig. 144

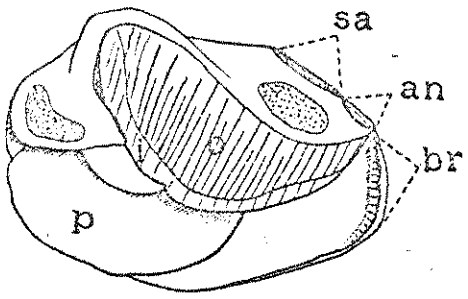

Fig. 145

radial furrow; umbonal region high; epidermis shining, usually painted with a beautiful pattern of triangular spots or chevron-shaped lines.

Type: *Unio cylindricus* Say, fig. 144. Animal, *Q. metanevra* Raf., fig. 145.

Section THELIDERMA (Swainson, 1840) Simpson.

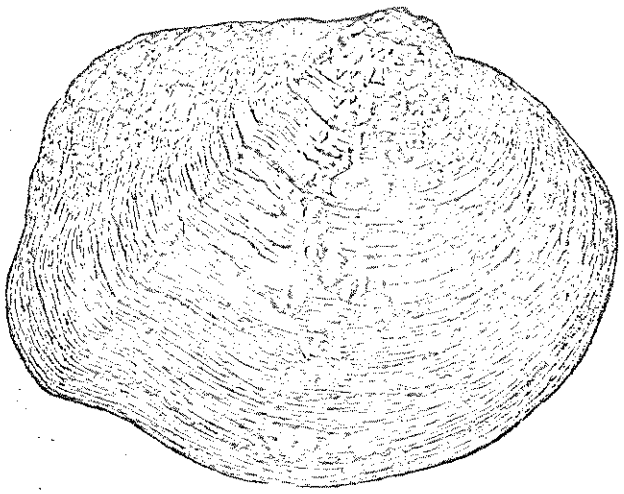

Fig. 146

Shell rounded, quadrate to rhomboid, solid, pustulous; beaks rather prominent, sculpture consisting of a few, rather coarse, subparallel ridges; anterior end rounded, base often arcuate, posterior end truncate, high and angled behind the ligament, epidermis rarely rayed, never as in *Quadrula s. s.*

Type: *Unio lachrymosus* Lea, fig. 146.

Genus TRITOGONIA Agassiz, 1852.

Shell solid, elongate, rhomboid, having a strong, irregular posterior ridge, obliquely truncated behind in the male, in the female this region is somewhat compressed and expanded into a broad wing; base curved; whole surface, except the rounded wing of the females, covered with pustules;

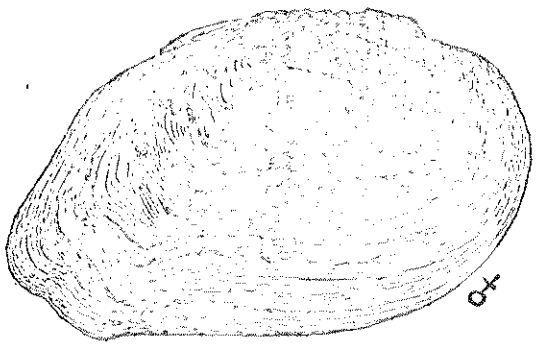

Fig. 147

beaks rather low, incurved and turned forward over the well developed lunule; beak sculpture strong, consisting of irregular, subparallel ridges which are curved upwards behind and fine radiating ridges in front of and behind them; epidermis dark olive; hinge plate rather narrow; pseudo-

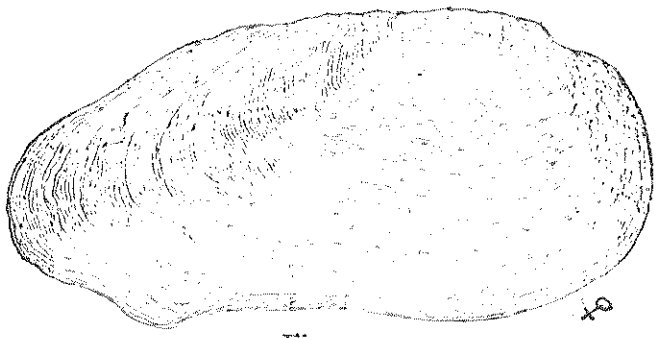

Fig. 147

cardinals strong, ragged; laterals long and straight, near to the pseudo-cardinals; cavity of beaks rather deep and compressed; female shell more compressed than that of the male. Marsupium occupying all four gills.

Type: *Unio tuberculatus* Bar., fig. 147.

Genus MEGALONAIAS Utterback, 1915.

Shell large, heavy, obovate or rhomboid, alate post-dorsally, disk obliquely folded; beaks sculptured with coarse, double-looped corrugations, which extend over the upper surface of the disk as nodulous plications; epidermis

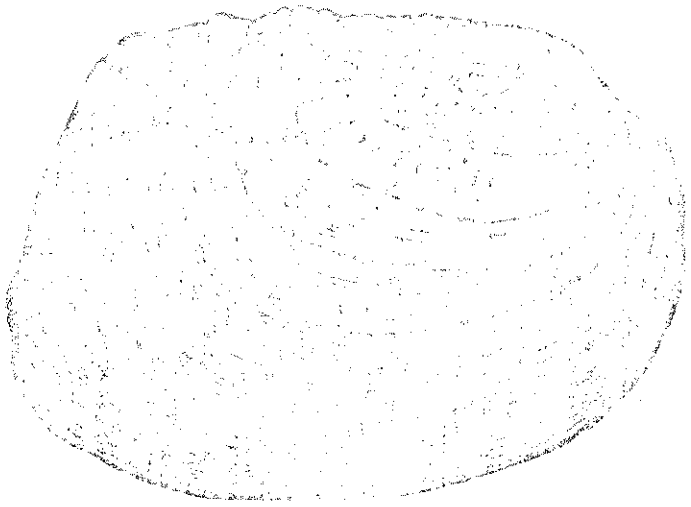

Fig. 148

dark-brown or blackish; beak cavities narrow and deep; anterior muscle scars deep and filled with a nacreous deposit, posterior scars large and indistinct.

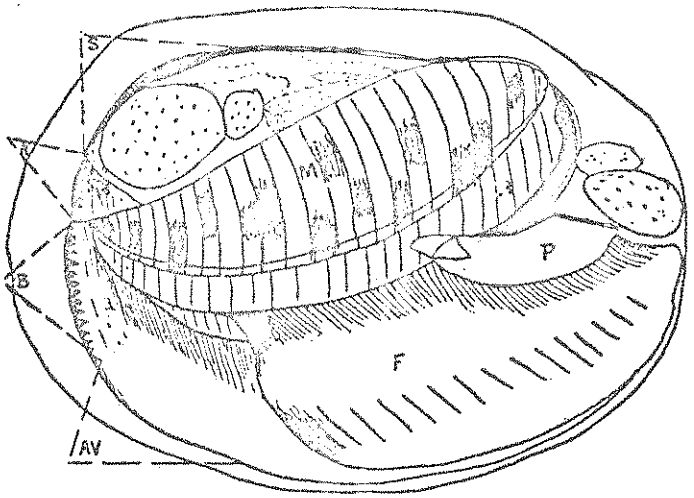

Fig. 149*

Type: *Unio heros* Say, fig. 148. Animal, fig. 149.

*The following lettering applies to figs. 149, 165 and 201:

A.—Anal opening.	F.—Foot.	P.—Palp.
Av.—Antero-ventral margin.	I.—Inner gill.	S.—Supra-anal opening.
B.—Branchial opening.	M.—Marsupium.	

Genus AMBLEMA Rafinesque, 1819.

Shell more or less alate; beaks prominent, sculptured with coarse, concentric or somewhat double-looped ridges which do not extend over the surface of the shell; surface of the valves usually sculptured with oblique folds; posterior slope generally having small radial plications, which curve

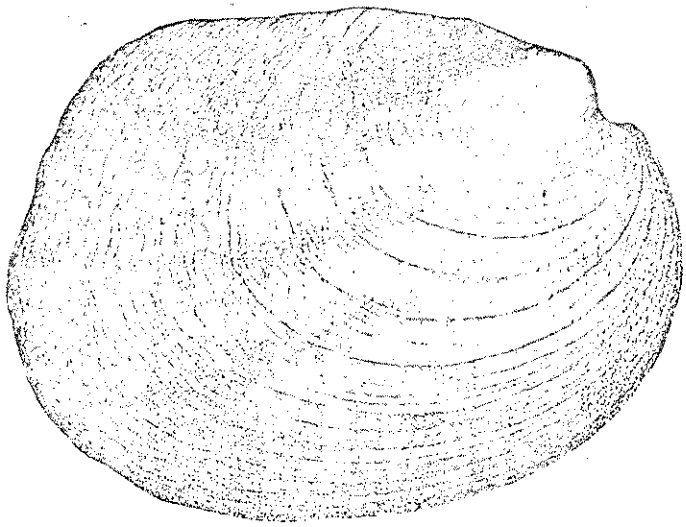

Fig. 150

upwards behind; epidermis brownish or blackish; anterior muscle scars large, distinct, very shallow, the anterior edge smooth, the rest apparently filled with roughened shelly matter; posterior scars large, shallow, indistinct; escutcheon large and dark.

Marsupium occupying all four gills.

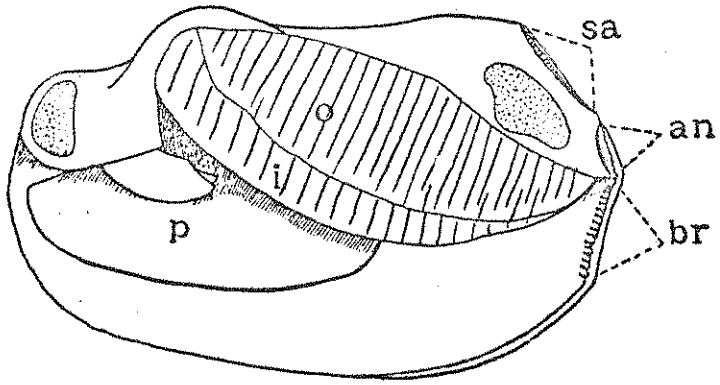

Fig. 151

Type: *A. costata* Raf.

Example: *A. undulata* (Bar.), fig. 150. Animal, *A. trapezoides* (Lea), fig. 151.

Genus FUSCONAIA Simpson, 1900.

Shell round, rhomboid, triangular or short elliptical, with a moderate posterior ridge; beaks high and full, curved inward and forward, sculptured with a few coarse, parallel ridges, which curve upward behind; epi-

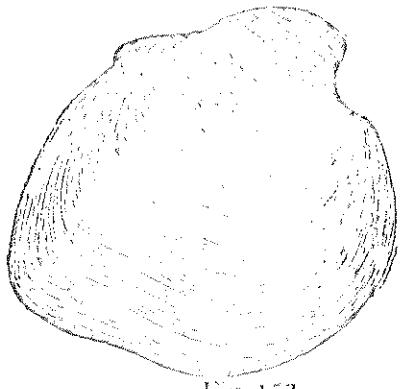

Fig. 152

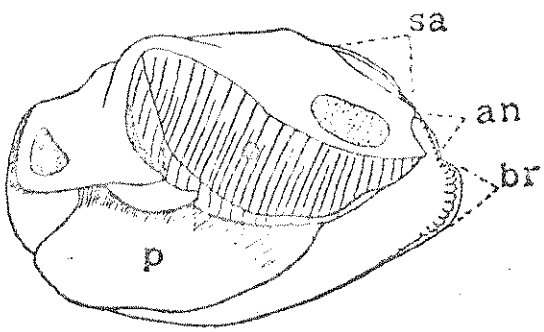

Fig. 153

dermis dark; surface not sculptured; hinge plate of moderate width; pseudocardinals strong; nacre white, salmon or purple.

All four gills marsupial.

Type: *Unio trigonus* Lea, fig. 152. Animal, (*F. rubiginosa* (Lea)), fig. 153.

Genus ROTUNDARIA (Rafinesque, 1820) Simpson.

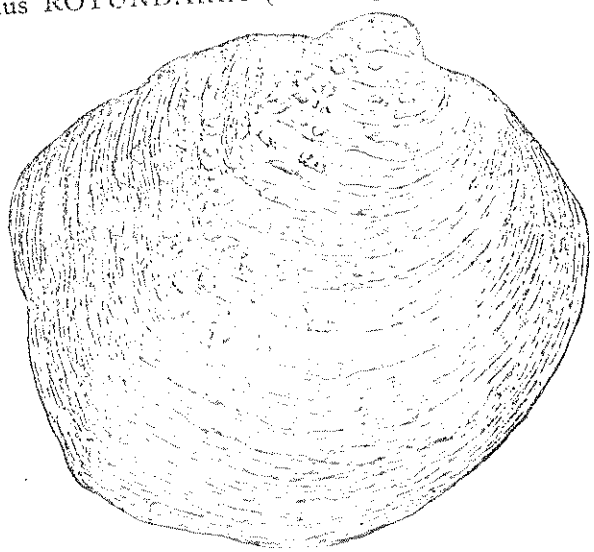

Fig. 154

Shell rounded; slightly truncated above in front; posterior ridge low beaks prominent, curved inward and forward over a strongly marked lu-

ule; beak sculpture consisting of numerous, fine, irregular, broken, somewhat concentric corrugations; posterior three-fifths of the shell tuberculate; epidermis brown; nacre purple.

Only the outer gills serving as marsupium.

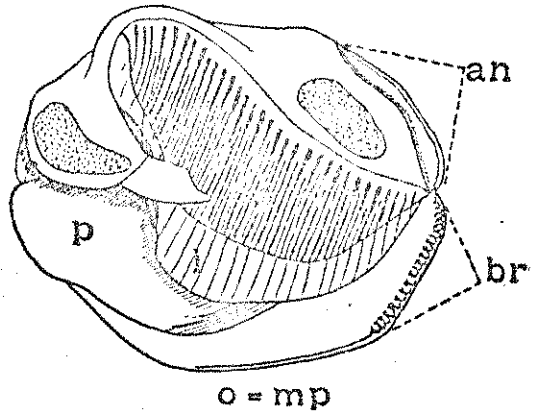

Fig. 155

Type: *Obliquaria* (*Rotundaria*) *tuberculata* Raf., fig. 154. Animal, fig. 155.

Genus PLETHOBASUS Simpson, 1900.

Shell large, irregularly oval, inflated, solid, somewhat suddenly swollen at the posterior base; posterior ridge low and rounded; beaks rather high, near the anterior end, having a few strong ridges, which are curved up-

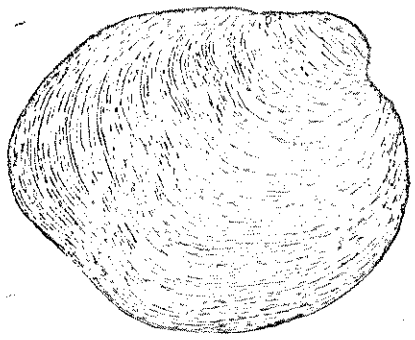

Fig. 156

wards behind; a row of low, irregular tubercles extends from near the beaks to post-basal part of the valves; epidermis tawny yellow to dark brown; hinge plate solid, not flattened; pseudo-cardinals triangular, rough;

cavity of the beaks not deep; front part of the shell very heavy, thinner behind.

Outer gills only serving as marsupium.

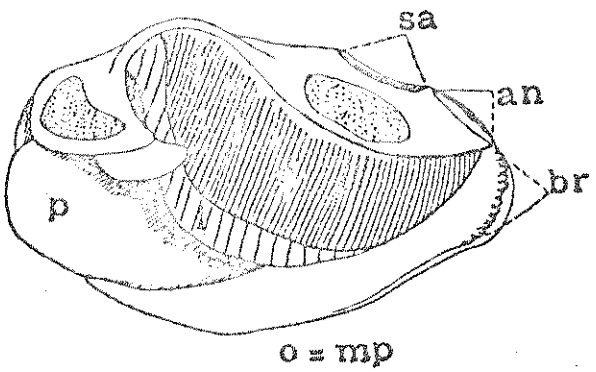

Fig. 157

Type: *Unio æsopus* Green, fig. 156. Animal, fig. 157.

Genus PLEUROBEMA (Rafinesque, 1820) Agassiz.

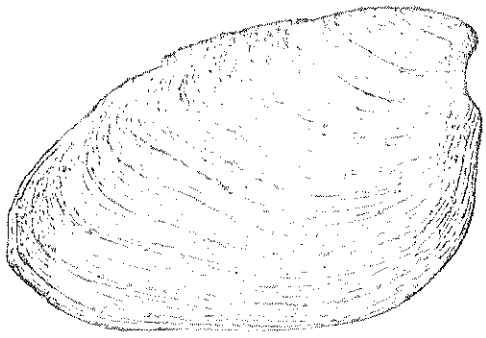

Fig. 158

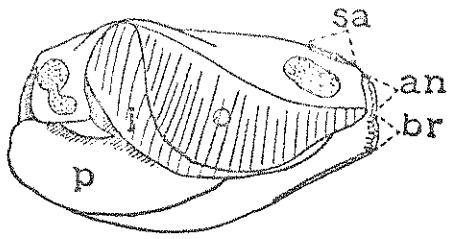

Fig. 159

Shell solid, triangular to rhomboid, usually with a prominent umbonal region; beaks at or near the anterior end of the shell, incurved and pointed forward over a small, but well developed lunule; beak sculpture coarse, consisting of a few, often broken, ridges, which curve upward posteriorly; posterior ridge present, but low and rounded; epidermis showing the rest periods plainly, tawny to olive, often ornamented with rays which show a tendency to break into square spots; hinge rather strong, plate generally narrow; pseudocardinals double in both valves. Cavity of the beaks shallow.

Outer gills only serving as marsupium.

Type: *Unio clava* Lam., fig. 158. Animal, fig. 159.

Genus LEXINGTONIA Ortmann, 1914.

"Shell subquadrate or subtrapezoidal, with slightly elevated beaks and well developed hinge teeth. Beaks not much anterior. Outer surface without sculpture. Epidermis lighter or darker brownish, with rather indistinct rays, which are narrower or wider and do not break up into blotches. Beak sculpture distinct, consisting of rather numerous (six to eight), rather crowded, subconcentric ridges, which form an indistinct, rounded angle upon the posterior ridge and are in front of this somewhat wavy and corrugated, but without showing any distinct zigzag pattern. Towards the disk, they disappear. Nacre whitish or pinkish."

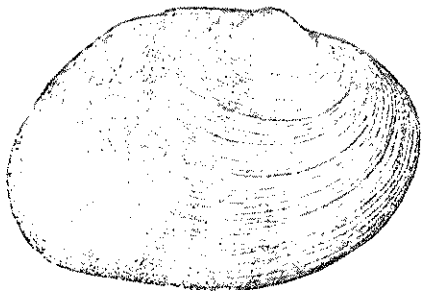

Fig. 160

Animal having only the outer gills marsupial and subcylindrical, red placentæ.

Type: *Unio subplanus* Con., fig. 160.

Genus ELLIPTIO Rafinesque, 1819.

Shell inequilateral, ovate to elongated, rounded in front and pointed or biangulate behind, with a more or less developed posterior ridge, often becoming slightly arcuate when old; beaks only moderately full, generally sculptured with coarse ridges, which run parallel with the growth lines or are somewhat doubly looped, sometimes broken and showing fine radiating lines behind; surface smooth, slightly concentrically ridged or pustulous; epidermis generally rather dull colored, rayless or fully rayed; hinge-plate narrow, two pseudocardinals and two laterals in the left valve and one pseudocardinal and one lateral in the right, with rarely a vestige of a second lateral; cavity of the beaks not deep or compressed. Marsupium occupying the whole length of the outer gills only, forming a thick, smooth pad when filled with young.

Key to the sections of *Elliptio*.

Shell spinose ..... *Canthyria.*

Shell smooth or feebly corrugated..... *Elliptio s. s.*

Section ELLIPTIO s. s.

Shell elongated, rhomboid or oval, usually more or less biangulate behind; beak sculpture consisting of a few rather strong ridges, which are nearly parallel to the growth lines or slightly doubly looped; the surface smooth or feebly corrugated.

Type: *Unio crassidens* Lam., fig. 161. Animal, fig. 162.

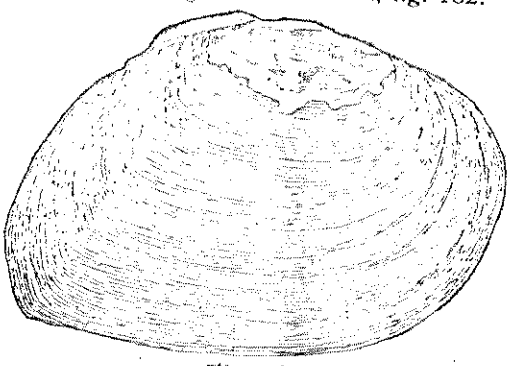

Fig. 161

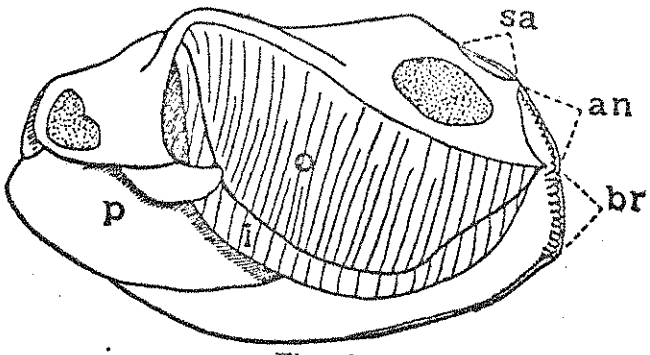

Fig. 162

Section CANTHYRIA Swainson, 1840.

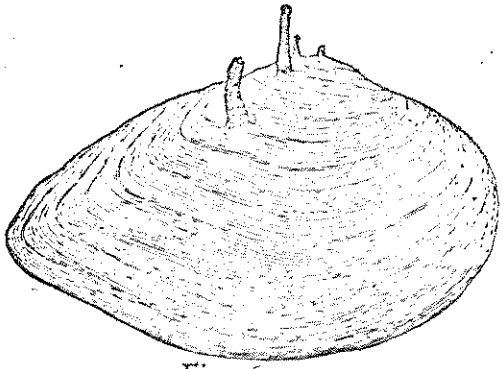

Fig. 163

Shell inflated, suboval, spinose, with a high, rather sharp posterior ridge, above which it is somewhat truncated; beaks rather compressed; epidermis smooth and shining, variegated with angular blotches; hinge sharply curved at the centre; pseudocardinals rather compressed; laterals short, remote; beak cavities rather deep.

Type: *Unio spinosus* Lea, fig. 163.

Genus UNIOMERUS Conrad 1853.

Shell trapezoidal, with a rounded posterior ridge and pointed or feebly angulate behind; beaks not prominent, sculptured with [illegible] rather

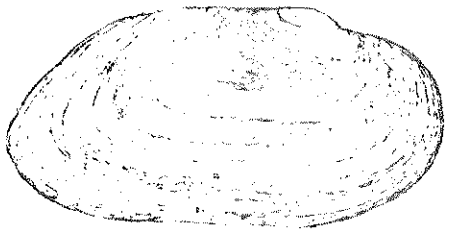

Fig. 164

strong, concentric ridges; epidermis generally rayless; pseudocardinals usually compressed, laterals delicate, slightly curved.

Outer gills only marsupial.

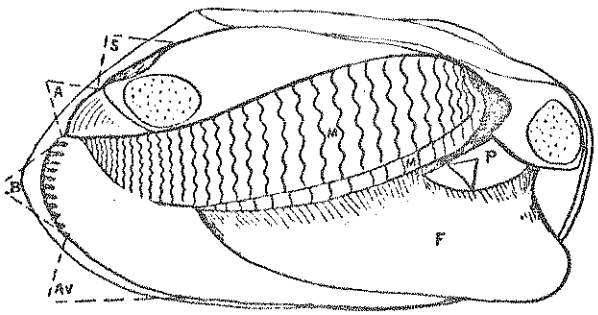

Fig. 165

Type: *Unio tetralasmus* Say, fig. 164. Animal, fig. 165.

Genus LASTENA Rafinesque, 1820.

Shell elongated, subsolid, inequilateral, generally wider in front, rounded and truncate at the anterior base, pointed at the post-basal region, and having a low posterior ridge, with one or more secondary ridges above it; beaks low, sculptured with a few coarse, irregular, longitudinal folds; epi-

Fig. 166

dermis shining, often rayed; a single imperfect tooth in each valve and sometimes vestiges of laterals; nacre purplish shading to blue at the edge; pallial line radially ridged.

Animal having the foot very large, as long as the shell when extended, of a subcylindrical, compressed shape, with a distal swelling. The middle portion of the outer gills only marsupial. Glochidia semicircular, slightly oblique, inequivalve, without points or hooks.

Type: *Anodonta (Lastena) lata* Raf., fig. 166.

Genus GONIDEA Conrad, 1857.

Shell elongated, subtriangular, much narrowed in front, wide behind, inflated, subsolid, usually with a high, sharp posterior ridge; beaks rather sharp but not high, the sculpture consisting of a few, strong, concentric bars: epidermis rayless; hinge with a rudimentary pseudocardinal and lateral in each valve, though these are sometimes wanting; pallial line with a trace of a sinus behind; nacre lurid to purplish.

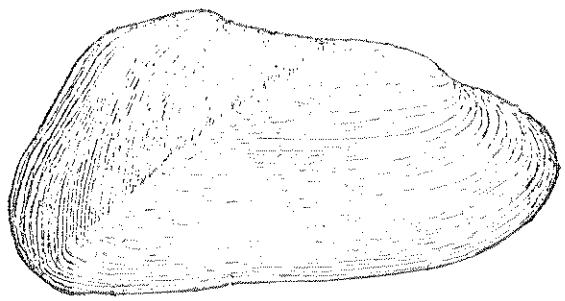

Fig. 167

Female having all four gills marsupial; with well developed septa, running parallel to the gill filaments and forming water tubes; septa not all continuous, but are often interupted, chiefly so toward the proximal (basal) part of the gill and, towards the edge, frequently shorter septa are intercalated. Glochidia subovate or nearly subcircular, without hooks.

Type: *Anodonta angulata* Lea, fig. 167.

Subfamily ANODONTINÆ Ortmann, 1912.

"Inner lamina of inner gill free from the abdominal sac, or more or less connected with it, rarely entirely connected; supra-anal opening well separated from the anal, sometimes the connection of the mantle separating it from the anal is very long and the supra-anal is quite short; branchial opening well defined, no papillæ or flaps in front of it on the edge of the mantle; marsupium formed by the outer gills in their length, distending, when

el[illegible]ed, and the thickened tissue at the edge capable of stre[illegible] [illegible] tion transverse to the gill, but not beyond the edge (or on[illegible] so): water-tubes in the gravid female divided longitudinally in [illegible], with only the one in the middle used as an ovisac, and closed at the base of the gill; glochidium semicircular or triangular, with a spine (hook) in the middle of the ventral margin of each valve; shell generally very heavy, often thin, never round, but more or less elongated; color of epidermis generally bright and with color markings; sculpture of the beak double-looped or concentric, in the latter case often extremely heavy; hinge rarely complete and, if so, of peculiar structure; generally there is a distinct tendency toward the reduction of the hinge-teeth, and often they are completely absent; sexual differences in the shell very rarely present." (Ortmann.)

Key to the genera of *Anodontinæ*.

1. { Beak sculpture concentric .... 2.
   { Beak sculpture double-looped .... 4.

2. { Beak sculpture fine .... *Anodontoides.*
   { Beak sculpture coarse .... 3.

3. { Pseudocardinals well developed .... *Alasmidonta.*
   { Pseudocardinals rudimentary .... *Strophitus.*

4. { Hinge wholly edentulous .... *Anodonta.*
   { Hinge teeth more or less developed .... 5.

5. { Beak sculpture tubercular; surface tubercular or folded .... 6.
   { Beak sculpture not tubercular; surface smooth except on posterior slope .... 7.

6. { Beak sculpture strong and continuous with tubercular surface sculpture .... *Arcidens.*
   { Beak sculpture poorly developed and not continuous with surface sculpture .... *Arkansia.*

7. { Beak sculpture double-looped; pseudo-cardinals fully developed .... *Lasmigona.*
   { Beak sculpture open behind; a single pseudo-cardinal in each valve .... *Simpsoniconcha.*

Genus STROPHITUS Rafinesque, 1820.

Shell elliptical to rhomboid, inflated, subsolid, pointed or biangulate behind, with a low posterior ridge, which is sometimes double; beaks full, sculpture consisting of a few, strong, concentric ridges, which curve sharply

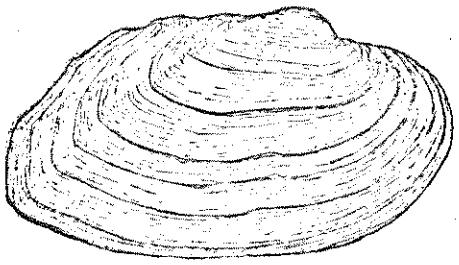

Fig. 168

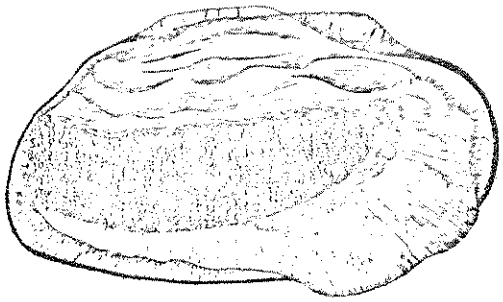

Fig. 169

upwards behind; epidermis rayed or rayless, shining; hinge line incurved in front of the beaks; teeth rudimentary, a vestigial, compressed tooth in each valve, and sometimes a secondary tooth; laterals rarely present. Marsupium occupying the whole of the outer gills, consisting of short, horizontal ovisacs, which run directly across the gills.

Type: *Anodonta undulata* Say.
Example: *S. edentulus* (Say), fig. 168. Animal, fig. 169.

Genus ANODONTA Lamarck, 1799.

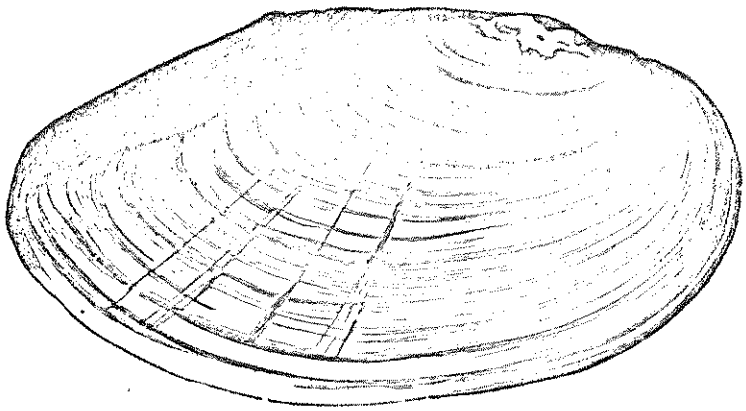

Fig. 170

Shell elliptical, thin, inflated, often slightly winged posteriorly; beak sculpture consisting of rather numerous, more or less parallel ridges, usually somewhat doubly looped and becoming slightly nodulous on the loops; surface generally smooth, shining; hinge edentulous, reduced to a mere line, regularly curved; nacre dull.

Marsupium occupying the whole outer gills, when filled forming a smooth, very thick, liver-colored pad.

Type: *Mytilus cygneus* L.

Example: *A. cataracta* Say, fig. 170. Animal, fig. 171.

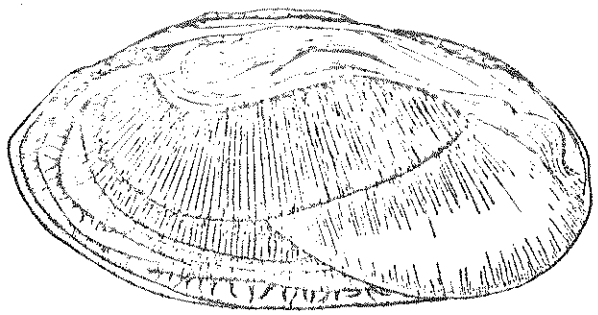

Fig. 171

Genus ANODONTOIDES Simpson, 1898.

Shell elliptical, inflated, thin, with a faint posterior ridge, sometimes constricted at the centre of the base; beaks rather full, with a few, not very coarse, subparallel, concentric ridges, which are curved up rather suddenly, behind and back of these are fine radiating ridges; epidermis smooth and

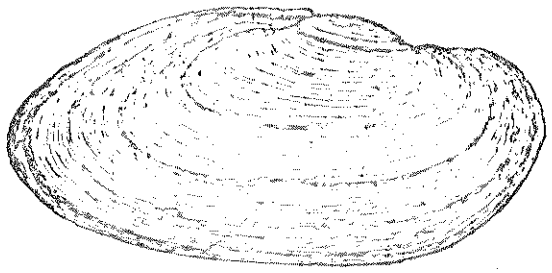

Fig. 172

shining, often rayed; hinge line slightly incurved in front of the beaks, edentulous or bearing the merest rudiments of teeth; nacre bluish-white. Marsupium occupying the outer gills only.

Type: *Anodonta ferussaciana* Lea, fig. 172.

Genus ARCIDENS Simpson, 1900.

Shell subsolid, inflated, subrhomboidal, with full high beaks; beak sculpture very strong, consisting of irregular corrugations, which fall into two loops, at the base of which the ridges are swollen into knobs that continue out in two radiating rows on to the disk of the shell; in front of and behind the beaks are many fine, radial wrinkles, the posterior ones being zig-

zigged; surface of the shell covered with oblique folds and wrinkles; epidermis dark olive, shining; left valve with two elongated, compressed pseudocardinals, the posterior under the beak and curved upwards, cutting off

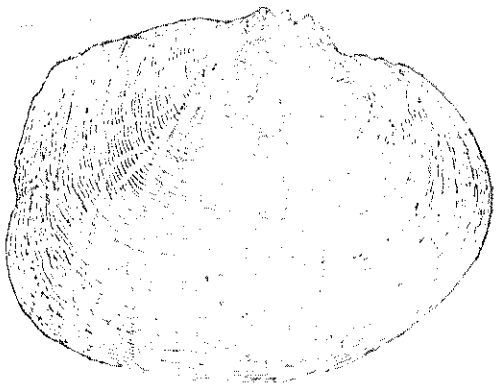

Fig. 173

the hinge plate in the right valve, which has a single, compressed pseudocardinal in front; laterals numerous, short, blurred; nacre white. Marsupium occupying the outer gills.

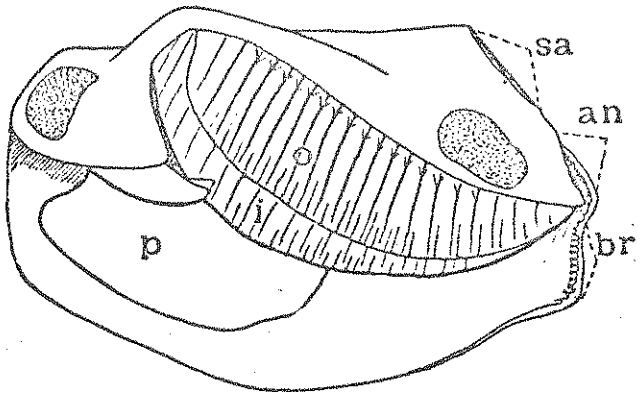

Fig. 174

Type: *Alasmodonta confragosa* Say, fig. 173. Animal, fig. 174.

Genus ARKANSIA Ortmann and Walker, 1912.

Shell moderately thick, subrotund to subovate or subrhomboidal, inflated, with full beaks. Disk sculptured with irregular, oblique folds, which are sometimes indistinct. Beak sculpture poorly developed, consisting of two to three double-looped bars, the loops slightly swollen or tubercular, dis-

appearing toward the disk and not continuous with the sculpture of the latter. Hinge well developed, with strong pseudocardinals, a very strong

Fig. 175

interdental projection in the left valve and well developed, strong, but rather short laterals.

Outer gills only marsupial.

Type: *Arkansia wheeleri* O. and W., fig. 175.

Genus LASMIGONA Rafinesque, 1831.

Shell elliptic-rhomboid, compressed; beaks low, their sculpture consisting of strong bars; one pseudocardinal in the right valve and two in the left, the hinder somewhat Λ-shaped, cutting off the hinge-plate in the right valve; laterals generally imperfect. Marsupium thick, padlike, filling the outer gills.

Key to the subgenera of *Lasmigona*.

1. Shell corrugated on posterior slope ..... *Lasmigona s. s.*
   Shell smooth ..... 2.
2. Hinge teeth delicate ..... 3.
   Hinge teeth very heavy ..... *Pterosyn.*
3. Lateral teeth compressed, moderately developed ..... *Platynaias.*
   Lateral teeth nearly or quite wanting ..... *Alasminota.*

Subgenus PLATYNAIAS Walker, 1917.

Shell smooth, subsolid, shining, rayed; beak sculpture sharply double-looped; teeth delicate; laterals compressed, moderately developed.

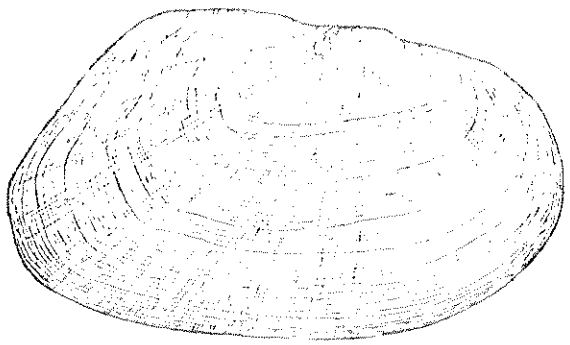

Fig. 176

Type: *Symphynota compressa* Lea, fig. 176.

Subgenus LASMIGONA s. s.

Shell subrhomboid, compressed, corrugated behind; beaks low, their sculpture consisting of several coarse ridges, which generally fall into two slight loops, and often with radiating ridges in front and behind; epidermis

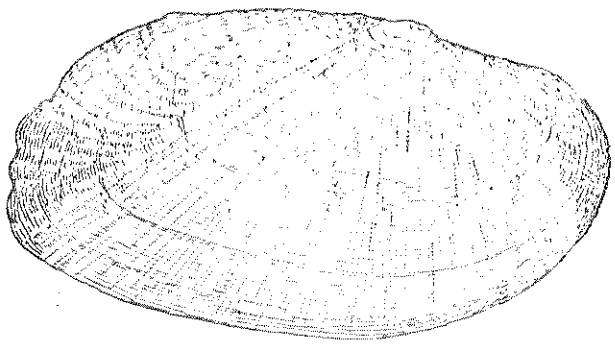

Fig. 177

shining; laterals partly developed, consisting of blurred ridges, which slope diagonally downward and backward on the hinge-plate; cavities of the beaks shallow.

Type: *Alasmidonta costata* Raf., fig. 177.

Subgenus ALASMINOTA Ortmann, 1914.

Shell elongated elliptical, rather small. Surface without sculpture. Pseudocardinals delicate; laterals nearly or quite wanting. Beak sculpture of heavy, consisting of four to six rather fine, sharp bars, the first one or

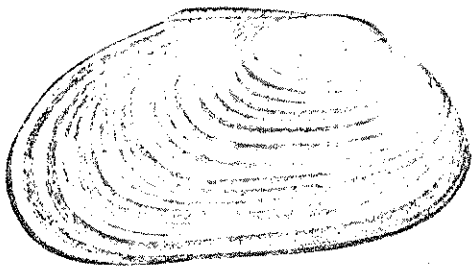

Fig. 178

two subconcentric, the following ones sharply double-looped, the posterior loop smaller, separated from the anterior by a deep, sharp, re-entering angle.

Type: *Margaritana holstonia* Lea, fig. 178.

Subgenus PTEROSYNA Rafinesque, 1831.

Shell large, ovate-rhomboid, inflated in the post-basal region; beaks much compressed; their sculpture sharply and strongly doubly looped; epidermis dark, scarcely rayed; teeth very heavy.

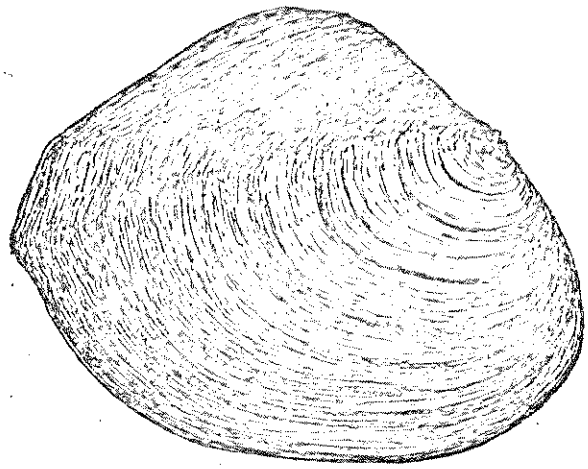

Fig. 179

Type: *Alasmodonta complanata* Bar., fig. 179.

Genus ALASMIDONTA Say, 1818.

Shell generally rhomboid, inflated, with a well developed posterior ridge, which ends in a point when it is single or a biangulation when double; beaks full and high, with coarse, concentric or slightly doubly looped bars; epidermis rayed, shining; hinge with two pseudocardinals in the left valve and one in the right; laterals usually wanting or imperfect, present in *Prolasmidonta*, cavity of the beaks deep; nacre bluish. Marsupium occupying the entire outer gills.

Key to the subgenera of *Alasmidonta*.

1. Lateral teeth present ..... *Prolasmidonta*.
   Lateral teeth absent or obsolete ..... 2.
2. Shell solid, pseudocardinals solid, stumpy ..... 3.
   Shell thinner, pseudocardinals compressed or imperfect ..... 4.
3. Shell ovate-rhomboid, inflated ..... *Alasmidonta s. s.*
   Shell smaller, compressed, very solid ..... *Pegias*.
4. Posterior slope slightly corrugated ..... *Rugifera*.
   Posterior slope smooth ..... 5.
5. Shell rhomboid, posterior ridge low, rounded ..... *Pressodonta*.
   Shell subtriangular, posterior ridge high, sharp ..... *Bullella*.

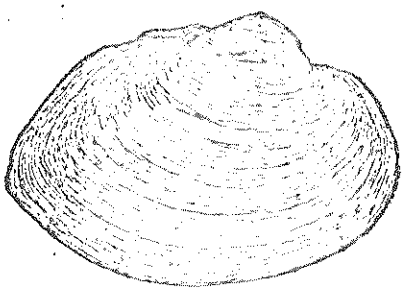

Fig. 180

Subgenus ALASMIDONTA s. s.

Shell ovate-rhomboid, solid, inflated, shining, with very strong, generally concentric, beak sculpture; pseudocardinals solid, stumpy, somewhat radiately ridged; laterals short, very imperfect or wanting; beak cavities deep, compressed.

Type: *Monodonta undulata* Say, fig. 180.

Subgenus PRESSODONTA Simpson, 1900.

Shell small, decidedly rhomboid, surface generally painted with unbroken rays; beak sculpture slightly corrugated; teeth compressed.

Type: *Unio calceolus* Lea, fig. 181.

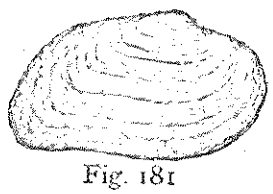

Fig. 181

Subgenus PROLASMIDONTA Ortmann, 1914.

Lateral hinge teeth present, but their number reversed, two in the right, one in the left valve. Beak sculpture moderately heavy, bars with an angle upon the posterior ridge and a slight sinus in front of it. Inner lamina of inner gills free. Female shell recognizable by a slight swelling in the region of the posterior ridge.

Fig. 182

Type: *Unio heterodon* Lea, fig. 182.

Subgenus PEGIAS Simpson, 1900.

Fig. 183

Shell small, thickened in front, with a sharp posterior ridge, in front of which is a wide, radial impression, ending in a basal sinus; above this ridge is another, making the shell decidedly biangulate and truncate behind; beak sculpture consisting of sub-conic corrugations, generally swollen on the posterior ridge; epidermis decorticated, but showing a few, dark radial rays on the base of the shell; pseudocardinals rather solid; laterals wanting.

Type: *Margaritana fabula* Lea, fig. 183.

Subgenus RUGIFERA Simpson, 1900.

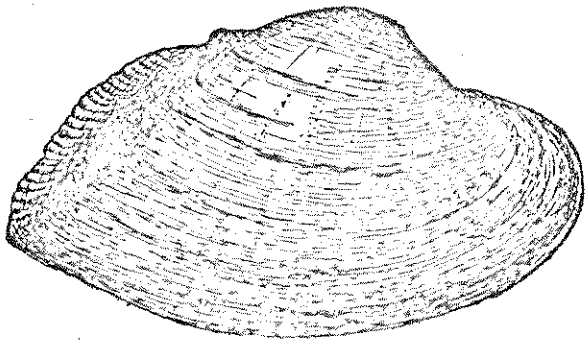

Fig. 184

Shell elongated, rhomboid, inflated, surface brilliantly painted with radiations which often break into dappled or splashed pattern of color; posterior slope slightly corrugated; teeth very imperfect; laterals wanting.

Type: *Alasmodonta marginata* Say, fig. 184.

Subgenus BULLELLA Simpson, 1900.

Shell thin, greatly inflated, somewhat triangular, with a high, sharp posterior ridge; beaks very full, having exceedingly strong, concentric sculpture, extending well on to the disk; pseudocardinals reflexed, compressed.

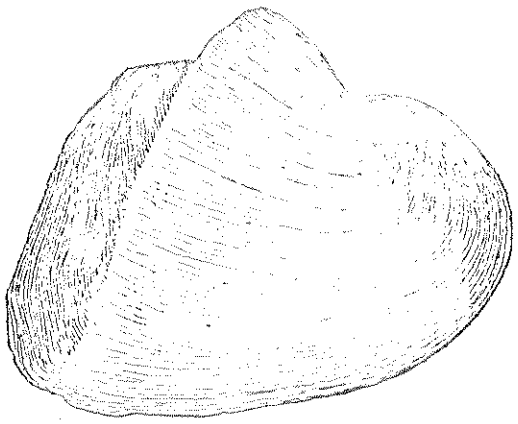

Fig. 185

Type: *Margaritana arcula* Lea, fig. 185.

Genus SIMPSONICONCHA Frierson, 1914.

Fig. 186

Shell small, elongate elliptical, rounded in front and behind, often slightly incurved at the central base; beak rather sharp, but not full; sculpture consisting of fine parallel ridges which are looped up in the middle and open behind; epidermis brownish, rayless; teeth imperfect, a single, irregular, compressed tooth in each valve; laterals nearly or quite wanting; anterior end of the shell much thickened; nacre dull whitish. Marsupium occupying the whole of the outer gills.

Type: *Alasmodonta ambigua* Say, fig. 186.

Subfamily LAMPSILINÆ Ortmann, 1912.

"Inner lamina of inner gills rarely more or less free from the abdominal sac, generally connected with it throughout; supra-anal opening separated from the anal, rarely entirely closed; branchial openings well defined; edge of the mantle in front of the branchial opening smooth to crenulated or with peculiar papillæ or a flap; marsupium rarely formed by the whole outer gill, generally only by or within the posterior part of the outer gill; edge of marsupium, when charged, distending and bulging out beyond the original edge of the gill, generally assuming a beaded appearance; water-tubes simple in the gravid female; glochidium semicircular or semi-elliptic,

without spine, rarely celt-shaped and with two spines; shell heavy or lighter, rounded, or oval to elongate; color of the epidermis rarely dull, mostly bright, with color markings; sculpture of the beaks generally double-looped, but often obsolete, more rarely concentric; hinge generally complete, with well developed teeth, which only in rare cases show a tendency to become reduced; sexual differences more or less noticeable in the shell, often very strongly expressed." (Ortmann.)

Key to the genera of *Lampsilinae*.

1. { Male and female shells alike .... 2.
   { Male and female shells different ....

2. { Shell elongate-triangular .... *Ptychobranchus*.
   { Shell rounded-triangular or oval .... 3.

3. { Shell oval, with a medial row of large tubercles .... *Obliquaria*.
   { Shell rounded-triangular, nodulously wrinkled or lachrymose .... 4.

4. { Epidermis painted with delicate mottlings on a light ground, beak cavities shallow .... *Cyprogenia*.
   { Epidermis painted with radiating hair-lines, beak cavities deep and compressed .... *Dromus*.

5. { Female shell more or less expanded in the post-basal region ...... 6.
   { Female shell slightly swollen just behind the middle of the base .... *Medionidus*.

6. { Dorsal margin winged .... 7.
   { Dorsal margin not winged .... 8.

7. { Pseudocardinals perfect; glochidium celt-shaped, with two spines .... *Proptera*.
   { Pseudocardinals rudimentary; glochidium semicircular, without spines .... *Paraptera*.

8. { Pseudocardinals well developed, complete .... 9.
   { Pseudocardinals divided into irregular laminæ .... *Glebula*.

9. { Shell with a distinct posterior ridge, dorsal-slope smooth .... 10.
   { Shell usually without a distinct posterior ridge, or when distinct, dorsal-slope radiately sculptured .... 11.

10. { Hinge heavy and strong; hinge-plate wide and flat .... *Plagiola*.
    { Hinge delicate; hinge-plate narrow .... *Amygdalonaias*.

11.	Marsupial expansion of the female shell of the same texture as the rest of the shell	12.
	Marsupial expansion of the female shell of different texture from the rest of the shell and usually radiately sculptured	*Truncilla.*
12.	Inner edge of the mantle in front of the branchial opening differentiated with papillæ or flaps	13.
	Inner edge of mantle in front of branchial opening without papillæ or flaps	16.
13.	Shell smooth	14.
	Shell strongly sculptured posteriorly	*Lemiox.*
14.	Beak sculpture double-looped	15.
	Beak sculpture concentric	*Carunculina*
15.	Inner edge of mantle in front of branchial opening in female distinctly papillate	*Ellipsaria*
	Inner edge of mantle in front of branchial opening in female with a ribbon-like flap	*Lampsilis*
16.	Shell inflated, usually higher than long	*Obovaria.*
	Shell subcompressed, longer than high	*Actinonaias.*

Genus PTYCHOBRANCHUS Simpson, 1900.

Shell triangular, solid, sometimes becoming arcuate in old specimens; umbonal region rather elevated; beak sculpture consisting of faint, somewhat broken ridges, which have a tendency to be doubly looped; posterior

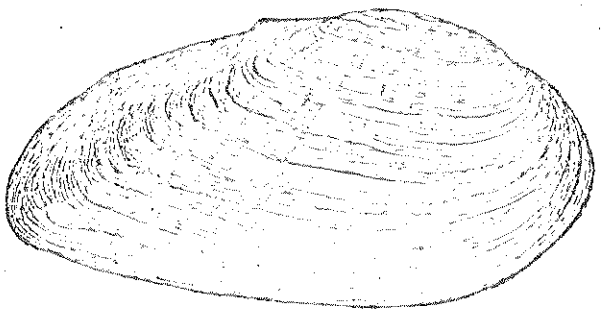

Fig. 187

ridge rounded, but well developed; epidermis usually painted with wavy hair-like rays or broken, radiating bars, which show a tendency to form square spots; hinge-plate rather wide and flat; pseudocardinals small, low, triangular and roughened; laterals club-shaped, remote.

Marsupium occupying the basal half of the entire length of the outer gills and having in front six to twenty beautiful folds; ovisacs distinct, each ending below in an enlarged, rounded bulb, which has a colored spot in the centre.

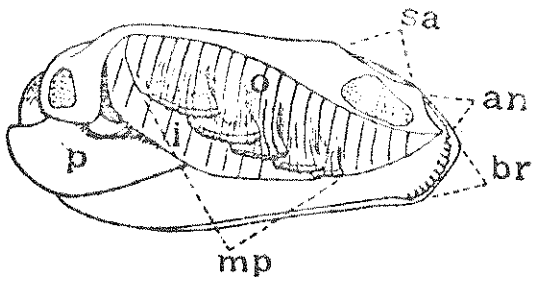

Fig. 188

Type: *Unio phaseolus* Hild., fig. 187. Animal, *P. subtentus* (Say), fig. 188.

Genus OBLIQUARIA Rafinesque, 1820.

Shell inflated, solid, oval, ending in a tolerably sharp point behind, having a row of large, compressed, longitudinal knobs running from the beaks to the centre of the base, those of one valve alternating with the knobs of the other, and a well developed posterior ridge, the space between the ridge and the knobs somewhat excavated; posterior slope and sometimes the entire shell more or less corrugately sculptured; beaks prominent, incurved and pointed slightly forward toward a tolerably well developed lunule; beak sculpture strong, consisting of four or five heavy, parallel ridges, which fall

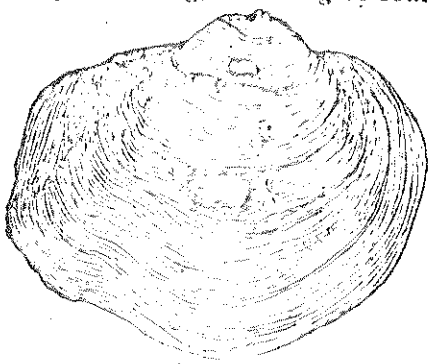

Fig. 189

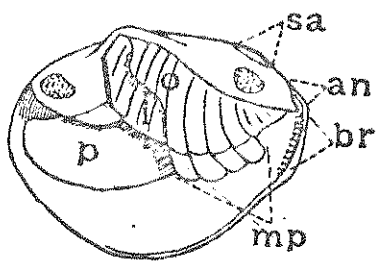

Fig. 190

low in front, but are curved upwards behind; epidermis smooth, generally shining, painted with numerous, delicate, wavy, darker, broken rays; pseudo-cardinals strong, distinct and ragged; laterals short, nearly straight; front part of the shell very solid, suddenly becoming rather thin, just behind the knobs. Marsupium consisting of a few, distinctly marked ovisacs (4 to 7) occupying a position just behind the centre of the outer gills, projecting far below the rest of the branchiæ, their bases rounded.

Type: *O. reflexa* Raf., fig. 189. Animal, fig. 190.

Genus DROMUS Simpson, 1900.

Shell solid, rounded triangular; beaks well forward, rather high; beak sculpture consisting of fine ridges running parallel with the growth lines, the furrows between the ridges interrupted at the posterior ridge; posterior ridge distinct; a series of humps runs from the beaks down to the central part of the base of the shell, which is otherwise sculptured by irregular, concentric ridges; epidermis beautifully painted by undulated, radiating,

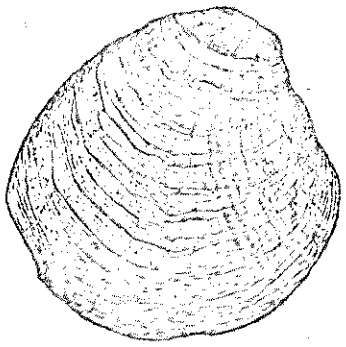

Fig. 191

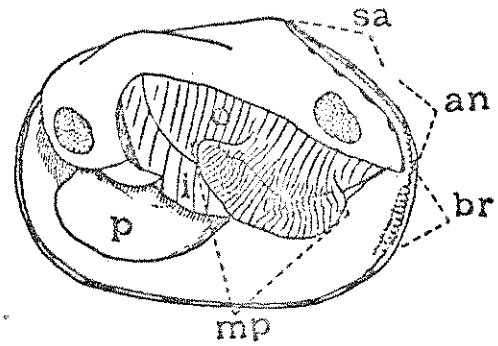

Fig. 192

broken hair-lines or fine maculations; hinge plate wide and flat; pseudocardinals triangular, small and low, ragged; laterals low, short, club-shaped; cavity of the beaks deep and compressed; front part of the shell very thick, suddenly becoming thinner at the row of humps. Marsupium occupying the base of nearly the whole outer gills in numerous narrow ovisacs, which extend beyond the original edge of the gill.

Type: *Unio dromas* Lea, fig. 191. Animal, frontispiece, fig. 192.

Genus CYPROGENIA Agassiz, 1852.

Shell solid, inflated, rounded, triangular, sometimes slightly retuse, generally a little biangular behind; posterior ridge usually well developed; umbonal region flattened parallel with the axis of the shell, sometimes com-

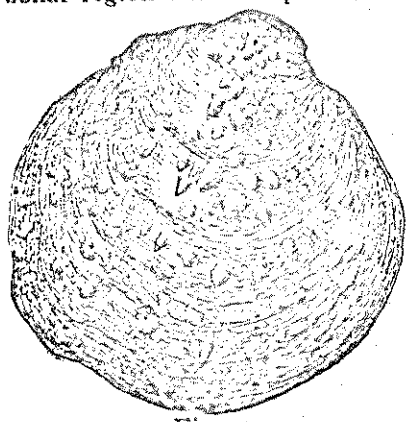

Fig. 193

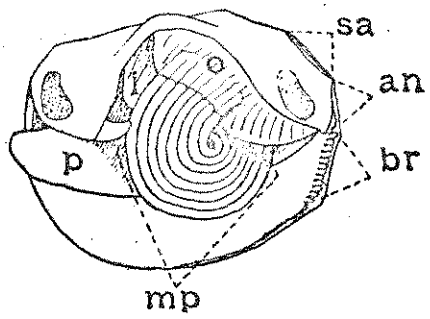

Fig. 194

pressed; beaks curved inward and forward, their sculpture very faint, consisting of slightly double looped ridges; sculpture of the shell nodular, radiately wrinkled or lachrymose; ligament black and conspicuous; lunule distinct, well developed; epidermis shining, painted with delicate mottling on a light ground; hinge plate wide and flat; pseudo-cardinals heavy, triangular, blunt and ragged; laterals short, obliquely striated; cavity of the beaks not deep; nacre bright and silvery.

Marsupium consisting of from seven to twenty-three very large purple ovisacs pendant from near the central base of the outer gills and formed into a close coil with the ends turned inward.

Type: *Unio irroratus* Lea, fig. 193. Animal, fig. 194.

Genus PLAGIOLA (Rafinesque, 1819), Agassiz.

Shell solid, surface irregularly, concentrically ridged; epidermis smoothish, but here and there wrinkled; painted with larger and smaller scattered rays, which are generally broken into irregular lunate or squarish blotches;

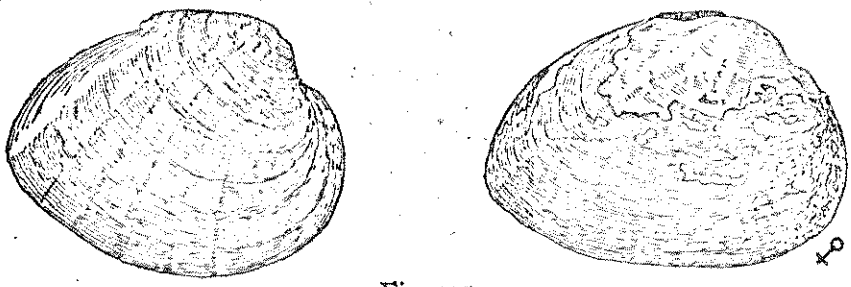

Fig. 195

hinge heavy and strong; hinge plate wide and flat; female shell smaller than the male, more inflated and swollen at the post basal region. Marsupium large, projecting far below the inner gills.

Type: *Unio securis* Lea, fig. 195.

Genus AMYGDALONAIAS Fischer and Crosse, 1893.

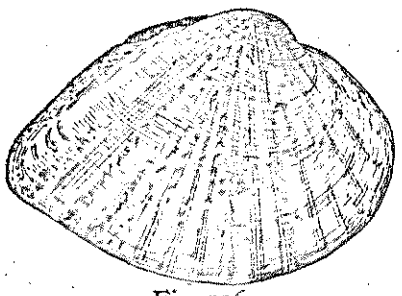

Fig. 196

Shell inflated, decidedly truncate at the posterior slope; surface slightly concentrically sculptured; posterior ridge sharp and well defined; epidermis shining, sometimes wrinkled, looped and painted with a beautiful pattern of broken or arrow-marked rays; area of the beaks flattened off in the direction of the axis of the shell, but not compressed; beak sculpture delicate, somewhat broken and doubly looped, the anterior loop rounded, the posterior sharp below, the ribs fading out where they cross the posterior ridge; hinge

delicate; pseudo-cardinals rather compressed, high and ragged; hinge plate narrow; female shell very slightly swollen at the post-base. Marsupium consisting of numerous, distinct ovisacs and having a well marked sulcus extending around it at some distance above its base.

Type: *Unio comptus* Lea.

Example: *P. elegans* (Lea), fig. 196.

Genus MEDIONIDUS Simpson, 1900.

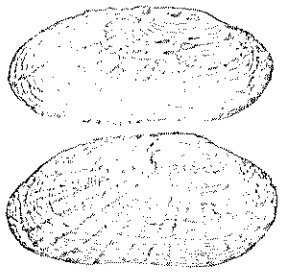

Fig. 197

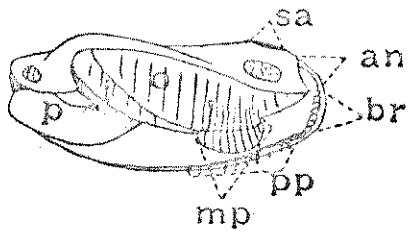

Fig. 198

Shell elongated, rather inflated, often arcuate when adult, sometimes having a posterior ridge; dorsal slope and occasionally the posterior portion of the shell plicately or nodulously wrinkled; epidermis smooth and bright, variagated with broken green rays and blotches; beak sculpture consisting of rather fine, subparallel, often broken ridges in two loops, the anterior rounded, the posterior somewhat angled, occasionally broken into zigzags; pseudo-cardinals small, stumpy and somewhat roughened; laterals rather short, slightly curved and club-shaped; female shell slightly swollen behind the middle of the base. Marsupium occupying the central posterior part of the outer gills, sometimes extending nearly their whole length.

Type: *Unio conradicus* Lea, fig. 197. Animal, fig. 198.

Genus GLEBULA Conrad, 1853.

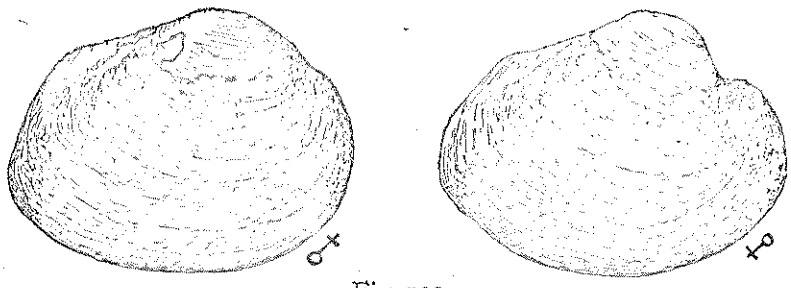

Fig. 199

Shell solid, much inflated, short, elliptical, bluntly pointed and slightly biangulate behind, with a low, posterior ridge; female shell swollen at the

post-base; beaks compressed, sculpture unknown; epidermis brownish, cloth-like; pseudo-cardinals divided into irregularly radiating, granular lamina, sometimes to the number of a dozen or more in each valve; hinge-plate reduced to a mere rounded line behind the pseudo-cardinals; laterals short, remote. Ovisacs apparently separated from each other by a sulcus.

Type: *Unio rotundata* Lam., fig. 109.

Genus PROPTERA Rafinesque, 1819.

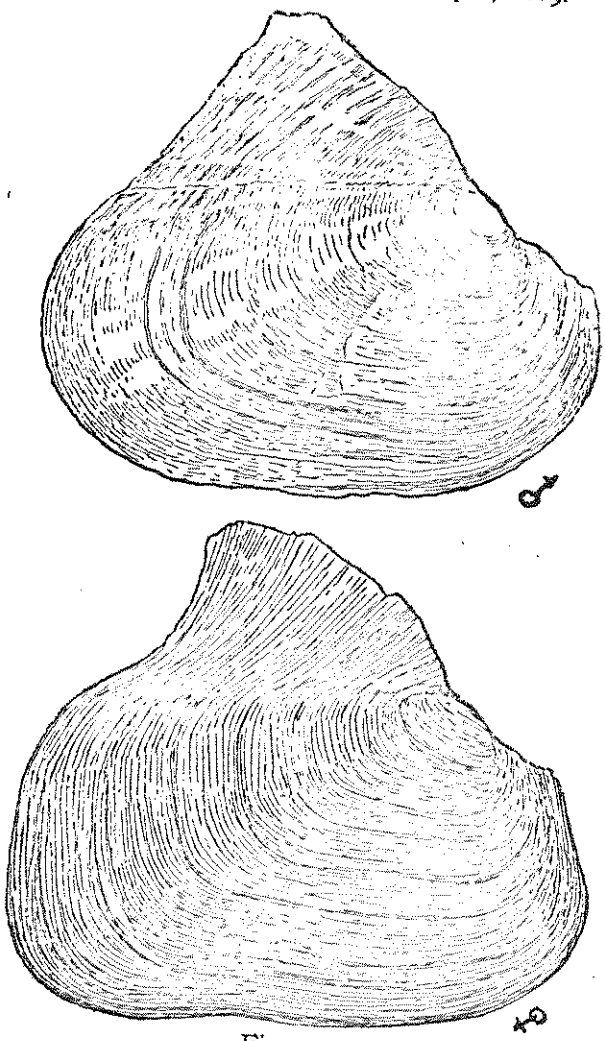

Fig. 200

Shell usually large, gaping at anterior edge and edge of dorsal slope, winged along the dorsal region when young and often when adult; beak

sculpture feeble, consisting, when developed, of an anterior and posterior loop, the former often wanting; epidermis generally brown, often cloth-like when fresh, rayless or feebly rayed; teeth rather compressed, pseudo-cardinals frequently imperfect or nearly wanting; laterals remote. Marsupium kidney-shaped, consisting of numerous ovisacs occupying the posterior part of the outer gill; edge of mantle in female slightly lamellar in front of the branchial opening with granulations, but without papillæ. Glochidia celt-shaped, with two spines, one at each of the ventral corners.

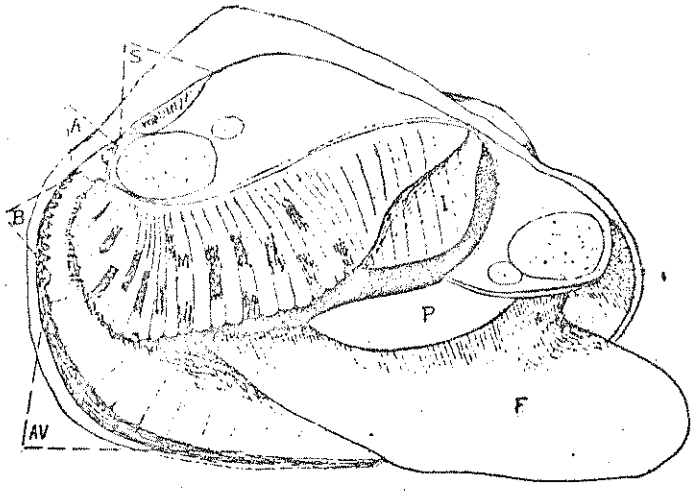

Fig. 201

Type: *Unio alatus* Say, fig. 200. Animal, fig. 201.

Genus PARAPTERA Ortmann, 1911.

Shell large, thin, elliptical or slightly obovate, more or less compressed, winged on the dorsal margin; beaks low; epidermis rather smooth, often feebly rayed, dull colored, but usually glossy; teeth compressed, pseudo-cardinals but feebly and often imperfectly developed; nacre purplish. Male and female shells nearly alike, the latter scarcely swollen at post-basal region.

Marsupium kidney-shaped, swollen, consisting of many ovisacs occupying the posterior part of the outer gill; mantle edge of the female slightly

lamellar in front of the branchial opening, with crenulations, but not with papillæ. Glochidia very small, of suboval shape.

Fig. 202

Type: *Unio gracilis* Bar., fig. 202.

Genus OBOVARIA Rafinesque, 1819.

Shell short, oval, rounded or retuse, solid, inflated, thick in front, thinner behind, with high beaks, which are sculptured with very faint, irregular, often broken and slightly nodulous ridges, which show a tendency to fall into two loops, the posterior often open behind; epidermis dull, brownish, silky or cloth-like, rarely rayed, rays indistinct; female shell but slightly inflated in the post basal region, commonly having a shallow furrow or a flattened area at the posterior end; pseudo-cardinals solid; stumpy; laterals short, club-shaped. Marsupium kidney-shaped, projecting far below the edge of the gill and occupying the posterior portion of the outer gills.

Key to the subgenera of *Obovaria.*

Shell retrorse to short oval, beaks high and central.....*Obovaria s. s.*
Shell elliptical, beaks anterior.....*Pseudoön.*

Subgenus OBOVARIA s. s.

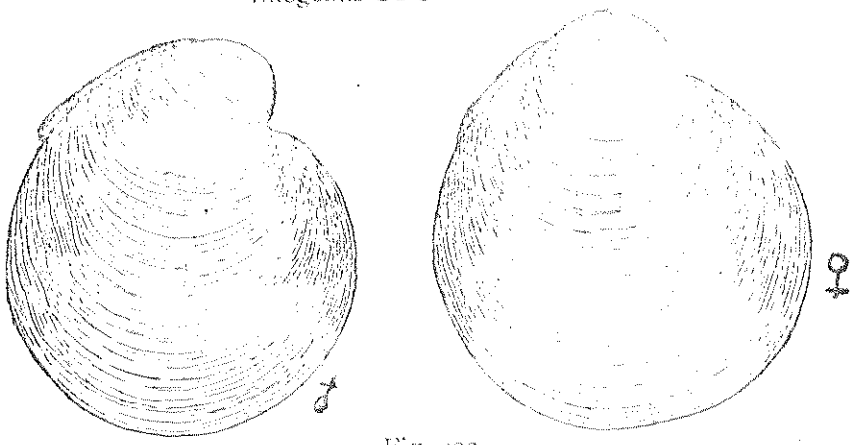

Fig. 203

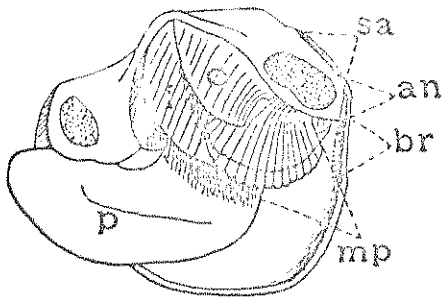

Fig. 204

Shell retrorse to short oval; beaks high, central; pseudo-cardinals rarely parallel with the laterals; cavity of the beaks deep, subcompressed; nacre bluish-white or purple. Marsupium as in the genus.

Type: *Unio retusa* Lam., fig. 203. Animal, fig. 204.

Subgenus PSEUDOÖN Simpson, 1900.

Shell elliptical, inflated, solid; that of the male slightly pointed at the upper posterior part; epidermis brownish or blackish, rayless or very feebly

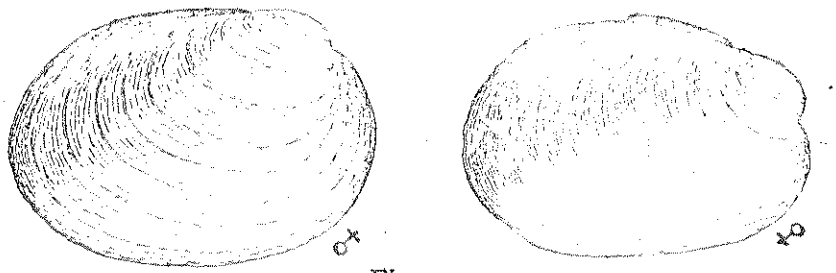

Fig. 205

rayed; beaks anterior; pseudo-cardinals solid, stumpy or slightly elongate in age, and showing a tendency toward being parallel with the laterals; nacre silvery, iridescent posteriorly. Marsupium kidney-shaped, not reaching to the posterior end of the outer gill, though extending quite well forward.

Type: *Unio ellipsis* Lea, fig. 205.

Genus ACTINONAIAS Fischer and Crosse, 1893.

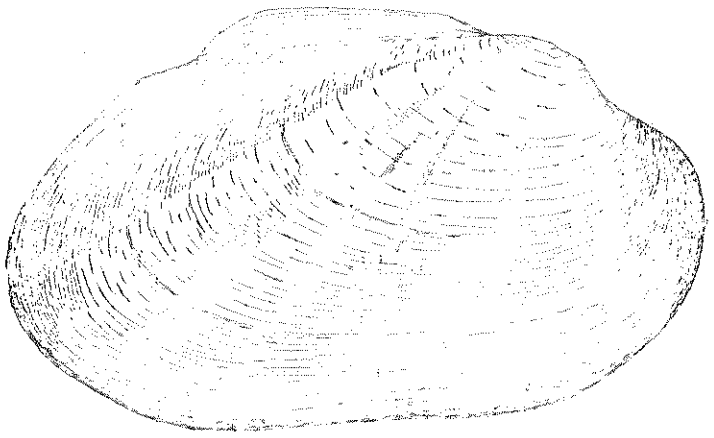

Fig. 206

"Shell ovate or subelliptical, distinctly longer than high, compressed or slightly inflated, without, or with, indistinct posterior ridge. Disk not sculptured. Beaks moderately anterior, never in the middle of the shell and never very near the anterior end. Beak-sculpture poorly developed, consisting of a few faint bars, which have a tendency to become double-looped, with the central part between the loops obliterated. Epidermis yellowish to greenish, generally with distinct rays. Male and female shells differing in shape, but the difference often hardly noticeable.

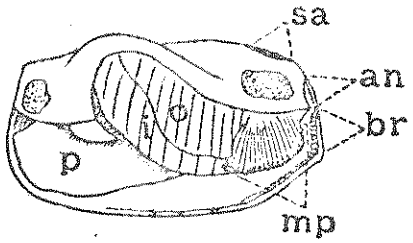

Fig. 207

Soft parts agreeing with those of Obovaria in every respect: the glochidia also of the same type." (Ortmann.)

Type: *Unio sapotalensis* Lea, (animal), fig. 207.

Example: *A. ligamentinus* (Lam.), fig. 206.

Genus CARUNCULINA Simpson, 1898.

Shell small, inflated, obovate, rather soft, with a thick dark epidermis, which is rayless or only feebly rayed; beak sculpture consisting of rather strong, concentric ridges, which form, as a general thing, only a single crowded loop in front and are strongly curved upward behind. Pseudo-

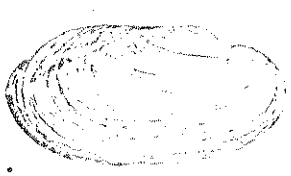

Fig. 208

Fig. 209

cardinals compressed, smooth on the inside, generally reflected upward, somewhat torn on the edges. Shell quite commonly pointed posteriorly, that of the female truncated obliquely on the post-base. Marsupium kidney-shaped, formed by a few large ovisacs, projecting beyond the gill; female having a well developed caruncle on the inner edge of the mantle in front of the branchial opening.

Type: *Unio parvus* Bar., fig. 208. Animal, fig. 209.

Genus EURYNIA Rafinesque, 1820.

Shell oval to oblong; surface smooth; beak sculpture delicate, double-looped; female shell more or less expanded or swollen in the post-basal region.

Inner edge of the mantle in the female distinctly papillate. Marsupium kidney-shaped, ocupying the posterior part of the outer gill.

Key to the subgenera of *Eurynia*.

Shell elongate, more or less pointed behind.

Papillæ on inner edge of mantle regular, uniform, reaching to middle of lower margin..... *Eurynia s. s.*

Shell subovate or subelliptical, not much pointed behind.

Papillæ on inner edge of mantle irregular, not reaching to middle of lower margin..... *Micromya.*

Subgenus EURYNIA s. s.

Shell usually of good size, subelliptical, elongated, more or less pointed behind; beak sculpture double-looped, the posterior loop often open behind.

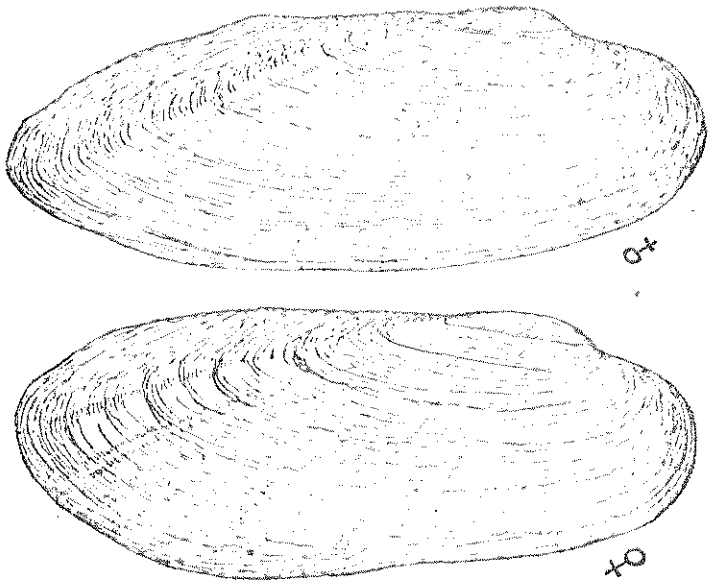

Fig. 210

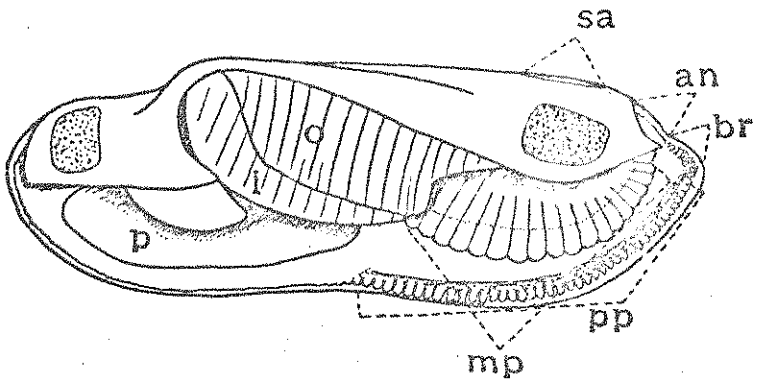

Fig. 211

Inner edge of the mantle in the female in front of the branchial opening with a long row of quite regular, uniform, subequal papillæ, reaching to about the middle of the lower margin.

Type: *Unio recta* Lam., fig. 210. Animal, fig. 211.

Subgenus MICROMYA Agassiz, 1852.

Shell small or of medium size, suboval or subelliptical, not very long and not much pointed behind; beak sculpture distinctly double-looped, but often obsolete, the posterior loop often showing a tendency to be open.

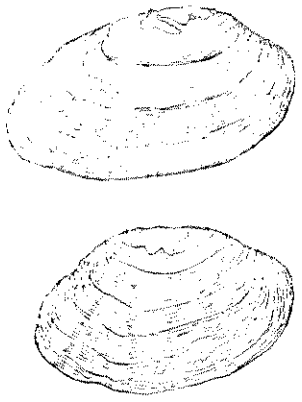

Fig. 212

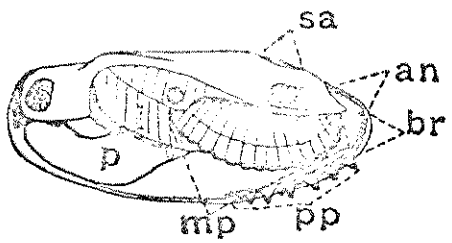

Fig. 213

Inner edge of the mantle of the female in front of the branchial opening with a shorter or longer row of rather irregular, larger and smaller papillæ, reaching not quite to the middle of the lower margin.

Type: *Unio fabalis* Lea, fig. 212. Animal, *E. iris* (Lea), fig. 213.

Genus LAMPSILIS Rafinesque, 1820.

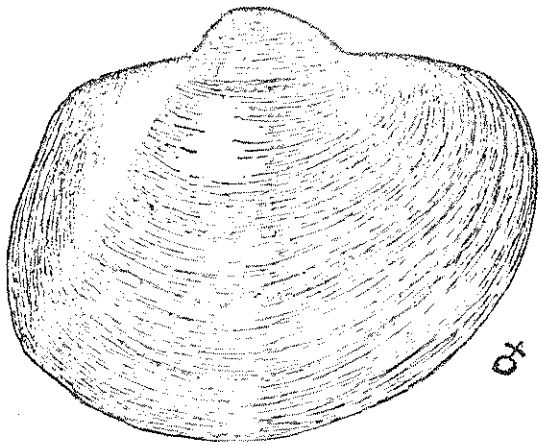

Fig. 214

Shell oval to elliptical, smooth or slightly, concentrically sculptured, usually without a posterior ridge; epidermis generally smooth and shining, often rayed; beak sculpture, consisting of double-looped, parallel ridges, sometimes the posterior loop open behind or the sculpture is obsolete; hinge

with one or two pseudocardinals and one lateral in the right valve, and two pseudo-cardinals and two laterals in the left; *female* shell having a strong inflation of the shell and dilatation in the post-basal region, producing a distinct posterior truncation of the shell. Marsupium kidney-shaped,

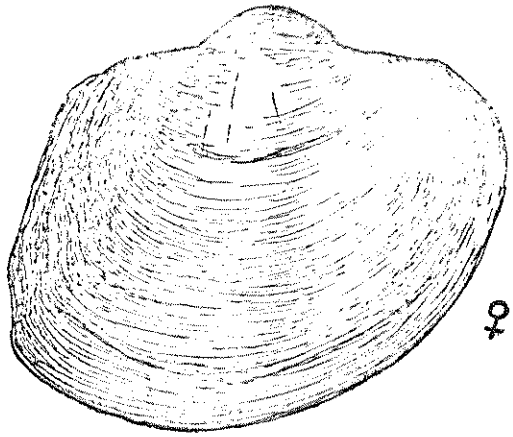

Fig. 214

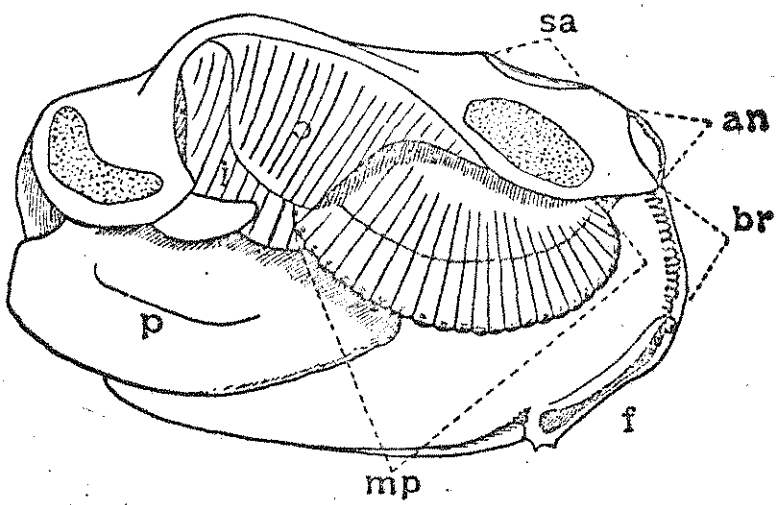

Fig. 215

occupying the posterior part of the outer gills; edge of the mantle of the female in front of the branchial opening developed into a ribbon-like flap, generally produced anteriorly into a full, projecting lobe, which has a lacerated appearance.

Type: *Unio ovatus* Say, fig. 214. Animal, fig. 215.

Genus LEMIOX (Rafinesque ??) Ortmann, 1916.

Shell triangularly ovate, solid, more or less inflated, with a low, rounded posterior ridge; beaks high, turned forward over a small lunule, sculpture distinctly double-looped; surface with strong, corrugated, subradial sculpture on the posterior half, which is divaricate on the posterior ridge and which sometimes covers the entire shell; epidermis clouded, dull green or yellowish green, usually feebly rayed; pseudocardinals low, subradial, ragged, two in the left valve, one to three in the right valve; laterals heavy, double in the left valve, partly double in the right; muscle scars small, impressed; nacre silvery white, iridescent behind, thicker in front. Male shell subovate or subtriangular, with a broad, shallow, radial depression in front of the posterior ridge or having the whole disk, at least, flattened. Female shell usually ovate, sometimes inflated, smaller than the male, with a feebly developed marsupial swelling, distinctly, but irregularly, denticulate on the margin, at the base near the posterior end.

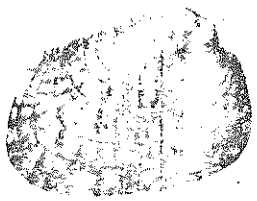

Fig. 216

Mantle margin of the female in front of the branchial opening denticulate on the outer margin. The inner margin has, just in front of the branchial, a few small papillæ and then is laminate and elevated and rather smooth and probably capable of some expansion.

Type: *Unio calatus* Con. (*Unio rimosus* Raf. ??), fig. 216.

Genus TRUNCILLA Rafinesque, 1819.

Shell rounded, oval or subtriangular, solid, inflated, generally smooth and rayed; beak sculpture delicate, often obsolete, double-looped; female shell very different from that of the male, having a very decided inflation in the post-basal region, which is thinner than the rest of the shell, of different texture, often toothed and usually radiately sculptured.

Inner edge of the mantle in the female in front of the branchial opening is not parallel to the outer edge, but is more or less remote from it, often quite distant from it and has finer or coarser papillæ. The mantle between the two edges is peculiarly spongy. Marsupium swollen, kidney-shaped, formed by many ovisacs, occupying the posterior portion of the outer gill.

Key to the subgenera of *Truncilla*.

1. Male shell smooth, no radiate, posterior furrow; female shell inflated along posterior ridge ..... *Truncilla s. s.*
   Male shell with a wide, radiate, posterior furrow ..... 2.
2. Female shell with a small, rounded, radial post-basal swelling ..... *Scalenaria.*
   Female shell with a greatly produced basal swelling, nearly in the centre of the base ..... *Dysnomia.*
   Female shell with a rounded, foliaceous swelling at the posterior base ..... *Pilea.*

Subgenus TRUNCILLA s. s.

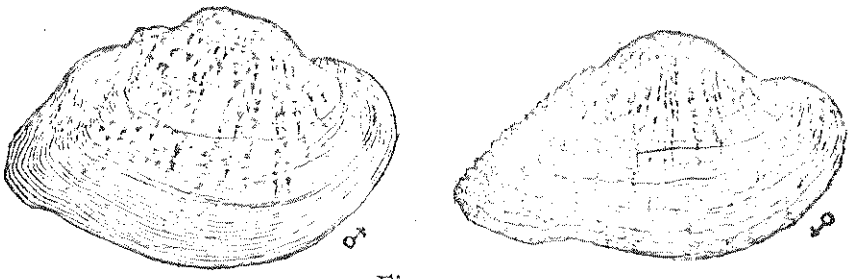

Fig. 217

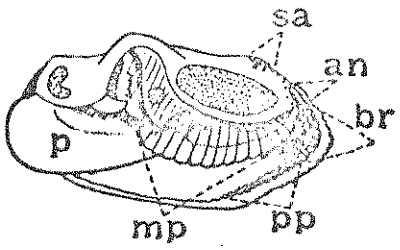

Fig. 218

Shell covered with broken rays, somewhat triangular and without a wide, radiate, posterior furrow.

Type: *T. triqueter* Raf., fig. 217. Animal, fig. 218.

Subgenus SCALENARIA (Rafinesque, 1820) Agassiz.

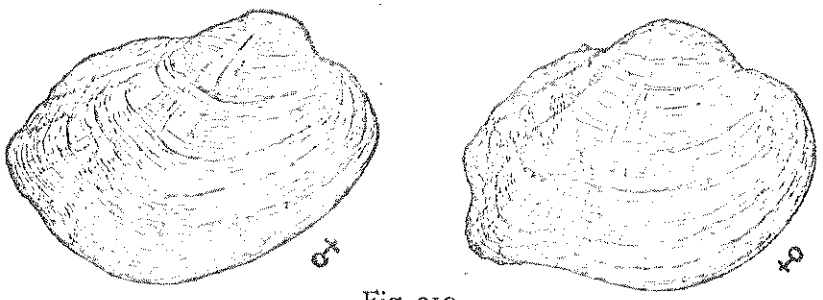

Fig. 219

Male shell having a wide, radiating, shallow depression in front of the posterior ridge; that of the female having a small, rounded, well-defined, radial post-basal swelling.

Type: *Unio sulcatus* Lea, fig. 219.

Subgenus DYSNOMIA Agassiz, 1852.

Shell of the male with a posterior and central radiating ridge, with a wide flattened space between, that of the female with a greatly produced

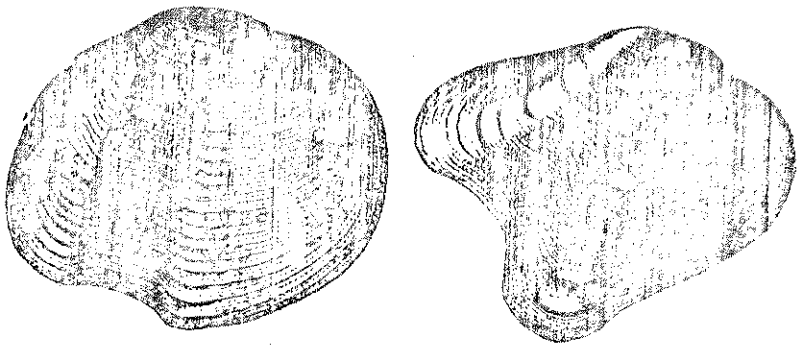

Fig. 220

inflation a little behind the centre of the base, being a continuation of the central ridge.

Type: *Unio foliatus* Hild., fig. 220.

Subgenus PILEA Simpson, 1900.

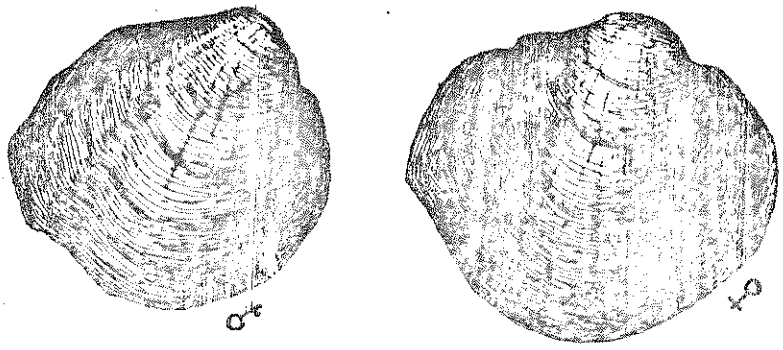

Fig. 221

Male shell with a wide, shallow, radiating depression in front of the posterior ridge, that of the female with a rounded foliaceous swelling at the posterior base.

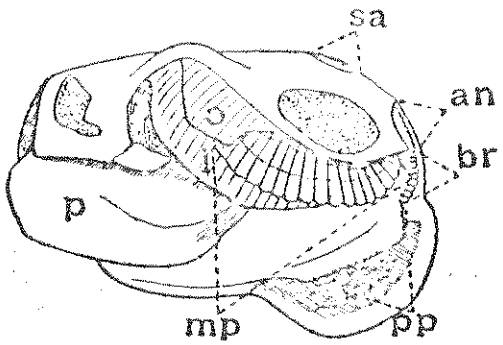

Fig. 222

Type: *Unio personatus* Say, fig. 221. Animal, *T. rangiana* (Lea), fig. 232.

Genus *incertæ sedis*.

Genus COKERIA Marshall, 1916.

"Shell gaping anteriorly, moderately thin, subquadrangular to subtriangular; abruptly rounded anteriorly, posterior margin nearly straight and perpendicular, dorsal margin straight, ventral margin gently curving throughout its entire length. Valves widest just in front of the posterior ventral angle. Umbones at about the anterior third of the dorsal margin,

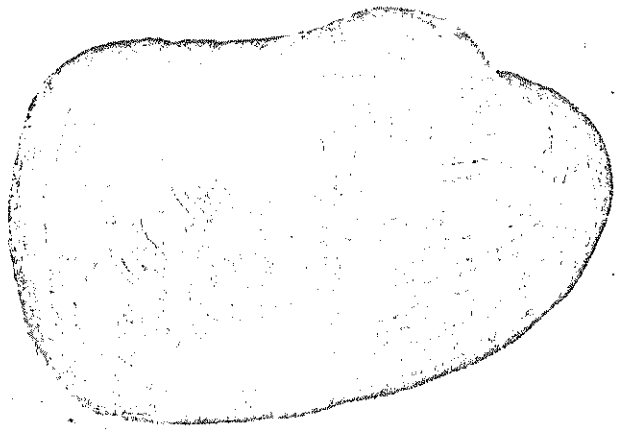

Fig. 223

high and incurved, the second growth line nearly horizontal. Posterior dorsal ridge very high, obtusely angular. Posterior area descending abruptly from the ridge and somewhat wing-like. Greatest inflation is along the umbonal ridge. A pronounced furrow extends from the umbo to the lower third of the posterior margin. Seven rest periods distinctly marked by con-

[illegible] from the middle port[illegible] [illegible] period. Dorsal area [illegible] chestnut, lighter (nearly straw col[illegible]) [illegible] posteriorly, rest stages sharply defined by blackish lines. Umbonal region faintly tinged with green. Periostracum thin, slightly glossy, closely adhering.

"Nacre anteriorly lustrous white and thickened; posteriorly thin violaceous and brilliantly iridescent. Pallial line not sharply defined and with several concentric striæ above it, its anterior portion radiately striated. Anterior adductor and retractor scars separated, deep and rough, posterior scars superficial. Dorsal scars concealed by the incurving of the upper portion of the valve.

"Lateral tooth of the right valve thin, very high, wing-like, striated longitudinally. Laterals of the left valve similar to that of the right valve, but smaller, the groove between them being very narrow. Pseudocardinals of the right valve two, thin, opposite, the upper one being the stronger. Pseudocardinals of the right (left?) valve coalescing, standing in the same straight line, the anterior one high, slightly curved, the posterior low, its summit irregularly crenulated. The sculpture of each umbo consists of four concentric ridges, highest (almost a nodule) at their posterior ends, and numerous concentric striæ." (Marshall).

Type: *Cokeria southalli* Marshall, fig. 223.

Family DREISSENSIIDÆ.

Shell mytiliform, equivalve, of prevailing prismatic substance, ligament subinternal; anterior adductor and pedal protectors inserted on a septum in the beak. Byssiferous.

Genus CONGERIA Partsch, 1835.

Type: *Congeria subglobosa* Partsch.

Typical Congeria is not represented in our fauna.

Subgenus MYTILOPSIS Conrad, 1857.

Shell mytiliform, attached by a byssus; hinge with a septum, beneath which on the cardinal side is a triangular cup-shaped, thin, white process, which projects obliquely towards the cavity of the valves; cartilage groove rather deep. Edge of the mantle united and extended posteriorly in two distinct siphons and open at the base for the extension of the foot.

Fig. 224

Type: *Mytilus leucophaeata* Con., fig. 224