

Madeira, where it certainly does not occur. The present variety may have been taken for it.

Lemniscia calva (Lowe) race ~~*veterina*~~ nov. Shell 11 mm. max. diam., sometimes as small as 9.5 mm. Pleistocene fossil in the beds east of Caniçal, Madeira, common. It is not certain that *calva* belongs to *Lemniscia*. Paiva's *galeata* is congeneric with *calva*. In the Norman collection at the British Museum, specimens of *calva* are labeled *galeata*.

NOTES ON THE NAIAD FAUNA OF THE UPPER MISSISSIPPI RIVER.*

II. THE NAIADES OF THE UPPER MISSISSIPPI DRAINAGE.†

BY N. M. GRIER AND J. F. MUELLER.

While it was the original intention to limit this list to those species actually found in the Mississippi river above its junction with the Ohio, the fullest consideration of the topic has led us to include all species authentically reported from the entire Upper Mississippi Drainage. The larger number of the listed species were collected while the writers were engaged in Mussel Survey and Appraisal work for U. S. Bureau of Fisheries in part of that region during the summer of 1920. The remaining species in the list have been obtained by the rechecking of the available literature dealing with or bearing upon the Naiades of this region as indicated in the accompanying bibliography. Species having an apparently doubtful or accidental record have been omitted. The nomenclature used is that recently formulated by Ortmann and Walker (12), but for convenience there is also added the equivalents of the different species in the synonymy of Simpson. (14)

*Published with permission of the Commissioner of Fisheries, Washington, D. C.

†Contribution from U. S. Biological Station, Fairport, Iowa, and Biological Laboratory Washington and Jefferson College.

- Fa
1. *Margaritana m*
Simpson—Illin
(1), and Call (3)
above this region
Family
Sub-Fa
 2. *Quadrula pust*
Simpson—enti:
and Danglede (1)
 3. *Quadrula pust*
Lea)
Geiser (5), and
did not encounter
from Fox River.
 4. *Quadrula nobis*
Simpson—Miss:
to Louisiana. V
abundantly at Fa
 5. *Quadrula quad*
Simpson—enti:
Casually distribu
 6. *Quadrula frugi*
Specimens are
Ia., and from th
Rivers, Illinois.
Strode (15).
 7. *Quadrula verru*
Simpson. Mis
Minn. Reported
(3). Not comm
 8. *Tritogonia nob*
Simpson repor
to Mississippi.
Bureau of Fisher

Family MARGARITANIDAE Ortmann.

1. *Margaritana monodonta* Say.

Simpson—Illinois and E. Iowa. Similarly reported by Baker (1), and Call (3), from the same regions. We did not find it above this region.

Family UNIONIDAE (D'Orbigny), Ortmann.

Sub-Family UNIONIDAE (Swainson), Ortmann.

2. *Quadrula pustulosa* (Lea).

Simpson—entire Mississippi drainage. Common. Wilson and Danglade (18), St. Croix drainage.

3. *Quadrula pustulosa prasina* (Conrad)=(var. *schoolcraftensis* Lea)

Geiser (5), and Call (3), report this shell from Iowa. We did not encounter it north of there. Reported by Lapham (9), from Fox River.

4. *Quadrula nodulata* (Raf.)=*Quadrula pustulata* (Lea).

Simpson—Mississippi R. and tributaries from E. Iowa south to Louisiana. We did not collect this species. It is found abundantly at Fairport, Iowa in the main river.

5. *Quadrula quadrula* (Raf.)=*Quadrula lachrymosa* (Lea).

Simpson—entire Mississippi drainage. St. Croix drainage. Casually distributed.

6. *Quadrula fragosa* (Con.).

Specimens are known from Iowa City, Iowa, Cedar River, Ia., and from the Spoon, Kaskaskia, Illinois and Mississippi Rivers, Illinois. Closely related to the preceding species. *Vide* Strode (15).

7. *Quadrula verrucosa* (Raf.)=*Tritogonia tuberculata* (Barnes).

Simpson. Mississippi drainage area generally. Red Wing, Minn. Reported from S. Minnesota by Lapham (9), and Call (3). Not common.

8. *Tritogonia nobilis* (Conr.).

Simpson reports this shell from the Red River of the North to Mississippi. We did not collect this shell, although the Bureau of Fisheries has it recorded from L. Pepin.

iv. The present variety

v. Shell 11 mm. max.

Pleistocene fossil in the

It is not certain that

cata is congeneric with

British Museum, speci-

ER MISSISSIPPI RIVER.*

MISSISSIPPI DRAINAGE.†

WELLER.

limit this list to those

river above its junc-

on of the topic has led

ported from the entire

number of the listed

were engaged in Mussel

bureau of Fisheries in

1920. The remaining

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g upon the Naiades of

anying bibliography.

accidental record have

that recently formu-

for convenience there

nt species in the syn-

of Fisheries, Washington,

port, Iowa, and Biological

age area except its southern portion. Red Wing. Abundant locally.

undulata (Lea).
Iowa.

Quadrula heros (Say).

age area generally. Rare in L. e than below it.

Quadrula undulata (Barnes).

age area generally. Wilson and drainage. Common. Believed by tributary stream species.

Q. plicata (Say).

south to Arkansas, etc. Wilson drainage.

Quadrula ebenus (Lea).

age area generally, except western part go into N. and C. Minnesota. Minn. No longer common.

rubiginosa (Lea).

drainage. Wilson and Dangle drainage. A tributary stream species.

Mississippi drainage. Var. *trigona* abundant in L. Pepin. Reported common.

Q. tuberculata Raf.

age area generally. This species in certain areas of the Upper Missouri. According to Clark this is stream species.

Q. granifera (Lea).

va. Baker (1), found it at Mc-his species from L. Pepin to Fair-

19. *Plethobasus cyphus* (Raf.)=*Pleurobema aesopus* (Green).
Reported by Grant (6) and Holzinger (7) from Minnesota. We encountered our first specimen of it at the foot of L. Pepin. Comparatively rare and more abundant at present in the sloughs.

20. *Pleurobema cordatum* (Raf.)=*Q. obliqua* (Lea).

Reported by Baker (1) from Iowa. Specific localities are desirable. Probably more southern in distribution. Ortman considers this species as not specifically different from *Pleurobema coccineum* (Con.).

21. *Pleurobema catillus* (Conr.)=*Q. solida* (Lea).

Simpson, Mississippi R. north to Minnesota. Collected above Red Wing. According to Wilson and Dangle (18) no "Quadrulae" are found in the Mississippi River proper above the falls of St. Anthony, a fact which has a bearing upon the distribution of all mussels of the *Quadrula* type in these regions.

22. *Pleurobema coccineum* (Con.)=*Q. coccineum* (Con.).

Simpson—entire Upper Mississippi drainage. Wilson and Clark, drainage of Red River of the North. We did not encounter it. It is apparently a small tributary species.

(To be continued.)

RAMBLES OF A MIDSHIPMAN II.

BY P. S. REMINGTON, JR.

After leaving Guantanamo, Cuba, the squadron headed south for the Panama Canal. We passed within sight of Jamaica but did not stop, much as I should have liked to collect there. For several days we drove steadily on, manoeuvring as we went. It was a most maddening sight to me after we had made a good day's run, to see the Admiral mount the bridge and commence sending up signals for manoeuvres which would turn us about and start us back toward Cuba. However, schedules are inflexible things in the Navy, and we must not arrive ahead of time.

At length we awoke one morning to see the white-topped mountains of Panama coming in view over the horizon, and

1852. Gould, A. A. *Mollusca and Shells*. (*Chloræra leonina*, syn. *Melibe leonina* Gould.) United States Expedition, during years 1838, 1839, 1840, 1841, 1842. Under the command of Charles Wilkes, U. S. N. Page 310. Boston.
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NOTES ON THE NAIAID FAUNA OF THE UPPER MISSISSIPPI RIVER. *

II. THE NAIADES OF THE UPPER MISSISSIPPI DRAINAGE. †

BY N. M. GRIER AND J. F. MUELLER.

(Continued from page 49.)

23. *Pleurobema pyramidatum* (Lam.)=*Q. pyramidatum* (Lam.)
Simpson—north in the Mississippi to Prairie du Chien, Wisconsin. We collected specimens of it in L. Pepin.
24. *Pleurobema clava* (Lam.).
Simpson's records of this species from Minnesota and Iowa are considered doubtful (see Ortmann, 1). It may be present nearer the Ohio. Probably of a tributary type.
25. *Elliptio crassidens* (Lam.)=*Unio crassidens* (Lam.).
Reported by Holzinger (7) from Winona County, Minn.

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†Contribution from U. S. Biological Station, Fairport, Iowa, and Biological Laboratory Washington and Jefferson College.

We also found th
this point. Abae
point. Not comm
26. *Elliptio dilat*
Simpson—entire
out in the vicinity
creasing in numbe
N. and C. Minnesc
27. *Arcidena confra*
Simpson—Missis
from Iowa by Ra
lected by us near R
28. *Lasmigona comp*
Simpson—E. Iov
Mississippi R. abov
observe it between I
29. *Lasmigona costat*
Simpson—Upper
Wilson and Dangla
secured specimens o
30. *Lasmigona compi*
Simpson—Upper
son and Danglade(I
A var. *katharinae* (S
North, it may be late
it has not been repoi
31. *Anodonta imbecil*
Wilson and Dangh
—entire Mississippi
32. *Anodonta grandi*
Simpson—entire M.
believed to be a tribu
often confused with c
species. Var. *benedic*

and Shells. (*Chioræra leonina*,
) United States Expedition,
1840, 1841, 1842. Under the
names, U. S. N. Page 310.

atomy of an Eolid, *Chioræra*
ald.) Proc. Acad. Nat. Sci.

and branchiate Mollusca from
region. Trans. Royal. Canad.

of locomotion of the sea-hare
Exper. Zool., 24:139-145.
Mollusques, pp. 129-130.

Structural and Systematic
fig. 19.

THE UPPER MISSISSIPPI RIVER. *

UPPER MISSISSIPPI DRAINAGE. †

J. F. MUELLER.

(page 49.)

1.)=*Q. pyramidatum* (Lam.)
from Prairie du Chien, Wis-
consin, if it in L. Pepin.

from Minnesota and Iowa
(ann. 1). It may be present
as a tributary type.

to *crassidens* (Lam.).

from Winona County, Minn.

Commissioner of Fisheries, Washington,

Station, Fairport, Iowa, and Biological
Legation.

We also found this species at Red Wing, nearly 80 miles above
this point. Absent from L. Pepin; more abundant above that
point. Not common.

26. *Elliptio dilatatus* (Raf.)=*Uta gibbosus* (Barnes).

Simpson—entire Mississippi drainage. Apparently clammed
out in the vicinity of Red Wing, but abundant in L. Pepin, de-
creasing in numbers descending the river. Not reported from
N. and C. Minnesota.

Sub-Family ANODONTINÆ.

27. *Arcidens confragosus* (Say).

Simpson—Mississippi river and states adjoining it. Reported
from Iowa by Baker (1); S. Minnesota by Grant (6). Col-
lected by us near Red Wing. Comparatively rare.

28. *Lasmigona compressa* (Lea)=*Symphynota compressa* (Lea).

Simpson—E. Iowa and Wisconsin. Wilson and Danglede,
Mississippi R. above Bemidji and Bemidji Lake. We did not
observe it between Red Wing and La Moille, Minn.

29. *Lasmigona costata* (Raf.)=*S. costata* (Raf.)

Simpson—Upper Mississippi drainage, and St. Lawrence,
Wilson and Danglede, Red River of the North. Rare. We
secured specimens of this only above L. Pepin.

30. *Lasmigona complanata* (Barnes)=*S. complanata* (Barnes).

Simpson—Upper Mississippi drainage, St. Lawrence. Wil-
son and Danglede (18), Crow Wing drainage, Minn. Common.
A var. *katharinae* (Simpson) is found in the Red River of this
North, it may be later found in the Upper Mississippi, although
it has not been reported from there as yet.

31. *Anodonta imbecillis* (Say).

Wilson and Danglede (18), L. Minnewaska, Minn. Simpson
—entire Mississippi drainage area.

32. *Anodonta grandis* (Say).

Simpson—entire Mississippi River system. By some, it is
believed to be a tributary form rarely found in the river. It is
often confused with *corpulenta*, Call insisting they are the same
species. Var. *benedictensis* (Lea) reported by Wilson and Dan-

glade from L. Minnewaska; var. *gigantea* (Lea) reported by Call; var. *pepiniana* (Lea) reported by Wilson and Danglade from lakes of Crow Wing drainage, Minn. var. *kennicotti* (Lea) by the latter from L. Osakis are all considered by Ortmann as doubtful forms.

33. *Anodonta corpulenta* (Cooper).

Simpson—Upper Mississippi drainage. Wilson and Danglade, St. Croix drainage. In our experience somewhat more abundant than *grandis*.

34. *Anodonta suborbiculata* (Say).

Simpson—Iowa, Illinois and South. Rare in the main river, but somewhat fairly common in the sloughs, especially at Fairport, Iowa.

35. *Anodontooides ferussacianus* (Lea).

Simpson—Upper Mississippi drainage area generally, but as Ortmann, (10) points out its range is more northern. The variety *buchanensis* (Lea) appears to be an old female of *ferussacianus*. It has been reported from the Red River of the North and Crow Wing drainage by Wilson and Danglade. *A. modestus*, reported by the latter from the lakes of the Minnesota River drainage is thought by Ortmann to be a dwarf form of *A. ferussacianus*.

36. *Simpsoniconcha ambigua* (Say)=*Hemilastina ambigua* (Say).

The U. S. Biological Station records this from the Upper Mississippi River at Fairport, Iowa.

37. *Alasmidonta calceola* (Lea).

Simpson—Upper Mississippi drainage. Collected by us near Fountain City, Wis. Rare.

38. *Alasmidonta marginata* (Say).

Simpson—Upper Mississippi and St. Lawrence drainage. Collected by us near Wabasha, Minn. Local in distribution.

39. *Strophitus endentulus* (Say).

Simpson—entire Upper Mississippi drainage. Fairly common. Var. *pavonius* is simply a rayed form of the preceding species, observed according to Mr. H. W. Clark where the water is clearer, and is not entitled to varietal distinction.

40. *Obovaria*
Simpson—M
collected it app
as Wilson and
esota. Never t

41. *Plagiola En*
Simpson—U
Arkansas and
beds and appar

42. *Truncilla tr*
Distribution

43. *Truncilla d*
Distribution

44. *Leptodea leq*
Simpson—U
River. Found
possibly more:
Mr. Clark repo
port, Iowa.

45. *Leptodea fr*
Simpson—en
more abundant

46. *Proptera al*
Simpson—en
sas. Common.

47. *Proptera lat*
Distribution
mens were foun

48. *Proptera eq*
The type loc
Minn. Holange
consensus of o
north of Daven

49. *Obovaria ra*
The evidence

Sub Family LAMPSILINAE

40. *Obliquaria reflexa* (Raf.).

Simpson—Mississippi drainage. Red Wing, Minn. where we collected it apparently represents its northernmost distribution as Wilson and Danglade do not report it from C. and N. Minnesota. Never abundant.

41. *Plagiola lincolata* (Raf.)=*Plagiola securis* (Lea).

Simpson—Upper Mississippi drainage as far south as the Arkansas and Tennessee rivers. Always taken from mussel beds and apparently attains a great age. Abundant locally.

42. *Truncilla truncata* (Raf.)=*Plagiola elegans* (Lea).

Distribution largely that of the preceding species.

43. *Truncilla donaciformis* (Lea)=*Plagiola donaciformis* (Lea).

Distribution largely that of the preceding species.

44. *Leptodea leptodon* (Raf.)=*Lampsilis leptodon* (Raf.).

Simpson—Upper Mississippi drainage south to Tennessee River. Found by Baker, (1), and Pratt, (13) in Iowa, but possibly more abundant toward the Ohio. Not observed, but Mr. Clark reports one dead shell from main river above Fairport, Iowa.

45. *Leptodea fragilis* (Barnes)=*Lampsilis gracilis* (Barnes).

Simpson—entire Mississippi drainage. In our experience more abundant in lower portions of the river.

46. *Proptera alata* (Say)=*Lampsilis alata* (Say).

Simpson—entire Mississippi drainage as far south as Arkansas. Common.

47. *Proptera laevissima* (Lea)=*L. laevissima* (Lea).

Distribution largely that of preceding species. Many specimens were found on sand bars.

48. *Proptera capax* (Green)=*Lampsilis capax* (Green).

The type locality of this species is the falls of St. Anthony, Minn. Holzinger (7) reports it from Vinona, Minn., but the consensus of opinion is that it ordinarily does not go much north of Davenport, Iowa.

49. *Obovaria retusa* (Lam.)

The evidence indicates that if this species is present in the

ta (Lea) reported by Wilson and Danglade n. ar. *kennicotti* (Lea) described by Ortmann as

Wilson and Danglade somewhat more

Rare in the main river, especially at Fair-

area generally, but as far northern. The var-
ied female of *ferussac-*
d River of the North
Danglade. *A. modest-*
of the Minnesota River
warf form of *A. ferus-*

astina ambigua (Say).
this from the Upper

Collected by us near

Lawrence drainage.
local in distribution.

inage. Fairly com-
orm of the preceding
Mark where the water
inction.

Upper Mississippi drainage, it is restricted to the regions near the Ohio.

50. *Obovaria olivaria* (Raf.)=*Obovaria ellipsis* (Lea).

Simpson—Upper Mississippi drainage as far south as the Arkansas and Tennessee Rivers. Collected by us near Red Wing, Minn. Rare in L. Pepin and as Ortmann (10) indicates, it prefers strong steady currents. More abundant further down stream. Not reported from N. and C. Minnesota.

51. *Actinonaius carinata* (Barnes)=*Lampsilis ligamentina* (Lam.).

Throughout the Upper Mississippi drainage, but rare in L. Pepin. Fairly common. Reported from the Crow Wing drainage by Wilson and Danglede.

52. *Carunculina parva* (Barnes)=*Lampsilis parva* (Barnes).

Lake Pepin. Reported from S. Minnesota by Call, (3). Becomes more common descending the river. Not reported from N. and C. Minnesota.

53. *Ligumia ellipsiformis* (Con.)=*L. ellipsiformis* (Cave.).

Simpson—Upper Mississippi Valley south to 38° latitude. Geiser (5), and Pratt (13), report it from Iowa. We did not collect it north of there, nor does it extend into Central and Northern Minnesota.

53a. *Ligumia subrostrata* (Say)=*L. subrostrata* (Say).

Reported by Simpson, (14) as occurring north to latitude 41°. We collected this species near Fountain City, Wis. indicating a more northerly range. Rare. Mr. Clark states it to be fairly common along the edges of the sloughs and that it is often represented by a large form originally described as *Unio mississippiensis*.

54. *Ligumia recta latissima* (Lam.)=*Lampsilis recta* (Lam.).

Common. Extending throughout the Mississippi drainage into N. and C. Minnesota. The typical *recta* is the small Great Lakes form. The typical Mississippi form is that given.

55. *Ligumia iris* (Lea)=*L. iris* (Lea).

Reported by Simpson from the St. Lawrence drainage and the Ohio drainage, Illinois and Wisconsin, indicating its pos-

sible occurrence in form to probably

56. *Lampsilis ovalis*

Not reported but through Simpson's Mississippi drainage between Red Wing, where its place is

57. *Lampsilis fallax*

Occasionally seen in the preceding species waters such as the

58. *Lampsilis siliqi*

Simpson—entire Pepin, more so the (13) remarks, it is bottomed. In these lot of pearls."

59. *Lampsilis fasciata*

Simpson—entire from the Illinois River, probably of being found Mississippi River.

60. *Lampsilis ventralis*

Abundant. Wil Croix, Minn., Crow ages. Simpson—e with this list, it should be the modern represe

61. *Lampsilis orbiculus*

Reported by Baker and seems to be its intergrades with the

62. *Lampsilis higginsii*

This species was reported near Winona

ected to the regions near

ellipsis (Lea).

ge as far south as the
lected by us near Red
Ortmann (10) indicates,
abundant further down
Minnesota.

=*Lampsilis ligamentina*

rainage, but rare in L.
in the Crow Wing drain-

ilis parva (Barnes).

Minnesota by Call, (3).
the river. Not reported

psiformis (Conr.).

south to 38° latitude.
on Iowa. We did not
extend into Central and

ostrata (Say).

ring north to latitude
Fountain City, Wis.
re. Mr. Clark states it
the sloughs and that it
inally described as *Unio*

psilis recta (Lam.).

ie Mississippi drainage
recta is the small Great
rm is that given.

Lawrence drainage and
sin, indicating its pos-

sible occurrence in the Upper Mississippi. Ortmann states this
form to probably be the var. *nov-eboraci*.

56. *Lampsilis anodontoidea* (Lea).

Not reported from the drainages of N. and C. Minnesota, al-
though Simpson reports it distributed throughout the entire
Mississippi drainage. It was found occasionally at points be-
tween Red Wing and La Moille, Minn., except in L. Pepin,
where its place is apparently taken by the next named species.

57. *Lampsilis fallaciosa* (Smith).

Occasionally species were found within the limits given for
the preceding species. More abundant in L. Pepin and quieter
waters such as those of the sloughs.

58. *Lampsilis siliquoidea* (Barnes)=*L. luteola* (Lam.).

Simpson—entire Mississippi drainage. Abundant in L.
Pepin, more so than in other parts of the river. As Ortmann
(13) remarks, it prefers "rather quiet water and sandy, muddy
bottoms. In these regions it apparently produces a large num-
ber of pearls."

59. *Lampsilis fasciola* (Raf.)=*L. multiradiata* (Lea).

Simpson—entire Ohio River drainage. Ortmann reports it
from the Illinois River in Illinois. There is thus a fair proba-
bility of being found in the lower stretches of the Upper Mis-
sissippi River.

60. *Lampsilis ventricosa* (Barnes).

Abundant. Wilson and Danglade (18) report it from the St.
Croix, Minn., Crow Wing and Red River of the north drain-
ages. Simpson—entire Mississippi drainage. In connection
with this list, it should be remembered that the Crow Wing is
the modern representative of the headwaters of the Mississippi.

61. *Lampsilis orbiculata* (Hildreth).

Reported by Baker (1) from McGregor, Iowa. This at pres-
ent seems to be its most northern record. Rare. It probably
intergrades with the next species.

62. *Lampsilis higginsii* (Lea).

This species was collected at Red Wing, Minn., L. Pepin and
points near Winona, Wis. Not reported from C. and N. Min-

nesota. Comparatively rare. The type locality is Muscatine, Iowa. The var. *grandis* does not seem to be clearly distinguished from its parent species.

63. *Dysnomia (Truncilopsis) triquetra* (Raf.) = *Truncilla triquetra* (Raf.).

Reported from Iowa by Pratt (13) and Witter (19). We collected two specimens in L. Pepin—an expansion of the Mississippi in S. Minnesota. This probably represents the most northerly record. Reported from Fairport, Iowa, by Mr. H. W. Clark.

In conclusion, acknowledgment is made to Dr. A. E. Ortmann, Carnegie Museum, Pittsburgh, Pa., Mr. H. W. Clark, U. S. Biological Station, Fairport, Iowa, and Dr. Bryant Walker, Detroit, Michigan, for criticisms kindly given toward the preparation of this manuscript.

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Silas O. Wheat, well kn Middlebury, Vt., Septen years of age, he apparentl summer's vacation when immediately.

Mr. Wheat was born i 1853, where he graduated attended the New York U fying as a teacher. He ta

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SILAS C. WHEAT.

Silas C. Wheat, well known to many conchologists, died at Middlebury, Vt., September 1, 1922. Although nearly 70 years of age, he apparently was hale and hearty and enjoying a summer's vacation when he suffered a stroke, dying almost immediately.

Mr. Wheat was born in Franklin, Delaware Co., N. Y., in 1853, where he graduated from the Franklin Academy and then attended the New York University School of Pedagogy, qualifying as a teacher. He taught in New York City, was principal