subarcuate with an obscure medial swelling; color lucid whitish with four longitudinal rows of small dark brown spots articulated with opaque white spots; two lines are most conspicuous on each side of the convex back of the shell, the other two on each side of the concave portion of the shell are fainter, and sometimes obsolete; in one specimen the space between the upper and lower lines on each side is pale brown; to these color lines are added more or less evident, transverse, equally spaced, brownish lines which give the shell a segmented aspect curiously like that of a small maggot; the colors differ in strength in different specimens; the posterior end of the shell is attenuated and decurved, the posterior aperture small, with a minutely mucronate plug; the anterior end of the shell is larger, the aperture very oblique, almost horizontal, its margin simple, not expanded, nor is there any constriction behind it; the operculum is brownish; length, 2.5; maximum diameter at girdle, 1.0; diameter of aperture, .05 mm. U. S. Nat. Mus. Cat. No. 333531.

When color is present in Caecidæ, it is usually either uniform over the whole shell or nebulously distributed. The present species is the first I have been able to trace which has developed a color pattern. It is quite possible that these colors are fugitive, at any rate they differ considerably in strength in different specimens. There is also some difference in the size of different individuals. The measurements given are those of the largest of the lot.

Besides the types in the National Collection, others are in that of Mr. Lermond.

FRESHWATER MOLLUSCA FROM MACKENZIE RIVER BASIN, CANADA.

BY E. J. WHITTAKER [1]

While engaged in work for the Geological Survey for several seasons between 1917 and 1922, the writer, as occasion permitted, made collections of the freshwater molluscs of the

[1] Published by permission of the Director of the Geological Survey of Canada.

area traversed. This included the lake, the Mackenzie river as far as river from its mouth to the South Horn, and Kakisa rivers, all tributa The writer is greatly indebted to M cation and checking of species of t Sphæriidæ, and to Doctor W. H. for identification of members of the Through the kindness of Doctor E. been permitted to include collection Wrigley and Big Island, and addit lake and Hay river.

Collections were made from thirt are listed in order below and desig succeeding table the number at the to the locality to which that number

List of Localities with Number of

1. South shore, Fawn lake, Horn
2. South shore, Second lake, Hor
3. Southwest side of Mackenzie r Providence. 16 species.
4. Western end of Lake Kakisa.
5. South shore of Lake Kakisa river. 13 species.
6. Head of Lower Rapids, Liard r Simpson. 4 species.
7. At junction of South Nahan species.
8. Mills lake at mouth of Horn r
9. At mouth of Hay river. 10 sp
10. South shore near Sulphur Poi species.
11. Big Island, head of Mackenzie
12. Near Fort Wrigley. 2 species.
13. South side, Mills lake. 14 spec

From the above localities a total of which supplements considerably the

area traversed. This included the south shore of Great Slave lake, the Mackenzie river as far as Fort Simpson, the Liard river from its mouth to the South Nahanni river, and Hay, Horn, and Kakisa rivers, all tributary to the Mackenzie river. The writer is greatly indebted to Mr. F. C. Baker for identification and checking of species of these molluscs, exclusive of Sphæriidæ, and to Doctor W. H. Dall and Doctor V. Sterki for identification of members of the above mentioned family. Through the kindness of Doctor E. M. Kindle the writer has been permitted to include collections made by him from Fort Wrigley and Big Island, and additional material from Mills lake and Hay river.

Collections were made from thirteen localities in all, which are listed in order below and designated by number. In the succeeding table the number at the top of each column refers to the locality to which that number has been assigned.

List of Localities with Number of Species Taken at Each.

1. South shore, Fawn lake, Horn river. 8 species.
2. South shore, Second lake, Horn river. 11 species.
3. Southwest side of Mackenzie river, 30 miles above Fort Providence. 16 species.
4. Western end of Lake Kakisa. 10 species.
5. South shore of Lake Kakisa near mouth of Kakisa river. 13 species.
6. Head of Lower Rapids, Liard river, 36 miles above Fort Simpson. 4 species.
7. At junction of South Nahanni and Liard rivers. 2 species.
8. Mills lake at mouth of Horn river. 6 species.
9. At mouth of Hay river. 10 species.
10. South shore near Sulphur Point, Great Slave lake. 5 species.
11. Big Island, head of Mackenzie river. 2 species.
12. Near Fort Wrigley. 2 species.
13. South side, Mills lake. 14 species.

From the above localities a total of 43 species were obtained which supplements considerably the excellent lists with de-

scriptions given by Dall in the Harriman Alaskan Expedition series.[1] Seventeen forms of pelecypods and twenty-six species of gastropods, including six terrestrial forms, were recognized. The following list gives their distribution at the different localities:

[1] Dall, W. H., Harriman Alaska Expedition, Vol. XIII, Land and Fresh-Mollusca, 1910.

Pelecypoda.

Family UNIONIDÆ.

Anodonta grandis footiana Lea. 4.
Anodonta grandis var. *imbricata* Anthony. 5.
Anodonta var. 9.
Strophitus edentulus var. 9.
Lampsilis superiorensis Marsh. 4, 9.

Family SPHAERIIDÆ.

Sphaerium vermontanum Prime. 12.
Sphaerium canadense Sterki ms. 5, 9, 12, 13.
Sphaerium solidulum Conrad. 4.
Sphaerium striatinum Lamarck. 4.
Sphaerium tenue Prime. 2, 3, 5, 13.
Sphaerium tumidum Baird. 10?, 12.
Musculium jayense Prime. 1.
Musculium rosaceum Prime. 13.
Pisidium compressum Prime. 13.
Pisidium indianense Sterki. 2, 9.
Pisidium scutellatum Sterki. 1, 2, 3, 5, 13.
Pisidium ventricosum Sterki. 2.
Pisidium, two sp. 5.

Gastropoda.

Family ZONITIDÆ.

Euconulus fulvus Müller. 6.
Zonitoides nitidus Müller. 4.

Family ENDODONTIDÆ.

Pyramidula cronkheiti Newcomb. 3, 6, 7, 13.

Family SUCCINIDÆ.

Succinea avara Say. 3,
Succinea chrysis Wester
Succinea retusa Lea. 3.

Family LYMNAEIDÆ.

Lymnaea catascopium S
Lymnaea catascopium v
Lymnaea obrussa decam
Lymnaea palustris Mülle
Lymnaea palustris alpe
Lymnaea stagnalis appr
Lymnaea stagnalis var.
Lymnaea vahli (Beck) M
Planorbis arcticus Mülle
Planorbis deflectus Say.
Planorbis exacuous Say.
Planorbis hirsutus Gould
Planorbis parvus Say.
Planorbis trivolvis Say.
Planorbis subcrenatus C
Segmentina armigera Sa
Segmentina christyi Dall

Family AMNICOLIDÆ.

Amnicola emarginata K

Family VALVATIDÆ.

Valvata lewisii Currier.
Valvata lewisii helicoide
Valvata tricarinata Say.

As noted above, there is
numbers and species at the
species are added to those li
basin.

Lampsilis superiorensis is
and Horn rivers. Thousan
banks in early midsummer
piles of the dead shells are

Family SUCCINIDÆ.

Succinea avara Say. 3, 13,
Succinea chrysis Westerlund. 6, 7.
Succinea retusa Lea. 3.

Family LYMNAEIDÆ.

Lymnaea catascopium Say. 1, 4, 5, 11.
Lymnaea catascopium var. 4.
Lymnaea obrussa decampi var. *strengi*. 3, 8.
Lymnaea palustris Müller. 2, 3, 8, 9, 10.
Lymnaea palustris alpenensis Baker. 13.
Lymnaea stagnalis appressa Say. 3, 9.
Lymnaea stagnalis var. 1, 4, 8, 11.
Lymnaea vahli (Beck) Müller. 8.
Planorbis arcticus Müller. 1, 2, 4, 5, 13.
Planorbis deflectus Say. 9.
Planorbis exacuous Say. 2, 5.
Planorbis hirsutus Gould. 1, 6.
Planorbis parvus Say. 2, 3, 5, 13.
Planorbis trivolvis Say. 3.
Planorbis subcrenatus Cpr. 1, 3, 9.
Segmentina armigera Say. 9.
Segmentina christyi Dall. 1, 3, 8, 13.

Family AMNICOLIDÆ.

Amnicola emarginata Küster. 3, 5, 10, 13.

Family VALVATIDÆ.

Valvata lewisii Currier. 1, 2, 3, 5, 10.
Valvata lewisii helicoidea Dall. 2, 4, 8, 13.
Valvata tricarinata Say. 2, 3, 4, 5, 10, 13.

As noted above, there is a considerable variation both in numbers and species at the different localities. Seventeen species are added to those listed by Dall from the Mackenzie basin.

Lampsilis superiorensis is exceptionally abundant in Hay and Horn rivers. Thousands are stranded and die on the banks in early midsummer as the flood waters recede, and piles of the dead shells are to be seen everywhere. On the

other rivers of the area, though conditions seem exactly the same, this species is rare or absent.

The species recorded from south shore of Great Slave lake really come from a small pond fifty yards back from the beach but connected with the lake proper at high water. Shells are very rare along the beach owing to the fact that, in the break-up of the ice, the latter is driven up on the beach, destroying a large part of the molluscan life.

The fact that casual collecting undertaken while the writer was engaged in other work resulted in increasing the distribution area of seventeen species should encourage all collectors who have an opportunity of visiting northern latitudes. However, owing to the boreal and semi-boreal character of the climate, which imposes a certain amount of uniformity on the fauna, the number of new species found in any one area is not likely to be large.

A NEW SPECIES OF PHYSA FROM TEXAS.

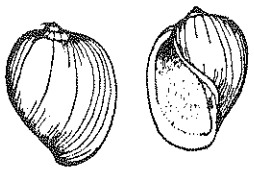
BY WILLIAM J. CLENCH

The following description is based upon four specimens sent to me by L. J. Bottimer, of Liberty, Texas.

PHYSA BOTTIMERI n. sp.

Shell: sinistral, small, subglobular, imperforate, rather thin, corneous. Color: light horn with a rather dull surface. Whorls: 4½, the last shouldered and very large. Spire: very short, the nuclear whorl dark reddish brown in color. Aperture: large, five-sixths of the total length of the shell, the outer edge slightly straightened. Lip: lower half slightly flaring. A well-developed white callus formed along the edge continuous with the base of the columella. Columella: straight, with a well-defined, slightly thickened fold. Suture: well impressed. Sculpture: composed of

FIG. 4.



Physa bottimeri, X 3.

fine growth lines, a few co
tervals producing a some
striæ absent.

Type: Length 6.6, width
of M. No. 31617.)

Cotype: Length 6.3, wi
(Walker, No. 75895.)

Cotype: Length 6.4, wi
(Clench, No. 1378.)

Cotype: Length 5.5, wi
(A. N. S. Phila.)

Type locality: Comanche
Texas.

Remarks: This species of
with other species of the
dered forms. It agrees w
outline but differs in being
lip callus, and less thicke
A well-formed callus is fo
types; this callus is lacking

Type deposited in the
Michigan; cotypes in the
Detroit, in my own collect
Natural Sciences of Philad

RADULA TE

BY WI
Unive

The following method h
traction, staining and mo
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by boiling and were then
the *Physa* in a strainer ar
thirty seconds was found
easy extraction of the an