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CONTENTS

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ANNOUNCEMENT

STERKIANA is named after Dr. Victor Sterki (1846-1933) of New Philadelphia, Ohio, famed for his work on the Sphaeriidae, Pupillidae, and Valloniidae. It is fitting that this serial should bear his name both because of his association with the Midwest and his lifelong interest in non-marine Mollusca.

The purpose of STERKIANA is to serve malacologists and paleontologists interested in the living and fossil non-marine Mollusca of North and South America by disseminating information in that special field. Since its resources are modest, STERKIANA is not printed by conventional means. Costs are kept at a minimum by utilizing various talents and services available to the Editor. Subscription and reprint prices are based on cost of paper and mailing charges.

STERKIANA accepts articles dealing with non-marine Mollusca of the Americas in English, French, or Spanish, the three official languages of North America. Contributors are requested to avoid descriptions of new species or higher taxa in this serial as the limited distribution of STERKIANA would probably prevent recognition of such taxa as validly published. Papers on distribution, ecology, and revised checklists for particular areas or formations are especially welcome but those on any aspect of non-marine Mollusca will be considered.

STERKIANA will appear twice a year or oftener, as material is available. All correspondence should be addressed to the Editor.

SUBSCRIPTIONS: 50¢ per number; subscriptions may be entered for not more than 4 numbers in advance; please make checks and money orders payable to the Editor.

STERKIANA est une collection de travaux sur les Mollusques extra-marins des deux Amériques, distribuée par un groupe de malacologues du centre des Etats-Unis. STERKIANA publie des travaux en anglais, en français et en espagnol acceptés par le conseil de rédaction. Prière d'adresser toute correspondance au Rédacteur.

ABONNEMENT: 50¢ le numéro, par chèque ou mandat payable au Rédacteur.

STERKIANA es una coleccion de trabajos sobre los Moluscos extra-marinos viventes y fosiles de las dos Americas, editada por un grupo de malacólogos de los Estados Unidos centrales. Contenirá en el porvenir trabajos en inglés, francés, y español que serán acceptados por la mesa directiva. La correspondencia deberá ser dirigida al Editor.

PRECIO: 50¢ el número.

SOME LAND SNAIL RECORDS FROM LOUISIANA

LESLIE HUBRICHT

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SEVERAL weekend trips into Louisiana to collect land snails were made by the author during the year 1962. About fifty species were collected, many of which had not been previously reported from the State. Since the land snail fauna of Louisiana is poorly known, publication of these records would add much to the knowledge of this fauna. In this report only the parishes are given for the localities.

Polygyra septemvolva febigeri (Bland). -- Jefferson, Orleans, Plaquemines.

Polygyra auriformis (Bland). -- Concordia, East Feliciana, Jefferson, La Salle, Orleans, Rapides, St. Charles, St. Martin, St. Mary, St. Tammany, West Feliciana.

Polygyra leporina (Gould). -- Catahoula, Livingston, Tangipahoa, West Feliciana.

Polygyra texasiana (Moricand). -- Concordia, Jefferson, LaSalle, Orleans, Rapides, St. Charles, St. Martin. All of these records are from urban areas. This species is probably introduced into eastern Louisiana.

Stenotrema stenotrema (Pfeiffer). -- Jefferson (river drift), West Feliciana.

Stenotrema leai aliciae (Pilsbry). -- Catahoula, Concordia, Plaquemines, Rapides, Terrebonne, West Feliciana.

Mesodon thyroidus (Say). -- Catahoula, Concordia, Jefferson, LaSalle, Orleans, Rapides, St. Martin, St. Tammany, Tensas, West Feliciana.

Mesodon inflectus (Say). -- Catahoula, Concordia, East Feliciana, Jefferson, Rapides, West Feliciana.

Triodopsis fosteri (F. C. Baker). -- Catahoula, Rapides.

Haplotrema concavum (Say). -- West Feliciana.

Euconulus chersinus chersinus (Say). -- East Feliciana, Jefferson, Rapides, St. Mary, St. Tammany, Tensas.

Euconulus chersinus dentatus (Sterki). -- West Feliciana.

Guppya sterkii (Dall). -- West Feliciana.

Glyphyalinia circumstriata (Taylor) -- West Feliciana.

Glyphyalinia indentata (Say). -- Concordia, East Feliciana, Jefferson, Madison, Orleans, Rapides, St. Mary, Tangipahoa, Tensas, West Feliciana.

Glyphyalinia sculptilis (Bland). -- West Feliciana.

Mesomphix globosus (MacMillan). -- East Feliciana, St. Tammany, Tangipahoa, West Feliciana.

Mesomphix capnodes (W.G. Binney). -- West Feliciana.

Paravitrea significans (Bland). -- East Feliciana, West Feliciana.

Paravitrea conecuhensis (Clapp). -- Jefferson, St. Tammany.

Hawaiia minuscula minuscula (Binney). -- Concordia, East Feliciana, Jefferson, Rapides, St. Martin, St. Mary, St. Tammany, Tensas, West Feliciana.

Ventridens intertextus (Binney). -- West Feliciana.

Zonitoides arboreus (Say). -- East Feliciana, Plaquemines, Rapides, St. Martin, St. Tammany, Tensas, Terrebonne, West Feliciana.

Anguispira strongylodes (Pfeiffer). -- Catahoula, Concordia, Rapides, Tensas.

Discus patulus (Deshayes). -- East Feliciana, Jefferson, St. Tammany, West Feliciana.

Helicodiscus notius Hubricht. -- East Feliciana.

Helicodiscus parallelus (Say). -- St. Tammany, West Feliciana.

Punctum minutissimum (Lea). -- Concordia, Tensas.

Deroceras laeve (Müller). -- West Feliciana.

Philomycus carolinianus (Bosc) -- Catahoula, Rapides, Tensas, West Feliciana.

Oxyloma salleana (Pfeiffer) -- Concordia, Jefferson, Rapides.

Succinea concordialis Gould. -- Concordia, East Feliciana, Jefferson, LaSalle, Rapides, St. Charles, Tensas.

Succinea greeri Tryon. -- West Feliciana.

Succinea grosvenori Lea. -- Jefferson, Rapides, St. Charles, West Feliciana.

Catinella texana Hubricht. -- Catahoula, Concordia, Madison, Rapides, Tensas, West Feliciana.

Catinella oklahomarum (Webb) -- St. Mary, West Feliciana.

Strobilops texasiana Pilsbry & Ferriss. -- St. Martin.

Strobilops aenea Pilsbry. -- St. Charles, St. Mary, Tensas, Terrebonne.

Gastrocopta contracta (Say). -- Rapides, West Feliciana.

Gastrocopta pentodon (Say). -- Concordia.

Gastrocopta tappaniana (C.B. Adams). -- Concordia, Jefferson, St. Martin, Terrebonne.

Pupoides albilabris (C.B. Adams). -- Rapides, St. Martin, St. Tammany, West Feliciana.

Vertigo milium (Gould). -- Concordia, St. Mary, Tensas, Terrebonne.

Vertigo oscariana Sterki. -- Tensas, West Feliciana.

Vertigo rugosula Sterki. -- Concordia, Livingston, Terrebonne.

Vertigo oralis Sterki. -- Concordia, Livingston, Jefferson, Terrebonne.

Vertigo ovata Say. -- Jefferson, St. Charles, Terrebonne.

Vertigo teskeyae Hubricht. -- Jefferson, St. Martin, Terrebonne.

Pupisoma dioscoricola (C.B. Adams). -- Ascension, Jefferson, Orleans, St. Charles, St. Landry, St. Mary, St. Tammany, Terrebonne, West Feliciana.

Pupisoma macneilli (Clapp). -- Concordia, Ascension, Tensas.

Carychium floridanum G.H. Clapp. -- Jefferson, Tangipahoa.

Helicina orbiculata (Say). -- Jefferson, St. Charles, St. Mary, St. Tammany, West Feliciana.

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MALACOLOGIA, VOLUME 1, NO. 1

LACK of space in STERKIANA No. 9 prevented notice of the first number of this publication. It is a substantial volume of 160 pages, containing seven articles, listed below, and profusely illustrated with photographic plates and line cuts. The standards set by the editorial board are a credit to their ability and we are sure that MALACOLOGIA will soon take its place in the first rank of malacological publications of the world.

The international character of the publication is maintained with announcements in English, French, Spanish, German, and Russian. All the articles in this first number are in English but the pages of MALACOLOGIA are open to articles in each of the languages just named. Each paper is followed by a substantial abstract in languages other than that of the paper itself and these abstracts are longer and more detailed than the one that precedes the paper, a practice which has been observed before, for example in Czech publications, and which has proved most useful to those unable to read the language of the original.

The first number contains the following articles:

A. L.

REPRINTS FROM AMU NEWS BULLETIN AND ANNUAL REPORT

VARIATION IN MESODON FERRISSI PILSBRY. -- BY ALAN SOLEM. (Reprinted from American Malacological Union News Bulletin and Annual Report, 1954, p. 2).

As part of a long range study of ecological variation in land mollusca, the author has made a preliminary survey of conchometric variation in Mesodon ferrisi (Pilsbry) and summarized the historical records and known ecology of the species.

Preliminary conclusions are that the limiting factor of distribution is moisture and that differences in spire height between specimens found on Clingman's Dome (6600') and at the base of the Chimneys (2800') are statistically significant (means were more than 3 standard deviations apart) and probably are associated with the greater chances of dessication at the lower level, necessitating retreat deep into rock piles. Under such conditions, low spire would have selection value. Whether the adaptation is genotypic or phenotypic is unknown.

Mr. Solem's paper was accompanied by kodachrome slides showing charts of collecting stations, the general topography of the area and the snails being collected in their natural habitat. Morrison: "I wonder if they range from beneath the stones at night. Did you collect at night?" Solem: "No." Bequaert: "It would be interesting to try collecting by sugaring the trees in the area; snails often are so taken when trees are sugared for moths." Jacobson: "Do they look like any other species?" Solem: "Not really; once you start collecting them you couldn't mistake them." Bequaert: "It is dangerous to take statistics from a number of collections; how many did you use?" Solem: "I studied our collection at Ann Arbor, then at the Academy of Natural Sciences and MCZ - only three or four." Bequaert: "Do you know what proportion of the specimens were taken alive?" Pilsbry: "We got all of ours alive." Solem: "In that area it is much easier to find live than dead shells."

PILSBRY AND BRUNSON ON MAGNIPELTA MYCOPHAGA. -- HENRY A. PILSBRY. (Reprinted from American Malacological Union News Bulletin and Annual Report, 1954, p. 4).

In 1948 Dr. Pilsbry received a young specimen of a remarkable slug from near Lolo Pass in the Bitter Root mountains of Idaho. Shortly after publication as a new genus and species (Nautilus 67: 37-8, 1953), Prof. R. B. Brunson of the University of Montana collected a large number of these slugs on Deer Creek near Missoula, Montana. Complete details will soon be published.

Dr. Pilsbry showed slides of the anatomy of the slug and explained its taxonomic position. Photographs of the active animal and a contracted one were passed around while detailed information on its habitat was read from Dr. Brunson's notes.

Teare: "Was there color to the mucus? Did the collector take a smear?" Pilsbry: "He didn't say; I didn't see the live specimen myself."

CHECKLIST OF PLEISTOCENE AND LIVING MOLLUSCA OF WISCONSIN

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To the writer's knowledge, this is the first complete checklist of non-marine Mollusca for Wisconsin. It is made up of published records from Baker (1928) to the present. All the records of freshwater mollusks prior to 1928 can be found in Baker's work. The records of land gastropods were compiled from Levi and Levi (1950) and Pilsbry (1939-1948).

The state is divided between two great drainage systems, the Great Lakes-St. Lawrence River system and the Mississippi River system. This permits both southern and eastern species to occur within the same geographic area. Although the two systems are now separated they were once connected by the Wisconsin and Fox rivers. This may account for species of the Mississippi drainage system occurring in the St. Lawrence system.

The writer will gratefully acknowledge notice of any omissions or new records that are brought to his attention. If a supplement should be necessary, it will appear in STERKIANA.

This checklist was prepared as part of a research project supported by the Ohio State University Development Fund and the Department of Geology. This support is gratefully acknowledged.

1. NAIADES

1. ACTINONAIAS CARINATA (Barnes) 1823. -- Ortmann 1919: 232; Baker 1928: 218; Morrison 1932: 381; van der Schalies 1950: 454; Clark and Berg 1959: 48, implied.

2. ACTINONAIAS ELLIPSIFORMIS (Conrad) 1836. -- Baker 1928: 263 (Ligumia); van der Schalies 1950: 454.

3. ALASMIDONTA CALCEOLUS (Lea) 1830. -- Baker 1928: 185.

4. ALASMIDONTA CALCEOLUS DANIELSI F. C. Baker 1928: 187.

5. ALASMIDONTA CALCEOLUS MAGNALACUSTRIS F. C. Baker 1928: 188.

6. ALASMIDONTA MARGINATA Say 1819. -- Baker 1928: 189; van der Schalies 1950: 454; Clark and Berg 1959: 27, implied.

7. ALASMIDONTA MARGINATA TRUNCATA (B. H. Wright) 1898. -- Baker 1928: 192.

8. ALASMIDONTA MARGINATA VARIABILIS F. C. Baker 1928: 94. -- Morrison 1932: 381.

9. AMBLEMA COSTATA Rafinesque 1820. -- Baker 1928: 80; Morrison 1932: 377.

10. AMBLEMA COSTATA PLICATA (Say) 1817. -- Teskey 1954, Naut. 68: 27: Brown Co.

11. AMBLEMA PERUVIANA (Lamarck) 1819. Baker 1928: 73; van der Schalies 1950: 454.

12. AMBLEMA RARIPLICATA (Lamarck) 1835. -- Baker 1928: 76.

13. (Anodonta cataracta Say 1817). -- Not in Wisconsin, fide Baker 1928: 300.

14. ANODONTA CORPULENTA Cooper 1934. -- Baker 1928: 168; van der Schalies 1950: 454.

15. ANODONTA GRANDIS Say 1829. -- Baker 1928: 152; Morrison 1932: 379; Clark and Berg 1959: 36, implied.

16. ANODONTA GRANDIS FOOTIANA Lea 1840. -- Ortmann 1919: 147; Baker 1928: 157; Morrison 1932: 379; Teskey 1954, Naut. 68: 27, Brown Co.

17. ANODONTA GRANDIS GIGANTEA Lea 1834. -- Baker 1928: 161.

18. ANODONTA GRANDIS PLANA Lea 1834. -- Baker 1928: 155.

19. ANODONTA IMBECILLIS Say 1829. -- Ortmann 1919: 162 (A. ohioensis); Baker 1928: 172 (Utterbackia i.); van der Schalies 1950: 454; Clark and Berg 1959: 41, implied.

20. ANODONTA IMBECILLIS FUSCA F. C. Baker 1927. -- Baker 1928: 175. Probably an inconsequential variety.

21. (Anodonta implicata Say 1829). -- Not in Wisconsin, fide Baker 1928: 300.

22. ANODONTA KENNICOTTII Lea 1861. -- Baker 1928: 163; Morrison 1932: 379.

23. ANODONTA MARGINATA Say 1817. -- Baker 1928: 165; Morrison 1932: 379.

24. ANODONTOIDES BIRGEI F. C. Baker 1923. -- Baker 1928: 180; Morrison 1932: 380.

25. ANODONTOIDES FERUSSACIANUS (Lea) 1834. -- Baker 1928: 175; Morrison 1932: 380; Clark and Berg 1959: 35, implied.

26. ANODONTOIDES FERUSSACIANUS SUBCYLINDRACEUS (Lea) 1838. -- Baker 1928: 178; Morrison 1932: 380.

27. ARCIDENS CONFRAGOSUS (Say) 1829. Baker 1928: 196; van der Schalies 1950: 454.

28. CARUNCULINA PARVA (Barnes) 1823. -- Ortmann 1919: 258; Baker 1928: 251; van der Schalies 1950: 454; Clark and Berg 1959: 49, implied.

29. CARUNCULINA PARVA CAHNI F. C. Baker 1927. -- Baker 1928: 253.

30. CUMBERLANDIA MONODONTA (Say) 1829. -- Baker 1928: 48.

31. CYCLONAIAS TUBERCULATA (Rafinesque) 1820. -- Baker 1928: 103.

32. CYCLONAIAS TUBERCULATA GRANIFERA (Lea) 1838. -- Baker 1928: 107; van der Schalies, 1950: 454.

33. DYSNOMIA TRIQUETRA (Rafinesque) 1820. -- Baker 1928: 296.

34. ELLIPTIO COMPLANATUS (Dillwyn) 1817. Baker 1928: 134; Clark and Berg 1959: 21, implied.

35. ELLIPTIO CRASSIDENS (Lamarck) 1819. -- Baker 1928: 131; van der Schalies, 1950: 454.

36. ELLIPTIO DILATATUS (Rafinesque) 1820. -- Baker 1928: 124; Morrison 1932: 378;

van der Schalies 1950: 454; Clark and Berg, 1959: 23, implied.

37. ELLIPTIO DILATATUS DELICATUS (Simpson) 1900. -- Baker 1928: 128; Morrison 1932: 378.

38. ELLIPTIO DILATATUS STERKII Grier 1918. -- Baker 1928: 130; Morrison 1932: 378; Teskey 1954, Naut. 68: 27, Brown Co.

39. FUSCONAIA EBENUS (Lea) 1831. -- Baker 1928: 66; van der Schalies 1950: 454.

40. FUSCONAIA FLAVA (Rafinesque) 1820. -- Baker 1928: 53; Morrison 1932: 377; Clark and Berg, 1959: 19.

41. FUSCONAIA FLAVA PARVULA Grier 1918. -- Baker 1928: 58; Teskey 1954, Naut. 68: 27, Brown Co.

42. (Fusconaia subrotunda kirtlandiana Lea 1834). -- Baker 1928: 136, not found in Wisconsin.

43. FUSCONAIA UNDATA (Barnes) 1823. -- Baker 1928: 59; van der Schalies 1950: 454.

44. FUSCONAIA UNDATA TRIGONA (Lea) 1831. -- Baker 1928: 63.

45. FUSCONAIA UNDATA WAGNERI F. C. Baker 1928: 64.

46. LAMPSILIS ANODONTOIDES (Lea) 1834. -- Baker 1928: 266; van der Schalies 1950: 454.

47. LAMPSILIS ANODONTOIDES FALLACIOSA (Smith) Simpson 1900. -- Baker 1928: 268 (L. fallaciosa); van der Schalies 1950: 454.

48. (Lampsilis cariosa (Say) 1817). -- Not in Wisconsin, fide Baker 1928: 301.

49. LAMPSILIS HIGGINSII (Lea) 1857. -- Baker 1928: 293; van der Schalies 1950: 454.

50. ?LAMPSILIS ORBICULATA (Hildreth) 1828. -- Ortmann 1919: 32, doubtful.

51. (Lampsilis radiata (Gmelin) 1792). -- Not in Wisconsin, fide Baker 1928: 301.

52. (Lampsilis radiata borealis (A. F. Gray) 1882). -- Not in Wisconsin, fide F. C. Baker 1928: 302.

53. LAMPSILIS RADIATA SILIQUOIDEA (Barnes) 1823. -- Ortmann 1919: 283 (L. luteola); Morrison 1932: 382; Baker 1928: 270; van der Schalies 1950: 454; Clark and Berg 1959: 60, implied.

54. "LAMPSILIS SILIQUOIDEA CHADWICKI" F. C. Baker 1928: 279.

55. "LAMPSILIS SILIQUOIDEA PEPINENSIS" F. C. Baker 1927. -- Baker 1928: 275.

56. LAMPSILIS RADIATA SILIQUOIDEA form ROSACEA (De Kay) 1843. -- Ortmann 1919: 289 (L. luteola r.); Baker 1928: 277; Morrison 1932: 382; Teskey 1954, Naut. 68: 27, Brown Co.

57. LAMPSILIS SUPERIORENSIS (Marsh) 1897. -- Baker 1928: 302.

58. LAMPSILIS VENTRICOSA (Barnes) 1823. -- Ortmann 1919: 301 (L. ovata v.); Baker 1928: 281; van der Schalies 1950: 454.

59. LAMPSILIS VENTRICOSA LURIDA Simpson 1914. -- Baker 1928: 289; Morrison 1932: 383.

60. LAMPSILIS VENTRICOSA OCCNDENS (Lea) 1829. -- Baker 1928: 286; Morrison 1932: 382.

61. LAMPSILIS VENTRICOSA PERGLOBOSA F. C. Baker 1928: 285.

62. LAMPSILIS VENTRICOSA WINNEBAGOENSIS F. C. Baker 1928: 291.

63. LASMIGONA COMPLANATA (Barnes) 1823. -- Baker 1928: 147; Morrison 1932: 379; van der Schalies 1950: 454.

64. LASMIGONA COMPLANATA KATHERINAE (Lea) 1838. -- Baker 1928: 151; Teskey 1954, Naut. 68: 27, Brown Co.

65. LASMIGONA COMPRESSA (Lea) 1843. -- Baker 1928: 139; Morrison 1932: 378; Clark and Berg 1959: 31, implied.

66. LASMIGONA COSTATA (Rafinesque) 1820. -- Baker 1928: 141; Morrison 1932: 378; Clark and Berg 1959: 33, implied.

67. (Lasmigona costata eriganensis Gries 1918). -- Not in Wisconsin, fide Baker 1928: 144.

68. LASMIGONA COSTATA NUDA F. C. Baker 1928: 145.

69. LASMIGONA COSTATA PEPINENSIS F. C. Baker 1928: 144.

70. LEPTODEA FRAGILIS Rafinesque 1820. -- Ortmann 1919: 247 (Paraptera); Baker 1928: 234; van der Schalies 1950: 454; Clark and Berg 1959: 46, implied.

71. LEPTODEA FRAGILIS LACUSTRIS Baker 1922. -- Baker 1928: 237; Teskey 1954, Naut. 68: 27, Brown Co.

72. LEPTODEA LAEVISSIMA (Lea) 1830. -- Baker 1928: 247 (Proptera); van der Schalies 1950: 454.

73. LEPTODEA LEPTODON Rafinesque 1820. -- Baker 1928: 239.

74. LIGUMIA RECTA (Lamarck) 1819. -- Ortmann 1919: 276; Baker 1928: 255; Morrison 1932: 381; Clark and Berg 1959: 52, implied.

75. LIGUMIA RECTA LATISSIMA (Rafinesque) 1820. -- Baker 1928: 257; Morrison 1932: 381; van der Schalies 1950: 454.

76. (Ligumia subrostrata (Say) 1831). -- Not in Wisconsin, fide Baker 1928: 300.

77. MEGALONAIAS GIGANTEA (Barnes). 1823. -- Baker 1928: 69; van der Schalies 1950: 454.

78. OBLIQUARIA REFLEXA Rafinesque 1820. -- Ortmann 1919: 214; Baker 1928: 210; van der Schalies 1950: 454.

79. OBOVARIA OLIVARIA (Rafinesque) 1820. Ortmann 1919: 229; Baker 1928: 214; van der Schalies 1950: 454; Clark and Berg 1959: 47, implied.

80. PLAGIOLA LINEOLATA Rafinesque 1820. Ortmann 1919: 243; Baker 1928: 231; van der Schalies 1950: 454.

81. PLETHOBASUS CYPHYUS (Rafinesque) 1820. -- Baker 1928: 110; van der Schalies 1950: 454.

82. PLEUROBEMA CLAVA (Lamarck) 1819. -- Baker 1928: 137.

83. PLEUROBEMA CORDATUM Rafinesque 1820. Baker 1928: 136 (P. obliquum).

84. PLEUROBEMA CORDATUM CATILLUS (Conrad) 1836. -- Baker 1928: 117, 118 (P. coccineum catillus and P. coccineum solida).

85. PLEUROBEMA CORDATUM COCCINEUM (Conrad) 1836. -- Baker 1928: 113 (P. coccineum); Morrison 1932: 378; van der Schalies 1950: 454.

86. PLEUROBEMA CORDATUM MISSISSIPIENSIS F. C. Baker 1928: 121. Not recognized by van der Schalies.

87. (Pleurobema cordatum pyramidatum (Lea) 1834). -- Baker 1928: 137 (P. pyramidatum): Not in Wisconsin.

88. PROPTERA ALATA (Say) 1817. -- Baker 1928: 241; van der Schalies 1950: 454; Clark and Berg 1959: 45, implied.

89. PROPTERA ALATA MEGAPTERA (Rafinesque) 1820. -- Baker 1928: 244.

90. PROPTERA CAPAX (Green) 1832. -- Baker 1928: 248; van der Schalies 1950: 454.

91. (Ptychobranchus fasciolare (Rafinesque) 1820). -- Ortmann 1919: 208 (Ellipsaria f., not Wisconsin); Baker 1928: 300, not in Wisconsin.

92. QUADRULA FRAGOSA (Conrad) 1836. -- Baker 1928: 88.

93. QUADRULA METANEVRA Rafinesque 1820. -- Baker 1928: 97; van der Schalies 1950: 454.

94. QUADRULA NODULATA Rafinesque 1820. -- Baker 1928: 95; van der Schalies 1950: 454.

95. QUADRULA PUSTULOSA (Lea) 1831. -- Baker 1928: 90; van der Schalies 1950: 454.

96. QUADRULA PUSTULOSA PRASINA (Conrad) 1834. -- Baker 1928: 93.

97. QUADRULA QUADRULA Rafinesque 1820. -- Baker 1928: 84; van der Schalies 1950: 454.

98. QUADRULA QUADRULA BULLOCKI F. C. Baker 1928: 87.

99. SIMPSONICONCHA AMBIGUA (Say) 1825. -- Baker 1928: 183; van der Schalies 1950: 454.

100. STROPHITUS RUGOSUS (Swainson) 1822. -- Baker 1928: 198; van der Schalies 1950: 454.

101. STROPHITUS RUGOSUS LACUSTRIS F. C. Baker 1928: 207.

102. STROPHITUS RUGOSUS PAVONIUS (Lea) 1836. -- Baker 1928: 202; Morrison 1932: 381.

103. STROPHITUS RUGOSUS PEPINENSIS Baker 1928: 204.

104. STROPHITUS RUGOSUS WINNEBAGOENSIS Baker 1928: 205.

105. TRITOGONIA VERRUCOSA (Rafinesque) 1820. -- Baker 1928: 100; van der Schalies 1950: 454.

106. TRUNCILLA DONACIFORMIS (Lea) 1828. -- Ortmann 1919: 241; Baker 1928: 228; van der Schalies 1950: 454.

107. TRUNCILLA TRUNCATA Rafinesque 1820. -- Ortmann 1919: 238; Baker 1928: 224; van der Schalies 1950: 454.

108. TRUNCILLA TRUNCATA LACUSTRIS Baker 1928: 227.

109. (Uniomerus tetralasmus sayi (Ward) 1914). -- Baker 1928: 137, not Wisconsin.

110. VILLOSA IRIS NOVIEBORACI (Lea) 1838. -- Baker 1928: 260 (Ligumia); Clark and Berg 1959: 53, implied.

2. SPHAERIIDAE

111. PISIDIUM ADAMSI Prime 1851. -- Baker 1928: 387; as P. sargenti: Baker 1928: 388; as P. sphaericum, Baker 1928: 429; Herrington 1962: 30.

112. PISIDIUM CASERTANUM (Poli) 1791. -- As P. abditum, Baker 1928: 407; as P. complanatum, Baker 1928: 402; as P. griseolum, Baker 1928: 412; as P. neglectum, Baker 1928: 390; as P. noveboracense, Baker 1928: 391; as P. politum, Baker 1928: 404; as P. politum decorum, Baker 1928: 405; as P. roperi, Baker 1928: 400; as P. subrotundum, Baker 1928: 409; as P.

subrotundum pumilum, Baker 1928: 410; as P. superius, Baker 1928: 397; Teskey 1954: 27; Herrington 1962: 33.

113. PISIDIUM COMPRESSUM Prime 1851. -- Baker 1928: 371; Solem 1952: 129; Herrington 1962: 35.

114. PISIDIUM COMPRESSUM ARROSUM Sterki 1916. -- Sterki 1916: 447.

115. PISIDIUM COMPRESSUM LIMNICOLUM Sterki 1905. -- Baker 1928: 374.

116. PISIDIUM COMPRESSUM PELLUCIDUM Sterki 1916. -- Baker 1928: 372.

117. PISIDIUM CONVENTUS Clessin 1877. -- As P. abyssorum, Baker 1928: 416; as P. abyssorum levissimum, Baker 1928: 418; Herrington 1962: 36.

118. PISIDIUM CRUCIATUM Sterki 1895. -- Baker 1928: 376; Herrington 1962: 37.

119. PISIDIUM DUBIUM (Say) 1816. -- As P. virginicum, Baker 1928: 368.

120. PISIDIUM FALLAX Sterki 1896. -- Baker 1928: 375.

121. PISIDIUM FALLAX PRESSUM Sterki 1896. -- Baker 1928: 375.

122. PISIDIUM FERRUGINEUM Prime 1851. -- Baker 1928: 427; as P. medianum, Baker 1928: 426.

123. PISIDIUM IDAHOËNSE Roper 1890. -- Baker 1928: 370; Herrington 1962: 42.

124. PISIDIUM LILLJEBORGI Clessin 1886. -- As P. scutellatum cristatum, Baker 1928: 394; Herrington 1962: 43.

125. PISIDIUM MILIUM Held 1836. -- Baker 1928: 413.

126. PISIDIUM NITIDUM Jenyns 1832. -- As P. contortum, Baker 1928: 415; as P. glabellum, Baker 1928: 384; as P. minusculum, Baker 1928: 383; as P. paupercula, Baker 1928: 421; as P. splendidulum, Baker 1928: 411; as P. tenuissimum, Baker 1928: 419; Herrington 1962: 45.

127. PISIDIUM OBTUSALE Pfeiffer 1821. -- As P. rotundatum, Baker 1928: 423; as P. vesiculare, Baker 1928: 424.

128. (Pisidium peraltum Sterki 1900). -- Baker 1928: 380; Herrington (1954) states that the species has too few specimens or is too badly mixed for him to make any pronouncement about it at that time.

129. PISIDIUM PUNCTIFERUM (Guppy) 1867. As P. punctatum, Baker 1928: 378; as P. punctatum simplex, Baker 1928: 379; Herrington 1962: 47.

130. PISIDIUM SUBTRUNCATUM Malm 1855. -- Baker 1928: 427; as P. overi Baker 1928: 398; Herrington 1962: 48.

131. PISIDIUM VARIABILE Prime 1851. -- Baker 1928: 382; Herrington 1962: 50.

132. PISIDIUM WALKERI Sterki 1895. -- Baker 1928: 395; as P. mainense, Baker 1928: 396; Herrington 1962: 51.

133. SPHAERIUM LACUSTRE (Müller) 1774. -- As S. jayense, Baker 1928: 354; as S. rosaceum, Baker 1928: 358; as S. ryckholti, Baker 1928: 360; Herrington, 1962: 19.

134. SPHAERIUM OCCIDENTALE Prime 1860. -- Baker 1928: 348; Teskey 1954: 27; Herrington 1962: 21.

135. SPHAERIUM OCCIDENTALE AMPHIBIUM Sterki 1907. -- Baker 1928: 349.

136. SPHAERIUM PARTUMEIUM (Say)

136. SPHAERIUM PARTUMEIUM (Say) 1822. -- Baker 1928: 356; as S. truncatum, Baker 1928: 357; Herrington 1962: 23.

137. SPHAERIUM RHOMBOIDEUM (Say) 1822. -- Baker 1928: 346; Herrington 1962: 25.

138. SPHAERIUM SECURIS Prime 1865. -- Baker 1928: 361; Teskey 1954: 27; Solem 1952: 129; Herrington 1962: 26.

139. SPHAERIUM SECURIS SPHAERICUM (Anthony) 1852. Baker 1928: 362.

140. SPHAERIUM STRIATINUM (Lamarck) 1818. Baker 1928: 336; as S. aureum declive, Baker 1928: 321; as S. bakeri, Baker 1928: 333; as S. emarginatum, Baker 1928: 329; as S. flavum, Baker 1928: 343; as S. flavum foxense, Baker 1928: 344; Franzen 1957: 34; as S. notatum, Baker 1928: 340; as S. solidulum, Baker 1928: 324; as S. stamineum, Baker 1928: 326; as S. stamineum wisconsinense, Baker 1928: 327; Solem 1952: 123; Herrington 1962: 27.

141. SPHAERIUM STRIATINUM CORPULENTUM Sterki 1916. -- Baker 1928: 337.

142. SPHAERIUM STRIATINUM LILYCASHENSE Baker 1898. -- Baker 1928: 339.

143. SPHAERIUM STRIATINUM OHIOËNSE Sterki 1913. -- Baker 1928: 341.

144. SPHAERIUM STRIATINUM form SOLIDULUM Prime 1865. -- Teskey 1954: 27.

145. SPHAERIUM SULCATUM (Lamarck) 1818. -- As S. crassum, Baker 1928: 319; as S. lineatum, Baker 1928: 322; as S. simile, Baker 1928: 315; as S. simile planatum, Baker 1928: 317; Teskey 1954: 27.

146. SPHAERIUM TRANSVERSUM (Say) 1829. -- Baker 1928: 352; Herrington 1962: 29.

3. FRESHWATER PULMONATES

147. ACELLA HALDEMANI ("Deshayes" Binney) 1867. -- Baker 1928: 266; Morrison 1932: 370.

148. APLEXA HYPNORUM (Linnaeus) 1758. -- Baker 1928: 473; Morrison 1932: 377; Teskey 1954: 27, Brown Co.

149. ARMIGER CRISTA (Linnaeus) 1758. -- Baker 1928: 385 (Gyraulus); Baker 1945: 47, 50; as A. imbricatus, Baker 1945: 77, perhaps distinct.

150. ARMIGER IMBRICATUS (Müller) 1774. -- Baker 1945: 77, University Bay, near Madison, Lake Mendota; perhaps a synonym of the above.

151. BULIMNEA MEGASOMA (Say) 1824. -- Baker 1928: 277; Morrison 1932: 371; Solem 1952: 129, Door Co.

152. FERRISSIA PARALLELA (Haldeman) 1841. -- Baker 1928: 395; Morrison 1932: 375.

153. FERRISSIA RIVULARIS (Say) 1819. -- Baker 1928: 398.

154. FERRISSIA SHIMEKII (Pilsbry) 1890. -- Baker 1928: 402.

155. FERRISSIA TARDA (Say) 1830. -- Baker 1928: 399; Morrison 1932: 376.

156. FOSSARIA DALLI (F.C. Baker) 1906. -- Baker 1928: 288.

157. FOSSARIA EXIGUA (Lea) 1841. -- Baker 1911: 285 (Galba obrussa e.); Baker 1928: 301; Morrison 1932: 371.

158. FOSSARIA GALBANA (Say) 1825. -- Baker 1928: 304.

159. FOSSARIA HUMILIS (Say) 1822. -- Teskey 1954: 27, Brown Co.

160. FOSSARIA MODICELLA (Say) 1825. -- Baker 1928: 289; Morrison 1932: 371; Solem 1952: 129, Door Co.

161. FOSSARIA MODICELLA RUSTICA (Lea) 1841. -- Baker 1928: 291.

162. FOSSARIA OBRUSSA (Say) 1825. -- Baker 1928: 293; Morrison 1932: 371; Solem 1952: 129, Door Co.

163. FOSSARIA OBRUSSA DECAMPI (Streng) 1906. -- Baker 1911: 289; Baker 1928: 299; Morrison 1932: 371.

164. FOSSARIA OBRUSSA PENINSULAE (Walker) 1908. -- Baker 1928: 298.

165. FOSSARIA PARVA (Lea) 1841. -- Baker 1928: 285.

166. FOSSARIA SAYI F. C. Baker 1928: 305.

167. GYRAULUS ALTISSIMUS (F. C. Baker) 1919. -- Baker 1928: 382.

168. GYRAULUS ARCTICUS ("BECK" Möller) 1842. -- Baker 1928: 380; Morrison 1932: 375.

169. GYRAULUS CIRCUMSTRIATUS (Tryon) 1866. -- Baker 1928: 378; Morrison 1932: 375; Baker 1945: 74.

170. GYRAULUS CIRCUMSTRIATUS WALKERI (Vanatta) 1902. -- Baker 1928: 379.

171. GYRAULUS DEFLECTUS (Say) 1824. -- Baker 1928: 370; Morrison 1932: 374; Baker 1945: 508, Lake Winnebago; Teskey 1954: 27, Brown Co.

172. GYRAULUS DEFLECTUS OBLIQUUS (De Kay) 1843. -- Baker 1928: 372; Morrison 1932: 374; Baker 1945: 70, Lake Cherek.

173. GYRAULUS HIRSUTUS (Gould) 1840. -- Baker 1928: 367; Morrison 1932: 374.

174. GYRAULUS PARVUS (Say) 1817. -- Baker 1928: 374; Morrison 1932: 375; Teskey 1954: 27; Baker 1945: 74, 270, 330, 336.

175. HELISOMA ANCEPS (Menke) 1830. -- Baker 1928: 317 (H. antrosa); Morrison 1932: 371; Baker 1945: 127, 334; Teskey 1954: 27, Brown Co.

176. HELISOMA ANCEPS CAHNI F. C. Baker 1927. -- Baker 1928: 327; Morrison 1932: 372; Baker 1945: 344; Franzen 1956: 24.

177. HELISOMA ANCEPS PERCARINATUM (Walker) 1909. -- Baker 1928: 324.

178. HELISOMA ANCEPS SAYI F. C. Baker 1928: 322; Morrison 1932: 372; Baker 1945: 127, 342, 400.

179. HELISOMA ANCEPS SHELLENSE F. C. Baker 1927. -- Baker 1928: 325; Baker 1945: 400; Franzen 1957: 32.

180. HELISOMA ANCEPS STRIATUM (F. C. Baker) 1902. -- Baker 1928: 328; Walker 1918: 96; Baker 1945: 400.

181. HELISOMA ANCEPS UNICARINATUM (Haldeman) 1844. -- Baker 1928: 321; Morrison 1932: 372.

182. HELISOMA CAMPANULATUM (Say) 1821. -- Baker 1928: 345; Morrison 1932: 373; Solem 1952: 129, Door Co.

183. HELISOMA CAMPANULATUM DAVISI (Winslow) 1926. -- Baker 1928: 349.

184. HELISOMA CAMPANULATUM FERRISSI (F. C. Baker) 1922. -- Baker 1928: 350; Morrison 1932: 373.

185. HELISOMA CAMPANULATUM SMITHII F. C. Baker 1928: 353, probable for Wisconsin.

186. HELISOMA CAMPANULATUM WISCONSINENSE (Winslow) 1926. -- Baker 1928: 351;

Morrison 1932: 373; Baker 1945: 153, 360, 454.

187. HELISOMA CORPULENTUM (Say) 1824. -- Baker 1928: 337.

188. HELISOMA TRIVOLVIS (Say) 1817. -- Baker 1928: 330; Morrison 1932: 372; Baker 1945: 147, 148, 284, 286, 324, 334, 346, 348, 412; Solem 1952: 129, Door Co.

189. HELISOMA TRIVOLVIS LENTUM (Say) 1834. -- Baker 1928: 342 (H. pseudotrivolvis); Morrison 1932: 373.

190. HELISOMA TRIVOLVIS MACROSTOMUM (Whiteaves) 1863. -- Baker 1945: 147, 294, 324, 348, 376, 412.

191. HELISOMA TRIVOLVIS MEGASOMA (De Kay) 1843. -- Teskey 1954: 27, Brown Co.

192. HELISOMA TRIVOLVIS PILSBRYI (F. C. Baker) 1926. -- Baker 1928: 334; Morrison 1932: 372; Baker 1945: 23, 138.

193. HELISOMA TRUNCATUM (Miles) 1861. -- Baker 1928: 339; Baker 1945: 147, 288, 324, 350, 416.

194. HELISOMA WINSLOWI (F. C. Baker) 1926. -- Baker 1928: 336 (H. trivolvis w.); Morrison 1932: 373; Baker 1945: 147, 348.

195. LAEVAPEX FUSCA (C. B. Adams) 1840. -- Baker 1928: 404 (as Ferrissia).

196. LAEVAPEX KIRKLANDI (Walker) 1903. -- Baker 1928: 406 (as Ferrissia).

197. LYMNAEA STAGNALIS JUGULARIS Say 1817. -- Baker 1928: 198; Morrison 1932: 369; Noland and Reichel 1943: 8-13; Carriker 1943: 52-59; Solem 1952: 129, Door Co.

198. LYMNAEA STAGNALIS LILLIANAE F. C. Baker 1910. -- Baker 1911: 153; Baker 1928: 205; Morrison 1932: 369; Franzen 1958:33.

199. LYMNAEA STAGNALIS PERAMPLA Walker 1908. -- Baker 1928: 204.

200. LYMNAEA STAGNALIS SANCTAE-MARIAE Walker 1892. -- Baker 1928: 207; Morrison 1932: 369.

201. PHYSA ANCILLARIA (Say) 1825. -- Baker 1928: 424; Wurtz 1949: 21 (as a synonym of P. heterostropha).

202. PHYSA BAYFIELDENSIS F. C. Baker 1928. -- Baker 1928: 442; Franzen 1957: 32.

203. PHYSA BREVISPIRA (Lea) 1869. -- Baker 1928: 465.

204. PHYSA CHETEKENSIS F. C. Baker 1928: 440; Franzen 1957: 32.

205. PHYSA ELLIPTICA (Lea) 1837. -- Baker 1928: 455.

206. PHYSA ELLIPTICA AUREA (Lea) 1839. -- Baker 1928: 458.

207. PHYSA GYRINA (Say) 1821. -- Baker 1928: 449; Morrison 1932: 376.

208. PHYSA GYRINA HILDRETHIANA (Lea) 1841. -- Baker 1928: 453.

209. (Physa heterostropha (Say) 1817). -- Baker 1928: 447, not Wisconsin. It may nevertheless occur in Wisconsin if P. ancillaria (Say) (Baker 1928: 424) and P. sayii (Tappan): (Baker 1928: 430; Teskey 1954: 27) are considered as synonyms following Wurtz (1949).

210. PHYSA INTEGRA (Haldeman) 1841. -- Baker 1928: 460; Morrison 1932: 377.

211. PHYSA INTEGRA BILLINGSII (Heron) 1880. -- Baker 1928: 463.

212. PHYSA LAPHAMI F. C. Baker 1928: 420; Morrison 1932: 376; Franzen 1957: 32.

213. PHYSA MAGNALACUSTRIS Walker 1901. -- Baker 1928: 435; Solem 1952: 129.

214. PHYSA MICHIGANENSIS Clench 1926. -- Baker 1928: 469; Morrison 1932: 377.

215. PHYSA OBRUSSOIDES F. C. Baker 1928. -- Baker 1928: 445; Morrison 1932: 376; Franzen 1957: 32.

216. PHYSA SAYII (Tappan) 1839. -- Baker 1928: 430; Morrison 1932: 376; Teskey 1954: 27, Brown Co. Wurtz 1949: 31, as synonym of P. heterostropha, see No. 209, this list.

217. PHYSA SAYII CRASSA Walker 1901. -- Baker 1928: 434.

218. PHYSA VINOSA (Gould) 1847. -- Baker 1928: 427.

219. PHYSA WALKERI (Crandall) 1901. -- Baker 1928: 466.

220. PHYSA WARRENIANA (Lea) 1864. -- Walker 1918: 115; Baker 1928: 437.

221. PLANORBULA ARMIGERA (Say) 1818. -- Baker 1928: 355; Baker 1945: 176, 310, 326, 336; Solem 1952: 129; Teskey 1954: 27.

222. (Planorbula crassilabris (Walker) 1907). -- Baker 1928: 359, not Wisconsin.

223. PROMENETUS EXACUOUS (Say) 1821. -- Baker 1928: 361; Morrison 1932: 374; Baker 1945: 24, 181, 318, 328, 336.

224. PROMENETUS EXACUOUS MEGAS (Dall) 1905. -- Baker 1928: 363; Morrison 1932: 374.

225. PROMENETUS UMBILICATELLUS (Cockerell) 1887. -- Baker 1928: 383; Baker 1945: 482.

226. PSEUDOSUCCINEA COLUMELLA (Say) 1817. -- Baker 1928: 272; Morrison 1932: 370.

227. STAGNICOLA CAPERATA (Say) 1829. -- Baker 1928: 260; Teskey 1954: 27.

228. STAGNICOLA CATASCOPIUM (Say) 1817. -- Baker 1928: 250; Morrison 1932: 370.

229. STAGNICOLA EMARGINATA (Say) 1821. -- Baker 1928: 234; Morrison 1932: 370.

230. STAGNICOLA EMARGINATA ANGULATA (Sowerby) 1872. -- Baker 1928: 241.

231. STAGNICOLA EMARGINATA CANADENSIS (Sowerby) 1872. -- Baker 1928: 239; Solem 1952: 129.

232. STAGNICOLA EMARGINATA VILASENSIS (Baker) 1927. -- Baker 1928: 243; Morrison 1932: 370; Franzen 1956: 26.

233. STAGNICOLA EMARGINATA WISCONSINENSIS (Baker) 1910. -- Baker 1928: 245; Morrison 1932: 370; Franzen 1958: 32.

234. STAGNICOLA EXILIS (Lea) 1837. -- Baker 1928: 226; Morrison 1932: 370. Listed by Teskey as a form of S. palustris, q.v.

235. STAGNICOLA LANCEATA (Gould) 1848. -- Baker 1928: 228; Morrison 1932: 370; Solem 1952: 129.

236. STAGNICOLA NASHOTAHENSIS (Baker) 1909. -- Baker 1928: 232; Franzen 1958: 33.

237. STAGNICOLA PALUSTRIS (Müller) 1774. -- Teskey 1954: 27 (Limnaea p.)

238. STAGNICOLA PALUSTRIS ELODES (Say) 1821. -- Baker 1928: 212; Morrison 1932: 369.

239. STAGNICOLA PALUSTRIS EXILIS (Lea) 1837. -- Teskey 1954: 27 (Limnaea palustris form exilis). See also No. 234, this list.

240. STAGNICOLA REFLEXA (Say) 1821. -- Baker 1928: 221.

241. STAGNICOLA UMBROSA (Say) 1832. -- Baker 1928: 218.

242. STAGNICOLA UMBROSA JOLIETENSIS (Baker) 1901. -- Baker 1928: 220.

243. STAGNICOLA WALKERIANA F. C. Baker 1926. -- Baker 1928: 247; Solem 1952: 129; Franzen 1957: 32.

244. STAGNICOLA WINNEBAGOENSIS (F. C. Baker) 1922. -- Baker 1928: 230; Franzen 1956: 25.

245. STAGNICOLA WOODRUFFI (F. C. Baker) 1901. -- Baker 1928: 256.

4. FRESHWATER OPERCULATES

246. AMNICOLA EMARGINATA (Küster) 1852. -- Baker 1928: 126 (Cincinnatia).

247. AMNICOLA EMARGINATA CANADENSIS (F. C. Baker) 1928: 130 (Cincinnatia).

248. AMNICOLA EMARGINATA LACUSTRIS (F. C. Baker) 1928: 127 (Cincinnatia); Morrison 1947: 27; Franzen 1957: 31.

249. AMNICOLA GELIDA F. C. Baker 1921. -- Baker 1928: 110.

250. AMNICOLA GREENENSIS F. C. Baker 1928: 113; extinct; Franzen 1957: 31.

251. AMNICOLA INTEGRA Say 1821. -- Baker 1928: 122.

252. AMNICOLA INTEGRA JUDAYI (F. C. Baker) 1922. -- Baker 1928: 124; Franzen 1956: 22.

253. AMNICOLA LEIGHTONI F. C. Baker 1921. -- Baker 1928: 120, Pleistocene.

254. AMNICOLA LIMOSA (Say) 1817. -- Baker 1928: 93; Morrison 1932: 368.

255. AMNICOLA LIMOSA ORBICULATA Lea 1841. Specimens identified as this variety are in the Museum of Zoology, University of Michigan, No. 1520, from Wisconsin.

256. AMNICOLA LIMOSA PARVA Lea 1841. -- Baker 1928: 102; Morrison 1932: 368.

257. AMNICOLA LIMOSA PORATA (Say) 1821. Baker 1928: 98; Morrison 1932: 368. The variety is not recognized by Berry.

258. AMNICOLA LIMOSA SUPERIORENSIS F. C. Baker 1928: 101; Solem 1952: 129; Franzen 1957: 31.

259. AMNICOLA LUSTRICA Pilsbry 1890. -- Baker 1928: 104; Solem 1952: 129.

260. AMNICOLA LUSTRICA DECEPTA F. C. Baker 1928: 108; Morrison 1932: 368; Franzen 1956: 22.

261. AMNICOLA LUSTRICA PERLUSTRICA F. C. Baker 1928: 109; Franzen 1956: 22.

262. AMNICOLA ONEIDA PILSBRY 1917. -- Baker 1928: 111.

263. AMNICOLA PILSBRYI Walker 1906. -- Baker 1928: 118.

264. AMNICOLA PRECURSOR F. C. Baker 1928: 116, Pleistocene.

265. AMNICOLA WALKERI Pilsbry 1898. -- Baker 1928: 114; Morrison 1932: 368.

266. AMNICOLA WALKERI FOXENSIS F. C. Baker 1928: 116; Franzen 1956: 22.

267. BULIMUS TENTACULATUS (Linnaeus) 1758. -- Teskey 1954: 27.

268. BULIMUS TENTACULATUS MAGNALACUSTRIS F. C. Baker 1928: 81; Franzen 1956: 23.

269. CAMPELOMA BREVISPIRUM F. C. Baker 1928: 74; Franzen 1957: 31.

270. CAMPELOMA DECISUM (Say) 1817. -- Baker 1928: 57; Morrison 1932: 367.

271. CAMPELOMA INTEGRUM (Say) 1821. Baker 1928: 63.

272. CAMPELOMA MILESII (Lea) 1863. -- Baker 1928: 61; Morrison 1932: 367.

273. CAMPELOMA RUFUM (Haldeman) 1841. -- Baker 1928: 68; Teskey 1954: 27.

274. CAMPELOMA RUFUM GIBBUM (Currier) 1867. -- Baker 1928: 73.

275. GONIOBASIS LIVESCENS (Menke) 1830. -- Baker 1928: 180. Solem 1952: 129; Teskey 1954: 27.

276. GONIOBASIS LIVESCENS BARRONENSIS F. C. Baker 1928: 186; Franzen 1957: 31.

277. GONIOBASIS LIVESCENS CORRECTA (Brot) 1868. -- Baker 1928: 185.

278. GONIOBASIS LIVESCENS MICHIGANENSIS F. C. Baker 1928: 183; Franzen 1957: 31.

279. HYDROBIA (or FONTIGENS?) NICKLINIANA (Lea) 1839. -- Baker 1928: 132 (Stimpsonia).

280. ?HYDROBIA NICKLINIANA ATTENUATA (Haldeman) 1842. -- Baker 1928: 136: "not yet known for Wisconsin."

281. (Lioplax subcarinata (Say) 1818). -- Baker 1928: 49, not Wisconsin.

282. LIOPLAX SUBCARINATA WISCONSINENSIS F. C. Baker 1928: 50; Franzen 1957: 32.

283. PLEUROCERA ACUTUM Rafinesque 1831. -- Baker 1928: 171; Teskey 1954: 27.

284. PLEUROCERA ACUTUM TRACTUM (Anthony) 1850. -- Baker 1928: 173.

285. POMATIOPSIS CINCINNATIENSIS (Lea) 1840. -- Baker 1928: 168.

286. POMATIOPSIS LAPIDARIA (Say) 1817. -- Baker 1928: 162; Teskey 1954: 27.

287. (Pyrgulopsis letsoni (Walker) 1901). -- Baker 1928: 140: not yet found in Wisconsin.

288. (Pyrgulopsis scalariformis (Wolf) 1868). -- Baker 1928: 138: not known from Wisconsin.

289. PYRGULOPSIS SHELDONI (Pilsbry) 1890. -- Walker 1918: 140; Baker 1928: 144.

290. SOMATOGYRUS DEPRESSUS (Tryon) 1862. -- Baker 1928: 147.

291. SOMATOGYRUS SUBGLOBOSUS (Say) 1825. -- Baker 1928: 155 (Birgella).

292. SOMATOGYRUS SUBGLOBOSUS ISOGONUS (Say) 1829. -- Baker 1928: 159.

293. SOMATOGYRUS TRYONI Pilsbry and Baker 1927. -- Baker 1928: 150; Morrison 1932: 369; Solem 1952: 129.

294. VALVATA BICARINATA Lea 1841. -- Baker 1928: 18: the typical form not yet found in Wisconsin.

295. (Valvata bicarinata normalis Walker 1902). -- Baker 1928: 20: see V. winnebagoensis.

296. VALVATA LEWISI Currier 1868. -- Baker 1928: 26; Morrison 1932: 366.

297. VALVATA LEWISI HELICOIDEA Dall 1905. -- Baker 1928: 29, said to occur with the type form throughout its range.

298. VALVATA PERDEPRESSA Walker 1906. -- Walker 1918: 130; Baker 1928: 21; Solem 1952: 129.

299. VALVATA SINCERA Say 1824. -- Baker 1928: 23; Solem 1952: 129.

300. VALVATA SINCERA DANIELSI Walker 1906. -- Baker 1928: 24.

301. VALVATA SINCERA NYLANDERI Dall 1905. -- Baker 1928: 25; Morrison 1932: 366.

302. VALVATA TRICARINATA (Say) 1817. Baker 1928: 11, lists the typical form and the varieties basalis Van. (p. 17); infracarinata Van., p. 18; mediocarinata F. C. Baker (p. 17); see also Franzen 1957: 32; perconfusa Walker (p. 16); simplex Gould (p. 18); and unicarinata De Kay (p. 16). See also Morrison 1932: 366; Solem 1952: 129.

303. VALVATA WINNEBAGOENSIS F. C. Baker 1928: 475; Franzen 1957: 32.

304. VIVIPARUS CONTECTOIDES W. G. Binney 1865. -- Baker 1928: 35; Washburn 1957: 72; Roscoe 1962: 36.

305. VIVIPARUS INTERTEXTUS ILLINOISENSIS F. C. Baker 1928: 38.

306. VIVIPARUS MALLEATUS (Reeve) 1863. -- Teskey 1954: 27.

307. VIVIPARUS SUBPURPUREUS (Say) 1829. -- Baker 1928: 42.

5. LAND GASTROPODA

308. ALLOGONA PROFUNDA (Say) 1821. Pilsbry 1940: 877; Levi and Levi 1950: 133; Solem 1952: 129; Teskey 1954: 26.

309. ANGUISPIRA ALTERNATA (Say) 1816. -- Pilsbry 1948: 568; Levi and Levi 1950: 135; Solem 1952: 129; Teskey 1954: 26.

310. ARION CIRCUMSCRIPTUS Johnston 1828. -- Pilsbry 1948: 673; Dundee 1958: 52.

311. CARYCHIUM EXIGUUM (Say) 1822. -- Pilsbry 1948: 1052, possibly implied; Levi and Levi 1950: 137; Teskey 1954: 27.

312. CARYCHIUM EXILE CANADENSE Clapp 1906. -- Pilsbry 1948: 1059, implied; Levi and Levi 1950: 137.

313. CEPAEA NEMORALIS (Linnaeus) 1758. -- Pilsbry 1939: 9, doubtful.

314. CIONELLA LUBRICA (Müller) 1774. -- Pilsbry 1948: 1047, implied; Levi and Levi 1950: 137; Teskey 1954: 26.

315. COLUMELLA EDENTULA (Draparnaud) 1805. -- Pilsbry 1948: 1002; Levi and Levi 1950: 136.

316. ?DEROCERAS LAEVE (Müller) 1774. -- Pilsbry 1948: 539, possibly implied.

317. DEROCERAS RETICULATUM (Müller) 1774. Pilsbry 1948: 534.

318. DISCUS CRONKHITEI (Newcomb) 1865. -- Pilsbry 1948: 600; Levi and Levi 1950: 135; Teskey 1954: 26 (D. c. anthonyi).

319. DISCUS CRONKHITEI CATSKILLENSIS (Pilsbry) 1898. -- Pilsbry 1948: 605; Levi and Levi 1950: 135.

320. DISCUS PATULUS (Deshayes) 1830. -- Pilsbry 1948: 608; Levi and Levi 1950: 135; Teskey 1954: 26.

321. EUCONULUS CHERSINUS (Say) 1821. -- Pilsbry 1946: 239, var. only; Levi and Levi 1950: 134.

322. EUCONULUS CHERSINUS POLYGYRATUS (Pilsbry) 1899. -- Pilsbry 1946: 240; Teskey 1954: 26.

323. EUCONULUS FULVUS (Müller) 1774.

Pilsbry 1946: 235, implied; Levi and Levi 1950: 134; Teskey 1954: 26.

324. GASTROCOPTA ARMIFERA (Say) 1821. -- Pilsbry 1948: 874, implied; Levi and Levi 1950: 137; Teskey 1954: 26.

325. GASTROCOPTA CONTRACTA (Say) 1822. -- Pilsbry 1948: 880, implied; Levi and Levi 1950: 137; Teskey 1954: 26.

326. GASTROCOPTA CORTICARIA (Say) 1816. -- Pilsbry 1948: 894, implied.

327. GASTROCOPTA HOLZINGERI (Sterki) 1899. -- Pilsbry 1948: 883, implied; Teskey 1954: 26.

328. GASTROCOPTA PENTODON (Say) 1821. -- Pilsbry 1948: 886, implied; Teskey 1954: 26.

329. GASTROCOPTA TAPPANIANA (C. B. Adams) 1842. -- Pilsbry 1948: 869; Levi and Levi 1950: 137.

330. HAPLOTREMA CONCAVUM (Say) 1821. -- Pilsbry 1946: 208, implied; Levi and Levi 1950: 133.

331. HAWAIIA MINUSCULA (Binney) 1840. -- Pilsbry 1946: 420; Levi and Levi 1950: 134; Teskey 1954: 26.

332. HELICODISCUS PARALLELUS (Say) 1821. -- Pilsbry 1948: 625; Levi and Levi 1950: 135; Solem 1952: 129; Teskey 1954: 26.

333. HENDERSONIA OCCULTA (Say) 1831. -- Pilsbry 1948: 1037; Levi and Levi 1950: 137; Teskey 1954: 26.

334. MESODON CLAUSUS (Say) 1821. -- Pilsbry 1940: 712.

335. MESODON THYROIDUS (Say) 1816. -- Pilsbry 1940: 706; Levi and Levi 1950: 132; Solem 1952: 129; Teskey 1954: 26.

336. MESODON ZALETUS (Binney) 1837. -- Pilsbry 1940: 722.

337. NESOVITREA BINNEYANA (Morse) 1864. -- Pilsbry 1946: 259, implied; Levi and Levi 1950: 134.

338. NESOVITREA ELECTRINA (Gould) 1841. -- Pilsbry 1946: 256; Levi and Levi 1950: 134; Teskey 1954: 26.

339. OXYLOMA DECAMPI GOULDI Pilsbry 1948: 732.

340. OXYLOMA RETUSA (Lea) 1834. -- Pilsbry 1948: 725, implied; Levi and Levi 1950: 136; Solem 1952: 129; Teskey 1954: 26.

341. PARAVITREA MULTIDENTATA (Binney) 1840. -- Pilsbry 1946: 352, Mich., Ind.; Levi and Levi 1950: 135.

342. ?PLANOGYRA ASTERISCUS (Morse) 1857. -- Pilsbry 1948: 1038, implied by Mich. and Ont. records.

343. PUNCTUM MINUTISSIMUM (Lea) 1841. -- Pilsbry 1948: 644, implied; Levi and Levi 1950: 135; Teskey 1954: 26 (P. pygmaeum).

344. PUPILLA MUSCORUM (Linnaeus) 1758. -- Pilsbry 1948: 933, implied. Not recorded by the Levis, Solem, or Teskey.

345. PUPOIDES ALBILABRIS (C. B. Adams) 1841. -- Pilsbry 1948: 921, possibly implied; N. D., S. D., Ont., and southward. Recorded elsewhere for Illinois, Ohio, Pennsylvania.

346. RETINELLA INDENTATA (Say) 1823. -- Pilsbry 1946: 288, implied; Levi and Levi 1950: 134; Solem 1952: 129; Teskey 1954: 26.

347. STENOTREMA FRATERNUM (Say) 1824. -- Pilsbry 1940: 681; Levi and Levi 1950: 132; Solem 1952: 129; Teskey 1954: 26.

348. STENOTREMA FRATERNUM CAVUM

(Pilsbry and Vanatta) 1911. -- Pilsbry 1940: 684.

349. STENOTREMA HIRSUTUM (Say) 1817. -- Levi and Levi 1950: 131.

350. STENOTREMA LEAI (Binney) 1878. -- Pilsbry 1940: 676; 1948: 1099; Levi and Levi 1950: 132; Solem 1952: 129; Teskey 1954: 26 (last three as S. monodon).

351. STRIATURA EXIGUA (Stimpson) 1850. -- Pilsbry 1946: 490, implied; Levi and Levi 1950: 135.

352. STRIATURA FERREA Morse 1864. -- Pilsbry 1946: 497, Mich.; Levi and Levi 1950: 135.

353. STRIATURA MILIUM (Morse) 1859. -- Pilsbry 1946: 495, implied; Levi and Levi 1950: 135; Teskey 1954: 26.

354. STROBILOPS AENEA Pilsbry 1926. -- Pilsbry 1948: 862, implied; Levi and Levi 1950: 136.

355. STROBILOPS AFFINIS Pilsbry 1893. -- Pilsbry 1948: 860, implied; Levi and Levi 1950: 136; Teskey 1954: 26.

356. STROBILOPS LABYRINTHICA (Say) 1817. -- Pilsbry 1948: 854, implied; Levi and Levi 1950: 136; Teskey 1954: 26.

357. SUCCINEA AVARA (Say) 1824. -- Pilsbry 1948: 837, implied; Levi and Levi 1950: 136; Solem 1952: 129; Teskey 1954: 26.

358. SUCCINEA GROSVENORI Lea 1864. -- Pilsbry 1948: 9, implied.

359. SUCCINEA OVALIS Say 1817. -- Pilsbry 1948: 801, implied; Levi and Levi 1950: 136; Teskey 1954: 26.

360. SUCCINEA OVALIS OPTIMA Pilsbry 1908. -- Pilsbry 1948: 805, implied.

361. TRIODOPSIS ALBOLABRIS (Say) 1816. -- Pilsbry 1940: 835; Levi and Levi 1950: 133; Solem 1952: 129.

362. ?TRIODOPSIS ALBOLABRIS ALLENI (Sampson) 1883. -- Pilsbry 1940: 840, possibly implied: Minn., Iowa, Ill.

363. ?TRIODOPSIS DENOTATA (Férussac) 1823. -- Pilsbry 1940: 821, possibly implied: Mich., Ind., Ill.

364. ?TRIODOPSIS FRAUDULENTA VULGATA Pilsbry 1940: 805, possibly implied: Mich., Ind., Ill.

365. TRIODOPSIS MULTILINEATA (Say) 1821. -- Pilsbry 1940: 847; Levi and Levi 1950: 133; Teskey 1954: 26.

366. ?TRIODOPSIS TRIDENTATA (Say) 1816. -- Pilsbry 1940: 792, possibly implied: Mich., Ind., Ill.

367. VALLONIA ALBULA Sterki 1893. -- Pilsbry 1948: 1031, implied; Man., S.D., N.Y.

368. VALLONIA COSTATA (Müller) 1774. -- Pilsbry 1948: 1026, implied; Levi and Levi 1950: 137; Teskey 1954: 26.

369. ?VALLONIA EXCENTRICA Sterki 1883. -- Pilsbry 1948: 1025, implied; Mich., Ind., Ill., Wash., but value of species in doubt.

370. VALLONIA GRACILICOSTA Reinhardt 1883. -- Pilsbry 1948: 1028, possibly implied: Minn., Ark.

371. VALLONIA PARVULA Sterki 1893. -- Pilsbry 1948: 1027, implied: S.D., Iowa, Ill., Ohio, Ont.

372. VALLONIA PERSPECTIVA Sterki 1893. -- Pilsbry 1948: 1033, implied: Minn., Mo., Ill., W. Va. Recorded elsewhere for Ontario.

373. VALLONIA PULCHELLA (Müller) 1774.

Pilsbry 1948: 1023, implied; Levi and Levi 1950: 137; Teskey 1954: 26.

374. ?VENTRIDENS DEMISSUS (Binney) 1843. -- Pilsbry 1940: 459, possibly implied: Mich., Ind., Ill.

375. ?VENTRIDENS INTERTEXTUS (Binney) 1841. -- Pilsbry 1940: 468, possibly implied: Mich., Ind., Ill.

376. ?VENTRIDENS LIGERA (Say) 1821. -- Pilsbry 1940: 465, possibly implied: Mich., Ind., Ill., Mo.

377. VERTIGO BINNEYANA Sterki 1890. -- Pilsbry 1948: 955, implied: Man., Ont., Iowa.

378. VERTIGO ELATIOR Sterki 1894. -- Pilsbry 1948: 956, implied: B.C., Alta. to Me., Ont., Mont., N.M. Recorded elsewhere for W. Va.

379. VERTIGO GOULDII (Binney) 1843. -- Pilsbry 1948: 971, implied; Levi and Levi 1950: 137.

380. VERTIGO MILIUM (Gould) 1840. -- Pilsbry 1948: 944, implied: Me., Que., Ont., S.D., southward. Recorded elsewhere for Iowa, Ill., Ohio.

381. VERTIGO MODESTA (Say) 1824. -- Pilsbry 1948: 982, implied: B.C. to Ont., Me., south to Conn. and Calif. Recorded elsewhere for Ohio.

382. ?VERTIGO MORSEI Sterki 1894. -- Pilsbry 1948: 952, possibly implied: Mich., Ind., Ill., Ont.

383. VERTIGO NYLANDERI Sterki 1909. -- Pilsbry 1948: 970; Levi and Levi 1950: 137.

384. VERTIGO OVATA Say 1822. -- Pilsbry 1948: 952, implied; Levi and Levi 1950: 137; Teskey 1954: 26.

385. VERTIGO TRIDENTATA Wolf 1870. -- Pilsbry 1948: 965, implied: Minn., Ont., Que., Ill., Mo., Kansas.

386. VERTIGO VENTRICOSA (Morse) 1865. -- Pilsbry 1948: 957, implied; Levi and Levi 1950: 137.

387. ?VITRINA LIMPIDA Gould 1850. -- Pilsbry 1946: 501, possibly implied: Man., Ont., Mich., Penna.

388. ZONITOIDES ARBOREUS (Say) 1816. -- Pilsbry 1946: 480; Levi and Levi 1950: 133; Solem 1952: 129; Teskey 1954: 26.

389. ZONITOIDES LIMATULUS (Binney) 1840. -- Pilsbry 1946: 484, possibly implied: Mo., Ill., Ind., ?Mich.; Levi and Levi 1950: 134.

390. ZONITOIDES NITIDUS (Müller) 1774. -- Pilsbry 1946: 476, implied; Solem 1952: 129; Teskey 1954: 26.

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REPRINTS FROM AMU NEWS BULLETIN AND ANNUAL REPORT

A PRELIMINARY REPORT OF MOLLUSCAN FAUNAL ZONES IN PEORIA SILT (PLEISTOCENE). -- BY A. BYRON LEONARD AND DOROTHEA S. FRANZEN. (Reprinted from American Malacological Union News Bulletin and Annual Report, 1948, p. 17).

The Peoria silt, a member of the Sanborn formation, is a massive, structureless, homogeneous deposit, gray to buff in color, ranging from a few feet to 30-40 feet in thickness. There is no visible stratification, except very locally, where ponds formed on the old loess surface.

Since there is reason to believe that the Peoria silt represents more than one interval of Pleistocene time, this study was undertaken to determine whether or not there might be faunal changes within the deposit. This report includes data from only 3 of the 20 or more localities in northwestern Kansas that will be included in this study.

Gastropod mollusks were taken at intervals of 5-10 feet. The fauna, consisting of 25-30 species is grouped into 3 faunal zones. In the lower zone eleven species are represented of which Succinea grosvenori, Pupilla muscorum and P. blandi are predominant. In the Transition zone, 13 species are represented. Eight species, Euconulus chersinus, Helicodiscus singleyanus, Pupilla blandi, P. muscorum, Succinea avara, Vallonia gracilicosta, Vertigo gouldi paradoxa, and Vertigo modesta are in the Transition and also in the Lower and Upper zones. Succinea grosvenori is found in the Transition and Lower zones. Three species, Columella alticola, Discus shimeki, and Hawaiia minuscula are found in the Transition and Upper zones. In the Upper zone, 17 species are represented of which 5 are restricted to this zone: Cionella lubrica, Discus cronkhitei, Pupoides albilabris, Retinella species, and Zonitoides arboreus.

Dr. Franzen illustrated this paper with slides of charts showing relative percentages of a given species in the population of each horizon studied. Dr. Baker noted that Striatura milium is mostly boreal today, and that it had been present in limited ranges only, in the diagrams which Dr. Franzen presented; could this information be an aid in interpreting former climatic conditions?

REPRINTS OF RARE ARTICLES ON MOLLUSCA. -- JOSEPH FREDERICK WHITEAVES, 1862, "On the Land and Fresh Water Mollusca of Lower Canada, ..." Canadian Naturalist and Geologist, vol. 6, pp. 452-459.

ARTICLE XXXIV. -- On the Land and Fresh Water Mollusca of Lower Canada, with thoughts on the general geographical distribution of Animals and Plants throughout Canada. By J. F. Whiteaves, F. G. S., Honorary member of the Ashmolean Society of Oxford, &c., &c.

(Read before the Natural History Society of Montreal)

Our knowledge of the land and fresh water mollusca inhabiting Canada generally, is very limited. The papers published by Mr. Bell and Mr. D'Urban in the Canadian Naturalist, together with another in the Canadian Journal by Mr. Williamson, contain all the published information on this subject. During the past summer, (1861) I have given the whole of my time to the investigation of these creatures in Lower Canada, and have obtained some additional information respecting them, which I propose bringing before the public in this paper.

The result of about five months collecting, principally in the neighbourhood of Quebec and Montreal, has been the discovery of nineteen species previously unknown in Lower Canada. They are for the most part well known New England species, which had not previously been detected so far north as Canada. Four of these are land, and fifteen fresh water shells. Of the land shells, the first is, it would seem, an indubitable alien, -- the Helix rufescens of Muller, a small snail, common enough in Great Britain, but which has not hitherto been found on the American continent. During my stay at Quebec, I found it living in abundance on that part of the plains of Abraham, known as the Cove Fields.

On the island of Orleans, another rare and beautiful little snail occurred to me, also alive, -- the Helix capsella of Gould, which has been hitherto only found in the state of Tennessee. Living about decayed logs, under small pieces of timber washed ashore, on trunks of smooth trees and under stones, -- observed only by the prying eye of the naturalist, -- occur sundry little snails, with cylindrical shells, the apertures of which are generally armed with teeth. Owing to the general resemblance of these shells to a small chrysalis, they have received the generic name of Pupa. Of this group two species (Pupa simplex, Gould, and Vertigo Gouldii, Binney) were previously known to inhabit Lower Canada from the researches of Messrs. Bell and D'Urban. To this number I can add two species, Pupa armifera, Say, which lives in quantities under stones on the plains of Abraham, and Pupa contracta, Say, which I found on the island of Orleans. The extremes

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of heat and cold, together with the dryness of the atmosphere in Canada seem unfavourable to the abundance of land snails. Hence we must not expect, perhaps, to find many novelties among the terrestrial mollusca, except among the small and critical species. But in this land of lakes and mighty rivers, which may almost be said to be unexplored, many interesting fresh water shells may yet be obtained.

Of the Unionidae, four species new to the published lists, have occurred to me in Lower Canada. Three of these are New England species, while the other was described from the Ohio River.

In the rivers, lakes and swamps, throughout the whole province, living in the sand or mud at the bottom, there occur small bivalves of the genera Cyclas and Pisidium. The chief difference between Cyclas and Pisidium is that in

Cyclas the two siphons are distinct, while in Pisidium the siphons are united into a single tube. The shell of Cyclas is nearly equilateral, while that of Pisidium is very oblique. These creatures are most abundant everywhere, but, comparatively speaking, very little is known respecting them. I have eight species not previously recorded as Canadian, while in the proceedings of the Boston Natural History Society, ten species new to science are recorded from the neighbourhood of Lake Superior. I would call special attention to these little shells; the fact of no less than eighteen species having been left out in all the catalogues of land and fresh water shells in the Canadian Naturalist, would seem to shew that our rivers and lakes may contain many rare and curious forms which have yet to be detected.

The remaining three species are Limnaea columella, Planorbis armigerus and P. deflectus; three fresh water snails, mostly critical forms, which have been previously overlooked. A most remarkable fact in connection with these fresh water snails, is that no less than nine species, a large proportion of the whole, occur on both the Atlantic and Pacific coasts. It has been held by many naturalists, that a lofty mountain chain will form an obstacle to the migration of species. Yet here we find that on each side of a mountain barrier, some of the peaks of which are as much as 15,000 and 16,000 feet above the level of the sea, and clothed with perpetual snow, such sluggish creatures as fresh water mollusca both can and do exist, the species in each case being identical. It would seem at any rate, that there are exceptions to this rule, and that the Rocky Mountains, for example, do not present an insuperable obstacle to migration.

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But if we call in the aid of geology, we shall find that, in all probability, this great mountain barrier is of later date than the fauna and flora existing around it. It should be stated too that the fresh water Pulmonifera are remarkable for their world-wide distribution.

The laws which affect the geographical distribution of plants and animals on the surface of our planet, are creating much interest just now in the minds of scientific men. Analogy it has been said favours the supposition that each species whether animal or vegetable was originally formed in some particular locality, whence it spread itself gradually over a certain area; rather than that the earth was at once, by the fiat of the Almighty, peopled as we at present behold it. The majority of our best naturalists are inclined to accept the theory that every species has originated from a common centre, and that numerous such centres were situated in different parts of the world, each centre being the seat of a particular number of species. In accordance with this view, Mr. Woodward, in his admirable treatise on recent and fossil shells, has mapped out the whole globe into molluscan provinces, each of which he supposes to possess a certain number of shells peculiar to it, and to be characterized by definite groups of this class of animals. Prof. Schouw, of Berlin, has carried out the same idea in the vegetable kingdom; but the views of these two gentlemen do not exactly correspond. Mr. Woodward divides the eastern part of North America into two regions, characterized, according to his views, by a peculiar assemblage of land and fresh water shells. One of these he calls the Canadian region, which includes the whole of Upper and Lower Canada;--and the other the Atlantic region, which comprises all the United States east of the Mississippi valley. In Europe generally, even at the present date, but little is known respecting the natural history of Canada. Hence Mr. Woodward's data were hardly sufficient to enable him to generalize with much confidence. He remarks, "the country drained by the great lakes, and the river St. Lawrence possesses very few peculiar shells, and those mostly of fresh water genera. It is chiefly remarkable for the presence of a few European species, which strengthen the evidence of a landway across the Atlantic having remained till after the epoch of the existing animals and plants."

This landway I propose to say a few words

about presently. And here, it may be observed, that of all the land snails which are common to both sides of the Atlantic, very few can be proved

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to be really indigenous to America. Now, with one exception, all the shells of both Upper and Lower Canada also inhabit the Atlantic region. The little group of fresh water bivalves, to which I endeavoured previously to draw some attention, forms this exception. Eight species of Cyclas and three of Pisidium are, so far as we know at present, peculiar to Canada, and have never been found elsewhere. But these little shells require to be carefully searched for, and are very similar one to an other; hence they may have been overlooked in the New England states.

When we turn to the sister science of botany, we shall find that somewhat different views of geographical distribution have been entertained. If we compare our knowledge of Canadian plants with Prof. Schouw's theories respecting the general geographical distribution of the vegetable kingdom we shall see that in Canada two botanical provinces meet. The first is the well-known Arctic flora, which is characterized by the abundance of mosses, Saxifrages, Gentians, species of Silene, Arenaria, and Dianthus; and also by the presence of many species of willow and sedges.

As defined by Prof. Schouw, the total absence of tropical families, a notable decrease of the forms peculiar to the temperate zone, and the prevalence of forests of firs and birches, form additional characteristics of this region. Geographically, it includes all the countries within the polar circle, with some parts of Europe, Asia and America to the south of it; as for example, the mountains of Scotland and Wales, Labrador, Greenland, and the northern part of Canada. Next we have what Prof. Schouw calls the region of Asters and Solidagos, characterized by the great variety of oaks and firs, the small number of Umbelliferae and Cruciferae, by the almost total absence of true heaths, which are here replaced by Vacciniums, and by the abundance of the said Asters and Solidagos. Geographically it includes Mr. Woodward's Atlantic region, and the southern part of Canada. Thus, judging from the distribution of Mollusca, Mr. Woodward thinks that Canada should rank as a distinct natural-history region, while on the contrary, judging from the evidence afforded by the vegetable kingdom,-- according to Prof. Schouw's theory, part of Canada belongs to an Arctic, and part to an Atlantic region. But here again we must not neglect to inquire what light the geology throws upon this question, and turning to the geologic record, we shall find that since the first appearance of these animals and plants on the surface of our globe, great alterations in the relative distribution of land and water and a general subsi-

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dence and re-upheaval of the continents of Europe and America, have been effected. We shall do well to remember the brilliant generalizations of the late Edward Forbes, after a close study of the distribution of animals and plants in Great Britain, and of their connection with the tertiary deposits of the same country.

On the tops of the mountains near the lakes of Killarney, in the south of Ireland, occur a few plants, entirely different from those of the Scotch and Welsh mountains, but nearly agreeing with those of the Asturian mountains in the north of Spain. According to Forbes, the southern character of these Irish plants, and their extreme isolation, point to a period when a great mountain barrier extended across the Atlantic, uniting Ireland with Spain. Soon after this, arguing from similar data, he infers that another barrier connected the west of France with the south-west of England and thence to Ireland;-- and a little later England and France were connected by dry land, towards the eastern part of the Channel. Upon this supposition it is easy to understand why two small snails (the Helix incarnata and Bithinia marginata,) which abound as Pleistocene fossils in the valley of the Thames,

although extinct in Great Britain, are still found living in France.

At the time of the glacial drift, what are now the summits of the Scotch and Welsh mountains were then -- Forbes argues -- low islands, or members of chains of islands, extending to the area of Norway, through a glacial sea -- clothed with an Arctic vegetation, which in the gradual upheaval of those islands, and consequent change of climate, became limited to the summits of the new formed and still existing mountains. After this upheaval it is believed that Ireland was connected with England, and England with Germany, by vast plains, fragments of which still exist, and upon which lived the Irish elk, two-horned rhinoceri, the Arctic elephant (Elephas primigenius), and other quadrupeds now extinct, but which have left behind them in the gravels of our English drift, unmistakeable evidence of their having at one time roamed in great numbers over what is now Great Britain.

The array of facts which tends to corroborate Forbes's theories would occupy too much time to explain in detail; -- I have merely stated his general views in so far as they affect the question at issue. Carrying out these well known generalizations, Sir Charles Lyell after visiting this country and studying the peculiar distribution of Pleistocene fossils in Lower Canada, published a theory which he thought would account for these phenomena. This

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was that the land in North America, "after it had acquired its present outline of hill and valley, cliff and ravine," was subjected to a gradual submergence -- and that at a subsequent period it re-emerged from the ocean. Again, it is a well-known fact, that more than half of the marine shells of the northern New England states, and also of the Gulf of the St. Lawrence are common to the seas of northern Europe. This has been held, with much probability, to prove the existence of a landway across the Atlantic since the epoch of the still living animals and plants.

It should be stated that many American shells, which are not now known to inhabit the European seas, occur fossil in the red crag of Great Britain -- this would tend to prove the great antiquity of the existing fauna.

If too the Helix labyrinthica (a little snail common in Canada) be, as many of our best naturalists think, identical with a fossil species from the Eocene beds of the Isle of Wight, it is just possible that some of our land shells may prove to be even of still older date. It has been noticed by scientific men in Britain, that these fossil land shells from the Isle of Wight are of a group quite American in character. Neither should we forget the theory that at a period somewhat later geologically than these Eocene beds, the isthmus of Darien, or some portion of it at least, was submerged, and we should take into consideration the supposed consequent alteration of the currents of the gulf stream. It has been suggested that from this cause alone, the climate of Great Britain was then as cold as that of the island of Newfoundland at the present day.

But here in Canada, our knowledge of facts is much too meagre and unsatisfactory to enable us to generalize either on the distribution of plants and animals in British America, or on the connection between existing animals and the tertiary formations of this country. The deposits of land and fresh water shells in our lacustrine marls, require to be carefully worked out. and catalogues of the species which they contain to be published. In the living land and fresh water mollusca, much is yet to be done; -- the neighbourhood of Lake Superior may yet produce many new fresh water forms, while the vicinity of Toronto, and that part of Canada to the south-west of Lake Erie are, conchologically speaking, almost unknown. The opening up of canals has caused a northward emigration of fresh water shells, and by this means several species have been enabled to travel from Ohio into the south-west peninsula of Canada. In my own private collection,

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I have six fresh water shells hitherto not known

to inhabit Canada, which have been introduced in this way; five are from the Welland Canal, and one is from the Thames river at Chatham, C.W.; they are all well-known Ohio shells. The object of this paper has been a suggestive one, and if by these few remarks I shall have attracted attention to the interesting subject of our land and fresh water shells, my labour will not have been in vain.

List of land and fresh water shells hitherto not known as inhabiting Lower Canada.

Anodonta undulata, Say. St. Charles River, near Quebec.

Anodonta decora, Lea. Old quarries near the Mile-end, Montreal.

Anodonta plana, Lea. Rideau Canal near Ottawa City.

Unio luteolus? Lam. var. Common in the St. Lawrence both at Quebec and Montreal.

Unio compressus, Lea. (U. alasmodontinus? Barnes). Assumption River, M. de Villeneuve: Rideau Canal near Ottawa City, Mr. Billings.

Cyclas rhomboidea, Say; and two species as yet undetermined; St. Lawrence, at Quebec.

Pisidium variabile? Prime; and four species not yet determined.

Planorbis armigerus, Say. Trenches in fields near Quebec. This shell belongs to the genus Planorbalina of Haldeman.

Planorbis deflectus, Say. Streams near Quebec.

Limnaea columella, Say. Common in the St. Lawrence near Quebec, at low water, with its variety macrostoma.

Helix rufescens, Muller. Common in the Cove fields, Quebec, but probably introduced.

Helix capsella, Gould. Island of Orleans, but very rare.

Helix dentifera, Binney. St. Lambert, Montreal.

Pupa armifera, Say. Abundant in the Cove fields, Quebec.

Pupa contracta, Say. Island of Orleans.

Shells new to Upper Canada.

From the Welland Canal and its neighbourhood:

Unio gracilis, Barnes.
" coccineus? Lea.
" plicatus, Lesuer.
Paludina integra, Say.
Physa gyrina, Say.
Helix palliata, Say.
" thyroidus, Say.

From the river Thames at Chatham, C.W.:

Unio circulus, Lea.

Canadian fresh water shells which occur also on the west side of the Rocky Mountains.

Valvata sincera, Say.
Limnaea solida, Lea. (L. apicina, Lea).
" catascopium, Say.
" jugularis, Say. (L. stagnalis, Linn).
" palustris, Linn. (L. elodes, Say).
" pallida, Adams.
Physa heterostropha, Say.
" hypnorum, Linn. (P. elongata, Say).
Planorbis corpulentus, Say.
" trivolvis, Say.

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Of these shells, two are not allowed to be good species; Limnaea catascopium being considered a variety of L. palustris, and Planorbis corpulentus of P. trivolvis, but in each case they form well marked varieties. My authority for their occurrence west of the Rocky Mountains is Dr. Binney, in his catalogue of the fluviatile gasteropoda of North America, published for the Smithsonian Institution, Washington.

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NOTE. It will be noticed that generic and specific names in this paper are not in italics. This follows the original exactly. EDITOR.

REPRINTS FROM AMU NEWS BULLETIN AND ANNUAL REPORT

AN EXCURSION TO LAKE MIRAGOANE, HAITI. -- BY WALTER J. EYERDAM. (Reprinted from American Malacological Union News Bulletin and Annual Report, 1953, pp. 28-29).

This is a brief report on a small collection of highly endemic species of shells, taken in 1927 from a small freshwater lake in Haiti while the author was collecting biological material for the U.S. National Museum and the Museum of Comparative Zoölogy.

Several excursions were made to Lake Miragoane to collect land shells, reptiles and plants, in the company of Dr. Erik Ekman, the Swedish botanist. The freshwater shells were taken on the south side of the lake right after a disagreeable experience of becoming embogged in deep mud.

The lake has been very superficially explored, and at certain seasons it is an aquatic aviary harboring many species of rare and interesting birds. To an experienced and enthusiastic naturalist who is willing to spend several weeks at this spot there is considerable promise of rich return in endemic species of limnological forms of life. Only about three miles in area, it is practically the only fresh-water lake in Haiti.

(page 29): The shell fauna of Hispaniola is quite interesting, and because of rugged topography there are still many undiscovered races of shells to be found. Then there are large areas where apparently no mollusks occur. The shell fauna of Cuba is several times as great in species and in numbers as is that of Hispaniola.

The freshwater shells collected by the author in Haiti are all at the Museum of Comparative Zoölogy and at the Philadelphia Academy of Sciences.

GASTROPODS AND THE ECOLOGY OF LOESS DEPOSITION. -- BY A. BYRON LEONARD. (Reprinted from AMU News Bulletin and Annual Report, 1951, p. 4).

The extensive deposits of late Pleistocene loesses which blanket the underlying sediments in the central Great Plains region are generally accepted as being eolian in origin. However, contrary to the opinions of a number of students of the Pleistocene of this region, Leonard expressed the view that the loesses were not deposited under conditions of widespread aridity, comparable to those prevalent in the days of the "dustbowl." This view is supported by evidence derived from studies of fossil mollusks contained in the loesses. This evidence may be summarized as follows:

1. The molluscan fauna of the Peoria loess numbers about 30 species, approximately three times as many as occur in the region today.

2. Population density, although actually indeterminable, is judged to have been high, since as many as 5000 shells per cubic foot of loess is not uncommon.

3. Many species, such as Discus cronkhitei, D. shimeki, Pupilla blandi, P. muscorum, Columella alticola, Cionella lubrica, Striatura milium, Vallonia gracilicosta, Vertigo modesta, V. tridentata, V. gouldi paradoxa, and others which were abundant in Peorian times, are now absent from the central Great Plains.

4. From these facts it may be deduced that moisture was more abundant, or more equitably distributed than now, that there was an abundant vegetative cover on the Great Plains, and that therefore the hypothesis that the loesses were derived by wind action from an arid landscape, denuded of its floral cover, is untenable. That the silts which compose the loesses were derived from silts blown from constantly renewed glacial valley trains is proposed as a more acceptable hypothesis.

Dr. Leonard's paper was accompanied with several Kodachrome slides showing the general geologic formation of the locality described. This discussion ensued: Dr. Morrison: "Is loess deposit thicker near streams?" Dr. Leonard, "Yes, and coarser. Extensive studies have been made in this

direction." Dr. Fritz Haas: "I am most interested in this, coming from loess country myself. In the aeolian loess of Europe there are but three species of shells, while in the ravines where they were swept together by rain forty to fifty species may be harbored, not homogeneous but stratified. Have you made studies along this line?" Dr. Leonard: "Yes, extensive study. We were helped by an opportune roadside cut made as a highway was being constructed."

CORRECTIONS AND ADDITIONS TO THE CHECKLIST OF NORTH DAKOTA PLEISTOCENE AND RECENT MOLLUSCA

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A CHECKLIST of the mollusks which are known to occur at present and to have occurred during the Pleistocene Epoch in North Dakota was published in STERKIANA No. 8, p. 12-18. Two errors were incorporated by me. These are given below with numbers and letters designating the position in the checklist which they should have.

Since submitting the original checklist several other items have been discovered. I am particularly indebted to Dr. F. D. Holland, Jr. of the University of North Dakota for contribution of this information. I wish also to express my thanks to the editors of STERKIANA for this opportunity to make corrections and additions to the checklist.

CORRECTIONS

50a. SPHAERIUM STRIATINUM Sterki 1921. -- Dall 1905: 136; Winslow 1921: 15.

96a. PROMENETUS UMBILICATELLUS (Cockerell) 1885. -- Winslow 1921: 12.

ADDITIONS

1. ANODONTA DECORA LEA. -- Lea 1858: 13.

2. ANODONTA FERUSSACIANA Lea 1834. Lea 1858: 13. (=Anodontoides ferussacianus (Lea) 1834.)

3. MARGARITANA COMPLANATA Lea. -- Lea 1858: 13. (= Lasmigona complanata (Barnes) 1823.)

4. UNIO ALATUS Say 1817. -- Lea 1858: 13 (=Proptera alata (Say) 1817).

5. UNIO ANODONTOIDES Lea 1831. -- Lea 1858: 13 (=Lampsilis anodontoides (Lea) 1831.)

6. UNIO ASPERRIMUS Lea 1831. -- Lea 1858: 13 (=Quadrula quadrula Rafinesque 1820).

7. UNIO ELEGANS Lea 1831. -- Lea 1858: 13 (=Truncilla truncata Rafinesque 1820).

8. UNIO LACRIMOSUS Lea 1828. -- Lea 1858: 13 (=Quadrula quadrula).

9. UNIO LAEVISSIMUS Lea 1830. -- Lea 1858: 13 (=Leptodea laevissima (Lea) 1830).

10. UNIO LUTEOLUS Lamarck 1819. -- Lea

1858: 13 (=Lampsilis radiata siliquoidea (Barnes) 1823).

11. UNIO OCCIDENS Lea 1829. -- Lea 1858: 13 (=Lampsilis ventricosa (Barnes) 1823).

12. UNIO RECTUS Lamarck 1819. -- Lea 1858: 13 (Ligumia recta (Lamarck) 1819).

13. UNIO RUBIGINOSUS Lea 1829. -- Lea 1858: 13 (=Fusconaia flava (Rafinesque) 1820).

14. UNIO UNDULATUS Barnes 1823. -- Lea 1858: 13 (=Amblema costata Rafinesque 1820, Fusconaia undulata (Barnes) 1823, or Megalonaias gigantea (Barnes) 1823).

FRESHWATER OPERCULATES

15. AMNICOLA BINNEYANA (Hannibal) 1913. UND.

LAND SNAILS

16. VERTIGO ARTHURI von Martens 1882. -- Pilsbry 1948: 997.

REFERENCES CITED

LEA, Isaac 1858 (1859) Verbal report of a gift of shells from Dr. F. V. Hayden collected from Big Sioux River, James River and the Red River of the North and presented to the Academy. -- Acad. Nat. Sci. Philadelphia, Proc. (Minutes of the March 1858 Meeting), vol. 10: 13.

PILSBRY, H. A. (1948) Land Mollusca of North America (North of Mexico). -- Acad. Nat. Sci. Philadelphia, Monograph 3, vol. 2, pp. 521-1113.

REPRINTS OF RARE PAPERS ON MOLLUSCA: NEW WORLD SPECIES IN THE "BULLETIN DE LA SOCIÉTÉ MALACOLOGIQUE DE FRANCE." A. La ROCQUE.

NOTE. Recently, I was lucky enough to acquire a complete set of this rather rare serial. Aside from its interest as a rarity, its value as a reference work is heightened by the fact that it contains two important papers on North and South American Mollusca. The first of these is by C. F. Ancey (1887) well known to readers of the early volumes of the NAUTILUS. The complete title of this paper is given under References Cited. Only part of it is reprinted here (pp. 291-299) as the remainder deals with Mollusca of other parts of the world. The second paper, also by Ancey (1888), is reprinted in full as it deals with a well known North American genus (Pyrgulopsis).

1. DESCRIPTIONS OF NENIA STYLINA AND NENIA BLANDIANA Ancey, ex: Bull. Soc. Malac. France, 4: 291-293, 1887.

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NENIA STYLINA

Testa vix rimata, cylindraceo-subfusiformis, oblique (vertice excepto obtuso, laevigato), acute confertimque costulata, costulis ad aperturam debilioribus, solidula, opaca, haud nitens, cineraceo-brunnea, subvinosa, apice sordide cinerascente. Spira medio vix inflata, ad

summum parum attenuata; anfractus 9, sutura obliqua (inter inferiores subdenticulata) separati, convexi; ultimus basi attenuatus, antice valde solutus, antice protractus, basi rotundatus, cervice subplanata; apertura subrecta, sinuosa, pyriformi-subcircularis, cum peristomata continuo, subtenui, undique (sinistrorse praesertim) expanso, patente, laete fulvida; sinulus angularis latus; lamellae approximatae; supera valida, compressa, marginalis; infera profundior, obliqua minor; lunella distincta, filiformis, arcuata; plica palatalis una, supera, interiorem conspiciente perspicua; subcolumellaris inconspicua.

Long., 21; diam., 4; long. apert. (ext.), 4; lat. (ext.) ejusd., 3 1/2 mill.

Andes de la Nouvelle-Grenade.

Cette coquille est voisine de la Clausilia Adam-

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siana (Pfeiffer[1]) de Chanchamayo (Pérou), mais elle est plus grêle, moins atténuée, a un tour de plus à la spire, un test plus solide, d'une couleur différente, costulé et non strié, opaque, sans aucun brillant. Enfin, bien que du même groupe, elles sont fort dissemblables.

NENIA BLANDIANA.

Clausilia Blandiana, Pfeiffer, in: Proc. zool. Soc., 1855, p. 280; Verz., p. 180; Nov. conch., I, p. 79, n° 134, pl. XXII, fig. 4-6; Mon. Helic., IV, p. 785, 1869.

Var. ciocolatina, Ancey.

Testa minor, solidula, intense obscureque brunnea, minime diaphana; sutura angustissime rufo-marginata; peristoma saturate brunneum.

Long., 18; diam., 4 3/4 mill.

1. In: Proc. zool. Soc., 1860, p. 140; Malak. Blatt., 1861, p. 81; Mon Helic., VI, p. 518.

Santa-Fé de Bogota, en Nouvelle-Grenade (fide G. B. Sowerby).

Je n'ai jamais vu le type de la Blandiana, telle qu'elle est décrite par Pfeiffer, mais le test, d'après la diagnose, serait translucide, la coloration serait différente de celle de cette variété, la taille serait supérieure et le péristome blanc au lieu d'être d'un brun intense. Il n'y a pas d'autres dissemblances, mais elles ne me semblent pas permettre d'élever cette forme, constante du reste, au rang

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spécifique, parce que les trois caractères nécessaires pour l'en séparer ne s'y trouvent pas réunis.

VI

ÉTUDES SUR LA FAUNE MALACOLOGIQUE DES ÎLES GALAPAGOS.

BULIMULUS AMASTROIDES

Testa conoideo-ovalis, solidula, perforata, cereo-ochracea, subnitidula, obsolete confertimque, infra suturam praesertim plicatula, inferne sublaevis; spira vertice parum acutiuscula, convexe conoidea; anfractus 7 regulariter crescentes, subplanati, attamen tantisper convexiusculi, sutura impressa linearique separati; ultimus indistincte pallidiore zona circumdatus, infra subattenuatus, convexus, regularis; apertura vix obliqua, irregulariter truncato-ovalis, extus convexa, superne angulata; columella valida plica interna, incrassata, oblique quasi basi truncata armata; peristoma simplex, rectum, inconspicue obtusatum, infrà leviter expansiusculum; margo columellaris dilatatus, patens, intus a basali angulo obtuso divisum.

Long., 9 1/2; diam. 4 2/3; alt. apert. 3 2/3 mill.

Ce Bulime appartient à la série des Nesiotus, Albers (ou mieux Omphalostyla, car le genre Nesiotes existe en Entomologie), groupe caractéristique de l'Archipel des Galapagos dont il pro /-/

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vient, selon toute vraisemblance. Il ne peut être confondu avec le calvus de Sowerby, la seule Espèce qui puisse lui être comparée, à cause de son faciès général très différent, dû à sa forme plus ovalaire, à sa taille moindre, à sa sculpture, à son test plus mince, etc., etc.

BULIMULUS RUGULOSUS.

Bul. rugulosus, Sowerby, in: Conch. ill., fig. 37.

Le type de cette Espèce, de la série des Nesiotus, est pourvu de deux bandes brunes sur un fond plus clair. Une variété, plus commune que le type, a les tours convexes comme elle, et la même sculpture ainsi que le même nombre de tours. Cette variété que j'ai nommée infuscata a les bandes foncées tellement larges qu'elles forment le fond de la coquille, ne laissant entre elles qu'une zone plus claire assez étroite; la seconde tend aussi à s'effacer vers la base de la coquille.

Enfin une troisième, plus digne d'attention (var. planospira), a les tours au nombre de 7 1/4, les inférieurs surtout beaucoup plus aplanis; la coloration est à peu près celle de la variété citée plus haut; le diamètre est un peu plus faible, toutes proportions gardées, l'ombilic un peu plus étroit, le dernier tour plus petit et moins renflé; enfin la surface est ornée de rides saillantes et grossières, distantes et irrégulières outre les stries spirales qui s'y trouvent comme chez le type. La columelle est fortement épaissie, anguleuse à sa base,

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presque droite et subpliciforme à l'intérieur.

Long., 20 1/2; diam., 8; hauteur de l'ouverture, 7 1/4 mill.

Ile Chatham (archipel des Galapagos).

BULIMULUS ESCHARIFERUS.

B. eschariferus, Sowerby, in: Conch. ill., fig. 85. — Pfeiffer, Mon. helic. viv., II, 1848; Reeve, in: Conch. Icon. (seulement la figure portée comme représentant le rugulosus; cette dernière espèce, par contre, est portée par erreur comme représentée par la figure de l'eschariferus.)

Le type a 17-18 mill. de longueur et sa forme est "ovato-pyramidata"; comme chez le rugulosus, j'ai observé une variété de coloration; la disposition des bandes chez cette variété est la même que l'on remarque chez le type du rugulosus.

Var. bizonalis.

Testa fulvo-ochracea, lineis duabus angustis brunneis in medio anfr. ultimi cincta.

De plus, j'ai vu des sujets dont je donne la description ci-après, et qui m'ont paru mériter d'être mentionnés à titre de:

Var. subconoidalis.

Magis in conum elongatum attenuata, minus ovalis; anfr. 7 (nec 8); apertura pariter ac in ty-

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pico specimine alta lataque; columella basi magis angulosa et incrassato-subpliciformis; testa paulo minor (15 mill.).

On voit par cette courte diagnose que la columelle présente ici à sa base un angle un peu plus accusé, et qu'elle a un aspect plus pliciforme; seulement la modification à laquelle est soumise cette partie de la coquille est de peu de valeur et ne mérite, à cause de son peu de constance, qu'une attention un peu secondaire; une variation analogue a, en effet, été constatée

chez le B. nux (Broderip), rugulosus (Sowerby) et incrassatus (Pfeiffer) et doit de même se produire chez la plupart des autres Nesiotus.

A propos de cette dernière Espèce, il faut noter que le B. nuciformis (Petit) en est fort voisin et ne s'en sépare que par son test plus mince, plus ventru, sa columella peu calleuse, dépourvue de pli à l'intérieur; c'en est, à coup sûr, une forme dérivée, et il est même étonnant que les malacologistes de l'Ancienne Ecole, qui sont si difficiles pour l'admission d'une forme au rang spécifique, n'aient pas agi de même pour celle-ci. La couleur, si remarquable du reste, est la même chez les deux coquilles; mais chez certains sujets de l'incrassatus, c'est l'élément jaune qui prédomine.

Les Bulimulus des îles Gatapagos, qui donnent un cachet tout spécial à la forme de cet Archipel, puisque, en dehors des Espèces de ce genre qui lui sont toutes spéciales (on n'y a trouvé qu'une

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Succinea) ne ressemblent pas à ceux de la côte la plus voisine[1], et constituent un groupe spécial; cette série paraît habiter exclusivement ces îles. On y remarque des coquilles fort dissemblables de sculpture, de port et de couleur, qui, cependant paraissent toutes se rattacher à la même section, bien que l'on en ait distrait les Pleuropyrgus et Raphiellus. Les Espèces qui les composent me semblent, et je ne répète ici qu'une opinion que j'ai soutenue ailleurs, que des modifications du même type de création.

Si l'on veut examiner comparativement quelques-unes de ces Espéces, on verra que les B. Jacobi et le rugulosus sont, par exemple, des formes analogues par leur sculpture et que le rugiferus, le sculpturatus et le Darwini possèdent également un test couvert de rides ondulées, bien que la première ait, par l'allongement de sa spire, une tendance à se rapprocher, comme port, du Chemnitzioides (Forbes); que les deux suivants ont un peu les contours de l'incrassatus et que le dernier possède (fait tout anormal pour la section) une forte dent pariétale et une columelle pourvue d'un si gros pli qu'elle paraît être dentiforme. Ces exemples prouvent qu'il était au moins prématuré de créer deux nouveaux termes sous-génériques pour les Bulimes de l'Archipel. J'ai, du reste, subdivisé déjà ces Espèces en plusieurs séries se rapportant à un type commun.

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Un fait extrêmement remarquable chez ces coquilles, et d'une grande importance à signaler, est la similitude presque absolue des contours et parfois de caractères et de couleurs de quelques-unes d'entre elles avec les Achatinellidae des îles Sandwich. Ainsi, si l'on regarde le dos de la coquille de l'Amastra porphyrea (Newcomb) et le Bul. nux placé dans la même position, on ne distinguera pas sans difficulté qu'elle est l'Achatinella et quel est le Bulimulus. Le test est identique, les contours semblables, la coloration la même. Les Bulimus ustulatus, achantinellinus et calvus nous présentent des exemples identiques. Plusieurs montrent, par les caractères du pli columellaire parfois très saillant, contourné dans une direction oblique ou même comme tronquée, une tendance marquée à se rapprocher de cette grande famille polynésienne. Et, en effet, ce fait curieux assurément n'est cependant pas difficile à expliquer. Les îles Galapagos, situées sous l'Équateur, ont pourtant une faune beaucoup plus méridionale que ne semblerait l'indiquer leur situation, et cela à cause du grand courant froid qui se dirige du pôle Antarctique le long des côtes occidentales de l'Amérique du Sud. Les Bulimes appartiennent incontestablement au Système Américain, mais ils se sont modifiés peu à peu, grâce à la nature volcanique de ces îles et à leur position géographique au milieu du Pacifique. Les Achatinellidae, entièrement restreintes à l'archipel Hawaïnien, habitent un sol semblable,

1. Celle de la République de l'Équateur.

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au milieu du même Océan et probablement dans les mêmes conditions d'existence.

La nature du test, comme crispé par de fortes rugosités, de beaucoup des Espèces des Galapagos s'explique par la sècheresse de ces îles et le peu de végétation qui les recouvre; la coquille de ces Bulimes est généralement épaisse, et beaucoup d'entre eux ont un système de coloration analogue; leur dernier tour est fréquemment fascié et la bande médiane, plus pâle que le fond de la coquille, est doublée de chaque côté par une étroite zone foncée.

Bull. Soc. Malac. France,
IV. Juillet 1887.

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2. ANCEY'S MONOGRAPH OF THE GENUS PYRGULOPSIS, ex Bull. Soc. Malac. France, 5: 185-202, 1888.

ÉTUDE MONOGRAPHIQUE
SUR LE GENRE
PYRGULOPSIS
PAR
M. C. F. ANCEY
MEMBRE FONDATEUR

Les "Proceedings Davenport Academy of sciences", vol. V, 1886, p. 9, ont publié tout récemment un excellent travail de MM. R. E. Call et H. A. Pilsbry, intitulé: On Pyrgulopsis, a new genus of rissoid mollusk, with descriptions of two new forms, dans lequel les auteurs donnent la caractéristique d'un nouveau genre détaché des Pyrgula et fondé pour les Pyrgula Américaines dont la P. Nevadensis Stearns (Proc. Ac. Phil., 1883, p. 173) est considérée comme le type.

Les Pyrgulopsis, outre leur distribution géographique exclusivement américaine et leur mode de station, diffèrent encore des Pyrgula Européennes par divers caractères tirés de la coquille. Les caractères génériques donnés par les auteurs sont les suivants:

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"Shell minute, conically turreted, somewhat elongated, imperforate, unicarinate; apex acute; aperture ovate; peritreme continuous.

"Operculum[1] ovate, thin, corneous, spiral, with polar point well forward and approximating the columella.

"Jaw thin, membranaceous.

"Odontophore with teeth arranged in transverse rows, according to the formula 3 + 1 + 3. Formula for denticles of rhachidian:

$$\frac{4+1+4}{1+1}.$$

"Distribution[2]: Western and South Western United States in fresh or brackish water."

Jusqu'ici, d'après les auteurs, les Pyrgula d'Europe sont pourvues de deux ou de plusieurs carènes. Le type du genre est la P. helvetica

1. L'opercule de deux des espèces seulement a été examiné, les P. Nevadensis, Stearns, et spinosa, Call et Pilsbry. Les deux autres espèces décrites n'ont pas été jusqu'ici trouvées vivantes; il en est de même pour celles du Nicaragua, que je décris plus loin.

2. Ce genre, comme on le verra, a une distribution plus vaste, puisqu'il se trouve jusque dans l'Amérique centrale.

Michelin (in Mag. de Zool., 1831, p. 37, pl. XXXVII), décrite postérieurement d'une localité suisse, sous l'appellation d'annulata par Cristofori et Jan. J'ajouterai que le groupe nommé Diana par Clessin, établi en faveur de la P. Thiesseana, Godet, de Missolonghi (Grèce), ne me paraît avoir qu'une valeur insignifiante.

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L'opercule est mince, corné, et reproduit les sinuosités de l'ouverture, chez le type du genre.

J'ajouterai que, chez cette dernière, le péristome est franchement sinueux, sensiblement projeté en avant après son milieu, puis rétrocédant à la base. Il est presque droit et légèrement rétrocédant chez les Pyrgulopsis.

Dans l'état actuel de nos connaissances, on peut diviser les Pyrgulopsis en deux séries:

1° Pyrgulopsis typiques.

Cette série comprend les formes qui ressemblent le plus par leur aspect conique-élancé, la longueur de leur spire et la petitesse relative du dernier tour aux Pyrgula. Trois espèces, toutes des États-Unis, les P. Nevadensis, Stearns, P. scalariformis, Wolf, et P. Mississipiensis, Call et Pilsbry.

2° Espèces bythiniformes.

Ce groupe, beaucoup plus ovalaire et moins élancé que le précédent, renferme, outre le P. spinosa, Call et Pilsbry, du Texas, toutes les formes de l'Amérique centrale. Il a beaucoup de rapport avec les Potamopyrgus de Stimpson, sortes d'Amnicoles épineuses, localisées aux Antilles, en Nouvelle-Zélande et en Afrique occidentale; mais, outre la nature cornée du test, ces coquilles diffèrent essentiellement des nôtres par la manière d'être des épines, qui sont des projections épidermiques, tandis que ce sont des modifications du test lui-même chez ces Pyrgulopsis. Il est possible

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que ce groupe (Pyrgophorus) devra être considéré plus tard comme un genre distinct.

Le genre Tryonia, Stimpson, qui se trouve en quantité considérable dans la vaste dépression appelée "Colorado Desert", dans la Californie méridionale et dans le territoire de l'Arizona, à l'état subfossile, et dont deux sujets ont été rencontrés à l'état frais dans l'Utah, me semble voisin, au point de vue des caractères malacologiques, des Pyrgulopsis; l'opercule en est encore inconnu. Les espèces semblent à un haut degré polymorphes, fait que nous remarquerons également chez le P. Nevadensis et spécialement chez l'espèce du Nicaragua, où les formes sont si nettement tranchées que l'on peut ici croire à une certaine fixité chez diverses d'entre elles. Je n'ai pas cru, vu cette tendance polymorphe, élever ces mollusques au rang spécifique, et je les indique ici avec un point de doute placé avant le nom que je leur donne, mais si ces variations sont constantes, comme je le crois, ils devront constituer des espèces distinctes et devront être désignées sous les noms que je leur attribue dans ce travail. Il doit en être vraisemblablement de même pour les diverses coquilles rapportées à titre de variétés aux deux espèces de Tryonia, les T. protea, Gould, et T. clathrata, Stimpson[1].

1. Les genres du lac Baïkal, assimilés par M. Dall au genre Américain Tryonia, me paraissent en différer, tant au point de vue de la coquille, qu'au point de vue de la répartition géographique.

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1° PYRGULOPSIS TYPIQUES

PYRGULOPSIS NEVADENSIS

P. Nevadensis, Stearns, in: Call et Pilsbry, Proc. Davenport Ac. Sc., 1883, p. 10. — Pyrgula Nevadensis, Stearns, l. c.; Call et Beecher, Am. nat., sept. 1884, vol. XVIII, p. 851-855; — Call, in: Bull. U. S. Geol. Survey, n° 11, 1884.

Testa parva, satis elongata, variabilis, turrita, imperforata; anfractus 4 1/2-5 1/2, valide ad peripheriam unicarinati, caeterum laevigati;

epidermide nitido, pallide stramineo vel albido induti, ad suturam albidi; sutura profunda et regulariter impressa ob carinam approximatam conspicua. Apertura valde obliqua, rotundato-ovata, angulo carinae excavatae correspondenti deformata, postice acute angulata, anteâ bene rotundata. Peristoma continuum, parietali margini appressum. Operculum pallide corneum, spirale, aperturam omnino claudens.

La dentition de cette espèce a été décrite et figurée avec soin par M. Chas. E. Beecher (vide Proc. Dav. Ac., p. 11-12). Elle a un aréa géographique assez restreint et n'a été rencontrée que dans les lacs Walker et Pyramide, dans la portion nord-ouest de l'État de Nevada; elle n'a été trouvée à l'état vivant que dans ce dernier lac.

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Var. ecarinata.

Carina plus minusve obsoleta, interdûm deficiente.

Ce Pyrgulopsis est extrêmement variable; les sujets sont tantôt élancés, tantôt très écourtés; la carène est parfois très aiguë, et quelquefois la coquille en est tout à fait dépourvue; elle passe, du reste, par tous les intermédiaires. Le dernier tour est souvent sensiblement renflé au-dessus du dernier.

PYRGULOPSIS SCALARIFORMIS

Pyrgulopsis scalariformis, Call et Pilsbry, l. c., p. 14, pl. II, fig. 13; Pyrgula scalariformis, Wolf, in: Am. Journ. Conch., 1869, vol. V, p. 198, pl. XVII, fig. 3.

Testa turrita, gracilis; anfractus 6, expositione (?) albi, sutura profunda, per totum ambitum inferne carinati; apertura parva, ovalis, vix anfractui penultimo connecta.

Communis in stratis post-pliocenis prope rivum Illinois, ad Tazawelt (Illinois).

Cette espèce est localisée dans la station ci-dessus mentionnée, où elle n'a pas été trouvée vivante. Elle est voisine de la suivante, mais elle est beaucoup plus allongée, plus conique, la spire est plus élancée, plus acuminée; la carène, plus aiguë, se prolonge sur les tours supérieurs.

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PYRGULOPSIS MISSISSIPPIENSIS

Pyrgulopsis scalariformis, Call et Pilsbry, l. c., p. 13, pl. II, fig. 14-16. -- Pyrgula scalariformis var. Mississipiensis, Pilsbry, Am. Nat., 1886, p. 75 (nomen).

Testa minuta, pupaeformis, elevata, imperforata; anfractus 5 1/2 - 6, planulati; carina distincta 2 aut 3 inferiorum anfractuum munita (carina primùm suturam approximans, in ultimo mediana); ultimus spiram aequans et abrupte ad carinam angulatus, expositione alba. Sutura distincta, tantùm ad initium ultimi anfractus et inferne profunde impressa, suprâ anfractum ultimum ob carinam appressam inconspicua. Apertura anguste ovata, antice valide ac inferne anguste rotundata, valde obliqua. Peristoma continuum, fere rimatum, suprâ parietem leviter expansiusculum. Labrum simplex, acutum.

a) Long., 3,58; lat., 1,60 millim. -- b) Long., 3,38; lat., 1,56 millim. -- c) Long., 3,50; lat., 1,64 millim. -- d) Long., 3,40; lat., 1,64 millim.

Cette forme n'a été trouvée jusqu'ici que sur les bords du Mississipi, non loin de l'embouchure de l'affluent nommé Rock River (Rock Island County, Illinois). Elle diffère de son congénère, le P. scalariformis, Wolf, par diverses particularités importantes. Elle n'est point carénée sur les tours supérieurs, l'ouverture est différente et la carène, qui est déprimée, remplit entièrement la suture.

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Le contour des tours supérieurs ne ressemble pas,

d'après la figure de Wolf, à celui des tours du P. scalariformis.

Le P. Mississipiensis varie comme le Nevadensis au point de vue de la longueur de la spire, de la largeur du dernier tour qui est plus ou moins ventru, plus ou moins anguleux et de l'ouverture qui est plus ou moins haute; mais ses variations ne sont pas si considérables, à beaucoup près, que chez le Nevadensis.

2° PYRGULOPSIS BYTHINIFORMES (Pyrgophorus.)

PYRGULOPSIS SPINOSA

P. Spinosa, Call et Pilsbry, in : Proc. Dav. Ac. Nat. Sc., 1886, p. 14.

Testa minuta, imperforata, turrita, unicarinata, (carina in 3 inferis anfractibus spinosa, obscura); Spira turrito-conoidea; anfractus 5-5 1/2, duo primi rotundati, spinis destituti, ecarinati, reliqui tres subgeniculati, ad carinam angulati; ultimus magnus, interdùm infrà carinam spinosus. Epidermis nitide corneus, ad apicem fere albidus, spiraliter minutissime striatus. Apertura rotundato-ovata, antice rotundata. Peristoma haud continuum, acutum, simplex, ad columellam tantisper expansum minutum umbilicum mentiens. Sutura leviter impressa. Operculum spirale, rubello-corneum.

a) Long., 3,86, lat., 2,34 millim. -- b) Long.,

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3,00; lat., 1,88 millim. -- c) Long., 3,06; lat., 1,52 millim.

Comal Creek, à New-Braunfels, Texas.

Cette espèce a été rencontrée en compagnie du Goniobasis pleurostriata, Say, d'une Amnicola et d'une Bythinella.

Une forme que j'inscrirai provisoirement sous le nom de var. brevispira, a été figurée par Call et Pilsbry (fig. 19); elle est remarquable par sa spire écourtée ainsi que par le renflement et la hauteur de son dernier tour; l'ouverture chez elle égale presque, en longueur, le reste de la spire. Cette coquille ne m'est pas connue en nature.

J'arrive à une série fort intéressante que j'ai reçue dernièrement du Dr Newcomb. Elle comprend les coquilles les plus grandes du groupe et du genre. Toutes ont un air de parenté avec le P. spinosa, mais sont plus grandes, plus solides, et leur ornementation est éminemment sujette à variation. Parmi quelques individus inscrits par moi à la suite de l'espèce type, à titre de variétés, il en est plusieurs, comme je l'ai dit plus haut, et comme je dois ici encore le répéter, qui me paraissent devoir être élevés au rang spécifique, lorsque des matériaux plus considérables pourront être étudiés. J'ai donné, dans le courant du travail, un nom à celles qui me semblent bien nettement tranchées, en le faisant précéder de la désignation de Variété(?).

Si l'on n'a ici affaire qu'à une seule forme, il faut admettre alors qu'elle est, à un haut degré,

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douée de polymorphisme, comme la Tryonia protea[1]; on passe, en effet, du type fortement caréné et couronné, à une autre forme presque complètement lisse, et de la forme turbinée-conique à la forme ovalaire et à une autre très allongée.

Je dois, du reste, dire que les spécimens que j'ai eus sous les yeux pour la description ne m'ont pas donné lieu de constater le passage d'une de ces formes à une autre, et c'est ce qui me paraît être la confirmation de l'opinion par moi émise plus haut.

PYRGULOPSIS NICARAGUANUS

Pyrgula Nicaraguensis, Newcomb, mss.

Testa solidula, conoideo-oblonga, imperforata vel angustissime rimata, pallide straminea,

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1. Bien que diverses formes me semblent être réunies sous ce nom.

leviter subvirens, haud transparens, coronata. Spira elongato-conoidea, acuta. Anfractus 5 1/2-6 3/4 regulariter velociterque accrescentes, sutura lineari separati; 2 1/2 primi (embryonales) albiduli, convexi, ecarinati, sutura profundiore, laevigati; sequentes geniculati, paulo supra medium carinulati (carina tuberculato-undulata, in duobus ultimis nigrescente, in ultimo supera, tuberculis paulatim magis magisque distinctis), spatio infrasuturali plano-declivi; infracarinati verticali, plano; anfractus ultimus magnus, ovalis, infrâ carinam superam liris spiralibus

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minutis, prope aperturam nigrescentibus, numero variis (in typico specimine 4), interdum in superiores continuatis, ad basin obsolescentibus exaratus et convexus, regulariter attenuatus, in peradultis speciminibus ad finem deflexus; penultimus suprà aperturam interdùm ventricosior. Apertura fere recta, inferne leviter recedens, subpyriformis, ovalis, superna angulata, intus nitida. Peristoma simplex, acutum, interdum undique tenuiter nigro-limbatum.

Long. (typici spiciminis, 5 1/2 anfr.) 4 1/6; lat., 2 1/2; long. apert. fere 2; lat. ejusd., 1 1/4 millim.

Long. (spec. majorum 6 3/4 anfr.) 6 millim.

Cette magnifique espèce si distincte du P. spinosa, par son test, sa taille et même sa sculpture, bien que sa carène ondulée ait de l'analogie avec celle de l'espèce précédemment citée, relativement à sa position et aux tubercules qui couronnent le test, provient du Nicaragua (D[r] Newcomb). Les deux variétés suivantes me semblent des modifications de ce type; mais les formes lisses ou à faible sculpture spirale qui suivent s'en écartent notablement, et il est probable que ce sont des espèces distinctes.

Var. costulifera, Ancey.

Leviter infra carinam undulatam in ultimo obsoleteque pliculosa.

Var. duplicata, Ancey.

Lira infra carinam undulatam prominente se-

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quentibus multo validiore unâ, aliquando 2 vel 3 aequalibus instructa.

Var.? (Pyrgulopsis Newcombiana, Ancey).

Testa solida, expositione (?) lactea, nitidula, oblonga, fere laevis (oculo armato vix distincte passim spiraliter impressa). Spira conoideo-oblonga, acuta. Anfractus 6 1/2 convexi; sutura impressa; ultimus ovalis, antice distincte et longiuscule deflexus. Apertura subovalis, supra angulata, fere recta, inferne subrecedens, haud ampla, intus lactea. Vestigia lirarum spiralium sub lente in anfractu 3 et 4.

Long. 5 1/3; lat., 3; long. apert., 1 3/4; lat. ejusdem, 1 1/3 millim

Cette forme commence la série des variétés lisses ou faiblement costulées ou striées dans le sens de la spire et dépourvues de la carène ondulée si caractéristique du type et des variétés précédentes. L'exemplaire qui a servi à la description est le plus lisse de toute la série du Nicaragua que j'ai eue à ma disposition.

Var.? (Pyrgulopsis conoidea, Ancey).

Testa praecedenti similis, sed spira multo magis conica et anfractu ultimo rotundiore insignis. Anfractus 6 1/2, spiraliter exiliterque multilirati, (lira una interdum validiore ac apice basique laevibus), regulariter et minus celeriter quam in typo accrescentes, convexi; sutura impressa; ultimus ad finem haud (nisi in peradultis) descendens.

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Long., 4 3/4; lat., 2 3/4; long. aper. 1 3/4 millim.

Ce Pyrgulopsis, trouvé avec le précédent dans le Nicaragua, s'en distingue par sa

spire conoïde, tandis qu'elle est ovalaire chez le Newcombiana, par son accroissement plus lent et par ses stries fines et concentriques, mais pourtant bien visibles de sa surface.

Var. (?) (Pyrgulopsis producta, Ancey).

Testa elongato-oblonga, spiraliter multilirata (summo basique laevibus), expositione (?) alba. Spira elongata, conoideo-attenuata, acuta. Anfractus 6 1/2, satis convexiusculi; sutura impressa; spatio infra-suturali laevigato; ultimus oblongus, antice haud deflexus. Apertura sat parva, ovalis, supra angulata.

Long., 5 2/3; lat., 2 1/3; long. apert., 1 3/4 millim.

Nicaragua.

Ce Pyrgulopsis est le plus allongé de tous ceux de l'Amérique centrale; sa spire, plus élancée, est moins conique que celle du précédent, auquel il ressemble par son mode de striation.

PYRGULOPSIS CORONATUS

Testa oblongato-attenuata, angustissime perforata, subnitida, virescens. Spira conoideo-producta; apice sat acuta; anfractus 5 regulariter et sat celeriter crescentes, convexi; sutura impressa; primi duo (embryonales) pallidiores, apice laevi-

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gati, sequentes contabulati, carinam, validam supra-medianam (tuberculis acutis, prominentibus, conicis et horizontaliter compressis coronatam), gerentes, praetereà lira una minus valida exarati; ultimus oblongo-ovatus, magnus, superi coronatus et, infrà carinam superam, nonnullis aliis (plerumque 3 aut 4 distantibus) carinis acutis, minùs prominulis et simplicibus eximie ornatus. Apertura vix obliqua, oblonga, intùs superne vix angulata. Peristoma simplex, acutum, fere rectum, inferne tantisper recedens. Operculum normale.

Long., 3 1/2; lat., 2 1/6; long. apert., 1 1/2 millim.

Vera-Cruz (Mexique).

Cette belle Espèce, voisine de ses congénères du Texas et de l'Amérique centrale, est remarquable par sa forte carène pourvue d'épines coniques comprimées et plus saillantes que chez n'importe laquelle des autres espèces connues de ce genre. Il n'a pas été, du moins à ma connaissance, rencontré de formes lisses en compagnie du type, comme chez les P. nicaraguanus et Wrighti.

J'ai reçu cette coquille sous le nom de Paludestrina spinifera, Adams; mais chez cette dernière, qui provient de la Jamaïque et qui n'appartient pas au genre Pyrgulopsis, les épines sont des projections épidermiques, et non des modifications du test même.

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PYRGULOPSIS WRIGHTI

Testa turrito-oblonga, anguste subperforata, virescenti-subhyalina, nitidiuscula. Spira elongato-conica, summo subacuta; anfractus 5-5 1/4, convexi, sutura profunda separati; primi 2 laeves; tertius spiraliter exiliterque sculptus; sequentes carina acuta supera leviter undulato-spinosa, lineisque impressis spiralibus numerosis plus minusve perspicuis exarati (carina prope aperturam subevanida); ultimus ad finem leniter paulatimque deflexus, oblongus. Apertura vix obliquatula, integra, ovato-oblonga, superne subangulata. Peristoma simplex, acutum, inferne levissime subrecedens, fere rectum.

Long., 3; lat., 1 3/4; alt. apert., 1 1/6 millim.

Lac Coatépèque (République de Guatemala).

Cette Espèce, dédiée à mon ami le malacologiste américain B. H. Wright, auteur de divers travaux sur les Unionidés de la Floride, est d'une taille très inférieure à celle de l'Espèce du Nicaragua, mais paraît se distinguer comme elle par une extrême variabilité, ainsi qu'on pourra s'en convaincre d'après l'étude des formes

trouvées en même temps, et que je distingue au même titre que celles du Nicaragua, placées à la suite du P. Nicaraguanus.

Var. plicosa.

Typo simillima, sed anfractibus carinatis dis-

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tincte longitudinaliter plicosis, spinulis in costulas inferne evanidas leviter productis.

Cette variété, qui n'est qu'une modification assez légère du type primitif, est au Wrighti ce que la var. plicifera est au Nicaraguanus.

Var. (?) transitans.

Penultimus anfractus tantummodo superne carinatus (carina leviter undulato-tuberculosa vel simplex); ultimus oblongus, spiraliter impressus, haud carinatus, ad finem deflexus. Testa magis oblonga.

Long., 3 1/3 millim.

La forme que je viens d'indiquer constitue un passage entre le type épineux et les formes lisses qui suivent.

Var. (?) oblonga.

Precedentem satis approximat, sed oblonga, levissime spiraliter impressa, ecarinata; anfractus 5; ultimus vix neque abrupte antice descendens, vel simplex.

Long., 3 1/2; lat., 2-2 1/8; long. apert., 1 1/2 millim.

Cette forme est tout à fait l'analogue du P. Newcombianus, auquel elle ressemble beaucoup en petit.

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Var. minima.

Precedenti similis, sed paulo minus ventrosa; anfractus 5.

Long., 2 2/3; lat., 1 1/2; long. apert., 1 1/10 millim.

Var. (?) obesa.

Testa laevigata, abbreviata, inflato-ovata, perforata, nitida, (emorina) alba; spira conica, acuta; anfractus 5 1/4, regulariter et satis celeriter crescentes, convexi; sutura impressa; ultimus maximus, ventricosus. Apertura magna, testae dimidium tamen non aequans, superne leviter intùs angulata, fere recta. Peristoma simplex, rectum, acutum.

Long., 3 1/3; lat., 2 1/3; alt. apert., 1 1/2 millim.

Parmi les coquilles du lac Coatépêque se trouvait la suivante, qui est si différente du Wrighti, que j'ai cru devoir sans crainte l'élever au rang spécifique.

PYRGULOPSIS HYDROBIOIDES

Testa elongato-turrita, angustè perforata, hyalino-virens, laevigata. Spira elongata, conico-attenuata; anfractus 6, regulariter crescentes et diametro paulatim usque ad ultimum majores, convexi, sutura impressa separati; penultimus major; ultimus post medium tantisper inflatulus, vel oblongo-ventricosus. Apertura oblonga, superne leviter

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angulata, tertiam totius testae partem adaequans, vel etiam minor, fere recta. Peristoma simplex, rectum, acutum.

Long., 4 1/4; lat., 2 1/8; long. apert. vix, 1 1/2 millim.

Ce Pyrgulopsis ressemble tout à fait à l'Hydrobia ulvae de nos côtes.

Bull. Soc. malac. France. V. Mars 1888.

REPRINTS OF RARE PAPERS ON MOLLUSCA: J. F. WHITEAVES, 1863, ON THE LAND AND FRESH-WATER MOLLUSCA OF LOWER CANADA. --- Canadian Naturalist and Geologist, vol. 8, pp. 98-113, 12 figures.

ART. IX. — On the Land and Fresh-water Mollusca of Lower Canada; by J. F. Whiteaves, F.G.S., &c.

(Read before the Natural History Society of Montreal.)

PART II. — LIST OF SPECIES INHABITING LOWER CANADA.

The writer of this list wishes to acknowledge his obligations to many of the most eminent United States conchologists for practical suggestions and assistance. Mr. Temple Prime has kindly indentified the Cycladidae; The writer is also indebted to Messrs. Bland, Binney, J. G. Anthony, I. Lea, A. D. Brown, Tryon, and others, for critical advice and sympathy.

In the nomenclature of the Unionidae, the names given by Rafinesque have been retained; these having priority. The writer has been unable to see why Lamarck's short, insufficient diagnoses of species in this difficult family, should be preferred to the exclusion of the earlier descriptions of the author of "the Bivalve Shells of the Ohio River."

NOTE. — The following abbreviations have been made use of in citing the authority for each species in Lower Canada: — R.B. (R. Bell) : W. D. (W. D'Urban) : E.B. (E. Billings) : R.J.F. (R. J. Fowler) : J.F.W. (J. F. Whiteaves) : W. C. (W. Couper) M. de V. (M. de Villeneuve).

As the Lower Canadian Cycladidae seem very little understood, Mr. Prime's careful descriptions of these somewhat intricate shells have, with his consent, been added; together with wood-cuts, taken from original drawings.

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LAMELLIBRANCHIATA.

UNIONIDAE.

Unio radiatus, Lamarck. Abundant in the rivers and lakes of Canada East. The U. siliquoideus is often taken for this shell.

Unio siliquoideus, Barnes. Equally common with the above. For details of difference between the former species and this, see Conrad's Monograph of the genus Unio. As many able conchologists deny that this is the Unio luteolus of Lamarck, I have preferred keeping the name given to the species by Barnes.

Unio Canadensis, Lea. St. Helen's Island, Montreal; apparently very rare. Some rayed specimens of a Unio which I took at Quebec may be a dwarf form of this species. A single dead typical specimen on the beach of the Island of Orleans: J.F.W.

Unio cardium, Rafinesque. (U. ventricosus, Barnes.) St. Lawrence; very fine near Quebec. Unio subovatus, Lea, appears to be the male of this species; and U. occidens, Lea, a variety of the female.

Unio complanatus, Solander. By far the commonest Unio in the district; living (according to Mr. Bell) as far down the St. Lawrence as Berthier below Quebec.

Unio dilatatus, Rafinesque. (U. gibbosus, Barnes.) Widely distributed in the St. Lawrence and its tributaries, but scarce. Some varieties closely resemble the last species.

Unio rectus, Lamarck. St. Lawrence

at Quebec and Montreal, but somewhat rare.

Unio alasmodontinus, Barnes, (U. pressus, Lea.) Rare: L'Assomption river: M. de V. River St. Pierre, and Lachine canal near Montreal : R.J.F. Rideau Canal near Ottawa city: E.B.

Unio alatus, Say. Ottawa river, near Ottawa: mouth of River Rouge : R.B.

Unio olivarius, Rafinesque. (U. ellipsis, Lea, fide J. G. Anthony.) St. Lawrence at Quebec and Montreal; fine and not infrequent at Quebec.

Margaritana margaritifera, Linn. (Alasmodon arcuatus, Barnes.) Very large and fine in the St. Charles river near Quebec : J.F.W. Green and Rimouski rivers; both of the Matapedia lakes; Lake St. John : R.B.

Margaritana costata, Rafinesque. (Alasmodon rugosa, Barnes.) Sparingly in the St. Lawrence about Montreal. Yamaska river near St. Hyacinthe : J.F.W.

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Margaritana marginata, Say. With the foregoing, but not very common.

Margaritana undulata, Say. Common in the St. Lawrence down to Quebec; at which latter place it is very abundant, and often beautifully coloured.

Anodonta cataracta, Say. (A. fluviatilis, Lea.) Lake Calvaire, near Quebec : abundant in small creeks near the St. Charles river at Quebec: J.F.W. Large and plentiful at Brome Lake in the Eastern Townships: R.J.F. Probably common in suitable places throughout the district.

Anodonta Lewisii, Lea. Lachine canal near Montreal. R.J.F.

Anodonta Benedictensis, Lea. Mississquoi bay, Lake Champlain.

Anodonta implicata, Say. Fine in the St. Lawrence near Quebec : J.F.W. Berthier: R.B.

Anodonta Ferussaciana, Lea. Creek at L'Orignal : R.B. Fine in old stone quarries near the Mile-end toll-gate, Montreal.

Anodonta undulata, Say. St. Charles river about three miles from Quebec.

Anodonta edentula, Say. Lake Matapedia : R.B. Brome Lake in the Eastern Townships: R.J.F. I consider this species, and perhaps even the next, as identical with A. undulata, Say.

Anodonta subcylindracea, Lea. Lachine Canal : R.J.F. St. Lawrence at Quebec. J.F.W,

Anodonta Footiana, Lea. Sixteen Island, Eagle Nest, and Bevan's lakes. W.D.

Anodonta modesta ? Lea. A few specimens which appear to me to agree with Mr. Lea's figures and description of this species, were taken by Mr. Bell from Lake St. John.

CYCLADIDAE

The genus Cyclas was proposed by Bruguière in the year 1792; but Scopoli's genus Sphaerium bears date 1777; and consequently has priority, as has been shown by Dr. Gray. See Mr. Temple Prime's elaborate monograph of the North and South American species of this genus, published in the "Proceedings of the Academy of Natural Sciences of Philadelphia" for December, 1861.

Sphaerium sulcatum, Lamarck. (Cyclas similis, Say) Metis lakes, and a small lake six miles S.W. of Metis : R.B. Common

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in the St. Lawrence at Montreal; and probably widely diffused throughout the province.

Sphaerium solidulum, Prime. Creek at L'Orignal : R.B. It will probably be detected in Canada East, as it has been taken so near the border.

Sphaerium striatinum, Lamarck. (Cyclas edentula, Say.) Lachine Canal, near Montreal : R.J.F. St. Lawrence and St. Charles rivers near Quebec, abundant : J.F.W.

Sphaerium rhomboideum, Say, (sp.). Gregarious, but very local. Old quarries near

the Mile-end toll-gate, Montreal, but apparently confined to a very limited space there. R.J.F. and J.F.W.

Sphaerium occidentale, Prime. Swamps on an island near Lachine : R.J.F.

Sphaerium transversum, Say, (sp.). Lachine Canal near Montreal : R.J.F. St. Lawrence near Quebec : J.F.W.

Sphaerium securis, Prime. Old stone quarries filled with water, near the Mile-end toll-gate, Montreal : R.J.F. and J.F.W. Lachine: R.J.F.

Pisidium Virginicum, Brongniart. (Cyclas dubia, Say.) St. Lawrence and St. Charles rivers at Quebec : J.F.W. Montreal, in the St. Lawrence, and the Lachine canal. Probably common in all the large tributaries of the St. Lawrence.

Pisidium altile, Anthony. Fine in the ponds near the Mile-end, Montreal : R.J.F., and J.F.W. A smaller, more compressed variety abounds in the St. Charles River near Quebec; J.F.W. It is the P. compressum of Prime; but Mr. Anthony's name seems to have priority.

Pisidium abditum, Haldeman. A very common species in Lower Canada. I cite four localities where I have taken it, as examples. Swamps in woods near the St. Charles river, Quebec : trenches in fields near the Beauport road : marshy ground on the Plains of Abraham, -- both near Quebec. Brook near river St. Pierre, Montreal.

GASTEROPODA, — PECTINIBRANCHIATA.

VIVIPARIDAE.

Paludina decisa, Say. Common throughout the district. Reversed varieties occasionally occur in the St. Lawrence, about Montreal.

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Valvata tricarinata, Say. Also abundant. At Quebec the species generally occurs large, with the carinae sometimes almost obsolete.

Valvata sincera, Say. Marl lake, Anticosti : R.B.

Valvata humeralis, Say. This species, so closely allied to the depressed form of V. piscinalis of Europe, has been taken by Mr. Bell at the following localities : Matanne; small lake at the head of Awaganasees brook, and Little Lake Matapedia.

Amnicola porata, Say. Lake Calvaire, near Quebec : J.F.W. Little Lake Matapedia : R.B. Near Montreal : R.J.F.

Amnicola tenuipes, Haldeman. St. Lawrence, near Quebec : burrowing in the sand between tide-marks : J.F.W.

MELANIADAE.

Melania subularis, Lea. (M. acuta, Lea.) St. Lawrence at Montreal.

Melania Niagarensis, Lea. St. Lawrence, from Quebec to Montreal. At Quebec I obtained only the pale yellowish, unbanded variety.

GASTEROPODA, -- PULMONIBRANCHIATA.

LIMNAEIDAE.

Limnaea stagnalis, Linnaeus. (L. jugularis, Say.) Common at Montreal in the St. Lawrence, but rare at Quebec. Metis lakes, and lakes on the Rimouski river : R.B. Probably of wide distribution in Canada East.

Limnaea megasoma, Say. Very fine at Nuns' Island, near Montreal : M. de V., and R.J.F. Hawkesbury village: R.B.

Limnaea ampla, Mighels. This fine species was first detected in Lower Canada by R. J.F. at Brome Lake.

Limnaea decollata, Mighels. Great Lake Matapedia, and Rimouski village : R.B.

Limnaea columella, Say. St. Lawrence at Quebec, adhering to stones at low water-mark : J.F.W. The var. macrostoma occurs with the type.

Limnaea reflexa, Say. Upper Metis

Lake : R.B. Near Grenville village : W.D.

Limnaea umbrosa, Say. Point Levis : J.F.W. Montreal

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Mountain : St. Anne : creek about two miles below Chat river : Metis and Restigouche rivers : R.B.

Limnaea elodes, Say. (L. palustris ? Linn.) Common everywhere throughout the district. Haldeman in his monograph considers it the L. fragilis of Linnaeus. In Europe L. fragilis is considered a variety of L. stagnalis, Linn., and the L. elodes of Say as probably identical with the L. palustris.

Limnaea catascopium, Say. A common species. As unpublished localities, I may cite the St. Charles river near Quebec, and Cap Rouge in the same neighborhood. Dr. Lewis of Mohawk (N.Y.) considers it a variety of the preceding shell.

Limnaea solida, Lea. (L. apicina, Lea: fide Haldeman.) Profusely abundant everywhere about the St. Lawrence at Quebec. Metis, Rimouski, and White rivers : R.B.

Limnaea caperata, Say. Widely distributed. Abundant with Succinea ovalis, Say, on the banks of the St. Charles river, near Quebec. Limnaea umbilicata, Adams : is generally considered a variety of this species.

Limnaea humilis, Say. (L. modicellus, Say.) Green Island village : Rimouski : St. Anne : R.B. Lake Calvaire near Quebec : and ponds near the Mile-end toll-gate, Montreal : J.F.W. L. parva, Lea, is supposed by Haldeman to be the young of this species.

Limnaea desidiosa, Say, (L. acuta and L. Philadelphica, Lea: fide Haldeman.) Upper Lake Metis : Marl lake, Anticosti : (the var. acuta) : R.B.

Limnaea pallida, Adams. Great Lake Matapedia : Cape Chat : R. B.

Limnaea alternata (or a new species). Point Levis : R.B. A species which I am unacquainted with.

Limnaea exigua, Lea : (young). In a small lake near Hamilton's farm : W.D.

Limnaea galbanus, Say. Abundant in shell-marl from the bottom of Eagle's Nest lake: W.D.

Physa heterostropha, Say. Common everywhere throughout the district.

Physa ancillaria, Say. St. Charles river near Quebec : J.F.W. near Montreal : R.J.F. Rimouski village : R.B. Doubtful if distinct from the preceding.

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Physa marginata, Lea. (not of Say.) Near Rimouski village. Probably a variety of P. heterostropha.

Physa hypnorum, Linn. (P. elongata, Say.) Abundant about Quebec and Montreal. Green Island: Metis : St. Anne : R.B.

Physa aurea Lea. Several localities in the county of Rimouski : R.B. Near Quebec : J.F.W.

Physa elliptica, Lea. Small lake one mile west of the Indian village in Arundel : W.D.

Planorbis macrostomus, nobis. (see description, and Figure 12.) Ponds near the Mile-end toll-gate, Montreal : R.J.F., and J.F.W.

Planorbis trivolvis, Say. Common throughout the district. Planorbis corpulentus of Say appears to be a variety of this species.

Planorbis lentus, Say. Less frequent than the above. St. Lawrence at Montreal. An almost hyaline variety occurs with the normal form.

Planorbis bicarinatus, Say. Abundant apparently all through the province. Extremely large at Brome Lake, R.J.F. At Quebec a variety with transverse wrinkles, and the upper carina almost obsolete (P. megastoma? De. Kay.) is more abundant than the type.

Planorbis campanulatus, Say. Near Quebec : J.F.W. : Fine at Brome Lake : common in the Richelieu River at St. Johns : St. Helen's Island, Montreal : R.J.F. Near Grenville, and in numerous lakes throughout that district. W.D.

Planorbis exacutus, Say. Scarce : swamps near the City mills, Montreal : R.J.F.

Planorbis deflectus, Say. Near Quebec : J.F.W. Great Lake Matapedia : R. B. Sixteen-Island and Sugar-bush lakes : W.D.

Planorbis parvus, Say. Widely distributed, and plentiful throughout the district.

Planorbulina armigera, Say. (sp.) Trenches in fields near the Beauport road, Quebec : J.F.W., and W. Couper : Nuns' Island, Montreal : R.J.F. Ponds on the top of Montreal Mountain : R.B.

Ancylus fuscus? Adams. Ponds near the Mile-end toll-gate, Montreal : R.J.F., and J.F.W.

Ancylus rivularis? Say. St. Lawrence, at Quebec and Montreal : St. Charles river near Quebec. Not having access to Haldeman's monograph of this genus, I am uncertain about these two species. The last may be A. parallelus, Haldeman.

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GASTEROPODA,-PULMONIBRANCHIATA.

HELICIDAE.

Tebennophorus Carolinensis, Bosc. Point Levis, large and fine : probably common in wooded districts.

Limax campestris ? Gould. Abundant under stones in fields : also in woods.

Vitrina limpida, Gould. (V. pellucida.) Montreal Mountain, abundant : R.J.F., and J.F.W. Rivière du Loup : R.B. and J.F.W. Trois Pistoles : St. Anne : Restigouche river, ten miles above its junction with the Matapedia : R.B.

Succinea obliqua, Say. Abundant everywhere, but generally in dryer situations than most North American Succineas.

Succinea ovalis, Gould. Banks of the St. Charles river near Quebec : J.F.W. Metis, Matanne, and St. Anne : R.B.

Succinea avara, Say. Island of Orleans; J.F.W.

Succinea vermeta, Say. Mouth of the Magdalen and Restigouche rivers: R.B. As many conchologists consider this a distinct species from the preceding, in deference to their opinion I keep them separate.

Helix albolabris, Say. Fine and frequent throughout the district : Mr. Bell appears, however, not to have met with it in the county of Gaspé.

Helix dentifera, Binney. St. Lambert, Montreal : near Brome Lake : R.J.F. Apparently very rare in Lower Canada.

Helix exoleta, Binney. About the Montmorenci river, near the falls : W.C., and J.F.W. Wentworth, Montcalm and Harrington : W.D.

Helix Sayii, Binney. Widely diffused, but scarce : Island of Orleans, near Quebec : W. C., and J.F.W. Montreal Mountain : near Brome lake : R.J.F. Restigouche river, about five miles above the mouth of the Matapedia : R.B. Near Doran's lake, Grenville : W.D.

Helix hortensis, Muller. Brandy Pots and Hare Island : extending from Metis to Gaspé bay. R.B.

Helix tridentata, Say. Montreal Mountain, but very rare.

Helix monodon, Racket. Abundant throughout the district, in suitable situations. In Lower Canada the typical form is abundant but the varieties (?) H. fraterna, Say; and H. Leaii, Ward; have not occurred to me in Lower Canada.

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Helix multidentata, Binney. In 1861 I found one living specimen of this species on the Island of Orleans, and not noticing the teeth, took it for H. capsella of Gould. I am indebted to Mr. Bland for the correction of this error.

Helix lineata, Say. A species widely distributed throughout the district, but not abundant.

Helix labyrinthica, Say. The same remarks will apply to this species as to the above. Island of Orleans, Montmorenci falls, etc.

Helix alternata, Say. Very abundant everywhere in Lower Canada.

Helix striatella, Anthony. In different situations to the above but equally common.

Helix rufescens, Muller. Living in abundance at Quebec on that part of the Plains of Abraham known as the Cove fields. J.F.W.

Helix (Zonites) cellaria, Muller. Dead shells of this species have been taken by Mr. Fowler near gardens in Craig Street, Montreal.

Helix pulchella, Mull. Abundant throughout the province.

Helix concava, Say. Not very common, but apparently with a wide range.

Helix electrina, Gould. Near Brome Lake in the Eastern Townships : R.J.F.

Helix arborea, Say. One of the commonest of the Canadian land-snails.

Helix indentata, Say. Montreal Mountain R.J.F.

Helix asterisca, Morse. Valley of the Marsouin river ; R.B.

Helix chersina, Say. (=H. fulva? Mull.) Common in damp situations.

Bulimus lubricus, Mull. Rivière du Loup; Trois Pistoles : Metis lakes, and along the Restigouche : R.B. Montreal Mountain : R.J.F., and J.F.W.

Bulimus harpa, Say. Montreal Mountain : R.J.F., and J.F.W. Rivière du Loup : J.F.W. Metis : mouth of Magdalen river, and very abundant in the Marsouin valley : R.B.

Bulimus marginatus, Say. (Pupa fallax, Say.) Sugar Bush Lake, and near Gate Lake : W.D.

Pupa armifera, Say. Plains of Abraham, Quebec : W.C. and J.F.W.

Pupa contracta, Say. Island of Orleans : J.F.W.

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Vertigo simplex, Gould. Rivière du Loup : J.F.W. Valley of the Marsouin : along the Restigouche and at Metis : R.B.

Vertigo Gouldii, Binney. Island of Orleans, and Rivière du Loup : J.F.W. Sixteen-Island lake. W.D. Montreal Mountain : R.J.F.

Vertigo ovata? Say. Montreal mountain : R.J.F., and J.F.W. The only specimen taken was not quite adult, but appeared to belong to this species.

Carychium exiguum, Say. Sixteen-Island Lake, one specimen : W.D.

DESCRIPTIONS OF NEW, OR IMPERFECTLY KNOWN SPECIES.

SPHAERIUM.

(Section A. Species with Rounded but not Protuberant Beaks.)

(Figure 1)

Sphaerium sulcatum, Lamarck.

Animal white; tubes, a light orange color.

Shell transversally oval, nearly equilateral, light in texture for its size; posterior margin somewhat more pointed: anterior rounded; base slightly curved; valves convex; beaks full raised above the outline of the shell; posterior portion a little longer; sulcations coarse, regular; epidermis dark chestnut brown; interior light blue; hinge margin narrow, nearly a straight line; cardinal teeth small, indistinct, situated somewhat towards the anterior side, double in both valves, and so placed as to assume the shape of the letter V reversed; lateral teeth on a line with the primary teeth, large, strong and prominent.

Long. 11-16; lat. 71-61; diam. 5-16 inches.

The young is more equilateral than the adult, and more compressed; it presents the shape of a quadrilateral, and is of a light lemon colour: the striations are as heavy as those of the mature shell. The hinge-margin is generally straight, but, in specimens from Alabama, Pennsylvania, and Rhode Island it is slightly curved.

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(Figure 2.)

Sphaerium solidulum, Prime.

Animal not observed.

Shell transversely inequilateral, elongated, slightly convex; beaks full, not very prominent; anterior margin rounded; posterior drawn out to an angle; base slightly curved : epidermis variable, dark chestnut or brownish yellow, with sometimes a yellow zone on the basal margin; sulcations coarse, irregular; interior dark blue; hinge margin considerably curved; cardinal teeth double, in the shape of the letter V reversed; lateral teeth large; the anterior placed at an angle with the margin; the posterior more on a continuation of the curve.

Long. 9-16; lat. 7-16; diam. 5-16 inches.

Differs from the preceding species in being less elongated, more inequilateral, less convex; the hinge margin is more curved, and the shell is more solid than in the S. sulcatum. Having unfortunately mislaid my only specimen from L'Orignal, the figure is taken from a fine large specimen from the Little Miami river, at Waynesville, Ohio. Canadian specimens will probably be smaller, and with their distinctive characters less strongly marked.

(Figure 3.)

Sphaerium striatinum, Lamarck.

Animal white; tubes light reddish yellow.

Shell slight, transversely elongated, somewhat compressed, inequilateral; anterior margin rounded, posterior distended, inferior rounded; beaks full, not much raised; sulcations irregular, at times so light as hardly to be seen with the naked eye, thus giving the shell a lustrous appearance; colour varying from a light greenish-yellow to a darker shade; valves slight; interior blue; hinge margin

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slightly curved : cardinal teeth double, very small, of the same size; lateral teeth larger, not very prominent.

Long. 7-16; lat. 5-16; diameter 4-46 inches.

Compared to the Sphaerium solidulum, this species is smaller, more inequilateral, less tumid, more compressed, less solid, less heavily sulcated, and its posterior extremity is more distended.

A very common species in the rivers of Lower Canada; but appears to have been generally overlooked.

(Figure 4.)

Sphaerium rhomboideum, Say. (sp.)

Animal; white? syphons reddish-yellow.

Shell sub-globular, rhombic, orbicular, equilateral; anterior margin truncated; posterior slightly angular; basal nearly straight; beaks full, but not prominent; valves slight, convex towards the beaks, gradually decreasing in fullness towards the margins; interior blue; sulcations very delicate; epidermis olive-green, often with a straw coloured zone on the margins; young shell more compressed than the adult; hinge margin nearly straight; cardinal teeth rudimentary; lateral teeth distinct, somewhat acute, not elongated.

Long. 8-16; lat. 6-16; diam. 5-16 inches.

A very local, but gregarious species.

(Figure 5.)

Sphaerium occidentale, Prime

Animal not observed.

Shell oval, small, pellucid, fragile, equilateral, margins rounded; valves slight, rather convex; beaks full, rounded, not much raised; sulcations very fine, hardly visible; epidermis horn coloured; cardinal teeth very diminutive, lateral teeth more distinct.

Long. 5-16; lat. 4-16; diam. 3-16 inches.

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This species is remarkable for its completely oval shape, which renders it quite distinct from all others. Apparently rather rare in Lower Canada.

(SECTION B. - SPECIES WITH PROTUBERANT, OR CALYCULATE BEAKS.)

Figure 6.

Sphaerium transversum, Say. sp.

Animal white, syphonal tubes pink, foot white.

Shell transversely oblong, elongated, subinequilateral, translucent; anterior side narrow; anterior margin rounded, posterior margin subtruncate, basal very much curved; beaks placed somewhat on the anterior side, large, calyculate, very much raised above the outline of the shell; striae very delicate; epidermis greenish-yellow (generally whitish in Canadian specimens), of a darker shade at times in the region of the beaks; valves slight; interior bluish; hinge-margin very nearly straight, narrow; cardinal teeth compressed, in the shape of the letter V reversed, and very much expanded; lateral teeth slightly elongated.

Long. 10-16; lat. 7-16; diam. 4-16 inches.

This large and delicate species is remarkable for its very transverse shape and for the narrowness of the anterior extremity, as compared to the posterior.

Figure 7.

Sphaerium securis, Prime.

Animal pinkish; syphons of the same colour.

Shell rhombic-orbicular, ventricose, subequilateral, both sides nearly of the same length; anterior margin a little curved; posterior margin abrupt, forming an obtuse angle with the hinge margin; basal margin much longer than the superior margin, rounded;

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beaks large, calyculate, slightly inclined towards the anterior, very approximate at apex; valves slight, very convex, especially in the region of the umbones; striae delicate, regular, hardly perceptible; epidermis glossy in some cases, very variable in colour, but generally of a greenish-horn tint; at times of a brilliant yellow or straw colour (in Canadian specimens often translucent glossy white); hinge-margin curved, narrow; cardinal teeth very small, united at base; lateral teeth slight elongated; very narrow.

Long. 6-16; lat. 5-16; diam. 4-16 inches.

Unlike any other Canadian species.

The descriptions of the Lower Canadian species of Sphaerium have been taken from Mr. Prime's able monograph. The ensuing descriptions are original, except in the case of Limnaea ampla.

PISIDIUM

Figure 8.

Pisidium Virginicum, Brongniart.

Shell ovate, elliptical, oblique; strongly concentrically sulcate; "beaks placed much nearer one end;" slightly elevated, rounded, with a decided inclination to the anterior portion of the shell. Posterior end elongated, rounded; anterior portion truncate; ventral margin convex. Easily distinguished from all the Lower Canadian Pisidia by its large size, strong concentric sulcations, and general outline.

Figure 9.

Pisidium altile, Anthony.

Shell sub-triangular, very tumid (except in the variety compressum, which may prove a distinct species), especially in the region

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of the beaks: generally much broader from the umbo to the ventral margin, than in the opposite direction: beaks elongated into an obtuse point:

anterior portion shortly rounded, but not truncate; posterior end forming a rounded, slightly pointed angle with the very convex ventral margin. Surface very finely striated.

Figure 10.

Pisidium abditum, Haldeman.

Shell ovate, orbicular, not very inequilateral; ventricose; beaks prominent, rounded; general outline very variable, sometimes very oblique; in others the umbones almost central, the general form being nearly circular, but elongated and very bluntly pointed posteriorly: surface striated, the striae stronger than in the preceding species.

LIMNAEIDAE,

Limnaea ampla, Mighels.

"L. testa amplâ, subovata; anfractibus quinque, convexis, superné geniculatis; suturâ valde impressâ; spira brevi; apertura latâ; umbilico profundo (?); columella valde plicata."

I have copied the original diagnosis of this very characteristic species from the proceedings of the Boston Society of Natural History for June 21st, 1843.

Dr. Mighel's description agrees with our Lower Canadian specimens in nearly every respect; but the Brome Lake specimens

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are imperforate, or very nearly so. The species is easily known by its large and wide body-whorl, which is decidedly angulated towards the sutures. The spire varies in length, but is seldom more than half as high as the last volution.

Figure 12.

Planorbis macrostomus, nobis.

Shell in many points closely resembling Planorbis lentus, Say: of which it may perhaps be only a variety. It is much larger, higher, and has deeper costae; its lines of growth are very prominently marked; the upper angle of the whorls as shown in the mouth is more prominent. Lip widely expanded, and reflected, covered with a white enamel. In this latter character it differs from all the North American species of Planorbis. It is a species nearly allied to Planorbis lentus and P. trivolvis; but apparently distinct from both.

EDITOR'S NOTE. The figures in this paper have not been reproduced in this reprint. AL

REPRINTS OF RARE PAPERS ON MOLLUSCA. -- Robert Bell, 1859. On the Natural History of the Gulf of St. Lawrence. -- Canadian Naturalist and Geologist, vol. 4, pp. 212-216, 219-220.

NOTE. Only part of this paper is reproduced here, namely that which deals with fresh-water and land species. The full title of the paper, as it appears at the beginning of Bell's article, is given below; the entire paper occupies pages 197 to 220 of vol. 4 of the Canadian Naturalist and Geologist.

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ARTICLE VI. - On the Natural History of the Gulf of St. Lawrence, and the distribution of the Mollusca of Eastern Canada. By Robert Bell, Jr.

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(Fresh Water.)

Planorbis trivolvis. - L'Orignal on the Ottawa, Lachine, Montreal, and in the Rimouski, Metis and Ristigouche Rivers; found also, in 1857, in Lake Kenogami, between Chicoutimi and Lake St. John, at the head of the Saguenay.

P. campanulatus. - Renfrew on the Bonnechere River, Montreal, and in shell marl from near Philipsburgh, St. Armand and St. Rose, Terrebonne, and living in Lakes Metis and Matapedia.

P. bicarinatus. - Renfrew, L'Orignal, Montreal, in marl from Ste. Rose, Sheffold Mountain and Carleton, Bay of Chaleus, also living in the Ristigouche River.

P. lentus. - Renfrew and near Montreal.

P. parvus. - L'Orignal and Montreal, in marl from Anticosti and several localities in the Eastern Townships; inhabits still water throughout the whole of the Peninsula of Gaspé.

Physa heterostropha. - Mississippi River, L'Orignal, neighbourhood of Montreal, Eastern Townships, and along the south-east side of the St. Lawrence below Quebec as far down as Gaspé Bay. They seem to thrive as well and grow to as large a size in Gaspé as anywhere else. I found a few Physas in some shell marl from Anticosti, which appear to belong to this species.

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P. aurea. - L'Orignal and Carillon on the Ottawa, Lachine Canal, Montreal, and several localities in the County of Rimouski.

P. ancellaria. - L'Orignal and near Rimouski village.

P. elongata. - L'Orignal, Montreal, Green Island, Metis and Ste. Anne (Gaspé).

Limnaea megasoma. - This fine species was found by Mr. Billings in the Bonnechere River, and by myself in a creek near Hawkesbury Village, where it was rather abundant.

L. jugularis (stagnalis). - Plentiful in many streams and small lakes on the south side of the Ottawa and in the St. Lawrence near Montreal, and extremely abundant in the Metis Lakes in the county of Rimouski.

L. caperata. - St. Lawrence near Montreal, and very plentiful in Lake, Matapedia.

L. umbrosa. - Common in ponds between Montreal and Lachine, and near Ste. Anne (Gaspé) at which place I found an individual having its aperture turned to the left side.

L. elodes. - This is by far the most common Limnaea inhabiting stagnant waters in the Ottawa valley and about Montreal, but as it is a variable species, I am uncertain whether it occurs or not among those collected below Quebec.

L. catascopium. - Rimouski, Ristigouche and Dartmouth Rivers.

L. opacina. - St. Lawrence, between St. Nicolas and St. Antoine; alive and pretty abundant at low tide at Point Levi, in the Metis River

above the high fall, Rimouski and White Rivers.

L. acuta. - This is the most abundant species in the shell marl from Marl Lake, Anticosti.

Ancylus rivularis. - Old quarries near the mile end toll-gate, Montreal.

Paludina decisa. - South Nation River, L'Original, Lachine Canal and St. Helen's Island.

Melania acuta. - St. Lawrence, near Montreal and Varennes.

M. Niagarensis. - Same localities.

Amnicola porata. - Occurs in marl from the Lachine railway and Shefford mountain, and was found living in Little Lake, Matapedia (County of Rimouski).

Valvata tricarinata. - Abundant in marl from Philipsburgh, St. Armand and the Lachine railway, and inhabits Lake Matapedia.

V. sincera. - Marl Lake, Anticosti.

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(Terrestrial.)

Helix alternata. - This is perhaps the most widely diffused species of the land snails found in Canada. It occurs abundantly on both sides of the Ottawa, at Montreal, Point Levi opposite Quebec, and down the south-east side of the St. Lawrence into Gaspé, and is common over the whole peninsula as far as my observations extended, at Dalhousie, N.B., and along the Ristigouche River.

H. albolabris. - One of the most common species in the Ottawa Valley, at Montreal and Point Levi, but does not extend so far down as the County of Gaspé, having been last observed on the coast of Metis. It was, however, found at Lake Matapedia, 25 miles south-east of Metis, and was extremely abundant at Dalhousie and along the Ristigouche as far up as the mouth of the Patapedia.

H. monodon. - Very abundant under stones in pasture fields near L'Orignal and in the augmentation of Grenville, Montreal mountain, Point Levi under decaying leaves lying on disintegrated shale, but was not found further down the St. Lawrence. Not having collected a single individual of this species during the previous part of the summer while travelling in the northern part of the district, I was astonished on coming to the Ristigouche to find them in the greatest profusion in many places along that river, as well as at Dalhousie.

H. exoleta. - One specimen found on the Ristigouche about five miles above the mouth of the Matapedia.

H. tridentata. - Montreal mountain, rare.

H. concava. - A few specimens found near L'Orignal and on the Montreal mountain; plentiful at Point Levi.

H. hortensis. - It seems scarcely credible that this species has been imported from Europe, considering how widely diffused and vastly numerous it has become along the Lower St. Lawrence. On the main land it was first observed on Mount Commis, about nine miles south of St. Luce and on the coast at Metis, where it was abundant, and below which it seems to occupy the place of H. albolabris, but is generally much more numerous. In 1857 I found vast numbers of them on the Brandy Pots and Hare Island in the middle of the St. Lawrence opposite Rivière du Loup. The climate of Gaspé seems to be very favourable to their propagation, as they appear to have spread over the country for a considerable distance inland. The yellow and banded varieties

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seem to be about equally numerous. Where land has been recently cleared and burnt over, their withered shells may be seen strewed in thousands over the surface of the soil. In the valley of the Marcouin they were observed to extend 12 miles inland, which was farther than at any other place. The height at which the last specimen was found was about 1500 feet above the sea, as indicated by the barometer which we had with us. The young from the size of a grain of duck shot to half that of the adult shell were met with in our journey up this valley in the end of July.

H. arborea. - This and the next species are probably the most abundant snails in the Ottawa valley and all along the Lower St. Lawrence from Kamouraska to Gaspé Bay, and in every part of the peninsula which we visited, and also around Lake St. John at the head of the Saguenay. Both these species exist on the Island of Anticosti, as I found specimens of them imbedded in fresh-water shell marl which Mr. Richardson brought from there in 1856. They are amongst the commonest land shells at Montreal and Point Levi, although they may not appear to be so owing to their small size.

H. striatella. - Found everywhere with the preceding species.

H. lineata. - L'Orignal, Augmentation of Grenville, Carillon, Montreal Mountain, and in many localities along the St. Lawrence from Berthier to Marsoni River, Gaspé.

H. labyrinthica. - L'Orignal, Rivière du Loup (en-bas), Green Island, and a few localities in Gaspé.

H. pulchella. - Carillon, Montreal, Berthier, mouth of Magdalen River and Dalhousie.

H. electrina. - Carillon.

H. chersina. - L'Orignal, Trois Pistoles, Ste. Anne, Marcouin, Magdalen River and mouth of the Matapedia.

Bulimus lubricus. - Montreal, Rivière du Loup, Trois Pistoles, Metis Lakes and Campbellton, mouth of Restigouche River.

B. harpa. - Metis, mouth of Magdalen River, and very abundant in the Marsoni valley.

Vitrina pellucida. - Rivière du Loup, Trois Pistoles and Ste. Anne.

Succinea ovalis. - L'Orignal, Metis, Matan and Ste. Anne.

S. avara. - L'Orignal, Matan, mouth of Magdalen River, and along the Ristigouche, near the mouth of the Patapedia.

S. obliqua. - Abundant in the Ottawa valley, at Montreal,

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Point Levi, all along the south-east side of the St. Lawrence from Rivière du Loup to Gaspé, and in nearly every place examined in the interior of the peninsula or on the Ristigouche.

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(Fresh Water.)

Unio radiatus. - Very abundant in the Ottawa and some of its tributaries from Ottawa City downwards in the Lachine Canal and the St. Lawrence in the vicinity of Montreal. Mr. Billings has a number of specimens of this and the next species from Lake Nipissing.

U. complanatus. - Lake Nipissing, Ottawa River, Lachine Canal and the St. Lawrence as far down as Berthier below the Island of Orleans, where the last living specimen was obtained, but valves both of this and the preceding species were very frequently found on the beach all the way to Gaspé. Abundant in Lake St. John, and said to inhabit the Little River St. Margarite on the north shore opposite Ste. Ann, Gaspé.

U. gibbosus. - Very abundant in the Ottawa at L'Orignal, and on St. Helen's Island, Montreal.

U. ventricosus. - Bonechere and Ottawa Rivers, Lachine Canal and St. Lawrence near Montreal.

U. ellipsis. - Culbute, (the channel between Calumet Island and the north shore of the Ottawa) and St. Helen's Island.

U. rectus. - Culbute, Ottawa near L'Original, Lachine Canal and St. Helen's Island.

U. alatus. - Common in Ottawa at L'Orginal, where I once caught a large specimen with a baited fish-hook in about ten feet of water.

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Margaritana rugosa. - South Nation River, Lachine Canal and St. Helen's Island.

M. marginata. - Culbute and St. Helen's Island.

M. arcuata (margaritifera). - Green and Rimouski Rivers, Lake St. John and both the Matapediac Lakes.

M. undulata. - Culbute, L'Original and St. Helen's Island.

Anodouta subcylindracea. - Lachine Canal, Grand Lac about 10 miles south of Rimouski, a small lake 6 miles southwest of Grand Metis, Lakes Matapedia and St. John.

A. pavonia. - Very abundant in the creek at L'Original and in old quarries near the mile end toll-gate, Montreal.

A. fluviatilis? - Ottawa near L'Orignal and Lachine Canal.

Cyclas similis. - Very abundant in the creek at L'Original, Lachine Canal, Metis Lakes and a pond 6 miles S. W. of Metis.

C. Orbiculata. - St. Lawrence near Montreal.

C. Dubia. - Ottawa City, Carillon, Montreal, Point Levi, Mare Lake Anticosti, Eastern Townships, and throughout the eastern peninsula of Lower Canada.

Besides the above 128 species of recent shells occurring in Canada, there are in the collection of the Geological Survey many more, the names of which have not yet been determined. I hope to be able to give a list of these in a future number of the Naturalist. Principal Dawson has kindly undertaken to name the Tubicolae, Bryozoa, Foraminifera, &c., dredged on the north coast of Gaspé, and will publish a list of them in another number of this magazine.

(To be continued.)

EDITOR'S NOTE. Spellings of place names are given in this reprint as they appear in the original. "Marsouins" and "L'Orignal" seem to have given the printer particular trouble. On this page (opposite) "Mare Lake" should be Marl.

SUPPLEMENT

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BELL, Robert (cont.)

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