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DEVOTED TO THE INTERESTS OF
CONCHOLOGISTS

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BOSTON.

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TO

THE NAUTILUS, VOL. XVII.

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EDITORS:
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Academy of Natural Sciences, Philadelphia.
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THE NAUTILUS.

VOL. XVII. MAY, 1903. No. 1.

TO OUR READERS.

With the present issue, the *publication office* of THE NAUTILUS is changed from the Wagner Institute, Philadelphia, to the Boston Society of Natural History, Boston, Mass. This change is in consequence of the appointment of MR. JOHNSON, the Business Manager and Junior Editor, to the curatorship of the Boston Society. All subscriptions, advertisements and other business communications should hereafter be addressed to MR. JOHNSON, at the Boston Society; while MSS. for publication should be sent to DR. PILSBRY, at the Academy of Natural Sciences of Philadelphia. Books and papers for review may be sent to either or both of the editors.

MONTANA SHELLS -PYRAMIDULA STRIGOSA.

MORTON J. ELROD.

The various forms of *Pyramidula strigosa* give a series of exceedingly interesting and widely varied structure. The series found in western Montana shows plainly the result of different environment. The different forms of *strigosa* vary from the large shells along Flathead Lake, measuring 24.34 mm. in diameter, to the very small specimens described below. On July 15, 1900, the ascent of Sinyaleamin mountain was made. At height of 8,500 feet an alpine variety was found among the loose rock. There was very little vegetation. No trees were near. They had been left 500 feet below. An occasional scrubby plant and the lichens of the rocks afford the food. Ten days

later an ascent was made of McDonald's Peak, fifteen miles further north in the range. At height of 7,500 feet a hunt was made for the shells, and the first were found at 7,800 feet, continuing until nearly 8,500, when the rocks were so large and so steep it was useless to search for them.

Finding specimens on the high slopes of two peaks in the same range, at about the same altitude in each case, seems to indicate that they are not found lower. At this altitude the summer is short. The months of June, July, August, with possibly a little of September, is the period of activity. Snow was not far from the specimens found. In one case, only a few feet from the shells was a large snow bank.

The slope on McDonald on which they were found lies to the west. The shells here would receive the sun early in the forenoon, and the last rays as the sun sank behind the hills would strike the ridge on which they were living. The conditions were much more favorable than on Sinyaleamin peak. The snow melts sooner, the ridge is broader with more pulverized rock and more vegetation. The absence of snow tempers the winds. The altitude is a few hundred feet lower, which might make a difference.

Search was made for an hour or more for the shells. A large shell vial was filled, a couple of dozen live ones being placed in a separate vial. Living specimens on both McDonald and Sinyaleamin peaks were proof that they live there at the present. The summit of McDonald is too rough and broken, without soil or vegetation, for shells to live. None were found.

As these shells show decided differences from any yet collected, they are here given as a separate variety, and description follows. They seem distinct enough to mark a separate species.

Pyramidula strigosa Gld., var. *alpina* n. var.

Shell small; brownish-gray, tending toward light horn color, in dead shells turning to pearly white; lustre somewhat silky; shell flat, little elevated; lines of growth, under hand lens, fine, an occasional increment of growth giving the appearance of sculpturing; suture well impressed, the periphery well rounded; aperture nearly circular, slightly obovate, somewhat higher than wide; markings as in *strigosa*, the upper band continuing in the spire, gradually disappearing; umbilicus medium, circular, deep, subcylindric.

Large diam., 7–10 mm., average of ten specimens, 8.91 mm.; greatest depth, 3–5 mm., average of ten, 4.34 mm.; aperture, 3.65–4.38 mm., average of eight, 3.99; whorls, 4–4.50 mm., average of ten, 4.26 mm.

Specimens taken at 8,500 feet, on Sinyaleamin mountain, Mission Range, Montana. Also taken on McDonald Peak, same range. Alt. 7,800 to 8,500. Types at the University of Montana.

The averages from the seven localities where shells have been collected show very conclusively the effect of altitude on the size of the shells. Increase in altitude diminishes the length of the season, the amount of heat received, the amount of food supply, and the chances of life. The result is to stunt or dwarf the animals attaining the heights. This is plainly shown in the sizes of shells at the different altitudes. As greater altitudes are reached, shells reduce in diameter, in depth, in the size of the aperture and in the number of whorls. Young specimens taken from the adults at Flathead Lake had shells with 2.25 to 2.50 whorls. If all the young at different altitudes start with the same number when born, the reduction of shell growth in spirals is easily deduced. The very significant observation is that a few hundred feet in altitude shows a corresponding reduction in size of the shells. The smallest shells are but three-eighths the diameter of the largest, one-third of the depth, have an aperture two-fifths as large, and have but two-thirds the number of whorls. The relative proportions of the largest, from Flathead Lake, to the smallest, on Sinyaleamin mountain, are seen from the following approximate ratios:

	Largest shells.	Smallest shells.
Large diam. to depth . . .	11 to 7	14 to 7
Depth to width of aperture . .	28 to 22	20 to 22
Large diam. to aperture . .	23 to 11	21 to 11

This story, in brief, as brought out by study, is as follows: *Pyramidula strigosa*, var. *cooperi*, from some source got into the Flathead Lake region. At this altitude, 3,000 feet, it flourished and grew, but the slow-moving animals migrated. As they ascended the mountain sides, following the streams to the banks of the lakes, and then ascended the wooded slopes the difficulties in securing food for existence became more of a problem. The shorter season required more hardy animals. Stunting or accidental variation produced smaller individuals, which would not require so much food on account of the

reduced size. The ascent of the mountain continuing, the reduction in size became more pronounced, resulting in the specimens as found. The shells at high altitude are less than one-half the size in any dimensions, as a consequence being less than one-eighth in volume. Present collecting shows that all but the two extremes have been by some perchance killed, although later search may produce the intervening specimens. But in many places in the mountains of western Montana shells of medium size are found at from 5,000 feet to 6,000 feet or higher.

Pyramidula strigosa Gld., var. *Cooperi* W. G. B.

This species abounds along the banks of Flathead Lake and along the banks of lakes in the Mission mountains. At Sinyaleamin Lake, in this range, altitude about 3,800 feet, they were not uncommon, but could not be called abundant. Associated with it, but occurring in very small numbers, was *Polygyra townsendiana* Lea, var. *ptychophora* A. D. Br., and *Pyramidula solitaria* Say. At McDonald Lake, in the same range and fifteen miles further north, the species was abundant, in common again with the *Polygyra* and *P. solitaria* Say. Here some two quarts were secured by a day's search among the dead leaves and under decaying logs. To gather them was to crawl on hands and knees among the dense growth of small trees and underbrush, the interlacing dead branches being a constant hindrance as well as a menace to clothing. Many live ones were secured. A large series was gathered which had evidently been killed and eaten by squirrels. As the pine squirrel, *Sciurus richardsoni* Buck, was rather abundant; he is charged with the damage, though it is not unlikely the little chipmunk, *Tamias* sp., takes a part in the work. This collecting was in July, 1900.

The shells were generally opened at the apex of the spire, a large opening being made. An occasional shell was punctured at some other place, but not many. The enemy seems to have discovered how and where to strike in order to secure the meal with the least effort. *Pyramidula strigosa* var. *Cooperi* had the larger number of shells thus injured—fifty-four. Of *Pyramidula solitaria* fifty were found cut by animals, and but three of *Polygyra townsendiana* var. *ptychophora*. The two former were much more abundant, and *cooperi* more conspicuous than *solitaria*. *P. townsendiana* were quite difficult to find, and the small number of injured shells shows how

this affects their mortality through foes. Being of the same color as the decaying leaves and moss, and for the most part under logs and debris, they seem to escape their enemies more readily than the two species of *Pyramidula*.

Along the banks of the Flathead Lake, near the University of Montana Biological Station, this species was also found in rather large numbers. In July, 1899, numbers of shells were found containing young. While they were in colonies, yet the specimens were much scattered, and it required much care and search to find them. The search was usually made after a rain, which was the most suitable time for finding them, but at the same time the conditions made the work very disagreeable.

Pyramidula strigosa Gld., a small variety.

Shells entirely different from those mentioned in the preceding paragraph are found on most of the lower slopes of western Montana. They fit in between *cooperi* and *alpina*, but are not found associated with either variety. Nowhere does it seem abundant. The small size is probably due to the shortness of the season at which the animals can live. By July the hills and mountain slopes have become dry and parched, although in this month there are occasional light showers. Their dimensions, in millimeters, are as follows for ten specimens taken at 5,000 feet: Large diameter, 11.95 to 16.73, average 13.83; depth, 5.30 to 7.40, average 6.12; aperture, 4.72 to 6.67, average 5.57; number of whorls, 4.8 to 5.4, average 6.15.

Pyramidula strigosa Gld., var.

A series of shells was collected on the Tobacco Root range by Earl Douglass and E. H. Murray, which the writer has examined. Another series was taken by Prin. P. M. Silloway, of Lewistown, Fergus county. These are the only collections of *strigosa* made in the State east of the Rocky Mountains, so far as the writer knows. They are immediately recognized as differing from those west of the divide. The sculpturing is coarser and they look thicker and more earthy. They are decidedly greater in depth than those found on the higher slopes west of the divide. They differ in these particulars also from the high altitude form *alpina*. In general shape they are much like *cooperi*, but very much smaller. The dimensions in mm., average of ten specimens, are as follows: From Tobacco Root mountains, altitude 7,000 feet. Large diameter, 15.21; depth, 9.30; aperture, 7.06;

whorls, 5.05. From Lewistown, altitude 4,792 feet. Large diameter, 16.80; depth, 11.78; aperture, 7.66; number of whorls, 5.28.

From the above it will be seen that the specimens at higher altitude are diminished in size, as also in the number of whorls in the shell, as is the case of those west of the main range.

The following table of comparisons of ten average specimens will give a better idea of the differences than can be given in any other way:

	Altitude.	Large Diam.	Depth.	Aperture.	No. whorls.
Flathead Lake	3,000	23.12	13.96	10.85	6.01
McDonald Lake	3,300	22.16	12.98	10.66	5.99
Sinyaleamin Lake . . .	3,800	21.82	12.28	10.24	5.75
Lewistown	4,792	16.80	11.78	7.66	5.28
Mt. Lo Lo	5,000	13.83	6.12	5.57	5.15
Tobacco Root Mts. . .	7,000	15.21	9.30	7.06	5.05
McDonald Peak	7,800	10.17	4.79	4.25	4.47
Sinyaleamin Peak . .	8,500	8.91	4.34	3.99	4.26

In examining the preceding table, it will be remembered that the specimens from Lewistown and the Tobacco Root mountains were taken east of the continental divide, all the others from the west slope. The series ranges from 3,300 to 8,500 feet altitude. There is a gradual diminution in each measurement, the smallest and highest specimens showing about one-third the dimensions of the lowest and largest, with the whorls diminished almost two, or nearly one-third.

The two collections from the east side of the range show the same reduction, but the series is much smaller. I thought there was an error in the altitude of those from the Tobacco Root range, but as Mr. Douglass insists there is not, it appears that conditions there must differ from those prevailing elsewhere in the State.

WRITINGS OF JAMES G. COOPER, M. D., ON CONCHOLOGY AND PALAEONTOLOGY, WITH LIST OF SPECIES DESCRIBED BY HIM.

COMPILED BY WILLIAM J. RAYMOND.

Abbreviations: Proceedings of the California Academy of Sciences, first series: Pr. C. A. S.; second series, Pr. C. A. S. (2).

Bulletin of the California Academy of Sciences: Bull. C. A. S.

American Naturalist: Am. Nat.

American Journal of Conchology: Am. J. Conch.

An asterisk denotes that the species was discovered by Dr. Cooper. In addition to the species named in this list, more than eighty were discovered by Dr. Cooper and described by Newcomb, Carpenter and Gabb in 1863 and 1864.

1. Report of Explorations and Surveys for a Railroad to the Pacific Coast, Washington, 1860, XII, Part 2. Report upon the Mollusca Collected on the Survey, by William Cooper, with notes by J. G. Cooper, pp. 369–386. Also published in The Natural History of Washington Territory, by J. G. Cooper, M. D., and Dr. G. Suckley, U. S. A., 4to, pp. xiv, 497, New York, 1859.

**Chrysodomus middendorffii* n. sp. (William Cooper).

**Nassa gibbsii* n. sp.

**Ancylus caurinus* n. sp.? (No description.)

**Planorbis planulatus* n. sp.

Also Pac. Railroad Rep., I, 219–221, 1855, Natural History Report. Incidental references to Mollusca.

2. Notice of Land and Freshwater Shells collected by Dr. J. G. Cooper in the Rocky Mountains, etc., in 1860. By T. Bland and J. G. Cooper, Ann. Lyc. Nat. Hist. N. Y., VII, 1–9, Pl. IV, 1861.

**Helix mullani* n. sp.

**Helix polygyrella* n. sp.

3. On some New Genera and Species of California Mollusca. Pr. C. A. S. II, 202–207. 1863.

Strategus n. gen.

**Strategus inermis* n. sp.

**Æolis opalescens* n. sp.

**Æolis iodinea* n. sp.

**Tritonia palmeri* n. sp.

**Pleurophyllidia californica* n. sp.

**Doris montereyensis* n. sp.

**Doris sanguinea* n. sp.

**Doris alabastrina* n. sp.

**Doris sandiegensis* n. sp.

4. *Strategus* (preoccupied) changed to *Navarchus*. Pr. C. A. S., III, 8.

5. On New or Rare Mollusca Inhabiting the Coast of California. Pr. C. A. S., III, 56–60, fig. 14. 1863.

Neaplysia n. subgen.

**Aplysia californica* n. sp.

**Doris albopunctata* n. sp.

**Triopa catalinæ* n. sp.

**Dendronotus iris* n. sp.

**Æolis barbarensis* n. sp.

6. On the New Genus of Terrestrial Mollusca Inhabiting California. Pr. C. A. S., III, 62–63, fig. 15. 1863.

**Binneya notabilis* n. gen., n. sp.

7. Descriptions of New Species of Marine Shells from the Coast of California, by Wm. M. Gabb. Pr. C. A. S., III, 1865. Described by Dr. Cooper, page 188.

**Gadinia* (*Rowellia*) *radiata* n. subgen., n. sp.

8. Description of a New California Helix, with notes on others already described. Pr. C. A. S., III, 259–261. 1866.

**Helix sequoicola* n. sp.

9. On a New Species of Pedipes Inhabiting the Coast of California. Pr. C. A. S., III, 294–5, fig. 29. 1866.

**Pedipes unisulcata* n. sp.

10. The West Coast Helicoid Land Shells. Pr. C. A. S., III, 331–9. A synopsis of 55 species.

11. Geographical Catalogue of the Mollusca found west of the Rocky Mountains, between 33° and 49° north latitude. Pamph. 4to, 40 pages. San Francisco, 1867. 795 species named, with geographical range.

12. Cronise's Natural Wealth of California. San Francisco, 1868. Chapter on Zoology by J. G. Cooper, M. D. 55 species of Mollusca, mainly edible, pages 499–501.

13. The Fauna of Montana Territory. Papers in six issues of Am. Nat. on Mammals, Birds, Reptiles, Fishes; and the Shells of Montana, vol. II, 486–7. 1868–9. 24 species enumerated, with notes.

14. On a New Californian Terrestrial Mollusc. Am. J. Conch., IV, 209, 210, Pl. 18, figs. 1–3. 1869.

Ammonitella yatesii n. gen., n. sp.

15. On the Distribution and Localities of West Coast Helicoid Land Shells, &c. Am. J. Conch., IV, 211–240. 1869.

16. Notes on the Fauna of the Upper Missouri. Am. Nat., III, 294–9. 1869. Includes list of 7 Mollusca.

17. The Naturalist in California. Am. Nat., III, 182–9 and 470–481. Incidental references to the Mollusca. 1869.

18. The West Coast Fresh-Water Univalves, No. 1. Pr. C. A. S., IV, 93–101. A synopsis of 43 pulmonate species. 1870.

**Ancylus caurinus* W. Cp. is here described. See No. 1.

**Planorbis occidentalis* n. sp.

19. On a New Californian Helicoid Land Shell. Am. J. Conch., V, 196–7, Pl. 17, fig. 8. 1870.

Daedalochila harfordiana n. sp.

20. Notes on West Coast Land Shells, No. II. Am. J. Conch., V, 199–219. 1870. Additions to paper No. 15, with classification of the Helices of the West Coast.

21. Notes on Mollusca of Monterey Bay, California. Am. J. Conch., VI, 42–70. 1870. A list of 197 species, with notes.

22. Additions and Corrections to the Catalogue of Monterey Mollusca. Am. J. Conch., VI, 321–2.

23. Note on Gadinia and Rowellia. Am. J. Conch., VI, 319, 320.

24. Note on Waldheimia pulvinata Gld. Am. J. Conch., VI, 320.

25. Monterey in the Dry Season. Am. Nat., IV, 756–8. References to the Mollusca.

26. Catalogue of the Invertebrate Fossils of the Western Slope of the United States. Part II. San Francisco, 1871. 30 pages. Intended merely as a check-list and for labels, supplementing the Geographical Catalogue of 1867.

27. On Shells of the West Slope of North America. No. 1. Pr. C. A. S., IV, 150–6, notes on 51 species; No. II, IV, 171–5, notes on 34 species.

28. On New Californian Pulmonata, etc. Proc. Acad. Nat. Sci., Phila., 1872, 143–154, Pl. 3.

**Limax (Amalia) hewstoni* n. sp.
**Limax campestris* Binney, var. *occidentalis* n. var.
**Ariolimax californicus* n. sp.
**Ariolimax niger* n. sp.
**Assiminea californica* n. sp.
**Alexia setifer* n. sp.
**Arion? andersoni* n. sp.
**Lysinoe diabloensis* n. sp.

29. On the Law of Variation in the Banded California Land Shells. Pr. C. A. S., V., 121–5, Pl. VII, VIII. 1873.

30. Note on Alexia setifer and its Allies. Pr. C. A. S., V., 172. 1873.

31. California During the Pliocene Epoch; in the Miocene Epoch; The Eocene Epoch in California; Note on Tertiary Formation of California. Pr. C. A. S., V, 389–392, 401–404, 419–421, 422. 1874.

32. The Origin of California Land Shells. Pr. C. A. S., VI, 12–14. 1875.

33. On Shells of the West Slope of North America. No. III. Pr. C. A. S., VI, 14–27. 1875. Notes on about 75 species. See No. 27.

34. The Age of the Tejon Group, California. Am. Jour. Sci., 3d ser., vol. 14, 321–2. 1877. From Pr. C. A. S., Nov., 1874.

35. Notes on Some Land Shells of the Pacific Slope. Proc. Am. Phil. Soc., XVIII, 282–288. 1879. Notes on about 30 species.

36. On Fossil and Sub-Fossil Land Shells of the United States, with Notes on Living Species. Bull. C. A. S., I, No. 4, 235–255. 1885.

37. West Coast Pulmonata; Fossil and Living. Bull. C. A. S., II, No. 7, 355–376 and map; Bull. C. A. S., II, No. 8, 497–514; Pr. C. A. S. (2), I, 11–24. 1887.

38. Catalogue of Californian Fossils. Cal. State Mining Bureau, 7th Ann. Rep. State Mineralogist, 221–308. 879 species of Mollusca, with geographical range of those in the list now living. 1888.

39. Fresh-Water Mollusca of San Francisco County. Zoe, I, 196–7. 1890.

40. The Value of Fossils as Indications of Important Mineral Products. 9th Ann. Rep. State Mineralogist, 284–6. 1890.

41. Notes on the Subalpine Mollusca of the Sierra Nevada, near lat. 38° (with Plate I), by W. J. Raymond. Additional Notes and Descriptions of New Species by J. G. Cooper, M. D. Pr. C. A. S. (2), III, 61–69 and 70–91. 1890.

Primella n. subgen. (of *Sphærium*).

Sphærium raymondi n. sp.

Ancylus caurinus W. Cp., var. *subalpinus* n. var.

Planorbis subcrenatus Cpr., var. *disjectus* n. var.

42. On Land and Fresh-Water Shells of Lower California. No. 1. Pr. C. A. S. (2), III; 99–103. 1891.

Bulimulus inscendens W. G. B., subsp. *bryanti* n. subsp.

Rhodea californica Pf., subsp.? *ramentosa* n. subsp.

43. The same, No. 2. Pr. C. A. S. (2), III, 207–217. 1892.

Bulimulus inscendens W. G. B., var. *beldingi* n. var.

Bulimulus sufflatus Gld., var. *insularis* n. var.

Columna ramentosa J. G. C. replaces *Rhodea* subsp. *ramentosa*.

Columna ramentosa J. G. C., var. *abbreviata* n. var.

Helix areolata Pf., var. *exanimata* n. var.

44. The same, No. 3. Pr. C. A. S. (2), III, 338–344, Pl. XIII, XIV. 1893. Fuller descriptions and figures of species named in 1 and 2.

Melaniella? eiseniana n. sp.

Planorbis anitensis n. sp.

Planorbis peninsularis n. sp.

Helicodiscus lineatus Say, *sonorensis* n. subsp.

45. The same, No. 4. Pr. C. A. S. (2), IV, 130–143, Pl. V, VI. 1894.

Bulimulus (pallidior?) vegetus Gld., var. *regexspiza* n. var.

Melaniella tastensis n. sp.

46. The same, No. 5. Pr. C. A. S. (2), V, 163–5. 1895.

Bulimulus decipiens n. sp.

Pliocoluma n. gen.

47. Catalogue of the Land and Fresh-Water Mollusca of Lower California. Zoe, III, 12–25. 1892.

48. Catalogue of Californian Fossils. Bull. No. 4, Cal. State Mining Bureau, 65 pages and Pl. I–VI. 1894. See No. 38.

Part II. Bibliography and References. Includes many titles of papers on Recent Shells. Part III. Additions to the Catalogue of Californian Fossils Obtained since 1888. Part IV. Remarks on Fossils Collected by Dr. S. Bowers. Part V. Descriptions and Figures of New Species. Thirty-seven new species Cretaceous and Cretaceous B (or Eocene). See p. 7.

49. Catalogue of West North American and Many Foreign Shells. Printed for the State Mining Bureau. Also a complete list of Mollusca known to inhabit the West Coast of North America, from Sitka, Alaska, to Cape St. Lucas, and inland to the Rocky Mountains, north of Mexico. 1894.

50. On Some Pliocene Fresh-Water Fossils of California. Pr. C. A. S. (2), IV, 166–172, Pl. XIV. 1894.

Margaritana subangulata n. sp.

51. Catalogue of Marine Shells, collected chiefly on the eastern shore of Lower California. Pr. C. A. S. (2), V, 34–48. 1895. List of 191 species.

52. On West Mexican Land and Fresh-Water Mollusca. Pr. C. A. S. (2), V, 166–9. 1895. Seventeen species and varieties.

53. On Some New Cretaceous (and Eocene?) Mollusca of California. Pr. C. A. S. (2), VI, 330–337, Pl. XLVII, XLVIII. 1896.

Sistrum cretaceum n. sp.
Littorina subobesa n. sp.
Calliostoma lignitica n. sp.
Sigaretus costatus n. sp.
Triplicosta n. subgen.
Pholadomya (Triplicosta) progressiva n. sp.

No. 48. Bull. 4, Cal. State Mining Bureau. Cretaceous and Eocene species:

Terebra wattsiana n. sp.
Surcula crenatospira n. sp.
Surcula monilifera n. sp.
Surcula inconstans n. sp.
Pleurotoma perkinsiana n. sp.
Pleurotoma decipiens n. sp.
Drillia ullreyana n. sp.
Mangilia suturalis n. sp.
Cordiera gracillima n. sp.
Cancellaria irelaniana n. sp.
Ancilla (Oliverato) californica n. subgen., n. sp.
Bittium longissimum n. sp.
Cerithium fairbanksi n. sp.
Potamides carbonicola n. sp.
Potamides davisiana n. sp.
Fusus supraplanus n. sp.
Mitra simplicissima n. sp.
Stomatia intermedia n. sp.
Calliostoma kempiana n. sp.
Tornatella normalis n. sp.
Bulla assimilata n. sp.
Tornatina erratica n. sp.
Siphonaria capuloides n. sp.
Astarte semidentata n. sp.
Crassatella lomana n. sp.
Cucullæa bowersiana n. sp.
Corbula triangulata n. sp.
Mytilus dichotomus n. sp.
Crenella santana n. sp.
Megerlia dubitanda n. sp.
Waldheimia imbricata n. sp.

Miocene and Pliocene species:

Agasoma barkerianum n. sp.
Trophosycon kernianum n. sp.
Limnæa contracosta n. sp.
Planorbis pabloanus n. sp.
Anodonta (nuttalliana) lignitica n. var.
Amnicola yatesiana n. sp.

GENERAL NOTES.

A New British Vitrea.—In the last (April) number of the *Journal of Conchology*, Mr. B. B. Woodward describes a new *Vitrea* from Cheshire, *v. rogersi*. It stands near *v. alliaria* and *v. helvetica*, and has been identified also as *v. glabra*. It is named for the late Mr. T. Rogers of Manchester, who first (1870) found British specimens.

Errata.—Owing to the absence of both editors from Philadelphia during the printing of the April number, some typographical errors escaped correction on the proofs. On p. 136, 4th line, the first word should be Hieizan. In the second paragraph on p. 137, the second word should be *largillierti*, and the 16th line from bottom of same page should begin with a capital M. On p. 139 the term Pelecypods is misspelled. There are also some other like errors.


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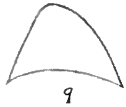
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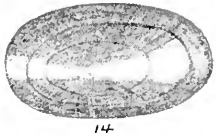
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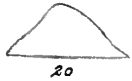
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THE NAUTILUS.

VOL. XVII. JUNE, 1903. No. 2.

NOTES ON EASTERN AMERICAN ANCYLI.

BY BRYANT WALKER.

An attempt to determine the *Ancyli* of Michigan leads necessarily to a critical study of all the species described from the States east of the Mississippi. The following notes embody the results of the investigation, and are published in the hope of stimulating a more active interest in this most perplexing and little understood group.

The amount of material examined has been considerable. In addition to that in my own collection, which includes the Jas. Lewis, DeCamp and Lothrop collections, I have had the entire collections of Dr. V. Sterki, Dr. R. J. Kirkland, A. A. Hinkley, Jas. H. Ferriss and Geo. H. Clapp, and through the kindness of Dr. Pilsbry a suite of seventy-three trays from the collection of the Philadelphia Academy of Natural Sciences. I am also indebted to Dr. Pilsbry for examining the type of *Ancylus haldemani*, which corrected my previous conception of that species, and established the validity of the species described as *A. kirklandi*. I am also under obligations to Messrs. Frank C. Baker and Henry Hemphill for valuable material.

The lack of authentic examples of many of the rarer species has been a source of great embarrassment. But by process of elimination and careful study of the original descriptions, it is believed that in most cases the difficulty has been successfully overcome.

In studying the *Ancyli* well cleaned specimens are the prime requisite. They can then be easily separated in the two sections

characterized by the smooth or striate apex. In differentiating the species in these groups, the shape and contour of the shell are the main elements to be relied upon, the sculpture of the surface being an exceedingly variable factor, which, by itself, cannot in most cases be considered a specific character. As in all fresh-water forms, a very large degree of variation must be allowed for. But in spite of this, it is believed that nearly all the described species should be allowed to stand, and, although in certain instances it is not always possible to determine the exact specific relations of particular specimens, yet, as a rule, the lines between the different forms can be drawn with a reasonably satisfactory degree of certainty.

Bourguignat, in his "Notice sur le genre Ancylus," in 1853 (J. de C. IV., p. 63), divided the genus into two subgenera: *Ancylastrum*, with the apex inclined to the right, and *Velletia*, with the apex inclined to the left.

Clessin (1882), in the Conchlien Cabinet, considered these two groups to have only a sectional value. He also restricted *Ancylastrum* to the Eurasian species which group around *A. fluviatilis;* and with the exception of *A. fragilis* and *oregonensis*, which he referred to *Velletia*, and the large western *A. newberryi* and *patelloides*, which he placed in a new genus, *Lanx*, included all the North American species in a separate group, *Haldemania*, which he characterized as follows: "Shell conical, apex not bent backwards and only slightly removed from the centre-line of the shell, aperture round or oval. Type *A. obscurus* Hald."

Unfortunately *Haldemania* is preoccupied, having been used by Tryon in 1862 (Proc. P. A. N. S., 1862, p. 95) for the group of *Viviparidæ* now known as *Lioplax*, so that his very appropriate name cannot be retained.

As has already been shown (NAUTILUS, XVI., p. 85), the North American species included in Clessin's *Haldemania* are divided into two natural groups, characterized by the presence or absence of apical sculpture. These groups are, at least, of sectional value, and must be recognized.

Owing to the uncertainty which still prevails as to just what Haldeman's *obscurus* really is, and the consequent inability to say with accuracy to which group that species belongs, it does not appear desirable to retain *obscurus* as the type of either section. Whenever an examination of Haldeman's type shall definitely determine where

the species belongs, *Haldemania* can be written as a synonym of that group. Until this is done, the matter must rest in abeyance.

Leaving the position of the western species, which are outside the scope of this paper, for future consideration, I propose to divide the eastern American species of *Ancylus* into two sections, characterized as follows:

1st. *Lærapex*, sec. nov.

Shell usually depressed, apex obtuse or sub-acute, smooth. Type: *A. fuscus* Ads.

2. *Ferrissia*, sec. nov.

Shell usually elevated, apex acute, radially striate. Type: *A. rivularis* Say.

Section Lærapex.

This section includes all the larger species of *Ancylus*, which are characteristic of the lakes and slow-flowing streams of the northern States, the Mississippi Valley and Florida. They are usually found on the reeds, dead leaves and submerged timber in such localities, and are rarely, if at all, found on stones, dead shells, etc., in rapidly flowing streams, where they are replaced by the species of the section *Ferrissia*. With the exception of *A. diaphanus* and, possibly, *A. obscurus*, the species of this group seem to be wholly lacking in the mountain streams of the Appalachian region between the Ohio river and Florida.

I. Ancylus fuscus Adams (1840). Pl. I., figs. 1–9.

Adams' description calls for a large depressed, elliptical shell, moderately curved at the sides, with a moderately prominent, obtuse apex, slightly behind and to the right of the middle; $7\frac{3}{4}$ mm. long, $4\frac{1}{2}$ wide and $1\frac{1}{4}$ high. No mention is made of the outline of the slopes. Haldeman states that all these are rectilinear, while Gould describes the shell as regularly convex. None of these authors refer to the surface sculpture. But subsequent writers have assumed that the surface was smooth.

Specimens answering these requirements are common, and show that the species has an extensive range from Massachusetts west, at least, to the Mississippi Valley and south to New Orleans. I have not seen any specimens from Kentucky, Tennessee, the South Atlantic or the Gulf States east of Louisiana.

The very limited amount of material examined from Massachu-

setts, none of which is typical in size, does not show any considerable variation in the contours of the shell. But in the west, where it is an abundant species, there is considerable variation in this respect.

In 1896 (NAUTILUS, IX., p. 139), Dr. Pilsbry described a shell similar in shape, though narrower and higher, with the surface ornamented with " very fine, somewhat irregular, radial striæ, more distinct toward the periphery " as *A. eugraptus*.

The large amount of material examined has forced me to the conclusion that *eugraptus* is only a ribbed form of *fuscus*. In almost every considerable number of specimens, all the variations can be found from those with a smooth surface, through those with the surface more or less radially rippled, to those with the fine ribs of typical *eugraptus*. This variation in the sculpture is not confined to the western specimens. In two sets of *A. fuscus* from Winchester, Mass., in different collections, which, so far as shape and contour is concerned, are entirely typical, the surface varies from the typical smooth *fuscus* to examples with as well developed ribs as the majority of the western *eugraptus*. Nor are the western specimens of *eugraptus* uniformly higher and narrower than the typical eastern examples of *fuscus*. While, perhaps, they average higher than the eastern specimens, they vary insensibly from the depressed form of typical *fuscus* to elevated specimens higher than the typical *eugraptus*, so that I have not seen my way clear to separate the eastern from the western form on any substantial difference in shape.

Assuming the Massachusetts form to be typical *fuscus*, it may be described as a depressed, oval or slightly obovate shell, with the left side more arcuate than the right; anterior and right slopes straight, posterior and left slopes slightly convex; apex very obtuse, not rising above the general outline of the shell, smooth, slightly behind and to the right of the middle. Translucent horn-color, shining. Surface with faint growth lines, otherwise smooth or with irregular and discontinuous transverse ripples which tend to form irregular radial riblets.

From central New York to the west there appears to be a much greater degree of variation. The shells tend to become narrower and more elevated, and with a greater convexity to the left slope. But throughout the peculiar, rounded, obtuse apex remains as a valuable specific characteristic in differentiating it from *A. kirklandi, diaphanus* and *obscurus*.

One peculiar form can, I think, be traced directly to the habitat of the animal. In nearly every lot of western shells are to be found a number of specimens, very narrow and elongated, with both of the lateral sides decidedly convex and with the sides nearly parallel. When placed on a flat surface the shell rests on the middle of the side and the ends are elevated and arched, giving a trough-shaped appearance to the shell, when placed apex downward. Now, *fuscus* is a dweller upon reeds and other aquatic vegetation. When it lives on the flat side of a reed or leaf it grows normal in shape and the peritreme touches the surface all the way around. But when it lives on a round reed such as *Scirpus lacustris*, which is narrower than the full grown shell, it adapts itself to its position and grows to fit the reed, the ends following the convex surface of its support and the sides lapping down around the reed itself.

The dimensions of the specimens figured are as follows:

Fig. 1. Length 5.5, width 4, alt. 1.25 mm.

Fig. 4. Length 7.25 width 4.5, alt. 1.75 mm.

Fig. 37. Length 8.25, width 4.5, alt. 3 mm.

Variable within the limits above specified, nevertheless, *A. fuscus* is a consistent and well defined species, which need not be confused with any of its allies. It differs from *A. kirklandi* by its more depressed and more regularly oval shape and more nearly central, more obtuse, less prominent and less eccentric apex; from *A. diaphanus* by its elongated, oval shape and more obtuse apex and from *A. obscurus* by its more depressed, less acute and more central apex and straight posterior outline.

Var. *eugraptus* Pilsbry (1896), Pl. I., figs. 10–15.

Typically slightly narrower and considerably higher than the typical *fuscus*, but subject to great variation in this respect. Figures 10–12 from New Orleans and 13–15 from Reeds L., Kent Co., Mich., represent the extremes. Surface with "very fine, somewhat irregular radial striæ, more distinct toward the periphery."

Type: length 6, width 4, alt. 1.8 mm.

Fig. 10. Length 7, width 4.75, alt. 1.8 mm.

Fig. 13. Length 7.25, width 4.25, alt. 2.25 mm.

II. Ancylus diaphanus Hald. (1841). Pl. II., figs. 13–18.

This is a well marked species and, in all the localities where the typical form is found, seems to be very constant in its characters and

subject to less variations than many of the other species. For this reason I hesitate to refer to it the more elliptical forms from the western States, which are usually referred to it, but which seem to me rather referable to *A. kirklandi*, and until a larger amount of material shall have demonstrated the identity of these shells with the typical form, prefer to restrict the species to the author's type, "distinguished by its circular and flattened form and central inconspicuous apex." As thus limited, it is found in the Delaware river at Easton, Pa., the Ohio river at Pittsburg and Edgeworth, Pa., the Illinois river, the Tennessee river at Knoxville, Tenn., and the Holston river, Tenn. The specimens from the last locality are those quoted without identification by Lewis in his paper "On the Shells of the Holston River" (A. J. of C., VI., p. 222), and later referred to "*haldemani?*" (Proc. P. A. N. S., 1872, p. 110). Haldeman's description, though brief, is quite to the point, and leaves little to be added. It may be said, however, that the apex is smooth, the surface smooth or delicately shagreened with fine transverse ripples, which in none of the specimens examined become sufficiently raised or connected to be called ribs; the anterior and left slopes are slightly convex, the posterior and right nearly straight; the left side is usually more arcuate than the right and often decidedly so, the general shape, however, even then remaining subcircular. There is some little variation in height as shown by the figures, and, in the more elevated examples, the shell is less circular, the anterior and left slopes become more decidedly convex and the apex rather less central, being, as it were, tipped backward by the more rapid growth and greater convexity of the anterior portion of the shell. The largest examples seen are from the Ohio river at Edgeworth, Pa., collected by Mr. George H. Clapp. Those from the Holston and Tennessee rivers are decidedly smaller, the example measured from the Holston being exactly typical in size.

Fig. 13. Length 7, width 5.5, alt. 2 mm.

Fig. 16. Length 7.5, width 5.5, alt. 2.5 mm.

Holston River. Length 5.5, width 4.5, alt. 2 mm.

Tennessee River. Length 5, width 4, alt. 2.

Explanation of Plate I.

All the figures are drawn on the same scale. The outline figures are transverse sections through the apex or point of greatest altitude.

Figs. 1–3. *A. fuscus* Ads., Winchester, Mass.
Figs. 4–6. *A. fuscus* Ads., Grand River, Kent Co., Mich.
Figs. 7–9. *A. fuscus* Ads., Black Lake, Ottawa Co., Mich.
Figs. 10–12. *A. fuscus eugraptus* Pils., New Orleans, La.
Figs. 13–15. *A. fuscus eugraptus* Pils., Reeds L., Kent Co., Mich.
Figs. 16–18. *A. obscurus* Hald., Volusia Co., Fla.
Figs. 19–21. *A. excentricus* Mor., Barton Creek, Travis Co., Tex.

(To be Continued.)

TWO NEW SPECIES OF EOCENE FOSSILS FROM THE LIGNITIC OF ALABAMA.

BY T. H. ALDRICH.

UMBRACULUM (EOSINICA) ELEVATUM n. sp. Fig. 1.

Shell small, outline ovate, depressed conic, substance rather thin, apex partially immersed, pointed backwards to the left. Surface of shell with numerous radiating folds, strongest at the margin, gradually becoming weaker and dying out some little distance from the apex, a few concentric striæ or growth lines showing one-fourth the distance down from the apex; interior smooth, polished, rather pearly, the apical point marked by a rounded pearly protuberance; interior margin fluted. Longest diameter, 18 mm., width 12 mm., height 5 mm.

Locality. Wood's Bluff, Ala., lignitic stage.

The type is in the State Museum. This shell resembles a limpet,

FIG. 1.

UMBRACULUM ELEVATUM.

FIG. 2.

GASTROCHÆNA STRIATULA.

and has some of the characters of *Tylodina* Raf., but I consider it an *Umbraculum* somewhat like *U. plicatulum* Martens from Cuba. The interior of our species is very different. It should be placed in a

new subgenus, EOSINICA, which may be described as ovate-conic, radially ridged, interior smooth, terminating in a rounded protuberance and interior margin generally crenulated.

GASTROCHÆNA STRIATULA n. sp. Fig. 2.

Shell small, substance thin, ventral opening large, ovate anteriorly and pointed at posterior with its margin turned outward towards the anterior end of shell. The shell is pointed anteriorly, rounded posteriorly with surface closely concentrically striated. Widest part of valve 6 mm., length 10 mm.

Locality. Wood's Bluff, Ala. This specimen was found imbedded in a coral, and unfortunately was broken. The cavity is rounded and smooth. It is rather wider and shorter than usual in this genus.

Part of type in my collection, balance in State Museum.

NEW PISIDIA.

BY V. STERKI.

Pisidium ohioense n. sp.

Mussel minute, equipartite, well inflated, elliptical in outline; beaks in the middle, rather broad, rounded, prominent over the hinge line; superior margin little curved or almost straight, with slightly marked, rounded angles at the scutum and scutellum; the other margins rounded or the posterior subtruncate; surface somewhat shining, horn colored, very finely and irregularly striate, usually with a few coarser lines of growth; shell thin, translucent; nacre glassy-transparent, muscle insertions slightly marked; hinge fine, plate narrow, cardinal teeth fine, lamellar, the right slightly curved, abruptly thickened and bifid at the posterior end, the left anterior longitudinal, almost straight, the posterior slightly oblique or longitudinal and parallel with the anterior and extending to over about its middle; lateral teeth comparatively stout, their cusps pointed, the outer ones of the right valve small but well formed; ligament rather stout.

Size: Long 2.5, alt. 2–2.1, diam. 1.5 mill.

Long 2, alt. 1.6–1.7, diam. 1.2–1.4 mill.

Long 1.8, alt. 1.5, diam. 1.3.

Young: Long 1, alt. 0.8, diam. 0.3 mill.

Habitat: A pond near Garrettsville, Portage Co., Ohio; a brook near Indian mounds, and a very small stream, Kent Co., Michigan.

In December, 1901, Mr. Geo. J. Streator collected several hundred specimens, most of them immature and young. They were regarded as a new species and named, but not published, waiting for more materials. Since then Dr. R. J. Kirkland has secured over three hundred specimens from the first named place in Michigan, and half a dozen from the latter. Last March Mr. Streator has again found a number of examples at Garrettsville, O. Most of the specimens were incrusted with a ferruginous or blackish coating, sometimes very thick.

This Pisidium is remarkable for the position of the beaks, which are not posterior, a feature also found with *Pis. medianum*. The species is somewhat variable in regard to size and shape; the largest specimen seen was 2.7 mill. long, and moderately inflated. There is a more different form, found among the Ohio and Michigan specimens, averaging smaller, 1.7–2.0 mill. long, comparatively shorter, well inflated, with the anterior part a trifle longer than the posterior, the anterior end subangular, the supero-anterior slope being slightly marked, and the color is somewhat lighter.

In one specimen of the more typical form from Michigan, the beaks are low, flattened on top, or rather impressed, and with concentric, elevated ridges around the flattened areas, somewhat like those of *Pis. ferrugineum* Pr.

Pis. mainense n. sp.

Published as *Pis. walkeri* St. var. *mainense* St. in the NAUTILUS, XII., p. 79. Since then numerous specimens were collected in Michigan by Dr. R. J. Kirkland from Reed Lake, Green Lake, Pine Island Lake and Little Bostwick Lake, and proved distinct from *P. walkeri*, which is widely distributed and fairly constant. *Pis. mainense* is considerably smaller, less elongate, less oblique, the anterior and posterior parts are less disproportionate in size. The hinge is of rather the same character as that of *walkeri*, but in the specimens examined from both Maine and Michigan, the left anterior cardinal tooth is rather longer, and the cusps of the laterals are more abrupt, especially so in the left valve.

Size: Long 3, alt. 2.6, diam. 2.

Long 3.5, alt. 3, diam. 2.3.

Long 3.7, alt. 3.1, diam 2.2 (L. Bostwick Lake).

The original specimens had been collected at several places in Aroostook Co., Me., by Mr. Olaf O. Nylander.

Pis. costatum n. sp. (fossil).

Mussel small, somewhat oblique, strongly inflated, with three or four concentric, prominent ridges on each valve; beaks rather posterior, large, much projecting over the hinge margin, flattened on top with a sharp, prominent concentric ridge around the flattened part; outline of the valves rather oval or ovoid, with the supero-anterior slope somewhat less curved, the anterior end subangular and the posterior end subtruncate; surface with fine, irregular striæ and lines of growth between the ridges; shell rather thin; hinge rather short, stout and compact, plate moderately broad, and short, cardinal teeth well formed, the right slightly curved, thicker at the posterior end, the left anterior large, almost straight, ascending obliquely and the lamella strongly curved up, its posterior part projecting over the inferior edge of the plate; the posterior rather parallel with the anterior and extending over about two-thirds of the latter; lateral teeth close to the cardinals and the ligament, short, those of the right valve stout, pointed, the outer ones very slight, especially so the anterior, the grooves short and deep, the left laterals moderately stout, high, pointed; ligament short and strong.

Size: Long 2.5, alt. 2.1 (with the beaks), diam. 2.3 mill.

Fossil in a marl bed at Monitor, Bay Co., Michigan, in company with other Pisidia, collected and sent for examination by Mr. Bryant Walker.

This species seems to stand near *Pis. ventricosum* Pr., but its beaks are less posterior, and the outlines are rather different. It also resembles *P. scholtzii* Cless. as described and figured, with the flattened beaks. This feature, however, does not seem to be constant. In two specimens of *P. scholtzii* which I owe to the kindness of Mr. Clessin, the beaks are slightly "calyculate," but not flattened on top. Also in a few younger valves of *P. costatum*, the beaks are less flattened, and the ribs slighter.

A PROPOSED STUDY OF GONIOBASIS.

LAWRENCEBURG, IND., MAY, 1903.

EDITORS OF THE NAUTILUS:

For many years I have been under the impression that the infor-

mation that now exists and is at the command of the conchologist, in reference to the genus *Goniobasis*, both in the form of labeled collections and literature, is in such shape as to be practically useless to the average collector for the following reasons :

1st. That the local collectors and students have in their collections recorded species and varieties of species, many of which are entirely due to local surroundings, and which should not be recognized, as they now are, as distinct species. These have never been brought together in numbers sufficient to allow of a proper estimate as to their value as separate species.

2d. That the individual study of this family, in many cases without the means of comparing large numbers of so-called species and varieties, has resulted in much confusion and caused a prevalent erroneous conception of their value as species.

3d. That the great difficulty which the study of this family presents, the liability to error, and the dislike of any one to publish work which may afterwards prove to be wrong, has deterred many from putting forward their individual information, which would be of great value when used in connection with a mass of similar information from other sources.

With these facts before me, I believe that some step ought to be taken to at least do something to throw additional light on this large genus of North American mollusks.

My idea is as follows ; Take George W. Tryon's *Strepomatidæ* of North America, use his list of the *Goniobasis* as a basis, and build up a monograph of the genus on the foundation and along the lines laid down by him.

Many " species " very closely related in geographical distribution are named as such simply from a variation of color, a variation which exists in almost every known species to a greater or less degree.

With a large collection of my own, with the opportunity of examining several others of fair dimensions and containing large series ot *Goniobasis*, and with a tolerably large proportion of the existing literature at hand, I am satisfied that with the generous help of others interested in this matter I may undertake the task, hoping that some good end may be obtained. I propose to send out to all students of the subject lists of all the described species of the genus *Goniobasis*, requesting them to correct such lists to the best of their judgment and ability, and to supply me by exchange or loan with

sufficient material, and with such information as may tend to satisfactorily solve all questions that may arise. By this means I might hope to accumulate sufficiently ample and valuable information to serve for the eventual publication of an up-to-date work on the subject.

Yours truly, A. C. Billups.

PUBLICATIONS RECEIVED.

Notes on Prosobranchiata, No. I, Lotorium. — By H. Leighton Kesteven. Proc. Linn. Soc. of New South Wales, 1902, Pt. 3, pp. 443–483, pl. xvii.

This interesting paper again brings before us the old genus *Triton*, which, being pre-occupied, has long been abandoned in Mollusca, but regarding a substitute there seems to be a very diversified opinion. The author has gone thoroughly over the ground, adopting *Lotorium* Montfort, as proposed by Harris (Catl. Tertiary Moll. in Brit. Mus., Pt. 1, 1897).

Montfort's names are the earliest that can be considered (Conch. Syst., ii, 1810). *Aquillus* (type *M. cutaceus* Linn.) appears on page 579, and *Lotorium* (type *M. lotorium* Linn.) on page 583. The right to amend *Aquillus* to *Aquilus* and to discard it on grounds of uncertain etymology is questionable; still its similarity to *Aquila* makes the name less desirable than *Lotorium*, and as only a few pages intervene between the two names, it seems a small matter to discuss, still strict ruling would probably make *Aquillus* the generic name.

The author does not agree with Dr. Dall and Simpson (Moll. of Porto Rico, p. 416), who by elimination makes *Septa* Perry, 1811, the type genus of the family *Septidæ*, and recognizing three other genera, *Ranularia* and *Lampusia* Schumacher, 1817, and *Lotorium* Montf.

The author's statement that, "the whole of the species included by Tryon in *Triton* (*sensu strictu*), *Simpulium*, *Cymatium* and *Gutturnium*, form one natural genus," is apparent to any one who has made a study of all the species based solely on conchological characters.

From the figure of Perry's *Septa rubicunda*, and the habitat "New Holland" assigned, I should consider it *T. australe* Lam. and not *T. nodiferus* Lam. The apices of twenty-nine species are described and figured.—C. W. J.


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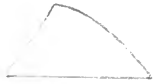
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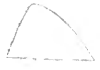
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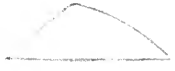
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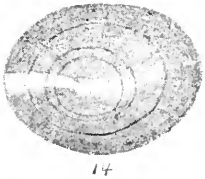
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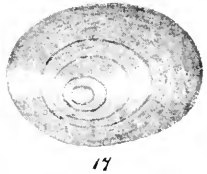
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WALKER. EASTERN AMERICAN ANCYLI.

THE NAUTILUS.

VOL. XVII. JULY, 1903. No. 3.

NOTES ON EASTERN AMERICAN ANCYLI.

BY BRYANT WALKER.

III. ANCYLUS OBSCURUS Hald. (1844). Pl. I, fig. 16–18.

I am in great doubt as to the identification of this species. Haldeman's type, a single specimen, came from the Nolachucky River, below Greenville, Tenn. It has been cited from Jamaica by Adams, from St. Thomas and Porto Rico by Shuttleworth and from Guadaloupe by Fischer. The citations of Crosse (J. de C., xl, p. 38) and of Dall and Simpson (U. S. Fish Com. Bull., i, p. 371) of this species in their catalogues of Porto Rico mollusca, are based wholly on the original citation of Shuttleworth. Both Bourguignat and Clessin question the West Indian localities and Mazé in his "Catalogue revisé des mollusques terrestres et fluviatile de la Guadaloupe," etc. (J. de C., xxxi, p. 29, 1883), states that he had neither found it there himself nor seen it in any of the local collections. More recently, Dr. W. H. Dall has quoted it from several localities in Florida (Proc. U. S. Nat. Mus., 1885, p. 273).

Haldeman compares the type with *A. rivularis* and *haldemani* and his outline figure justifies the comparison.

Clessin's description is substantially taken from Haldeman, the dimensions given being the same. But his outline figure is quite different and he has modified his description to agree with his figure, placing the apex in the last third of the length and calling it "very obtuse" instead of following the author's statement "apex but slightly projecting, rather more than one-third of the shell posterior." He

quotes no other localities than those of Haldeman, Adams, Shuttleworth and Fischer. His figure is so decidedly different from Haldeman's that it would seem to have been drawn from an actual specimen, but he does not so state. He also compares *obscurus* with *diaphanus*, saying that it differs only by its more posterior apex.

Pilsbry, in his description of *A. eugraptus* (NAUT. ix, p. 139), compares that species with both *fuscus* and *obscurus*.

These are the only references to *obscurus* that I have been able to find. The only specimens I have seen, which are at all referable to this species, are in the collection of A. A. Hinkley, from Volusia county, Florida, and are said to have been identified by Dr. Dall. There are eleven specimens in this lot, of which six are *A. peninsulæ*, the remainder are quite different and may be *obscurus*. At the time Dr. Dall's paper was published, *A. peninsulæ* had not been described and, if these specimens were identified by him, the mixture of the two forms raises a query not only as to which form he identified with *A. obscurus*, but also in regard to the identity of the specimens referred to that species from the several Floridan localities quoted in his paper. Both of the forms represented in the Hinkley lot are characteristic, wide, depressed *Lævapices* and such as would be expected from a lake country, being closely related to *A. fuscus*. As has already been stated, the only species of *Lævapex* from the region from which Haldeman's type came, that has been clearly identified, is *A. diaphanus*. With that exception, all the *Ancyli* seen from that region belong to the section *Ferrissia*. This fact, taken in connection with Haldeman's figure and his comparison of *obscurus* with *rivularis* and *haldemani*, raises a very serious doubt in my mind whether the Floridan specimens referred to have been correctly identified. It certainly seems remarkable that so acute an observer aa Haldeman should have made such a comparison, if he had before him a shell similar to those of the Hinkley lot.

I regret that I have not been able to have Haldeman's type examined critically in regard to the apical characters. When that is done, I should not be at all surprised if it proved to be a genuine *Ferrissia*. In the meantime, it seems best to describe and figure the Hinkley shell, as it may be represented in other collections under this name, leaving the question of its identity with Haldeman's species for future determination. When cleaned, the shell is a light yellowish horn-color, shining, very thin, fragile and transparent;

depressed, quite regularly oval in shape, the left side being rather more arcuate than the right; apex subacute, though not much elevated behind the middle of the shell and decidedly turned to the right; the anterior slope is nearly rectilinear, the right and left somewhat convex above, concave below and flattening out toward the periphery; the posterior slightly concave; surface with the lines of growth faint but quite regular, slightly rippled transversely or with fine radial ribs (in two of the five specimens examined, radial ribs are developed as strong as in *A. fuscus engraptus*). Length (fig. 16) 6.5, width 4.5, alt. 1.5 mm.

It will be observed that while this shell is larger and more depressed than the typical *obscurus*, the proportion of the length to the breadth is almost exactly the same. The longitudinal outline, however, is much nearer to Clessin's figure than it is Haldeman's.

The affinities of this form are with *A. fuscus*, *kirklandi* and *peninsulæ*. It is, however, more closely related to *kirklandi* than to the others and possibly may prove to be a southern development of that species. It differs, however, by its more depressed, narrower and more regularly oval shell, and the peculiar concavo-convex outline of the lateral slopes. From *fuscus*, it differs decidedly in contour by reason of the more posterior, more prominent and more excentric apex and the peculiar lateral slopes. The shape and color are so entirely different, that there is no reason to confuse the ribbed form with *A. peninsulæ*, which is found associated with it.

IV. Ancylus excentricus Morelet (1851). Pl. 1, fig. 19–21.

This species is the sole representative in the United States of a group of general distribution in the West Indies, Mexico and Central America, characterized by the prominent, rather obtuse and very excentric apex and, usually, well-developed radial ribs over the surface. The only recorded localities are Comal Creek, New Braunfels, and Barton Creek, Travis county, Texas. Specimens from the latter locality, collected by Singley, are before me and are larger than those from Comal Creek, cited by Pilsbry (Naut. iii, p. 64), and agree almost exactly with the dimensions given by Morelet, the size of the specimen figured being, length $7\frac{1}{2}$, width $4\frac{1}{2}$, alt. 2 mm. *A. excentricus* is so entirely different in shape from all other North American species that there is no possibility of confusing it with any of them. Another peculiarity of this species is the depression of the

apex. In all other North American species the apex is the point of greatest altitude, but in *excentricus*, the highest point of the shell is anterior to the apex.

There is some question as to the specific validity of this form. Bourguignat (J. de C. iv, p. 175) considered it to be only a variety of *A. radiatus* Guilding, characterized by the apex being slightly more acute. And in this, he has been followed by Clessin (Conch. Cab., Ancylus, p. 67). Crosse and Fischer (Miss. Sci. Mex., ii, p. 37) state that it differs from *radiatus* by its thinner shell, more pointed and more excentric apex and the absence of the radiating striæ, and on this account prefer to recognize it as distinct, although admitting that the two forms are very close to each other. Von Martens (Biol. Cent. Am., p. 402) also describes the shell as "without radial sculpture" and considers it distinct. Pilsbry, in his notice of the New Braunfels specimens, however, mentions slight indications of most delicate riblets radiating from the apex. All of the five specimens from Barton Creek have the radial ribs more or less developed. In most of them the ribs are stronger along the antero-lateral slopes, the median portion being nearly smooth or only slightly rippled. In one example, however, the well-developed ribs extend over the entire anterior slope.

Under these circumstances, the approximation of the Texan shells to *A. radiatus* seems very probable. Whether this is also the case with the typical form from Guatemala, must remain uncertain until authentic material can be critically studied. I have not been able to make any comparison of the Texan specimens with *radiatus*.

V. Ancylus peninsulæ Pilsbry & Johnson (1896). Pl. II, figs. 19–21.

This beautiful species, which is readily distinguished by "its large size, broadly oval and depressed form, blunt apex and the dense radial striation," is apparently peculiar to the inland waters of Florida, where it seems to be very generally and abundantly distributed. In addition to the original locality, the St. John's River, specimens have been seen from Volusia and Manatee counties and from Lake Jessup, which indicate a general range over the state. It is possible that some of the localities cited by Dall for *A. obscurus* (Proc. U. S. Nat. Museum, 1885, p. 273) belong to this species.

VI. ANCYLUS KIRKLANDI n. s. Pl. II, figs. 1–12.

Shell large for the genus, thin, translucent, horn-colored; broadly oval or obovate, sides nearly equally curved, ends broadly rounded; quite elevated; apex subacute, behind and to the right of the middle, and decidedly turned to the right; posterior and right slopes straight or slightly concave, anterior slope quite convex, left slope decidedly convex; surface with the growth lines regular and distinct and more or less rippled by transverse wrinkles, which frequently tend to form feeble, irregular radial riblets.

Fig. 1 (type): Length 8, breadth $5\frac{1}{2}$, alt. 2.5 mm.

Grand Rapids, Mich.: Length 9.25, breadth 5.5, alt. 2.5 mm.

Grand Rapids, Mich.: Length 8.25, breadth 5, alt. 2 mm.

Hardy, Arkansas: Length 6.50, breadth 5, alt. 2 mm.

Fig. 4: Length 6, breadth 4.50, alt. 2 mm.

Fig. 7: Length 5.75, breadth 4, alt. 2 mm.

Fig. 10: Length 5.25, breadth 3.25, height 2 mm.

This fine large species is a well-defined one and has wide range, extending from Trenton, N. J., west to Hardy, Ark. The specimens from the last locality were cited as *A. haldemani* by Pilsbry (Proc. P. A. N. S., 1900, p. 457), and, from this identification, that species was placed among those with smooth apices in the NAUT. xvi, p. 88. A recent examination by Dr. Pilsbry of the type of *A. haldemani* has shown that that species has a striate apex and, therefore, does not belong in *Lævapex* at all. *A. kirklandi* is distinguished by its large size, decidedly elevated shape and its prominent, subacute apex, which is decidedly turned to the right. There is some considerable variation in shape, as shown by the above measurements, some examples being more elongated with nearly parallel sides. There is also considerable difference in height. But in all cases the subacute, prominent apex and the convex, left slope are characteristic, and always distinguish it from *fuscus*, in which the apex, even in the more elevated examples, is always bluntly rounded and the left slope scarcely convex.

Kirklandi is more nearly related to the Florida shell herein referred to as *obscurus* than to any other species, but differs by its broader form, greater elevation, more acute and more eccentric apex and greater convexity of the left lateral slope.

The finest specimens of *kirklandi* come from Grand River, Kent county, Mich., where they have been collected in great abundance

by Dr. R. J. Kirkland, after whom the species is named. The Arkansas specimens collected by Ferriss are nearly as large. Toward the east the species seems to diminish rapidly and uniformly in size to an extent which would almost justify their recognition as a varietal race. Ohio specimens (fig. 4), collected in considerable numbers by Dr. V. Sterki, are uniformly smaller than the type, while those from Roaches Run, opposite Washington, D. C., and the Potomac River at Alexandria, Va. (figs. 7–10), are still smaller than those from Ohio. A single example in the collection of the Phil. Academy from Trenton, N. J., is similar to these, but slightly larger. Were it not for the intermediate character of the Ohio shells, these specimens would probably be considered a distinct species, characterized by their small size, proportionately higher and narrower shell and more convex anterior slope. But as shown by the figures, the larger and wider Virginian shells grade indistinguishably into the Ohio form, as that does into the immature specimens of the still larger typical form. That this difference in size is a local peculiarity is shown by the fact that in the considerable amount of material collected by Dr. Sterki, both in Ohio (several localities) and in the Potomac and its tributary, Roaches Run, near Washington, not a single specimen was obtained which by its greater size would seem to indicate that the balance of the specimens obtained were immature shells. There are also several trays in the Academy's collection from "Washington" similar to those collected by Dr. Sterki. From Michigan and several other western localities, occasional small and medium sized, high, narrow specimens have been noticed which, though larger, seem indistinguishable from the corresponding eastern form (fig. 10). But these do not seem to be persistent varieties in any one locality, being usually associated with the usual form of *kirklandi;* but rather sporadic individuals which for some reason have failed to develop normally. It is the occurrence of such specimens, together with the inability to find any marked specific character in the eastern forms, except the difference in size, that has caused me to refrain from giving them varietal rank until additional material shall give a better opportunity to pass upon the exact relations to these various forms.

Plate II.

Figs. 1–3. *A. kirklandi* Walker (type), Grand River, Kent Co., Mich.

Figs. 4–6. *A. kirklandi* (var.), Tuscawaras R., New Philadelphia, Ohio.

Figs. 7–9. *A. kirklandi* (var.), Roaches Run, opp. Washington, D. C.

Figs. 10–12. *A. kirklandi* (var.), Roaches Run, opp. Washington, D. C.

Figs. 13–15. *A. diaphanus* Hald., Ohio R., Edgeworth, Pa.

Figs. 16–18. *A. diaphanus* Hald., Ohio R., Edgeworth, Pa.

Figs. 19–21. *A. peninsulæ* P. & J., Volusia Co., Fla.

DESCRIPTIONS OF NEW JAPANESE LAND SHELLS.

BY H. A. PILSBRY AND Y. HIRASE.

Japonia sadoensis n. sp.

Shell umbilicate, conic, dull dark brown; sculpture of very delicate, thread-like oblique striæ, widely and irregularly spaced, and numerous regularly spaced spiral cuticular threads, which bear rather long hairs, very easily rubbed off, being preserved only on the latter part of the last whorl in some specimens, wholly lost in others. Whorls $4\frac{1}{2}$, very convex, the last tubular. Aperture oblique, circular, the peristome thin, continuous, in contact with the preceding whorl for a very short distance above; columellar margin slightly expanded. Alt. 4, diam. 4.7 mm.

Niibo-mura, Sado. Types no. 84768 A. N. S. P.

This species is clearly distinct from *J. barbata* and *citharella* Gld., described from Oshima in the Riukiu group, and *J. musiva* Gld., of unknown locality. Dr. von Möllendorff has recognized Gould's *J. barbata* in specimens collected by Mr. F. W. Eastlake in the Hakone mountains (Journ. Asiat. Soc. Beng. liv, 1885, p. 67); this gives another Japanese locality for the genus, but in view of the geographic separation, I think that the Hakone form will prove different from that described by Gould from Oshima.

Chloritis tosanus n. sp.

Shell umbilicate, slightly convex above, convex beneath, very thin, fragile and chestnut-brown; densely sculptured with very short, darker, curved hairs, arranged in oblique lines as usual, but a little

irregular in some places. Whorls $4\frac{1}{2}$, very convex, separated by a deep suture, the last whorl large, rounded at the periphery and beneath. Aperture broadly lunate, slightly oblique. Peristome thin and unexpanded, suddenly dilated and recurved at the axial insertion, half covering the umbilicus. Alt. 10, diam. 17 mm.

Shiujo-mura, Tosa. Type no. 84415 A. N. S. P., from no. 1015 of Mr. Hirase's collection.

It is similar to *C. perpunctatus*, but nearly twice the size. In *C. fragilis* the hairs stand about twice as far apart as in this species, which is the first *Chloritis* from Shikoku Island.

Kaliella xenica n. sp.

Shell minutely perforate, pyramidal, much higher than wide, the spire with nearly straight lateral outlines and very obtuse apex; thin, yellowish, faintly and finely striate. Whorls $6\frac{3}{4}$, slightly convex, the last obtusely angular at the periphery, convex beneath. Aperture broadly lunate, the peristome thin, columellar margin reflexed. Alt. 3.7, diam. 2.7 mm.

Shukunegimura, Sado. Type no. 84762 A. N. S. P., from no. 1041 of Mr. Hirase's collection.

This species resembles *K. præalta* in general shape, but its outlines are noticeably more convex, the apex is more obtuse, and there are fewer whorls. (Xenikos, strange.)

A PROPOSED STUDY OF GONIOBASIS.

BY A. A. HINKLEY.

The article in the June NAUTILUS, under the above heading, by Mr. A. C. Billups, was read with interest. It is time something should be done to bring this interesting group of shells out of the present chaotic condition. The work will be difficult, owing to more or less variations in all the species and the wide geographical distribution of some, together with the meager description often given and sometimes drawn from only two or three specimens; added to this, some of the types are inaccessible or lost.

There are twenty-four species of *Goniobasis* listed in G. W. Tryon's monograph on *Strepomatidæ* as being found north of the Ohio River or in that stream, viz.:

G. intersita Hald.
G. suturalis Hald.
G. costifera Hald.
G. cubicoides Anth.
G. spartenburgensis Lea.
G. iota Anth.[1]
G. tecta Anth.
G. gibbosa Lea.[2]
G. depygis Say.
G. livescens Menke.
G. milesii Lea.
G. lithasioides Lea.
G. infantula Lea.
G. louisvillensis Lea.[3]
G. pulchella Anth.
G. gracilior Anth.
G. translucens Anth.
G. interlineata Anth.
G. ohioensis Lea.
G. brevispira Anth.
G. semicarinata Say.
G. haldemani Tryon.
G. informis Lea.[4]
G. virginica Gmel.

The specific value of some of the above is doubtful, and to settle points in question will require large series of specimens, preferably from the localities where the types were found. I would suggest that any one who can do so, collect such a series, including all stages of growth, make a note of the situation where found, and send the same to Mr. Billups, if he decides to go ahead with the work.

I am sure some new species will be found, but I hope no specimens will be described as new until their validity is well established.

If the different groups of the *Strepomatidæ* could be studied as thoroughly as *Io* has been by Mr. Chas. C. Adams, a large share of the doubtful species could be eliminated. There are other species which show nearly as great a variation as the *Io;* for instance, *Pleurocera canaliculatum* Say has a wide variation in form and varies from a smooth surface to one with two well-developed grooves on the body-whorl. *Angitrema armigera* Say is also quite variable in both form and tubercles, some specimens having a row of double tubercles on the periphery of the body whorl. I am strongly of the opinion that the specimens described by Dr. Lea as *Meseschiza grosvenorii* were young *Ang. armigera* Say; his description and figure fits many of the young of that species, excepting for the notch, which is probably abnormal, as Tryon held. *Angitrema duttoniana* Lea and *Lithasia downiei* Lea may only be variations of *Ang. armigera* Say; specimens I have collected in Tennessee seem to indicate it.

[1] Ohio? see Amer. Jour. of Conchology.

[2] Described from two specimens and said to be a "remarkable species."

[3] Described from two imperfect specimens.

[4] Described from two specimens.

I would like to see an interest taken in this neglected group of mollusca.

DESCRIPTIONS OF NEW SPECIES OF ACHATINELLIDÆ FROM THE HAWAIIAN ISLANDS.

BY D. D. BALDWIN.

Amastra henshawi n. sp.

Shell dextral, imperforate or subperforate, solid, ovately conical, apex subacute; surface lusterless, striated with somewhat irregular lines of growth; embryonic whorls under a lens showing very delicate radiating sulcations. Color varies from light to very dark brown, the upper whorls generally much darker than the body whorl; the lower whorls with traces of a deciduous, brown epidermis. Whorls 6, somewhat convex, the last one with a light carination at the periphery; suture well impressed. Aperture ovate, a little oblique, livid white within; peristome acute, slightly thickened within, extremities united with a thin, livid-white parietal callosity; columella white, flexuous, abruptly terminating in a thin lamellar plait.

Length 18, diam. 10 mm.

Habitat: South Kona, Island of Hawaii.

Found in damp woods at the roots of ferns and nearly buried in trash, at altitudes of from 1,800 to 4,000 feet.

We take pleasure in dedicating this shell to Prof. H. W. Henshaw, formerly of the Smithsonian Institution, Washington, D. C. He discovered both this and the following species. The Professor is at present a resident of Hilo, Island of Hawaii, and his explorations are contributing largely to our knowledge of the land fauna of this island.

Amastra saxicola n. sp.

Shell dextral, imperforate, rather solid, elongately ovate-conic, apex subacute; surface lustreless, sculptured with delicate growth lines; embryonic whorls smooth and polished. Color reddish-brown, tending to lighter shade on the middle whorls; apex pearly white; destitute of the usual fugacious epidermis of this genus. Whorls 7, slightly convex; suture well impressed. Aperture ovate, a little oblique, pinkish within. Peristome simple, acute, not thickened within, extremities joined by a very thin, pinkish parietal callosity;

columella white, flexuous, terminating in a moderately-developed lamellar plait.

Length $20\frac{1}{3}$, diam. 10 mm.

Habitat: Kau, Island of Hawaii.

This shell seems to live among and under rocks to an unusual degree. It is found on old lava flows attached to the under side of rocks, or in loose soil and trash at the base of bunch grass growing on lava flows. The locality is very arid.

Amastra senilis n. sp.

Shell fossil, dextral, deeply perforated, the perforation penetrating to the apex; moderately solid, globose with a short conical spire, apex acute; surface sculptured with coarse, irregular growth lines, with a few irregular cross striæ or ridges on the three lower whorls; embryonic whorls under a lens exhibiting delicate and regular sulcations. Color of the living shell unknown. Whorls 7, convex. Aperture sinuately oval, a little oblique; peristome simple, acute, not thickened within, extremities joined by a thick parietal callosity; columella terminating in a slight, flexuous fold.

Length 23, diam. 18 mm.

Habitat: Hamakua, Island of Hawaii.

This and the following species were discovered and sent to me by Mr. Eugene Horner, of Paauila, Hawaii. They were found at a place called Palihoukapapa on the Hamakua slope of Maunakea, at an elevation of 4,000 feet. The shells were imbedded in the earth about one foot below the surface.

Prof. Henshaw reports other similar localities on the island of Hawaii where there are extensive deposits of fossilized land shells about a foot below the surface of humus. Nearly all the known genera of Hawaiian land shells are represented in these deposits by species, some still extant, others probably now extinct. The deposit of earth above the fossilized shells indicates several hundred years antiquity.

Amastra fossilis n. sp.

Shell fossil, dextral, minutely perforated, somewhat solid; elongately conical, apex rather acute; surface striated with somewhat irregular growth lines; embryonic whorls under a lens exhibiting very delicate and regular sulcations. Color of living shell unknown.

Whorls 7, slightly convex. Aperture oblique, ovate; peristome simple, very thin, columellar margin slightly expanded over the umbilicus; columella terminating in a flexuous thread-like plait.

Length 18, diam. 9 mm.

Habitat: Hamakua, Island of Hawaii.

This shell in shape resembles some of the forms of *Amastra turritella* Fer., which is found on the island of Oahu.

NOTES AND NEWS.

We have lately learned, through Mr. Charles Hedley, of the death of two New Caledonian conchologists—Richard Rossiter, on January 16, 1903, aged 62 years, and Julien Bernier, March 3d, at the age of 55 years. Both died at Noumea. Rossiter formed a large collection of shells, and supplied the types of many new forms to the editors of the *Journal de Conchyliologie*, to John Brazier, of Sydney, N. S. W., his brother-in-law, and to Dr. W. D. Hartman, of West Chester, Pa. His collection will probably be acquired by the Colonial Museum at Noumea. Julien Bernier was Clerk to the local Parliament of New Caledonia, and founded the "Musée Colonial" at Noumea. Some of his material has been described in the Journal de Conch. and elsewhere. *Placostylus bernieri* Hartman, and various other species discovered by him, preserve his memory.

A New Pleurotomaria.—Mr. Y. Hirase, of Kyoto, Japan, has recently discovered a new species of *Pleurotomaria*, related to *P. beyrichi*, from which it differs in having much more numerous, distinctly beaded spiral cords. In shape and color it resembles *P. beyrichi*. The new form will be described under the name *Pleurotomaria hirasei*.—H. A. Pilsbry.

Ashmunella Thomsoniana Cooperæ.—I have just found this form living in abundance at Pecos, New Mexico. The greatest diameter of five specimens measured is 16, 15, 15, 15, 15½ mm., thus averaging larger than the original specimens. The basal tooth is single, with at most a faint indication of doubling.—T. D. A. Cockerell.

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TWO NEW MOLLUSKS FROM THE WEST COAST OF AMERICA.

BY WILLIAM HEALEY DALL.

The National Museum has received through the kindness of Mr. J. S. Arnheim, of San Francisco, several interesting shells collected by Capt. William Noyes, of San Francisco, of which two appear to be undescribed.

Sigaretus noyesii n. sp.

Shell depressed, mottled purplish brown above, pale or nearly white below, pale purplish with two obscure revolving brown bands internally, nucleus minute, two-whorled, translucent, subsequent whorls two, rapidly enlarging; surface with obvious incremental lines, and faint, very fine, partially obsolete, spiral striation; covered with a yellowish silky periostracum; suture distinct but not impressed; axis rather widely pervious, body with a slight, transparent coat of callus; pillar lip hardly thickened or reflected, general form gibbous; alt. 10, major diam. 36, minor diam. 26 mm.

Gorgona Islands, Colombia, in the Gulf of Panama.

This species is a West American analogue of *S. maculatus* Say, of the east coast, which is more solid, more convex, with much more conspicuous spiral sculpture, and has the coil of the whorls impervious or nearly so.

Tonicia arnheimi n. sp.

Shell small, back rather rounded, girdle narrow, naked, yellow brown; color pale pink with pale brown dotting, two white lines en-

closing a dark brown streak on the dorsal keel of the intermediate valves; eye spots with a metallic silvery lustre; anterior valve with seven, posterior with eight notches, the teeth radially striate; intermediate valves with one lateral notch on each side; interior coloration pinkish white with a magenta axial streak; sculpture much like that of *T. crenulata* Sowerby, but central areas with much sparser riblets and no defined central smooth area, the sutural crenulations stronger and forming a wider band, the pleural rugæ mostly fore and aft in direction, the second valve larger than the rest and with a more conspicuous mesial smooth area. Interior with sinus square not denticulate. Anterior and posterior plates with obscurely radial pustules and very numerous eyes. Length 15, lat. 7, height 4 mm. in the dried animal.

Noyes Cove, Narborough Island, Galapagos Group, in 20 fathoms; Capt. Noyes.

This species is clearly of the group of *T. crenulatus* but is separated by sufficiently distinct characters. The brilliancy of the eye spots, each situated in a deep, minute pit, is very remarkable. There are on this small creature nearly 1000 of them.

PLEISTOCENE MOLLUSKS OF WHITE POND, NEW JERSEY.

BY FRANK C. BAKER.

The Chicago Academy has recently received from Dr. Stuart Weller, Paleontologist of the University of Chicago, a collection of Pleistocene mollusks from the marl beds of White Pond, near Marksboro, New Jersey. The material consists of about a quart of mixed shells, which, when studied quantitatively, gave some interesting results. *Valvata* and *Amnicola* made up ninety-five per cent. of the entire lot, the former being forty-five and the latter fifty per cent. Of the remainder, *Planorbis bicarinatus* made up two per cent., *Planorbis campanulatus* one per cent., and the rest of the species the other two per cent. *Aplexa* was the rarest, there being but two specimens in the entire lot.

I am indebted to Mr. Bryant Walker for assistance in determining some of the material. The list of species is as follows:

Pisidium compressum Prime. Normal.

Amnicola limosa Say. Very variable and abundantly represented.

Amnicola galbana Haldeman. This characteristic fossil is very abundant in the White Pond formation. It shows some variation in the height of the spire, but seems to be easily separated from *A. limosa*. Several monstrosities of galbana were found in this collection; two were scalariform and the others (6) had the spire variously contorted, like the forms of *Planorbis complanatus* figured by European conchologists. One specimen had the spire almost concealed by the gibbous last whorl. Monstrosities seem to be rare, as only eight were found in a lot of over two thousand specimens.

Valvata tricarinata Say, var. *confusa* Walker. This is nearly as abundant as the *Amnicolas*. Only a small percentage of the specimens were typical *confusa* with two well-defined keels, the majority having the basal keel strongly developed, the upper part of the whorl being rounded. In some specimens the two keels are so strong that they form elevated ridges.

Physa ancillaria Say. Not uncommon.

Aplexa hypnorum Linne. Two specimens of a small Aplexa which seems referable to *hypnorum* are in the collection.

Planorbis campanulatus Say. Typical, but not abundant.

Planorbis bicarinatus Say. Many specimens of this species show a tendency to form spiral lines, similar to those on var. *striatus* Baker.

Planorbis deflectus Say. Common and typical.

Planorbis exacutus Say. But one specimen of this species was found.

Limnæa galbana Say. Not common.

Limnæa humilis Say. Not common.

Succinea retusa Lea. Not common.

ON CATALOGUING A COLLECTION OF SHELLS.

BY MRS. M. BURTON WILLIAMSON.

When I began to catalogue my shells I used a ledger blank book, but in time the book looked untidy, as the space was not sufficient for the addition of species new to the collection that from time to time

were added to it. Then I copied the whole list, leaving space for the introduction of species not listed. But in some cases the blank spaces were not needed while more space was required for families and genera not represented in the book. Again I copied the entire catalogue, excepting the west coast species which I listed on cards to form a card catalogue. In time this second book began to look far from neat, so I tried a new plan. I used "Ward's Catalogue of the Mollusca," marking with a small mark such species as I had, and inserted blanks between the printed leaves for species that were not found in the price list; but this made the pamphlet rather bulky and also necessitated my looking over two lists, the printed one and the written one, in order to find if I had certain species. The plan was satisfactory at first, then I thought out a better one which I will give you.

I used a patent cover for blank leaves such as students use for laboratory notes, examination papers, etc., in colleges and schools. I bought paper the proper size for the cover, about eight by ten inches. This paper had holes stamped out at the right place for the metal clasps to be inserted. I use ruled paper, as names and localities are quickly seen on the same line, but this is a matter of taste, as dots can mark the space between names of shells and their localities.

The classification is a matter of choice. I use the same as that found in "Tryon's Structural and Systematic Conchology" for marine shells, excepting the west coast shells, for which I use another classification. My reason for using Tryon's is, if I get a shell from a family new to me I know where to list it immediately by referring to the Systematic Conchology, for by constantly studying and referring to this work I have become tolerably conversant with the classification.

I wrote only on one side of the paper when making out this new list, and paged only this side. This left a blank opposite each page to be used if the page became full. This blank page I numbered alphabetically to correspond with the numbered page. For example, if I required the blank leaf opposite page 5, I numbered it 5^a, and if I found it necessary to add new leaves at this place they would be paged 5^b, 5^c, 5^d, etc. on the left page, on the right 5^1, 5^2, 5^3, etc. The possibility of adding new leaves, one after another, or of taking out and rewriting the leaves is the strong feature in favor of using these covers. The use of the alphabet, or as much of it as is needed

in conjunction with the figures, makes repaging from time to time unnecessary when the book is enlarged.

At the front of this catalogue I have an index of genera arranged alphabetically. By indexing according to genera much space is saved and it does not take much time to refer to the page for species if one does not remember just where the species may be found in the classification.

For the use of beginners I will tell how I list specimens on a page. After leaving space at the left hand of each page for the binding of the leaves with the metal clasps, I write the name of the shell, by whom named and the locality all upon one line, keeping the locality of each species at the extreme right hand of the page. At the left hand I write the initials or some letter to indicate from what source the shell or shells were received, also the number of specimens. Above the name of the genera and species I write the name of the family in large letters. I use red ink for this, as the family name is more prominent in this way. As noted before, if the space for the specific name becomes too crowded I write upon the opposite page the name of the specimen I desire to list, indicating this upon the page where the others are listed. As they are listed specifically according to the alphabet the place assigned to it upon the blank page is the same as upon the page that is filled.

For West Coast shells, as before mentioned, I use cards. When a new specimen is listed upon a new card it is placed with the names of the rest of the genus. Any data desired are written upon each card. I got my cards cut and a hole punctured in each one by the thousand.* All cards for the specific name are the same size, those for the families and genera have an offset at the top. That is, a raised margin was left at the top of each card, these were raised sometimes at one end sometimes at the other end, and others had the margin in the center. When genera are listed upon a few cards the raised margins would hide each other if they were not placed at a little distance from each other, but if one generic name is at the extreme right hand of the row of cards in the box or drawer, another in the middle, still another at the extreme left hand, these generic names are readily detected by the eye, whereas if they followed one another all in a row some would be hidden from sight.

* It is best to use the cards of the Library Bureau, as they are of uniform size and quality.

NEW NORTH AMERICAN PISIDIA.

BY V. STERKI.

Pisidium ashmuni n. sp.

Mussel somewhat elongate, moderately inequipartite, scarcely oblique, moderately inflated; superior and inferior margins moderately curved, supero-anterior slope curved down to the rounded anterior end situated well below the median line; posterior end subtruncate, with more or less of an angle at the scutum; beaks somewhat posterior, rather broad, rounded, moderately elevated over the hinge margin; surface shining, with microscopic, shallow, rather regular, crowded striae, and one or a few impressed lines of growth; color pale horn, shell translucent, thin; hinge slight, plate narrow; cardinal teeth rather long, fine, lamellar, the right curved with its anterior end much shorter and situated much higher up on the plate than the posterior which is somewhat thickened; left anterior of the same shape as the right, rather hook-like at its anterior end, the posterior oblique, slightly curved and passing over about two-thirds of the anterior; lateral teeth rather long, produced far beyond the pointed cusps; outer laterals of the right valve slight but distinct; ligament rather slight.

Size: Long. 2.8, alt. 2.3, diam. 1.6 mill.
Long. 2.3, alt. 1.9, diam. 1.4 mill.

Most specimens are intermediate.

Habitat: San Rafaels, New Mexico, collected by Rev. E. H. Ashmun, in whose honor the species has been named.

Pis. ashmuni ranges under the *abditum* group. It is easily recognized, being of about the same size with *Pis. splendidulum* St. It is more elongate and its beaks are broader.

Pisidium danielsi n. sp.

Mussel slightly inequipartite, moderately and regularly inflated, outlines nearly short oval; all margins well curved, or the posterior subtruncate, anterior end rounded, rather below the median line; angles at the scutum and scutellum not marked in most specimens, slightly so in some; umbones little posterior, low, slightly projecting over the hinge margin, moderately broad, each with a depression below the apex and above a slightly raised, concentric ridge; surface with somewhat coarse, subregular and sharp striæ, and a few coarser

lines of growth, rather dull and microscopically rugulose; color grayish white to yellowish horn, in some specimens slightly plumbeous around the beaks; shell moderately thick, nacre white, muscle insertions distinct but not impressed; hinge rather stout, plate rather broad; right cardinal tooth strongly curved over a deep excavation, its posterior part thickened and grooved to bifid, the left anterior strongly curved and rather massive, placed rather high up on the plate, the posterior oblique, curved, its anterior part reaching to or over the middle of the anterior; lateral teeth stout, the cusps rather short, the outer ones in the right valve rather small but well formed; ligament strong.

Size: Long. 4.5, alt. 3.9, diam. 2.6 mill.

Habitat: Marsh from a spring on Lake James, Steuben Co., Indiana, numerous specimens collected by Mr. L. E. Daniels, of the Indiana Geological Survey, in whose honor the species is named. During the season of 1902 Mr. Daniels has collected many and interesting Pisidia and Sphæria, especially in northern Indiana, a section from which very little had been known.

The present species has some resemblance with—typical—*Pis. strengii*, but in the latter species the outlines are more angular, the beaks narrower and more prominent and rounded, the striation is finer, and the hinge slighter. *Pis. danielsi* is of special interest. From the features of the surface, the beaks and the hinge, there is no doubt but that it ranges under the same group with *P. compressum*, *kirklandi*, *cruciatum*, *fallax*, etc., although the rounded outlines, the low beaks, and the moderate and regular convexity would suggest rather the contrary at first sight. Young specimens, however, have an unmistakable similarity of the outlines with those of *Pis. compressum* Pr. In some of the specimens the beaks are broader, and the depression and ridge are less marked or almost obsolete, just as it is with certain forms of *Pis. compressum*.

Pisidium obtusale C. Pfr.

At the same place as the preceding Mr. Daniels has collected numerous specimens which are distinct from all North American species described, but exactly like *Pis. obtusale* from several places of Europe, and appear to be identical with that species. They are rather large and almost globular; long. 3.6, alt. 3.1, diam. 2.6 mill. It is to be expected that the same will be found also at other places.

NOTICES OF NEW JAPANESE LAND SHELLS.

BY H. A. PILSBRY AND Y. HIRASE.

Eulota (*Euhadra*) *euterpe* n. sp.

Shell umbilicate, depressed, the upper surface low-conic, lower surface convex. Last 1½ whorls *white under a thin yellow cuticle*, which is in part worn off in the type specimen; the *periphery marked with a narrow dark chestnut band*, the edge of which appears above the suture of the penultimate and last whorls; the inside of the umbilicus of the same dark color; *inner whorls red-brown*, the apex whitish. Surface rather glossy, rather closely plicate-striate above, somewhat smoother below the periphery. Whorls 6, slightly convex, regularly and slowly increasing, the last scarcely descending in front, *distinctly angular at the periphery*, the angle almost disappearing just below the lip. Aperture oblique, lunate, white and showing the brown band within, peristome *reddish-brown*, a little thickened within, the upper margin slightly expanded, the outer and basal margins reflexed, columellar margin dilated. Alt. 24, greater diam. 39, lesser 34.5 mm.

Prov. Kunchan, Riukiu. Type no. 1078 of Mr. Hirase's collection.

This very handsome *Euhadra* belongs to the group of *E. mercatoria*. It is similar to that species in the umbilicus and shape of the peristome, and the slow, regular increase of the whorls; but it differs from *mercatoria* in the depression of the whole shell, the more angular periphery, the finer and closer sculpture, and in coloration. Only one specimen has been received.

Eulota (*Plectotropis*) *marginata* n. sp.

Shell broadly and openly umbilicate, convexly low-conic above, convex beneath, solid and strong; light brown, surface lustreless, sculptured with irregular growth-wrinkles only. Whorls 7, but slightly convex, slowly and regularly increasing, separated by a slightly impressed suture which is distinctly margined above. Last whorl slightly descending in front, acutely carinate at the periphery, the keel *narrowly impressed on both sides;* base convex, not angular around the umbilicus, but very suddenly curving into it. Aperture oblique, nearly as high as wide; the peristome slightly thickened

within, white, noticeably grooved at the position of the keel, below which it is more thickened, expanded and narrowly reflexed. Alt. 14, diam. 27, width of umbilicus 6.5 mm.; width of aperture 11, oblique alt. 10.5 mm.

Kunchan, the northern province of Riukiu Island. Type no. 84924 A. N. S. P., from no. 1080 of Mr. Hirase's collection.

A large, solid species, with the keel margined on both sides, and projecting a trifle at the suture.

Eulota (*Aegista*) *friedeliana* var. *peraperta* n. v.

Differs from *friedeliana* from Nagasaki, the type locality, in the more widely open umbilicus and the noticeably smaller aperture in shells of the same size. Alt. 9, diam. 17 mm.; width of umbilicus 5.5 mm.

Isshochi, Higo. Type no. 84925 A. N. S. P., from no. 343a of Mr. Hirase's collection.

Eulota (*Plectotropis*) *conomphala* n. sp.

Shell umbilicate, depressed, low-conic above and below the acute peripheral keel. Thin, light brown, nearly lustreless, slightly striated with growth lines, and showing very fine, close, rather indistinct spiral lines under a lens, obsolete in places. On the upper surface there are sparse, short cuticular processes, easily rubbed off. Whorls $6\frac{1}{2}$, slowly widening, nearly flat, the keel of the last whorl bearing a fringe of cuticular filaments, triangular at their bases. Base angular around the deep, conic umbilicus. Last whorl very little descending in front. Aperture oblique, the upper margin of the peristome simple, basal margin thin, very narrowly reflexed; columellar margin dilated above. Alt. 9.5, diam. 19.5 mm.

Yakujima, Osumi. Type no. 84926 A. N. S. P., from no. 905a of Mr. Hirase's collection.

A very distinct, thin species, noticeably bi-conic in shape, and angular around the regularly conic umbilicus. It is an interesting addition to the fauna of Yakujima.

Hirasea planulata n. sp.

Shell imperforate, discoidal with rounded periphery and level upper surface. Yellowish brown, dull and very densely, very finely radially striate above, becoming smooth and glossy beneath. Spire

almost level, but the inner whorls are very slightly sunken. Whorls $5\frac{1}{2}$ to $5\frac{3}{4}$, convex, slowly widening, the last falling a little to the aperture and noticeably contracted at the lip; the base impressed in the middle as usual. Aperture nearly vertical, narrowly crescentic, the lip thickened within by a strong white rib. Alt. 1.8, diam. 3.5 mm., or a little smaller, alt. 1.4, diam. 3.2 mm.

Hahajima, Ogasawara. Type no. 82976 A. N. S. P., from 849b of Mr. Hirase's collection.

This was formerly thought to be a small form of *H. biconcava*, but the study of additional specimens of both show *H. planulata* to be constantly smaller, with a nearly level spire, while in *biconcava* the spire is conspicuously sunken.

Kaliella incensa n. sp.

Shell almost imperforate, depressed, the spire very low, conic, the base convex, periphery rounded in fully mature shells; thin, yellow, translucent and smoothish, under a strong lens seen to be minutely and closely striate obliquely above, the striæ decussate on the earlier whorls, the base smooth.

Whorls $3\frac{3}{4}$, but slightly convex, the last nearly double the width of the preceding. Aperture slightly oblique, lunate, the peristome thin, columellar margin suddenly dilated and reflexed near the axial insertion. Alt. 1.6, diam. 2.8 mm.

Hakusan, Kaga. Types no. 84788 A. N. S. P., from no. 973*a* of Mr. Hirase's collection.

A small species with few rather wide whorls, the last one rapidly widening. The columellar lip is more oblique than usual. It might be placed in *Microcystina*, but it has the sculpture of *Kaliella*. (*Incensus*, unrecorded.)

Kaliella harimensis var. *sadoensis* n. var.

This variety is somewhat larger than *K. harimensis*. It also resembles *K. okiana*, but the columellar margin is less widely dilated. It is from Shukunegimura, Sado; types no. 84764 A. N. S. P., from no. 1034 of Mr. Hirase's collection.

GEORGE T. MARSTON.

We regret to announce the death of our friend and correspondent, George Terence Marston. He was born in Chicago, Jan. 31, 1867. When he was five years of age his father died and his widowed mother moved to De Pere, Wisconsin. He attended the public schools and graduated from the high school at the age of fourteen years. He immediately found employment in a bank at De Pere, but was soon called to a position of higher responsibility in a bank at Green Bay. Here his ambition and tempermental intensity of nature led him to overwork, and after a few years he resigned his position and sought to regain his health by a vacation at the seaside.

He came to Quincy in 1891 and was employed in the bank of the State Savings Loan and Trust Company. His clear mind, industry, mastery of the principles of business and a rare talent for the accurate and systematic management of details, made him a valued and trusted man.

Though compelled to devote himself to business, his special delight was in scientific studies, especially conchology. He had collected and had in his cabinet specimens of nearly every species found in Wisconsin, and cherished a hope of some day being able to have the time to prepare a work on the mollusks of that State.

His last work was in photographing the embryological development of the snail, with some very good results. Among his contributions to the NAUTILUS was an article on the occurrence of *Helicina occulta* Say, in Brown county, Wis.

He was married to Helen E. Collins, daughter of W. H. Collins, Oct. 3, 1898, who with two children survives him.

GENERAL NOTES.

REVIEW OF THE CLASSIFICATION OF THE CYRENACEA. By William H. Dall. Proc. Biol. Soc., Wash., vol. xvi, pp. 5–8, 1903.

In working over the *Cyrenacea* for the Memoir on the Tertiary Fossils of Florida, Dr. Dall found the nomenclature and classification of this super-family in much confusion, and while the details are

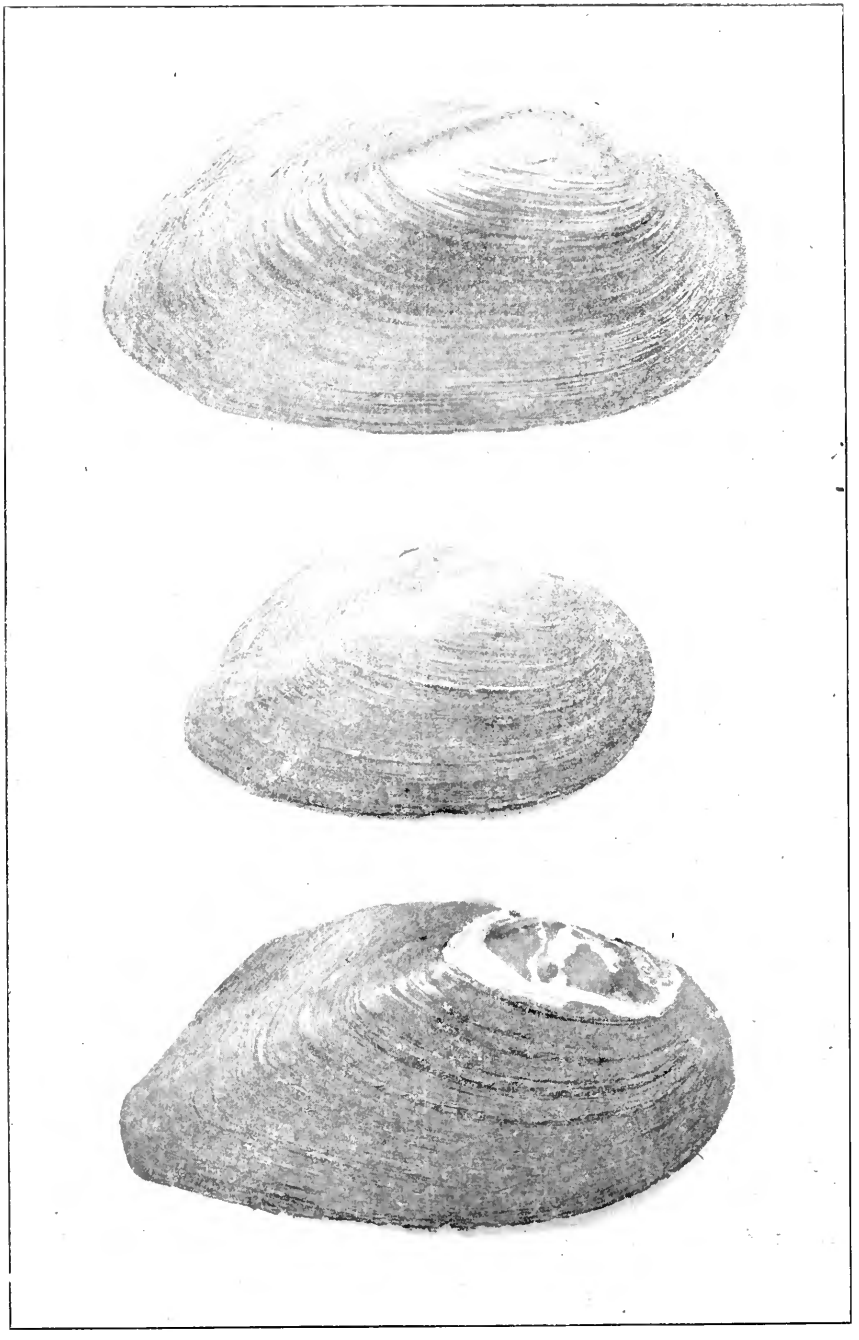
reserved for the memoir a synopsis of the arrangement adopted has been given in this pamphlet, which deals with the families of *Cyrenidæ* and *Sphæriidæ*.

In the *Cyrenidæ* twenty-three proposed genera, subgenera and sections are listed and type specimens with synonyms are given; to these Dr. Dall has added one new genus and four new sections. Of the genus *Donacopsis* Sandberger, 1872, he says: "I suspect this to be merely a subdivision of *Cyrena*."

Of the family *Sphæriidæ* fourteen genera, subgenera and sections are listed with type specimens. Section *Cyclocalyx*, subgenus *Cymatocyclas*, and subgenus *Tropidocyclas* are new. The three types are *Pisidium scholtzii* Clessin, *P. compressum* Prime, and *P. henslowianum* Sheppard.

"*Pera* Leach, and *Euglesa* Leach, 1852, are synonymous with *Corneocyclas* s. s.," and *Galileja* Costa; *Euglesia* Leach, 1840; *Pisum* Gray, 1847, not Megerele, 1811; *Cordula* Leach; *Fluminina* Clessin; *Cycladina* Clessin, and *Rivulina* Clessin, are, according to Dr. Dall, not separable from *Pisidium* s. s.—Mrs. M. Burton Williamson.

Land Shells of Curacao.—In Mr. Smith's useful review of the land shells of this island (Proc. Malac. Soc., London iii, 113) several species seem to have been overlooked: *Cionella gloynii* and *Succinea gyrata*, both described by Gibbons in the Journal of Conchology II, pp. 135, 136, plate I, *Stenogyra octonoides*, *Pupa fallax*, and *Drymæus multilineatus* noticed on p. 136; also Man. Conch. XIII, p. 29. Perhaps *Cionella gloynii* belongs to Mr. Smith's group *Neosubulina*. Another species, "*Macroceramus inermis* Gundl.," is also reported. The dentition of some of these specimens has been examined by Binney, and proves to be like that of *M. gossei*, so that the Curaçao shell is a member of the genus *Microceramus*. It is no doubt distinct from the East Cuban *Mac. inermis*, and may be related to or identical with *Pineria bonairensis* Smith. The latter is probably a *Microceramus*, but I have not seen specimens. Mr. Gibbons' note adds six species to the fauna of Curaçao, raising the total number now known to twelve.—H. A. Pilsbry.



FRIERSON . UNIO DECLIVIS AND U. TETRALASMUS.

THE NAUTILUS.

VOL. XVII. SEPTEMBER, 1903. No. 5.

THE SPECIFIC VALUE OF UNIO DECLIVIS, SAY.

BY L. S. FRIERSON.

The synonymy of *Unio tetralasmus* Say, given by R. E. Call in the Transactions St. Louis Academy of Sciences, vol. vii, 1895, page 52, has been very generally followed; wholly by some, and partially by others. Mr. Call says: "It preserves its specific character so generally that it is a matter of great surprise that so many synonyms should fall under it. The study of the figures, descriptions and localities above indicated will furnish convincing evidence of identity. Of the total number [of synonyms] listed seven came from Louisiana and contiguous territory; of these seven, five are from the same state (*Louisiana*) and of those five two are from the same bayou." I have faithfully studied the descriptions, etc., above indicated, together with the shells themselves in their native habitat, Louisiana, with the result that I find *U. declivis* Say, to be readily recognizable as a perfectly distinct species from the balance of this group, with *U. geometricus* Lea, as a synonym (according to Dr. Lea himself). *Unio declivis* is, moreover, very *rare* as compared with the rest of the group, and generally misunderstood. In order that students may recognize the shell it is figured herewith, and the following specific differences noted:

First. It never attains the extreme size of *U. tetralasmus* as shown by the following measurements, based on adult specimens of each:

U. declivis, length 85, height 45, diameter 35 mm.

U. tetralasmus, length 133, height 70, diameter 50 mm.

Second. The beaks of *U. declivis* are more nearly *terminal* than in *U. tetralasmus* (both Say and Lea mention this fact in describing the species).

Third. The color of the nacre of *U. declivis* is "purplish" (*vide* Say and Lea), while that of *U. tetralasmus* is always white, very frequently dull, with large blotches of olive-brown. This is an invariable characteristic of the thousands I have collected.

Fourth. *U. tetralasmus* Say, is rounded or bluntly pointed posteriorly, with a rounded or obsolete posterior ridge; while *U. declivis* when *perfect* is much more acutely *rostrate* posteriorly, as noted by Mr. Say, with a "subcarinated" posterior ridge.

Finally, these species inhabit different stations, *U. declivis* being found in *rivers* (Say's type and Lea's *U. geometricus* both came from Bayou Teche, a navigable stream) while *U. tetralasmus* invariably lives in the "small streams and ponds of the South," as stated by Conrad. An apparent exception being Lea's *U. symmetricus* which he said came from (Alexandria, La.) the Red River; but he procured his shell at second hand from Dr. Hale, who no doubt was in error, as he assuredly was in the case of other shells said to have come from the same river. These shells can live in localities where, from three to six months at a time, there is *absolutely no water;* in fact living shells have been thrown out by the plowshare, and hundreds have been seen killed by fire sweeping over the dried-up ponds. (See plate III, middle figure.) *This ability to withstand droughts is no doubt a cause for the misunderstanding of the group.*

Mr. Simpson, in his "Synopsis of the Naiades," says: "and if there were no connecting links, it would be easy to make half a dozen species out of it." If the species happens to grow in constant waters, they form more or less perfect shells, and are easily seen to be distinct species. But on account of their drought-resisting abilities and the preference for *small* streams in the case of the *tetralasmus* crowd, it may easily be seen that a *majority* of the adult shells have had to resist droughts and live through a succession of dormant stages. During these dormant periods, the mantle of the animal is partially withdrawn and the deposition of the epidermis and columnar layers ceases, but the inner nacre is still deposited. The mantle is especially withdrawn from the *end* of the prominent *rostrated* portion of

U. declivis. In consequence there are produced in this way many variations and malformed specimens.

A colony of *rough,* black and corroded *U. tetralasmus* was taken from a stream across which a boy could jump, and planted in a railroad tank of fifteen acres, newly made by the K. C. S. R. R. Two years after, one of their progeny was taken from this tank, with a yellow, smooth epidermis as hard and glossy as glass, and as distinct from *U. declivis* as *luteolus* is from *ligamentinus* (see pl. iii, upper figure).

In this connection, the writer would remark that in an article published several years ago (NAUTILUS XI, 3), under the caption "Conchological Notes from Louisiana," he spoke of the abovementioned difference in habitat of *U. declivis* and *U. tetralasmus.* But at that time all of his specimens were named according to prevalent tradition, and he exactly *reversed* their *names.*

Like many other young collectors, the writer has in this way sent out numbers of shells with erroneous names, and helped to make confusion worse confounded. He hopes herein to correct at least one of these errors, and at the same time to render justice to that most excellent naturalist, Thomas Say.

By comparing the figure with that given by Conrad in his Monography, page 45 (and on which Mr. Call's synonymy is based, no doubt,) it will be seen that the shells of *U. declivis* and *U. tetralasmus* are utterly unlike.

EXPLANATION OF PLATE III.

Upper figure. *U. tetralasmus* Say. R. R. tank, De Soto, La.

Middle figure. *U. declivis geometricus* Lea. Dried bed of Lake Connisnia, La., showing stunting and periodicity of growth induced by successive droughts.

Lower figure. *U. declivis* Say. Bayou Plaquemine, La., at Church Point.

A NEW SPECIES OF METZGERIA.

BY WILLIAM HEALEY DALL.

The genus *Metzgeria* Norman, has hitherto been known from a single species, the *pusilla* of Sars or *alba* of Jeffreys. This is reported from the coast of Norway and the northeastern North At-

lantic in relatively deep water. A second species from the Santa Barbara Channel, California, has lately reached me.

Metzgeria californica n. sp.

Shell small, translucent white, with a pale straw-colored, dull, wrinkled and rather conspicuous periostracum; nucleus small, smooth, white, obliquely inclined, of nearly two whorls; there are four or five rounded subsequent whorls separated by a deep, not channelled, suture; sculpture of about nine rather prominent, rounded axial ribs extending from suture to suture and on the last whorl to the base, separated by wider interspaces and crossed by numerous subequal spiral threads, covering the whole shell, their wider interspaces striated by the incremental lines. Aperture about half as long as the shell, the outer lip sharp, the throat smooth and white; the pillar white, not callous, with three distinct, oblique plaits beside the slightly raised margin of the canal, these are only visible from the side of the aperture; anteriorly the pillar is tortuous, slightly recurved, open and rather wide. Length of shell 14, of aperture 7; width of shell 6 mm.

This species is easily discriminated from *M. pusilla* by its deeper sutures and more convex whorls, and by having a more tortuous pillar with three or four distinct oblique plaits instead of only two. On a direct view, at right angles to the plane of the aperture, the plaits are invisible, but are perfectly distinct from a point more laterally situated. The operculum is elongate-quadrate with apical nucleus. The shell, with other specimens from the same locality, was sent to the National Museum by J. H. Paine.

NOTICES OF NEW LAND SHELLS OF THE JAPANESE EMPIRE.

BY H. A. PILSBRY AND Y. HIRASE.

Eulota (*Euhadra*) *quæsita* var. *decorata* n. v.

Smaller than *quæsita*, and much more coarsely sculptured with irregularly spaced, fold-like striæ, which are well raised and in part light yellow; the ground-color of the shell being either that of *quæsita* or of the form *perryi*, the types being of the dark pattern.

Alt. 22, diam. 35 mm. (Ōkuki).

Alt. 18.5, diam. 28 mm. (Chojamura).

Ōkuki and Chojamura, Mutsu. Types no. 84884 A. N. S. P., from no. 985a of Mr. Hirase's coll.

Eulota (Euhadra) connivens var. *diversa* n. v.

Shell resembling the smaller *E. connivens* var. *phæogramma* Auc., but larger, with the periphery strongly angular, like a thick *Plectotropis*. Alt. 18, diam. 25.3 mm.

Riukiu I. Type 84877 A. N. S. P. Collector unknown.

Eulota (Euhadra) submandarina var. *miyakejimana* n. v.

Shell similar to *E. submandarina*, but the whorls of the spire are flatter, less convex.

Alt. 18.6, diam. 25 mm.

Alt. 16.5, diam. 21.7 mm.

Miyakejima, Izu. Types no. 84879 A. N. S. P., from no. 1067 of Mr. Hirase's collection.

Eulota (Euhadra) submandarina var. *niijimana* n. v.

Decidedly smaller than *E. submandarina;* subangular at the periphery, with $4\frac{3}{4}$ to 5 whorls.

Alt. 12.3, diam. 17.5 mm.

Alt. 12, diam. 17 mm.

Niijima, Izu. Types no. 84880 A. N. S. P., from no. 1051 of Mr. Hirase's collection.

Ennea iwakawa var. *oshimana* n. var.

Differs from *E. iwakawa* in being much larger; from var. *yakashimæ* in the decidedly more slender form. Alt. 4.3, diam. 1.7 mm.

Oshima, Osumi. Types no. 84875 A. N. S. P., from no. 936 of Mr. Hirase's collection.

Like almost all of the species of Oshima, this is quite noticeably differentiated from the allied form of the main islands of Japan.

Tornatellina kitaiwojimana n. sp.

Shell perforate, globular, with short, very obtuse, conic spire; thin and fragile, transparent horn-colored, faintly and finely striate. Whorls $3\frac{1}{2}$, convex. Aperture large; columella bearing a prominent, squarish double fold; parietal wall bearing a small, rather short entering lamella. Length 2.7, diam. 2 mm.

Kita-Iwojima, Izu. Types no. 84965, A. N. S. P., from no. 1094 of Mr. Hirase's collection.

An extraordinary species, very unlike any other yet known from the region. Kita-Iwojima is one of the Sulphur or Volcano Islands, a little group lying southwest of the Ogasawara group, and on a line with the Izushichito group, or "Seven islands of Izu." They were discovered by Bernard de Torres in 1543, and are governed by Japan from the Ogasawara Is. Volcanic forces are still active in this group, which is regarded by Yoshiwara as a continuation of the Fuji chain, rather than orogenically belonging to the Ogasawaran volcanic chain.

The following species of land shells have been found on Kita-Iwojima:

Tornatellina inexpectata Pils.
Tornatellina kitaiwojimana Pils.
Tornatellina hataiana Pils.
Opeas gracile ogasawaranum Pils.

Kaliella prædalta var. *izushichitoensis* n. v.

Shell smaller than *K. prædalta*, with decidedly stronger peripheral angle. Brown, somewhat transparent.

Miyakejima, Izu. Types no. 84961, A. N. S. P., from no. 1060a of Mr. Hirase's collection. Also, Niijima, Izu, no. 1060 of Mr. Hirase's collection.

Kaliella nesiotica n. sp.

Shell conic, with very slightly convex lateral outlines, obtuse summit, acutely thread-carinate periphery and slightly convex base; transparent brown. Whorls fully 6, slightly convex, parted by a suture in which the fine thread-like keel ascends. Sculpture of extremely minute, rather widely-spaced hair-striæ. Aperture basal, squarish, the columellar margin reflexed above. Alt. 3.6, diam. 3.2 mm.

Miyakejima, Izu. Types no. 84964, A. N. S. P., from no. 1072 of Mr. Hirase's collection.

Near *K. crenulata* Gude, but the excessively fine hair-like striæ are much more widely spaced in this species.

Sitala niijimana n. sp.

Shell minutely perforate, with conic spire, obtuse apex, strongly

angular periphery and convex base; thin, fragile, and of a pale, somewhat transparent horn-color. Surface faintly marked with growth-wrinkles, and under very strong magnification, showing an excessively minute, close decussation of radial and spiral lines. General outlines of the spire straight. Whorls $3\frac{1}{2}$, convex. Columella reflexed above. Alt. 2, diam. 2.3 mm.

Niijima, Izu. Types no. 84963, A. N. S. P., from no. 1057 of Mr. Hirase's collection.

The rather acutely angular periphery is nearly in the middle of the height of the shell. It is referred to the genus *Sitala* on account of its spiral sculpture, which is, however, excessively minute.

NOTE ON THE FAMILY SEPTIDÆ.

BY W. H. DALL.

In the Report on the Mollusks of Porto Rico, I adopted for the family *Tritonidæ* of authors, the name *Septidæ*, and for the typical genus the name *Septa*, proposed by Perry in 1811. Perry's list of species comprised six, beside which he mentions the *Murex tritonis* of Linné (spelling the specific name *tritonia*, but his meaning is obvious). His genus was equivalent to the genus *Triton*, as used by authors of the first half of the 19th century. His largest and most conspicuous species, which he compares with *Murex tritonis*, belongs to the same group as the latter, which was generally accepted as the type of the old genus *Triton* and reserved for it by Montfort when he divided the genus, a year earlier than Perry. Therefore I accepted *Septa rubicunda* Perry (= *Triton nodiferus* Lam.) as the type of Perry's genus and applied the name to the congeneric species of Porto Rico, since *Triton* is preoccupied.

In an interesting and useful paper by H. Leighton Kesteven, referred to in the June number of the NAUTILUS, the author does not accept the name *Septa* because Perry's first species is a *Lotorium* and without argument is taken by Mr. Kesteven as type. He shows very clearly that the name cannot be used for *Lotorium*, but does not observe that I never proposed to so use it. I used it for the group of *Murex tritonis* L., which is generically distinct from the group of which *Lotorium* is a member, and which, as Mr. Kesteven shows,

has no other name at present which is valid. I was not obliged to take the first species of *Septa* as a type, knowing it to be a *Lotorium*, and did not. The species for which I used it had no valid generic name and *Septa* was applicable, and should, I think, be adopted.

ON SOME NEW LAND MOLLUSCA FROM MIDDLE AMERICA.

BY C. F. ANCEY.

I. *Streptostyla Sumichrasti*, n. sp.

S. Sumichrasti, Crosse & Fischer, in coll. Sallé.

Testa cylindraceo-oblonga, tenuis, nitidissima, obsolete et flexuosa substriatula, læte fulvo cornea, concolor sed ad apicem obtusulum pallidior. Spira gradata, conoideo-attenuata. Anfractus $6\frac{1}{2}$ convexiusculi, sutura canaliculata divisi, ultimus elongatus, latere dextro leviter planulatus. Apertura subauriformis, superne longe attenuata, basi subdilatata; lamina columellaris tenuis, vix callosa, elongata, spiraliter torta, basi antice vix truncata. Peristoma obtusiusculum, flexuosum, medio antice dilatatum, basi recedens.

Long. 29, diam. 13, alt. $19\frac{1}{2}$ mill.

Hab. in isthmo Tehuantepec, reipublicæ Mexicana (coll. Ancey, Dautzenberg, Jousseaume).

A fine large species related to the smaller S. lurida, Shutt. and S. Bocourti, Cr. & Fisch., but much more slender than the latter and of a more graceful oblong shape than the former. This is surely distinct from any species I examined in the collection of the late A. Sallé, now in the possession of Mr. Ph. Dautzenberg.

II. *Streptostyla clavulata*, n. sp.

Testa parvula, primo aspectu Ferussaciis ex grege F. procerulæ similis, tenuis, nitida, obsolete vix striatula, verisimiliter statu recenti pallide cornea, sed emortua albido-hyalina, cylindraceo-elongata, oblongula. Spira producta, regulariter attenuata, obtusa, apice magno. Anfractus $6\frac{1}{4}$, subplanulati, sutura appressa, parum distincta, infra pellucido marginata divisi; ultimus cylindraceo-oblongus, basi subattenuatus. Apertura superne angusta, basi dilatata, lamina columellaris brevis, parum valida, subcallosa, leviter

spiraliter torta, basi antice truncatula. Peristoma obtusum, medio antice flexuoso-productum, basi recedens.

Long. $8\frac{2}{3}$, lat. 3, alt. apert. 4 mill.

Hab. in America centrali (?).

A small elongate shell, quite unlike any other I am acquainted with and resembling a Ferussacia. I am indebted for a specimen to Mr. Ph. Dautzenberg, who procured two examples in a lot of loose miscellaneous shells from various localities.

A PARTIAL LIST OF THE MARINE MOLLUSKS OF SAN SALVADOR, BAHAMAS.

BY FRANK COLLINS BAKER.

The following partial list of San Salvador shells is based on a collection exhibited at the World's Columbian Exposition, and now in the Field Columbian Museum, by whom it was referred to the writer for identification.

San Salvador, or Watling Island, is one of the Bahama Islands, and lies just north of the Tropic of Cancer. Its molluscan fauna is like that of the West Indies and Florida. The specimens are mostly beach shells.

Arca barbata Linne.
Lucina dentata Wood.
Lucina pennsylvanica Linne.
Subemarginula octoradiata Gmelin.
Acmæa punctulata Gmelin.
Fissurella barbadensis Gmelin.
Fissurella fascicularis Lamarck.
Nerita tessellata Gmelin.
Nerita versicolor Lamarck.
Nerita peloronta Linne.
Neritina pupa Linne.
Hipponyx antiquatus Linne.
Polinices lactea Guilding
Natica canrena Lamarck.
Tectarius muricatus Linne.
Cerithium literatum Born.
Trivia pediculus Linne.
Trivia quadripunctata Gray.
Lambidium oniscus Linne.
Tritonium chlorostomum Lamarck.
Pyramidalla dolabrata Linne.
Columbella ovulata Lamarck.
Columbella mercatoria Lamarck.
Olivella nivea Gmelin.
Conus mus Hwass.
Conus verrucosus Hwass.
Bulla occidentalis A. Adams.
Melampus flavus Gmelin.
Cerion sp.

NOTES, NEWS AND REVIEWS.

THE USE OF THE GENERIC NAME HELICOSTYLA.—In the discussion of the nomenclature of "*Cochlostyla*," it has not been noticed that Mörch, in 1865, used the name *Helicostyla* to include *Axina*, *Corasia*, *Helicobulimus*, etc. He gives a new name *Pythohelix* for the species *boholensis* and *fulgetrum* and misspells *Orustia* ("Onistia") and *Corasia* ("Coracia"). See Journ. de Conchyl., 1865, p. 385. —H. A. P.

THE ZOÖLOGICAL RECORD, Vol. xxxix, 1902. Mollusca. By E. R. Sykes, B. A., assisted by E. A. Smith, I. S. O., pp. 85. The total number of titles recorded is 611; this of course including many papers purely palæontological. As in the preceding records compiled by Mr. Sykes, the summaries relating to Anatomy and Distribution are especially full, and cannot fail to be of the utmost utility to many students. Thus, on p. 45, references to all articles dealing with inland mollusks of the United States may be found. It may be well to call attention here to a slip, whereby the species of *New Mexico* are placed under "Neotropical, Mexican Region," p. 44, and omitted from "American Region." While New Mexico has a "Lower Austral" element in *Holospira*, this genus has occurred only in a few places in the extreme south, and the fauna as a whole is overwhelmingly "nearctic." Again, Washington, Oregon and Bahamas are put in the "Transatlantic Province" (p. 50), whereas the two former should have been placed in the "Californian," and the latter in the "Caribbean." The systematic part seems to be very well done; though in treating the Pelecypoda, a further classification would certainly facilitate reference. The several parts of the Record may now be purchased separately, the Mollusca for 4, the Brachiopoda 1 shilling.[1] They will be found well worth the price, even to the local naturalist, for the information on what is being done the world over in the study of mollusks.

NOTES ON POLYPLACOPHORA OF THE CONCHYLIEN CABINET.—The monograph on this group, by S. Clessin, has now progressed

[1] From the Zoölogical Society, 3 Hanover Square, London.

far enough to show the general quality of the work. The figures are all bad copies, as well as most of the descriptions; and such classification as there is is only right by accident; such cases being readily accountable for by the law of chances. If it were only a reasonably careful compilation, the work might still have a certain value; but it abounds with minor blunders, such as "*Chiton sowerbyanius*" for *C. sowerbyanus*, "Port Jankson," "Chiton goodalii," etc.; but perhaps the most amusing case in the part just issued is that of *Chiton sulcatus* Wood. This is renamed *Chiton Woodii* Cles., and said to be from "Lord Woods Insel der Gallopagos." The new name is of course quite unnecessary, because *Ch. sulcatus* Wood dates from 1814, some years prior to any other use of that specific name. The new name *Chiton* (*Callochiton*) *Carpenteri* Cles. (p. 64), is a synonym of *Callistochiton pulchellus* Gray, besides being pre-occupied, see p. 25 of the same work. When the monograph on Scaphopoda in the *Conchylien Cabinet* was issued, I thought that for blunders and general inadequacy it could not be surpassed; but the work on Chitons, by the same author, promises to be a close second.—H. A. P.

Zweiter Beitrag zur Binnen-conchylien des Miocäns von Oppeln in Schlesien.—Von Prof. Dr. A. Andreæ. Hildesheim, Dec., 1902. In this further study of a Miocene land-shell fauna, Prof. Andreæ brings out several novelties of unusual interest. The new group *Gyralina* contains *Hyalinia* (*G.*) *roemeri* n. sp., a form very similar to our *Helicodiscus lineatus*. There is a new species of *Strobilops*, described under the name *Strobilus*. Also several interesting Helices. *Adelopoma martensi* n. sp., is a minute Diplommatina-like form, in which relation is found with South American species described under the genus *Adelopoma* of Doering, ranging from Argentina to Guatemala. In this connection it may be well to call attention to the fact that forms of the same genus occur in eastern Asia. "*Diplommatina*" *pusilla* Mart. of Japan, and its variety *omiensis* Pils., which are placed by Kobelt (Tierreich, *Cyclophoriden*) in *Cylindropalaina*, really have all the shell characters of *Adelopoma*. Also *D. amurensis* Mouss. (Journ. de Conchyl., 1887), from Vladivostock, which is apparently identical specifically with *pusilla* Mart. Another German Miocene species, *Diplommatina dietzi* Flach, is referred by Dr. Andreæ to *Adelopoma*. The distribution of the genus

is somewhat similar to that of *Clausilia* and the Belogonous Helices —European, Oriental and South American.—*H. A. Pilsbry.*

A Biological Reconnoissance in the Vicinity of Flathead Lake [Montana].—By Morton J. Elrod. (Bulletin Univ. of Montana, No. 10.) A synopsis of work in all branches of Zoölogy done at the Biological Station of the University of Montana. Besides a good many notes on mollusks throughout the text, there is a catalogue of Montana shells (pp. 170–174), and illustrations of a series of varieties of *Pyramidula strigosa* (plate xxvii) and *P. Elrodi* (pl. xxxii).

Classification of the British Species of the Genus Solen L., etc. By H. H. Bloomer (Journal of Malacology, x, 1903). Mr. Bloomer, continuing the series of articles upon the anatomy of *Solen*, gives us a description and illustrations of *Ceratisolen legumen*, *Solecurtus strigillatus and S. candidus*. The former has much in common with *S. ensis*, while as would be expected, *Solecurtus* differs in many respects. Respecting the true Solens, Mr. Bloomer looks upon "*Solen vagina* as a more primitive form, and *Ensis ensis* and *E. siliqua* as more specialized forms." *Cultellus pellucidus* coming somewhere between. He finds anatomical differences between *Solen* and *Ensis*, sufficient to call for the generic separation of the latter group, which until very recently has been considered a subgenus of *Solen*. These careful, comparative studies in Pelecypod anatomy are valuable and worthy of imitation.

MRS. MARY P. OLNEY.

We have recently learned with great regret, of the death of Mrs. Mary P. Olney, of Spokane, Wash. Mrs. Olney was a devoted lover of nature, and notwithstanding her advanced years, has taken a very active interest in the study of mollusca. Interesting notes such as: "Odor of snails," "Young Pyramidula strigosa," etc., were frequently contributed to The Nautilus, and one form, Polygyra mullani var. Olneyæ, was dedicated to her.

THE NAUTILUS.

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A NEW GENUS OF TROCHIDÆ.

BY WILLIAM HEALEY DALL.

In dredging between Oahu and Molokai in the Hawaiian Islands, in depths varying between 220 and 436 fathoms, sandy and rocky bottom, the U. S. Fish Commission steamer "Albatross" obtained a number of specimens of a large deep-water gastropod shell, occupied by hermit crabs and completely covered by the extended basal membrane of a large *Actinia*. It is not uncommon to find gastropod shells covered by sponges or hydroid zoophytes, commensal with a Pagnroid crab, and it often happens that the zoophyte grows beyond the margin of the aperture forming a shield for the growing crab, to their mutual advantage; since the crab in such cases does not have to seek a new habitation on the ground that the old one has become too small for him, while his movements prevent the zoophyte from becoming smothered by the mud, as might happen if the crab sought another domicile and left the old one lying on the bottom. In such cases the lime of the original shell is often gradually absorbed, though the sponge or zoophyte retains more or less of the original form. In the present case, however, the original shell appears to be normally so deficient in lime as to be practically of a flexible, horny consistency and chiefly composed of a rather tough, thick layer of conchioline. In order that it may retain its shape, it is necessary to keep it in alcohol, as in the case of *Torellia* and some forms of *Velutinidæ*.

STYLOBATES n. g.

Shell depressed-turbinate, few whorled, feebly calcified, with a deep, funicular umbilicus bordered by a carina; surface wrinkled in harmony with the incremental lines; aperture ample, interrupted by the body whorl, the pillar lip straight, the outer lip and base continuously arcuate; the suture appressed. Animal? operculum?

Stylobates æneus n. sp.

Shell large, flexible, with three rapidly-enlarging whorls, which are moderately convex above, descending to a well-marked but not deep appressed suture; base convex, the margin of the umbilicus carinate, its cavity straight-sided and funicular; last whorl expanded at the aperture, which has a thin, simple margin, straight at the termination of the umbilical coil, slightly angular at the intersection of the umbilical carina, the lips above separated for a short distance on the body whorl; shell of yellowish-gray color (in alcohol) with a well-marked, brassy lustre; sculpture of small, irregular wrinkles harmonizing with the lines of growth; outer lip somewhat sinuous and gently excavated at the periphery; upper margin of the aperture advancing beyond the lower. Maximum diameter about 75, minimum 40, height 35, diameter of umbilicus about 10 mm.

Habit. station 3893 of the U. S. Fish Commission steamer "Albatross," in the Hawaiian Islands. There are occasional minute granulations on the surface which may, however, be merely individual peculiarities. The soft parts and operculum are as yet unknown.

This large and peculiar shell does not closely resemble any other deep-water form yet recorded. While its proper classification must remain unsettled until the soft parts are obtained, its general form and habit recall several of the *Trochidæ*, and bear a curious superficial resemblance to the New Zealand land shell formerly known as *Helix* (now *Paryphanta*) *busbyi*.

DISTRIBUTION OF JAMAICAN SPECIES OF COLOBOSTYLUS.

BY P. W. JARVIS.

In this group there are thirteen clearly marked species:

Colobostylus interruptus (Lam.).	C. nuttii Pils.
C. humphreyanus (Pfr.).	C. albus (Sowerby).

C. thysanoraphe (Sowerby).
C. jayanus (Ads.).
C. redfieldianus (Ads.).
C. bronni (Ads.).
C. chevalieri (Ads.).
C. banksianus (Sowerby).
C. yallahensis (Ads.).
C. tectilabris (Ads.).
C. lamellosus (Ads.).

Colobostylus interruptus (Lam.) (Area No. 12). Living specimens of this species are very rare, and only occasionally found on the Dallas mountains, but weather-beaten shells are very abundant on Long and Dallas mountains, lying to the north of Kingston. In Mr. Henry Vendrye's list of Jamaican Land and Fresh-Water Shells, it is classed under *Choanopoma*.

Colobostylus humphreyanus (Pfr.) (Area No. 4) inhabits a very wide area, from the Cockpit country in St. Elizabeth and Trelawny, westward to "Silver Spring," in Westmoreland. The differences between specimens from distant localities are very slight and there seems to be no tendency to vary amongst individuals.

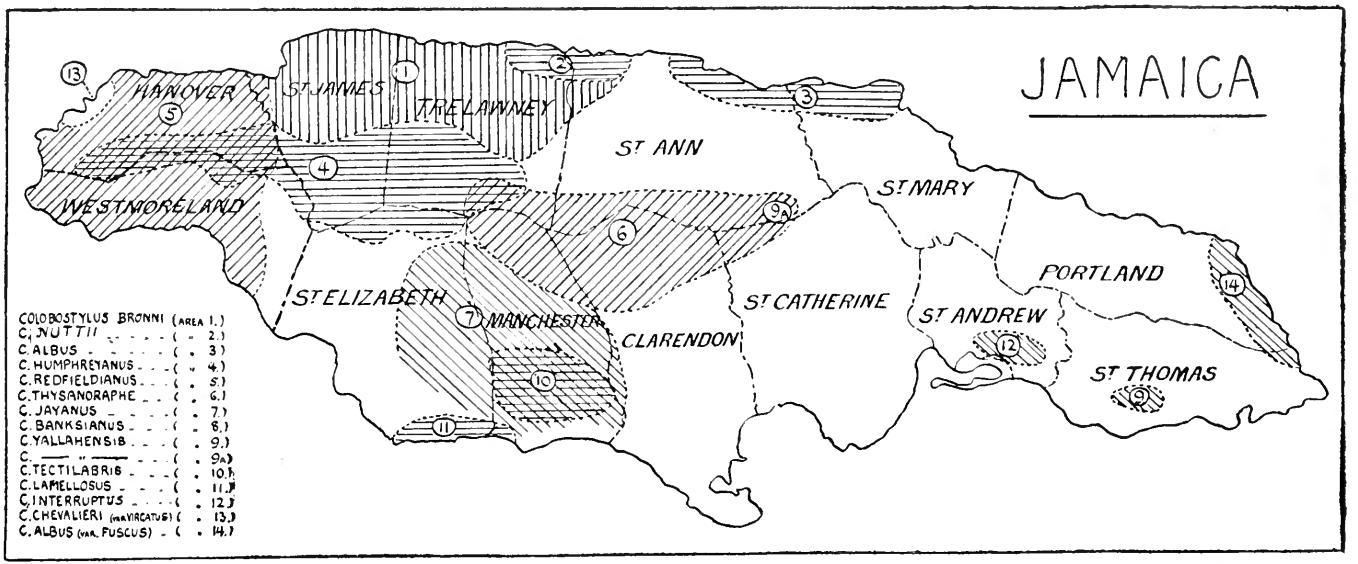
Colobostylus thysanoraphe (Sow.) (Area No. 6) occurs on the high mountains in the center of the island. Fairly abundant in the Cave Valley district.

Colobostylus jayanus (Ads.) (Area No. 7) is common throughout Manchester. This species is somewhat nearly allied to *C. thysanoraphe*. I have not yet found either any intermediate varieties or both species in one locality.

Colobostylus redfieldianus (Ads.) (Area No. 5) occurs in the two parishes of Westmoreland and Hanover. Varies considerably in size and color.

Colobostylus bronni (Ads.) (Area No. 1). The metropolis of this shell is the highland parts of St. James and Trelawny where it abounds, it is common in smaller numbers throughout these two parishes.

Colobostylus chevalieri (Ads.). The typical form of this very pretty shell occurs somewhere in the mountains near Montego Bay. I have not yet found it. Dr. F. A. Sinclair, who has kindly given me specimens, did not take note at the time of the exact locality. The varieties *album* and *virgatum* of Adams, are found together at Green Island in Hanover (Area No. 13).



DISTRIBUTION OF THE SPECIES OF COLOBOSTYLUS.

Colobostylus nuttii Pils. (Area No. 2), is found on the Coast mountains at Braco, near Duncans.

Colobostylus albus (Sowerby) (Area No. 3). The typical forms of this species inhabit the coast mountains from Port Maria to St. Anns Bay and for a few miles inland. The var. *fuscus* of Adams, comes from the John Crow hills in Portland (Area 14).

Colobostylus banksianus (Sowerby) (Area No. 7). This species has its headquarters in Manchester and spreads for a considerable distance across the borders of St. Elizabeth and through the Cockpit country.

Colobostylus yallahensis (Ads.) (Area No. 9). The types of this species came from "Roaches Gully," on Creighton Hall Estate, in St. Thomas; it is also found at one or two other places on the Yallahs hills. This species also crops up at Schwallenburg (Area 9 A) on the slopes of Mount Diablo, in St. Anns. I do not know of its having been found anywhere else than in these two small areas.

Colobostylus tectilabris (Ads.) (Area 10), inhabits the central and southern parts of Manchester. It is widely distributed over this area but not common.

Colobostylus lamellosus (Ads.) (Area No. 11) is found on the mountains of the South Coast of St. Elizabeth.

A NEW JAMAICAN COLOBOSTYLUS.

BY HENRY A. PILSBRY.

Colobostylus nuttii n. sp.

Shell narrowly umbilicate, turbinate conic, similar in general shape to *C. chevalieri* (C. B. Ad.); surface very finely, densely and regularly striate throughout, the striæ more spaced and sharper on the early whorls, exactly as in *C. albus*. Coloration various, but usually consisting of a wide, purplish or purple-brown belt, leaving a pale or whitish band below the suture and around the umbilicus; the penult. whorl or whorl and a half bicolored, the lower part dark, the upper whitish; the upper whorl always purple-black. 3 to $3\frac{1}{2}$ very convex whorls remain, the summit being truncate. The aperture is vertical, chest-

nut-brown within, at least in large part, not quite circular, being a little longer than wide, and with the inner margin less arcuate than the outer. Peristome moderately broad, with a low, brown, raised inner rim, and whitish or white expansion, which is dilated into a slightly recurved or concave lobe above, adnate to the preceding whorl; it is also a little dilated at the columellar margin. The umbilicus is smooth within, but rarely shows faint traces of a few spiral cords.

Length 17, diam. 13 mm.

Length 15, diam. 11 mm.

The operculum is white externally, slightly concave, rather coarsely wrinkled tangentially, and with about $2\frac{1}{2}$ whorls after the blackish nucleus, which is situated at about the lower third, and much nearer the columellar than the outer margin. The edge is very deeply grooved, the sides of the groove smooth or nearly so.

Braco, Trelawny, in northwestern Jamaica, the types collected by Mr. George Nutt, and sent by Mr. P. W. Jarvis.

This species differs from *C. chevalieri* in the sculpture of fine vertical striæ, the obsolescence of spiral cords around the umbilicus and in coloration. *C. albus*, which has similar sculpture and operculum, differs in the narrow lip, not dilated above. The latter species is the most nearly related form known to me.

Sometimes the wide median color zone is split by a lighter peripheral tract; or it may be reduced to a narrower belt below the periphery.

NOTES ON THE MOLLUSK FAUNA OF SAN NICHOLAS ISLAND.

BY HERBERT N. LOWE.

San Nicholas, the most bleak and barren bit of land in the whole group of the Santa Barbara Islands, lies apart from its more favored sister islands, sixty-five miles from the mainland. It is a small island, barely nine miles long, by four or five wide, without a vestige of a tree of any kind, and very little of the cactus, which grows in such quantities on the other islands. About half its area is a great desert of shifting sands where lie the bleaching bones of an extinct race of Indians which inhabited the island many years ago. Many

strange and interesting implements of stone, bone and shell have been found, showing very skillfull workmanship.

On this favored spot it was the writer's good fortune to spend three weeks in scientific research during the month of February, 1902. The marine shells are all of rare occurrence, with the exception of *Acmæa gigantea*, *Haliotis cracherodii* and *Mytilus californianus*, which grow on the rocks by the thousand. The red "abalone," *Haliotis rufescens*, used to be very abundant on the island, as was also the giant *Cryptochiton stelleri*, but are now of very rare occurrence. The smaller species, such as *Ocinebra circumtexta*, *Marginella varia*, *Gadinia reticulata*, *Mitromorpha filosa*, *Megatebennus bimaculatus* and a few of the smaller *chitons* were found under stones in little sheltered inlets away from the heavy surf.

The remainder of the coast line is composed alternately of great ledges of smooth rocks and strips of smoother sand beach. Unlike the other islands, with their steep cliffs jutting off abruptly into deep water, San Nicholas is low, lying with bluffs sloping gradually to the water's edge, with shallow water a long distance from shore. A belt of kelp, in places more than a mile wide, surrounds the island, making a landing very difficult. A fair idea of the marine species inhabiting the coast may be obtained from the bleached shells found on the old Indian camp grounds, as they seemed to have eaten molluscs of every description, principally the *Haliotis*, fragments of which cover the mounds by the million, and the irridescent shells reflecting the rays of the sun in a gorgeous and dazzling play of color, present a picture long to be remembered.

The following is a list of marine species found on the Indian mounds:

Cypræa spadicea Gray.
Trivia solandri Gray.
Erato vitelina Hds.
Acmæa gigantea Gray.
Acmæa mitra Esch.
Acmæa pelta var. *nacelloides* Dall.
Chlorostoma brunneum Phil.
Chlorostoma montereyensis Kien.
Chlorostoma funebrale A. Ad.
Gadinia reticulata Cpr.
Cryptochiton stelleri Midd.
Cardium quadrigenarium Con.
Cardium biangulatum Sby.
Rupellaria lamellifera Con.
Lucina californica Con.
Venus fordii Yates.
Hinnites giganteus Gray.
Pecten æquisulatus Cpr.
Tapes staminea Con.
Norrissia norrissii Sby.

Lucapina crenulata Sby.
Fissuridea aspera Esch.
Pachypoma inequale Martyn.
Pomaulax undosus Wood.
Ocinebra circumtexta Stearns.
Fusus barbarensis Trask.
Mitra maura Swains.
Cancellaria cooperi Gabb.
Ischnochiton conspicuus Cpr.
Monoceros lapilloides Com.
Olivella boetica Cpr.
Oliva biplicata Sby.
Purpura saxicola Val.
Mytilus californianus Con.
Haliotis rufescens Swain.
Haliotis cracherodii Leach.
Haliotis corrugata Gray.
Natica sp.

The reefs where the *Acmæa gigantea* have their home, jutting out between the sand beaches, are, after every storm, temporarily covered over with sand. At such times a large quantity of sand gets under the mantle of the *Acmæa*, causing little nodules to be formed on the inside of the shell, from the size of a pinhead to that of a small bean. The shells were of unusual thickness, to withstand the continual pounding of the surf.

As I have previously stated, the island is almost destitute of vegetation, making the land shells few and far between. The only species were: *Helix tryoni*, found alive in small numbers; *H. feralis*, one fresh specimen and occasional dead ones; *H. sodalis*, none but dead and bleached ones. I should probably not have obtained any live *Helices* had it not been for a rain storm which came on while I was on the island, when the tiny creatures seemed to sprout as it were from the bowels of the earth. After every rain storm there comes a fierce, drying, west wind, which makes the snails "hunt their holes" in a hurry, and any unfortunate *Helix* not under cover is made short work of by the scorching winds and sand blowing upon them. About the only food for the snails is a low-growing salt bush, at the roots of which they burrow in the dry season. At the east end of the island are found the few scattering live *Helices* with comparatively few dead shells, while at the west end of the island the dead and bleached shells lie by the thousand on the great stretches of shifting white sand. As there is no vegetation whatever at that end of the island, and the prevailing winds, in the opposite direction, makes it impossible for them to have been driven there by that agency, it remains an unanswered question how came these myriads of dead and bleached shells in this sand desert?

At the west end occasional springs of fresh water drip from over-

hanging ledges of rock to little pools on the sand beach, and then flow to the great ocean without having benefited the island in any way. In these little pools a few small stunted *Physas* were found.

During the winter season the island is the rendezvous of Japanese fishermen, who catch lobsters for the Los Angeles market. They also make a business of hunting *abalones* at low tide. The meats are cleaned from the shells, boiled in salt water and spread on the flat rocks to dry, when they are sacked up and shipped to Japan and China, and considered a great delicacy by the celestial epicures. The shells are sent to Los Angeles and made into pearl buttons, souvenir spoons and various "curios" to tempt the pocket-book of the tourist.

NEW JAPANESE MARINE MOLLUSKS.

BY HENRY A. PILSBRY.

Phasianella tristis n. sp.

Shell imperforate, globose turbinate, thick and solid, dark reddish-brown, the apical whorl whitish; smooth. Spire short. Whorls 3, rapidly increasing, the last rounded. Aperture more than half the length of the shell, oblique, rounded-ovate; columellar margin regularly concave, flattened and callous. Alt. 3.6, diam. 3 mm.

Rishiri, Kitami. Types no. 85222 A. N. S. P., from no. 1367 of Mr. Hirase's collection.

Near *P. oligomphala*, but the aperture is less oblique, the shell more solid and of a more sombre color.

Gibbula affinis var. *cognata* n. v.

Differs from *G. affinis* of the Viti Is. in having the larger spiral cords more equal and regularly spaced, the apical whorls rose-colored. Riukiu I.

Gibbula vittata n. sp.

Shell narrowly but openly umbilicate, conic, fleshy-brown, striped longitudinally with white, the white stripes about half as wide as the darker ones. Surface nearly lusterless. Whorls subangular above

the middle of the upper surface, the last also angular at the periphery; sculptured with narrow spiral cords, of which there are four between the peripheral angle and the shoulder, the surface nearly smooth or with one cord above the shoulder. Base with about nine spiral cords. Whorls nearly 6. Aperture oblique, rounded, angular at the base of the columella, smooth within. Columella straightened in the middle. Umbilicus smooth and white within. Alt. 6, diam. 5.3 mm.

Riukiu I. Types no. 82037 A. N. S. P., from no. 1318 of Mr. Hirase's collection.

Gibbula incarnata n. sp.

Shell perforate or closed, turbinate, coral-red, uniform or with some paler or whitish spots at the periphery, a small area around the columella white. Sculptured with nearly smooth spiral cords as wide as their intervals, nine in number on the penultimate whorl. On the somewhat flattened base there are about 8 finer cords. Spire conic, the apex obtuse. Whorls 5, convex, the last subangular around the base. Aperture oblique, irregularly rounded, smooth within. Columella wide and calloused. Alt. 5.3, diam. 5.

Kumihama, Tango. Types 82141 A. N. S. P., from no. 1323 of Mr. Hirase's collection.

Monilea (*Rossiteria*) *nucleolus* n. sp.

Shell depressed globose-conic, narrowly umbilicate; white with an interrupted buff zone above, and conspicuously variegated with squarish black-brown spots, of which there is a row of broad ones below the suture (three or four on a whorl), a row of smaller ones just above the periphery, and another on the base. Besides these, there is an irregular articulation or dotting of dark brown on the spiral cords. Surface glossy, sculptured with numerous very low and subequal, nearly smooth, spiral threads, almost obsolete on the base, but reappearing at the border of the umbilicus; and showing under a lens, subregular, close, longitudinal grooves, almost obsolete, but visible near the suture and umbilicus. Whorls 5, convex, the last well rounded. Aperture oblique, the columellar margin deeply concave in the middle; columella abruptly truncate at the base. Outer lip bevelled to a sharp edge, thickened and spirally lirate within. Alt. 5.6, diam. 6.3 mm.

Compared with *M. nucleus* Phil., this species differs in being smaller, with the whole sculpture much fainter, subobsolete. It is also more depressed, and the umbilicus widens more at the opening.

Clanculus gemmulifer var. *pallidus* n. v.

Differs from *gemmulifer* by its pale, yellowish-brown tint, with roseate apex, and some indistinct, paler, radial flames; only a few of the liræ having sparse black beads, each between two white ones.

Kashiwajima, Tosa. Types no. 85221 A. N. S. P., from no. 910*b* of Mr. Hirase's collection.

MISS S. F. PRICE.

We learn with deep regret of the death, at her home at Bowling Green, Ky., on July 3d, of Miss Sadie F. Price. Miss Price was born at Bowling Green. Her parents were Alexander M. and Marie Price. For many years Miss Price had been actively interested in the flora of her State, upon which she published a number of articles, among them a useful illustrated work, "The Fern Collector's Handbook." Ornithology also claimed her attention, and in the last dozen years she became interested in mollusks, and becoming acquainted by correspondence with conchologists working upon inland species, she collected assiduously and successfully, publishing a list of her local collections in this journal for November, 1900. Miss Price assisted upon the Kentucky exhibit at the Columbian Exposition, where she exhibited plants and a series of paintings of the birds of Kentucky, which attracted much attention. Like a true naturalist, Miss Price passed on to many pupils the love of nature. She is survived by her sister, Miss Mary Price, with whom she had lived for many years.

GENERAL NOTES.

HELIX HORTENSIS AT PERCE, P. Q.—Dr. John M. Clarke reports this species as very common in the limestone regions at Perce, Gulf of St. Lawrence. A specimen sent is of the five-banded form.—H. A. P.

PROF. T. D. A. COCKERELL, of East Las Vegas, New Mexico, has removed to Colorado Springs, Colorado.

REV. A. B. KENDIG, of Brookline, Mass., has sold his large collection of land shells to the Franklin and Marshall College, Lancaster, Pa.

THE largest fresh-water pearl on record was found at Genoa, Wisconsin, by seventeen-year-old Frank Hastings while he was fishing. It weighs 185 grains and is pure white. It measures $\frac{1}{1}\frac{5}{6}$ of an inch in diameter. A local dealer bought the pearl, just as it was when it came from the shell, for $2,675.—*Cleveland Leader.*

MRS. S. L. WILLIAMS, of Chicago, has recently added to her large and beautiful collection of *Cypræidæ* a specimen of *Cypræa broderipii* Gray. We believe this is the only specimen in America.

PUBLICATIONS RECEIVED.

A NEW LAND SHELL FROM CALIFORNIA. By Paul Bartsch (Proc. Biol. Soc. Wash., xvi, pp. 103, 104, 1903). *Sonorella wulcottiana* is described from Palm Springs, San Diego Co., where it occurred in crevices of rocks.

ON SOME ADDITIONAL FOSSILS FROM THE VANCOUVER CRETACEOUS, WITH A REVISED LIST OF THE SPECIES THEREFROM. By J. F. Whiteaves. (Geological Survey of Canada, Mesozoic Fossils, vol. i, part 5, pp. 309–415, plates 40–51.)

This part is similar to the one published in 1879, consisting of a report of the many collections received since that time. Some 27 species of *Cephalopoda* are recorded, including six new species. The *Gastropoda* are represented by 35 species, 12 of which are new. *Scaphapoda* two species, and *Pelecypoda* 48 species, 10 being new to science. The synonymy and bibliography is given in full and the illustrations are excellent. The work is a valuable contribution to American palæontology.—C. W. J.

THE NAUTILUS.

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SOME NOTES ON THE GENUS FULGUR.

BY CHAS. W. JOHNSON.

In the very interesting and valuable paper, "Studies of Gastropoda II, Fulgur and Sycotypus," by Amadeus W. Grabau (Amer. Naturalist, August, 1903), the author has again brought to generic rank the name of *Sycotypus*. No stronger evidence is brought forth to uphold this view than that already given, viz., the character of the protoconch, as pointed out by Conrad. Dr. Dall and others consider the condition of Conrad's specimens to have been pathologic, while the many tertiary forms seem to completely bridge all distinguishing conchological characters, leaving only the ciliated periostratum, a feature which is lost in the fossils and in *Fulgur pyrum* is often obsolete or wanting. Still *Sycotypus*, as a rule, forms a recognizable group, very convenient in tracing the origin of many of the species.

Has the protoconch of *F. pyrum* been studied? It may have no bearing on the subject, but it is interesting to note that while the egg-capsules of *F. canaliculatum* are readily distinguished from *F. carica* and *F. perversum* by having a single-keeled edge, those of *F. pyrum* are biangular, resembling those of *F. perversum* in miniature.

In tracing the ancestral relations of the various so-called species, Mr. Grabau has brought out many points which deserve careful consideration. Every one who has made a study of the tertiary species probably has a different view in regard to the relationship of the various forms, and these views should be freely given and the consensus of opinion adopted.

All agree that the Eocene *Levifusus* is probably the immediate

ancestor of *Fulgur*, the latter being first represented in the Oligocene and Lower Miocene by *F. spiniger* and its several varieties, and in the middle Miocene by *F. fusiformis*.[1]

From this form was probably derived, as Mr. Grabau states, "the large and ponderous *Fulgur maximum* Conr.," which apparently, through the varieties *tritonis* and *filosum*,[2] leads to the recent *F. carica* and its variety *eliceans*. On the other hand, the sinistral form undoubtedly evolved from *F. maximum* in the upper Miocene much earlier than Mr. Grabau's table would imply, and by forms such as *F. adversarium* and *F. obfilosum* leads directly to the recent *F. perversum*, and its rare variety *kieneri* Phil. presenting exact parallels to the *F. tritonis filosum* and *F. carica eliceans* series, thus strengthening the theory of a common ancestry. During the Pliocene, *F. perversum* seems to have extended and found more favorable conditions further south, for it is really more plentiful and better developed in the Caloosahatchie than in the Waccamaw beds. On the gulf coast at the present time it is more abundant than on the Atlantic, while *F. carica* is not found at all in the Gulf of Mexico.

In the Caloosahatchie beds there appeared a new form, *F. rapum* Heilp., probably derived from *F. perversum* (as such forms of *perversum* as Mr. Grabau has called *obrapum* would indicate) and apparently representing a reversion to the *maximum* type.

I would not consider *obrapum* to be sinistral *rapum*, neither would I consider *obfilosum* to be a sinistral *filosum*; for while admitting a common ancestry, the immutability of the recent *perversum* and *carica* has given us reason to believe that the same stability has existed since they originated. To admit the mutability of sinistral and dextral forms only makes "confusion worse confounded." *F. rapum*, through the form *tritonoides* Grabau, leads to the recent *F. coarctatum* Sowerby of the Gulf of Mexico, an extremely rare shell which may possibly be extinct. The long anterior canal of the monstrosity *F. candelabrum* Lam., as figured by Kiener, indicates a position here, rather than under *eliceans*.

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[1] In a bed which overlies the Chipola and having an out-crop in a mill-race two miles east of Argyle, Fla., I found this species, identical with specimens from St. Mary's, Md.

[2] *F. filosum* did not originate in the upper Miocene, as indicated by Mr. Grabau's table; *F. maximum*, *tritonis* and *filosum* are all associated with *F. incile* at Yorktown, which moreover is the type locality for *filosum*.

The *Sycotypus* group probably originated, as Mr. Grabau suggests, with such forms as *F. burnsii*, *perizonatum* and *tampaensis* in the Upper Oligocene (Lower Miocene?) and *F. coronatum* and *rugosum* in the Middle Miocene. It seems rather a doubtful conclusion to refer to *F. rugosum* as the direct ancestor of *F. canaliculatum*. I have not seen the "Faison variety" of *F. canaliferum* referred to, but I am inclined to consider *F. alveatus* and *incile* as intermediate forms and to trace the line of ancestry of *F. canaliculatum* and *pyrum* through the same formations in which I trace *F. carica* and *perversum*, viz., the Miocene of Virginia and North Carolina and the Pliocene of the Waccamaw and Caloosahatchie.

The typical *F. incile* of Yorktown seems to have evolved into two forms in the Duplin county beds; the one, *F. conradii*[1] Tuomey and Holmes, leads to the so-called *canaliferum* Conr., the type of which is the *F. canaliculatum* T. & H., from the Waccamaw, and in no way separable from the recent form. The other form, derived from *incile*, represents a very mutable species, and to the various forms had been applied the names of *F. carolinensis*, *excavatus*, *elongatus* and *pyriformis*. These exhibit, however, all gradations and extend through the Pliocene to the recent *F. pyrum* Dillw.

F. concinnum does not belong to the "Middle Miocene." The type locality is Sampson Co., N. C., and I found it also along the Cape Fear River, ten miles above Elizabethtown, Bladen Co., in a bed typically Duplin. I do not know the forms which Conrad described as *amœnum* and *Kerrii* and a study of the form from Walker's Bluff, N. C., might throw additional light on the subject.

THE GREATEST AMERICAN PLANORBIS.

BY HENRY A. PILSBRY.

Planorbis magnificus n. sp.

The shell is very large and high, sinistral as usual, the upper or spire half yellow or pale brown, the lower or umbilical half dark brown. Surface glossy, finely marked with growth-lines, and usually some spiral series of minute long granules, as in many species of pond

[1] That *F. conradii* represents an intermediate form between *incile* and *canaliculatum* is clearly shown by a series in the Joseph Willcox collection of Fulgurs, presented to the Academy of Natural Sciences, Philadelphia.

snails (but without thread-like striæ such as *Planorbis trivolvis* has). Spire narrow, deeply sunken, with steep sides; the summit of the whorls acutely angular. Umbilicus deeply funnel shaped, the base of the whorls so narrowly rounded as to appear almost angular. Whorls nearly 5, the last very large, rounded at the periphery, somewhat flattened and sloping above, more convex below it. Aperture but slightly oblique, irregularly ovate, angular or subangular above, broadly rounded below, the peristome slightly expanded.

Diam. 36, height 24.5 mm.

Diam. 34, height 22 mm.

Lower Cape Fear River in the vicinity of Wilmington, North Carolina, collected by Mr. Wm. P. Seal.

This species is remarkable not more for its size than for the great width, far exceeding any other species. It differs from *P. trivolvis*, *ammon* and their allies in the surface sculpture and narrower umbilicus. *Planorbis corpulentus* Say is also somewhat related, but its differential features will be obvious in a comparison with Mr. Bryant Walker's illustrations and description of that species, NAUTILUS XIII, p. 133, plate 3 (April, 1900).

OBSERVATIONS ON THE BYSSUS OF UNIONIDÆ.

BY L. S. FRIERSON.

Recently, while collecting young or very small *Unionidæ*, two species were obtained having a byssus. Seven or eight specimens of *Lampsilis texasensis* Lea, were taken so provided, and one specimen of *Lampsilis fallaciosus* Simpson. The *L. texasensis* varied from one-eighth to one-half inch in length, while the *L. fallaciosus* was five-eighths of an inch long.

The size of the shell and the length of the byssus did not appear to bear any constant ratio, nor did the size (or diameter) of the byssus vary. The most of the *texasensis* and also the *fallaciosus* were taken by means of a combination flour scoop and sieve such as is used in our kitchens. This was used to scrape up the bottom, and then the mud washed out leaving the larger stuff behind. In this way the original position occupied by the shells could not be ascertained; but several specimens were taken attached to sticks, and these were hanging suspended in the water clear of the bottom.

The byssus was attached to the soft parts at about one-fourth distance from the anterior to the posterior end.

One of the *texasensis* had a byssus cylindrical in shape, about half the diameter of a human hair laid alongside for comparison. But that of the others and also of the *fallaciosus* was roughly ribbon-shaped, and resembled a flat piece of "molasses pulled-candy," both in texture and in contour. While wet they were very elastic, but exceedingly brittle when dry, appearing to be of the same composition as the ligament of the shell. These ribbons were irregularly twisted, now to the right, now to the left, as well as vertically undulatory. This gave them a sort of spiral spring effect which was quite noticeable.

The proximal end, when separated from the soft parts by slight traction, was bulb-shaped and attached to a style-like process which occasionally could be drawn from between the valves. My appliances were not equal to the task of determining whether this process was an outgrowth of the foot or of the mantle. The distal ends were attached to quite a little raft of heterogeneous material, and I believe that this "raft" serves to make a float, analogous to the balloons by which spiders sail through the air in the autumn months. None of them seemed to be directly fastened to any large body such as sticks or old shells, but merely entangled with the moss or algæ growing on the sticks, etc. The lengths of these byssi were about three to eight inches.

Several very small *Quadrulas* were taken. But no byssus was noted on any of them. Could this feature be a characteristic of *Lampsilis* and closely allied genera?

A NEW GUPPYA FROM FLORIDA.

BY HENRY A. PILSBRY.

Guppya miamiensis n. sp.

The shell is perforate, almost exactly like *Guppya gundlachi* in shape, size and color; glossy and smooth, with *no trace of spiral lines*, even under high magnification. Alt. 1.5, diam. 2.3 mm., whorls $3\frac{3}{4}$.

Miami, Dade Co., Florida. Types no. 77083 A. N. S. P., collected by S. N. Rhoads, 1899.

In Mr. Rhoads' list of Miami shells, published in a former num-

ber of this journal, this was listed as *G. gundlachi*. Mr. Geo. H. Clapp, who obtained some of Rhoads' specimens, directed my attento its distinctness. *G. gundlachi* occurs at a neighboring locality, Lemon City, Fla., as well as throughout the St. John's valley, and in west Florida—probably extending all over the peninsula. It was collected by Mr. Singley at Hidalgo, Texas, and is a well-known West Indian and Mexican species. *G. gundlachi* is invariably characterized by the presence of a sculpture of very minute regular and close, spiral striæ, as mentioned in the descriptions of Pfeiffer, von Martens and others, and as I have confirmed in numerous specimens from Florida, Texas, Mexico and the West Indies.

NEW LAND SNAILS OF THE JAPANESE EMPIRE.

BY H. A. PILSBRY AND Y. HIRASE.

Eulota luhuana yakushimana n. var.

Shell small with conic spire, yellowish red-brown or bright yellowish green, indistinctly streaked with darker or sometimes with two or three bands faintly indicated; wrinkle striate with dense fine spiral lines as usual. Whorls $5\frac{1}{2}$, the last very deeply descending below the periphery of the preceding whorl. Umbilicus very narrow and rapidly contracting within. Aperture nearly horizontal, the upper and lower margins subparallel; peristome narrowly reflexed, thickened within.

Alt. 17.5, diam. 23, width of umbilicus 2 mm.

Alt. 17, diam. 23, width of umbilicus 2.5 mm.

Yakushima, Osumi. Types no. 85752 A. N. S. P., from no. 895 of Mr. Hirase's collection.

This race has the small, contracted umbilicus of *E. l. nesiotica*, but it differs in the very small size and conic spire.

Ganesella moellendorffiana n. sp.

Shell openly umbilicate, depressed, with low conic spire, the base concave around the moderately open umbilicus, one-tenth the diameter of the shell; thin, reddish brown, with a narrow, darker band above and a pale band at the periphery. Surface glossy, weakly marked with growth-wrinkles and densely engraved with minute, spiral lines. Whorls 6, convex, very slowly and regularly increasing, the last but

very slightly descending anteriorly, very slightly angular in front, becoming rounded. Aperture lunate, moderately oblique; peristome thin, narrowly reflexed. Alt. 20.5, diam. 29.6, width of umbilicus 3 mm.

Amagisan, Izu. Type no. 85753 A. N. S. P., from no. 1140 of Mr. Hirase's collection.

This is one of the finest of the *japonica* group of species, resembling *G. jacobii* in contour, but much larger, with a comparatively wider umbilicus and darker in color. It is named in honor of Dr. O. von Moellendorff, in whose untimely death malacology has lost one of the most acute and industrious authorities upon Oriental snails.

Pristiloma japonica n. sp.

Shell minute, imperforate, discoidal, the upper surface very low, conoidal, base convex, periphery rounded; pale yellow, somewhat translucent, glossy and almost smooth, very faintly striate radially above. Whorls $5\frac{1}{3}$, slowly widening, slightly convex, the base impressed in the center. Aperture nearly vertical, narrowly lunate, the outer lip acute and thin, strengthened a short distance within by a white, callous ridge, showing as a buff streak outside; columellar margin narrowly reflexed at the insertion. Alt. 1.5, diam. 2.7 mm.

Toya, Kuziro, in eastern Yesso. Types no. 85754 A. N. S. P., from no. 1146 of Mr. Hirase's collection.

It is impossible to say whether this is really a *Pristiloma* until the jaw and teeth can be examined; but from the close resemblance of the shell to *P. lansingi*, the generic reference seems probable. There is no Oriental group to which it could properly be referred, to my knowledge. It is a new generic type for Japan.

NEW PISIDIA.

BY V. STERKI.

Pis. complanatum n. sp. Mussel inequipartite, slightly oblique, moderately inflated; superior margin short, somewhat curved, with rounded, more or less projecting angles at the scutum and scutellum; posterior part short, truncate, passing with a rounded angle in the inferior margin, which rises in a strong curve to the rounded-angular anterior end; supero-anterior slope not well marked, slightly curved;

beaks rather posterior, projecting over the hinge margin, slightly bulging anteriorly and posteriorly, flattened laterally; surface with very fine, almost regular striæ and a few faint lines of growth, with a slight, silky gloss; color light to brownish-horn; shell scarcely translucent; nacre thin, with the muscle insertions visible but not impressed; hinge slight to moderately stout, plate rather narrow, right cardinal tooth curved, occupying the whole width of the plate, its anterior end abruptly thick and grooved or bifid, its ends are connected by the sharp, inferior edge of the plate, thus forming a groove; left anterior cardinal tooth short, curved or angular, the posterior quite short, small, oblique; lateral teeth moderately stout, with short, pointed cusps, the outer ones of the right valve quite small but distinct; ligament short, comparatively stout.

Long. 3.2, alt. 2.8, diam. 1.8 mill.; long. 2.7, alt. 2.4, diam. 1.6 mill.

Habitat: Little Black Creek and lakes in Muskegon Co., Michigan, sent by Mr. Bryant Walker.

This species is different and distinct from all our Pisidia. It somewhat resembles *P. ultramontanum* Pr., but is much smaller, its beaks are narrower, of different shape and more prominent. Some of the specimens from the creek are higher over the beaks and in the posterior part, and thus the mussel is of a rather different shape. In others, the beaks are less flattened, laterally.

Pis. rowelli n. sp. Mussel well inflated, elliptical-ovate in outline, angles at scutum and scutellum slightly projecting, broadly rounded; posterior margin just perceptibly subtruncate, supero-anterior slope slightly marked; beaks a little posterior ("in normal position"), large, rounded, projecting over the hinge margin; surface shining, slightly and irregularly striate, with a few coarser lines of growth; horn colored to brownish over the beaks, usually with a lighter zone along the margins, not sharply defined; shell translucent, rather thin; hinge slight, plate rather narrow; right cardinal tooth angular, with its posterior part thicker and grooved, left anterior short, triangular, placed high up on the plate, the posterior much longer, oblique, curved; lateral teeth with rather short, abrupt cusps in the left valve; the outer ones in the right valve small; ligament slight.

Long. 7.5, alt. 6.2, diam. 4.5 mill.

Habitat: Near Sisson, at the foot of Mount Shasta, California, collected by Rev. J. Rowell.

This large and beautiful Pisidium cannot be mistaken for any other species. It seems to be related to *abditum* Hald., and some of the old-world Pisidia. Young specimens are very little inflated, and of a light, almost whitish color.

Pis. cuneiforme n. sp. Mussel inequipartite, oblique, moderately to rather well inflated, mostly so near the beaks; hinge margin slightly curved, the angles at the scutum and scutellum projecting; anterior part considerably longer, attenuated, somewhat cuneiform, and directed downward, the end rounded, supero-anterior slope well marked, straight or slightly curved; posterior part short, subtruncate; beaks moderately large and slightly elevated over the hinge margin; surface finely and irregularly striate, pale to yellowish horn-colored, or whitish, dull to shining; shell opaque to subtranslucent, thin; hinge slight, short, plate narrow; cardinal teeth placed far towards the anterior, well formed; the right curved, its posterior part slightly thicker and grooved; the left anterior well curved, the posterior slightly so, almost longitudinal and above the anterior, long; right lateral teeth slight, cusps low and rounded, the outer ones well formed; in the left valve the cusps are short, high, abrupt, pointed; ligament slight.

Long. 2.8, alt. 2.4, diam. 1.8 mill.

Habitat: Michigan and Minnesota. In Michigan: Byer's trout pond, Kent Co.; Blue Lake and Green Creek, Muskegon Co.; Hess Lake, Newaygo Co.; Lake Michigan, at High Id. Harbor. Clearwater River, Stearns Co., Minn. Collected by Messrs. Bryant Walker, H. E. Sargent and R. G. Kirkland.

Specimens were received in 1895, and again in '98 and '99, and then regarded as representing a distinct species. Yet the number of specimens from each place being limited, it seemed advisable to wait for more materials.

Pis. cuneiforme has some resemblance with *P. subtruncatum* Malm. and (var.) *cuneatum* Blz., of Europe; but the beaks are broader, less elevated; the surface striation and appearance are different, and the young of both show more differences between each other than the adult. Of our North American species, it has resemblance only with some forms of *P. compressum*, but our species is much smaller and its anterior part is longer, comparatively. Young and half-grown specimens are comparatively shorter, less inequipartite and less oblique.

A well-marked feature of the hinge is, as it seems, the relative position of the teeth, the distance between the cardinals and posterior lateral cusps being twice as long as that between the cardinals and anterior laterals. In other species, *e. g.*, *Pis. compressum*, *variabile*, *noveboracense*, that difference is much less marked, and in *P. virginicum* the cardinals are about equidistant from the laterals.

NEW LAND SNAILS FROM SOUTH AMERICA.

BY C. F. ANCEY.

Epiphragmophora orophila Anc.

Testa umbilicata, umbilico margine columellari fere prorsus obtecto, depressa, solidula, subnitida, fusco-olivacea, supra medium fascia fulva cincta, supra oblique et irregulariter striata, striis rugiformibus, subtus exilioribus, præterea passim et minute malleata atque spiraliter infra impressiuscula. Spira convexa, obtusa, late subconoidea. Anfractus $5\frac{1}{4}$ convexi, sutura impressa, in ultimo subirregulari discreti, ultimus relative magnus, antice sat breviter deflexus. Apertura obliqua, transverse oblonga, intus fuscula, fascia transmeante. Peristoma album, incrassatum, anguste expansum, basi reflexum et intus dilatatum, ad columellam late supra umbilicum eversum, marginibus sat remotis, basali declivi.

Diam. $29\frac{1}{2}$, min. 24, alt. 16 mill.

Hab. in Andibus Peruviæ.

This shell, received by MM. Sowerby and Fulton as *E. clausomphalos* (?), Dev. & Hupé, is quite unlike the latter, but is related to a species of smaller size that one of these gentlemen sent me some years ago as *E. Farrisi* Higg., or rather *E. Higginsi* Pfr., the former name being preoccupied. However it does not seem to correspond with the original diagnosis. The present species is larger, its surface is rough but of a plain brown color, ornamented with a brown band and the umbilicus is nearly closed.

Epiphragmophora Turtoni Anc.

This I have described in the journal as probably Bolivian, but subsequently my friend Mr. Gude has described from Paraguay an *E. Dormeri*, which appears to be very close to it and of which I have seen the type in his collection. Both are probably from the same

country. *E. turtoni* is larger, a trifle more depressed, and is furnished with a single median brown band. Otherwise the two species are very much alike.

Porphyrobaphe sarcostoma, n. sp.

Testa imperforata, solida, ovato-oblonga, nitida, striis incrementi lævibus oblique notata, in parte infera ultimi anfractus obsolete et superficialiter lineis spiralibus vix impressa, sub epidermide lutescente fuscula vel cinereo-fulva, atque strigis seu lineis undulatis vel fulguratis crebre picta, præterea obscure saturatius 3 vel 4-fasciata, fasciis ob lineas persæpe interruptis, duabus primis in anfractibus superis continuatis, apice pallido. Spira conoidia, modice elongata, obtusa. Anfractus $6\frac{1}{2}$ convexiusculi, duo primi microscopice punctati, ultimus regulariter oblongus, ad aperturam brevissime ascendens. Sutura parum profunda, inferne (an casu fortuito?) impresso marginata. Apertura subobliqua, elliptico-oblonga, intus cœrulescenti-albida, fauce nitida, fusco-carnea; superne angulata, postice ad basin columellæ tantisper subangulata. Columella intus plica supera mediocri alba oblique ascendente munita, postea subarcuata. Peristoma callosum, crassum, undique breviter expansum et reflexum, albido-carneum, ad basin dilute fusculum, marginibus callo valido ejusdem coloris junctis.

Long. 7.4, lat. 3.1, alt. apert. (oblique, cum perist.) $3\frac{1}{2}$ mill.

Hab. in Colombia (?).

I saw only one example of this beautiful species and it is in my collection. I can compare it with no other, the color of lip and throat being a striking feature.

(*To be continued.*)

MRS. HENRIETTA H. T. WOLCOTT.

We regret to chronicle the death of Mrs. Henrietta H. T. Wolcott, of Dedham, Mass., following a severe accident. She passed away after much suffering, October 8th, in the 78th year of her age. Mrs. Wolcott was deeply interested in the study of nature, was a proficient botanist, and of late years interested in Conchology. A wide traveler, she was never happier than when engaged in gathering interesting material suitable for educational purposes; and many small, well-

chosen school collections were given by her to educational institutions and public schools. In the course of her travels she frequently obtained new or rare specimens which she shared with cordial pleasure with those students to whom they were of special interest. Her last contribution of this kind was the *Sonorella Wolcottiana* from Palm Springs, in the desert region of southeastern California. Philanthropic work also claimed much of her attention, to which she brought a mind clear and sensible, broadened by experience of many years at home and in distant countries. Mrs. Wolcott was the daugher of Joseph and Eleanor Eustis, of Boston, and the widow of the late John W. Wolcott. She leaves a son and two daughters, besides many, not bound by ties of relationship, yet who will remember her as a friend, benefactor, or co-laborer.—W. H. D.

NOTES AND NEWS.

Shells of Douglas Co., Central Washington.—Prof. R. E. Snodgrass collected a small series of shells at Grand Coulee, Blue Lake, in July, 1902, comprising the following species.

"Pyramidula" strigosa Gld. (small var.).
Agriolimax campestris Binn.
Succinea nuttalliana Lea.
Succinea gabbi Tryon.
Limnæa nuttalliana Lea.
Limnæa adelinæ Tryon.
Limnæa near sumassi Bd.
Planorbis trivolvis var. horni Tryon.
Planorbis parvus Say.
Physa triticea Lea.
Pisidium compressum Prime,
Pisidium sp. undet.

This locality must be near or at the western limit of *P. strigosa*. Specimens are in the coll. of the Washington Agricultural College at Pullman, Wash., and that of the Academy at Philadelphia.—*H. A. Pilsbry.*

Schismope rimuloides (Cpr.) *at San Diego.*—This species was described by Carpenter as a *Scissurella*, from Mazatlan. In examining some specimens sent some years ago as "*Vanikoro?*" by Henry Hemphill, I found that they were the species named above. I do not know that this genus has been reported from California hitherto. —*Pilsbry.*

THE NAUTILUS.

VOL. XVII. DECEMBER, 1903. NO. 8.

A NEW CALIFORNIAN TRIVIA.

BY WILLIAM J. RAYMOND.

During the summer of 1901 the University of California, with the financial aid of friends in Los Angeles, maintained a Marine Biological Laboratory at San Pedro, California, and carried on biological exploration along the coast from Redondo to Newport, around Catalina Island, and from Los Coronados Islands to La Jolla in the vicinity of San Diego. The large gasoline launch "Elsie" was chartered for the summer and equipped with apparatus for the study of the physical environment of marine life, including depth, temperature and salinity of water and character of bottom. Collections of specimens were made within the regions named, from shore-line to an extreme depth of 100 fathoms. For this purpose the launch was provided with a winch and rope, dredges, trawls, tow-nets and receptacles for the preservation of the specimens. The molluscan collections, which were large and interesting, were placed in the writer's hands for identification and report. In advance of a complete report it is desirable to put certain observations on record, among them the descriptions of new species encountered. A previously known but undescribed species of *Trivia* is:

Trivia ritteri n. sp. Shell small, white, form ovate, inflated, anterior extremity slightly produced, spire completely covered, but rather prominent, base convex, outer lip margined, strongly sculptured with about twenty, smooth, sharp ribs, much narrower than the interspaces which are nearly flat and scarcely roughened by irregular rugæ parallel to the axis of the shell, no sulcus, the ribs continuing

unchanged in width across the back, except that occasionally a few ribs near the spire are interrupted at the median line; a few short intercalary ribs are usually present on the sides of the shell; aperture rather wide, armed with 17 to 18 denticulations on the outer lip, and 14 to 16 on the inner. Two extreme specimens in size measure: length 11.5, breadth 8.6, height 7.2 mm.; length 9.2, breadth, 6.5, height 5.7 mm.

Catalina Island, 60 fathoms (Cooper); Monterey (Dall); Cortez Bank, 54 fathoms (Dall); Catalina Island near Avalon, 40 fathoms (Sta. 21, U. C. M. B. L.); off San Pedro, about 50 fathoms (Sta. 83, U. C. M. B. L.).

A dead specimen and a fragment of a second, collected more than thirty years ago by Dr. Cooper, as cited above, but wrongly identified as *Trivia sanguinea* Gray, are now in the museum of the University of California. If the admission of *T. sanguinea* to the Californian fauna rests solely upon this identification, the name should be removed from our lists. See Cooper's Geographical Catalogue of the Mollusca Found West of the Rocky Mountains, 1867, No. 626.

To Dr. Dall is owing the citation of localities which considerably extend the known range of *T. ritteri*. A specimen was submitted by Dr. Dall to Mr. J. Cosmo Melvill, of Manchester, England, who considered it new after comparison with *T. multilirata*, *europæa*, *candidula*, *pellucidula*, etc. In the character of the ribs it somewhat resembles *T. buttoni* Melv., but differs in color, being white instead of straw-colored, in having about twenty instead of fourteen ribs, and in its size, the latter species being 5.5 mm. in length. *T. ritteri* differs from *T. europæa* in the ribs, which in the former species are less numerous, sharp, and much narrower than the interspaces, while in the latter they are more rounded and wider. The shell of the latter is also more inflated. From *T. panamensis* Dall, the present species differs in much greater size and more numerous ribs. It gives me great pleasure to dedicate this beautiful species to Professor William E. Ritter, in charge of the University of California Marine Biological Laboratory at San Pedro, 1901.

ANNIE M. LAW.

For much of our knowledge of the mollusk fauna of east Tennessee and western North Carolina we are indebted to two ladies, Miss

ANNIE M. LAW and MRS. GEORGE ANDREWS. Before them, RUGEL had made a beginning in this beautiful but difficult mountain country. Until FERRISS and his friends began their explorations, these three enthusiasts were the only naturalists to exploit the region for land mollusks.

Miss Law[1] came from distinguished English ancestry. Her parents were John and Ann Law, of Carlisle, England. Her uncle, Richard Law, was governor of Malta. Other relatives who rendered services to the State were Chief Justice Lord Ellenborough, the Bishop of Bath and others. The Law family records were destroyed during the Civil War, so that the exact date of Miss Law's birth cannot be ascertained; but her father, John Law, came to America about 1850, Miss Law being about nine years old at that time.

"Mr. Law located some nine miles from the town of Maryville, Blount county, Tenn., a wild, mountainous country, though there was a watering-place about two miles distant where the *elite* of the South came through the summer for health and rest. Otherwise our neighbors were illiterate. There were no schools or churches, so that our parents were our teachers and companions. My father died in 1852 or '53. During his lifetime on the farm, my sister would ride into Maryville and recite Latin and algebra to Dr. Anderson (the founder of Maryville Theological Seminary) once or twice a week. Then moving into the town, she still continued these studies. She passed the examination for teaching school, and received a certificate at the age of thirteen. Being large for her age, she was given a school. She was proficient in music and gave lessons.

"Through Col. W. G. McAdoo, of Knoxville, she was introduced to Dr. James Lewis, of Mohawk, N. Y., who wished her to collect shells. She had from childhood a taste for shells, mineralogy, entomology, botany, in fact everything connected with nature. She began a correspondence with Dr. Lewis about 1868, which continued until his death. She had also a number of other correspondents in America and abroad.

"I might write a long story about some of her trips while collecting. After being in California four years, she returned to Tennessee and spent several months there. On one occasion, Dr. Lewis wished some

[1] The following account is from data and a biographical sketch furnished by Mrs. Fannie Law Andrews, Miss Law's younger sister.

particular shell from Bald Mountain in the Great Smoky Mountains. She procured a young man friend and two horses, and setting out from Concord, Knox county, went to the top of the Big Bald and procured the shells desired. They had to spend the night there. During the night there was a terrific thunder-storm far beneath them. She never enjoyed a trip more. Another trip she made in Monroe county was from Jalapa to Telico Plains. The distance was not great, but it was a bitter cold morning, the banks of the river covered with ice. She wore rubber boots, and wading in, got beyond her depth; but she got the shells. On this trip, I was her companion. As there was no house on the side I was on, I followed with bare feet. She suffered very much, not having dry footwear; but we soon reached a comfortable fire at a friend's, dried our things and were made comfortable. My sister never seemed to think of her own comfort when engaged in the search for shells. Many such exposed trips she made, the effects of which I think undermined her health.

"When she returned to California the second time, I was with her. We came by way of Mohawk, N. Y., visited the family of Dr. Lewis, and had the pleasure of seeing his collection. We also made a flying trip to Florida, visiting Jacksonville, St. Augustine, Palatka and Silver Springs. Wherever we were, she collected shells."

In California, Miss Law made her home at Watsonville, Santa Cruz county, with her sister, Mrs. Andrews, until her death, January 12, 1889.

Among the species discovered by her are *Gastrodonta acerra*, *Vitrinizonites latissimus*, *Polygyra chilhoweensis* and *P. lawi*.

NOTE ON MUREX MARCOENSIS SOWERBY.

BY FRANK COLLINS BAKER.

In the Journal of Malacology, volume 7, p. 162, Mr. G. B. Sowerby has described a Murex marcoensis from Marco, Florida. This form was previously noted by Dr. W. H. Dall and the writer of this note, it being considered by them a color variety of Murex messorius Sowerby. Dr. Dall, in speaking of Murex messorius says (Bull. Mus. Comp. Zool., v. 18, p. 196), "The Florida specimens are often of a deep rose-pink." In Trans. Acad. Sciences, St.

Louis, the writer remarked on p. 377, "Dr. W. H. Dall has characterized a variety *rubidum*, from Cedar Keys, Florida, the shell being of a deep pink color." The writer was in error in stating that Dr. Dall had characterized the variety *rubidum*, he having simply referred to the rose color.

The history of this variety will therefore stand as follows:

1889. Dall: *Murex messorius* (Sowb.) Reeve, pink variety, Bull. Mus. Comp. Zool., v. 18, p. 196.

1897. Baker: *Murex messorius* (Sowb.) Reeve, var. *rubidum* "Dall," Trans. Acad. Sci., St. Louis, v. 7, p. 377.

1900. Sowerby: *Murex marcoensis*, Journ. of Malocology, v. 7, p. 162.

If the two forms are the same, which I have no reason to doubt, it will stand as *Murex messorius* var. *rubidum* Baker.

NEW LAND SNAILS FROM SOUTH AMERICA.

BY C. F. ANCEY.

Porphyrobaphe galactostoma Anc.

P. galactostoma Anc. in Bull Soc. Malac. Fr., 1890, p. 153 (juv.). *P. yatesi* Pfr. var. *albolabris* Dohrn, in Cat. Staudinger.

Testa imperforata, solidula, subglutinosa nitens, oblongo-attenuata, vix lineis incrementi notata, epidermide luteo-virenti induta, fasciis 4 badiis (supera angusta, infera late sed parum distincta), strigis fulguratis luteis interruptis in ultimo anfractu eximie picta, fasciis 2 superis in anfractibus prioribus conspicuis. Spira conoidea, regulariter attennata, apice obtuso, pallide lutescenti-albo, microscopice punctato-rugoso seu vermiculato. Anfractus $6\frac{1}{4}$ convexiusculi, sutura lineari, albida, infra linea fusca marginata, ultimus oblongus, ad aperturam breviter ascendens. Apertura subobliqua, inferne distincte recedens, elliptico-oblonga, utrinque angustata, ad basin columellæ angulata, nitide lactea, fauce alba. Columella superne late calloso-plicata, postea fere recta, cum basi sinulum latum efficiens, expansa et dilatata. Peristoma candidum, callosum, late expansum et reflexum, nitidum, marginibus callo eximie candido junctis.

Long. 78, lat. 33, alt. apert. (oblique cum perist.) 38 mill.

Hab. Eastern Peru (fide Staudinger).

This is closely allied to *P. sublabeo* Anc., *P. vicaria* Fult., and *P. Yatesi* Pfr., all from Peru, but is remarkable for its pure white reflected lip. It was originally described from a juvenile specimen, imperfect in several respects.

Porphyrobaphe victor Pfr.

I secured an authentic specimen of *P. Augusti* Jouss. (Bull. Soc. Zoöl. de France, 1887, p. 1, pl. III, fig. 10), and cannot see that it differs from Pfeiffer's species.

Bulimulus Blanfordianus, n. sp.

Testa anguste et obtecte rimata, oblongo-attenuata, parum solida, lineis incrementi grossiusculis, sub suturam pliculosis, infra et prope aperturam lævioribus, et striis exilibus, in ultimo anfractu parum conspicuis crebre sculpta, castaneo-fulva, punctulis luteis parvis passim notata, apice nudo, pallide fuscescente. Spira conica, lateribus convexis, acutiuscula. Anfractus $6\frac{1}{4}$ convexiusculi, ultimus oblongus, subattenuatus. Apertura distincte obliqua, intus nitide cœrulescens, ovalis, supra attenuata. Peristoma simplex, obtusum, margine dextro regulariter convexo, basali rotundato, columellari dilatato, perforationem fere omnino tegenta, adnato, lacteo, dextro et columellari callo cœrulescente junctis. Columella intus pliciformis, spiraliter recedens.

Long. 55, lat. $25\frac{1}{2}$, alt. apert. $27\frac{1}{2}$ mill.

Hab. Iquico, Bolivia, 3500 met. above the sea (fide Fulton).

A very large Bulimulus, respectfully dedicated to Mr. W. T. Blanford, the well-known writer on Indian shells. It is closely allied to *Bulimulus anthisanensis* Pfr., from Ecuador, but is much larger and more capacious. In that respect it resembles *B. inca* d' Orb., more than any other species from the same country, but the two species are clearly distinct.

A NEW SCISSURELLA FROM PATAGONIA.

BY PAUL BARTSCH.

Scissurella dalli spec. nov.

Shell minute, moderately elevated, whorls increasing uniformly and rapidly in size from the extreme apex to the aperture. Nepionic

whorls one and one-half, not enlarged, dextral, translucent, shining, without sculpture. Post-nepionic whorls two, decidedly inflated, with the slit about half way between the suture and the periphery, open only in about one-twelfth of the last turn, marked on the rest as a narrow, moderately deep, depressed groove, which is bounded on each side by a raised thread. The remaining ornamentation of the whorls consists of feeble, raised, equally-spaced, axial riblets, which follow the curve of the outer lip. These riblets are best developed between the suture of the whorls and the slit, becoming enfeebled toward the periphery and quite obsolete on the base. In addition to these, a few ill-defined spiral lirations manifest themselves under high magnification between the suture and the slit. Suture strongly impressed. Periphery of the last whorl well rounded. Base rather depressed and somewhat concave toward the umbilical region, marked by the faint continuation of the axial riblets and many exceedingly fine spiral striæ. Umbilicus narrow, deep, bounded by a weak basal fasciole. Aperture large, broadly pyriform with continuous peritreme, posterior angle obtuse, somewhat patulous anteriorly; outer lip thin; columella oblique, thin; parietal wall distinct, reflected upon the body whorl, partly closing the umbilicus.

The type is in the U. S. Nat. Museum collection, No. 171400, and comes from the Gulf of St. George, Patagonia. It measures, long. 0.8 mm., diam. 1.4 mm.

GENERAL NOTES.

VITRINA DEPOSITING EGGS.—You may be interested to know that on November 8th, and again to-day (November 15th), I found *Vitrina limpida* Gld., depositing their eggs. The eggs are white, almost round, some of them being slightly pointed at one end, and about 1 mm. in diameter. They are laid in bunches of six or eight, under rotting wood on the ground.

In the ten years during which I have been watching this "colony," I have never seen a young shell, but think the eggs are hatched in the early spring, the snails reaching maturity in the autumn. From October to January is their active season, and during those three months they can be found moving around on any pleasant day. Have found them very active when the temperature was below 40°.—GEO. H. CLAPP, EDGEWORTH, PA.

PUBLICATIONS RECEIVED.

Mollusks of Our Southeastern Coast.—The United States National Museum has recently published a reprint of its Bulletin No. 37: "A preliminary catalogue of the shell-bearing marine mollusks and brachiopods of the southeastern coast of the United States, with illustrations of many of the species," by William Healey Dall. The first edition of this work, published in 1889, having become exhausted, the reprint has been found advisable to meet the requests for copies.

The body of the reprint is a verbatim copy of the earlier edition, but the usefulness of the work has been much increased by the addition of 21 new plates, containing 188 figures.

It is a classified list of the shell-bearing marine mollusks found between Cape Hatteras and Mexico. For each species the author has indicated the extreme northern and southern range, and some of the more important intermediate localities; the range in depth; the range in time, and its occurrence in Europe, if it be known to occur there. The average length of specimens of part of the species is given. 95 plates, containing many hundreds of excellent figures, illustrate a great many of the species. The reprint is obtainable by those properly entitled to receive it.—W. B. M.

List of British Non-marine Mollusca.—By B. B. Woodward (Journal of Conchology, x, pp. 352–367, Oct. 1, 1903). British conchologists have been among the most conservative in matters of nomenclature and taxonomy. For many years it seemed that no material innovation from the arrangement in Jeffrey's British Conchology could obtain recognition in the non-marine mollusks of the tight little isle. In the last few years all this has been changed. The great progress of malacological science abroad and the revival at home, signalized by the formation of the liveliest Malacological Society in the world, has finally lead to the revision of the British list now before us. The general classification followed is that of Fischer, but greatly modified in details of family and generic divisions. A few points of especial interest to American conchologists may be mentioned here. The name *Vitrea radiatula* is preferred to that of *V. hammonis*. Mr. Woodward concludes that "there is a costate form of *Vallonia* in America distinct from the

costate variety of *V. pulchella* present in Britain, and I recommend that until it can be demonstrated more conclusively than has at present been done that there are two British species, the costate form be classed as a variety of the typical *V. pulchella*." The name *Tachea* being preoccupied for a genus of birds, *Cepæa* Held is substituted. The nomenclature of "Buliminus" is discussed, and that name is replaced by *Ena* of Leach, and the family name is changed to *Enidæ*. *Pupa* is discussed at length. It appears that that name was first used for species of *Actæon* and *Cerion*, and finally by Drapernaud for what is now known as *Pupa*. Mr. Woodward concludes that *Jaminia* Risso, 1826, is the earliest available name for the *Pupa muscorum* group.

In the Basommatophora, *Phytia myosotis* replaces the familiar *Alexia*, preoccupied in Coleoptera, and *Oratella* takes the place of *Leuconia*, being earlier. *Planorbis glaber* Jeffr. is definitely separated from the American *P. parvus*. Mr. Woodward disputes the propriety of Dall's course in substituting *Corneocyclas* for *Pisidium*, but otherwise the generic nomenclature of bivalves calls for no special comment.

Mr. Woodward uses the emended forms "*Dreissensia*," "*Vivipara*," "*Aplecta*" and "*Assemania*," a course against the general usage in this country.—H. A. Pilsbry.

On Some Mollusca Known to Occur in Indiana.—By W. S. Blatchley and L. E. Daniels (27 Ann. Rep. Dept. Geology and Nat. Resources of Indiana for 1902). This paper of 100 pp. is supplemental to the report on Indiana mollusks by Dr. R. E. Call, published in 1899. Some 92 species are added to the fauna of the State, a large number of them being figured and all described. Some little known or new forms are among those illustrated, such as *Succinea calumetensis* Calkins, *Limnæa woodruffi* Baker, *Ancylus shimekii* Pils., *Lithasia obovata biconica* and *Goniobasis indianensis* Pils., various *Pisidia* described recently by Sterki, *Lampsilis blatchleyi* Daniels, etc., so that the report is of general interest to those studying our inland mollusks.

The same Annual Report includes A Check List of Indiana Mollusca with Localities, by L. E. Daniels. 277 species have been ascertained to occur within the State.

CONTRIBUTIONS TO THE TERTIARY FAUNA OF FLORIDA.—By Wm. H. Dall. Trans. Wagner Free Institute of Science, Philadelphia, vol. iii, pt. vi.

This constitutes the concluding part of Dr. Dall's extensive work. The entire volume (iii) comprising 1654 pages and 60 plates, constituting the most valuable and exhaustive treatise on the American Tertiary fauna ever presented, and forming a work indispensable both to the conchologist and palæontologist.

Parts I and II are devoted to the Gastropoda, and the remaining parts to the Pelecypods, Part III being given up entirely to a new classification of the latter. All the parts as they have appeared have been reviewed in the pages of THE NAUTILUS.

The present work takes up the family *Veneridæ*, with a history of the various generic names employed; most of the changes in nomenclature have, however, been noted in the "Synopsis of the Veneridæ" (Proc. U. S. Nat. Mus., xxvi, 335), but this work in many cases covers the ground more thoroughly, giving the complete generic and specific synonomy of many of the recent forms which extend into the tertiary. 41 new species are described.

In the family *Lucinidæ* there are 33 new species, and in the *Chamidæ* seven. The subgenus *Echinochama* Fischer is given generic rank. The family *Carditidæ* is also well represented in the tertiary, 18 new species being described. The *Cyrenidæ* contains several new forms, the section *Cyrenodonax* Dall., the type of which, *C. formosana* Dall, n. sp., "Recent in Formosa, at the mouth of the Tamsui River," is described in a foot-note. *Miodontopsis* is proposed for *Miodon* Sandberger 1870, not of Carpenter, 1865. *Ageria* Roissy is adopted in place of *Galatea* Brug. (*Galathea* Lam.) 1803, not Fabr. 1793. Type *G. radiata* Lam.

In regard to the small fresh-water forms usually referred to the *Cyrenidæ*, Dr. Dall says: "While closely related, it seems more convenient to place *Sphaerium* and *Corneocyclas* (= *Pisidium* Pfeiffer) in a separate family," *Sphaeriidæ*.

Crassatellites Krüger 1823, which supplants *Crassatella* Lam. 1801, not of Lam. Prodome 1799, is largely represented in the American tertiary. The recent *C. floridana* Dall, described from a young shell, proves to be the same as *C. gibbesii* T. & H. *Crassinella* Guppy is given only subgeneric standing. *C. lunulatus* Conr. is restricted to the fossil, the recent form being *C. mactracea* Linsley.

The *Astartidæ* number 22 species, of which seven are new. *Cyclas* Bruguiere 1798 (1st species *Venus islandica* Linn.) replaces *Cyprina* Lam. 1818, and is located with *Trapezium* and *Coralliophaga* in the family *Pleurophoridæ*. *Pandora carolinensis* Bush is considered the same as the Miocene *P. arenosa* Conr. *Laternula* Bolten 1798 = *Anatina* Lam. 1809.

To the readers of THE NAUTILUS the many recent changes in nomenclature may, perhaps, be better understood by the following extract from the author's preface: "In the years which have elapsed since this Memoir was begun, the subject of zoölogical nomenclature has been much discussed and the general consensus of opinion seems to trend towards the acceptance of names for which no diagnosis was originally supplied, provided the species cited under them are identifiable. This change from the British Association rules of 1842 is responsible for much unnecessary overturning of formerly accepted names with no visible benefit to science, but since it appears to express the will of the majority, it seems useless to oppose it, and in Parts IV–VI it has been complied with, except in the case of the anonymous auctioneer's catalogue, known as the 'Museum Calonnianum.' This compilation from a manuscript of Hwass, edited by Da Costa, and printed for the auctioneer, George Humphrey, has usually been credited to the latter. I confess, my desire to settle the nomenclature on a firm basis, though great, has not been equal to the acceptance of these anonymous, undefined, worthless names, which would involve the loss of much that is fundamental in the nomenclature of mollusks. I still hope that the common sense of naturalists will find a way—if necessary, an arbitrary way—to eliminate this publication from authorized sources of nomenclature. The 'Museum Boltenianum' stands on a different footing, and the principal change which its acceptance involves in the earlier part of this work is the substitution of the name *Busycon* for the more familiar *Fulgur*."

The part closes with a "Discussion of the Geology," followed by descriptions of the several stages or horizons and lists of the species recognized in each, also a summary in tabular form, showing the relations of the faunas to one another. Some idea of the amount of labor involved in preparing this great work may be derived from a foot-note on page 1552: "It may be of interest to note that during the progress of this work approximately eight thousand three hundred and fifty species have been discussed or compared, and eight

hundred and sixty new forms described. More than fifty new group-names, from sections to genera, have been proposed, and more than five times as many reduced to the rank of synonyms as unnecessary or belated. The number of species known at present between the beginning of the Oligocene and the present fauna is between three and four thousand, probably less than half as many as will eventually be obtained and discriminated."

The richness of the tertiary fauna is clearly shown by the lists of species, the bed of the Caloosahatchie River alone containing 639 species, of which 48 per cent. are recent and 28 per cent. are peculiar to the bed. From the Chipola beds 333 species are recorded, about one-half being peculiar to it, thirty-five species surviving to the existing fauna. The Oligocene marl of Bowden, Jamaica, is also very productive, thus far yielding 435 species, of which 12 per cent. appear to be identical with recent species.—C. W. J.

A List of Species of Mollusca from South Africa, forming an appendix to G. B. Sowerby's Marine Shells of South Africa. By Edgar A. Smith (Proc. Mal. Soc., London, v, 354–402, pl. xv). This valuable fauna list enumerates 390 species, including over 300 species not in Mr. Sowerby's work. Nine species are described as new. The region covered includes only the coasts of Cape Colony and Natal. It may be of interest to know that the so-called *Fulgur africanus* Sowb., based on a half-grown shell in poor condition, is a *Fusus;* a figure given of the adult shell shows a columellar callus detached from the whorl at the lower part, forming an umbilical rimation.—C. W. J.

Descriptions of Sixty-eight New Gastropoda from the Persian Gulf, Gulf of Oman, and North Arabia Sea. By Jas. Cosmo Melvill and Robt. Standen. (Ann. and Mag. of Nat. Hist., Ser. 7, vol. xii, pp. 289–324, pl. xx–xxiii.)

This paper contains some very interesting forms, among them two species of the genus *Homalaxis*, a species of *Scissurella*, one *Kleinella*, and a *Fluxina*. All of the species are excellently figured.—C. W. J.

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GUNDLACHIA AND ANCYLUS.

BY WM. H. DALL.

During the last ten years I have frequently announced to acquaintances and assistants interested in conchology, my belief in certain propositions hitherto unsupported by proof, bearing on the so-called genus *Gundlachia*, viz:

1. That *Gundlachia* is merely an *Ancylus* which has under favorable circumstances been able to form a calcareous epiphragm and survive the winter, which ordinarily kills the great mass of individuals, and, while retaining the shell of the first year, to secrete an enlarged and somewhat discrepant shell during its second summer.

2. That not all *Ancyli* necessarily have the ability to do this, but the practice may have developed in certain small species; and in tropical regions where the dry season takes the place of winter it is possible that survival may become more or less habitual with some of these species, though evidence of this is still needed.

On no other hypothesis could I account for the fact that single specimens, or a small lot of specimens on a single occasion (after a specially favorable season?), of *Gundlachia* have been reported from various parts of the world and described as species, but which nobody has been able to find a second time or in any considerable numbers. Also that the young *Gundlachia* cannot be distinguished from an *Ancylus* and usually resembles some common species of *Ancylus* of the same ponds in which the *Gundlachia* appears; while the only species which have been repeatedly collected as *Gundlachia*

come from tropical or southern countries. There is nothing distinctive in the radula or soft parts of *Gundlachia*, as far as yet observed, to separate it from the analogous *Ancylus*.

A paper which, for the first time, brings to bear on this hypothesis facts which seem to render it sufficiently acceptable to publish, has been contributed by Erland Nordenskiöld to the Zoölogische Anzeiger, XXVI, pp. 590–593, July, 1903, with seventeen figures. In this paper to which the reader may profitably refer, a process such as my hypothesis assumes is fully illustrated in *Ancylus moricandi* d'Orbigny, from the Chaco region of Brazil, up to the point of the completion of the epiphragm and the determination of the identity of the forms bearing it with the typical first year *Ancylus*. The formation of the second-year shell or *Gundlachia* by these individuals, alone remains to be demonstrated to establish the hypothesis as a fact.

NOTES ON THE STRUCTURE OF THE SHELLS OF UNIO.

BY L. S. FRIERSON.

The shells of *Unio* are stated by most authors to be composed of three layers, known as the "epidermis," the "columnar" or "prismatic" layer, and the "nacreous," or simply called the "nacre." As a matter of fact, however, these shells are composed of four layers, the nacre being composed of two distinct layers. These may be readily noted in a polished section of some thick-shelled species, and especially if a species be chosen, such as Obovaria retusa *Lamarck*, showing the two layers in different colors. A clearer idea of the two layers may be obtained if the secreting "mantle" be studied. This part of the animal, though called by a single name "mantle" really is composed of two distinct portions, and should have two names. That portion extending from the beaks to the pallial line is thin, and one is tempted to say structureless, while from the pallial line to the margin, it is thickened, and plentifully supplied with nerves and muscles. The extreme edge of this is thickened, and secretes both the epidermal and columnar layers. From this edge to the pallial line is secreted a layer of nacreous material which may be called the extra-pallial layer. If a section of any thick-shelled species be made, it can easily be seen that the

elements of growth of this layer are *diagonal* to the general surface of the shell. From the pallial line to the beaks is deposited the fourth, or intra-pallial layer—the elements of which are parallel to the general surface. The sectionized shell will show the extra-pallial layer wedge-shaped, with the apex at beak, and base occupying the distance from the pallial line to the margin, while the intra-pallial layer is also wedge-shaped, with its apex at the pallial line.

Because the pallial line is composed of very many small muscle-scars disposed in a line, if the two layers could be separated, a sur-

face would be exposed "radially ridged." Sometimes, by decay, this separation is effected, partially, near the beaks, and the "false beaks" so exposed are strikingly "radially ridged"—so much so as to deceive an expert like Dr. Lea. If a thick-shelled *Unio* like *Quadrula trigona* be burnt, this structure can be very readily demonstrated.

It is not impossible that this appearance of decayed or fossilized *Unios* has given rise to the opinion, as stated by Mr. Chas. T. Simpson, that the primeval *Unios* were provided with "radial beak-sculpturing." The difficulty experienced by every collector of obtaining living shells showing beak-sculpturing, and the *a priori* improbability of fossil shells retaining this very perishable character, lends an air of probability to the above theory, which may be further strengthened by the curious fact that *no* North American *Unio* retains the slightest tendency to show their beaks so sculptured.

LAND SHELLS OF MT. DESERT, MAINE.

BY H. S. COLTON.

On Mt. Desert Island last summer I found land shells in six localities. At Hall's Quarries I found *Zonitoides arboreus* near the shore at the edge of the woods. From Seal Harbor I received *Vitrea hammonis* Strom, *Pyramidula striatella* Anth., *Helicodiscus lineatus* Say and *Carychium exiguum* Say. At Coryledge point under boards within a yard or two of the place where the beach began, I found

Pupa muscorum in untold numbers, *Cochlicopa lubrica* Müll, *Vitrea hammonis* Strom, *Zonitoides arboreus* Say and *Succinea obliqua* Say. At Southwest Harbor Village, under planks, by the road-side I found:

Vitrea hammonis Ström.
Zonitoides arboreus Say.
Zonitoides milium Morse.
Vitrina limpida Gld.
Euconulus fulvus Müll.
Strobilops labyrinthica Say.
Vertigo ventricosa Morse.
Sphyradium edendulum Drap.
Cochlicopa lubrica Müll.
Pyramidula striatella Anth.
Vallonia excentrica Sterki.

The great majority of the species that I found were in Sea Wall and McKinley Villages. These two villages were about three miles apart. Here the conditions were the same. New board-walks were being built along the road and the planks of the old one were thrown into the gutter and into the adjoining fields. I found the following under these boards or in the grass near the boards:

Sea Wall Village.	*McKinley Village.*
Vallonia excentrica Sterki, abun.	*Vallonia excentrica* Sterki.
Pupa muscorum L., abundant.	*Vertigo ventricosa* Morse.
Cochlicopa lubrica Müll, abun.	*Cochlicopa lubrica* Müll.
Vitrina limpida Gld. abun.	*Vitrina limpida* Gld.
Vitrea hammonis Ström.	*Vitrea hammonis* Ström.
Euconulus fulvus Müll.	*Euconulus fulvus* Müll.
Zonitoides arboreus Say.	*Zonitoides arboreus* Say.
Zonitoides exiguus Stimp.	*Agriolimax agrestis* L.
Agriolimax compestris Binn.	*Agriolimax compestris* Binn.
Pyramidula striatella Anth.	*Pyramidula striatella* Anth.
Helicodiscus lineatus Say.	*Helicodiscus lineatus* Say.
Succinea obliqua Say.	*Succinea obliqua* Say.
Succinea avara Say.	*Succinea avara* Say.
Acanthinula harpa Say.	*Acanthinula harpa* Say.

I visited a number of islands but explored only a few carefully. I spent an hour on the evergreen woods of Suttons and found a few *Zonitoides arboreus* Say. An hour on Baker's Island, an hour on Black Island and six hours on Little Goat's Island, revealed me nothing. On Little Ram Island, a rock about a hundred feet long covered with about three feet of soil which supports a number of dead spruce trees, I got *Zonitoides arboreus* and *Succinea obliqua* under some dead wood. On Greening's Island, where I lived and explored

most carefully, I discovered two specimens of *Succinea avara* Say under a board in a swamp. On Little Cranberry Island, under boards near the woods, I found:

Cochlicopa lubrica Müll.
Vitrea hammonis Ström.
Euconulus fulvus Müll.
Agriolimax compestris Binn.
Pyramidula striatella Anth.
Succinea avara Say.

With the exception of the places where the board-walk was being repaired, land shells were the most plentiful on great Cranberry Island. The island is shaped like the letter G and is about four miles long. I explored the western part of the island or the back of the G most carefully. The western shore is composed of ledges of solid rock behind which lies an extensive bog. Where the rock wall is low the surf has built "sea walls" by piling up cobblestones, making a steep beach back of which lies the swamp. This swamp and the higher places near the shore are covered with grass, on top of which the sea in times of storm has cast old planks, stumps, boxes and all kinds of rubbish. It was under these that the shells were found. There was one exception however. *Pyramidula alternata* Say, I found under stones. I found them within a foot of where the vegetation ended and the rocks began that went down to the sea. Indeed all the species enumerated below were found within twenty feet of the beach. Sprinkled through the grass are the shells of *Buccinum undatum*, *Littorina* and *Mytilus edulis*. Some have been washed up, others have been carried by the crows and gulls. It has been suggested that it is owing to the abundance of calcium carbonate in the soil due to these decomposing shells that land shells are so very abundant at the edge of the sea.

Vallonia costata Müll.
Pupa muscorum L.
Cochlicopa lubrica Müll.
Vitrea hammonis Ström.
Zonitoides arboreus Say.
Euconulus fulvus Müll.
Agriolimax compestris Binn.
Pyramidula alternata Say.
Pyramidula striatella Anth.
Helicodiscus lineatus Say.
Succinea obliqua Say.

Little Duck Island lies about eight miles to the southward of Mt. Desert and is the most isolated that I visited. It is about a half a mile in diameter and is half covered with a dense growth of woods, principally spruce. Half is bare of trees and is covered with coarse grass, granite ledges out-cropping here and there. Between the woods and the field there is an area of trees. It was here under

sticks that I found nearly everything. I did however find *Zonitoides arboreus* Say and two specimens of *Helix hortensis* and *P. alternata* Say away from any trees. A year ago *Succinea obliqua* was found in great abundance around a spring, but I did not notice them there this year. This year I found them in the area of dead wood.

Pupa muscorum L.
Cochlicopa lubrica Müll.
Euconulus fulvus Müll.
Zonitoides arboreus Say.
Vitrea hammonis Ström.
Helix hortensis Müll!
Pyramidula alternata Say.
Pyramidula striatella Anth.
Helicodiscus lineatus Say.
Succinea obliqua Say.

NEW LAND SNAILS FROM SOUTH AMERICA.

BY C. F. ANCEY.

Bulimulus ephippium Anc.

Testa anguste et profunde perforato (perforatio supra columellari margine obtecta), conoideo-ovata, tenuissima, papyracea, sericea, parum micans, pallide fulvo-lutea, concolor, obsolete et oblique pliculosa, plicis parum regularibus. Spira regulariter conoidea, apice obtusiusculo, microscopice spiraliter striato atque longitudinaliter undulato. Anfractus 6 convexiusculi, sutura impressa, ultimus amplus, initio vix subangulatus, subattenuatus, antice leniter et longiuscule deflexus. Apertura ovata, superne subattenuata et angulata. Peristoma tenue, brevissime expansiusculum, haud reflexum, margine columellari late in trianguli forma dilatato, callo parietali nullo.

Long. 20½, diam. 12, alt. apert. (oblique) 11½ mill.

Hab. Bahia, Brazil (teste H. Fulton).

This is a member of the Eudioptus section.

Bulimulus goniotropis, n. sp.

Testa angustissime perforata, pyramidata, fulvo-cornea, concolor, tenuis, microscopice et confertim spiraliter impressa, striis vix perspicuis, haud profunde incisis, lineis incrementi obliquis subnotato, nitidula. Spira regulariter conica, producta, lateribus rectis, apice sat minuto, oblique et flexuose costulato et striis microscopicis spiralibus sculpto. Anfractus 7 planiusculi, regulariter crescentes, sutura appressa linea impressa marginata divisi, ultimus medio angulatus, infra convexo-declivis, supra angulum vix convexus. Apertura ob-

liqua, emarginato-ovalis, extus haud angulata. Peristoma subincrassatum. Undique breviter patens, ad basin et columellam magis dilatato-expansum, marginibus distantibus, supero strictiusculo, columellari supra perforationem in trianguli forma reflexo.

Long. $20\frac{1}{2}$, lat. $11\frac{1}{2}$, alt. apert. (oblique) $10\frac{1}{2}$ mill.

Hab. Espirito Santo, Brazil.

In texture like *B. pileiformis* Moric., but in general form more like *B. perlucidus* Spix.

Odontostomus squarrosus, n. sp.

Differt a peraffini *O. exeso*, Spix, impressionibus testæ magis numerosis, parvulis, minus elongatis, testa subinde minus undata, plica columellari debiliore, dente supero marginis dextri magis oblique sito, minore ac minus lato; cæterum *O. exeso* simillima. An ejus varietas?

Long. $39\frac{1}{2}$, lat. $14\frac{1}{2}$, alt. apert. (perist. incluso), $18\frac{1}{2}$ mill.

Hab. Brazil.

Odontostomus glabratus, n. sp.

Testa oblongo-fusiformis, perforata, solidula, nitidula, lævigata, obsolete sed in anfractibus prioribus distinctius suboblique striatula, alba, cinereo irregulariter multinotata et strigata. Spira conoideo-attenuata, apice sat minuto, sub lente costulato. Anfractus 9 convexiusculi, sutura impressa, simplici discreti, ultimus ovato-oblongus, ampliusculus, latere dextro depressus et late scrobiculatus, basi parum attenuatus. Apertura superne angulata, subovalis, fere recta, ringens, scilicet: dente lamelliformi parum crasso in pariete, plica columellari supera oblique intrante, dente basali uno sulco extero correspondente et dentibus 2 in margine dextro, primo parvulo, secundo majore, in medio sito. Peristoma expansum, prope insertionem strictiusculum, postea leviter angulatum, marginibus remotis, callo incrassato junctis.

Long. 25, diam. 9, alt. apert. $8\frac{1}{2}$ mill.

Hab. Sierra de Cosquina, Argentina.

Intermediate, as it were, between *O. Wagneri* Pfr., and *leptodon* Mart.

Odontostomus Deraini Anc.

Testa rimato-perforata, fusiformis, subnitida, sordide alba, corneo vel cinereo (statu emortuo) conspersa et irregulariter strigata, con-

fertim et oblique rugoso-plicata, rugis infra magis lævibus. Spira elongata, conoideo-attenuata, producta, apice obtuso, sat parvo, quasi subtruncato, sub lente microscopice costulato. Anfractus 9, convexiusculi, sutura impressa, ultimus oblongus. Apertura irregulariter ovalis, supra angulata, basi ad columellam leviter angulata, parum obliqua, ringens, scilicet: dente lamelliformi magno, compresso in pariete, plica columellari supera oblique intrante, subquadrata et mediocri; dente basali acuto, scrobiculo extero profundo correspondente; et dentibus 2 in margine dextro, primo minutissimo, secundo majore plicæ columellari opposito. Peristoma initio strictum, tum undique expansiusculum, subincrassatum, album, marginibus callo nitido junctis.

Long. 22, diam. $6\frac{3}{4}$, alt. apert. 7 mill.

Hab. Sierra de Cosquina, Argentina.

Allied to *O. Riojanus* Doering, but larger and with different aperture.

Odontostomus gemellatus Anc.

The ground color is brownish in fresh specimens, not white as in the type (a bleached example). A small tooth is sometimes present just above the large columellar plate. The apex is like in *O. punctatissimus* Lea.

Porphyrobaphe sarcostoma Anc.

Since I sent the diagnosis of *Porphyrobaphe sarcostoma*, I have seen the figures given in the *Manual of Conchology* of some varieties of *P. Yatesi*, and acknowledge that my specimen was an extreme form of Pfeiffer's species.

DESCRIPTIONS OF NEW JAPANESE LAND SHELLS.

BY H. A. PILSBRY AND Y. HIRASE.

Japonia toshimana n. sp.

Shell narrowly umbilicate, turbinate, covered with a dark brown cuticle, roughened by delicate wide-spaced thread-like or lamellar striæ and two series of long curved bristles near the periphery. Spire conic. Whorls nearly 5, the first $2\frac{1}{2}$ rounded, the next subangular in the middle, the last obsoletely biangular, fringed at the angles. Aperture slightly oblique, circular, the peristome simple

and thin, in contact with the preceding whorl for a short distance above. Alt. 5, diam. 5 mm.

Toshima, Izu. Types no. 85755 A. N. S. P., from no. 1133 of Mr. Hirase's collection.

This species is larger and more conspicuously fringed than *J. sadoensis*, and darker colored. It does not correspond to any of the species described by Gould.

Eulota (*Aegista*) *kobensis* var. *discus* n. var.

This form is *almost flat above*, though the individual whorls are convex. The last whorl is *angular at the shoulder*, and very convex beneath. The *umbilicus is extremely wide* and shallow, its width contained $2\frac{1}{2}$ times in that of the shell.

Alt. 5.5, diam. 17, width of umbilicus 7 mm.; whorls $5\frac{3}{4}$.

Alt. 6, diam. 16, width of umbilicus 6 mm.; whorls $5\frac{1}{2}$.

Amasaki, prov. Tosa. Types no. 85770 A. N. S. P., from no. 1108 of Mr. Hirase's collection.

Eulota (*Eulotella*) *commoda* var. *izuensis* n. var.

The shells of this race are similar to *E. commoda* from Kayabe, Ojima except in having a much narrower umbilicus. Alt. 5.5, diam. 7, umbilicus 1 mm. wide.

Oshima, Izu. Types no. 85790 A. N. S. P., from no. 1138 of Mr. Hirase's collection.

Eulota (*Plectotropis*) *shikokuensis* var. *hadaka* n. var.

Differs from *Plectotropis shikokuensis* by having comparatively few long low tubercles in place of the dense clothing of scales of *shikokuensis*, and there is no peripheral fringe.

Irazuyama, Tosa. Types no. 85802 A. N. S. P. from no. 1099 of Mr. Hirase's collection. (*Hadaka*, naked.)

Eulota endo n. sp.

Shell narrowly umbilicate, depressed-globose with low conic spire; chestnut brown, glossy, smooth except for slight growth-lines. Spire conoidal, the apex obtuse. Whorls 5, slowly and gradually increasing, a little convex, the last convex peripherally, very slightly descending in front. Aperture oblique, rounded-lunate, the peristome thin, narrowly expanded, the columellar margin dilated and white. Alt. 5.7, diam. 7 mm.

Seta, Omi. Types no. 85784 A. N. S. P., from no. 1113 of Mr. Hirase's collection.

This small, pea-like species differ from *E. commoda* (A. Ad.) by its much less convex whorls (*Eudo* a pea).

Trishoplita mesogonia var. *minima* n. var.

This race differs from *T. mesogonia* in being much smaller, with the peripheral angle decidedly weaker. It is thin, pale brown or brownish corneous, with a tendency to be paler below the suture, and frequently with some whitish spots there; whorls $5\frac{1}{2}$.

Alt. 6.5, diam. 8.5 mm.

Alt. 6, diam. 8 mm.

Tokushima, Awa (Shikoku). Types no. 84713 A. N. S. P., from no. 832 of Mr. Hirase's collection.

Macrochlamys izushichitojimana n. sp.

Shell minutely perforate, depressed, with low conoid spire and a distinct peripheral angle in front, the last whorl becoming rounded on the latter part; very thin, brown, somewhat translucent. Surface somewhat glossy, sculptured with irregular, low, coarse wrinkles along the growth-lines above, smoother and more glossy beneath. Whorls $4\frac{3}{4}$, slowly and regularly increasing. Aperture lunate, the lip simple and acute, with a small triangular dilation at the axial insertion.

Alt. 3.8, diam. 6 mm.

Miyakejima, Izu. Types no. 85944 A. N. S. P., from no. 1058a of Mr. Hirase's collection. Also occurs on Niijima, Hirase's no. 1058, the specimens being slightly smaller with $4\frac{1}{2}$ whorls, and a little paler.

This species is related to *M. semisericata*, but it is larger with more elevated spire, rougher surface and a distinct peripheral angle.

Macrochlamys decens n. sp.

Shell minutely perforate, depressed, biconvex, the spire low conoidal, the periphery obtusely angular, and the base convex; thin, amber-brown, somewhat translucent. Surface somewhat glossy, with slight, irregular sculpture of fine growth-wrinkles. Whorls fully 6, convex, very slowly and regularly increasing. Aperture lunate, the peristome simple and acute, with a small triangular dilation at the axial insertion, the columella noticeably thickened within. Alt. 3.3, diam. 5.3 mm.

Omi-mura, Echigo. Types no. 85782 A. N. S. P., from no. 1119 of Mr. Hirase's collection.

This species of the *Discoconulus* group is larger than most other Japanese forms of that type, and has more numerous closely-coiled whorls than the related species.

Punctum infans n. sp.

Shell depressed, openly umbilicate, chestnut brown, the inner whorls corneous; sculptured with irregular, low and curved, rather widely spaced, obliquely radial wrinkles, which are nearly obsolete beneath, where a faint, close and fine spiral striation may be seen. Spire flattened, the inner whorls projecting slightly. Whorls 3, the last wide, obtusely angular at the periphery, much more convex beneath. Peristome thin and acute. Alt. 1, diam. 1.9 mm.

Hachijo, Izu. Types no. 85781 A. N. S. P., from no. 1067a of Mr. Hirase's collection.

This shell is more angular than the allied *P. amblygonum*. The generic reference is uncertain.

Kaliella sororcula n. sp.

Shell minutely perforate, trochiform, the spire conic with very slightly convex lateral outlines and obtuse apex, base convex; thin, brown, nearly lusterless above, the base somewhat glossy. Whorls nearly 6, convex, the last with an acute, thread-like peripheral keel, which may usually be seen in the suture of the preceding whorls. Aperture oblique, rather narrow. Peristome thin and acute, the columellar margin arcuate, narrowly reflexed and thickened. Alt. 3, diam. 4.8 mm.

Amasaki, Tosa. Types no. 85771 A. N. S. P., from no. 1109 of Mr. Hirase's collection.

With the shape of *K.* (?) *ceratodes* Gude, this species lacks the brilliant gloss of that, the surface being dull, like the much larger *K. gudei* Pils. and Hir., and it is seen to be faintly striatulate under a strong lens.

PUBLICATIONS RECEIVED.

THE PALEONTOLOGY AND STRATIGRAPHY OF THE MARINE PLIOCENE AND PLEISTOCENE OF SAN PEDRO, CALIFORNIA.—By Ralph Arnold (Mem. Cal. Acad. Sciences III, 1903). 4to, 420 pp., 37 plates. This important work, which has engaged Mr. Arnold's attention for some years, consists of three parts, of which Part I is devoted to general descriptions of the Pliocene and Pleistocene beds, their stratigraphy and faunal relations. Mr. Arnold concludes that during the latter part of the Pliocene the climate was much colder than at present, 18.5 per cent. of the species of the

Deadman Island Pliocene being now found living only to the north, many of them not south of the Puget Sound district. During the Pleistocene, warmer climate ensued, the upper San Pedro beds indicating more tropical conditions than those now prevalent. The marine Pleistocene has been found to be enormously developed on the West Coast.

Part II, the descriptions of species, occupies the greater portion of the volume. Nearly all of the species are fully described, and illustrated by good pen-drawings. Since most of the forms are still living, the full descriptions and illustrations will render the work of great use to students of the recent shells of the West Coast; and it should have a wide circulation among West Coast conchologists. Many new forms are described, a large proportion of which will doubtless be found to be also recent. The nomenclature is fairly brought up to date, but there are some exceptions which one might reasonably expect to see corrected, such as the retention of *Trophon belcheri* in "*Chorus*," the use of "*Runella*" for *Gyrineum*, of "*Hipponyx*" for *Amalthea*, and of "*Phorcus*" for *Chlorostoma pulligo*. Neither of the species *bimaculata* and *callomarginata* belongs to *Clypidella*, as was shown over ten years ago. The Chitons seem to have gone astray as to family classification. The two species of *Planorbis* described and figured are incorrectly named. In the *Scaphopoda*, Mr. Arnold admits *Dentalium hexagonum* Sby. and *D. pseudohexagonum* Dall, placing *D. neohexagonum* S. & P. in the synonymy of both. The fact is that *hexagonum* is an oriental species not found in California, and *pseudohexagonum* is a MSS. name, not before published. The common Californian species is rightly known as *D. neohexagonum*. Similarly, *Cadulus fusiformis* S. & P., a species published and figured some years ago, is placed in the synonymy of the hitherto undefined MSS. name "*C. nitentior* Cpr." The figure and description given fix the name *nitentior* on what seems to be the tube of a serpulid annelid. Notwithstanding these and various other oversights, the nomenclature is in the great majority of species abreast of the times. Among many interesting facts brought out, is the absence of *Haliotis* before the Pleistocene in Californian strata. The plates illustrate not only the fossils, but also characteristic views of the principal terranes.

Part III, bibliography, gives a useful list of works dealing with West Coast mollusks, including a complete bibliography of the writings of Dr. R. E. C. Stearns.—H. A. P.

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SHELL COLLECTING DAYS AT FRENCHMANS' BAY.

BY DWIGHT BLANEY.

It is with the desire to return some of the pleasure the writer has derived from the interesting accounts of collecting trips which have appeared in the NAUTILUS, that the following description of a dredging trip in Frenchmans' Bay, Maine, has been written:

Taking a calm morning, with the tide nearly at low-water mark, we start off in a small scow in tow of our fifty-foot steamer. A calm day is to be preferred, as the labor is much reduced, a rough sea making it very uncomfortable in the pitching scow.

The scow is fitted with seats, and gives us plenty of room to coil the 100 fathoms of rope, places for pails, tubs and sieves, with safe corners for glass jars of sea water. We usually dredge in what we know as good fishing-ground, as more shells are found in such places, though all kinds of bottom are tried.

The dredging stations for the day are planned beforehand and we look forward with no little anticipation to the hauling up of the dredge.

We are always hoping to find alive the *Pecten islandicus*, *Thracia conradi*, or the *Aporrhais occidentalis*, as we have only dredged dead specimens before; and the chance of adding new species to our collection keeps us continually hard at work.

To-day we try first, some hard bottom off the northern end of Long Porcupine Island and the first haul brings in about a dozen fine live specimens of the large scallop, the *Pecten tenuicostatus*. This

great scallop, six or seven inches in diameter, is good eating, and we lay them aside to appear later in a different form on the breakfast table. The large stones and dead shells are looked over carefully and we find attached to them the *Crucibulum striatum*, and the Chitons, *Tonicella marmorea*, *Tachydermon albus*, and the *Tachydermon ruber*. On a previous trip we dredged a single, fine specimen of the *Hanleya mendicaria*. This rare Chiton is usually found in much deeper water than the bay.

The remaining sand and mud is now poured into large sieves with handles and looked over carefully. We find alive the beautiful *Margarita obscura*, *Margarita undulata* and *Margarita cinerea*. These are not uncommon, however, and are hurried into the glass jars of water, to be studied later under the microscope. We are always glad to find the *Scalaria groenlandica*, though we find few alive. Many kinds of *Bela* are found, among which are the common *Bela incisula*, also the *Bela scalaris*, *Bela harpularia*, *Bela pleurotomaria*, and the more rare *Bela violacea* and *Bela gouldii*. Also in this section we find the *Velutina haliotoidea*, *Trichotropis borealis*, and the *Lunatia groenlandica*, and the *Trophon clathratus*.

The contents of the sieves are now washed over the side of the scow; the mud washed away and the cleaned sand and shells poured into pails, labelled with the station, depth of water and character of bottom, to be looked over after being dried at home.

A great many specimens are in this way obtained, and much material collected to be separated on rainy days.

We move on now a quarter of a mile to a station with muddy bottom at 25 fathoms, where in a few hauls of black, sticky mud we find numbers of *Leda tenuisulcata*, *Yoldia thraciæformis* and *Yoldia sapotilla*, with quantities of *Astarte undata*, *Cardita borealis*, a few of the *Cardita novangliae*, *Cardium pinnulatum*, *Thracia truncata*, also, of course, great numbers of *Nucula proxima*, *Nucula delphinodonta* and *Nucula tenuis*.

Another haul nearer shore, on harder bottom, brings us *Rissoa carinata* and *Rissoa exarata*. Here also we find the *Chrysodomus decemcostatus*, the *Sipho stimpsonii* and *Sipho pygmaeus*, and a few young *Serripes groenlandicus*, with the pretty zig-zag markings which disappear in the older specimens.

The material is also washed and sifted after being picked over, and with aching backs we rest in the scow as we go ploughing

through the water on the way home. It is by no means easy work hauling the dredge, leaning over the side of the scow to wash the contents of the sieves, and we have narrow escapes from sea-sickness on rough days.

Outside the islands, in deep water, we have dredged the *Dentalium striolatum*, valves of the *Panomya norvegica*, *Mya truncata* and *Liocyma fluctuosa*, and alive the *Menestho albula*, *Admete couthouyi*, *Puncturella noachina*, *Lepeta caeca*, *Modiolaria nigra*, *Modiolaria discors* and *Modiolaria corrugata*, also the *Cardium islandicum*.

On arriving home, the material collected is spread in the sieves to dry in the sun, and we find it difficult to wait until it is dry enough to bring into the work room. It is only by careful picking over that the smaller species are obtained and it is in this way that we get good series of the *Rissoidæ*. The *Rissoa*, or rather *Cingula castanea*, *Rissoella eburnea*, *Turbonella nivea*, *Turritella acicula*, and *Turritella erosa*, *Molleria costulata*, *Retusa gouldii* and *Retusa petenuis*, and the *Diaphana debilis*.

Many live specimens are put into shallow dishes, and under the microscope it is most interesting to watch the *Margaritas*, *Belas*, *Lunatias* and the active *Yoldias* moving about.

A day's dredging thus means a good deal of work, and after all comes the labelling and putting in the cabinet, last but not least of a day's dredging.

OBSERVATIONS ON THE GENUS QUADRULA.

BY L. S. FRIERSON.

In his admirable Synopsis of the Naiades, Mr. Chas. T. Simpson says (page 766), that although he had examined thousands of animals of the *plicata* group of *Quadrula*, he had never seen but a single one having eggs in the gills, and that other students had found them equally barren. In NAUTILUS (vol. xv, no. 4, p. 39), H. von Ihering speaks of *the specimen* of *Q. heros* Say, examined by Lea, and of *the specimen* seen by Sterki, and he seems to be rather doubtful whether *Quadrula* (of this group at all events) *always* carry eggs in all four gills. My observations of late have been singularly lucky in this respect and will, I think, settle this point. The first specimen

found gravid by me (of this group) was a *Q. trapezoides*, May 10, 1901. Since that time I have opened and examined dozens of gravid specimens. They are gravid from May to September, after which I have never found eggs in their gills. Of *Quadrula perplicatus* Conrad, I have taken but two specimens, June 7, 1901, and August 19, 1903. In one the gills (all *four*) were but one-half filled with eggs, the *lower half* of each gill being empty. The other was a normal *Quadrula*. *Quadrula heros* had never been taken gravid by me until October 8, 1903, a young specimen proved to be in that condition. Its gills (four) were packed full of uncountable ova. These, under the microscope, were perfectly spherical and undeveloped, showing that they were recently extruded from the ovary.

On November 24, 1903, a batch of about fifty were brought me by a negro, to be sent to Mr. Chas. Conner, of Philadelphia. After packing fifteen or twenty for him, the remainder were opened, and to my surprise, fully half were gravid. Mr. Conner reported several of his also gravid. Most of these eggs were not yet developed into glochidia, several specimens having eggs in the "mulberry stage."

January 7, 1904, out of seven specimens opened, four proved to be gravid. These were full of glochidia, but they did not seem to be perfectly developed or ready to be extruded, being very sluggish.

These observations prove two points: First, that the *plicata* group belongs safely to *Quadrula*, as defined by Mr. Simpson, and that the specimen noted by Sterki and H. von Ihering must have been abnormal. Secondly, that the *seasons* of ovulation are different in different species of the same group, *Q. trapezoides* being a summer breeder, while *Q. heros* is an autumn or winter breeder.

THE MOLLUSKS OF CEDAR LAKE, INDIANA.

BY FRANK COLLINS BAKER.

Some months ago, the Monon Railroad invited the writer to visit Cedar Lake, Indiana, to witness the seining of the lake for "pirate" fish, such as carp, gars and pickerel. Incidentally a collection of the mollusks was made, which seems of more than passing interest. The lake is a body of cold water, of considerable extent and of great depth in places. The species collected are as follows:

Valvata tricarinata Say.

Valvata tricarinata var. *confusa* Walker.

Valvata bicarinata Lea.

Valvata bicarinata var. *normalis* Walker.

A quantitative study of the *Valvatas* collected is very interesting. 275 specimens were collected, of which 117 were typical *tricarinata*, 104 *bicarinata* var. *normalis*, 31 *tricarinata* var. *confusa*, 21 *bicarinata*, 1 specimen was 4-carinate and 1 specimen of *bicarinata* was almost ecarinate.

The most common forms of the carinate *Valvatas* would seem to be *tricarinata* and *bicarinata* var. *normalis*; typical *bicarinata* seeming the rarest.

Amnicola limosa Say. Common.

Amnicola walkeri Pilsbry. A single specimen of this very distinct species was found, but a careful search of the lake would probably reveal a number of specimens. It is one of the most characteristic of the fresh-water mollusks.

Planorbis campanulatus Say. Very common.

Planorbis bicarinatus Say. Common.

Planorbis exacutus Say. Apparently rare, as only two specimens were found.

Planorbis parvus Say. Very common.

Limnæa caperata Say. Fairly common.

Limnæa humilis Say. Not common.

Physa heterostropha Say. Not common.

Physa gyrina Say. Not common.

Succinea retusa Lea. Common.

A NEW FLORIDIAN AMNICOLA.

BY H. A. PILSBRY.

Amnicola augustina n. sp.

Shell narrowly umbilicate, brown or olive-brown, smooth, ovate-conic; spire convexly conic, the apex rather obtuse. Whorls $4\frac{3}{4}$, quite convex, separated by deeply-impressed sutures. Aperture about half as long as the shell, broadly ovate, obtusely angular above; peristome acute, continuous, dark-edged, adnate to the preceding

whorl for a short distance above. Operculum as usual in the genus. Length 3.2, diam. 2.2, longest axis of aperture 1.6 mm.

A small stream near St. Augustine, Florida. Types no. 58088, A. N. S. P., collected by Charles W. Johnson.

This species is larger than *A. floridana* Ffld., with a longer spire and more obtuse apex. It was collected in some quantity by Mr. Johnson many years ago. It was at first identified as *Bythinella tenuipes* Couper, and so recorded in NAUTILUS iii, p. 137; but further investigation has shown that it belongs to a different group of species.

NOTES ON THE NOMENCLATURE OF THE PUPACEA AND ASSOCIATED FORMS.

BY W. H. DALL.

The publication of Mr. Woodward's list of British land shells and certain work on which I have been engaged, have recently drawn my attention to this subject, which I have found so involved and so imperfectly represented in many publications on the group as to lead me to a tolerably thorough investigation, some of the results of which are here expressed.

I take it as axiomatic that (1) the type of a group must be one of the species mentioned when the name of the group was first published; (2) that in consolidating several old genera one of the old names and not a new one must be employed for the consolidated group; (3) that when a heterogeneous group is subdivided, its name must be retained for one of the resulting subdivisions; and (4) that we are under no obligation to accept the first species of a list as the type of a group for which no type has been selected by the original author, but that we should accept the decision of the first subsequent author who undertakes to select types from the original list in revising it.

In the following notes only the question of nomenclature is considered, the validity of the sections is left to the specialist in this difficult group. In matters of specific synonymy, I have depended on L. Pfeiffer, Pilsbry and Sterki.

Isthmia Gray, 1821. The sole example cited is *Vertigo pygmæa* Drap., which must be regarded as the type. *Staurodon* Lowe, 1852, and *Dexiogyra* Stabile, 1864, are synonymous.

Jaminea Risso, 1826; not Brown, 1827. Brown cites the name as of Bruguiere, but I have found no reference to this origin of it elsewhere. Risso's group is heterogeneous, and was intended for the large Pupas in which the body whorl interrupts the peristome, while for the small species of *Vertigo*, etc., with a continuous peristome, he proposed a genus *Saraphia*, none of the species contained in which can be positively recognized. Risso's first species is *Vertigo minutissima* Hartmann, which should properly have been placed in *Saraphia*. Those which agree more or less with his diagnosis have since been separated into a number of groups in the following order chronologically: *Abida, Sphyradium, Encore, Torquatella*. There are also three unidentifiable species. Risso's second species was the last to be separated and should have been reserved for *Jaminia*, of which *Torquatella* must be regarded as a synonym. This type is *Turbo muscorum* Linné, not Draparnaud.

Chondrus, Cuvier, 1817, not of Lamouroux, 1813. Cuvier's *Chondrus* was divided into two groups not named and with no type cited. In 1821, Gray cited *Pupa cinerea* Drap., as an example, but Cuvier's name is pre-occupied in Polyps. The next name for this group is *Torquilla* Studer, 1820, type *P. secale* Drap. *Torquilla* had been used by Brisson in 1760 for a bird. Now Brisson is a non-binominal writer and his genera have only been adopted by an arbitrary over-riding of the rules of nomenclature. Nevertheless I am inclined to believe that such arbitrary acts are sometimes beneficial to science and to be praised rather than blamed, when the occasion is suitable, and the consensus of opinion of the specialists in the department affected, practically unanimous. Rejecting *Torquilla*, the next name in order is *Abida* Leach, in Turton, 1831, sole example cited *P. secale*, which must be regarded as the type. Several other names have been proposed to take the place of *Chondrus* by too hasty writers, such are *Granaria* Held, 1837, *Pupella* Swainson, 1840, *Chondrina* Reichenbach, 1847; while further subdivisions of the type are *Sandahlia* and *Granopupa* Westerlund, 1887.

Alæa Jeffreys, 1830. This heterogeneous group, beside species of *Isthmia* and *Jaminia*, contained originally *Pupa edentula* Drap., afterward separated as *Sphyradium* and *Pupa minutissima* Hartmann, which must be taken as the type.

Pupilla Leach, in Turton, 1831. Two species are cited, one being already the type of *Jaminia*, the other, namely, *P. umbilicata* Drap.,

necessarily becomes the type of *Pupilla*. *Gastrodon* Lowe, 1852, not of Rafinesque, 1815, and *Reinhardtia* Boettger, 1878, are synonymous. *Lauria* Gray, 1840, was proposed for *P. umbilicata* and *P. anglica* Fér.; if *Lauria* is retained at all it must be for the latter, in which case *Leiostyla* Lowe, 1854, is synonymous.

Encore Agassiz, in Charpentier, 1837, was proposed for *P. tridens* and *P. quadridens* Drap. *Gonodon* Held, Dec., 1837, *Chondrula* Beck, 1838, and *Chondrulus* Westerlund, 1890, appear to be synonymous.

Sphyradium Agassiz, 1837, has been adopted for *P. edentula* Drap., by the process of elimination; *Paludinella* Lowe, 1852, not of Pfeiffer, 1841; *Edentulina* Clessin, 1876, not of Pfeiffer, 1855; and *Columella* Westerlund, 1876, are synonymous. *Sphyradium* (*ferrari*) Hartmann, 1840, has been named *Coryna* by Westerlund, 1887. *Sphyradium* Martens, in Albers, 1860, is a synonym of *Orcula* Held.

Faula H. and A. Adams, 1855, not of Blanchard, 1850, was renamed *Fauxulus* by Schaufuss in 1869. *P. capensis* Kurr, appears to be the type.

Ptychochilus Boettger, 1880, founded on *Pupa tantilla* Gould, seems to have priority over *Nesopupa* Pilsbry, 1900. *Bifidaria* Sterki, in Pilsbry, 1891, contained two species, *P. contracta* Say and *P. servilis* Gould. *P. contracta* being taken as type by Sterki in 1892, for his section *Albinula*, *P. servilis* must be considered the type of *Bifidaria* s. s., and not *P. hordacea*, for which Sterki's *Eubifidaria*, 1893, will stand, if the sections are valid otherwise.

DESCRIPTIONS OF NEW JAPANESE LAND SHELLS.

BY H. A. PILSBRY AND Y. HIRASE.

Eulota chishimana n. sp.

Shell umbilicate, depressed globose, with conic spire, rather thin, pale yellow, becoming white on the spire, the last whorl encircled by three bands, that at the periphery dark chestnut and sharply defined, the others much paler, reddish-brown, and indistinctly defined, one in the middle of the base, the other on the upper surface, ascending the spire midway between sutures on the penult. whorl, or obsolete except on the last whorl. There are also one or two dark

oblique streaks indicating places of growth-arrest. Sculpture of irregular, rough and coarse wrinkles in the direction of growth lines, and under the lens, irregular fine spiral lines are seen. The spire is much smoother than the last whorl. Whorls about 6, moderately convex, regularly increasing, the last rounded peripherally, not descending in front. Aperture not very oblique, lunate, white and conspicuously banded within. Lip broadly reflexed, strengthened by a narrow callous ridge within, the face flat or concave, the thin outer portion dark flesh colored, the ridge lighter or white. The peripheral band extends to the lip-edge.

Alt. 20.5, diam. 26.5 mm.

Alt. 19.5, diam. 25 mm.

Kunashiri Island, in the Chishima (Kuril) chain. Types no. 86324 A. N. S. P., from no. 1153 of Mr. Hirase's collection.

This fine *Euhadra*, of a type unknown in the main island of Japan, is the first to be reported from the Kuril chain. Other land shells from Kunashiri will be described in a future communication.

Vitrea radiatula var. *radiata* n. var.

This variety is smaller than *radiatula*, and of a pale reddish-brown tint, not greenish. It is decidedly larger than *V. radiatella* (Reinh.), and less depressed. Alt. 2, diam. 4 mm.

Tōya, Kuziro, in eastern Yesso (Hokkaido). Types no. 85788 A. N. S. P., from no. 1147 of Mr. Hirase's collection.

Alycœus awaensis n. sp.

This shell is larger and more elevated than *A. reinhardti*, pale brown. Sculptured with spaced riblets, which on the swollen last half whorl became fine and densely crowded. The neck is moderately contracted and smooth. The aperture is circular, lip thin, narrowly reflexed. There are sometimes some spiral striæ on the spire, not visible in all specimens. Alt. 3.8, diam. 2.6 mm.

Hiyama, Awa, Island of Shikoku. Types no. 84958 A. N. S. P., from no. 1083 of Mr. Hirase's collection.

Succinea ikiana n. sp.

A species of the *S. avara* group, but more solid that that species and of a bright amber color. Whorls 3, very convex and parted by deep sutures. Sculpture of irregular, coarse wrinkles. Aperture ovate, the upper insertion of the outer lip arcuate.

Length 8.5, diam. 5, length of aperture 5 mm.

Length 7, diam. 3.6, length of aperture 4 mm.

Wataramura, Iki. Types no. 85747 A. N. S. P., from no. 1148 of Mr. Hirase's collection.

Vertigo japonica n. sp.

Shell minute, oblong, about equally obtuse at both ends; brown, nearly smooth. Whorls 5, parted by deep sutures, the last whorl tapering downwards, impressed by a deep furrow terminating above the middle of the outer lip. Aperture irregularly ovate, contracted by four teeth: a long parietal lamella, a strong columellar lamella and two short, deeply-placed palatal plicæ. Peristome thin, very narrowly expanded, the outer lip projecting forward and bent inward at the upper third, at the termination of the external furrow. Alt. 1.7, diam. 1 mm.

Ikusagawa, Ojima. Types no. 85746 A. N. S. P., from no. 1143 of Mr. Hirase's collection.

This species from southern Yesso is related to *V. hirasei* from Kyūshū, but differs from that species in having much larger teeth. Both belong to a group of Vertigines which lives throughout the whole northern part of the Holarctic region.

Nesopupa tamagonari n. sp.

Shell extremely short and broad, very obtuse at both ends, chestnut-brown, nearly smooth, somewhat glossy. Whorls $4\frac{1}{2}$, rapidly increasing, parted by slightly-impressed sutures; the last whorl forming more than half the length of the shell, tapering downwards, bearing a strong crest or ridge close behind the outer lip. Aperture small, squarish-oval, obstructed by six teeth: a long, entering parietal and a much shorter angular lamella; a deeply-placed columellar lamella; a small, tubercular basal plica, and two short but high lamellar palatal plicæ. Alt. 1.3, diam. 1 mm.

Chichijima, Ogasawara. Types no. 85745 A. N. S. P., from no. 855a of Mr. Hirase's collection.

A peculiar, almost globular *Nesopupa*, related to *N. dedecora*, but shorter, with a weaker crest, which is nearer to the lip. (*Tamagonari*, egg-shaped.)

This is the second Ogasawaran species of a Polynesian genus, discovered by Mr. Hirase's collectors. These little strangers are per-

haps the only exclusively Polynesian element in the snail fauna of the Bonin Islands. *Tornatellina* also is doubtless a group of Polynesian origin, though in the ages of its existence it has spread to the borders of the Pacific, from New Zealand to the Japanese islands.

Carychium pessimum var. *borealis* n. var.

Differs from *C. pessimum* in being smaller and less conic, more of an oblong shape. Harutori, Hokkaido. Types no. 85772 A. N. S. P., from no. 1144 of Mr. Hirase's collection.

LE PERE LAMBERT, S. M.

BY CHARLES HEDLEY.

Half a century ago, a little band of Marist missionaries landed in New Caledonia to convert to their faith the cannibal savages of that island. For years, lance or casse-tête daily threatened them with cruel death. They knew no society but the disgusting companionship of brutal savages. From the danger, hardships and squalor of their life, these cultured gentlemen turned for relaxation to the pleasant paths of science. To them we owe most of our knowledge of the fauna, flora, geology and ethnology of New Caledonia. One by one, Montrouzier, Thomassin, Rougeyron—this noble company of hero, pauper, saint and savant—have gone to their rest. The last patriarch, Father Pierre Lambert, died in Noumea, on November 3, 1903, aged 82 years.

He wrote a few short papers in the Journal de Conchyliologie, but he will be chiefly remembered as a collector. One of the finest of the cones bears his name, as does one of the largest *Placostylus*. Souverbie dedicated to him species of *Pecten*, *Melanopsis*, *Trochus*, *Euchelus*, *Xenophora*, *Mitra*, *Cancellaria*, *Pleurotoma*, *Rissoina* and *Eulima*, also the genus *Lambertia*.

Pere Lambert published a memoir on Ethnology—Moeurs et Superstitions des Néo-Calédoniens, Noumea, 1900, pp. vi, 360, with 60 illustrations. An important but little known book.

GENERAL NOTES.

Ancyli Adhering to Water Beetles.—Two interesting examples of *Ancyli* attached to the elytra of water beetles, recently came under my observation through the kindness of Mr. Albert P. Morse, who collected them at Wellesley, Mass. One a *Dinutes* (whirligig beetle), collected April 26, 1900, has an *Ancylus fuscus* Adams, 4 x 2.5 mm., situated dorsally and extending about equally over each elytron; whether it adhered with sufficient strength to prevent the beetle flying, can only be surmised. The habit of *Dinutes* in gyrating on the surface of the water, often in the bright sun-light for hours at a time, is not strictly conducive to the life of an *Ancylus* thus situated, for it would be entirely out of water while the beetle was on the surface, although during the early spring the beetle probably spent most of its time beneath the water.

The other, a *Dytiscus*, collected in October, 1898, carried an *Ancylus parallelus* Hald., 5 x 2.5 mm., near the end of the left elytron. Both cases present an interesting factor in the distribution of species, which probably in many instances accounts for the sudden appearance of mollusks in small, artificial ponds.—C. W. Johnson.

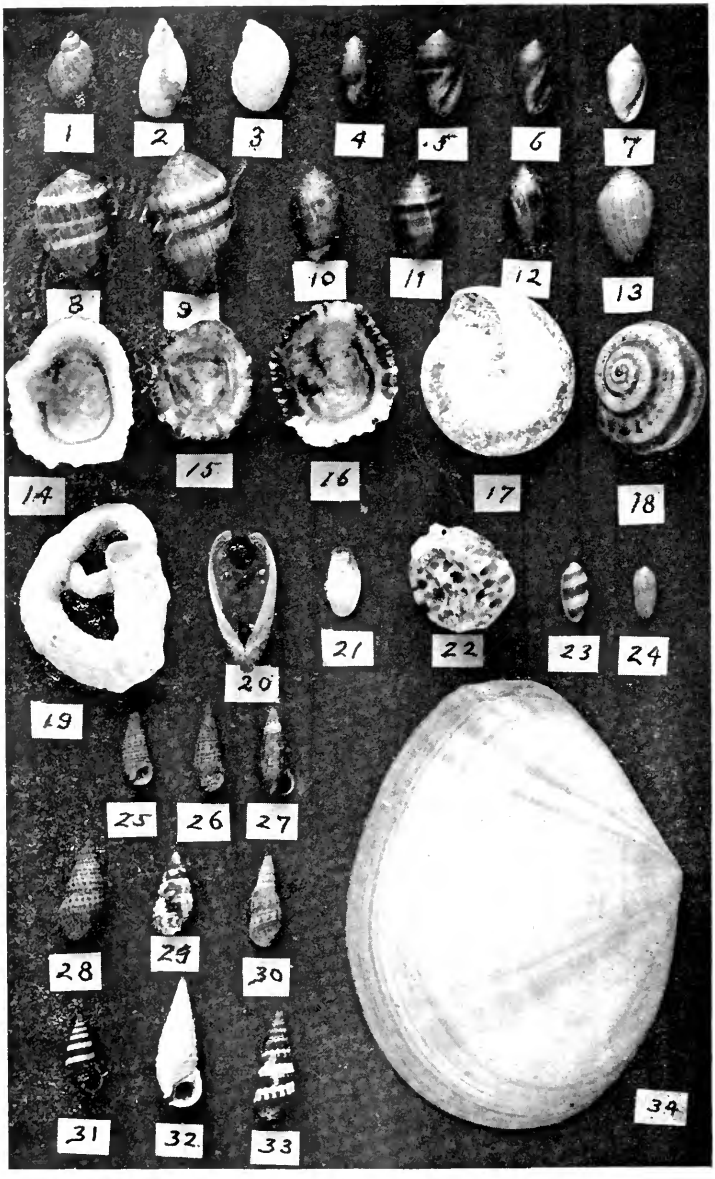
Clam-orous Crows.—The following newspaper clipping, if true, shows that the amiable, inoffensive clams of the Northwest coast are having a hard time of it, and are entitled to the sympathy of all conchologists without distinction of age, sex or color:

"Scare-crows are now placed upon slate roofs in Victoria, B. C. The crows, which swarm on the beach and dig for clams, fly over the buildings and drop the clams on the roof, by this means breaking the shells and leaving the meat free to be eaten. In many cases, when the clams were dropped, the slate would be broken."

Such conduct on the part of the crows is certainly discreditable; they should be placed on the black-list.

> Ill fare the clams to hungry crows a prey,
> And brought to grief in such a crow-ill way.

The clam is probably *Saxidomus giganteus* Desh., quite common in the Vancouver region and the principal edible clam of both "Injuns" and white folks thereabout, and solid enough to break roof slates if not political ones, when dropped from a considerable elevation. *S. giganteus* is abundant between ordinary tide marks; it is great in soup; an excellent clam.—Robt. E. C. Stearns, *Los Angeles, Cal.*



DAVIS: BERMUDA SHELLS.

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HELIX HORTENSIS IN NEW ENGLAND.

BY REV. HENRY W. WINKLEY.

The following is a suggestion. I cannot say that I am convinced that it is a proof, but I offer these thoughts for what they are worth. We must associate *H. hortensis* with northern European forms rather than with the American land shells. Its distribution in New England is most singular, limited as it is to widely separated spots, mostly small islands of the east coast. It certainly cannot have had the same migration as *Polygyra* or *Pyramidula* or it would be distributed as they are. Undoubtedly at the close of the glacial period, the American types worked north and east into New England; but *H. hortensis* was not one of them. That it came from Europe is evident. Commerce-voyages of Norsemen or other explorers have been suggested. This theory becomes absurd when one examines the localities where *H. hortensis* lives. These places are not ports and never have been. Some of them are the last places a man would land, not the first. Let us now ask the question of an earlier migration. Circumpolar species exist. Other forms common to Europe and America would make an interesting study. That there was a preglacial period when forms migrated around the northern regions is a settled fact. Did *H. hortensis* come then and survive? The writer has been much interested in the glacial theory, and has done some field work on the New England area. That the glacier covered all of New England is an accepted fact, but when we say all, is there not a chance for exceptions. Along the southern coast we may point

to Long Island as a terminus. The sound is not deep and tides not great, this barrier would be and was crossed. The eastern coast is different. The trend of the ice, though slightly deflected towards the east, was in a southerly direction; comparatively little passed off the east coast. Add now a study of Greenland, as it is under continental glaciation conditions and probably exactly as New England was. Peary's exploration shows a range of animals like the musk-ox, arctic wolf and others at Independence Bay, and practically the extreme northern limit of Greenland, and this implies food on which they live. In other words, Greenland under a glacier yet has a shore line of animal and vegetable life. The distribution of *H. hortensis* fits the theory that it is a survivor. The present abodes are such that it could not have been carried from one to the other and not have found a home on the mainland more than it has. On the other hand Grand Manan, outer islands in Casco Bay, the extremity of Cape Ann and Cape Cod, are places that would be last resorts. A more exhaustive treatment of the subject would deal with elevation and subsidence, possible islands or land in the east now submerged. The stronger tides that would break up a mass of ice extending seaward. I leave these topics and present only the simple suggestion.

A NEW SPECIES OF PERIPLOMA FROM CALIFORNIA.

BY WILLIAM HEALEY DALL.

Periploma sulcata n. s.

Shell rotund, white, with the left valve flatter, thin, sculptured with numerous, close-set, irregularly concentric, more or less interrupted, low ridges, separated by subequal shallow interspaces; the surface is also microscopically shagreened, and there is a low rib extending from the beak to the lower margin of the ill-defined rostrum and an ill-defined furrow radiating from the beak toward the anterior base, in the right valve; beaks low, distinctly fissured; anterior dorsal hingeline rounded, posterior ditto, shorter, nearly rectilinear, forming with the elevated rib a subtriangular space which is free from the undulations which cover the rest of the shell; interior shining, hardly nacreous, the muscular impressions very small, the pallial line obscure; chondrophores prominent, spoon-shaped, extend-

ing obliquely forward, and with their connecting resilium sustaining a proportionately large triangular lithodesma; the chondrophores are supported behind by well-developed clavicular props, which are inserted posteriorly on the surface of the valve below the linear hingeline. Length 32, height 27, diameter of right valve 6 and of the left valve 4 mm.

This elegant shell, in a somewhat damaged condition, was thrown upon the beach at San Pedro, Cal., after one of the heavy winter storms and collected by Mrs. T. S. Oldroyd, to whom we owe so many additions to the fauna of this region.

This species is, we believe, the first *Periploma* known to possess an undulated sculpture, and bears to those of the ordinary type such a relation as that of *Cyathodonta* to *Thracia* or *Labiosa* to *Raeta*. The differences of sculpture and in the form of the lithodesma suggest that, as in the case above cited, *P. sulcata* is entitled to a sectional name for which *Halistrepta* is proposed.

A NEW DENTALIUM FROM CALIFORNIA.

BY WILLIAM J. RAYMOND.

Dentalium vallicolens n. sp.

Adult shell large, rather slender, moderately curved posteriorly, the latter half nearly straight; cream-white, often yellowish toward the mouth, shining where not eroded, earlier portion usually dull and chalky because of erosion; growth-lines fine, irregular, distinct, rarely an encircling groove due to repaired fracture; at the apex there are longitudinal, low, rounded, inconspicuous threads, of which seven or eight are more prominent and three to six in each interspace are less prominent; these die out, and fine, superficial striae appear, visible under the glass and continued to the mouth of the shell, seven or eight per millimeter of circumference; aperture simple, circular, mouth slightly oblique.

Two specimens measure: length 64.5, diam. of aperture 5.3, of apex 1.5, at middle 4.6, height of arch from chord 2.5 mm.; length 64.0, diam. of aperture 4.7, of apex 1.4, at middle 4.2, height of arch from chord 3.0 mm.

Young shell strongly curved, very slender for the first eight or ten millimeters of length, then rapidly enlarging; at first seven or

eight angled, the angles defined by sharp ribs with channeled interspaces, then passing into the sculpture of the adult by successive interpolations of secondary riblets, while the primary ribs lose in prominence and the section of the shell becomes circular.

Length 16.7, diam. of aperture 2.0, of apex 0.3, at middle 0.1, height of arch from chord 1.8 mm.

University of California Marine Biological Laboratory: Station 12, Vincente (or Redondo) Submerged Valley, Santa Monica Bay, 145 fathoms, temp. 45.5° F., bottom sand and mud; also scattering specimens from station 14 off Point Fermin, 100 fathoms, temp. 46°; station 70, La Jolla Submerged Valley, between 117 and 54 fathoms; station 79, off San Diego, 64 fathoms.

The Vincente submerged valley where this species was found in considerable numbers, is one of a series of such valleys described and mapped by Prof. George Davidson, of the University of California, in Proc. Cal. Acad. Sci., 3 Ser. Geology, Vol. 1, No. 2. Opposite Redondo the 100-fathom line marks the edge of a gently sloping, submarine plateau which extends seaward about seven miles. Outside of this plateau the bottom descends much more abruptly. The Vincente valley is nearly 300 fathoms deep and about one and one-half miles wide where it breaks through the edge of the plateau. It carries a depth of 100 fathoms to within one and one-half miles of the beach, thus bringing the colder water of greater depths, with its accompanying fauna, close inshore. It is probable that the Dentalium here described will be found in deeper water as marine exploration proceeds along the coast of southern California.

The sculpture of this fine, large species recalls *D. ceratum* Dall (Florida, Cuba, Barbados), but the former is larger, the adult shell is proportionately wider, the young is more attenuated at the apex, and the superficial striae are continued to the mouth, even on the largest specimens. At the length of Dall's species, *D. vallicolens* is more than twice as wide. The peculiar sculpture of the earlier portion and the striation of the latter, readily separate the present species from *D. pretiosum* and *D. indianorum*, even if the angled apex be lost, as is almost invariably the case in the adult. Erosion has in some specimens proceeded so far that patches only of the outer layer of shell are left. In others it seems to have attacked the shell beneath the outer layer so that longitudinal lines and encircling rings of opaque white appear beneath the outer, shining layer which then begins to scale off.

NOTES ON THE MOLLUSCA OF THE BERMUDA ISLANDS.

BY C. ABBOTT DAVIS, S. B.

Last July and August were profitably spent in collecting insects and mollusks among the three hundred beautiful islands now called the Bermudas. Like the Hawaiian group, they are chiefly interesting because of their isolated geographical position, being nearly 700 miles distant from any other land. Commerce, however, is rapidly changing the fauna and flora of Bermuda to such an extent that old records, *i. e.*, records of twenty years standing, are obsolete or unreliable. Large quantities of West Indian shells are constantly being brought to the island to sell to the unsophisticated traveller, and some of the stores actually sell these shells as Bermudian. Even the native colored boys are anxious to sell shells for "tuppence," and they are not particular about the historical side, so that one has to beware of all shells not collected in situ.

The expeditions of Prof. Helprin in the summer of 1888, and of Prof. Verrill in the spring of 1898 and of 1901, form the nucleus of most of the authentic published data. I had planned a trip to Bermuda for July and August 1903, but upon learning of the Bristol-Mark expedition, I decided to go with them, and the following notes are a part of the records of our trip.

In 1900, Dr. Pilsbry revised the "Air-breathing Mollusks of the Bermudas," and my research differs little except in minor details. For instance, he agrees with Mr. Smith that *Succinea bermudensis* Pfr., is *S. barbadensis* Guild., but states that the animals need a careful study. I agree with the latter statement and as proof of it illustrate three Bermudian forms. Fig. 1 is the common form, Fig. 2 was occasionally taken at Flatts, Fig. 3 is the fossil variety.

Physa acuta Drap., has not been recorded since G. Brown Goodes' record of 1888. We took it from rain-water tanks in Devonshire Swamp.

The variety *pulchella* Pfr., of *Truncatella caribæensis* Sowb., is always found *dead*. This, taken with the fact that this mollusk lives at the high-tide mark, and is therefore apt to be water-worn, makes *pulchella* simply a worn *carribæensis*.

In a lot of several hundred *carribæensis* received recently from the West Indies, there is a complete series showing the wear on these

shells, even to fresh transparent specimens. Prof. Verrill has lately added the following to Dr. Pilsbry's list:

Blauneria heteroclita Montg., *Hyalina lucida* Drap.

Pœciloronites zonata Verr. (Fig. 17), *Siphonaria henica* Verr.

My records add the following:

Carychium exiguum Say. (var.). Sub-fossil.

Vitrea cellaria Müll. Several at Hamilton.

Helix pisana Müll. Several at St. Georges (Fig. 18).

Planorbis dilatatus Gld. Dev. Swamps, (Brackish water).

Paludestrina tenuipes Cooper (var.). Eve's Pond.

The beautiful genus *Melampus* needs revision, and as I collected (personally) several quarts of these bewildering shells, I will attempt the following key to the Bermudian forms:

A. Aperture narrow and short, shells small, pointed at both ends, greasy, brownish or blackish, no teeth (see Fig. 4).
M. bulloides Mont.

B. Aperture wider and longer, at the extreme base a very prominent fold, shells larger, apex pointed, greasy, color brownish or purplish, with one or more revolving white or yellowish bands, row of teeth within the outer lip very numerous, (Fig. 5). *M. flavus* Gmel.

1. Color plain brown or purple, no stripes, (Fig. 6).
Var. *purpureus* n. v.

2. Size and shape same as *purpureus*, immaculate white when alive, rare, found only at Hungry Bay, (Fig. 7).
Var. *albus* n. v.

C. Aperture still wider, shell wide at the top, apex abrupt, two or more well developed teeth on the inner lip, often attaining to double the size of *flavus*, not green, (Fig. 8 is the Florida form). *M. coffeus* Linn.

1. Larger, and apex more pointed than in *coffeus*, the row of teeth in outer lip very irregular and uneven, banded spirally, with brown and white, width of bands *very irregular*, (Fig. 9). Var. *gundlachi*, Pfr.

2. Pilsbry says: "Scarcely if at all to be distinguished from the prior *M. gundlachi* Pfr., but not attaining so large a size." These are probably the juvenile *gundlachi*, the lack of color and lustre in the large ones being due to longer exposure and yet they look like another variety so the smaller ones are called (Fig. 10). Var. *redfieldi*, Pfr.

3. Size and shape same, but the revolving bands of light and dark color *alternate evenly*, (Fig. 11).
Var. *alternatus* n. v.

4. Smaller, darker, polished, beautifully mottled with more or less prominent *vertical* stripes, (Fig. 12).
Var. *verticalis* n. v.

5. Stout, *plain brown* form, with no markings whatever. (Fig. 13). Var. *bishopii* n. v.

Named in honor of mine host Mr. Geo. A. Bishop, Supt. of Public Gardens, Hamilton, Bermuda.

As to *Siphonaria*, Verrill has described in the "Transactions of the Conn. Academy of Science," a species called *S. henica*. So far as is known, only one specimen—the type—is in existence. This was taken at Bailey Bay on the north shore. We collected over three pints of *S. alternata* Say, and found many of the var. *brunnea* Hanley, also two others.

2. Shell small (size 16 x 13 mm.), blackish, opaque *opalescent*, rare, Hungry Bay, south shore (Fig. 15). Var. *opalescens* n. v.

3. *Intermediate* in size and coloration between *brunnea* and *opalescens*. Very thin, translucent, always distinguished by radial black lines from apex to margin, covering the whole or a part of the inner surface. Common on the south shore at high-tide mark (Fig. 16).
Var. *intermedia* n. v.

There are undoubtedly many marine species which might be added to the published lists of Dall, Heilprin, Verrill, and others; but the great difficulty just now is to eliminate equivalent nomenclature. I have not seen records of the following species taken by us in Bermuda:

Acmæa punctulata Gmel.
Anachis catenata Sowb.
Alabina adamsii Dall.
Asaphis deflorata Linn.
Bittium varium Pfr.
Chione beaui Recl.
Chione pygmæa Lam.
Coralliophila abbreviata Lam.
Cypræacardia hornbeckiana Mörch.
Cythara simulata Rve.
Ocinebra intermedia Ads.
Nassa consensa Rav.
Natica livida Pfr.
Nitidella cribraria Linn.
Olivella rosalina Ducl.
Ostrea folium Linn.
Pecten ornatus Lam.
Pitaria fulminata Mke.
Purpura undata Lam.
Rissoina pulchra Ads.
Semela proficua Pult.

Eulima gracilis Ads.
Gastrochæna ovata Sby. (Fig. 20.)
Litiopa bombyx Kein.
Spirula australis Lam.
Tellina promera Dall.
Tellina sybaritica Dall.

Vermetus erectus Dall. This shell is quite common, but generally has the erect portion broken off, as in Fig. 19.

The following are undoubtedly new forms. Cotypes of each are deposited (with the *Melampus* and *Siphonaria*) in the museums at Washington, Philadelphia, Boston and Providence.

Gastrochæna mowbrayi sp. n. (Fig. 21).

This has often been mistaken for a juvenile *G. ovata*, (Fig. 20) as it resembles *ovata* in shape and color, but neither in size, nor habitat. In Bermuda *G. ovata* has an alt. of 20 mm. and bores a hole about 10 mm. in diameter in the solid brain-corals, or shell-rock.

On the other hand, *G. mowbrayi* is found in the dead or dying stems of the branch coral (*Oculina*) the entire stem of which could be put into a tube of *ovata*. *G. mowbrayi* occupies a cavity a little larger than the shell (which is about 6 x 3 mm., the cut showing an extremely large specimen) with a small opening to the outer surface of the coral. These shells are often grouped so closely together, as to undermine the strength of the coral, (see Fig. 22). Locality, Harrington Sound, dredged in 20 to 40 ft. Named in honor of Mr. Lewis Mowbray an enthusiastic Bermudian naturalist.

Tellina lævigata Linn., var. *stella* n. v.

T. lævigata is called the "sunset shell" by the natives, and it well deserves the name on account of its beautiful bands of orange or pink alternating with delicate yellow tints. About one out of twenty of these shells has diverging, radial pink rays (like *T. radiata*). For this nameless variety I propose the name *stella* (Fig. 34) collected at Flatt's Inlet.

Volvaria avena Lam., var. *southwicki* n. v.

Volvaria avena (Fig. 23) is common along the north shore of Bermuda, and is widely known and easily recognized by its conspicuous transverse orange bands, size 9 x 3 mm.

On Hamilton Beach I found a smaller constant variety (Fig. 24) which had a uniformly dark, mottled ground with no bands of color. Alt. 6 x 2 mm. This variety is named after my friend, Mr. Jas.

M. Southwick, Curator of the Roger Williams' Park Museum, Providence, R. I.

Key to the Bermudian Species of the Genus Cerithium.

The species of this genus were the hardest to revise owing to the fact that the descriptions being brief and often inaccurately figured, no two museums have them named alike. A generous use of the microscope is necessary to distinguish species, and while there are undoubtedly intergrades, the majority are I think, distinct species and not varieties. They are so dissimilar that they can be readily separated. Most of the species may be picked up in Bermuda by the thousand. I brought home at least a half bushel for study.

A. Very small, jet-black inside and out, often decollate, nodules in *vertical rows of three dashes*. Bermuda form, Fig. 25; Haiti form, Fig. 26; white-tipped Florida form, Fig. 27.
C. minimum Gmel.

B. Larger, stouter, plain black or dirty brown inside and out, spirals very uneven, nodules in vertical rows of *three dots* (Fig. 28). *C. nigrescens* Mke.

C. Shell stout, spirals uneven, *handsomely variegated* black and white or yellow and white, nodules in vertical rows of three dots (Fig. 29). *C. variabile* Ads.

Note.—This shell has been called *eriense* Val., and even placed as a variety of *ferrugineum* Say, which it does not resemble in the least. (See the original figure and description of *ferrugineum* by Say.)

D. Long, narrow, yellowish-brown, spirals very irregular, three vertical nodules united, forming vertical ribs, by far the rarest form in Bermuda (Fig. 30). *C. ferrugineum* Say.

E. Long, narrow, apex sharp, black with a white revolving band below the suture, the black band contains dashes and the white band dots, spirals regular, blackish inside (Fig. 31).
C. septenstriatum Say.

F. Larger than any of the above, spirals regular. A whitish calcarious deposit distinguishes this shell (Fig. 32). When this covering is removed by acid or wear as in Fig. 33, it reveals a brownish interior with white bands on which the nodules are shaped like an exclamation point (!), the two upper dots being united. The apex is always very sharp.
C. albocoopertum sp. n.

Any other Bermudian records would be gratefully received by the writer, as he has in press a "Check-List of the Bermudian Mollusca."

GENERAL NOTES.

Mollusca on Pike's Peak Colorado.—Last fall I collected *Pupa muscorum* (L.), *Vallonia cyclophorella* Ancey, *Euconulus fulvus* (Müll.) and *Zonitoides arboreus* (Say) by the printing office on Pike's Peak, 10,000 ft. alt. I put them on record because of the altitude; the dominant vegetation of the place consists of *Achillea*, *Dasiphora*, *Fragaria*, *Salix*, *Rosa*, *Populus tremuloides*, *Carduus*, *Geranium*, *Epilobium*, *Delphinium*, *Arctostaphylos uva-ursi*, *Campanula*, *Potentilla*, *Allium*, *Pedicularis*, *Gentiana*, *Picea*, *Pinus*, *Juniperus*, *Antennaria*, *Artemisia*, *Pentstemon*, *Machaeranthera*, *Rudbeckia*, *Frasera* and *Calochortus:* nearly all circumpolar genera, it will be observed, the last five only being exclusively American. I have a note that I found also *Succinea avara*, but kept no specimens. —T. D. A. Cockerell.

Chione cancellata Linn. in the Jersey City Market.—A strange shell in the market always interests the conchologist. A short time ago my brother gave me a *Chione cancellata* which he had found with some clams (*Venus mercenaria*) purchased of Mr. Brittain, a fish dealer on Bergen ave., Jersey City, N. J. He said there were several in the basket from which the clams were taken. Desirous of knowing whence they came, I inquired of Mr. Brittain where the clams were gathered and he said he believed they came from North Carolina.—Sloman Rous.

The Molluscan Fauna of One Log.—On October 15th, I collected from the under side of an old log, 12 inches in diameter and 9 feet long, in the vicinity of Des Moines, Iowa, 634 living specimens of the following species:

Polygyra albolabris Say, 1.
Polygyra appressa Say, 140.
Zonitoides arboreus Say, 244.
Zonitoides minusculus Binn., 69.
Conulus fulvus Müll., 12.
Succinea avara Say, 5.

Corychium exiguum Say, 4.
Bifidaria pentodon Say, 1.
Bifidaria armifera Say, 143.
Strobilops labyrinthica Say, 3.
Agriolimax campestris Binn., 12.

Many other logs yielded abundantly of the same and other species. —T. Van Hyning.

Mr. Jas. H. Ferriss is collecting shells and ferns in Arizona. He reports great success, and the specimens sent in give evidence that he has not lost the knack of finding the finest kinds of snails. There are several forms of *Sonorella*, *Ashmunella chiricahuana* and some new forms of the *levettei* type, two new species of *Oreohelix*,[1] one of them ornamented with whorls of hairs, besides the "small stuff."—H. A. Pilsbry.

Vertigo andrusiana Pils. when fully adult has two teeth on the parietal margin, at least in some specimens, and a very minute tooth above the upper palatal plica. Until nearly adult, the basal fold is not developed.—H. A. P.

Helicogona arbustorum in Newfoundland.—Adult living specimens of this common British and European land snail were collected by Dr. Robert Bell in the middle of July, 1885, on grassy slopes facing the sea, near the narrows of St. John's Harbor, Newfoundland. So far as the writer is aware, this is the first time that this species has been found, in a living state, on the American side of the Atlantic. Dr. Bell says that many wrecks of vessels take place on this part of the coast, and that a little farther to the south of the locality where these snails were found, there is a small patch where the common heather (*Calluna vulgaris*) grows. This marks the spot, he adds, where an emigrant ship was stranded, and the beds of the emigrants, which were stuffed with heather, were taken ashore and emptied out.—J. F. Whiteaves, in *The Ottawa Naturalist*, vol. xvii, no. 11, p. 192, Feb., 1904.

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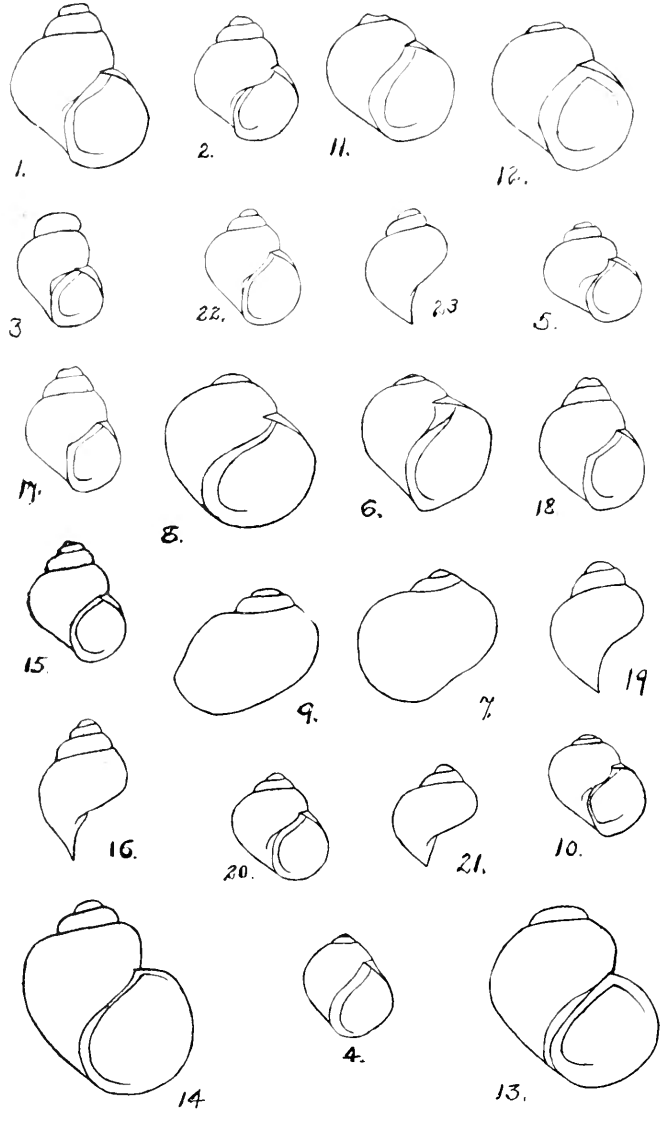
[1] *Oreohelix* is a new genus for the Rocky Mountain Helices of the *H. strigosa* group, hitherto wrongly placed in "Patula" or *Pyramidula*, from which they differ by the lack of pedal furrows.—*H. A. P.*

PUBLICATIONS RECEIVED.

SCIENTIFIC RESULTS OF THE TRAWLING EXPEDITION OF H. M. C. S. THETIS, MOLLUSCA Pt. II, SCAPHOPODA AND GASTROPODA.—By Charles Hedley (Memoirs Australian Mus. IV, pp. 327–402, plates 36–38). This interesting and valuable paper contains the descriptions of 37 new species and three new genera: *Epigrus*, *Myxa*, and *Fascinus*. The new forms together with many others are illustrated by 52 excellent figures in the text. The author has adopted *Calcar* Montfort, 1810, in place of *Astralium* Link, with the following note: "It is obvious that *Astralium* Link cannot honestly be said to have been published in 1807. Probably as a published name Astralium should date from Herrmannsen's article in the Proceedings of the Zoölogical Society of London for 1851, p. 231. Unless the rules of the zoölogical nomenclature are to be broken, *Calcar* must be used instead of *Astralium*. *Cassidea* Brug. 1789 is used in place of *Semicassis* (Klein 1753, pre-Linnean) Mörch 1852.—C. W. J.

DIAGNOSES OF NEW SPECIES OF MOLLUSKS FROM THE SANTA BARBARA CHANNEL, CALIFORNIA. By William Healey Dall (Proc. Biol. Soc., Wash., Dec. 13, 1903, pp. 171–176).

In this interesting paper Dr. Dall describes ten new west-coast species. Of this number all, excepting *Mitra dolorosa* from the Gulf of California, were dredged at Santa Catalina Island during the summer of 1903, by Messrs. Lowe and Paine. One genus, Macromphalina, is new to the west coast. New species are: *Actæon* (*Rictaxis*) *painei*, *Clathurella lowei*, *Mangelia fancheræ*, *Mitra lowei*, *Mitra dolorosa*, *Murex* (Ocinebra?) *painei*, *Lunatia draconis*, *Macromphalina californica*, *Scala sawinæ* and *Ischnochiton biarcuatus*. As will be seen by the feminine endings two species are named for ladies. Besides the species from the Gulf of California, *Lunatia draconis* has been dredged at Drake's Bay, Monterey and the Farallones Islands. Of the specific name *draconis* Dr. Dall says: "As Drake was long known to the Spaniards as 'El Drako,' I have named the species *draconis* in his honor." *Scala sawinæ* has been dredged off the Coronada Islands, Avalon and at the Isthmus. The type is from the harbor side of the isthmus at Santa Catalina and was dredged by Dr. Dall in 1873. With these exceptions all the species were dredged off Avalon. Another new species of a genus not before known to inhabit the west coast was described by Dr. Dall in THE NAUTILUS, Sept., 1903, under the title, "A New Species of Metzgeria." This species collected by J. H. Paine, Dr. Dall named *Metzgeria californica*.—*Mrs. M. Burton Williamson.*



WALKER. ON SOMATOGYRUS.

THE NAUTILUS.

VOL. XVII. APRIL, 1904. No. 12.

NEW SPECIES OF SOMATOGYRUS.

BY BRYANT WALKER.

Through the kindness of Mr. A. A. Hinkley, of Du Bois, Ill., I have had the opportunity of examining the *Amnicolidæ* collected on his recent trip to the Coosa river, and the larger portion of the species herein described are from his collection. The others have been received from the different sources stated in the descriptions.

The new species collected by Mr. Hinkley are remarkable for the diversity of form exhibited, which was quite unexpected in view of the very general similarity in that particular of the species already discovered. The collection also shows that the earlier collectors on the Coosa practically ignored the smaller forms in the more exciting pursuit of the peculiar *Pleuroceridae* of the river, and that there yet remains much to be done before the molluscan riches of that wonderful stream will be exhausted.

The late Dr. Jas. Lewis in his "Fresh Water and Land Shells" (1876), lists four species of *Somatogyrus* as occurring in Alabama, viz:

S. aureus Tryon. *S. parvulus* Tryon.
S. currierianus Lea. *S. subglobosus* Say.

Having Dr. Lewis' collection in my possession, I am able to check up his determinations in the light of our present information. It is evident, from the condition of his specimens, many of which are not even washed, to say nothing of having the black and ferruginous deposits removed, with which they are frequently covered, that Dr.

Lewis had not given any critical study to the group, and that his determinations were at the best superficial. It is of interest therefore to consider his list *seriatim*, and to make such corrections as are necessary. *S. aureus.* Dr. Lewis confounded this species with *S. parvulus* Tryon and *georgianus* herein described. For the first error he is not wholly responsible, as the only genuine *parvulus* he had was received from Dr. Lea as *aureus.* His specimens from the "Tennessee River" and "Cahawba River" are *georgianus.* Those from the Coosa are partly *georgianus* and partly *aureus.* Those from the Alabama river are correctly named.

It may be added that *aureus* was found in the Coosa at Wetumpka by Mr. Hinkley, where it has also been collected by Mr. A. C. Billups. It is also in the Lewis collection from the Holston river, Tenn., the Etowah river, Ga., the Tennessee river, Jackson Co., Ala., and from Bridgeport, Ala. It was also collected by Dr. Pilsbry and myself in the Tennessee river at Knoxville, Tenn., on our return from the Pentadelphian expedition in 1901. I have it also from Decatur, Ala., collected by De Camp.

S. currierianus, Dr. Lewis' specimens from Decatur, Ala., are labelled "Type" and seem to be correct. See Pl. v, figs. 8 and 9.

S. parvulus. As stated above, the only specimens referable to this species (see Pl. v, figs. 22 and 23) from the Connesauga river, Ga., were received from Dr. Lea under the name of *aureus.* His specimens from the Tennessee river at Bridgeport, Ala., are immature *aureus*, as are also those from the Coosa.

S. subglobosus. There are no specimens under this name from the Coosa river in the Lewis collection. Those from the Alabama river, while differing somewhat in contour from the typical form of the Ohio valley, seem substantially the same.

The characteristic feature of the Coosa river species of *Somatogyrus* is the heavy flat columellar callus, which usually quite obliterates the umbilicus. This is present in nearly all the species. The former connection of the Coosa with the Tennessee drainage is shown by the occurrence of *S. subglobosus*, *aureus* and *georgianus* in both systems and the narrow, rounded columellar callus in *S. obtusus* and *umbilicatus*, which is characteristic of all the species of the Ohio and Tennessee drainage, except *S. georgianus* and the form referred to *S. currierianus* by Tryon in Mon. F. W. Univ. Moll., p. 62, Pl. 17, fig. 13.

All the figures are drawn on the same scale so that the relative size of the different species is represented on the plate.

Somatogyrus hinkleyi n. sp. Pl. v, figs. 1 and 2.

Shell globose-conic, imperforate or with a mere chink at the umbilicus, light horn-colored, smooth, growth lines scarcely evident. Spire elevated, apex obtuse. Whorls 4–4½, those of the apex convex, penultimate and body whorls more or less shouldered; suture deeply impressed; body whorl large, convex or in shouldered examples somewhat flattened at the periphery and obtusely angled below. Aperture large, rounded above, somewhat flattened at the base and decidedly angled at the junction of the lip with the base of the columella and angular at the upper insertion of the lip; lip simple, in aged examples somewhat thickened within. Columella heavy, callused, flattened and nearly straight, callus thinner on the parietal wall. Alt. 4¾, diam. 3¾ mm. Alt. 5, diam. 3½ mm.

Coosa river at Wetumpka, Ala. (type locality), five miles above Wetumpka, Wilsonville and Fort Williams' Shoals. Also Tallapoosa river at Tallassee, Ala.

This fine species was collected by Mr. Hinkley in considerable numbers at all the localities above mentioned, except at Tallassee, where only a single specimen was found. It occurred "on rocks in swift water, generally on the under side. Sometimes several individuals were found close together." It differs from all the known species in the elevated spire and conical form excepting *S. pennsylvanicus* and *virginicus* herein described, but those species are much smaller and decidedly different in contour. Young shells have the whorls decidedly convex, the shoulder not appearing until after the third whorl. The penultimate whorl shown in its entirety in half-grown specimens is usually quite quadrate, owing to the shoulder and flattening of the periphery. In mature specimens the shoulder tends to become less evident and often entirely disappears. I take great pleasure in naming this unusual form after its discoverer, Mr. A. A. Hinkley, whose recent trip to the Coosa was so fruitful in novelties.

Somatogyrus constrictus n. sp. Pl. v, fig. 3.

Shell small, conic, light horn-colored, smooth, except for the fine growth lines. Apex eroded in all specimens seen, the portion remaining consisting only of the last 2–2½ subcylindrical whorls, which are very convex with a deeply-impressed suture, the body whorl is

somewhat inclined to be gibbous. Aperture small for the genus and nearly round, obtusely angled above. Columella concave with a heavy, flat callus, which extends unbroken between the extremities of the lip leaving the umbilicus scarcely exposed. Lip simple, somewhat flattened along the basal portion and obtusely angled at its junction with the columella. Alt. 3, diam. $2\frac{1}{2}$ mm.

Coosa river, five miles above Wetumpka, Ala. (type locality), also at Wetumpka and near Wilsonville.

Only a few specimens of this species were found by Mr. Hinkley at any of the above localities, "never more than one in the same place, and always on the under side of rock in swift water." Unfortunately all the specimens are badly eroded so that it is impossible to give the apical characters. No young specimens that can be referred to the species were found. This species is remarkable for its elevated amnicoloid shape and deeply constricted whorls, but the heavy columellar callus reveals its generic affinities.

Somatogyrus nanus n. sp. Pl. v, fig. 4.

Shell very small, imperforate, conic-globose, pale greenish-yellow, smooth, shining. Spire very short and rapidly acuminating to the sub-acute apex. Whorls 3, those of the spire but slightly convex, separated by a shallow suture; the body very large, forming most of the shell, convex, somewhat flattened toward the suture. Aperture quite narrowly-angled above, widening and regularly-rounded below. Columella concave, flattened, with a heavy callous, which entirely covers the umbilicus and becomes thin and transparent on the parietal wall. Alt. $2\frac{3}{4}$, diam. $2\frac{1}{2}$ mm.

Coosa river, five miles above Wetumpka, Ala. (type locality), also at Wetumpka, Wilsonville and Fort Williams Shoals above Farmer, Ala.

This little species is apparently the most abundant form in the Coosa. It was "found in all places on rocks in swift water, scattered or collected in bunches of any number up to 25 or 30." It is well characterized by its small size and the short, acute apex, which with large body whorl and slightly-impressed suture, gives a peculiar mamilliform shape to the shell. The shells are almost invariably covered with a thin, greenish deposit, which under the microscope appears to consist of innumerable, oval granules, closely but irregularly agglutinated on the surface.

Somatogyrus umbilicatus n. sp. Pl. v, fig. 5.

Shell small, globosely depressed, umbilicate, light greenish-yellow, smooth, except for the fine, rather unequal, lines of growth. Spire short, obtusely elevated. Whorls $3\frac{1}{2}$, those of the spire convex and separated by a well-impressed suture; body whorl large, gibbously convex. Aperture sub-circular, rather longer than broad, obtusely angled above and slightly flattened along the basal margin. Columella concave, narrowly reflected; columellar callus, moderately heavy, rounded, reflected over but not concealing the round, deep umbilicus, thin and transparent on the parietal wall. Alt. 3, diam. 3 mm.

Coosa river at Wetumpka, Ala. (type locality), also at Fort Williams Shoals above Farmer, Ala.

This species is remarkable for its depressed, valvata-like form and round, deep umbilicus, which readily differentiates it from all other known species of the genus. It does not appear to be very abundant at Wetumpka, and only a single example was collected at Fort Williams Shoals.

Somatogyrus coosaensis n. sp. Pl. v, figs. 6 and 7.

Shell small, globose, imperforate, light yellow, smooth, with very fine lines of growth. Spire very short, apex obtuse. Whorls $3\frac{1}{2}$, rapidly increasing, those of the spire but slightly convex and separated by a very shallow suture; body-whorl inflated, large and convex. Aperture large, very oblique, expanded and well rounded above, obliquely flattened at the base. Columella concave, with a heavy, flat callus, which entirely covers the umbilicus, but rapidly attenuates above the axis; parietal wall with a thin transparent callus. Lip simple, the upper extremity projected along the body whorl at its insertion, at which point it is abruptly curved in to meet the parietal wall and rapidly drawn back below, forming a decided angle where it unites with the base of the columella. Alt. $3\frac{1}{2}$, diam. 4 mm.

Coosa river at Wetumpka, Ala. (type locality), also five miles above Wetumpka, and at Fort Williams Shoals above Farmer, Ala. Very abundant at the first two localities, but only a single specimen was taken at the last. This species is about the size of *S. currierianus* (Figs. 8 and 9) to which it is closely related, but differs in the less elevated spire, slightly impressed suture, regularly rounded body

whorl, which is not shouldered as in that species, and in the decided angle at the junction of the columella with the basal lip. The bright honey-yellow color is eminently characteristic. It resembles young specimens of *S. crassus*, but differs in the particulars stated in connection with that species.

Somatogyrus obtusus n. sp. Pl. v, fig. 10.

Shell small, globular, narrowly umbilicate, greenish white, smooth, shining. Spire very short, apex obtuse. Whorls $3\frac{1}{2}$, those of the spire convex and slightly shouldered, separated by a well impressed suture, body whorl large, globosely convex. Aperture subcircular, rounded above, obtusely angulate below. Lip simple, meeting the body whorl at nearly right angles at its insertion on the parietal wall, expanded below and somewhat thickened within along the basal margin. Columella concave, narrowly reflected; columellar callus not very heavy, and rounded; parietal wall covered with a thin transparent callus. Umbilicus distinct, narrow, somewhat contracted by the reflected columellar lip. Alt. 3, diam. 3 mm.

Coosa river, just above the railroad bridge at Farmer, Ala.

Only eight examples of this distinct, little form were obtained, but they are very uniform, varying only in size. *S. obtusus* differs from nearly all the Coosa river forms in the narrow, rounded columellar callus and distinct umbilicus. In this respect it is allied to the species of the Tennessee and Ohio drainage, grouping around *S. integer*, but differs from them all in the obtuse apex, globular form and the decided angle at the junction of the columella with the basal lip.

Somatogyrus crassus n. sp. Pl. v, figs. 11 and 12.

Shell small, globose, very solid, imperforate, light greenish yellow, smooth, lines of growth very fine. Spire short, apex obtuse. Whorls about 4, those of the spire slightly convex, suture well impressed. Body whorl large, somewhat gibbous and swollen above. Aperture large, rounded above, somewhat flattened basally and obtusely angled at the junction of the lip with the columella. Lip simple, thickened within, by a deposit of callus. Columella concave, with a heavy, flat callus which extends from one extremity to the lip of the other, and entirely covers the umbilicus. Alt. (apex eroded) 4.25, diam. 4.25 mm.

Coosa river at Wetumpka, Ala. (type locality), also five miles above Wetumpka.

Only a single adult specimen was found. But quite a number of half-grown individuals occurred. This species differs from all the others known from the Coosa, except *S. georgianus*, in the solid shell, heavy columellar callus, thickened lip and in the inflation of the upper part of the body whorl. In these respects it resembles *S. georgianus*, but differs in size and in being imperforate, lacking the axial groove, less gibbous, and more globose. The apex is eroded in all the specimens so that the exact number of whorls could not be determined. The immature shells are about the size of *S. coosaensis* and somewhat resemble that species, but differ in the thicker shell, color, smaller and more regularly rounded aperture, which is scarcely angled at the base, the upper extremity of the lip is also less curved in at its insertion.

Somatogyrus georgianus n. sp. Pl. v, fig. 13.

Shell globose, turbinate, perforate, thick, solid, light greenish-yellow, smooth, except for fine growth lines. Spire short, obtuse. Whorls about four, those of the spire convex with a well-impressed suture, body-whorl large, very convex and inflated above. Aperture large, obtusely-angled above and broadly-rounded below. Columella concave with a very heavy, narrow callus, which extends to the upper insertion of the lip and is adnate to the body whorl only at its upper end, and below the narrow umbilicus is separated from the body whorl by a deep axial groove. Lip simple, but thickened within, its insertion on the parietal wall is below the periphery. Alt. (apex eroded) 5, diam. $4\frac{1}{2}$ mm.

Chattanooga river, Chattanooga Co., Ga. (type locality), also Tennessee river, Cahawba river and Alabama river, Ala. (Lewis Coll.).

A couple of indifferent specimens have been in my possession for several years, which were found among some *Pleuroceridæ* collected by R. E. Call. A larger suite in Mr. Hinkley's collection from the same source, and three lots from the Lewis collection have served to confirm the distinctness of the form. This species resembles *S. sargenti* (pl. v, fig. 14) in the inflation of the upper part of the body whorl, but differs in lacking the shoulder characteristic of that species and in the peculiar formation of the columella, which is unlike that of any other species except *S. pumilus* Con. and *S. trothis* Doh. It also resembles *S. crassus*, but is larger, the body whorl more elong-

ated and more inflated above and has an entirely different form of columellar lip. Dr. Pilsbry has kindly compared some of the Tennessee river specimens with the unique type of Conrad's *pumilus*, and writes that while *pumilus* has the same peculiar axial groove, it is smaller (alt. 3.9, diam. 3 mm.), different in color and has the aperture more oblique. Doherty's species is smaller, about the size of *S. integer*, and has the axial groove only slightly developed. The three species, however, form a natural group more closely related to each other than to the other species in the genus. Many of the specimens in the Lewis collection have the aperture rather more expanded below than in the typical form.

This species is apparently ovoviviparous. In four out of fifteen examples in the lot from the Tennessee river, young shells of about $2\frac{1}{2}$ whorls and about $1\frac{1}{2}$ mm. in height and breadth were found lodged behind the opercula of the adults in various degrees of extrusion. In two cases the young shells dropped out in the cleaning process, the outer edge of the operculum being forced out of its normal position to allow the passage of the young. In the other two, the young are further within the shell and the operculum is set in nearly its usual position. An interesting monstrosity, which apparently belongs to this species, occurred in the lot from the Cahawba river. Nearly the whole of the body whorl is encircled at the periphery by a strong carina. It appears from beneath the upper insertion of the lip and continues around the whorl about three-fourths of the circumference, when it rapidly subsides and entirely disappears before the lip is reached. There is no trace of it on the upper whorls that remain. The axial groove is bounded on the inner side by a sharp angle, which merges into the edge of the lip at the base.

Somatogyrus pennsylvanicus n. sp. Pl. v, figs. 15 and 16.

Shell small, obtusely conic, narrowly umbilicate, sometimes imperforate, light horn-color, smooth, with very fine growth-lines. Spire elevated, apex obtuse. Whorls about $4\frac{1}{2}$, convex, slightly flattened toward the suture, which is well impressed. Aperture ovate, less than half the length of the shell, angled above and rounded below, slightly flattened along the basal lip. Columella nearly straight with a rather heavy, but narrow, rounded callus, which is thin and transparent in the parietal wall. Umbilicus a mere chink or entirely covered by the callus deposit. Lip simple, somewhat thickened within, especially on the basal part. Alt. $3\frac{3}{4}$, diam. $2\frac{1}{2}$ mm.

Columbia, Pa.

About thirty specimens of this amnicola-shaped species were in the collection of the late Dr. G. A. Lothrop, labelled *Amnicola decisa*, but unfortunately with no indication from whom they were obtained. The large number of species from that locality in the collection would indicate that Dr. Lothrop had been in correspondence with some collector residing in that vicinity. At first sight, it would be taken for an *Amnicola*, but the columellar callus is decisive on its generic position, which is confirmed by the allied *S. virginicus* and by Mr. Hinkley's discovery of a somewhat similar elevated form (*S. hinkleyi*) in the Coosa. It is similar in shape to that form, but is smaller, the whorls more rounded, the columellar callus is narrower and rounded, and there is no decided angle at the junction of the basal lip with the columella. In shape it resembles also somewhat *S. virginicus* but differs in the particulars pointed out in connection with that species.

Somatogyrus virginicus n. sp. Pl. v, figs. 17, 18 and 19.

Shell small, globosely conic, imperforate, light greenish-yellow, smooth, shining, lines of growth very fine. Spire elevated, obtusely conic. Whorls about 4, those of the spire convex, with a well-impressed suture, body whorl subglobose, regularly convex. Aperture ovate, angled above and broadly rounded below. Umbilical region impressed, but covered by a rather broad, rounded columellar callus which becomes thinner and transparent on the parietal wall. Columella nearly straight. Lip thin and sharp. Alt. (fig. 18) $3\frac{3}{4}$, diam. 3 mm. Alt. (fig. 17) $3\frac{1}{2}$, diam. $2\frac{1}{2}$ mm.

Barnard's Ford, Rapidan R., Va. (W. J. Farrer Coll.)

This species in its elevated form resembles *S. pennsylvanicus*, and the two with *S. hinkleyi* form a natural group quite distinct in shape from all the other known species. It differs from the latter in its smaller size, more convex body whorl and narrow, rounded columellar callus, and from the former in being somewhat larger, less solid, more globose, thin lip, color and especially in the impressed umbilical area, which is one of the most distinctive specific characters. Like many of the *Amnicolæ*, there are two forms represented in the series, one being decidedly more slender than the other as shown by the figures, otherwise they are entirely similar. This is probably a sexual difference, but has not been observed in any other species of this genus.

Somatogyrus pilsbryanus n. sp. Pl. v, figs. 20 and 21.

Shell small, gibbous-globose, scarcely perforate, rather thin, light yellow-horn colored, smooth, lines of growth very fine. Spire short, conic, obtuse. Whorls $3\frac{1}{2}$, those of the spire convex, separated by a well-impressed suture, body whorl large, very convex, gibbous. Aperture large, widely ovate, obtusely angled above and regularly rounded below. Umbilical region impressed. Umbilicus a mere chink. Columella concave, with a heavy, flat callus, which becomes thin and transparent on the parietal wall. Alt. 3, diam. 3 mm.

Tallapoosa river, Tallassee, Ala.

This is another of the new species discovered by Mr. Hinkley. It occurred quite abundantly and is a well marked and distinct form. It is related to *S. parvulus*, Tryon (Pl. v, figs. 22 and 23), in general appearance, but differs in the wide, gibbous body whorl, more obtuse apex and in the heavy, flat, columellar callus, *S. parvulus* being more acutely conical, with the body whorl regularly rounded and with a narrow, rounded, columellar callus. Dr. Pilsbry has kindly compared it with the types of Tryon's species and concurs in its specific distinctness. I take great pleasure in naming it after him.

A NEW SUBSPECIES OF POLYGYRA TRIDENTATA.

BY H. A. PILSBRY.

Polygyra tridentata discoidea n. subsp.

The shell is larger than *tridentata*, more depressed, the spire usually nearly flat. Whorls $5\frac{1}{2}$, closely and sharply striate. Umbilicus more widely expanding at its opening, showing more of the preceding whorl. The aperture is more or less "dished," the parietal tooth directed towards the upper lip-tooth, which while varying somewhat in shape has a tendency to be rather wide and flat-topped. The lower lip-tooth is more acute, both being strictly marginal.

Alt. $9\frac{1}{2}$, diam. $20\frac{1}{2}$ mm.

Alt. 8, diam. 19 mm.

Alt. $8\frac{1}{2}$, diam. $18\frac{1}{2}$ mm.

Charleston Landing, Clarke Co., Southern Indiana. Cotypes in coll. A. N. S. P. and of L. E. Daniels.

During a recent visit, Mr. G. H. Clapp called my attention to the form of *P. tridentata* found around Cincinnati, and widely known in

collections. A recent sending from Mr. L. E. Daniels of the same race from a point further down the Ohio valley is made the occasion for describing it. The subspecies seems to be a characteristic and abundant form along the lower Ohio river, its range southwestward as well as up the river still remaining to be ascertained.

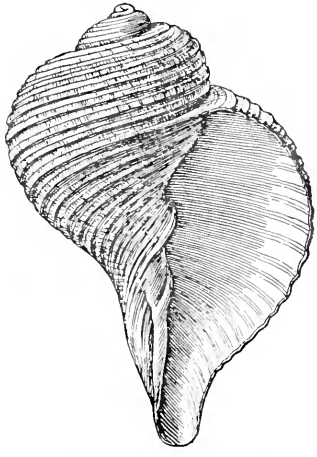
It resembles the large *P. tridentata complanata* in shape, but is invariably sharply striate and does not reach so large a size.

DESCRIPTION OF TWO NEW TERTIARY FOSSILS.

BY CHARLES W. JOHNSON.

Cancellaria rapella n. sp.

Shell very fragile, spire but slightly elevated, depressed and excavated near the suture, with three and one-half whorls including the protoconch, the latter smooth and consisting of one and one-half whorls; body whorl with about twenty-five spiral ridges, those on the central portion flattened and obsoletely grooved, lines of growth prominent and on the spire give the interstices between the spirals a punctated appearance; columella with two prominent folds and a slight umbilical rimation. Length, 29 mm.



CANCELLARIA RAPELLA.

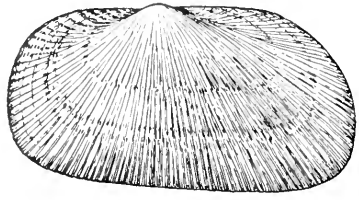
Miocene, Magnolia, Dauphin Co., North Carolina.

One specimen of this delicate shell was found while cleaning the marl from the interior of a large *Busycon maxima* var. *tritonis* Conr., collected by Mr. Joseph Willcox. It is related to *C. venusta* Tuomey and Holmes, but the shell is much thinner, spire less elevated and excavated near the suture. Type in the museum of the Wagner Free Institute of Science, Philadelphia.

Linearia? divaricata n. sp.

Shell very thin, compressed, nearly equilateral, umbones smooth,

from which extend upwards of sixty radial ribs, those of the anterior and posterior divaricating toward their respective margins, a few of the upper ones curving upward to the hinge line, the larger ribs frequently forked near the margin, lines of growth quite prominent. Length 15, alt. 8, diam. 4 mm.



LINEARIA DIVARICATA.

Eocene (Lower Claiborne), Berryman's place, two miles northeast of Alto, Cherokee Co., Texas. Type in the Lea collection of the Academy of Natural Sciences, Philadelphia (Acc. no. 9706).

This interesting specimen represents both valves intact, the matrix filling the interior is quite hard and the shell so thin that an attempt to develop the hinge would undoubtedly destroy the specimen. I can therefore only refer it doubtfully to the genus *Linearia* until more material is obtained.

GENERAL NOTES.

Occurrence of Zinc in Fulgur.—In *Science* for January 29, 1904, P. 196, Mr. Harold C. Bradley, of Yale University, states that: "In the course of an investigation on the chemical physiology of certain invertebrates, undertaken under the direction of Dr. Lafayette B. Mendel, it was found that the ash of the hepatopancreas of the large carnivorous gastropod *Sycotypus canaliculatus* contains an element hitherto unobserved in such connection, namely zinc * * * samples of ash from *Sycotypus canaliculatus* gave approximately eleven per cent. and twelve per cent. respectively of ZnO."

"At the same time qualitative examinations were made of specimens dredged from various parts of Long Island Sound about New Haven and in all cases zinc was found in large quantities in the ash of *Sycotypus* and *Fulgur carica* * * * The significance of this unique occurence of zinc in the economy of *Sycotypus* and *Fulgur* is still to be determined, as is the nature of the combination in which it exists. These points, together with the distribution of the element in other marine forms about the Sound, are at present being investigated."

The Senior Editor of The Nautilus is on a collecting trip through Florida and Cuba. He will return the latter part of April.