STERKIANA

NUMBER 26 COLUMBUS OHIO JUNE 1967

CONTENTS PAGE

EDITOR
Aurèle La Rocque
Department of Geology
Ohio State University
125 S. Oval Drive
Columbus 10, Ohio

A CHECK-LIST OF MOLLUSCS OF GLACIER NATIONAL PARK, MONTANA

RICHARD H. RUSSELL AND ROYAL BRUCE BRUNSON

Department of Zoology, University of Montana, Missoula, Montana

Several aspects of the natural history of Glacier Park have been studied, and pamphlets have been printed which deal with such well-known areas as wild-flowers, birds, mammals, and rocks. However, little has been published on the invertebrate faunas, and except for the work of S.S. Berry in 1919, no survey has been made of the Mollusca.

Glacier Park is a unique area for study because within the Park are found headwaters of three great continental drainage systems: the Columbian, Hudsonian, and Missourian (see map, p. 2).

This checklist is based largely upon: (1) the collections of the authors, (2) the survey by Berry in 1916, (3) Pilsbry's monograph on North American Land Mollusca. The authors would like to thank Mr. Gerald S. Swenson of the Department of Zoology, University of Montana, for access to his collection records made during the summer of 1966. Most of the Sphaeriidae were identified by Rev. H. B. Herrington and his help is gratefully acknowledged. We should like to acknowledge the help and cooperation of the officials of Glacier National Park, particularly Mr. Ed Beatty and Mr. Francis Elmore.

Some of the collections made by the senior author in 1960 were sent to the Chicago Museum of Natural History. Where this is the case, their catalogue numbers are given and preceded by CNHM. Catalogue numbers of the collections of the authors are preceded by their initials. Included are only those species for which actual records are available. Where synonyms occur in the literature, these are placed in parentheses after the specific name which the authors consider to be correct. In most cases, complete synonymies can be found in the references given after each species.

Distributions are not intended to be complete, but are given only as an indication of the range of each species within the Park.

CLASS PELECYPODA

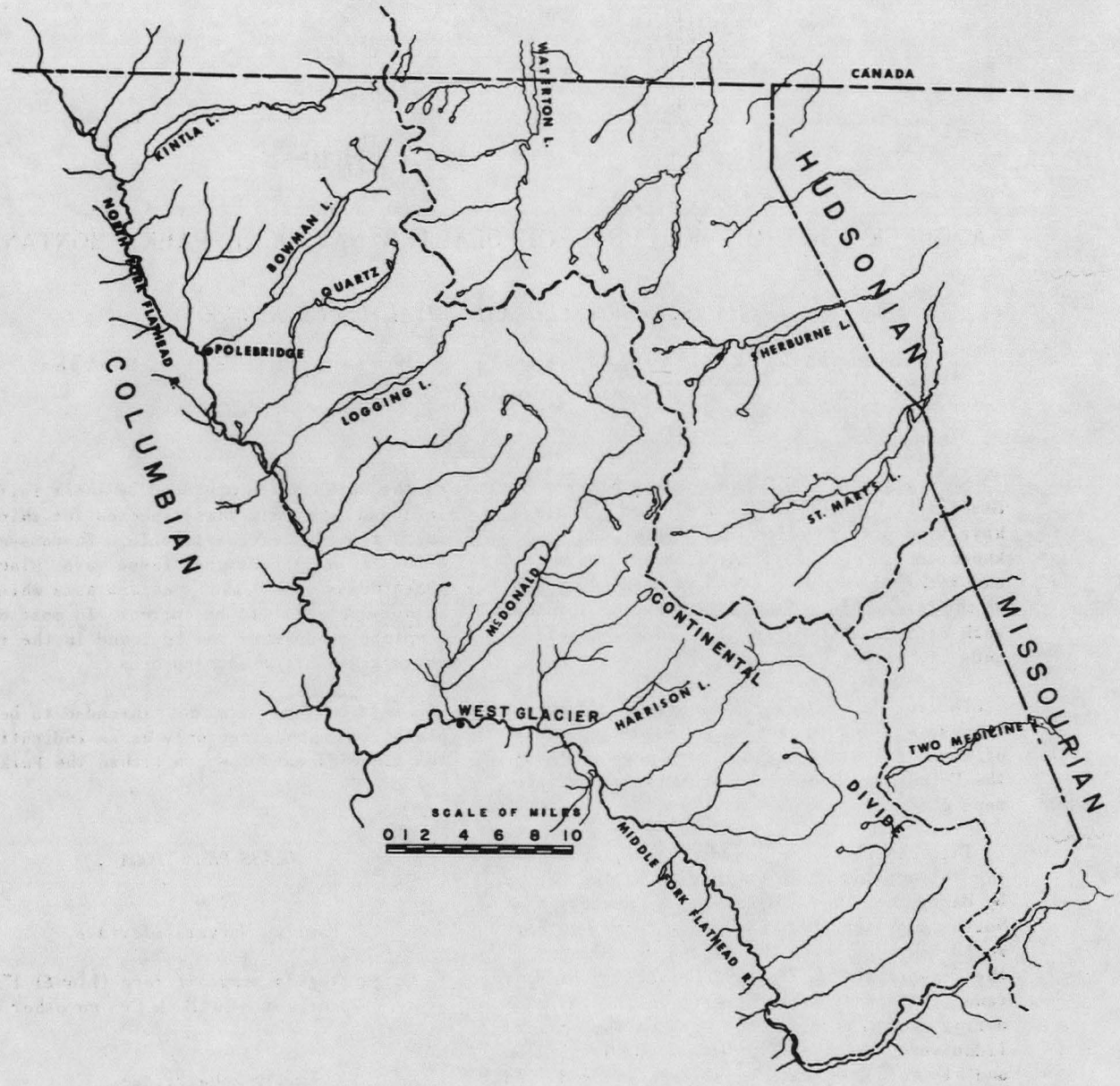
Family Margaritiferidae

1. *Margaritifera margaritifera* (Linné) 1758
   Missouri dr.: Cut Bank Cr. no other data.

Family Sphaeriidae

2. *Pisidium abditum* Haldeman 1841
   Hudsonian dr.: Iceberg Lake (Berry)
   Columbian dr.: Logging Cr. (RBR 13147); Pond near Granite Park Chalet (RBR 13247)

3. *Pisidium casertanum* (Poli) 1791
   Hudsonian dr.: Swiftcurrent L.; Grinnell L.; Josephine L. (Lehmkuhl); Lost Lake (Russell & Brunson).



MAP OF GLACIER NATIONAL PARK, MONTANA, SHOWING DRAINAGE SYSTEMS

Columbian dr.: Sprague Cr. (CNHM 105941); Bowman Cr.; (CNHM 105947); Polebridge (CNHM 105946).

4. *Pisidium idahoense* (Roper) 1890
Hudsonian dr.; Lower St. Mary's Lake (RHR 472).

5. *Pisidium lilljeborgi* Clessin 1886
Columbian dr.: Bridge on Camas Cr. (RBB 12947).

6. *Pisidium obtusale* form *rotundatum* Prime 1865
Columbian dr.: Polebridge (CNHM 106007).

7. *Pisidium variabile* Prime 1851
Hudsonian dr.: Swiftcurrent L. (Lehmkuhl).

8. *Musculium lacustre* form *ryckholti* (Normand) 1844
Columbian dr.: Pond near Camas Cr. (RBB 13047).

9. *Sphaerium nitidum* Clessin 1876
Hudsonian dr.: Swiftcurrent L. (Lehmkuhl).

10. *Sphaerium occidentale* (Prime) 1852
Columbian dr.: Polebridge (CNHM 105973); Bowman L.; (CNHM 105971) RBB 4259); south of Kintla L.; (RHR 288, RBB 9257).

11. *Sphaerium securis* (Prime) 1851
Columbian dr.; Polebridge (CNHM 105962).

CLASS GASTROPODA

Family Acroloxidae

12. *Acroloxus coloradensis* (Henderson) 1930
Hudsonian dr.: Lost Lake (Russell & Brunson).

Family Ancylidae

13. *Ferrissia parallela* (Haldeman) 1841
Columbian dr.: Fish L.; (Swenson).

14. *Ferrissia fusca* (C. B. Adams) 1840
Columbian dr.: Stream near Howe L. (Swenson); Camas Cr. (RBB 24347).

Family Lymnaeidae

15. *Lymnaea stagnalis appressa* (Say) 1818
Columbian dr.: marsh south of Kintla L. (RHR 126 239); Lake McDonald (Swenson).

16. *Stagnicola caperata* (Say) 1829
Columbian dr.: Lake McDonald; Quartz Cr.; Harrison L.; Three Bears L (Swenson); Mud Cr. (RBB 852a); marsh south of Kintla L. (RHR 271, RBB 8957).

17. *Stagnicola* cf. *elrodiana* Baker 1935
Columbian dr.: Quartz L. (Swenson).
Hudsonian dr.: St. Mary's L. (RBB 4859).

18. *Stagnicola palustris* (Müller) 1774
Hudsonian dr.: Swiftcurrent L. (Lehmkuhl).
Columbian dr.: Bowman L. (CNHM 105755); Polebridge (CNHM 105863); Quartz L.; Harrison L.; Lake McDonald; Logging Cr. (Swenson); marsh south of Kintla L. (RHR 268, 127, 282, 291, RBB 3257, 9157).

Family Planorbidae

19. *Gyraulus parvus* (Say) 1817
Hudsonian dr.: Swiftcurrent L. (Lehmkuhl).
Columbian dr.: Sprague Cr.; Howe L.; Quartz L.; Fish L.; Mud L.; McDonald Cr. (Swenson); marsh near Kintla L. (RHR 275, 268, RBB 9657); Camas Cr. (RBB 24147).

20. *Helisoma anceps* (Menke) 1830 (=*H. antrosa* Conrad)
Columbian dr.: Harrison L. (Swenson); Camas Cr. (RBB 33047).

21. *Helisoma trivolvis* (Say) 1817
Columbian dr.: Polebridge (CNHM 105794); South of Kintla L. (RHR 123, 292 RBB 8557); Camas Cr.; Lake McDonald (Swenson).

22. *Menetus (Promenetus) exacuous* (Say) 1821
Columbian dr.: Polebridge (CNHM 105884); South of Kintla L. (RHR 284, 293, RBB 8757,

9557); Fish L.; Quartz L.; John's L.; Logging Cr. (Swenson).

Missourian dr.: Kiowa (RBB 8857, 9357).

23. *Planorbula armigera* (Say) 1818

Columbian dr.: South of Kintla L. (RHR 124, 231, 290, RBB 8857, 9357).

Family Physidae

24. *Aplexa hypnorum* (Linné) 1758

Columbian dr.: Sprague Cr. (pond); Nyack Cr. (pond); Logging Cr. (Marsh) (Swenson); Polebridge (CNHM 105813, 105814); Bowman Lake (CNHM 105880); Near Kintla L. (RHR 125, 283, RBB 8657, 9457).

Hudsonian dr.: Swiftcurrent L. (Lehmkuhl).

25. *Physa gyrina* (Say) 1821

Columbian dr.: Lake McDonald; Quartz L.; Bowman Cr.; Kintla L.; Harrison L.; Three Bears L.; Logging L. (Swenson); Camas Cr. (RBB 24247); Mud L. (RBB 34247).

Hudsonian dr.: Josephine L.; Swiftcurrent L. (Lehmkuhl); Lost L. (Russell & Brunson); St. Mary's L. (RBB 34847).

Family Pupillidae

26. *Columella edentula* (Draparnaud) 1805

Columbian dr.: Lake McDonald (CNHM 105890). (See Pilsbry, 1948, for Montana).

27. *Vertigo modesta corpulenta* (Morse) 1865

Missouri dr.: Mt. Morgan trail (Berry, for *V. modesta parietalis*).

Hudsonian dr.: Gunsight trail; Grinnel Lake; Josephine L.; McDermott L.; Swiftcurrent Canyon; Granite Park Trail (Berry) (see Pilsbry, 1948, for Montana).

Family Succineidae

28. *Succinea avara* Say 1824

Columbian dr.: South of Kintla (RHR 274).

Family Endodontidae

29. *Discus cronkhitei* (Newcomb) 1864

Columbian dr.: Granite Park Trail (Berry); South of Kintla (RHR 272); Lake McDonald (CNHM 105896); Sprague Cr. (CNHM 105804); Bowman L. (CNHM 105801).

Hudsonian dr.: Swiftcurrent Canyon (Berry); St. Mary's L. (RBB 13756).

Missourian dr.: Mt. Morgan trail (Berry).

30. *Punctum californicum* Pilsbry 1898

Columbian dr.: Granite Park trail (Berry).

Hudsonian dr.: Gunsight Trail; Josephine L.; McDermott L.; Ptarmigan Falls; Swiftcurrent Canyon (Berry).

Missourian dr.: Cut Bank Cr. (Berry).

Family Vitrinidae

31. *Vitrina limpida alaskana* (Dall) 1905

Columbian dr.: Granite Park Trail (Berry, for *V. alaskana*).

Hudsonian dr.: Triple divide Pass; Josephine L.; McDermott L. (Berry); Swiftcurrent trail (RHR 155, 157); St. Mary's (RBB 14156).

Missourian dr.: Logan Pass (CNHM 105760, RBB 2460).

Family Zonitidae

32. *Pristiloma wascoense* (Hemphill) 1911

Columbian dr.: Granite Park Trail (Berry, for *Polita chersinella*); Logan Pass (RHR 160).

Hudsonian dr.: Peigan Pass Trail; McDermott L.; Swiftcurrent Canyon (Berry); Swiftcurrent Trail (RHR 159).

Missourian dr.: Mt Morgan Trail (Berry).

33. *Retinella binneyana occidentalis* (Baker) 1930

Columbian dr.: Granite Park Trail (Berry, for *Polita binneyana*); Bowman L. (CNHM 105752).

Hudsonian dr.: St. Mary's (RBB 14256).

34. *Striatura pugetensis* (Dall) 1895
Columbian dr. Granite Park Trail (Berry, for *Striatura milium pugetensis*).

35. *Zonitoides arboreus* (Say) 1816
Columbian dr. Granite Park Trail (Berry) South of Kintla L. (RHR 273) Sprague Cr. (CNHM 105805).
Hudsonian dr. Gunsight Trail McDermott L. (Berry) St. Mary s L. (CNHM 105808)
Missourian dr. Mt. Morgan Trail (Berry).

36. *Euconulus fulvus* (Müller) 1774
Columbian dr. Sprague Cr (CNHM 105887). Bowman L. (CNHM 105842).

37. *Euconulus fulvus alaskensis* Pilsbry 1899
Columbian dr Lake McDonald (CNHM 105898)
Hudsonian dr St Mary s (RBB 13956). Ranges throughout the Park (Berry).

Family Limacidae

38. *Limax maximus* Linné 1758
Columbian dr. West Glacier (RBB 5051).

Family Sagdidae

39. *Microphysula ingersolli* (Bland) 1874
Columbian dr. Granite Park Trail (Berry, for *Thysanophora ingersolli*); Logan Pass (RBB 2360, RHR 156, (CNHM 105824). Lake McDonald (CNHM 105879).
Hudsonian dr. Gunsight Trail Piegan Pass Ptarmigan Falls Swiftcurrent Canyon (Berry) Swiftcurrent Trail (RHR 158).
Missourian dr. Mt. Morgan Trail (Berry).

40. *Oreohelix subrudis apiarium* Berry 1919
Columbian dr. Granite Park Trail (Berry, for *O. cooperi apiarium*), (CNHM 106326, RBB 3054, 4159). Lake McDonald (RBB 552).
Hudsonian dr. Gunsight Trail Piegan Pass Trail (Berry) St. Mary s Lake (CNHM 106328, RHR 131 RBB 6354) Lost Lake (CNHM 105925, RHR 134) Rising Sun Camp (CNHM 106327, RHR 130) Boes Cr. (RBB 14356) Logan Pass (RBB 2260 RHR 154) Sun Point (RHR 161).

REFERENCES

BERRY, S. S. (1919) Mollusca of Glacier National Park, Montana. -- Acad. Nst. Sci. Phila., Proc., 71 195-205, pls. IX, X.

HERRINGTON, H. B. (1962) A Revision of the Sphaeriidae of North America. -- Misc. Publ. Mus. Zool., Univ. Michigan, 74 p.

LEHMKUHL, D. (1966) A Study of the Littoral Invertebrates of Three Mountain lakes in Glacier National Park, Montana. -- M.S. Thesis, University of Montana.

PILSBRY, H. A. (1939) Land Mollusca of North America (North of Mexico). Vol. I, Part 1 Acad. Nat. Sci. Phila., Monogr. 3 p. xviii + 1-573.

---- (1940) *Ibid.*, vol. I, Part 2 *Ibid.*, p. 575-994.

----- (1946) *Ibid.*, vol. II Part 1 *Ibid.*, p. 1-520.

----- (1948) *Ibid.*, vol. II, Part 2. *Ibid.*, p. 521-1113.

RUSSELL, R. H. and BRUNSON, R.B. (in press) *Acroloxus coloradensis* (Henderson) from Glacier National Park, Montana.

MANUSCRIPT RECEIVED AND ACCEPTED FOR PUBLICATION, JANUARY 24, 1967

DR. VICTOR STERKI AS A MALACOLOGIST

RALPH W DEXTER

(Continued from page 8)

the Land Mollusca of Ohio. -- 5th Annual Report, Ohio Acad Sci., pp. 14-31-

----- (1900) List of the Land and Freshwater Mollusca of Tuscarawas County, Ohio. -- 3th Annual Report, Ohio Acad. Sci., pp. 30-42.

----- (1907) A Preliminary Catalog of the Land and Freshwater Mollusca of Ohio Proc Ohio State Acad. Sci., 4: 365-402 Special Paper No. 12

----- (1911) Civilization and Snails. -- Nautilus, 24: 98-101.

DR. VICTOR STERKI AS A MALACOLOGIST[1]

RALPH W. DEXTER

Department of Biological Science, Kent State University, Kent, Ohio

Dr. Victor Sterki (1846-1933) was a well-known physician, conchologist, and naturalist in the eastern Ohio - western Pennsylvania region. He was born in 1846 at Solothurn, Switzerland, where he attended the local gymnasium and lyceum during his youth. He pursued medical studies 1868-73 at the University of Bern where he eventually received the M.D. degree in 1878. While a medical student he collected plants and shells as a hobby and took formal courses in botany and zoology as well as in medicine. After passing the government examination for the practice of medicine, he served in the eye hospital at the University of Bern until 1874 when he entered private practice. Following a period of illness he studied protozoology at Munich, Germany, and wrote his doctoral dissertation on a study of ciliated protozoans.

His medical practice in Switzerland continued until 1883. At that time he went with his bride to New Philadelphia in Tuscarawas County, Ohio. In addition to developing a medical practice in the New World he continued his interest in shells and soon became one of the leading students of the land and freshwater shells of eastern United States. In doing so he took the advice of one of his former teachers who had said that, 'Every practicing physician should pursue some natural science studies as a constant stimulus, to freshen him up and keep him abreast with general science' (Sterki, 1895). Many physicians of Sterki's day followed that practice.

Sterki's special interests in mollusks were the families Pupillidae and Valloniidae, groups of tiny land snails, and the Sphaeriidae, commonly called fingernail clams. Eventually he became the recognized authority in the United States on these three families. In 1894 he became a member of the Ohio State Academy of Science when it was but three years of age. Through the years he attended many of its meetings and presented many papers to its members, especially on his field study of mollusks.

Some of the reports he gave at meetings of the Ohio Academy of Science, as it soon became known, were as follows: 'Interesting and little known Mollusca of Ohio' at the meeting for 1894; 'Analytical key for identifying the land Mollusca of Ohio' for the meeting of 1896 (Ster-

---

1. This report is based upon a lecture given to the Pittsburgh Shell Club which met at the Carnegie Museum in Pittsburgh, Pennsylvania, on 6 November 1965. Reprinted here from the March 1967 issue of the *Pittsburgh Shell Club Bulletin* with permission.

ki, 1897). 'Lists of the Land and Freshwater Mollusca of Tuscarawas County Ohio' at the meeting for 1899 (Sterki, 1900) and 'Anatomy and Physiology of the Unionidae' for the meeting of 1910.

In 1909 he became Assistant Conchologist at the Carnegie Museum in Pittsburgh. Later he was advanced to Associate Curator of Mollusks until his health forced him to resign. At the time of his death he left his personal collection of shells to the museum including some 12,000 lots of sphaeriids. During his lifetime he published 151 papers, chiefly on mollusks, and described over 100 new species of shells. At the time of his death he left descriptions of nearly an equal number which had not been published. In view of the recent revision of the Sphaeriidae (Herrington, 1962) it is perhaps best that these descriptions were not published since Sterki was well-known as a 'splitter' and the current trend is to reduce the number of species in that family to a relatively small number of recognizable species which undergo considerable variation. Fifty-two of his papers were on Ohio mollusks published chiefly in the *Nautilus*, *Annual Reports of the Ohio Academy of Science*, the *Ohio Naturalist*, and the *Ohio Journal of Science*. His best known work was 'The Land and Freshwater Mollusca of Ohio' published as Special Paper No. 12 by the Ohio Academy of Science (Sterki, 1907). Between 1887 and 1930 Dr. Sterki published 123 articles, notes, and reviews in the *Nautilus*. A number of taxa have been named in his honor, although some have since been reduced in rank. The following are still found in the literature: Genus *Sterkia; Euconulus sterkii; Guppya sterkii; Gastrocopta procera sterkiana; Elliptio dilatatus sterkii; E. gibbosus sterkii; Lymnaea parva sterkii*.

Sterki was much concerned over the disappearance of native snails. In 1911 he published an article entitled 'Civilization and Snails.' He pointed out, 'Over large parts of Ohio there are at present probably less than 20, or 10, percent of the number of mollusks which populated them 50 or 70 years ago.' However, he did observe that land snails associated with human habitats have increased, and *Bithynia tentaculata*, since its introduction from Europe, has become common in Lake Erie.

In a little bulletin Dr. Sterki published following 20 years of medical practice (Sterki, 1895), he not only compared his medical practice and the nature of medical institutions in Europe and in the United States, and reported on some unusual medical cases which came to his attention, but he also outlined his recommendations for medical education and practice. Among his suggestions was a plea for better knowledge of botany and zoology on the part of students before beginning the study of medicine. He was a member of the old school that believed a physician should also be a naturalist.

Dr. Raymond C. Rush (1875 - 1954) was a personal friend of Dr. Sterki and the two made frequent shell collecting trips together (Dexter, 1955). Dr. Rush once told the writer that Dr. Sterki had unusual eyesight. He was extremely nearsighted, and without his glasses he could see small mollusks in minute detail by holding the tiny specimens close to his eyes. This may be the reason why he specialized in the small species of mollusks.

Dr. Sterki died at New Philadelphia 25 January 1933 in his 87th year. Two obituaries were published at that time (Anon., 1933; Brooks, 1933). A journal of non-marine molluscan studies has been named *Sterkiana* in his honor. It was founded by Dr. Aurèle La Rocque, Department of Geology, Ohio State University in 1959. Thus the spirit of non-marine malacological studies is perpetuated in his name in his adopted state of Ohio.

REFERENCES

ANON. (1933) Victor Sterki. -- Ohio Jour. Sci., 33½ 250

BROOKS, Stanley T. (1933) Victor Sterki (1846-1933). -- Nautilus 46: 134-136.

DEXTER, RALPH W (1955) Raymond C. Rush, M.D. (1875-1954) -- Nautilus 68: 102-104.

HERRINGTON, H. B. (1962) A Revision of the Sphaeriidae of North America (Mollusca: Pelecypoda) -- Misc. Pub., Mus. Zool., Univ. Mich. No. 118, 74 p.

STERKI, Victor (1895) After 20 years medical practice in the Old and New World--Notes and Observations -- 46 pp., Beobachter Publishing Co., New Philadelphia, Ohio.

(1897) Analytical Key for identifying

(CONCLUDED ON PAGE 6)

most specimens, but in some, though rarely, this part is carinate or rounded. Some are slightly tuberculated below the suture. Among the young specimens some are costate near the apex, others entirely smooth and without bands. I owe the fine specimen figured to Mr. Dutton, after whom I name it.— *Lea.*

This species is smaller and more fragile than *L. armigera.* It is also elegantly banded, which is more rarely the case with *armigera;* and it differs also in having smaller, frequently obsolete tubercles, and in the aperture being much less channelled.

Fig. 55.

I do not hesitate in agreeing with M. Brot in considering *fasciolata*, Reeve, as a synonyme.

The original description and copy of Reeve's figure are given below.

Io fasciolata.— Shell shortly fusiform, yellowish-green, encircled with narrow bands of olive, whorls 5 to 6, convexly sloping, the first smooth, the last gibbously angled, tubercled at the periphery, tubercles distant; aperture diamond-shaped, scarcely channelled.

Habitat.— United States.

Observations.— Closely allied to *L. Duttoniana*, but less channelled, and more widely apertured, owing to the more gibbously angled circumference of the last whorl.— *Reeve.*

9. A. Wheatleyi, Tryon.

Angitrema Wheatleyi, Tryon, Am. Journal of Conchol., vol. ii, p. 4, t. 2, f. 1, 1866.

Description.— Shell conoidal, inflated, rather thin; spire conical, sharp pointed, suture not much impressed; whorls about six, those of the spire flattened, the body-whorl large, rather flattened above the somewhat angled periphery, convex below, and somewhat attenuate at the base; the periphery is ornamented with a single prominent row of slightly compressed tubercles, and above is rugosely wrinkled, with a tendency towards tuberculation; aperture large, subrhomboidal, half the length of the shell, somewhat attenuate below, columella nearly perpendicular, a little twisted. Bright horn-color, with four broad, equidistant brown bands.

Fig. 56.

Habitat.— Elk River, at Winchester, Tenn.

Diameter, 16 mill.; length, 25 mill.

Observations.— This species is much more inflated, and has more numerous tubercles than *A. Duttoniana*, Lea; it is in appearance more like an obese variety of *A. verrucosa*, Raf., but that species is heavier in texture, and has several rows of tubercles. The well-developed tubercles and inferiorly contracted aperture will readily distinguish this species from *Lithasia fuliginosa*, Lea.— *Tryon.*

10. A. stygia, Say.

Melania stygia, Say, New Harmony Dissem., p. 261. Aug. 28. 1829; reprint, p. 17. Binney's Reprint, p. 142. Binney, Check List, No. 251. Wheatley, Cat. Shells U. S., p. 27. Jay, Cat., 4th edit., p. 275. DeKay, Moll. N. Y., p. 93. Reeve, Monog. Mel., sp. 400. Brot, List, p. 49.
Melania tuberculata, Lea, Philos. Trans., iv, p. 101, t. 15, f. 31. Obs., i, p. 111. DeKay, Moll. N. Y., p. 93. Wheatley, Cat. Shells U. S., p. 27. Binney, Check List, No. 277. Jay, Cat., 4th edit., p. 275. Catlow, Conch. Nomenc., p. 189.
Juga tuberculata, Lea, Chenu, Man. Conchyl., i, f. 2017.
Melania Spixiana, Lea, Philos. Trans., vi, p. 93. Obs., v, p. 93.
Melania nodata, Reeve, Monog. Mel., fig. 422.
Io tuberculata, Adams, Genera, i, 299.

Description.— Shell robust, ovate conic, black; spire rather larger than the aperture, eroded at tip; volutions five, hardly convex; wrinkles obsolete, excepting a few larger ones; suture not profoundly indented; aperture narrowed at base into a slight sinus and subangulated; much wider in the middle; labrum much arcuated in the middle.

Fig. 57.

Greatest breadth, less than half an inch, length, three-fourths.

Observations.— A specimen of this shell was given to me by Mr. Lesueur; several were found in Cumberland River by Dr. Troost. In form it resembles *armigera*, nob., more than any other species, but that shell is armed with tubercles and ornamented by colored lines, its suture also is only a simple line.— *Say.*

The following is Mr. Lea's description of

Io tuberculata.— Shell obtusely turreted, wide, very dark brown or black; apex obtuse; whorls, five; middle of the last whorl furnished with tubercles; outer lip irregularly curved; base angulated; aperture purple and one-half the length of the shell.

Habitat.— Tennessee River; Prof. Vanuxem.

Diameter, ·5; length, ·9 of an inch.

Observations.— This species is somewhat allied to the *M. armigera*

(Say), but is smaller and much less ponderous. The tubercles are more numerous and less elevated.

In the *tuberculata* the impressed band, which exists in the *armigera* above the armature, is wanting. In color it differs altogether.—*Lea*

In Phil. Trans., vi, p. 82, Mr. Lea changed the name of his species, as the original name was preoccupied by Spix. He therefore proposed, instead of *tuberculata*, the name *Spixiana*. Mr. Reeve, finding *tuberculata* preoccupied by Spix, and not having seen Mr. Lea's change of name, proposed *nodata*. These names must all yield, however, to Say's *stygia*, which is the first published description of the species. Mr. Say himself (cover of Conchology, No. 6) decided Mr. Lea's species to be a synonyme—an opinion in which he has been sustained by several of our conchologists.

Through the kindness of Mr. Lea I have been permitted to examine a number of specimens in his cabinet. They exhibit every gradation, from a smooth to a tuberculate surface.

B. Body-whorl with numerous tubercles, in parallel rows.

11. A. lima, CONRAD.

Melania lima, CONRAD, New Fresh-Water Shells, p. 54, t. 8, f. 8, 1834. CHENU, Reprint. DEKAY, Moll. N. Y., p. 97. WHEATLEY, Cat. Shells U. S., p. 26. JAY, Cat., 4th edit., p. 274. CATLOW, Conch. Nomenc., p. 187. BROT, List, p. 33. MULLER, Synopsis, p. 46.
Anculotus lima, Conrad, REEVE, Monog. Anc., t. 1, f. 1.
Lithasia lima, Conrad, BINNEY, Check List, No. 300.
Megara lima, Conrad, ADAMS, Genera, i, 306.

Description.—Shell conic, or subfusiform; with approximate nodulous, spiral lines of unequal size; body-whorl angulated; angle with a series of prominent tubercles; base with two lines, the superior one nodulous; aperture nearly half the length of the shell, contracted, and acutely angular above, and obtusely pointed at base; labrum very thin; color olive; within with purple bands.

Fig. 58.

Observations.—A fine species, easily recognized by its numerous tubercles, and ventricose form. Inhabits Elk River, Alabama, adhering to stones, and is a common species.—*Conrad.*

Distinguished from *L. verrucosa*, Raf. (*nupera*, Say), by its

angulated body-whorl, conical spire, acute apex, and by the irregularity in the size of its tubercles.

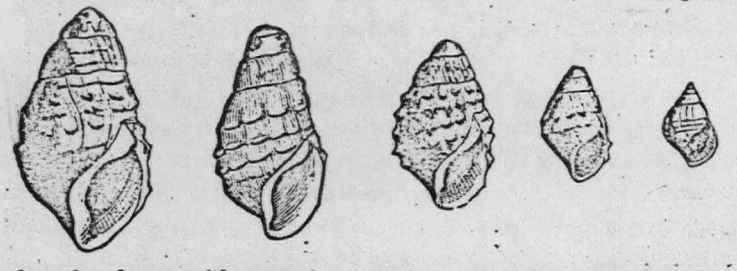
Mr. Reeve originally described this species as *nupera*, and *vice versa*, but subsequently corrected the error. It occurs also in Tennessee River.

12. A. verrucosa, RAFINESQUE.

Pleurocera verrucosa, RAFINESQUE, Annals of Nature, p. 11, 1820.
Melania nupera, SAY, New Harmony Dissem., p. 260. Amer. Conch., pt. 1, t. 8, f. 1, 2. BINNEY'S Reprint, p. 157, t. 8. CHENU'S Reprint, p. 16, t. 2, f. 3. DEKAY, Moll. N. Y., p. 97. WHEATLEY, Cat. Shells U. S., p. 26. BROT, List, p. 40. JAY, Cat. Shells, 4th edit., p. 274.

Description.—Ellipsoidal, top very obtuse, base of the opening obtuse, inside lip thickly plaited; four spires, the last two flattened,

Fig. 59. Fig. 60. Fig. 61. Fig. 62. Fig. 63.



the other large, with several rows of warts; back of the opening wrinkled; color olivaceous-brown, opening whitish.

Habitat.—The lower parts of the Ohio.

Length, about two-thirds of an inch, not quite double the breadth.—*Rafinesque.*

With no disposition to give place to the description of Mr. Rafinesque, at the expense of naturalists of honesty and reputation, I am still constrained, in this instance, to quote his name for the shell that is so well known amongst us as Mr. Say's *nupera*. Indeed, I cannot find any description of a species of shell, by Rafinesque, which indicates so unmistakably the shell intended by him, as does the one here quoted. It may be mentioned, not as proof in itself, but merely as collateral evidence of the correctness of my views of this species, that in a manuscript by Rafinesque, entitled "Conchologia Ohioensis," belonging to the Smithsonian Institution, a rough

pen sketch of *Pleurocera verrucosa* is given, which is a very good representation of Mr. Say's *nupera*.

The description of the latter species is as follows:—

Melania nupera.— Shell oblong suboval; volutions five, slightly rounded; body-whorl with about three revolving series of subequal, equidistant granules or tubercles, not higher than wide, occupying the superior portion of the surface; second volution with but two series; remaining volutions with slightly elevated, longitudinal lines instead of tubercles, often obsolete; spire decorticated towards the tip; suture not deeply impressed; aperture longer or as long as the spire; sinus of the superior angle profound; labium concave, with a callus near the superior angle; columella with a slight, obtuse, hardly prominent angle above the incipient sinus, which is obvious; labrum not abbreviated above, nor much produced near the base.

Observations.— This species is common in the Wabash River; the spire is almost invariably so much decorticated that no trace of the longitudinal lines remains; in the young only are the lines distinct, and even in these they are sometimes obsolete or altogether wanting. It varies in the number of its series of tubercles, some specimens having but one, and others, though these are rare, as many as five or six.— *Say.*

Melania Holstonia.—Shell grained, conical, somewhat thick, black; spire somewhat elevated; sutures impressed; whorls flattened above; aperture ovate, purple.

Fig. 64.

Habitat.— Holston River, Tennessee.

Diameter, ·38; length, ·79 of an inch.

Observations.— A very distinct species with four series of small, rather sharp elevations round the whorls, the two inferior ones rather indistinct. Only two specimens have come under my notice, and both have the apex decollated.—*Lea.*

The figure of *Holstonia* is copied from Mr. Lea's plate. The locality of "Holston River, Tenn.," may well be doubted.

The species is a very common one in North Alabama, and exhibits considerable variation in size and proportions. A specimen in Coll. Haldeman is labelled "Nashville."

As for Deshayes' *Melanopsis semigranulosa*, its identity is proved by his quotation of Mr. Say's species as a synonyme, in his description. Say published in 1829, Deshayes in 1830. It therefore appears that the great French naturalist, upon

removing the species to the genus *Melanopsis*, seized the occasion to deprive Mr. Say of his species, a meanness that has unfortunately found many advocates amongst naturalists (?) whose sole ambition appears to be, to write "nobis" as frequently as possible. But, like M. Deshayes, these gentlemen, although sometimes successful for a period, will all eventually find themselves quoted where they have placed the authors they have endeavored to despoil,—*among the synonymes.*

Subgenus LITHASIA, [redacted]

Lithasia, HALDEMAN, Supplement to Monog. Limniades, No. 1, Oct. 1840. BINNEY, Check List of Fluviatile Univalve Shells, June, 1860. LEA, Proc. Acad. Nat. Sci., p. 54, Feb. 1861. Jour. Acad. Nat. Sci., v. pp. 258 and 354, March, 1863. Observations, ix, pp. 80 and 176, March, 1863.
Lithasia, Haldeman (part.), H. & A. ADAMS, Genera, i, p. 308, Feb., 1864.
Lithasia, Lea, 1845, CHENU, Man. Conchyl., i, p. 296, 1859.
Megara (part.), ADAMS, Genera, i, p. 306, Feb., 1854.
Anculotus (sp.), Say, GRAY, Genera, Zool. Proc., pt. 15, p. 153, 1847. REEVE, Monog., April, 1860.
Anculosa (sp.), Say, AUCT.
Melania (sp.), AUCT.

Description.—Shell ovately fusiform or oval, small, smooth. Aperture not so distinctly channelled in front as in the typical *Angitremæ*. Columella with an anterior and posterior callous deposit.

Geographical Distribution.—Like the typical species, we find the *Lithasiæ* inhabiting principally the waters of Tennessee and North Alabama; but one of the species is completely separated from the geographical area of the group, its habitation being confined to the Ohio River and tributaries. This shell, *L. obovata*, is somewhat removed from the general type, but is connected with it, by *L. undosa*, a Kentucky species. Another allied shell, *L. consanguinea*, has heretofore been found in Indiana only.

SYNOPSIS OF SPECIES.

A. Shell large, ovate, inflated.

1. L. FULIGINOSA, Lea, Reeve, sp. 401.
2. L. FLORENTIANA, Lea. Not of Reeve, Anculotus, fig. 4.
3. L. VENUSTA, Lea.
4. L. DILATATA, Lea.
5. L. IMPERIALIS, Lea.

B. Shell small, compact, oval-elliptical, thick.

6. L. VITTATA, Lea.
7. L. SHOWALTERII, Lea, Reeve, Melania, fig. 421.
8. L. NUCLEOLA, Anthony, Reeve, Melania, fig. 348.
9. L. OBOVATA, Say, Reeve, Anculotus, fig. 21. *L. Hildrethiana*, Lea, *L. undosa*, Anthony, Reeve, Melania, fig. 447. *L. rarinodosa*, Anthony (Manuscript), Reeve, Melania, fig. 268. *L. consanguinea*, Anthony, Reeve, Anculotus, fig. 2.

C. Shell obliquely flattened.

10. L. COMPACTA, Anthony, Reeve, Melania, fig. 343.
11. L. NUCLEA, Lea, Reeve, Melania, fig. 423.

D. Shell subcylindrical.

12. L. BREVIS, Lea, Reeve, Melania, fig. 344. *L. solida*, Lea, *non* Reeve, Melania, fig. 454.
13. L. FUSIFORMIS, Lea.
14. L. DOWNIEI, Lea.

A. *Shell large, ovate, inflated.*

1. L. fuliginosa, LEA.

Melania fuliginosa, LEA, Philos. Proc. Philos. Trans., viii, p. 170, t. 5, f. 17. Obs., iii, p. 8. DEKAY, Moll. N. Y., p. 94. TROOST, Cat. WHEATLEY, Cat. Shells U. S., p. 25. BINNEY, Check List, No. 113. CATLOW, Conch. Nomenc., p. 186. BROT, List, p. 40. REEVE, Monog.-Melania, sp. 401.
Leptoxis fuliginosa, Lea, ADAMS, Genera, i, p. 307.

Description.—Shell smooth, fusiform, somewhat inflated, rather thick, dark brown; spire obtuse; sutures impressed; whorls six, somewhat convex; aperture large, at the base angular and channelled.

Fig. 65.

Habitat.—Big Bigby Creek, Maury Co., Tenn.

Diameter, ·50; length, ·85 of an inch.

Observations.—In general form this species resembles the *M. Duttoniana* (nobis), but differs in being less elevated in the spire, in being without tubercles, and of a very dark color; the substance of the shell is disposed to be purple. The epidermis is thick and very dark. Mr. Dutton found it rare.—*Lea.*

I was at first disposed to consider this the same as *L. Florentiana*, Lea; but it appears to be always colored differently, being darker, with, generally, broad brown bands, and sometimes the general surface is brilliant green ornamented with the bands, while *Florentiana* is of uniform color. This species also differs from *Florentiana* in being more inflated.

2. L. Florentiana, LEA.

Melania Florentiana, LEA, Philos. Proc. Philos. Trans., viii, p. 188, t. 6, f. 53. Obs., iii, p. 26. DEKAY, Moll. N. Y., p. 99. WHEATLEY, Cat. Shells U. S., p. 25. BINNEY, Check List, No. 110. CATLOW, Conch. Nomenc., p. 186. BROT, List, p. 40.
Io Florentiana, Lea, H. & A. ADAMS, Genera, i, p. 299.

Description.—Shell tuberculate, elliptical, ponderous, pale; spire obtuse; sutures impressed; whorls six, slightly convex; aperture elongated, whitish.

Fig. 66.

Habitat.—Tennessee River, Florence, Alabama.

Diameter, ·47; length, ·87 of an inch.

Observations.—An elliptical species resembling the *M. olivula*, Conrad. Its aperture is so much elongated as to be more than half the length of the shell. Three of the specimens are without bands, a fourth has several very indistinct ones. The whorls are somewhat flattened on the superior part and are disposed to be tuberculated below the sutures. In the young the tubercles are more distinct. In some of the adult specimens they are entirely wanting.—*Lea.*

This species is well represented now, in our cabinets, and very seldom exhibits the tuberculation which appears to have faintly characterized Mr. Lea's first specimens. Reeve's fig. 4, of *Anculosa Florentiana*, more properly represents *L. Tuomeyi*, Lea.

3. L. venusta, LEA.

Melania venusta, LEA, Philos. Proc. Trans., viii, p. 187, t. 6, f. 52. Obs., iii, p. 25. DEKAY, Moll. N. Y., p. 99. JAY, Cat. 4th edit., p. 275. TROOST, Cat. WHEATLEY, Cat. Shells U. S., p. 27. BINNEY, Check List, No. 235. CATLOW, Conch. Nomenc., p. 189. BROT, List, p. 40. REEVE, Monog. Melania, sp. 315.

Description.—Shell disposed to be tuberculate, fusiform, somewhat thin, yellowish above; spire rather obtuse; sutures roughly impressed; whorls six, convex; aperture elongated, at the base angulated and channelled, within whitish.

Habitat.—Tennessee.

Diameter, ·43; length, ·80 of an inch.

Observations.— Dr. Troost sent me a single specimen of this species which is very distinct, the columella is very much thickened, particularly above, in which it resembles the genus *Melanopsis*. The aperture is rather more than half the length of the shell. In this specimen a single obscure band may be observed within, close to the base of the columella.— *Lea.*

Fig. 67.

This species is more narrowly cylindrical than *L. Florentiana;* besides, it is lighter colored, heavier in texture, with the two deposits of callus on the columella more prominent and the canal narrower and better developed. It is a rather rare species.

4. L. dilatata, Lea.

Lithasia dilatata, Lea, Proc. Acad. Nat. Sci., p. 55, 1861. Jour. Acad. Nat. Sci., v, pt. 3, p. 260, t. 35, f. 69. Obs., ix, p. 82.

Description.— Shell smooth, subglobose, rather thick, grayish-green, yellowish below the sutures, obscurely banded; spire obtusely conical; sutures irregularly impressed; whorls five, the last one large and ventricose; aperture large, subrhomboidal, brownish within and angular at the base; columella thickened above and below, incurved; outer lip sharp and much dilated.

Fig. 68.

Habitat.— Tennessee; Dr. Troost.

Diameter, ·45; length, ·73 of an inch.

Observations.— This is a well-characterized species, nearly allied to two species which I described some years since, before *Lithasia* was established, under the names of *Melania Florentiana* and *M. venusta*, both of which must be removed to the well recognized genus *Lithasia*. It is nearest to the former, but is more globose, more glaucous and darker inside, and has a larger callus above. The bands on this species are very obscure, and are, indeed, simply the general color interrupted by light, transverse, fine lines. On the upper part of the body-whorl there are several low tubercles, which may not be found in all the individuals of this species. The callus above is tinted with brown. The outer lip is bordered with white. The length of the best specimen is nearly three-quarters of an inch, and the aperture is more than half the length of the shell.— *Lea.*

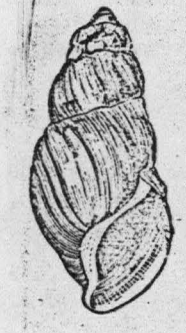
The type of Mr. Lea's description I have figured. It is, I think, a good species, although very close to *L. fuliginosa*. It appears to be a more solid shell than that species, however, and the aperture is narrower below, with a more distinct fuse.

5. L. imperialis, Lea.

Lithasia imperialis, Lea, Proc. Acad. Nat. Sci., p. 53, 1831. Jour. Acad. Nat. Sci., v, pt. 3, p. 258, t. 35, f. 67. Obs., ix, p. 80.

Description.— Shell tuberculate, fusiform, rather thick, dark horn-color; spire raised, conoidal; sutures irregularly and much impressed; whorls six, the last rather large, irregularly tuberculate above, rather inflated; aperture rather small, elongately rhomboidal, whitish within, furnished with brown hair-like lines, channelled at the base and recurved; columella sigmoid, slightly thickened above; outer lip somewhat expanded, acute at the margin.

Fig. 69.



Operculum rather small, very dark brown, rhomboidal, with the polar point on the left edge near the base.

Habitat.— North Alabama; Prof. Tuomey.

Diameter, ·70 of an inch; length, 1·55 inches.

Observations.— This is much the largest *Lithasia* I have seen. Although several of the whorls of the vertex are eroded off, still it measures one and a half inches in length. A single specimen only was received, and this without the operculum. The tubercles are large and irregular, and not much raised. The capillary brown lines in the interior are numerous and rather obscure, but this may not be the case with more perfect specimens. They seem to replace the usual bands. They do not reach the edge, which is bordered with white. Below the sutures there is a stricture which nearly amounts to a furrow. It more nearly resembles *Melania* (*Lithasia*) *Duttonia* (nobis), than any other known species, but is a larger, more ponderous species, and has not the numerous small tubercles, nor the bands of that species.— *Lea.*

B. *Shell small, compact, oval-elliptical.*

6. L. vittata, Lea.

Lithasia vittata, Lea, Proc. Acad. Nat. Sci., p. 273, 1862. Jour. Acad. Nat. Sci., v, pt. 3, p. 354, t. 35, f. 67. Obs., ix, p. 176.

Description.— Shell smooth, cylindrical, rather thin, dark horn-color,

four-banded; spire short, decollate; sutures irregularly impressed; whorls flattened, the last very large; aperture large, rhomboidal, whitish within and much banded; outer lip acute; columella thickened, white, incurved.

Operculum ovate, thin, light brown, with the polar point on the inner edge near to the base.

Habitat. — Coosa and Cahawba Rivers, Alabama; E. R. Showalter. Diameter, ·40; length, ·88 ? of an inch.

Observations. — This is a beautifully banded species, which is so near to *brevis* (nobis) in size and outline that I considered it at first as a strongly marked variety of that species. From examination now of about a dozen specimens before me, sent by Dr. Showalter and Dr. Lewis, I am perfectly satisfied that this is a distinct species. All the specimens I have seen have four well expressed dark brown bands, which are strongly exhibited within. All the specimens are so much worn at the apex that it is impossible to say how many whorls they naturally have. There is a great difference in the form of the apertures of the specimens before me, — some have quite an angular base, while others are rounded almost like a *Melania*. The aperture is probably two-thirds the length of the shell. — *Lea.*

Fig. 70.

7. L. Showalterii, Lea.

Lithasia Showalterii Lea, Proc., Acad. Nat. Sci., p. 188, 1850. Jour. Acad. Nat. Sci., v, pt. 3, p. 262, t. 35, f. 72. Obs. ix, p. 84.
Melania Showalterii, Lea, Reeve, Monog., sp. 423. Brot, List, p. 33.

Description. — Shell smooth, ovately cylindrical, rather thick, yellowish horn-color, banded; spire obtusely conical; sutures very much impressed; whorls six, the last large and flattened; aperture large, subovate, elongate, whitish within, dark-banded, obtusely angular at the base, columella thickened above and below, incurved; outer lip acute and somewhat constricted.

Fig. 71.

Habitat. — Cahawba River, at Centreville, Alabama; E. R. Showalter. Diameter, ·38; length, ·70 of an inch.

Observations. — This species presents a number of varieties, but the character of the flattened enlarged side, frequently producing quite a large shoulder, is generally preserved. Sixteen out of nineteen specimens before me have very much the same character of bands, viz.:

three broad, nearly equal, distant, revolving ones. The other three lose all the yellowness of the epidermis, and present an intensely deep purplish brown hue inside and out. The largest of these three has a more constricted aperture than any of the others, and it has revolving striæ more distinct towards the base, which I have not observed in the others. The aperture is also quite channelled below, which is indistinct in the others. Another of these three dark specimens has a higher spire and a shorter aperture, leaning towards the form of a *Melania*. The shoulder in many of the specimens is large and well pronounced, while in others it is small. The aperture is about two-thirds the length of the shell. This species reminds one, as to its outline, of *Melania undosa*, Anth., from Kentucky. It is, however, larger, more cylindrical and has the callus on the columella, which *undosa*, of course, has not. *Undosa* is also much paler and has a higher spire. I have great pleasure in dedicating this species to Dr. Showalter, who is doing so much for the natural history of his adopted state. — *Lea.*

This species resembles the preceding, but is less cylindrical, with the aperture wider, and the outer lip more curved. The spire is shorter and more rapidly acuminate.

8. L. nucleola, Anthony.

Melania nucleola, Anthony, Proc. Bost. Soc. Nat. Hist., iii, p. 360, Dec., 1850. Binney, Check List, No. 181. Brot, List, p. 40. Reeve, Monog., sp. 348.

Description. — Shell small, thick, eroded, subglobose or subcylindrical, smooth, greenish, encircled by two bands; whorls 2-3, ventricose, the last at length cylindrical; aperture semilunar; lip dilated in front, thickened behind; columella with a copious callous deposit.

Fig. 72. Fig. 73.

Habitat. — Tennessee.

Longitude, ½; latitude, ⅜ of an inch.

Observations. — This species, which resembles closely *L. nuclea*, Lea, may be distinguished by being rather larger; differently colored, being light brown; while *nuclea* has a tinge of green; by having two chestnut-colored bands in place of the four dark ones of Mr. Lea's species; and by the columella being not so much thickened. It is a rare species, whilst *nuclea* appears to be rather an abundant one.

Belongs to a group of solid, ellipsoidal species peculiar to the re-

gion of Lower Tennessee and Alabama. It has a very sparing development of the spire, and a remarkable flattening about the middle of the last whorl.—*Anthony.*

9. L. obovata, Say.

Melania obovata, Say, New Harmony Dissem., No. 18, p. 276, Sept. 9, 1829; Reprint, p. 18, 1840. Binney's Reprint. p. 143. DeKay, Moll. N. Y., p. 98. Wheatley, Cat. Shells U. S., p. 26. Catlow, Conch. Nomenc., p. 188. Jay, Cat., 2d edit., p. 45.
Anculotus obovatus, Say, Jay, Cat., 4th edit., p. 276. Reeve, Monog. Mel., f. 21.
Leptoxis obovata, Say, Hald., Monog. Lept., p. 2, t. 1, f. 27-34. Binney, Check List, No. 374. Brot, List, p. 25.
Lithasia obovata, Say, Chenu, Manuel, i, f. 2056-8. Adams, Genera, i, 308.
Anculosa obovata, Say, Wheatley, Cat. Shells U. S., p. 26.
Melania Hildrethiana, Lea, Philos. Proc. Philos. Trans., viii, p. 164, t. 5, f. 1. Obs., iii, p. 2, t. 5, f. 1. DeKay, Moll. N. Y., p. 92. Wheatley, Cat. Shells U. S., p. 25. Binney, Check List, No. 133. Catlow, Conch., Nomenc., p. 187.
Leptoxis Hildrethiana, Lea, Adams, Genera, i, p. 307.
Melania undosa, Anthony, Ann. N. Y., Lyc., vi, p. 124, t. 3, f. 25, March, 1854. Binney, Check List, No. 280. Brot, List, p. 39. Reeve, Monog. Mel., sp. 447.
Melania rarinodosa, Anthony, MSS., Reeve, Monog., sp. 268. Brot, List, p. 39.
Melania consanguinea, Anthony, Ann. N. Y. Lyc., vi, p. 125, t. 3, f. 26, March, 1854. Binney, Check List, No. 66. Brot, List, p. 39.
Anculotus consanguineus, Anthony, Reeve, Monog. Anc., sp. 2.

Description.—Shell subobovate, dark brown or blackish, volutions nearly five; spire remarkably rounded, short; body-whorl with a very obtuse, slightly indented band or undulation, a little above the middle; aperture more than twice the length of the spire, narrow; labium polished, with a callus above; labrum not projecting near the base, subrectilinear from the shoulder to the basal curve, very convex at the shoulder; base rounded and without indentation.

Fig. 74.

Animal, foot rounded, rather longer than wide, equally rounded before and behind; above yellowish-white, lineated with black lines.

Habitat.—Kentucky River, and some other tributaries of the Ohio.

Length, three-fourths; breadth, nearly half an inch.

Var. A. Indented band almost obsolete.

Observations.—The spire, and even a part of the body-whorl in all old shells, are sometimes remarkably eroded, as in the *M.* (*Anculotus*) *prærosa*, nob., and indeed, the general appearance is such, that at a little distance, and without particular observation, it might be readily mistaken for that shell, but the form is less globular, and the aperture is altogether different. I found it very abundant in Kentucky River in

company with that shell and other species of *Melania*. I also observed it at the falls of the Ohio. Lesueur and Troost obtained specimens in Fox River of the Wabash. When young, the undulation is hardly visible, and the shell is often of a dull yellowish color, which on the larger volutions becomes gradually of the characteristic color.—*Say.*

Melania Hildrethiana, Lea, is the half grown stage of this species, as I have verified, by an examination of Mr. Lea's original specimens, one of which he kindly presented to me (see figure). In uniting it with *obovata*, it is proper to say that Prof. Haldeman and Dr. Jay have preceded me.

The following is Mr. Lea's description of

Melania Hildrethiana.—Shell smooth, fusiform, rather thick, horn-color; spire short, pointed at the apex; sutures deeply impressed; whorls five, convex; aperture large, angular at base, ovate, white or purple.

Fig. 78.

Habitat.—Ohio River, near Marietta; Dr. Hildreth.

Diameter, ·25; length, ·37 of an inch.

Observations.—The aperture of this little species is nearly two-thirds the length of the shell. In outline it is allied to *M. fusiformis*, herein described. It may be distinguished by the sutures being more impressed, and the base being more angular. One of the specimens is purple on the columella and at the base. I dedicate it to Dr. Hildreth, to whose kindness I owe several specimens.—*Lea.*

This is nothing more than a small variety of *L. obovata*, Say. I have not seen many specimens, but they all appear to be of stunted growth, and I should not be surprised if future research proves them to be living in circumstances unsuited to their full development.

The following description is of a not entirely full grown shell, retaining the spire complete to the apex. It is a rare state, several whorls being generally lost by truncation.

Fig. 76.

The remarkably shouldered whorls and smaller size of *M. undosa* will scarcely distinguish it as a variety of this species. Its description here follows:—

Melania undosa.—Shell ovate, smooth, olivaceous, moderately thick; whorls 6-7, rapidly converging to the apex, convex; body-whorl ample, with a distinct, but somewhat rounded

shoulder; suture impressed; aperture irregularly ovate; outer lip waved; inside of the aperture whitish or brownish, often with obscure bands; columella rounded, extending into a broad, shallow sinus.

Habitat.—Nolin River, Kentucky.

Diameter, ·38 (10 millim.); length, ·66 inch (17 millim.) Length of aperture, ·35 inch (9 millim.). Breadth of aperture, ·19 inch (5 millim.).

Observations.—A somewhat variable species; the remarkably shouldered body-whorl will, however, readily distinguish it; differs from *M. obovata*, Say, by its more distinct spire, its greater proportionate breadth, and by the form of the aperture; it is also much less ponderous; many specimens are obscurely banded on the body-whorl; this is more distinctly visible in the young shell.—*Anthony.*

The shell figured and described by Mr. Reeve as *rarinodosa* is evidently the same as the above. The description is

Melania rarinodosa.—Shell ovately turbinated, olive, obscurely broad-banded; whorls 5-6, flatly convex, obtusely swollen and obsoletely noduled round the upper part; aperture ovate; columella twistedly effused.

Fig. 77.

Habitat.—United States.

Anthony, Manuscript in Mus. Von dem Busch.

Observations.—Rather a doubtful species, received by Dr. Busch from Mr. Anthony with the above name in manuscript.—*Reeve.*

Melania consanguinea.—Shell ovate, smooth, thick, brownish-olive; spire short, acuminate; whorls eight, the upper ones nearly flat, the last two or three much shouldered; body-whorl very large, slightly constricted in its upper portion, and very faintly banded; sutures deeply impressed; aperture regularly ovate, within livid, approaching to purple far within; columella rounded, with scarcely a perceptible sinus, tinged with purple at base.

Fig. 79.

Habitat.—Indiana.

Diameter, ·40 inch (10 millim.); length, ·75 inch (20 millim.). Length of aperture, ·40 inch (10 millim.); breadth of aperture, ·20 inch (5 millim.).

Observations.—Allied to, but perfectly distinct from, *M. undosa;* its greater solidity, more elongated spire, and greater number of whorls will at once distinguish it: the whorls of the spire are much more convex, and there is no prominent angle formed by the shoulder on the body-whorl as in *M. undosa.*—*Anthony.*

C. *Shell obliquely flattened.*

10. L. compacta, ANTHONY.

Melania compacta, ANTHONY, Ann. N. Y. Lyc., vi, p. 122, t. 3, f. 22, March, 1854. BINNEY, Check List, No. 62. BROT, List, p. 32. REEVE, Monog., sp. 343.
Lithasia nuclea, LEA, Proc. Acad. Nat. Sci., p. 188, 1870. Jour. Acad. Nat. Sci., v, pt. 3, p. 263, t. 35, f. 73. Obs., ix, p. 85. BINNEY, Check List, No. 301.
Melania nuclea, Lea, REEVE, Monog., sp. 423. BROT, List, p. 33.

Description.—Shell ovate-conic, smooth, thick yellowish-green; spire obtusely elevated; whorls about five, nearly flat; body-whorl large, subangulated near the base, with three very dark bands, two of which are below the angle; the penultimate whorl has two bands only, and the lowest of these is nearly or quite concealed by the suture, and on the upper whorl the same band is indicated only by a dark hair-like line; sutures well impressed; aperture rather large, ovate, within whitish and banded; columella strongly indented, base regularly rounded, without any sinus.

Fig. 80.

Habitat.—Alabama.

Diameter, ·38 inch (10 millim.); length, ·60 inch (15 millim.). Length of aperture, ·30 inch (7½ millim.); breadth of aperture, ·18 inch (4½ millim.).

Observations.—A short, thick, compact species, with seldom more than three perfect whorls remaining, other two whorls being indicated on the abruptly decollate spire; the whorls are slightly shouldered, and the lines of growth are curved and prominent; compared with *M. fusiformis*, Lea, it is less fusiform, more ponderous, has the spire less acute, and an aperture entirely different; from *M. proteus*, Con., it differs in its totally different spire and aperture, and its want of the tuberculous shoulder of that species; the bands in the interior are very dark and well defined.—*Anthony.*

The following appears to be a synonyme, judging from the comparison of type specimens of each.

Fig. 81.

Lithasia nuclea.—Shell smooth, elliptical, yellowish-olive, thick, solid, three-banded; spire obtuse-conical; sutures impressed; whorls five, the last large and slightly inflated; aperture rather small, ovately rounded, white and three-banded within, recurved at the base; columella thickened above and below, incurved; outer lip sharp.

Habitat.—Coosa River, Alabama: E. R. Showalter, M.D.

Diameter, ·34; length, ·60 of an inch.

Observations.—I have nine specimens before me of this little species, which has much the aspect of an *Anculosa*, as well also of some *Melaniæ*. But the callus on the lower and upper parts of the columella naturally places it in *Lithasia*. The longest of these specimens is not more than half an inch, and all are banded precisely alike, the three bands being nearly of equal size and equidistant. It would appear then that these bands are more constant than usual in the *Melanidæ*. Four out of the nine have a light purple spot on the middle of the columella, the others are entirely white. Without being at all like *Melania obovata*, Say (*consanguinea*, Anth.), in outline or general appearance, the columella is very much the same, both being thick with an incipient channel at base. Indeed, *M. obovata* properly belongs to the genus *Lithasia*. In form, color and bands, *nuclea* reminds one of *M. basalis* (nobis), but it is more rotund, has a thicker columella, has a less brilliant epidermis and is a more solid shell. The aperture is about one-half the length of the shell. Dr. Showalter says in his letter that "this is the most uniform species in my collection."—*Lea.*

Shell subcylindrical.

11. L. brevis, Lea.

Melania brevis, Lea, Philos. Proc., ii, p. 242. Philos. Trans., ix, p. 6. Obs., iv, p. 26. Wheatley, Cat. Shells U. S., p. 24. Binney, Check List, No. 38. Brot, List, p. 32. Reeve, Monog., sp. 344.

Anculosa solida, Lea, Philos. Proc., ii, p. 243. Philos. Trans., ix, p. 29. Obs., iv, p. 29. Wheatley, Cat. Shells U. S., p. 28.

Leptoxis solida, Lea, Binney, Check List. No. 384. Brot, List, p. 25.

Melania trivittata, Reeve, Monog., sp. 420.

Description.—Shell striate, subcylindrical, somewhat solid, yellow; spire rather short; sutures impressed; whorls flattened; columella thickened above; aperture ovate, white.

Fig. 82.

Habitat.—Alabama.

Diameter, ·41; length, ·60 of an inch.

Observations.—A single specimen only of this species is before me. The apex being eroded, the number of whorls cannot with certainty be ascertained; there appear to be about five. On this specimen there are eight indistinct impressed striæ, and several low, irregular folds on the body-whorl, which may be more distinct on the superior whorls when found perfect. The aperture is about half the length of the shell. —*Lea.*

The following is Mr. Lea's description of

Lithasia solida.—Shell smooth, elliptical, rather thick, yellowish-brown; spire somewhat drawn out; sutures impressed; whorls flattened; columella incurved, thickened above and below; aperture elongated, elliptical, white.

Habitat.—Alabama.

Diameter, ·38; length, ·60 of an inch.

Observations.—Three specimens only were sent to me by Dr. Foreman. They differ very little from each other, except that one exhibits a few indistinct, elevated, revolving striæ. Other specimens may present this character more strongly. Neither of the specimens has a perfect spire, the apices being eroded. The number of whorls I should think, however, were five. The aperture seems to be rather more than half the length of the shell. The columella is remarkable for its callus near the base as well as having another above.—*Lea.*

Until the possession of more specimens will enable naturalists to distinguish *L. brevis* and *L. solida*, they had probably better remain united as one species. Reeve's figure of the latter appears to have too long a spire, and to be differently formed in the aperture.

Mr. Reeve has not recognized the genus *Lithasia*, and accordingly changes the name to *trivittata*, Reeve, because Mr. Lea had already used *brevis* for a Melanian.

12. L. fusiformis, Lea.

Lithasia fusiformis, Lea, Proc. Acad. Nat. Sci., p. 54, 1861. Jour. Acad. Nat. Sci., v, pt. 3, p. 261, t. 35, f. 71. Obs., ix, p. 71.

Description.—Shell sulcate, fusiform, rather thin, obscurely furrowed, reddish-brown, four-banded, conical; sutures irregularly impressed; whorls six, the last large and somewhat inflated; aperture elongately rhomboidal; whitish within and four-banded, channelled and recurved at the base; columella with double curve, thickened above; outer lip somewhat constricted, with an acute margin.

Fig. 83.

Operculum small, ovate, dark brown, serrate around the base and

outer margin, with the polar point inside the left edge about one-third above the basal margin.

Habitat.— Coosa River, Alabama; E. R. Showalter, M. D.

Diameter, ·30; length, ·52 of an inch.

Observations.—Six specimens are before me. Neither, I think, quite full grown. This species differs materially from *Showalterii* (nobis) from the same river. It is not quite so large, is not inflated, but more constricted on the body-whorl, and has rather distant, low, longitudinal folds, which in some specimens are scarcely observable. It differs in having four brown bands, the *Showalterii* having but three. The most remarkable character of *fusiformis* is the long, recurved channel which brings it close to the genus *Io*. All the specimens have transverse furrows, which are more strongly developed in some of them than in others. The *operculum* is very remarkable, having the margin from near to the polar point round the upper part of the outer margin completely *serrate*. Fortunately, two of the specimens were found to have the operculum adhering to the desiccated parts within, and both were found to possess this peculiar character, which I have never observed in any other species of the *Melanidæ*. The aperture is nearly two-thirds the length of the shell.—*Lea.*

It is not improbable that this may eventually prove to be the young of some other species—*Showalterii*,—or even *Downiei*.

13. L. Downiei, Lea.

Lithasia Downiei, Lea, Proc. Acad. Nat. Sci., p. 273, 1862. Jour. Acad. Nat. Sci., v, pt. 3, p. 354, t. 39, f. 227. Obs., ix, p. 176.

Description.— Shell sparsely nodulous, subcylindrical, chestnut-colored; spire obtusely conoidal, somewhat raised; sutures irregularly impressed; whorls seven, flattened, the last rather large, rhomboidal, white or banded within; outer lip sharp, sinuous; columella white and incurved.

Fig. 84.

Habitat.— Cumberland River; Major T. C. Downie.

Diameter, ·44; length, ·98 of an inch.

Observations.— This is an unusual form of *Lithasia* and cannot be confounded with any known species. The spire is exserted like most of the *Melanidæ*, but the aperture has all the characteristics of the true *Lithasiæ*. Its most remarkable character is the formation of the few low, elongate tubercles which it possesses. These are formed by an enlargement on

the middle of the edge of the outer lip at each stage of growth,—a character I have not observed in any other species of *Melanidæ*. I suspect that this species will generally be found to be banded. One of the two specimens before me has six well-defined bands, which are indistinct on the outside, but are well marked on the inside. The other has only one band, and this is visible only on the upper whorls, the aperture being whitish, with a brown, indistinct band at the base. The upper callus is well marked, and the channel below is well defined. The aperture is more than one-third the length of the shell. I have great pleasure in naming this fine species after Major T. C. Downie, to whom I owe the acquisition of many new and rare mollusks.— *Lea.*

Subgenus STREPHOBASIS, Lea.

Strephobasis, Lea, Proc. Acad. Nat. Sci., p. 96, April, 1861. Jour. Acad. Nat. Sci., v, pt. 3, pp. 264 and 355. Obs., ix, pp. 86, 177.
Megara (sp.), H. & A. Adams, Genera, i, p. 306, Feb., 1854.

A. *Shell ovate-conical.*

1. S. curta, Haldeman.

Melania curta, Haldeman, Monog. Limniades, No. 3, p. 3 of Cover. Binney, Check List, No. 80. Brot, List, p. 32. Reeve, Monog., sp. 345.
Melania solida, Lea, Philos. Trans., t. 9, f. 27. Obs., iv, p. 57. Binney, Check List, No. 245. Brot, List, p. 31. Reeve, Monog. Melania, f. 454.
Strephobasis solida, Lea, Jour. Acad. Nat. Sci., v, pt. 3, p. 266, t. 35, f. 77. Obs., ix, p. 88.
Megara solida, Lea, Adams, Genera, i, p. 306.

Description.—Shell short, conical, smooth; spire plane, nearly twice as long as the aperture, which is narrow and quadrate with a narrow anterior sinus; color green or chestnut.

Fig. 85.

Habitat.— Ohio River.

Length, ⅝ of an inch.

Observations.— Resembles *M. conica*, Say, but the whorls increase more rapidly in size.— *Haldeman.*

The above description is not a satisfactory one, but the shell is recognized as identical with *solida* by authenticated types in the collection of Mr. Anthony, one of which is here fig-

ured. It is a mistake to assign the Ohio River as the habitat of this species.

Mr. Lea's descriptions and copy of his last figure here follow:—

Melania solida.—Shell smooth, obtusely conical, thick, solid, dark horn-color; spire rather short; sutures much impressed; whorls convex; aperture small, rhomboidal, twisted at the base, white within; columella inflected.

Habitat.—Tennessee.

Diameter, ·5; length, ·9 of an inch.

Observations.—This species in form somewhat resembles *M. alveare*, Conr., on one side, and *M. canaliculata*, Say, on the other. It has not, however, either furrows or tubercles. The three specimens before me have all mutilated apices, and therefore the number of whorls cannot be correctly ascertained. There may be seven or eight. The aperture is about one-third the length of the shell. There is no appearance of bands in these. This is one of those species which have a twisted aperture, being auger-shaped, the outer lip being spread out, and the edge having a line of a double curvature. The columella is very much twisted.

Strephobasis solida.—Shell smooth, subcylindrical, thick, solid, dark horn-color or olive; spire obtusely conical; sutures impressed; whorls slightly convex, the last slightly constricted; aperture rather large, nearly quadrate, whitish within; outer lip acute, very sinuous; columella sinuous, thickened below and channelled backwards.

Fig. 86.

Operculum subovate, very dark brown, with the polar point near the middle of the base.

Habitat.—Tennessee; E. Foreman, M.D.: East Tenn.; President Estabrook: Pulaski Creek, Kentucky; Joseph Lesley.

Diameter, ·50 of an inch.

Observations.—I described and figured an imperfect specimen of this species in the Trans. Am. Phil. Soc., May 2, 1845, under the name of *Melania solida*. The figure shows the specimen to have been very imperfect in the aperture. Having subsequently received a number of perfect specimens (except in the apex), and finding its proper place to be in the genus *Strephobasis*, I have made a new description, and propose to give a more perfect figure. The specimens before me, more than a dozen, vary much in outline, some

being more cylindrical than others. One of them has two obscure bands, visible inside and out. Another has an indistinct band inside at the base of the columella; others are white. Two from Kentucky have two broad dark bands, and two are of an olive color, with a purple spot at the base of the columella. In mature specimens the inner edge of the outer lip is thickened. Some of the mature specimens have a broad furrow round the body-whorl. The length of the aperture is usually about the third of the length of the shell.—*Lea.*

Messrs. Haldeman and Anthony both agree with me in considering *curta* and *solida* to be identical.

2. S. pumila, Lea.

Melania pumila, Lea, Philos. Proc., iv, p. 166, Aug., 1845. Philos. Trans., x, p. 60, t. 9, f. 36. Obs., iv, p. 60. Binney, Check List, No. 223. Brot, List, p. 33. Reeve, Monog., sp. 446.
Megara pumila, Lea, Adams, Genera, i, p. 306.

Description.—Shell smooth, obtusely conical; rather thick, dark horn-color; spire depressed; sutures much impressed; whorls slightly convex; aperture elongate, contracted, twisted at the base, within whitish.

Fig. 87.

Habitat.—Tuscaloosa, Alabama.

Diameter, ·27; length, ·53 of an inch.

Observations.—The two specimens before me are, in form and size, the same. They differ in one having two broad, purple bands, and the other being entirely without. On the inferior part of the whorl one has five rather distinct striæ, the other has these less distinct. The apex of each of these is eroded, and therefore the number of whorls cannot be ascertained. This species is closely allied to *M. alveare*, Conrad, but is a much smaller shell, and in the two individuals before me there is no appearance of the tubercles which usually exist on the carina of the lower whorl of that species. —*Lea.*

This is a very distinct species. The Smithsonian collection contains a number of specimens, labelled "Tennessee." They are very uniform in size, color and markings.

S. pumila is more nearly allied to *P. productum*, Lea (*glossum*, Anth.), than to *alveare;* but it is very much smaller, heavier and differs in the form of the aperture.

STERKIANA NO. 26, JUNE 1967

3. S. carinata, LEA.

Strephobasis carinata, LEA, Proc. Acad. Nat. Sci., p. 273, 1862. Jour. Acad. Nat. Sci., v, pt. 3, p. 355, t. 39, f. 228. Obs., ix, p. 177.

Description.— Shell carinate, subfusiform, inflated, rather thin, greenish, four-banded; spire obtuse; sutures very much impressed; whorls six, flattened, carinate at the apex, the last one inflated; aperture rather large, rhomboidal, whitish and banded within; outer lip sharp, somewhat sinuous; columella thickened, bent back and much twisted.

Fig. 88.

Habitat.— Tennessee River; W. Spillman, M.D.

Diameter, ·20; length, ·37 of an inch.

Observations.— A single specimen, no doubt young, and somewhat fractured on the outer lip, is the only one received among the shells from Dr. Spillman. The spire is perfect, and all the whorls but the lowest one are carinate. It is, perhaps, nearest to *S. Clarkii* (nobis), but may be at once distinguished by the inflated form, the size and the bands. The aperture is about half the length of the shell.— *Lea.*

The figure is a copy of Mr. Lea's. It is doubtless a distinct species although the adult will probably differ much.

B. *Shell cylindrical.*

4. S. olivaria, LEA.

Strephobasis olivaria, LEA. Proc. Acad. Nat. Sci., p. 273, 1862. Jour. Acad. Nat. Sci., v, pt. 3, p. 356, t. 39, f. 229. Obs., ix, p. 178.

Description.— Shell smooth, elliptical, thick, banded, dark olive; spire obtusely conical; sutures very much impressed; whorls about seven, convex, the last one large; aperture large, rhomboidal, white within and banded; outer lip acute, slightly sinuous; columella thickened below and twisted backwards.

Fig. 89.

Habitat.— Knoxville, Tennessee; J. Clark.

Diameter, ·42; length, ·99 of an inch.

Observations.— Some twenty specimens are before me, all having very much the same size, form and general appearance. Generally there are two broad, well-characterized bands, strongly marked on the inside and observable on the outside. Two of the specimens have no bands, one has a single band, two have four bands, and three are purple inside. This species is nearest to *solida*, herein described, but it is more elliptical, less ponderous and of quite a different color,— that species being light horn-color. The aperture is about four-tenths the length of the shell.—*Lea.*

5. S. plena, ANTHONY.

Melania plena, ANTHONY, Ann. Lyc. N. H. New York, vi, p. 121, t. 3, f. 21, March, 1854. BINNEY, Check List, No. 210. BROT, List, p. 33. REEVE, Monog. Mel., sp. 450.

Strephobasis Spillmanii, LEA, Proc. Acad. Nat. Sci., p. 96, 1861. Jour. Acad. Nat. Sci., v, pt. 3, p. 264, t. 35, f. 74. Obs., ix, p. 86.

Description.— Shell oblong ovate, smooth, thick, dark olive-green; spire abruptly decollate, not elevated; whorls 4-5, convex; body-whorl large, a little constricted in the centre, having two very faint, distant bands, more distinct in the interior; sutures irregularly and distinctly impressed; aperture large, subrhomboidal, within livid and banded; columella strongly indented and twisted, with a strong sinus at base.

Fig. 90.

Habitat.— Alabama.

Diameter, ·45 inch (11 millim.); length, ·80 inch (21 millim.). Length of aperture, ·42 inch (11 millim.); breadth of aperture, ·20 inch (5 millim.).

Observations.— A strong, corpulent shell, of a dark livid color, which cannot well be confounded with any other; its most prominent characters are, its full broad form, the paucity of its whorls, and its strongly indented columella.— *Anthony.*

Mr. Anthony's shell above described was figured from a specimen not mature; for comparison another specimen from the cabinet of that gentleman is here figured. It will be seen to be the same, evidently, as Mr. Lea's, which is copied from his plate. *Spillmanii* is thus described:—

Fig. 91.

Strephobasis Spillmanii.— Shell smooth, cylindrical, somewhat thick, dark brown or greenish, shining, very much banded; spire obtuse, short, carinate at the apex; sutures irregularly impressed; whorls slightly convex above, the last one constricted; aperture rather large, somewhat square, bluish and much banded within; outer lip acute, sinuous; columella sinuous, thickened at the base and channelled backward.

Habitat.—Tennessee River, four miles above Chattanooga; Wm. Spillman, M. D.

Diameter, ·41; length, ·95 of an inch.

Observations.—I owe to the kindness of Dr. Spillman a number of this remarkable shell, to which he gave the habitat of Tennessee River, but did not designate from what part. Fortunately, there were some young specimens which, with those approaching maturity, gave us the advantage of tracing the great difference between the old and young. The old are decollate, and present, by the body-whorl being flattened, an almost perfect cylindrical form, while the young, which have the spire entire or nearly so, are almost perfectly oval and do not present a quadrate aperture, but an ovato-rhombic one. The callus at the base of the columella is strong, and amounts nearly to a fold, below which the channel suddenly turns backwards. The upper portion of the whorl, immediately below the suture, is tumid, and hence it has a bulbous appearance. This portion is usually lighter colored than the other parts of the whorl. The color differs in some of the specimens, some being more disposed to being dark brown, while others again are greenish. All which I have seen are more or less banded, some of them so thickly as to make the specimen almost black. These bands are all apparent on the inside. The length of the aperture is naturally, I presume, about half the length of the shell, but none of the mature specimens before me have perfect spires, and therefore the proportion cannot be correctly ascertained. There are six or seven whorls.

I have great pleasure in dedicating this interesting species to Dr Spillman, to whom I am not only indebted for this, but for very many of the mollusks which he has so successfully discovered in the streams which flow through other districts as well as his own.—*Lea.*

6. S. cornea, Lea.

Strephobasis cornea, Lea, Proc. Acad. Nat. Sci., p. 96, 1861. Jour. Acad. Nat. Sci., v, pt. 3, p. 265, t. 35, f. 75. Obs., ix, p. 87.

Description.—Shell smooth, cylindrical, thick, horn-color; spire obtuse; sutures irregularly impressed; whorls slightly convex above, the last one constricted; aperture rhombo-quadrate, yellowish-white within; outer lip acute, sinuous; columella sinuous, thickened and channelled backward at its base.

Operculum small, ovate, spiral, dark brown, with the polar point near the base.

Habitat.—Tennessee River, four miles above Chattanooga; William Spillman, M.D.

Diameter, ·41; length, ·88 of an inch.

Observations.—Among the previously described species from Dr. Spillman were two of this, which, while it has a close resemblance, still may easily be distinguished from it. They totally differ in the color of the epidermis and the *cornea* is without any bands. The substance of the shell is stouter and the channel below not quite so well pronounced. There is al o a disposition to thickening on the upper part of the columella which the other has not. In both of the specimens before me there is a thickening following the inner edge of the outer lip. The lines of growth in both are well marked, and in all cases they begin below the antecedent one. The length of the aperture would, I presume, be rather less than half the length of the shell, but both specimens being decollate, the true length of the shell cannot be ascertained, nor can the character of the apical whorls be observed.—*Lea.*

Fig. 92.

7. S. Lyonii, Lea.

Strephobasis Lyonii, Lea, Proc. Acad. Nat. Sci. 5, 1864. Obs., xi, 107.

Description.—Shell smooth, subcylindrical, thick, dark horn-color or olive, rarely banded; spire obtusely conical; sutures impressed; whorls eight, somewhat convex; aperture somewhat constricted, rhomboidal, whitish within, rarely banded; outer lip acute, somewhat sinuous; columella thickened below and channelled and drawn back at the base.

Fig. 93.

Habitat.—Holston River at Knoxville, East Tennessee.

Diameter, ·48; length, ·92 of an inch.

Observations.—I have about a dozen, of various ages, of this well characterized species, which is nearly allied to *Spillmanii* (nobis). It differs in having a shorter aperture, in being rather larger, and in not being so cylindrical. In the young of the two there is a marked difference in outline, *Lyonii* being much more conical. Some of the less cylindrical specimens approach *olivaria* (nobis), but that is a smaller species, of a darker color, and almost always having two

bands; *Lyonii* is usually without bands. Among the specimens before me two have a single band, one has two bands, one has four bands, and another has five bands. Four have a dark purple mark round the base of the columella. In those before me the color of the epidermis is very variable; several are light horn-color, one young one is almost a cinnamon-brown, and three are olivaceous. The old specimens are much eroded at the apex, and this causes a more cylindrical outline. The aperture is about four-tenths of the length of the shell.—*Lea.*

8. S. corpulenta, ANTHONY.

Melania corpulenta, ANTHONY, Ann. Lyc. N. H., vi, p. 127, t. 3, f. 28, March, 1854. BINNEY, Check List, No. 70. BROT. List, p. 32.

Description.—Shell ovate, smooth, yellowish, banded; whorls 6–7, convex; body-whorl very full, with two distant dark brown bands quite broad, which are nearly concealed on the upper whorls by the revolutions of the spire; sutures impressed; aperture narrow ovate, broadest at base, banded within; columella much curved below the middle, white, and thickened at base, with a broad and distant sinus in that region.

Fig. 94.

Habitat.—Alabama.

Diameter, ·42 inch (10 millim.); length, ·80 inch (20 millim.). Length of aperture, ·40 inch (10 millim.); breadth of aperture, ·17 inch (4 millim.).

Observations.—Its most prominent character is the corpulence of the body-whorl, and its regular oval form. May be compared with *M. bitæniata*, Conr., but its body-whorl is much more rounded or oval, it is less banded, and the bands are more distinct; the spire is more elevated and less abrupt.—*Anthony.*

In the shape of the aperture this resembles *S. cornea*, Lea, but it appears to differ in the superior portion of the body-whorl being swelled out.

9. S. bitæniata, CONRAD.

Melania bitæniata, CONRAD, New Fresh Water Shells, p. 52, t. 8, f. 6, 1834. DEKAY, Moll. N. Y., p. 94. WHEATLEY, Cat. Shells U. S., p. 24. BINNEY, Check List, No. 34. BROT, List. p. 32. HANLEY, Conch. Misc., t. 8, f. 73.
Anculotus bitæniatus, Conrad, REEVE, Monog. Anculotus, t. 3, f. 25.
Strephobasis Clarkii, LEA, Proc. Acad. Nat. Sci., p. 66, 1861. Jour. Acad. Nat. Sci., v, pt. 3, p. 262, t. 35, f. 76. Obs., ix, p. 87.

Description.—Shell conic, with convex whorls; spire short; one whorl entire, very convex; apex eroded; color olive, with two broad purple bands on the body-whorl; one on the contiguous whorl; columella with a callus above and another near the base; aperture half the length of the shell; labrum regularly arcuated; within bluish, with purple bands

Fig. 95.

Habitat.—Black Warrior River.

Observations.—It is a rare species, remarkable for its broad, purple bands and convex whorls.

There can be no doubt of the identity of *bitæniata* and *Clarkii*. I give a good figure of the former from an authenticated specimen in Coll. Anthony. The number of bands on the body-whorl varies from two to five. Mr. Lea's description of *Clarkii* and a copy of his figure follow:—

Strephobasis Clarkii.—Shell smooth, cylindrical, rather thin, yellowish horn-color, trebly banded; spire very obtuse, short; sutures irregularly impressed; whorls five, slightly convex above, the last one constricted; aperture rather large, squarish, whitish and much banded within; outer lip acute; columella sinuous, white at the base, thickened and channelled backward.

Habitat.—Tennessee River, at Chattanooga, Tenn.; Joseph Clark. Diameter, ·38; length ·72 inch.

Observations.—Several specimens of this shell were long since sent to me by my deceased friend, Mr. Clark, and it is with peculiar pleasure that I dedicate it to him who, during a long life, devoted his best energies to the investigation of the fauna and flora of Ohio, and other Western States. This species differs from the other two, herein described (*cornea* and *Spillmanii*), in being more regularly cylindrical; in being shorter and in having three regularly revolving brown bands, one of which only is observable on the upper whorls. The aperture is more than one-half the length of the shell. There is a thickening in the interior of the upper part of the whorls, which in some specimens is irregular and oblique, and is observable from the outside. It gives a yellowish appearance to this part of the whorl under the suture.—*Lea.*

Fig. 96.

Subgenus PLEUROCERA, RAFINESQUE.

Pleurocera, RAFINESQUE, Jour. de Phys. Bruxelles, tome 88, p. 423, 1819. BLAINVILLE, Dict. Sc. Nat., xxxii, p. 236, 1824, xli, p. 376, 1826. Man. Malacologie, p. 441, 1825. Rang, Man. Conchyl., p. 374, 1829. MENKE, Syn. Method, 2d edit., p. 43, 1830. FERUSSAC, Bull. Zool., p. 93, 1835. SOWERBY, Conch. Man., 2d edit., p. 231, 1842. HERMANNSON, Indicis Gen. Malacoz., i, p. 296, 1846. HALDEMAN, Iconog. Encyc., p. 84.

Ceriphasia, SWAINSON, Malacol., pp. 204, 342, 1840. GRAY, Syn. Brit. Mus., 1844. HERMANNSON, Indic. Gen. Mal., i, p. 208, 1846. GRAY. Zool. Proc., pt. 15, p. 153, 1847. H. and A. ADAMS, Genera Recent Moll., i, p. 297, 1854. CHENU, Manuel de Conchyl. i, p. 288, 1859.

Telescopella, GRAY, Proc. Zool. Soc., pt. 15, p. 153, 1847.

Elimia (part), H. and A. ADAMS, Genera, i, p. 300, 1854. CHENU, Man. de Conchyl., i, p. 290, 1859.

Megara (part), H. and A. ADAMS, Genera, i, p. 306, 1854. CHENU, Man. de Conchyl., i, p. 293, 1859.

Trypanostoma, LEA, Proc. Acad. Nat. Sci., p. 169, April, 1862. Jour. Acad. Nat. Sci., 2d ser., v, pt. 3, p. 268, March, 1863. Obs., ix, p. 90, March, 1863.

Melania (sp.), of authors. BINNEY, Check List. REEVE, Monog. Mel., Nov., 1859, to June, 1861. BROT, Cat. Syst., p. 30, 1862.

Description.—Shell generally lengthened conical or cerithiform, aperture moderate, prolonged into a short spout or canal in front. Columella not callously thickened.

Geographical Distribution.—The species contained in this subgenus are inhabitants of the valleys of the Ohio, Tennessee and Alabama rivers. Two or three species are found as far north as the Great Lakes, but none, so far as I am aware, have been found in any of the rivers of the Atlantic seaboard, or west of the Mississippi.

The species generally have a wide distribution within the limits referred to and are numerously represented in individuals.

Mr. Lea has described several of the species as *Io's*, but I restrict the typical form of *Io* to the fusiform, ventricose species, in which the canal and spire are subequal.

A. *Tuberculate.*

1. P. alveare, CONRAD.

Melania alveare, CONRAD, New Fresh-Water Shells, p. 54, t. 4, f. 7, 1834. DEKAY, Moll. N. Y., p. 94. WHEATLEY, Cat. Shells, U. S., p. 24. JAY, Cat. 4th edit., p. 272. BINNEY, Check List, No. 11. BROT, List, p. 30. HANLEY, Conch. Misc. t. 8, f. 74. MÜLLER, Synopsis, p. 46, 1836.

Megara alveara, Conrad, CHENU, Manuel, i, f. 2022. ADAMS, Genera, i, p. 305.

Melania torquata, LEA, Philos. Proc., ii, p. 242, Dec., 1842. Philos. Trans., ix, p. 27. Obs., iv, p. 27. WHEATLEY, Cat. Shells U. S., p. 27. BINNEY, Check List, No. 271. ADAMS, Genera, i, 306.

Melania pernodosa, LEA, Philos Proc., iv, p. 105, Aug., 1845. Philos. Trans., x, p. 66, t. 9, f. 49. Obs., iv. p. 66, t. 9, f. 49. BINNEY, Check List, No. 202.

Io pernodosa, Lea, ADAMS, Genera, i, p. 229.

Melania nupera, SAY (young), American Conchol., pt. 1, t. 8, middle figure.

Melania producta,* LEA, Philos. Proc., ii, p. 243. Dec., 1842. Philos. Trans., ix, p. 28. Obs., iv, p. 28. WHEATLEY, Cat. Shells U. S., p. 26. BINNEY, Check List, No. 217. BROT, List, p. 36.

Melania grossa,* ANTHONY, Proc. Acad. Nat. Sci., p. 59, Feb., 1860. BROT, List, p. 40. REEVE, Monog., f. 411.

Description.—Shell short, conical, ventricose; whorls flattened, with a line of wide compressed tubercles at the base of the penultimate whorl; body-whorl angulated; angle armed with prominent tubercles; base hardly convex, with about five prominent lines; aperture obliquely elliptical; less than half the length of the shell.

Observations.—Inhabits with the preceding species (*M. lima*) Elk River, Alabama. The spire is very regularly conical and the base strongly ribbed.—*Conrad.*

The figure (No. 99) is from a type specimen in the collection of my friend Mr. Haldeman, who very kindly placed in my hands his entire valuable series of Conrad's, Say's and his own types. No. 97 represents a large shell from Coll. Anthony. No. 98 is from a specimen in my cabinet exhibiting the plicate whorls of the spire. The species is very variable in length. No. 101 represents an elongated specimen from Cumberland River, Tennessee; this variety Mr. Lea has described as *M. torquata.*

Fig. 97. Fig. 98. Fig. 99.

The following are the descriptions of *pernodosa* and *torquata.*

*M. producta and grossa are the young of a large variety of *alveare.*

Melania pernodosa.—Shell tuberculate, conical, rather thick, horn-color, striate below; spire elevated, ribbed on the apex; sutures undulated; whorls eight, flattened, tuberculate on the inferior portion; aperture small, angular and canaliculate at the base, within white.

Fig. 100.

Habitat.—Cypress Creek, Florence, Alabama.

Diameter, ·4; length, ·68 of an inch.

Observations.—This is a very remarkable species, having numerous, somewhat oblique tubercles, thickly set in a single row on the middle of the whorls. In the specimen before me, the only one I have seen, there is a dark spot between each of the tubercles. Towards the apex, the tubercles are more elongate and closely set, so as absolutely to become ribs across the whole of the whorl. The aperture is rather more than one-third the length of the shell. The striæ on the inferior half of the whorls are very regular and distinct, and number eight in this specimen.—*Lea.*

Fig. 101.

Melania torquata.—Shell tuberculate, subfusiform, shining, rather thin, yellow; spire rather elevated; sutures impressed; whorls seven, somewhat convex; aperture elongated, angular at the base, within whitish.

Habitat.—Tennessee.

Diameter, ·42; length, ·80 of an inch.

Observations.—This is a very beautiful species, of which I have only one specimen before me. The necklace-like row (whence its name) of small closely set tubercles, gives it an attractive appearance. Each successive whorl covers up these tubercles as well as several striæ below them, leaving the whole spire smooth. The aperture is rather contracted, and nearly half the length of the shell. The outer lip is sharp, and very much curved. It has some resemblance to *M. alveare* (Conr.) but is a larger shell, less solid, and more fusiform.—*Lea.*

The young of the large specimen figured, having attained to the full size of the ordinary adults and still differing from them, has been described as distinct by both Messrs. Lea and Anthony. Copies of their descriptions are given below. Having examined numerous specimens I have no doubt of their identity with *alveare.*

As already mentioned, *Strephobasis pumila*, Lea, is closely allied in general appearance to *alveare.*

Mr Lea believes *alveare* to be a *Lithasia*, but I do not find

the callous deposits on the columella sufficiently well marked to place it in that genus.

Melania producta.—Shell folded, subfusiform, rather thin, horn colored; spire obtusely conical; sutures impressed; whorls eight, flattened; aperture elliptical, whitish.

Habitat.—Tennessee.

Diameter, ·57; length, ·70 of an inch.

Observations.—This species has rather distant folds on the first six whorls, and a disposition to tuberculation on the middle of the lower whorl, the superior part being disposed to be striate. The base of the columella is twisted, and the channel well impressed. The aperture is quite one-half the length of the shell.—*Lea.*

Melania grossa.—Shell ovate, folded, thick; spire obtusely elevated, composed of about eight convex whorls rapidly attenuating to an acute apex; whorls folded, except the last two; body-whorl tumid, smooth; color of epidermis light greenish olive; aperture elliptical, whitish inside; columella rounded; outer lip much curved, with a well marked sinus at the base.—*Anthony.*

Fig. 102.

Habitat.—Tennessee.

Observations.—A short, thick species whose chief characteristics are its bulbous form, and short but prominent ribs on the upper whorls. All the whorls but the last are remarkably narrow and crowded, lines of growth prominent, four or five striæ revolve around the base of the shell. Resembles *M. glandula*, nob., in form, but its different color and texture, with its prominent ribs, will at once distinguish it.—*Anthony.*

The figure is from Mr. Anthony's type.

2. P. Foremanii, Lea.

Melania Foremanii, Lea, Philos. Proc., ii, p. 242. Philos. Trans., ix, p. 27. Obs., iv, p. 27. Binney, Check List, No. 111. Brot, List, p. 30. Reeve, Monog., f. 432. Wheatley, Cat. Shells U. S., p. 25.

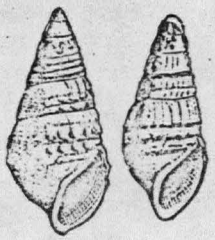
Description.—Shell tuberculate, pyramidal, rather thick, yellowish-brown; spire elevated; sutures irregularly lined; whorls nine, flattened; aperture elongated, angular and channelled at the base, within whitish.

Habitat.—Alabama.

Diameter, ·52 of an inch; length, 1·28 inches.

Observations.—A fine, large, symmetrical species, furnished with a row of closely-set tubercles on the middle of the whorl, and several irregular transverse striæ disposed to be tuberculate. The seven or eight specimens before me are very similar, differing but little in form or color. The oldest one is rather browner. It is remarkable for its regular pyramidal form. The aperture is contracted, and rather more than one-third the length of the shell. I have great pleasure in dedicating it to Dr. Foreman to whose kindness I owe the specimen in my cabinet.—*Lea.*

Fig. 103. Fig. 103*a*.



This species differs from other tuberculate *Pleurocera* in the oval form of the base of the body-whorl and in possessing several instead of one row of tubercles. Figure 103*a* is from a specimen in my cabinet, from Coosa River, Alabama, authenticated by Mr. Lea.

I have been much puzzled by the resemblance of this shell to *P. prasinatum*, Conr. and *P. Anthonyi*, Lea, and it would not surprise me if the three should be found to be but one species, as the forms of the shell and aperture are similar, and specimens of *Foremanii* in Coll. Haldeman are scarcely tubercled, while in one of the Smithsonian types of *Anthonyi* a disposition to tuberculation is evident.

2a. P. Lesleyi, Lea.

Trypanostoma Lesleyi, Lea, Proc. Acad. Nat. Sci., p. 4, 1864. Jour. Acad. Nat. Sci., vi, p. 146, t. 23, f. 59, 1867.

Description.—Shell tuberculate, pyramidal, dark horn-color; spire exserted; sutures irregularly impressed; whorls about eight, somewhat impressed; aperture rather small, rhomboidal, white and sometimes banded within; outer lip acute, very sinuous; columella thickened.

Operculum ovate, dark brown, rather thin, with the polar point near the base.

Habitat.—Smith's Shoals, Cumberland River, East Tennessee; Pulaski County, Kentucky.

Diameter, ·80; length, 1·2 inches.

Observations.—This species is closely allied to *T. undulatum*, Say, but may at once be distinguished by its lower spire and proportionately wider base, where it is flatter. The undulations on Mr. Say's shell are low, while in *Lesleyi* these are replaced by well defined tubercles, which are disposed to be compressed and incline to the left. There is only a single row of these tubercles, but those of the row above cause swellings on the upper part of the whorls. In the young state they differ totally, the *undulatum* being entirely smooth, while the *Lesleyi* has tubercles to the apex, except that on the first two or three whorls they change into folds. In the multiplicity of nodules it resembles *Lithasia pernodosa* (nobis). In the spire it also resembles *L. armigera*, Say, and *L. Jayana* (nobis), but differs in the aperture being Trypanostomose and of course not belonging to the same genus. I have ten specimens before me. Those from Prof. Troost I have had for a long time and believed they might be a variety only of *undulatum*, but the young sent by Mr. Lesley and Major Lyon convinced me at once that the species was new and distinct. The aperture is more square than in *undulatum* and the fuse is less. The young are striate on the under part of the whorls, which is never the case with *undulatum*. The aperture is about one-third the length of the shell. I have great pleasure in naming this after Mr. Joseph Lesley, Civil Engineer, to whose kindness I am indebted for many Kentucky species.—*Lea.*

Fig. 104.

A second specimen, kindly furnished by Mr. Lea, is more elongated than his type. The species bears the same relation to *undulatum* that *filum* does to *canaliculatum;* and it is strikingly like Say's *armigera*.

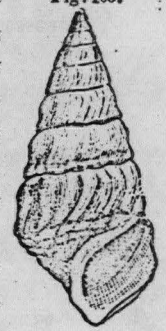
3. P. undulatum, Say.

Melania undulata, Say, New Harmony Dissem., p. 261; Reprint, p. 17; Binney's edit., p. 142. Reeve, Monog., f. 307. Haldeman, Am. Jour. Sci., xlii., p. 216, Dec., 1841. Anthony's List, 1st and 2d edits. DeKay, Moll. N. Y., p. 92. Wheatley, Cat. Shells U. S., p. 27. Jay, Cat., 4th edit., 275. Binney, Check List, No. 281. Brot, List, p. 31. Hanley, Conch. Misc., t. 1, f. 10. Catlow, Conch. Nomenc., p. 189. Brot, Mal. Blatt., ii, p. 106, July, 1860.
Megara undulata, Say, Chenu, Man. Conchyl., i, f. 2025. Adams, Genera, i, p. 306.

Description.—Shell large, elevated, conic, brownish, with a broad,

equally impressed band; inferior boundary of the band elevated and deeply crenate; superior boundary elevated and sometimes nodulous; volutions at least eight, not convex; suture not impressed, hardly obvious, undulated by revolving on the inferior crenate boundary of the impressed band; labrum near the base, much protruded; sinus very obtuse.

Fig. 135.



Habitat.—Ohio River.

Length one inch and four-tenths.

Observations.—I observed this large species to be abundant in Kentucky River, when travelling in that state two years since with Mr. Maclure. It seems to approach nearest in character to the *canaliculata*, nob., but its rough appearance will distinguish it even at first sight.—*Say.*

A fine specimen from Mr. Anthony's collection is the original of our figure.

The various species of this general type, described by Mr. Lea, *nobilis*, *moniliferum*, *nodosum*, are not sufficiently distinct. This shell may (for the present) remain separated from them on account of the sulcate band encircling the periphery and its being wider.

This species extends through Ohio, Indiana, Illinois, Kentucky, Tennessee, Alabama, and West Georgia and presents great variation of contour. The number of nodules on the periphery varies, and also the development of the canal. Many of the large specimens, broadly banded, are very beautiful.

4. P. excuratum, Conrad.

Melania excurata, Conrad, New Fresh-Water Shells, p. 49, t. 4, f. 6, 1834. Anthony, List, 1st and 2d edits. Jay, Cat., 4th edit., p. 273. DeKay, Moll. N. Y., p. 96. Binney, Check List, No. 103. Müller, Synopsis, p. 43, 1836.

Melania excurvata, Conrad, Wheatley, Cat. Shells U. S., p. 25.

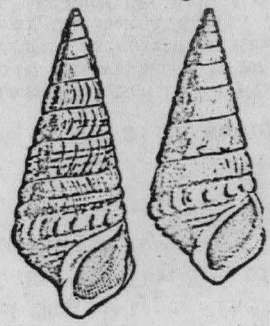
Melania rorata, Reeve, Monog. Mel., sp. 306. Brot, List, p. 31.

Io Spillmanii, Lea, Proc. Acad. Nat. Sci., p. 394, 1861. Jour. Acad. Nat. Sci., v, pt. 3, p. 348, t. 39, f. 215. Obs., ix, p. 170.

Description.—Shell subulate, with a spiral band of slightly oblique subcompressed tubercles on the base of the inferior whorls; above this is a prominent line with slight intervening channel, volutions towards the apex nearly entire; base with three prominent lines, the superior one largest; the third hardly prominent and approximate to the middle one.

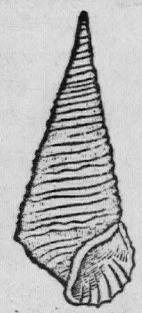
Observations.—A large and beautiful species, common in the Tennessee River at Florence. It is perhaps most nearly allied to *M. Sayi* (*M. canaliculata*, Say), but the elevated line and form of the tubercles will distinguish it from that species. The epidermis is reddish-brown or black.—*Conrad.*

Fig. 107. Fig. 108. Fig. 108.



Mr. Conrad's figure not being a very good one I have had a figure drawn from a fine specimen from the original locality, kindly furnished to me by Mr. Lea. I have included *rorata*, Reeve and *Spillmanii*, Lea, in the synonymy of this species, finding no characters by which to distinguish them. I have already expressed a doubt whether any of the species immediately following *undulata* are really distinct from it.

Fig. 109.



The figures of the accompanying descriptions are copies of those of Messrs. Reeve and Lea.

Melania rorata.—Shell pyramidally conical, brownish-olive, spire raised, whorls 10–11, slopingly convex, corded throughout with rather close-set ridges, some of which are beaded; aperture ovate, columella callous, twisted, effusely channelled.

Habitat.—Alabama.—*Reeve.*

The following species may be regarded as an immature form of *excuratum* rather than as a distinct species.

Io Spillmanii.—Shell smooth, attenuately conical, pale horn-color; spire regularly conical, striate above; sutures slightly impressed; whorls about ten, flattened, obtusely angular in the middle; aperture small, rhomboidal; outer lip sharp and sinuous; columella white and very much twisted; canal short and subeffuse.

Habitat.—Tennessee River, Alabama? Wm. Spillman, M. D.

Diameter, ·46; length, 1·25 inches.

Observations.—This species is nearly allied to *modesta*, herein described, but may be distinguished by its longer and more attenuate spire, the upper whorls being covered with regular close transverse striæ. The channel is also rather longer and more twisted. One

only of four specimens received is full grown. This has, above the angle of the last whorl, a few undefined tubercles. Below this angle there are five or six well defined transverse striæ. None of the specimens have bands. Should adults generally be found with tubercles, then this species should be placed in the tuberculate group and not in the smooth one, where I have now placed it in the above description. The aperture is nearly one-third the length of the shell. I have great pleasure in dedicating the species to Dr. Spillman, who has done so much for the natural history of his own and other Southern States.

Fig. 110.

The typical *excuratum* differs widely enough from *undulatum*, Say, but there exist intermediate forms of a nature to perplex the naturalist. Among these may be mentioned *P. ponderosum*, Anth. (*dux*, Lea), with the tubercles and canal nearly obsolete and the revolving striæ very faint, so that the surface of the shell appears at first sight flat and smooth; also *annuliferum*, Conr., in which the revolving lines are more strongly developed. These shells all partake of one general type and form a natural group of closely related species, at the least.

5. P. moniliferum, Lea.

Trypanostoma moniliferum, Lea, Proc. Acad. Nat. Sci., p. 172, 1862. Jour. Acad. Nat. Sci., v, pt. 3, p. 295, t. 36, f. 125, March, 1863. Obs., ix, p. 117.
Io nodosa, Lea, Proc. Acad. Nat. Sci., p. 393, 1861. Jour. Acad. Nat. Sci., v, pt. 3, p. 345, t. 39, f. 212, March, 1863. Obs., ix, p. 168.
Io variabilis, Lea, Proc. Acad. Nat. Sci., p. 393, 1861. Jour. Acad. Nat. Sci., v, pt. 3, p. 347, t. 39, f. 214, March, 1863. Obs., ix, p. 169.

Description.—Shell tuberculate, thick, pyramidal, yellowish or greenish, banded or without bands; spire high, pyramidal; sutures irregularly impressed; whorls about ten, flattened, striate below, sometimes obscurely sulcate, tuberculate on the periphery; aperture rather large, rhomboidal, within either white or salmon and generally double-banded; outer lip acute, very sinuous; columella thickened below and very much twisted.

Operculum ovate, very dark brown, with the polar point near the base.

Habitat.—Tennessee; Prof. Troost and Mr. Anthony: Florence, Alabama; Rev. G. White, Mr. Pybas and Mr. Thornton: Cumberland River; Dr. Powell: Ohio River, near the mouth in Illinois; J. Ronaldson: New Harmony, Indiana; Mr. Carley and Mr. Sampson: Warrior River, Alabama; Prof. Brumby.

Fig. 111.

Diameter, ·67; length, 1·53 inches.

Observations.—This is among the largest species of the *Melanidæ* which inhabit the waters of the United States. It has usually been considered a variety of *Melania* (*Trypanostoma*) *undulata*, Say, but it is easily distinguished by its being longer and narrower in the outline, in having a greater number of whorls, and in having more and smaller tubercles on the periphery of the last whorl. This usually has twelve or thirteen, while *undulata* has seven or eight. Few individuals are without bands, and there are usually two broad ones more distinct within than without. These two bands are sometimes separated into four. The first three or four whorls are usually carinate. The tubercles, which are usually beautifully defined, are highly ornamental, but usually do not exist above the ultimate and penultimate whorls. This species seems to be widely distributed, and few or none of our species are more beautiful. There is usually a revolving raised line above, and parallel with, the row of tubercles. The color of the epidermis varies much. Some specimens are of a rich straw yellow, and others are greenish, while others again are of a deep olive-brown, with a fine natural polish. Some have the upper band so broad that a single whitish line is visible under the suture. This may be remarked more particularly in the specimens from the vicinity of New Harmony. The aperture is about one-third the length of the shell.—*Lea.*

Fig. 112.

Io nodosa.—Shell tuberculate, raised, conical, greenish horn-color, banded; spire irregularly conical; sutures very much impressed; whorls about ten, flattened, tuberculate on the middle, striate below; aperture rather small, rhomboidal, banded within; outer lip sharp and sigmoid; columella white and very much twisted; canal rather short.

Operculum pyriform, spiral, dark chestnut-brown, with the polar point near to the basal margin.

Habitat.—Tennessee River, Alabama? Wm. Spillman, M. D.

Diameter, ·57; length, 1·58 inches.

STERKIANA NO. 26, JUNE 1967

Observations.—This is one of those species of *Melanidæ* which we have considered to belong to the group with a regular channel at the base, like the genus *Fusus*, but which really belongs to the genus *Io*, having other characters differing from *Melania*. It is nearly allied to the species which I described as *Melania nobilis** in the Trans. Am. Phil. Soc., vol. x, pl. 9, fig. 48, from a single imperfect specimen. It is a smaller species, and is not so fusiform, having a shorter channel, which is not quite so much twisted, and the nodules are not so large. The aperture is more than one-third the length of the shell. — *Lea.*

Io variabilis.— Shell smooth, raised, conical, subfusiform, banded, deep purple or greenish; spire regularly conical; sutures slightly impressed; whorls about nine, flattened, angular in the middle; aperture elongately rhomboidal; outer lip sharp and sinuous; columella white or purple and very much twisted; canal long and narrow.

Fig. 113.

Habitat.—Tennessee River, Alabama? Wm. Spillman, M.D.

Diameter, ·40; length, ·88 of an inch.

Observations.—A number were received from Dr. Spillman, but they are generally young, and the older specimens were much injured in the delicate fuse and outer lip. It is a small, thin species, with a well developed, nearly straight, channel. It seems to be a very variable species, some individuals being of intense purple, nearly black, while others are yellowish, with numerous bands; others again are greenish, without bands. Some are carinate towards the apex, while others are free from carination. There is a disposition in several to be tuberculate along the angle on the middle of the lower whorl. Generally there is a light line along the upper part of the whorls. The aperture is nearly one-half the length of the shell.—*Lea.*

The four species *undulatum*, *excuratum*, *moniliferum* and *robustum* are mainly distinguished by the following differences:—

Undulatum is a stout, broadly conical shell, strongly angled on the periphery and having large tubercles. The base is much flattened.

Robustum, with much the same general outline, is not much angled on the periphery, with the inferior portion of the whorl

*In transferring this to the genus *Io*, I think it may properly be considered the type of a group of the genus.

longer and more convex. It bears the same general relation to *undulatum* that *Troostii* does to *canaliculatum;* and these shells may prove to be only tuberculate varieties of the others.

Excuratum is a much longer, narrower species than either of the above, with the whorls almost flat, and the upper ones thickly striate. This feature is most apparent in the young shell (*Spillmanii*, of Lea).

Moniliferum is not so narrow in its proportions as *excuratum*, and is generally beautifully banded. It differs from *excuratum* in the young shells being smooth instead of striate on the spire.

6. P. nobile, Lea.

Melania nobilis, Lea, Philos. Proc., iv, p. 165, Aug. 1845. Philos. Trans., x, p. 65, t. 9, f. 48. Obs., iv, p. 65. Binney, Check List, No. 179.
Io nobilis, Lea, Adams, Genera, i, p. 299.

Description.—Shell tuberculate, conical, rather thick, yellowish horn-color; spire elevated; sutures irregularly undulate; whorls flattened, in the middle tuberculate; aperture rather large, elongated, angular, and channelled at the base, within yellowish; columella twisted.

Habitat.—Alabama.

Diameter, ·72; length, 1·7 inches.

Observations.—This is among the finest of our American species. It is remarkable for its large size and extended sinus, which allies it to the genus *Io*, in which it might, with no great impropriety, be placed. The specimen before me has eight whorls, and the broken apex would probably present about three more. The central ones have a dark band below, and are of a rather bright horn-color above. In this specimen there is a rather coarse stria above the row of tubercles, and two smaller ones below. The margin of the outer lip is quite sinuous. It has some resemblance to *M. excurata*, Conr., but may be distinguished by having a larger fuse, and in the position of the tubercles, which are not oblique, as described in that shell. When other specimens shall be observed it may be found to differ in some of the characters described above. Aperture rather more than one-third the length of the shell.—*Lea.*

Fig. 114.

Chiefly distinguished by the narrow lengthened canal which terminates the aperture. Mr. Lea's figure being imperfect I have figured a specimen in Mr. Anthony's collection.

7. P. robustum, Lea.

Io robusta, Lea, Proc. Acad. Nat. Sci., p. 393, 1861. Jour. Acad. Nat. Sci., v, pt. 3, p. 346, t. 39, f. 213, March, 1863. Obs., ix, p. 168.

Description.— Shell canaliculate, slightly tuberculate, raised, conical, pale horn-color, obscurely banded below; spire regularly conical; sutures very much impressed; whorls about ten, flattened about the apex, channelled below; aperture rather small, rhomboidal, banded within; outer lip sharp and sigmoid; columella pale salmon color; channel rather short.

Fig. 115.

Operculum ovately angular, spiral, very dark brown, with the polar point near to the basal margin.

Habitat.—Tennessee River, Alabama? Wm. Spillman, M. D.

Diameter, ·76; length, 1·49 inches.

Observations.— There are two specimens before me. Both have tubercles below the sulcate channel, but one has them much better developed than the other. The aperture within is pale salmon in both specimens, but this may not be constant. It is rather shorter in the channel than *nodosa*, herein described, and the spire is also shorter. The aperture is more than one-third the length of the shell.— *Lea.*

This species is exceedingly closely allied to *undulatum* but appears to be rather wider, more obtusely conical and more robust. The aperture is produced into a somewhat longer canal at the base than that species usually exhibits.

The figure is a copy of that of Mr. Lea.

B. *Sul*

8. P. canaliculatum, Say.

Melania canaliculata, Say, Jour. Acad. Nat. Sci., ii, p. 175, January, 1821. Binney's Reprint, p. 65. Binney, Check List, No. 45. DeKay, Moll. N. Y., p. 94. Wheatley, Cat. Shells U. S., p. 24. Ravenel, Cat., p. 11. Jay, Cat., 4th edit., p. 273. Anthony, List, 1st and 2nd edits. Kirtland, Report Zool. Ohio, p. 174. Catlow, Conch. Nomenc., p. 185. Brot, List, p. 30. Reeve, Monog. Mel., sp. 304.

Io canaliculata, Say, Morch, Yoldi Cat., p. 56.

Ceriphasia canaliculata, Say, Chenu, Manuel, Conchyl. i, f. 1959.

Ceriphasia canaliculata, Say, Adams, Genera, i, p. 297.

Melania conica, Say, Jour. Acad. Nat. Sci., ii, p. 176, January, 1821. Binney's Reprint, p. 70. Binney, Check List, No. 65. Reeve, Monog. Mel., sp. 252. DeKay, Moll. N. Y., p. 95. Ravenel, Cat., p. 11. Haldeman, Monog. Limniades, No. 7, p. 4 of Cover. Brot, List, p. 30. Kirtland, Rep. Zool. Ohio, p. 174. Anthony, List, 1st and 2nd edits. Jay, Cat., 4th edit., p. 273. Wheatley, Cat. Shells U. S., p. 24. Catlow, Conch. Nomenc., p. 186. Sowerby, Mollusca, Fauna Boreali Americana, iii, p. 316, 1836.

Melania substricta, Haldeman, Suppl. to Monog. of Limniades.

Pirena plana (Jan.), Brot, Mel., p. 60, note.

Strombus Sayi, Wood, Index Testaceol. Suppl., t. 4, f. 24.

Melania Sayi (Wood), Short and Eaton, Notices, p. 82. Anthony, List, 1st and 2nd edits.

Melania Sayi, Ward, Wheatley, Cat. Shells U. S., p. 27.

Melania Sayi, Ward, Kirtland, Rept. Zool. Ohio, p. 174. Jay, Cat., 4th edit., p. 274. Higgins, Cat., p. 7.

Melania Sayi, Deshayes, Catlow, Conch. Nomenc., p. 188.

Melania Sayi, Deshayes, Encyc. Meth. Vers., ii, p. 427, 1830.

Melania exarata, Menke, Syn. Meth., p. 135, 1830. Binney, Check List, No. 100.

Melania ligata, Menke, Syn. Meth., p. 236, 1830. Binney, Check List, No. 162.

Melania auriscalpium, Menke, Syn. Meth., p. 133, 1830. Binney, Check List, No. 25.

Gyrotoma conica, Say, Adams, Genera, i, p. 305.

Description.— Shell tapering, horn-color; volutions about seven, slightly wrinkled; spire towards the apex much eroded, whitish; body, with a large obtuse groove, which is obsolete upon the whorls of the spire in consequence of the revolution of the suture on its inferior margin; this arrangement permits the superior margin of the groove only, to be seen on the spire, in the form of an obtuse carina on each of the volutions; aperture bluish-white within with one or two obsolete revolving sanguineous lines; labrum slightly undulated by the groove and with a distinct sinus at the base of the columella.

Habitat.— Ohio River.

Breadth, three-fifths of an inch; length, one inch and one-tenth.

Greatest transverse diameter more than two-fifths. Very common at the Falls of the Ohio River. It is probably the largest species of this genus in the United States, and may be readily distinguished from its congeners by its broad groove.—*Say.*

The deep sulcus which distinguishes Mr. Say's *Mel. canaliculata*, in its typical form, shades off so gradually into a smooth, flattened surface, that not only is it difficult to arrange the species of this group, but it is even doubtful whether many of the species which are placed in other groups are really distinct. Especially, may it be doubted whether the small shells recently described by Mr. Lea under the names of *bivittatum*, *pamilum*, *simplex*, etc., are distinct from the young of *canaliculatum*.

Fig. 120. Fig. 118. Fig. 117. Fig. 119.

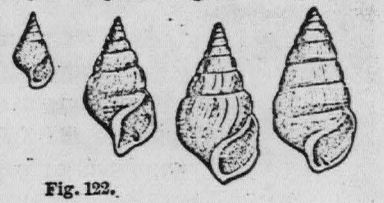
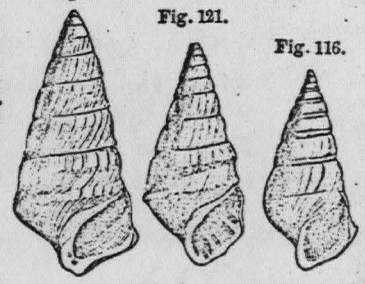


Fig. 122. Fig. 121. Fig. 116.



Mr. Say describes the young shell of *canaliculata* as *Melania conica*. It is differently formed from the adult shell and does not possess the sulcated body-whorl. The illustrations of this species, all drawn from specimens, exhibit the various stages of growth, etc.

Fig. 116 is a tall, slender form from the Ohio River, scarcely sulcate. No. 117 represents a stunted specimen also from the Ohio. No. 119 is from Tennessee River. No. 120 is a quite young shell from the Falls of the Ohio. No. 122 is a heavy northwestern form; the specimen probably came from the interior of Ohio. No. 121, a beautiful sharply sculptured form, is from Tennessee. Nos. 117, 118, 119 represent the *M. conica* of Say. It will be seen that there is much variation of form in this species; so the color also varies from a light green and yellow to a dark brown or nearly black and is either uniform or banded. The area of geographical distribution is very great, extending from the interior of Ohio to Alabama and through Indiana and Illinois.

The following is Mr. Say's description of

M. conica. — Shell conic, rapidly attenuating to an acute apex, very slightly wrinkled, olivaceous; suture not deeply impressed; volutions seven or eight; aperture oblique, equalling the second, third, and fourth whorls conjunctly.

Var. A. With from one to three revolving, rufous or blackish lines.

Habitat. — Ohio River.

Length, nearly three-fifths inch; of the aperture, one-fourth inch.

Observations. — May be readily distinguished from *M. Virginica* by the much more rapid attenuation of the spire, and in the proportional difference in the length of the aperture, which in the *Virginica* is not more than equal to the length of the second and third whorls. — *Say.*

Melania substricta was proposed by Prof. Haldeman instead of *conica* under the impression that the latter name was pre-occupied. He afterwards used the name for a new species.

The following species, described by Menke, are all synonymes of *canaliculatum:*

Melania exarata. — Shell conically turreted, acute; apex eroded; striate, greenish-brown; last whorl encircled by two transverse sulci, plane between; the other whorls carinate in the middle; aperture obliquely ovate; lips alate, arcuate, margined within, extreme margin subreflected.

Habitat. — Ohio River, at Cincinnati.

Long., 13 lin. ; lat., 6 lin. — *Menke.*

Melania ligata. — Shell turreted, apex eroded, truncate, with transverse acute striæ, below sulcate, corneous; whorls seven, convex, the last bifasciate, the others singly banded.

Habitat. — Ohio River, at Cincinnati.

Long., 9 lin.; lat., 3½ lin. — *Menke.*

Melania auriscalpium. — Shell turreted, apex truncately eroded, smooth, corneous, whorls six, convex, the last doubly banded, the others singly banded; lip arcuate, sub-alate, produced in front.

Habitat. — Ohio River, near Cincinnati.

Long., 10; lat., 3¼ lin. — *Menke.*

It is questionable whether *P. canaliculatum* is really distinct from *P. undulatum;* indeed, the transition between the smooth and tubercled surface is so gradual, and the range and development of the two species in different localities so exactly similar that I am inclined to think them identical, but like Mr. Lea and Prof. Haldeman, who entertain the same views, I do not feel at liberty to unite them as yet.

Fig. 123.

As an illustration of the great difficulty attending the determination of species in this family, I figure (fig. 123) a depauperate specimen of *canaliculatum* furnished me by Prof. Haldeman.

30 STERKIANA NO. 26, JUNE 1967

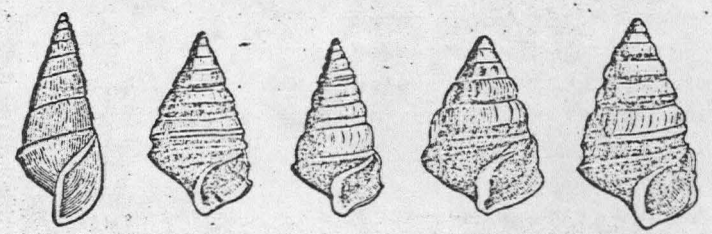
9. P. filum, Lea.

Melania filum, Lea, Philos. Proc., iv, p. 105. Philos. Trans., x, p. 62, t. 9, f. 41. Obs., iv, p. 62. Binney, Check List, No. 109. Brot, List, p. 30. Reeve, Monog. Mel., sp. 402?

Elimia filum, Lea, Chenu, Man. Conchyl., i, f. 1980. Adams, Genera, i, p. 300.

Description.— Shell carinate, conical, rather thin, dark horn-color; spire elevated; sutures impressed; whorls flattened, carinate in the

Fig. 124. Fig. 125. Fig. 125*a*. Fig. 126. Fig. 127.



middle; aperture small, rhomboidal, angular at the base, within whitish, columella twisted.

Habitat.— Alabama.

Diameter, ·47; length, 1·06 inches.

Observations.— A single specimen only of this species was submitted to me by Major LeConte. It is very nearly allied to *M. elevata*, Say, but may be distinguished by its thread-like carina on the middle of the whorls, which, on the superior ones, presents a mere simple line. The outer lip is remarkably patulous, presenting the auger-shaped lip which belongs to a certain group of the *Melaniæ*. The apex being imperfect, the number of whorls cannot be ascertained. There are eight visible on this specimen, and it probably possesses ten in a perfect state. The aperture is about one-third the length of the shell.— *Lea.*

This species has by many been considered a variety of *canaliculatum*; my impression is, that it is well distinguished by its more strictly conical shape, flattened whorls, and more elevated carina on the periphery. It almost entirely replaces *canaliculatum* in the waters of Tennessee (I have seen numerous specimens from all portions of the state), and, if specifically identical with the latter species, must at least be distinguished as a local variety. The type figure which I have copied (fig.

124) is very poor, and in fact looks much like the young of *P. ponderosum*.

10. P. ponderosum, Say.

Melania ponderosa, Anthony, Proc. Acad. Nat. Sci., Feb., 1860, p. 59. Binney, Check List, No. 213. Brot, List, p. 59.

Trypanostoma dux, Lea. Proc. Acad. Nat. Sci., p. 170, 1862. Jour. Acad. Nat. Sci., v, pt. 3, p. 283, t. 36, f. 105. Obs., ix, p. 105.

Description.— Shell conic, broad, smooth, olivaceous, thick; spire considerably but not acutely elevated; whorls 7–8, subconvex; lines of growth curved and strong; sutures distinct; aperture rhombic, rather small, whitish within; columella indented, outer lip much curved forward, forming a broad, well marked sinus at base.

Fig. 128.

Habitat.— Tennessee.

Observations.— One of the most ponderous of the genus. In form it resembles *M. canaliculata*, Say, but has not the channel of that species, and differs also in the aperture. The body-whorl is strongly keeled about the middle, and has another and less clearly defined carina about midway between the first and the suture above. The lines of growth are very strong and occasionally varicose. A strong deposit of white callus is found upon the columella, which is much thickened near the base.— *Anthony.*

At a meeting of the New York Lyceum of Natural History held in June, 1860, Dr. Budd referred this species to Mr. Conrad's *excurata*. I have already remarked upon the resemblance in the description of the latter species. There can be no doubt that Mr. Lea's *T. dux* is a synonyme. Mr. Lea's description here follows. The figure of *ponderosa* is from the original type, that of *dux* is copied from Mr. Lea's.

Trypanostoma dux.— Shell carinate, pyramidal, thick, reddish-brown; spire much raised; sutures slightly impressed; whorls about nine, flattened; aperture rather large, rhombic, pale salmon-color within and very much twisted.

Operculum subpyriform, dark brown, with polar point near to the basal line.

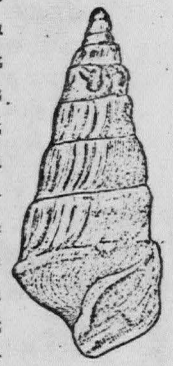
Habitat.— Tennessee River; Dr. W. Spillman: Fox River, Illinois; J. Sampson; Oostenaula: Rev. G. White: Tuscumbia; B. Pybas.

Diameter, ·75; length, 1·80 inches.

STERKIANA NO. 26, JUNE 1967

Observations.—This is the largest species of *Trypanostoma* of our country which I have seen. It is nearly two inches long and is athletic. It is closely allied to *Melania* (*Trypanostoma*) *canaliculata* and *undulata*, Say, which two may indeed be only varieties of each other. It has a carina like each of them, and this is sometimes slightly nodulous like the latter, and there is a slight furrow-like impression above the carina which reminds one of the former. The whorls are remarkably flat and the color of the epidermis is more brownish. Three specimens out of six before me are more or less banded inside. The specimen from Tuscumbia is whitish inside and has two indistinct bands. It is an imperfect specimen, and may really not belong to this species. The aperture is more than one-fourth the length of the shell.—*Lea.*

Fig. 129.



11. P. Troostii, Lea.

Trypanostoma Troostii, Lea, Proc. Acad. Nat. Sci., p. 171, 1862. Jour. Acad. Nat. Sci., v, pt. 3, p. 285, t. 36, f. 107. Obs., ix, p. 107.
Trypanostoma viride, Lea, Proc. Acad. Nat. Sci., p. 172, 1862. Jour. Acad. Nat. Sci., v, pt. 3, p. 291, t. 36, f. 119. Obs., ix, p. 113.
Trypanostoma ligatum, Lea, Proc. Acad. Nat. Sci., p. 171, 1862. Jour. Acad. Nat. Sci., v, pt. 3, p. 288, t. 36, f. 114. Obs., ix, p. 110.

Description.—Shell carinate, conical, very much inflated, yellowish horn-color or greenish, banded or without bands; sutures irregularly and very much impressed; whorls about nine, rather impressed, sometimes channelled; aperture large, rhomboidal, whitish and sometimes banded within; outer lip acute, sinuous; columella thickened below and very much twisted.

Fig. 130.

Fig. 131.

Habitat.—Tennessee; Prof. G. Troost: Florence, Alabama; Rev. G. White: Oostenaula River, Georgia; Bishop Elliot: Fox River, near New Harmony, Indiana; J. Sampson.

Diameter, ·64; length, 1·29 inches.

Observations.—I have five specimens before me; that from the late Prof. Troost (after whom I have great pleasure in naming it), I have had for a long time. It is one of the largest species we have in the United States. It is perhaps nearest to *Melania* (*Trypanostoma*) *canaliculata*, Say. It is, however, more inflated, the aperture is larger and the columella more extended. All the specimens are not channelled, but all are more or less carinate at the periphery. Two of the specimens are obscurely banded inside, and one very much banded inside and out. The old specimens are thickened inside the edge of the lip. The aperture is more than one-third the length of the shell.—*Lea.*

Fig. 132.

Without making a *positive* decision in this matter I am *inclined* to believe that *T. Troostii* is distinct from *canaliculatum*. It appears to be more inflated in its form, not so flatly conical, with a longer, rounded base.

The specimens before me convince me, however, that *T. viride* and *ligatum* are only young shells of the same species. I give Mr. Lea's descriptions of the latter two. The figures are copied from his plate.

Trypanostoma viride.—Shell subsulcate, somewhat thick, subfusiform, olivaceous; spire obtusely conical; sutures much impressed; whorls seven, convex, the last slightly canaliculate; aperture rather large, rhomboidal, purple or whitish within; outer lip acute, sinuous; columella thickened below and slightly twisted.

Fig. 133.

Habitat.—Tennessee; Prof. Troost.

Diameter, ·48; length, ·89 of an inch.

Observations.—I have about a dozen specimens before me, all of which have the same olive-green hue. They have been in my possession a long time, and I had put them among the young of *Melania* (*Trypanostoma*) *canaliculata*, Say. I have now no doubt but that they are distinct from that large species. None of them are half the size, the color is darker and they are wider in proportion. The revolving furrow above the periphery of the last whorl is hardly observable in some specimens. Every one of my specimens has a purplish-brown spot at the base of the columella, and in some specimens this color pervades the whole of the interior. The aperture is more than a third of the length of the shell.—*Lea.*

Trypanostoma ligatum.—Shell carinate, subfusiform, rather thick, inflated, shining, with or without bands, yellowish-olive; spire ob-

tusely conical; sutures impressed; whorls seven, slightly convex, the last very large, corded on the periphery; aperture large, rhomboidal, obscurely banded within; outer lip acute, sinuous; columella thickened below, with reddish spots at the base, and much contorted.

Habitat.—Tennessee; Prof. Troost: Cumberland River; C. T. Downie: North Alabama; Prof. Tuomey: Ohio River, at Cincinnati; U. P. James.

Diameter, ·38; length, ·71 of an inch.

Observations.—This is a short thick species with a fine natural olivaceous polish. A specimen from Prof. Troost has been in my possession many years, and is the most perfect. It has two obscure bands inside. Another I recently obtained from Dr. Hartman, who received it from Prof. Tuomey. A third is an old eroded specimen, quite brown, sent by Mr. Downie. After the above description was made, I received from Mr. James four specimens, neither of them entirely mature, which he took in the Ohio River at Cincinnati. Two only have the ligatures round the periphery of the last whorl. Two have four bands, one has two well-defined bands and two are without. One of the two without bands is of very dark brown, and the other very light brown. The aperture is nearly one-half the length of the shell. The obsolete bands within are dark brown, but the spot at the base of the columella is of a bright reddish color. The upper part of the whorls, which are slightly rounded, is of a yellowish color. Very different from the description of *Melania ligata*, described by Menke, Synopsis, 82.—*Lea.*

Fig. 134.

12. P. affine, Lea.

Trypanostoma affine, Lea, Proc. Acad. Nat. Sci., p. 4, 1861. Jour. Acad. Nat. Sci., vi, p. 145, t. 23, f. 57, 1867.

Description.—Shell channelled, pyramidal, horn-color; spire very much raised; sutures regularly impressed; whorls about nine, channelled, flattened above; aperture subrhomboidal, whitish or banded within; outer lip acute, sigmoid; columella thickened and very much twisted.

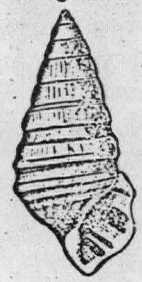
Habitat.—Smith's Shoals, Cumberland River, East Tennessee.

Diameter, ·60; length 1·35 inches.

Observations.—This species is allied to *Thorntonii* (nobis), and belongs to the group of which *canaliculatum*, Say, may be considered

the type. It differs from that species in having a longer fuse or basal channel, in which character it approaches the genus *Io*. It is closely allied to *moniliferum* (nobis), but differs in having a shorter spire; being channelled on the periphery and having no nodules. There is usually a well defined channel above the periphery, the middle of the lower whorl being carinate. Below the carina there is usually a single stria. Two specimens of the four before me have a broad single band on the upper whorls and several bands in the interior. The base of the columella is very much twisted backwards, and the edge of the outer lip is disposed to be thickened. The aperture is rather more than one-third the length of the shell.—*Lea.*

Fig. 135.



13. P. moriforme, Lea.

Trypanostoma moriforme, Lea, Proc. Acad. Nat. Sci., p. 172, 1862. Jour. Acad. Nat. Sci., v, pt. 3, p. 290, t. 36, f. 118. Obs., ix, p. 112.

Description.—Shell sulcate, subcylindrical, solid, single banded, horn-color; spire obtusely conical; sutures impressed; whorls about nine, impressed canaliculate; aperture rather small, rhombic, white within, with a single band; outer lip acute, very sinuous; columella thickened below and very much twisted.

Habitat.—Oostenaula River, near Rome, Georgia; Rev. G. White: Tennessee River; Dr. Spillman: Tuscumbia, Alabama; B. Pybas.

Fig. 136.

Diameter, ·52; length, 1·08 inches.

Observations.—This is a well characterized species. I have nearly forty specimens from different habitats before me. It is nearly allied to *Melania* (*Trypanostoma*) *infrafasciata*, Anthony, but it differs in being more solid and being subcylindrical as well as having a more contracted aperture. It has very much the same kind of fine line near the base. It is not quite so angular. The aperture is not quite one-third the length of the shell. It belongs to the group of which *Melania* (*Trypanostoma*) *canaliculata*, Say, may be considered the type.—*Lea.*

The figure is a copy of Mr. Lea's. The peculiar features of this species appear to be well preserved in several specimens before me. Partaking of the general features of *canaliculatum*, it is yet distinguished by its more cylindrical, elongated form.

14. P. Pybasii, Lea.

Trypanostoma Pybasii, Lea, Proc. Acad. Nat. Sci., p. 172, 1862. Jour. Acad. Nat Sci., v, pt. 3, p. 289, t. 36, f. 115. Obs., ix, p. 111.

Description.— Shell obtusely carinate, obtusely conical, solid, double-banded, greenish-brown; spire obtuse; sutures much impressed; whorls about eight, slightly convex; aperture small, rhombic, white and banded within; outer lip acute and very sinuous; columella thickened below and very much twisted.

Fig. 137.

Habitat.— Tuscumbia, Alabama; B. Pybas.

Diameter, ·46; length, 1·05 inches.

Observations.— Quite a number of specimens were sent by Mr. Pybas, which are all very nearly alike. Some are darker than others. The angle on the periphery of the whorls is obtuse, and in many specimens obsolete. The lower whorl is usually flattened, sometimes impressed, making quite a channel. It is near to *T. moriforme* herein described, but is not so turgid, is of a darker color and has usually two dark bands inside; *moriforme* usually has a thin band but sometimes none. The length of the aperture is not quite one-third the length of the shell. I name this after Mr. B. Pybas, to whom I am indebted for it and many fine species from this vicinity.— *Lea.*

15. P. Showalterii, Lea.

Trypanostoma Showalterii, Lea, Proc. Acad. Nat. Sci., p. 172, 1862. Jour. Acad. Nat. Sci., v, pt. 3, p. 293, t. 36, f. 122. Obs., ix, p. 115.

Description.— Shell striate, sometimes smooth, much drawn out, subcylindrical, thick, horn-color or brown, sometimes banded below; spire much raised; sutures much impressed; whorls nine, somewhat flattened; aperture small, rhomboidal, whitish or salmon-color within; outer lip sharp, somewhat sinuous; columella thickened below and very much twisted.

Operculum ovate, dark brown, with the polar point near to the base.

Habitat.— Cahawba River, Alabama; Dr. E. R. Showalter: Tuscaloosa, Alabama; Dr. Budd: Oostenaula River, Georgia; Rev. G. White and Bishop Elliott.

Diameter, ·46; length, 1·38 inches.

Observations.— This is a very remarkable species, having a high subcylindrical spire and a small aperture. Six from the Oostenaula are all more or less striate, two of them having a well defined revolving band near the base on the inside, one has an obsolete band, and the remaining three are without a band. Three of these specimens are of a bright horn-color, the others are dark brown, and one has indistinct bands above the dark one. The thickened part of the columella in three specimens is of a light salmon. Three of the four from Cahawba River are slightly striate, the fourth smooth. These have no bands and are all white on the columella. The aperture is about one-fourth the length of the shell. I have great pleasure in naming this after Dr. Showalter, who has done so much in the development of the Mollusca of his State.

Fig. 138.

This species is closely allied to *Melania* (*Trypanostoma*) *Ordii* (nobis), but it is more attenuate and more cylindrical.— *Lea.*

C. *Angulate, striate below the periphery.*

16. P. Thorntonii, Lea.

Trypanostoma Thorntonii, Lea, Proc. Acad. Nat. Sci., p. 170, 1862. Jour. Acad. Nat. Sci., v, pt. 3, p. 284, t. 36, f. 106. Obs., ix, p. 106.

Description.— Shell carinate, pyramidal, rather thick, horn-color, banded or not banded; spire regularly elevated; sutures somewhat impressed; whorls about ten, flattened; aperture rather small, rhombic, white within; outer lip acute, very sinuous; columella thickened below and very much twisted.

Fig. 139.

Operculum ovate, dark brown, with the polar point near to the base.

Habitat.— Tuscumbia, Alabama; L. B. Thornton, Esq. and Rev. G. White: Chattanooga, Tennessee; J. Clark.

Diameter, ·62; length, 1·37 inches.

Observations.— This appears to be a common species about Tuscumbia and up the Tennessee River. I have about sixty specimens before me. They came with a large number mixed up with *Mel.* (*Trypanostoma*) *undulata*, Say, but were easily separated from that species. They are always smaller, and none have undulations. Like *undulata* they are usually banded; only eight are without bands entirely. Some specimens have a single

broad revolving band on all the whorls, some have several bands, and others again have a capillary line visible on the inside only. Four are dark purplish-green, the color being caused by the broad bands on the inside. It is nearly allied to *T. moriforme* herein described, but is not cylindrical. The specimens are usually of a very regular pyramid with a short base. The carina of the periphery is usually strong, but not always so. In this it is near to *Melania* (*Trypanostoma*) *filum* (nobis), but it is more slender than that species. The aperture is about one-third the length of the shell. Most of the specimens are slightly channelled on the lower whorl. I name it after L. B. Thornton, Esq., to whom I am indebted for many fine specimens of this and other shells.— *Lea.*

This species is shorter in the canal, possesses wider bands and wants the tubercles of *moniliferum* which it otherwise much resembles.

17. P. trivittatum, LEA.

Trypanostoma trivittatum, LEA, Proc. Acad. Nat. Sci., p. 175, 1862. Jour. Acad. Nat. Sci., v, pt. 3, p. 282, t. 36, f. 102. Obs., ix, p. 104.

Description.— Shell smooth, subfusiform, rather thin, shining, olivaceous, three-banded; spire conical, pointed, carinate at the apex; sutures line-like; whorls, eight, flattened, the last one being large; aperture rather large, rhombic, banded within; outer lip acute, sinuous; columella slightly thickened and incurved.

Fig. 140.

Operculum ovate, dark brown, with the polar point near the base.

Habitat.— Tombigbee River, Mississippi; Wm. Spillman, M. D.

Diameter, ·39; length, ·78 of an inch.

Observations.— I have examined about twenty specimens of this species and find them differing very slightly. Every one has three bands, the lower two of which are more distinct on the outside than the upper one, while inside they are well defined and much alike. Three of the specimens are very dark, almost purple, but the bands are distinguishable inside. There is a white line immediately below the sutures. In some specimens there is a disposition to be somewhat angular on the periphery, below which there are transverse striæ in some individuals. The aperture is about three-eighths the length of the shell.— *Lea.*

Very closely allied to *P. Thorntonii*, but a little more convex, with longer canal.

18. P. infrafasciatum, ANTHONY.

Melania infrafasciata, ANTHONY, Proc. Acad. Nat. Sci., p. 57. Feb., 1860. BINNEY, Check List, No. 148. BROT, List, p. 30. REEVE, Monog. Melania, sp. 301.

Description.— Shell conical, smooth, solid, of a pale brown color, form moderately slender and elevated; whorls 8–9, decollate, slightly concave; sutures distinct; lines of growth curved and very distinct; body-whorl decidedly concave, with a well marked ridge revolving near the summit of the aperture, so as to make a tolerably sharp angle near the middle of the body-whorl; two or three coarse striæ revolve parallel with it; below this is a dark brown band, continued around the base of the shell; aperture rhombic, ovate, livid and banded within; columella strongly incurved, with a callous deposit its whole length and well defined sinus at base.

Fig. 141.

Observations.— Compared with *M. gradata*, nobis, it is more elongate, more solid and has not the carina and regularly graded whorls so characteristic of that species; less conical than *M. canaliculata*, Say, and less broad. Like *M. annulifera*, Con., in form, but has not the revolving costæ of that species.— *Anthony.*

The figure above is from Mr. Anthony's type.

18a. P. fastigiatum, ANTHONY.

Melania fastigiata, ANTHONY, Ann. N. Y. Lyc., vi, p. 113, t. 3, f. 13, March, 1854. BINNEY, Check List, No. 108. REEVE, Monog. Melania, sp. 302.

Description.— Shell conical, smooth, moderately thick; of a pale yellowish-green color, ornamented with two distinct, distant, reddish-brown bands on each whorl, except those near the apex, which are carinate; spire elevated, rising from the broad body-whorl with regularly decreasing volume in a pyramidal form to the acute apex; whorls ten, not convex, with rather indistinct sutures in a furrowed channel; lines of growth curved and strong, particularly on the penult and body-whorl, where they are almost folds; body-whorl distinctly carinated, having one carina at the middle, another short distance below, with a broad band immediately above the carinæ, and

Fig. 142.

another far within, near the base. Aperture small, subrhomboidal, whitish within, three bands visible in the interior; columella nearly straight, a little thickened, outer lip very much curved, auger-like; sinus narrow, recurved.

Habitat.—Tennessee.

Diameter, ·38 of an inch (10 millim.); length, ·80 of an inch (20 millim.). Length of aperture, ·32 of an inch (8 millim.); breadth of aperture, ·16 of an inch (4 millim.).

Observations.—A fine symmetrical species, which is, perhaps, most nearly allied to *M. vestita*, Conr.; from that shell it differs in being less ponderous, more acute in its outline, and in its flat whorls, the *M. vestita* being angulated below the middle; it has also a double band, while *vestita* has a single one. From *M. elevata*, Say, it differs by its less slender outline, its want of "thread-like carinæ" on the whorls, and its lines of growth are more curved, more elevated and more distant; differs from *M. spinalis*, Lea, by not having carinated whorls, by its more delicate color, and it has not the superior part of the whorl darker than below, as described in *M. spinalis*.—*Anthony.*

Figured from the type. This species is very close to *Thorntonii*, Lea, but its outline is narrower. It may also be compared with *infrafasciatum*, but differs in having more acutely carinated whorls and a longer, more distinct fuse. The two narrow bands are present in all the specimens I have examined.

19. P. Postellii, Lea.

Trypanostoma Postellii, Lea, Proc. Acad. Nat. Sci., p. 171, 1862. Jour. Acad. Nat. Sci., v, pt. 3, p. 286, t. 36, f. 110. Obs., ix, p. 103.

Description.—Shell carinate, pyramidal, rather thick, horn-color; spire regularly conical; whorls eight, flattened, the last rather small; aperture very small, rhomboidal, whitish within; outer lip acute, very sinuous; columella thickened below and very much twisted.

Fig. 143.

Habitat.—Tennessee River; J. Postell: North Alabama; Prof. Tuomey.

Diameter, ·35; length, ·85 of an inch.

Observations.—I have from Mr. Postell eight specimens, and from Professor Tuomey, five. They vary very little, but most of them are imperfect at the apex or outer lip. This species very closely

resembles *Thorntonii* herein described, but is a much smaller species, with a smaller aperture and compressed whorls. All the specimens before me are more or less angulate on the periphery. None have bands. The aperture is about two-ninths the length of the shell. I name this after Mr. Postell, to whom I am indebted for specimens of this and many other new species of Mollusca.—*Lea.*

This species is closely allied to *infrafasciatum* but may be distinguished by its whorls being more flattened, and by its narrower form.

20. P. incurvum, Lea.

Trypanostoma incurvum, Lea, Proc. Acad. Nat. Sci., p. 171, 1862. Jour. Acad. Nat. Sci., v, pt. 3, p. 285, t. 36, f. 109. Obs., ix, p. 103.

Description.—Shell carinate, conical, rather thin, horn-color; spire somewhat elevated; sutures regularly impressed; whorls eight, flattened, obscurely striate below; aperture rather small, rhombical, whitish within; outer lip acute, extremely sinuous; columella very much twisted.

Fig. 144.

Habitat.—Florence, Alabama; Rev. G. White.

Diameter, ·37; length, ·89 of an inch.

Observations.—Among the *Melanidæ* sent to me by Mr. White, I found three specimens of this species which, being near to *Thorntonii*, herein described, evidently was supposed to be the same species. It is, however, a smaller, thinner and more slender species, and the remarkable sinuous edge of the outer lip at once marks the difference. The inward curve, starting at once in that direction from the suture, turns forward before it reaches the periphery of the whorl and again curves to the base, making a complete sigmoid curve. The aperture is about one-third the length of the shell.—*Lea.*

This species resembles the last but is very distinct in the incurved tip. It differs from *infrafasciatum* by the same characters as *Postellii*.

21. P. Alabamense, Lea.

Trypanostoma Alabamense, Lea, Proc. Acad. Nat. Sci., p. 171, 1862. Jour. Acad. Nat. Sci., v, pt. 3, p. 288, t. 36, f. 113. Obs., ix, p. 110.

Description.—Shell carinate, somewhat thick, subfusiform, dark horn-color; spire somewhat attenuate; sutures regularly impressed; whorls about eight, flattened, striate below; aperture rather small, rhomboidal, whitish within; outer lip acute, sinuous; columella blackened below and very much twisted.

Fig. 145.

Habitat.—North Alabama; Prof. Tuomey: Florence, Alabama; Rev. G. White.

Diameter, ·46; length, 1·11 inches.

Observations.—This species is allied to *Florencense*, herein described in outline, but is a much smaller species, less exserted in the spire, of a much lighter color and with fewer whorls. The three specimens before me differ but little in size or color, neither has a perfect apex, and therefore the character or the exact number of the upper whorls cannot be ascertained. They all have a few indistinct revolving striæ below the periphery of the last whorl. The aperture is about one-third the length of the shell.—*Lea.*

Very distinct from the preceding two species in the longer spire and canal. A variety with a light line below the sutures and yellowish-brown within occurs in Powell's River, Cumberland Gap, E. Tennessee.

21a. P. Florencense, Lea.

Trypanostoma Florencense, Lea, Proc. Acad. Nat. Sci., p. 171, 1862. Jour. Acad. Nat. Sci., v, pt. 3, p. 287, t. 36, f. 112. Obs., ix, p. 109.

Description.—Shell subcarinate, turreted, rather thick, dark brown or yellowish horn-color; spire very much raised; sutures slightly impressed; whorls about eleven, slightly convex; aperture rather small, rhombic, within bluish-white; outer lip acute, sinuous; columella whitish and very much twisted.

Habitat.—Florence, Alabama; Dr. Spillman: Tuscumbia; L. B. Thornton, Esq.

Diameter, ·59; length 1·05 inches.

Observations.—This is a large, rather slim species. Among eight

specimens, the longest is one inch and six-tenths. It is nearly allied to *Melania* (*Trypanostoma*) *elongata* (nobis), but is not carinate like that species, nor are the whorls so flat. The two specimens from Florence are larger, and very dark brown. Of the six from Tuscumbia, four are yellowish, and two are banded and greenish. Two of the yellowish ones are disposed to salmon-color inside. There is a slight disposition above the periphery to flatness or indentation. The aperture is more than the fourth of the length of the shell.—*Lea.*

Fig. 146.

I have seen some specimens from Coosa River, Alabama, in which the whorls are more convex than Mr. Lea's figure. The species has a more extended distribution than the above localities would indicate, Mr. Lea having specimens from New Harmony, Indiana.

The preceding species (*Alabamense*) may prove to be the young of this shell.

22. P. olivaceum, Lea.

Trypanostoma olivaceum, Lea, Proc. Acad Nat. Sci., p. 172, 1862. Jour. Acad. Nat. Sci., v, pt. 3, p. 290, t. 36, f. 117. Obs. ix, p. 112.

Description.—Shell carinate, subfusiform, rather thick, olivaceous; spire rather obtuse; sutures impressed; whorls about eight, flatttened; aperture rather large, rhomboidal, whitish within; outer lip sharp, sinuous; columella thickened below and very much twisted.

Fig. 147.

Operculum ovate, dark brown, with polar point near to the base.

Habitat.—Tombigbee River, Mississippi; W. Spillman, M. D.

Diameter, ·50; length, 1·06 inches.

Observations.—Dr. Spillman sent me quite a number of this species. In outline and size it is very near to *Strephobasis olivaria* (nobis), but it differs in the base of the columella, which separates it from the genus *Strephobasis*, and it is more flattened on the whorls, and is not banded; except in rare cases it has an obscure small band near the base. The olive-green hue of the epidermis is very constant. The carina generally leaves a thread-like line along the suture. The aperture is about one-third the length of the shell.—*Lea.*

This shell is very nearly allied to *P. ponderosum*, Anthony (*P. dux*, Lea). The figure is from Mr. Lea's plate but differs in the form of the aperture, in color and in size.

22a. P. canalitium, Lea.

Trypanostoma canalitium, Lea, Proc. Acad. Nat. Sci., p. 175, 1862. Jour. Acad. Nat. Sci., v, pt. 3, p. 292, t. 36, f. 121. Obs., ix, p. 114.

Description.— Shell canaliculate, conical, rather thick, horn-color, obscurely banded; spire regularly conical, somewhat raised, double-banded towards the point; sutures impressed; whorls about seven, flattened, the last canaliculate; aperture small, rhomboidal, white or salmon, and banded within; outer lip sharp and sigmoid; columella twisted, recurved at the base.

Fig. 148.

Habitat.— Yellowleaf Creek, Alabama; E. R. Showalter, M. D.

Diameter, ·43; length, ·99 of an inch.

Observations.— Three specimens are before me all of the same size, and having the appearance of half-grown *Melania* (*Trypanostoma*) *canaliculata*, Say, but they are mature and evidently distinct. The channel above the middle of the whorl is smaller, but well characterized. In the form of the aperture they are very much the same, being auger-shaped like *Cerithium*. It is very nearly allied to *Melania* (*Trypanostoma*) *infrafasciata*, Anth., from Tennessee, but may be distinguished by its channel above the middle of the whorls, and in having three bands visible in the interior, while the *infrafasciata* has but one, as described by Mr. Anthony, and none on the superior whorls, as all our three have. The aperture is about three-tenths the length of the shell.— *Lea.*

This figure is a copy of Mr. Lea's. In specimens of this shell, from Columbus, Miss., the canal is much better developed than in the above figure.

23. P. Clarkii, Lea.

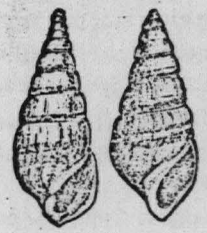
Trypanostoma Clarkii, Lea, Proc. Acad. Nat. Sci., p. 171, 1862. Jour. Acad. Nat. Sci., v, pt. 3, p. 285, t. 36, f. 108. Obs. ix, p. 107.

Description.— Shell obtusely carinate, conical, rather thick, dark olive; spire raised; sutures very much impressed; whorls about

eight, flattened; aperture rather small, rhomboidal, within whitish; outer lip acute, sinuous; columella white and twisted.

Operculum ovate, dark brown, with the polar point near the basal margin.

Fig. 149. Fig. 150.



Habitat.— French-broad and Tellico Creeks, Tennessee; J. Clark and Prof. Christy: Florence, Alabama; Rev. G. White: Noxubee River, Mississippi; Dr. Spillman: Clinch River, Tennessee; Dr. Warder: and Coosa, Cahawba and Alabama Rivers, Alabama; Dr. Showalter.

Diameter, ·46; length, 1·13 inches.

Observations.— This species has the color of *Spillmanii*, herein described, but it is a smaller and thicker species, and has a distinct carina. It is also less attenuate. The specimen from Clinch River is pale horn-color. Those from Tellico Creek are nearly all furnished with 2–4 bands. Two or three from French-broad are of a deep purple. The aperture is about one-third the length of the shell.

I have great pleasure in naming this after my deceased friend, Joseph Clark, to whom I am indebted for many species brought by Prof. Christy.— *Lea.*

I doubt whether this species is really distinct from *P. canalitium*. It appears, however, to be rather a broader shell proportionally, with a better developed carina and recurved canal. Both are common species.

24. P. Anthonyi, Lea.

Trypanostoma Anthonyi, Lea, Proc. Acad. Nat. Sci., p. 172, 1862. Jour. Acad. Nat. Sci., v, pt. 3, p. 293, t. 36, f. 122. Obs., ix, p. 115.

Description.— Shell rugosely striate, pyramidal, thick, yellowish, olive; spire raised; subrugosely impressed; whorls about nine, flattened; aperture rather large, rhomboidal, white within; outer lip acute, sinuous; columella thickened below and very tortuous.

Fig. 151.

Operculum subovate, dark brown, with the polar point near to the base on the left.

Habitat.— Tennessee; J. G. Anthony: Warrior River and Yellow Leaf Creek, Alabama; Dr. Showalter: Fox River, Indiana; J. Sampson.

Diameter, ·63; length, 1·43 inches.

Observations.— A number of specimens of this fine large species are

SMITHSONIAN MISCELLANEOUS COLLECTIONS, VOL. 26, JUNE 1967

before me, from various habitats. It is allied to *Melania* (*Trypanostoma*) *canaliculata*, Say, but it may easily be distinguished from it by the absence of a regular canal, and being a less ponderous shell. The color, too, is more of a yellow-green; usually there are three or four rather coarse striæ about the middle of the whorl, which form irregular canals. The canal at the base is wide and much recurved. Some specimens are almost entirely smooth, and some are 1¾ inches long. The aperture is about one-third the length of the shell. I name this after Mr. J. G. Anthony, to whom I am indebted for several fine specimens, and many other species from Tennessee.—*Lea.*

Fig. 152.

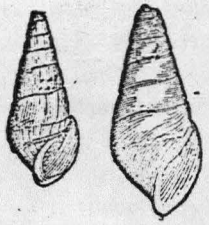
The first figure is from a Tennessee specimen, and is a copy of that given by Mr. Lea. The shells quoted from "Fox River, Indiana, J. Sampson," are more closely allied to *Florencense*, and are probably identical with that species.

This shell appears to be distinct from its congeners, but approximates closely to *Florencense* on one side and *Troostii* on the other side. It is a common species.

25. P. prasinatum, CONRAD.

Melania prasinata, CONRAD, Am. Jour. Sci., 1st ser., XXV, p. 342, t. 1, f. 14, January, 1834. JAY, Cat., 4th edit., p. 274. BINNEY, Check List, No. 216. BROT, List, p. 33. CATLOW, Conch. Nomenc., p. 188. DEKAY, Moll. N. Y., p. 98. REEVE, Monog. Melania, sp. 403.

Fig. 153. Fig. 154.



Description.—Shell subulate, slightly turreted, whorls seven or eight, flattened, aperture elliptical, a little oblique; about one-third of the length of the shell; body-whorl subangulated at base; epidermis green-olive.

Var. A. With broad revolving costæ, those on the body-whorl crenulated. Inhabits Alabama River, adhering to limestone rocks. Cabinet of the Academy of Natural Sciences of Philadelphia.—*Conrad.*

25a. P. incrassum, ANTHONY.

Melania incrassata, ANTHONY, Ann. Lyc. N. Y., vi, p. 99, t. 2, f. 17, March, 1854. BINNEY, Check List, No. 144. BROT, List, p. 34.
Trypanostoma Hartmanii, LEA, Proc. Acad. Nat. Sci., p. 173, 1862. Jour. Acad. Nat. Sci., v, pt. 3, p. 270, t. 36, f. 80. Obs., ix, p. 92.
Trypanostoma bivittatum, LEA, Proc. Acad. Nat. Sci., p. 175, 1862. Jour. Acad Nat. Sci., v, pt. 3, p. 279, t. 36, f. 97. Obs., ix, p. 191.

Description.—Shell conical, smooth, thick; spire elevated; whorls 8–9, very convex, somewhat biangulated; sutures deeply impressed; body-whorl striated, with a constriction about the middle, which also extends to the penultimate whorl; aperture ovate, within reddish; columella not indented, reflected, sinus deep.

Habitat.——?

My Cabinet.

Diameter, ·45 of an inch (12 millim.); length, 1·12 inches (29 millim.). Length of aperture, ·37 inch (9 millim.); breadth of aperture, ·18 inch (4½ millim.).

Observations.—Only one specimen has come under my notice, which, however, is so unlike any other that I cannot hesitate to consider it new.—*Anthony.*

Fig. 155.

It is a thick, ponderous species, with narrow convex or biangulated whorls, faintly banded on the angulations.

Trypanostoma Hartmanii.—Shell smooth, sometimes obscurely channelled, solid, greenish, or reddish-brown, regularly conical, banded or without bands; spire pyramidal; sutures regularly impressed; whorls about nine, slightly convex; aperture small, rhombic, white or salmon-color within; outer lip acute, sinuous; columella thickened below and very much twisted.

Habitat.—Cahawba and Coosa Rivers; Dr. Showalter: Warrior River, Alabama; Dr. Budd: Knoxville; J. Clark: Tennessee River, Alabama; Dr. Spillman.

Diameter, ·50; length, 1·25 inches.

Observations.—Two or three specimens of this fine species have been in my collection for a long time, and were given to me under the name of *Melania pyrenella*, Con., but Mr. Conrad's shell is not so solid, has flatter whorls and is carinate. Some of the specimens of *Hartmanii* are furnished with two broad bands, which are usually well marked

inside, others are without bands, and these are usually salmon-colored within. Three of the specimens out of some thirty before me are of a rich dark brown, which arises from the interior nacre being purplish. The aperture is more than one-third the length of the shell. I have great pleasure in naming this after my friend W. D. Hartman, M.D., who has furnished me with a number of fine specimens.*— *Lea.*

P. bivittatum.— Shell smooth, conical, rather thick, yellow, double-banded; spire obtusely conical; sutures much impressed; whorls seven, rather convex, the last one large; aperture rather large, somewhat rhomboidal, white and double-banded within, outer lip acute, somewhat sinuous; columella thickened below and very much twisted.

Fig. 156.

Habitat.— Tennessee; Prof. Troost.

Diameter, ·34; length, ·68 of an inch.

Observations.— This is a small robust species. Five specimens came many years since from Prof. Troost, mixed with many young specimens of *M. canaliculata*, Say, to which it has some resemblance, but it may easily be distinguished by its shorter spire, and larger body-whorl. All the specimens have two regular deep brown bands. The aperture is about two-fifths the length of the shell. Two or three of these specimens were mixed with some young shells from Cincinnati, I think by accident, but still it is possible that they may have come from Cincinnati.— *Lea.*

Figured from Mr. Lea's plate. There can be no doubt that this is the young of Mr. Lea's *Hartmanii*.

25b. P. Jayi, Lea.

Trypanostoma Jayi, Lea, Proc. Acad. Nat. Sci., p. 173, 1862. Jour. Acad. Nat. Sci., v, pt. 3, p. 270, t. 36, f. 81. Obs., ix, p. 92.

Description.— Shell smooth, pupæform, thick, shining, reddish-brown; spire obtusely conical; sutures very much impressed; whorls eight, rather swollen, the last rather large; aperture small, rhomboidal, rather narrow, pale brown within; outer lip acute, sinuous; columella thickened below and twisted.

Habitat.— Alabama? J. C. Jay, M.D.

Diameter, ·46; length, 1·16 inches.

Fig. 157.

Observations.— A single specimen was given to me many years since by Dr. Jay under the name of *Melania prasinata*, Con., but it is a very different shell from the type of that species in the collection of the Academy of Natural Sciences, that being of a greenish color, having a few nodes round the periphery, which is angulated, neither of which characters belongs to *Jayi*. Indeed, our shell is much nearer to *clausa* (nobis) in outline, but it is not so pupæform, and it has a more twisted columella, the spire being more conical.

It is to be regretted that a single specimen only should be under observation, as others may be different in color. The interior as well as the columella is of a dull salmon, and the darkness is occasioned by obscure bands which do not extend quite to the edge, which is slightly thickened. The aperture is not quite one-third the length of the shell. I name this species after Dr. Jay, to whom I owe the possession of it, and who has done so much to advance a knowledge of our conchology.— *Lea.*

26. P. tortum, Lea.

Trypanostoma tortum, Lea, Proc. Acad. Nat. Sci., p. 174, 1862. Jour. Acad. Nat. Sci., v, pt. 3, p. 275, t. 36, f. 89. Obs., ix, p. 97.

Description.— Shell smooth, conical, horn-color, rather thick; spire rather obtusely conical; sutures very much impressed; whorls seven, flattened; aperture rather large, subrhomboidal, white or brownish within; outer lip acute, scarcely sinuous; columella very much incurved, slightly thickened above, more thickened below and very much twisted.

Fig. 158.

Habitat.— Little Uchee, below Columbus, Georgia; G. Hallenbeck.

Diameter, ·44; length, ·96 of an inch.

Observations.— Several specimens of this species are before me. In one of the specimens there are three or four obscure striæ about the periphery. It is probable that others may be found with this character more developed. On the upper whorls there is a raised line revolving immediately above the suture, which causes the

*Since the above was written, a letter received from Dr. Hartman says, that Dr. Showalter informed him that "the orange color of the animal is remarkable." Dr. Hartman also mentions that he and Dr. Showalter had distributed this shell under the name of *Melania pyrenella*, Con., which mistake Dr. Hartman corrected by reference to the type specimen, which is in the collection of the Academy of Natural Sciences.— *Lea.*

suture to be more impressed. The columella is more than usually twisted, whence the name of the species. Two of the specimens are of a dull brown within, but have a whitish margin. The aperture is rather more than the third of the length of the shell.— *Lea.*

27. P. dignum, LEA.

Trypanostoma dignum, LEA, Proc. Acad. Nat. Sci., p. 273, 1862. Jour. Acad. Nat. Sci., v, pt. 3, p. 350, t. 39, f. 219. Obs., ix, p. 172.

Description.— Shell slightly noduled, subfusiform, somewhat thick, honey-yellow, single-banded spire raised, regularly conical; sutures impressed; whorls about eight, flattened, the last rather large; aperture ovately rhombic, salmon or white within, single-banded within; outer lip acute, sinuous; columella bent in, twisted, obtusely angular at the base.

Fig. 159.

Habitat.— Yellowleaf Creek, Shelby County, Alabama; E. R. Showalter, M. D.

Diameter, ·52; length, 1·06 inches.

Observations.— I have two specimens of this beautiful species before me. The smaller has a well-defined row of small tubercles on the middle of the whorls. The larger has an ill-defined, obscure row, which is partly made up by a raised line. Below this is a well-marked capillary, brown band, which is distinct outside and in. The clear, bright, smooth epidermis is of a honey-yellow, inclining to brown. In outline it is near to *Melania* (*Goniobasis*) *Vanuxemiana* (nobis), but it cannot be confounded with that species. The aperture is more than one-third the length of the shell.— *Lea.*

D. *Carinate, striate Pleuroceræ.*

28. P. unciale, HALDEMAN.

Melania uncialis, HALD., Monog. Limniades, No. 4, p. 3 of Cover, Oct. 5, 1841. JAY, Cat., 4th edit., p. 275. BINNEY, Check List, No. 279. BROT, List, p. 37. REEVE, Monog. Mel., sp. 435.

Melania oblita, LEA, Philos. Trans., x, p. 298, t. 30, f. 6. Obs., v, p. 54. BINNEY, Check List, No. 182. BROT, List, p. 36.

Melania bicostata, ANTHONY, Proc. Acad. Nat. Sci., p. 56, February, 1860. BINNEY, Check List, No. 33. BROT, List, p. 30. REEVE, Monog. Melania, sp. 246.

Melania rigida, ANTHONY, Proc. Acad. Nat. Sci., p. 62. February, 1860. BINNEY, Check List, No. 229. REEVE, Monog. Melania, sp. 270.

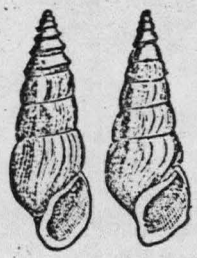
Melania sugillata, REEVE, Monog. Mel., sp. 319, September, 1860. BROT, List, p. 31.

Description.— Shell pale olivaceous, turreted, with eight or ten slightly convex whorls, the earlier ones of which are strongly carinated; lines of growth curved; aperture ovate, with a sinus anteriorly. One-inch long.

Habitat.— Beaver Creek, N. E. Tennessee.

Observations.— Bears a general resemblance to *M. Virginica.* As far as I can judge from the description, it must be somewhat like *M. Warderiana*, Lea.— *Haldeman.*

Fig. 160. Fig. 161.



The figure is from Prof. Haldeman's type specimen. It is a common species, and inhabits also West Virginia.

The following appear to me to be synonymes:

M. oblita.— Shell very much carinated, turreted, screw-shaped, rather thin, horn-colored; spire drawn out; sutures linear; whorls twelve, acutely carinate; aperture small, elliptical, within whitish; columella white and twisted.

Habitat.— Tennessee?

Diameter, ·30; length, ·96 of an inch.

Observations.— I have about a dozen of this species, which is very distinct from any with which I am acquainted. The locality I am uncertain about, the label being by some accident lost. I believe it comes from Tennessee, but am not certain. Its very marked character of a screw, or rather of a gimlet, strikes one at once. In most species there is a thread-like line above the carina and several below. The carina is not usually persistent on the body-whorl. It is nearest in form and size to *M. percarinata*, Con., but may be easily distinguished by the absence of granules between the carinæ, the leng th o the spire, having three or four more whorls, and in being less shiny. The aperture is not quite one-third the length of the shell.— *Lea.*

Fig. 162.

Fig. 163.

Melania bicostata.— Shell conical, light horn-color, rather thick; spire elevated, acute; whorls 11–12, strongly carinate near the apex and decidedly so on each succeeding whorl, not excepting even the body-whorl in most cases, though sometimes obsolete there; carinæ often in pairs, near to and parallel with each other; sutures deeply impressed, often with a decided furrow at that point, caused by the carinæ. Aperture

broadly elliptical, or subrhombic; within dirty-white or obscurely banded; columella deeply rounded, with a well marked sinus at base.

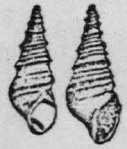
Habitat.—Tennessee, near Athens.

Observations.—Appears to be a very abundant and rather variable species. Several hundred individuals have come under my notice. It cannot well be confounded with any other species, though of a form by no means uncommon. The sharp double carinæ will at once generally determine it. Occurs abundantly near Athens, in small streams. —*Anthony.*

The figure illustrates one of Mr. Anthony's type specimens. The following is the young of *bicostatum*.

M. rigida.—Shell conic, elevate, carinate, rather thin; whorls 8-9, carinate and banded; sutures distinctly marked; aperture small, elliptical, whitish within; columella indented; sinus small but very distinct.

Figs. 164, 165.



Habitat.—Tennessee.

Observations.—This is one of those sharply keeled Melaniæ of which *M. bella*, Conr., *M. carino-costata* and *M. oblita*, Lea, may be considered good examples. The whorls of the spire have each two carinæ with generally a dark band between them though this is sometimes wanting; the body-whorl has four or five of these carinæ and generally two bands, one of which revolves within the aperture. To the touch this species has a peculiarly rough feel.—*Anthony.*

Figure 165 is from Mr. Anthony's type.

Fig. 166.

M. sugillata.—Shell acuminately turreted, livid gray, whorls ten to eleven, the first few encircled with a very sharp keel, the rest smooth; aperture rotundately ovate, columella twisted, sinuately reflected at the base.

Habitat.—Alabama.

Observations.—Of a smooth, livid, bruised aspect, encircled towards the apex with a particularly prominent fine keel, which soon disappears.—*Reeve.*

The above figure is copied from Reeve. *Generally*, but little dependence can be placed in the correctness of the localities given for American species of *Strepomatidæ* in

the Cumingian collection—and in the present instance, the locality may be questioned, as the species is rather of the Tennessee type.

29. P. subulare, Lea.

Melania subularis, Lea, Philos. Trans., iv, p. 100, t. 15, f. 30. Obs., i, p. 110, t. 15 f. 30. Ravenel, Cat., p. 11. DeKay, Moll. N. Y., p. 92, t. 7, f. 138. Wheatley, Cat. Shells U. S., p. 27. Jay, Cat., 4th edit., p. 275. Binney, Check List, No. 257. Brot, List, p. 35. Reeve, Monog. Melania, sp. 428. Whiteaves, Canad. Naturalist, viii, p 102, April, 1863.
Ceriphasia subularis, Lea, Adams, Genera, i, p. 287.

Description.—Shell elevated and acutely turreted, horn-color; apex acute; whorls about twelve, flat, carinate on the middle of the body-whorl; base angulated; aperture white and one-fourth the length of the shell.

Fig. 167.

Habitat.—Niagara River.

Diameter, ·4; length, 1·3 inches.

Observations.—I took this species at the Falls of Niagara, and being unable to refer it to any described species, have given it a place here. It resembles the *Virginica* (Say), but differs greatly in elevation, the *Virginica* having about seven whorls only. The carina causes the whorls to be flatter in the *subularis*. In some specimens the columella is purple.—*Lea.*

This is one of our most beautiful species; the clear, polished surface is quite translucent, banded below the sutures by yellow and light blue. It appears to be a common species in the great lakes and their tributaries.

Fig. 167 is a copy of Mr. Lea's.

The species is reported from St. Lawrence River, by Mr. Whiteaves.

29 a. P. intensum, Anthony.

Melania intensa, Anthony, Reeve, Monog. sp. 371. Brot, List, p. 30.

Description.—Acuminated, purple-black, whorls ten, flatly convex, encircled with a keel above the sutures, last whorl slightly angled and ridged at the base; aperture rather small, purple-black.

Anthony. MSS. in Mus. Cuming.

Habitat.—United States.

A very characteristic purple-black shell, encircled by a keel so near to the suture as to give them an appearance of being more than usually excavated.—*Reeve.*

I have seen specimens of this shell, but without locality attached to the label. It much resembles *subulare*, Lea, and may be a variety of that species, but I have seen no specimens of the latter species which at all resemble this in color.

Fig. 167 *a*.

The specimens before me and also Mr. Reeve's specimen, as exhibited by his figure, are ornamented by a narrow yellowish band below the sutures.

30. P. subulæforme, Lea.

Trypanostoma subulæforme, Lea, Proc. Acad. Nat. Sci., p. 174, 1862. Jour. Acad. Nat. Sci., v, pt. 3, p. 289, t. 36, f. 116. Obs., ix, p. 111.

Description.—Shell carinate, subulate, rather thin, horn-color; spire attenuately conical; sutures very much impressed; whorls ten, flattened below and carinate above; aperture small, subrhomboidal, whitish within; outer lip acute, sinuous; columella slightly thickened and twisted.

Operculum ovate, dark brown, with the polar point near the base slightly on the left.

Fig. 168.

Habitat.—Knoxville, Tennessee; Prof. Troost and W. Spillman, M.D.

Diameter, ·39; length, 1·07 inches.

Observations.—This species is nearly allied to *Melania* (*Trypanostoma*) *bicostata*, Anth., and in outline and size very close to *Melania* (*Trypanostoma*) *Ocoeénsis* (nobis). From *bicostata*, it may be distinguished by the difference in the aperture, in being more subulate and in having the carina less marked. The channel of *bicostata* is more retrorse and more angular at the point. The aperture is about one-fourth the length of the shell. Two of the three specimens before me are without any bands, the third has a well-defined brown band within the aperture. It is nearly the same in outline as *attenuatum* herein described, but differs in the form of the aperture and in being carinate.

I doubt whether this is more than the adult form of *P. Henryanum*, Lea.

31. P. Henryanum, Lea.

Trypanostoma Henryanum, Lea, Proc. Acad. Nat. Sci., p. 272, 1862. Jour. Acad. Nat. Sci., v, pt. 3, p. 351, t. 39, f. 222. Obs., ix, p. 173.

Description.—Shell carinate, attenuate, sharp-pointed, thin, semi-transparent, pale horn-color, without bands; spire regularly attenuately conical; sutures regularly impressed; whorls ten, flattened, the last one regularly carinate and striate in the middle; aperture, small, subrhomboidal, whitish within; outer lip very sharp and sinuous; columella bent in and very much twisted.

Fig. 169.

Habitat.—Tennessee? Smithsonian Institution.

Diameter, ·29; length, ·80 inch.

Observations.—Among the *Melanidæ* sent to me by Prof. Henry, Secretary of the Smithsonian Institution, were a few of this species, which I at first regarded as a variety of *Melania* (*Trypanostoma*) *uncialis*, Hald., but it is certainly a distinct species. In the spire it is very much the same, but the color is paler, and in the form of the aperture it is quite different,—*uncialis* having a retrorse channel at the base while our species curves towards the front and has a more delicate columella, and is altogether more fragile. All the specimens before me have six revolving striæ on the lower whorl, below the periphery. The aperture is not quite one-third the length of the shell.

I have sincere pleasure in dedicating this species to my friend Prof. Joseph Henry, Secretary of the Smithsonian Institution, who liberally has placed the fresh-water mollusca of that admirable Institution under my examination.—*Lea.*

32. P. Lewisii, Lea.

Trypanostoma Lewisii, Lea, Proc. Acad. Nat. Sci., p. 172, 1862. Jour. Acad. Nat. Sci., v, pt. 3, p. 292, t. 36, f. 120. Obs., ix, p. 114.

Description.—Shell sulcate, somewhat thin, high, conical, dark brown or horn-color, banded; spire very much drawn out; sutures slightly impressed, whorls about eleven, flattened; aperture small, subrhomboidal, banded within; outer lip acute, slightly sinuous; columella slightly thickened below and very much twisted.

Habitat.—Peoria, Illinois; J. Lewis, M. D.

Diameter, ·47; length, 1·12 inches.

SMITHSONIAN MISCELLANEOUS COLLECTIONS NO. 26, JUNE 1967

Observations.—I have three specimens before me, all of which differ slightly. Two are dark brown and they are purple within. The third is light horn-color, with light brown bands covering the greater part of the whorls. The upper whorls of all three are carinate. It is allied to *Melania* (*Trypanostoma*) *annulifera*, Con., but it is a smaller shell, more attenuate, and the aperture is more rounded at the base. The aperture is about one-fourth the length of the shell. I have great pleasure in calling this after my friend Dr. Lewis, of Mohawk, New York, who has aided me greatly by sending me very many new shells from our fresh waters.—*Lea.*

Fig. 170.

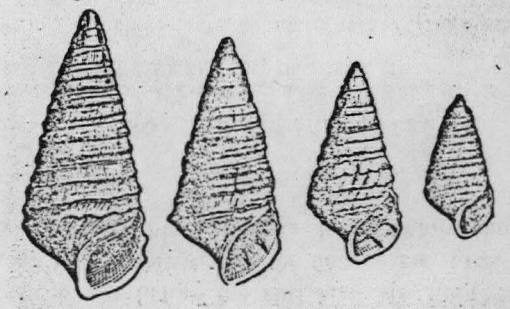
This species may be only a striate form of *elevatum*, Say.

33. P. annuliferum, Conrad.

Melania annulifera, Conrad, New Fresh Water Shells, p. 51, t. 8, f. 2, 1834. Jay, Cat., 4th edit., p. 272. Binney, Check List, No. 17. DeKay, Moll. N. Y., p. 94. Wheatley, Cat. Shells U. S., p. 24. Brot, List, p. 30. Catlow, Conch. Nomenc., p. 185. Reeve, Monog. Melania, sp. 308. Müller, Synops. 44.
Melania annulata, Conrad, Jay, Cat., 2nd edit., p. 455.
Melania Ordiana, Lea, Philos. Proc., ii. p. 242, Dec., 1842. Philos. Trans. ix, p. 26. Obs., iv, p. 26. Wheatley, Cat. Shells U. S., p. 26. Binney, Check List, No. 191. Brot, List, p. 30.
Ceriphasia annulifera, Conr., Adams, Genera, i, p. 297.
Ceriphasia Ordiana, Lea, ibid., p. 297.

Description.—Shell elevated, subconical, with flattened whorls and elevated, distant ribs, alternately smaller; about five on the body-whorl and three on the adjoining one; suture obsolete; color generally blackish exteriorly and dark purple within.

Fig. 171. Fig. 172. Fig. 173. Fig. 174.



Observations.—Inhabits with the preceding species, from which it differs in being less ventricose, and having the ribs plain; the aperture is shorter than in the preceding. The three specimens figured are from Alabama; it will be noticed that in one of them, the central striæ are tuberculate, thus forming a connection with *Foremanii*, Lea.—*Conrad.*

The following is regarded as a synonyme:—

Mel. Ordiana.—Shell striate, pyramidal, dark brown; spire drawn out; sutures deeply impressed; whorls flattened; aperture rhombic; small, whitish.

Habitat.—Alabama.

Diameter, ·52; length, 1·25 inches.

Observations.—A single specimen only of this species is before me, and that unfortunately is decollate, in having lost, probably, four or five whorls: the four lower whorls are perfect. The outer lip is much curved, giving the aperture an auger-like appearance and causing the channel to be much impressed. On the body-whorl there are four rather distant elevated striæ, three of which are large; the whorls above exhibit two. The aperture is about one-fourth the length of the shell. This species resembles *M. canaliculata* (Say), and *M. annulifera* (Conr.). It has not the channel of the former, and differs from the latter in having deeply impressed sutures, in the form of the aperture, in the outer lip and in the striæ. I dedicate it to my old friend, Geo. Ord, Esq.—*Lea.*

Fig. 175.

The description of *Mel. Ordiana* quoted above answers exactly to a variety of *P. annuliferum*, which varies much in outline and in the development of the canal. In the Smithsonian Collection are preserved fine specimens of a variety of this species in which the shell is much broader than usual, with the periphery sharply angulated.

34. P. Brumbyi, Lea.

Melania Brumbyi, Lea, Philos. Trans., x, p. 298, t. 30, f. 5. Obs., v, p. 54. Binney, Check List, No. 40. Brot, List, p. 30. Reeve, Monog. Melania, sp. 277.

Description.—Shell striate, pyramidal, rather thick, reddish-brown; spire very much elevated, carinate at the apex; sutures but slightly impressed; whorls flattened; aperture rather large, rhomboidal, within rubiginose; columella twisted.

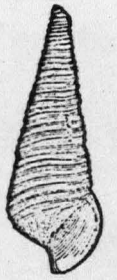
Habitat.—Coosa River, Ala.; Huntsville, Ala.

Diameter, ·53; length, 1·72 inches.

Observations.—This is a very remarkable species, and among the largest of our Melaniæ. In form and size it is allied to *annulifera*,

Conr., but may easily be distinguished by its more numerous striæ, its reddish color and the form of its aperture, which is more open. In the *Brumbyi* there is an angle in the middle of the whorl, which gives the aperture a rhomboidal form. The columella is rufous and the channel whitish. The apex of each of them being broken, the number of whorls cannot be correctly ascertained. I should suppose there were at least ten. Some of the specimens here are beautifully granulate between the striæ. The aperture is not quite one-fourth the length of the shell. Along the suture, on the upper part of the whorl, there is a line of a lighter color than the other part. I dedicate this species to Prof. R. T. Brumby, who has done so much in bringing to light the interesting shells of Alabama. — *Lea.*

Fig. 176.



35. P. Currierianum, Lea.

Trypanostoma Currierianum, Lea, Proc. Acad. Nat. Sci., p. 155, May, 1863. Jour. Acad. Nat. Sci., vi, p. 147, t. 23, f. 61, 1867.

Description.—Carinate, very attenuate, with dark brown bands; spire very much drawn out; sutures linear, scarcely impressed; whorls about ten, flattened; aperture small, rhomboidal, banded within; outer lip acute, very sinuous; columella whitish and very much twisted.

Fig. 177.

Operculum ovate, reddish-brown, rather thick, with the polar point near the base towards the left margin.

Habitat.—Florence, Alabama.

Diameter, ·31; length, 1·26? inches.

Observations.—I have seven specimens before me for examination, none of which are perfect at the apex, and therefore the number of whorls is somewhat uncertain. It is a well-characterized shell, all the specimens being without any variation except in age. There are five dark brown bands, the upper and lower being the broadest. The lower two of the three in the middle are on two revolving striæ. The whorls above the body-whorls exhibit two of the five bands all the way to the apex. In old individuals the outer lip is much expanded and slightly thickened inside of the edge. It is allied to *Melania Trypanostoma elongata* (nobis), but may easily be distinguished by being more attenuate, smaller, thinner and in having five bands.

The aperture is about one-fifth the length of the shell. I name this after Mr. A. O. Currier, to whom I am indebted for it. — *Lea.*

E. *Plicate Species.*

36. P. Sycamorénse, Lea.

Trypanostoma Sycamorénse, Proc. Acad. Nat. Sci., p. 175, 1862. Jour. Acad. Nat. Sci., v, pt. 3, p. 283, t. 37, f. 104. Obs., ix, p. 105.

Description.—Shell plicate, conical, yellowish horn-color, rather thick; spire attenuate, pointed; sutures impressed; whorls eleven, somewhat convex, carinate above, plicate in the middle; aperture rather small, rhomboidal, whitish within; outer lip acute, sinuous; columella incurved, thickened below and twisted.

Fig. 178.

Habitat.—Sycamore, Claiborne County, East Tennessee; J. Lewis, M. D.

Diameter, ·36; length, ·92 inch.

Observations.—A single specimen only is before me. It is a rather small, very symmetrical species. The seven upper whorls are carinate, the three middle ones are furnished with numerous rather obscure folds, the lower whorl is smooth. In outline it resembles *labiatum*, herein described, but cannot be confounded with that species which is not plicate nor yellowish, and the form of the lower part of the aperture is very different. The aperture is little more than the fourth of the length of the shell. — *Lea.*

The figure is copied from Mr. Lea's plate.

37. P. plicatum, Tryon.

Pleurocera plicatum, Tryon, Proc. Acad. Nat. Sci., Oct., 1863.

Description.—Shell ovate-conical, spire attenuate, the upper whorls closely plicate, the lower ones smooth or obsoletely concentrically striate. Whorls but slightly convex, sutures well impressed. Color light green, with usually a lighter band below the sutures and ornamented with narrow or broad brown bands. Aperture canaliculately produced. The outer lip and columella twisted.

Fig. 179.

Diameter, ·35; length, ·7 inch.

Habitat.—Nashville, Tenn.

Observations.—I owe to Dr. Gould the opportunity of describing this beautiful little species. It differs from *P. grossa*, Anth. (young of *alveare*) in being more slender, different in color and in having bands; the aperture is not nearly so large proportionally and the plicæ are finer. — *Tryon.*

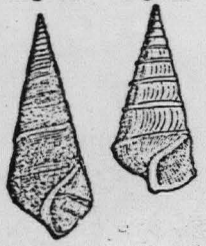
F. *Smooth, Angulate Pleuroceræ.*

38. P. elevatum, SAY.

Melania elevata, SAY, Jour. Acad. Nat. Sci., ii, p. 176, Jan., 1821. BINNEY, Reprint. p. 70. BINNEY, Check List, No. 97. JAY, Cat., 4th edit., p. 273. LAPHAM, Cat. Moll. Wisconsin, p. 368. DEKAY, Moll. N. Y., p. 96. WHEATLEY, Cat. Shells U. S., p. 25. CATLOW, Conch. Nomenc., p. 186. BROT, List, p. 30, REEVE, Monog. Melania, sp. 442.
Ceriphasia elevata, Say, CHENU, Manuél, i, f. 1961.
Melania elongata, LEA, Philos. Trans., iv, p. 121, t. 15, f. 29. Obs., i, p. 130. TROOST, Cat. BINNEY, Check List, No. 99. WHEATLEY, Cat. Shells U. S., p. 25. BROT, List, p. 30.
Ceriphasia elongata, Lea, CHENU, Manuél, i, f. 1959.
Elimia elevata, Lea, ADAMS, Genera, i, p. 300.
Melania tracta, ANTHONY, Bost. Proc., iii, 361, 1850. REEVE, Monog. 429, 1861.

Description.—Shell gradually attenuating to the apex, slightly and irregularly wrinkled, olivaceous; suture not deeply impressed; volutions nine or ten, with several more or less elevated revolving lines, of which one being more conspicuous gives the shell a carinated appearance; aperture oblique, equalling the length of the second, third and fourth volutions conjunctly.

Fig. 180. Fig. 181.



Length, one inch; breadth, two-fifths.

Habitat.—Ohio River.

Observations.—Distinct from our other species, by the elevated revolving lines.— *Say.*

It may be doubted whether *elevatum* and *Lewisii* will not eventually prove to be the same species; I am much inclined to doubt their specific distinction.

The present shell inhabits the waters of Ohio, Indiana and Illinois, the Ohio River, Kentucky and West and Middle Tennessee.

Mr. Say and other conchologists have considered Mr. Lea's *elongatum* to be a synonyme of *elevatum*, in which opinion I concur. The following is the description and copy of the figure of

Melania elongata.—Shell elevated and acutely turreted, dark horn-color with purple bands; apex acute; whorls about ten and slightly depressed; base angulated, aperture bluish-white and about one-fourth the length of the shell.

Fig. 182.

Habitat.— West Tennessee; John Lea.

Diameter, ·5; length, 1·5 inches.

Observations.— This fine *Melania* seems most to resemble the *subularis* (nobis). It differs from it in being wider, in being darker colored and in having a less number of whorls. The bands in some specimens are scarcely visible.— *Lea.*

Reeve figures a shell under the name of *elongata* (Monog. sp. 305) which certainly does not represent this species — it may represent a very fine specimen of *T. annulifera*, Conrad.

The species varies very much in form, and a very long narrow variety has been described as distinct by Mr. Anthony, as follows:

Fig. 183.

Melania tracta. — Shell ovately-lanceolate, gracile, brownish-green, longitudinally varicosely-plicate and encircled with elevated lines; whorls 7, very convex; sutures profound; aperture contorted, narrowly oval lip produced in front; columella white, mouth livid.

Long. 1⅛; lat. ⅜ poll.

Habitat.— Ohio.

Observations.— General form like *M. Virginica*, but with the whorls more rounded. The delicate raised lines which surround it are among its more obvious characters. — *Anthony.*

39. P. gradatum, ANTHONY.

Melania gradata, ANTHONY, Ann. Lyc., N. Y., vi, p. 112, t. 3, f. 12, March, 1854. BINNEY, Check List, No. 130. BROT, List, p. 30. REEVE, Monog. Melania, sp. 261.
Melania eximia, ANTHONY, Ann. Lyc. N. Y., vi, p. 107, t. 3, f. 7, March, 1854. BINNEY, Check List, No. 106. BROT, List, p. 58. REEVE, Monog. Melania, sp. 408.
Trypanostoma curtatum, LEA, Proc. Acad. Nat. Sci., p. 155, May, 1863.

Description.—Shell conical, smooth, solid, greenish horn-color; spire

not much elevated; whorls 7-8, slightly concave, with a distinct, elevated ridge, closely overlying the suture and the projecting shoulder of the succeeding whorl, so as to form a series of steps to the subacute apex; body-whorl large, generally angulated or distinctly ribbed at base, which is not much rounded; sutures impressed; aperture subrhomboidal, whitish within; outer lip much bent forward towards the base; columella straight, produced into a narrow deep sinus, which is slightly recurved.

Length, ·85 inch (22 millim.); diameter, ·42 inch (11 millim.). Length of aperture, ·30 inch (8 millim.); breadth of aperture, ·20 inch (5 millim.).

Habitat. — Alabama.

Observations. — Belongs to the group of which *M. canaliculata* may be considered the type. It is, however, much less elevated than *M. canaliculata*, has not the conspicuous grooving on the body-whorl as in that species, and its spire has the whorls flat instead of exhibiting an obtuse carina, as described by Mr. Say; a sharp elevated carina at the base of the whorls closely overlies the suture beneath; the extreme upper whorls having this more distant from the suture become distinctly carinated. The regular gradation of the whorls is its most distinctive character. — *Anthony.*

Fig. 184.

Very closely allied to *T. arata*, Lea. The figure is from Mr. Anthony's original type. The shell described as *eximia* by Mr. Anthony is the young of *gradatum*, and the latter name is retained as being more characteristic of the species. For a complete suite of young and old specimens, I am indebted to Prof. Haldeman, who collected them in Holston River, Washington Co., S. W. Virginia. I suspect that Mr. Anthony's locality, "Alabama," for *gradatum*, is incorrect.

Mr. Lea has recently described the same species as *Trypanostoma curtatum*, his shells being rather shorter and more obese than Mr. Anthony's type of *gradatum*. Some of the varieties of this species are finely banded, and others sharply carinate. The following is the description of

Melania eximia. — Shell deeply sulcate and carinate, ovate; of a beautiful, light, apple-green color, ornamented with two dark-green bands, and an elevated, prominent carina of a light color revolving

between them; spire not remarkably elevated, but acute, of a rather convex outline; whorls 8-9, somewhat convex, and with sutures not prominent, but channelled; body-whorls with about four carinæ, the lowest one being indistinct; aperture small, subrhomboidal, with two bands in the interior, distant from each other and from the edge of the outer lip; outer lip much twisted, auger-like, causing the sinus, which is small, to curve backwards.

Fig. 185.

Diameter, ·28 inch (7 millim.); length, ·60 inch (15 millim.). Length of aperture, ·25 inch (6 millim.); breadth of aperture, ·13 inch (3 millim.).

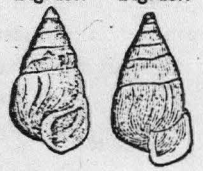
Habitat. — Tennessee.

Observations. — A beautiful little shell, of a singularly bright, lively appearance; the colors are well contrasted, very distinct, and the prominent carinæ add to the general effect. On the upper whorls, but one band is visible, the lower one being concealed, or nearly so, by the revolutions of the spire. It cannot well be compared with any other species. — *Anthony.*

Mr. Anthony's type is figured. The following is Mr. Lea's description of

Trypanostoma curtatum. — Shell smooth, pyramidal, yellowish, thick; whorls seven, flattened, the last one impressed; aperture rhomboidal, whitish within; outer lip acute, expanded, very sinuous; columella thickened, bent in, and very much twisted.

Fig. 186. Fig. 187.



Operculum ovate, dark brown, with polar point near the base on the left.

Habitat. — Powell's River, near Cumberland Gap, East Tennessee.

Diameter, ·41; length, ·75 inch.

Observations. — Quite a number of this species were sent to me by Major Lyon. It is a short thick species, with a well-characterized aperture, the columella being much thickened, drawn back and twisted. It is allied to *T. pumilum* and *minor* (nobis), but differs from both in having the sides flattened and being angular about the middle of the body-whorl. Very few of *curtatum* are banded, while all I have seen of the above two species are banded, and the epidermis polished. The aperture is about one-third the length of the shell. — *Lea.*

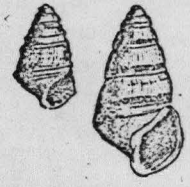
STERKIANA NO. 26, JUNE 1967

40. P. aratum, LEA.

Melania aratum, LEA, Philos. Proc. ii, p. 242, Dec., 1842. Philos. Trans. ix, p. 24. Obs., iv., p. 24. DEKAY, Moll. N. Y., p. 98. BROT, List, p. 30.
Melania exarata, LEA, Philos. Proc. ii, p. 14, Feb., 1841. Philos. Trans., viii, p. 183, t. 6, f. 44. Obs., iii, p. 21. TROOST, Cat. BINNEY, Check List, No. 101. CATLOW, Conch. Nomenc., p. 186.
Ceriphasia exarata, Lea, ADAMS, Genera, i, p. 297.
Trypanostoma cinctum, LEA, Proc. Acad. Nat. Sci., p. 112, 1864. Jour. Acad. Nat. Sci., vi, p. 147, t. 23, f. 60, 1867.

Description.—Shell carinate, conical, rather thick, black; sutures rather deeply grooved; whorls flattened, carinate; aperture small, at the base angular and channelled, dark within.

Fig. 188. Fig. 189.



Habitat.—Tennessee.

Diameter, ·28; length, ·57 of an inch.

Observations.—I received only two specimens of this species, both of which are decollated. It is perfectly distinct, and remarkable for its jetty hue, its carina and its deeply impressed sutures, which are caused by the carina.—*Lea.*

First described as *exarata*, which was preoccupied by Menke. I suspect that this species is identical with *Pl. gradatum*, Anthony, the latter being the adult form. The following is no doubt identical.

Trypanostoma cinctum.—Carinate, subfusiform, somewhat thick, dark horn-color; spire somewhat raised; suture impressed; whorls about seven, flattened; aperture rather small, rhomboidal, whitish within; outer lip acute and sinuous; columella thickened and twisted below.

Fig. 190.

Habitat.—North Alabama.

Diameter, ·32; length, ·65 inch.

Observations.—A single specimen only was received, and it was among several specimens of *Alabamense* (nobis), to which it is allied; but it is evidently a smaller species, with a comparatively shorter spire and with a more developed angle on the periphery, which is accompanied by a furrow. The angle on the lower whorl is cord-like, while on the upper whorls it is sharper and has the furrow deeper above. There are no colored bands on this specimen, and I suspect that it will be found to be generally if not always without them. The aperture is rather more than one-third the length of the shell.—*Lea.*

41. P. carinatum, LEA.

Trypanostoma carinatum, LEA, Proc. Acad. Nat. Sci., p. 4, 1864. Jour. Acad. Nat. Sci., vi, p. 148, t. 23, f. 62, 1867.

Shell carinate, acutely conical, reddish horn-color, thin, transparent; spire acutely conical and sharp at the point; sutures very much impressed; whorls about nine, carinate and striate above; aperture rather small and rhomboidal; outer lip acute, sinuous; columella somewhat thickened and twisted.

Fig. 191.

Habitat.—Bull Run, tributary to Clinch River, East Tenn.

Diameter, ·19; length, ·44 inch.

Observations.—Two specimens only were received, having somewhat the aspect of young shells, but I suspect they are nearly if not quite mature. It is evidently a delicate species. It has rather a wide channel, with the outer lip not much produced. In outline it resembles *Melania* (*Goniobasis*) *sculptilis* (nobis), but differs from it generically as well as in being shorter in the spire and in not having deep striæ over the whole of the whorls. The aperture is more than one-third the length of the shell.—*Lea.*

That this species *is* very young is evident, and I have a conviction that it will be found to be the quite young of *P. aratum*.

42. P. lativittatum, LEA.

Trypanostoma lativittatum, LEA, Proc. Acad. Nat. Sci., p. 273, 1862. Jour. Acad. Nat. Sci., v, pt. 3, p. 352, t. 39, f. 223. Obs., ix, p. 174.

Description.—Shell carinate, subattenuate, rather thin, shining, dark, broadly banded; spire conical; sutures linear; whorls about seven, flattened above, yellow at the base; aperture small, subrhomboidal, broadly banded within; outer lip sharp, sinuous; columella bent in, thickened below.

Fig. 192.

Habitat.—Chikasaha River, Alabama; W. Spillman, M. D.

Diameter, ·26; length, ·62 inch.

Observations.—This is a small, gracefully formed species, with a very broad, intensely brown band around the middle of the whorl. There is a second narrow band immediately under the suture. The

48 STERKIANA NO. 26, JUNE 1967

angle forming the carina is continued, is well defined on all the whorls, and immediately below it is a hair-like elevated line parallel to it. The area at the base of the columella is of a fine yellow, and contrasts sharply with the dark-brown band above. It is allied to *Chikasahaensis* (nobis), but differs in being more gracefully slender, having different bands and less impressed sutures. The aperture is about one-third the length of the shell. — *Lea.*

42 a. P. strictum, Lea.

Trypanostoma strictum, Lea, Proc. Acad. Nat. Sci., p. 272, 1862. Jour. Acad. Nat. Sci., v, pt. 3, p. 352, t. 39, f. 224. Obs., ix, p. 174.

Description.—Shell carinate, rather attenuate, thin, semi-transparent, pale horn-color, single banded; spire regularly conical; sutures linear; whorls about six, flattened above; aperture rather small, rhomboidal, whitish and single banded within; outer lip sharp, slightly sinuous; columella slightly bent in and twisted.

Fig. 193.

Habitat.—South Carolina; Prof. L. Vanuxem.

Diameter, ·24; length, ·60 inch.

Observations.—Among the numerous mollusca brought from the South long since by my friend, the late Prof. Vanuxem, I found a single specimen of this species, which is different from all others brought by him. I do not know from what part of South Carolina it came, but probably from Spartanburg District, as many of his specimens were there. This is a small, very regularly formed species, in general outline near to *lativittatum*, herein described, but totally different in the band, that species having it broad and dark while this is hair-like and pale. It is also more fusiform. The aperture is more than one-third the length of the shell. — *Lea.*

P. lativittatum has a line below the angle which this shell has not.

43. P. modestum, Lea.

Io modesta, Lea, Proc. Acad. Nat. Sci., p. 394, 1861. Jour. Acad. Nat. Sci., v, pt. 3, p. 348, t. 39, f. 216. Obs., ix, p. 170.

Description.—Shell smooth, conical, greenish horn-color; spire regularly conical; sutures impressed; whorls nine, flattened, angular

in the middle; aperture small, regularly rhomboidal; outer lip sharp and sinuous; columella white and very much twisted; canal short and effuse.

Habitat.—Tennessee River, Alabama? Wm. Spillman, M. D.

Diameter, ·39; length, ·88 inch.

Fig. 194.

Observations.—I have about a dozen of various ages before me. There is no variation in them, either in color or form, but some are slightly carinate towards the apex. None have bands. The channel is short and the outer lip flattened out, so that this species closely impinges on the auger mouthed *Melanidæ*. None before me have the least appearance of colored bands. It is allied to *Spillmanii*, herein described, but is a shorter shell and not so attenuate. The aperture is more than one-third the length of the shell. — *Lea.*

This is evidently a young shell, but whether a distinct species or not I cannot say.

44. P. Leaii, Tryon.

Io viridula, Lea, Proc. Acad. Nat. Sci., p. 394, 1861. Jour. Acad. Nat. Sci., v, pt. 3, p. 349, t. 39, f. 218. Obs., ix, p. 171.

Description.—Shell smooth, cylindrico-conoidal, greenish; spire somewhat raised; suture slightly impressed; whorls about nine, flattened, obtusely angular in the middle; aperture rather small, rhomboidal; outer lip sharp, sinuous; columella purple at the base, slightly twisted; canal short and dilate.

Fig. 195.

Habitat.—Coosa River, Alabama; Wm. Spillman, M. D.

Diameter, ·40; length, ·98 inch.

Observations.—There are three adult specimens before me. Neither has a perfect spire, but the upper whorls show slight carination. There are a few obscure transverse striæ below the angle of the last whorl. The general color is of a faded dark olive-green. Along the sutures the color is light. Within the aperture the color is dull purple in two specimens; in the third, there are four obscure, broad bands. The aperture is a little more than one-fourth the length of the shell. This species has so short a channel and so dilated an outer lip, that it is little removed from the group of *Melanidæ*, which has the auger-shaped aperture, and which I have called *Trypanostoma*. — *Lea.*

STERKIANA NO. 26, JUNE 1967

Figured from Mr. Lea's plate. The name *viridula* being preoccupied by Mr. Anthony, I gladly avail myself of the present opportunity to dedicate this species to a gentleman who by his immense labors conducted during a period of nearly forty years, has done more for the science of conchology than any other American naturalist. It is closely allied in form to *P. Tuomeyi*, Lea, but differs in the striate spire and in the form of the aperture strikingly. In the latter respect it presents rather an unusual type among the *Pleurocerœ*.

45. P. Tuomeyi, Lea.

Trypanostoma Tuomeyi, Lea, Proc. Acad. Nat. Sci., p. 171, 1862. Jour. Acad. Nat. Sci., v, pt. 3, p. 287, t. 36, f. 111. Obs., ix, p. 109.

Description.— Shell carinate, somewhat thick, high conical, dark brown; spire attenuate conical; sutures scarcely impressed; whorls about ten, flattened; aperture small, rhomboidal, very dark within; outer lip sharp, sinuous; columella a little thickened below and very much contorted.

Fig. 196.

Habitat.—North Alabama; Prof. Tuomey: Florence, Alabama; Rev. G. White.

Diameter, ·45; length, 1·23 inches.

Observations.—I have about a dozen specimens before me from the two habitats. In outline and size it is perhaps nearest to *Melania* (*Trypanostoma*) *elongata* (nobis) from West Tennessee, but it is easy to distinguish it from that species, by its being rather more slender and its being darker. In outline and color it is very close to *Melania* (*Trypanostoma*) *Brumbyi* (nobis), but it differs in the form of the mouth and in not being striate. The aperture is rather more than one-fourth the length of the shell. I have great pleasure in dedicating this species to my deceased friend, Prof. Tuomey, to whom I am greatly indebted for many new and interesting species collected by himself while engaged in his geological survey of the State of Alabama.— *Lea.*

Closely allied to *pyrenellum*, Conr., but differing in the better developed canal, etc.

46. P. gracile, Lea.

Io gracilis, Lea, Proc. Acad. Nat. Sci., p. 394, 1861. Jour. Acad. Nat. Sci., v, pt. 3, p. 349, t. 39, f. 217. Obs., ix, p. 171.

Description.— Shell smooth, conical, pale purple; spire regularly conical; sutures regularly impressed; whorls about nine, flattened, angular in the middle; aperture rather small, rhomboidal; outer lip acute and sinuous; columella pale purple, very much twisted and bent out; canal short and widely effuse.

Fig. 197.

Habitat.— Coosa River, Alabama; Wm. Spillman, M. D.

Diameter, ·36; length, ·90 inch.

Observations.— I have two adults before me. They are precisely alike, except that one has an obscure band visible in the inside. It is a graceful, symmetrical species, with a slight purplish tint which is stronger at the base than at the apex. It is allied to *Io Spillmanii* on one side and to *Io viridula* on the other, both herein described. The epidermis is rather more shining than usual, and the channel is short and wide. The upper part of the whorls, below the line of the suture, is lighter. The aperture is about one-third the length of the shell.—*Lea.*

The figure is from Mr. Lea's plate.

47. P. Spillmanii, Lea.

Trypanostoma Spillmanii, Lea, Proc. Acad. Nat. Sci., p. 173, 1862. Jour. Acad. Nat. Sci., v, pt. 3, p. 271, t. 36, f. 82. Obs., ix, p. 86.

Description.— Shell smooth, regularly conical, dark olive; spire much raised; sutures regularly impressed; whorls about nine, flattened; aperture rather small, rhomboidal, white within, sometimes banded; outer lip acute, sinuous; columella white and very much twisted.

Fig. 198.

Operculum ovate, reddish-brown, rather thin, with the polar point near the base.

Habitat.— Noxubee River, Mississippi; Wm. Spillman, M. D.: and Tennessee; J. Clark.

Diameter, ·46; length, 1·20 inches.

Observations.—Six specimens are before me, one of them is slightly carinate. In some there is a disposition to put on a whit-