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A

AMERICAN JOURNAL OF CONCHOLOGY.

VOLUME II.

EDITED BY

GEORGE W. TRYON, JR.,

Member of the Academy of Natural Sciences of Philadelphia; Corresponding Member of the Boston Society of Natural History, the New York Lyceum of Natural History, the California Academy of Natural Sciences, the Zoological-Botanical Society of Vienna, &c.

CONTAINING ARTICLES BY

WESLEY NEWCOMB, M. D.,
E. MICHENER, M. D.,
THOMAS BLAND,
T. A. CONRAD,

WM. M. GARR,
JOHN G. ANTHONY,
W. HARPER PEASE,
P. P. CARPENTER,

O. A. L. MORCH,
H. CROSSE,
F. DAULTE,
And the Editor.

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W. Newcomb

From a photograph for the American Journal of Conchology.

W. A. C. 2011. Tabaa.

A M E R I C A N

JOURNAL OF CONCHOLOGY.

VOL. II.

JANUARY 1, 1866.

No. 1.

DESCRIPTION OF A NEW AMERICAN SPECIES OF
HELIX.

BY WESLEY NEWCOMB, M. D.

HELIX IDAHOENSIS, Newcomb.—t. 1, f. 1, 2, 3.

Description.—II. testa profunde umbilicata, turbinato-conoidea, corneo-cinerea, apice obtusa; anfr. 5 rotundatis, quarum duobus primis laevibus vel minute oblique striatis, reliquis forte costatis; costis in anfr. ultimo 20 ad 26, albis; sutura bene impressa; apertura perobliqua, rotundata, que peristomate integro, simplici, non-reflexo.

Dimensions.—Diam. major .525 pol., minor .45 pol., axis .45 pol.

Locality.—Between Idaho City and Cour d'Alene Mining District, Idaho Territory, (H. Hemphill.)

Shell deeply umbilicate, turbinately conic, ashy horn-color, apex obtuse; whorls 5, rounded, the first two smooth, or minutely obliquely striated, the remainder strongly ribbed transversely, numbering on the last whorl 20 to 26, of a clear white color; suture well impressed; aperture very oblique and circular; lip entire, simple, not reflected.

My Cabinet. Cabinet of George W. Tryon, Jr.

Observations.—I know of no *Helix* with which this species can be compared. *H. cryptoportica*, Pfr., has comparatively more and finer ribs, with the shell of quite a distinct form. In the character of the ribs, standing out prominently on a ground of a darker color, the contrast and general appearance reminds one of some species of *Scalaria*. The nearest approach of any terrestrial species with which I am acquainted, in this respect, is *Bulimus Fairbanki*, Pfr., from Bombay.

The rounded whorls, circular mouth and strong ribs mark a new type of the genus for America.

ON AN ABNORMAL SPECIMEN OF PLANORBIS
BICARINATUS.

BY GEORGE W. TRYON, JR.

Plate 1, Fig. 4.

The shell figured, is in the collection of Charles M. Wheatley, Esq., of Phoenixville, Pa., and was collected by him at Mexico, Owego Co., N. Y. It has assumed a turbinate and scalariform shape, the spire being obtusely elevated, whorls very convex, with deep suture, and the upper carina strongly developed; at the base it is narrowly umbilicate, the umbilical region small, and bounded by the lower carina; the aperture is small, ovate, somewhat expanded, and much thickened within; owing to compression, the two extremities of the lip join upon the body, and are turned into the aperture, forming a strong rib, which revolves within the shell.

Numerous abnormal European Planorbis are illustrated in Hartmann's magnificent work, "Erd und Süsswasser Gastropoden der Schweiz," but the species are all small ones. This is the first American specimen which we have observed to deviate much from the normal form; reversed or scalariform shells being very much rarer in America than in Europe. Some of our species of *Limnæa* are sometimes slightly scalariform, and in the *Viviparidæ* this is more frequent, but the deviation has never been observed to be very great. *Melantho integra* and *decisa* are both occasionally met with, reversed. I believe that no scalariform *Helix* has been observed in the United States, and the reversed specimens known do not exceed ten or twelve.*

* See "Note on Variation in Species of *Helix* in Eastern North America," in "Remarks on Certain Species of North American Helicidæ," by Thos. Bland.-Annals of the Lyceum of Nat. Hist., New York, VII, 1862.

DESCRIPTIONS OF NEW FRESH-WATER SHELLS
OF THE UNITED STATES.

BY GEORGE W. TRYON, JR.

STREPOMATIDÆ.

1. *ANGITREMA WHEATLEYI*, Tryon.—t. 2, f. 1.

Description.—Shell conoidal, inflated, rather thin; spire conical, sharp pointed, suture not much impressed; whorls about 6, 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, sub-rhomboidal, half the length of the shell, somewhat attenuate below, columella nearly perpendicular, a little twisted. Bright horn-color, with four broad, equidistant brown bands.

Dimensions.—Length 25 mill., diam. 16 mill.

Habitat.—Elk River, at Winchester, Tenn., (C. M. Wheatley.)

My Cabinet. Cabinet of Charles M. Wheatley.

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.

2. *PLEUROCERA BICINCTUM*, Tryon.—t. 2, f. 2.

Description.—Shell elevated conical, somewhat cylindrical, thick, smooth and shining; spire elevated, obtuse, suture distinctly but not deeply impressed; whorls about 6, somewhat flattened, the last with an angular periphery, which is carinate, and a second carina, less distinct, below it; lines of

growth crowded, curved; aperture rhomboidal, rather narrow, terminating in a contracted fuse, outer lip very sinuous, curving forward towards the base, columella short and rounded. Bright olive-green, nearly orange beneath the suture; aperture and columella purple.

Dimensions.—Length (eroded) 19 mill., diam. 10 mill.

Habitat.—Bridgeport, Ala., (W. H. DeCamp.)

Cabinet of Charles M. Wheatly, Phœnixville, Penna.

Observations.—This species is closely allied to *Pl. aratum*, Lea, but differs in the position of the carinæ, the form of the aperture, etc. I do not know any other species with which it can be compared. I have seen only one individual, but the differences it exhibits are too marked to permit it to remain uncharacterized.

3. EURYCELON LEAH, Tryon.—t. 2, f. 3.

Description.—Shell conical, thick, shining; spire conical, obtusely elevated, suture moderately impressed; whorls about 6, slightly convex, everywhere covered with very fine close revolving striæ, somewhat shouldered beneath the suture and erimped, body whorl large, slopingly convex; aperture large, ovate, broad below. Wax-yellow or somewhat olivaceous, lighter beneath the the suture, white within.

Dimensions.—Length (eroded) 19 mill., diam. 13 mill.

Habitat.—Etowah River, Cartersville, Geo., (W. H. DeCamp.)

Cabinet of Charles M. Wheatley, Phœnixville, Penna.

Observations.—This species is somewhat like *Gon. luteola*, Lea, in color, striæ and texture, but differs in having tubercles, and in the form of the aperture. In *G. pergrata*, Lea, the striæ are coarser, and the tuberculations wanting. It is a very neat species, beautifully marked by the narrowly compressed numerous tubercles under the suture, and its close, waved revolving striæ.

4. GONIOBASIS UNdulATA, Tryon.—t. 2, f. 4.

Description.—Shell turritid, narrow, moderately thick; spire much elevated, acute, suture deeply impressed; whorls 9 to 10, somewhat convex, sloping, carinate just above the suture, with faint plications above the carina, crossed by raised revolving striæ, which extend over all the whorls, and number 9 on the body whorl; the revolving striæ, in crossing the ribs, appear undulated; aperture small, oval, a little angled at the base. Color dark brown, without bands.

Dimensions.—Length 19 mill., diam. 6·5 mill.

Habitat.—Georgia.

My Cabinet.

Observations.—This species belongs to the great group of tuberculate Goniobases so characteristic of the rivers of Georgia, among which may be named *G. Etowahensis*, *inclinans*, *papillosa*, *Postellii*, &c. It differs from all of them by its crisp, rigid appearance. It resembles somewhat, in form, *G. porrecta*, Lea, but is well distinguished by being a little wider, and by the striae being undulated above.

LYMNÆIDÆ.

5. PHYSA CONIFORMIS, Tryon.—t. 2, f. 5.

Description.—Shell obovate or somewhat cone-shaped, the spire very short, with an acute, black-tipped apex; body whorl round, shouldered above, inflated, but becoming narrower below, while the long, somewhat ear-shaped aperture is broadly rounded below, causing the shell to resemble strikingly in outline *Conus tulipa*, Linn.; whorls 5, the first ones minute; suture well impressed, lines of growth close and fine, surface polished, texture moderately thin, translucent. Color greyish-white, the lip slightly thickened and colored red; columella appressed, twisted and turned back at base, very much as in *Ph. venusta*, Lea, or *Ph. diaphana*, nob.

Dimensions.—Length 16 mill., diam. 9·5 mill., length of aperture 12 mill.

Habitat.—Humboldt River, Oregon, (W. M. Gabb.)

My Cabinet. Cabinet of Wm. M. Gabb.

Observations.—A very distinct species, of which I possess several specimens. It is well separated from all the numerous species inhabiting the Pacific States, by its peculiar form; the color, also, is rather unusual.

6. PHYSA OLEACEA, Tryon.—t. 2, f. 6.

Description.—Shell completely oval, with the outline of the spire not elevated above a continuation of the general curve of the body; spire very short, apex minute, suture linear, but margined; whorls 4, rapidly increasing, the last large, narrowly oval; aperture long and narrow, the lip much thickened within; columellar lip heavy, polished, slightly twisted and turned back; texture thin, diaphanous, surface almost unmarked by growth-lines, brilliantly polished, and bright oil-colored; columella tinged with pink, lip margined with dark red.

Dimensions.—Length 12 mill., diam. 7 mill.

Habitat.—Bridgeport, Ala., (Charles M. Wheatley.)
Lake Superior, (Jos. Leidy, M. D.)

My Cabinet. Cabinet of Mr. C. M. Wheatley, Phoenixville, Penna. Cabinet of the Academy of Natural Sciences, Philadelphia.

Observations.—This species, of which I have seen numerous examples, of all ages, is much shorter in the spire, more oval, and differently colored from *Ph. gyrina*, Say. *Ph. brevispira*, Lea, is differently colored and more inflated, and finally, *Ph. Primeana*, nob., is a smaller species, with distinct striae, longer spire, and more inflated. It is, I think, the most beautiful species of the genus yet detected in the United States.

New Localities for Physæ.

PHYSA BREVISPIRA, Lea. Buffalo, N. Y. W. S. Nason.
(Smithsonian Collection.)

“ NIAGARENSIS, Lea. Grand Rapids, Mich. C. M. Wheatley. (Coll. Wheatley and Tryon.)

“ GROSVENORII, Lea. Dayton, Nevada. C. M. Wheatley. (Coll. Wheatley and Tryon.)

“ PARVA, Lea. Little Valley, Nevada. C. M. Wheatley. (Coll. Wheatley and Tryon.)

“ WHITEI, Lea. Chattahoochie River, Columbus, Geo. (Coll. Wheatley and Tryon.)

“ GYRINA, Say. Carson, Nevada. C. M. Wheatley. (Coll. Wheatley and Tryon.)

This is a very large variety, distinguished by an unpolished epidermis, and rough, coarse growth-lines.

“ INTEGRAL, Hald. Rhode Island. (Coll. Tryon.)

I am not aware of this species having been noticed until now, in any other locality, except that of the description, Indiana.

“ NIAGARENSIS, Lea. Lake Superior. Joseph Leidy, M. D. (Coll. Tryon.)

This species may prove to be only a variety of *integra*, Hald.

DESCRIPTIONS OF NEW EXOTIC FRESH-WATER MOLLUSCA.

BY GEORGE W. TRYON, JR.

1. VIVIPARA SUPRAFASCIATA, Tryon.—t. 2, f. 7.

Description.—Globosc-conic, inflated, rather thin; spire elevated-conic, suture deeply impressed; whorls 5, very convex, the last large, with very fine growth-lines, obsolete revolving lines and slight malleations; umbilicus small, the shell subangular around it; aperture obliquely oval. Rather a brilliant green, with the spire, and body whorl above the aperture, traversed by dark green narrow bands, five or six in number, which are disposed to be alternately narrower.

Dimensions.—Length 25 mill., diam. 20 mill.

Habitat.—Tropical Australia.

My Cabinet. Cabinet of the Academy of Natural Sciences, Philadelphia.

Observations.—This species in the general form reminds one of *V. contacta*, Millet, or of *V. intertexta*, Say. From *V. Australis*, Reeve, it is easily distinguished. That species is narrower, appressed above, with only a few distant brown lines, and the whorls are not so globose. It does not answer at all to the description of *V. Waterhousei*, recently described from Australia.

2. HEMISINUS BINNEYI, Tryon.—t. 2, f. 8.

Description.—Shell ovate, somewhat thin; spire moderately elevated, apex obtuse, suture well impressed; whorls 5, a little convex, the last large, smooth; aperture more than half the length of the shell, angulate above and below, columella curved, slightly notched at the base. Bright olive, with four darker bands, of which the second is widest, and about fifteen revolving rows of small, numerous, transverse dark red dots; bands red within the aperture.

Dimensions.—Length 13 mill., diam. 7 mill.

Habitat.—New Grenada, (Wm. G. Binney.)

My Cabinet. Cabinet of the Academy of Natural Sciences, Philadelphia.

Observations.—This species is nearly related in form and coloring to *H. aspersus*, Reeve, from Brazil (= *osculati*, Villa), but the latter is spirally grooved, and is a more solid, ventricose shell.

3. *PHYSA* (*ISIDORA*) *HAINESII*, Tryon.—t. 2, f. 9.

Description.—Shell ovate, ventricose, moderately thick (for the genus); spire short, acute, suture very deeply impressed; whorls 3 to 4, very rapidly enlarging, extremely convex, the last bulbous, with very fine epidermal revolving lines; aperture broadly oval, well rounded above and below, columella lip almost equally curved with the outer one; a heavy callous deposit on the columella causes a continuous peritreme. Light horn-color.

Dimensions.—Length 9.5 mill., diam. 7 mill.

Habitat.—Australia, (W. Newcomb, M. D.) India? (W. A. Haines.)

My Cabinet. Cabinet of W. A. Haines, New York. Cabinet of Wesley Newcomb, M. D., Oakland, Cal.

Observations.—I cannot identify this species among those recently described from Australia, and its characters are so distinct that it cannot easily be confounded with any other. I am inclined to believe the locality India an error, because among the shells submitted to me by Mr. Haines, were a number of Australian, as well as Indian species.

4. *PHYSA* (*BULINUS*) *ACUTISPIRA*, Tryon.—t. 2, f. 10.

Description.—Shell cylindrically-ovate, elongated, very thin, transparent, highly polished; spire elevated, very acute, suture slightly impressed; whorls 5, oblique, slightly convex; aperture narrow-ovate, two-thirds the total length, columella a little folded, and somewhat turned back at the base. Very light horn-color.

Dimensions.—Length 12 mill., diam. 6 mill.

Habitat.—Australia, (W. A. Haines.)

My Cabinet. Cabinet of W. A. Haines, New York.

Observations.—May be compared to *Bulinus hypnorum*, Linn., of Europe, or *Ph. virginea*, Gould, of Oregon.

Among the species recently described in the "Zool. Proc. of London," I find none with which this can be identified.

5. *PLANORBIS ESPERANZENSIS*, Tryon.—t. 2, f. 11, 12, 13.

Description.—Shell small; whorls 3, high, obliquely convex very closely revolving; spire somewhat sunken above, shallow below; aperture long and very narrow, oblique. Dark horn-color, shining.

Dimensions.—Axis 1.5 mill., diam. 3 mill.

Habitat.—Esperanza, Cuba, (C. M. Wheatley.)

My Collection. Collection of Charles M. Wheatley, Phoenixville, Penna.

Observations.—This curious little species came along with *Pl. lucidus*, Pfr., with which it has probably hitherto been confounded. The *lucidus* is more wheel-shaped, much lighter in color, and the whorls do not revolve nearly so close one upon the other, consequently are all well exhibited, the spire occupying half the diameter; whereas in *Esperanzensis*, it does not comprise scarcely one-third. In the close revolution of the whorls, this species resembles *Pl. contortus*, Mich., of Europe, and in its form it is strikingly like the Indian *Pl. calathus*, Bens.

6. *PLANORBIS (PLANORBULA) BERENDTHI*, Tryon.—t. 2, f. 14, 15, 16.

Description.—Shell smooth, consisting of three orbicular volutions, increasing moderately in size; spire a little sunken, suture very distinct, below a little more shallow than above, but otherwise not differing; surface marked by growth-lines; aperture oval, slightly dilated, not extending either above or below, beyond the plane of the volutions, far within dentate, namely on the lip, three narrow, small, equidistant transverse lamellæ, and below them one large perpendicular lamina; on the body opposite, is a central curved transverse lamina, and a smaller one below it. Very light horn-color.

Dimensions.—Axis 2 mill., diam. 6 mill.

Habitat.—Vera Cruz, Mexico, (Berendt.)
Orizaba, Mexico, (Botteri.)

My Collection. Collection of Charles M. Wheatley, Phoenixville, Penna.

Observations.—A little less in size than *Pl. armigerus*, Say, and externally not unlike it, except in the color being much lighter, and the umbilicus much more shallow. The teeth are arranged very much in the same manner as in *armigerus*.

7. *LYMNEA WILSONII*, Tryon.—t. 2. f. 17.

Description.—Shell sinistral, sub-fusiform, thin; spire elongated, acute, suture deeply impressed; whorls 6, convex, oblique, rapidly increasing in size, the last narrowly oval; aperture sub-ovate, half the total length, narrow, columella a little twisted and reflected, leaving a narrow, deep umbilicus. Light amber-color.

Dimensions.—Length 22 mill., diam. 10 mill.

Habitat.—New Zealand.

My Cabinet. Cabinet of the Academy of Natural Sciences, Philadelphia.

Observations.—This is one of the finest of the few sinistral species. It may be compared with *L. Timorensis*, but that is a heavier species, more rugose, with the spire more obtuse, and not so convex.

Dedicated to the memory of the late Dr. Thomas B. Wilson.

LYMNEA CUBENSIS, Pfr. I. St. Croix. Dr. R. E. Griffith.
(Coll. Acad. Nat. Sciences.)

“ “ “ Terroya River, Vera Cruz, Mexico,
Strebel. (Coll. Wheatley and
Tryon.)

“ *MACROSTOMA*, Say, Mexico. Berendt. (Coll. Wheat-
ley.)

AMNICOLA CINCINNATIENSIS, Anth. Orizaba, Mexico. Bot-
teri. (Coll. Wheatley.)

DESCRIPTION OF A NEW SPECIES OF RISSOA.

BY GEORGE W. TRYON, JR.

RISSOA EXILIS, Tryon.—t. 2, f. 18.

Description.—Shell subulate, light brown, consisting of six convex volutions, with well-marked suture; aperture oval, proportionally very small; surface covered with slight revolving striae?

Dimensions.—Length $\cdot 135$ inch, diameter $\cdot 07$ inch; length of aperture $\cdot 04$ inch, breadth $\cdot 03$ inch.

Habitat.—San Diego, Cal., on salt water grass, (Dr. J. G. Cooper.)

My Cabinet.

Observations.—I find only a single specimen of this very distinct Rissoid among a lot of *R. Cooperi*, nob. There appear to be traces of revolving striae on this specimen, which is, unfortunately, not in good condition, being a dead shell.

ADDITION TO "CATALOGUE OF HELICES INHABIT-
ING THE WEST COAST OF NORTH AMERICA,
NORTH OF CAPE ST. LUCAS."*

BY WESLEY NEWCOMB, M. D.

New Localities.

4. HELIX TOWNSENDIANA, Lea.

Between Idaho City and Cour d'Alene Mining District,
Idaho Territory, (H. Hemphill.)

This is a small variety of the species.

6. HELIX CALIFORNIENSIS, Lea.

Monterey, Cal.

16. HELIX TUDICULATA, Binney.

Mountains of San Bernardino.

37. HELIX STRIGOSA, Gould.

Between Idaho City and Cour d'Alene Mining District,
Idaho Territory, (H. Hemphill.)

42. HELIX FULVA, Drap.

San Gorgonio Pass, Los Angeles County.

Additional Species.

44. HELIX ARBOREA, Say.

Los Angeles, Cal. British Columbia.

45. HELIX MINUSCULA, Binney.

San Bernardino Valley.

46. HELIX IDAHOENSIS, Newcomb.

Between Idaho City and Cour d'Alene Mining District,
Idaho Territory, (H. Hemphill.)

* This Journal, Vol. I., p. 342.

MONOGRAPH OF THE FAMILY STREPOMATIDÆ.

[Continued from p. 341, Vol. I.]

BY GEORGE W. TRYON, JR.

GONIOBASIS, Lea.

a. *Shell spirally ridged.*

1. **G. procissa**, *Anth.* Fig. 1. Ovate, thick, inflated; spire short, conical; whorls 5, convex, the last large, with five sharp, raised revolving carinæ, the two central ones more prominent; aperture small, round-ovate. Greenish or brownish. *N. Car.*

b. *Shell tuberculate or nodulous.*

2. **G. varians**, *Lea.* Figs. 2, 3. Cylindrically conical; smooth, plicate or striate, thick; spire raised, suture impressed; whorls 7, shouldered, and frequently tuberculate; aperture small, elliptical, narrow at base. Yellowish or brownish, sometimes banded. *Coosa River, Ala.*

3. **G. Hydeii**, *Conr.* Fig. 4. Elevated, conical; spire elevated, suture slightly impressed; whorls about 7, flattened, the last rounded below the periphery, with three or four acute spiral lines of tubercles on the upper portion of the whorl, and one or two rows on the spire; aperture elliptical. Brownish, sometimes with green bands. *Black Warrior River, Ala.*

4. **G. decorata**, *Anth.* Figs. 5, 6, 7. Sub-fusiform; spire elevated, suture impressed; whorls 6, last very large, covered with transverse rows of tubercles, the lines towards the base less tuberculate; aperture large, rhomboidal. Yellowish or dark brown, frequently with several dark bands. *Geo. and E. Tenn.*

Fig. 5 represents *G. decorata*, *Anth.*, the young shell; Fig. 6 is *G. granulata*, *Lea*, a half-grown shell, and Fig. 7 is *G. Tryoniæna*, *Lea*, the adult.

5. **G. cælatura**, *Conr.* Fig. 8. Sub-fusiform; spire obtusely elevated, suture impressed; whorls 6, slightly convex, the last large, with obscure longitudinal ribs, and numerous unequal, prominent revolving lines, sub-nodulous where they cross the ribs; aperture rather large, oval. Reddish brown, sometimes banded. *Geo.*

Narrower, with closer striae, and not so tuberculate as *decorata*.

6. **G. occata**, *Hinds*. Fig. 9. Ovate, rather thin; spire obtuse; whorls few, rounded, grooved, with sharp ridges, elevated into frequent irregular, sharp, acute tubercles. Brownish, the ridges marked internally with narrow brown bands. *California*.

7. **G. Albanyensis**, *Lea*. Fig. 10. Conical, rather thin; spire sub-elevated, suture irregularly impressed; whorls 6, planulate, those of the spire plicate, with revolving granulate lines throughout; body whorl convex; aperture moderate, sub-rhomboidal, a little sinuous below. Yellowish-olive. *Albany, Baker Co., Geo.*

8. **G. Stewardsoniana**, *Lea*. Fig. 11. Sub-fusiform, thick, shining; spire very obtuse, suture impressed; whorls slightly convex, the last large, transversely striate, somewhat granulate; aperture very large, oval. Dark green or brown. *Knoxville, Tenn.*

Very closely allied to No. 5 (Fig. 8), but is thicker, smaller, without bands, and generally of a peculiar dark green color.

9. **G. flavescens**, *Lea*. Fig. 12. Sub-cylindrical, thick; spire obtusely conical, elevated, suture irregularly impressed; whorls about 5, slightly convex, the last very large, folded, closely striate, and slightly granulate; aperture large, rhomboidal. Light yellowish, white, or tinged with pink or numerous pink-banded within. *Oconee and Tennessee Rivers, E. Tenn.*

Narrower, more finely striate, and much lighter color than *calatura* (No. 5, Fig. 8).

10. **G. catenaria**, *Say*. Figs. 13, 14, 15. Elongate, conoidal; spire conical, with a carinated angle above the suture, obscurely longitudinally ribbed; ribs crossed by several revolving lines, and terminating in tubercles on the body whorl; aperture small, elliptical. Brownish. *S. Car. Geo.*

Fig. 13 is *catenaria*, from one of Say's type specimens; Fig. 14 is a half-grown, and Fig. 15 the adult (and typical) *sublirata*, Conr.

11. **G. catenoides**, *Lea*. Figs. 16, 17, 18, 19. Elevated conical; spire elevated; whorls flattened, suture well impressed; body whorl large, inflated, angulate in middle; whorls with longitudinal ribs, terminating tuberculately upon the periphery of each whorl, and with close revolving striae; aperture small, ovate. Light brownish, the revolving hair-like striae of darker color. *Chattahoochee River, Geo.*

11a. **G. viridostriatus**, *Lea*. Fig. 20. Fusiform, rather thin: spire obtusely conical, suture irregularly impressed; whorls 5, somewhat flattened, the last convex, slightly plicate, and covered throughout with raised granulate revolving striae; aperture rather small, sub-rhomboidal, columella inflected and contorted. Yellowish-olive, the striae dark green, and visible within the aperture. *Flint River, Geo.*

The ornamentation of this species is very peculiar, and reminds one of exotic species.

12. **G. Etowahensis**, *Lea*. Fig. 21. Turrited, thin, plicate, tuberculate: spire elevated, suture irregularly much impressed; whorls 7, all carinate, with compressed tubercles on the periphery, striate below; aperture small, rhomboidal. Brownish. *Lake Monroe, Fla. Etowah and Tennessee Rivers, Geo.*

13. **G. Hallenbeckii**, *Lea*. Fig. 22. Turrited, thin, irregularly plicate, tuberculate; spire subulate, suture much impressed; whorls 8, somewhat convex, carinate in the middle, with compressed tubercles where the plications terminate on the carina, below with several revolving striae. Pale horn-color or olivaceous, sometimes banded. *Geo.*

Larger, more tuberculate, and with more elevated spire than the next.

14. **G. Boykiniana**, *Lea*. Figs. 23, 24, 25, 26. Elevated, somewhat turrited; spire conical, suture well impressed; whorls 7—8, sloping, flattened, strongly angled in the middle, angle visible on the spire, somewhat tuberculate, with longitudinal plicae above, and revolving lines below. Brownish or olivaceous, sometimes banded. *Geo.*

A variable species, but always distinguished from the last, among other differences, by its flattened whorls.

15. **G. Bentoniensis**, *Lea*. Fig. 27. Conical, elevated; spire raised, suture very much impressed; whorls 7, slightly convex, carinate, folded above, striate below the carina; aperture rather small, ovate, narrow below. Greenish horn-color, not banded. *Benton Co., (?) N. Ala.*

Closely allied to, if not identical with No. 14.

16. **G. papillosa**, *Anth.* Figs. 28—30. Sub-turrited, thin; spire conical, suture irregularly impressed; whorls 7, sub-carinate, decussated into tuberculations, coloring the surface above the periphery, with several striae below. Pale brown, not banded. *Etowah River, Geo. Fla.*

Figs. 28, 29 represent *papillosa*, the latter being from the type; Fig. 30 is *Dornicana*, *Lea*.

17. **G. Couperii**, *Lea*. Fig. 31. Turrited, thin; spire elevated, suture much impressed; whorls 7, narrow, sub-carinate, with raised revolving striae all over, plicate above the periphery, and slightly tuberculate at the termination of the plications. Dark brown, with a broad band at base. *Etowah River, Geo.*

18. **G. inclinans**, *Lea*. Fig. 32. Subulate, thin; spire sub-attenuate, apex acute, suture furrowed: whorls 8, flattened, covered with many oblique folds, not carinate, with revolving striae; aperture very small, oval. Brownish, lighter below the suture, obscurely banded. *Geo. and N. Ala.*

19. **G. Postellii**, *Lea*. Fig. 33. Attenuately conical, rather thin; spire elevated, suture irregularly impressed; whorls 8, flattened, granulate above, striate below the periphery. Yellowish-olive, the striae frequently forming bands within the aperture. *Altamaha River, Geo.*

20. **G. arachnoidea**, *Anth.* Figs. 34, 35. Attenuately conical, rather thin; spire narrowly elevated, suture much impressed; whorls 12, convex, strongly striated throughout, carinated, and above the carina obscurely plicate, the plications more distinct towards the apex; the periphery is sometimes obscurely flattened. Light horn-color, not banded. *Tenn.*

Fig. 35 is *intertexta*, *Anth.*

21. **G. Conradi**, *Brot.* Fig. 36. Attenuately conical, rather thin; spire elevated, suture slightly impressed; whorls 9, nearly flat, with slightly curved ribs, interrupted near the suture by a revolving granulated line, ribs on the body whorl becoming obsolete above the periphery. Reddish-brown. *Savannah River, Geo.*

22. **G. carinifera**, *Lam.* Figs. 37—41. Elevated, moderately thick; spire raised, suture well impressed: whorls 7, convex, flattened generally upon the periphery, those of the spire somewhat carinate, with a line of bead-like tubercles revolving below the suture. Brownish or olivaceous. *Yadkin River, S. Car. Geo. N. Ala.*

Fig. 37 represents the type; Fig. 38 is an enlarged outline; Fig. 39 is *bella*, *Conr.*; Fig. 40 is *percarinata*, *Conr.*; Fig. 41 is *nebulosa*, *Conr.*

130. **G. vittata**, *Anth.* Fig. 42. Sub-turritid, moderately thick; spire elevated, suture well impressed: whorls 9, slopingly flattened, biangulate in the middle, obsolete granulate below the suture. Yellowish-brown, with dark, narrow, revolving bands. *Ala.*

Perhaps a var. of *carinifera*.

22a. **G. abbreviata**, *Anth.* Figs. 43—45. Ovate-cylindrical, small, thick; spire convex, short, conical; whorls 5—6, the last large, cylindrical; with large tubercles upon the spire and shoulder of the last whorl. Dark horn-color or greenish, with a yellowish central broad revolving band, or two brown bands, or without bands. *Ky. Tenn.*

Fig. 43 represents the type; Fig. 44, *elegantula*, *Anth.*; Fig. 45, *abbreviata*, *Anth.*

22b. **G. vesicula**, *Lea*. Fig. 46. Elliptical, thin; spire very short, obtuse, suture not very distinct; whorls 3, somewhat convex, obscurely tuberculate above; aperture large, long-ovate. Yellow, not banded, salmon-color within. *Ala.*

c. *Shell plicate.*

23. **G. obesa**, *Anth.* Fig. 47. Globosely-ovate, solid; spire short, conical, rather immersed, suture slightly impressed; whorls 5, slopingly rounded, obsoletely plicate, the last very large, spirally ridged towards the base. Fulvous, with obscure, narrow, olive-green bands. *Ala.*

24. **G. blanda**, *Lea*. Fig. 48. Obtusely fusiform, obtusely conical above, rather thin; spire very obtuse, suture impressed; whorls 5, flattened above, obscurely folded, the last large, sub-angular; aperture rather large, elliptical. Dark horn-color, yellowish-white within. *Yellow Leaf Creek, Ala.*

26. **G. æqualis**, *Hald.* Fig. 49. Short conical, thick; spire conical, suture slightly impressed; whorls 5, sloping, flatly convex, longitudinally folded, the last large, angulate on the periphery; aperture narrow elliptic, as long as the spire. Reddish-brown. *Notchucky River, Tenn.*

27. **G. semigradata**, *Reev.* Fig. 50. Pyramidally conical, thick; whorls 5—6, flatly sloping, and sharply angulate and carinate; first few whorls plicate, the last with two carinae; aperture ovate, a little effused at base. Fulvous olive, with a green band. *Ala.*

28. **G. carinocostata**, *Lea*. Figs. 51—54. Elevated conical, rather thin; spire elevated, suture sulcate; whorls 7, flattened, carinate and plicate, plicæ not reaching to middle of body whorl. Wax-yellow to dark brown, whitish or brownish within, sometimes banded. *Tenn. Ala. Geo.*

Fig. 51 represents the type; Figs. 53 and 54 are *scabrella*, *Anth.*, younger shells.

28a. **G. strenua**, *Lea*. Fig. 55. Sub-fusiform, rather thin; spire raised, suture very much impressed; whorls 7, convexly flattened; distantly folded on the spire, and carinate above the suture; body whorl convex, without folds or carina. Brownish-olive or yellowish horn-color, white or brownish within. *Benton County, N. E. Ala.*

28b. **G. perstriata**, *Lea*. Fig. 57. Acutely conical, rather thin; spire elevated, somewhat attenuate, at the apex carinate and granulate, suture deeply impressed; whorls 7, convex, striate, the last not angled; aperture small, elliptical. Cinnamon-brown. *Cossa River, Ala.*

28c. **G. Smithsoniana**, *Lea*. Fig. 58. Fusiform, somewhat thick, mucronate; spire obtusely conical, plicate, suture impressed; whorls 7, planulate, angulate above the suture, the last large and somewhat obscurely angulate; aperture rather large, sub-rhomboidal, a little effused at base. Dark horn-color, whitish within. *N. Geo. E. Tenn.*

28d. **G. Emeryensis**, *Lea*. Fig. 59. Sub-fusiform, rather thin; spire obtusely conoidal, suture irregularly impressed; whorls 6, planulate, above distantly plicate, body whorl smooth, obsolete angulate in the middle; aperture rather large, sub-rhomboidal. Dark olive, without bands, bluish-white within. *Rocky Creek, branch of Emery Run, E. Tenn.*

29. **G. Lecontiana**, *Lea*. Fig. 60. Conical, thick; spire obtusely elevated, suture slight; whorls 6, flattened, with somewhat curved folds; aperture large, elliptical. Horn-color, bluish within. *Geo.*

31. **G. obtusa**, *Lea*. Figs. 61, 62. Sub-fusiform, somewhat thick, inflated; spire very obtuse, suture irregularly impressed; whorls 5, slightly convex, cancellate above; aperture very large, ovately rhomboidal. Yellowish horn-color, white within. *Tenn. Geo.*

Fig. 62 represents *G. cadus*, *Lea*.

32. **G. amœna**, *Lea*. Fig. 63. Sub-fusiform, thick; spire obtusely conical, suture irregularly impressed; whorls 6, somewhat convex, folded, striate at the apex; aperture large, ovately rhomboidal. Pale chestnut-color, without bands, whitish within. *N. Ala.*

33. **G. Tuomeyi**, *Lea*. Fig. 64. Fusiform, rather thick; spire obtusely conical, the first few whorls closely plicate, suture impressed; whorls 6, flattened above, the last ventricose, smooth; aperture large, rhomboidal, columella twisted. Yellowish-olive, with or without bands. *N. Ala.*

35. **G. interveniens**, *Lea*. Fig. 65. Conical, rather thin; spire obtusely conical, suture irregularly and very much impressed; whorls 6, flattened, with distant large curved folds, becoming obsolete towards the middle of the body whorl. Dark horn-color or brown, double-banded or without bands; white, brown, or banded within. *N. Ala.*

36. **G. olivella**, *Lea*. Fig. 66. Fusiform, rather thick; spire obtusely conical, suture irregularly very much impressed; whorls 5, somewhat convex, shining, folded; folds decussated just below the suture. Olivaceous, without bands, white within. *Tenn.*

37. **G. interrupta**, *Habl.* Figs. 67—72. Fusiform, rather thick, inflated; spire obtusely conical, suture impressed; whorls 5, slightly convex, either folded, striate or granulate. Yellowish-olive, with or without bands. *Tenn. Cherokee Co., N. C.*

Fig. 71 is *Chrysty*, *Lea*; Fig. 72 is *G. instabilis*, *Lea*.

38. **G. crispa**, *Lea.* Fig. 73. Fusiform, rather thick; spire obtuse, suture much impressed; whorls 6, convex; folded and closely transversely striate or crispate. Yellowish, not banded, whitish within. *Florence, Ala.*

39. **G. formosa**, *Conr.* Figs. 74, 75. Sub-fusiform, rather thin; spire elevated, suture well impressed; whorls 6, convex, with distant robust rounded ribs; two approximate lines revolve below the suture, and the base is profoundly striated. Olivaceous, with distant brown bands. *Tenn. N. Ala.*

Fig. 75 is *G. ornatella*, *Lea.*

40. **G. mediocris**, *Lea.* Fig. 76. Sub-fusiform, rather thin; spire conical, suture irregularly impressed; whorls 6, flattened, distantly folded. Ash-color, shining, banded. *Tenn.*

Narrower, less folded, and differently colored from *G. formoso*.

42. **G. Duttonii**, *Lea.* Fig. 77. Conoidal, thick; spire conoidal, suture irregularly impressed; whorls 7, rapidly increasing, somewhat convex, with small close folds. Pale reddish-yellow, not banded, or with two distant broad bands, white and banded within. *Mauvy Co., Tenn. Grayson Co., Ky.*

43. **G. laqueata**, *Say.* Figs. 78—81. Conoidal, moderately thick; spire elevated, apex acute, suture well impressed; whorls 7, convex, with regular, somewhat curved ribs, becoming obsolete towards the middle of the body whorl; aperture large, columella a little curved at the base, and produced. Yellowish, with generally two brown bands. *Tenn.*

Fig. 81 is *G. monozonalis*, *Lea*, a young individual.

44. **G. Pybasii**, *Lea.* Fig. 82. Elevated, thin; spire attenuate, sharp-pointed, suture impressed; whorls 7, flatly convex, distantly folded, folds scarcely apparent on body whorl. Yellowish, with generally 4 bands, the two middle ones approximate. *Tuscumbia, Ala.*

45. **G. induta**, *Lea.* Fig. 83. Elevated conical, rather thin, polished; spire conoidal, sharp-pointed, suture much impressed; whorls 8, flatly convex, with erect folds, becoming obsolete towards the middle of the body whorl; aperture small, a little narrowed at base. Dark brown, 4-banded. *Vienna, Dooly Co., Geo.*

46. **G. versipellis**, *Anth.* Fig. 84. Ovately conical, somewhat thin; spire short, conical, acute, suture slightly impressed; whorls 7, flattened, with straight small folds, sometimes striate, body whorl bulbous, inflated; aperture elliptical. Horn-color, with generally two approximate central narrow bands. *Tenn.*

More inflated, with more numerous whorls (for its size) than *G. laqueata*.

47. **G. gracilis**, *Lea.* Fig. 84a. Club-shaped, rather thin; spire elevated, acute, suture well impressed; whorls 8, convex, the first few with slight fine plications. Horn-color, not banded. *Tenn.*

48. **G. paucicosta**, *Anth.* Fig. 85. Elevated conical, thick, shining; spire elevated, apex acute; suture well impressed; whorls 8—9, convex, with distant, prominent, much curved, rugose plications. Dark greenish, livid within. *Tenn.*

49. **G. tenebrosa**, *Lea.* Fig. 86. Conical, thick; spire rather elevated, suture impressed; whorls 7, flattened, the first few folded. Nearly black, bluish within. *Tenn.*

50. **G. coracina**, *Anth.* Figs. 87, 88. Conically turritid, narrow, thin, shining; whorls 6—7, flat, plicate, plicæ extending to middle of body whorl. Dark purplish-black, purple within. *Cuny Fork, Tenn.*

Fig. 88 is *G. Sellersiana*, *Lea.*

51. **G. intersita**, *Habl.* Fig. 89. Conic, moderately thick; whorls convex, plicate, with a decussating line below the suture. Olivaceous. *Swan Creek, Ind.*

52. **G. columella**, *Lea.* Fig. 90. Conical, rather thin; spire somewhat elevated; whorls 6, slightly convex, narrow, obscurely plicate, striate towards the apex, the last one smooth; aperture small, elliptical, angular at base. Horn-color, whitish within. *Tenn.*

53. **G. blanda**, *Lea.* Fig. 91. Conical, rather thin, shining; spire rather elevated, striate towards the apex; whorls 7, flattened, folded; aperture small, elliptical, angular at base. Horn-color, whitish within. *Tenn.*

More folded than *G. columella*, with a different aperture.

54. **G. nitens**, *Lea.* Fig. 92. Conical, thick, shining; spire obtuse, suture moderately impressed; whorls 7, flatly convex, folded, folds extending to middle of body whorl; aperture small, slightly angular at base. Dark brown, reddish within. *Tenn.*

55. **G. mutata**, *Brot.* Fig. 93. Elevated conical, thick; spire elevated; apex acute, suture moderately impressed; whorls 7, flatly convex, the first few plicate, transversely ridged, becoming obsolete towards the aperture. Dull olive. *Tenn.*

56. **G. suturalis**, *Hald.* Fig. 94. Conical, moderately thick; spire elevated, suture well impressed; whorls 6, flat, angled just above the suture, and on the periphery, the superior portion plicate, carina bordered by a raised line, which is double on the body. Dark olivaceous, banded, white within. *Ohio?*

This species appears to be identical with *G. mutabilis*, but cannot be the same if the locality is correct.

57. **G. mutabilis**, *Lea.* Fig. 95. Conical, somewhat thick; spire conical, suture well impressed; whorls 6, flattened, carinate and striate, the first ones plicate; aperture rhomboidal; narrow below, columella twisted. Yellowish-green, with or without four bands. *Butts Co., Geo.*

58. **G. Viennaensis**, *Lea.* Fig. 95a. Sub-fusiform, rather thin; spire regularly conical, suture irregularly impressed; whorls 7, flattened, distantly folded, the last whorl large; aperture rather large, rhomboidal. Olivaceous, bluish white within. *Vienna, Dooly Co., Geo.*

59. **G. Curreyana**, *Lea.* Figs. 96, 97. Conical, rather thick; spire somewhat elevated, suture irregularly impressed; whorls 7, rather convex, all of them with few, sharp, curved folds; aperture small, angular below. Horn-color, not banded. *Barren River, Ky.*

60. **G. costifera**, *Hald.* Fig. 98. Lengthened, conical; spire elevated, suture well impressed; whorls 8, slightly convex, covered with moderate sized, low, rounded ribs, decussated below the suture by spiral lines. Light horn-color. *Hennepin, Ills.*

61. **G. Deshayesiana**, *Lea.* Figs. 99—101. Elongate conical, thin; spire elevated, suture impressed; whorls 8, somewhat convex, rather closely folded, and decussated by spiral lines below the suture. Dark horn-color. *Tenn.*

62. **G. Abbevillensis**, *Lea.* Fig. 102. Conical, rather thick, shining; spire conical, suture linear; whorls 7, flatly convex, the last large, those of the spire prominently folded, the first few carinate and striate. Chestnut-color, somewhat ochraceous within. *Abbeville District, S. C.*

63. **G. Doolyensis**, *Lea.* Fig. 103. Cylindrically conical, thin; spire elevated, much drawn out, suture irregularly impressed; whorls 9, a little convex, closely folded; aperture very small, columella much twisted. Dark horn-color, or ash-grey. *Tenn. Vienna, Dooly Co., Geo.*

64. **G. inconstans**, *Lea.* Fig. 104. Sub-fusiform, rather thin; spire obtusely conical, suture impressed; whorls 6, somewhat convex, folded above. Horn-color, olivaceous or dark brown, sometimes banded, white or pale purple within. *Etowah River, Geo.*

65. **G. continens**, *Lea*. Figs. 105, 106. Conical, rather thin; spire irregularly conical, suture impressed; whorls 7, somewhat convex, those of the spire with curved folds. Yellowish horn-color, not banded, bluish-white within. *N. Ala.*

Fig. 106 is *G. proletaria*, *Lea*.

66. **G. viridicata**, *Lea*. Fig. 107. Elongate conical, thin; spire conical, exserted, suture impressed; whorls 7, somewhat convex, those of the spire rather closely folded. Greenish, not banded, bluish-white within. *Grayson Co., Ky.*

67. **G. purpurella**, *Lea*. Fig. 108. Conical, thin, shining; spire conical, suture impressed; whorls 7, slightly convex, folded, and decussated by a single line below the suture. Purplish, sometimes banded, dark within. *Cany Fork River, Tenn.*

68. **G. semicostata**, *Conr.* Fig. 109. Conical, somewhat thick; spire elevated, suture impressed; whorls 6, convex, finely spirally striate, those of the spire folded; body whorl without ribs, obscurely striate above, sub-biangular in the middle. Dark horn-color, banded, bluish-white within. *N. Ala.*

69. **G. dislocata**, *Rav.* Fig. 110. Conical, rather thick; spire elevated, suture well impressed; whorls convex, those of the spire rudely ribbed. Light yellow. *Dan River, N. C.*

69a. **G. Lindsleyi**, *Lea*. Fig. 111. Cylindrically conical, rather thin; spire conoidal, suture very much impressed; whorls flatly convex, with erect folds. Yellowish horn-color, not banded, bluish-white within. *Tenn.*

Narrower, and more ribbed than *G. dislocata* (No. 69).

70. **G. paupercula**, *Lea*. Fig. 112. Sub-cylindrical, rather thin; spire rather short, suture impressed; whorls somewhat convex, those of the spire folded, striate at the apex. Chestnut-color or dark-olive, not banded, whitish within. *N. Ala.*

71. **G. corneola**, *Anth.* Fig. 113. Conical, very thin; spire short, suture not much impressed; whorls 6, somewhat flat, folded, with revolving, raised striae. Light horn-color, with sometimes four or five narrow bands. *Cosa River, Ala.*

Undoubtedly a quite young shell.

* 72. **G. nassula**, *Conr.* Figs. 114—116. Conical, somewhat thin; spire elevated, suture irregularly impressed; whorls 8, rather flattened, covered with close, raised striae, crossing distant distinct ribs. Yellowish-brown. *Tuscumbia, Ala.; Cany Fork, Tenn.*

~ Fig. 116 represents *G. Edgardiana*, *Lea*.

74. **G. rugosa**, *Lea*. Fig. 117. Conical, rather thin, translucent; spire elevated conical, suture very much impressed; whorls 7, very convex, with close, erect ribs, crossed by slight striae, ribs terminating at a raised line on the periphery; aperture angular below. Horn-color, whitish within. *Tenn.*

75. **G. costulata**, *Lea*. Fig. 118. Conical, rather thin; spire lengthened, carinate above, suture impressed; whorls 9, rather convex, with much curved, rounded folds; aperture small, sub-rhomboidal, angular below. Yellowish, bluish within. *Tenn.*; *Barren River, Ky.*

76. **G. cinerella**, *Lea*. Fig. 119. Sub-fusiform, thin; spire obtusely conical, suture irregularly impressed; whorls 6, slightly convex, with close folds, decussated by two lines below the suture. Ash-color, not banded, whitish within. *Tenn.*

78. **G. caliginosa**, *Lea*. Fig. 120. Conical, somewhat thick: spire elevated, suture irregularly impressed; whorls 8, rather convex, cancellate throughout by distant nearly equal longitudinal and transverse plications. Dark brown, purple within. *Tenn.*

79. **G. nodulosa**, *Lea*. Fig. 121. Conical, thick; spire elevated, suture irregularly impressed; whorls 7, rather flattened, closely cancellate, the last large; aperture rather large, sub-angular below. Dark brown, bluish within. *Tenn.*

81. **G. difficilis**, *Lea*. Fig. 122. Lengthened, conical, rather thin; spire attenuate, suture moderate; whorls 8, slightly convex, the upper ones obsolete plicate. Dark olive or brownish, not banded, white within. *Tenn.*

82. **G. sparus**, *Lea*. Figs. 123, 124. Lengthened conical, somewhat thick: spire attenuate, suture irregularly impressed; whorls 8, convex, the upper ones with small curved folds, decussated by a revolving line below the suture. Pale yellow, not banded. *Duck Creek, Tenn.*

Fig. 124 is *G. cerea*, *Lea*.

83. **G. Thorntonii**, *Lea*. Fig. 125. Conoidal, rather thin; spire conical, suture much impressed; whorls slopingly convex, with distant prominent bent folds, ending in nodes on the periphery. Horn-color, not banded. *Tuscumbia and Florence, Ala.*

84. **G. cancellata**, *Say*. Rather slender, attenuated; whorls convex, with about 26 longitudinal, crossed by 18 revolving lines, those towards the base crowded. *Florida.*

I have not seen this species, and it has never been figured.

x 85. **G. circincta**, *Lea*. Fig. 126. Turrated, rather thin; spire drawn out, suture slight; whorls 9, slightly convex, centrally carinate, striate, the first few plicate. Pale yellow, banded. *Tenn.*

86. **G. athleta**, *Anth.* Figs. 127—129. Conical, nearly smooth, rather thick; spire much elevated, suture moderate; whorls 10, nearly flat, with faint ribs, more prominent on the upper ones. Dark horn-color or greenish, white within. *Tenn.*

Fig. 128 is *G. glauca*, *Anth.*, and Fig. 129 is *G. Lyonii*, *Lea*.

87. **G. curvicostata**, *Anth.* Figs. 130, 131. Turrated, thick; spire much elevated, suture slightly impressed; whorls 8, slightly convex, with strong, curved costæ. Burnt-olive, purplish within. *Florida.*

Fig. 131 is *G. densecostata*, *Reeve*.

88. **G. striatula**, *Lea*. Fig. 132. Conical, rather thin; spire somewhat elevated, suture impressed; whorls 8, convex, closely striate, carinate above and plicate. Dark brown, reddish within. *Tenn.*

89. **G. tripartita**, *Reeve*. Fig. 133. Acuminately conical, somewhat thick; spire elevated, suture moderate; whorls 9, moderately rounded, distantly spirally ridged; the first few whorls strongly carinated, then plicate, and afterwards smooth. Olive. ?

90. **G. decora**, *Lea*. Fig. 134. Acutely turrated, rather thin; spire acute, elevated, suture impressed; whorls 9, rather flattened, with close ribs and striæ on all but the two lower whorls. Horn-color, whitish within. *Green River, Ky.; Tenn.*

91. **G. crebricostata**, *Lea*. Fig. 135. Elevated conical, rather thick; spire much elevated, suture linear; whorls 7, flattened, covered with close, slightly curved folds; aperture small, elliptical, angular below. Horn-color, bluish within. *Robinson Co., Tenn.*

< 92. **G. comma**, *Comr.* Fig. 136. Subulate, much elongated, slender; whorls 8 or 9, flattened, suture much impressed, with longitudinal, distant, slightly arcuated ribs, disappearing on the lower whorls; aperture small, rhomboidal, angular below. Olive, with a dark band above the middle. *Black Warrior River, Ala.*

93. **G. acuta**, *Lea*. Fig. 137. Acutely turrated, thin; spire elevated, acute, suture moderate; whorls 8, flattened, carinate immediately above the suture, the first few plicate, striate; aperture small, acutely angular at base. Horn-color. *Tennessee River.*

94. **G. subcylindracea**, *Lea*. Fig. 138. Sub-cylindrical, elongated, somewhat thick; spire obtusely elevated, suture impressed; whorls 8, convex, the first few slightly plicate, the others smooth; aperture small, ovate. Horn-color, whitish within. *Tenn.*

95. **G. baculum**, *Anth.* Fig. 139. Sub-cylindrical, thick; spire elevated, suture well impressed; whorls about 10, flattened, all but the two last with straight folds; aperture small, ovate, angular at base. Reddish-brown, with a light line below the suture, light red within. *Tenn.*

96. **G. concinna**, *Lea*. Fig. 140. Sub-cylindrical, thin; spire drawn out, suture impressed; whorls 9, flattened, the upper ones closely folded and carinate; aperture small, angular at base. Brown, whitish within. *Tenn.*

I doubt whether this is really distinct from No. 95.

97. **G. eliminata**, *Anth.* Fig. 141. Conical, narrow, thin; spire slender, elevated, suture impressed; whorls 8, somewhat flattened, carinate above the suture, with revolving lines on and above the carina, the upper whorls obscurely folded; aperture small, angular at base. Brown. *Owensboro, Ky.*

98. **G. teres**, *Lea*. Figs. 142, 143. Acutely turritid, thin; spire drawn out, suture impressed; whorls 9, convex, slowly increasing, the upper ones folded; aperture small, elliptical. Horn-color, white within. *Tenn.*

Fig. 143 represents *G. terebralis*, *Lea*, a shell not quite adult.

99. **G. gracillima**, *Anth.* Fig. 144. Acutely turritid, narrow, thin; spire very slender, elevated; whorls 8, convex, the upper ones folded and striate, the lower ones smooth, the striae being replaced by indistinct, slender, brown lines; the lower part of each whorl carinate; aperture small. Brown, banded within. *S. Car.*

100. **G. Clarkii**, *Lea*. Fig. 145. Club-shaped, thin; spire elevated, much drawn out, suture somewhat impressed; whorls 10, flattened, the last swollen; aperture small, elliptical, produced and angled at the base. Dark brown, same color within. *Duck Creek, Tenn.; Lee Co., Geo.*

101. **G. DeCampii**, *Lea*. Fig. 146. Elongated, very much attenuated, thin; spire subulate, suture linear; whorls 10, flatly convex, upper ones closely plicate, a little angled above the suture. Corneous, whitish within. *Huntsville, Ala.*

103. **G. plicifera**, *Lea*. Figs. 147—149. Turritid, somewhat thick; spire elevated, suture well impressed; whorls 9 convex, smooth or closely striate, with prominent curved ribs. Dark horn-color. *Oregon.*

104. **G. silicula**, *Gould*. Figs. 150, 151. Slender, nearly cylindrical; spire elevated, suture deeply impressed; whorls 6—8, well rounded, with numerous obsolete fine revolving striae, the upper ones longitudinally plicate. Dark chestnut-color, sometimes with two bands. *Oregon*.

Fig. 151 represents *G. Shastuensis*, *Lea*.

104a. **G. rudens**, *Reeve*. Fig. 152. Slender cylindrical, somewhat thick; whorls well rounded, spirally closely striated, the first few strongly plicate. Dull olive. *Oregon, Cal.*

105. **G. nigrina**, *Lea*. Fig. 153. Small, conical, rather thin; spire elevated, suture well impressed; whorls 6—7, convex, the first few faintly plicate, the last whorl striate below. Nearly black, dark purple within. *Oregon, Cal.*

106. **G. rubiginosa**, *Lea*. Fig. 154. Elevated, sub-cylindrical, rather thin; spire sub-attenuate, suture very much impressed; whorls 7, convex, carinate, the first ones obscurely plicate; body whorl angled and flattened on the periphery, with a raised line above and below. Reddish, obscurely banded, light reddish within. *Oregon*.

107. **G. Bairdiana**, *Lea*. Fig. 155. Somewhat drawn out, rather thick; spire acute, suture impressed; whorls 8, slightly convex, the first few closely and distinctly plicate; aperture small, ovate. Dark brown, whitish within, and single banded. *Oregon*.

d. *Shell angulate.*

108. **G. trochiformis**, *Conr*. Fig. 156. Short conical, turritid, babylonian, ventricose; spire short, suture well impressed; whorls 6, angulated, flat-topped, each with two prominent spiral lines; periphery of body whorl carinated; base flattened. *N. Ala.*

109. **G. cristata**, *Anth*. Figs. 157, 158. Rhomboidal, strongly carinate, thin; spire short conical, suture slightly impressed; whorls 5, flat, shelving, very strongly angulate and carinate in the middle. Horn-color, sometimes banded. *Ala.*

110. **G. cruda**, *Lea*. Fig. 159. Sub-fusiform, rather thin, shining; spire obtuse, suture slightly impressed; whorls flattened above, the last rather large and angulate in the middle; aperture large, rhomboidal. Dark brown, obscurely banded, brown within. *Tennessee River*.

111. **G. Whitei**, *Lea*. Fig. 160. Fusiform, thick, very much inflated; spire obtusely conical, suture slightly impressed; whorls 5, flattened above, the last ventricose; aperture large, widely rhomboidal. Bright yellowish-brown, generally 3-banded. *Geo.*

111a. **G. expansa**, *Lea*. Somewhat fusiform, rather thick; spire obtusely conical, suture somewhat impressed; whorls 5, slightly convex; aperture large, expanded. Yellowish, 4-banded, whitish within. *Ala.*

112. **G. casta**, *Anth.* Fig. 161. Obtusely conical, thick; spire obtusely elevated, suture moderately impressed; whorls 6—7, nearly flat; body whorl sub-angulate, with five coarse prominent striae below the angle. Light horn-color. *Ala.*

112a. **G. subrhombica**, *Lea*. Fig. 162. Obtusely conical, rather thin, smooth; spire obtuse, suture impressed; whorls 5, planulate, above obtusely carinate, the last obsolete angulate in the middle; aperture large, rhomboidal. Dark olive, not banded, white within. *Hog Creek, N. Geo.*

113. **G. rhombica**, *Anth.* Fig. 163. Conic, rather thin; spire conical, not much elevated, suture moderate; whorls 6, nearly flat, very distinctly regularly striate; body whorl large, somewhat convex. Brownish, white within. *Ala.*

114. **G. angulata**, *Anth.* Figs. 164, 165. Acutely conic, rather thick; spire conical, moderate, apex acute, suture linear; whorls 8, nearly flat, the upper ones somewhat carinate, the body whorl distinctly angulate; aperture narrow, acute below. Brown, whitish within. *Tenn.*

Fig. 165 represents *G. intercedens*, *Lea*, the adult shell.

115. **G. Bridgesiana**, *Lea*. Fig. 166. Fusiform, somewhat inflated, rather thin; spire obtusely conical, apex carinate, suture linear; whorls 7, flattened; aperture large, sub-rhomboidal. Honey-yellow, not banded, whitish within. *Catawba River, Ala.*

I doubt whether this is more than a variety of No. 114.

116. **G. cubicoides**, *Anth.* Fig. 167. Conical, thick; spire moderately elevated, suture linear; whorls 6—7, flat, rapidly enlarging, body whorl large, acutely angulate; aperture broadly ovate. Brownish, white within. *Wabash River, Ind.*

117. **G. Spillmanii**, *Lea*. Fig. 168. Fusiform, thin, shining; spire obtusely conical, suture linear; whorls about 6, flattened, somewhat impressed below the suture; aperture large, rhomboidal. Greenish horn-color, not banded. *Tennessee River.*

120. **G. pallidula**, *Anth.* Fig. 169. Conic, rather thick; spire obtusely conic, suture slightly impressed; whorls 6, flattened, the last large and angulate in the middle; aperture large, rhomboidal. Pale horn-color, with faint brown narrow bands, two on the body and one on the whorl next above it. *Tenn.*

121. **G. vicina**, *Anth.* Fig. 170. Conical, thick, rather smooth; spire short, suture linear; whorls 6, upper ones sub-convex; body whorl a little shouldered beneath the suture, and angulated in the middle; aperture rather large, rhomboidal. Yellowish-brown, with a narrow brown band, increased to two on the body whorl. *Ala.*

122. **G. Spartenburgensis**, *Lea.* Fig. 171. Fusiform, rather thin; spire acutely conical, carinate at apex, suture impressed; whorls 8, flattened. Bright greenish horn-color, banded or without bands. *Spartenburg Dist., S. C.: Marietta, O.; Wabash River, Ind.*

123. **G. modesta**, *Lea.* Fig. 172. Conical, fusiform, rather thin; spire rather elevated, suture linear; whorls 8, flattened, the last angular in the middle. Dark horn-color. *Chattahoochie River, Columbus, Geo.*

e. *Whorls very strongly angulated.*

125. **G. Gerhardtii**, *Lea.* Figs. 173, 174. Conical, thin, shining; spire regularly conical, suture impressed; whorls 6, flattened above, the last one large, carinate and angulate in the middle; aperture large, sub-rhomboidal. Yellowish-green to dark brown, banded, whitish within. *Geo.; Coosa River, Ala.*

Fig. 174 is *G. infuscata*, *Lea.*

125a. **G. fraterna**, *Lea.* Fig. 175. Fusiform, thin; spire obtusely conical, suture well impressed; whorls 6, planulate, acutely carinate above the suture, the body whorl carinate in the middle; aperture small, ovately rhomboidal, columella twisted below, a little effused at base. Yellowish, with or without four brown bands. *Catawba River, Ala.*

127. **G. acutocarinata**, *Lea.* Figs. 176—178. Fusiform, elevated, somewhat thick; spire elevated, suture much impressed; whorls 6, flattened, shelving, carinate above the suture, the last carinate in the middle; aperture small, rounded below, columella curved to the right at base. Dark brown, purplish within. *E. Tenn.*

Fig. 177 represents *G. pagodiformis*, *Anth.*, and Fig. 178, *G. torulosa*, *Anth.*

f. *Body whorl bi-multiangulated.*

128. **G. tabulata**, *Anth.* Ovate conic, smooth, thin; spire concavely conical, suture distinctly impressed; whorls 5, upper ones convex, the penultimate flat, and the last sub-cylindrical, angulated into several planes; aperture large, ovate. Dark brown, reddish-purple within. *Tenn.*

129. **G. Catabæa**, *Habl.* Am. Jour. Conch., Vol. I., t 1, f. 5—7. Short conic, inflated; spire conical, suture well impressed; whorls 6, flattened, carinate, the last inflated, bicarinate in the middle; aperture ovate. Bright green, polished, bluish within, sometimes bivittate in the middle. *Catawba River, N. C.*

131. **G. subangulata**, *Anth.* Fig. 182. Elevated fusi-form, carinate; spire sub-elevated; suture slightly impressed; whorls 6, acutely carinate above the suture, the last flatly convex, biangulate in the middle; aperture small, columella obtusely angular at base. Reddish horn-color, banded, whitish within. *Ala.*

132. **G. symmetrica**, *Habl.* Figs. 183—185. Turrited, moderately thick; spire elevated, suture deeply impressed; whorls 8—9, convex, the upper ones carinated above the middle, last one centrally biangulate; aperture small, sub-angulate at base. Light to dark green, frequently 2-banded with brown. *W. Va., E. Tenn., S. Car., N. Geo. and Ala.*

Fig. 184 is *assimilis*, *Anth.*; Fig. 185, *Ucheensis*, *Lea.*

133. **G. iota**, *Anth.* Conical, somewhat thin; spire acutely elevated, suture well impressed; whorls 10, convex, the upper ones strongly carinate below the middle; aperture small, pyriform, with a slight basal sinus. Greenish horn-color, whitish within. *Ohio?*

134. **G. nigrocincta**, *Anth.* Fig. 186. Conical, smooth, thin, not much elevated, suture impressed; whorls 6, sub-convex, slightly angulated above the suture, the last obsoletely biangulate in the middle; aperture small, angulate below. Brown, with four dark brown bands. *Tenn.*

135. **G. tecta**, *Anth.* Figs. 187, 188. Narrowly elevated, thin; spire elevated, suture impressed; whorls 7—8, slopingly flattened, carinate just above the suture, the last whorl biangulate in the middle; aperture small, columella curved, a little effused at base. Brown, reddish within, slightly banded. *Ohio, Ala.*

Fig. 188 is *G. macella*, *Lea.*

136. **G. hybrida**, *Anth.* Fig. 189. Conical, elevated, nearly smooth; whorls 8—9, slopingly convex, upper ones much carinated, carina obtuse, lower ones entirely smooth; aperture small, well rounded below. Reddish-brown, rose-color or violet within. *Tenn.*

137. **G. fuscocincta**, *Anth.* Fig. 190. Short, conically ovate, smooth, moderately thick; spire short, conical, suture moderately impressed; whorls 5, flattened, sub-carinate, the last large, angulate in the middle; aperture large, broadly ovate. Yellowish brown, with two broad brown bands, visible within. *Ala.*

138. **G. congesta**, *Conr.* Subulate; whorls 9, the lower ones obscurely angulated, those of the spire acutely carinate towards the apex; suture well defined; body whorl obscurely sub-angulated; aperture longitudinal, elliptical.

The above is Conrad's description. The shell has never been figured, and I cannot find any specimens named in any of our collections.

g. Short, clavate, smooth species.

139. **G. auriculæformis**, *Lea.* Fig. 191. Elliptical, smooth, rather thin; spire short, suture impressed; whorls 6, slightly convex, the last large; aperture elongate, contracted. Yellow, whitish within. *Tuscaloosa, Ala.*

140. **G. Nickliniana**, *Lea.* Fig. 192. Obtusely conical, smooth, solid; spire short, suture impressed; whorls 6, slightly convex; aperture large, somewhat rounded. Very dark horn-color, purple within. *Bath Co., W. Va.*

141. **G. aterina**, *Lea.* Fig. 193. Sub-fusiform, smooth, solid; spire obtusely conical, suture impressed; whorls 6, convex; aperture large, sub-ovate, columella inflected, thickened and contorted. Black or greenish-black, purple within. *E. Tenn.*

Smaller and narrower than No. 140, and more angulate on the periphery.

142. **G. Binneyana**, *Lea.* Fig. 194. Obtusely fusiform, smooth, rather thin, very much inflated; spire depressed, conical, suture impressed; whorls 5, slopingly flattened above, the last ventricose; aperture very large, sub-ovate; columella thickened, spotted at the base. Dark olive, obscurely banded, dark purple within. *Cosa River, Ala.*

More oval, with less expanded lip than No. 140.

143. **G. ebum**, *Lea.* Figs. 195, 196. Obtusely conical, smooth, thick; spire obtuse, suture slight; whorls 4 (truncated), somewhat flatly convex, the last with a rounded angle at periphery; aperture large, ovate, sub-angular at base. Very dark purple or blackish, purple or bluish within. *Robinson Co., Tenn.*

144. **G. Vauxiana**, *Lea.* Fig. 197. Fusiform, smooth, rather thin; spire very obtusely conical, suture lightly impressed; whorls 5, flattened above, and somewhat sub-carinate at apex, the last one inflated; aperture very large, widely rhomboidal, angular at base. Green. *Cosa River, Ala.*

145. **G. larvæformis**, *Lea.* Fig. 197a. Obtusely fusiform, smooth; whorls 6—7, the first few minutely keeled; aperture ovate. Olive. *United States.*

The above species, described by Mr. Reeve, I have not seen; but, judging from the figure, it must be very close to, if not identical with *G. Vauxiana*, *Lea.*

146. **G. auricoma**, *Lea*. Fig. 198. Fusiform, smooth, thin; spire very obtuse, suture linear; whorls 5, slightly convex; aperture very large, sub-rhomboidal. Yellowish, often with narrow bands. *Tennessee River*.

147. **G. glabra**, *Lea*. Conical, smooth, rather thin, shining; spire somewhat elevated, suture impressed; whorls 6, flatly convex, the first ones sub-carinate; aperture elongated, columella incurved. Dark chestnut, purple within. *Holston River, E. Tenn.*

148. **G. graminea**, *Hald*. Fig. 199. Conical, short, inflated, smooth, polished; spire obtuse, suture moderate; whorls 5, somewhat convex; aperture large, rhomboidal, somewhat angular below. Brilliant green, with a light yellow sutural band, bluish within.

149. **G. gibbosa**, *Lea*. Fig. 200. Obtusely conical, gibbous, rather thin; spire obtuse, suture irregularly impressed; whorls 5, somewhat convex, the last large; aperture large, elliptical, columella thickened, flattened, impressed, and much curved. Greenish horn-color, banded above and below in the interior, columella red. *Sciota River, Ohio*.

Differs from all the other species in the very flat, impressed columella.

151. **G. cognata**, *Anth*. Fig. 201. Ovate, short, smooth, moderately thick; spire very small, obtuse, suture deeply impressed; whorls 6, convex, the last one very large; aperture moderate, broad ovate, columella deeply rounded, indented and callous. Brownish-yellow, with three sub-central brown bands, and one obscure sutural one, bands visible within the aperture. *Tenn.*

152. **G. Georgiana**, *Lea*. Fig. 202. Fusiform, inflated, smooth, rather thick; spire obtusely elevated, suture very much impressed; whorls 5, very convex, the last large; aperture large, sub-rhomboidal, columella bent in, thickened and somewhat twisted. Bright yellowish, with dispersed whitish maculations and three bands. *N. Geo.*

153. **G. abrupta**, *Lea*. Fig. 203. Short conical, smooth, rather thick; spire short conical, suture linear; whorls 7, flattened, the last large, sub-angulate on the periphery; aperture large, rhomboidal, columella curved and much thickened below. Yellowish, generally with two approximate sub-central bands. *Ala.*

154. **G. depygis**, *Say*. Fig. 204. Oblong, conic ovate, moderately thick; spire conic, suture well impressed; whorls 5, the last somewhat elliptical; aperture narrow ovate, acute above. Yellowish, generally with two rufous bands, equidistant from the suture, the base, and each other. *Ohio River*.

155. **G. livescens**, *Mke.* Figs. 205—207. Ovate oblong, smooth, moderately thick: spire short, conically acute, suture slightly impressed; whorls 5—6, rather flat, the last large: aperture large, elliptical. Horn-color, purple within. *All the Great Lakes and streams emptying into them.*

Fig. 206 is *G. napella*, *Anth.*, and Fig. 207 is *G. cuspidata*, *Anth.*

156. **G. Milesii**, *Lea.* Fig. 208. Sub-fusiform, smooth, rather thick: spire sub-elevated, suture irregularly impressed: whorls 6, sub-inflated; aperture large, columella slightly incurved. Olivaceous, purplish within. *Tuscola Co., Mich.*

Closely allied to *livescens*, but appears to be more convex, and to attain a larger size. I am not satisfied that it is a distinct species.

157. **G. simplex**, *Say.* Figs. 209—212. Convex, sub-fusiform, smooth, rather thick, rapidly enlarging: spire attenuated, sub-carinate, apex acute, suture not deeply impressed: whorls 8, the last large, convex: aperture moderate oval. Dark brown, dull red within. *Holston and Clinch Rivers, S. W. Va., and E. Tenn.*

Fig. 209 represents the type; Fig. 210 is *Wardcriana*, *Lea*, in which the apical whorls are persistent and perfect; Fig. 211 is *subsolida*, *Lea*, and Fig. 212 is *Vanuremii*, *Lea*.

158. **G. Potosiensis**, *Lea.* Convexly conical, carinate, rather thin: spire obtusely elevated, suture much impressed: whorls 8, convex. Brown, purplish within. *Potosi, Mo.*

Very closely allied to *G. simplex*. It is one of the very few species found west of the Mississippi River.

159. **G. torta**, *Lea.* Fig. 213. Club-shaped, smooth, rather thick; spire obtusely elevated, suture impressed: whorls 7, slopingly convex, the last large; aperture very large, elliptical, columella twisted. Dark brown, bluish-white within. *Big Creek, Lawrence Co., Tenn.*

When the spire is perfect, it is attenuately drawn out, the same as in some species of *Cylindrella*.

160. **G. Saffordi**, *Lea.* Fig. 214. Obtusely conical, smooth, thick; spire rather short, suture linear: whorls 7 (when not eroded), slightly convex, the last large, gibbously enlarged in the middle; aperture large, oval, elongated, columella twisted. Dark green, purple within. *Lebanon, Wilson Co., Tenn.*

160a. **G. virens**, *Anth.* Fig. 215. Ovate conic, smooth, thick; spire obtusely elevated, suture well impressed: whorls 6, convex, the last large; aperture large, elliptical, columella well rounded, with a slight sinus at base. Light green, paler towards the summit, bluish within. *Ala.*

161. **G. Newberryi**, *Lea.* Fig. 216. Ovately conical, smooth, rather thin; spire obtusely elevated, suture much impressed: whorls 6, inflated; aperture rather small, ovately rounded, outer lip inflated, columella incurved. Dark brown, triple-banded, yellow below the suture, whitish and banded within. *Oregon.*

162. **G. bulbosa**, *Gll.* Fig. 217. Ovately conical, rather thin: spire obtuse, with well impressed suture; whorls 5—6, (eroded) inflated, very convex; aperture ovately rounded. Brownish, shining, without bands. *Columbia River, Oregon.*

Maybe the same as *G. Newberryi*, the only difference being in the bands.

163. **G. Lithasioides**, *Lea.* Fig. 218. Sub-fusiform, smooth; spire conoidal, suture impressed; whorls 6, flattened, sub-constricted; aperture rather large, rhomboidal. Corneous, without bands. *Ohio.*

164. **G. infantula**, *Lea.* Fig. 219. Obtusely fusiform, moderately thick; spire short, with well impressed suture; whorls 5, sub-convex, a little flattened above; aperture large, ovate, columella thickened and twisted. Dark horn-color, obscurely banded; white and banded within. *Louisville, Ky.*

165. **G. Louisvillensis**, *Lea.* Fig. 220. Obtusely fusiform, smooth; spire short, conical, suture irregularly impressed; whorls 5, flatly convex; aperture rather large, long elliptical. Dark brown, not banded, white within. *Louisville, Ky.*

It is very doubtful whether this is distinct from *G. infantula*.

h. *Smooth, elevated species.*

166. **G. pulchella**, *Anth.* Fig. 221. Conically elongated, thin: spire elevated, suture well impressed; whorls 7, convex; aperture rather large, elongately ovate. Brownish horn-color, with two brown bands. *Ohio.*

More elevated than *M. depygis*, and lighter color and more convex than *M. gracilior*.

167. **G. cinerea**, *Lea.* Fig. 222. Conically elongated, thin, smooth, bright; spire elevated, sharp-pointed, suture very much impressed; whorls 8, convex, the last slopingly convex; aperture rather large, sub-rhomboidal, columella bent in, slightly thickened. Ash-gray, double-banded, bluish-white within, columella purplish. *S. Car.*

Doubtfully distinct from *pulchella*. The description is from a single specimen, and the habitat may be an error.

168. **G. gracilior**, *Anth.* Fig. 223. Conical, elevated, smooth, rather thick; spire elevated conical, suture slightly impressed; whorls 8, the upper ones flattened, the last slopingly convex, peculiarly constricted around the superior half; aperture small, pyriform, columella arcuate, forming a sinus of the margin below. Dark brown, with two broad yellowish-green bands on the periphery, the sutural line pale, banded within, columella dark brown. *Congress and Springfield Lakes, Stark Co., Ohio.*

169. **G. Etowahensis**, *Lea*. Fig. 224. Conoidal, smooth, thin; spire raised-conical, suture impressed; whorls 7, slightly convex; aperture rather large, sub-rhomboidal, outer lip acute and sinuous, columella bent in and very much twisted. Dark brown, with two broad dark bands. *Etowah River, Geo.*

Wider than *gracilior*, with a larger, more angulate aperture, the whorls more convex and not constricted.

170. **G. translucens**, *Anth.* Fig. 225. Conical ovate, somewhat bulbous, thin, translucent; spire obtuse, suture well impressed; whorls 5, convex, the last large; aperture large, ovate, slightly angular at the base. Light horn-color, with two distant broad dark brown bands. *Canada.*

171. **G. ovoidea**, *Lea*. Fig. 226. Elliptical, smooth, rather thick; spire obtusely conical, suture slightly impressed; whorls 6, slightly convex; aperture moderate, ovate. Horn-color, with two indistinct dark bands, white within. *Alexandria, La.*

A single specimen only was received by Mr. Lea.

172. **G. grata**, *Anth.* Fig. 227. Elongately fusiform, rather thick, shining; spire raised, sharp-pointed, suture regularly impressed; whorls 9, flattened, the last slightly convex; aperture rather large, sub-rhomboidal, outer lip acute and sinuous, columella bent in and twisted. Bright olivaceous, with generally four dark bands, of which the two middle ones on the periphery are approximate, whitish and banded within. *Big Prairie Creek, Ala.*

173. **G. quadricincta**, *Lea*. Figs. 228, 229. Conical, somewhat thick, polished; whorls 9—10, sloping, the last large and convex; aperture large, sub-rhomboidal. Bright yellow, with four green bands, of which the two middle ones are approximate, whitish and banded within. *Coosa River, Ala.; Geo.*

Larger, more inflated and lighter color than *G. grata*.

174. **G. flava**, *Lea*. Fig. 230. Obtusely conical, smooth, rather thin; spire obtuse, suture very much impressed; whorls about 6, flattened, the last slopingly convex; aperture moderate, ovate, outer lip acute, slightly sinuous, columella bent in and thickened. Yellow, 3-banded, bands visible within. *Benton Co., N. E. Ala.*

175. **G. tenebrovittata**, *Lea*. Fig. 231. Elongated conical, smooth, rather thin; spire raised, suture slightly impressed; whorls 6—8, flattened, the last large; aperture large, sub-rhomboidal. Yellowish, without or with four bands, which are narrow, and the two middle ones approximate or sometimes coalesce into one. *Coosa River, Ala.*

Larger and more elevated than *G. grata*, and the bands narrower.

176. **G. tenera**, *Auth.* Fig. 232. Elongate fusiform, rather thin; spire elevated, slightly carinate at apex, suture well impressed; whorls 8, slightly convex, the last large; aperture small, sub-rhomboidal, produced at base. Light horn-color, 4-banded, the two middle bands approximate. *Ala.*

Distinguished by the narrowly effused aperture.

178. **G. Elliottii**, *Lea.* Fig. 233. Obtusely conical, somewhat thick, obscurely striate; spire obtusely elevated, and carinately angled above the much impressed suture; whorls 6, slopingly convex, the last large; aperture large, ovately rhomboidal, columella twisted below. Yellowish-brown, without bands, generally dark brown within, fading to white on the margin. *Fannin Co., Geo., Uchee and Little Uchee Rivers.*

179. **G. pallescens**, *Lea.* Figs. 234, 235. Acutely conical, carinate above the suture, rather thin; spire elevated, suture deeply impressed; whorls 9, sloping, flatly convex; aperture small ovate, angular at base. Yellowish, generally without bands, sometimes 4-banded. *Chester Dist., S. C.; Little Uchee River, Columbus, Geo.*

Fig. 235 is *G. inosculata*, the immature shell of this species. The figure of *pallescens*, which is a copy of Mr. Lea's, does not well represent the species.

179a. **G. Romæ**, *Lea.* Fig. 236. Conoidal, thick, sub-carinate; spire elevated conical, suture slightly impressed; whorls 7, planulate, the first ones carinate; aperture large, ovate; lip acute, sub-sinuous, columella thin and contorted. Dark corneous, without bands. *Rome, Geo.*

179b. **G. circumlineata**, *Tryon.* Figs. 237, 238. Fusiform, inflated, thick; spire elevated, apex acute; whorls 6—7, convex, the initial ones sometimes slightly folded; body whorl convex, obscurely many angled, the planes produced by irregular, raised revolving lines; aperture small, oblique, ovate. Dark greenish-black or dark horn-color, without bands. *Cal.*

180. **G. parva**, *Lea.* Fig. 239. Conical, smooth, thin; spire somewhat raised, sharp-pointed, suture well impressed; whorls 7, flatly convex; aperture rather small, sub-rhomboidal. Horn-color, not banded. *Geo.*

May be the same as *pallescens*.

182. **G. Anthonyi**, *Lea.* Fig. 240. Obtusely conical, smooth, rather thin, shining; spire obtuse, suture moderate; whorls 6, somewhat convex, the last long; aperture large, elongately rhombic, columella very much twisted and narrowly produced below. Dark chestnut-brown, not banded. *Tenn.*

183. **G. Cahawbensis**, *Lea.* Fig. 241. Obtusely conical, smooth, rather thin; spire elevated at the apex, carinate and sharp-pointed, suture linear; whorls 8, flattened, the last rather large; aperture small, ovate. Dark horn-color, obscurely banded, whitish or yellowish within. *Cahawba River, Ala.*

185. **G. Gabbiana**, *Lea*. Fig. 242. Ovately fusiform, smooth, rather thin; spire slightly elevated, sharp-pointed, suture moderate; whorls 8, convex and varicose; aperture small, sub-rhomboidal. Horn-color, not banded. *Tenn., Ala.*

185a. **G. pulla**, *Lea*. Fig. 243. Fusiform, obtuse, smooth; spire obtusely elevated, suture irregularly impressed; whorls 7, slightly convex; aperture small, ovately rhomboidal. Dark brown, shining, light purplish within. *Cumberland Gap, E. Tenn.*

186. **G. sordida**, *Lea*. Figs. 244—247. Conical, smooth, somewhat thick; spire obtuse, suture well impressed; whorls (eroded), slopingly convex; aperture rather large, somewhat rounded. Dark horn-color, bluish within. *Tenn.; Ala.; Saline Co., Ark.*

Fig. 244 represents the type; Fig. 245 is *G. plebeia*, *Anth.*; Fig. 246, *G. brunnea*, *Anth.*; and Fig. 247, *G. perfusca*, *Lea*.

187. **G. clavæformis**, *Lea*. Fig. 249. Club-shaped, smooth, rather thin, spire acute, suture somewhat impressed; whorls 8, convex, the last a little compressed around the upper part; aperture elongated. Chestnut-brown, shining, light purple within. *Ocoee District and Clinch River, Tenn.*

188. **G. castanea**, *Lea*. Fig. 250. Club-shaped, smooth, rather thin; spire elevated, carinate towards the apex, suture narrow; whorls 8, somewhat convex; aperture small, elliptical. Dark brown, purple within. *Moury Co., Tenn.*

191. **G. adusta**, *Anth.* Figs. 251—254. Conical, smooth, rather thick; spire elevated, acute, suture linear; whorls 8, flattened, the last slopingly convex; aperture ovate, columella deeply rounded, produced at base. Dark brown, purplish within. *Tenn.*

Figs. 251 and 252 represent *G. adusta*; Fig. 253 is *G. funebris*, *Anth.*; and Fig. 254, *G. Cumberlandiensis*, *Lea*.

192. **G. furva**, *Lea*. Conical, rather thick; spire rather elevated, suture furrowed; whorls flattened; aperture small, sub-rhomboidal, angular at base. Dusky, purplish within. *Coosa River, Ala.*

193. **G. dubiosa**, *Lea*. Figs. 255, 256. Conical, smooth, rather thin; spire attenuately conical, sharp-pointed, suture impressed; whorls 10, somewhat convex; aperture rather small, ovate. Reddish horn-color, whitish within. *Tenn.*

Fig. 256 is *G. Estabrookii*, *Lea*.

194. **G. lævigata**, *Lea*. Fig. 257. Obtusely conical, smooth, rather thin; spire rather short, carinate towards the apex, suture linear; whorls 7, somewhat convex; aperture rather large, elliptical, angular at base. Yellowish, white within. *Alabama River.*

195. **G. interlineata**, *Anth.* Fig. 258. Elongated, slender, thin; spire elevated, suture moderately impressed; whorls 7—8, sub-convex, smooth; aperture small, elliptical, slightly produced at base. Greyish horn-color, alternating with narrow, brown, longitudinal, hair-like lines. *Christy Creek, Ind.*

196. **G. Ohioensis**, *Lea.* Fig. 259. Conical, smooth, somewhat thin; spire obtusely conical, sharp-pointed, carinate at apex, suture very much impressed; whorls 9, convex; aperture small, somewhat rounded. Horn-color, whitish within. *Yellow Springs, Ohio.*

197. **G. brevispira**, *Anth.* Fig. 260. Conical, ovate, smooth, rather solid; whorls 4—5, convex; aperture ovate. Brownish-green, paler at the suture. *Ohio.*

198. **G. semicarinata**, *Say.* Figs. 261—270. Acutely conical, rather thick, smooth; spire elevated, carinate towards the apex, suture well impressed; whorls 9, rather convex; aperture small, elliptical. Yellowish-green or reddish horn-color, generally lighter at the suture, whitish within. *Tenn., Ky., Ohio, Ind., Ills.*

Figs. 261 and 262 represent *G. semicarinata*; Fig. 263, *G. Kirtlandiana*, *Lea*; Fig. 264, *G. inornata*, *Anth.*; Fig. 265, *G. bicolorata*, *Anth.*; Fig. 266, *G. data*, *Anth.*; Fig. 267, *G. varicosa*, *Ward*; Fig. 268, *G. angustispira*, *Anth.* and Fig. 269, *G. Grosvenorii*, *Lea.* Fig. 270, *G. babylonica*, *Lea*, is a geniculate monstrosity of this species.

199. **G. Haldemani**, *Tryon.* Fig. 271. Narrowly elongated; spire elevated, suture slightly impressed; whorls 9, smooth, flat, the last sub-angulated at the periphery; aperture small, sub-rhomboidal. Light horn-color. *Lake Erie, Lake Champlain.*

200. **G. curvilabris**, *Anth.* Fig. 272. Conical, smooth, rather thick; spire elevated, suture deeply impressed; whorls 7—8, convex, cylindrical, constricted around the middle; aperture irregularly oval, lip very much curved. Greenish horn-color. *Tenn.*

201. **G. informis**, *Lea.* Fig. 273. Lengthened cylindrical; spire elevated, suture moderately impressed; whorls 6, flatly convex, medially constricted; aperture sub-rhomboidal, angulate below. Dark corneous. *Louisville, Ky.*

202. **G. vittatella**, *Lea.* Fig. 274. Lengthened, sub-cylindrical, smooth; spire elevated, apex sometimes carinate, suture linear; whorls 8, planulate; aperture small, sub-rhomboidal. Dark brown, with a single dark band. *Cumberland Gap, E. Tenn.*

203. **G. Alexandrensis**, *Lea.* Fig. 275. Acutely conical, smooth, narrow, thin; spire elevated, suture moderately impressed; whorls 7, somewhat convex; aperture small, trapezoidal, a little produced below. Dark horn-color, white within. *Alexandria, Lu.*

204. **G. Haleiana**, *Lea*. Fig. 276. Subulate, very narrow, smooth, thin, polished; spire much elevated, suture impressed; whorls 9, convex; aperture small, ovate, angular at the base. Yellowish horn-color, sometimes with two bands, of which the lower is broadest. *Alexandria, La.*

205. **G. rubella**, *Lea*. Fig. 277. Awl-shaped, carinate and striate above, rather thin; spire attenuate, suture very much impressed; whorls 8, very convex; aperture quite small. Reddish, without bands. *Murphy, Cherokee Co., N. C.*

206. **G. spinella**, *Lea*. Fig. 278. Much attenuated, smooth, thin; spire elevated, sharp-pointed, suture well impressed; whorls 9, somewhat flattened; aperture very small, ovate. Dark olive. Lighter on the suture, not banded, white within. *Sycamore, Claiborne Co., Tenn.*

207. **G. Draytonii**, *Lea*. Fig. 279. Smooth, conical, thick; spire raised, suture very much impressed; whorls 6, convex; aperture small, ovate. Dark chestnut-brown, without bands or obscurely banded, dark brown within. *Fort George and Walla, Oregon.*

207a. **G. nigrina**, *Lea*. Conical, smooth, thin, polished; spire elevated, suture impressed; whorls 6, slopingly convex; aperture small, ovate. Dark olivaceous or nearly black, purple or olivaceous within. *California.*

Distinguished from *G. Draytonii* by color and texture.

208. **G. proximia**, *Say*. Figs. 281—284. Conical, rather slender, smooth, shining; spire acute, carinate, suture much impressed; whorls 7, slopingly convex; aperture rather large, rhomboidal. Reddish-brown, with or without bands. *N. C., S. C., Tenn., Alabama River.*

Fig. 281 is *approximata*, Hald.; Fig. 282, *abjecta*, Hald.; Fig. 283, *rubricata*, *Lea*; Fig. 284, *Taitiana*, *Lea*.

208a. **G. rufescens**, *Lea*. Fig. 285. Elongated, conical, smooth, rather thin, shining; spire elevated, suture well impressed; whorls 7, convex, carinate towards the apex; aperture small, elliptical, angular below. Dark red, purplish within. *Mamma's Creek, Tenn.*

i. *Striate species, spire elevated.*

× 209. **G. Virginica**, *Gmel*. Figs. 286—290. Elongated, conical, smooth, rather thin; whorls 6, the upper ones carinate, convex or flattened, either smooth or with one to ten revolving striæ; aperture elongate-elliptical. Brownish or olivaceous, generally with two bands. *Middle States.*

A very variable species.

210. **G. sulcosa**, *Lea.* Fig. 291. Elongated, conical, thin; spire elongated, suture well impressed; whorls flattened, transversely sulcate: aperture small, ovate. Yellowish. *Tenn.*

When perfect specimens are obtained, this may prove to be a species of *Pleurocera*.

211. **G. Buddii**, *Lea.* Fig. 292. Cylindrical, striate, rather thin: spire attenuated, suture much impressed; whorls 8, flatly convex: aperture small, elliptical. Horn-color, whitish within. *Tenn.*

212. **G. Troostiana**, *Lea.* Fig. 293. Elevated, thickly striate, thin: spire elevated, apex acute, carinate: whorls 10, slightly convex; aperture oval. Brown, generally brown within. *Tenn.*

213. **G. latitans**, *Auth.* Fig. 294. Elevated, obscurely striate, rather thin; spire elevated, suture deeply impressed; whorls 8—9, very convex: lines of growth coarse; aperture large, oval. Greenish-brown, banded. *Mammoth Cave, Ky.*

214. **G. porrecta**, *Lea.* Fig. 295. Elongated, attenuate, moderately thick: spire acuminate, suture canalicularly impressed: whorls 9, flattened, carinate and striate: aperture small, oval. Blackish-brown, white or brown within. *E. Tenn.*

215. **G. sculptilis**, *Lea.* Fig. 296. Conical, thin, thickly striate: spire conical, apex carinate and granulate, suture irregularly impressed; whorls 10, rather flattened, the last bulbous; aperture small, elliptical. Horn-color, white within. *Tenn.*

216. **G. crenatella**, *Lea.* Fig. 297. Narrowly elongated, sub-cylindrical, sub-costate, transversely thickly ridged: spire much elevated, suture much impressed; whorls 7, flattened; aperture very small, obliquely oval. Dark brown. *Cosa River, Ala.*

[To be Concluded in April No.]

GONIOBASIS, Lea.



Fig. 22.



Fig. 2.



Fig. 8.



Fig. 4.



Fig. 3.



Fig. 13.



Fig. 20.



Fig. 6.



Fig. 11.



Fig. 5.



Fig. 16.



Fig. 1.



Fig. 7.



Fig. 15.



Fig. 12.



Fig. 18.



Fig. 19.



Fig. 10.



Fig. 21.



Fig. 14.



Fig. 17.



Fig. 9.

GONIOBASIS, Lea.

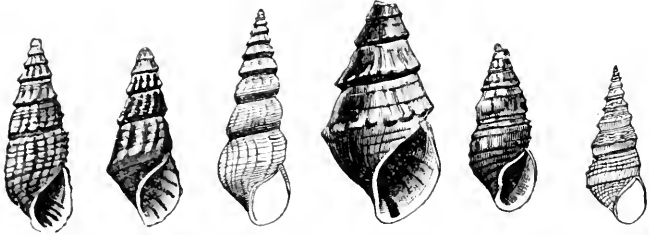


Fig. 23. Fig. 24. Fig. 34. Fig. 26. Fig. 27. Fig. 35.



Fig. 23. Fig. 28. Fig. 30. Fig. 29. Fig. 32. Fig. 31. Fig. 46.

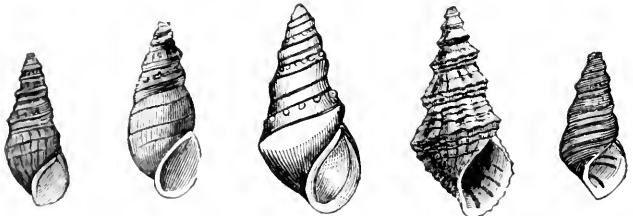


Fig. 37. Fig. 41. Fig. 38. Fig. 25. Fig. 42.

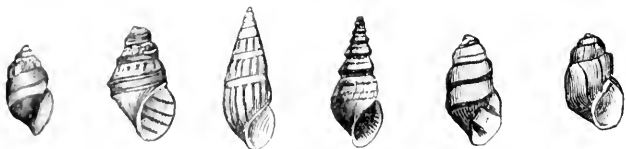


Fig. 43. Fig. 40. Fig. 36. Fig. 39. Fig. 44. Fig. 45.

GONIOBASIS, Lea.



Fig. 58.



Fig. 49.



Fig. 60.



Fig. 57.



Fig. 53.



Fig. 78



Fig. 55.



Fig. 47.



Fig. 51.



Fig. 52.



Fig. 54.



Fig. 65.



Fig. 77.



Fig. 59.



Fig. 70.

GONIOBASIS, Les.



Fig. 74.



Fig. 79.



Fig. 71.



Fig. 48.



Fig. 63.



Fig. 80.



Fig. 64.



Fig. 50.



Fig. 62.



Fig. 69.



Fig. 76.



Fig. 72.



Fig. 66.



Fig. 73.



Fig. 67.



Fig. 75.



Fig. 61.



Fig. 68.



Fig. 81.

GONIOBASIS, Lea.

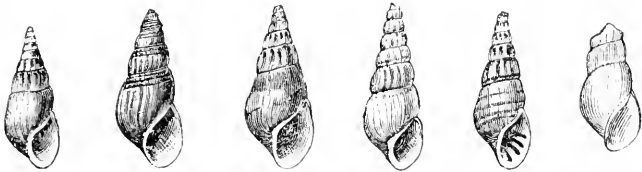


Fig. 92. Fig. 90. Fig. 95a. Fig. 103. Fig. 82. Fig. 110.

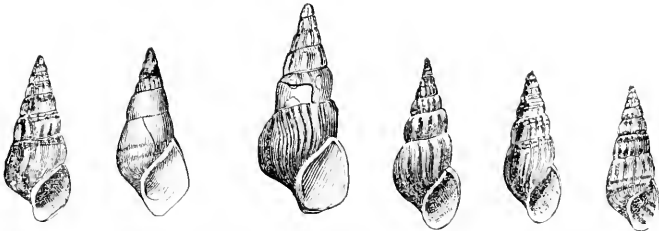


Fig. 98. Fig. 93. Fig. 97. Fig. 85. Fig. 100. Fig. 83.

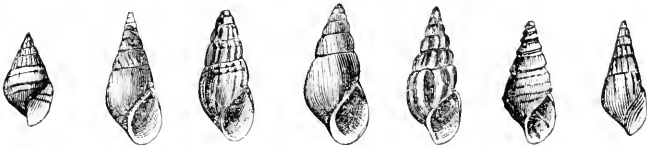


Fig. 84. Fig. 86. Fig. 101. Fig. 84a. Fig. 96. Fig. 94. Fig. 87.



Fig. 109. Fig. 102. Fig. 105. Fig. 91. Fig. 111. Fig. 107. Fig. 95.



Fig. 108. Fig. 112. Fig. 90. Fig. 106. Fig. 104. Fig. 89. Fig. 88.

GONIOBASIS, Lea.

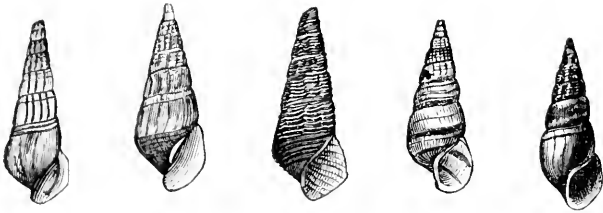


Fig. 130.

Fig. 128.

Fig. 115.

Fig. 126.

Fig. 129.

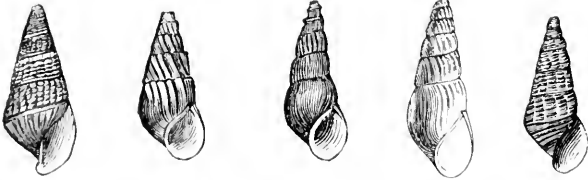


Fig. 121.

Fig. 131.

Fig. 133.

Fig. 127.

Fig. 114.

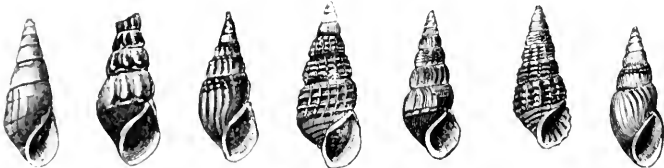


Fig. 122.

Fig. 125.

Fig. 118.

Fig. 130.

Fig. 134.

Fig. 116.

Fig. 123.



Fig. 119.

Fig. 117.

Fig. 122.

Fig. 124.

Fig. 113.

GONIOBASIS, Lea.



Fig. 152.



Fig. 136.



Fig. 149.



Fig. 151.



Fig. 139.



Fig. 142.



Fig. 148.



Fig. 137.



Fig. 147.



Fig. 135.



Fig. 145.



Fig. 141.



Fig. 150.



Fig. 138.



Fig. 144.



Fig. 153.



Fig. 154.



Fig. 146.



Fig. 140.



Fig. 155.



Fig. 143.

GONIOBASIS, Lea.

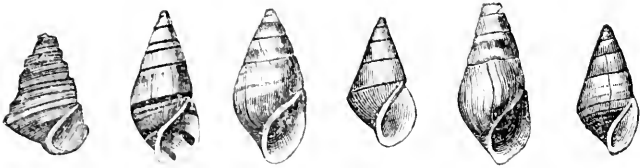


Fig. 156. Fig. 174. Fig. 166. Fig. 167. Fig. 168. Fig. 161.



Fig. 165. Fig. 158. Fig. 187. Fig. 172. Fig. 186. Fig. 173.



Fig. 183. Fig. 184. Fig. 182. Fig. 157. Fig. 176.



Fig. 163. Fig. 162. Fig. 189. Fig. 164. Fig. 188. Fig. 177.



Fig. 185. Fig. 170. Fig. 190. Fig. 171. Fig. 178.



Fig. 169. Fig. 160. Fig. 159. Fig. 175.

GONIOBASIS, Lea.



Fig. 210.



Fig. 209.



Fig. 215.



Fig. 214.



Fig. 211.



Fig. 213.



Fig. 205.



Fig. 207.



Fig. 195.



Fig. 208.



Fig. 199.



Fig. 217.



Fig. 196.



Fig. 197a.



Fig. 216.



Fig. 203.



Fig. 202.



Fig. 192.



Fig. 206.



Fig. 194.



Fig. 198.



Fig. 201.



Fig. 200.



Fig. 193.



Fig. 212.



Fig. 197.



Fig. 204.



Fig. 191.

GONIOBASIS, Lea.



Fig. 235.



Fig. 234.



Fig. 231.



Fig. 236.



Fig. 233.



Fig. 241.



Fig. 230.



Fig. 229.



Fig. 228.



Fig. 227.



Fig. 210.



Fig. 232.



Fig. 237.



Fig. 224.



Fig. 235.



Fig. 218.



Fig. 223.



Fig. 225.



Fig. 221.



Fig. 219.



Fig. 222.



Fig. 226.



Fig. 229.



Fig. 220.

GONIOBASIS, Lea.



Fig. 252.



Fig. 264.



Fig. 266.



Fig. 244.



Fig. 245.



Fig. 254.



Fig. 256.



Fig. 246.



Fig. 263.



Fig. 265.



Fig. 258.



Fig. 243.



Fig. 247.



Fig. 267.



Fig. 255.



Fig. 257.



Fig. 259.



Fig. 253.



Fig. 250.



Fig. 249.



Fig. 251.



Fig. 242.



Fig. 261.



Fig. 262.



Fig. 260.

GONIOBASIS, Lea.



Fig. 292.



Fig. 293.



Fig. 290.



Fig. 294.



Fig. 284.



Fig. 288.



Fig. 295.



Fig. 289.



Fig. 291.



Fig. 285.



Fig. 268.



Fig. 269.



Fig. 272.



Fig. 270.



Fig. 287.



Fig. 271.



Fig. 278.



Fig. 274.



Fig. 282.



Fig. 283.



Fig. 281.



Fig. 277.



Fig. 297.



Fig. 279.



Fig. 275.



Fig. 296.



Fig. 273.



Fig. 276.



Fig. 286.

NOTE ON HELIX RUFA, DE KAY.

BY E. MICHENER, M.D., AVONDALE, CHESTER CO., PA.

Mr. Wm. G. Binney, when speaking of *Helix albolabris*, Say, remarks, that "*Helix rufa*, DeKay, appears to be the young of this species."—"Supplement to Binney's Terrestrial Mollusks," p. 44.

Again, under *Helix thyroides*, Say, speaking of its varieties, he says:—"One from Germantown, Pa., is very small, measuring only 15 millimetres in diameter. It is globose, shining, sometimes imperforate, and generally without the parietal tooth. It is impossible to distinguish it from forms of *H. bucculenta*." Of the latter, he gives *H. thyroides*, var. B. of Pfeiffer, as a synonym.

Now, the Germantown variety of *H. thyroides* also occurs in this vicinity, and agrees exactly with DeKay's description of *H. rufa*. I have not, however, found it imperforate, and the parietal tooth is generally slightly developed in mature shells.

The young shells of *H. albolabris* and *H. thyroides* closely resemble each other, perhaps cannot be distinguished, except by color in the rufous variety of the latter.

I would designate this shell as

HELIX THYROIDES, var. RUFA,

Synonym, *Helix rufa*, De Kay,

and if it is "impossible" to distinguish between this and *H. bucculenta*, Gld., I would add it also to the synonymy.*

* *Note by the Editor.*—We think, with our correspondent, that *H. bucculenta* is, probably, identical with DeKay's species; at least, we can perceive no difference between it and what has hitherto been regarded as the Philadelphia form of *H. thyroides*. The more globose form, darker color, smaller size, etc., serve to distinguish it from *thyroides*. We are inclined to consider it a distinct species, however, rather than a variety. Its geographical distribution is extensive. DeKay gives the localities, Rockland and Orange Counties, New York; and Dr. Gould, Georgia to Texas. To these I add the following, of specimens in my cabinet, Newbern, N. C.; Antietam, Md.; Trenton and Atlantic City, N. J.; Germantown, Pa.

REMARKS ON THE ORIGIN AND DISTRIBUTION OF
THE OPERCULATED LAND SHELLS WHICH
INHABIT THE CONTINENT OF AMERICA
AND THE WEST INDIES,
WITH A CATALOGUE OF THE AMERICAN SPECIES.

BY THOMAS BLAND.

In a paper "On the Geographical Distribution of the Genera and Species of Land Shells of the West India Islands, with a Catalogue of the Species of each Island," (*Annals of the Lyceum*, N. Y., VII., 1861). I referred to Darwin's remark, that "the species of all kinds, which inhabit Oceanic islands, are few in number, compared with those on equal continental areas," and that the affinity of the inhabitants of islands is "to those of the nearest mainland, without being actually the same species."

I observed, that "the generic affinity of the land shells of the West India Islands to those of the adjacent parts of the American Continent is certainly intimate, but the existence of several genera, not represented on the Continent, shows other relationships,—the operation, it may be, of local causes. Seeing, moreover, the greater number of both genera and species, absolutely and proportionately, in the islands under consideration, it may not unreasonably be suggested that the insular stamp has rather been impressed on the fauna of the adjacent Continent, than the reverse."

With reference to the questions above noticed, I propose to offer some further observations on the relations of the land shell faunas of the American Continent and the West Indies to each other, and to the faunas of other countries. My remarks, for the present, will be confined to the origin and distribution of the operculated shells. I adopt the classification of Pfeiffer (*Mon.*, 1865), giving the total number of genera and species in each Family and Subfamily, and the names (with number of species) of the genera represented in America and the West Indies. I indicate the numbers of species which occur in North America (excluding Mexico), Mexico (exclusive of Lower California), Central America (including Yuc-

tan), South America (including the whole of New Grenada), and the West Indies. In using the term *origin*, applied to Families, Subfamilies and Genera, I refer to the country in which there is the maximum specific representation.

PNEUMONOPOMA.

Subordo. I.—OPISOPHTHALMA.

Fam. I.—ACICULACEA.

Origin.—West Indies; 4 genera, 67 species.

	Total Species.	N. Am.	Mex.	C. Am.	S. Am.	W. I., especially.
GEOMELANIA,	21	—	—	—	—	21 Jamaica.
CHITTYA,	1	—	—	—	—	1 “
TRUNCATELLA,	39	5	2	—	2	16 Cuba.

Fam. II.—DIPLOMATINACEA.

Origin.—Asia and Oceanica; 3 genera, 23 species; no representation in America or West Indies.

Subordo. II.—ECTOPHTHALMA.

Fam. I.—CYCLOSTOMACEA.

Subfam.—*Cyclotca*.*

* I alter the order in which the names of Subfamilies are given by Pfeiffer, for the purpose of bringing together those of similar origin.

Origin.—Asia; 7 genera, 190 species.

	Total Species.	N. Am.	Mex.	C. Am.	S. Am.	W. I., especially.
CYCLOTUS,	111	—	2	4	16	40 Jamaica.

Subfam.—*Cyclophora*.

Origin.—Asia and Oceanica; 5 genera, 228 species. CRASPEDOPOMA (5 species) belongs to the Azores and Canaries.

	Total Species.	N. Am.	Mex.	C. Am.	S. Am.	W. I., especially.
CYCLOPHORUS.	163	—	3	3	8	6 Martinique and Guadeloupe.

Subfam.—*Pupinea*.

Origin.—Asia; 9 genera, 89 species.

	Total Species.	N. Am.	Mex.	C. Am.	S. Am.	W. I., especially.
MEGALOMASTOMA,	27	—	—	2	1	17 Cuba.

Subfam.—*Realica*.

Origin.—Asia (Oceanica), 5 genera, 75 species.

	Total Species.	N. Am.	Mex.	C. Am.	S. Am.	W. I., especially.
HYDROCENA,	27	—	—	—	1	—
BOURCIERA,	2	—	—	—	2	—

Subfam.—*Cyclostomca*.

Origin.—Africa; 5 genera, 172 species.

	Total Species.	N. Am.	Mex.	C. Am.	S. Am.	W. I., especially.
CYCLOSTOMUS,	113	—	—	—	—	23 Jamaica.
TUDORA,	34	—	1	—	—	28 “

Subfam.—*Pomatiatea*.

Origin.—Europe; 1 genus, 24 species; not found in America or the West Indies.

Subfam.—*Licinea*.

Origin.—West Indies; 7 genera, 101 species. The genus *CYCLOTOPSIS* (2 species) is peculiar to Asia.

	Total Species.	N. Am.	Mex.	C. Am.	S. Am.	W. I., especially.
JAMAICEA,	2	—	—	—	—	2 Jamaica.
LICINEA,	6	—	—	—	—	4 Cuba? Haiti?
CHOANOPOMA,	49	—	—	—	—	49 Cuba, Jamaica.
CTENOPOMA,	25	—	—	—	—	25 Cuba.
DIPLOPOMA,	1	—	—	—	—	1 “
ADAMSIELLA,	16	—	—	1	1	12 Jamaica.

Subfam.—*Cistulea*.

Origin.—West Indies; 2 genera, 134 species.

	Total Species.	N. Am.	Mex.	C. Am.	S. Am.	W. I., especially.
CISTULA,	40	—	1	8	2	26 Cuba.
CHONDROPOMA,	94	1	3	2	4	81 “ Haiti.

Fam. II.—*HELICINACEA*.Subfam.—*Stoastomea*.

Origin.—West Indies; 1 genus, 83 species, of which 1 occurs in the Island of Opara.

	Total Species.	N. Am.	Mex.	C. Am.	S. Am.	W. I., especially.
STOASTOMA,	83	—	—	—	—	82 Jamaica.

Subfam.—*Helicinea*.

Origin.—West Indies; 5 genera, 344 species.

	Total Species.	N. Am.	Mex.	C. Am.	S. Am.	W. I., especially.
TROCHATELLA,	33	—	—	—	1	30 Cuba.
LUCIDELLA,	5	—	—	—	—	5 Jamaica.
HELICINA,	273	5	23	18	26	103 Cuba, Haiti.
SCHASICHEILA,	5	—	2	1	—	1 New Providence, Bahamas.
ALCADIA,	28	—	—	—	1	26 Jamaica, Cuba.

Subfam.—*Georissea*.

Origin.—Asia; 1 genus, 4 species; peculiar to Asia.

Totals, 55 genera, 1534 species. Total species on the American Continent 150, being about 10 per cent., and in the West Indies 599 species, being 39 per cent. of the known operculated land shells, excluding those referred to by Pfeiffer as “*incertæ sedis vel omnino dubia*.”

It appears from the foregoing, if the origin of *Families* only be considered, that the origin and distribution of the operculated species in America and the West Indies, is as follows:—

Origin.	No. of Sp. America.	Per cent.	No. of Sp. W. Indies.	Per cent.
Asiatic,	66	44	314	52½
West Indian,	84	56	285	47½
	<hr/> 150	<hr/> 100	<hr/> 599	<hr/> 100

This would lead to the inference that the Asiatic and West Indian influences are not far from equal in the Islands, and that the latter predominates on the Continent.

If, however, the origin of *Families* and *Subfamilies* (in those cases in which the former are subdivided) be considered,—by no means an unreasonable way of treating the question,—the results are very striking.

Origin.	No. of Sp. America.	Per cent.	No. of Sp. W. Indies.	Per cent.
African,	1	½	51	8½
Asiatic,	42	28	63	10½
West Indian,	107	71½	485	81
	<hr/> 150	<hr/> 100	<hr/> 599	<hr/> 100

The greater African influence in the Islands, and Asiatic on the Continents, is rather to be expected, on the supposition that America would receive African colonists from the West Indies, and the latter Asiatic colonists from the former.

The following table, prepared on the same basis as the one immediately preceding, shows, in a very interesting manner, the various degrees in which the African, Asiatic and West Indian influences appear to have been exerted in different sections of the American Continent:—

Origin.	N. Am.	Per cent.	Mexico.	Per cent.	C. Am.	Per cent.	S. Am.	Per cent.
African,	—	—	1	2½	—	—	—	—
Asiatic,	—	—	5	13½	9	23½	28	44½
West Indian,	11	100	31	84	30	76½	35	55½
	<hr/> —	<hr/> —	<hr/> 37	<hr/> 100	<hr/> 39	<hr/> 100	<hr/> 63	<hr/> 100

Total on the Continents, 150 species.

It will be noticed (from the last table), that the African influence is manifest only in Mexico, where the Asiatic influence is at its minimum, and the West Indian (the rest of North America excepted) at its maximum; that the Asiatic influence is greatest in South America, diminishing towards the North, while the West Indian influence has its maximum in the North, and becomes gradually less towards the South.

It is remarkable that on the Continent of America there is no peculiar genus of operculated shells, save *Bourciera* (*Cyclostomacea*), of which 2 species only are known, and *Schasicheila* (*Helicinacea*), embracing 5 species, while in the Islands there are very many strictly West Indian genera represented by a multiplicity of species.

The facts regarding the distribution of the operculated land shells most certainly do not support the statement of Darwin, that "the species of all kinds which inhabit Oceanic islands are few in number, compared with those on equal continental areas;" but they do lead to the conclusion, in the case under consideration, that the insular stamp, as I have elsewhere observed, has rather been impressed on the fauna of the adjacent continents, than the reverse.

I have not closely examined the subject, but believe that the distribution of operculated species in other islands or groups of islands (for example, Madagascar and Ceylon) show the same connection with the continents adjacent to them, as exists between the West Indies and America. The question is suggested, Are the faunas of the islands more ancient than those of the continents?

It is a noticeable fact, bearing on the relationship of the American and West Indian operculated shell faunas, that the identical species common to both are very few.

The following are the only examples known to me:—

<i>Cyclotus translucidus</i> , Sowb.,	Columbia and Ins. Trinidad.
<i>Chomotropoma dentatum</i> . Say,	Florida and Cuba.
<i>Helicina subglobulosa</i> , Poey,	" "
" <i>Dysoni</i> , Pfr.,	Honduras and Ins. Trinidad.

Several species of *Truncatella* are common to both faunas, but the habits of that genus are rather maritime than terrestrial.

On a future occasion I may attempt a similar inquiry relative to the origin and distribution of the inoperculated species.

CATALOGUE OF THE OPERCULATED LAND SHELLS
WHICH INHABIT THE CONTINENT OF AMERICA.

[NOTE.—In the following Catalogue, the Genera and Species are arranged in the order adopted by Pfeiffer (Mon. 1865), and the numbers are given of the sections (§) into which he divides the Genera.]

PNEUMONOPOMA.

Subordo. I.—OPISOPHTHALMA.

Fam.—ACICULACEA.

TRUNCATELLA.

- | | | |
|-----|------------------------------|-----------------------------|
| § 2 | <i>subcylindrica</i> , Gray, | Florida, W. Indies. |
| | <i>californica</i> , Pfr., | California. |
| | <i>pulchella</i> , Pfr., | Florida, W. Indies. |
| 3 | <i>curibæensis</i> , Sowb., | Florida, Mexico, W. Indies. |
| | <i>bairdiana</i> , Ad., | Panama. |
| | <i>bilabiata</i> , Pfr., | Florida, Mexico, W. Indies. |
| 4 | <i>rostrata</i> , Gould, | Brazil. |

Subordo. II.—ECTOPHTHALMA.

Fam.—CYCLOSTOMACEA.

Subfam. I.—*Cyclotca*.

CYCLOTUS.

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| § 1 | <i>giganteus</i> , Gray, | Columbia. |
| | <i>quitoensis</i> , Pfr., | Quito, N. Grenada. |
| | <i>duikeri</i> , Pfr., | Equador, N. Grenada. |
| | <i>inca</i> , Orb., | Venezuela, Bolivia. |
| | <i>translucidus</i> , Sowb., | Columbia, Guatemala,
Ins. Trinidad. |
| | <i>popayanus</i> , Lea., | N. Grenada. |
| | <i>prominulus</i> , Fer., | Brazil. |
| 2 | <i>angulatus</i> , Sowb., | N. Grenada. |
| | <i>granulatus</i> , Pfr., | Equador. |
| | <i>boyotensis</i> , Pfr., | N. Grenada. |

3	<i>laxatus</i> , Sowb.,	Columbia.
4	<i>stramineus</i> , Rv.,	Columbia.
	<i>Dysoni</i> , Pfr.,	Mexico, Honduras.
4	<i>glaucostratus</i> , Pfr.,	Venezuela.
	<i>bisinuatus</i> , Martens,	Costarica.
5	<i>distinctus</i> , Sowb.,	Columbia.
9	<i>Berendti</i> , Pfr.,	Mexico.
	<i>discoideus</i> , Sowb.,	Demerara.
10	<i>incomptus</i> , Sowb.,	N. Grenada.

Subfam. II.—*Cyclophorea*.

CYCLOPHORUS.

8	<i>Mexicanus</i> , Menke,	Mexico.
12	<i>lutescens</i> , Pfr.,	Mexico.
15	? <i>purus</i> , Forbes,	Central America.
	<i>Cumingi</i> , Sowb.,	Columbia.
	<i>haematomma</i> , Pfr.,	Equador.
	<i>Bourcierii</i> , Pfr.,	Equador.
	<i>Guayaquillensis</i> , Sowb.,	Guayaquil.
	<i>psilomitus</i> , Pfr.,	Venezuela.
	? <i>Gaji</i> , Hupé,	Chili.
16	<i>pouderosus</i> , Pfr.,	Guatemala.
	<i>Boncardi</i> , Sallé,	Mexico.
	<i>texturatus</i> , Sowb.,	Guatemala.
	<i>Cuyennensis</i> , Shuttl.,	French Guiana.
17	? <i>Moricandi</i> , Pfr.,	Brazil.

Subfam. III.—*Pupinea*.

MEGALOMASTOMA.

1	<i>bifasciatum</i> , Sowb.,	Guayaquil.
3	<i>simulacrum</i> , Mor.,	Guatemala.
	<i>Guatemalense</i> , Pfr.,	Guatemala.

Subfam. IV.—*Licina*.

ADAMSIELLA.

4	<i>chlorostoma</i> , Sowb.,	Demerara.
	<i>Osberti</i> , Tristram,	Guatemala.

Subfam.—*Cyclostomea*.

TUDORA.

2	<i>pluviospira</i> , Pfr.,	Mexico.
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Subfam.—*Cistulea*.

CISTULA.

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| § 1 | <i>pleurophora</i> , Pfr., | Honduras. |
| 2 | <i>radiosa</i> , Mor., | Guatemala. |
| | <i>Tamsiana</i> , Pfr., | Venezuela. |
| 3 | <i>Gruneri</i> , Pfr., | Honduras. |
| | <i>Küsteri</i> , Pfr., | Honduras. |
| 4 | ? <i>acerbula</i> , Mor., | Guatemala. |
| 5 | <i>Thoreyana</i> , Phil., | Bolivia. |
| 6 | <i>Grateloupi</i> , Pfr., | Yucatan, West Indies? |
| | <i>Largillierti</i> , Pfr., | Yucatan. |
| | <i>rigidula</i> , Mor., | Guatemala. |
| 7 | <i>trochlearis</i> , Pfr., | Mexico, Guatemala. |

CHONDROPOMA.

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|---|-------------------------------|----------------|
| 2 | <i>plicatulum</i> , Pfr., | Venezuela. |
| | <i>Venezuelense</i> , Pfr., | Venezuela. |
| | <i>Cumanense</i> , Pfr., | Cumana. |
| | ? <i>vespertinum</i> , Mor., | Mexico. |
| 4 | <i>dentatum</i> , Say, | Florida, Cuba. |
| 5 | ? <i>turritum</i> , Pfr., | Honduras. |
| | <i>subauriculatum</i> , Pfr., | Cumana. |
| 7 | <i>rubicundum</i> , Mor., | Guatemala. |
| | <i>Cordovanum</i> , Pfr., | Mexico. |
| 9 | <i>truncatum</i> , Wieg., | Mexico? |

Subfam.—*Realica*.

HYDROCENA.

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| <i>Bridgesi</i> , Pfr., | Chili. |
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BOURCIERA.

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|-------------------------------|----------|
| <i>helicinæformis</i> , Pfr., | Equador. |
| <i>Fraseri</i> , Pfr., | Equador. |

Fam.—HELICINEA.

TROCHATELLA.

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|-----|---------------------------|------------|
| § 4 | <i>semilirata</i> , Pfr., | Venezuela. |
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HELICINA.

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|-----|------------------------------|------------------------|
| § 1 | <i>unidentata</i> , Pfr., | Ins. Carmen, Honduras. |
| | <i>lirata</i> , Pfr., | Mexico, Yucatan. |
| 3 | <i>Mohriana</i> , Pfr., | Mexico. |
| | <i>microdina</i> , Mor., | Guatemala. |
| 5 | <i>exigua</i> , Pfr., | Honduras. |
| 8 | <i>sanguinea</i> , Pfr., | Honduras. |
| | <i>occulta</i> , Say, | Indiana, U. S. |
| 9 | <i>crassilabris</i> , Phil., | Venezuela? |

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| 11 | <i>Funcki</i> , Pfr.,
<i>delicatula</i> , Shuttl.,
<i>pellucida</i> , Sowb.,
<i>fragilis</i> , Mor., | N. Granada.
Mexico.
French Guiana.
Guatemala. |
| 12 | <i>Tamsiana</i> , Pfr.,
<i>raresulcata</i> , Pfr.,
<i>sordida</i> , King,
<i>arenicola</i> , Mor., | Venezuela.
Mexico.
Brazil.
Yucatan. |
| 13 | <i>chrysochila</i> , Binn.,
<i>turbinata</i> , Wieg.,
<i>Deppiana</i> , Martens,
<i>Sandozi</i> , Shuttl.,
<i>zephyrina</i> , DuRoi.,
<i>Berndti</i> , Pfr.,
<i>Chiampensis</i> , Pfr.,
<i>Sprucei</i> , Pfr.,
<i>tenuis</i> , Pfr., | North America?
Mexico.
Mexico.
Mexico.
Mexico.
Mexico.
Mexico.
Peru.
Mexico, Yucatan, W. Indies? |
| 13 | <i>vernalis</i> , Mor.,
<i>Oweniana</i> , Pfr.,
<i>tropica</i> , Jan.,
<i>orbiculata</i> , Say,
<i>elata</i> , Shuttl., | Guatemala.
Mexico.
Texas.
Florida, Texas.
Mexico. |
| 14 | <i>riparia</i> , Pfr.,
<i>meridigera</i> , Sallé,
<i>Paraënsis</i> , Pfr.,
<i>Antoni</i> , Pfr., | N. Grenada.
Mexico, Guatemala.
Brazil.
Honduras. |
| 15 | <i>sinuosa</i> , Pfr.,
<i>Hebbsæ</i> , Sallé,
<i>notata</i> , Sallé,
<i>hemastoma</i> , Moric.,
<i>chrysochila</i> , Shuttl.,
<i>Hanleyana</i> , Pfr.,
<i>flavida</i> , Menke,
<i>Strebli</i> , Pfr.,
<i>brasilabris</i> , Pfr., | Mexico?
Mexico.
Mexico.
Brazil.
Mexico.
Louisiana.
Mexico, Guatemala.
Mexico.
Mexico. |
| 16 | <i>sylatica</i> , Orb.,
<i>Dytoni</i> , Pfr.,

<i>diaphana</i> , Pfr., | Bolivia.
Honduras, Venezuela,
Ins. Trinidad.
Honduras. |
| 17 | <i>oresigyna</i> , Orb., | Bolivia. |
| 18 | <i>fulva</i> , Orb.,
<i>Brazilensis</i> , Gray, | Bolivia.
Brazil. |
| 19 | <i>Sowchiana</i> , Pfr.,
<i>Columbiana</i> , Phil.,
<i>gonochila</i> , Pfr., | Guatemala.
Columbia.
Venezuela. |
| 20 | <i>Limbini</i> , Pfr.,
<i>subglobulosa</i> , Poey, | Mexico, Guatemala.
Florida, West Indies. |

	<i>maculata</i> , Sowb.,	South America.
	<i>Chryseis</i> , Tristram,	Guatemala.
21	<i>amena</i> , Pfr.,	Honduras.
23	<i>Ghiesbreghtii</i> , Pfr.,	Mexico.
	<i>Kieneri</i> , Pfr.,	Venezuela.
	<i>caracolla</i> , Moric.,	Brazil.
	<i>cinctella</i> , Shuttl.,	Mexico.
23	<i>concentrica</i> , Pfr.,	Venezuela, N. Grenada.
	<i>carinata</i> , Orb.,	Bolivia.
	<i>Lundi</i> , Beck,	Brazil.
24	<i>Candiana</i> , Orb.,	Venezuela.
26	<i>angulata</i> , Sowb.,	Brazil.
27	<i>Beschei</i> , Pfr.,	Brazil.
	<i>variabilis</i> , Wagn.,	Brazil.
	<i>Tilei</i> , Pfr.,	Brazil.
28	<i>rostrata</i> , Mor.,	Guatemala.
	<i>Salvini</i> , Tristram,	Guatemala.
	<i>rhynchostoma</i> , Shuttl.,	Columbia.
	<i>denticulata</i> , Pfr.,	Honduras.

SCHASICHEILA.

	<i>Nicoleti</i> , Shuttl.,	Mexico.
	<i>alata</i> , Menke,	Mexico.
	? <i>pannucea</i> , Mor.,	Guatemala.

ALCADIA.

	? <i>sericca</i> , Drouet,	Cayenne.
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NOTE.—I find that, in the foregoing paper and Catalogue, *Cyclotus Cooperi*, Tryon, (Phila. Proc., 1863,) of Mexico, has been omitted. Pfeiffer has also overlooked it.

NOTE ON THE INTERNAL STRUCTURE OF MEGASPIRA.

BY THOMAS BLAND.

Lea gave the generic name of *Megaspira* (Obs. II., p. 21,) to *Pupa elatior*, Spix, which, with the allied species *elata*, Gould, was placed by Pfeiffer (Mon. II. and III.) in the genus *Balea*. In his last Supplement (Mon. IV.), Pfeiffer adopts *Megaspira*, considering it entitled to generic rank.



Megaspira elatior,
Spix.

In a late examination of the internal structure of species of *Cylindrella*, I opened a specimen of *Megaspira elatior*, and finding it extremely curious, and, so far as I can learn, hitherto unnoticed by authors, I now describe it.

In the centre and on the under side of the septa, beginning at about the twelfth whorl from the apex, there is a raised lamina, which is continued to the aperture, where it terminates on the parietal wall.

A single lamina revolves on the axis in the upper whorls, but lower down, where the septal lamina commences, there are two or three, the lowest projecting obliquely, and with a sinuous margin, which is obsolete on the last whorl. These axial laminae terminate on the columellar margin of the aperture. Within several of the lower whorls, on the septa, there are two or three curved lamellae, at right angles with the axis, some of them armed with a hook, the point of which is directed towards the axis.

The transverse lamellae and lamina, of peculiar form, with sinuous margin, I have not observed in any species of *Cylindrella*. Of the alliances of *Megaspira* with other genera, shown by the buccal plate and lingual band, I have not seen any notice.

ILLUSTRATIONS OF MIOCENE FOSSILS, WITH
DESCRIPTIONS OF NEW SPECIES.

BY T. A. CONRAD.

NASSIDÆ.

NASSA, Lam.

Subgenus, BULLIOPSIS, Conrad.

This subgenus is distinguished by the absence of conspicuous striæ or ribs, while the species are variable in form, and the labrum is without lines within.

N. QUADRATA, Conrad.—Pl. 3, fig. 1.

Description.—Ovately turritid; whorls scalariform, with an obtuse revolving ridge on the angle; body whorl slightly contracted below the ridge; columella callous, with the deposit broad.

N. quadrata, Conrad.—Journ. Acad. Nat. Sci., Vol. VI., p. 226, pl. 9, fig. 16.

This is a variable, but distinct species; on the body whorl are indistinct revolving lines near the base, and occasionally irregular obsolete lines on the ridge.

Locality.—St. Mary's Co., Md.

N. MARYLANDICA, Conrad.—Pl. 3, fig. 3.

Description.—Oblong-ovate, entire; whorls 6, slightly convex; body whorl slightly flattened laterally; suture impressed; spire conical; columella callous, broad and thick on the summit; aperture about half the length of the shell.

Bullia Marylandica, Conrad.—Proceed. Acad. Nat. Sci., 1862, p. 287.

Locality.—St. Mary's Co., Md.

N. INTEGRATA, Conrad.—Pl. 3, fig. 5.

Description.—Ovate; spire conical; whorls convex; body whorl ventricose; aperture elliptical, nearly half the shell's length; columella thick and reflexed, but without a prominent callus.

Buccinum integrum, Conrad.—Proceed. National Institution, p. 194.

Variety, *OVATA*, Conrad.—Pl. 3, fig. 4. (Proceed. Acad. Nat. Sciences, 1862, p. 287.)

Locality.—Calvert Cliffs, Md.

N. SUBCYLINDRICA, Conrad.

Description.—Ovately turritid, sub-cylindrical; body whorl slightly contracted; base with revolving lines; summits of the whorls slightly flattened or sub-scalariform.

This species differs from *N. quadrata*, in being without revolving lines at base, without a revolving ridge below the suture, and in having the whorls only slightly flattened at summit. These four species have been determined by a comparison of the young shells of each form.

VOLUTIDÆ.

VOLUTIFUSUS, Conrad.

Description.—Fusiform; body whorl finely striated or smooth, with the exception of the shoulder, which is sometimes tuberculated; columella plaited, folds 2 to 3, sometimes very prominent, oblique; apex papillated; initial whorl acute, sub-spiral, narrow; beak produced, recurved or sinuous.

This genus, so long confounded with *Voluta*, is remarkably characteristic of Miocene strata in Europe and America. Its narrow base and recurved beak distinguish it from the former. The species are more variable and difficult to distinguish than those of *Voluta*. The only recent form with which they might be regarded as congeneric is *Voluta dubia*, Broderip. The species in this country are:—*V. Trenholmii*, Tuomey and Holmes; *V. obtusa*, Emmons; *V. solitaria*, Conrad; *V. mutabilis*, Conrad, and *V. typos*, Conrad. Those of Europe:—*V. Lamberti*, Sowerby; *V. Turbelliana*, Grateloup; *V. auris-leporis*, (Sowerby,) Grat. There is no true *Voluta* in the Tertiary formations of North America. The recent genus is almost exclusively limited to Australia, Southern Africa, and the Indian Ocean. *V. Junonia* (genus *Scaphellu*, Swainson,) is the only one of the living *Volutidæ* on the United States coast. It inhabits the waters of the keys near Tampa Bay.

where I found fragments and saw a whole specimen. Also South Carolina, on the authority of Dr. Ravenel.

The *V. musica* is the only species which can be certainly referred to *Voluta*, as restricted, in the West Indies.

V. TYPUS, Conrad.—Pl. 3, fig. 2.

Description.—Fusiform, thick in substance; whorls 6, besides the initial one, slightly concave above, with an angle near the suture, obscurely plicated; labrum thick near the summit, with an acute margin; columella with two distinct, little prominent folds; beak sinuous.

Locality.—North Carolina.

CANCELLARIDÆ.

CANCELLARIA, Lam.

C. PERSPECTIVA, Conrad.—Pl. 3, fig. 6.

Description.—Sub-globose, with irregular, oblique, prominent, narrow, distant ribs, and prominent, flattened, revolving striae, with an intermediate fine line; spire very short, conical; whorls profoundly channelled at the suture; aperture ovate; labrum with short, prominent lines within, and the margin undulated; umbilicus large, exhibiting the volutions to the apex, alternately striated within, margin acute; columella with 3 plaits, the upper one largest, and the lowest one small.

Locality.—James River, Virginia, near Smithfield.

C. BIPLICIFERA, Conrad.—Pl. 3, fig. 9.

Description.—Sub-ovate, with rather thick, prominent ribs, and revolving, broad striae, and an intermediate fine line; ribs slightly convex; summits of the whorls widely and deeply channelled; shoulder coronated; umbilicus small; columella concave, biplicate.

C. biplicifera, Conrad.—Journ. Acad. Nat. Sciences, Vol. VIII., p. 187.

Locality.—Calvert Cliffs, Md.

C. ALTERNATA, Conrad.—Pl. 4, fig. 7.

Description.—Whorls 6, rounded, with nine or ten prominent ribs, and prominent revolving distant striae, and an intermediate fine line; spire conical; aperture less than half the length of the shell, sub-ovate; columella 3-plaited, plaits decreasing in size towards the base; umbilicus small; summits of volutions flattened; 5 of the larger revolving lines on the penultimate whorl.

C. alternata, Conrad.—Journ. Acad. Nat. Sciences, Vol. VII., p. 155.

C. ENGONATA, Conrad.—Pl. 4, fig. 8.

Description.—Short-fusiform, longitudinally ribbed, with prominent revolving lines, about 12 in number, from the shoulder to base; whorls 5; spire conical, scalariform; aperture lunate; columella three-plaited, the middle one very oblique.

C. engonata, Conrad.—Journ. Acad. Nat. Sciences, Vol. VIII., p. 188.

Locality.—Calvert Cliffs, Md.

C. PLAGIOSTOMA, Conrad.—Pl. 4, fig. 15.

Description.—Short fusiform, with numerous prominent ribs, and distant, prominent revolving lines; spire scalariform; whorls 6, with one prominent revolving line on the flattened summit; aperture more than half the shell's length; columella three-plaited, the superior one very prominent, and continued into a ridge revolving to the base; base narrow, slightly produced and twisted; sub-umbilicated.

C. plagiostoma, Conrad.—Journ. Acad. Nat. Sciences, Vol. VII., p. 136.

Locality.—James River, near Smithfield, Virginia.

C. SCALARINA, Conrad.—Pl. 4, fig. 17.

Description.—Sub-fusiform; volutions 6; ribs numerous, prominent; revolving lines very prominent, distant, four on the penultimate whorl below the angle, and four or five close, fine lines above; spire scalariform, prominent; aperture less than half the shell's length; labrum without lines, but with slight furrows, corresponding to the ribs opposite; columella three-plaited, the two lower folds approximate; base slightly produced, sub-acute.

Locality.—Virginia?

MURICIDÆ.

BUSYCON, Bolten.

B. ALVEATUM, Conrad.—Pl. 3, fig. 7.

Description.—Pyriform or sub-fusiform; substance moderately thick; spire prominent, scalariform, angle of whorls situated much above the middle, carinated on the angle; summit channelled, the canal margined by a prominent line, broad on the body whorl; space between the two revolving lines slightly concave; columella with a salient angle on its lower half.

Locality.—St. Mary's River, Md.

A much smaller species than its nearest congener *B. incile*, with angular volutions, less ventricose, and an angular columella, which in the other is rounded; the sutural channel is much less profound.

B. STRIATUM, Conrad.—Pl. 3, fig. 8.

Description.—Pyriform; spire moderately prominent, conical; whorls nearly straight or indistinctly concave laterally; angles immediately above the suture furnished with numerous small, close tubercles; suture impressed, not channelled; surface covered with distinct revolving rugose lines, except a space on the lower part of the body whorl, where they are finer, and about four in number; labrum within striated throughout its whole length.

Locality.—Virginia or Maryland.

CYPRÆIDÆ.

CYPRÆA, Lin.

C. ANNULIFERA, Conrad.—Pl. 4, fig. 19.

Proceed. Acad. Nat. Sciences, 1862, p. 567.

This species is approximate to *C. annularia*, Brong.

EULIMIDÆ.

NISO, Risso.

N. LINEATA, Conrad.—Pl. 4, fig. 13.

Description.—Subulate, polished, with obsolete revolving lines; body whorl angulated and slightly carinated at its greatest diameter; whorls 10 or 11, with a deep angular groove at the suture.

Bonellia lineata, Conrad.—Journ. Acad. Nat. Sciences, Vol. VIII., p. 188.

Locality.—Calvert Cliffs, Md.

AURICULIDÆ.

TIFATA? A. and H. Adams.

T. LONGIDENS, Conrad.—Pl. 4, fig. 12.

Descriptions.—Acutely oval; spire conical, apex mucronate; whorls 7; suture profound; aperture very narrow, dentato-striate within; columella with an elongated, slightly curved plait, directed obliquely upwards.

Melampus longidens, Conrad.—Proceed. Acad. Nat. Sciences, 1862, p. 584.

Locality.—Yorktown, Virginia.

I had referred this shell to a new subgenus, *Ensiphorus*, as it has only the one large fold, but it is, more probably, a true *Tifata*, although that genus has two columellar folds.

SAXICAVIDÆ.

SAXICAVA, Bellevue.

S. PARILIS, Conrad.—Pl. 4, fig. 6.

Description.—Sub-oval, ventricose, equilateral, very thin in substance, end margins nearly equally rounded, summit prominent, lines of growth minute.

Locality.—Shiloh, N. J.

ANATINIDÆ.

PERIPLOMA, Schum.

P. ALTA, Conrad.—Pl. 4, fig. 10.

Description.—Obtusely ovate in the adult, substance thin; sub-orbicular when young; posteriorly ventricose; anterior side sub-rostrated, compressed; the end truncated, direct, much above the basal line, which is profoundly rounded; anterior submargin of the right valve with a slightly raised line, anterior to which the valves are suddenly contracted.

Locality.—Shiloh, Cumberland Co., N. J.

This large species is abundant, but always more or less distorted in the adult specimens, so that the large figure is only approximate, but the young appears to have its original form, as given in the figure. It is allied to the very small species of the Southern coast, *P. papyratia* (*Anatina*), Say, which is represented in fig. 9 for comparison, and is the only figure yet published of that recent species. *P. alta* is unknown in any other locality than Shiloh.

THRACIA, Leach.

T. MYLEFORMIS, Conrad.—Pl. 4, fig. 3.

Description.—Ovate, inequilateral; posterior side somewhat produced, compressed, much reflexed; the end acutely rounded.

Saxicava myleformis, Conrad.—Proceed. Acad. Nat. Sciences, 1862, p. 585.

Locality.—With the preceding.

This small species has much resemblance in outline and surface to *Mya arenaria*.

The figure is only approximate to the true outline, as the shell is slightly crushed.

MACTRIDÆ.

SPISULA, Gray.

S. CAPILLARIA, Conrad.—Pl. 3, fig. 10.

Description.—Triangular, subequilateral; umbo prominent; lunule not defined; surface with prominent or coarse lines of growth; anterior margin very regularly rounded; posterior side sub-cuneate, slightly contracted or flattened on the disk; umbonal slope abrupt, but undefined by an angle, except on the umbo; posterior slope with hair-like, oblique lines; lateral teeth striated with minute, but distinct lines.

Locality.—James River? Va.

TELLINIDÆ.

TELLINA, Lin.

Subgenus, ANGULUS, Muhlfeldt.

T. PERACUTA, Conrad.—Pl. 4, fig. 11.

Description.—Elliptical, subequilateral; posteriorly rostrated and acute.

Locality.—Shiloh, Cumberland Co., N. J.

A small species, allied to *T. polita*, Say, but longer in proportion, and more acute.

Subgenus, TELLINELLA? Gray.

T. CAPILLIFERA, Conrad.—Pl. 4, fig. 2.

Description.—Triangular, inequilateral, very thin in substance; umbonal slope of right valve slightly carinated, sub-marginal, straight, bounded posteriorly by a slightly impressed line, end sub-truncated, much above the line of the base; surface with minute, close, hair-like, concentric lines on the anterior side; lateral teeth prominent; left valve ventricose.

Locality.—Shiloh, Cumberland Co., N. J.

The extreme fragility of this shell has prevented me from ascertaining the hinge of the deeper valve, and the species is, therefore, only provisionally referred to *Tellinella*.

MYSIA, Leach.

M. PABILIS, Conrad.—Pl. 4, fig. 1.

Description.—Equilateral, nearly circular, ventricose, thin and fragile; basal and anterior margin regularly rounded.

Locality.—Shiloh, Cumberland Co., N. J.

ASTARTE, Sowerby.

A. COMPSONEMA, Conrad.—Pl. 4, fig. 18.

Description.—Sub-triangular, inequilateral, slightly convex; ornamented with regular, sub-equal, close, concentric lines, rounded, slightly recurved, between 45 and 50 in number; apex prominent, acute; lunule lanceolate; dorsal margin very oblique, slightly sinuous; posterior side slightly contracted; extremity much above the line of the base, and obtuse.

Locality.—Virginia?

This elegant species is more elevated than *A. concentrica*, Con., and has more numerous and finer lines; it differs from *A. bella*, Con., in having rather larger lines, and in the hinge-plate being much narrower, and the lunule much less excavated. The genus is remarkably developed in the American Miocene, 18 species having been described, whilst 4 species only have been obtained from the Eocene, and there are but 3 recent species on the Atlantic coast, as far North as Massachusetts; and, except *A. castanea*, Say, they do not live South of that State. There is a curious blending of tropical or sub-tropical genera in the American Miocene, with forms which are prevalent in Northern latitudes. Thus *Cypræa*, *Conus* and *Crassatella* lived on the Virginia coast in company with many species of *Astarte*, of which genus no species has been found even in the Postpliocene of Virginia or Carolina.

A. DISTANS, Conrad.—Pl. 4, fig. 14.

Description.—Triangular, convex-depressed, with four broad, concentric undulations; concentric lines unequal; umbo flattened, with prominent, small, concentric ribs; inner margin minutely crenulated.

A. distans, Conrad.—Proceed. Acad. Nat. Sciences, 1862, p. 288.

Locality.—Shiloh, Cumberland Co., N. J.

A. THOMASII, Conrad.—Pl. 4, fig. 16.

Description.—Triangular, slightly ventricose; ribs robust, rounded, recurved; concentric lines minute; towards the posterior end, the ribs become obsolete; posterior extremity sub-truncated nearly direct; summit prominent; lunule large, acutely ovate, deeply impressed; inner margin crenulated.

A. Thomasi, Conrad.—Proceed. Acad. Nat. Sciences, 1855, p. 267.

Locality.—Near Mullica Hill, N. J.

CARDITIDÆ.

CARDITAMERA, Conrad.

C. ACULEATA, Conrad.—Pl. 4, fig. 5.

Description.—Trapezoidal, inequilateral; umbonal slope ventricose; base emarginate in the middle; disk contracted in the middle; ribs very large over the umbonal slope; anterior ribs erenulated; the larger ribs and the dorsal sub-margin with prominent scales.

Locality.—Shiloh, Cumberland Co., N. J.

I found one valve only, of this small and distinct species.

MYTILIDÆ.

LITHOPHAGA, Bolten.

L. SUBALVEATA, Conrad.—Pl. 4, fig. 4.

Description.—Oblong, very thin and fragile, ventricose, posterior side produced, a slight wide furrow marks the umbonal slope, on and behind which are concentric grooves and lines; basal margin slightly emarginate or contracted.

Locality.—Shiloh, Cumberland Co., N. J.

A single specimen was found penetrating the shell of *Ostrea percrassa*, Conrad.

REFERENCE TO PLATES ILLUSTRATING MR. CONRAD'S
PAPERS.

Plate 3.

- Fig. 1. *NASSA QUADRATA*, Conrad.—P. 65.
 “ 2. *VOLUTIFUSUS TYPUS*, Conrad.—P. 67.
 “ 3. *NASSA MARYLANDICA*, Conrad.—P. 65.
 “ 4. “ *INTEGRA*, var. *OVATA*, Conrad.—P. 66.
 “ 5. “ “ Conrad.—P. 66.
 “ 6. *CANCELLARIA PERSPECTIVA*, Conrad.—P. 67.
 “ 7. *BUSYCON ALVEATUM*, Conrad.—P. 68.
 “ 8. “ *STRIATUM*, Conrad.—P. 69.
 “ 9. *CANCELLARIA BIPLICIFERA*, Conrad.—P. 67.
 “ 10. *SPISULA CAPILLARIA*, Conrad.—P. 71.

Plate 4.

- Fig. 1. *MYSIA PARILIS*, Conrad.—P. 71.
 “ 2. *TELLINELLA CAPILLIFERA*, Conrad.—P. 71.
 “ 3. *THRACIA MYEFORMIS*, Conrad.—P. 70.
 “ 4. *LITHOPHAGA SUBALVEATA*, Conrad.—P. 73.
 “ 5. *CARDITAMERA ACULEATA*, Conrad.—P. 73.
 “ 6. *SAXICAVA PARILIS*, Conrad.—P. 70.
 “ 7. *CANCELLARIA ALTERNATA*, Conrad.—P. 67.
 “ 8. “ *ENGONATA*, Conrad.—P. 68.
 “ 9. *PERIPLOMA (ANATINA) PAPYRATA*, Say.—P. 70.
 “ 10. “ *ALTA*, Conrad.—P. 70.
 “ 11. *TELLINA PERACUTA*, Conrad.—P. 71.
 “ 12. *TIFATA LONGIDENS*, Conrad.—P. 69.
 “ 13. *NISO LINEATA*, Conrad.—P. 69.
 “ 14. *ASTARTE DISTANS*, Conrad.—P. 72.
 “ 15. *CANCELLARIA PLAGIOSTOMA*, Conrad.—P. 68.
 “ 16. *ASTARTE THOMASII*, Conrad.—P. 72.
 “ 17. *CANCELLARIA SCALARINA*, Conrad.—P. 68.
 “ 18. *ASTARTE COMPSONEMA*, Conrad.—P. 72.
 “ 19. *CYPREA ANNULIFERA*, Conrad.—P. 69.

NOTE ON THE GENUS GADUS, WITH DESCRIPTIONS
OF SOME NEW GENERA AND SPECIES OF
AMERICAN FOSSIL SHELLS.

BY T. A. CONRAD.

DENTALIIDÆ.

GADUS, Montagu? Rang. 1829.

Helonyx, Stimpson, 1865.

This genus is attributed to Montagu by Rang, but I can find no such genus in Montagu's Conchology. Deshayes quotes it, *Gadus*, Rang. Dr. Stimpson remarks, that *G. clavatus*, Gould, is the only living species; but *G. gadus*, Montagu informs us, is a "pelagic species, found in many parts of the British Channel, adhering to the *log* (lead) line;" and a few others were obtained by Cuming in America seas. The genus makes its first appearance in the Eocene of Europe and America. The American fossil species are:—*D. pusillum* (*Ditrupa?*), Gabb; *D. subcoarctata* (*Ditrupa*), Gabb; and *D. thallus*, Conrad. There are three species in the Paris Eocene.

ECPHORA, Conrad.

There is one species only in America, and one in the Miocene near Bordeaux, *E. Jauberti* (*Pyrula*), Grateloup, very closely allied to *E. 4-costata*, Say, but having three ribs, whilst the latter has invariably four. There is a remarkable affinity among a number of the Dax and Italian fossils with the Miocene shells of North America; for example, *Cancellaria ampullacea*, Brocc., is allied to *C. biplicifera*, Con.; *Cypræa annularia*, Brong., to *C. annulifera*, Con.; *C. leporina*, Gray, Lam., to *C. Carolinensis*, Con.; the species of *Trochita* near Dax, erroneously referred to *trochiformis*, is allied to *T. perarmato*, Con. *Nerita carinata*, Brocchi (Italy), is a species of *Carinorbis*, Conrad, an American Miocene genus.

VELUTINIDÆ.

LEPTONOTIS, Conrad.

Description.—Sub-oval or sub-rotund; apex distant from the margin; peristome continuing around the body of the volution to near the base of the columella.

Velutina (Oolina) expansa, Whitfield.—*Amer. Journ. Conch.*
Vol. I., p. 265, pl. 27, figs. 14, 15.

This genus differs from *Velutina* in the remarkable expansion of the outer lip, and the distance of the apex from the margin. It was probably unlike *Velutina*, an inhabitant of deep water.

MACTRIDÆ.

CUMINGIA, Sowerby.

C. BOREALIS, Conrad.—*Gould's Invert. of Mass.*, fig. 36.

This shell has long been referred to the fossil *C. tellinoides*. Con., but it is greatly inferior in size, and the height is less in proportion to its length. It inhabits the coast of Massachusetts; South Carolina, on the authority of Dr. Ravenel.

CORBULIDÆ.

CORBULA, Lam.

C. ALIFORMIS, Conrad.

Description.—Elongated, oblique, very inequilateral, with a sinuous anterior margin; hinge margin with a linear groove posteriorly; smaller valve unknown.

C. alta, Conrad.—*Journ. Acad. Nat. Sciences*, 2d Series,
Vol. II., pl. 1, fig. 3, (not *C. alta*, 2d Series, Vol. I., pl. 12,
fig. 33.)

This shell belongs exclusively to the Shell Bluff group, and is very distinct from *C. alta* of the Vicksburg group.

TELLINIDÆ.

MACOMA, Leach.

M. VIRGINIANA, Con.

This species is extinct, and may be distinguished from *M. lusoria* by being proportionally more elevated, rounded at base, and less compressed and reflexed anteriorly. In "Fossil Shells of the Tertiary Formations," this species is described as *T. lusoria*. Say.*

* Inhabits the coast of New Jersey.

ANOMIIDÆ.

DIPLOSCHIZA, Conrad.

Description.—Shell bivalve, with a deeply notched or emarginate hinge in both valves; smaller valve concave; structure laminated.

D. CRETACEA, Conrad.*

Description.—Short-ovate; larger valve ventricose, with one to three distant concentric undulations; umbo truncated; smaller valve deeply concave; cardinal notch carinated on both sides.

Dimensions.—Length $\frac{1}{2}$ inch.

Locality.—Alabama. Cretaceous. Dr. Showalter.

Observations.—This genus seems to approximate more nearly the families *Anomiidæ* and *Terebratulidæ*, bearing the same relation to *Anomia* that *Morrissia* does to *Terebratula*. The shell seems to have been attached by the umbo of the larger valve, the truncature of which reminds us of the truncated beak of *Terebratula*.

TEREBRATULIDÆ.

TEREBRATULINA, D'Orbigny.

T. FILOSA, Conrad.*

Description.—Sub-orbicular, with numerous thread-like, close, ramose, radiating lines.

Locality.—Alabama, in rotten limestone (cretaceous). Dr. Showalter.

This species differs from *T. gracilis*, in having finer lines, and in the wave of the basal margin, which is in the opposite direction from that of *T. gracilis*.

LACUNARIA, Conrad.

Description.—Ovato-conoid or sub-globose, thin in substance, with delicate, close, revolving lines; aperture entire, rounded or round-ovate, angulated posteriorly, margins disunited; columella flattened, with a long groove descending from the umbilicus.

L. ALABAMIENSIS (*Natica*), Whitfield.—Amer. Journ. Conch., Vol. I., p. 265, pl. 27, figs. 9, 10.

* To be figured in the next No. of this Journal.

L. ERECTA (*Natica*). Whitfield.—Ib., fig. 11.

Deshayes figures a number of species of this Eocene genus under the generic name of *Lacuna*. I believe the genus inhabited deep water, unlike *Lacuna*, and probably terminated its existence at the close of the Eocene period. Certainly it is as yet unknown in a later formation.

CYCLOMERA, Conrad.

I propose this name, in place of *Cycloceras*, given by me as a subgenus of *Baculites*, which name is pre-occupied.

DESCRIPTIONS OF NEW SPECIES OF AUSTRALIAN
FRESH-WATER SHELLS.

BY T. A. CONRAD.

I published, in the "Proceedings of the Academy of Natural Sciences of Philadelphia," Vol. V., p. 10—11, Feb., 1850, descriptions of several new species of fresh-water shells from Australia. The *Unios* contained in that paper, were afterwards more fully described by me in the "Journal of the Academy," with lithographic figures; but the univalve shells have, until now, remained unfigured. Finding that a number of new species from the same country have been recently described in the "Zoological Proceedings," London, I now re-publish mine, with colored illustrations, in order to enable naturalists to make more satisfactory comparisons.

1. VIVIPARA SUBLINEATA. Conrad.—t. 1, f. 8.

Description.—"Ventricose, conoidal, sub-umbilicate; volutions 5, ventricose; epidermis olive, polished, with minute obsolete revolving lines; body whorl sub-carinated in the middle; aperture sub-oval. $\frac{7}{8}, \frac{3}{4}$."

Paludina sublineata, Conrad.—Proc. Acad. Nat. Sci., 1850, p. 11.

Locality.—Darling River, Australia.

Observations.—This species belongs to a very distinct group of Viviparidæ of exotic distribution, and which is represented by *V. melanostoma*, Benson; *V. Ceylonica*, Dohrn; *V. pramorsa*, Benson; *V. amplior*, Mousson; *V. dissimilis*, Müller, etc.

It is very distinct from all of the above, and does not resemble the descriptions of any of the Australian Viviparidæ. The revolving lines are closely arranged, but so minute as to be invisible without a lens.

2. MELANIA TETRICA, Conrad.—t. 1, f. 9.

Description.—"Tarrited; volutions 9, with oblique angular ribs, crossed by sharp, prominent lines, giving the ribs an acutely tuberculated character; whorls of spire angulated above the middle, and destitute of revolving lines above the angle: ribs on body whorl not continued to the middle of the volution; the revolving lines about 12 in number, 4 on the penultimate volution; aperture ovate-acute, slightly oblique. 1."

Melania tetrica, Conrad.—Proc. Acad. Nat. Sci., 1850, p. 11.

Locality.—Rivers of S. E. Australia.

Observations.—May be compared with *M. Australis*, Reeve, which is not so high in the spire, with large ribs, which are curved. *Australis*, moreover, comes from a distant locality—the rivers of North Australia.

3. MELANIA BALONNENSIS, Conrad.—t. 1, f. 10.

Description.—"Ovate-elongate, thin, diaphanous; volutions 6, those of the spire angulated, obliquely ribbed; revolving lines distinct, but little prominent; the ribs on body whorl short; aperture elliptical, nearly half the length of the shell; epidermis pale straw-color, with unequal spots of reddish-brown. 3."

M. Balonnensis, Conrad.—l. c., p. 11.

Locality.—Balonne River, Australia.

Observations.—Of much lighter texture than *M. tetrica*, also lighter colored, and ribs not so strongly expressed.

4. AMPHIPEPLEA PERLEVIS, Conrad.—t. 1, f. 5.

Description.—"Ovate, thin and fragile, pellucid; volutions 5: spire very short, the whorls convex; body whorl slightly flattened on the side, and also near the suture; epidermis straw-colored; columella with a prominent, slender, very oblique fold revolving within to the apex; aperture large, patulous, ovate, regularly rounded at base."

Lymnea perlevis, Conrad.—l. c., p. 11.

Locality.—Salamanca and Balonne Rivers, Australia.

Observations.—Allied to *A. Lessoni*, but less ventricose, and has flattened sides, while those of the former are convex. The surface is coarsely undulated parallel with the growth-lines.

5. *PHYSA PECTOROSA*, Conrad.—t. 1, f. 6.

Description.—"Sub-ovate; volutions 4 or 5; spire short, apex eroded; penultimate whorl ventricose; columella with a prominent, compressed, triangular, oblique tooth or fold; epidermis olivaceous, clouded with brown. $\frac{3}{4}$, $\frac{1}{2}$."

Ph. pectorosa, Conrad.—l. c., p. 11.

Locality.—Bogan River, Australia.

Observations.—This is a much inflated species, almost shouldered above; columella with a double fold—a character which I have not observed in any other species of the genus.

6. *PHYSA AUSTRALIANA*, Conrad.—t. 1, f. 7.

Description.—"Elliptical, thin, diaphanous; volutions 4 or 5, regularly convex; spire short; epidermis amber-colored; columella with a slender prominent fold, which revolves within to the apex; margin of labrum regularly curved or rounded. $\frac{3}{4}$, $\frac{3}{8}$."

Ph. Australiana, Conrad.—l. c., p. 11.

Locality.—Bogan River, Australia.

NOTE ON MR. PEASE'S SPECIES OF POLYNESIAN
PHANEROPNEMONA.

BY GEORGE W. TRYON, JR.

When we received the MSS. of Mr. Pease's descriptions, published in our last volume, we were not aware that we would be able to illustrate them. Having since received types of the species, we now give colored figures, and also the habitats, omitted in the original descriptions.

1. REALIA OCHROSTOMA, Pease.—t. 5, f. 1.
Habitat.—Hervey Isles.
2. REALIA VARIABILIS, Pease.—t. 5, f. 2.
Habitat.—Hervey Isles.
3. REALIA SCALARIFORMIS, Pease.—t. 5, f. 3.
Habitat.—Oulan Isl'd.
4. REALIA AFFINIS, Pease.—t. 5, f. 4.
Habitat.—Hervey Isles.
5. REALIA LEVIS, Pease.—t. 5, f. 5.
Habitat.—Oulan Isl'd.
6. PUPOIDEA SCALARIFORMIS, Pease.—t. 5, f. 6.
Habitat.—Hervey Isles.
7. PTEROCYCLOS PARVA, Pease.—t. 5, f. 8.
Habitat.—Hervey Isles.
8. HELICINA PACIFICA, Pease.—t. 5, f. 7.
Habitat.—Oulan Isl'd.

ON THE MODERN CLASSIFICATION OF MOLLUSKS.

BY O. A. L. MÖRCH.

[From "Journal de Conchyliologie, October, 1865.]

TRANSLATED BY GEORGE W. TRYON, JR.

In a Review of my Catalogue of the Lassen Collection, M. Crosse has cited, as an example of the inferior value of the lingual dentition, as a systematic character, the fact, that the *Helicinæ*, according to this classification, are placed with a much elongated group—the *Cyclostomæ*. These two families have not, really, another character in common, than the position of the eyes at the exterior base of the tentacles, a character partaken of by nearly all the tentaculated Gasteropods.

The *Helicinæ* are distinguished by the want of the profound groove in the middle of the foot, and especially by the form of the operculum, which, on the contrary, accords perfectly with that of the *Neritinæ*; nevertheless, they have not the resemblance of the lateral processes. The callosity of the columella, as also the faculty of dissolving the internal walls of the shell, are also characters which indicate resemblances with the *Neritinæ*. As well as all fluatile, univalve or bivalve shells have certain common affinities, for example, a thick and coriaceous epidermis, so have the *Helicine* characters in common with other terrestrial Mollusks, such as the *Cyclostomæ*, and especially the *Helices*.

It is M. Lovén who first founded the modern classification of Gasteropods, based on the lingual dentition. M. Troschel has given names to several groups established on this character (*Tænioglossata*, *Rhipidoglossata*, *Toxoglossata*, etc.); but he has, at the same time, admitted others, based on the organs of respiration (*Pneumonopoma*, *Cyclobranchia*, etc.) My studies of Mollusks during twenty years, have induced me to accord a more elevated systematic value to the lingual dentition. Certain exceptions can, of course, be cited, as well as the

Edentates and the Cetaceans among Mammals. For example, *Æolis* and *Voluta* have not more than a single row of teeth, whilst those of the groups the nearest approaching the first genus have numerous rows, and those approximating to the second have three rows; only the teeth which remain in the above genera, resemble the corresponding teeth in the allied forms.

Many genera are deprived of teeth, although the neighboring generic groups possess them (for example, *Thetys fimbriata*, *Doridopsis* (Hancock), *Stilifer*, *Leptoconchus*); but it is possible that these genera possess them in a young and larval state. The genera *Sibirium* and *Terebra*, which have been cited as deprived of teeth, really possess them, a result of more exact researches recently undertaken.

Series I.—MONOTOCARDIA.

Heart bilocular, with only one auricle, copulation effected between two individuals by means of the intromission of an organ.

Class I.—ANDROGYNA (MUSIOGLOSSATA, Mörch, *olim.*)

Sexual organs united, always furnished with a *receptaculum seminis* (petiolate bladder); male organ retractile.

Tongue provided with multiserial teeth (except *Æolis* and the Pellibranchs): mouth with mandibles. (But this is not so with the Agnatha.)*

1. *Pulmonata*.—P. terrestria, P. fluviatilia (*Lymanea*, *Planorbis*, etc.), P. marina (*Siphonaria*.)
2. *Opisthobranchia*.—(Gymnobranchs, Tectibranchs, Pellibranchs.)
5. *Pelagica*.—(gymnosomous Pteropods.)

Class II.—EXOPHALLIA.

Sexes separate; male organ not retractile, sometimes concealed in the branchial cavity, or with the tentaculum. Mouth supplied by suction.

I. *Trinoglossata*.—Tongue with seven rows of sharp, curved teeth.

A. *Rostrifera*.—Mouth at the extremity of a non-retractile muzzle.

Metamorphosis in the interior of the egg.

a. Terrestria. *Cyclostomacea*.

b. Fluviatilia. *Paludina*, *Ampullaria*.

* A group established by M. Mörch in 1859, including *T. stacella*, *Daudinardia*, *Streptaria*; etc.

Metamorphosis out of the egg (larva swimming.)

c. Marina. *Cerithium*, *Turritella*.

Metamorphosis within a sac.

d. Parasitica. *Vermetus*, *Calyptrea*, *Hippomyx*.

e. Pelagica. *Heteropoda*.

B. *Probosciferæ*.—Mouth at the extremity of a retractile proboscis. Larva swimming. *Natica*, *Cassis*, *Dolium*, *Triton*, *Ranella*.—Proboscis not retractile, *Cypræa*, *Strombus*.

II. *Rachiglossata*.—Lingual teeth disposed in three longitudinal rows, simply sharp, not curved, (except *Voluta*, which has but one row.) Mouth at the extremity of a retractile proboscis. Eggs enclosed in corneous capsules. (*Melicerigenes*.)—*Marginella*, *Voluta*, *Harpa*, *Olivæ*, *Nassa*, *Buccinum*, *Fasciolaria*, *Fusus*, *Murex*, *Turbinella*, *Purpura*, *Columbella*, *Mitra*.

III. *Toxoglossata*.—Lingual teeth subulate, with an external or internal veneniferous canal. *Cancellaria*, *Terebra*, *Clionella*, *Pleurotoma*, *Conus*.

Series II.—DIOCORDIA.

Heart trilocular, with two auricles surrounding the rectum.

Class III.—PSEUDOPHALLIA (ASPIDBRANCHIA, *Olin*.)

Sexes separate, but without external male organ. The question of copulation in this class, or the mere dispersion of semen, as with the *Acephala*, is undetermined. The heart is provided with two auricles, even with the genera which have not more than a single branchia. (See "*Voyage of the Astrolabe*," Anatomy of *Turbo marmoratus*.) Development known only in *Chiton* and *Dentalium*.

I. *Rhipidoglossata*.—Lingual teeth numerous, disposed in two orders, the marginal ones aciculate and turned into hooks.

a. Terrestria. *Helicina*.

b. Fluviatilia. *Neritina*.

c. Marina. *Nerita*.

Trochoïdea, (*Haliothis*.)

Fissurellidea.

II. *Heteroglossata*.—Dentition more distinct by the failure of the subulate marginal teeth.

Cyclobranchia. *Patella*, *Chiton*.

Cirribranchia. *Dentalium*.

Class IV.—ACEPHALA.

Sexes separate (except with *Ostra* and *Pecten*, which are hermaphrodite.) Without copulation; fecundation by the dispersion of semen. The larvae are provided with two wings, ommatophorous, and tentaculated, as the Gasteropods. The metamorphosis is, therefore, retrograde (*Lovèu*.)

1. Dinnyaria.

2. Heteromyaria, (*Mytilinea*.)

3. Monomyaria.

The Cephalopods do not differ more from the Gasteropods, than the gymnosomous Pteropods. Their long arms correspond to the prehensile collar of the Pneumoderms; their short arms, furnished with cups, are likewise recognized in the Gymnosoms. Their funnel corresponds with the foot of the Gasteropods, but their heart and their copulative organ are not sufficiently known to permit us definitely to indicate their place.

The thécosomous Pteropods (*Hyalwa*, etc.) differ from the gymnosomous Pteropods by their teeth, which are disposed in three rows, and by their fins, which correspond to the cephalic *column* of the Olives, and not with the epipodium of the Gymnosoms. According to the anatomy given by Souleyet, in the "Voyage of the Bonite," these animals are undoubtedly androgynous. I have, in the "Malakoz. Blatter," 1859, given more extended notices of these subjects. The ancient groups based on the form of the foot, correspond with those of Klein for the Vertebrates: Apoda, Bipeda and Quadripeda (including the Reptiles.)*

* M. Crosse proposes, in a future No. of the "Journal de Conchyliologie," to attack the system of classification indicated above. We will furnish our readers with a translation of this paper also, as soon as we receive it. We have already stated our opinion, that the dentition is of much less value in classification than is generally accorded to it.

REPLY TO MR. CONRAD'S CRITICISM ON MR. GABB'S
"REPORT ON THE PALÆONTOLOGY OF
CALIFORNIA."

BY WILLIAM M. GABB.

The criticisms of Mr. Conrad, in the "Journal of Conchology" for October, on my paper on Cretaceous Fossils in the "Geological Report of California," and the diametrically opposite opinions held by that gentleman and myself, oblige me reluctantly to vindicate my position.

A reply is rendered the more necessary, from the fact, that the criticism comes from one who is universally acknowledged to be the highest authority on the Tertiary Formations in the country, and who claims that I have described Tertiary fossils as belonging to an older formation.

It would be well to bear in mind the wide difference in the facilities for studying the question in discussion, possessed by Mr. Conrad and myself. A very extensive personal study of the rocks in place, extending over a space of upwards of three years, assisted by suites of many thousands of specimens, is hardly to be compared with the examination of a single boulder, even when aided by the carefully digested results of my work.

I am free to admit, that, when I first saw the newer member of the California Cretaceous, I pronounced it Eocene Tertiary, without hesitation. Nay, more: after I had recognized undoubted Cretaceous forms in the rock, I still maintained, for more than a year, that there was a mixture of Tertiary forms in it, and it was only after a minute comparison of the doubtful species with authentic specimens of Eastern Eocene fossils, that I yielded reluctantly to the conviction, that the rock was unequivocally Cretaceous. An instance of these close relations is found in the resemblance of *Architectonica cognata* with one of its Eastern congeners.

But, not to consume more of your valuable space, I shall

reply to the separate items at once. Mr. Conrad says I have "included the rock of Cañada de las Uvas, which contains *Venericardia planicosta* and *Aturia zic-zac* in the Cretaceous series, but he has failed to show one Cretaceous fossil from that rock, and adds:—"I do not perceive, from Mr. Gabb's Report, that there is any mixture of Cretaceous and Eocene species in California."

The first proposition I deny; the second I admit, and shall endeavour to prove that it is correct, though from a reason exactly the opposite of the one that Mr. Conrad gives.

The following list will show the species found in common in the two divisions of the California Cretaceous:—

<i>Callianassa Stimpsonii</i> , Gabb,	Chico Creek, Div. A. Clayton and Tejon, Div. B.
<i>Nautilus P. ranas?</i> Shum.,	Shasta Co., A. Clayton, B.
<i>Aturia Mathewsonii</i> , Gabb,	Martinez, A. Clayton and Tejon, B.
<i>Ammonites</i> , n. s.,	Martinez, A. Clayton, B.
<i>Fusus Mathewsonii</i> , Gabb,	Martinez and Mt. Diablo, A. Clayton, B.
<i>Amaucropsis alveata</i> , Con., sp.,	Mt. Diablo, A. San Diego, Martinez, Clayton, B.
<i>Dentalium Cooperii</i> , Gabb,	Mt. Diablo and Siskiyou, A. San Diego and Martinez, B.
<i>D. stramineum</i> , Gabb,	Mt. Diablo, A. San Diego and Martinez, B.
<i>Cylichna costata</i> , Gabb,	Almost every locality of both Divisions.
<i>Mactra Ashburnerii</i> , Gabb,	" " " "
<i>Aeicula pellucida</i> , Gabb,	San Luis Gonzaga, A. Martinez, B.
<i>Calliava Mathewsonii</i> , Gabb,	Martinez, A. Clayton, B.
<i>Nucula (Acila) truncata</i> , Gabb,	Pence's Rancho, Tuscan Sp'gs. San Luis Gonzaga, A. Martinez, B.
<i>Leda proteata</i> (?), Gabb,	Martinez, A. Nearly everywhere in B.

The above list contains fourteen species, the identity of several of which, in the two members of the formation, has been called in question.

But, granting that Mr. Conrad is correct in every instance, there are enough still left to establish the fact, that the two groups of rocks are members of one formation, and not, as he supposes, one Cretaceous, the other Tertiary.

In the upper member are found the following *Cephalopoda*:—

Nautilus, apparently *Texanus*, Shum. The same species, whether *Texanus* or not, is not rare in the older group, in the Northern part of the State, associated with over a dozen species of Ammonites.

Aturia Mathewsonii, G., claimed by Mr. Conrad as *A. ziczic* or *A. angustata*, has been found at Tejon* and Clayton in Division B; but the specimen from which my drawing was taken, and by means of which Mr. Conrad recognizes a *Tertiary fossil*, was found by Mr. Mathewson and myself in the older member, associated with *Turritella Saffordii*, *Venus varians*, *Pugnolus humulus*, and other equally characteristic species of that group!

Ammonites, n. s., referred incorrectly to *A. Newberryanus* (Report, pl. 10, fig. 5), also found abundantly at Martinez in Division A. Several specimens were collected by myself, associated, in the same rock, and within a few feet of a specimen of *Cardita Hornii*, G., (*C. planicosta*, var. *regia* of Conrad.

? *Ammonites Cooperii*, G. One of the *Ammonitidae*, whether an *Ammonite* or not, is from the presumed Eocene of Mr. Conrad, from San Diego, and the family is sufficient to establish the age of that deposit, had we no other proof.

Fusus Californicus, Con. sp. Mr. Conrad is mistaken in supposing that my specimens do not come from his typical locality. His figure (Pacific R. R. Rep., Vol. V., pl. 2, fig. 11.) is apparently taken from an internal cast, corresponding exactly with many found at Clayton and Tejon. I have specimens from both localities. There is no other shell, yet found by myself or any of my friends, that will correspond with his figure; and, so far as his description goes, it agrees perfectly with my species. I quote it at length:—"Fusiform; spire conical, volutions rounded, somewhat flattened above; (it must be remembered that this is in the cast) body whorl ventricose, beak short and narrow."

Volutilithes Navarroensis, Shum. As I understand the genus *Rostellites*, Con., one important character is the existence of a large number of small folds on the columellar lip. Our species has but three. It cannot be the same as *R. Texanus*, Con., which, as figured by Mr. Conrad, has at least eight folds; and the character of the spire is sufficiently different to separate it.

* I might here remark, that I use the local name "Tejon" to designate a stretch of country about four or five miles long, including the north end of the Canada or "Cajon" de las Uvas and Alizos Creek, containing a continuous deposit of the rocks in question. It was from this place that Mr. Conrad obtained the boulder, containing the originals of his paper in the "Pacific Railroad Report."

Fusus Rémondii, *F. Hornii* and *F. Cooperii* are all members of the subgenus *Hemifusus*, none of them resembling *Perissolax*, the first least so of all. Mr. Conrad does not appear to understand the generic character of *Perissolax*. I founded the genus in 1861, to receive a division of the genus *Fusus* having a form almost like *Tudicla* or *Haustellum*; that is to say, with a very low spire; short, thick set body whorl, and a long, narrow canal. I mentioned, as types of the genus, *F. longirostris*, D'Orb., and *F. trivolous*, Gabb, and remarked, that the genus seemed to be peculiar to the Cretaceous. Mr. Conrad appears to misunderstand the peculiar characters of the genus, and to apply the name to a totally different group of shells; ignoring my two types, both of which are Cretaceous species, and saying: "This genus is peculiar to the Eocene formation."

Perissolax brevirrostris, G. Subsequent study has confirmed me in the opinion that this shell was correctly placed under the genus *Perissolax*, although its unusually short canal caused me to hesitate at first. It is probably an extreme form.

Naticina obliqua and *Turritella Ucasana*. Said by Mr. Conrad to be Eocene species. Both of these shells have been found by Mr. Rémond and myself in strata containing *Ammonites* and *Baculites*, and abounding in other Cretaceous forms.

Amauropsis alveata, Gabb. Cal. Report.

Natica alveata, Con. Pacific R. R. Report. Mr. Conrad says: "Is a species of *Globularia*, and occurs, I think, in the Older Eocene Limestone of South Carolina, or a species very near to it." In his original description of the species, he remarks: "There is no analogous species in the Eocene of the Atlantic slope." He says I have figured two species, because I illustrate two diverse forms. Being limited in space, I only figured the extreme varieties. The angle of the upper portion of the whorl varies from one form to the other, and the striation of the surface is equally inconstant. Hardly two specimens are exactly alike. The majority of the specimens show revolving lines on at least a part of the surface; those from San Diego being the only ones on which I was unable to detect lines on some portion, and only a single specimen, one from Curry's, south of Mt. Diablo, showed the whole surface strongly striate. This variation is *not* dependent on the geological horizon, as Mr. Conrad represents me as saying. I made no such remark as he quotes.

Chemnitzia Spillmanni. Mr. Conrad is, possibly, correct in separating this shell from his species. I was obliged to trust almost entirely to my memory, the description being too short and unsatisfactory to assist me. In the description there is no reference to the under side of the whorls; and the difference in the apical angle, between specimens so widely different in age, and, consequently, in size, would not, of itself, be of specific value, unless united with other characters.

Carlita Hornii. I have already, in my Report, explained the apparently unaccountable mistake into which Mr. Conrad has fallen, with reference to this species. I do not see that there is any thing to add.

Dosinia elevata is not a *Dosiniopsis*, but a true *Dosinia*; so that, despite its external resemblance to *D. Meekii*, it is still distinct.

Meretrix Uvasana, Con., (*Dosinia*, per Err. Jour. Conch.), and *Ficus mamillatus*, Gabb. Unfortunately, my copy of Conrad's Tert. Foss. is at present inaccessible. I can, consequently, express no opinion on these two species; though, if the first is the same as *Dione ovata*, Rogers, the error is Mr. Conrad's, not mine.

Meekia sella, G. If Mr. Conrad had taken the pains to have read the generic description, he would have seen at once that this shell, so far from being a *Cyprina*, could not even belong to that family. From a long acquaintance with Mr. Conrad, I am convinced that he would not wilfully misrepresent facts, and, consequently, am the more surprised at the extreme carelessness exhibited by his note on this species.

Further, he calls it Eocene. Granting that my Division B should prove Eocene, the species would not assist the proof, since, of the three known species of the genus, every specimen yet found has come from the rock which Mr. Conrad says is "doubtless Cretaceous."

M. navis, G., "is a species of *Yoldia*." It has the external form of *Yoldia*, but, nevertheless, has the hinge, and, in a faint degree, the posterior thickening of *Meekia*.

Maetra Ashburnerii, G., is a variable species. Mr. Conrad says I have confounded two species, and adds: "One he describes as having 'regular, nearly uniform, rounded, concentric ribs,' and another as having only fine lines of growth." In my description (p. 153, Cal. Rep.) I say: "Surface variable; specimens from some localities showing a large number of regular, nearly uniform, rounded, concentric ribs; while those found at other places have these ribs few, entirely absent,

or only represented by fine lines of growth." I might add, that these variations occur entirely without reference to the two geological horizons.

Nucula truncata. Mr. Conrad, starting with the theory that I have united two formations, when he finds a species quoted as occurring in both deposits, coolly disposes of it by saying: "Two species are *evidently* confounded under this name." How, "*evidently*," I cannot understand. Certainly, I, with a hundred specimens before me, should have better means of knowing, than my critic, who has never seen so much as a single specimen, and only one drawing.

Leda proteta. The remarks made on the preceding species will apply with equal propriety to this. There is but one species in California included under this name, though I was not quite sure of the correctness of my reference.

"The remarkable and very characteristic fossil, *Radiolites gregaria* (*Tritiosoma gregaria*, Con., Olim.), abundant in California, has been omitted by Mr. Gabb in his report," because neither Mr. Gabb nor any other member of the Geological Survey ever found even a fragment of the species among the tons of fossils collected by those gentlemen. It is even doubtful whether the species may not be extra-limited, and whether Mr. Conrad may not have been misinformed regarding its locality.

In conclusion, permit me to repeat, that I regret exceedingly having been forced into this discussion, though I trust that I have answered the objections of my critic in such a manner as to convince him that he was mistaken in his views in regard to the geological age of my Division B of the California Cretaceous Rocks.

San Francisco, Cal., Nov. 14, 1865.

Editor's Table.

REVIEWS.

I.—AMERICAN.

Proceedings of the Academy of Natural Sciences of Philadelphia. July—August, 1865.

Descriptions of New Species of Fossils, from the Marshall Group of Michigan, and its supposed equivalent in other States; with Notes on some Fossils of the same age previously described. BY PROF. ALEXANDER WINCHELL.

The following are the new species described:—

<i>Discina Gallaheri.</i>	<i>Rhynchonella unica.</i>
<i>Producta gracilis.</i>	“ (<i>Retzia?</i>) <i>micropleura.</i>
“ <i>duplicostata.</i>	<i>Centronella Allei.</i>
“ <i>Morbiliana.</i>	<i>Ostrea patercula</i>
“ <i>curtirostra.</i>	<i>Pterinea spinalata.</i>
“ <i>dolorosa.</i>	<i>Pernopecten, nov. gen.</i>
<i>Othis flava.</i>	“ <i>limatus.</i>
<i>Spirifera Missouriensis.</i>	<i>Pinna? Marshallensis.</i>
“ <i>biloba.</i>	<i>Myalina Lowensis.</i>
“ <i>Ohionensis.</i>	<i>Sanguinolites strigatus.</i>
<i>Spirifera centronata.</i>	<i>Sanguinolaria rostrata.</i>
“ <i>Sillana.</i>	<i>Conularia Newberryi.</i>
<i>Spiriferina Clarksvillensis.</i>	<i>Bellerophon Whittleseyi.</i>
“ <i>binacuta.</i>	<i>Metoptoma undata</i>
<i>Rhynchonella tetra ty. r.</i>	<i>Pleurotomaria quinquedulcata.</i>
“ <i>heteropsis.</i>	<i>Cyrtoceras Rockfordense.</i>
“ <i>persinuata.</i>	

II.—FOREIGN.

FRENCH.

Journal de Conchyliologie. V., No. 4. Paris. H. Crosse, 25 Rue Tronchet. October, 1865.

Note sur l'Helix constricta, et sur sa distribution géographique en France et en Espagne. BY H. CROSSE.

Quelques mots sur un arrangement des Mollusques pulmonés terrestres (Géophiles, Fér.) basé sur le système naturel. (Continued.) BY O. A. L. MÖRCH.

In the present paper, we have a long list of species, which have been anatomically studied, arranged in accordance with the author's views of their natural classification.

Sur la Classification moderne des Mollusques. BY O. A. L. MÖRCH.

This paper we have translated, and publish in this Number.

Note sur cette question : La Tellina balthica, Linné, appartient-elle au genre Telline ? BY C. RECLUZ.

Descriptions de deux espèces nouvelles de Pupinacea, avec des observations sur cette tribu. BY O. SEMPER.

Registoma ambiguum, Ins. Luzon.

Pupina difficilis, Ins. Palaos.

Description d'une Turbinelle nouvelle et observations sur le genre Latirus. BY H. CROSSE.

Turbinella Hidalgoi, Crosse.

Description de trois espèces nouvelles du genre Partula. BY O. SEMPER.

P. Leucothoe, Ins. Palaos.

P. Calypso, “

P. Thetis, “

Description d'espèces nouvelles d'Australie, provenant de la collection de M. Geo. French Angas. BY H. CROSSE and P. FISCHER.

Pleurotoma (Mangelia) Vincentina. *Maetra pinguis.*
 “ (Clathurella) Lallemandiana. *Periploma Angasi.*
 “ “ Letourneuriana. *Mesodesma obtusa.*

Maetra amygdala.

Description d'une espèce nouvelle. BY J. GONZALES HIDALGO.

Castalia Crosseana.

Addition à la note de M. le Professeur A. Mousson sur la Faune Malacologique terrestre et fluviatile des Archipels Fidji et Samoa. BY H. CROSSE.

*Description de deux espèces Fossiles appartenant aux genres
Scagliola et Microstelma.* BY O. SEMPER.

Scagliola Mohrensterni, Inferior Oligocene, Latdorf.
Microstelma Bellardii, Subappinine, Asti.

Notice sur une espèce du genre Limopsis. BY O. SEMPER.

Limopsis Brocchii, Subappinine, Mt. Biancano, near Bologne.

Bibliographie.

Annales des Sciences Naturelles: Zoologie. IV. Paris, August,
1865.

Recherches sur la Famille des Tridacnides. BY DR. LEON
VAILLANT.

An extended anatomical memoir, prefaced by a history of the family. The paper is not yet completed, and we may, at a future period, refer to it more fully.

SCIENTIFIC INTELLIGENCE.

EXPLORATIONS.—Dr. H. Berendt, a well-known collector, has just departed for Honduras and Guatemala, intending to explore those interesting regions, principally for terrestrial and fluviatile Mollusks. The principal localities to be examined are: the Belize River from its mouth to its source, and the plateau and lakes in the Province of Peten, Guatemala.

The cost of the expedition is defrayed principally by a few of our Conchologists.

OUR READERS will be concerned to learn that Mr. John G. Anthony, attached, as Malacologist, to the Scientific Exploration of Brazil by Prof. Agassiz, has been compelled to return to Cambridge, in consequence of severe illness, which attacked him shortly after the arrival of the party in Rio Janeiro.

CONCHOLOGICAL MUSEUMS IN THE UNITED STATES.—We omitted to include in our List of the principal American Collections, published in our last Number, that of

William A. Haines, New York; 12,000 species.

We have also to add the splendid collection of terrestrial and fluviatile Mollusca possessed by

John H. Thomson, New Bedford, Mass.; over 6000 species.

Mr. Thomson informs us, that there are nearly fifty private collections, numbering 1000 species and upwards each, in the city of New Bedford.

HELIUS SCULPTILIS, Pease, is pre-occupied by Mr. Bland for an American species.



Fig. 1, 2, 3 *Helix Italicensis* Newcomb. Fig 7 *Physa Australiana* Cuv.
 " 4 *Planorbis bicarinatus* Say. " 8 *Paludina sublineata* "
 " 5 *Lymnaea perlevis* Cuv. " 9 *Melania tetrica* "
 " 6 *Physa pectorosa* " " 10 " *Balonnensis* "

DRAWN BY E. J. NOLAN.

BOWEN & CO. LITH. PHILA.



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- Fig 1. *Angitrema Wheatleyi* Tryon
 " 2. *Pleurocera binctum* "
 " 3. *Eurycaelon* Leau. "
 " 4. *Gauvobasis undulata* "
 " 5. *Physa coniformis*. "
 " 6. " *oleacea*. "
 " 7. *Vivipara supraliata*. "

- Fig 8. *Hemistoma Binneyi* Tryon
 " 9. *Isidora Hainesi* "
 " 10. *Physa acutispira* "
 " 11. *Platorbis Esperanzaensis* "
 " 12. *Planorbis Bercudii*. "
 " 13. *Lymnaea Wilsoni* "
 " 14. *Horsus exilis* "

DRAWN BY E. J. NOLAN

BOWEN & COLIETH PHILA







Fig 1. *Realia ochrostoma* Pease.
" 2. " *variabilis*, "
" 3. " *scalariformis*, "
" 4. " *affinis*, "

Fig 5. *Realia laevis* Pease,
" 6. *Pupoides scalariformis*, "
" 7. *Helicina pacifica*, "
" 8. *Pterocyclos parva*, "



John G. Silliman

From a Photograph for the American Journal of Conchology 1866

A M E R I C A N

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APRIL 1, 1866.

No. 2.

FURTHER OBSERVATIONS ON MR. GABB'S PALÆONTOLOGY OF CALIFORNIA.

BY T. A. CONRAD.

In my observations on some species in Mr. Gabb's "Palæontology of California," I did not intend to disparage Mr. Gabb's labors; for the work is generally accurate, the plates excellent, and the whole highly creditable to the State of California and to Mr. Gabb. I only intended to call attention to the stratigraphical relations of the upper member of Mr. Gabb's Cretaceous formation, and to suggest that it might be Eocene, as I thought I detected Eocene species in his Division B: especially as he has referred only one exclusively Cretaceous genus to that division. Of whatever age Division B may eventually prove, whether Cretaceous or Eocene, I am certain that the fossils which I described in the Pacific Railroad Reports are from an Eocene boulder.

The only mode of conveying an idea of the stratigraphical position of Division B, is by a geological description, which I presume, will be published in Professor Whitney's Report. Are the strata distorted or inclined? or, are they in the form

of Breccia? In a country which has always been subjected to volcanic disturbances, we should naturally look for the occurrence of some rock, like that of Wilmington, N. C., which holds Eocene and Cretaceous species in common, and which is of so uniform a character as to have deceived Professor Tuomey, who imagined the Tertiary and Secondary species to have lived in the same period.* Being a Breccia, the rock must have been formed in the Eocene Period, and the exceptional character of its fauna is easily explained. Deshayes remarks of the supposed intermixture of Cretaceous and Eocene fossils in a transition formation in the Alps, "Leur mélange a pu être le résultat de la dégradation d'une couche marneuse fossilifère dans de la mer tertiaire au moment de ses premiers dépôts." Now, if Mr. Gabb really finds all his species which I consider Eocene, in Division B, in company with *Hamites* and other exclusively Cretaceous genera, how is it that, in his "Palæontology of California," he describes 13 *Ammonites*, 1 *Belemnite*, 1 *Hamite*, 3 *Helicoceras*, 1 *Turrilite*, 1 *Ptyloceras*, 2 *Crioceras*, 1 *Ancyloceras*, 2 *Baculites*; not one of which is said to have been taken from Division B, and only one Cretaceous genus referred to that Division,—*Aporrhais angulata* (*Anchura*, Conrad)? This, he says, occurs "in a single stratum of greenish-gray limestone," so that its position in Division B is doubtful.

With regard to the genus *Aturia*, it has not been found in Europe, nor in America, east of the Rocky Mountains, nor in Oregon, lower than the Older Eocene. Edwards says: "This genus appears to be confined to the Tertiary, and is widely diffused."

Dosiniopsis alta does not agree with Mr. Gabb's figure, the posterior side being much shorter and more obtuse, and I believe it to be a different species. In Mr. Gabb's shell, the external character is so very close to *Dosiniopsis Meekii*, that the only difference is a more abrupt and sub-angular curve to the anterior margin from the apex. Mr. Gabb says that his shell is a true *Dosinia*; but he must publish a figure of the hinge before he can substantiate the reference. The genus *Dosinia* originated in the Miocene Period; at least, it is yet unknown in the Eocene, or in the Oligocene of America, and perhaps of Europe. The form which closely resembles it externally, is *Dosiniopsis* of the Older Eocene (Cyprinoid Cytheree of Deshayes).

In the beautiful illustrations to Dr. Karl Zittel's "Bivalves der Gosaugebilde," the genus *Cyprimeria* is represented in pl. 3, fig. 7, under the head of *Circe*, and in pl. 4, fig. 1, as

* The Lower Eocene beds of Jamaica contain masses of Cretaceous limestone, and it may be that the California Lower Eocene strata contain similar masses.

Circe; fig. 3 as *Dosinia*, and fig. 4 as *Cyclina*. He also figures 5 species of *Venilia*, Morton, under the heads of *Cypricardia*, *Cyprina*, and *Isocardia*. *Circe*, *Dosinia* and *Cyclina* did not exist before the Miocene Period. In order to form a more natural system from new comparisons of the natural affinities of families and genera, an extensive revision of fossil groups will have to be undertaken to rescue them from the highly artificial classification which yet obtains the sanction of authority. Analogy only, however, can be brought to bear on organic remains, but this of itself can enable us to approximate a more natural arrangement than at present exists. I believe that many genera perished with the Cretaceous fauna, which are yet credited with Tertiary and existing species. For instance, the genus *Venericardia* is supposed by D'Orbigny to be represented by a few species in the Cretaceous period; but a glance at his figures is sufficient to show them to be distinct. I believe the genus *Venericardia* came in, for the first time, with the Eocene fauna, and in vast abundance.*

The genus *Meekia*, Gabb, I accept as a natural group of the family *Cyprinidae*, and his *Meekia sella* as distinct from the Oregon *Cyprina bisecta* (Eocene.) The hinge of the latter I have not seen; but, as the shell is said to have a palleal line without a sinus, I presume the genus to be either *Cyprina*, or one nearly related to it.

VOLUTIDÆ.

VOLUTILITHES NAVARROENSIS has the external sculpture and form of a species of *Rostellites* found in New Jersey, which I have supposed to be identical with *R. Texana*. The number of folds may prove it distinct from the Texas species, but I have no specimen for comparison, and I believe the number of columellar folds varies in the same species.

FASCIOLARIA ELONGATA, Sowerby, is an European species, very similar in sculpture to the American species, as represented in Mr. Gabb's figure of his *F. Navarroensis*. This genus is limited to the Cretaceous era.

SYCOTOPYDÆ.

PERISSOLAX, Gabb, is limited to the one species, but it is very different from *Busycon Blakeyi*, Conrad. That species is nearly related to *Levigus trabeatus*, Conrad, of the Claiborne (Alabama) locality.†

*The shells described by Dr. Zittel, under the names of *Cardita Reynesi* and *C. granigera*, are species congeneric with D'Orbigny's Cretaceous *Cardita*.

† *Perissolax brevisrostris* represents another genus.

HEMIFUSUS HORNII, H. COOPERII and H. REMONDII, Gabb, and FICUS MAMILLATUS, Gabb, are members of my proposed genus *Ficopsis*, of the family *Sycotopydæ*, though the two former species are aberrant, and may be regarded as a subgenus, or even a distinct genus of *Sycotopydæ*.* *Hemifusus*, I believe, has never been found in a fossil state.

NATICIDÆ.

AMAUROPSIS ALVEATA, Gabb, is a member of Lamarck's genus, *Ampullina*, (*Globulus*, Sow.; *Globularia*, Swains.) It is quite distinct from the shell figured by Mr. Gabb as the same in Division A. My species was published in 1856, and it is only within a year, I worked out from a piece of limestone, the first specimen of this genus known in the Eastern Eocene. *Ampullina*, like *Natica* and *Lunatia*, never has revolving lines. *A. alveata*, Con., has a shorter aperture than Mr. Gabb's species, and a broadly reflexed pillar lip.

ASTARTIDÆ.

VENERICARDIA HORNII, Gabb, is a very different variety (or species?) from the *V. planicosta* as figured in the Pacific Railroad Reports. The latter is more close to the typical *V. planicosta*, and comes certainly from an Eocene rock.

VENERIDÆ.

DOSINIA. As the three species referred to this genus by Mr. Gabb, are without figure or description of the hinge, their generic characters are unknown. I should not be surprised if *D. inflata* has the hinge character of *Cyprinella*.

DOSINIOPSIS, Conrad. European species, *Cyprina planata*, Sowerby; *Venus plana*, Sowerby. A genus of the Senonian and Older Eocene. American species, *D. alta*, Con., *D. lenticularis*, Rogers, *D. Meekii*, Con. (*D. alta*, Gabb, not Conrad), all of which are Older Eocene species.

HAMITES VANCOUVERENSIS, pl. 18, fig. 18, I believe to be an *Ancyloceras*.

PTYCOCERAS ÆQUICOSTATUS is more likely to be *Hamites*.

NEPTUNEA CURVIROSTRIS, pl. 18, fig. 37, I believe to represent an undescribed genus.

LYSIS, Gabb. This genus is related to *Carinorbis*, Conrad, (*Clathrella*, Recluz.)

* There are some other Eocene forms in Europe allied to these, which I think may constitute a genus, *Priscoficus*. EXAMPLES: *P. intermedia*, Melville; *P. Smithii* Sowerby.

OBSERVATIONS ON RECENT AND FOSSIL SHELLS,
WITH PROPOSED NEW GENERA AND SPECIES.

BY T. A. CONRAD.

CEPHALOPODA.

NAUTILIDÆ.

NAUTILUS, Breyer.

NAUTILUS PERFORATUS, Conrad.—Journal of the Academy of Natural Sciences, second series, vol i., p. 213.

As it is impossible to say whether Solander's *scrobiculatus* represents this species or *umbilicatus*, I retain the name under which I described it. Chemnitz's figure, if intended for this shell, is badly drawn, as the umbilicus is represented as much wider, the volutions narrower, and the aperture with wider outer margin and direct sides, whilst in the present shell the sides slightly taper, and the outer margin is much more acutely rounded.

Dillwyn says the volutions of *scrobiculatus* are smooth, but in our shell the whorls are transversely striate and undulato-plicate. The centre of the umbilicus is perforated, and there are minute close rugose lines on the back, which are well represented in Knorr's figure, vol. iv., t. 22, and which figure agrees very well with *N. perforatus* in every detail except color. Under the lens the flat sides exhibit minute rugose and granulated transverse lines, but no longitudinal ones, which are limited to the rounded dorsal region.

HERCOGLOSSA, Conrad.

Nautiloid; septa angular and linguiform; apex of the angle, or tongue-shaped lobe, not contiguous with the adjacent septum; siphon large or moderate, situated within the centre, or between the middle and inner margin, and not dorsal or funnel shaped, but tubular and gradually tapering.

NAUTILUS ORBICULATUS, Tuomey.

This genus contains *Aturia Matthewsoni*, Gabb, and perhaps another from N. Jersey. Eocene species, *Nautilus Parkinsoni*, Edwards. An undoubted species of *Aturia*, which is charac-

terized by the funnel-shaped dorsal siphuncle, has not yet been found below the Eocene. Mr. Gabb does not describe the siphuncle or its position in his shell, and I have been guided only by the angles of the septa not being contiguous and its geological position in the cretaceous formation. If Mr. Gabb will compare the specimens from Division A with those in Division B, and note the differences, if any, especially in the siphon, it will be important both in a stratigraphical and conchological point of view. My attention to this subject has very recently been called by the account of *N. Parkinsoni*, in Edwards' Monograph of the Eocene Cephalopoda, and when I first saw the figure of *Aturia Matthewsoni* I had no doubt of its being an *Aturia*.

CIMOMIA, Conrad.

Nautiloid; septa sinuous, double-waved, or sigmoid, numerous; siphon small, central.

NAUTILUS BURTINI, Galeotti.—Lower Eocene.

I do not think any of the cretaceous forms are certainly of this genus.

APORRHAIIDÆ.

ANCHURA, Conrad.

Description.—Genus unknown in the Tertiary. It has a prolonged straight labrum, which either has one long ensiform curve or is biangulated, abrupt, and broad on the outer margin; the latter being the typical form and the former the subgenus *Drepanochilus*, Meek. The cretaceous species of France, as figured by D'Orbigny, are 1 *Rost. Dupiniana*, 2 *R. Robinaldina*, 3 *R. alpina*, 4 *R. asteriana*, 5 *R. carinata*, 6 *R. calcarata*, 7 *R. tricosuta*, 8 *R. carinella*, 9 *R. Parkinsoni*, 10 *R. simplex*, 11 *R. ornata*, 12 *R. Requieriana*. Of these No. 6, 7, 10, 11, 12 represent the subgenus *Drepanochilus*, Meek.

TELLINIDÆ.

CYPRIMERIA, Conrad.

This genus is limited to the Chalk Period, and embraces the following species: *C. Texana* (*Arcopagia Texana*, Roemer), *C. densata* (*Arcopagia densata*, Conrad), *C. excavata* (*Cytherea excavata*, Morton), and *C. Peruviana*, Conrad. European species: *C. concentrica* (*Circe concentrica*, Zittel), *C. cretacea* (*Dosinia cretacea*, Zittel), *C. primæva* (*Cyclina primæva*, Zittel), *C. discus* (*Lucina discus*, Matheron), *Arcopagia numismalis*, D'Orbigny, *A. rotundata*, D'Orbigny. I should have proposed another name had I properly understood the family characters of this shell when I published it.

CYPRINIDÆ.

VENILIA, Morton.

This is another genus of the Chalk which characterizes the Gosau deposits and the Senonien strata of North America. The American species are as follows: *V. Conradi*, Morton, *V. rhomboidea*, Con., *V. humilis*, Meek, *V. Gabbana*, Meek, *V. sub-tumida*, Meek, *V. trapezoidea*, Con., *V. trigona*, Gabb, *V. Laphami*, Shumard sp. European species: *V. cretacea* (*Cypricardia testacea*, Zittel), *V. bifida* (*Cyprina bifida*, Zittel), *V. crassidentata* (*Cyprina crassidentata*, Zittel), *V. cycladiformis* (*Cyprina cycladiformis*, Zittel), *V. planilorsata* (*Isocardia planilorsata*, Zittel). A genus unknown in the Tertiary.

CARDITIDÆ.

PSEUDOCARDIA, Conrad.

C. Smidti, Horn, *C. Hungaricum*, H., *C. Mageri*, H., *C. Hauei*, H., *C. apertum*, Munster, *C. conjugens*, Partsch., *V. Neocomiensis*, D'Orb., *V. quadrata*, D'Orb., *V. tenuicostata*, Zittel, *V. Dupiniana*, D'Orb., *V. constantii*, D'Orb., *V. cottablina*, D'Orb., *V. dubia*, Sowerby. A genus which became extinct in the Upper Cretaceous Period.

MYTILIDÆ?

ORTHONOTA, Conrad.

The type of this genus is *O. undulata*, Con. European species: *Sanguinolites anguliferus*, M'Coy, *S. iridenoides*, M'Coy, *S. clava*, M'Coy, *O. rigida*, Sowerby, *O. inornata*, Phil. American species: *O. undulata*, Con., *O. carinata*, Con.

The genus is easily recognized by its narrow, elongated form, with nearly or quite rectilinear and parallel dorsal and ventral margins, and by the presence of either undulations or oblique raised lines posteriorly. The shells were extremely thin, apparently without cardinal teeth.

SOLENIIDÆ.

PLECTOSOLEN, Conrad.

Under this head I propose to group some Older Eocene forms, which are straight or slightly recurved; beaks nearly terminal; an anterior furrow direct or oblique, with a corresponding ridge within. European species: *Solen gracilis*, Sowerby, *S. obliquus*, Sowerby, *S. Dixoni*, Sowerby, *Cultellus affinis*, Sowerby, *S. angustus*, Deshayes, *S. proximus*, Deshayes. American species: *S. protectus*, Con. (Oregon.)

DESCRIPTIONS OF NEW SPECIES OF TERTIARY,
CRETACEOUS, AND RECENT SHELLS.

BY T. A. CONRAD.

CRASSATELLIDÆ.

CRASSATELLA.

C. PERALTA, Conrad.—Pl. 8, fig. 1.

Description.—Subtriangular; height rather more than the length; convex; cardinal margin oblique; posterior margin widely subtruncated, with a slightly inward slope.

Locality.—Goshen, Cape May Co., N. J. Mr. Ashmead.

Observations.—A very perfect ferruginous cast of this species from a new locality, which I suppose to be Miocene, was found in company with the following species, a less perfect cast. They are widely dissimilar to other known species.

C. PLANATA, Conrad.—Pl. 8, fig. 4.

Description.—Subovate, compressed, anteriorly obliquely truncated inwards; posteriorly slightly produced; extremity nearly medial in relation to the height of the shell. (Cast.)

C. CURTA, Conrad.—Pl. 8, fig. 2.

Description.—Subtriangular, convex; rather longer than high; posterior end truncated, direct; ventral margin rounded in the middle, rectilinear posteriorly; cardinal plate broad.

C. curta, Conrad.—Proceed. Acad. Nat. Sciences, 1862, p. 578.

Locality.—Virginia?

VENERIDÆ.

MERCENARIA, Schum.

M. OBTUSA, Conrad.—Pl. 8, fig. 3.

Description.—Cordate-triangular, very inequilateral, thick and ponderous, ventricose, densely covered with reflexed laminated concentric lines, and with obsolete radiating lines in the middle of the valves; posterior end obtusely rounded, the extremity truncated either direct or obliquely inwards; beaks prominent: lunale large, cordate, impressed; inner margin densely crenate; anterior cicatrix large and profound.

Locality.—Patuxent River, Virginia.

Observations.—Having two entire specimens, large and small, which perfectly agree in their characters, I consider this a very distinct species, allied to *M. submortoni*, D'Orbigny.

Var. A.—Slightly produced and subcuneiform posteriorly.

CHAMIDÆ.

ARCINELLA.

ARCINELLA CORNUTA, Conrad.

Description.—Orbicular-cordate; radiating ribs very spinous; spines very thick, tubular; interstices deep, rugoso-punctate; lunale broadly cordate; buccal side granulated.

Chama arcinella, Tuomey and Holmes (not Lamarck). Pliocene Fossils of South Carolina, p. 22, pl. vii.; fig. 4, 5, 6.

Observations.—This species differs from the recent one in being larger, much thicker, and more especially in having fewer spines, which are much thicker than in the recent species, and not in two series of thick and thin spines, which characterize the latter.

TELLINIDÆ.

CYPRIMERIA PERUVIANA, Conrad.—Pl. 9, fig. 1.

Description.—Subtriangular, inequilateral, lentiform, posterior extremity opposite the end of the cardinal line; ventral margin rounded.

Locality.—Amotope, Peru. Dr. Ruschenberger.

Observations.—Mr. Darwin refers to a few fossils, an *Ammonite*, *Baculite*, &c., at Concepcion, which he inclines to believe belong to an Older Tertiary formation. I have no doubt of their Cretaceous origin, and the present genus is an additional proof of the presence of Cretaceous strata in Peru.

ANOMIIDÆ.

DIPLOSCHIZA, Conrad.

D. CRETACEA, Conrad.—Pl. 9, figs. 2, 3.

American Journ. of Conch., vol. i., p. 77.

TEREBRATULIDÆ.

TEREBRATULINA FILOSA, Con.—Pl. 9, figs. 4, 5.

American Journ. of Conch., vol. i., p. 77.

Observations.—This species is more nearly of the outline of *T. gracilis* of Europe than of *T. Gaudalupæ*, Roemer, a species of Texas. The latter has a more tapering and prominent umbo and a shorter hinge line, and the smaller valve much more convex.

TELLINIDÆ?

CUMINGIA MEDIALIS, Conrad.

Description.—Ovate-trigonal; beaks central; surface with concentric lamellar lines; posterior side folded, with the opposite ventral margin emarginate.

Cumingia tellinoides, Con.—Miocene Foss., p. 28, pl. 14, fig. 4.

Locality.—James River, Virginia.

Observations.—This species is much larger than the recent *C. tellinoides*, and differs in being proportionably shorter, in having central beaks, a much larger hinge plate, &c. It is very variable in form, and has the habits of *Saxicava*.

RECENT SPECIES.

ANATINIDÆ.

PERIPLOMA, Schum.

P. FRAGILIS, Totten.

Description.—“Thin, fragile, white, rounded ovate, inequilateral; the shorter side narrowed and truncated; tooth narrow, directed obliquely forward.”—Gould.

ANATINA BOREALIS, Gould (not Say). This species is much more elevated and proportionably shorter than *P. papyratia*, Say, which is found only on the Southern coast. It is more nearly related to *P. alla*, Conrad, a Miocene fossil of New Jersey, but that species has more prominent beaks and a hinge plate very different in form. As Col. Totten refers to me as having influenced his reference of this species to *P. papyratia*, it is proper to adopt his proposed name, which was suggested by some doubts of its being Say's species. Its close relation to the New Jersey Miocene species is very interesting, because it lives, apparently, no further south than Massachusetts, and the Miocene species is associated with abundance of *Crassatella*, a *Clementia*, which genus now inhabits Australia and the Philippine Islands; *Carbitamera*, which is unknown in a recent state north of Florida; *Ephora*, an extinct Miocene genus with two species, one American and one European.

DESCRIPTION OF A NEW SPECIES OF UNIO.

BY T. A. CONRAD.

UNIO DEPYGIS, Conrad.—Pl. 10, fig. 1.

Description.—Short, suboval, subcompressed, beaks situated behind the middle; disks slightly tumid medially; posterior side flattened or slightly contracted; opposite ventral margin truncated; anterior ventral and anterior margins regularly rounded; posterior margin truncated, direct; beaks undulato-plicate; epidermis olivaceous, indistinctly rayed posteriorly, and clouded with dark green about the umbo; anterior cardinal tooth long and very oblique.

Locality.—Harpeth River, Tennessee. W. H. DeCamp, M. D. Cabinet of Dr. Wm. H. DeCamp, Grand Rapids, Mich.

Observations.—More compressed than *U. lens* and less ponderous. It is also a larger species, and very peculiar in having so short a posterior side and no obliquity of outline.

DESCRIPTION OF A NEW SPECIES OF VIVIPARA.

BY GEORGE W. TRYON, JR.

VIVIPARA WALTONII, Tryon.—t. 10, f. 2.

Description.—Shell ovate-conic, moderately thick, the surface marked only by growth lines; spire pyramidal, suture well impressed; whorls 5—6, moderately convex, regularly and slowly increasing, the last two-thirds of the total length; aperture small, rounded oval; umbilicus scarcely covered by the columellar lip; surface polished, light olive, with revolving bands, which are visible in the interior of the mouth.

Dimensions.—Length 22, diam. 17 mill., length of aperture 13 mill.

Locality.—St. John's River, Florida. Mrs. Margaretta Walton.

Cabinet of Dr. E. Michener, Avondale, Chester Co., Penna.

Observations.—The above species was first observed by Mr. Say, who thus remarks upon it: "*Paludina elongata*, Swainson. Capt. Leconte presented me with a shell which, he informed me, he found in the River St. John, Florida. I described it nearly four years since under the name of *multilineata*; but recently, being about to publish it, on a more attentive examination and comparison with a specimen of the *elongata* from Calcutta, given to me by Mr. Hyde, of Philadelphia, I have concluded that it varies from that specimen only in having the umbilicus a little smaller."—*New Harmony Disseminator*, ii. p. 245, Aug. 12, 1829.

In the "American Conchology," plate x., Mr. Say figured this species under the name of *vivipara*, Linn., and his figures are copied, with the same name, in Prof. Haldeman's "Monograph of the Limniades," pl. vi., f. 3, 4. In the last-mentioned work another figure is given of a young specimen (pl. vii., f. 3, 4) under the name of *Bengalensis*, Lam. (= *elongata*, Swn.). This is from a specimen deposited by Mrs. Say in the museum of the Academy of Natural Sciences of Philadelphia, and believed to be the original specimen received by Say from Florida.

Prof. Haldeman remarks: "There appears to be no reason to doubt the locality of this specimen; at any rate, Say was satisfied upon this point, and I accordingly admit it as indigenous upon his authority. I have compared the original specimen with shells from Calcutta, and find that it differs as little from them as they do from each other. If this is not the *Bengalensis* of Lamarek, it must have the name given to it by Say, that of Swainson having been previously given to a fossil species."

I have made many comparisons of this species with the *Bengalensis* of Lamarek without detecting the resemblances which misled Messrs. Say and Haldeman. The history of almost any genus in Conchology shows a great progressive development of acute discrimination in the study of its species, and perhaps no group of shells can be cited as a more instructive example of this substantial progress than the one of which this is a member. In the time of Linnæus, his *Helix vivipara* was fully understood to embrace all the banded *Viviparæ*, but from it was soon separated the *fasciata*, Müll. (*achatina*, Drap.) These two species became afterwards the types of two subdivisions, constituting the great fasciate group of the restricted genus *Vivipara* (from the old genus has been separated *Melantho*, *Tulotoma*, *Lioplax*, etc.) These divisions are distinguished in all their species by a marked difference in the convexity of the whorls, and in their rapidity of increase in size.

The first type, *V. vivipara*, is represented in America by at least three species, *V. lineata*, Val., *V. intertexta*, Say, and *V. Bermondiana*, D'Orb. These are all globose species, with rapidly enlarging whorls, very convex, with deep sutures. *V. lineata* has been almost constantly, to the present time, confounded with *V. vivipara* by American authors; but its very constant specific difference was long since pointed out by Küster in his "Conchylien Cabinette." The shell herein described is confounded by Say and Haldeman (partly) with this division, whereas it undoubtedly belongs to the other.

The second division of the group, represented typically by *V. fasciata*, has been enlarged by European naturalists by the elimination of several distinct species, among which may be cited *V. pyramidalis*, Jan. The shells of this division have higher spires, the whorls much less convex and increasing in size more gradually. This group is represented in America, so far as we are aware, by one species only, the one now described.

Both divisions are represented by exotic species, and it remains to distinguish *V. Waltonii* from *V. Bengalensis*, which belongs to the same division. The most striking difference is that of color, *Waltonii* having the warm reddish tints of the

European and American species, while *Bengalensis* is a light but dull green, and its bands a darker green. The latter also has a longer spire, and its whorls are not quite so convex.

The specimen I have figured is intermediate in size between the *Vivipara* figured by Say and the *Bengalensis* figured by Haldeman; and, although Say proposed a description under the name of *multilineata*, and Haldeman describes "numerous narrow spiral bands" in *Bengalensis*, yet an examination of both their figures will show but four bands, the number on the two specimens before me. It is, perhaps, possible to separate each band into several closely approximate revolving colored lines, but this may be done with almost any fasciate shell. I insist upon this point in the present instance, because the possession of four bands stamps this species as North American in its origin, and because *Bengalensis* has, in common with other Asiatic species, numerous distinct narrow bands. (I count twelve on one specimen in my cabinet.) We can probably even determine the origin of these species by this character alone; thus:—

A. Bands Red.

Two banded.	Cuban.	V. <i>Bermondiana</i> , the only species.
Three banded.	European.	Every fasciate species.
Four banded.	North American.	Every fasciate species.

B. Bands Green.

Bands numerous.	Asiatic (Indian).	V. <i>Bengalensis</i> , V. <i>Ingallsianus</i> , etc.
	Australian.	V. <i>suprafasciata</i> , V. <i>Australis</i> , V. <i>Essingtonensis</i> .

Not Banded.

Asiatic and American.

It will be noticed that Mr. Say did not describe his specimens from Florida under the name of *multilineata*. Prof. Haldeman, therefore, ought not to have quoted this name in his synonymy of *V. vivipara*. Mr. Say at first suspected his shell to be new, but on publishing it, concluded that it was not so; I am, therefore, at liberty to affix a name to this species, and *multilineata* would be inappropriate, as not describing correctly one of the characters of the shell, and as indicating a foreign origin of the species; besides it is preoccupied by my friend, Prof. Meek, for a fossil species discovered in Nebraska. I, therefore, dedicate it to the lady who collected the specimens in Dr. Michener's cabinet.

Dr. Michener allowed me to examine also specimens of *V. lineata* from the same locality, and differing in no respect from specimens from other portions of the Southern States.

DESCRIPTIONS OF NEW FLUVIATILE MOLLUSCA.

BY GEORGE W. TRYON, JR.

1. MELANIA PREMORDICA, Tryon.—t. 10, f. 3.

Description.—Shell ovately conical, robust, covered with regular, close, curved growth lines, and with rounded revolving ribs, of which seven are on the body whorl; spire conical elevated, ? (eroded), suture deeply impressed; whorls convex, surface formed into a succession of planes by the revolving ribs; aperture ovate, a little broadly effused below; the ribs form slight sulcations within the aperture. Reddish-brown, sometimes dark greenish-brown; internally white or light yellowish, the sulcations deep brown.

Dimensions.—Length (eroded) 30 mill.; diameter 22 mill.

Habitat.—Burmah.

My cabinet. Cabinets of Isaac Lea, Philada., and Charles M. Wheatley, Phoenixville, Penn.

Observations.—This is a very remarkable species. There are very few which possess revolving ribs, and in all those previously known they are tuberculate. In general form and color this species resembles *M. gloriosa*, Anth., described in vol. i. of this Journal, but it is a much smaller species. In ornamentation it is nearest, perhaps, to *M. lyrata*, Menke,* but is a larger, stouter species, without tuberculations.

I owe to Isaac Lea, Esq., the opportunity of describing this interesting exotic species.

2. LYMNÆA (LIMNOPHYSA) SHURTLEFFII, Tryon.—t. 10, f. 4, 5.

Description.—Ovate-cylindrical, rather thin, diaphanous, minutely concentrically striate; spire moderately elevated, apex acute, suture impressed: whorls six, flatly convex, the last one three-fourths the length of the shell, subcylindrical, compressed on the sides; aperture one-half the total length, contracted, somewhat ear-shaped, columella with a considera-

* Reeve *Conch. Icon. Melania*, fig. 170.

ble twist, reflected over and nearly covering the umbilicus. Light brown or horn color, shining, tip of spire and interior margin of labrum colored dark bluish-purple.

Dimensions.—Length 19 mill., diam. 9 mill.

Habitat.—Weatogue, Hartford Co., Conn. Dr. S. Shurtleff.

My cabinet. Cabinet of Isaac Lea. Cabinet of Dr. Shurtleff.

Observations.—The circumstances under which this and the following species were found are so peculiar that it is with great hesitation that I have ventured on a description of either of them. That new species of these shells should exist undetected in sections of the United States which have been so well explored by assiduous naturalists, would be surprising; but in the present instance the almost irresistible supposition is, that these species are of very recent origin, in fact, contemporaneous with that of the body of water which they inhabit. I have looked in vain for some evidence upon the specimens themselves of the effect of some strong local influence. The species are so distinct that they afford no clue to a possible derivation from others.

In conclusion, I present the following interesting particulars:—

Extract from a letter from the late Dr. S. Shurtleff to Isaac Lea, Esq., dated Weatogue, Hartford Co., Conn., November 22, 1865.

“In the summer of 1860 I made an excavation some two rods below a spring that flows about eight months in the year. The spring comes from a neighboring hill. The overlying rock is New Red Sandstone. From the time of the excavation until the summer of 1864 there was water in the artificial pond. It was dry in 1864, but I did not examine for shells, as before the excavation I had repeatedly examined the spring, but never found shells of any description.

“After my return from Pennsylvania in September, 1865, accidentally crossing the pond, which was dry, I noticed quantities of shells clustered in the hollows. I gathered a few and laid them by for leisure examination; and when I came to look at them again, I found *L. umbrosa*, as I supposed, as well as a nondescript species. I immediately went to the pond and secured all the *Lymnæans* I could find—some alive and many dead; and, fearing the dry season would destroy them all, I put many of the living shells into another pond I have since made, that will never dry up. I may have collected 50 specimens of *L. umbrosa*? and of the other specimens a half pint.

“How these shells came in the pond is as much a matter of surprise to me as it is to you. I have no knowledge that there was ever a shell put into the pond.

“One fact more. The spring and pond are perfectly isolated, as the overflow disappears at the edge of a sandy plain in less than ten rods from its fountain-head, and there is no stream of perpetual running water within one mile of it. The Farmington River is about a mile distant in the valley below, and here the only species yet found are *Lym. columella*, Say, *Physa heterostrophata*, Say, *Planorbis bicarinatus*, Say, *Vivipara decisa*, Say, *Unio complanatus*, Sol., and *U. radiatus*, Lam.

“The pond is two hundred feet above the bed of Farmington River.”

3. PLANORBIS (GYRAULUS) CIRCUMSTRIATUS, Tryon.—t. 10, f. 6—8.

Description.—Shell small, rugose, generally distorted in adult specimens (the whorls not proceeding in the same plane, but elevated or depressed below it at times); volutions four, convex, increasing very slowly in diameter, with deeply impressed suture, towards the aperture deflected; below concave, but exhibiting all the volutions, with two or three raised revolving lines; aperture small, very oblique. Light horn color.

Dimensions.—Diameter 6 mill., height $1\frac{1}{2}$ mill.

Habitat.—Artificial pond at Weatogue, Conn. Dr. S. Shurtleff.

My cabinet. Cabinet of Mr. Lea. Cabinet of Dr. Shurtleff.

Observations.—This species is of the same size as *Planorbula armigera*, Say, and its upper surface is remarkably like that shell. It differs, however, in its unarmed, oblique aperture, and concave, lineated under surface.

The deflected aperture reminds one of *Pl. deflectus*, but from that, as well as *parvus* and *albus*, it is distinguished by the slow increase in the size of the whorls.

The remarkable raised revolving lines are visible on the under surface of all the adults before me, but on a number of young shells I can detect no trace of them.

Besides the above two species, I find a single specimen of *Lym. umbrosa*, Say, and several of *L. desiliosa*, Say.

OBSERVATIONS ON AN ABNORMAL SPECIMEN OF
PHYSA GYRINA.

BY GEORGE W. TRYON, JR.

Plate 10, Figs. 9, 10.

The shell first figured is from Grand Rapids, Mich., and was sent to me by J. A. McNeil, Esq., of that place, where the species occurs abundantly. The monstrosity consists in the upper portion of the whorls being round-shouldered or geniculate, with a deep immersed suture, making the spire somewhat scalariform, but short.

It is well known that *Pabulina scalaris*, Jay, a Florida species, was described from a single specimen in the author's cabinet, and that no other specimens have since occurred. The singular deformation of the present species suggests to me the probability that *scalaris* also is a more exaggerated example of the same aberrant formation.

A copy of Dr. Jay's original figure (fig. 10) is given for comparison.

MONOGRAPH OF THE FAMILY STREPOMATIDÆ.

[Concluded from p. 52.]

BY GEORGE W. TRYON, JR.

GONIOBASIS, Lea. (Continued.)

J. Heavy, pupæform or cylindrical species.

217. **G. cylindracea**, *Con.* Figs. 298, 299. Cylindrical, smooth, very thick; spire short, truncate, suture irregularly much impressed; body whorl cylindrical; aperture very long and narrow, very much contracted above. Yellowish horn color, sometimes banded. *N. Ala. Miss.*

Fig. 299 is from the type of *M. oppugnata*, Lea.

* 218. **G. pupoidea**, *Anth.* Figs. 300, 301. Narrowly cylindrical, smooth, thick; spire somewhat raised, conical, suture much impressed; whorls 6, flattened above; aperture small, elliptical. Yellowish, four-banded. *Coosa and Cahawba Riv., Ala.*

Narrower, with longer spire and smaller aperture than *G. cylindracea*. Fig. 301 represents *G. propinqua*, Lea.

219. **G. lita**, *Lea.* Fig. 303. Rugosely striate, thick; spire obtusely elevated, suture irregularly impressed; whorls 6, the last subcylindrical; aperture small, constricted. Greenish-brown, white or purple within. *Cahawba River, Ala.*

220. **G. fallax**, *Lea.* Fig. 304. Pupæform, somewhat cylindrical, smooth, spire obtuse, much elevated, suture impressed; whorls 7, slightly convex, the last subcylindrical; aperture small, very much constricted, elongate elliptical, angular at base. Dark brown or dark horn color, sometimes four-banded within. *Coosa River, Ala.*

221. **G. inosculata**, *Lea.* Fig. 305. Inflated, pupæform, thick; spire elevated, suture very much impressed; whorls 7, convex, the last subcylindrical; aperture very small, elliptical. Yellowish-brown, four-banded. *Coosa River, Ala.*

More inflated, of brighter color, and more distinctly banded than *G. fallax*.

222. **G. Alabamensis**, *Lea*. Fig. 306. Inflated, pupæ-form, thick; spire raised, obtuse, suture very much impressed; whorls 7, very convex; body whorl subcylindrical; aperture small, constricted. Yellowish, four-banded. *Coosa Riv., Ala.*

Much more convex than *G. inosculata*.

223. **G. rara**, *Lea*. Fig. 307. Conical, somewhat scalariform, thick; spire raised, scalariform, suture irregularly impressed; whorls 8, flattened, angular above; aperture small, elliptical, angular at base. Dark olive, shining, purple within. *Coosa River, Ala.*

May possibly be a monstrosity of *G. fallax*.

224. **G. punicea**, *Lea*. Fig. 308. Subcylindrical, smooth, thick; spire elevated, conical, suture impressed; aperture small, ovately rounded. Reddish-brown, white within. *Coosa River, Ala.*

225. **G. pudica**, *Lea*. Fig. 309. Smooth, conical, somewhat thick; spire conical, suture irregularly impressed; whorls 6, slightly convex; aperture small, ovate. Olive or reddish, shining. *N. Ala.*

This species has been confounded with *G. olivula*, *Con*. It is a smaller, more solid shell.

226. **G. fabalis**, *Lea*. Fig. 310. Elliptical, smooth, thick; spire very obtuse, suture irregularly impressed; whorls 4, convex, the last large; aperture large, subrhomboidal. Yellowish, four-banded, white and banded within. *Tenn. River.*

227. **G. Shelbyensis**, *Lea*. Fig. 311. Fusiform, smooth, somewhat thick; spire obtusely conical, suture impressed; whorls 6, slopingly convex; aperture small, subovate. Yellowish, sometimes banded, white within. *Yellowleaf Creek, Ala.*

Closely allied to *G. pudica*, but differs somewhat in the shape of the aperture. The whorls also are not so convex.

228. **G. fumea**, *Lea*. Fig. 312. Conical, smooth, rather thin; spire somewhat raised, suture irregularly impressed; whorls 5—6, flattened above, somewhat inflated below; aperture ovate-rhombic. Sooty brown, sometimes obscurely banded, whitish within. *Yellowleaf Creek, Ala.*

229. **G. æqua**, *Lea*. Fig. 313. Conical, thick, substriate; spire conical, elevated, obtuse, suture moderate; whorls 6, flattened above; aperture small, rhomboidal. Dark brown, whitish within. *Yellowleaf Creek, Ala.*

230. **G. solidula**, *Lea*. Fig. 314. Subfusiform, smooth, obtusely conical, somewhat thick; spire raised, suture moderate; whorls 5, slightly convex; aperture large, ovate. Yellowish, banded, whitish within. *Yellowleaf Creek, Ala.*

231. **G. olivula**, *Conrad*. Figs. 315, 316. Subfusiform, smooth, somewhat thin; spire conical, decollate, suture very much impressed; whorls about 6, somewhat convex, the last one large; aperture large, ovate, rounded below. Greenish-olive, obscurely banded, yellowish-white within. *N. Ala.*

Fig. 316 represents *G. lepida*, *Lea*.

232. **G. fascinans**, *Lea*. Fig. 317. Fusiform, smooth, somewhat thick, shining; spire high, conical, suture impressed; whorls 6, slightly convex; aperture small, somewhat retuse at base. Yellowish horn color, with three narrow bands. *Yellowleaf Creek, Ala.*

More conical and less convex than *G. olivula*.

233. **G. Showalterii**, *Lea*. Fig. 318. Fusiform, rather thick; spire obtusely elevated, suture impressed; whorls 6, flatly convex, the last large; aperture large, ovately rhombic, outer lip sharp and slightly sinuate. Yellowish-brown, with four narrow bands. *Coosa and Cahawba Rivers, Ala.*

This species is more convex than *G. fascinans*, and has four bands.

233a. **G. pupæformis**, *Lea*. Fig. 319. Sub-pupæform, rather thick, smooth, suture impressed; whorls 6, slightly convex; aperture rather large, elongate-pyriform. Dark brown, obsolete five-banded. *Coosa River, Ala.*

234. **G. clausa**, *Lea*. Fig. 320. Subpupæform, thick, very obtusely inflated; spire short, convex conical, suture well impressed; whorls 7, somewhat convex; aperture very small, subrhomboidal, angular at base, columella straight. Olive, with or without bands. *Coosa River, Ala.*

235. **G. crepera**, *Lea*. Fig. 321. Conical, somewhat thick, substriate; spire somewhat raised, suture irregularly impressed; whorls 6, somewhat convex; aperture ovately rhombic, angular below. Sooty brown. *Yellowleaf Creek, Ala.*

236. **G. abscida**, *Anth.* Fig. 322. Subquadrate, smooth, thick; spire nearly plane from erosion; whorls 5, the last very large; aperture long and narrow, subrhombic, the outer lip well curved below. Dark reddish-brown. *Ala.*

Closely allied to, if not identical with, *G. crepera*. Only one specimen is known.

237. **G. Vanuxemiana**, *Lea*. Fig. 323. Obtusely conical, convex, striate, solid; spire conical, suture impressed; whorls 6, somewhat convex; aperture ovate. Yellowish, four-banded. *Ala.*

238. **G. Coosaensis**, *Lea*. Fig. 324. Fusiform, or sub-elliptical, rather thick, coarsely striate; spire raised, conical, suture well impressed; whorls 7, slightly convex, the last large and narrowed below; aperture oblique, long and very narrow, angular at base. Horn color, four-banded. *Coosa River, Ala.*

239. **G. rubicunda**, *Lea*. Fig. 325. Subfusiform, thick, regularly striate; spire elevated, convex conical, suture impressed; whorls 6, slightly convex; aperture elongate elliptical, angular at base. Reddish without and within. *Coosa River, Ala.*

Not so coarsely striate as *Coosaensis*; the aperture is also wider.

240. **G. Hayesiana**, *Lea*. Figs. 326—328. Subcylindrical, striate, solid; spire elevated, conical, suture well impressed; whorls 6, flattened; aperture small, elliptical. Yellowish-brown. *Ala.*

241. **G. arctata**, *Lea*. Fig. 329. Subfusiform, compressed at the sides, coarsely striate, thick; spire conical, suture much impressed; whorls 6, flattened; aperture narrow, rhomboidal, angularly produced below. Yellowish horn color. *Tuscaloosa, Ala.*

242. **G. ampla**, *Anth.* Figs. 330, 331. Conical, elevated, smooth, rather thick; spire obtusely conical, suture well impressed; whorls 7, somewhat flattened, the last large; aperture large, ovately rhomboidal, obtusely angular at base, columella incurved. Dark horn or olive color, much banded. *Coosa and Cahawba Rivers, Ala.*

Fig. 331 represents *Hartmannii*, *Lea*, the full grown of this species; it is the largest of the genus. Some specimens are slightly striate.

243. **G. mellea**, *Lea*. Fig. 332. Conical, subfusiform, smooth, rather thick; spire conical, sharp-pointed, suture well impressed; whorls 7, convex, rapidly enlarging, the last very convex and large; aperture rhomboidal, angular below, columella perpendicular. Bright honey-yellow, sometimes four-banded. *Coosa River, Ala.*

244. **G. ambusta**, *Anth.* Fig. 333. Ovate, rather thin, smooth; spire obtusely elevated; whorls 6, subconvex, the last large and obsoletely striate; aperture large, narrowly ovate. Chocolate color, reddish within. *Ala.*

245. **G. læta**, *Jay*. Figs. 334—336. Inflated fusiform, thick, smooth or coarsely striate; spire obtusely conical, suture impressed; whorls 6, rather convex, the last large; aperture large, elliptical, angular at base. Yellowish, with or without bands, white within. *Coosa River, Ala.*

Fig. 334 is a fac-simile of the rather poor one of Dr. Jay's Catalogue. The species is generally striate. Fig. 336 represents a half-grown specimen, *G. uniolata*, *Anth.*

246. **G. harpa**, *Lea*. Figs. 337, 338. Conical, rather thick, striate; spire elevated conical, suture somewhat impressed; whorls 6, somewhat convex; aperture small, elliptical, angular at base. Horn color. *Tuscaloosa, Ala.*

Fig. 338 represents *G. textilosa*, *Anth.*, a half-grown specimen.

247. **G. oliva**, *Lea*. Elliptical, striate, solid; spire rather short, suture much impressed; whorls 5, convex; aperture small, oval. Brown. *N. Ala*.

Narrower and smaller than *leta*, resembling *harpa* in form, but the aperture is wider and more rounded below.

248. **G. proteus**, *Lea*. Fig. 339. Subcylindrical, pupæform, thick, smooth; spire elevated, suture impressed; whorls 6, convex; aperture small, ovate, well rounded at base. Yellowish horn color. *Tuscaloosa, Ala*.

249. **G. grisea**, *Anth*. Fig. 339a. Ovate, smooth, thick; spire elevated, suture well impressed; whorls 7, convex, the last obscurely ribbed. Dull gray, obscurely banded. *Tennessee River, Ala*.

250. **G. culta**, *Lea*. Figs. 340, 341. Subfusiform, inflated, rather thick, rugosely striate; spire obtuse, suture irregularly very much impressed; whorls 7, carinate above, the last biangulate; aperture wide, rhomboidal. Greenish-yellow, three or four-banded. *Coosa River, Ala*.

Fig. 341 represents *G. suavis*, *Lea*.

251. **G. luteola**, *Lea*. Subfusiform, obtusely conoidal, somewhat thick, straw color; spire conical, suture impressed; whorls 5, the last large, inflated, subangulate above, a little striate below; aperture large, subrhomboidal, obtusely angulate at base. Straw color. *Coosa River, Ala*.

252. **G. grvida**, *Anth*. Fig. 344. Ovate, smooth, thick; spire conical, suture moderate; whorls 7—8, nearly flat, the last large, inflated, subangulate in the middle; aperture oval, a little angulate at base. Light brown, livid within. *Ala*.

253. **G. Germana**, *Anth*. Fig. 345. Ovate, conical, smooth, rather thin; spire conical, suture moderately impressed; whorls 6, flat, the last large and subangulate in the middle; aperture large, rhombic, subangulate below. Ash gray to dark brown, brownish within, with a white border. *Catawba River, Ala*.

This differs from *grvida* principally in the form of the aperture.

254. **G. variata**, *Lea*. Fig. 346. Subfusiform, inflated, smooth, somewhat thick; spire short conical, suture well impressed; whorls 6, flattened above, the last very much inflated; aperture large, ovate. Yellowish or purplish, sometimes banded. *Coosa River, Ala*.

255. **G. ovalis**, *Lea*. Figs. 347—349. Ovate, solid, striate; spire short conical, suture much impressed; whorls 6, well rounded; aperture oval, narrow. Yellow, banded, white within. *Coosa River, Ala*.

Not so broadly ovate nor so large as *G. lata*, *Jay*. Fig. 348 represents *G. copiosa*, *Lea*, and Fig. 349 *G. orbicula*, *Lea*.

256. **G. virgulata**, *Lea*. Figs. 350, 351. Ovate, thick, smooth; spire short conical, suture much impressed; whorls 7, convex, the last large, inflated; aperture diagonal, long, and narrow, angular at base. Greenish-yellow, four-banded. *Coosa River, Ala.*

Fig. 351 represents *G. glandaria*, *Lea*, the adult. In the young shell the spire, when present (Fig. 350), is attenuate and sharp-pointed.

257. **G. clara**, *Anth.* Fig. 352. Ovate, smooth, thick; spire conical, suture slightly impressed; whorls 7, flat, the last large, inflated; aperture ovate, angulate at base. Yellow, with four brown bands. *Ala.*

258. **G. inflata**, *Hall.* Fig. 353. Ovate-conical, smooth, thick; spire conical, suture moderately impressed; whorls 5, flattened, the last inflated; aperture rhomboidal, angulate at base. Brown or green, banded inside with red. *Alabama River.*

The above description does not correspond altogether with that of *germana*, *Anth.*, but if the figure here given (which is copied from Reeve's "Conchologia Iconica," and represents a shell in Mus. Anthony) is *inflata*, then the two are probably identical.

259. **G. fusiformis**, *Lea*. Fig. 354. Fusiform, smooth, rather thin; spire short-conical, acute, suture linear; whorls 6, the last inflated; aperture ovate, rounded below. Yellowish, sometimes double-banded. *Tenn.*

260. **G. bellula**, *Lea*. Fig. 355. Subfusiform, striate, somewhat thick; spire short, suture well impressed; whorls 5, convex, the last large; aperture rather large, elliptical, obtusely angular at base. Pale horn color, four-banded, white and banded within. *Yellowleaf Creek, Ala.*

261. **G. calculoides**, *Lea*. Fig. 356. Subfusiform, robust, irregularly striate, and noded above; spire obtusely conical, suture irregularly impressed; whorls 6, much inflated, the last large; aperture rather small, elliptical, angled at base, columella perpendicular, straight. Horn color, with or without bands. *Coosa River, Ala.*

262. **G. basalis**, *Lea*. Elliptical, thick, smooth; spire short, obtuse, suture impressed; whorls convex; aperture ovately elongate, acutely angular at base. Yellowish-green, banded. *Ala.*

Resembles *G. glandaria*, *Lea*, but is thinner, the outer lip more expanded, and the aperture rather longer. It is closely allied to *G. fusiformis*, *Lea*.

263. **G. Lewisii**, *Lea*. Fig. 357. Somewhat cylindrical, thick, coarsely striate; spire raised conical, suture much impressed; whorls 6, flattened, with rough revolving ridges or striae; aperture small, ovately rhomboidal, obtusely angular at base. Dark green, four-banded. *Coosa and Tallapoosa Rivers, Ala.*

264. **G. ellipsoides**, *Lea*. Fig. 358. Elliptical, thick, with two or three cord-like striæ and a few impressed striæ at base; spire elevated, convexly conical, suture irregularly impressed; whorls 7, slightly convex, the last large; aperture narrow, elongate-elliptical, columella nearly perpendicular. Greenish-yellow, banded. *Coosa River, Ala.*

265. **G. elliptica**, *Lea*. Fig. 359. Elliptical, smooth or slightly striate: spire obtuse, subpupæform, slightly folded at tip, suture impressed; whorls 6, flatly convex, the last large: aperture large, elongate-elliptical, obtusely angular at base, columella incurved. Yellowish, four-banded. *Coosa River, Ala.*

266. **G. bullula**, *Lea*. Fig. 360. Conical, truncate, smooth, inflated, rather thin; spire raised, eroded, suture impressed; whorls 5, inflated, the last rather large; aperture large, wide-ovate, obtusely angular at base. *Yellowleaf Creek, Ala.*

267. **G. excavata**, *Anth.* Fig. 361. Ovate-conic, smooth, thick; spire obtusely elevated, suture well impressed; whorls 4 remaining, flattened, the last with a central concave excavation, with its borders somewhat carinate: aperture moderate, ovate. Dark olivaceous, purple within. *Ala.*

268. **G. purpurea**, *Lea*. Fig. 362. Subfusiform, smooth: rather thin; spire obtusely conical, suture slightly impressed; whorls 5, sloping, flattened, the last large and subangulated on the periphery; aperture rhomboidal, angular at base. Dark brown, purple within. *Ala.*

Very closely allied to *excavata*, *Anth.*, and *rara*, *Lea*.

269. **G. quadrivittata**, *Lea*. Fig. 363. Conical, smooth, rather thick; spire raised, conical, suture much impressed; whorls 8, flatly convex, the last subangular; aperture constricted, ovately rhomboidal. Greenish-yellow, four-banded. *Coosa River, Ala.*

270. **G. propria**, *Lea*. Fig. 364. Fusiform, smooth, rather thick; spire raised, conical, suture impressed; whorls 6, slightly convex; aperture ovate, wide at base. Yellowish-olive, four-banded. *Ala.*

271. **G. negata**, *Lea*. Fig. 365. Elliptical, subconical, thick, closely and regularly corded with striæ; spire conical, suture well impressed; whorls 6, slightly convex, the last large; aperture ovate, broad below. Yellowish, four-banded. *Coosa River, Ala.*

272. **G. impressa**, *Lea*. Fig. 366. Fusiform, moderately thick, closely and sharply transversely sulcate; spire obtuse, suture well impressed; whorls 6, slightly convex; aperture large, oval, angular at base. Reddish or yellowish-brown. *Coosa River, Ala.*

Well distinguished by its large size and singular sharp striæ. In size and form it much resembles *G. lata*, *Jay*.

273. **G. pergrata**, *Lea*. Fig. 367. Subcylindrical, somewhat thick; spire obtusely conical, suture much impressed; whorls 6, slightly round-shouldered above, with faint, close, impressed, revolving striae; aperture large, subrhomboidal, columella arcuate. Greenish horn color. *Cosa River, Ala.*

Only a single specimen has been obtained, and it is questionable whether it is more than a poor example of a half-grown *impressa*.

274. **G. capillaris**, *Lea*. Fig. 368. Cylindrical, thick, very closely striate, with small, sharp ridges; spire obtuse, suture irregularly impressed; whorls slightly convex; aperture large, widely elliptical, obtusely angulate at base. Yellowish brown. *Cosa River, Ala.*

Differs from *G. impressa* by being smaller and more narrow and cylindrical.

GONIOBASIS, Lea.



Fig. 298.



Fig. 299.



Fig. 300.



Fig. 301.



Fig. 303.



Fig. 304.



Fig. 305.



Fig. 306.



Fig. 307.



Fig. 308.



Fig. 309.



Fig. 310.



Fig. 311.



Fig. 312.



Fig. 313.



Fig. 314.



Fig. 315.



Fig. 316.



Fig. 317.



Fig. 318.



Fig. 319.



Fig. 320.



Fig. 321.



Fig. 322.



Fig. 323.



Fig. 324.



Fig. 325.

GONIOBASIS, Lea.



Fig. 326.



Fig. 327.



Fig. 328.



Fig. 329.



Fig. 330.



Fig. 333.



Fig. 331.



Fig. 332.



Fig. 334.



Fig. 335.



Fig. 336.



Fig. 337.



Fig. 338.



Fig. 339.



Fig. 339a.



Fig. 340.



Fig. 341.



Fig. 344.



Fig. 345.



Fig. 346.

GONIOBASIS, Lea.



Fig. 347.



Fig. 348.



Fig. 349.



Fig. 350.



Fig. 351.



Fig. 352.



Fig. 353.



Fig. 354.



Fig. 355.



Fig. 356.



Fig. 357.



Fig. 358.



Fig. 359.



Fig. 360.



Fig. 361.



Fig. 362.



Fig. 363.



Fig. 364.



Fig. 365.



Fig. 366.



Fig. 367.



Fig. 368.

ANCULOSA, Say.

1. *Plicate Species.*

2. **A. plicata**, Con. Figs. 1—4. Suboval, moderately thick; spire short-conical, suture moderately impressed; body whorl slightly convex, with revolving ribs around the upper part, more or less interrupted by, or altogether separated into crenulations; aperture rounded elliptical. Green, with or without bands. *Tenn. River, N. Ala.*

Fig. 4 represents *tuberculata*, Lea, Black Warrior River, Ala.

2. *Sulcate Species.*

3. **A. Showalterii**, Lea. Fig. 5. Suborbicular, thick; spire scarcely raised, suture well impressed; body whorl inflated, encircled throughout by several heavy revolving ribs, causing corresponding grooves within the aperture; aperture large, suboval, the lip crenulate. Very dark brown. *Coosa River, Ala.*

4. **A. canalifera**, Anth. Figs. 6, 7. Ovate, thin; spire conical, suture slightly impressed; whorls 5, the last large, inflated, with several carinate revolving lines; aperture large, oval. Brown or olive. *Dan River, N. C.*

Is possibly the young of *A. corpulenta*, Anth.

6. **A. costata**, Anth. Figs. 8, 9. Subglobose, thin; spire small, short conic; body whorl ventricose, with three to five narrow equidistant revolving costae; aperture subrotund. Olivaceous, white or purplish within. *Ohio River.*

7. **A. rubiginosa**, Lea. Figs. 10—18. Ovately gibbous, thick, smooth, or more or less covered with revolving ridges or striae; spire obtusely elevated, suture slightly impressed; body whorl somewhat constricted above; aperture small, with a heavy deposit of naere on the labium. Greenish or reddish, banded, generally purple within. *Black Warrior and Coosa Rivers, Ala.*

8. **A. dissimilis**, Say. Figs. 19—56. Ovate conic, thin; whorls 3 or 4, with a slight suture; body whorl large, subcarinate in the middle, and occasionally with revolving carinae above or below it; aperture broadly ovate, sometimes with a tooth upon the columella. Yellowish or greenish, not banded, white within. *Susquehanna River, Penn., New York, Maryland, Virginia from James River to Shenandoah River.*

A very abundant and variable species; separated from *Anculosa* as a sub-genus *Nitoris* by H. and A. Adams, and as *Mudaliu* by Haldeman, but it does not appear to possess any permanent distinctive characters. Figs. 19—28 represent young and old specimens of the typical shell, with the carinae more or less developed. Fig. 29 is a copy of the figure of DeKay's *A. carinata* from Lake Champlain. Figs. 30—32 are transitional to figs. 33—36, representing *carinata*, Lea, a form inhabiting sparingly the Potomac River

at Washington, and more abundantly the Roanoke River and Shenandoah River. Figs. 37—41 represent *variabilis*, Lea, another form having the same distribution as the last. Fig. 42 is *trivittata*, DeKay, being the same form, rarely banded, from Lake Champlain.

The transition from a smooth to a toothed columella is represented by figures 43—49, exhibiting forms of *nigrescens*, Conrad. *A. monodontooides*, Con. (figs. 50—53), *A. dentatus*, Couthouy (figs. 54, 55), and *A. affinis*, Hald. (fig. 56), are all forms having the toothed columella. The habitat of the latter is most probably erroneously given as Ohio.

9. **A. dilatata**, Con. Figs. 57—78. Subovate, moderately thick; spire conical, somewhat elevated, suture well impressed; whorls 4—5, the last large, inflated, generally smooth, sometimes angulated in the middle, or with several angles, or closely covered by revolving ribs; aperture large, round-ovate, dilated at the base, and produced towards the left, columella straight, occasionally toothed. Light brown to bright or dark green. *Rivers of Western Virginia tributary to the Ohio River.*

Another protean species, replacing *dissimilis*, Say, from which it is constantly distinguished by the peculiar form of the base of the aperture.

Figs. 57—59 represent the typical shell. Fig. 60 is a young banded specimen, with a toothed columella, the type of *A. Rogersii*, Con. Fig. 61 is *carinatus*, Anth., and 62 and 63 *Kirtlandianus*, Anth.

Fig. 64 represents *inflata*, Lea, seemingly very distinct, but connected with the type form by insensible gradations; and fig. 65 is *A. littorina*, Hald.

The following represent Haldeman's "Varieties:" Figs. 66, 67, *glauca*, fig. 68, *solidula*, fig. 69, *sinuata*, fig. 70, *striata*, fig. 71, *rapeformis*. The balance of the figures illustrate a series of specimens, many of which somewhat resemble *dissimilis*.

As this species becomes old, the base of the aperture sometimes thickens, and loses its dilated angle, so as to appear, when thus abraded, to be broadly rounded below.

10. **A. corpulenta**, Anth. Fig. 79. Broad-ovate, smooth, thick; spire conical, suture slightly impressed; whorls 5—6, flattened, the last very large, inflated, subangular on the periphery; aperture large, ovate, broadly rounded below, columella incurved. Dark brown, sometimes banded within. *N. Car.*

A larger, more ponderous species than *dissimilis*. But it *may* be only a variety of that shell. Occasionally one or more additional angles on the body whorl are visible, and, as previously mentioned, I suspect that *A. caudifera* is the juvenile form, with the angles better developed.

11. **A. melanoides**, Con. Figs. 80—82. Conical, thick; spire short conical, suture moderately impressed; whorls 4, flattened, the last large; aperture elliptical, angular at base, about half the length of the shell. Light green, obscurely banded. *N. Ala.*

Fig. 82 represents the adult, *A. turgida*, Hald.

12. **A. trilineata**, Sty. Figs. 83—85. Subglobose, rather thin; spire short, apex sharp, suture well impressed; whorls 4, rounded, the last large; aperture round. Yellowish-brown, with generally three dark-brown revolving bands. *Ohio Riv.*

Fig. 85 is *A. viridis*, Lea, an adult shell without bands.

† 13. **A. subglobosa**, *Say*. Figs. 86—96. Smooth, subglobose, or bell-shaped, very thick; spire short, suture well impressed; whorls 5, the last very large, impressly flattened around the upper part; aperture ovate, rounded below, columella incurved, much thickened. *W. Virg., Tenn., N. Ala., N. Geo.*

Figs. 86—88, typical. Greenish or yellowish-brown, brown within.

Fig. 89, *globata*, *Lea*. A young double-banded specimen.

Figs. 90—92, *gibbosa*, *Lea*. A variety without bands.

Figs. 93—95, *tintinnabulum*, *Lea*, including those specimens most inclined towards a campanulate form. Generally doubly-banded, or the bands broken up into maculations, frequently purple within.

Fig. 96, *virgata*, *Lea*. The young of the campanulate form.

✱ 14. **A. prærosa**, *Say*. Figs. 97—100. Oval or subglobose, moderately thick; spire very short, eroded, suture irregularly impressed; whorls 4 or 5, the last very large, inflated, subglobose almost the entire size of the shell, a little flattened around the superior part; aperture ovate or pyriform, the lips very thick. Greenish or brown, with purple bands or maculations, purple within. *Ohio River to N. Ala.*

✱ Fig. 99 is *A. angulata*, *Con.*, a half-grown shell from Flint River, Ala., and Fig. 100 represents the quite young, *Mel. Cincinnatiensis*, *Lea*, from the Ohio River.

✱ 16. **A. tæniata**, *Con.* Figs. 101—103. Oval or oblong, thick, smooth; spire eroded, suture irregularly impressed; body whorl subconical, flattened around the upper part; aperture small, ovate, lips remarkably thickened. Greenish or brownish, generally with four equidistant purple bands, aperture generally tinged with purple within. *N. Ala.*

This is a longer, narrower species than *A. prærosa*; the colors are also more vivid, the aperture smaller, and the lips thicker. The half-grown shell is *A. Coosacensis*, *Lea* (Fig. 103).

17. **A. Troostiana**, *Lea*. Fig. 104. Ovate, thick, smooth; spire short, suture well impressed; body whorl thick, slopingly convex; aperture small, widely oval, well rounded below. Very dark brown, almost black, bluish within. *Tenn.*

More ponderous and darker-colored than *subglobosa*, and having a more elevated spire.

18. **A. pinguis**, *Lea*. Fig. 105. Subrotund, smooth, inflated, rather thick; spire very obtusely conical, suture well impressed; whorls 4, the last very large, slightly convex, angulated in the middle; aperture very large, widely oval. Dark brown, without bands, white or purple within. *Lebanon, Tenn.*

20. **A. contorta**, *Lea*. Fig. 106. Ovate, smooth, thick; spire elevated, suture very deeply impressed; whorls very convex, the last large, oval; aperture small, nearly round, columella much thickened and very much curved. Yellowish horn color, *Coosa River, Ala.*

21. **A. vittata**, *Lea*. Fig. 107. Subglobose, smooth, thick; spire obtuse, suture well impressed; whorls 4, inflated, the last very large and very convex; aperture small, nearly round, columella much incurved. Yellowish, with several bands, tinged with purple within. *Coosa River, Ala.*

22. **A. planospira**, *Anth.* Fig. 108. Ovate or obovate, smooth, thick; spire nearly flat, suture slightly impressed; whorls 4, perfectly plane above, the last very large, obovate, somewhat round-shouldered; aperture rather long, narrow, columella somewhat thickened. Light brown, with four bands. *Kentucky, Tenn.*

23. **A. ampla**, *Anth.* Figs. 109—114. Ovate-globose, thick; spire very short, eroded generally to a plane with the body whorl, suture well impressed; body whorl large, regularly convex; aperture large, oval, well rounded below. Light yellowish-brown or greenish, sometimes impressly striate, banded or maculate; white, vividly banded within. *Coosa River, Ala.*

Figs. 109—111 exhibit the types, Fig. 112 is *elegans*, *Anth.*, and Figs. 113, 114 are *formosa*, *Lea*. The latter is impressly striate.

24. **A. zebra**, *Anth.* Fig. 115. Oval, smooth, rather thick; spire obtuse, not prominent, suture well impressed; whorls 4, convex, the last regularly oval; aperture oval, rather long. Yellowish, with longitudinal or diagonal zig-zag markings of very dark brown or reddish, bluish-white within. *Ala.*

✕ 25. **A. picta**, *Con.* Figs. 116—119. Rounded-ovate, rather thick, smooth; spire entirely eroded, suture irregularly impressed; body whorl somewhat slopingly compressed above; aperture large, oval, broadly rounded below. Bright yellow, with maculations either transversely disposed in bands or diagonal zig-zag markings.

Fig. 118 is *Foremani*, *Lea*, and Fig. 119 *flammata*, *Lea*. This species is distinguished from *zebra*, *Anth.*, by the superior portion of the whorls being slopingly flattened.

26. **A. ornata**, *Anth.* Fig. 120. Convex-conic, smooth, moderately thick; spire elevated, suture well impressed; whorls 5, convex, the last moderate in size, regularly rounded; aperture small, oval, well rounded below. Dark yellow, polished, with three very distinct brown bands. *N. Carolina.*

27. **A. Lewisii**, *Lea*. Fig. 121. Elliptical, smooth, rather thick; spire obtuse, not advanced above the general curve of the body whorl, suture scarcely impressed; whorls 5, the last large, oval; aperture long, narrow, ovate. Yellowish horn color, not banded, whitish within. *Tenn.*

28. **A. squalida**, *Lea*. Fig. 122. Subglobose, smooth, very thick; spire obtuse, suture moderately impressed; whorls 4—5, convex, the last large, a little shouldered above; aperture large, wide, lips extraordinarily thickened. Brownish, banded. *Tuscaloosa, Ala.*

Very globose, and not unlike *ampla* in form, but much heavier in texture.

29. **A. patula**, *Anth.* Fig. 123. Ovate, rather thin, smooth; spire small, elevated, suture well impressed; whorls 4—5, convex, the last inflated; aperture large, semicircular, columella only slightly incurved. Dark horn color, pink within. *Tenn.*

30. **A. viridula**, *Anth.* Fig. 124. Ovate, smooth, rather thin; spire elevated, suture well impressed; whorls 4—5, convex; aperture ovate, large, columella well incurved, with a broad sinus below. Dark green, livid within. *Tenn.*

Variety of *dilatata*, Conrad?

32. **A. ligata**, *Anth.* Fig. 125. Long-ovate, smooth, rather thick; spire obtusely elevated, suture well impressed; body whorl very long, impressly flattened or somewhat constricted above; aperture small, ovate, well rounded below, columella deeply indented. Dark green, two or three-banded without and within. *Cosa River, Ala.*

Narrower and more constricted than *teniata*, Con.

ANCULOSA, Say.



Fig. 1. Fig. 2. Fig. 3. Fig. 4. Fig. 5. Fig. 6. Fig. 7.



Fig. 8. Fig. 9. Fig. 10. Fig. 11. Fig. 12. Fig. 13. Fig. 14.



Fig. 15. Fig. 16. Fig. 17. Fig. 18. Fig. 19. Fig. 20. Fig. 21.



Fig. 22. Fig. 23. Fig. 24. Fig. 25. Fig. 26. Fig. 27. Fig. 28.



Fig. 29. Fig. 30. Fig. 31. Fig. 32. Fig. 33. Fig. 34. Fig. 35.



Fig. 36. Fig. 37. Fig. 38. Fig. 39. Fig. 40. Fig. 41.

ANCULOSA, Say.



Fig. 42. Fig. 43. Fig. 44. Fig. 45. Fig. 46. Fig. 47. Fig. 48. Fig. 49.



Fig. 50. Fig. 51. Fig. 52. Fig. 53. Fig. 54. Fig. 55. Fig. 56. Fig. 57.

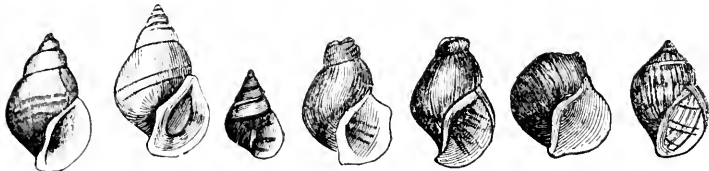


Fig. 58. Fig. 59. Fig. 60. Fig. 61. Fig. 62. Fig. 63. Fig. 64.



Fig. 65. Fig. 66. Fig. 67. Fig. 68. Fig. 69. Fig. 70. Fig. 71.



Fig. 72. Fig. 73. Fig. 74. Fig. 75. Fig. 76. Fig. 77. Fig. 78.

ANCULOSA, Say.



Fig. 79.



Fig. 87.



Fig. 88.



Fig. 90.



Fig. 91.



Fig. 92.



Fig. 80.



Fig. 81.



Fig. 82.



Fig. 83.



Fig. 84.



Fig. 85.



Fig. 86.



Fig. 89.



Fig. 93.



Fig. 94.



Fig. 97.



Fig. 98.



Fig. 99.



Fig. 101.



Fig. 95.



Fig. 96.



Fig. 100.



Fig. 103.



Fig. 104.



Fig. 106.



Fig. 107.



Fig. 102.



Fig. 105.



Fig. 108.



Fig. 109.



Fig. 112.



Fig. 113.



Fig. 116.



Fig. 110.



Fig. 111.



Fig. 114.



Fig. 115.



Fig. 119.



Fig. 120.



Fig. 125.



Fig. 117.



Fig. 118.



Fig. 121.



Fig. 122.



Fig. 123.



Fig. 124.

**NOTE ON THE LINGUAL DENTITION OF THE
STREPOMATIDÆ.**

BY GEORGE W. TRYON, JR.

As lingual dentition has been adopted as a very important character (somewhat hastily, I think) in the classification of the Mollusca, it may be well to ascertain how far it may be corroborative with other differences in the genera of North American *Strepomatidæ*. Troschel, in his magnificent work "Das Gebiss der Schnecken," divides the *Melanians* into several groups, of which the following contain American species:

Ancyloti. The peculiarity of the dentition of the forms belonging to this group is that the Rhachidian tooth is broader than long, rounded behind, and swollen out before (*ausgebuchtet*). The Laterals have a rhombic form, with the outer posterior angle somewhat drawn out, and the inner Uncini always possess a smaller quantity of denticulations than the outer ones. The jaw exhibits numerous small scales, which appear of a polygonal, mostly hexagonal form.

In this group are included *Ancylotus*, *Melania depygis* (*Goniobasis*), *Gyrotoma*, and *Io*.

We copy the figures given by Troschel:—

<i>Ancylotus prerosus</i> .	See plate 11, fig. 1.
" <i>costatus</i> .	" 11, " 2.
" <i>dissimilis</i> .	" 11, " 3.
<i>Melania depygis</i> .	" 11, " 4.
<i>Gyrotoma ovoidea</i> .	" 12, " 1.
<i>Io spinosa</i> .	" 12, " 2.

It will be noticed, by an inspection of these figures, that the differences in the form of the dentition are so slight as to be of no value for the purpose of separating the genera. Indeed, Troschel acknowledges that he can find no difference of sufficient importance for the separation of *Melania depygis*, or of *Gyrotoma*,* from *Ancylotus*.

* He curiously regrets that the nearly-allied genus *Schizostoma*, Lea, is unknown to him!

Pachychili. There is in this group also a marked distinctness of form. As we have excluded this genus from the family *Strepomatidæ* on considerations entirely conchological, it is very interesting to find in the dentition differences quite as marked as those existing in the shell. To show the very peculiar form of the Rhachidian tooth, we copy from Troschel the following for comparison:—

Pachychilus lævissimus. See plate 12, fig. 3.
 “ *Schiedeanus.* “ 11, “ 4.

It is curious, however, and shows how little dependence can be placed on any one character in the grouping of Mollusca, to find *Pirena* and *Melanopsis* placed by this author together with *Pachychilus*, on account of their almost identical dentition, when they differ so much in conchological characters and in geographical distribution.

Dr. William Stimpson, nearly two years since, published a paper in the American Journal of Science and Arts, “On the Structural Characters of the so-called Melanians of North America,” containing the results of observations of the animals of several of our species, including an *Io*, *Anculosa*, and *Goniobasis*. The individuals of these three very distinct genera were not found to differ one from another in any structural character, although readily distinguished from Oriental species. We will state the differences in their relative importance as they appear to us. 1st. By being oviparous, while the latter are ovo-viviparous. 2d. By the mantle margin being plain in the American, and fringed in the exotic family. 3d. By difference in dentition. To these may be added a sufficient conchological difference to justify the separation into two families, even if the soft parts were undistinguishable.

REMARKS ON THE ORIGIN AND DISTRIBUTION OF
THE OPERCULATED LAND SHELLS WHICH
INHABIT THE CONTINENT OF AMERICA
AND THE WEST INDIES.

(Continued from p. 58.)

BY THOMAS BLAND.

Before discussing in detail the relations of the West Indian Islands *inter se*, and with the adjacent Continent, as shown by the distribution of operculated and also inoperculated land shells, I desire to explain the difference in the character and extent of the distribution of the two classes.

That difference is not, it appears, peculiar to the region under consideration, inasmuch as fully two-thirds of all the known operculated species are peculiar to Islands, while more than one-half of the inoperculated are peculiar to Continents.

The facts with reference to the distribution of genera and species in America and the West Indies are as follows:—

	American Continent.	West Indies.
Operculated genera,	14	22
" species,	151	603
2 genera (3 species) peculiar to the Continent.		
10 " (215 ") " " Islands.		
12 " common, with 149 species on the Continent and 388 on the Islands.		

	American Continent.	West Indies.
Inoperculated genera,	22	18
" species,	1251*	737
5 genera (15 species) peculiar to the Continent.		
1 genus (1† ") " " Islands.		
17 genera common, with 1236 species on the Continent and 736 on the Islands.		

* The number of inoperculated continental species is rather approximate than absolutely correct. For general purposes, I use the classification of the *Helicæ* adopted by Pfeiffer in his Monograph, but in a subsequent part of this paper I shall refer to the sub-genera of *Helix*, *Bulinus*, &c.

† *Eugoa bicolor*, Gould, found in St. Thomas and Trinidad; also in the East Indies. The genus belongs to Africa.

The majority of the genera of operculates common to the Continent and Islands have the greater number of species on the Islands, while the reverse is the case with the majority of such genera of inoperculates. It is noticeable, also, that species of such former genera (speaking generally) attain larger size on the Islands—in *Helicinacea*, for example—and of the latter on the Continent, especially in *Helix*, *Bulimus*, *Oleacina*, and *Cylindrella*.

Looking at the distribution of species in America and the West Indies, and considering each genus as having had its origin where the greatest number of its species is found, (on the Continent or Islands), the following is the result:—

OPERCULATES.

Origin of Genera.	N. Am. per cent.	Mex. per cent.	C. Am. per cent.	S. Am. per cent.	Am. Cont. per cent.	W. Ind. per cent.
American,		13½	10	17	13	1½
West Indian,	100	86½	90	82	87	98¾

INOPERCULATES.

American,	96½	82	87	98½	95	67
West Indian,	3½	18	13	1½	5	33

It would appear that insular conditions have been more favorable to the increase both of genera and species of operculates, or it may be said to variation, and continental conditions to inoperculates.

The species of both classes common to the Continent and Islands (4 operculated and 36 inoperculated) are, with few exceptions, of West Indian rather than American forms. The number of operculated species found in more than one island is 18, but of inoperculates 55, the latter having, on the whole, a wider insular distribution than the former.

Considering the distribution of genera and species both of operculates and inoperculates in the West Indian Islands, the character of the species common to them and the Continent of America, and found in more than one Island, the West Indies, although, in one sense, a single zoological province, may be divided into five sub-provinces, viz:—

1. Cuba, with the Isle of Pines, the Bahamas, and Bermudas.
2. Jamaica.
3. Haiti.
4. Porto Rico, with Viéque and the Virgin Islands, also including Anguilla, St. Martin, and St. Bartholomew.
5. Guadaloupe and Martinique, with Barbuda and the islands between it and them, and to the south, to and inclusive of Trinidad.

In the last number of this Journal (pp. 54-58) I stated the origin of the Families and Sub-families of operculated Shells, showing, from the distribution of species, the extent of African, Asiatic, and West Indian influences in the Islands generally, and in different parts of the Continent.

The following table explains how those influences, estimated from similar data, are manifested in the different West Indian sub-provinces.

Origin.	Cuba, &c. per cent.	Jamaica. per cent.	Haitl. per cent.	Porto Rico, &c. per cent.	Guade- loupe, &c. per cent.
African,	4	13	13	6	8
Asiatic,	6	14	5	11	25
West Indian,	90	73	82	83	67

As might be expected from the result on the Continent, it appears that the Asiatic influence has its maximum, and the West Indian its minimum, in the group of islands (Guadeloupe, &c.) which is nearest to, and, as I shall show, has most relationship with South America.*

There is another view, however, which deserves notice, of the relationship of the operculated shell faunas of the Continent and Islands, derived from the distribution of genera in connection with the question of origin of the Families and Sub-families.

In the analyses in the preceding part of this paper (p. 57), I dealt with the operculated shells *generally*, but the distribution of genera and species belonging to the three Families is, in reality, very different.

Aciculacea. Omitting *Truncatella* (the distribution of which in the Islands is imperfectly known), the other two genera, *Geomelania* and *Chittya*, are not only West Indian, but peculiar to Jamaica.

Cylostomacea. Of the 66 Continental species, 42 belong to sub-families of Asiatic, 1 of African, and 23 of West Indian origin, which species are distributed as follows:—

Origin.	No. of Sp. in N. Am.	Mexico.	C. Amer.	S. Amer.
African,		1		
Asiatic,		5	9	28
West Indian,	1	4	11	7

The distribution in the insular sub-provinces is as follows:—

Origin.	No. of Sp. in Cuba, &c.	Jamaica.	Haiti.	Porto Rico, &c.	Guade- loupe, &c.
African,	10	31	8	2	3
Asiatic,	15	34	3	3	9
West Indian,	123	29	26	14	3

Helicinacea. This Family is of West Indian origin.

* In connection with the distribution of operculated shells, the term South America refers especially to the intertropical parts of the Southern Continent.

I may here incidentally remark that the animals of *Cyclotus*, *Cyclophorus*, and *Megalomastoma*, three of the five genera of the Family *Cyclostomacea* of Asiatic origin, represented in America and the West Indies, have a buccal plate in addition to the lingual membrane, (as to *Bourciera* and *Hydrocena* I am not informed*), while in *Cyclostomus* and *Tulora* of African, and, I believe, in the genera of West Indian origin, the buccal plate is wanting.†

Before describing the more remarkable features of the distribution of operculated shells in the West Indian sub-provinces, I may observe that a statement of the number alone of genera represented in different parts of the American Continent and in the West Indies is comparatively of little value. The annexed table gives the names of the genera, with the number of species in each sub-province. The mark * indicates that the genus is not represented on the Continent, and † that the continental species do not exceed three in number. *Cyclophorus* and *Schasicheila* are the only genera with more numerous continental than insular species, while *Bourciera* and *Hydrocena* are exclusively continental.

Seeing that four operculated species only are common to the Continent and the Islands, the extraordinary fact appears that the West Indian Islands have nearly 600 peculiar species of operculated land shells.

St. Croix (Porto Rico group) is the only island in which, so far as I have ascertained, evidence has been discovered of extinct operculated species. *Cyclostoma basicarinatum* and *C. chordiferum*, found with other sub-fossil species (*Helix*, *Bulimus*, and *Pupa*), have been described by Pfeiffer.

* Since putting this in the printer's hands, Prof. Theo. Gill has called my attention to the fact, that *Bourciera* has been placed by Troschel among the genera of *Helicinacea*, with which it essentially agrees in dentition, while *Hydrocena* has been taken as the type of a peculiar family also related to *Helicinacea*, in which the buccal plate is absent.

† See my paper "On the Buccal Plate in Certain Genera of the Family Cyclostomacea," Amer. Jour. of Conch., i. 45, in which I refer to Troschel, "Gebiss der Schnecken," part i., 1856.

	Cuba, &c.	Jamaica.	Haiti.	Porto Rico, &c.	Guade- loupe, &c.
ACICULACEA.					
*Geomelania,		21			
*Chittya,		1			
Truncatella,	10	8		3	5
CYCLOSTOMACEA.					
<i>Cyclotea.</i>					
Cyclotus,	2	34	2		3
<i>Cyclophorea.</i>					
Cyclophorus,					6
<i>Pupinea.</i>					
†Megalomastoma,	13		1	3	
<i>Licina.</i>					
*Jamaicea,		2			
*Licina,	1		2		
*Choanopoma,	25	12	8	3	1
*Ctenopoma,	22	2	1		
*Diplopoma,	1				
†Adamsiella,	1	11			
<i>Cyclostomea.</i>					
*Cyclostomus,	5	14	4	1	1
†Tudora,	5	17	4	1	2
<i>Cistulea.</i>					
Cistula,	15	4	2	4	1
Chondropoma,	58		13	7	1
HELICINACEA.					
<i>Stoastomea.</i>					
*Stoastoma,		80	1	1	
<i>Helicina.</i>					
†Trochatella,	20	6	4		
*Lucidella,		4	1		
Helicina,	56	11	15	9	16
†Schasicheila,	1				
†Alcacia,	9	14	2	1	
Totals,	244	241	60	33	36

1. *Cuba, the Isle of Pines, the Bahamas, and Bermudas.*—There is no operculated genus peculiar to this group, excepting *Diplopoma*, of which the only species is in Cuba. The single insular representative of the Mexican genus *Schasicheila* is in New Providence. Two Cuban species only are found on the Continent, *Chondropoma dentatum*, Say, and *Helicina subglobulosa*, Poey, both also in Florida or the adjacent keys.

The known species of *Truncatella*, having strictly terrestrial habits, placed by Pfeiffer in the section *Montana*, as distinguished from *Littorales*, are peculiar to Cuba and Jamaica.

Exclusive of *Truncatella*, there is no operculated species common to this and any other of the sub-provinces, excepting *Helicina rugosa*, Pf., found also in Haiti. *Megalomastoma procer*, Poey, and *Chondropoma dissolutum*, Pf., are in Cuba and the Isle of Pines.

The absence of *Geomelania* and *Chittya*, and of *Stoastoma* and *Lucidella* (all unrepresented on the Continent), with the great development of *Megalomastoma*, *Choanopoma*, *Ctenopoma*, *Cistula*, *Chondropoma*, *Trochatella*, and *Helicina*, as compared with other sub-provinces, is remarkable.

The foramen in the superior margin of, and within the aperture of many species of *Choanopoma*, *Ctenopoma*, *Tubora*, *Cistula*, and *Chondropoma*, and the tubercle, especially in *Ctenopoma*, belonging to this sub-province, are local peculiarities not found, even in species of the same genera, in any other island. (Poey, *Memorias*, ii. 40.)

2. *Jamaica.*—The operculated genera peculiar to this sub-province are *Geomelania* and *Chittya*, and *Jamaicea*. *Stoastoma*, with 80 species, represented in Haiti and Porto Rico by one species in each, and *Lucidella*, with one only in Haiti, may almost likewise be termed peculiar. There is no species common to Jamaica and the Continent, and one only found in another island, viz., *Cistula lugubris*, Pf., which inhabits Anguilla, in the Porto Rico sub-province. *Megalomastoma* and *Chondropoma*, both having species on the Continent, and *Licina*, three genera represented in Cuba and Haiti, and the two first in Porto Rico, are not found in Jamaica, while of *Cyclotus*, which is South American as regards the Continent, it has 34 of the 41 insular species. In Jamaica there are 5 genera not represented in Cuba, while in the latter there are 4 not in the former. In every point of view, the operculated land shell fauna of Jamaica appears to be the most varied and peculiar.

3. *Haiti.*—This island has no peculiar operculated genus, and no species common to it and the Continent. *Helicina rugosa*, Pf., and *Tubora pupaeformis*, Sowb., are alone found in any other sub-province—the one in Cuba and the other in Anguilla. Having representatives of *Megalomastoma*, *Licina*,

and *Chonchropoma* (absent in Jamaica), Haiti has more relationship with Cuba than with Jamaica; but alliance with the latter is shown by 1 species of *Stoastoma* and 1 of *Lucidella*, genera not present in Cuba. I should remark that the land shell fauna of Haiti has been investigated less than those of the neighboring islands, and that further research is much to be desired. It is probable that the islands of the Bahamas group, nearer to Haiti than to Cuba, will, on close examination, be found to have as much, if not more, relationship with the former than the latter.*

4. *Porto Rico, with Viéque and the Virgin Islands, including also Anguilla, St. Martin, and St. Bartholomew.*—There is not only no peculiar operculated genus in this group of islands, but several of the genera represented in the three preceding sub-provinces are wanting, viz., *Cyclothus*, *Ctenopoma*, *Trochastella*, and *Lucidella*. This sub-province, having species of *Megalomastoma* and *Chonchropoma*, genera not found in Jamaica, has, on the whole, less alliance with that island than with Cuba and Haiti. There is no species common to the Continent and this sub-province, but several species are widely distributed in the islands comprised in it. All the species which inhabit Viéque are found in Porto Rico, excepting *Chonchropoma sulculosum*, Fer., belonging also to St. Bartholomew. Several species are common to Porto Rico, St. Thomas, and St. John. The only species found in another sub-province is *Helicina fasciata*, Lam., which is attributed to St. Kitts, Guadeloupe, and one or two other islands of the same group.

5. *Guadeloupe and Martinique, with Barbuda and the Islands between it and them, and also Islands to the south, to and inclusive of Trinidad.* There is no operculated genus absolutely peculiar to this group of Islands, but *Cyclophorus*, not found in the other sub-provinces, has 2 species in Guadeloupe, and 4 in Martinique; on the continent, there are 3 in Mexico, 3 in Central America, and 8 in South America. *Cyclothus*, with 16 of the 22 continental species in South America, and which inhabits Cuba, Jamaica, and Haiti, but not Porto Rico, is represented in Martinique, Grenada, and Trinidad.

In this sub-province, *Megalomastoma* and all the genera of the sub-family *Lirinea*, excepting *Chonchropoma*, which has 1 species only, are absent. On the Continent, *Adamsiella* alone of that sub-family is represented, and by 2 species, 1 in Central and the other in South America. The family *Cyclostomata*, which has 1 continental species (in Mexico), has 3 species in this group of islands. The family *Helicinacea* is represented

* I learn from my friend, Mr. D. Sargent, of Great Inagua, that several years ago an alligator landed from a log of mahogany, and lived some time on that island—a colonist, it was supposed, from Haiti.

only by species of *Helicina*. There are 2 species common to the Continent and this sub-province—*Cyclotus translucidus*, Sowb., of Venezuela and Trinidad, and *Helicina Dysoni*, Pf., of that island and Honduras. *Helicina fasciata*, Lam., as already mentioned, is common to this and the Porto Rico sub-province.

This group of islands has unquestionably very marked relationship with South America.

In connection with this sub-province, I may observe that the land shell fauna of Curaçao, situated at no great distance from the coast of Venezuela, is somewhat anomalous.

The following 4 species are known from thence: *Tulora megacheila*, P. and M., of a genus belonging especially to Jamaica, and with 1 continental (Mexican) species only, *Helic pentodon*, Menke, more allied to *H. tichostoma*, Pf., of Cuba (judging from description), than to any other insular species.

Bulinus elongatus, Bolt., distributed in several of the islands embraced in the fourth and fifth sub-provinces, and also found on the Continent, in French Guiana.

Pupa uva, Lam., of the sub-genus *Strophia*, which has one continental species only (*incana*, By., of Florida), and whose insulated distribution is confined to the first, third, and fourth sub-provinces.*

(To be continued.)

* Albers (Die Heliceen, 1861) erroneously attributes *S. alcarria*, Dillw., and *S. uva* to Guadeloupe. The former, with the var. *rubicunda*, Menke, belongs, I believe, to the Bahamas.

DESCRIPTIONS OF NEW AMERICAN FRESH WATER SHELLS.

BY JOHN G. ANTHONY.

1. ANODON McNIELII, Anthony.—t. 6, f. 1.

Description.—Shell smooth, elliptical, somewhat inflated, rounded before and biangular behind; substance of the shell thin and diaphanous; epidermis remarkably smooth and polished, of a pale yellowish-green color over the umbones, becoming darker and rougher on the posterior slope; beaks prominent, rugose at tip, the wrinkles occupying nearly the entire surface of the earliest growth; hinge margin slightly curved, with ligament long and slender: marks of growth distant and distinct, but not very broad, three only on each valve: anterior and posterior cicatrices scarcely perceptible; nacre silvery white and iridescent.

Dimensions.—Diam. 1 inch, length 2 7-10ths inches, breadth 1½ inches.

Habitat.—Michigan.

Collection Mus. Comp. Zoology, Cambridge, Mass.

Observations.—Without presenting any very prominent characters, this shell seems perfectly distinct: its texture is remarkably thin and diaphanous, and it has a strong but not very sharp carina on the umbonial slope: the basal edge is curved upward behind, giving the shell rather a cuneate appearance.

2. ANODON SUBGIBBOSA, Anthony.—t. 6, f. 2.

Description.—Shell smooth, inflated, subquadrate, inequilateral, and very thin; epidermis of a dull olive color and without rays; marks of growth not distant but distinct, about 4 on each valve, indicated by a rather broad darker line; beaks not very prominent, having coarse elevated rugae at tip; anterior slope rounded, posterior slope obscurely angulated and somewhat excavated: anterior and posterior cicatrices both very indistinct; nacre bluish in color, but somewhat iridescent.

Dimensions.—Diameter 1 4-10ths inches, length 3 inches, breadth 2 inches.

Habitat.—Black Lake, Michigan.

Collection Mus. Comp. Zoology, Cambridge, Mass.

Observations.—Distinguished by its inflated character and dull, dark olive color, in which it somewhat resembles *Anod. gibbosa*, Say, but it is more equilateral, less inflated, less ponderous, and the epidermis has not the fine green rays and general green color of that interesting species. The form of the present species in every stage of its growth differs essentially from *Anod. gibbosa*. The color of the epidermis is more like that of *Anod. Couperiana*, Lea, but in no other particular does it resemble that species.

3. ANODON INORNATA, Anthony.—t. 7, f. 1.

Description.—Shell broadly elliptical, very inequilateral, rounded before and sub-biangular behind; substance of the shell moderately thick; epidermis of a dull ochrey-yellow, without rays, deepening into a light brown color on the posterior slope; beaks rather prominent, with prominent, elevated, and waved wrinkles at tip; anterior cicatrices distinct and well defined, posterior cicatrices also distinct, but less deep than the anterior; marks of growth widely separated in the earlier stages of growth, becoming more crowded near the basal edge in old specimens; nacre silvery and highly iridescent, particularly at the posterior end, tinged with salmon color under the beaks.

Dimensions.—Diam. $1\frac{1}{2}$ inches, length $3\frac{5}{8}$ inches, breadth $2\frac{1}{8}$ inches.

Habitat.—Michigan, Slawson's Lake.

Collection of Mus. Comp. Zoology, Cambridge, Mass.

Observations.—May be compared with *Anod. opalinus*, Nob., but is less inflated, less angular, is more elongate, and a thicker and heavier shell; with no other species would it be likely to be confounded. Although the substance of this shell is quite thick, it is, nevertheless, translucent and opalescent; the surface is finely and delicately striate longitudinally and transversely, and, under the microscope, presents an unusually beautiful appearance.

4. UNIO OPALINUS, Anthony.—t. 7, f. 2.

Description.—Subrhomboidal, somewhat inflated, rather thick; lines of growth becoming varicose anteriorly; beaks placed near to, and pointed towards, the anterior end of the shell, with several doubly-curved undulations; ligament margin straight and slightly declining, posterior slope and margin sub-biangular, basal margin almost straight, anterior margin somewhat rounded; epidermis light yellowish or greenish, iridescent. Cardinal teeth small, lateral teeth long and straight; cavity of the shell moderate, of the beaks rather deep and angular; anterior cicatrices distinct, posterior cicatrices confluent and indistinct, dorsal cicatrices in the cavity of the beaks; nacre pearly, very iridescent posteriorly.

Dimensions.—Length $1\frac{3}{4}$ inches, breadth 1 inch, diameter $\frac{1}{2}$ inch.

Locality.—Michigan.

Collection Mus. Comp. Zoology, Cambridge, Mass.

Observations.—Resembles somewhat *Unio Sayi*, but is longer in proportion to the breadth; the beaks are placed nearer to the anterior end, and the species is much smaller. It may also be compared with *Unio gibbosus*, Barnes, which it certainly resembles in general form. It is, however, more bi-angular behind; the color is very different, being dark and rayed in *gibbosus*; the latter is also a heavier species, the nacre either salmon, purple, or white, very much thickened anteriorly, and the cavity of the beaks very shallow. The undulations of the beaks are more decidedly marked and closer in *opalinus* than in *gibbosus*.

5. GONIOBASIS CINGENDA, Anthony.—t. 7, f. 3.

Description.—Shell conic, smooth, olivaceous; spire elevated, but decollate, exhibiting but 5 whorls, having lost at least 3 which it should have had in a perfect condition; whorls convex, slightly ridged below the middle, immediately below which a broad, dark brown band passes around the upper whorls, becoming double but confluent on the penultimate, but distinctly double and distant on the body whorl; sutures deep and sharply defined; aperture ovate and bluish within; columella deeply rounded, curved at the base, forming with the outer lip a distinct but not deep sinus; lines of growth very distinct and curved.

Dimensions.—Length 1 $\frac{2}{10}$ inches, diameter $\frac{1}{2}$ inch, length of aperture $\frac{1}{2}$ inch, breadth $\frac{4}{10}$ inch.

Habitat.—North Carolina.

Collection Mus. Comp. Zoology, Cambridge, Mass.

Observations.—May be compared with *G. Virginica*, Say, which it resembles somewhat in form and coloring, but it is altogether of a more solid texture and more robust; it also has a broader, darker, and more distinct band round the whorls; the whorls are also less convex and more angulated. I know of no other shell with which it is likely to be confounded. The lines of growth are well defined, and on the body whorl become varicose.

Editor's Table.

REVIEWS.

I.—AMERICAN.

Canadian Naturalist and Geologist. New Series, II., No. 5, October, 1865.

Review of the Northern Buccinums, and Remarks on some other Northern Marine Mollusks. Part 1. BY DR. WM. STIMPSON.

This very able memoir, by our esteemed contributor, includes detailed descriptions and distinctive characters of all the American species, together with notes on their geographical distribution. We quote some portions of the paper, deeming it of too important character to be passed over with an ordinary notice.

The author remarks, that, "Among the spiral grooves and striae or ridges with which the shell is always more or less deeply sculptured, two kinds may usually be distinguished, a large and a small kind, those of the latter being by far the more numerous, and distributed upon the surface of the others. These kinds we shall call, for convenience, the primary and secondary grooves, or ridges, as the case may be. The difference between them is very conspicuous in *B. glaciale*. The columella has normally three folds, an upper, middle, and lower one;—the lower one constituting the oblique inferior margin of the columella. These folds are not always distinct, but all of them may be made out in *B. tenue*. The middle fold is obsolete in most of the species, but is very prominent and tooth like in *B. ciliatum*."

“With one or two doubtful exceptions, the genus *Buccinum* is restricted geographically to the temperate and frigid seas of the Northern Hemisphere. More careful examination, both of the shell and soft parts of the Antarctic species (such as *B. Antarcticum* and *B. Zealandicum*) referred to the genus, is required, before deciding upon their actual pertinence to it.

“Geologically, the history of the genus commences in the Pliocene formation. They are found in the European Tertiary deposits of that age, even as far south as the shores of the Mediterranean. They become very numerous in the Pleistocene deposits both of Europe and North America, but reach their maximum development in the existing seas.

“I have endeavored to include in the following review all the species which certainly belong to the genus. As to the *B. Dalei* of Sowerby, and the *B. ovooides* of Middendorff, if we may rely upon the accuracy of the observation of Mr. Alder, on the lingual dentition of the former, as detailed in Forbes & Hanley’s ‘British Mollusca,’ Vol. IV., p. 284, these species are not true *Buccinums*. Mr. Alder says:—‘Its tongue differs from that of *Buccinum undatum*, as well as from those of the allied species of the genus *Fusus*, and makes a slight approach to that of *Mangelia*. It has a single plain and slightly curved tooth on each side, and a very thin non-denticulated plate in the centre.’ This statement clearly indicates the existence of a distinct generic group, for which we would propose the name *Liomesus*, with *Buccinum Dalei* as the type. I have specimens of *L. ovooides* from Behring’s Straits.”

The species (15 in number) are described very fully, with the synonymy very carefully worked out. We have carefully compared Dr. Stimpson’s results with the original figures and descriptions, as well as such specimens as we could examine, and are very glad to corroborate his views in almost every instance. There are other genera of shells represented on our coast, that need the same careful study, and we trust, therefore, that Dr. Stimpson will continue his investigations. Two of the species are new:—

B. plectrum, and *B. Tottenii*.

We have only space left for reproducing, with the addition of the geographical distribution, a

“*Synoptic Table of the Species of Buccinum.*”

A. Body-whorl angulated or carinated

- a. Primary transverse ridges flat; secondary ridges inconspicuous.
 1. Shell thin; aperture not patulous; outer lip not sinuated.

* Whorls shouldered; aperture broadest above.

B. Polare, Icy Cape, Arctic Ocean north of Behring's Straits.

** Whorls scarcely shouldered; aperture broadest below.

B. Grælandicum, Davis' Straits, Fossil at Montreal.

2. Shell thick and strong; aperture patulous, outer lip sinuated.

* Shell elongated.

B. Donorani, New Foundland, Greenland?

** Shell ovate.

B. glaciale, Arctic Ocean, Greenland, Spitzbergen.

b. Primary transverse ridges convex; secondary grooves very distinct.

B. angulosum, Behring's Straits, Icy Cape.

B. Body-whorl not angulated.

a. Aperture narrow.

1. Primary ridges flat.

B. striatum, Sea of Ochotsk.

2. Primary ridges convex; a strong, tooth-like plait on the columella.

B. ciliatum, Behring's Straits to Greenland, South to Nova Scotia.

b. Aperture broad.

1. Longitudinal folds numerous, often interrupted, or interposed.

* Primary ridges flat.

B. plectrum, Behring's Straits, Fossil at Portland, Maine.*

* Variety? If distinct, Dr. Stimpson proposes for it the name *Buccinum Packardii*.

** Primary ridges obsolete; secondaries conspicuous, crowded.

B. tenue, Arctic Ocean, South to Labrador.

2. Longitudinal folds not interrupted or interposed.

* Shell thick and coarsely striated.

† Sinus of outer lip near the suture, columella short.

B. undulatum, Labrador to New Jersey.

†† Sinus of outer lip near the middle, columella projecting.

B. undatum, Coast of Europe from Southern Norway to Portugal.

** Shell finely striated, usually thin.

† Secondary ridges easily distinguished from the primaries, which are often obsolete.

‖ Columella distinctly folded.

B. simplex, Ochotsk Sea.

‖‖ Columella smooth, not distinctly folded.

B. cyaneum, North Atlantic from Greenland to Norway and Northward.

†† Secondary ridges confounded, for the most part, with the primaries.

‖ Longitudinal folds conspicuous.

B. Totteni, New Foundland, Fossil at Montreal.

‖‖ Longitudinal folds obsolete.

B. Humphreysianum, Northern Europe, Greenland, Arctic Ocean, near McKenzie's River, Gulf of St. Lawrence.

The Canadian Naturalist and Geologist. New Series, II. No. 6. December, 1865.

Notes on some of the more Remarkable Genera of Silurian and Devonian Fossils. BY E. BILLINGS. (Continued.)

The present paper contains observations on the genus *Beatricea*, which the author now believes to be neither a plant, as at first supposed, nor a shell, as determined by Mr. Alpheus Hyatt, Jr.,* but a coral.

Reprint of Conchological Papers. BY ISAAC LEA. Published in the Proceedings of the Academy of Natural Sciences of Philadelphia. From May, 1863, to May, 1865. 8vo. pamphlet, 32 pp. Philadelphia, 1866.

This work contains descriptions of 138 new species of fresh water shells, principally *Unionidæ* and *Strepomatidæ*.

We have already noticed the papers and copied the names and localities of the species on their first publication. The present compilation is very useful for those interested in the subject of Mr. Lea's labors, and its solid contents show his unremitting activity and zeal in the study of our fluviatile molluscous fauna.

Bulletin of the Mus. of Comp. Zool., No. 4. 8vo., 9 pp. Cambridge, Mass. June, 1865.

List of the Brachiopoda from the Island of Anticosti, sent by the Museum of Comparative Zoology to different Institutions in exchange for other Specimens, with Annotations. BY N. S. SHALER.

* See this Journal, vol. i., p. 272.

The species described are:—

<i>Lingula elegantula.</i>	<i>Orthisina diversa,</i>
<i>Strophomena semioralis.</i>	Syn. <i>O. Verneuilli</i> , Billings.
“ <i>reticulata.</i>	<i>Plectambonites glabra,</i>
“ <i>arcuata.</i>	Syn. <i>Leptæna sericea</i> , Billings.
“ <i>Anticostiensis,</i>	<i>Plectambonites arca,</i>
Syn. <i>S. alternata</i> , Billings.	Syn. <i>Leptæna transversalis</i> , Bil-
<i>Strophomena alternivalvata.</i>	lings.
<i>Brachyprion</i> , N. G.	<i>Plectambonites tenera.</i>
“ <i>ventricosum,</i>	<i>Leptæna quadrilatera,</i>
Syn. <i>Stroph. Philomela</i> , Billings?	Syn. <i>Strophomena depressa</i> , Bil-
<i>Brachyprion geniculatum.</i>	lings.
<i>Orthis media,</i>	<i>Platystrophia regularis.</i>
Syn. <i>O. elegantula</i> , Billings.	<i>Atrypa impressa,</i>
<i>Orthis aquivalva,</i>	Syn. <i>A. reticularis</i> , Billings.
Syn. <i>O. hybrida</i> , Billings.	<i>Atrypa flavella.</i>
<i>Orthis rhynchonelliformis.</i>	<i>Athyris turgida.</i>
“ <i>alata.</i>	<i>Spirifer tenuistriatus.</i>

Annals of the Lyceum of Natural History of New York. VIII.
Nos. 6 and 7. November, 1865.

Catalogue of the Mollusca of Little Gull Island, Suffolk County, New York. BY SANDERSON SMITH.

The other papers contained in the present issue of the Annals we have already noticed as separate publications.

Researches upon the Hydrobiinæ and Allied Forms. BY DR. WM. STIMPSON, 8vo., 58 pp. Smithsonian Institution, Washington, D. C., August, 1865.

Under the above title the author has collected a mass of important information regarding the structural characters and affinities of the various species of minute fresh water shells, which have been hitherto best known under the names of *Amnicola*, *Bithinia*, *Hydrobia*, etc. He proposes to unite these, as Messrs. H. and A. Adams have done, to the family *Rissoiidae*, as he cannot find sufficient distinctive characters to justify the separation of the fresh water species as a family, *Amnicolidae*, as proposed originally by us,* and subsequently adopted and defined by Prof. Theo. Gill.†

Dr. Stimpson, after eliminating certain errors of Prof. Gill's diagnosis as regards the American species, concludes that there is no character left which would serve to distinguish the *Amnicolæ* and their allies as a distinct family from *Rissoiidae*,

* Proc. Acad. Nat. Sciences, Sept., 1862.

† Proc. Acad. Nat. Sciences, 1864, p. 35.

except that of "foot not continued in front of rostrum. But this character does not seem to be of sufficient importance to indicate the separation of the two groups as distinct families, when the agreement is so close in all other points." For this reason, our author forms a subfamily, *Hydrobiinæ*, for these shells. The *Rissoidæ* are thus described:—

"Tentacles elongated, with the eyes at their outer bases. Verge (male organ) exerted, situated on the back at a considerable distance behind the right tentacle. Gills both pallial; the right or principal one usually rather short and broad, and composed of few laminae, which are much broader than high. Foot oblong, truncate before, rounded or pointed behind. Operculigerous lobe well developed. Operculum horny or partly shelly, spiral or concentric. Lingual teeth 3. 1. 3; the rows being more transverse and less arcuated than in the Littorinidæ. Rhachidian tooth broader than long, and armed with basal denticles (so called by Troschel) on each side, which may be either on the basal margin or on the anterior surface of the tooth above the base; cusp recurved and denticulated. Intermediate tooth more or less hatchet-shaped, having a handle-like process (peduncle) projecting outwardly from the base of the broad body, which is denticulated at the upper margin. Lateral teeth generally slender and armed with numerous minute denticles at their superior margins. Shell small, spiral, turreted or depressed, often more or less umbilicated; aperture more or less rounded, never truly channelled in front; peritreme continuous. Station in fresh, brackish, or sea water, rarely on land. Distribution mundane."

In this family are included, according to Dr. Stimpson, several subfamilies, which he names and describes as follows:

"**BYTHINIINÆ**, with an ovate shell, a concentric operculum which is calcareous within, and with cervical lobes. They are comparatively large. Fresh water. Genus *Bythinia*,* Gray.

RISSOININÆ, with an ovate or turreted shell, and a thick, corneous, subspiral operculum provided with an internal process (articulated). Size small. Marine. Genus *Rissoina*, D'Orb.

RISSOINÆ, with an ovate or elongated shell, and a subspiral operculum not provided with a process. Foot without lateral sinuses. Rhachidian tooth of the lingual ribbon with the basal teeth on the inferior margin. Size small. Marine. Genera *Rissoa*, Frem., *Cingula*, Flem., *Alvania*, Risso, *Onoba*, H. and A. Ad., *Setia*, H. and A. Ad., *Ceratia*, H. and A. Ad., *Fenella*, A. Ad.

* Syn. *Elona*, Moq.-Tand.

SKENEINÆ, with a depressed, almost discoidal shell, and a corneous, paucispiral* operculum. Minute. Marine. Genus *Skenea*, Flem.

HYDROBINÆ, with shell and operculum and foot like those of the *Rissoinæ*, but with the Rhachidian tooth of the lingual ribbon having the basal teeth on the anterior surface behind the lateral margins. Size variable; some are minute, some as large as *Bythinæ*. Living in fresh or brackish water. Genera *Hydrobia*,† Hartm., *Littorinella*, Braun, *Amnicola*, Gould and Hald., *Bythinella*,§ Moq.-Tand., *Stenothyra*,|| Benson, *Trincula*, Benson, *Pyrgula*, Christ. and Jan., *Palulestrina*, D'Orb., *Tryonia*, Stm., *Potamopyrgus*, Stm., *Lithoglyphus*, Muhlfeldt, *Fluminicola*, Stm., *Gillia*, Stm., *Somatogyrus*, Gill, *Cochliopa*, Stm.

POMATIOPSINÆ, with the shell and operculum as in the *Rissoinæ*. Foot with lateral sinuses. Size small. Amphibious. Genus *Pomatiopsis*,¶ Tryon.

The above mentioned characters may be tabulated as follows:—

- A. Operculum concentric - - - - - BYTHINIINÆ.
- B. Operculum spiral.
 - a. Operculum pauci-spiral - - - - - SKENEINÆ.
 - b. Operculum subspiral.
 - 1. Operculum with an internal process - - - - - RISSOININÆ.
 - 2. Operculum without an internal process.
 - * Foot without lateral sinuses.
 - † Rhachidian tooth of the lingual ribbon with the basal denticles on the inferior margin - - - - - RISSOINÆ. †
 - ‡ Rhachidian tooth of the lingual ribbon with the basal denticles on the anterior surface behind the lateral margins - - - - - HYDROBINÆ.
 - ** Foot with lateral sinuses - - - - - POMATIOPSINÆ.**

We beg to differ in opinion from Dr. Stimpson regarding the rank to which these various groups are entitled. In the first place, we think our *Amnicolidae* as validly separated as a distinct family as are many other well-recognized families of shells. We would mention the following distinctive characters in addition to the only one which Dr. Stimpson finds to belong to the *Amnicolidae*, that of the "foot not continued in front of the rostrum."

* According to the terminology of Woodward, the operculum of *Skenea* would be multi-spiral, and that of the *Rissoinæ*, etc., pauci-spiral.
 † Syn. *Paludinella*, Loven (not Pfeiffer), and *Littorinida*, Eyd. & Soul.
 ‡ Syn. *Leachia*, Risso (not Lesueur), *Microna*, Ziegler.
 § Syn. *Nematula*, Benson.
 ¶ Syn. *Chilocyclus*, Gill.

RISSOIDÆ. *Shell* elongated, generally costate or striate, heavy, not umbilicated; aperture angulated above, more or less truncately and broadly channelled below, somewhat rhomboidal, labrum very much callously thickened. Generally white or brown, or banded.

Operculum. Subspiral.

Dentition. Rhachidian tooth with basal denticles at each side.

Foot projecting in front of rostrum.

Distribution. *Marine only.*

SKENEIDÆ. *Shell* depressed, planorboid.

Operculum. Pauci-spiral.

Dentition. Rhachidian tooth with the cusp large, obtuse; laterals also different in form from *Rissoïdæ*.

Distribution. *Marine only.*

AMNICOLIDÆ. *Shell* turbate or elongate, generally smooth, thin; aperture generally round, and peristome continuous, broadly rounded below, not thickened. Greenish.

Operculum. Subspiral or concentric.

Dentition. Rhachidian tooth with denticles placed on its anterior surface behind the lateral margins.

Distribution. *Fresh water or amphibious.*

The reason why Dr. Stimpson did not find more than one distinctive character to separate the families, it will be perceived, is simply because he has *included* all the other characters in his diagnosis of *Rissoïdæ*. When we instituted the family *Amnicolidæ*, we had not studied the differences of the Soft Parts, but simply those of the shells in connection with their station; and we still think that ample characters may be thence derived, even if no differences in the animals had been observed.

The *Skeneidæ* we now separate from *Rissoïdæ*, *principally* on conchological grounds, as we are constantly receiving proof of the vastly inferior value of the lingual armature as a distinctive character. With regard to *Rissoïdæ*, we adopt the subfamilies *Rissoïninæ* and *Rissoïnæ*, but for the genera of *Amnicolidæ* we prefer a somewhat different grouping:—

BYTHINIINÆ. *Operculum* concentric, calcareous within.

STENOTHYRINÆ. *Shell* turbate. *Operculum* subspiral, calcareous. *Distribution* Indian. *Stenothyra*, *Gabbia*.*

* This genus is correctly described in this Journal (vol. i., p. 220, t. 22, f. 7), but the figure of the operculum is not so distinctly drawn as could be wished, which has caused Dr. Stimpson to doubt its generic position. It is a good genus, and by no means an immature *Stenothyra*.

HYDROBIINÆ. Shell elongated, perforate, smooth. Operculum corneous. European and American. *Littorinella*, *Hydrobia*, *Bythinella*, *Paludestrina*.*

AMNICOLINÆ. Shell turbinate; whorls very convex, umbilicate; aperture round; peristome continuous. American. *Amnicola*.

POMATIOPSINÆ. Foot with lateral sinuses. Shell elongate; margin of aperture slightly expanded. Terrestrial or amphibious. American. *Pomatiopsis*.

COCHLIOPINÆ. Shell heliciform, heavy; aperture oblique; umbilicus large, with an angulated margin. American. *Cochliopa*.†

LITHOGLYPHINÆ. Shell subglobular; spire short; aperture large, half round; peristome not continuous; imperforate or slightly perforate. European and American. *Gillia*, *Somatogyrus*, *Lithoglyphus*, *Fluminicola*.

For comparison, we copy the arrangement of *Hydrobiinæ* adopted by Dr. Stimpson.

* The animals of *Tricula*, *Pyrgula*, and *Tryonia* are undescribed, and I will not venture to assign their place, believing that the two last named belong decidedly to another family. Does not *Potamopyrgus*, St., belong to the same group?

† I almost doubt the pertinence of *Cochliopa* to this family, although Dr. Stimpson's description of the Soft Parts seems to place it here.

SYNOPTIC TABLE OF THE GENERA OF HYDROBIINÆ.

A. Operculum testaceous	-	-	-	-	-	-	-	-	-	-	-	-	-
B. Operculum corneous.	-	-	-	-	-	-	-	-	-	-	-	-	-
a. Shell elongated; only one distinct basal denticle on either side of rhachidian tooth.	-	-	-	-	-	-	-	-	-	-	-	-	-
1. Shell smooth.	-	-	-	-	-	-	-	-	-	-	-	-	-
* Inner lip thickened	-	-	-	-	-	-	-	-	-	-	-	-	-
** Inner lip not thickened.	-	-	-	-	-	-	-	-	-	-	-	-	-
† Verge simple.	-	-	-	-	-	-	-	-	-	-	-	-	-
Apex of shell obtuse; whorls convex; rhachidian tooth without a central basal process	-	-	-	-	-	-	-	-	-	-	-	-	-
Apex of shell acute; whorls flattened; rhachidian tooth with a central basal process	-	-	-	-	-	-	-	-	-	-	-	-	-
†† Verge bifid.	-	-	-	-	-	-	-	-	-	-	-	-	-
2. Shell sculptured.	-	-	-	-	-	-	-	-	-	-	-	-	-
* Shell carinated	-	-	-	-	-	-	-	-	-	-	-	-	-
** Shell longitudinally plicated	-	-	-	-	-	-	-	-	-	-	-	-	-
1. Shell short; two to four basal denticles on either side of rhachidian tooth.	-	-	-	-	-	-	-	-	-	-	-	-	-
Shell ovate-conic; whorls coronated with spines; cusp of intermediate tooth with numerous (11) equal denticles	-	-	-	-	-	-	-	-	-	-	-	-	-
2. Shell depressed, globular, or ovate; cusp of intermediate tooth with few (3-8) unequal denticles.	-	-	-	-	-	-	-	-	-	-	-	-	-
* Shell not depressed; base carinated; umbilicus large	-	-	-	-	-	-	-	-	-	-	-	-	-
† Verge simple; two basal denticles on either side of rhachidian tooth	-	-	-	-	-	-	-	-	-	-	-	-	-
†† Verge bifid or winged; three or four basal denticles on either side of rhachidian tooth	-	-	-	-	-	-	-	-	-	-	-	-	-
Shell thin, perforate; outer lateral tooth with as numerous, or more numerous denticles than the inner.	-	-	-	-	-	-	-	-	-	-	-	-	-
† Shell comparatively large, globose; tentacles tapering; verge very large, compressed	-	-	-	-	-	-	-	-	-	-	-	-	-
Shell thick, imperforate; outer lateral tooth with fewer denticles than the inner.	-	-	-	-	-	-	-	-	-	-	-	-	-
†† Verge winged on one side, not bifid	-	-	-	-	-	-	-	-	-	-	-	-	-

Stenothyra.

Tritula.

Titorinella.

Hydrobia.

Pyrgula.

Tryonina.

Potamopyrga.

Cochiopa.

Gilia.

Somatogyrus.

Annicola.

Lithoglyphus.

Fiuminicola.

A large part of Dr. Stimpson's paper is occupied by interesting detailed descriptions of the animals of several of the species, with figures illustrative of their lingual armature, generative organs, ova-capsules, etc.

Among the interesting discoveries made by the author is the fact that *Annicola Nickliniana* (and most probably the allied species *tenuipes*, *Binneyi*, *turbiniiformis*, *intermedia*, etc.), are congeneric with *Bithinella* (the European fresh water *Hydrobiu*). And that the globular species which, from a cursory examination of the shell alone, would be all referred to Prof. Gill's genus *Somatogyrus*, really constitute three genera, *Fluminicola*, type *Pal. Nuttalliana*, Lea; *Gillia*, type *Mel. altilis*, Lea; and *Somatogyrus*, type *S. depressus*, Tryon.

The last part of the paper contains systematic diagnoses of the genera of *Hydrobiinæ*, with partial lists of the species.* Among these genera are the following new ones, all of which were first described in this Journal (vol. i., p. 54, *et seq.*): *Tryonia*, *Potamopyrgus*, *Cochliopa*, *Gillia*, *Fluminicola*.

This important work may be obtained without charge by addressing the Smithsonian Institution.

Proceedings of the Academy of Natural Sciences of Philadelphia, No. 5. Nov. and Dec., 1865.

Contributions to the Palæontology of Illinois and other Western States. BY F. B. MEEK and A. H. WORTHEN.

<i>Lithophaga? pertenuis.</i>	<i>Tentaculites Sterlingensis.</i>
“ <i>lingualis</i> , Phillips?	<i>Orthoceras crebristriatum.</i>
<i>Modiolopsis perorata.</i>	“ <i>subbaculum.</i>
<i>Pleurophorus subcostatus.</i>	“ <i>Jolietense.</i>
“ <i>angulatus.</i>	“ <i>nobile.</i>
“ <i>costatiformis.</i>	“ <i>Winchellii.</i>
<i>Grammysia rhomboidalis.</i>	<i>Phragmoceras Walshii.</i>
<i>Conocardium obliquum.</i>	<i>Gomphoceras sacculum.</i>
<i>Edmondia peroblonya.</i>	“ <i>turbiniiforme.</i>
<i>Chænomya rhomboidea.</i>	<i>Nautilus peramplus.</i>
“ <i>hybrida.</i>	“ <i>Niotensis.</i>
<i>Scolygrickia subarcuata.</i>	“ <i>Lasallensis.</i>
<i>Isonema depressa.</i>	<i>Discites ornatus</i> , Hall, var. <i>am-</i>
<i>Pleurotomaria meta.</i>	<i>plus.</i>
<i>Conularia multicostata.</i>	“ <i>disciformis.</i>
“ <i>subcarbonaria.</i>	<i>Cryptoceras capax?</i>
“ <i>Whitei.</i>	“ <i>Leidyi.</i>
<i>Tentaculites tenuistriatus.</i>	<i>Trochoceras? Baeri.</i>
<i>Tentaculites Oswegonsis.</i>	

* We much doubt the pertinence of *Paludestrina lapidum* and *P. perisotomata*, D'Orb., to the genus *Lithoglyphus*.

Observations on the Microscopic Shell Structure of Spirifer cuspidatus, Sowerby, and some Similar American Forms.
BY F. B. MEEK.

American Journal of Science and Arts. Vol. XLI. (2d series),
No. 121. January, 1866.

Notice of a New Group of Eocene Shells. BY T. A.
CONRAD.

Descriptions of New Species of Pupadæ. BY EDWARD S. MORSE.
(Reprinted from the Annals of the New York Lyceum of Natural History, VIII., Nov., 1865.)

Isthmia ventricosa, Maine, Concord, N. H., Mohawk and
Greenwich, N. Y.

“ *Bollesiana*, Maine, New Hampshire, Massachusetts, New York, Norfolk, Va.

“ *corpulenta*, Little Valley, Washoe Co., Nevada.

Pupilla Blandii, Missouri River, near Fort Berthold.

This paper contains magnified figures of the shells, and of the lingual dentition and buccal plates of two of the species.

Notes on Certain Terrestrial Mollusca, with Descriptions of New Species. BY THOMAS BLAND. (Reprinted from the same.)

Proserpinella Berendti, Mexico.

Stenopus? Guiblingi, Venezuela.

Helix conspecta, San Francisco, Cal.

Succinea Sillimani, Humboldt Lake, Nevada.

“ *Stretchiana*, Little Valley, Washoe Co., Nev.

“ *Verrilli*, Salt Lake, Anticosti Island, Gulf of St. Lawrence.

In this paper, *Proserpinella*, a new genus, is described. It differs from *Proserpina* in being destitute of a columellar fold. There are also figures of the animal and dentition of the *Stenopus*, and of the dentition of *Cylindrella* and *Macroceramus*, with explanatory remarks.

Achatina Californica, Pfr., is shown to be from New Granada instead of California.

Finally, *Pupa Rowellii*, Newcomb, and *Pupa Californica*, Rowell, are compared and figured.

Reperterio fisico-natural de la Isla de Cuba. 8vo. Habana.
No. 1, April, 1865. No. 2, May, 1865.

Review of Natural Science Literature of Cuba (including Mollusca). BY D. MANUEL J. PRESAS.

No. 3-6, June—September, 1865.

Descripcion de tres Moluscos Terrestres de la Isla de Cuba.

BY D. FELIPE POEY.

Helix gracilis, Poey.

Cylindrella modesta, Poey.

Paludinella helicoides, Gundl.

Catalogo de los Moluscos terrestres y fluviales de la Isla de Cuba. BY RAFAEL ARANGO; with Introductory Notice by FELIPE POEY.

No. 8, November, 1865.

Descripcion de una Especie Nueva de Molusco terrestre Cubano. BY D. MANUEL J. PRESAS.

Cylindrella Garciana, Wright, Mss.

No. 9, December, 1865.

Moluscos Terrestres y Fluviales encontrados por Gundlach y Presas, en una Excursion de Ceiba Mocha al Pan y al Palenque. BY D. MANUEL J. PRESAS.

II.—FOREIGN.

BRITISH.

Conchologia Iconica: or, Figures and Descriptions of the Shells of Molluscous Animals. BY LOVELL REEVE.

Parts 246, 247.

Oculum. March, 1865. 8 plates and 39 species. The new species are:—

O. fruticum, Adams. Malacca.

“ *alabaster*, Rve. Senegal.

Erato. March, 1865. 3 plates, 18 species.

E. angulifera, Sowb. Borneo.

“ *gallinacea*, Hinds. Philippines.

“ *hematina*, Mke. Porto Rico.

“ *minuta*, Rve. Philippines.

“ *corrugata*, Hinds. Philippines.

“ *pellucida*, Rve. Bombay.

“ *nana*, DuRoi. ?

Unio (continued). April, 1865. Plates 21-25 and species 91-125.

U. villicatus, Rve. Guatemala.

“ *Coahuensis*, White. ?

“ *Moretonicus*, Rve. Tasmania.

“ *Vignoni*, Bernardi. ?

U. rotunditrus, Lam., is the name given to a figure of which the original is probably *U. Kienerianus*. It is, therefore, not surprising that Mr. Reeve considers it "but little deserving of the name given to it."

We would inform English conchologists that the species figured and described as *Coccoluensis*, White, is either a very fine, large female *U. nasutus*, Say, or *U. Mississippiensis*, Con.

U. Sayi, Ward, is described as *U. electricus*, with the synonym "*U. Sayi*, Ward (not of Tappan)".

Parts 248, 249.

Carinaria. June, 1865. 1 plate, 3 species.

Tornatella. June, 1865. 4 plates, 22 species. The following are new:—

<i>T. suturalis</i> , Adams.	Japan, Philippines
" <i>fumata</i> , Rve.	Australia.
" <i>Cumingii</i> , Ad.	Rio Janeiro.
" <i>pulchricus</i> , Ad.	Philippines.
" <i>Senegalensis</i> , Petit.	Senegal.
" <i>Nipponensis</i> , Ad.	Japan.
" <i>Diane</i> , Ad.	Japan.
" <i>modesta</i> , Ad.	Philippines.
" <i>lyrata</i> , Carpenter.	Hong Kong.
" <i>Mariæ</i> , Ad.	?

Ovulum (concluded). June, 1865. Plates 9-14, species 40-66.

<i>O. Angasi</i> , Ad.	Australia.
" <i>roseum</i> , Ad.	China Seas.
" <i>Indicum</i> , Rve.	Bombay.
" <i>Californicum</i> , Sowb.	California.
" <i>arcuatum</i> , Rve.	?
" <i>variabile</i> , C. B. Ad.	?
" <i>neglectum</i> , C. B. Ad.	?
" <i>lividum</i> , Rve.	Panama.
" <i>Antillarum</i> , Rve.	W. Indies.

Unio (continued). June, 1865. Plates 26-30, species 126-160.

<i>U. bicrelatus</i> , Rve.	?
" <i>flavidens</i> , Benson.	Bengal.
" <i>aplatus</i> , Swains.	Island of Chiloe.
" <i>merdiger</i> , Watts.	Hungary.
" <i>gubernaculum</i> , Rve.	?
" <i>inornatus</i> , Hanley.	Cambojia.
" <i>auratus</i> , Swains.	Island of Chiloe.
" <i>obliqui-radiatus</i> , Rve.	?

<i>U. Menziesianus</i> , Gray.	New Zealand.
" <i>Dembæ</i> , Rossm.	Abyssinia.
" <i>fragilis</i> , Swains.	Island of Chiloe.
" <i>Auklandianus</i> , Gray.	New Zealand.
" <i>juligo</i> , Rve.	?
" <i>æreus</i> , Rve.	?

U. obliqui-radiatus is nothing but a female *U. radiatus*, Lam. *U. auratus*, Swains., and *U. fragilis*, Swains., both from the Island of Chiloe, appear to me to be the same species.

Parts 250, 251.

Pyramidella. October, 1865. 6 plates, 45 species.

Cerithium. October, 1865. 10 plates, 70 species.

C. nigrofasciatum, Sowb. Philippines.

" *circinatum*, Ad. Philippines.

The monograph of *Pyramidella* is completed, and contains forty-five species, of which none are new. *Cerithium* is not yet complete.

We hope that Mr. Sowerby will find sufficient encouragement to proceed with the publication of "Conchologia Iconica," now threatened with discontinuance, in consequence of the recent deaths of Hugh Cuming and of its author and publisher, Mr. Lovell Reeve.

Report of the Thirty-fourth Meeting of the British Association for the Advancement of Science, held at Bath in September, 1864. 8vo. London, 1865.

Further Report on Shetland Dredgings. BY J. GWYN JEFFREYS.

"In one of my former Reports I noticed that the marine fauna of Shetland is in the main Scandinavian. This, indeed, would be the natural inference from the geographical position of these isles. But it has undoubtedly also a southern character, and includes many species which inhabit the Mediterranean. Some naturalists, who appear not to have studied the question in all its bearings, ascribe this southern element to the influence of the Gulf of Mexico. I cannot help repeating what I have already urged elsewhere, that the *eastern* coasts of Shetland are, so far as can be ascertained, quite exempt from the operation and effect of this mighty 'river in the ocean.' No seeds of tropical plants, no *Ianthina*, *Spirula*, exotic kinds of *Teredo*, *Verella*, or other pelagic animals which usually accompany the course of the Gulf Stream, have ever been found on any part of these coasts. The only drift wood which has been observed floating in the sea or cast ashore by the waves—and in this treeless district every kind of wood is

much sought after—consists of Norwegian fir trees, often with their roots, and drilled by the same species of *Teredo* (*T. megotara* or *nana*) that attacks piles and fixed wood-work, as well as boats equally in the harbors of East Shetland and Norway. Besides, another consideration must not be lost sight of, viz., that the Mediterranean fauna is quite independent of the Gulf Stream; and a glance at Maury's chart will show that the direction of its course, or of the 'drift' which may have been mistaken for it, off the western coasts of Europe and Africa (including the entrance to the Straits of Gibraltar), is entirely *southward*, and forms, in fact, the return current. The present distribution of marine life in the European seas must be traced in some other way, and with reference to geological conditions. Palæontologists are well aware that many kinds of Mollusca which still inhabit the Mediterranean, but not our seas, left their remains on the area that now constitutes the eastern coasts of England, perhaps at a period long antecedent to the origin of the Gulf Stream. Several species of Mollusca, which may be termed southern forms, likewise occur on the Dogger Bank and the coasts of Yorkshire and Northumberland; and among them may be enumerated *Trochus millegranus*, *Scalaria Turtoni*, *Natica sordida*, *Murex erinaceus*, *Defrancia brachystoma*, and *Pleurotoma teres*. . . ."

"It seems to me as if shells belonging to the same species, that are common to the littoral and deep-water zones, attain a greater size and thickness in the former than in the latter habitat. Such are *Venus gallina*, *Tellina fabula*, *Mactra solida* (compared with its variety *elliptica*), *Tectura virginea*, *Rissoa Alderi*, *Trochus zizyphinus*, *T. cinerarius*, *T. tumidus*, and *Buccinum undatum* (compared with its variety *Zetlandica*). Mr. Jordan informs me that he has observed the same difference with regard to specimens of *Pandora inwiquivalvis* and its variety *obtusa*, *Tectura virginea*, and *Chiton discrepans*, which he has lately taken on the shore and dredged off the Channel Isles. More extensive observations are unquestionably desirable, if not necessary, before this proposition can be substantiated; but it has been abundantly proved by the researches of Dr. Davy, Forchhammer, and Bishof, that the quantity of carbonate of lime held in solution by sea-water, and from which shells are secreted, occurs chiefly along coast-lines, being derived from terrestrial sources, and brought down to the sea by rivers, streams, and the washings of rain and waves. This would give a reason for littoral shells being more solid than those from deep water; and possibly the greater abundance of food in the former than in the latter case might account for the increase of bulk.

“I noticed in the last Report, that living Mollusca, taken by the dredge from considerable depths, and placed in a shallow vessel of water drawn from the shore, did not appear to be in the slightest degree affected by the sudden change of bathymetrical conditions. I wish to qualify this statement, and, at the same time, to record a further observation. It is quite true that the Mollusca in question were lively and active in their new habitat; but those which were of the univalve kind exhibited a peculiarity and habits with which I was much struck. All of them, on being placed in the vessel, tried to escape from the bottom, and quickly found their way up the sides to the open air; some floated with the sole of the foot uppermost and the shell downwards. Now, it is very certain that in their native habitat, at a depth of nearly 500 feet, these mollusks, which are ground-dwellers and have no means of rising to the surface of the sea, could not have floated in this way, or even had time or opportunity, since they were taken up from the depths of the ocean, to acquire such a habit. Was it instinct? If so, when was it implanted? Another fact worthy of notice is the eagerness which they displayed to escape out of the water and to breathe the open air. One would have supposed that the water at the bottom of the ocean was much less aerated or oxygenated than that on the shore, and that the mollusks would have supplied their gills more copiously in surface-water with the requisite element. But exactly the contrary has been ascertained by some experiments conducted on board the French surveying ship ‘Bonite;’ and it is now clearly established that the quantities of atmospheric air increase with the depth. According to Dr. Wallich, in an admirable chapter of his ‘North Atlantic Sea Bed,’ entitled ‘The Bathymetrical Limits of Life in the Ocean,’ the proportion of gaseous matter taken up by water is very greatly increased under an increase of pressure, all gases (especially oxygen and hydrogen) being easily compressible and becoming fluid under a comparatively slight pressure. We but imperfectly understand the mode in which the solution of atmospheric air in sea-water is brought about; but the tendency of fluids to absorb gaseous bodies is constant under all circumstances, and the quantity which they are capable of appropriating increases with pressure. It, therefore, follows that the deeper the stratum of water, the greater must be the amount of gaseous matter held in solution by it. For a more detailed explanation of this problem I must refer to the work above cited. I can now understand why deep-water mollusks do not find in the surface-water the same supply of atmospheric air as they had been accustomed to, and why they

creep out of it into the open air to avoid a sensation which we should call stifling or suffocation."

This paper is concluded with a description of a new species of *Amphisphyræ*.

A. expansa, Jeffreys, Shetland,

and a monograph of the species *Stilifer*, including a description of the animal.

Transactions of the Linnean Society of London. Vol. 24, part 3, 1864.

On a New Genus of Teredininæ. BY E. PERCEVAL WRIGHT, M. D.

This species was obtained in Comer River, a branch of the Ganges. The water is perfectly fresh, being seventy miles from the sea, though at thirty miles further down it is brackish at full tide. The species, it appears, though now first described, is well known to Hindoo boatmen, who meet with it even higher up the Ganges. Boats infested by them are suspended over a fire, which soon destroys them, and by slightly charring the surface, prevents, for a time, a second attack.

The auricle is not developed on the valves of this species, we are informed, but whether this proves a permanent, and, therefore, a generic character, must be determined by future researches. Only two specimens were examined, and I have occasionally found the auricle absent in species in which it is usually well developed.

In the largest specimen, the valves are an inch in length, and the pallets 7-8ths of an inch. Of the latter, "the body is broad, slightly concave on its inner surface, which, in one specimen, is worn somewhat flat; the outer surface is convex and roughly imbricated. A peculiar core-like body is seen running through the expanded portion underneath the thick scale-like striae. The stalk is cylindrical, curved, and tapers to a fine, sharp point; there is a slight muscular scar around the junction of the body with the stalk." Dr. Wright has named the genus *Nausitora*, and the species *N. Dunlopei*.

On the Structure and Homologies of the Renal Organ in the Nudibranchiate Mollusca. BY ALBANY HANCOCK.

An extended and valuable paper, illustrated by six excellent plates.

British Conchology, or an Account of the Mollusca which now Inhabit the British Isles and the Surrounding Seas. BY J. GWYN JEFFREYS. Vol. 3, 12mo, cloth, 393 pp. and 9 plates. London, John Van Voorst, 1865. (Price 12 shillings per volume.)

We have rarely perused a work on Natural History which has afforded us so much pleasure as the volumes of which the *third*, as quoted above, is now before us. It is seldom, indeed, that naturalists succeed in investing their subject with an interest which renders it acceptable to those who are not specially instructed therein. In this difficult undertaking Mr. Jeffreys has succeeded. He has given us the best and fullest descriptions in language remarkably free from the ordinary dry technicality of the science, succeeded by most excellent observations on the localities, both recent and fossil, the bibliography of the species, on the habits of the animals, etc.

We have never before seen so much and so varied information contained in such small compass in any work on geographical conchology. The fifty pages of observations on the genus *Teredo* form the most elaborate example in the present volume of the author's style.

We commend this work to the perusal of all those interested in the science, and trust that some American author will undertake a work to be written in the same attractive style.

We congratulate Mr. Jeffreys upon his success, a success which will also benefit our science and mankind by luring numbers to study the subject.

Annals and Magazine of Natural History. XVI. London, 1865.
No. 92. August.

On the Homology of the Buccal Parts of the Mollusca. BY DR. OTTO A. L. MÖRCH, of Copenhagen.

On the Operculum and its Mantle. BY DR. O. A. L. MÖRCH.

No. 94. October.

On the Australian Species of Paludina. BY E. VON MARTENS, M. D.

P. Australis, Reeve, "probably = *P. Essingtonensis*, Shuttl."

P. affinis, Martens. This, we are informed, bears the same relation to *P. Australis* that the European *P. fasciata* does to *P. vivipara*. The position of the bands and absence of spiral sculpture will serve to distinguish *V. suprafasciata*, figured in our January No., from either of these species.

P. polita, Martens. This we believe to be the same as *V. sublineata*, Conrad, figured also in our last No. The latter name has priority.

No. 95. November.

On the Microscopic Structure of the Shell of Rhynchonella Geinitziana. BY WM. B. CARPENTER, M. D.

FRENCH.

Malacologie d'Aix-les-Bains. BY J. R. BOURGUIGNAT. 8vo., 86 pp., 3 plates. Paris, 1864.

The following species are new :—

Zonites Dumontianus. *Cæcilianella uniplicata.*
Helix Juriniana. *Pomatias Sabaudinus.*

Monographie du Nouveau Genre Francais Paladilhia. BY J. R. BOURGUIGNAT. 8vo., 21 pp. and 1 plate. Paris, January, 1865.

This new genus is instituted for several minute univalve fluviatile shells recently discovered in France. They are elongated shells, having the general appearance of *Acme*, but umbilicated and having a *pleurotomose lip!*

Paladilhia pleurotoma. *Paladilhia Gervaisiana.*
 “ *Moitessieri.*

Monographie du Nouveaux Genre Francais Moitessieria. BY J. R. BOURGUIGNAT. 8vo., 18 pp. and 2 plates. Paris, Dec., 1863.

The typical species of this genus is *Paludina Simoniana*, Charp. (= *P. vitrea*, Moquin-Tandon, not *P. vitrea* of Menke.

The new species are :—

Moitessieria Rolandiana. *Moitessieria Massoti.*
 “ *Gervaisiana.*

Mollusques Terrestres et Fluviatiles. RECUEILLIS PAR M. HENRI DUVEYRIER dans le Sahara, et decrits par M. J. R. BOURGUIGNAT. 8vo., 30 pp., 3 plates. Paris, 1865.

Helix Warnieriana. *Planorbis Duveyrieri*, Deshayes.
Hydrobia Duveyrieri.
Planorbis Aucapitainianus. “ *Maresianus.*

Journal de Conchyliologie. Third Series, vi., No. 1, 8vo. Paris, January, 1866. 104 pp. and 4 plates, one of which is colored.

Anatomie du Genre Septifer. BY P. FISCHER.

Etudes sur la Faune Malacologique de Saint Jean-de-Luz, de Dinan et quelques autres Points du Littoral Océanien de la France. Part 2. BY JULES MABILE.

Examen Critique du Groupe des Helix cariosula, Mayrani, Candidissima et Bætica. BY J. B. GASSIES.

Note sur l'Identité des Lucina Voorhævei, Deshayes, et L. mirabilis, Dunker. BY F. VAN HULKELOM.

Note Relative aux Genres Balea et Temesa. BY O. SEMPER.

Description d'Espèces Nouvelles Provenant d'Australie et des Iles Salomon et Norfolk. BY J. C. COX, M. D.

<i>Vitrina planilabris.</i>	<i>Helix aridorum.</i>
<i>Helix Greenhilli.</i>	“ <i>splendescens.</i>
“ <i>Urarensis.</i>	“ <i>flosculus.</i>
“ <i>Nautiloidea.</i>	

Description d'Espèces Nouvelles Provenant de la Nouvelle Calédonie. Sixth article. BY J. B. GASSIES.

<i>Zonites subfulvus.</i>	<i>Neritina Artensis.</i>
<i>Helix Kanakina.</i>	“ <i>costulata.</i>
<i>Bulimus Artensis.</i>	<i>Navicella Moreletiana.</i>
<i>Cyclostoma Guestierianum.</i>	

Description de Coquilles Terrestres Nouvelles. BY H. CROSSE.

<i>Helix Lienardiana, Mauritius.</i>	<i>Helix Bocageana, China?</i>
“ <i>Hidalgoiana, Oceanica.</i>	“ <i>Cuileti, Oceanica.</i>
“ <i>Primeana, China?</i>	“ <i>Mabilei, Oceanica.</i>

Description d'Espèces Appartenant à la Faune Malacologique de l'Indo-Chine. BY ARTHUR MORELET.

<i>Vitrina Cochinchinensis.</i>	<i>Unio venustus.</i>
<i>Monocondylus tumidus.*</i>	“ <i>micropterus.</i>
“ <i>exilis.</i>	

Description d'un Murex Fossile du Terrain Tertiaire Sub-Apennin de la Vallée de l'Elsa (Toscane). BY M. PAULUCCI.

Murex Veranyi.

Description de Coquilles Fossiles des Terrains Tertiaires Supérieurs (continued). BY M. C. MAYER.

<i>Cardium Brocchii.</i>	<i>Cardium Girondicum.</i>
“ <i>commune.</i>	“ <i>Leogenanense.</i>
“ <i>Darwini.</i>	“ <i>Saucatsense.</i>
“ <i>Gallicum.</i>	

Curiosités Bibliographiques; une Mystification Scientifique au XVIIIe Siècle. BY H. CROSSE.

Bibliographie.

* “*Monocondylaea*, Anct., On ne s'explique ni la diphtongue ni la desinence feminine.”

Revue et Magazin Zoologie. No. 11, Nov., 1865. Mollusques Nouveaux, Litigieux ou peu Connus. BY M. J. R. BOURGUIGNAT.

- Unio Rothi*. Lake of Tiberias, River Jordan, Syria.
 “ *umbonatus* (*U. littoralis*, var. *umbonatus*, Rossmüssler).
 “ *Subreniformis*, Bourg. Spain.
 “ *Penchinatianus*, Bourg. “
 “ *Valentinus*, Rossm. “
 “ *Hispanus*, Moq.-Tand. “
 “ *Graellsianus*, Bourg. “
 “ *Courquinianus*, Bourg. “

Revue et Magazin de Zoologie. Second Series, XVIII., No. 1, 1866. Mollusques Nouveaux, Litigieux ou peu Connus. BY J. R. BOURGUIGNAT.

Anodonta Melinia. Valencia.

The balance of the paper contains the enumeration of the *Unionidae* of the Spanish Peninsula and of Algiers, numbering thirty-four species, with remarks on *Unio Aleroni* and other species.

Malacologie de la Grande-Chartreuse. BY J. R. BOURGUIGNAT. 104 pp., 8vo. Paris, F. Savy, June, 1864. (30 francs.)

This is one of the most beautiful octavos on Conchology ever issued from the French press. The paper is very heavy and of fine finish, the type and printing excellent, and the sixteen plates in duplicate plain on India paper, and colored, are splendidly executed.

Preceding the descriptive portion of the work is a sketch of the country, including the particular localities of the species collected, illustrated by nine beautiful lithographic views. A review of the authors who have described the species of this region then follows, and finally the synonymy and description of eighty species, including the anatomy of *Helix Fontenilli*, *H. alpina*, and *H. depilata*.

The new species described are:—

- | | |
|--------------------------|------------------------------|
| <i>Arion Dupuyanus</i> . | <i>Zonites Dumontianus</i> . |
| <i>Limax erythrus</i> . | <i>Helix phorochoetia</i> . |
| “ <i>eubalius</i> . | “ <i>Bourniana</i> . |

Malacologie de l'Algerie. BY J. R. BOURGUIGNAT. Sixth Part (conclusion), pp. 233-380.

Hydrobia, 3 species, *Amnicola*, 9 species, *Melania*, 1 species, *Melanopsis*, 3 species, *Neritina*, 3 species, *Sphaerium*, 2 species, *Pisidium*, 4 species, *Unio*, 7 species, *Anodonta*, 4 species.

The following are new:—

- | | |
|-------------------------------|-------------------------|
| <i>Neritina Maresi</i> . | <i>Anodonta embia</i> . |
| <i>Unio Letourneuxi</i> . | “ <i>Numidica</i> . |
| <i>Anodonta Letourneuxi</i> . | |

In an appendix the following additional new species are described:—

Vitrina Letourneuxi.

Zonites subplicatulus.

Helix Challameliana.

“ *Bastidiana.*

Helix ablennea.

Vertigo briobia.

Hydrobia Challamelliana.

In the appendix a recapitulation of the species is given, numbering 319, being 234 more than the number enumerated in Terver's work, and 194 more than the catalogue of Morelet. A map of Algiers is next given, colored to represent those parts of the country thoroughly and superficially explored and unexplored for shells, respectively. The latter exhibits by far the largest surface, and the thoroughly explored region is comparatively small.

The species of Morocco and Tunis are then enumerated and compared with those of Algiers. The third chapter of the appendix treats at length of the geographical distribution of the species, and is illustrated by a colored map showing the position of the littoral, mountain, and high plateau faunæ, with a tabular view of the species of the mountains and of the valleys.

The fourth chapter shows that the species of the Algerian provinces do not approach those of the Canaries, Madeira, Sicily, or Central Africa, but belong rather to the Spanish fauna. In proof of this proposition, lists of the shells of the above islands are given. M. Bourguignat concludes, from the very distinct faunas possessed by the Canaries and Azores, that each archipeligo (once a single large island) has its own particular centre of creation, and that they did not at any time join the African Continent. Among 254 Sicilian species enumerated, 62 are also Algerian, but many of these are cosmopolite species. The species of Spain number 300, of which more than half are found also in Algiers.

In a fifth chapter the author examines the Malaco-stratigraphical principles governing the distribution of species of the European system. He says that—

“1. Between the 35th and 46th degrees of north latitude is found a zone of creation, and this zone coincides with a series of mountain ranges extending from the Atlantic Ocean to the Caspian Sea in Asia.

“2. That to the north of this zone the species distributed over the vast central and northern regions of Europe originate entirely within this zone.

“3. That to the south, on the contrary, each species has a localized existence, and remains unchangeable in its habitat and its mode of habitation.”

These three points prove that this zone of creation may be divided into three well distinguished parts, each forming a particular creative centre.

The first centre includes Spain, extending from the Pyrenees to the south of Morocco, Algiers, and Tunis. The second extends from the French Alps, following the mountain chains to the east towards the Bosphorous and Black Sea, and to the south to the extremities of the Italian and Hellenic peninsulas; and the third is found from the eastern borders of Anatolia along the Taurian chain towards the Persian and Caspian Seas; it includes Caucasia, Crimea, the Isle of Crete, Cyprus, etc.

It is a singular fact, says our author, that to the south of these three grand centres, there does not exist any other special fauna, and that the vast regions of the Sahara, Tripoli, Egypt, Arabia Petrea, Mesopotamia, and Persia are void of special species, making an immense line of demarcation between the great European and the African and Asiatic centres.

In the Sahara and Tripoli all the species of terrestrial or fluviatile shells belong to the *Spanish* fauna, except *Melania tuberculata* from the *African*. In Egypt nearly all the terrestrial species are Syrian, while the fluviatiles are descended from the *African* centre, introduced by the Nile. In Mesopotamia the shells are Syrian; and all the species of Persia are Armenian in origin.

To the north of these creative centres M. Bourguignat finds the same facts governing the distribution of the species as to the south of them; the vast countries extending from the Alps to the Arctic Ocean containing almost entirely species having their origin in the Alpine system.

As the result of his studies of the principles of geographical distribution, M. Bourguignat presents the following summary:—

“1. The centre of creation of each species is simple, and not multiple.

“2. The species of the European system have their creative centre in the mountainous countries, and not in the plains or low countries.

“3. There exist in Europe, without counting certain small continental or insular centres, three great centres of creation: 1. The Spanish centre. 2. The Alpine centre. 3. The Taurian centre.

“4. The species which are distributed throughout the whole European system originate in these centres.

“5. Each centre possesses a peculiar fauna, entirely special, and composed of a series of adapted types.

“6. To the north of these centres the area of the species is

immense; to the middle, on the contrary, it is excessively circumscribed. The differential proportions of the middle and northern areas is as 1 to 200.

"7. To the north of the centres the acclimatation or radiation of the species is effective to the middle of the region.

"8. The radiation from the Alpine centre embraces nearly all of Europe; that of the Spanish centre is very feeble; that of the Taurian centre is nearly none.

"9. To the middle of the centres, on the contrary, the species is always localized; generally it is special.

"10. A species is so far special that it has a centre where it inhabits solely, without intermixture with another, when not submitted to maritime influence or accidental acclimatation.

"11. The maritime influence is powerless in the regions to the north of the centres.

"12. To the middle of the centres, on the contrary, the maritime influence is asserted with such energy with certain species, that these shells have become, for malacologists, the positive evidence of a sea-coast.

"13. The species accidentally transported are an exception, nevertheless, to those subject to maritime influence, being acclimated, 1. Those of the north to the middle, and not those of the middle to the north; 2. Those of the Orient to the Occident, and never those of the Occident to the Orient.

"14. The conchological population of the great centres of creation is always less numerous (comparatively) than that of insular centres.

"15. Every island, however inconsiderable, separated in origin from the Continent, possesses its peculiar species.

"16. Every island, anciently united with a Continent, and separated by the sea at a more recent epoch, naturally contains the fauna which inhabited it prior to the separation.

"17. In the same island are found certain types of form, and a multitude of modifications of these types.

"18. The area of insular species is much more restricted than the area of Continental species placed to the middle of the grand creative centres."

The above interesting extracts, necessarily presented here in a condensed form, present to American Conchologists several facts (those relating to insular faunas) which are by no means new, Prof. C. B. Adams having discussed them at length in his "Contributions to Conchology."

The final conclusions of M. Bourguignat, in applying these facts to the Algerian fauna, are that—

1. At the commencement of the modern creative period the north of Africa was nearly an island, joined to Spain.

2. That at this epoch the Strait of Gibraltar did not exist.
3. That the Mediterranean communicated with the Ocean by the desert of Sahara, which at this time was a vast sea.

Bulletin de l'Academie Imperiale des Sciences de St. Petersburg. V. Parts 30-33. 4to. St. Petersburg.

Vorläufige Diagnosen einiger neuer Gasteropoden-Arten aus dem Nord Japanischen Meere. BY DR. L. V. SCHRENCK.

<i>Chiton Albrechtii.</i>	<i>Trochus globularius.</i>
“ <i>Lindholmii.</i>	<i>Natica bicincta.</i>
<i>Trochus Nordmannii.</i>	<i>Tritonium (Fusus) Jessoense.</i>
“ <i>subfuscescens.</i>	“ <i>(Buccinum) pericochlion.</i>
“ <i>Jessoensis.</i>	
“ <i>iridescens.</i>	<i>Voluta pusilla.</i>

Annales des Sciences Naturelles. 5th Series. Zoologie. Vol. 4. No. 6. December, 1865.

Comment les Ianthines font leur Flotteur. BY DR. LACAZE DUTHIERS.

Recherches sur l'Œil de quelques Céphalopodes. BY PROF. VICTOR HENSEN.

(Extracted from Zeitschr für Wiss. Zoologie, xv., 1865.)

GERMAN.

Monographia Pnuemonopomorum viventium. Supplementum secundum. BY DR. LOUIS PFEIFFER. 284 pp., 8vo. Theodor Fischer, Cassel, 1865.

Within the past few years, no other department of Malacological science has progressed so rapidly as the Terrestrial Mollusca. A host of enterprising collectors and naturalists have confined their attention to these shells alone, and have pursued the study with unequalled success. We look in vain through the literature of Marine Conchology for the same critical acumen and thorough knowledge of the subject; and among the fluviatile families, one only (*Unionidae*) has been equally well studied.

We believe that the entire credit of originating and promoting Terrestrial Malacology as a separate study, should be awarded to Dr. Louis Pfeiffer, who has unceasingly worked for many years in publishing a complete Bibliography of the species; besides his “Malacozoologische Blätter” and “Novi-

tates Conchologica," both of which are mainly devoted to the description of terrestrial species.

The following list of Dr. Pfeiffer's works will show at once the extent of his labors, and the rapid progress of this branch of the science:—

Symbolæ ad Historiam Helicorum. I., 1841. II., 1842. III., 1846.

Contains Tables of Synonymy, with descriptions of new or imperfectly known species only. In the third part, the species of *Helix* are arranged on the plan which the author has since used for all the genera.

Monographia Helicorum viventium. I., II., 1848. 1075 pp. 2278 species.
 " " " III., 1853. 711 pp. 3882 species.
 " " " IV., 1855. 920 pp. 5159 species.
Monog. Auriculacorum viventium. V., 1852. 209 pp. 242 sp.
 " *Pneumonopomorum* " I., 1852. 439 pp. 735 sp.
 " " " II., 1858. 249 pp. 899 sp.
 " " " III., 1865. 284 pp. 1686 sp.

The very large increase in the number of operculated shells is owing, in a considerable degree, to the researches of naturalists and travellers in Cuba. The increase of species of operculate terrestrial shells in the principal genera, may be designated thus:—

	Monog. 1. 1852.	Monog. 2. 1858.	Monog. 3. 1865.
<i>Acicula</i> ,	4	6	5
<i>Adamsiella</i> ,	12	14	16
<i>Alcadia</i> ,	17	23	28
<i>Alycæus</i> ,	3	14	39
<i>Cataulus</i> ,	6	13	15
<i>Choanopoma</i> ,	21	24	49
<i>Chondropoma</i> ,	33	58	94
<i>Cistula</i> ,	34	34	39
<i>Ctenopoma</i> ,	—	15	25
<i>Cyclophorus</i>	85	133	163
<i>Cyclostoma</i> ,	85	100	113
<i>Cyclotus</i> ,	45	62	111
<i>Diplommatina</i> ,	4	14	18
<i>Geomelania</i> ,	21	24	21
<i>Helicina</i> ,	148	219	273
<i>Hydrocena</i> , etc.,	14	49	64
<i>Leptopoma</i> ,	29	44	54
<i>Megalomastoma</i> ,	19	30	27
<i>Opisthoporus</i> ,	—	7	11
<i>Otopoma</i> ,	15	17	19
<i>Pomatias</i> ,	10	15	24
<i>Pterocyclos</i> ,	16	17	19
<i>Pupina</i> ,	8	14	24
<i>Stoastoma</i> ,	20	21	83
<i>Trochatella</i> ,	17	29	33
<i>Truncatella</i> ,	—	27	39
<i>Tudora</i> ,	25	27	34

It will be noticed, that, in several of the genera, the increase of known species within 13 years, has been very slow, while in others it has been exceedingly rapid. *Adamsiella*, *Cistula*, *Geomelania*, *Otopoma*, *Pterocyclos*, and *Tubora* are examples of the first; while, among the examples of rapid progression, *Stoastoma* is very remarkable, the increase being due to the energy of Hon. E. Chitty, a resident in Jamaica. In the present monograph, Dr. Pfeiffer has adopted a large number of the new genera proposed for East Indian species by the Messrs. Adams, Blanford and Benson, and most of the species described in the various scientific journals during the year 1864 are included.

Ueber die Familie der Rissoiden. BY GUSTAV SCHWARTZ VON MOHR-ENSTERN. (Denkschriften der Kaiserlich Akad. der Wissenschaften, XIX.)

I. *Rissoina*, 120 pp., 4to, 11 colored litho. plates. Wien, 1860.
II. *Rissoa*, 58 pp., 4to, 4 " " " " 1863.

This beautiful work deserves a longer notice than our space will at present admit of. The work commences with a long review of the literature of the family, containing synopses of the various classifications that have been proposed, with other interesting particulars. The literature quoted is very extensive, embracing over 150 volumes and papers; next we have descriptions of the principal collections of *Rissoideæ* in Europe, which have been consulted by the author.

Then follow papers on anatomical details, and on geographical and geological distribution.

After the foregoing introductory pages, the genus *Rissoina* is fully described, with numerous interesting facts appended, and an analytical table of fossil and recent species. The text of Part I. is concluded by very complete descriptions of 91 species.

Part II. contains a like description of the genus *Rissoa*, and its species, 47 in number.

The plates, representing the species greatly magnified, are beautifully drawn and colored, and contain over 300 figures. The work may be obtained from Karl Gerold's Sohn, bookseller, Vienna.

Novitates Conchologicæ. BY DR. LOUIS PFEIFFER. Part 22, 4to Cassel. (no date).

<i>Cylindrella Coronadoi</i> , Arango.	Cuba.
" <i>Blainviana</i> , Gundl.	"
<i>Trochatella regina</i> , Morelet.	"
<i>Helicina emoda</i> , Pfr.	"
<i>Trochatella Mouhoti</i> , Pfr.	Cambodia.

<i>Lucidella sulcata</i> , Weinland.	Haiti.
<i>Helicina MacMurrayi</i> , Pfr.	Trinidad.
<i>Cylindrella arcuata</i> , Weinl. and Mart.	Haiti.
“ <i>zebrina</i> , Pfr.	Jamaica.
“ <i>Paivana</i> , Pfr.	“
“ <i>arcustriata</i> , Wright.	Cuba.
“ <i>violacea</i> , Wright.	“
“ <i>trilamellata</i> , Pfr.	“
“ <i>tumidula</i> , Weinl. et Mart.	Haiti.
“ <i>suturalis</i> , Weinl.	“
“ <i>plumbea</i> , Wright.	Cuba.
“ <i>fastigiata</i> , Gundl.	“
“ <i>lateralis</i> , Gundl.	“
<i>Balea Haueri</i> , Bielz.	Transylvania.
“ <i>cyclostoma</i> , Bielz.	“
<i>Clausilia Meschendorferi</i> , Bielz.	“

These species are all handsomely figured.

Novitates Conchologicæ. Part 2. Mollusques Marins. BY DR. W. DUNKER. Eighth No. 4to. Cassel.

<i>Pecten multiscamatus</i> , Dkr.	Havana.
“ <i>sulcicostatus</i> , Sowb.	Port Natal.
<i>Tivela subglobosa</i> , Dkr.	?
“ <i>Natalensis</i> , Dkr.	Port Natal.
<i>Solen Lischkeanus</i> , Dkr.	
“ <i>Woodwardii</i> , Dkr.	Philippines.
“ <i>gracilis</i> , Phil.	“
“ <i>grandis</i> , Dkr.	“
“ <i>Malaccensis</i> , Dkr.	Malacca.
<i>Cultellus attenuatus</i> , Dkr.	

9th Part.

<i>Callista Gotthardi</i> , Dkr.	Upsolu.
<i>Smetta concinna</i> , Dkr.	Moluccas.
<i>Tapes Schnellianus</i> , Dkr.	Japan.
<i>Diplodonta bullata</i> , Dkr.	Ceylon.
<i>Lucina carnosa</i> , Dkr.	Port Natal.
“ <i>mirabilis</i> , Dkr.	?
<i>Donax egyptus</i> , Dkr.	Moluccas.
“ <i>splendens</i> , Dkr.	
<i>Dosinia tenuilirata</i> , Dkr.	Ceylon.
“ <i>subdichotoma</i> , Dkr.	“
“ <i>Ceylonica</i> , Dkr.	“
“ <i>regularis</i> , Dkr.	?

Novitates Conchologicæ. Supplement III. Monographie der Molluskengattung Venus. BY DR. EDW. RÖMER.

2d Part

Contains descriptions of species of *Tivela*, of which the following is new:—

Tivela levidensis, Römer. ?

3d Part

Commences the description of the species of *Cytherea*, section *Meretrix*.

Archiv. fur Naturgeschichte. Berlin, 1864.

Bericht über die Leistungen in der Naturgeschichte der Mollusken während des Jahres, 1863. BY DR. F. H. TROSCHEL.

The list of authors and synopsis of conchological papers is very full in this volume, embracing over 50 pages. The contents are divided by—1st. General and Periodical Works. 2d. Faunas. 3d. Classified Enumeration of Genera and Species.

DANISH.

Ofversigt af Kongl. Vetenskaps-Akademiens Förhandlingar. Stockholm, 1865.

On a Land Shell new to Scandinavia. BY J. E. ZETTERSTEDT.

This shell is the *Bulinus montanus*, Drap. The author states that it is the same as *Pupa placida*, Say, a species which has never been identified by American conchologists. We think it not unlikely that his surmise is a correct one.

SCIENTIFIC INTELLIGENCE.

ON THE ANATOMY OF TRIDACNA ELONGATA. By M. Leon Vaillant.

Tridacna elongata, Lam., occurs very abundantly in the Bay of Suez, where it is often employed as food. The author has accordingly been able to examine a great number of individuals of this animal.

"The retractor muscle of the foot, which is of considerable size in proportion to the protractor, serves, in part, for the closure of the valves; hence it may be that in those Monomyary Acepala which have an adductor muscle distinctly divided into two parts, the upper portion is to be regarded as representing the retractor of the foot diverted from its normal functions. The byssus of the *Tridacna*, already described by Müller, consists of two parts—one adhering to the bottom of a cavity of the foot, the other uniting this with external bodies. Each of these is secreted by a distinct organ—the former by the bottom of its cavity, the latter by a collection of racemose glands lining a circular groove in the wall of the cavity. The large notches of the margins of the shells enabled the author to ascertain the force which the mollusk is capable of exerting. He fixed an individual by one of its valves, and suspended a weight to the other. In this way he found that a specimen 21 centimètres in length, of which the valves weighed 1.264 kil., could support a weight of 4.914 kilogrammes; so that it may be supposed that an individual weighing 250 kilogrammes, and these are not uncommon, might, at a given moment, put out a force of more than 900 kilogrammes.

"In the nervous system, the branchial ganglia, forming a single mass with no trace of longitudinal division, exhibit transverse furrows bounding two false circumvolutions, A sort of inelastic tendon accompanies the connective extended from the branchial ganglion to one of the buccal ganglia

during its passage through the gastro-genital mass. The object of this arrangement appears to be the prevention of the dragging of the nerve when the organ is distended with eggs.

"Another remarkable arrangement is to be seen in the passage of the last portion of the intestine through the heart. At the entrance of the intestine into the ventricle, there are muscular bundles starting from the wall of the latter and inserted perpendicularly into the wall of the digestive tube. At the moment of contraction, these bundles must, by their shortening, tend to draw apart the walls of the intestine, which would otherwise be compressed during the systole, and thus the course of the fecal matters will not be interrupted. In these large mollusks, the difference between the arteries and veins is very easily seen; the former have a very distinct double epithelial and fibrous wall, whilst the latter are simple sinuses hollowed out in the tissues. All the blood is compelled to traverse an organ of hæmotosis (branchiæ or mantle) before returning to the heart.

"The proper temperature of the animal, compared with that of the bottom at which it lives, appeared to be rather high. The temperature registered by thermometers sunk at the point inhabited by the animals was about 63.°5 F. (17.°5 C.). The average temperature of the *Tritæna* was 68.°5 F. (20° C.)." —Annals and Magazine of Natural History, XVI., No. 95. November, 1865. (From Comptes Rendus, October 9, 1865.)

ON THE CORRECT APPLICATION OF CERTAIN TERMS USED IN THE DESCRIPTION OF SHELLS. By Augustus A. Gould, M. D.

"Taking a common clam for an example, and placing it with the beak uppermost, he showed the position of the enclosed organs, and that the extremity which was in front during locomotion should be called the *anterior*, and the opposite the *posterior* extremity; that the distance from the beak to the opposite margin should be called the *altitude*, the distance from the anterior to the posterior extremity the *longitudinal diameter*, and the distance through from one valve to the opposite the *transverse diameter*; that the concentric markings of growth should be called *longitudinal*, in distinction from those which radiate from the beak, to which the name of *vertical* should be applied. The terms *equilateral*, *posterior side*, and *anterior side*, as used, he showed to be peculiarly improper, and suggested instead the terms *equipartite*, *posterior part*, *segment* or *section*, etc. Passing then to the common spiral shells through the medium of *Limax*, *Patella*, *Dentalium*, and

Vermetus, he showed that the radiating or spiral striæ, in like manner, should be denominated *vertical*, and those which crossed the single whorls or the concentric lines of growth *longitudinal striæ*; that, in reality, the longitudinal diameter of a shell was the width of the largest whorl at its aperture, and its altitude the length of the unrolled spiral; and thus the terms used in the description of all shells become identical for analogous parts. For convenience, however, we may speak of the altitude of the *spire* as distinct from that of the *shell*, and so of its length; the anterior extremity and other relative terms were to be determined in this, as in the other instances, by the relation of the shell to the animal when in motion; and the parts enclosed by the spiral shell should be regarded as simply a hernia of the viscera through the back of the animal.

“There were other terms also, which he showed to be unsuitable, having been derived from a false idea of use, or from a fanciful analogy. Thus, the mouth, and throat, and teeth, and lips of a shell are spoken of, which terms might be allowable, were it not that there is an animal in all cases which should properly be considered in the full description, and which has all these parts performing their legitimate offices. He pursued the subject in this direction with various examples and suggestions.”—Proceedings Boston Society of Natural History, 1865.

We are very glad that Dr. Gould has called attention to the careless misappropriation of descriptive terms by modern Conchologists, and trust that every author will hereafter carefully select the best, and, at the same time, most descriptive names for the different external features of shells. There are many cases of error that will readily occur to our readers besides those particularized above. One of the most lamentable is the indiscriminate use of terms of different signification in describing the form of shells. Thus, the same shell may be described as fusiform, pupæform, conical, sub-cylindrical, elevated, etc., apparently without any idea of the real meaning of those terms.

CURIOUS DISTORTION IN THE SHELL OF *PHYSA HETERO-STROPHA*.—Through the kindness of Mr. Chas. M. Wheatley, we have had the opportunity to examine a few specimens, half-grown, of the above species. They were collected by Rev. E. C. Bolles at Cape Elizabeth, Maine. He writes respecting them: “It occurs in great numbers in a little arm of a pond that is the habitat of large and fine specimens of the same shell; perhaps half the little *Physas* are distorted as you see; the others are well formed.”

The distortion alluded to consists of sudden enlargement of the whorl near the aperture, something like *Planorbis campanulatus*, in consequence of which the animal has been unable to continue the usual sutural line, the upper margin of the whorl diverging from the prior one, and making a canaliculate suture.

REMARKS ON THE HABITS OF SPIRALIS FLEMINGII.* By
Alex. Agassiz.

"They come to the surface of the water about an hour after dusk; they do not remain long, and after ten o'clock at night were rarely met with. He succeeded only once in finding a few isolated specimens during the heat of the day; while at full tide, soon after dark, they were very often found in abundance. These animals are very easily kept in captivity, and their habits, which can then be carefully watched, may explain, in a very satisfactory manner, their sudden appearance and disappearance. As was already previously known, these animals can creep about by means of their wing-like appendages. When kept in captivity, it was noticed that they but rarely left the bottom during the day, merely rising a few inches and then falling down again to the bottom of the jar. After dark, however, they could all be seen in great activity, moving near the surface of the water as fast as their appendages enabled them. During the day they often remain suspended for hours in the water simply by spreading their wing-like appendages, and then suddenly drop to the bottom on folding them. This habit of remaining at or near the bottom, which they have in common with so many of our marine animals, explains undoubtedly their appearance and disappearance, as they probably only come to the surface in search of food at certain hours. When the animal is in motion, beating the water like a butterfly to propel itself forwards or upwards, the shell is carried at right angles, hanging somewhat obliquely to the direction of the movement. To counterbalance this weight, an exceedingly long and powerful siphon extends on the opposite side of the animal, which is used as a kind of balance-wheel, the shell, while the animal is in motion, assuming a totally different position when it is not thus counterbalanced. Mr. Agassiz exhibited at the same time drawings of the animal in different attitudes."—Proceedings Boston Soc. Nat. History, p. 15, Sept., 1865.

* This species occurred in great abundance at Nahant during the summer of 1863. It is the first time that a living *Pteropod* of this family has been observed on this coast.

DE JEUDE'S COLLECTION OF MOLLUSCA.

The fine collection of Mollusca formed by the late Prof. Lithe de Jeude, for many years Professor of Zoology in the University of Utrecht, has been purchased by Mr. Damon, of Weymouth. The collection, rich in the rare shells of the Moluccas, was displayed in 140 glass cabinets, and formed one of the chief scientific attractions of the city of Utrecht.—Ann. and Mag. Nat. Hist., London, Sept., 1865.

OTHER COLLECTIONS OF SHELLS FOR SALE.

Dr. E. R. Showalter, Uniontown, Ala., offers at a moderate price several hundred new species of *Unio*, *Goniobasis*, etc., recently described by Messrs. Lea and Anthony. The specimens are in very fine condition. (See advertisement.)

Dr. James C. Parkinson, corner of High and Fourth Streets, Burlington, New Jersey, offers for sale his beautiful collection, principally of showy and valuable marine shells. It contains about 2000 species, many of them very rare. There are included 2 fine *Cypræa aurora*, 4 *C. testudinaria*, 145 species of *Conus*, 11 species of *Argonauta*, etc.

Godefroy and Sohn, of Hamburg, offer for sale the duplicate shells collected by the Natural History Expedition sent by this enterprising firm to the Samoan and Vitian Islands. There are several hundred species contained in their catalogue, priced very moderately, including the new species of land and fresh-water shells recently described by Mousson in the "Journal de Conchyliologie." Many of the species are preserved in spirits. Address C. D. E. Schmeltz, Jr., Curator, care of Joh. Caesar Godefroy & Sohn, Hamburg.

Many of the duplicates of Cuming's collection have been acquired by Mr. G. B. Sowerby, who offers them for sale. This gentleman has also purchased the stock of the late Lovell Reeve.

The late Charles A. Poulson's collection will shortly be offered for sale.

Helix Liberiae, Brown, described in this Journal, i., p. 136, is a synonym of *H. Africana*, Pfr.

Among the large American cabinets of shells must be included that of Rev. E. R. Beadle, now located at Philadelphia, containing over 10,000 species, including an unusual proportion of rare exotic species, collected by himself or missionary friends.

[From Proceedings of the Academy of Natural Sciences, No. 5, Nov. and Dec., 1865.]

“REPORT OF THE COMMITTEE ON CONCHIOLOGY,
FOR 1865.

“To the Curators of the Academy of Natural Sciences:—

“*Gentlemen:* During the present year the Conchological collection has been increased by the addition of about 1400 species (4000 specimens), of which more than one-half are new to us.

“Among these donations, two deserve especial notice, viz.:—

“1st. A collection of 400 species from Mazatlan and Cape St. Lucas. These are named by Mr. Philip P. Carpenter, and the collection is extremely valuable to us from the fact that this gentleman has devoted many years to the special study of the Mollusca of our Pacific Coast.

“A small portion of this collection was purchased by the Academy, but most of the species were generously presented by Mr. Carpenter, who, in many cases, has contributed the only duplicates of rare species from his own cabinet.

“2d. We have received from the Smithsonian Institution over 800 species of shells collected by Wilkes' Exploring Expedition. These shells have all been labelled by the late Mr. Hugh Cuming, after comparison with the types in his own collection. Among them are a number of types of new species described by Dr. A. A. Gould, in his 'Report on the Mollusca of the Expedition.'

“With great satisfaction the Committee announce to you that, with a few trifling exceptions, they have, during the present year, completed the labelling and arrangement of the entire Conchological Collection. The task has been an arduous one; over 7000 labels have been written, and corresponding entries made in the Catalogue during the year.

“In almost every instance it has been necessary to determine the species by reference to the Library of the Academy. The splendid donations of shells made by the late Dr. T. B. Wilson were accompanied by loose numbers referring to catalogues drawn up by eminent London Conchologists. In the confusion attending the removal of our collection when the last addition

was made to our building, nearly all of these numbers were so displaced as to be useless. This confusion (certainly unavoidable, as the Academy has never possessed adequate means to ensure the proper care of its collections) is deeply to be regretted, as the Committee have been compelled to substitute their own instead of the original more authentic labels. The Academy has not recently been able to continue to supply its library with Conchological works, which has increased our difficulties.

“The cabinet now contains upwards of 13,000 species, and is the largest in America.

“Having no published Catalogue of our collection and its duplicates, a necessary basis for extensive exchanges, the Committee have effected very little in this way. There is probably no other department of the Museum possessing such numerous duplicates, so that the collection could be greatly enlarged by exchanges.

“The systematic classification of the shells was, until this year, chiefly Lamarckian, but the Committee have substituted for this the more scientific arrangement of recent systematists. At present the marine shells are classified according to the system of Messrs. H. and A. Adams, with modifications; the terrestrial shells according to that of Dr. Louis Pfeiffer, and the *Unionidæ* and fresh water Gasteropods to those of Messrs. Lea, Binney, and Tryon. The Committee have not been able, however, to exhibit the families and genera in their proper sequence, on account of the over-crowded condition of the cases; but this can be readily remedied at any time that we possess more space.

“We also regret the want of space exceedingly, because it debars us from exhibiting those interesting geographical series which, to a naturalist, are not less instructive than a collection of species, enabling us to acquire a knowledge of the limits and variations of species, as determined by climatal and other influences.

“Nearly double our present space is required for the proper exhibition of the collection which we already possess, and a small appropriation to publish a catalogue would enable us to increase largely and rapidly.

“While we deem it but right that the Academy, through you, should be made acquainted with our wants, the Committee forbear to press them at this time, being well aware that other departments of the collection require the first and *immediate* pecuniary aid of the Academy.

Respectfully yours,

GEORGE W. TRYON, JR.,

For Committee on Conchology.”

THE ACADEMY OF NATURAL SCIENCES OF PHILADELPHIA.

Those who are interested in the Natural Sciences, and we are sure that all of our readers *are* so interested, will read the following with great pleasure, and aid its object, if possible.

“AN ADDRESS: A sincere desire to learn what was known, and, if possible, to add to the common stock of knowledge concerning animals, plants, the inorganic constituents of the earth, and the laws of the natural forces under which they exist, induced a few gentlemen in this city, a little more than a half century ago, to meet together weekly for mutual instruction. They never supposed themselves to be learned men, but simply students or seekers after knowledge. They considered the study of nature, while released from their avocations, a rational and profitable recreation. Slowly their number increased.

“It was determined to date the foundation of the institution March 21, 1812, and to name it the ACADEMY OF NATURAL SCIENCES OF PHILADELPHIA.

“The society was incorporated March 24, 1817.

“The formation of a museum and library, indispensable implements of teachers as well as of learners, was begun in the earliest days of the Academy, with donations of a few natural objects and of books from members, each one contributing whatever he could. Both grew slowly, but with gradually accelerating progress.

“At this time the museum contains more than two hundred thousand objects of interest. Very many of them cannot be properly exhibited for want of space. In many respects this collection is scarcely surpassed by any other of the kind in the world. There is no display of birds on this Continent comparable to the Academy's, and in Europe not more than one or two equal it. This superb collection is in danger of total destruction from crowding, and from want of means to compensate skilled laborers to keep the skins free from corroding insects. The same remark is applicable to other departments.

“The museum is open gratuitously, on Tuesdays and Fridays, to the public, from one o'clock P. M. till sunset; and on other week-days it is resorted to for the purpose of study. Tickets of admission may be obtained from any member of the institution. The visitors on the public days are counted by hundreds. On the last Friday of the year just passed eleven hundred were admitted.

“The library consists of thirty thousand volumes, and contains some works which are found in no other collection in the United States. It may be consulted by any person introduced or accompanied by a member. It is a library for reference exclusively.

“The facilities for studying special subjects afforded by the museum and library have proved invaluable to many gentlemen, now distinguished professors in this and other States of the Republic, while preparing themselves for the professorial career. Many are more competent teachers than they could have been without the existence of this or similar institutions.

“The Academy has educated competent naturalists, who have accompanied exploring parties sent out by the Government to ascertain the available natural products, mineral and vegetable, of this and of remote countries. Major Long's expedition to the Rocky Mountains, and the South Sea exploring expedition, for example, as well as every exploring expedition under the auspices of the National Government, and many geological surveys of States, have included members of this institution, whose observations have been of economic value in many respects. The geological survey of California, now in progress, is conducted by members of the Academy.

“The importance of the natural sciences in a political sense is implied by the fact that institutions for the cultivation of them are sustained by the

most enlightened governments of Christendom. The Jardin des Plantes in Paris, the British Museum and Zoological Gardens in London, and the Smithsonian Institution in Washington, bear ample testimony on this point. Indeed, encouragement of the study of the natural sciences is seen to be greatest in those communities which are most conspicuous for intelligence and refinement. And is it wonderful that well-informed peoples should be willing to speed on their way those who are treading paths which have already led to the discovery of the modes of finding coal-basins, metallic veins of all kinds, illumination by gas, the utilization of steam, the electric telegraph, to say nothing about manufactures which have their origin in truths acquired only through the study of the natural sciences?

“Those who immediately use the library and museum of the Academy are not the sole beneficiaries of the institution. Its periodical publications, the ‘Journal of the Academy’ and the ‘Proceedings of the Academy,’ spread a record of its work before the world, and place it in communication with nearly two hundred kindred institutions, established at various points in Europe, Asia, Africa and America. There is no society for the cultivation of the natural sciences in the United States more respected abroad than this Academy. The foreign reputation it has acquired is, in some degree at least, the property of . . . the nation.

“The beneficial influence of the Academy is not restricted to its members. It is a prolific source from which usefulness flows far and wide. It may be considered an exemplary institution, because its organization has been imitated in various parts of our country. . . .

“The apartment in which the meetings are held is scarcely large enough for their accommodation. Public lectures on natural science, which have been long in contemplation, have not been delivered by members because there is no room in the hall adapted to the purpose.

“The revenue of the Academy consists in an annual contribution from each of its members, which, prior to the enhancement of the cost of fuel and the price of labor, was barely sufficient for the expense of warming and lighting the hall. The institution is free from debt, but its means, applicable to other purposes than its publications, are very small. The arrangement of the museum and library is the result of volunteer labor entirely, the amount of which is not easily appreciated.

“Such reasons, perhaps too briefly and imperfectly stated, have induced the Academy to appeal to the public for pecuniary aid. A committee has been appointed to solicit subscriptions to a building fund. It is earnestly hoped that its members will be able to report that the generosity of our enlightened and liberal-minded citizens, largely as it has contributed to various benevolent objects incident to events of the past four years, is still large enough to foster the cultivation of the natural sciences by providing means to enable the Academy to purchase a lot of ground of suitable size in a convenient situation, and to erect a building in all respects adapted to its purposes, and at the same time ornamental and creditable.

“It is conjectured that not less than one hundred thousand dollars will be required to accomplish the object in view. For this reason the payment of subscriptions is made contingent on the whole amount being subscribed within the present year. . . . Even if the growth of the Academy is to be arrested now, as it will be if its appeal to the public shall fail, a considerable increase of revenue will be necessary to preserve it, even in its present condition.

“The following resolutions were adopted at the annual meeting, December 26, 1865:—

“*Resolved*, That a committee, to consist of forty members, be appointed to solicit and receive subscriptions for the purpose of [purchasing a lot and] erecting a new fire-proof building for the use of the Academy.

“*Resolved*, That they shall prepare and publish a short history of the Academy, its purposes, its usefulness, and its wants, and circulate the same, together with forms of subscription.

Resolved, That the latter shall be worded so as to make the subscribers liable only in case the aggregate amount subscribed shall equal or exceed one hundred thousand dollars.

Resolved, That every subscriber of one thousand dollars or upwards shall receive the thanks of the Society, handsomely engrossed, signed by its officers, and mentioning the amount contributed. That he shall be entitled (if eligible) to life membership in the Academy, together with free admission to its lectures, and shall receive, free of cost, all its publications for life.

Resolved, That every subscriber of one hundred dollars and upwards, if he desire it, shall have free admission to the museum of the Academy, and admission to lectures, and the right to purchase our publications on the same terms as members.

Resolved, That this committee shall report progress at each business meeting of the Academy, and shall pay to the Treasurer of the Academy all moneys received by them, taking his receipt for the amounts."

We are glad to state that the Building-fund Committee are meeting with very fair success in their undertaking, the subscriptions already amounting to over \$37,000.

We will take charge of any subscriptions that may be forwarded to us.

OBITUARY.

LOVELL REEVE.

I regret to have to announce to my readers the decease of this very zealous and distinguished Conchologist. He died in London in the Fall of 1865.

Lovell Reeve was the author of numerous conchological works, some of them possessing the highest merit. We learn from the dedication of his volume on "British Land and Fresh Water Mollusks," that about 1831 he commenced the study of shells, encouraged by the advice and assistance of Dr. J. E. Gray. Ten years afterwards he published, through Messrs. Longmans & Co., of London, his "Conchologica Systematica," a splendid work, containing, in two volumes, over 300 colored plates. The expense attending this publication was so great that, to use his own words, "the only chance left to me of pursuing the subject was to turn printer and publisher myself. With a lithographic press, a staff of print-colorers, a stock of types and a printing-press, the means of production became comparatively easy. During the twenty-two years elapsed since, I have worked unremittingly on species, considering them more with regard to the phenomena of distribution than of classification. My 'Conchologia Iconica' has reached its fourteenth volume and eighteen hundredth plate." "Conchologia Iconica," the largest and most expensive as well as the most useful work ever published on the subject, now embraces monographs of most of the genera. The publication price for the parts issued to this date exceeds one hundred and twenty-five pounds sterling.

The plates are generally excellent, but the descriptions are mostly very poor, and without the former would be unreliable. The following details of this publication may not prove uninteresting; they are extracted from a recent advertisement of the work:—

"There is contained in the British Museum, and in the museum of a British naturalist, Mr. Hugh Cuming, a collection of shells quite unrivalled in number of species, variety,

and perfection. If all the collections of Europe and America, public and private, were united in one, the series would still be inferior in completeness to the combined collections of the British Museum and Mr. Cuming. But the latter is the collection *par excellence*. Mr. Cuming possesses from twenty to thirty thousand species and well-marked varieties, illustrated, in most instances, by several specimens, acquired during not less than half a century of untiring personal research. 'Not restricting,' said Professor Owen several years ago, in the 'Annals of Natural History,' 'his pursuit to the stores and shops of curiosity-mongers of our seaports, or depending on casual opportunities of obtaining rarities by purchase and exchange, he has devoted more than thirty years of his life in arduous and hazardous personal exertions, dredging, diving, wading, wandering, under the equator and through the temperate zones, both north and south, in the Atlantic, in the Pacific, in the Indian Ocean, and among the islands of its rich archipelago, in the labor of collecting from their native seas, shores, lakes, rivers, and forests, the marine, fluviatile, and terrestrial mollusks, sixty thousand of whose shelly skeletons, external and internal, are accumulated in orderly series in the cabinets with which the floors of his house now groan.' Since this was written, Mr. Cuming has added largely to his collection, and still labors unremittingly, purchasing and interchanging specimens with collectors in other parts of the world.

"The 'Conchologia Iconica' was commenced in 1843, as the exponent of this and other English collections of shells, and its publication has proceeded with uninterrupted regularity for twenty years. Part 236, just ready, will complete the Fourteenth Volume. The number of plates contained in these volumes is 1890, comprising not fewer, probably, than 15,000 figures of shells of the natural size, all drawn and lithographed by the same characteristic pencil, that of Mr. G. B. Sowerby. The system of nomenclature adopted is that of Lamarck, modified to meet the exigencies of recent discoveries. With the name of the species is given a summary of its leading specific characters in Latin and English. Then the authority for the name is quoted, accompanied by a reference to the work where the species was originally described; and next in order are its synonyms—the names given to the species by other authors, different from that to which it is entitled by priority, or in consequence of the introduction of an improved system of genera. The habitat of the species is next given, accompanied, where possible, by particulars of the circumstances under which it is found, such as the nature of the soil, depth, vegetation, etc.; and to this are added some remarks

directing attention to the most obvious distinguishing peculiarities of the species, with occasional criticisms on the views of other writers. It is also noted, under each species, in what cabinet, mostly that of Mr. Cuming, the type specimen selected for illustration is preserved.

“The author’s method of proceeding is as follows: Having determined upon a family to monograph, his first step is to select from the Cumingian collection a characteristic series of specimens of all the species of one or more genera, every specimen during the past twenty years having been taken from the cabinet under the supervision of Mr. Cuming himself, who furnishes whatever information he may be in possession of, either from transmitted sources or from individual personal research. This information, committed to paper, is subsequently sifted and collated with other information, and applied, as the working out of a monograph proceeds, to the respective species. On the completion of a monograph, the particulars of information are generalized, and their bearings on the different branches of the study are exhibited in the preliminary observations to each genus. For an elaborate example of what it is intended to convey, the reader is referred to the preliminary observations to genus *Terebratula*. For this reason the letter-press of Plate I. of each genus is not prepared until the monograph is completed, when it is issued along with the title-page and index. The Cumingian specimens having been selected, a search is then made among the specimens of the British Museum and other cabinets for further material, and the views of different authors as to their characters and affinities are examined and compared. The specimens determined upon for illustration are now grouped in plates for the artist; and the stones, when drawn on and printed from, are carefully put away in racks, arranged in alphabetical order according to the name of the genus. Many and curious are the details of etching, proving, printing, etc.; and the statistics of quantity acquire an interest as the work proceeds. The 1890 stones employed up to the present time weigh little short of seventeen tons; placed side by side, they would extend to a distance of more than half a mile; and if raised flat one upon another, they would reach to the height of the dome of St. Paul’s. The number of impressions printed from these stones is approaching half a million; and the coloring is done entirely by hand, forming the livelihood of a family of colorists, who follow their occupation from year to year with an assiduity and interest worthy of a higher branch of art.

“The mode of publication is to issue monthly a Part containing eight plates, price 10s. (or bi-monthly a double Part

of sixteen plates, price 20s.), the plates and letter-press being loose in the wrapper for facility of arrangement and reference. Two, sometimes three, genera are taken at a time, for the sake of variety, the publication proceeding with regularity until they are completed. When completed, they are issued separately as monographs, and when enough monographs have accumulated to form a volume, a title-page is issued for the permanent binding. The publishers undertake the binding of the work, employing a special process, in which sewing is dispensed with, to the great advantage and preservation of the plates."

I do not know whether the deaths of Messrs. Cuming and Reeve will cause the suspension of this gigantic work, but trust that the sale has become sufficiently large to induce its continuance by Mr. Sowerby.

Mr. Reeve published many papers in the "Proceedings of the Zoological Society of London, and also the following additional separate works:—

Mollusca of the Voyage of the Samarang. (Adams and Reeve.)

Elements of Conchology. 2 vols., 8 vo., with 62 colored plates.

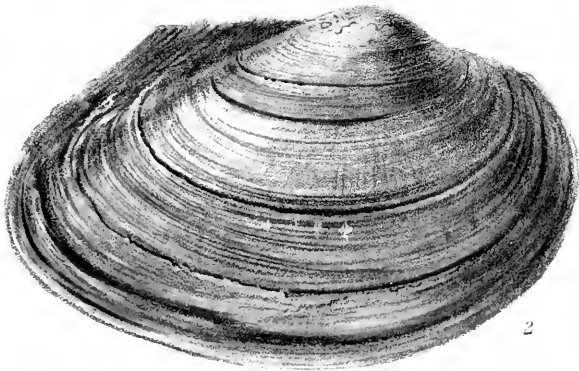
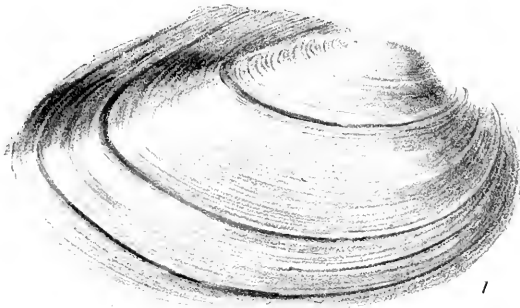
British Land and Fresh Water Mollusks. 12mo., cloth, with woodcut illustrations.

M. VALENCIENNES.

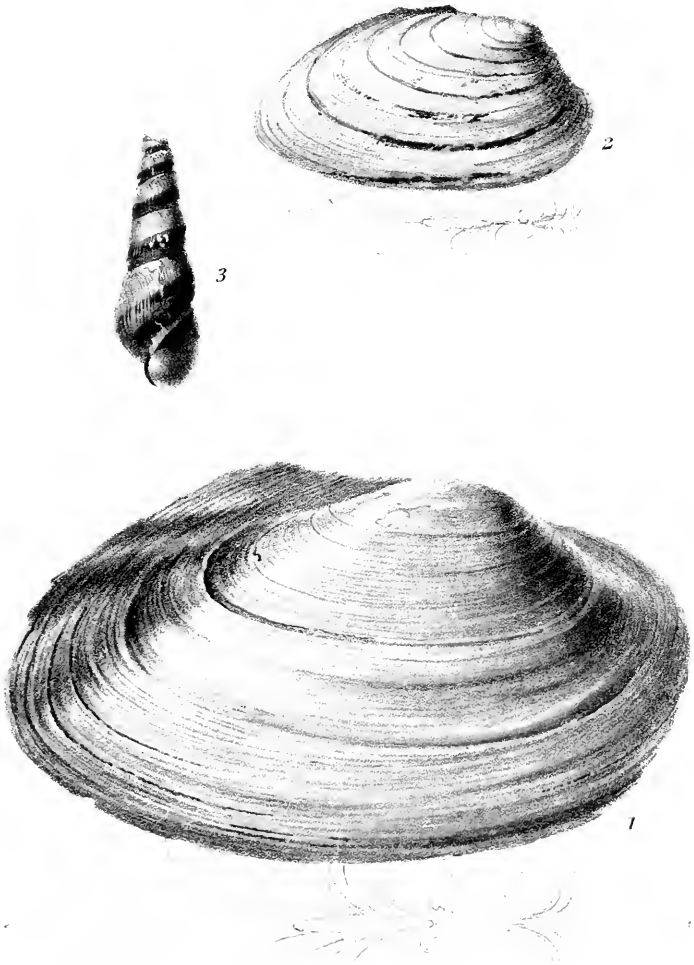
This gentleman, for many years Professor of Zoology in the Museum of Natural History, Paris, died on April 13th, 1865, aged 71 years. He was well known to naturalists by his numerous published works and papers, many of which treated of Conchological subjects; among others, the Conchological part of the "Voyage of the Venus." He also furnished descriptions of some American species for Humboldt and Bonpland's "Recueil des Observations." etc.

BOUCHARD-CHANTEREAUX.

This distinguished naturalist is also dead. He published several local catalogues of the Mollusca of Bologne and Pas-de-Calais, and other papers. At the period of his decease he was Director of the Museum of Natural History of Bologne.



1. Anodon JE Nicti, Anthony: 2. Anodon subgibbosa, Anthony:



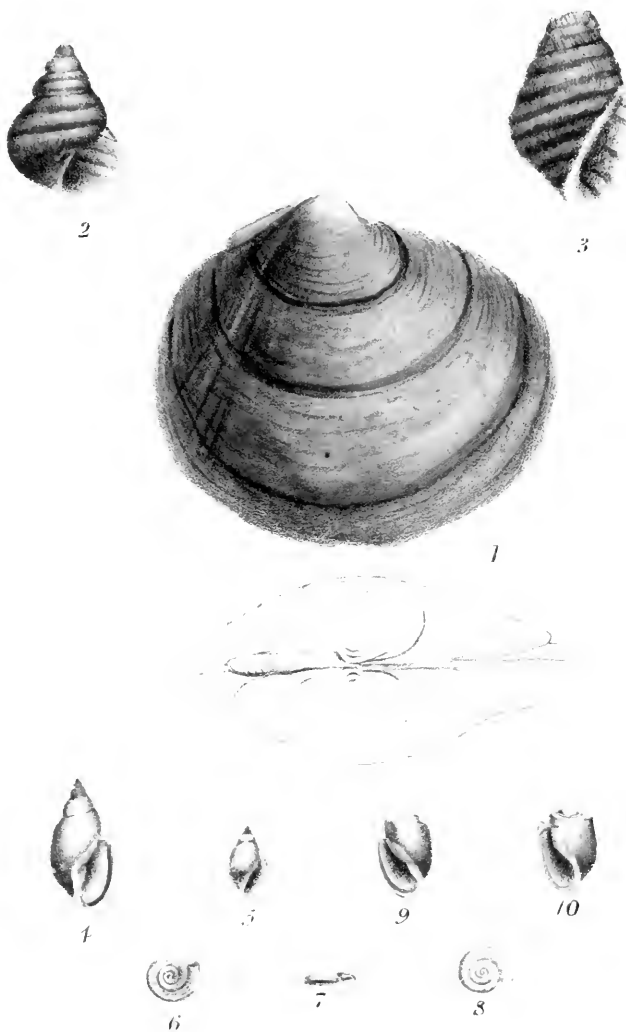
1. *Anodon mornata*, Anthony. 2. *Unio opalinus*, Anthony.
3. *Goniobasis cingula*, Anthony.



Fig 1 *Crassatella alta*. Conrad
" 2 " *curta*. Conrad
" 3 *Mercenaria obtusa*. Conrad
" 4 *Crassatella planata* Conrad

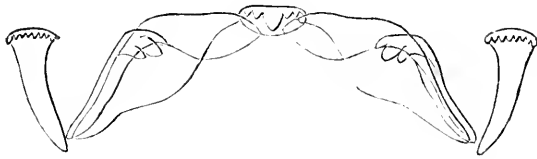


Fig 1 *Cyprimeria Peruviana*, Conrad
.. 2,3 *Diploschiza cretacea*, Conrad
.. 4,5 *Terebratulina filosa*, Conrad



1. *Unio depygis*, Conrad. 4, 5. *Lymnaea Shurtleffi*, Tryon
 2. *Vivipara Waltonii*, Tryon 6, 7, 8. *Planorbis circumstriatus*, Tryon
 3. *Metanta praeordata*, Tryon. 9. *Physa gyrina*, Say (abnormal).
 10. *Paludina scalaris*, Jay

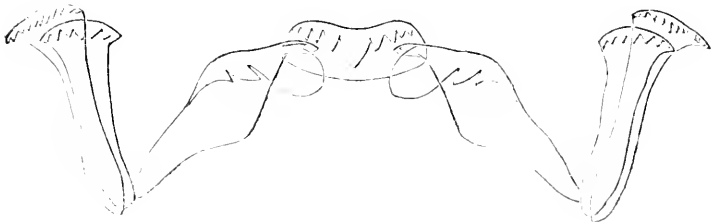
1.



2.



3.



4.



LINGUAL DENTITION.

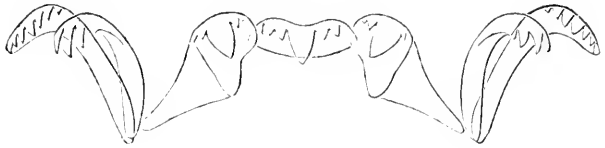
Fig. 1. *Ancylostus prerosus*, Say.

Fig. 3. *Ancylostus dissimilis*, Say.

“ 2. “ *costatus*. Anth.

“ 4. *Goniobasis depygis*, Say.

1.



2.



3.



4.



LINGUAL DENTITION.

Fig. 1. *Gyrotoma ovoidea*, Shuttl. Fig. 3. *Pachychilus levissima*, Sowb.
" 2. *Io spinosa*, Lea. " 4. " *Schiedeanus*, Phil.

Observations.—The above species is terrestrial in its habits, living on the ground, under rotten logs and decayed leaves; the animal, in common with all such, is black or of a dark color. It has been referred by Mr. Cuming (together with one much larger in size) to *Navigatoria*, Pfr. It differs from that species in shape, size, form of lip and habits, to say nothing of the localities. The above is rare, inhabiting but two small valleys on the island of Raiatea.

2. PARTULA OVALIS, Pse.

T. abbreviato-ovata, conica, solidiuscula, dextrorsa, umbilicata, longitudinaliter lineis incrementis subrugata, transversim tenuissimè striata; anfr. 5, plano-convexis, ultimus spira superans, subventricosus; apertura recta, oblonga, auriculata, basi rotundè angulata; labro intus calloso, supra medio subdentato; columella callosa, recta, verticalis, basi angulata intense castanea, lutea fasciata, aut omnino castanea.

Dimensions.—Long. 20, diam. 11 mill.

Shell abbreviately ovate, conical, rather thin, dextral, umbilicate, somewhat roughened longitudinally by fine irregular lines of growth, transversely very finely striated; whorls 5, flatly convex, the last slightly swollen and considerably longer than the spire; aperture straight, oblong, auriculate, at the base roundly angulate; columella callous, straight, vertical, angulate at its base; outer lip callous within; the callosity not reaching the body whorl, and forming a blunt tooth at its termination. Color, dark chestnut, encircled by a single broad yellowish band, or wholly dark chestnut.

Observations.—This species is terrestrial in its habits. Rare, confined to a single valley on the island of Raiatea.

3. PARTULA VITTATA, Pse.

Description.—*T. pyramidato-oblonga*, parum nitida, solida, longitudinaliter rugata, angustè perforata; anfr. 5, plano-convexis, ultimo ad basi subcoarctato; apertura oblongo ovalis, verticalis, interdum subobliqua, dentata; labro obliquè expanso, intus calloso, medio tuberculato; columella vix expanso, subcalloso. Intensè castanea, flavicante obscurè fasciata, interdum longitudinaliter strigata, rarissimè omnino fulvescente, labro purpurascete tineto.

Dimensions.—Long. 24, diam. 12 mill.

Shell pyramidally oblong, solid, longitudinally roughly and irregularly striated, closely umbilicate; whorls 5, flatly convex, the last somewhat contracted at its base; aperture oblong-oval, vertical, sometimes slightly oblique, dentate; lip flatly and

obliquely expanded, callous within, tuberculated about the middle; columella but slightly callous and but little expanded. Dark chestnut color, with an indistinct yellowish band, sometimes striped longitudinally, rarely wholly yellowish; lip stained with purple.

Observations.—A terrestrial species.

4. PARTULA CITRINA, Psc.

Description.—T. pyramidato-oblonga, solida, nitida, angustè umbilicata; anfr. 5, convexis, sutura marginata; apertura oblongo-ovalis, verticalis; labro planulatim obliquo, medio versus tuberculatim calloso; columella supernè callosa. Flavicante, obscure longitudinaliter strigata.

Dimensions.—Long. 25, diam. 12 mill.

Shell pyramidally oblong, solid, shining, closely umbilicate; whorls 5, convex, suture marginated; aperture oblong-oval, vertical; lip flatly oblique, tuberculately callous a short distance above the middle; columella callously thickened above. Citron or yellowish horn color, faintly striped longitudinally.

Observations.—The two last-described species have been referred by Mr. Cuming to *faba*, Martyn. The former of the above is quite distinct, both as to animal and shell. The latter we may eventually class as a var. of *faba*, which is a very interesting species, passing around the whole island of Raiatea near the shores, and hybridizing with the species up the valleys, or throwing off varieties up the several valleys.

5. PARTULA TRILINEATA, Psc.

Description.—T. elongato-ovata, solida, umbilicata, longitudinaliter striis irregularis subrugata, sub lente transversim striata; anfr. $4\frac{1}{2}$, plano-convexis, sutura subimpressa; apertura subrotunde ovata, vix obliqua, dentata, $\frac{1}{2}$ longitudinis testæ subæquans; labro rotundè incrassato; columella supernè nodose callosa. Flavicante, spira plerumque rufescente-fulva, anfr. ultimo longitudinaliter castaneo strigato, fasciis tribus intensè castaneis cingulato, sutura albida marginata.

Var. 1. Omnino intense castanea, longitudinaliter strigata, sutura pallidè marginata.

Var. 2. Omnino flavicante, longitudinaliter strigata.

Shell elongate ovate, solid, umbilicate, somewhat roughened longitudinally by coarse irregular striæ, very finely striated transversely; whorls $4\frac{1}{2}$, flatly convex, suture somewhat impressed; aperture rather roundly ovate, slightly oblique, dentate, less than one-half the length of the shell; lip broadly and roundly thickened; columella nodosely callous above. Cream

color or yellowish horn color, the spire usually reddish-brown, last whorl striped irregularly with brown, and encircled by three dark reddish-brown lines or bands, suture marginated with white.

Var. 1. Wholly dark reddish-brown, striped longitudinally, and sutures marginated with white.

Var. 2. Plain yellowish, striped longitudinally with light brown, without bands or sutural lines.

Observations.—The above species from the island of Tahiti, together with one of an analogous form inhabiting the neighboring island of Moorea, have been classed by Mr. Cuming with *nodosa*, Pfr. The localities given for the latter species are Tahiti and Navigators. Our species in all its varieties is *conspicuously striped longitudinally*, and, with very few exceptions, banded transversely. The lip and aperture also differ from *nodosa*. Specimens from the two localities may have become mixed in the Cumingian collection.

6. PARTULA ELONGATA, Pse.

Description.—T. *elongata*, *gracilis*, *turrita*, *tenui*, *pellucida*, *nitida*, sub lentè transversim tenui striata, longitudinaliter subrugosa, angustè umbilicata; anfr. $5\frac{1}{2}$, plano-convexis, sutura subimpressa, rarissimè marginata; apertura oblongo-ovalis, parum obliqua, edentata, $\frac{1}{2}$ longitudinis testæ æquans; labro æqualiter et subrotundè reflexo. Cornea vel pallidè rosacea, longitudinaliter strigata, interdum omnino straminea aut albida.

Var. Castaneâ bicingulata.

Shell elongate, slender, turreted, thin, transparent, shining, transversely very finely striated, somewhat roughened longitudinally, narrowly umbilicate; whorls $5\frac{1}{2}$, flatly convex, suture somewhat impressed, very rarely marginated; aperture oblong oval, somewhat oblique, edentate, one-half the length of the shell; lip evenly and somewhat roundly reflected. Horn color or pale rose, striped longitudinally, or wholly straw color.

Var. Encircled by three chestnut bands, more or less interrupted.

Observations.—The above species is referred to *P. lineata*, Less., by Mr. Cuming, which was collected by Lesson, during the voyage of the "Coquille," at Oualan, a small isolated island in Micronesia, 3000 miles from the Tahitian group. The description by Dr. Pfeiffer, in his first Monograph, corresponds with the true *lineata*, that, however, in the second, appears to have been drawn up from specimens found at Moorea (*Kimeo*), where the *elongata* occurs.

My collection comprises the most, if not all, the land species of Oualan, and we are confident our species does not inhabit that island, and that *lineata* is found nowhere else but Oualan.

7. PARTULA GRACILIS, Pse.

Description.—*T. gracilis*, oblonga, tenui, turrita, translucida, dextrorsa, albida, transversim creberrimè striata; anfr. 5, plano-convexis; apertura oblonga, edentata, $\frac{1}{2}$ longitudinis testæ æquans, basi producta; labro tenui, æqualiter et oblique expanso.

Dimensions.—Long. 16, diam. 7 mill.

Shell gracile, oblong, turreted, thin, translucent, dextral, finely and closely striated transversely; whorls 5, planely convex; aperture oblong, edentate, one-half the length of the shell, produced at base; lip thin, evenly and obliquely expanded. Color whitish.

Observations.—The above species has been determined by Mr. Cuming to be synonymous with *P. amabilis*, Rye., credited to the island of Anaa, one of the Paumotu's. It is evidently a mistake; we forbear, therefore, any comparison. It is the most delicate and graceful species in our collection, and without variety in shape or color.* We may as well remark here in this connection, that no species of *Partulæ* inhabit Anaa, nor, so far as we can learn, any of the Atolls. The land shells on Anaa are *Helicina* 1 sp., *Omphalotropis* 1 sp., *Truncatella* 1 sp., *Tornatellina* 2 sp., *Bulimulus junceus*, *Plecotrema mordax*, *Laimadonta striata*, *Melampus*, 5 sp. Two *Helices* and one species of *Nanina* have also been described from that locality, but after a thorough search of two months and a half, none could be found dead or alive.

8. PARTULA STRIOLATA, Pse.

Description.—*T. abbreviato-ovata*, solidiuscula, angustè umbilicata, transversim striis tenuis creberrimè notata; anfr. $4\frac{1}{2}$, plano-convexis, sutura plerumque marginata; apertura ovalis, edentata, parum obliqua; labro angustè, æqualiter, et subrotunde incrassato; columella superne subnodosè callosa; pallide cornea, aut castaneo-cornea, aut castanea, longitudinaliter tenui strigata.

Var. Rarissimè fasceis castaneis tribus cingulata.

* Mr. Reeve remarks that *amabilis* is peculiar, in wanting the transverse striæ common to near all the species of this genus. Our species above is more distinctly striated than any species we have from the Tahitian group of islands.

Shell shortly ovate, rather solid, narrowly umbilicate, transversely marked with fine crowded striæ; whorls $4\frac{1}{2}$, planely convex, generally marginated at the sutures; aperture oval, edentate, slightly oblique; columella slightly nodosely callous on upper part. Light horn color, or chestnut horn color, or chestnut, obscurely finely striped longitudinally.

Var. Very rarely encircled by three interrupted chestnut-brown bands.

Observations.—The above has been referred to *decussatula*, Pfr., by Mr. Cuming, which inhabits, as reported, the Solomon Islands, but, as we are inclined to believe, the Samoan. Our species is thicker, rather more stout, whorls are not rounded, and the aperture differs from *decussatula*.

9. PARTULA VEXILLUM, Pse.

Description.—T. subfusiformi-ovata, turrita, umbilicata, solida, dextrorsa, parum glabra; anfr. 5, plano-convexis, sutura bene impressa, interdum marginata; labro anguste, æqualiter et subrotunde incrassato, dextro recto, superne subangulato. Fulvescente cornea, fasciis aut lineis duabus intense castaneis cingulata, plerumque juxta perforationem castanea.

Dimensions.—Long. 20, diam. 10 mill.

Shell somewhat fusiformly ovate, turrited, umbilicate, solid, dextral, somewhat glabrous; whorls 5, planely convex, suture well impressed and sometimes marginated; aperture ovate, vertical, dentate, rounded at base; lip narrowly, evenly, and somewhat roundly thickened, straight on its outer edge and slightly angulated above. Yellowish horn color, ornamented with two dark chestnut bands or lines, and generally same color at umbilicus. A single specimen found wholly dark reddish-chestnut.

Observations.—The above species has been confounded with *lineata*, Less., as well as *elongata*, nob., to which refer for my remarks.

10. PARTULA STOLIDA, Pse.

Description.—T. elongato-ovata, dextrorsa, parum nitida, umbilicata, longitudinaliter subrugosa, sub lente transversim striata; anfr. 5, convexis, sutura impressa; apertura elongato-ovalis, dentata, interdum edentata; labro subrotundè incrassato. Castanea aut olivacea, obscure et tenuissime longitudinaliter strigata.

Dimensions.—Long. 20, diam. $10\frac{1}{2}$.

Shell elongate, ovate, dextral, rather dull, umbilicate, very finely roughened longitudinally and indistinctly under the lens striated transversely; whorls 5, convex; suture impressed; aperture elongately oval, rather small, not one-half the length of the shell, dentate, rarely edentate; lip somewhat roundly thickened. Chestnut or olivaceous, obscurely and very finely striped longitudinally.

Observations.—This species is quite distinct from *Vanikorensis*, Quoy, to which it has been referred. It is terrestrial in its habits. The shell and animal figured in Am. Expl. Ex. as *Vanikorensis* is, we are of opinion, a Tahitian species.

11. PARTULA CRASSILABRIS, Pse.

Description.—T. globoso-ovata, crassa, parum nitida, transversim tenui striata, umbilicata; anfr. 5, convexis, ultimo subventricoso; apertura suborbicularis, verticalis, dentata; labro rotundè incrassata. Flavescente cornea, interdum rufescente fulva, fascia flavescente cingulata.

Dimensions.—Long. 14, diam. 10 mill.

Shell globosely ovate, thick, dull, transversely finely striated, umbilicate; whorls 5, convex, the last somewhat ventricose; aperture suborbicular, vertical, dentate; lip roundly callous. Yellowish horn color, sometimes reddish-brown, with a single yellowish band encircling the last whorl.

Observations.—The above species corresponds with *Hebe*, Pfr., as to shape, size and form of lip. It is a terrestrial species, while *Hebe* is strictly arboreal. I hold it to be distinct.

12. PARTULA RUSTICA, Pse.

Description.—T. abbreviato, vel elongato-ovata, parum nitida, umbilicata, solidiuscula; anfr. 5, plano-convexis, ultimo subventricoso; apertura ovalis, dente parvulo munita; labro æqualiter rotundè calloso, parum reflexo; pallide aut intensè castanea, rarissimè fascia fulvescente cornea cineta, interdum omnino fulvescente cornea.

Shell stoutly ovate or elongate ovate, dull, umbilicate, rather thin; whorls 5, plano-convex, the last slightly ventricose; aperture oval, with a small, indistinct tubercle within; lip evenly and roundly thickened, but slightly reflected, angulate at base of columella. Light or dark chestnut-brown, very rarely with a faint yellowish horn color line or band, sometimes wholly of a yellowish horn color.

Observations.—Terrestrial in its habits.

13. PARTULA UMBILICATA, Pse.

Description.—T. globoso-ovata, solida, parum nitida, latè umbilicata, juxta perforationem rotundè angulata, transversim tenuissimè striata; anfr. $4\frac{1}{2}$, convexis, ultimo ventricosus; apertura rotunde ovalis, dentata; labro intus calloso, oblique plano: columella callosa, subdentiformis, ad basi angulata.

Fulvescente aut fuscesciente cornea, longitudinaliter obscurè strigata, apice plerumque rufescente fusca vel purpurascente, rarissime omnino intensè castanea, aut fulvescente cornea cingulata.

Dimensions.—Long. 18, diam. $12\frac{1}{2}$ mill.

Shell globosely ovate, solid, rather dull, openly umbilicate, roundly angulate at the umbilicus, transversely very finely striated; whorls $4\frac{1}{2}$, convex, the last swollen; aperture roundly oval, dentate; lip internally thickened, obliquely flat; columella callous, somewhat dentate, angulate at base.

Yellowish or brownish horn color, faintly striped longitudinally; apex usually reddish-brown or dark purple; seldom wholly dark chestnut-brown; occasionally with a broad yellowish horn color band; very rarely yellowish horn color, with a chestnut band.

14. PARTULA COMPACTA, Pse.

Description.—T. elongata ovata, solida, umbilicata, parum nitida, transversim tenui striata; anfr. 5, plano-convexis; apertura auriculata, verticalis vel subobliquis, prominente dentata, ad basi angulata; labro late calloso, angulato; columella subverticalis, inerassata. Fulvescente, interdum omnino rufescente fusca, rarissime fascia fulvescente cingulata.

Dimensions.—Long. 21, diam. $14\frac{1}{2}$.

Shell rather elongately ovate, solid, umbilicate, rather dull, transversely finely striate; whorls 5, plano-convex; aperture auriculate, vertical or slightly oblique, callous on its inner edge, callosity not reaching the body whorl, angulate near the outer edge; columella much thickened.

Yellowish, sometimes wholly reddish-brown, and rarely with a broad yellowish band.

Observations.—The two last species are analogous forms from the neighboring islands of Raiatea and Tahaa. They differ in the form of the lip and aperture and somewhat in general shape.

15. PARTULA BILINEATA, Psc.

Description.—T. conico-ovata, solida, nitida, umbilicata, transversim tenui striata; anfr. 5, sutura vix impressa; apertura ovalis, verticalis, forte dentata, ad basin rotundata; labro incrassato, subangulato, intus calloso; columella callosa.

Fulvescente cornea, fasciis duabus rufescente fuscis, rarissime fascia lata unica cingulata.

Dimensions.—Long. 18, diam. 12 mill.

Shell conically ovate, solid, shining, umbilicate, transversely finely striate; whorls 5, suture somewhat impressed; aperture oval, vertical, strongly dentate, rounded at base; lip much thickened, very slightly angulate near its outer edge, within callous; columella callous above.

Yellowish horn color, with two reddish-brown bands or lines, or very rarely with one very broad band occupying the greater part of the whorl.

Observations.—The four previous species have been referred to *P. auriculata*, Brod., which was collected by Mr. Cuming at the Tahitian Islands, and described by Mr. Broderip in Proc. Zool. Soc., 1832. The locality given, Huahaine, is incorrect. Our collection from that island is very large, comprising shells from every valley, all of which are of one type, that represented by *P. rosea*, Brod., and are quite distinct from those inhabiting the other islands of the group. The species of strictly auriculate shape of aperture are confined to Raiatea and the nearly-connected island called Tahaa. It is not improbable that Mr. Broderip had before him more than one species when he drew up his description. The variety he mentions is probably a ground species.

All authors since have placed the *auriculata* as a variety of *P. Otaheitana*, Brug. The nine figures given by Deshayes in Ferrusac's large work, are all from species inhabiting the island of Tahiti, and none of them approach *P. auriculata*.

Figures 11a and 11b, by Reeve, are undoubtedly from Raiatea, and one of them should be retained as the *auriculata*. Figure 11c is *crassilabris*, nob., described above. It is a terrestrial species from Raiatea. Dr. Pfeiffer, in his first Monograph, includes *auriculata* with *Otaheitana*, but in his last omits it altogether. I would observe, that there is a very rare dwarf variety of *Otaheitana* somewhat approaching the latter figure by Reeve, but it is of the normal shape of that species, and always sinistral. Figures 13a and 13b are from the island of Tahiti. We have named it *sinistrorsa*, although Mr. Cuming places it as a variety of *rubescens*, Rve. The latter species we consider the real type of *Otaheitana*.

16. *PARTULA SIMULANS*, Pse.

Description.—T. elongato-ovata, solidiuscula, parum nitida, transversim tenui striata; anfr. 5, convexis, interdum marginatis; apertura vix obliqua, oblongo ovalis; labro subrotundato, edentato. Pallide rufescente fusca, vel cornea, vel fulvescente.

Var. Fasciis tribus, interruptis, cingulata.

Dimensions.—Long. 17, diam. 10.

Shell elongately ovate, rather solid and dull, finely striated transversely; whorls 5, convex, sometimes marginated; aperture somewhat oblique, oblong oval; lip flatly rounded, edentate. Color plain reddish-brown or yellowish or horn color.

Var. Three interrupted transverse bands.

Observations.—The above species is decidedly not *tæniata*, Mörch, from the Fügii's. It is closely allied to *P. elongata*, Pse., but is shorter, thicker, lip more flat and wider, and colors more plain.

17. *PARTULA FASCIATA*, Pse.

Description.—T. elongato-ovata, turrata, solidiuscula, sordida, umbilicata, conferte et tenuissime transversim rugoso striata; anfr. 5, rotundato-convexis, ultimo ventricoso, sutura bene impressa; perist. late expanso et reflexo; columella lata, superne subcallosa; apertura oblongo-ovalis. Alba, epidermide fuscescente rufa vel olivacea induta, ad suturam nuda.

Dimensions.—Long. 22, diam. 12 mill.

Shell elongate ovate, turrated, rather solid, dull, umbilicate, closely and very finely rugosely striated transversely; whorls 5, roundly convex, last ventricose; suture well impressed; peristome widely expanded and reflexed; columella wide, above slightly callous; aperture oblong oval.

White, covered with a brownish-red or olivaceous epidermis, except at the sutures. The epidermis is liable to peel off.

Observations.—This species is from Marquesas Islands, and quite distinct from any of the Tahitian forms.

As it has been referred by Mr. Cuming to *Ganymedes*, Pfr., I fear some change has taken place in labels, or I have given the same name to two species in sending to that gentleman.

18. PARTULA VARIABILIS, Pse.

Description.—T. oblongo-ovata, solida, parum nitida, umbilicata; anfr. 5—6, plano-convexis, longitudinaliter tenui et rugosim striata; apertura oblongo-ovalis. ad basi contracta; labro plano rotundato, vix callosa; columella recta.

Pallidè castanea aut fulvescente cornea, longitudinaliter rufescente fuscis irregulariter strigata.

Omnino rufescente fusca, interdum fascia lata fulvescente cornea cingulata.

Straminea.

Dimensions.—Long. 22, diam. 13 mill.

Shell oblong ovate, solid, rather dull, umbilicate; whorls 5 or 6, flatly convex, rugosely and finely striated longitudinally; aperture oblong oval, narrow at base; lip flatly rounded, slightly callous on outer lip; columella straight.

Color, light chestnut or yellow horn color, with irregular reddish-brown longitudinal stripes.

Plain dark reddish-brown, sometimes with a broad yellowish horn color band.

Wholly straw color.

Observations.—Neither the above nor *fusca*, Pse., are the *Navigatoria*, Pfr. This species is more elongate than the *fusca*, Pse., and differs also from that species in the form of its lip.

[To be continued.]

REMARKS ON NUDIBRANCHIATA INHABITING THE
PACIFIC ISLANDS, WITH DESCRIPTIONS OF
TWO NEW GENERA.

BY W. HARPER PEASE.

Genus GONIOBRANCHUS, Pease.

Description.—Corpus, depressum, oblongo-ovale, subgelatinosum, pes elongatum, posticè ultra pallium extensum; tentaculæ cervicales, retractilis, laminatis: branchiis simplicis, linearibus, elongato-lanceolatis, quadrangularis, transversè laminatis, retractilis, interdum bifurcatis.

Remarks.—The chief peculiarity of this genus is the form of its branchiæ; they are simple, linear, of an elongate lanceolate shape, and quadrangular, usually slightly compressed, so that two sides are rather wider: those sides are finely and delicately laminated. The branchiæ are united at their base, and on one species bifurcate. To this genus should be referred *Doris vibrata*, Pse., *propinquata*, Pse., and *picta*, Pse., Proc. Zool. Soc., 1860; also *Doris pulchra*, Pse., Proc. Zool. Soc., 1861. The branchiæ of the first three were described as being ciliated on their edges. On close examination of larger species, the cilia prove to be the extension of the laminae beyond the edges; consequently those descriptions should be corrected to read "laminated," instead of "ciliated."

We add two new species as follows:—

GONIOBRANCHUS ALBOMACULATUS, Pse.

Description.—Animal elongate oval, convexly depressed; mantle rounded at either end, rather the widest at the middle, upper surface covered with depressed tubercles of irregular shape and size, and of a whitish color. Margins of the mantle thin and slightly gashed, anteriorly slightly dilated when in motion; cervical tentacles, arising from short, swollen bases, are large, elongate, cylindrical, tapering to acute tips, somewhat obliquely, delicately laminated; labial tentacles cylindrical, finger-shaped, rather long; branchiæ suberect, six or seven in number, rather large, retractile into a tubular cavity, laminae fine and close; vent central, consisting of a short coni-

cal tube; foot elongate oblong, transversely fissured in front; genital organs on the right side, a short distance posterior to the cervical tentacles. Color orange-yellow, margin bright violet, shading off into the ground color, tubercles whitish, cervical tentacles, branchiæ, and under surface cream white.

Length 2 inches.

GONIOBRANCHUS RETICULATUS, Pse.—t. 14, fig. 1.

Description.—Animal oblong-oval, mantle depressly convex, widest at the middle, similarly rounded at either extremity; margins thin, entirely covering the foot, the upper surface covered with remote, indistinct, small, depressed tubercles; cervical tentacles small, oblong-ovate, obliquely laminate and retractile into simple cavities; labial tentacles cylindrical, tapering; branchiæ small, suberect, twelve in number, two or three bifurcate, retractile into a simple cavity; vent consisting of a simple, slightly prominent orifice. Color cream-white, upper surface of the mantle minutely reticulated with brick-red lines, margined with orange and a white submarginal narrow band; tentacles brown, edges of the laminae pure white; labial tentacles tipped with orange; branchiæ cherry-red, under surface watery white; mantle and foot margined with orange.

Length $2\frac{1}{2}$ inches.

Genus STENODORIS, Pease.

Description.—Corpus elongatum, angustum, non palliatum, anticè cuspidatum, posticè compressum, attenuatum, posteriore tentaculæ utrinque obliquè incisum, dorso rotundate convexo; branchiæ parvis, plumosæ, bipinnatis, subretractilis, posticè in linea media dorsi anum circumdantes; tentaculæ cervicales, anteriore, vix compressis, ovatis, oblique lamellatis, subretractilis; pes angustus, elongatus, anticè truncatus, ora utrinque lobata; oculis distinctis, ad basin tentaculæ.

This genus is of very simple form; the body is soft, narrow, elongate, tapering to a point anteriorly, posteriorly compressed and elongate, no mantle or lateral fissure; tentacles far anterior, a short distance behind them the body is deeply incised on either side, thus forming a cephalic disk: they are closely approximating, of an ovate form, obliquely lamellated and subretractile into simple orifices; branchiæ small, subretractile, bipinnate, posterior to the middle, surrounding the vent; mouth between the locomotive and cephalic disks and provided with a pair of lobes; foot truncate in front, extending to the posterior end of cephalic disk; eyes appear to be immersed in the bases of the tentacles.

STENODORIS RUBRA, Pse.—t. 14, fig. 2.

Description.—Animal rounded above, subpellucid, covered with rather remote light red papillæ; tentacles moderately developed, somewhat laterally compressed; branchiæ twelve, forming a beautiful rosette, not extending over the margin of the body. Color pale vermilion, branchiæ and interstices of tentacular lamellæ bright vermilion.

Length 1 inch.

Genus LOBIFERA, Pease.

In Proc. Zool. Soc., 1860, we established a genus under the name of *Polybranchia*. Being convinced that I was mistaken as to the lobes enclosing true branchiæ, however closely the radiating lines may have resembled them, that name becomes a misnomer, and we consequently have adopted the above. We are gratified in being able to add two species, which fully confirm the genus.

LOBIFERA NIGRICANS, Pse.

Description.—Body elongate, tapering, smooth, arched above; lobes large, crowded, fan shape, not extending over the anterior portion of the body; head well developed, rounded in front; tentacles long; labial tentacles projecting laterally; edge of the mouth wrinkled; foot grooved transversely, the anterior portion broader than long, truncately rounded in front; the posterior portion is much the largest and longer, of an ovate oblong form. Color deep velvet black, foot pale slate, margined with yellow; the head and body is traversed by a medial stripe, and also irregularly spotted with the same color; also a stripe of the same along the sides near the foot; cervical tentacles lineated with the same, the lobes ornamented with an infra-marginal band, and studded with a few raised dots of the same color; labial tentacles with a narrow pale blue margin.

Length $1\frac{1}{2}$ inches.

LOBIFERA PAPILLOSA, Pse.

Description.—Body widest anterior to the middle, tapering rapidly posteriorly; lobes orbicular, thin, ciliated, covered with small remote papillæ and denticular vascular dots; cervical tentacles long, bifid at their outer third, remotely papillose, approximating at their bases; labial tentacles stout and rather short; foot very thin, auriculate and obtusely rounded in front, tapering rapidly to a delicate point behind; heart can be seen to pulsate a little anterior to the middle of the back; vent a prominent tubercle on the right side, just below the heart; eyes immersed between the posterior bases of the ten-

tacles. Color, lobes olivaceous, clouded with olive-brown; cervical tentacles pale, pellucid, olivaceous, freckled with dusky; foot pale olivaceous, punctured with white and dusky.

Length 3 inches.

Genus CHROMODORIS, Alder and Hancock.

This genus, established by Alder and Hancock, is represented on the islands of the Pacific by a large number of species. To it should be referred *Doris dorsalis*, Gld.; also *D. decora* and *D. marginata*, Pse. Proc. Zool. Soc., 1860.

The species deviate but little from the generic type, and fully confirm the genus. The body is elongate, somewhat slender, slightly dilated anteriorly and rounded posteriorly. The foot is narrow, extending some distance beyond the mantle posteriorly, and usually tapering to a point. The tentacles, as well as the branchiæ, are retractile; the latter are small, not extending over the edges of the mantle. All the species are lineated or margined with bright colors, but seldom spotted.

Genus ACLESIA, Rang.

Having had opportunity of examining several species of the above genus, we learn that they deviate but little from a common type. They are distinguished chiefly by the cirrhi which are spread over their bodies, and the ocellated spots, usually of blue or greenish centres, with which they are painted. (Colors and the style of their distribution may be classed as generic characters in many of the groups of Nudibranchiata.) They are gregarious in their habits, and live on sea weed. The corners of their heads, consequently, assume a tentacular form, quite elongate on some species, to enable them to grasp the sea weed; while at rest, they are withdrawn and the head is round or slightly dilated. *Stylocheilus*, Gld., we consider synonymous with this genus. The notes of Quoy and Gaimard on *A. longicauda* agree with our observations, and the drawing furnished Dr. Gould was taken, as they state, from the animal in motion.

ACLESIA PRODUCTA, Pse.

Description.—Animal elongate, subpellucid, smooth; cirrhi remote, simple or branched; lobes short and rounded about midway between the end of the foot and the head. Branchiæ large, arborescent, exposed; vent prominent; tentacles long, rather slender, of nearly equal length, the upper pair truncate and grooved laterally half their length; lips furnished with lateral tentacular lobes; eyes rather nearer to the posterior than anterior tentacles; foot narrow, elongate. Color pale

greenish-grey, clouded with dusky black, and more or less powdered with small patches of opaque white minute dots. The whole surface, except the sole of the foot, is beautifully veined with blackish-brown, the veins crowded, and running in an irregular manner longitudinally; decorated with remote oscillations, with brilliant light blue pupils, the iris deep brown, and encircled with ochre-yellow shadings; cirrhi pale, sole of the foot powdered with minute irregular flakes of white and pale brown, which, under the lens, are composed of clusters of minute dots.

DESCRIPTIONS OF ACHATINELLÆ.

[From Zoological Proceedings, London; Annals of Lyceum Nat. Hist., New York; Proc. Boston Nat. Hist. Society and Proc. California Acad. Nat. Sciences, with original remarks and figures not before published.]

BY W. NEWCOMB, M. D.

In a genus which numbers nearly two hundred species, it becomes a matter of much importance to call in the aid of figures, as well as descriptions for their correct identification. The editor of the American Journal of Conchology having offered to give illustrations of species described in the several publications named above, I avail myself of the opportunity to aid in the determination of species that previously may have (to some naturalists) been in doubt.

The published descriptions are repeated, with reference to the plate, and some original remarks are subjoined.

1. ACHATINELLA KAUIENSIS, Newcomb.

Annals of the Lyceum Nat. Hist., New York, April, 1860.

Plate 13, fig. 1.

Description.—Shell imperforate, dextral, trochiform, solid, strongly striated and decussated, above blackish-brown, the carina and base dirty white colored; suture crenulated; 7 whorls, flatly convex, the last with a cord-like keel in the middle; aperture irregularly quadrate; columella short, twisted, with one fold.

Long. $\frac{9}{10}$, lat. $\frac{8}{10}$ inch. Aperturæ long. $\frac{4}{10}$, lat. $\frac{5\frac{1}{2}}{10}$ inch.

Habitat.—Kauai, Sandwich Islands.

Remarks.—This is undoubtedly one of the most singular forms presented in the genus, and of extreme rarity. The specimen selected for the figure varies from the type in being provided upon the back of the last whorl with *three* instead of but *one* keel. Kauai is the most eastern of the large islands of the Sandwich Island group, and by geologists is considered as the oldest in the series; and it is worthy of remark that not a typical arboreal species of this genus has been met with, nor one ornamented with a variety of painted patterns, as upon the islands farther west.

2. *ACHATINELLA ANTHONII*, Newcomb.

Proceedings Cal. Acad. Nat. Sci., 1861, page 93.

Plate 13, fig. 2.

Description.—Shell conically ovate, solid, blackish-brown, longitudinally striate; whorls 6, inflated; suture moderately impressed; apex obtuse; aperture obliquely ovate, subangulate below; lip simple, thickened within; columella short, straight, with a somewhat callous plication below the middle. White banded below the suture, and of a dirty white in the umbilical region.

Remarks.—Excepting in size, and in being more ventricose, this species makes a near approach to *A. nucleola*, Gould. It is more than quadruple the size of *nucleola*, and not acute at the summit, by which it can be at once distinguished from that species. For this and the preceding species I am indebted to the Rev. Mr. Johnson, of Koloa. It is named after the eminent naturalist, John G. Anthony, Esq., of Cincinnati, Ohio.

The specimen selected for figuring is more obese than usual, and less elongated. A well-marked variety has the last whorl of a pale straw color.

3. *ACHATINELLA NIGRA*, Newcomb.

Proceedings Boston Nat. Hist. Soc., July, 1855.

Plate 13, fig. 3.

Description.—Shell dextral, globosely acuminate, rather solid; the two lower whorls inflated, the superior ones subulate; whorls 6, the last two cut up on the surface into rude cicatrices by longitudinal striæ, crossed by revolving elevations, irregularly distributed; superior whorls flattened, with closely-crowded, strong, longitudinal striæ; suture simple, well impressed; aperture round ovate; columella short, terminating in a lamellar tooth. Color yellowish-white, with a thin black epidermis.

Long. .70 lat. .45 inch.

Habitat.—E. Maui.

Remarks.—This species occupies an intermediate space between *A. obesa*, nob., and *A. K auaiensis*. In adult specimens the lip within is thickened by a heavy white deposit, and the tooth from the same cause changes from a lamellar to a nodulous form, as in the specimen figured.

4. *ACHATINELLA HUMILIS*, Newcomb.

Ann. New York Lyceum Nat. Hist., Sept., 1855.

Plate 13, fig. 4.

Description.—Shell elongately conical, longitudinally rudely striate; whorls 7, rounded above, flattened centrally, last one obscurely carinated superiorly; suture deep, simple; apex acute; aperture subrotund; lip acute, slightly thickened within; columella flattened with a thick plait. Color of shell pale salmon, covered with a densely black epidermis; columella and a deep margin of the outer lip within dark brown; interior of aperture bluish-white.

Long. $\frac{1}{2}$ in.; lat. $\frac{7}{16}$ in.

Habitat.—Kalai, Molokai. On the ground, under low bushes.

Remarks.—We have very little variety to note in this species, which was obtained in considerable numbers at the locality mentioned above on only one occasion. Subsequent researches of the same ground failed in obtaining specimens.

5. *ACHATINELLA PUSILLA*, Newcomb.

Ann. N. Y. Lyc., Sept., 1855.

Achatinella pulla, Newc. Zoolog. Proc., London, Nov. 1855, page 209.

Plate 13, fig. 5.

Description.—Shell dextral, conically ovate; apex acute; whorls 6, plano-convex; suture above but lightly impressed, below strongly marked; lip simple; columella short, with a twisted plait; epidermis light brown, often encircled by narrow white bands.

Long. $\frac{1}{2}$ in.; lat. $\frac{4}{10}$ inch. var major." $\frac{8\frac{1}{2}}{20}$; " $\frac{4}{10}$ " minor.*Habitat*.—Ranai.

Remarks.—The double name of *pusilla* and *pulla* was in consequence of Dr. Pfeiffer, of Cassel, publishing in my name several species which I had forwarded Mr. Cuming, in Zool. Proc., without knowing that they were already described by me in the Annals of the N. Y. Lyceum. The specimens were probably forwarded under the name given by Dr. Pfeiffer.

6. *ACHATINELLA PETRICOLA*, Newcomb.

Annals Lyc. Nat. Hist., New York, Sept., 1855.

Achatinella umbilicata, Pfr. Zool. Proc., London, Nov., 1855.

Plate 13, fig. 6.

Description.—Shell dextral, acutely conical, longitudinally coarsely striate; whorls 6, rounded, sometimes the last one inflated; suture simple, well impressed; aperture ovate; lip acute, slightly thickened within; columella rather long, with a sub-central revolving plait; often with an umbilicus. Color dark corneous, outer and columellar lips margined externally with white or yellowish-white.

Long. .5, lat. .25 inch.

Habitat.—Molokai, on the rocky sides of a Pali or precipice.

Remarks.—Specimens of this species vary sufficiently in the umbilical region, perhaps, to warrant their separation. Dr. Pfeiffer, the highest possible authority, has founded his species upon what I consider but a variety with a very open umbilicus, of which the figure furnishes a typical illustration. There is, however, such a gradation between different specimens with an open umbilicus and those which are closed, that I have not found it possible to draw a line between the two extremes, to determine where one ceases to be my *petricola* and becomes the typical *umbilicata* of Dr. Pfeiffer.

It may not, perhaps, be entirely uninteresting to Naturalists to know the reason of the specific name given to this little shell, which, to the author, recalls a scene of thrilling interest.

On the island of Molokai, as on some others of the Hawaiian group, may be found, in the mountain regions, deep gorges inaccessible to man, with precipices of two thousand feet or more, requiring to be scaled to reach the deep, dark, narrow vale which some convulsion of nature has opened in the mountain ridge. On such a mountain, so densely covered with bushes four or five feet high, dead specimens of what was at once detected as an unknown species were found. Desirous of obtaining a supply, the writer determined upon making his way *over* the bushes to an apparent opening a few rods distant. In effecting this object, the branches of a friendly Tutui tree were seized and used to drag the body forward. The opening was reached, but, to my surprise, my body was poising itself over a precipice, which, to my startled imagination, knew no bottom. Resting on the yielding tops of the bushes, with no support but the friendly Tutui branch, the position was one that called for immediate and decided retrograde action, which was, fortunately, effected in safety. On the rocks which formed the upper rim of the precipice some twenty or more specimens were obtained, and no shells in my cabinet have a stronger claim on my affectionate regard than these plain *Achatinella*, which live above the clouds on the bushy cliff and along the stony rim of this terrible precipice.

7. ACHATINELLA SUCCINCTA, Newcomb.

Proc. Boston Soc. Nat. Hist., July, 1855.

Plate 13, fig. 7.

Description.—Shell obesely conoid, thin, shining, corneous, longitudinally striate; whorls 7, flatly convex, slightly rugose above, not margined; suture but slightly impressed; aperture broadly ovate; columella deeply excavated, short, terminating in a broad plicate tooth; lip simple, slightly thickened within, with or without a broad obsolete white or brown central band on the last whorl, or a fine revolving sutural line of the same colors.

Long. $\frac{1}{2}$ 0; lat. $\frac{5}{6}$ poll.

Habitat.—Ewa, Oahu.

Remarks.—This species is the most obese of the *Leptachatinæ*, a sub-genus established by Dr. Gould and adopted by Dr. Pfeiffer. The specimen figured has a broad reddish-brown band around the body whorl, and extending around the whorl above, near the suture.

8. ACHATINELLA FUSOIDEA, Newcomb.

Annals, &c., 1855.

Plate 13, fig. 8.

Description.—Shell sinistral, rather solid, elongately produced; whorls 6-7, scarcely rounded (excepting the last), margined above; suture well impressed; aperture roundly ovate, small; columella very short, robust and twisted; lip simple above, slightly expanded below. Color, straw yellow.

Long. $\frac{1}{2}$ 5; lat. $\frac{5}{6}$ poll.

Habitat.—E. Maui.

Remarks.—This is an exceedingly rare species, but two specimens having come under my observation, one of which serves for the illustration, the other in the cabinet of the late Hugh Cuming, in London.

9. ACHATINELLA DWIGHTII, Newcomb.

Annals, &c., 1855. Republished by Dr. Pfeiffer in Zool. Proc., Nov., 1855.

Plate 13, fig. 9.

Description.—Shell oblong conical, sinistral, solid; surface covered with oblique longitudinal striæ, cut across by very numerous fine, slightly undulating cross striæ; whorls 6, flatly convex, crenulated at the sutures; suture simple, well marked; aperture ovate; columella broad, short, and slightly twisted;

outer lip expanded, sub-reflected below; sub-umbilicated. Color, a grayish-white, with numerous blotches and zigzag markings of brown, more obscure on the last whorl; aperture and lip of a dingy white.

Long. $\frac{1}{2}$; lat. $\frac{2}{3}$ poll.

Habitat.—Molokai.

Remarks.—This is also a rare species, offering but few varieties, the only variation from the type being the one figured, in which the suture, instead of being simple, is, in the last whorl, strongly corded.

10. *ACHATINELLA PHYSA*, Newcomb.

Proc. Boston N. H. Soc., 1855.

Plate 13, fig. 10.

Description.—Shell sinistral, pointed at the summit, strongly inflated below, rudely striated obliquely; whorls 6, first five flatly convex, the last largely inflated and obsolete carinated; suture simple and deeply impressed; columella short, slightly callous, broad, and partially covering a deep umbilicus; aperture large, semi-ovate; lip sub-reflected below, thin and simple above. Color of a dingy white, occasionally marked with yellow flammules, internally of a light lemon yellow, sometimes white.

Originally described in Zoological Proceedings, London, 1854, plate 24, fig. 64, in an immature state.

Long. 1, lat. .6.

Habitat.—Hawaii.

Remarks.—This is much the largest of the Physoid group of *Achatinella*, to which we refer *A. Helena*, Newcomb, from Molokai, *A. dubia*, Newcomb, from Oahu, and *A. grisea*, Newcomb, from Mani. The specimen figured is the largest-sized specimen that I have seen, the measurements rarely reaching to the size given.

11. *ACHATINELLA TETRAO*, Newcomb.

Boston Proc., 1855. Republished in Zool. Proc., at a subsequent date.

Plate 13, figs. 11, 12.

Description.—Shell sinistral, acutely conical, pointed at the summit, inflated below; whorls 6, rounded; suture deep; aperture sub-ovate; columella short and broadly plicate. Color white, covered by a thin epidermis, with black or brown undulations, often so dense as to cover most of the shell; a broad sutural carmine band is a constant character; aperture within white; columella and adjoining portion of the base of the shell pink or orange.

Long. $\frac{1}{2}\frac{5}{6}$; lat. $\frac{2}{3}\frac{9}{6}$ poll.

Habitat.—Ranai.

Remarks.—There is a beautiful group of these finely-painted acuminate *Achatinelle*, commencing with *A. venusta*, Mighels, and containing the following series:—

<i>A. venusta</i> ,	Mighels,
<i>A. citrina</i> ,	Mighels,
<i>A. Remyi</i> ,	Newcomb,
<i>A. sanguinea</i> ,	Newcomb,
<i>A. tetrao</i> ,	Newcomb,
<i>A. picta</i> ,	Mighels.

The four central islands of the group are represented by these species, the two first from Molokai, *sanguinea* from Oahu, *picta* from Maui, the other two from Ranai.

It may be noted that *A. Ferussaci*, Pfr., has been omitted from this association, as the typical shell in Mr. Cuming's collection is a worn, rather large-sized *sanguinea*.

A fine, light-colored variety, with a rosy tip, is occasionally found, but is much less common than those with a dark epidermis studded with small, white, triangular markings.

12. ACHATINELLA REMYI, Newcomb.

New York Lye., 1855.

Plate 13, fig. 13.

Description.—Shell acuminate elongate, striae numerous, well defined, obliquely longitudinal; whorls 7, rounded, minutely margined above or plain; suture rather deep; aperture sub-ovate; columella slightly callous, with a terminal lamellar plait. Color salmon, painted with numerous zigzag black lines, continuous from the summit to the base of the shell; lip margined within with reddish-purple.

Long. $\frac{1}{2}\frac{1}{6}$; lat. $\frac{2}{3}\frac{6}{6}$ poll.

Habitat.—Ranai.

Remarks.—This species is of great rarity, only a few specimens having been collected. It is not so robust a shell as the preceding, with which it has affinities, as also with *sanguinea* and *picta*. The measurements from adult specimens give the following result, viz:—

<i>A. picta</i> .	<i>A. tetrao</i> .	<i>A. sanguinea</i> .	<i>A. Remyi</i> .
$\frac{1}{2}\frac{9}{6} \times \frac{8}{2}\frac{1}{6}$	$\frac{1}{2}\frac{5}{6} \times \frac{9}{2}\frac{6}{6}$	$\frac{1}{2}\frac{8}{6} \times \frac{7}{2}\frac{6}{6}$	$\frac{1}{2}\frac{1}{6} \times \frac{6}{2}\frac{6}{6}$

13. ACHATINELLA ALEXANDRI, Newcomb.

Proc. Acad. Nat. Sci., San Francisco, Jan., 1864.

Plate 13, fig. 14.

Description.—Shell perforated, left-handed, elongately sub-cylindrical, shining, reddish-brown, with painting of elongate, inosculating black veins; whorls 6, convex, regularly, but slowly, increasing; apex a little obtuse; suture moderately impressed, not emarginate; aperture small, sub-ovate; lip acute; columella white, short, almost straight, truncate, terminating by a twisted plait passing within.

Long. $\cdot 6$, diam. $\cdot 25$ inch.

Remarks.—This species is more cylindrical than any of its congeners, resembling most *A. Remyi*, Newc., which is longer, not umbilicate, more pointed at the apex, with a twisted, not truncate, columella.

From *venusta* and *citrina*, Mighels, it varies both in form and color. With some varieties of *picta* it claims analogy only in the general plan of painting. Its striking characteristics are its blunt apex, slightly rounded whorls, small aperture, short and white columella, umbilicus, and general plan of coloring.

A few specimens were collected at an elevation of 7,500 feet, on West Maui, by the Rev. M. Alexander, to whom the species is dedicated.

14. ACHATINELLA UNDULATA, Newcomb.

Proc. Boston Soc. Nat. History, 1855.

Plate 13, fig. 15.

Description.—Shell sinistral or dextral, rather solid, acutely conical, shining, polished, with longitudinal oblique fine striae, microscopically spirally striate; whorls 6, rounded and margined above; suture well impressed; aperture sub-ovate; columella short and plicately twisted; lip acute, thickened within. Color light olive to chestnut, alternating with slightly undulating chestnut or black lines and bands, rarely marked by transverse black fasciæ; columella and aperture white.

Long. $\frac{1}{2}$ poll.; lat. $\frac{6}{10}$ poll.*Habitat*.—Waialua, Oahu.

Remarks.—This species, very variable in color and size, has in all cases the undulating markings by which it acquires its name. The specimen illustrated varies in the latitude from that given above by $\frac{3}{10}$ of an inch, and is more obese in consequence.

15. ACHATINELLA MAUIENSIS, Newcomb.

Zool. Proc., London, 1855, page 207.

Plate 13, fig. 16.

Description.—Shell sub-perforate, ovate-oblong, slender, longitudinally irregularly striate, under the lens spirally and densely decussately striate, not shining, white, with broad, serrated, longitudinal, brownish streaks; spire regularly conical, apex obtuse; suture smooth, scarcely sub-margined; whorls $5\frac{1}{2}$, flattened, the last equalling $\frac{2}{3}$ of the shell; base sub-attenuated; aperture oblong, not oblique; columellar plication obsolete; lip simple, straight, brown margined; columellar margin reflexly arched, partially adherent.

Long. .5, lat. .25 in.

Habitat.—West Maui.

Remarks.—This species might, with more propriety, be placed under *Bulimus*, as the genus *Achatinella* was originally defined by Swainson. This has, however, been enlarged by Dr. Pfeiffer to include the numerous late additions of aberrant forms with which Swainson was not acquainted.

It is with regret I learn that many localities of the rare and beautiful forms of this genus have been destroyed on the islands. Many of the species that selected for their homes the broad green Ti leaf have had their habitations destroyed by the greatly extended grazing ground of large herds of cattle. Mr. H. Mann, who recently returned from researches on the islands, states that *Achatinella's* have become very scarce owing to the above-named cause.

MONOGRAPH
OF THE
TERRESTRIAL MOLLUSCA
OF THE
United States.

BY GEORGE W. TRYON, JR.

PREFACE.

The substance of the following pages was written by me some years ago for my own use, in identifying the species of North American Land Shells. Having found it an important aid in this connection, saving me much time, trouble and uncertainty, I have concluded to publish it, in the hope that it will prove alike useful to others pursuing the same study. To this end, the subject has been carefully reviewed, much of it re-written, and all the species published to this date included.

After a vain attempt to reconcile the prominent characters of the shells with the characters of the soft parts, or animals, as described by recent observers, and to divide the species according to the families and sub-families which they have instituted, I have concluded to introduce only such of these divisions as will give the genera and species as nearly as possible in their natural sequence, founded upon *Conchological* distinctions.

In pursuing this course (unavoidable, on account of the paucity of our knowledge of anatomical characters, and of the values of these characters in classification), we less regret the absence of a strictly scientific arrangement, because without it we can more readily attain the object of these pages than by

separating, according to supposed important characters of the soft parts, species which, conchologically, greatly resemble one another, and again, on the same grounds, uniting incongruous forms.*

As nearly all the proposed genera of the American *Helices* appear to be well founded upon differences of animal and shell, I have adopted them, believing that they will facilitate rather than embarrass the investigator.

Finally, I may be permitted to add, these pages being written, not so much for the use of those who *are*, but rather for those who *desire to become*, Conchologists, it has seemed to me most proper that the descriptions of species should be as concise and as free from technical words as possible; that even characters of minor importance, and those, especially, which require microscopic observation, should be generally omitted, or only slightly alluded to; that the would-be naturalist

* Several recent writers have separated from the *Helicidae* certain species, which otherwise are entirely undistinguishable from that family, on account of the animal possessing a mucous pore near its tail, like the snails of the genera *Arion* and *Parmacella*. They have accordingly united them either to *Arionidae* or *Parmacellidae*.

The late M. Moquin-Tandon, a most excellent French malacologist, appears to us to have correctly determined the presence of a developed spiral shell as of sufficient importance to justify the retention of these species within the family *Helicidae*.

The possession of this mucous pore does not appear to characterize the animals of any particular groups of our species, for in those most nearly allied it is absent in one and present in another, and of a well characterized group of species, one only has been found to possess it. Very many of these animals have not yet been examined; so that, at present, it would serve no useful purpose to use this distinction in classification.

The differences in the jaw (buccal plate) and the armature of the tongue (lingual dentition) are employed by recent investigators for the combination of the genera of the *Helices* into sub-families, several of which appear to form good natural divisions, as *Helicellina* for the thin, glabrous species with unreflected lip. *Helicina*, on the contrary, includes a heterogeneous collection of forms, from which I would suggest that the species of *Patula* should be separated, though I do not think they can possibly be correctly associated with *Vallonia* and *Planospira*, *Strobulu* and *Helicodiscus*.

A close study of all that has been accomplished by American malacologists convinces me that—

1. If the sub-families proposed are properly characterized, *i. e.*, are natural groups, it is impossible, with our present limited knowledge, to properly distribute all the species among them, and—

2. For this reason, other sub-families must remain to be characterized; but—

3. If, when we obtain a knowledge of the characters of the soft parts of the at-present *unarrangeable* groups of species, it does not show the existence of other sub-families, then, in all probability, *no* sub-families, as now defined, exist.

The able investigators, Messrs. Binney, Bland and Morse, who are now carefully and thoroughly studying the dentition of our species, will doubtless, in due time, arrive at results in the highest degree satisfactory to conchological students. Meanwhile, impressed by the unsatisfactory nature of our own edifice (equally with that erected by our predecessors), we trust that it will remain unquoted by future systematists.

should *first* be induced to *collect* and *name*, afterwards to arrange his collections upon the study of their habits and affinities; and that naturalists would become ten times more numerous were they not appalled at the outset by the *immensity* of the subject, which afterwards proves its greatest charm.

There are, besides, many persons whose leisure or tastes do not permit them ever to become, strictly speaking, naturalists, but who, nevertheless, if furnished with proper guides, would gladly devote a few hours occasionally to the pursuit of some branch of natural history, although they would never engage in it to such extent as to make it a *study*: and we feel that this large class of persons should be encouraged to do as much as possible for the benefit of science by collecting the material necessary for the researches of the educated naturalist.

*

* *

Whenever good specimens could not be readily obtained for figuring, recourse has been had to previously published figures, and my acknowledgments are due to the works of Messrs. Binney, Bland, Lea and others, for the opportunity afforded by them for completing the illustrations. Very many of the shells are figured for the first time, as this is the first complete monography published since that of Dr. Binney.

The large number of new species described since that period have been classified in accordance with their affinities with those previously characterized.

At the close of the work will be found a list of **American** works on terrestrial species, and also a systematic list of the species and their principal synonyms. This has been deemed far preferable in the present instance (being more in accordance with the plan and purpose which I have endeavored to explain), to the usual method of prefixing the synonymy to the description of each species.

GEORGE W. TRYON, JR.

625 Market Street,
Philadelphia, July 1st, 1866.

INTRODUCTION.

*

* *

The number of described species of terrestrial mollusca known to inhabit within the limits of the United States is not far from 275 species, and many of these have a geographical distribution almost co-extensive with our territorial limits. There are, however, some peculiarly Southern and Californian groups of more restricted distribution, while there are not wanting, in our far Southern and South-western States, stragglers from the peculiar faunas of Mexico and Cuba; and even a few European species have become domesticated with us.

While *all* the species discovered and described in the United States to this date are included in the following pages, a few Mexican species are also added, generally as illustrations of allied forms inhabiting an adjacent country, many of which will doubtless be detected within our boundary when our little-known contiguous territories are more fully explored by the naturalist. A brief account of the geographical distribution of the species and of their habits is included under the description of each genus.

In the description of the species, for the sake of conciseness, many characters are omitted which are common to, and have already been used in the description of any of the groups, genera, or higher divisions in which the species is included, and, therefore, no specific description can be regarded as entirely complete in itself. It will, of course, be readily understood that adult shells of perfect growth are alone selected for these descriptions, and the same species, when immature, presents a very different aspect. *Mesodon abbolabris*, an animal of which the adult is furnished with a shell having a reflected and appressed lip and covered umbilicus, is, when young, furnished with a sharp-edged lip, and the umbilicus is open. The observer will soon, by a few comparisons, be enabled readily to separate the mature from the young shells, as the latter always present a peculiarly unfinished, fragile aspect.

When the ascertained geographical distribution of a species is extensive, we have generally indicated merely the States forming its boundaries. Its occurrence may be presumed within all the included region. More particular localities are only stated when the hitherto ascertained habitat of a species is extremely local.

Measurements are made in millimetres, 25 = 1 inch.

*Key to the Families of Terrestrial Mollusca inhabiting the
United States.*

Order PULMONIFERA.

Section A.—ADELOPNEUMONA (Inoperculata).

Includes both terrestrial and fluviatile species.
Shell without operculum.

Sub-order GEOPHILA.

Terrestrial shells. Head furnished with *four* tentaculæ, either retractile by inversion or contractile, the superior pair with the eyes at their summits. Respiratory orifice closed by a valve.

* TENTACLES RETRACTILE BY INVERSION.

† *Shell external.*

‡ *Shell thin, polished, translucent, lip sharp-edged.*

§ *Shell oblong-oval or fusiform.*

Family OLEACINIDÆ.

The species of *Oleacinidæ* inhabit the vicinity of sea-shores of the Southern States from South Carolina to Texas; also the Pacific coast, but not extending so far northwards as California. They are all large in size, and are stragglers from the Mexican and West Indian faunas.

§§ *Shell obliquely oval, whorls very few, rapidly increasing in size, the last one constituting nearly the entire shell.*

Family SUCCINIDÆ.

Distribution universal.

§§§ *Shell discoidal, suborbicular, turbinate or trochiform.*

Family HELICELLIDÆ.

Inhabit throughout the United States, but mostly in the Northern States east of the Rocky Mountains.

†† *Shell thicker, striate, frequently banded with colors, lip thick-edged, or generally either with an interior thickening caused by a marginal deposit of callus, or else reflected outwards and appressly flattened.*

§ *Shell discoidal, orbicular, turbinate or trochiform.*

Family HELICIDÆ.

Distribution universal.

§§ *Shell oblong or oval.*

Family ORTHALICIDÆ.

Tropical, a few species inhabiting the Gulf States.

§§§ *Shell cylindrical or pupæform.*

Family PUPADÆ.

Distribution universal.

†† *Shell internal, rudimentary, contained beneath the mantle.*

§ *Shell small, flattened, not spiral. Respiratory orifice in the posterior right margin of the mantle.*

Family LIMACIDÆ.

Distributed throughout the States east of the Rocky Mountains, and one species in Oregon. Most of the species are European in origin, and only occur near the coast, especially in the vicinity of the large commercial cities.

§§ *Shell represented only by a few agglomerated calcareous granules. Respiratory orifice in the anterior of the right margin of the mantle.*

Family ARIONIDÆ.

A single European species is found in seaports of the Northern States.

††† *Shell entirely absent. Mantle covering the entire upper surface of the body of the animal.*

Family PHILOMYCENIDÆ.

There are two species known, which inhabit the Northern and Middle States.

** TENTACLES (AND HEAD) CONTRACTILE BENEATH THE MANTLE, WHICH COMPLETELY COVERS THE BODY OF THE ANIMAL.

§ *Mantle smooth, coriaceous.*

Family VERONICELLIDÆ.

Tropical. One species only occurs in Florida.

§§ *Mantle tuberculute.*

Family ONCHIDIIDÆ.

A single species is found in Lower California.

Sub-order LIMNOPHILA.

Amphibious and fluviatile species. Head furnished with *two* tentaculæ, with eyes at their *bases*.

A few of these shells are considered terrestrial, because they inhabit land within reach of the tides.

§ *Shell oval-oblong or conoidal, mouth dentate within. Not umbilicate.*

Family AURICULIDÆ.

The American are all *sea-shore* species, except one minute shell (*Carychium exiguum*) which extends far inland, upon river margins and in damp places.

Section B.—PIANEROPNEUMONA (Operculata).

Shell operculate. Head furnished with two tentaculæ, with eyes sessile at their bases. Respiratory orifice without a valve.

Sub-order ECTOPATHALMA.

Eyes lateral, at the external bases of the tentacles. Operculum spiral or concentric.

§ *Shell orbicular or turbinate, whorls convex, lip continuous, reflected, umbilicus open or indented.*

Family CYCLOPHORIDÆ.

A few species inhabit the Gulf States.

§§ *Shell depressed, conical, whorls but little convex, lip not continuous, reflected, umbilicus covered by a heavy deposit of callus.*

Family HELICINIDÆ.

Tropical. Several species in the Gulf States, and one found as far north as Indiana. None in California.

Sub-order OPISOPHTHALMA.

Eyes placed posterior to the bases of the tentacles. Operculum sub-spiral.

§ *Shell cylindrical, apex truncate.*

Family TRUNCATELLIDÆ.

Inhabiting sea-shores of Florida and California.

MONOGRAPH
OF THE
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OF THE
United States.

Family OLEACINIDÆ, H. and A. Adams.

A single genus of this family inhabits the United States.

GLANDINA, Schumacher.

Shell oblong-oval, more or less elongated, corneous, shining; spire elevated; body whorl attenuated a little at base, imperforate; columella thin, arcuated, abruptly truncated at base; mouth long, rather narrow, lip sharp.

Animal, mouth capable of a proboscidiform protrusion, without a jaw.

The species of *Glandina* present few prominent distinctive characters, and are particularly liable to variation in size and form. As already mentioned, our species are southern in distribution, and occur only upon the sea-coast or in its near vicinity.

* *Transversely striate, without revolving striae.*

† *Oval, cylindrical, spire moderate.*

1. **Glandina truncata**, Say.

Plate 1, figures 1, 2.

Ovate-fusiform, heavy, striate; spire rather elevated; apex obtuse, suture well marked, crenulate; whorls 6-7, moderately convex; body three-fourths the total length, sub-cylindrical; aperture ovate-lunate, narrow, half the total length, labium sharp, rounded below to meet the perpendicular, truncate columella. Fawn color tinted with rose, deeper within the aperture.

Length 65, diam. 25 millimetres.

South Carolina to Florida.

2. **Glandina parallela**, W. G. Binney.

Plate 1, figure 3.

Oval-cylindrical, very solid, with numerous delicate striæ; spire elevated, obtuse, suture moderate; whorls 6-7, convex; body *with straight parallel sides*. White.

Length 56, diam. 20 mill.

Louisiana.

3. **Glandina Texasiana**, Pfeiffer.

Plate 1, figure 4.

Oblong, elongated, narrow, striate, shining, pellucid; spire convexly conical, obtuse, suture pallid, minutely crenulate; whorls 6, slightly convex; body longer than spire, attenuated at base; mouth half the total length, narrow, labrum flatly rounded, columella perpendicular, or *generally arcuate*. Yellowish rose color.

Length 29, diam. 10.5 mill.

Texas.

Narrower, smaller, and proportionally more solid than No. 1.

†† *Inflated oval, spire short.*4. **Glandina bullata**, Gould.

Plate 1, figure 5.

Ovate, *ventricose*, finely striate, *very thin, transparent*; spire short, obtuse, suture lightly impressed; whorls 5, slightly convex; body comprising seven-eighths of the shell; aperture two-thirds the total length, lunate, labrum rounded, columella arcuate. Very pale horn color.

Length 37, diam. 20 mill.

Louisiana.

** *Transversely striate, decussated by revolving lines.*5. **Glandina Vanuxemii**, Lea.

Plate 1, figure 6.

Ovate-fusiform, thin, fragile, translucent; spire moderate, obtuse, apex mamillary, suture crenulated; whorls 7-8, slightly convex; body large, convex, a little inflated; aperture half the length of the shell, nearly three times as long as broad, colu-

mella strongly arched. Pale fawn color, sometimes greenish, generally flecked with distant pale spots.

Length 70, diam. 25 mill.

Texas and Mexico.

6. **Glandina decussata**, Deshayes.

Plate 1, figure 7.

Oblong-conic, thin, shining; spire moderate, obtuse, sutures crenulated; whorls 7-8, somewhat convex; body two-thirds the total length, narrowly convex; aperture oblong, one-half the total length, columella curved, covered with a light callus. Light horn color.

Length 50, diam. 18 mill.

Texas, Mexico.

Narrower, more cylindrical than No. 5.

*

* *

Mexican species.

Not spirally striate.

7. **Glandina turris**, Pfeiffer.

Plate 1, figure 8.

Oblong turritid, thin, diaphanous; spire elevated, obtuse, suture crenulate; whorls 7; body narrow, equalling *three-sevenths of the total length*; aperture semi-oval, columella vertical, abruptly truncate before reaching the base of the aperture. Corneous.

Length 43, diam. 15 mill.

Mazatlan.

8. **Glandina Albersi**, Pfeiffer.

Plate 1, figure 9.

Ovate-oblong, thin, pellucid; spire moderate, conical, apex obtuse, suture scarcely crenulate; whorls $5\frac{1}{2}$ -6, slightly convex, the last *scarcely longer than the spire*, attenuated at base; aperture sub-vertical, sinuately semi-oval, labrum slightly arcuate, columella perpendicular. Light corneous.

Length 30, diam. 12 mill.

Mazatlan.

SUCCINIDÆ.

SUCCINEA, Draparnaud.

Shell obliquely ovate, imperforate, very thin, uncolored, corneous, transparent or translucent; spire very small, body whorl large, inflated; aperture large, oval or ovate, peristome simple, acute.

Animal large, with short and thick tentacles; foot broad. Buccal plate with a posterior quadrangular projection for the attachment of its muscles; cutting edge with one or more projections or folds, not striate.

Semi aquatic, inhabiting low, damp ground liable to overflow, on the margins of bodies of water, and frequently adhering to the leaves of aquatic plants. Generally, large numbers of a species are found together—at least of those northern species with the habits of which we are most familiarly acquainted. One species, however, *S. avara*, is very frequently found solitary or in pairs only, and appears to be somewhat different in its habit, as I have frequently taken it in shady places on high ground, far removed from bodies of water.

There appears to be two distinct groups or sub-genera of *Succineæ* inhabiting North America; the first, characterized by well-rounded whorls, is recognized by malacologists as typical; the second, with the shell ovate, and the whorls flattened above and effuse below, has received the name of *Brachyspira*, Pfr.

Examined with a view to geographical distribution, we find the two groups of *Succineæ* to have their representatives in every part of the Union, and yet, so far as we may presume to generalize from the very insufficient data which has been collected and published, the species appear to be much less diffused throughout the country than those of the *Helices*. The following table will give an idea of their territorial range:—

1. Inhabiting the Northern States westward to the Rocky Mountains, extending into British America, southwards to Virginia and Tennessee.
 - 7, *S. obliqua*, 10, *S. vermata*, 11, *S. avara*, 21 *S. ovalis*, 32, *S. aurea*.
 - a. Confined to New England States.
 - 1, *S. Totteniana*.
 - b. Confined to northern frontier of the United States and northwards
 - 12, *S. Grænlandica*, 14, *S. Ferilli*, 22, *S. Decampii*, 23, *S. Higginsi*.
 - c. Ohio.
 - 24, *S. retusa*.

2. Southern Atlantic States—South Carolina to Florida.
2, *S. inflata*, 4, *S. campestris*, 6, *S. effusa*, 26, *S. Wilsonii*,
29, *S. luteola*.
3. South-western States—Mississippi, Louisiana and Texas.
3, *S. unicolor*, 8, *S. Greerii*, 9, *S. Grosvenorii*, 27, *S. For-*
sheyi, 28, *S. concordialis*, 31, *S. Salleana*, 33, *S. Hale-*
ana.
4. Pacific States—California, Oregon, British Columbia,
Nebraska, etc.
5, *S. Stretchiana*, 13, *S. Gabbii*, 15, *S. lineata*, 16, *S.*
Mooresiana, 17, *S. Oregonensis*, 18, *S. rusticana*, 19,
S. Haydeni, 20, *S. Sillimani*, 25, *S. Nuttalliana*, 30,
S. Hawkinsii.

We thus find that our as yet imperfectly-known fauna exhibits thirty-three well characterized species of *Succinea*, and exceeds greatly those inhabiting Europe, which, in the last edition of Pfeiffer's Monograph, number thirteen.*

This extraordinary development of species of a single genus of terrestrial Mollusks upon our Continent is the more remarkable from the fact that in other terrestrial genera common to the two Continents, our fauna is by no means so rich as that of Europe. In *Helix*, *Bulimus* and *Pupa*, the species are not nearly so numerous with us.

Several species of *Succinea* inhabit Mexico, Central America and the West India Islands, but their number is not so great as would be expected from the considerable quantity of other types of terrestrial Mollusks in those countries. In fact, the paucity of these forms leads to the conclusion that the maximum development of these groups (*Succinea* and *Brachyspira*) of the genus is within the limits of the United States, and that the principal species are inhabitants of the temperate zone of America and Europe.

* It is remarkable that Pfeiffer and Albers (Helicéen, 1861) have both failed to recognize the true characters of the two groups of *Succinea* inhabiting Europe. Although their definition of *Brachyspira* is sufficiently correct, yet they have so distributed the species as to show that they regarded these divisions as very arbitrary, not as natural ones. Thus, we have almost every species of *Brachyspira*, European and American, placed by these authors in their sub-genus or group *Succinea*, whereas almost every European species is a true *Brachyspira*. We may instance *S. Pfeifferi*, *S. longiscata*, *S. Italica*, etc. *S. Humilis*, *S. Baudoni*, etc., may be classed as typical *Succinea*.

† *Spire short, body whorl very large, inflated, well rounded.*

1. *Succinea Totteniana*, Lea.

Plate 2, figure 1.

Obliquely ovate, thin, transparent, obsoletely striate, shining; spire very short, of scarcely three whorls; body whorl nine-tenths of the total length and inflated oval; aperture oval, obtusely angulate above, three-fourths the total length, peristome well rounded.

Length 16, diam. 9 mill.

New England and Eastern New York.

2. *Succinea inflata*, Lea.

Plate 2, figure 2.

Inflated, oval, thin, spire very short, apex sub-acute, suture impressed; whorls 3, those of the spire not very convex; body short-oval, seven-eighths the total length; aperture widely ovate. Chalky white, spire inclining to brown, aperture within tinged with light yellow.

Length 12, diam. 8 mill.

South Carolina and Georgia.

Is of heavier texture and different color from *S. Totteniana*. Mr. W. G. Binney considers this species doubtfully distinct from *S. Campestris*. I think it is well distinguished.

3. *Succinea unicolor*, Tryon. (Nov. spec.)

Plate 2, figure 3.

Oval, inflated, very thin, translucent, finely striate; spire very short, apex acute, suture moderately impressed; whorls 3, the last very large; aperture short-ovate, outer lip somewhat expanded. Light corneous.

Length 8, diam. 6 mill.

New Orleans, La.

This shell, mentioned by Pfeiffer as a variety, appears to me to be specifically distinct. Specimens exist in the magnificent collection of the Academy of Natural Sciences of Philadelphia, and for others I am indebted to Mr. Thomas Bland, of New York.

4. **Succinea campestris**, Say.

Plate 2, figure 4.

Rounded-ovate, distantly striate, shining; spire short, apex acute; whorls 3, convex, suture impressed; body large, ventricose; aperture oval, not quite two-thirds the total length, columella indented in the middle. Yellowish white or yellowish horn color, the striæ opaque white.

Length 15, diam. 10 mill.

South Carolina to Florida.

Differs from *inflata* in having a somewhat longer, more convex spire, and in the distant, white striæ. In *campestris* the aperture does not occupy so large a portion of the entire width as in *inflata*.

5. **Succinea Stretchiana**, Bland.

Plate 2, figure 5.

Globose-conic, thin, pellucid, shining, striatulate; spire short, obtuse, suture well impressed; whorls 3, convex, the last inflated; aperture roundly oval, columella arcuate, slightly thickened. Greenish horn color.

Length 6.25, diam. 5 mill.

Little Valley, Washoe Co., Nevada, on the eastern slope of the Sierra Nevada, 6500 feet above the sea.

6. **Succinea effusa**, Shuttleworth.

Plate 2, figure 6.

Depressed-oval, very thin, transparent, shining, slightly striated; spire remarkably short, apex acute, body equalling fourteen-fifteenths of the length of the shell; aperture very large, oblique, wide, broadly rounded below, columella scarcely rounded. Greyish horn color.

Length 11, diam. 7 mill.

Florida.

Differs from all the preceding in the minute spire and proportionally very long body, the aperture being four-fifths the total length and two-thirds of the width of the shell.

** *Spire moderate, apex acute, body inflated, aperture large, broadly oval, peristome well rounded, the superior part not flattened.*

7. **Succinea obliqua**, Say.

Plate 2, figure 7.

Ovate, very thin and fragile, pellucid, shining, irregularly wrinkled or striate; spire short, minute, suture well impressed; whorls 3, a little oblique, the last very large, expanded, ovate; aperture large, oval, both lips equally rounded, a little angular behind, equalling nearly three-fourths the total length. Yellowish or yellowish green.

Length 20, diam. 13 mill.

British America to Virginia, westward to Arkansas, Iowa.

8. **Succinea Greerii**, Tryon. (Nov. spec.)

Plate 2, figure 8.

Ovate, rather thick, rugose, not transparent; spire short conical, suture moderately impressed; whorls 3, but slightly oblique, well rounded, the last one a little flattened above the periphery; aperture ovate, three-fifths the total length, not acute above, well rounded below; columella twisted, with a slight callous deposit. Light yellowish or greenish horn color.

Length 15, diam. 9 mill.

Vicksburg, Miss.—Col. James Greer.

This species was recently sent to the Academy of Natural Sciences in considerable numbers by Col. James Greer. Most of the specimens were smaller than the one figured. It appears to be intermediate between *S. obliqua*, Say, and *S. Grosvenorii*, Lea, differing from the former in color, texture, the contorted and less curved columella, smaller size, and less swollen contour, as well as more regular increase of the whorls; and from the latter by its color, less convexity, more ovate aperture, &c.

9. **Succinea Grosvenorii**, Lea.

Plate 2, figure 9.

Ovate, thin, translucent, shining, distantly striate; spire elevated, apex acute, suture well impressed; whorls 3, a little oblique, the body large but not much inflated; aperture broadly rounded, the columella impressed above, equalling two-thirds the total length. Light lemon color.

Length 12, diam. 8 mill.

Alexandria, La.

Smaller than No. 8, with more elevated spire, more convex whorls, and heavier texture.

10. **Succinea vermeta**, Say.

Plate 2, figure 10.

Ovate-lengthened, very thin, fragile, translucent, wrinkled; spire elevated, acute, suture *profoundly impressed*; volutions 3, *very much rounded*, oblique; aperture ovate, rounded above. Yellowish.

Length 10, diam. 7 mill.

Northern States.

The great convexity of the whorls and very deep suture are the distinguishing characters of this species. A large variety of *S. avara* not possessing these characters has erroneously passed among Conchologists as *S. vermeta*.

11. **Succinea avara**, Say.

Plate 2, figures 11 and 12.

Ovate, thin, fragile, minutely hairy or shining, spire elevated, acute, suture well impressed; aperture broadly oval, *a little more than half the total length*. Yellowish or greyish, *frequently encrusted with dirt*.

Length 6, diam. $3\frac{1}{2}$ mill.

Northern, Middle and Western States to Nebraska.

The smallest of the northern species, readily distinguished from No. 10 by its less scalariform volutions. In Greenland it is replaced by the following species; in the Pacific States by *S. Oregonensis*; in the far South by *S. Halvana*—all species of about equal size. A western variety sometimes attains nearly double the dimensions quoted above.

This species frequently inhabits at a considerable distance from water or low grounds.

Mr. Isaac Lea has described a species from Ohio under the name of *S. Wardiana*, which Mr. Binney believes to be identical with *S. avara*, in which opinion I coincide. As Mr. Lea has recently asserted the specific weight of his species,* I have had a drawing made from the type (fig. 12) of *S. Wardiana*, to afford opportunity of making comparisons, as it had not been previously figured.

* Proceedings Acad. Nat. Sciences, 1865.

12. Succinea Grœnlandica, Beek.

Plate 2, figure 13.

Elongated, strongly wrinkled; spire elevated, suture well impressed; body very large proportionally, not inflated; aperture oval, three-fifths the total length. Covered with an opaque, somewhat shining, horn-colored epidermis, with narrow white lines caused by its abrasion from the elevated striae.

Length 8, diam. $5\frac{1}{2}$ mill.

Greenland, and Mingan Island, Gulf of St. Lawrence.

13. Succinea Gabbii, Tryon. (Nov. sp.)

Plate 2, figure 14.

Elongate ovate, thin, sub-pellucid, coarsely undulately striate; spire long, acute, suture deeply impressed; whorls nearly 4, but slightly oblique, very convex, the last three-fourths of the total length; aperture small, roundly oval, columella well incurved. Light yellowish.

Length 9, diam. 5 mill.

Crooked Creek of Owyhee, 60 miles W. of boundary S. E. Oregon. Crane Lake Valley, N. E. Cal.—W. M. Gabb.

Larger and more convex than *Grœnlandica*, and differently colored. The spire is proportionally longer in this than in the other species of the group.

14. Succinea Verrilli, Bland.

Plate 2, figure 15.

Ovate-conic, thin, sub-pellucid, striate; spire elevated, obtuse, apex globose, suture well impressed; whorls 3, very convex, not very oblique; aperture roundly oval, small, columella arcuate with a slight callus. Orange yellow, apex reddish.

Length 7, diam. 3.5 mill.

Salt Lake, Antieosti Island, Gulf of St. Lawrence.

Smaller than *Grœnlandica*, of different color, and has more distinct and regular incremental striae.

15. **Succinea lineata**, W. G. Binney.

Plate 2, figure 16.

Oblong ovate, irregularly wrinkled, between which are coarse, remote, revolving lines; spire acute; whorls 3, *very convex*; aperture *one-half* the length of the shell, oval; columella folded.

Length 12, diam. 6 mill.

Nebraska, N. E. California, British America.

Differs from *vermeta* by its more oval form. The aperture is correctly egg-shaped. It is the heaviest of American species. The columella is not always folded, nor the revolving lines apparent.

16. **Succinea Mooresiana**, Lea.

Plate 2, figure 17.

Ovate, thin, striate; spire elevated, acute; whorls 3, convex, suture impressed; body large, not inflated; aperture widely ovate, obtusely angled above; columella with a distinct fold. Light yellowish-white.

Length 9, diam. 6 mill.

Platte River.

This may be only a variety of No. 15. The principal difference is, that it is more depressed, the spire not so much exerted and not so convex, and the aperture nearly two-thirds the total length.

17. **Succinea Oregonensis**, Lea.

Plate 2, figure 18.

Elongated oval, thin, diaphanous, shining, striate; spire acute, suture well impressed; whorls 3, well rounded; body seven-eighths and aperture two-thirds the total length; aperture ovate, one-third longer than broad, columella arcuate. Color deep orange or golden.

Length 9, diam. 6 mill.

Oregon, California.

Differs from No. 16 principally in its diaphanous texture and dark color.

18. **Succinea rusticana**, Gould.

Plate 2, figure 19.

Elongate ovate, thin, fragile, diaphanous, irregularly striate: spire elevated, acute, suture moderately impressed; whorls 3, not very convex; body long, oval, not inflated; aperture narrowly oval, three-fifths the entire length. Pale greenish or yellowish.

Length 14, diam. 7 mill.

Oregon, California.

Immediately distinguished from the other species of this section by its narrow, lengthened form. Resembling the following several species, but differing from them all in the regular curve of the outer lip.

*** *Shell ovate, spire rather elevated, apex acute, whorls flattened, body whorl large, but not inflated, aperture angulate above, labrum superiorly more or less flattened.*

(BRACHYSPIRA, Pfeiffer.)

19. **Succinea Haydeni**, W. G. Binney.

Plate 2, figure 20.

Elongate-oval, thin, shining; spire short, acute; whorls 3, convex, the last marked with wrinkles of growth, and irregular, heavy, spiral furrows; aperture oblique, oval, five-sevenths the total length, the lower margin considerably expanded. Amber colored.

Length 21, diam. 9 mill.

Nebraska and northwards.

The peristome is more flexuose than in *S. ovalis*, Gld., and it is more attenuately pointed above; it also differs in having the revolving lines, and is a larger species.

Var. *minor*. Length 15 mill.20. **Succinea Sillimani**, Bland.

Plate 2, figure 21.

Oblong-ovate, thin, coarsely striate, shining; spire short, acute, suture impressed; whorls 3, convex, much flattened superiorly; aperture oblique, elongate oval, angular above, effuse at base, columella slightly arcuate, with a thread-like thickening above. White?

Length 20, diam. 8.5 mill.

Humboldt Lake, Nevada.

More attenuated than *S. Hayleni*, the last whorl less tumid, and the aperture more narrow.

21. **Succinea ovalis**, Gould.

Plate 2, figure 22.

Ovate-conic, very thin, pellucid, shining, very minutely striate, spire acute, suture slightly impressed; whorls 3, the last compressed and elongate; aperture produced, elongated, broadly rounded below, more than three-fourths the total length. Light yellowish horn color.

Length 12, diam. 6 mill.

New England to Wisconsin and southwards to Maryland and Kentucky.

22. **Succinea DeCampii**, Tryon. (Nov. sp.)

Plate 2, figure 23.

Ovate-conic, rather thick for the genus, translucent, finely striate, surface very much polished; spire short, acute, suture moderate; whorls 3, very oblique, narrow, flattened; aperture narrow ovate, columella slightly incurved. Yellowish ash color, spire golden, edge of aperture black.

Length 10, diam. 5 mill.

Marshall, Michigan. W. H. DeCamp.

Narrower, thicker and more polished than *S. ovalis*. It also differs in color and size. The black-edged peritreme is remarkable, and is present in all the adult specimens I have examined.

23. **Succinea Higginsii**, Bland. (Nov. spec.)

Plate 2, figure 24.

Depressed-oval, thin, pellucid, somewhat shining, pale horn colored; spire short, obtuse, suture deep; whorls 3, convex, the last rather depressed; columella scarcely arched, above conspicuously plicate; aperture angularly oval, frequently

armed with a small, oblique, white tooth on the parietal wall; peristome simple, regularly arcuate.

Length 15, diam. 7 mill.

Put-in Bay Island, Lake Erie.

Allied to *S. Sulleana*, Pfr., *S. Haydeni*, W. G. Binney, and especially to *S. ovalis*, Gould. Compared with the latter, the last whorl is less convex, the aperture is more angular above, the columella less arcuate and more distinctly plicate. Three specimens had the parietal tooth mentioned in the description. It is the only North American species in which this tooth has been observed.

24. *Succinea retusa*, Lea.

Plate 2, figure 25.

Ovate-oblong, thin and pellucid; spire moderate, acute; aperture two-thirds the total length, elongate ovate, sharply angled above, dilated and retracted below. Light yellowish.

Length 17, diam. 8 mill.

Ohio.

Very close to *ovalis*; rather narrower, and differs in the aperture.

25. *Succinea Nuttalliana*, Lea.

Plate 2, figure 26.

Ovate conic, very thin, pellucid, shining, striate; spire acute, attenuate; whorls revolving very obliquely; aperture two-thirds the total length, ovate, broadly rounded below, angled above; columella without fold. Light horn color or greyish.

Length 15, diam. 8 mill.

Oregon, California.

Aperture slightly narrower posteriorly than *ovalis*. The difference between the two is very slight, but they inhabit different zoological regions. *Nuttalliana* is rather larger than *ovalis*.

26. *Succinea Wilsonii*, Lea.

Plate 2, figure 27.

Elongate-oblique, striate, thin, diaphanous; spire prominent, acute, suture well impressed; whorls 4, rather convex, not

very oblique; aperture rather large, ovate, columella slightly incurved and contorted. Orange color.

Length 17, diam. 8 mill.

Darien, Georgia.

27. *Succinea Forsheyi*, Lea.

Plate 2, figure 28.

Ovate-conic, striate, thin, diaphanous; spire very short, acute; whorls 3, rapidly increasing, not very oblique; body whorl nearly the entire length of the shell, narrowly oval: mouth oval, a little angled above, columella folded nearly at the superior part of the aperture. Very light lemon color.

Length 11, diam. 6 mill.

Rutersville, Texas.

28. *Succinea Concordialis*, Gould.

Plate 2, figure 29.

Ovate-conic, thin, *feebly decussately striate*; spire acute, prominent; whorls rather more than 3, very oblique, rapidly increasing, the upper half of the body whorl flatly compressed; aperture two-thirds the total length, acuminate above, well rounded below; columella with greater curve than the outer lip, slightly angled at its superior termination near the top of the aperture; a thin callus covers the left margin, which is *slightly detached* anteriorly, *forming a rudimentary umbilicus*. Pale honey yellow.

Length 12, diam. 8 mill.

Texas, Mexico.

29. *Succinea luteola*, Gould.

Plate 2, figure 30.

Ovate-conic, irregularly wrinkled, *somewhat thickened*; spire moderate, apex acute; whorls 4, those of the spire well rounded; upper half of body obliquely flattened; aperture ovate, over half the total length, columella not folded. Pale yellowish or drab to white, apex and interior deeper yellow.

Length 12, diam. 6 mill.

Florida.

Differs from other shells of same size and proportion in its heavier texture.

30. **Succinea Hawkinsii**, Baird.

Plate 2, figure 31.

Very narrow, sub-cylindrical, thin, rugosely striate; spire very short, apex mamillary; whorls $2\frac{1}{2}$, suture not impressed; body very long and narrow, the sides flattened, sub-parallel; aperture narrow ovate, two-thirds the total length, viewed from the base exhibiting the interior of the whorl to the apex, columella slightly folded above, with a callous deposit. Covered with a rather opaque dark yellow or orange epidermis.

Length 12, diam. 5 mill.

Washington Territory, British Columbia.

No other American species has the peculiar narrow form, fragile substance and opaque epidermis of the above.

31. **Succinea Salleana**, Pfeiffer.

Plate 2, figure 32.

Depressed ovate, somewhat wedge-shaped, very thin, striate, with impressed irregular revolving striae; spire *very* short, not elevated above the general outline of the shell, apex papillary; whorls $2\frac{1}{2}$, very much obliquely flattened above, broadly rounded below; aperture seven-eighths the entire length of the shell, pear-shaped, sharply angled above, columella without fold, not so well rounded as the labrum. Light corneous.

Length 16, diam. 8 mill.

New Orleans.

The narrow wedge-shaped form of this species, together with the spire almost minute and the very long aperture, will amply serve to distinguish it from the others.

32. **Succinea aurea**, Lea.

Plate 2, figure 33.

Very small, elongated oval, very thin, transparent; spire short; whorls 3, a little tabulated posteriorly, suture deeply impressed; aperture narrow-ovate, acutely angled above; columella slightly folded. Amber color.

Length 8, diam. 4 mill.

Ohio, Niagara Falls.

Same size as *S. avara*, Say, but *narrower, more polished and pellucid, and darker color.*

33. **Succinea Haleana**, Lea.

Plate 2, figure 34.

Oval, minutely striate; whorls $2\frac{1}{2}$, apex mamillary, suture deeply impressed; body whorl a little flattened around the superior part; aperture widely oval, angled above, columella medially folded, with a slight deposit of callus. Light honey yellow.

Length 5, diam. 3 mill.

Alexandria, La.

Very close to avara; the whorls are not so convex, nor the spire so prominent, and the body is proportionally longer. *Avara* does not extend nearly so far southward.

* *

Mexican Species.

34. **Succinea cingulata**, Forbes.

Plate 2, figure 35.

Oblong-ovate, slightly oblique, striate, shining; spire well developed, suture impressed; whorls 4; aperture large, oval, columella at the base receding to the left. Brownish-yellow, with obsolete spiral white lines.

Length 12, diam. 6 mill.

Mazatlan?

HELICELLIDÆ.

Shell discoidal, orbicular or trochiform, corneous, thin, polished, sometimes transversely striate, translucent or transparent, *lip sharp* (not reflected outwards, nor internally thickened); aperture without proper marginal teeth, but sometimes with internal laminae not reaching to the edge.

Animal long and narrow. *Buccal plate* thin, crescentic, with an elevation in the middle of the cutting edge, side slightly striate in the centre, or all over.

Lingual dentition.—Uncini long and broad, tridentate, laterals long, narrow, curved, bidentate.

Sub-families.

VITRININÆ. *Shell* depressed, very fragile, consisting of about three whorls, the last extremely enlarged; mouth very oblique and large, extending to the centre of the base of the shell.

Animal too large for complete retraction within the shell.

Some of the species of *Vitrina*, as well as *Helix*, have a caudal mucous gland, and would, therefore, in accordance with the views of Gray and others, be placed in another family. We are at present compelled to consider the gland as of *no importance whatever* in classification, or else to construct an exceedingly artificial and unnatural system.

HELICELLINÆ. *Shell* thin, *glabrous*, translucent or transparent, *polished, globose*ly depressed; mouth not dentate. Umbilicus generally narrowly perforate. Umbilical region impressed.

Lingual dentition.—As in *Vitrininæ*.

Differs from *Vitrininæ* in the moderate aperture and impressed umbilical region, from *Gastrodontinæ* in being more depressed, and not impressed striate, and from *Patulinæ* in the absence of opaque color, or ribs.

GASTRODONTINÆ.* *Shell* thin, translucent, *striate* or ribbed, generally *depressed* conical, frequently lamellately toothed.

Lingual dentition.—Generally as in the above, sometimes the laterals are square, bidentate.

Distinguished from all the others by conical shape, from *Patulinæ*, also, by its narrow umbilicus, and diaphanous texture.

* This and the following Sub-family are not proposed with any intention but to facilitate the determination of species. The Sub-family *Valloninæ* of Mr. Morse, *in its present limits*, we cannot adopt.

PATULINÆ. *Shell* moderately thick, translucent to opaque, epidermis *opaquely* colored, sometimes banded or striped in the large species, *striate* or *ribbed*, discoidal, planospiral, or spire a little globosely elevated. Umbilicus wide. Mouth not toothed, (lamellately toothed in *one* species only.

Lingual dentition.—Uncini bidentate, laterals either long or square, bidentate or tridentate.

VITRININÆ.

Genera.

1. VITRINA, Drap. Shell very thin, polished, transparent, small, consisting of two or three depressed whorls, rapidly increasing. Aperture very large, oblique, lunate. Columellar margin a little inflated. Axis imperforate. Nearly covering the contracted animal.
2. BINNEYA, Cooper. Shell ear-shaped, nearly flat, whorls two, last whorl enormously expanded. One third as long as the animal, which it does not half cover when contracted.

Much more depressed, with a larger proportionate aperture than *Vitrina*.

VITRINA, Drap.

1. *Vitrina limpida*, Gould.

Plate 3, figure 1.

Globosely depressed, whorls $2\frac{1}{2}$, scarcely convex, suture very slightly canaliculate; plane of aperture very oblique. Colorless.

Diam. 6 mill.

Maine to Michigan, and Northward.

2. *Vitrina Angelicæ*, Beck.

Plate 3, figure 2.

Globosely depressed, whorls $3\frac{1}{2}$, suture crenulated, spire small, somewhat prominent; aperture lunately oval, oblique. Color greenish-yellow.

Diam. 6, height, 3·5 mill.

Greenland.

More globose, with one more whorl and more prominent spire than No. 1.

3. **Vitrina Pfeifferii**, Newcomb.

Plate 3, figure 3.

Globosely depressed, whorls 3; suture very finely margined; aperture large, oblique, roundly ovate; lip thin, columella arched.

Diam. 5, height 2 mill.

Carson Valley, Cal.

V. limpidi is smaller, with only $2\frac{1}{2}$ whorls, and thinner. *V. Angelicæ* is more globose, with more prominent spire.

BINNEYA, Cooper.

1. **Binneya notabilis**, Cooper.

Plate 3, fig. 4.

Depressed, smooth and shining, epidermis extending beyond margin of aperture, translucent when young, but opaquely thickened when old. Nuclear whorl with about thirty delicate transverse ribs. Pale brown.

Diam. 12, height 3 mill.

Santa Barbara I., Cal.

HELICELLINÆ.

Genera.

1. **MACROCYCLIS**, Beck. Shell moderate, widely umbilicate, planorboid, striate; whorls 4-5, the last wide, descending and *flattened above* at the aperture.
2. **HYALINA**, Ferussac. Shell moderate or small, globosely depressed, moderately umbilicated or perforated, or umbilicus closed, but impressed; whorls 4-6, vitreous, shining, regularly increasing, not angled at the periphery, nor flatly depressed at the aperture.

MACROCYCLIS, Beck.

1. **Macrocyclus Newberryana**, W. G. Binney.

Plate 3, figure 5.

Large, whorls 6, first ones flattened, but ultimate one convex, beneath convex; reddish-brown, striate, decussated by

fine spiral lines; spire depressed, suture deeply impressed; umbilicus wide and deep, lip margins connected by a callus on the body.

Diam. 37, height 13 mill.

San Diego, Cal.

Differs from all others of the group in its large size, and color. The decussated surface, large umbilicus and rounded lip distinguish it from *M. Vancouverensis*, Lea.

2. *Macrocyclus Vancouverensis*, Lea.

Plate 3, figure 6.

Large, whorls 5, the superior part of the last one flattened upon approaching the aperture, rounded beneath; bright yellowish-green, shining, roughly striate, with very slight revolving lines, suture moderate, umbilicus of moderate width and deep.

Diam. 30 mill.

Oregon and Washington Territory.

3. *Macrocyclus sportella*, Gould.

Plate 3, figure 7.

Medium size, whorls 5, the superior part of the last one flattened upon approaching the aperture, rounded below; very light apple-green, dull, very closely and sharply striate, reticulated by slight, revolving lines; suture moderate, umbilicus moderate and deep.

Diam. 18 mill.

Oregon, California.

With same number of whorls, is much smaller than No. 2, and more sharply striate. Messrs. Binney and Bland consider the two identical, but the differences are permanent in many specimens before me.

4. *Macrocyclus concava*, Say.

Plate 3, figure 8.

Medium, whorls 5, superior part of last one flattened towards the mouth, well rounded beneath; light-horn color or greenish, but almost white; slightly striate, suture well impressed, umbilicus rather wide and deep.

Diam. generally 12 to 15 mill.

Maine to Iowa, southwards to Georgia and Mississippi.

Lighter in color, and much smoother than *sportella*,

5. **Macrocyclus Voyana**, Newcomb.

Plate 3, figure 9.

Small, depressed; whorls 5, convex, the last declining towards the aperture and somewhat flattened or concave above, striate; aperture sinuate above, the lip slightly expanded, its extremities joined by a callus on the body-whorl; below broadly umbilicate. Pale horn-color.

Diam. 12.5 mill.

Canyon Creek, Trinity Co., California.

Smaller, darker colored and of more rugged aspect than the other Californian species; it may also be distinguished by the much greater sinuosity of the upper part of the lip.

6. **Macrocyclus Elliotti**, Redfield.

Plate 3, figure 10.

Whorls 5, depressed, conic or slanting above, suture moderate, striate, polished, well rounded beneath; umbilicus narrow, deep, aperture very oblique, wide; light greenish-yellow.

Diam. 9, height 4 mill.

North Carolina to Georgia.

HYALINA, Ferussac.

1. *Axis deeply indented at base but not perforate.*

1. **Hyalina indentata**, Say.

Plate 3, figure 11.

Whorls 4, flattened, thin, pellucid, polished, corneous, rapidly enlarging; aperture rather large, transverse, the peristome reaching below to the centre of the base of the shell, which is well impressed, but imperforate.

Diameter 5 mill.

From Canada to Florida, and westward to Michigan and Texas.

2. *Perforate or umbilicate.** *Very globose.*2. ***Hyalina friabilis***, Wm. G. Binney.

Plate 3, fig. 12.

Whorls 5, rapidly increasing; shell very globose, thin, polished, faintly striate, suture scarcely impressed; aperture sub-circular, sharp lipped, very slightly thickened at base, and a little reflected over the narrow, deep umbilicus; shell very convex below. Color light horn to reddish.

Diameter 20 to 25, alt. 12 to 15 mill.

South Indiana and Illinois, Arkansas, Alabama, Texas.

*** *Globosely depressed.*

(Subgenus OMPHALINA, Rafinesque, W. G. Binney.)

† *Closely striate above, smooth beneath.*

Diam. = 20 mill.

3. ***Hyalina lævigata***, Pfeiffer.

Plate 3, fig. 13.

Whorls 5, yellowish or fulvous, very closely and regularly striate above, smooth and shining beneath; last whorl expanding towards the aperture, which is rounded lunular; lip simple, slightly reflected around the moderate umbilicus, and much thickened within at base.

Diam. 20 mill.

Ohio, Indiana, and southwards to Florida, Mississippi and Arkansas.

.†† *Smooth, or coarsely, irregularly striate.*

Diam. = 25—35 mill.

4. ***Hyalina lucubrata***, Say.

Plate 3, figure 14.

Depressed, sub-globose; whorls more than 4, much wrinkled, sub-translucent, reddish-brown, polished, beneath paler; umbilicus rather large; aperture nearly orbicular.

Diam. 26, height 12 mill.

Mexico.

Differs in color and in being more depressed and more coarsely striate, from *lævigata*, Pfr.

5. *Hyalina caduca*, Pfeiffer.

Plate 3, figure 15.

Depressed-globose; whorls 5, rapidly increasing, striate, polished, light yellowish with a tinge of green; aperture subrotund, umbilicus moderate.

Diam. 25, height 13 mill.

Texas, Mexico.

Lighter colored than *H. lucubrata*, but doubtfully distinct from it.

6. *Hyalina fuliginosa*, Griffith.

Plate 3, figure 16.

Depressed globose; whorls $4\frac{1}{2}$, rapidly increasing, with irregular oblique wrinkles, smooth, shining, suture slightly impressed; aperture transversely subrotund, terminations of margin approaching; umbilicus moderate. Color dark horn or chestnut.

Diam. 25 mill.

Western part of the Atlantic States, Western and Southern States.

Approaches *H. levigata*, but is smoother, more polished, more depressed, umbilicus larger, aperture more rounded. Differs in color from *H. caduca* and *H. lucubrata*.

7. *Hyalina kopnodes*, Wm. G. Binney.

Plate 4, figure 21.

Depressed globose, wrinkled, below smooth, suture moderate; whorls 5, rapidly increasing, sometimes with revolving lines; aperture large, ends of margin approaching; umbilicus small and deep.

Diam. 35, height 13 mill.

Alabama.

Larger than its allies, lighter in color, *more depressed*, and of *heavy texture*.

*** *Shell much depressed.*

††† *Diam. = 12—16 mill.*

8. **Hyalina sculptilis**, Bland.

Plate 3, figure 18.

Depressed orbicular, subpellucid, pale horn color above, lighter beneath, regularly striate above and below; whorls 7, planulate, the last rapidly increasing; umbilicus scarcely perforated and almost covered by a reflection of the lip.

Diam. $12\frac{1}{2}$, height 5 mill.

Western North Carolina.

In its depressed form, small size, nearly closed umbilicus and number of whorls, this species is very distinct from any other of the group. The impressed striæ are close and regular.

9. **Hyalina cellaria**, Müller.

Plate 3, figure 19.

Much depressed, whorls 5, fragile, polished, very light-greenish above, more thickened and becoming lighter colored below; aperture transverse; umbilicus small and deep.

Diam. 10—12 mill.

Eastern and Middle States near the coast. (Introduced from Europe.)

10. **Hyalina inornata**, Say.

Plate 4, figure 22.

Depressed, perforate, smooth, shining, whorls 5, light yellowish horn color, suture moderately impressed; aperture transversely lunar, with a white testaceous internal deposit; lip reaching to the centre beneath; base flattened.

Diam. 16 mill.

Massachusetts to Virginia, and westwards to Iowa, Michigan and Kentucky.

Larger than *H. cellaria*, but with a much smaller umbilicus, being a mere perforation.

11. *Hyalina subplana*, Binney.

Plate 4, figure 23.

Whorls $5\frac{1}{2}$, planulate above and below, brownish, shining, striated near the apex, suture not much impressed; aperture transverse, without calcareous deposit within; umbilical region but slightly impressed, umbilicus very narrow.

Diam. 18 mill.

East Tennessee to Western Pennsylvania.

Differs from *H. cellaria* in having a narrower umbilicus, and from both that and *H. inornata* in the absence of a calcareous deposit on the interior of the aperture at the base; it is darker colored, larger, and has more whorls than either of them, and is more regularly flattened.

††† Shell small, diameter not exceeding 6 mill., umbilicus generally narrow and deep.

12. *Hyalina Breweri*, Newcomb.

Plate 4, figure 27.

Discoidal, pale corneous, shining, transparent, suture slightly channelled, broadly umbilicate; whorls 5; aperture lunate, lip thin, simple.

Diam. 5 mill., altitude 2.5 mill.

Lake Tahoe, California.

Less elevated, more polished, lighter colored, and more openly umbilicate than *H. arborea*.

13. *Hyalina nitida*, Müller.

Plate 4, figure 24.

Whorls $4\frac{1}{2}$, depressed, conically sloping above, with well marked suture, convex below; umbilicus moderate, but deep; aperture well rounded. Amber colored.

Diam. 6, altitude 3 mill.

New York to Ohio, and northwards to Great Slave Lake.

More conical and rather larger than *H. arborea*. This species was first detected by Dr. Ingalls at Greenwich, New York, who called it *H. hydrophila*. It was subsequently

ascertained to be one of the few European species common to both continents. It has been known among American conchologists, until recently, as *H. lucida*, Drap., which is, however, a synonym of *H. nitida*, Müll.

14. *Hyalina arborea*, Say.

Plate 3, figure 17.

Whorls $4\frac{1}{2}$, regularly and moderately increasing, depressed turbinate, thin, amber colored, smooth, shining; lip slightly flexuose; umbilicus moderate and deep.

Diam. 5—6 mill.

Georgia and northwards beyond Canada; westwards to the Rocky Mountains; Los Angeles Co., California.

15. *Hyalina electrina*, Gould.

Plate 4, figure 25.

Whorls $3\frac{1}{2}$, depressed, pale, shining, the last rapidly enlarging towards the mouth; umbilicus very small, deep; lip not flexuose.

Diam. 4 mill.

Maine to Georgia, and westwards to Iowa.

Differs from *H. arborea* in its pale color, more depressed, smaller, fewer whorls, and *their more rapid increase*, and very narrow umbilicus.

16. *Hyalina ottonis*, Pfeiffer.

Plate 4, figure 26.

Orbicularly depressed; whorls 4, very light colored, nearly white, suture narrow, periphery angular; superior surface of whorls obliquely declining, inferior well rounded; umbilicus narrow and deep.

Diam. 5, altitude 2.5 mill.

Florida and West Indies.

Much lighter colored and smaller than *H. arborea*, also angled at the periphery and not so widely umbilicate.

17. **Hyalina vortex**, Pfeiffer.

Plate 4, figure 28.

Very much depressed above, almost planorboid, suture deeply impressed, white, shining; whorls 5, convex beneath; umbilicus narrow and deep.

Diam. 5 mill.

Florida and Cuba.

Has one more whorl, and is more depressed than the other species, also lighter in color.

18. **Hyalina capsella**, Gould.

Plate 3, figure 20.

Whorls $6\frac{1}{2}$, planorboid, closely revolving, glistening; amber colored, with distant striæ; aperture narrow, semilunar, extending to the centre of the base, which is minutely perforate.

Diam. 5, altitude 2.5 mill.

East Tennessee.

++++ Shell minute, not exceeding 3 mill.

19. **Hyalina Binneyana**, Morse.

Plate 4, figure 31.

Whorls 4, spire slightly elevated, pellucid, nearly colorless; aperture well rounded; umbilicus moderate.

Diam. 3, height $1\frac{1}{2}$ mill.

Maine.

Differs from *H. minuscula* in having the spire a little elevated, and from *H. electrina* in being smaller and not increasing the whorls so rapidly. If *Hyalina* is not adopted as a genus, we suggest the name *Helix Morsei* for this species, as *Binneyana* is pre-occupied in that genus.

20. **Hyalina ferrea**, Morse.

Plate 4, figure 32.

Whorls 3, not shining, steel grey; last whorl rapidly enlarging; aperture very large, well rounded; spire slightly elevated, suture distinct, deeply channeled near the apex; umbilicus small and abrupt, exhibiting all the volutions; periostraca minutely marked with fine revolving lines.

Diam. 2·5, height 1·25 mill.

Maine.

Distinguished from *H. electrina* by having fewer whorls and being smaller in size, also in having a larger umbilicus and revolving striæ.

*
* * *

Mexican Species.

Hyalina bilineata, Pfeiffer.

Plate 4, figure 30.

Whorls 5, shining, light horn color, with a narrow brown band above the periphery and another below the suture; spire slightly elevated, suture not much impressed; umbilicus narrow.

Diam. 15, height 7 mill.

Hyalina zonites, Pfeiffer.

Plate 4, figure 29.

Whorls 6, closely and roughly striate, shining, light horn color, with a narrow, brown band revolving above the periphery, and scarcely concealed above by the spire; spire somewhat elevated, suture distinct; base with the striæ not half so numerous, and much more polished; umbilicus moderate.

Diam. 25, height 12·5 mill.

GASTRODONTINÆ.

*Genera.** *Not dentate.*

1. MESOMPHIX, Rafinesque. Shell moderate in size, umbilicate or perforate; aperture obliquely semilunar.
2. CONULUS, Fitzinger. Shell minutely conical, imperforate or perforate; aperture depressed transverse, its lower margin extending to the basal axis of the shell.

** *Lamellarly dentate.*† *Outer whorl dentate.*

3. GASTRODONTA, Albers. Shell minute, with one or more laminae revolving within the base. Surface nearly smooth, polished.

†† *Outer whorl and columella both dentate.*

4. STROBILA, Morse. Shell minute, with laminae both on the base and the columella. Surface strongly striate.

MESOMPHIX, Raf.

a. *Diam.* = 10—15 mill.

1. **Mesomphix intertexta**, Binney.

Plate 4, figure 33.

Subglobose, whorls 6—7, closely striated, sometimes with very faint revolving lines, yellowish horn color, slightly angled, and sometimes with a light and beneath it an ill-defined brown band at the periphery. Very convex below. Aperture oblique, narrow lunate, base of shell thickened by a calcareous deposit within; umbilicus small.

Diam. 19 mill.

Western New York to Georgia, and westward to Missouri and Iowa.

Larger than the next, and not quite so conical; the slightly angled periphery and bands of color, when present, offer distinctive characters. The shell is also thicker and not so pellucid, and frequently exhibits spiral lines, not visible on *ligera*.

2. **Mesomphix ligera**, Say.

Plate 4, figure 34.

Subglobose, elevated, obtuse, yellowish horn color, translucent, shining, whorls 6—7, closely striated; aperture obliquely narrowly semilunar, shell thickened within at the base; umbilicus narrow, sometimes closed.

Diam. 12—15 mill.

All the Middle and Western States.

See the distinctive characters under *H. intertexta*.3. **Mesomphix demissa**, Binney.

Plate 4, figure 35.

Depressed convex, whorls 6, shining, yellowish horn-color, thickly, but not coarsely, striate, base rather flattened, umbilicus very small; aperture very oblique, almost transversely compressed-lunate, base of shell thickened within.

Diam. 10—12 mill.

Western Pennsylvania; fossil in Alabama and Texas.

Much more depressed, more solid, and usually smaller than *H. ligera*.

b. Diam.=6—7 mill.

4. **Mesomphix cerinoidea**, Anthony.

Plate 4, figure 36.

Sub-globose, whorls 6, shining, yellowish horn-color, almost smooth, convex below, umbilicus very narrow; aperture semilunar, somewhat oblique, base of shell slightly thickened within.

Diam. 6—7 mill.

North Carolina.

Smoother and more depressed, but otherwise a miniature edition of *M. ligera*.

CONULUS, Fitz

a. *Diam.* = $2\frac{1}{2}$ —3 mill.

1. **Conulus chersina**, Say.

Plate 4, figure 37.

Whorls 5—6, convex, sub-conical, thin, pellucid, smooth, shining, amber-colored, suture well impressed; aperture narrowly transverse, base convex, indented around the closed umbilicus.

Diam. $2\frac{1}{2}$, height 2 mill.

The whole country westward to Rocky Mountains; San Gorgonio Pass, Los Angeles Co., California.

This shell is not the *C. fulva*, of Europe, with which it has been confounded; the differences pointed out by Mr. Morse, in his "Shells of Maine," appear to be constant.

2. **Conulus Fabricii**, Beek.

Plate 4, figure 38.

Whorls 6, convex, sub-conical, apex rather acute, suture profound; whorls striate, narrow, last whorl wider, base convex, impressed at the axis, which is nearly imperforate; aperture transversely lunar; color fulvous, pellucid.

Greenland.

Scarcely distinguished from No. 1 by the sub-perforate umbilicus.

3. **Conulus Gundlachi**, Pfeiffer.

Plate 4, figure 64.

Turbinata, shining, fulvous; whorls 5, convex, the last sub-planulate at base, excavated around the perforation, faintly marked with revolving lines; aperture depressed lunar.

Diam. $2\frac{1}{2}$, height $1\frac{2}{3}$ mill.

Florida, Cuba.

More depressed than No. 2. Differs from No. 1 in the perforate axis.

b. *Diam.* = $1\frac{1}{2}$ mill.

4. **Conulus minutissima**, Lea.

Plate 4, figure 63.

Globosely turbinate, above obtusely elevated, below convex, fuscous, minutely striate; whorls 4; aperture transversely lunar, umbilicated.

Diam. $1\frac{1}{2}$, height 1 mill.

Maine to Pennsylvania, Ohio.

Distinguished by its small size, striate surface, and well developed umbilical opening.

Mr. Morse has distinguished this species as the genus *Punctum*, (sub-family *Punctinae*), from the peculiar conformation of the buccal plate, which is divided into sixteen distinct pieces.

This is the smallest of our species.

GASTRODONTA, Albers.

1. **Gastrodonta gularis**, Say.

Plate 4, figure 39.

Sub-conical, shining, yellowish horn-color, translucent; whorls 7—8, striate; suture moderately impressed, aperture transverse, rather narrow, margin sharp, extending beneath to the centre of the base, which is barely perforate or closed; within thickened at the base by a callus deposit, and having two parallel lamellar teeth, extending nearly to the basal margin of the lip.

Diam. 7—9, height 5—7 mill.

East Tennessee, Georgia, Alabama.

Sometimes one tooth is wanting.

2. **Gastrodonta lasmodon**, Phillips.

Plate 4, figure 40.

Depressed orbicular, shining, corneous, translucent; whorls 7, narrow, very slowly increasing, minutely striate, suture moderately marked; aperture nearly circular, laminal teeth upon the internal base of the lip; umbilicus large and deep.

Diam. 6, height 3 mill.

East Tennessee, North Alabama.

Much more depressed than the other species. Is smaller than No. 1, and differs from it in the large umbilicus.

3. *Gastrodonta suppressa*, Say.

Plate 4, figure 41.

Convexly depressed, thin, spire flattened, shining, pellucid; whorls 6, slowly increasing, minutely striate above, beneath more flattened and smooth, suture moderately marked; aperture transversely semi-circular, callously thickened within at the base, with two parallel lamellæ; umbilicus merely perforated, sometimes covered.

Diam. 6, height 4 mill.

Middle States and Ohio.

Has one whorl less and is more depressed and smaller than No. 1; sometimes there are three instead of two teeth.

4. *Gastrodonta interna*, Say.

Plate 4, figure 42.

Convexly orbicular, reddish-brown, shining, covered above with close, rounded, very distinct ribs, beneath smooth; whorls 8, narrow, very slowly increasing, suture deeply impressed, periphery slightly angled; aperture transverse, narrow, within thickened, especially at base, with two short lamellæ near the outer portion of the basal margin; margin extending to the axis beneath, which is sometimes narrowly perforate, but frequently closed.

Diam. 6, height 4 mill.

West Pennsylvania to Georgia, and westwards to Missouri.

5. *Gastrodonta multidentata*, Binney.

Plate 4, figure 43.

Depressed, thin, yellowish horn-color, smooth, shining, pellucid; whorls 6, slowly increasing, suture impressed; aperture transverse, narrow, lip extending to the perforated axis, base convex, thickened within the aperture, through which may be seen two to four rows of 5 or 6 teeth each, radiating from the axis towards the circumference, upon the base of the outer whorl; teeth situated far within, and last row not usually visible from the aperture.

Diam. 3, height $1\frac{1}{2}$ mill.

Green Mountains, Vermont, North-east New York, Maine.

Readily distinguished by the teeth and size of the shell.

STROBILA, Morse.

1. **Strobila labyrinthica**, Say.

Plate 4, figure 44.

Obtuse-conic, brownish; whorls 6, heavily ribbed above, more slightly so beneath, suture well impressed, lip thickened, somewhat reflected, with two revolving laminae upon the base, not visible from the aperture, but seen through the shell. Upon the body are three revolving laminae, and on the columella another. Base flattened, umbilicus small, impressed.

Diam. $2\frac{1}{2}$, height $2\frac{1}{2}$ mill.

Maine to Maryland, Mississippi, Texas, Arkansas, Western States.

2. **Strobila Hubbardi**, Brown.

Plate 4, figure 45.

Depressed, thin, striated above, smooth beneath, brownish, thin; whorls 5, with two parietal revolving laminae, and two more far within on the outer whorl; umbilicus rather wide, lip slightly reflected.

Diam. $2\frac{1}{4}$, height $1\frac{1}{4}$ mill.

Indianola, Texas.

May be distinguished from No. 1 by the teeth being more depressed and having a large umbilicus.

PATULINÆ.

Genera.

1. **ANGUISPIRA**, Morse. Shell heavy, large, depressed-turbinate, solid, ribbed-striate, banded or striped; umbilicus moderate; aperture not toothed.
2. **PATULA**, Hald. Shell moderate, rather heavy, discoidal, a little convex above, concave below, ribbed-striate, unicolorous; umbilicus *very wide* but shallow, exhibiting all the volutions.
3. **PLANOGYRA**, Morse. Shell minute, perfectly flat above, umbilicus moderate; whorls very convex, the last one crossed by from 20 to 25 sharp raised ribs. Unicolorous.
4. **HELICODISCUS**, Morse. Shell minute, planorboid; whorls equally visible above and below, revolving on the same plane, externally with revolving striae; aperture lamellarly toothed within the outer lip. Unicolorous.

5. *PSEUDOHYALINA*, Morse. Shell minute, discoidal, slightly convex above, unicolorous, closely striate or ribbed; umbilicus large.

Distinguished from *Patula* by the minute size and more moderate umbilicus.

ANGUISPIRA, Morse.

a. *Not carinate, sometimes slightly angulate on the periphery.*

1. *Anguispira solitaria*, Say.

Plate 4, figure 46.

Globose, thick, coarsely striate; spire turbinate elevated, apex obtuse, suture distinctly impressed; whorls 6, well rounded; body large, well rounded, beneath very convex; aperture sub-circular, the extremities of the lip approaching upon the body; umbilicus large, deep, exhibiting all the volutions. Dark corneous, with (generally two) rufous revolving bands; sometimes nearly white and without bands.

Diam. 25, height 16 mill.

Ohio to Nebraska, and south to Ohio River.

2. *Anguispira Idahoensis*, Newcomb.

Plate 4, figure 54.

Turbinate conic, ashy horn-color; apex obtuse; whorls 5, very convex, the first nearly smooth, the others strongly transversely ribbed, ribs on last whorl numbering 20—26; aperture circular, very oblique; deeply and moderately umbilicate.

Diam. 13, altitude 11 mill.

Idaho Territory.

Distinguished from all the other species by its more conical form, and sharp, distinct, distant ribs.

3. *Anguispira Cooperii*, W. G. Binney.

Plate 4, figure 52.

Globosely elevated, solid, obliquely roughly striated, intersected by delicate, spiral lines; spire elevated, obtuse, suture deeply impressed; whorls 5, convex; body very convex, deflected at the aperture; aperture very oblique, circular, extrem-

ities of margin nearly joining, connected by a heavy callus; umbilicus moderate, deep. White variously marked with a single narrow, brown band, or two bands, or broader longitudinal and spiral patches.

Diam. 15—25, height 9—12 mill.

Nebraska, Washington Territory.

Smaller than No. 1, with rougher striæ, and *revolving lines*; the umbilicus is also proportionally smaller. In some specimens the spire is more flattened.

4. *Anguispira alternata*, Say.

Plate 4, figure 47.

Convex, more or less elevated, obliquely closely ridge-striated; spire slightly or considerably elevated, suture well marked; whorls 6, moderately increasing, not very convex; body moderate, very convex beneath, often slightly angled at the periphery; aperture $\frac{3}{4}$ ths circular, oblique; umbilicus large and deep, exhibiting the volutions. Light corneous, variegated by oblique irregular brown stripes or spots above and below.

Diam. 20—25, height 8—10 mill.

Whole country eastward of Rocky Mountains.

Varies considerably in ornamentation, convexity of the upper surface, and prominence of the rib-like striæ.

Var. Fergusonii, Bland. Smooth, never carinated.

Diam. 15, height 6 mill.

New York, New Jersey.

Var. alba, Tryon. Perfectly colorless.

Maine, (Morse.) Michigan, (Currier.)

b. Carinate.

5. *Anguispira strigosa*, Gould.

Plate 4, fig. 49.

Depressed orbicular, thick, striate; spire not much elevated, flattened, suture impressed; whorls 5; body moderately large, angulate at periphery, strongly deflected at aperture; aperture obliquely circular, lip very nearly continuous; umbilicus wide and deep. Ash-grey to brown, with generally a faint medial band, and numerous bands beneath it.

Diam. 20—25, height 10—12 mill.

Washington Territory, Oregon, Nebraska, N. Mexico.

6. *Anguispira Cumberlandiana*, Lea.

Plate 4, figure 48.

Lenticular, acutely carinated, thin, coarsely ribbed, striate; spire convex, much depressed, suture not prominent; whorls 5, slowly increasing, margined by a carina; aperture somewhat rhomboidal; umbilicus broad and deep. Pale yellowish or ash-color, with irregular transverse brown blotches.

Diam. 13-18, height 5-6 mill.

E. Tennessee.

Very close in color and striation to *alternata*, but differs entirely in its very depressed, lenticular form and very acute carina.

PATULA, Held.

1. *Patula perspectiva*, Say.

Plate 4, figure 50.

Nearly discoidal, slightly convex above, and concave below, strongly striate; whorls 6, suture deeply impressed; aperture small, $\frac{2}{3}$ ths rounded, generally in adult shells with a very slight tubular thickening (scarcely a *tooth*) within the base; umbilicus very wide, cup-shaped, shallow, exhibiting all the volutions. Corneous, reddish-brown.

Diam. 9, height 3 mill.

W. New York to N. Georgia, westward to Arkansas and Michigan.

The *tooth* described by Binney appears to be an imperfectly developed *fulcrum*.

2. *Patula striatella*, Anth.

Plate 4, figure 51.

Depressed convex, nearly discoidal; whorls less than 4, with delicate oblique striae; suture distinct; aperture rounded, transverse; umbilicus very large, shallow. Light horn-color.

Diam. 5, height $2\frac{1}{2}$ mill.

Maine to Great Slave Lake, B. A., southwards through W. New York and Pennsylvania to Ohio River, and westward to Kansas; District of Columbia.

Much smaller, with fewer whorls, and more elevated than No. 1. In the New England States it entirely replaces *S. perspectiva*.

3. **Patula Durantii**, Newcomb.

Plate 4, figure 53.

Depressed, discoidal, opaque, very minutely striated; *spire not at all elevated*, perfectly plane above; whorls 4, the last shelving; suture linear; aperture rounded, lunate, ends of lip margin approaching; broadly and perspective umbilicated. Pale corneous.

Diam. 5, height $1\frac{3}{4}$ mill.

Santa Barbara Island, Cal.

4. **Patula Whitneyi**, Newcomb.

Nearly flat above, *smooth*, suture well impressed; whorls 4; aperture lunate; with a perspective umbilicus. Smoky horn-color.

Diam. 5, height $2\frac{1}{2}$ mill.

Sierra Nevada, Cal.

5. **Patula Cronkheitei**, Newcomb.

Somewhat depressed, a little convex above, *ribbed-striate*; whorls 4, suture wide and deep, almost channeled; aperture rounded; umbilicus large, somewhat perspective. Yellowish horn-color.

Diam. 5, height $3\frac{3}{4}$ mill.

Klamath Valley, Oregon.

More elevated and more strongly striate and sutured than *striatella*, Anth.

PLANOGYRA, Morse.

1. **Planogyra asteriscus**, Morse.

Plate 4, figure 55.

Elevated, planorboid; whorls 4, very convex; suture deep; surface with 25-30 very oblique, thin, raised ribs, between which it is finely striate; umbilicus moderately large, showing all the volutions. Light brown.

Diam $1\frac{1}{2}$, height $\frac{3}{4}$ mill.

Maine, Massachusetts.

Differs from *exigua*, Stimp., by being smaller, the spire not elevated, and ribs not so numerous.

HELICODISCUS, Morse.

1. **Helicodiscus lineata**, Say.

Plate 4, figure 60.

Discoidal, greenish-yellow; whorls 4, visible below as well as above, with numerous parallel revolving lines, suture well impressed; aperture narrow-lunate; base shallow-concave; a pair of teeth within the outer lip, remote from the margin, and another pair further within and visible through the translucent periphery, in each pair one being placed above, the other below it.

Diam. 3 mill.

Maine to Virginia, westwards to Ohio, Texas.



PSEUDOHYALINA, Morse.

* *Diam.* = 5 mill.1. **Pseudohyalina limatula**, Ward.

Plate 4, figure 65.

Almost planorboid; whorls $4\frac{1}{2}$, increasing regularly, well rounded; suture very distinctly impressed; aperture small, almost round; umbilicus rather large, as wide as the last whorl, well defined and deep. Color very light, nearly white.

Diam. 5 mill.

New York, Ohio, Indiana, Michigan.

** *Diam.* = $2\frac{1}{2}$ mill.2. **Pseudohyalina minuscula**, Binney.

Plate 4, figure 62.

Whorls 4, depressed, whitish, slowly increasing in diameter; suture deep; aperture sub-rotund; umbilicus large and deep.

Diam. 2,— $2\frac{1}{2}$ mill.

United States east of Rocky Mountains, from Maine to Florida, and West Indies.

3. **Pseudohyalina incrustata**, Poey.

Plate 4, figure 61.

Depressed, spire slightly elevated, suture deep; whorls 4-5, well rounded, slowly increasing; mouth expanding, nearly circular, the ends of the lip-margin closely approaching and united by a callus; umbilicus one-third the entire diameter, showing all the whorls. Brown, with a ferruginous deposit.

Diam. 3, height $1\frac{1}{2}$ mill.

Texas (from Cuba.)

4. **Pseudohyalina conspecta**, Bland.

Plate 4, figure 58.

Umbilicate, sub-depressed, thin, with oblique, rather distant, rib-like striæ; dark horn color; spire convex, apex obtuse, smooth, suture deep; whorls 4, convex, gradually increasing, slightly descending towards the mouth; aperture oblique, lunate-rounded, margins approaching.

Diam. 2, altitude 1 mill.

San Francisco, California.

The spire is more raised, and the ribs more numerous and not so prominent as in *H. asteriscus*. It is distinguished from *H. Mazatlanica*, by its more distinct ribs and smaller umbilicus.

*** Diam. = $1-1\frac{1}{2}$ mill.5. **Pseudohyalina exigua**, Stimpson.

Plate 4, figure 57.

Discoidal, a little convex above, suture moderate; whorls $3\frac{1}{2}$, spirally striate, with oblique transverse ribs; aperture rounded; umbilicus wide, shallow, exhibiting the volutions.

Diam. $1\frac{3}{4}$ mill.

Canada, Massachusetts, Minnesota, around Lake Superior.

6. **Pseudohyalina millium**, Morse.

Plate 4, figure 56.

Depressed, convex above, transparent, shining, distinctly and regularly striate above, with microscopic revolving lines, more apparent beneath; whorls convex, rapidly enlarging; suture very deeply impressed; umbilicus quite large and deep, exhibiting all the volutions. White, with a greenish tinge.

Diam. $1\frac{1}{4}$, height $\frac{1}{2}$ mill.

Maine.

* * *

*Mexican Species.***Pseudohyalina Mazatlanica**, Pfeiffer.

Plate 4, figure 59.

Depressed, umbilicate, costato-striate, corneous; whorls 4, somewhat convex, the spire slightly raised; last whorl narrow, scarcely descending at the aperture; umbilicus equalling $\frac{1}{3}$ of the diameter; aperture oblique, lunately rounded, its margins approaching.

Diam. 2·3, altitude 1 mill.

Mazatlan, Mexico.

GLANDINA.

SYNONYMY AND REFERENCE TO

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- Fig. 3. *G. PARALLELA*, Wm. G. Binney. *Proc. Acad. Nat. Sciences*, p. 189, (1857.) No. 2.
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- " 4. *G. TEXASIANA*, Pfeiffer. *Proc. Zoological Soc.*, London, (1856.) No. 3.
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- Fig. 8. G. TURRIS, Pfeiffer. *Symbolæ*, iii., p. 91, (1846.) No. 7.
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- “ 4. S. CAMPESTRIS, Say. *Journ. Acad. Nat. Sci.*, i.,
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- “ 6. S. EFFUSA, Shuttleworth. Pfeiffer, *Monog. Hel.*
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- S. lineata*, DeKay. N. Y. Mollusca, p. 53, t. iv., f. 51, (1843.)
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- “ 10. *S. VERMETA*, Say. New Harmony Disseminator, ii., No. 15, (1829.) No. 10.
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- “ 13. *S. GRÆNLANDICA*, Beck. Pfeiffer, Monog. Hel. Viv., ii., p. 529, (1848.) No. 12.
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- " 24. *S. HIGGINSI*, Bland. (Nov. species.) *Amer. Jour. Conchology*, ii., No. 3, (1866.) No. 23.
- " 25. *S. RETUSA*, Lea. *Trans. Amer. Philos. Soc.*, v., p. 117, t. 19, fig. 86, (1837.) No. 24.
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- " 33. *S. AUREA*, Lea. *Proc. Amer. Philos. Soc.*, ii., p. 32, (1841.) No. 32.
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- " 35. *S. CINGULATA*, Forbes. *Proc. Zool. Soc., London*, p. 56, t. 9, fig. 8, (1850.) No. 34.

HELICELLIDÆ.

SYNONYMY AND REFERENCE TO
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- " 12. *H. FRIABILIS*, W. G. Binney. Proc. Acad. Nat. Sciences, p. 187, (1857.) No. 2.
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- Fig. 19. *H. CELLARIA*, Müller. Hist. Verm., No. 230,
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HELLICELLIDÆ.

SYNONYMY AND REFERENCE TO

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- " 23. *H. SUBPLANA*, Binney, l. c., ii., p. 229, t. 33,
(1851.) No. 11.
- " 24. *H. NITIDA*, Müller. Hist. Verm., ii., No. 234,
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Binney, l. c., ii., p. 243, t. 17, fig. 4, (1851.)
- " 38. *C. FABRICII*, Beck, Pfeiffer. Zeit. fur Mal., p. 90, (1848.) No. 2.
W. G. Binney, l. c., iv., p. 120, t. 77, fig. 17, (1859.)

See also figures 63, 64.

GASTRODONTA.

- " 39. *G. GULABIS*, Say. Jour. Acad. Nat. Sciences, ii., p. 156, (1821.) No. 1.
Binney, l. c., ii., p. 250, t. 37, figs. 3, 4, (1851.)
H. bicostata, Pfeiffer. Monog. Hel. Viv., i., p. 182, (1848.)

- Fig. 40. *G. LASMODON*, Phillips. Jour. Acad. Nat. Sci.,
viii., p. 182, (1842.) No. 2.
Binney, l. c., ii., p. 254, t. 37, fig. 2, (1851.)
H. macilenta, Shuttleworth? Bern. Mit., p.
195, (1852.)
- " 41. *G. SUPPRESSA*, Say. New Harmony Dissemi-
nator, ii., p. 229, (1829.) No. 3.
Binney, l. c., ii., p. 253, t. 37, fig. 1, (1851.)
- " 42. *G. INTERNA*, Say. Jour. Acad. Nat. Sciences,
ii., p. 155, (1821.) No. 4.
Binney, l. c., ii., p. 247, t. 30, fig. 4, (1851.)
- " 43. *G. MULTIDENTATA*, Binney. l. c., ii., p. 258, t.
48, fig. 3, (1851.) No. 5.

STROBILA.

- " 44. *S. LABYRINTHICA*, Say. Jour. Acad. Nat. Sci-
ences, i., p. 124, (1818) No. 1.
Binney, l. c., ii., p. 202, t. 17, fig. 3, (1851.)
- " 45. *S. HUBBARDI*, Brown. Proc. Acad. Nat. Sci-
ences, p. 333, (1861.) No. 2.

ANGUISPIRA.

- " 46. *A. SOLITARIA*, Say. l. c., ii., p. 157, (1821.) No. 1.
Binney, l. c., ii., p. 203, t. 24, (1851.)
- " 47. *A. ALTERNATA*, Say. Nicholson's Encycl., 1st
edit., t. 1, fig. 2, (1816.) No. 4.
Binney, l. c. ii., p. 212, t. 25, (1851.)
H. scabra, Lamarek, Anim. Sans. Vert., vi., p.
288, (1822.)
H. infecta, Pfeiffer, Mal. Blatt., p. 86, (1857.)
H. strongyloides, Pfeiffer. Proc. Zool. Soc.
London, p. 53, (1854.)
- " 48. *A. CUMBERLANDIANA*, Lea. Trans. Amer.
Philos. Soc., viii., p. 229, t. 6, fig. 61, (1843.) No. 6.
Binney, l. c., ii., p. 216, t. 31, (1851.)
H. mordax, Shuttleworth, Bern. Mittheil, (1852.)
- " 49. *A. STRIGOSA*, Gould. Proc. Bost. Soc. Nat.
Hist. ii., p. 166, (1846.) No. 5.
Moll. U. S. Expl. Exped., p. 36, fig. 41, (1852.)
Binney, l. c., ii., p. 210, t. 26, (1851.)

(See also figs. 52, 54.)

PATULA.

- Fig. 50 *P. PERSPECTIVA*, Say. Jour. Acad. Nat. Sciences, i., p. 18, (1817.) No. 1.
 Binney, l. c., ii., p. 256, t. 30, fig. 1, (1851.)
H. parvula, Deshayes, Encycl. Meth., ii., p. 217, (1830.)
- " 51. *P. STRIATELLA*, Anthony. Bost. Jour. Nat. Hist., iii., p. 278, t. 3, fig. 2, (1840.) No. 2.
 Binney, l. c.; ii., p. 217, t. 30, fig. 2, (1851.)
 (See also fig. 53.)

ANGUISPIRA.

(See fig. 49.)

- " 52. *A. COOPERI*, Wm. G. Binney. Proc. Acad. Nat. Sciences, p. 118, (1858.) No. 3.
 Terr. Moll., iv., p. 97, t. 77, fig. 11, (1859.)

PATULA.

(See fig. 51.)

- " 53. *P. DURANTI*, Newcomb. Proc. California Acad. Nat. Sci., p. 118, (1864.) No. 3.

ANGUISPIRA.

(See fig. 49.)

- " 54. *A. IDAHOENSIS*, Newcomb. Am. Jour. Conchology, ii., p. 1, t. 1, figs. 1, 2, 3, (1866.) No. 2.

PLANOGYRA.

- " 55. *P. ASTERISCUS*, Morse. Proc. Bost. Soc. Nat. Hist., vi., p. 128, (1857.) No. 1.

PSEUDOHYALINA.

- " 56. *P. MILLIUM*, Morse. Proc. Bost. Soc. Nat. Hist., vii., p. 28, (1859.) No. 6.
 W. G. Binney, l. c., iv., p. 101, t. 79, figs. 4, 5, (1859.)
- " 57. *P. EXIGUA*, Stimpson. Proc. Bost. Soc. Nat. Hist., iii., p. 175, (1850.) No. 5.
 Binney, l. c., iii., p. 16, t. 77, fig. 19, (1857.)
- " 59. *P. CONSPECTA*, Bland. Annals N. Y. Lyceum Nat. Hist., viii., (1865.) No. 4.
- " 58. *P. MAZATLANICA*, Pfeiffer. Malak. Blatt., iii., p. 43, (1856.)

(See also figs. 61, 62, 65.)

HELICODISCUS.

- Fig. 60. *H. LINEATA*, Say. Jour. Acad. Nat. Sciences,
i., p. 18, (1817.) No. 1.
Binney, l. c., ii., p. 261, t. 48, fig. 1, (1851.)

PSEUDOHYALINA.

(See fig. 59.)

- " 61. *P. INCRUSTATA*, Poey. Memorias, i., p. 208,
212, t. 12, figs. 11-16, (1852.) No. 3.
W. G. Binney, l. c., iv., p. 68, (1859.)
H. saxicola, (not of Pfeiffer,) Binney, l. c.,
ii., p. 174, t. 29a, fig. 4, (1851.)
- " 62. *P. MINUSCULA*, Binney. l. c., ii., p. 221, t. 17a,
fig. 2, (1851.) No. 2.
H. minutalis, Morelet, Testacea Novissima, ii.,
p. 7, (1851.)
H. apex, Adams, Cont. to Conch., p. 36, (1849.)
H. Lavalleana, *H. Mauriniana*, D'Orb., Moll.
Cuba, p. 161, t. 8, figs. 20-22, (1853.)

CONULUS.

(See figs. 37, 38.)

- " 63. *C. MINUTISSIMA*, Lea. Trans. Amer. Philos.
Soc., ix., p. 17, (1844.) No. 4.
W. G. Binney, l. c., iv., p. 100, t. 77, figs. 6,
7, (1859.)
H. minuscula, Binney, ii., p. 221, (1851.)
- " 64. *G. GUNDLACHI*, Pfeiffer. Wiegmann's Archiv.
für Naturgesch., i., p. 250, (1840.) No. 3.
H. egena, Gould, (not of Say,) in Binney, l. c.,
ii., p. 245, t. 22a, fig. 3, (1851.)

PSEUDOHYALINA.

(See Species 59.)

- " 65. *P. LIMATULA*, Ward. Binney, l. c., ii., p. 219,
t. 30, fig. 2, (1851.) No. 1.

PATULA.

(See Species 53.)

- P. WHITNEYI*, Newcomb. Proc. Cal. Acad.
Nat. Sciences, p. 118, (1864.) No. 4.
P. CRONKHITTEI, Newcomb, l. c., p. 180, (1865.) No. 5.

DESCRIPTIONS OF AMERICAN FRESH-WATER SHELLS.

BY T. A. CONRAD.

PHYSA, Drap.

1. *PHYSA POMILIA*, Conrad.—Plate 15, figs. 1, 2, 3.

Description.—Shell elliptical, thin, translucent; whorls 5, regularly rounded; spire conical, short; aperture about two-thirds the length of the shell, margin of labrum regularly rounded; base slightly produced.

Inhabits Randon's Creek, near Claiborne, Ala.

Physa pomilia, Conrad.—Amer. Journ., of Science and Arts, Vol. 25, p. 343, 1834.

ANCULOSA, Say.

2. *ANCULOSA PUMILA*, Conrad.—Plate 15, fig. 5.

Description.—Obliquely ovate, spire consisting of one convex whorl; apex eroded; color dark olive, almost black; aperture obtusely subovate; base slightly grooved behind the reflexed labrum.

Inhabits the Black Warrior River, Ala.

This small shell is supposed to belong to the family *Amnicolidæ*.

VIVIPARUS, Lam.

3. *VIVIPARUS GENICULUS*, Conrad.—Plate 15, figs. 11, 17.

Paludina genicula, Conrad.

Reeve has erroneously referred this very distinct species to *V. ponderosa*, Say, from which it is readily distinguished by its scalariform spire, and thinness in the substance of the shell. It is more nearly related to *V. integra*, Say.

UNIO, Retzius.

4. UNIO UBER, Conrad.—Plate 15, fig. 16.

Description.—Rounded, profoundly ventricose; posterior slope with a shallow subangular groove; posterior margin direct, extremity emarginate; umbo broad, inflated; epidermis brown above, pale olivaceous posteriorly and towards the ventral margin; within white, teeth very prominent.

Inhabits the Alabama River.

This species has some resemblance to a horse-chestnut.

5. UNIO FONTANUS, Conrad.—Plate 15, fig. 13.

Description.—Oblong, sub-compressed, thin in substance; disks flattened in the middle; beaks slightly raised above the hinge-line, undulated, decorticated; anterior margin regularly rounded; posterior extremity sub-truncated, or obtusely rounded; color green above, yellowish below and on the posterior slope, rays fine or linear, close, disappearing on the lower part of the anterior side; umbonal slope undefined; posterior slope with a slight oblique groove and raised line and distinct green ray; within bluish, white on the ventral submargin; lateral teeth single in both valves.

Inhabits a rivulet near Vicksburg, Miss.

I obtained one specimen only of this small species.

6. UNIO PRASINATUS, Conrad.—Plate 15, fig. 14.

Description.—Trapezoidal, very inequilateral; beaks decorticated, not plicate, hardly raised above the hinge-line; umbonal slope subangulated; posterior margin obliquely truncated, extremity subangulated; color olivaceous, with numerous close green rays, tinged with salmon-color; lateral teeth rectilinear.

Inhabits Florida.

**DESCRIPTIONS OF NEW MARINE BIVALVE
MOLLUSCA.**

BY T. A. CONRAD.

DOSINIA, Scopoli.

1. DOSINIA FLORIDANA, Conrad.—Plate 15, fig. 4.

Description.—Suborbicular, length rather more than the height, moderately thick, lentiform, inequivalve; posterior margin widely subtruncated, direct, or with a slight inward slope; concentric striæ regular, seldom anastomosing towards the ends, becoming obsolete towards the ventral margin; lunule depressed, with angulated margins.

Inhabits Florida Keys, Gulf of Mexico.

The shell is of a pale straw-color, with a few yellowish-brown irregular linear stains.

AZARA, D'Orbigny.

2. AZARA UNDATA, Conrad.—Plate 15, figs. 9, 10, 15.

Description.—Triangular, rather elongated, ventricose, inequilateral; lower valve waved, slightly constricted anteriorly; umbonal slope angular; upper subrostrated or subeuneiform; color bluish-white about the umbo and middle of the valves; pale brown generally on the other parts, and hair-like brown zig-zag lines on the anterior, conspicuous above and obsolete below.

Inhabits Rio de la Plata, S. A.

This species differs from *A. nimbose*, Sowerby.

CORBULA, Brug.

3. CORBULA CONTRACTA, Say.—Plate 15, fig. 12.

The figure is from a specimen found on the coast of North Carolina. The shell is a true *Corbula*, not an *Azara*, as H. and A. Adams suppose it to be.

PERIPLOMA, Schum.

4. PERIPLOMA PAPYRACIA, Say.—Plate 15, fig. 6.

This species is referred to in the Journal for January of the present year, page 70, and is figured on Plate 4, fig. 9. The illustration proving to be not so correct as desirable, I have re-figured it, as above indicated.

LUCINA, Lam.

5. LUCINA LINTEA, Conrad.—Plate 15, fig. 7.

Description.—Suborbicular, ventricose; beaks central; disks with close, radiating lines, and concentric, lamelliform, somewhat fringed striae; behind the umbonal slope is a slight furrow, or fold, minutely striated; cardinal and lateral teeth distinct; anterior cardinal area minutely wrinkled in the left valve, margins crenulated within; lunule acutely ovate, prominent.

Inhabits Tampa Bay, Florida.

TELLINA, Lin.

Subgenus ANGULUS?

6. TELLINA TAMPAENSIS, Conrad.—Plate 15, fig. 8.

Description.—Ovate-triangular, convex, inequilateral, very finely and closely lined concentrically; posterior margin obliquely subtruncated, the extremity angulated and situated much above the line of the base; cardinal teeth 2 in each valve, with an approximate short lateral tooth in the left valve, and a rudimentary lateral tooth in the opposite valve.

Inhabits Tampa Bay, Florida.

REFERENCE TO PLATE 15,
Illustrating Mr. Conrad's Papers.

- Figures 1, 2, 3, *PHYSA POMILIA*, Conrad.
“ 4. *DOSINIA FLORIDANA*, Conrad.
“ 5. *ANCULOSA PUMILA*, Conrad.
“ 6. *PERIPLOMA PAPYRACIA*, Say.
“ 7. *LUCINA LINTEA*, Conrad.
“ 8. *TELLINA TAMPAENSIS*, Conrad.
“ 9, 10, 15. *AZARA UNDATA*, Conrad.
“ 11, 17. *VIVIPARUS GENICULUS*, Conrad.
“ 12. *CORBULA CONTRACTA*, Say.
“ 13. *UNIO FONTANUS*, Conrad.
“ 14. *UNIO PRASINATUS*, Conrad.
“ 16. *UNIO UBER*, Conrad.

Editor's Table.

REVIEWS.

I.—AMERICAN

Proceedings of the Essex Institute. IV. No. 8. Salem, Mass.
June 2, 1866.

Observations on Polyzoa; Suborder Phylactolemata. BY
ALPHEUS HYATT.

A very important paper, containing microscopical observations on the genera of American Fresh-water Polyzoa, (Bryozoa,)—their structure and reproduction. Mr. Hyatt is the only American author, except Dr. Leidy, who has investigated into the history of this but little-known class of Mollusca. The paper is illustrated by several plates, drawn with that skill and finish which so eminently characterizes the pencil of Edward S. Morse.

Transactions of the Academy of Science of St. Louis. Vol. II.,
No. 2, Svo. St. Louis, 1866.

Some new varieties of Spirifer. BY G. C. SWALLOW.

- | | |
|-----------------------------------|-----------------------------------|
| <i>S. lineatus</i> , Martin. | <i>S. Leidyi</i> , Nor. and Prat. |
| var. <i>perplexa</i> , McChesney. | var. <i>Chesterensis</i> , Swal. |
| “ <i>striato-lineatus</i> , Swal. | “ <i>Merrimackensis</i> , Swal. |
| <i>S. cameratus</i> , Morton. | <i>S. increbescens</i> , Hall. |
| var. <i>percrassus</i> , Swal. | var. <i>Americana</i> , Swal. |
| <i>S. Kentuckensis</i> , Shumard. | <i>S. Keokuk</i> , Hall. |
| var. <i>propatulus</i> , Swal. | var. <i>Shelbyensis</i> . |

Descriptions of New Species of Bryozoa. BY DR. HIRAM A.
PROUT. (*Fossil*.)

- Fenestella nodosa*, Prout.
“ *dilata*, Prout.
Polypora imbricata, Prout.
“ *rigida*, Prout.
Retipora Hamiltonensis, Prout.
Ptilodictya (Stictopora) variabilis, Prout.

Annals of the Lyceum of Natural History of New York. VIII.,
Nos. 8, 9, 10. April, 1866.

Notes on Species of the Family Corbiculæ, with Figures.
BY TEMPLE PRIME. (Continued.)

This exceedingly valuable paper contains full descriptions of species, and their distinctive characters. The wood engravings are excellent.

The new species are:—

- Corbicula Pisidiformis*, Siam.
“ *Stimpsoniana*, ?
“ *vulgaris*, ?
Cyrena Mörchiana.

Corbicula notata, Prime, is made a synonym of *C. Cumingii*, Desh., and *Cyrena Corbiculæformis*, Prime, a synonym of *Veloritu Cochinchensis*, Hanley.

Tables of the Rectification of Mr. T. A. Conrad's "Synopsis of the Family Naiades of North America." BY ISAAC LEA, L.L.D. (Forming Appendix IV. to Mr. Binney's Bibliography of North American Conchology.) Smithsonian Miscellaneous Collections. Svo., 6pp. Washington, 1866.

This is a reprint of part of a paper published by Mr. Lea, under the above title, in the Proceedings of the Academy of Natural Sciences of Philadelphia, 1854.

Catalogue of the Genera Helix, Anastoma, Hypselostoma, Streptaxis, Tomigerus, Bulimus, Orthalicus, Partula, in the collection of A. D. Brown, Princeton, New Jersey. (2d edit.) January, 1866. 8vo., 65pp.

The first edition, published in 1861, contained Terrestrial Shells of all the genera—many of which are excluded from the present Catalogue. Over thirteen hundred species are enumerated, showing a marked increase since 1861. The collection of Mr. Brown is very rich in West Indian shells, particularly in those of the Island of Jamaica.

Note on the Affinities of the Bellerophonidæ. BY F. B. MEEK.
(From the Proceedings of the Chicago Academy of Sciences, Vol. I. March, 1866.)

Mr. Meek considers these ancient Mollusks to have been Gastropods, closely allied to *Fissurellidæ* and *Haliotidæ*.

Descriptions of Palæozoic Fossils from the Silurian, Devonian and Carboniferous rocks of Illinois, and other Western States. BY F. B. MEEK AND A. H. WORTHEN.

<i>Placunopsis carbonaria.</i>	<i>Anthracoptera? fragilis.</i>
<i>Aviculopecten randolphensis.</i>	<i>Myalina meliniformis.</i>
" <i>indianensis.</i>	<i>Monopteria, N. sub. gen.</i>
" <i>fimbriatus.</i>	<i>Pterinea (Monopteria) gibbosa.</i>
<i>Vanuxemia dixonensis.</i>	<i>Pterinea? subpapyracea.</i>
<i>Macrodon tenuistriatus.</i>	<i>Ambonychia (Megaptera) casei.</i>
<i>Schizodus curtus.</i>	

II.—FOREIGN.

BRITISH.

A Plain and Easy Account of the Land and Fresh-water Mollusks of Great Britain; containing Descriptions, Figures, and a familiar account of the habits of each species. BY RALPH TATE. 18mo., cloth, 244 pp., London, 1866. (Price 4 shillings plain, or 6 shillings colored.)

This little volume is more than it claims to be, and will prove a very useful and entertaining pocket companion to the well posted, as well as the uninitiated shell collectors of England. The species are all illustrated by lithographic plates and wood cuts.

Conchologia Iconica. Parts 252, 253. (Price 20 shillings.)

The present issue contains:—

Cerithium, plates 11 to 20, completing the monograph. Oct.—
Dec. 1865.

There are included in this genus, excluding *Vertagus* and *Cerithiopsis*, but embracing *Bittium*, one hundred and forty-nine species. The following are described as new:—

<i>C. lentiginosum</i> , Sowb.,	?
<i>C. filosum</i> , Sowb.,	Philippines.
<i>C. pupa</i> , Sowb.,	“
<i>C. Bermudæ</i> , Sowb.,	Bermuda.
<i>C. Adenense</i> , Sowb.,	Aden.
<i>C. Siphonatum</i> , Sowb.,	?
<i>C. clavis</i> , Sowb.,	?
<i>C. unilineatum</i> , Pease.	Sandwich Isles.
<i>C. fucatum</i> , Pease,	“ “
<i>C. Californiæ</i> , Sowb.,	California.
<i>C. Rissoidæ</i> , Sowb.,	St. Thomas, W. I.
<i>C. Thomasiæ</i> , Sowb.,	“ “
<i>C. delectum</i> , A. Adams,	Gallapagos.
<i>C. baticum</i> , Pease,	Sandwich Isles.
<i>C. pacillum</i> , Pease,	“ “
<i>C. tæniatum</i> , Sowb.,	Natal.
<i>C. altum</i> , Sowb.,	?
<i>C. tricarinatum</i> , Pease,	Sandwich Isles.
<i>C. insculptum</i> , Sowb.,	South Australia.
<i>C. trochiforme</i> , Sowb.,	California.
<i>C. gracillimum</i> , Sowb.,	?
<i>C. excavatum</i> , Sowb.,	North Australia.
<i>C. obsoletum</i> , Sowb.,	?

We notice, that in two cases, localities are given incorrectly, in ascribing to the United States species which are far-distant in their habitat. Thus, *C. Janthinum*, “Clermont-Tonnerre, (Island) U. S.,” and *C. lucertinum*, “Sydney Harbor, U. S.” The latter species was collected at Sydney, New South Wales, by Dr. Wm. Stimpson, and Dr. Gould has appended the initials W. S. to the locality, as authority for it. Mr. Sowerby has, perhaps, thought W. S. an error for U. S.

Eulima, 4 plates, Dec., 1865.

<i>E. arcuata</i> , Sowb.,	Sandwich Isles.
<i>E. solida</i> , Sowb.,	“ “
<i>E. subpellucida</i> , Pease,	“ “
<i>E. Sandwichensis</i> , Sowb.,	“ “
<i>E. conoidalis</i> , Sowb.,	“ “
<i>E. opaca</i> , Sowb.,	“ “
<i>E. retrorsa</i> , Sowb.,	Tahiti.
<i>E. gracillima</i> , Sowb.,	Guatemala.

Vertagus, 2 plates, Dec., 1865.

V. graniferus, Pease,

Sandwich Isles.

Natural History Transactions of Northumberland and Durham.

Vol. 1., No. 1. 8vo. Newcastle-upon-Tyne, 1865.

Reports of Deep Sea Dredging on the Coasts of Northumberland and Durham, 1862—4. Edited by GEORGE S. BRADY.

—*Report on the Mollusca.* BY JOSHUA ALDER.

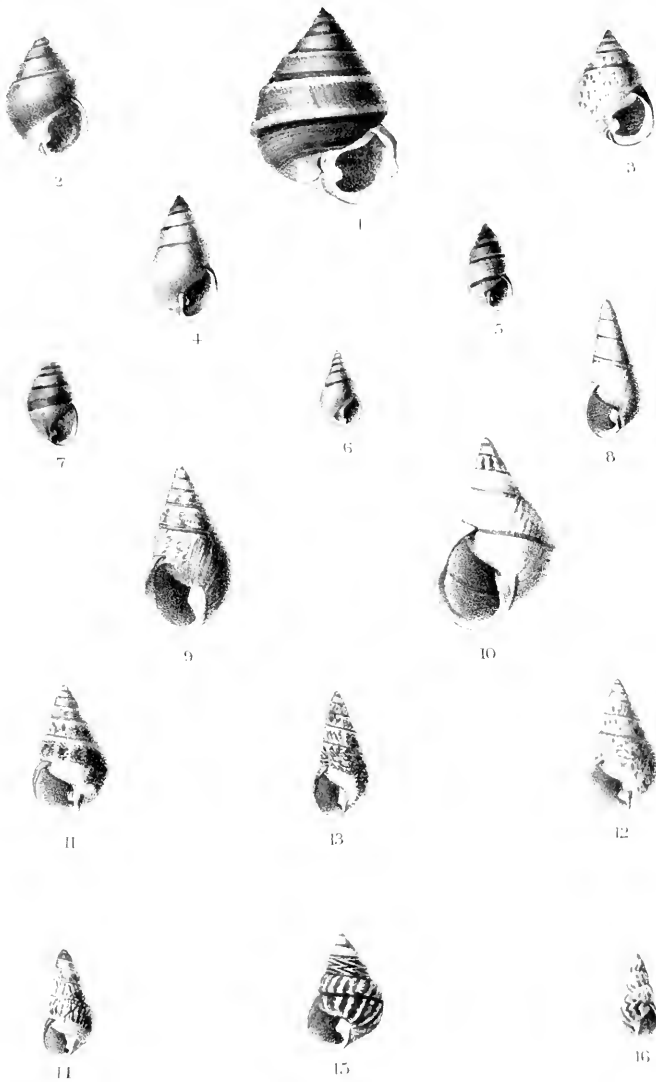
OBITUARY.

M. CANTRAINE.

Professor of Zoology at the University of Ghent. He published in 1840, in the "Memoires de l'Académie Royale de Bruxelles, XIII.," and also separately in quarto a "Malacologie Méditerranéenne," containing 173 pp., 4to., illustrated by 6 beautiful colored plates.

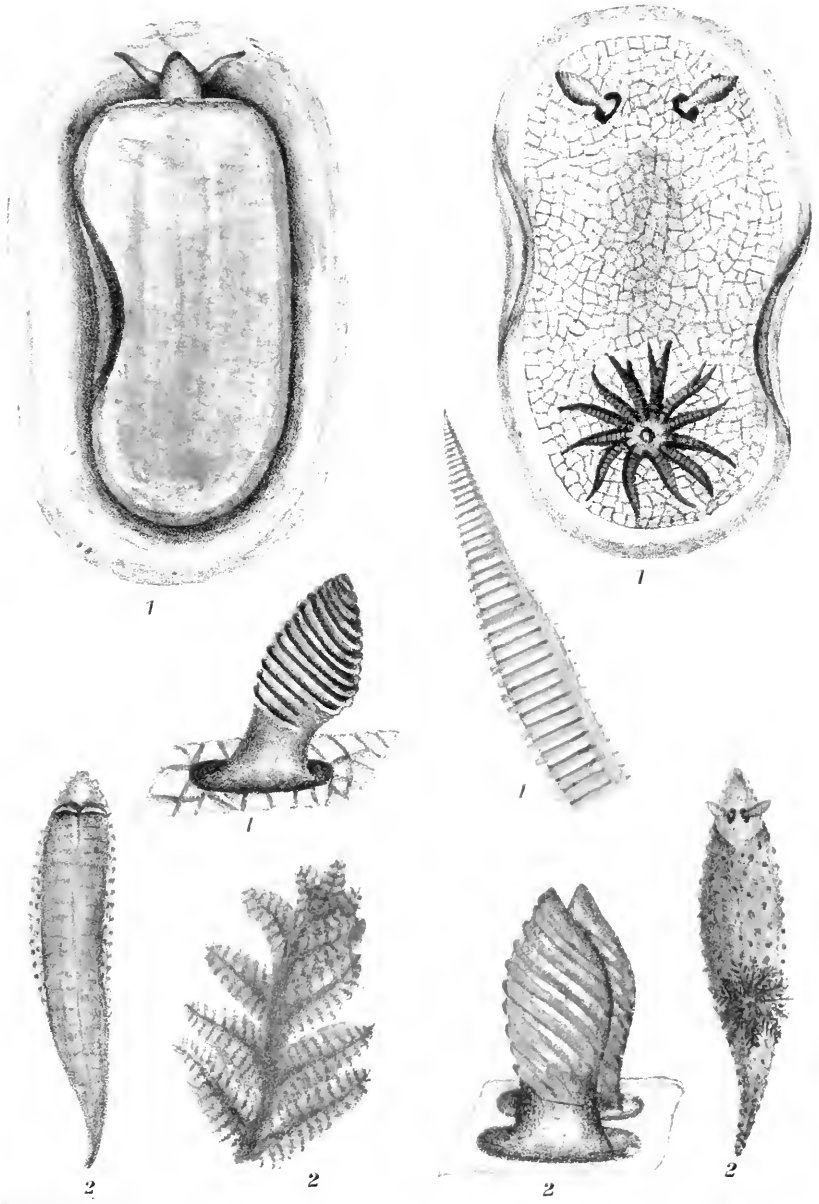
CHARLES A. POULSON.

We have, finally, to mourn the death of one of the earliest supporters of natural science, and of Conchology in particular, in America. Mr. Poulson is known only by one publication to naturalists generally—by his "Monograph of the Bivalve Shells of the River Ohio," being a translation of a work by Rafinesque; but to many of our earlier Conchologists he was a firm friend, furnishing "aid and comfort" freely for the promotion of their objects. He was also an enthusiastic collector, and amassed a cabinet which, a few years ago, would have been considered one of the best in the United States. By Mr. Poulson's will this collection is to be appraised and offered at private sale to public institutions; but should no sale be thus effected, it will be disposed of at auction.



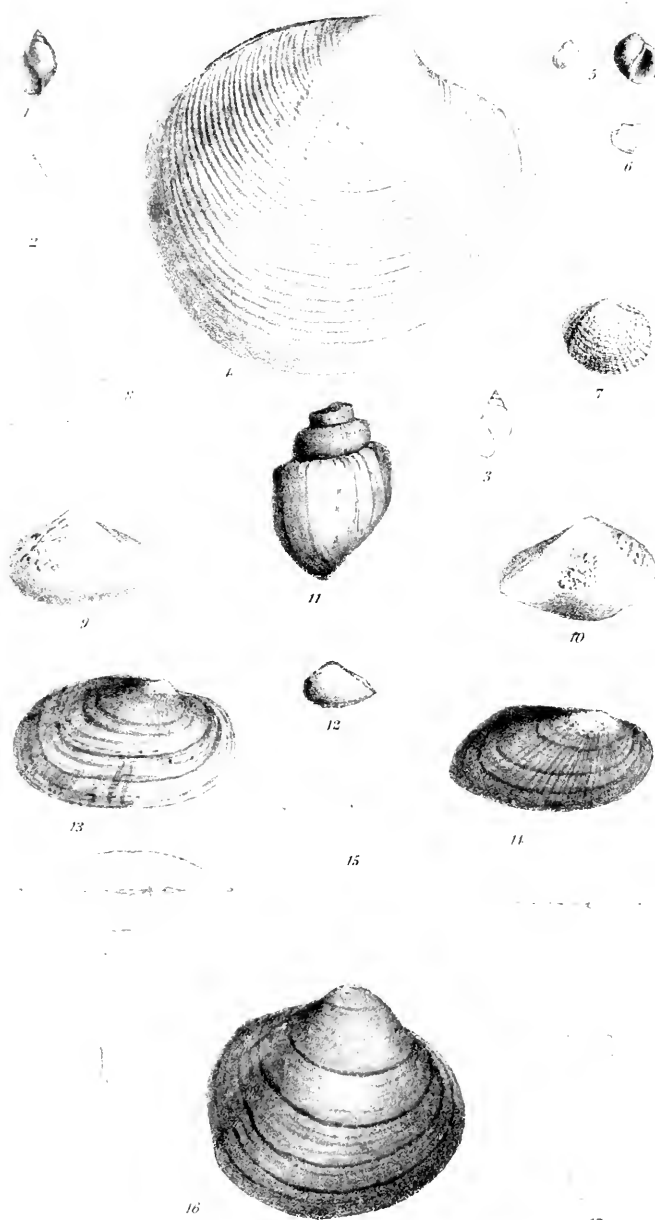
<i>Fig. 1. Achatinella Kauaiensis, Newcomb</i>	<i>Fig. 8. Achatinella bicolora Newcomb</i>
" 2 " <i>Anthonyi</i>	" 9 " <i>Dwighti</i> "
" 3 " <i>nigra</i>	" 10 " <i>physa</i> "
" 4 " <i>humilis</i>	" 11, 12 " <i>tetrao</i> "
" 5 " <i>pusilla</i>	" 13 " <i>Remyi</i> "
" 6 " <i>petricola</i>	" 14 " <i>Alexandri</i> "
" 7 " <i>succinea</i>	" 15 " <i>undulata</i> "

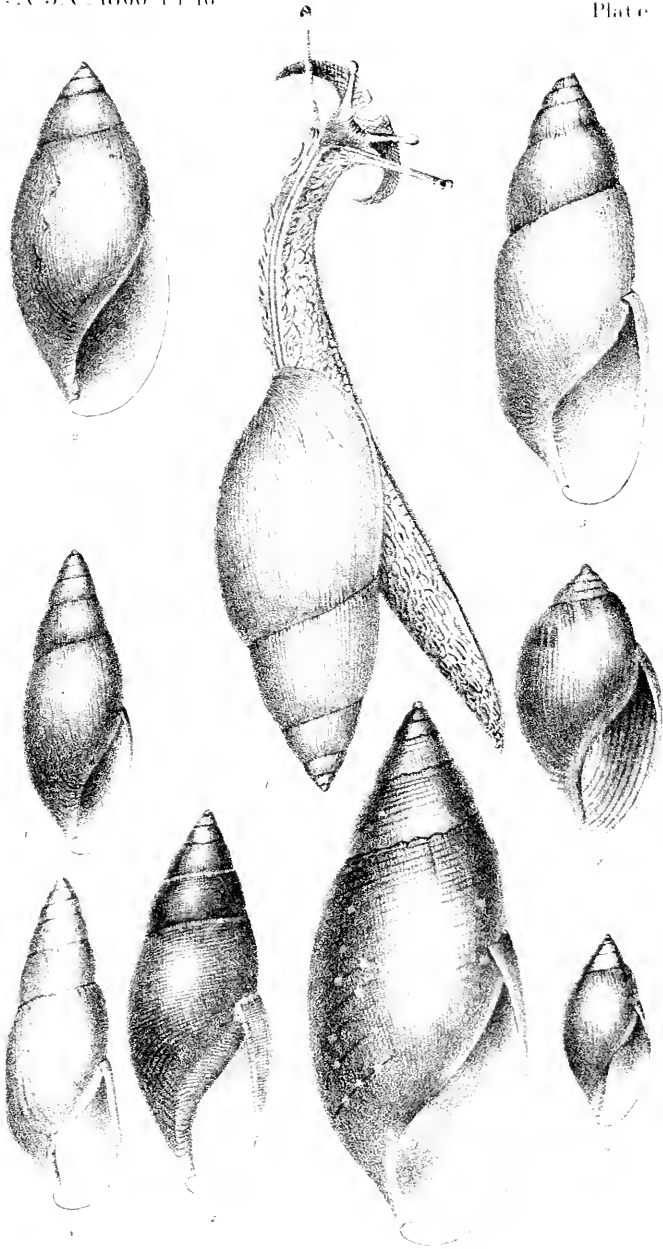
Fig. 16. Achatinella Mauiensis Newcomb

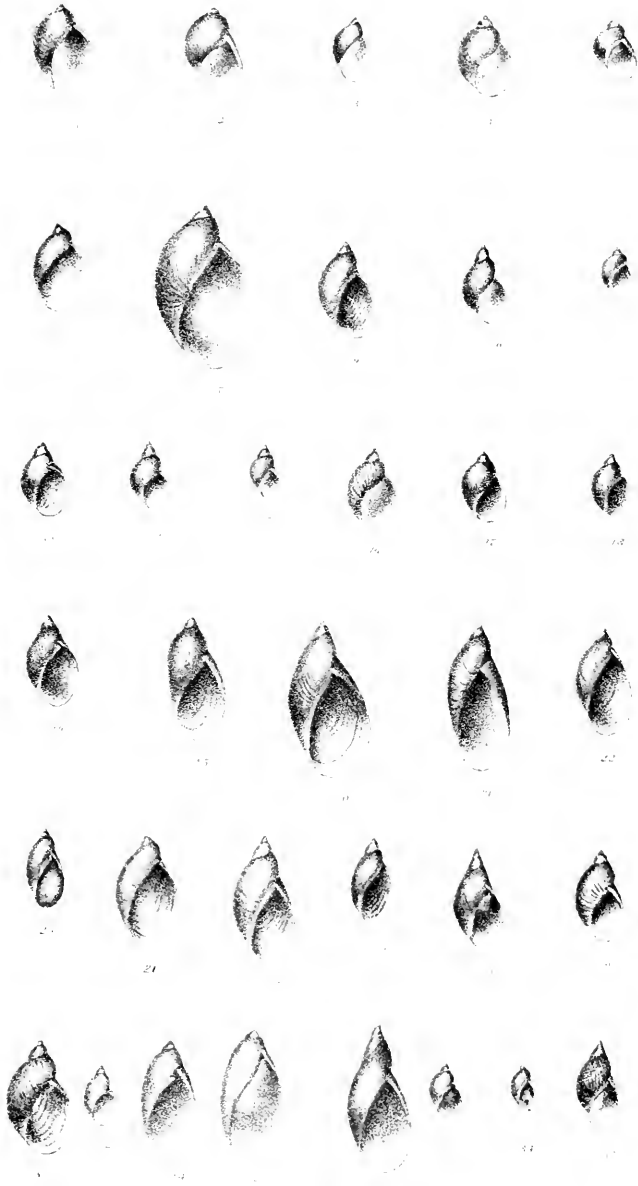


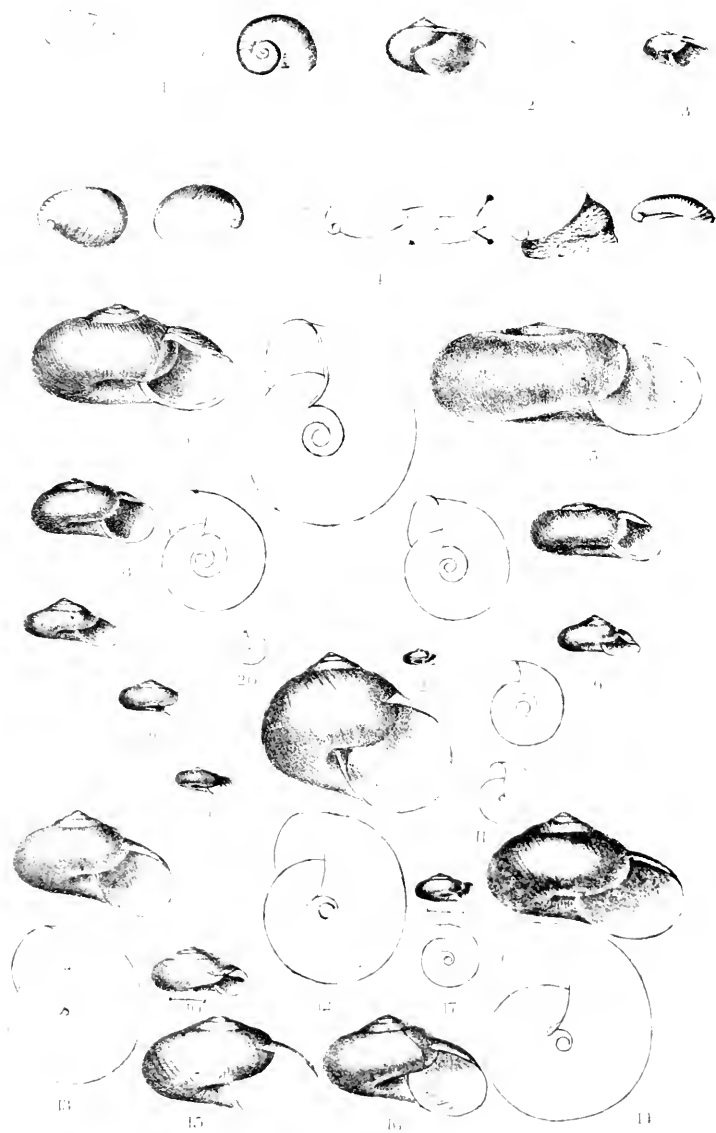
1 *Goniobrauchus reticulatus* Pease

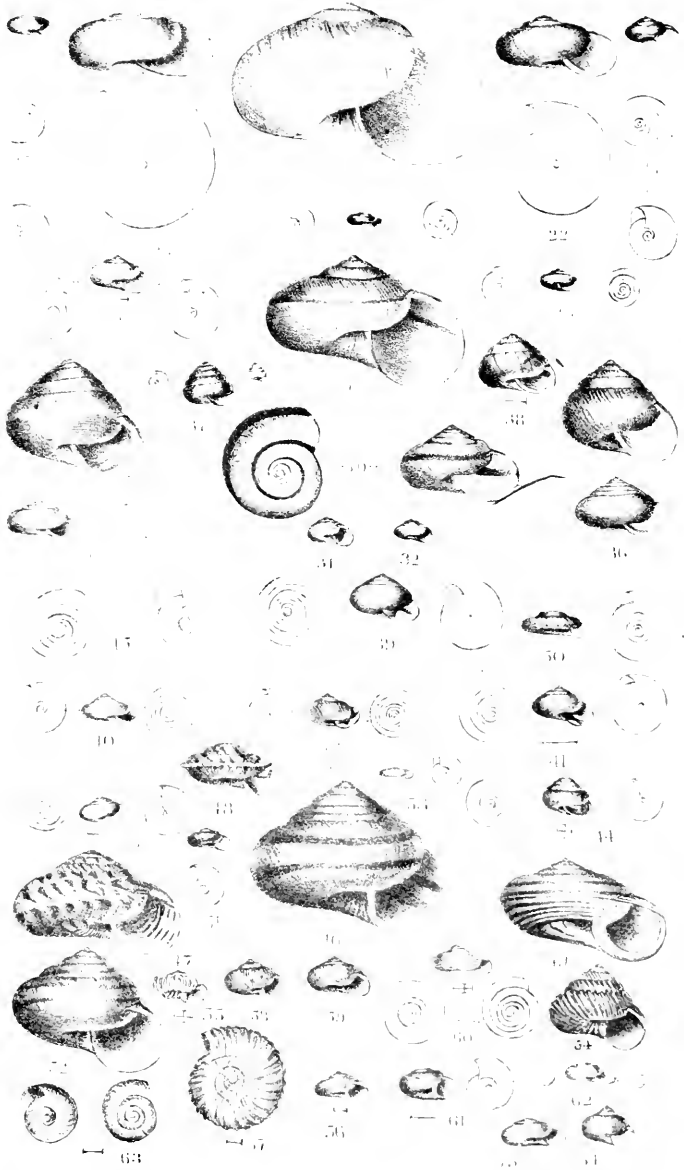
2 *Stenodonta subum* Pease













Bland

From a Photograph for the American Journal of Conchology 1866.

A M E R I C A N

JOURNAL OF CONCHOLOGY.

VOL. II.

OCTOBER 1, 1866.

No. 4.

DESCRIPTIONS OF NEW SPECIES OF LAND SHELLS,
INHABITING POLYNESIA.

BY WILLIAM HARPER PEASE.

1. *HELIX OUALANENSIS*, Pease.—t. 20, fig. 1.

Description.—T. parva, discoidea, tenui, lucida, supra plana, ad peripheriam rotundata; spira depressa, planam efformans; anfr. 3-4, celeriter accrescentes, radiatum striis tenuis incrementis subrugosis, concentricis sub lente striatis; ultimus basi rotundatus, late umbilicatus. Cinereo-lutescens, lineis aut strigis castaneis, angulatis et flexuosis, obliquis, ornata.

Dimensions.—Diam. 5, alt. 2 mill.

Shell small, discoidal, thin, shining, plane above, periphery rounded; spire depressed, forming a plane, slightly concave at apex; whorls 3-4, somewhat roughened by radiating striae of growth, concentrically obsolete striated, the last whorl rounded at base, widely umbilicate. Color light greyish-yellow, ornamented with brownish-red zigzag lines or stripes, obliquely, sometimes radiately disposed.

2. *HELIX VENOSUS*, Pease.—t. 20, fig. 2.

Description.—T. orbicularis, glabra, imperforata, tenuis, spira subconica, obtusa; anfr. 5, convexiusculi, gradati, ultimus ad peripheriam carinatus, basi convexus; apertura ovato-lunaris. Pallide cinereo-lutescens, lineis tenuis, nigricantibus, radiatim et concentricè ornata.

Dimensions.—Diam. 8, alt. 5 mill.

Shell orbicular, imperforate, thin, shining; spire somewhat conically elevated, obtuse; whorls 5, planely convex, the last carinate at periphery, base convex; aperture ovately lunate. Color greyish-yellow, base darker, ornamented with fine concentric blackish lines, and with faint radiating stripes and lines of the same color.

3. *HELIX FRIVOLA*, Pease.—t. 20, fig. 3.

Description.—T. parva, subgloboso-conica, tenuis, lævis, glabra, imperforata; anfr. 4, obsolete carinata, sutura impressa, vix marginata; apertura obliqua, lunato-ovalis. Pallide straminea.

Dimensions.—Diam. $5\frac{1}{2}$, alt. $3\frac{1}{2}$ mill.

Shell small, somewhat globosely conic, thin, smooth, shining, imperforate; whorls 4, obsoletely roundly carinate at periphery, suture impressed, finely marginate; aperture oblique, lunately oval. Color pale straw.

4. *HELIX DISTANS*, Pease.

Description.—T. tenuis, planorboidea, depressa, pallidè castanea, oblique costato-striata, supra planulata, spira parum elevata; anfr. 4-5, convexis, ultimo magno, rotundo, basi subangulato, sutura impressa; apertura magna, vix obliqua, subcircularis, ad parietale castellis intro volvente instructa; umbilico $\frac{1}{3}$ diametri subæquante.

Dimensions.—Diam. 7, alt. $2\frac{1}{2}$ mill.

Shell light, thin, planorboid, depressed, light chestnut, obliquely ribbed-striate, plane above, or spire very slightly elevated; whorls 4-5, convex, the last large, rounded, on its base slightly obtusely angulated, suture impressed; aperture large, nearly circular, and somewhat oblique, a number of rib-striae, revolving within on its base; umbilicus open, wide, comprising about one-third of the diameter of the shell.

Habitat.—Sandwich Islands.

Belongs to the *Hystrix* group of species, and is the most distant from the type, of any heretofore described.

5. *HELIX DECUSSATULA*, Pease.

Description.—T. discoidea, depressa, umbilicata, fusco-castanea et fulvo-maculose strigata, obliquè confertim et arcuatim costata, costellis volventibus decussata; anfr. 4-5, convexo-rotundatis, setigeris ornatis; sutura impressa, spira parum elevata; ad peripheriam rotundatim obsolete angulato; umbilico $\frac{1}{3}$ diametri subæquante; apertura elliptica, vix obliqua, lamella unica intro volvente instructa.

Dimensions.—Diam. $4\frac{1}{2}$, alt. $2\frac{1}{2}$ mill.

Shell discoidal, depressed, umbilicate, obliquely ribbed, ribs close, small, and somewhat curved or flexuous, decussated by concentric rib-striæ, which are more numerous and conspicuous on the base; whorls 4-5, convexly rounded, and sparsely ornamented with short hairs; suture impressed, spire but slightly elevated; periphery rounded or obtusely angulated; umbilicus about one-third the diameter of the shell, rounded on its edge; aperture somewhat oblique, and roundly elliptical, furnished with a single prominent lamella on the penultimate whorl; the radiating ribs of the exterior extend within the aperture. Mottled and striped irregularly with chestnut-brown and pale yellow.

Habitat.—Sandwich Islands.

6. *HELIX RUGATA*, Pease.

Description.—T. lenticulari, umbilicata, obliquè et irregulariter rugosa striata, et striis spiralibus decussata; anfr. 5, tumidiusculis, ad peripheriam acute carinato, spira parum elevata, apice obtuso, basi convexiusculo, ad umbilicum rotundè angulato; umbilico $\frac{1}{3}$ diametri subæquante; apertura subrhomboidea, lamellis duabus conspicuis parietalibus, unica parva in supero, dentibus lamellæformis tribus in labium. Fusco et pallidè fulvo tessellata.

Dimensions.—Diam. 5, alt. 2 mill.

Shell lenticular, umbilicate, irregularly ribbed obliquely; ribs small, wrinkled or flexuous, and decussated by concentric striæ; base decussated by revolving and radiating rib-striæ; whorls 4-5, slightly swollen, sharply carinate at periphery; spire but slightly elevated; apex obtuse; base somewhat obversely conical, plano-convex; umbilicus about one-third the diameter of the shell, roundly angulate on its edge; aperture subrhomboidal, furnished with two prominent lamellæ on the penultimate whorl, a small one on the upper side, and three lamelliform teeth on the labrum and pillar.

Habitat.—Sandwich Islands.

7. *HELIX LAMINATA*, Pease.

Description.—T. lenticularis, depressa, late et profunde umbilicata, oblique rugosula costata et sublente striis spiralibus obsolete decussata; apice obtuso; anfr. 6-7, convexiusculis, peripheria acute carinata; basi convexiusculis, costellis volventibus et striis radiatis decussata; apertura trapezoidalis, laminae 2 in pariete, 1 in columellae, 4 in basali, 1 in supero. Cornea, fusco maculoso strigata.

Dimensions.—Diam. 7, alt. $2\frac{1}{2}$ mill.

Shell lenticular, depressed, the upper surface obliquely ribbed, ribs small, irregular, rather close and sometimes curved or wrinkled, and obsoletely decussated by very fine revolving striae; umbilicus deep, one-third of the diameter of the shell, and angulate at its edge; whorls 6-7, upper ones faintly marginate; spire slightly convex, and apex obtuse; aperture trapezoidal, furnished with eight prominent laminae, of which two are on the wall of the aperture, one on the columella side, one on the upper, and four on the outer side. Yellowish-brown color, spotted and striped with reddish-brown.

Habitat.—Sandwich Islands.

8. *HELIX CAPILLATA*, Pease.

Description.—T. laevis, tenuissima, planorboidea, late et profunde umbilicata, radiatum costata, interstiiis subtilissime, et subflexuose striatus, striis volventibus, remotis, ornata; epidermide membranaceus induta; clathris setigeris insignis; anfr. 5, obtuso-carinatis, spira concava, sutura valde impressa; ad peripheriam rotundata; apertura subcircularis, rubro-castanea et straminea tessellata.

Dimensions.—Diam. 5, alt. 2 mill.

Shell very light, thin, planorboid, concave above, radiately ribbed, ribs numerous, rather small, their interstices very finely and somewhat flexuosity striated, also ornamented with remote revolving striae, which are most conspicuous on the periphery and base; shell covered with a membranaceous epidermis, bearing radiating lines of stiff hairs; whorls 5, obtusely carinated, suture deeply impressed, periphery broadly rounded, base obtusely carinate; umbilicus open and deep, comprising nearly one-half the diameter of the shell; aperture subcircular. Alternately and radiately banded with reddish-brown and light straw-color.

Habitat.—Sandwich Islands.

9. CARELIA OLIVACEA, Pease.

Description.—T. elongato-turrita; anfr. 8-9, plano-convexis, lævis vel transversim obsolete liris, anfr. ultimo, basi obtuse angulato; apertura parva, ovata; columella valde arcuata, ad basim oblique truncata; epidermide tenui viridescens olivacea induta; apertura fauce cœrulescente, labro nigricans, columella ad basim nigricante fusca. Interdum fascia albescens infra sutura circumdata.

Dimensions.—Long. 69, diam. 19 mill.

Shell elongately turritid; whorls 8-9, flatly convex, smooth or obscurely ribbed transversely, the last roundly angulate at its base; aperture small, ovate, about one-fifth the length of the shell; columella strongly arched and obliquely truncate at base; covered with a greenish-olive epidermis, which often, after the death of the animal, darkens; the suture is sometimes margined with a white or light colored band, which is free of epidermis; aperture bluish, edge black, base of columella dark chestnut.

Habitat.—Sandwich Islands.

Note by the Editor.—I have received from Mr. Pease the following corrections to his paper on "Partulæ," published in the last number of the Journal:—

PARTULA FASCIATA, Pease, = P. GANYMEDES, Pfr.:—"I was misled by an error in locality." In most cases, it will be noticed Mr. Pease does not acquiesce (nor do I) in the determinations, respecting the identity of his Partulæ with species already described by other authors, as determined by Mr. Cuming, and published in our first volume, p. 369, (from Proc. Zool. Soc.)

PARTULA LUGUBRIS, Pease.--Already published in Proc. Zool. Society, London.

A WELL-ABUSED MOLLUSK.

BY H. CROSSE.

Translated from the "Journal de Conchyliologie" for April, 1866,

BY FRANK DAULTE, CINCINNATI, OHIO.

The Poulp has ever been unfortunate in his relations with the human race. Fishermen hate him on account of the considerable quantity of small fishes, crustacea and mollusca destroyed by him, to their detriment. Instead of seeing in him a colleague,—a fisherman by trade like themselves, using but loyal means of competition, perfectly justifiable in such an era of commercial liberty as ours is,—they consider him rather as a pirate, unworthy of merey, who must be checked: and they lose no opportunity of capturing and destroying him. Moreover, during the bathing-season, they take a mischievous pleasure in relating to inquisitive Parisians (and for them every bather is a Parisian, whether he comes from Carcassonne or Beunos Ayres) the most dreadful stories about this mollusk. If to this be added, that from Pliny to Denys de Montfort, the most boasting of modern naturalists, scores of authors have taken pleasure in reproducing, with exaggeration, the absurd tales concerning the Poulp in old popular tradition, no wonder that so many persons fear almost as much as they do the shark, this cephalopod, whose odd organization, and his long arms furnished with sucking apparatus, renders him so odious to persons unacquainted with Natural History. Thus Denys de Montfort, in one of his works, after having related the story, as terrific as unlikely, of a gigantic Poulp, which folds its arms round a large ship, and threatens to carry her down in the abyss of the deep, adds, in corroboration of his tale, a plate representing this sad event, and more worthy of being displayed on a quack's sign at a market show, than in the writings of a trustworthy naturalist. He then relates, in good earnest, the battles which he himself fought with Poulps in the neighborhood of Havre, and which he won only through his tried valor and the invaluable help of a huge bull-

dog, his companion in his daring expedition. God knows, however, if the Poulps of our coasts deserve such a bad name, and if their capture is attended with the least danger. We here appeal to the recollections of all naturalists who ever attempted this kind of fishing, and if we be allowed to mention our own personal experience, we can certify, that, at several points of the coast of the Mediterranean, as well as of the ocean, we have caught Poulps, and seen them caught, and that, in no case, the help of the police has ever been needed.*

Nothing was wanting to these unfortunate creatures to lose their good name entirely, but to be patronized by modern literateurs. This has just been their fate. M. Victor Hugo does the Poulp the honor to devote to him a whole long chapter, in his new novel entitled "The Toilers of the Sea," and it is not precisely to eulogize him. Had he been satisfied to vilify him as to his morals by representing him to be of a treacherous and hypocritical nature, and in pretending that this invertebrate is "jelly seasoned with hatred!" we should have sighed in silence on the fate of an ill-used mollusk, accompanied with antithesis and pathos; but as to-boot, he endows him physically with an impossible, monstrous and unheard-of organization, which has never existed in like animals, we cannot help protesting, as a conchologist, against the lamentable encroachment on science by literateurs who are perfectly unacquainted with it, and who, therefore, speak about it like a blind man would of colors.

We do not exaggerate, we trust our readers will believe us; however, they can judge for themselves. The author begins by criticising Lamarek, highly exalting Montfort, which may easily be understood, the one being, indeed, much less romantic than the other. He then compares the Poulp—which he calls "Pieuvre," the vulgar name given to him by the fishermen of the islands of the Strait of Dover—with 17 animals which bear no resemblance whatever to him, thus affording the luxury of 17 of the strangest antithesis, of which we shall only transcribe a few, for the special benefit of savants. "The Bithus has pinchers, the Pieuvre has no pinchers; the Alouat has a twisting tail, the Pieuvre has no tail; the Lion has claws, the Pieuvre has no claws; the Eagle has a beak, the Pieuvre has no beak."

But yes, M. Victor Hugo, the Pieuvre has a beak, and a strong one, too, horny, sharp, moved by powerful muscles, and very similar to a reverted parrot's beak. In taking it away from this poor creature, you deprive him of his means of subsistence. How otherwise do you suppose he could

* The only really gigantic cephalopods, whose existence has been proved, do not belong to the genus Poulp, but are Decapods.

break open the calcareous covering of the crustacea and mollusca on which he feeds? Not, assuredly, with his sucking apparatus. You will probably have the kindness to lend him a nut-cracker!

Further, we find the following delightful remarks, relating to the functions of nutrition of that animal: "The Pieuvre has but one opening in the centre of his radia. Is this only hiatus the anus? Is it the mouth? It is both. The same opening performs both functions. It is entrance and outlet." Further still we read: "Another second, and his mouth-anus was being applied to Gilliatt's chest. Gilliatt bleeding on the side, and having both arms entangled, was a dead man." . . . What are you about, M. Victor Hugo? You give here the Poulp an organization as dirty as it is incorrect. All naturalists know very well that cephalopods have an anal orifice quite distinct from the buccal one, and which opens into the locomotive tube. It would have been easy for you to ascertain the fact, if, instead of consulting the ridiculous fables of Montfort, you had read some good work of one of the numerous naturalists who have written scientifically on the cephalopods, such as Cuvier, D'Orbigny, Vérany or Owen, for example. We must again, then, protest as energetically as at first, in the name of all those who understand aught about Natural Sciences. We would have a great many more such assertions to correct in this strange chapter, but it would lead us too far. Still the beotians of literature will not fail to praise it beyond measure, as well as the finest parts of the work. It is then, we believe, the duty of those who have, although unassumingly, yet conscientiously, devoted their lives to the study of science, to point out and rectify such gross errors, much more dangerous when they emanate from so eminent a writer as M. Victor Hugo, than if they came from an obscure author. We must add, that, although this unlucky chapter is full of every kind of enormities, and of facts completely false as to science, the paper of Paris which has the largest circulation, although not exactly the most intelligent, has seized with eagerness this opportunity (with that scent which characterizes it) to chose it precisely as a specimen of the work, and to transcribe it at full length, with the warmest eulogies.

We see thereby that popular instruction is in good hands, and in a fair track as regarding Natural Sciences. M. Michelet, also a confused literateur in regard to science, had already drawn quite an amusing fanciful portrait of the Poulp; but, after that sketched by M. Victor Hugo, nothing more can be added. It is easy enough to make it more accurate; but to frame it more fantastically, would be almost an impossibility.

DESCRIPTION OF A NEW SPECIES OF COLUMNA.

BY GEORGE W. TRYON, JR.

COLUMNA LEAI, Tryon.—Plate 20, fig. 1.

Description.—Shell elongate-fusiform, sinistral, smooth, somewhat thick; whorls 6, obliquely revolving, increasing gradually and somewhat convex, but broadly flattened on the periphery, which in the last whorl is somewhat impressed; apex obtuse; suture crenate margined, not deep; aperture small, narrow-ovate, the labrum with a slight revolving white callus. Yellowish, with oblique zig-zag longitudinal brown stripes.

Dimensions.—Length 66, diam. 19 mill.; length of aperture 23, width 9 mill.

Habitat.—Prince's Isle, W. Coast of Africa, (Dr. J. Wilson, U. S. N.)

My Cabinet. Cabinet of Isaac Lea. Cabinet of the Academy of Natural Sciences of Philadelphia.

Observations.—But three species of this genus have been previously described—the typical one, *C. flammea*, Martyn, with which this has probably been confounded, *C. eximia*, Shuttleworth, and *C. Hainesi*, Pfeiffer.

C. eximia, an inhabitant of Madagascar, is dextral, wants the longitudinal reddish-brown flames which ornament the other species, and in other respects differs so much, that, uniting to these points its geographical position, it may fairly be questioned whether it appertains at all to the genus *Columnna*.

The other species—*flammea*, *Hainesi*, and *Leai*—are all sinistral, and are inhabitants of Prince's Island.* They resemble one another closely in coloration and markings, but differ in the following particulars:—*flammea* and *Leai* are drawn-out species, with the whorls flattened in the middle, while *Hainesi* is a smaller shell, more conical, more convex, and with somewhat angulate periphery. *C. flammea* is at once distinguished

* I take great pleasure in dedicating this species to Mr. Lea, to whom I owe the opportunity of describing it. I have since found a specimen in the collection of the Academy of Natural Sciences, sent by a London conchologist, under the name of *C. flammea*.

from either of the others by its granulate surface, caused by the decussation of the irregular oblique growth-lines, by close, deeply impressed revolving striae; also by its flames of brown being narrower, more irregular, and by its much more prominent revolving tooth or rib on the columella.

In *Hainesii* the brown flames are, perhaps, still broader than in *Leai*, but the great differences are in size and form, which I have endeavored to show in Plate 20, fig. 2, representing *C. Hainesii*. This species, described in 1856 by Pfeiffer, is now, for the first time, figured. With regard to dimensions, the following are the measurements:—

	Length.	Diameter.
<i>C. Hainesii</i> ,	44 mill.	17 mill.
<i>C. Leai</i> ,	66 “	19 “

C. Hainesii is described by Pfeiffer from Cape Palmas, but I have before me several specimens, belonging to Mr. Lea's cabinet, collected by Dr. J. Wilson at Prince's Isle.

DESCRIPTIONS OF NEW SPECIES OF MELANIIDÆ
AND MELANOPIDÆ.

BY GEORGE W. TRYON, JR.

1. MELANIA MINUTA, Tryon.—t. 20, fig. 3.

Description.—Elevated-conical, spire acute; whorls 7, very convex, slowly increasing in size; suture deeply impressed; aperture small, ovate, well rounded below, columella incurved. Bright brown, obscurely strigate with red.

Dimensions.—Height 8, diam. 3 mill.

Habitat.—Tahiti, (Sr. Patricio Ma. Paz.)

My Cabinet. Cabinet of Sr. Paz, of Madrid, Spain.

Observations.—This is one of the smallest species of the genus. Fortunately, many of the specimens communicated to me possess opercula, thus enabling me to decide positively the generic position. *M. minuta* has been used by Dr. Brot as a substitute for *M. exigua*, of Morelet, supposing the latter name to be pre-occupied by Mr. Conrad for a California species; but as *M. exigua*, Conrad, does not belong to the genus *Melania* at all, *M. exigua*, Morelet, will stand, and I am at liberty to use the name *minuta*.

2. MELANIA OUALANENSIS, Pease MSS.—t. 20, fig. 4.

Description.—Shell elevated, conical, rather thick; spire elongate, apex truncate, suture deeply impressed; whorls 5, (remaining), covered with revolving close striae, and crossed by distinct distant plications, of which there are about twenty on the last whorl, becoming more prominent just below the suture; aperture moderate, narrow-ovate, rounded below. Dark horn-color, with narrow zig-zag red flames.

Dimensions.—Height 28.5, diam. 12 mill.

Habitat.—Oualan I., (W. H. Pease.)

My Cabinet. Cabinet of Mr. Pease, of Honolulu, Sandwich Islands.

Observations.—This species appears to be most nearly allied to *M. perpinguis*, Hinds, of Tahiti, from which it differs principally in the whorls being more convex, the plicæ more distant and prominent.

3. MELANIA PEASEI, Tryon.—t. 20, fig. 5.

Description.—Shell elevated, spire decorticated, with 3 whorls remaining, suture very slightly impressed; whorls flattened, slightly increasing, covered with faint revolving striæ; aperture oval, well rounded below. Very dark chocolate-brown, with an infra-medial yellowish band, dark red within.

Dimensions.—Height (truncate) 23, diam. 9 mill.

Habitat.—Fiji Isles, (Smithsonian Institution.)

My Cabinet. Smithsonian Collection, Washington, D. C.

Observations.—I have twice received this species, with printed label attached, from the Smithsonian Institution, the name being determined by comparison with his types by the late Hugh Cuming, of London. It was first sent as *perpinguis*, Hinds, along with genuine examples of that species, from which it differs greatly; and afterwards as *M. rudens*, described by Mr. Reeve without locality, but inhabiting, as we have ascertained, Oregon.

4. HEMISINUS PAZI, Tryon.—t. 20, fig. 6.

Description.—Clavate, smooth, thick; spire conical, apex obtuse, suture slightly impressed; whorls 3 (remaining), flattened above, rapidly increasing, the last subangulate, and more convex below the periphery; aperture large, very slightly produced at base, labrum thickened, broadly appressed. Polished horn-color; with irregular transverse short lines of red-brown, whitish within.

Dimensions.—Length 20, diam. 13 mill.

Habitat.—Quito, (Sr. Patricio Ma. Paz.)

My Cabinet. Cabinet of Sr. Paz.

Observations.—This species is not nearly allied to any previously described. Together with the following and *H. Binneyi*, published by me in the Journal of Conchology for 1865, it appears to form a peculiar group, readily distinguished from the well-known species of Brazil and the Orinocco River.

5. HEMISINUS SIMPLEX, Tryon.—t. 20, fig. 7.

Description.—Narrowly conical, smooth, spire elevated, apex obtuse, suture scarcely impressed; whorls 5, rapidly increasing; aperture narrow-ovate, angulate at both ends, columella slightly thickened, body-whorl without callus. Light olive, bordered with yellow below the suture, and with perpendicular zig-zag red stripes.

Dimensions.—Length 17, diam. 9 mill.

Habitat.—Quito, (Sr. Patricio Ma. Paz.)

My Cabinet. Cabinet of Sr. Paz.

Observations.—More slender, and differently colored and marked from *H. Pazi*. The aperture is also different at the base. It is a very showy species, of which I have seen several specimens.

DESCRIPTION OF A NEW SPECIES OF SEPTIFER.

BY GEORGE W. TRYON, JR.

SEPTIFER TRAUTWINEANA, Tryon.—t. 20, fig. 8.

Description.—Shell mytiliform, obtusely angulate medially, and with a carina extending from the beak to the centre of the posterior basal margin; lines of growth irregular, rugose; epidermis dark brown. Septum deeply sunken, with a longitudinal lamina under its posterior side. On the anterior margin, near the beaks, one valve is produced into a tooth, which clasps into a sinuosity in the other.

Dimensions.—Length 37, breadth 16, height 18 mill.

Habitat.—River San Juan, New Granada.

Cabinet of Isaac Lea, LL.D.

This large species was obtained by Mr. Trautwine in the River San Juan, a small stream, emptying into the Pacific in latitude 4°. Mr. Lea kindly communicated it to me for description.

DESCRIPTION OF A NEW SPECIES OF HELIX.

BY GEORGE W. TRYON, JR.

HELIX BRIDGESI, Tryon.—t. 20. figs. 9-11.

Description.—Discoidal: whorls 4, rather convex, striate, spire not elevated, suture deeply impressed: umbilicus wide and rather deep: aperture oval, small: lip not expanded. Light horn-color, with revolving brown bands, a narrow and then a broader one above the periphery, and three equidistant below it, the one nearest the umbilicus indistinct.

Dimensions.—Diameter 9, height 3 mill.

Habitat.—Nicaragua. (Bridges.)

My Cabinet.

Observations.—I can find no species with which this is very closely allied, except *Helix Chiapensis*, which is, however, differently banded, and has a narrower umbilicus. Several other species of land and fluviatile shells, brought from Nicaragua by the late lamented Bridges, remain to be determined, and some of them will probably prove to be new.

ON THE TERRESTRIAL MOLLUSCA OF THE GUANO ISLAND OF NAVASSA.

BY GEORGE W. TRYON, JR.

The minute island of Navassa, a mere speck upon the ocean, is over a hundred miles south of the eastern extremity of Cuba, nearly as far east of Jamaica, laying between it and Haiti—about fifty miles west of the latter.

So extremely local is the distribution of the Terrestrial Mollusks of the West India Islands, that such complete isolation is the surest guarantee of its species being peculiar to it.*

Until very recently, no species of shells were known to inhabit Navassa; but the introduction into the United States of its rich guano, has made us better acquainted with its natural productions.

To Mr. Eugene Gaussoin, Mining Engineer, of Baltimore, who recently visited the Island to report on its guano deposit, for the Navassa Company, science is indebted for the collection of the following recent, as well as some fossil species of shells; and to my friends, Mr. Thomas Bland and Prof. F. V. Hayden, I am obliged for the opportunity of describing these very interesting new species.

1. *HELIX GAUSSOINI*, Tryon.—t. 20, fig. 11.

Description.—Globosely depressed, smooth, rather thick; spire depressed-conical, apex obtuse, suture moderately impressed; whorls $5\frac{1}{2}$, convex, increasing slowly, not deflected at the aperture; aperture small, semilunar, labrum sharp, not reflected, but much thickened at the base, and terminating in the centre of the base of the shell, where it is considerably impressed and dilated, covering the umbilicus. White, the spire a faint flesh-color, (denuded of epidermis.)

Dimensions.—Diam. 9, alt. 6 mill.

Only one specimen of this species is before me; it is somewhat related to the Cuban group to which *H. melanocephalos*, &c., pertain.

* See Bland's paper on the "Geographical Distribution of the Land Shells which Inhabit the West Indies," published in the *Annals of the New York Lyceum of Natural History*, Vol. VII.

2. *CHONDROPOMA NAVASSENSE*, Tryon.—t. 20, fig. 12.

Description.—Ovately turrated, moderately thick, slightly truncate, covered with numerous close, sharp revolving lines decussating the almost equally prominent ridges of growth, and becoming more distinct towards the base; sutures excavated and minutely crenate-margined; aperture suboval, the outer lip expanded, but not reflected, produced angulate above, and rounded angulate below, the labrum laying close on the body-whorl, and almost entirely covering the umbilicus. Light horn-color or nearly white (bleached?)

Dimensions.—Alt. 18 (truncated), diam. 12 mill.

I have seen five specimens of this shell, of which one, from Prof. F. V. Hayden, appears to be fossil. Although no opercula were preserved, there is little doubt but that it belongs to the genus *Chondropoma*, a genus which is present both in Cuba and Haiti, but not represented in Jamaica, thus showing the alliance of the fauna of Navassa with those of the two former islands.

3. *HELICINA CIRCUMLINEATA*, Tryon.—t. 20, fig. 13.

Description.—Elevated, conical, apex mucronate; whorls 6, covered with close revolving lines, the last one having about twenty above the subangulate periphery, and smaller, closer lines on the base below it; lip slightly expanded and much thickened. White or somewhat flesh-colored (denuded).

Dimensions.—Height 9, diam. 9 mill.

Two specimens are before me, both evidently recent, although bleached, and destitute of opercula

MONOGRAPH OF THE TERRESTRIAL MOLLUSCA OF
THE UNITED STATES.

BY GEORGE W. TRYON, JR.

[Continued from p. 277.]

Family HELICIDÆ.

Shell depressed, or globosely elevated, strong, striate, with the epidermis colored, frequently banded, opaque, lip either margined within, or expanded, or appressed and reflected. Aperture sometimes toothed.

Animal snail-like, not so narrowly lengthened generally as in *Helicellidæ*. *Buccal plate* arcuate, thick, with transverse rounded ribs.

Lingual dentition.—Uncini and laterals the same in form, the former 1–2 dentate or notched irregularly, the latter 1 dentate.

Subfamilies.

HYGROMINÆ.—*Shell* not toothed, lip not reflected, sometimes expanded, more or less thickened within the margin.

MESODONTINÆ.—*Shell* frequently toothed, lip broadly reflected and appressed.

HYGROMINÆ.

Genera.

* *Umbilicate.*

1. HYGROMIA, Risso. Globosely depressed, not angulated, generally hirsute; whorls 5–7, convex; aperture rounded or widely lunate; lip acute, slightly expanded and thickened within. Corneous, generally unicolorous. Size small.

Inhabits east of Rocky Mountains.

2. AGLAJA, Albers. Depressed-conoidal, sometimes obscurely angulate; lip thickened within, encroaching a little on the umbilicus. Yellowish-brown, almost always banded. Size large; surface malleate.

Inhabits California and Oregon.

3. *ARIONTA*, Leach. Globosely turbinate; lip thickened within, expanded, dilated at the base so as nearly to cover the umbilicus. Color yellowish-brown, banded. Size large.

Inhabits California and Oregon.

4. *POLYMITA*, Beck. Globosely turbinate; lip much thickened within; columella *diagonal, much thickened, and frequently bearing a lamelliform or rounded tubercle*; umbilicus almost entirely covered. Shell large, thick, flesh-color, with generally several revolving bands of darker colors.

Inhabits West Indies, Mexico, Southern California.

** *Shell imperforate.*

5. *TACHEA*, Leach. Shell imperforate, turbinate or depressed, upper whorls flattened, last one convex, descending obliquely to the mouth, which is obliquely semicircular; peristome expanded, within labiate, expanded and appressed into and completely covering the umbilicus. Size moderate. Yellowish, more or less numerously banded.

European, introduced into the seaports and islands of the Eastern States.

6. *POMATIA*, Beck. Globular, large, last whorl very large, ventricose, deflexed at the aperture, which is orbicularly lunate; peristome slightly thickened within, reflexed and appressed over the umbilicus. Light horn-color, banded.

European, introduced into the seaports of the Southern States and West Indies.

HYGROMIA, Risso.

The five species here united, evidently constitute two distinct groups; the two first species being of European origin, while the other three belong to the Territories bordering on the Gulf of Mexico: yet we can find no characters of sufficient importance to justify their division into two generic groups.

HYGROMIA, Risso.

1. *Hygromia rufescens*, Pennant.

Plate 5, figure 1.

Depressed, subglobose, subangulate; spire depressed conical; whorls 6, somewhat convex, brownish, the last with a white band on the angulate periphery; not descending at the aperture, which is ovately lunar, slightly reflected over the rather large umbilicus.

Diam. 11, altitude 6 mill.

Montreal, Canada East, (J. F. Whiteaves.)

A common European species, introduced as above.

2. *Hygromia hispida*, Linnæus.

Plate 5, figure 2.

Rather depressed, moderately umbilicate, corneous, covered with short, hispid hairs; whorls 5-6, somewhat convex, narrow, slowly increasing; aperture semilunar, labiate within.

Diam. 10, altitude $5\frac{1}{2}$ mill.

Canada, Nova Scotia, Massachusetts. (Introduced from Europe.)

H. porcina, Say, a species described, evidently, from immature specimens, is now referred to this species.

3. *Hygromia jejuna*, Say.

Plate 5, figure 3.

Subglobose, spire prominent, suture impressed; whorls 5, the last ample, striae scarcely visible; mouth moderate, semi-circular; lip expanded, white, (the whorl grooved behind it,) internally ribbed or margined; umbilicus small, base of shell convex. Light yellow, sparingly hirsute.

Diam. 8, height 6 mill.

Georgia, Florida, Alabama.

I agree with Messrs. Binney and Bland in regarding this species, described from immature specimens, by Say, as identical with *H. Mobiliana*, Lea. Mr. Lea states that *H. Mobiliana* has a *reflected* lip, which at first sight, mature specimens *do* appear to have, caused by the external constriction, and the great thickening within.

4. **Hygromia Berlandieriana**, Moricand.

Plate 5, figure 4.

Globose, spire elevated, prominent, suture deeply impressed; whorls 5, well rounded, thin, translucent, scarcely striate, broadly rounded at periphery, contracted around the aperture; lip much expanded, white, with a much thickened internal margin; parietal wall sometimes with a deposit of callus; base rounded, umbilicus minute. White to yellowish-green, with sometimes a faint, narrow brown band above the periphery.

Diam. 12, height 9 mill.

Arkansas to Texas, Mexico.

Judging from the figure of *H. virginialis*, Jan., published in Chemnitz "Conchylien Cabinet." I do not agree with Binney in considering that species a synonym of *Berlandieriana*, but believe it to = *griseola*.

5. **Hygromia griseola**, Pfeiffer.

Plate 5, figure 5.

Globosely depressed, spire convexly elevated; whorls 4-4½, well rounded, slightly striate; aperture lunar, lip white, a little expanded; umbilicus very narrow. Light brown, with a darker band, bordered with white, above the periphery.

Diam. 10, altitude 6 mill.

Texas, Mexico, Guatemala.

Smaller, more depressed, and differently colored from *H. Berlandieriana*.

AGLAJA, Albers.

This group includes most of the large, brilliantly colored Californian species, and is remarkably restricted, none of its members inhabiting east of the Rocky Mountains. Albers places most of those known to him in the genus *Arionta*, leaving only one—*A. fidelis*, in *Aglaja*. An examination of the West Coast species of *Arionta*, in Albers, shows that he has confounded, in that genus, two distinct groups, of which, that containing the more globose species, with nearly covered umbilicus, really pertains to it; while those that are turbinate depressed, belong to *Aglaja*. Very many of these shells have never been figured, and very little is known regarding them. I have sup-

plied figures from type specimens, wherever possible, and hope at a future time to be able to complete their illustration.*

* *Hirsute, subangulate at the periphery.*

† *Nearly black, not banded.*

1. **Aglaja infumata**, Gould.

Plate 5, figure 6.

Large, solid, depressed-trochiform, angulate at periphery, suture not much impressed; whorls $6\frac{1}{2}$, not very convex, closely irregularly rugose-striate, granulate and hirsute; aperture rhomboidal, lip very slightly thickened within, scarcely expanded; base convex, umbilicus narrow. Brown, nearly black; aperture shining, chocolate within.

Diam. 37, height 16 mill.

From Humboldt Bay to San Pablo Bay, Cal.



†† *Light brown, with a brown band, bordered with white on each side.*

2. **Aglaja Hillebrandi**, Newcomb.

Plate 5, figure 7.

Depressed-trochiform; spire not much elevated, apex obtuse, suture moderate; whorls 6, very slightly convex, rather flattened, a little descending at the aperture, finely striate, hirsute; periphery angulated; aperture widely lunate, lip expanded; reflected below, thickened within, umbilicus moderate. Yellowish horn-color, the periphery with a red band, bordered with white on either side.

Diam. 22, height 9 mill.

Tuolumne Co., Mariposa, California.

* For particular information regarding the geographical distribution of the Californian Helices, see a paper by Dr. Wesley Newcomb, in American Journal of Conchology, i., p. 342, Oct., 1865.

** *Not hirsute, globosely turbinate.*

† *Nearly black, with sometimes a red band.*

3. **Aglaja fidelis**, Gray.

Plate 5, figure 8.

Subconical, moderately elevated; spire depressed-trochiform; whorls 7, rounded; suture distinct; surface thick, rugosely striate, with slight impressed revolving striæ; aperture obliquely semilunar, lip a little reflected below, scarcely thickened within, partially covering the umbilicus. Light brown to black, with generally a narrow red band, chocolate within, lip pink.

Diam. 37, height 20 mill.

Oregon.

†† *Reddish-ashen, not banded.*

4. **Aglaja anachoreta**, W. G. Binney.

Plate 5, figure 9.

Orbicularly convex; spire elevated, conic, suture impressed; whorls 6, granulated; aperture transversely rounded, lip thickened, slightly expanded, the extremities approaching, partly covering the umbilicus. Reddish-ashen, lip tinged with violet.

Diam. 26, height 14 mill.

California.

Is this a variety of the following species? It is very like it in form, but has no band.

††† *Yellowish-brown, with a narrow dark band.*

5. **Aglaja arrosa**, Gould.

Plate 5, figure 10.

Globosely conic, spire elevated, suture not much impressed; whorls 7, somewhat convex, declining a little at the aperture, rugosely striate, malleate, with indistinct revolving lines; aperture widely semilunar; lip narrowly expanded, a little reflected below; umbilicus partly covered. Brown, with a dark brown, nearly black band above the periphery, visible on the spire; light chocolate within.

Diam. 35, height 20 mill.

San Pablo Bay to Bay of Monterey, California.

6. Aglaja exarata, Pfeiffer.

Plate 5, figure 11.

Depressed-conical; spire short, conical, apex acute; whorls 7, rugose, malleated, slightly convex, the last wide, slightly descending at the aperture; aperture oblique, widely lunar, lip a little thickened, white, a little reflected below; umbilicus moderate; brownish, with a chestnut band.

Diam, 30, height 16 mill.

California.

Dr. Newcomb mentions a variety of a creamy-white color, without bands.

7. Aglaja Ayresiana, Newcomb.

Rounded-trochiform; whorls 7, slowly increasing, convex, the first ones superiorly with many rib-like striae, and numerous spiral lines, deeply impressed; inferiorly pale, and with minute decussating striations; suture well marked; aperture roundly ovate; lip a little expanded; umbilicus partly closed. Yellowish-white, with a broad black band.

Diam. 22, height 15 mill.

Nootka Sound, Northern Oregon.

8. Aglaja Nickliniana, Lea.

Plate 5, figure 12.

Conic-globose, rather thin; spire elevated; whorls 6, moderately convex, the last ventricose, finely granulated, polished; aperture rounded, forming two-thirds of a circle, lip a little expanded above, more so below; base depressed at centre, the umbilicus small and partly covered by the lip. Light yellowish-brown, with a brown band.

Diam. 21, height 18 mill.

California.

Dr. Newcomb believes *II. redemita* to be a variety of this species.

9. **Aglaja Carpenterii**, Newcomb.

Roundly conical; apex obtuse; whorls $5\frac{1}{2}$, convex, strongly striated, with numerous fine spiral lines; suture well impressed; aperture circular, margins approaching; lip a little expanded; umbilicus open. Brownish, with an obscure dark band.

Diam. 23, height $16\frac{1}{2}$ mill.

Tulare Valley, California.

Distinguished by its rounded aperture.

*** *Not hirsute, malleated, globosely depressed, not turbinate above.*

a. *With a brown band.*

10. **Aglaja tudicolata**, Binney.

Plate 5, figure 13.

Convexly orbicular; spire depressed-conic; whorls 5, a little convex; body large, expanding somewhat towards the aperture, obliquely wrinkled, malleated; aperture transverse, rather circular; lip a little expanded, reflected nearly, sometimes entirely, over the small umbilicus; base convex. Light yellowish-green or brown, with a broad dark band above the periphery, margined with white. Band visible on the spire.

Diam. 31, height 22 mill.

California.

11. **Aglaja Bridgesii**, Newcomb.

Depressed-globose; spire conical, suture well impressed, whorls 6, convex, plicately striate and minutely granulate; aperture round-lunate; lip expanded, reflected below, umbilicate. Translucent, grayish horn-color, with a narrow brown band.

Diam. 27, height 19 mill.

San Pablo, California.

Not solid, larger than *ramentosa*, Gould, spire more elevated, darker in color, and less granulated.

12. **Aglaja mormonum**, Pfeiffer.

Plate 5, figure 14.

Globosely depressed, thin, arcuately striate; spire slightly elevated; whorls 6, slightly convex, the last descending a little at the aperture; aperture obliquely lunar; lip white margined, the extremities converging, expanded, reflected towards the base; base convex, umbilicus moderate. Light reddish-brown, with a darker band above the periphery, margined with white.

Diam. 29, height $12\frac{1}{2}$ mill.

California.

13. **Aglaja ramentosa**, Gould.

Plate 5, figure 15.

Depressed-orbicular, thin, granulated; whorls $5\frac{1}{2}$, the last a little obtusely angulated; aperture obliquely ovate-oblong; lip white, slightly expanded above, reflected below; perforate. Brownish, with a peripheral band of dark brown, margined with white.

Diam. 20, height $12\frac{1}{2}$ mill.

California.

According to Dr. Newcomb, (*Am. Journ. Conch.*, i., p. 344.) *H. reticulata*, Pfeiffer, is a synonym of this species. I have not seen an authentic specimen of *H. reticulata*, but give a figure copied from a wood-cut loaned to me by Thomas Bland, (*Plate 6, fig. 18.*)

14. **Aglaja Traskii**, Newcomb.

Plate 5, figure 16.

Depressed-globose, thin; spire subplanulate; whorls 6, the last *not descending*, with numerous microscopical interwoven striae; lip but little thickened. Pale corneous, somewhat pellucid, brown banded, within tinged with purple.

Diam. 26, height 16 mill.

Los Angeles, Cal., Santa Barbara.

Differs from the following in its lighter substance and color, the lip not so much thickened, and the body-whorl not descending at the aperture.

15. **Aglaja Dupetithouarsii**, Deshayes.

Plate 5, figure 17.

Orbicularly convex, moderately thick, smooth or substriate; spire obtusely conoidal; whorls 7-8, narrow, the last inflated; aperture ovately semilunar, lip a little expanded; umbilicus moderate. Dark chocolate or light greenish when perfectly fresh, with a dark narrow band above the periphery, margined with white, band visible on the spire.

Diam. 29, height 17 mill.

Near Monterey, California.

Closely allied to *H. mormonum*, but more elevated.16. **Aglaja rufocincta**, Newcomb.

Plate 6, figure 20.

Depressed-globose, with impressed suture; whorls 6, the last *not descending* at the aperture, minutely decussately striate; aperture subrotund, lip expanded, columella not callous; umbilicate. Horny, red banded, lip white.

Diam. 17, height 10 mill.

San Diego and I. Santa Catalina, Cal.

17. **Aglaja Gabbii**, Newcomb.

Plate 6, figure 19.

Depressed-globose; spire convex, suture well impressed; whorls 5, convex, the last descending; aperture suborbicular, lip white, expanded, umbilicus very small, partly covered. Pale corneous, with an indistinct brown band.

Diam. 10, height 5 mill.

San Clemente I., Cal.

†† *Not banded.*

18. **Aglaja Rowellii**, Newcomb.

Depressed-globose; spire but little elevated, projecting at apex like a nipple, suture moderate; whorls $4\frac{1}{2}$, polished, very finely obliquely convex, the last large, descending at the aperture; aperture circular, lip thin, a little expanded, margins continued, adhering to the last whorl; umbilicus open. Opaque-white (bleached?)

Diam. 15, height 10 mill.

Arizona.

I have not seen this species, but doubt (from the description) whether its affinities are with this group.

ARIONTA, Leach.

The American species are peculiar to Southern California and Northern Mexico. The type of this genus, *A. arbustorum*, (as well as several other species,) is European, but the following are scarcely distinguishable from it, although so widely asunder in distribution. As already stated, many of the species placed in *Arionta* by Albers, really belong to *Aglaja*; *H. bicincta*, Pfeiffer, and *H. Townsendiana*, are also erroneously classed here by Albers.

1. **Arionta Veitchii**, Newcomb.

Plate 5, figure 19.

Subglobose; spire turbinate, elevated, suture not very distinct; whorls 6, a little convex, the last very large, declining towards the aperture; rather thin, obliquely striate, and sometimes a little spirally corrugated; aperture subcircular, lip a little expanded, and very slightly thickened, partly reflected over the narrow umbilicus; base of shell very convex. Yellowish-white, with numerous irregular, interrupted, revolving brown bands.

Diam. 23, height 19 mill.

Cerros Isle, Lower Cal.

2. *Arionta Californiensis*, Lea.

Plate 5, figure 20.

Subglobular, thin, transparent, slightly granulated and striate, shining; spire elevated; whorls 5, convex, the last very broad; aperture rather small, subcircular, lip slightly everted, thickened within, at the base more reflected, nearly covering the small umbilicus. Pale yellowish horn-color, minutely flecked with pale spots, with a narrow brown, pale margined band above the periphery.

Diam. 18, height 15 mill.

California.

3. *Arionta Kelletti*, Forbes.

Plate 6, figure 1.

Depressed-globose, thin, rugose-granulated; spire subtur-
binate, suture moderate; whorls 6, a little convex, the last large and well rounded at base; aperture wide-lunate, lip expanded, partly covering the narrow umbilicus. Reddish-brown, with a darker band on the spire and a lighter one on the periphery of the last whorl.

Diam. 22, height 19 mill.

San Diego, Cal.

4. *Arionta crebristriata*, Newcomb.

Plate 6, figure 2.

Moderately thick, depressed-globose; spire turbinate, suture well impressed; whorls 5, a little convex, the last descending towards the aperture, with dense, strong, transverse and minute, longitudinal striæ; aperture rounded, lip either thin, acute, or thickened within, its extremities approaching, sometimes connected by a callus; umbilicus partly covered by the lip. Dark horn-color, obsoletely banded, livid within the aperture.

Diam. 23, height 14-20 mill.

San Clemente I., Cal.

Variable in elevation, and in the thickening of the lip. Differs from *Kelletti*, Forbes, in sculpture.

*
* **Mexican Species.*5. **Arionta Rémondi**, Tryon.

Plate 5, fig. 18.

Turbinately globose, very thin; whorls 4, scarcely striate, (punctate when viewed with a lens,) slightly convex, the last large, rounded; base convex; umbilicus narrow, with an angled margin; aperture obliquely semilunar, lip expanded. Light corneous, with a narrow brown band on the periphery, and above the suture on the spire.

Diam. 17, height 12 mill.

Cinaloa, near Mazatlan.

6. **Arionta Humboldtiana**, Valenciennes.

Plate 6, figure 17.

Ventricose, roughly irregularly striate and wrinkled, malleated; spire small, acuminate; whorls 4, rapidly enlarging, the last very large; aperture oblique, large, lip expanded, its extremities connected by a thin testaceous deposit; umbilicus partly covered. Grayish-white, with three rufous bands on and above the periphery.

Diam. 37, height 28 mill.

Mexico.

I include this species because it was figured by Dr. Binney in his *Terrestrial Mollusks*, by error, as *Pomatia aspersa*. It does not even belong to the same genus, although placed there by Albers.

POLYMITA, Beck.

This group includes, according to Albers, a large collection of West Indian species, to which we now add several Californian forms.

1. **Polymita Tryonii**, Newcomb.

Plate 6, figure 3.

Solid, depressly globose; spire subturbinate, obtuse, suture well impressed; whorls 6, convex, with numerous minute revolving lines; aperture rounded, lip scarcely expanded, thickened within; columella diagonal, with one or two obsolete tooth-like prominences; umbilicus narrow, covered. Ashy sky-blue above, mottled by streaks of brown, yellowish-white below, an indistinct brown band on the periphery.

Diam. 25, height 19 mill.

Santa Barbara and San Nicholas Isles, Cal.

Var. Superior whorls with white transverse undulating lines.

2. **Polymita intercosa**, Wm. G. Binney.

Plate 6, figure 4.

Solid, globose-depressed; spire conic; whorls 5, slightly rounded, closely deeply *striate, crossed by deep revolving lines*; aperture obliquely lunar, lip heavy, thickened, dirty white, the extremities connected by a heavy ash-colored callus; umbilicus covered by the lip, which internally at the base is furnished with a tooth-like process or elevation. Grayish-yellow, with an obscure brown band.

Diam. 22, height 15 mill.

Oregon.

3. **Polymita areolata**, Sowerby.

Plate 6, figure 5.

Globose-conic, thin, striate; spire depressed-conoidal; whorls 5, a little convex, the last slightly descending towards the aperture, large, inflated; aperture rounded lunate, lip thickened within, columellar margin sometimes somewhat dentate, nearly covering the narrow umbilicus; base convex. Cream-color, ornamented with revolving series of interrupted brown lines, light brownish or reddish within.

Diam. 26, height 18 mill.

Oregon, California.

4. *Polymita redemita*, Wm. G. Binney.

Plate 6, figure 7.

Globose-conic, rather thin, wrinkled, closely and minutely granulate; spire elevated, obtuse, suture impressed; whorls 6, convex, last quite large and rounded, depressed towards the aperture; aperture rather large, very oblique, lip reddish ash-color, thickened, ends approaching, entirely covering the umbilicus. Brown, banded with chestnut above the middle.

Diam. 21, height 12 mill.

California.

Dr. Newcomb considers this a variety of *Nickliniana*, but it appears to me that it is distinguished by its closed umbilicus, as well as by texture and color.

5. *Polymita pandoræ*, Forbes.

Plate 6, figure 8.

Depressed-globose, thin, wrinkled, minutely striate; whorls 5, the last descending towards the aperture; aperture rounded, the lip thickened internally, expanded, dilated and reflected, covering the umbilicus. Brown or violet above, whitish beneath, the periphery encircled by a brown band, brown within, with a white band.

Diam. 17, height 14 mill.

Santa Barbara, and Southern California.

This species is smaller, but very closely allied to *P. Tryonii*.

6. *Polymita levis*, Pfeiffer.

Plate 5, figure 21.

Plate 6, figure 6.

Globose, thin, obliquely striate, obsoletely granulate; spire short; whorls 5, a little convex, the last inflated; aperture rounded-lunar, lip thickened within, sometimes subdentate on the columellar portion; umbilicus narrow, nearly covered by an expansion of the lip. White, varied by series of pellucid spots, sometimes running into stripes.

Diam. 16, height 13 mill.

Southern California.

Dr. Newcomb states that this species is not Californian or Oregonian, but belongs to a more southern fauna. I have specimens, however, referable to this species, received from Dr. Newcomb, from Bay of Monterey, Cal., as a variety of *H. areolata*. It is more orbicular than that species, the columella more distinctly tuberculate, and the surface more granulate. The first figure is a copy of that given by Pfeiffer, while the last represents a fresh and larger specimen.

7. *Polymita varians*, Menke.

Plate 6, figures 9-13.

Globose-conic, solid, smooth, shining, delicately striate; spire elevated-conic; whorls $5\frac{1}{2}$, convex, the last broadly rounded; aperture small, two-thirds circular, lip expanded a little, thickened within, very nearly covering the umbilicus; base convex. White, greenish, reddish or brown, sometimes with black or white bands, one or more in number, disposed on different portions of the surface, apex and columellar part of the lip always rose-color.

Diam. 17, height 15 mill.

Florida. (From West Indies.)

TACHEA, Leach.

1. *Tachea hortensis*, Müller.

Plate 6, figures 14, 15.

Subglobose, smooth; spire conoidal; whorls 5, the last ventricose; aperture rounded-lunar, lip dilated, thickened within; base convex, imperforate. Yellowish, sometimes with one to five revolving dark brown bands.

Diam. 19, height 16 mill.

New England States near the sea, and Islands on the coast. (From Europe.)

POMATIA, Leach.

1. **Pomatia aspersa**, Müller.

Plate 6, figure 16.

Subglobose, rather thin, coarsely and irregularly striate, finely striate and finely wrinkled and indented; spire obtuse; whorls 4-5, moderately convex, rapidly increasing, the last very large and ventricose; aperture large, oblique, rounded-lunate, lip white, sharp, a little expanded, extremities connected by a thin callus; umbilicus covered; base very convex. Yellowish or brownish, with brown bands, crossed by narrow undulating flammules of yellow.

Diam. 31, height 25 mill.

At various places on the Coast, New Orleans, Charleston Maine, Nova Scotia. (From Europe.)

HELICIDÆ.

SYNONYMY AND REFERENCE TO
PLATE 5.

HYGROMIA.

- Fig. 1. *H. RUFESCENS*, Pennant. British Zoology, fig. 34, (1776.) No. 1.
- " 2. *H. HISPIDA*, Linnæus. Systema Naturæ, p. 1244, Edit. Gmel., (1790.) No. 2.
- " 3. *H. JEJUNA*, Say. Jour. Acad. Nat. Sciences, ii., p. 158, (1821.) No. 3.
H. Mobiliana, Lea. Proc. Amer. Philosoph. Soc., ii., p. 82, (1841.)
Binney, Terrest. Moll., ii., p. 172, t. 42, fig. 2, (1851.)
- " 4. *H. BERLANDIERIANA*, Moricand. Memoires de Soc. de Histoire Nat. de Genève, vi., p. 537, t. 1, fig. 1, (1833.) No. 4.
Binney, Terrest. Moll., ii., p. 109, t. 49, fig. 1, (1851.)
- " 5. *H. GRISEOLA*, Pfeiffer. Symbolæ ad Hist. Hel., i., p. 41, (1841.) No. 5.
W. G. Binney, Terr. Moll., iv., p. 50, t. 77, fig. 20, (1859.)
H. albocincta et albozonata, Binney. l. c. i., p. 128, t. 2, (1851.)

AGLAJA.

- " 6. *A. INFUMATA*, Gould. Proc. Boston Soc. Nat. Hist., v., p. 137, (1855.) No. 1.
Binney, l. c. iii., p. 13, (1857.)
W. G. Binney, l. c., t. 79, fig. 2, (1859.)
- " 7. *A. HILLEBRANDI*, Newcomb. Proc. California Acad. Nat. Sciences, p. 115, (1864.) No. 2.

- Fig. 8. *A. FIDELIS*, Gray. Proc. Zool. Soc., London,
p. 67, (1834.) No. 3.
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H. Nuttalliana, Lea. Trans. Amer. Philos. Soc.,
vi., p. 88, t. 23, fig. 74, (1839.)
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- " 9. *A. ANACHORETA*, W. G. Binney. Proc. Acad.
Nat. Sciences, Philadelphia, ix., p. 185,
(1857.) No. 4.
Terr. Moll., iv., p. 11, t. 76, fig. 5, (1859.)
- " 10. *A. ARROSA*, Gould. W. G. Binney, l. c., p. 15,
t. 76, fig. 4, (1859.) No. 5.
H. æruginosa, Gould. (Pre-oc.) Proc. Bost. Soc.
Nat. Hist., v., p. 137, (1855.)
Binney, l. c. iii., p. 12, (1857.)
- " 11. *A. EXARATA*, Pfeiffer. Proc. Zool. Soc., Lon-
don, p. 108, (1857.) No. 6.
W. G. Binney, l. c., p. 13, (1859.)
A. AYRESIANA, Newcomb. Proc. Cal. Acad.
Nat. Sciences, p. 103, (1861.) No. 7.
- " 12. *A. NICKLINIANA*, Lea. Trans. Amer. Philos.
Soc., vi., p. 100, t. 23, fig. 84, (1839.) No. 8.
Binney, l. c., p. 119, t. 6a, not plate 6, (1851.)
W. G. Binney, l. c., p. 7, (1859.)
A. CARPENTERII, Newcomb. Proc. Cal. Acad.
Nat. Sciences, p. 103, (1861.) No. 9.
- " 13. *A. TUDICOLATA*, Binney. Bost. Soc. Nat. Hist.,
iv., p. 360, t. 20, (1842.) No. 10.
Binney, Terrest. Moll., ii., p. 118, t. 16, (1851.)
W. G. Binney, l. c., p. 7, (1859.)
A. BRIDGESII, Newcomb. Proc. Cal. Acad.
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- " 14. *A. MORMONUM*, Pfeiffer. Proc. Zool. Soc.,
London, p. 109, (1857.) No. 12.
W. G. Binney, l. c., p. 15, t. 79, fig. 21, (1859.)
- " 15. *A. RAMENTOSA*, Gould. Proc. Bost. Soc. Nat.
Hist., vi., p. 137, (1855.) No. 13.
Binney, l. c. iii., p. 12, (1857.)
- " 16. *A. TRASKII*, Newcomb. Proc. California Acad.
Nat. Sciences, p. 91, (1861.) No. 14.

- Fig. 17. A. DUPETITHOUARSII, Deshayes. *Revue Zool.*,
 p. 360, (1839.) No. 15.
 Binney, l. c. iii., p. 13, (1857.)
 W. G. Binney, l. c., p. 15, t. 76, fig. 9, (1859.)
 H. *Oregonensis*, Lea. *Trans. Amer. Philos.*
Soc., vi., p. 100, (1839.)
 (See also pl. 6, figs. 18, 19, 20.)

ARIONTA.

- " 18. A. RÉMONDI, Tryon. *Proc. Acad. Nat. Sci-*
ences, Philadelphia, p. 281, t. 2, fig. 1,
 (1863.) No. 5.
 " 19. A. VEITCHII, Newcomb, MS. No. 1.
 " 20. A. CALIFORNIENSIS, Lea. *Trans. Amer. Philos.*
Soc., vi., p. 99, t. 23, fig. 79, (1839.) No. 2.
 Binney, l. c. ii., p. 121, t. 6, fig. 2, (1851.)
 H. *vineta*, Valenciennes, *Voy. Venus Moll.*, t.
 1, fig. 2.
 (See also pl. 6, figs. 1 et seq.)

POLYMITA.

- " 21. P. LEVIS, Pfeiffer. (See pl. 6, fig. 6.)

HELICIDÆ.

SYNONYMY AND REFERENCE TO
PLATE 6.

ARIONTA.

(Plate 5, figs. 18 et seq.)

- " 1. A. KELLETI, Forbes. *Proc. Zool. Soc., Lon-*
don, p. 55, t. 9, fig. 2, a. 6, (1850.) No. 3.
 W. G. Binney, l. c., p. 17, t. 76, fig. 12, (1859.)
 " 2. A. CREBRISTRIATA, Newcomb. *Proc. Califor-*
nia Acad. Nat. Sciences, p. 116, (1864.) No. 4.
 (See also fig. 17.)

POLYMITA.

(See Plate 5, fig. 21.)

- Fig. 3. P. TRYONII, Newcomb. Proc. Cal. Acad. Nat. Sciences, p. 116, (1864.) No. 1.
- “ 4. P. INTERCISA, Wm. G. Binney. Proc. Acad. Nat. Sciences, Philadelphia, ix., p. 18, (1857.) No. 2.
W. G. Binney, Terr. Moll., iv., p. 8, (1859.)
H. Nickliniana, var. Binney, l. c. ii., p. 120, t. 6, fig. 1, (middle), (1851.)
- “ 5. P. APEOLATA, Sowerby. Pfeiffer, Zeitschrift für Malak., p. 154, (1845.) No. 3.
Binney, l. c. iii., p. 14, (1857.)
W. G. Binney, l. c., p. 19, t. 76, fig. 11, 3, (1859.)
- “ 6. P. LEVIS, Pfeiffer. Zeitschrift für Mal., p. 152, (1845.) No. 6.
W. G. Binney, l. c., p. 18, t. 76, fig. 10, (1859.)
- “ 7. P. REDEMITA, Wm. G. Binney. Proc. Acad. Nat. Sciences, Philadelphia, ix., p. 183, (1857.) No. 4.
Wm. G. Binney, Terr. Moll., iv., p. 9, (1859.)
H. Nickliniana, Lea, var. Binney, l. c. iii., t. 6, fig. 1, except middle figure, (1857.)
- “ 8. P. PANDORÆ, Forbes. Proc. Zool. Soc., London, p. 55, t. 9, fig. 3, *a, b*, (1850.) No. 5.
Binney, l. c., p. 15, (1857.)
W. G. Binney, l. c., p. 18, t. 76, fig. 8, (1859.)
H. Damascenus, Gould. Proc. Bost. Soc. Nat. Hist., vi., p. 11, (1856.)
- “ 9-13. P. VARIANS, Menke. Pfeiffer, Monog. Heliceorum Viv., i., p. 238, (1848.) No. 7.
W. G. Binney, l. c., p. 51, t. 78, fig. 22, (1859.)
H. polychroa et rhodocheila, Binney, l. c. ii., p. 128, t. 46, 47, (1851.)

TACHEA.

- “14-15. T. HORTENSIS, Müller. Hist. Vermium, ii., p. 57, (1774.) No. 1.
Binney, l. c., p. 111, t. 8, (1851.)
W. G. Binney, l. c., p. 51, (1859.)
H. subglobosa, Binney. Journ. Bost. Soc. Nat. Hist., i., p. 485, t. 17, (1837.)

POMATIA.

- Fig. 16. P. ASPERSA, Müller. Hist. Vermium, ii., p. 59, (1774.) No. 1.
 Binney, Terr. Moll., ii., p. 116, (1851.)
 W. G. Binney, l. c., p. 51, t. 77, fig. 4, (1859.)

ARIONTA.

(See figs. 1, 2.)

- " 17. A. HUMBOLDTIANA, Valenciennes. Pfeiffer, Symbolæ, i., p. 37, (1841.) No. 6.
 H. Buffoniana, Pfeiffer. Zeit. für Malakozoöl, p. 152, (1845.)
 Binney, l. c., p. 115, t. 43, (1851.)

AGLAJA.

(See Plate 5, figs. 6-17.)

- " 18. A. RETICULATA, Pfeiffer. Malakozoöl, Blätter, p. 87, (1857.) No. 13.
 W. G. Binney, l. c., p. 12, (1859.)
 " 19. A. GABBII, Newcomb. Proc. California Acad. Nat. Sciences, p. 117, (1864.) No. 17.
 " 20. A. RUFOCINCTA, Newcomb. Proc. California Acad. Nat. Sciences, p. 117, (1864.) No. 16.
 A. ROWELLII, Newcomb. Proc. California Acad. Nat. Sciences, p. 181, (1865.) No. 18.

ON A SPECIES OF HELIX FROM CALIFORNIA,
SUPPOSED TO BE NEW.

BY WM. H. DALL, ACTING DIRECTOR SCI. CORPS, W. U.
TELEGRAPH CO. RUSSIAN EXTENSION.

HELIX (CONULUS) CHERSINELLA, n. sp.—Plate 21, fig. 4.

Description.—Shell small, somewhat elevated, smooth, except that the lines of growth are occasionally indented; umbilicus minutely perforate; aperture semilunar and slightly oblique; whorls rotund, four and a half to five in number; suture impressed, not deep; lip not thickened or reflected. Color yellowish, translucent.

Dimensions.—Maj. diam. 0.14 in., min. diam. 0.13 in., alt. (in type) 0.09 in.

Locality.—"Big Trees," Calaveras Co., Cal. (Teste Newcomb.)

Cabinets of Newcomb, Smithsonian Institution, and Dall. Eight specimens.

This small species has relations with *Helix chersina*, Say, and *Helix indentata*, Say.

It resembles the former in its small size and many whorls, but differs in color and depressed spire, though sometimes almost as acute. It is related to the latter in its color and indented lines of growth, but differs in its greater number of whorls and much smaller size, and in the proportional size of the last whorl. It has as many whorls as *Helix arborea*, Say, *Whitneyi*, Newc., or *Breweri*, Newc., of three times the size, and is from a different locality than the two last mentioned. The rotundity of the whorls may well be noted.

The localities of the smaller *Helices* which have been found west of the Rocky Mountains, are as follows:—

H. Mazatlanica, Pfr. Mazatlan,? California.

- H. chersina*, Say. Middle States, Northern States generally, (Auct.) Massachusetts; Illinois; Marquette, Michigan; Stuart's Island, Norton Sound; Petropavlovsk, Kamschatka, (Dall.) Lake Tahoe, Cal., (J. G. Cooper.) Red River district, (R. Kennicott.) Mantchooria, (Middendorf.)
- H. Whitneyi*, Newc. Lake Tahoe, Cal., (Prof. Brewer.)
- H. Breweri*, Newc. Lake Tahoe, Cal.; Northern Cal., (Prof. Brewer.)
- H. Duranti*, Newc. Santa Barbara Island, Cal., (State Geol. Survey.)
- H. Cronkhitei*, Newc. [? *striatella*, (west of Rocky Mountains,) Bld., non Anth.] Klamath Valley, Oregon, (Gabb and Cronkhite.) Haywards, Alameda Co., Cal., (var.,) (Rowell.)
- H. conspecta*, Bland. Near San Francisco, (J. G. Cooper.)
- H. electrina*, Gould. Petropavlovsk, Kamschatka, (Dall.) Red River, (Kennicott.) Illinois; Marquette, Michigan; Massachusetts, (Dall.)
- H. chersinella*, Dall. "Big Trees," Calaveras Co., California.

I am indebted to Dr. Wesley Newcomb for the privilege of describing this shell, which agrees with no other in his large and well-named collection.

DESCRIPTIONS OF THREE NEW SPECIES OF LAND SHELLS FROM ARIZONA.

BY W. M. GABB.

HELI^x HORNII, Gabb.—Plate 21, fig. 5.

Description.—Shell small, openly umbilicate, depressed; covered with an opaque brown epidermis, which, under the glass, shows minute oblique striations, and a few small, scattered hairs; whorls $4\frac{1}{2}$, the first $3\frac{1}{2}$ forming a very low, nearly flat spire, the last descending much more rapidly; suture strongly marked, especially between the last and penultimate whorl; umbilicus occupying about a third of the inferior surface, indistinctly perspective; aperture oblique, subcircular; lip simple, inner margins approximating.

Dimensions.—Height .09 in., greatest diam. .16 in., smallest diam. .13 in.

Locality.—Fort Grant, at the junction of the Arivapa and San Pedro Rivers, Arizona. Collected by Dr. G. H. Horn.

Observations.—This pretty little shell is of nearly the same size as *H. Cronkhitei*, Newc., but can be distinguished by the opaque brown color, and, in very perfect specimens, by the presence of minute hairs; the whorls are proportionately a little more elevated; the mouth a little more nearly circular; the apex is flattened, instead of being regularly conical; the last volution descends more rapidly than the others, instead of having the same angle as the preceding ones, and, finally, it wants entirely the strong, cross sculpture so characteristic of Dr. Newcomb's species.

Dr. Horn also found at the same locality a very fine specimen of *H. strigosa*, Gld., the largest specimen I have seen of the species.

Besides these were two or three specimens of *H. minuscula*.

PUPA (MODICELLA) ARIZONENSIS, Gabb.—Plate 21, fig. 6.

Description.—Shell small, resembling *P. marginata*, Say, (*P. fallax*, Gld.) but more robust, sides more parallel, and apex more convex; imperforate, fusiform; sides diverging convexly from the apex, afterwards becoming more nearly parallel; whorls $5\frac{1}{2}$, convex; suture deeply impressed; lines of growth barely visible with a lens; color light horn, shining, shell translucent; aperture suboval, edentate; lip thickened, strongly reflected, white, opaque, acute externally, not constricted behind the reflexion; peristome not continuous on the body whorl; a slight emargination exists on the inner edge of the peristome, near the posterior end of the outer lip.

Dimensions.—Height .18 in., width of body whorl .09 in., length of aperture .06 in.

Locality.—With the preceding. (Dr. Horn.)

Observations.—This shell resembles more nearly, *P. marginata*, Say, than *P. modica*, with which it is also related, but can be distinguished from both by its more truly Pupoid shape, by the mouth being more distinctly angulated near the posterior end of the outer lip, and by the peculiar emargination of the internal edge of the peristome.

PUPA HORDACEA, Gabb.—Plate 21, fig. 7.

Description.—Shell very small, cylindrical; apex obtuse; whorls 6, convex; suture well impressed, smooth, thin, horn-color; aperture small, rounded below, unarmed, lip narrowly reflected and white; base umbilicate, the umbilicus bounded by an angle.

Dimensions.—Length .11, width .04 inch.

Locality.—With the preceding.

ON THE ACMÆIDÆ OF THE VANCOUVER AND
CALIFORNIAN PROVINCE.

BY PHILIP P. CARPENTER, B.A., PH.D.

Genus ACMÆA, Esch.

The ordinary Acmæids of the Californian and Northern shores divide themselves into the following principal groups:—

1. *Patina*.—Normal shape; often smooth, but, when well developed, with very fine, sharp, distant striæ; black, or teselated with olive-brown; margin moderate.

2. *Pelta*.—Similar shape; not striated; with faint swelling ribs, sometimes nearly obsolete; margin narrow.

3. *Persona*.—Apex pointed forwards; generally with obtuse ribs, and dome-shaped; sometimes spreading, with faint riblets.

4. *Spectrum*.—Apex somewhat anterior; not dome-shaped; with very strong, close, rounded ribs.

5. *Subra*.—Shape of *patina*, with close, nodulous striæ.

There are numerous intermediate forms, even between these clearly-defined groups; and in each, special forms are developed, which have been regarded as distinct species. Until the animals of these shall have been proved to present clear marks of separation, they must be regarded as simply the accidents of growth.

ACMÆA PATINA, Esch.

(For synonymy, *vide* Maz. Cat. and Br. Assoc. Reports, in locis.)

This species having been first described from dwarfed Northern specimens, it could only be recognized, along with the other Sitcha limpets, by the judgments of Philippi, Middendorf, and others, who had seen the shells; and by the useful axiom, that when authors describe the species of a particular locality, they mean the shells known to inhabit that lo-

cality. As the (figured) descriptions of Eschscholtz were very accurate for that time, it is considered that they deserve precedence, especially as the genus was constituted from them.

The Nuttallian limpets, as well as Chitons, were not described in Conrad's paper; whether because the author regarded them as identical with the similar forms from other seas, or because their determination is somewhat difficult, is not stated. However, Prof. Nuttall freely distributed his numerous specimens through the principal American and English collections, under well-chosen names for the principal forms. Although these names are of no authority in literature, having been first published, without descriptions, in Jay's Catalogue, it would have saved much confusion if they had been adopted, in preference to new ones, by American authors, as they were by English. Such a mark of courtesy would have been at least a graceful compliment from a pupil to a venerated teacher. However, both the Nuttallian names, when descriptions were at last published by Reeve, and those of Gould, must give place to the prior designations of Eschscholtz, although some of them may be conveniently retained for varieties.

The Gouldian species do not appear to have been noticed, or, at any rate, were not understood by Mr. Reeve, who, in his Monograph, described almost all the supposed species of Nuttall, from the Cumingian collection, adding some others of his own. The plates and extended descriptions of Dr. Gould's shells, in the Exploring Expedition Mollusca, were scarcely known in Europe till many years after their publication. In fact, the work was not accessible in the Smithsonian Institution in 1859; and it was only by special favor that I then obtained a proof copy of the plates, and borrowed the quarto volume from a friend, in order to work-up the Exploring Expedition collections. At that time Dr. I. Lea had not been able to find a copy in Philadelphia, nor to see Dr. Gould's type specimens of *Unionidae*. It is very greatly to be regretted that the works published by Government are not at once allowed to enter the regular markets, and are not sent as soon as published to the principal libraries of science.

Most of all shells, it is necessary that limpets be studied geographically. What differences may exist in the animals, we do not as yet know; but, though normal specimens may carry their specific marks along with them, there are everywhere, and especially in the different sections of the West American Coast, so many unconformable specimens which closely resemble distant species, that the naming of limpets in a mixed assemblage can never be performed with confidence.

Having critically examined, with the greatest care and microscopical analysis, at least 20,000 Western North American limpets, my conclusions will not be regarded as hasty, though they will, doubtless, often prove to be erroneous.

A. patina, the standard Northern limpet of the W. Coast, was described by Dr. Gould as *Lottia pintadina*, with the accuracy* and enlarged discrimination which characterize all his writings, and make them to the student so refreshing a contrast to the careless diagnoses of many authors. The following are the principal varieties:—

Var. *a. pintadina*. The analogue of the N. Atlantic *A. testudinalis*, and of the Gulf *A. mesoleuca*. Large, flat, open. Apex subcentral. Color tessellated with white and ashy-brown olive, in various proportions. Inside, the shell is generally of porcelainous white, with a squarely tessellated border, in which sometimes the light, sometimes the dark predominates. This variety includes *A. tessellata*, Nutt., and *diaphana*, Nutt., (but not *A. diaphana*, Rve., which=*A. mesoleuca*;) also *A. verriculata*, Rve. It is known from *A. mesoleuca* by the prevailing ashy and white, rather than green, tinge; and also, as well as from *A. testudinalis*, by the very fine, sharply raised, distant striæ, with interspaces very wide in proportion. The "spectrum" is sometimes dark, sometimes light brown, with indistinct outline, sometimes with a few light spots, or nearly white. In the Southern specimens, the white sometimes changes to a rich tortoise-shell.

Var. *b. strigillata*: (= *A. strigillata*, Nutt., pars: pars = *A. pelta*, jun.) Part of the shells thus grouped by Gould, "marginal rim narrower," may also be *A. pelta*, jun. The colors run into stripes, radiating and bifurcating. Under ordinary circumstances, this variety is not so elevated as *A. pelta*; has not its faint, swelling ribs; but displays, instead, the typical, sharp, distant striæ; and has a wider margin: but young shells, with the outside abraded, are very difficult to determine or to separate from *A. strigatella* of Cape St. Lucas; q. v. in Ann. Nat. Hist.

Var. *c. Cumingii*. (+ *A. mamillata*, Nutt. non Esch. nec Mus. Cuming hodie: + *A. fenestrata*, Nutt. + *A. verriculata*, Rve. + *A. cinis*, Rve.: = *A. scutum*, Esch., ?non D'Orb.) In this group, the shell is more raised and pointed anteriorly, with a broad black margin. The fine large shells are *A. Cumingii*, Rve., from "Valparaiso, Cuming," but Mr. C. expressly stated

* Unfortunately, the "deep emerald green" of the descriptions seems to have been added from the Gulf species, *A. mesoleuca*, specimens of which, along with varieties of *A. patina*, were sent to me by Dr. Gould, as representing his *pintadina*.

to me that he never took it, nor have I ever seen black limpets of that size in any authentic South American collection. Smaller shells of the same aspect are, however, undoubtedly South American, being described by D'Orbigny under the name of *A. scutum*, as of Eschscholtz, and occurring, in tolerable abundance, in the United States Exploring Expedition Chilian and Patagonian collections. These go through the usual Northern changes of form from scutoid to patinoid; are more or less spotted; and vary in sculpture. Normally they have closer striae, as in *A. testudinalis*; but fresh specimens are often nearly smooth, and in others (especially the flatter specimens) the striae become further apart, and would not be recognized as distinct from *A. patina* in a mixed collection. It will save confusion to retain D'Orbigny's name, as *A. scutum*, D'Orb., for the South Americans; and to distinguish the Northern black varieties of *patina* as *Cumingii*, that being the name given to the most characteristic forms. The *A. cantharus*, Rve., (Cape of Good Hope, *Archer*, certissime: "Guacomayo," Mus. Smithsonian,) can scarcely be distinguished from the flattened South Americans.

The *A. mamillata* of Nuttall is the young state of *Cumingii*, somewhat conical and arched; but the *A. mamillata* of Eschscholtz is a var. of *Scurria mitra*, *testibus* Philippi, Middendorff; while the shells now called *mamillata* in Mus. Cuming, as of Rve., are the black var. (*limatula*) of *A. scabra*, Nutt. The shells quoted by Dr. Gould under *pintadina*, p. 352, from the Boston Cab. A. N. S., are also probably *A. scabra*, Nutt., which is always known from *A. patina* by the rough striation.

A very pretty modification of the *Cumingii* type is *verriculata*, Reeve, of which *fenestrata*, Nutt., is the young. In this, the color-pattern is in a minute network, as in some vars. of *persona*. In *A. cinis*, Reeve, the same pattern is changing into the streaked varieties.

A. patina, var. *d.*, is internally almost always dark in the spectrum, with white sides. But sometimes there are concentric zones of dark, alternating with the white, in which state it is the "*A. cribraria*," Gld., ms., a very worn specimen of which was "purchased at the Sandwich Islands" by the omnivorous naturalists of the United States Exploring Expedition. Sometimes the spectrum is well defined, nearly black; and the sides are dark brown. The intermediate forms and shades between the vars. *Cumingii* and *pintadina* are very common. Sometimes the marginal edge grows light, with a dark belt inside; or the dark becomes more or less spotted. The outside almost always displays more or less of spots, generally in very small pattern.

Occasionally, almost the whole color of *A. patina* fades away, and the shell develops the pinkish tinge of *A. rosacea*; of this variety, a strangely distorted specimen is in the Mus. Smithsonian. Sometimes the animal appears to perish from atrophy, margin within margin appearing at the edge.

The young shell is much flatter than that of *A. pelta*; normally it has the apex very anterior, and the striae appearing at an early age.

ACMÆA PELTA, Esch.

Zool. Atl., Pt. 5, p. 19. = *P. fimbriata*, Gld. = *P. leucophæa*, (Nutt.) Rve.

Junior = *P. monticola*, Nutt., pars + *P. strigillata*, Nutt., pars.

Var. ? = *A. cassis*, Esch. loc. cit. p. 19. "Sitcha."

This species, when in good condition, is easily recognized by its regular conical form, narrow margin, and faint, irregular, bulging ribs; but it is generally decorticated, and often subject to remarkable variations of growth. Normally it is painted with brown-olive, passing into black, in radiating streaks (more or less broken-up into patches), which are deepest, tessellating the inner margin, between the ribs. Sometimes the ribs are strong and crowded from the commencement; (in which state it *may be* the *A. cassis*, Eschscholtz, if from *Sitcha*, as stated;) the shell then appearing, externally, exactly like *Patella deaurata*, from Cape Horn. One of the specimens sent to the Smithsonian Institution from the California Academy actually belongs to that species, as do also specimens brought to the British Museum, as from Vancouver Island, by the British North Pacific Boundary Survey. No doubt they really came from South America, and are easily distinguished from all varieties of Northern limpets by the rich metallic lustre of the inner surface. But sometimes the ribs are nearly obsolete in the adolescent shell, only faintly developing near the adult margin. Sometimes they fade away, leaving nothing but blunt striae. The shell is then known from the conical variety of *A. patina* by the narrow internal margin, and (if perfect) by the non-striated upper portion. Very rarely the shell loses its color, as well as its ribs, when it closely resembles *Scurria mitra*; it can be distinguished, however, by its thin texture, and by some indication of color or of striae in at least some portion of the surface. The smoothness of the adolescent shell, as well as the dull color, in which stripes prevail, is usually a good discriminating guide. In its first stage, like the other species, the shell resembles a minute horny *Ancylus*, with the apex near the margin. As the shell grows, the apex gradually ap-

proaches the central portion. When about one-fourth of an inch long, the shell is usually of an orange-yellow, with two conspicuous brown rays, others also appearing; non-rayed specimens are, however, common. In its early adolescence, irregular decorticated shells are the *A. monticola* of Nutt., ms.: some specimens not being distinguishable internally from *Lottia onychina*, Gld. This, however, is rightly assigned to Rio Janeiro, being identical with *A. subrugosa*, D'Orbigny, from Brazil.

Some of the specimens called *A. strigillata*, Nutt., ms., also belong to this stage, being the variety in which the stripes are fine and uniform. Others, however, are probably varieties of *A. patina*. In the Rev. J. Rowell's collection, there is a very remarkable exaggeration of this variety from Sta. Cruz, called *tesselata*, Nutt., in Mus. Cuming, in which (after the horny commencement) the shell develops three conspicuous olive-brown stripes over the back, broadly bordered on each side with white, the interstices with olive, scarcely dotted with light. Near the margin, however, it rather suddenly develops the ordinary strigate pattern. The shell is smooth, and must have lived on choice food in still water. The usual color inside is china-white, often tinged with yellowish. The border is normally with a very narrow dark rim, and dark scollops between the ribs. These sometimes assume the form of faint tessellations or dots, and, in rare instances, are nearly or quite absent. In the middle is an irregular brown blotch, often faintly developed, sometimes quite absent. Very rarely the shell is deeply tinged with rich purple-brown, with broad, colored margin, leaving only a narrow belt of white. There is little doubt that the food alters the color of the animals, as well as of the shells.

Some specimens of the form *textilis* appear most naturally to belong to this species, though they present, more or less, the freckled painting of *A. persona*. The apex, moreover, is rather more anterior than is usual in this species. They may be hybrids.

ACMÆA PERSONA, Esch.

Zool. Atlas, p. 20, pt. 5, pl. 24, f. 1, 2, + *A. radiata*, Esch. = *A. ancylus*, Esch. + *A. digitalis*, Esch.: *loc. cit.*

= *A. Oregona*, Nutt. *Var.* = *A. scabra*, Gld., *pars*, (f. 456, 456a, *excl.*) *non* Nutt.

Var. = *A. umbonata*, Nutt.

Var. = *A. textilis*, Gld.

The following are the principal forms:—1. Normal: strongly developed, = *A. Oregona*, Auct. Shell large, arched, with strong, rounded ribs and broad interspaces, coarsely

nodulous. Principal ribs about 16, of which the anterior are small, and generally abraded; but very irregular in arrangement. Sometimes 5, sometimes 12, divide the posterior half of the margin. Apex generally the full height of the shell; sometimes quite over the anterior margin, in which case the shell is generally elongated, and becomes the *digitalis* of Eschscholtz; sometimes only at one-sixth, or even one-third of the length. Color, outside white, with irregular stripes of brown, covered with a thin layer, spotted with olive-brown, which is generally eroded. Inside white or brownish-yellow; generally with an irregular brown spot, which is very rarely striped, and is sometimes entirely absent. Margin moderate, irregularly spotted with dark brown or black; very rarely without spots. Dr. Gould's description of his *P. scabra* exactly accords with this species, as does the shell* at fig. 456b.: but great confusion has arisen from the other specimen,* fig. 456, 456a belonging to a different species=*A. spectrum*, Nutt. *The name is retained for the shell* to which the diagnosis applies*, and, therefore, may be discarded as a synonym. This fortunate circumstance prevents the further confusion which would have attended the discarding of Reeve's Nuttallian species with the same name. In the young shell, the apex is very near the margin, and the back much arched.

2. Var. *umbonata*, Nutt. This is the usual Southern form, distinguished by the narrowness and small size of the ribs, which scarcely interrupt the margin. They are from about 15 to 26, with much wider interspaces. Being apparently still-water shells, they display the lace-pattern of dark olive and white, in very fine dots, with very beautiful effect. But this is often suddenly interrupted, and the typical stripes seen underneath. The interior is colored as in the typical form, but generally with more of black in the margin. The shape is still arched, but the shell is broader, and the apex is generally (not always) rather further removed from the margin.

3. Var. *textilis*, Gld. This is an extreme form of var. *umbonata*, in which the sides spread out, the apex is nearer the centre, the back is not arched, and the ribs are rounded and distant. It can scarcely be distinguished from the young of some of the varieties of *A. pelta*, except by the fretted pattern. It is probable that Dr. Gould had specimens of the latter under his eye, intermixed, when he wrote the diagnosis, although the figured type accords best with *A. persona*, var.

* All the remarks on Dr. Gould's species are written after very careful study of the figured types in the Smithsonian Institution; those on Nuttall's species of the types in his own collection (since presented to the British Museum); those on Reeve's species of the types in Mus. Cuming, now removed to the British Museum; and those on D'Orbigny's species, of the types in his own collection in the British Museum.

The *A. digitalis*, Esch., I regard as an extreme form of the normal *Oregona* type. It differs in being much smaller, with the apex very near the anterior margin, and the color having a large share of light ash outside, and a yellowish cast within. It is found abundantly in the Northern localities.

The *A. radiata* (= *ancyllus*) of Esch. is probably a variety of the Northern *digitalis* form. But Philippi asserts that the types are Chilian. His authority, however, is not irresistible evidence, as the South American shells of the *Oregona* form can scarcely be distinguished from their Northern allies: *v. infra*.

This species is, by far, the most variable of the limpets on the coast. No one seeing specimens of *digitalis* and *textilis* side by side, would believe that they could have a common origin; perhaps they would not even be regarded as congeneric. If each form had kept pretty closely to its own type, the intermediate specimens might have been regarded as hybrids; but the transitions appear too numerous and gradual for that hypothesis. See the remarks on *Lottia gigantea*.

ACMÆA SPECTRUM, (Nutt.) Reeve.

= *Fig. 456, 456a, Expl. Exped. Mollusca, quasi Lottia scabra*, Gld.: (non diagnosis, nec, *fig. 456b*, = *A. persona*, var.)

This shell is, in general, so easy to recognize, that it stands without synonym, with the unfortunate exception of a solitary shell having been figured by mistake, under *A. scabra*, Gld., (non Nutt.); that species being otherwise a variety of *A. persona*. *A. spectrum* is a Southern form, ranging from Lower California to Monterey, but not found in the Vancouver district. Normally it is solid, rather depressed, with from 20–30 very strong, rounded ribs, not evanescent anteriorly, the interstices being occupied by intercalary riblets. The color is white, with fine lines of brown (not striped, as in *pelta* and *persona*,) between the principal ribs, which delicately dot the otherwise uniform white margin. The habit of growth and consequent varieties of sculpture, resemble those of the flattened *Siphonarie*. Sometimes the principal ribs are rather sharp, palmating the margin. Occasionally they are small and crowded, becoming faint at the margin, when the shell presents the internal aspect of *A. mitella*; at other times assuming that of *Patella pediculus*. Generally the apex is at the anterior third; rarely at the anterior fourth, with very elongated outline; but sometimes it is nearly central, with a rounded shell. In this species also there is occasionally found a var. *textilis*; when the ribs become faint and distant, the color-lines run into network, and the shell is of a thinner tex-

ture. The young is extremely inequilateral, and rapidly develops the characteristic ribs. Inside, the shell has a white callus, through which the dark irregular blotch appears. This occasionally takes the form, so common in Valparaiso limpets, of irregular ghostly bars, which gave the name to the species. Many of the Valparaiso shells of the United States Exploring Expedition were named *Oregona* (= *persona*) by Mr. Cuming, having exactly the same shape, and, with that species, often presenting the spectral appearance. It appears, therefore, that neither shape, nor color, nor sculpture alone suffice in all cases to separate the limpets of North and South America, nor the North American species from each other. I generally find the best guide to be a certain habit of growth, which presents a balance among the individual characters. I confess that I could not always separate Northern and Southern individuals, either of the *scutum* or the *Oregona* types, in a mixed collection, unless they were in very good condition. Even Mr. Cuming had the same difficulty. The general run of specimens, however, can generally be distinguished, without much risk of error.

ACMÆA SCABRA, (Nutt.,) Reeve, (non Gld.)

This species is also so well marked, that it has not been re-described. It is rare, and confined to the Southern fauna, ranging (like *spectrum*) from Lower California to Monterey. With the shape and size of *A. patina*, it is easily distinguished by the crowded, imbricated riblets, which may almost always be traced near the margin, even when the surface is decorticated. The shell is thin, and normally of an orange-tinted white, generally faintly spotted outside and dotted near the margin with rufous. The margin is sharp and spreading; the interior china-white, or with rufous spots, and sometimes a bluish tinge anteriorly. The nuclear shell is of a reddish horn-color, extremely thin; when a little older, the apex is, as usual, very anterior, the rasp-like surface most delicately sculptured, and the color finely gauzed with rufous.

A well-marked variety seems to have an admixture of black blood, probably from intermarriage with the negro race of *A. patina*. With the same sculpture externally, the interior has the broad black margin of *A. patina*, (var. *scutum*), and a dark spot in the centre. One specimen is dark all over. Another stout dwarfed shell has a prettily tessellated boorder, and would (in a mixed collection) be taken for *A. cymbiola*, Gld., = *P. parasitica*, D'Orb.—As I have seen no intermediate specimens between the two forms, this may be described as var. *limatula*, '*A. scabra*, Nutt.,' extus sculpturâ normali; seu intensiore,

lirulis quibusdam majoribus, valde nodosis; intus albidâ, nitidâ; limbo lato nigro, seu rarius tessellato; spectro sæpius fusco maculato.

It is probably the *Acmæa patina* of the Mazatlan Catalogue, sp. 265, but the specimens were too much worn outside to decide with confidence.

Habitat.—San Pedro, *Cooper, Palmer*; Sta. Cruz, *Rowell*; Monterey, *Rich*; Mazatlan, *Reigen*.

Ordinary collections of limpets from the coast may generally be grouped under the above five species; the three first only being Northern. A few individuals, however, are (rarely) met with, which must continue to perplex malacologists till more specimens have been compared, and their animals examined. They belong to two distinct forms. The first is

ACMÆA ASMI, Middendorff.

This is easily recognized by its small size, very conical shape, uniform dark color, and great solidity. It is generally rounder than *Nacella incessa*; and the latter has a horny aspect, and is moderately thin. Among all the myriads of limpets which I have handled, I have never seen more than about 6 specimens of *A. Asmi*. I am inclined to regard it as a stunted variety of one of the other species, probably *pelta* though it may be a cross between that species and *patina*, var. *Cumingii*. This view is confirmed by one of Dr. Cooper's specimens, in which the adult shell is a normal *pelta*, while the young portion would have made an excellent *Asmi*, if detached from the rest.

ACMÆA (? var.) ROSACEA, Carpenter.

Brit. Assoc. Rep. 1863, p. 650, no 248.

=*A. pileolus*, *Mus. Cum.*: ?non Middendorff.

A. t. parvâ, conicâ, tenui, lævi; t. jun. pallide rosaceâ, elegantissime maculis albis et fuscis subradiatim sparsis; t. adultâ strigis fusco-rosaceis et albidis pictâ; apice elevato, parum antico; intus rosaceâ. Long .2, lat. .16, alt. .08 poll.

Habitat.—S. Diego, Monterey, *Cooper*.

Specimens of this species are named "*pileolus*, Midd.," in *Mus. Cuming*, and are said to have been received by Mr. Damon from Middendorff himself. But there surely must be some mistake, as the following is the author's diagnosis, in his

Beiträge, Vol. II., p. 38, (and plate I., fig. 4):—"T. minuta, leviuscula, elliptica, elevata, fornicato-conica, vertice subantico: extus, vestita epidermide fuscâ, sub microscopio irregulariter rugosa, centro sæpe multum erosa, et inde calcaria, albida: intus nitida, ex livido flavicans, margine fusco, et maculâ eâdem centrali. Long. 8, lat. 6, alt. 4 mill. Div. ant. 55°, post. 30°. In my specimen, the central and greater part of the exterior is eroded and without epidermis, so that the latter only surrounds the shell with a brown marginal band. Though internally bright, the brown has externally a faint water-colored shade. The shell is arched in each direction. A color variety has the margin painted with about 20 white spots, arranged radiatingly inside and out. *Habitat.*—Sitcha."

I hardly know how my *rosacea* can be affiliated to the above; and believe that Middendorff must have had under his eye, when writing, specimens of *pelta*, jun., of which there are many varieties in the Northern seas.

Dr. Cooper's young specimen from S. Diego was perfectly fresh, though completely encrusted. On removing the nullipore, it appears quite smooth; in other respects exactly resembling the common Southern form of *A. virginica*, as seen in the shell sand from the Channel Islands. The larger specimen from Monterey had lain dead long enough for annelids to build their houses inside; but, except in the absence of striæ, which are rarely seen in dead British specimens, it exactly resembles one of the shells sent by Mr. Bean as *A. virginica* from Scarborough. It can hardly be supposed, however, that the species are identical. It is distinguished from *A. patina*, jun., a rare variety of which has a pinkish tinge, by the absence of striæ, the very thin texture, and the regularly conical growth. A more numerous series of shells of this form will be awaited with interest. Some specimens, almost exactly corresponding with the young shell from S. Diego, but *striatell*, were collected by Col. Jewett. They were marked "Panama," but I strongly suspect that they were West Indian.

Genus LOTTIA.

=*Lottia*, Gray, *auct. pars*: *maxima pars*=*Acmea*, Esch.

Animal, pallii margine intus papillis lamellaribus, circa dorsum lateraque instructo, antice interruptis: pede elongato. ovali, planato; branchiâ minimâ. (*Alcock.*)

Testa *Acmea* similis.

LOTTIA GIGANTEA, Gray.

Gray ms. in Brit. Mus., Sowerby, Gen. f. 1; Reeve, Conch. Syst. f. 1, (copied.)

=*A. scutum, nonnull. ms. (vide Mazatlan Catalogue, p. 208): non* Eschscholtz, *nec* D'Orbigny.

=*[Tecturella] grandis, Gray, Smithsonian Institute Check List, No. 176; British Association Report, 1861, p. 137.*

L. t. magnâ, crassiore, planatâ, expansâ; texturâ sæpius spongiosâ; nucleo minore, corneo, nigrofulco, ancyloformi, vertice mamillato, subelevato; dein elongatâ, posticè griseâ, undulatâ; t. adolescente verrucosâ, radiis obscuris, antice haud verrucosis; t. adultâ plus minusve latâ; plus minusve radiatâ, seu verrucosâ; apice plus minusve à margine remotâ; parte anticâ seu haud projiciente, seu circiter quintâ totius longitudinis; parte posticâ plus minusve elevatâ, convexâ: extus, ut in "Acmaeâ peltâ" pictâ, albido-griseâ, fusco-olivaceo copiose irregulariter strigatâ: intus, plerumque testâ testudinariâ, margine lato, nigro; spectro definito, fusco, seu rarius albido; cicatrice musculari fortiore, interdum purpureo seu violaceo tinctâ.

Sp. *normalis*, A, long. 2·6, lat 2·05, alt. 7. }

" *varians*, B, " 2·95, " 2·35, " 8. }

Ex apice ad marg. ant. sp. A ·45 } Apicis alt. A ·6. }

" " " B ·05 } " B ·35. }

Habitat.—California Inferior.

This shell, by far the largest in the family, has been long known in collections, and comes to us from various quarters of the world. The United States Exploring Expedition specimens were duly labeled "Valparaiso." It is only known to live, however, in Middle and Lower California. The peculiarity of the mantle-fringe was first pointed out to me by Dr. Cooper in 1860, when preparing the Smithsonian Institute Check Lists. To distinguish it, I proposed the name *Tecturella*, in order to preserve the remembrance of *Tectura*, Milne Edwards, which falls as a synonym of *Acmaea*. I was not aware that Dr. Stimpson had previously employed it in his "Invertebrata of Grand Maun." I then proposed the name *Lecania*, under which I may have distributed duplicates; but on the eve of publication by Dr. Alcock (from whose notes I have copied the above diagnosis of the animal) and myself, I was fortunate enough to obtain the loan of that very rare but most excellent work "Sowerby's Genera," which was the original of Mr. Reeve's well-known "Conchologia Systematica." Here our very shell appears, excellently figured, as the first species of Gray's "*Lottia*," and with his ms. name *gigantea*.

Of course, neither Gray nor Sowerby were aware of the characters of this species; and (*Acmæa* not being then known in the West of Europe) *Lottia*, as well as *Tectura* and *Patelloidea*, simply meant a limpet with a single neck-plumed gill. It happens, however, (according to Woodward in litt.,) that *Acmæa* was first described in the Appendix to "Kotzebue's Voyage," some years before the Zool. Atlas, and anteriorly to all the Western names. All the rest of the *Lottia* thus becoming *Acmæa*, there remains this one for which the name may be retained. Perhaps other species now reckoned as *Acmæa* or *Patella* may prove to be congeneric. The above diagnosis of the animal only applies to this species; the main point of difference is supposed to be the interruption of the fringe in front. In general characters, Dr. Alcock regards it as more nearly allied to *Acmæa*; but in special points, including the character of the teeth, to *Scurria*. As I believe no Latin diagnosis has ever been written of the species, I have endeavored to prepare one that shall embrace all the specimens I have examined.

Lottia gigantea is an excellent test for ascertaining the amount of variation allowed in a limpet, inasmuch as there is no other species that offers any approach to it; and the general habit is so much the same in all the specimens, that no one who examines a large number, would doubt their identity. And yet, in about 30 specimens examined, the ratio of the anterior portion in front of the apex to the entire length (which is generally a nearly constant quantity in each species) was found to vary from 1 : 7 to 1 : 20.

The adult is, in shape, something like an enormous *Acmæa persona*, and calls to mind *Helcion pectinatus* (of which the animal is not known) and the Southern *Patellæ* of the type of *ænea*, Mart. The color of the interior resembles that of the Cape species, *P. petasus*, and its congeners. It is generally very brilliant; the body-mark being spotted in clouds with bright sienna, over which more or less of white porcelain is deposited. The shell outside is almost always eroded, and of a spongy texture. When perfect, it displays very faint, swelling, irregular riblets, which are broad and more or less warty, except on the head; the warts are very stout in the young shell. The outer margin of well-grown specimens is colored like *A. pelta*. Sometimes the profile presents an elegant curve, concave anteriorly, convex posteriorly; but often the eroded apex descends almost perpendicularly to the margin. The horny nucleus is very small in proportion, with the apex raised as compared with the adult; in this respect the reverse of the *Acmææ*. The point is very obtuse, and displays a spongy decollation as in the adult. When less than the tenth

of an inch long, it begins to throw off a light drab portion posteriorly, the black projecting into it in broad rays; the shell, at the same time, developing coarse, faint ribs. A specimen, about .2 inch long, which was adhering to an adult, and is probably conspecific, is entirely drab, of rough, irregular growth, and with but few brown spots. A series is wanting to connect these very young shells with the adolescent specimens.

Some of the Chilian limpets, which have been banded about between *Patella* and *Acmæa*, may possibly prove to belong to *Lottia* as now restricted.

Genus SCURRIA, Gray.

Dr. Alcock writes, that "in *Scurria mitra* the mantle-margin is beset within with lamellar papillæ, extending completely round, but less developed in front; the foot is thick and roundish oval; the gill moderate, triangular, and broad at the base. In the typical *Acmææ*, (*patina*, *pelta*, *fascicularis*) the mantle-margin is plain within; the foot oval; the gill long and plume-like. In *A. discors*, however, the gill is triangular, with a broadish base, as in *Scurria*." It appears evident that the anatomical details have not yet been examined in a sufficient number of species to ascertain what characters are generically important, and what of specific value only. All grouping according to the shells alone, is manifestly erroneous. The absence of true *Patellæ* from the whole Northern coasts of America is very remarkable.

SCURRIA MITRA, Escholtz.

= *Acmæa m.* + *A. mamillata* + *A. marmorea*, Eschscholtz, *Zool. Atlas*, Pt. 5, pp. 18, 19, pl. 23, f. 4.

= ?*Lottia pallida*, Gray, *Zool. Beech. Voy.*

= *Patella conica*, Gould, *Expl. Exped. Moll.*, p. 346, (from type.)

This shell, which is profusely abundant and large in the Vancouver district, varies considerably in outline, but is always very conical, with the apex elevated and pointed, even in very young specimens. As generally seen, the surface is smooth, even in fresh shells, and after the nullipore has been uncoated; but occasional specimens present faint indications of striæ, as stated by Dr. Gould. Whether this be co-ordinate with any differences in the animal, has not been ascertained. Fresh Southern specimens are sometimes found (as from Monterey, Cooper) with a delicate pink tinge; but the dead shell is uniformly of a pure white, not yellowish or ashy like the South American *Scurria scurra*, Lesson. Dr. Gray (and Dr.

Gould, as appears from Expl. Exped. Moll., p. 347) considered the shells of the Northern and Southern oceans conspecific; but they may pretty easily be separated. I have examined more than a thousand from Vancouver, but none of them have the horny aspect (common in *Nacella*) which is generally seen in Chilean specimens. In these, the young shell is more swelling, which gives a slight excurvation to the profile of the adult; while the profile line of the posterior portion in *S. mitra* is straight or even concave. Moreover, *S. scurra* is crowded with minute, obsolete, radiating striæ, crossed by lines of growth, as described by Dr. Gould; while *S. mitra*, if sculptured at all, has the lines few, distant, and more raised.*

An ordinary conical specimen measures:—

	long. 1·4, lat. 1·35, alt. 1·4.
A smaller, spreading	“ “ 1·2, “ 1·08, “ ·8.

Surely, those who set the fashion in ladies' dress, must have borrowed the outline of the most improved crinolines from the spreading form of these little molluses; the conical form representing the common kinds. But they should remember that *Scurria*, living where there is no fire and abundance of water, are safe under a dome, which, inflated with air, made of inflammable material, and near a fire, may consume, with untold agony, the frame of the fashion-follower, who conceals her form within a mere portion of it.

As the sculpture described under *P. conica*, Gould, belongs to *S. scurra*, Lesson, the rarer, sculptured form of *S. mitra* may be described as var. *tenuisculpta*.

Scurria mitra, t. striis, seu lirulis, valde distantibus, subexpressis, t. jun. intensoribus, plus minusve sculptâ.

* It is most probable that Dr. Gould had under his eye some young specimens of *S. scurra*, along with the young of *S. mitra*, when he wrote the diagnosis of *Patella conica* in Expl. Exped. Moll. The type specimen in Mus. Smithsonian is undoubtedly *S. mitra*, jun. The specimens of the United States Exploring Expedition shells were so sadly intermixed, and the labels often so manifestly erroneous, that it is not wonderful if Dr. Gould (and others who believed in them) should have occasionally erred. The animal of *Scurria scurra*, Lesson, (embedded in the stalks of Fuci, Valparaiso) is well described in Expl. Exped. Moll., pp. 356, 357; but there is no "genus *Scurria*, Eschscholtz," *scurra* being Lesson's species, and *Scurria* Gray's genus. Dr. Gould also speaks (p. 356) of *Aemua persona*, *A. radiata*, and *A. ancyclus*, Eschscholtz, as being varieties of "*Lottia scutum*, (Eschscholtz.) D'Orbigny," the animal of which, as described by Couthouy from Valparaiso, is fringed with fine cirri. Now, *A. scutum*, Eschscholtz, is a variety of *A. patina*, (as stated, indeed, by Dr. Gould himself at p. 352;) and *A. persona*, with its varieties *radiata* and *ancyclus*, form a very distinct species; all of them being from the Sitca district. Nuttall's "*monticola*" (= *monticola*), a Californian shell = *pelta*, var., is also quoted by Dr. Gould among the Valparaiso limpets, p. 354.

? *SCURRIA* (?var.) *FUNICULATA*.

Brit. Assoc. Report, 1863, p. 650, no. 250, b.

? *S. t.* parvâ, regulariter conicâ, apice acuto, elevato, parum antrorsum sito; albidâ, liris validis, rotundatis, interdum vix nodulosis; irregulariter huc et illuc dupliciter vel tripliciter dispositis; margine à costis extus undato; cicatrice haud conspicuâ. Long. .24, lat. .18, alt. .12 poll., div. 80°.

Habitat.—Monterey, Cooper.

One very small specimen was sent by Dr. Cooper to the Smithsonian Institution, so different in sculpture from the most strongly marked specimens of *Scurria mitra*, that I presume it to be distinct. The ribs, which are stout for the size, are sometimes single, sometimes gathered into twos and threes; with wide interspaces, in which intercalary riblets appear.

Genus *LEPETA*, Gray.

= *Propilidium*, Forbes.

The generic place of this species and the last are doubtful, the animal not having been yet examined.

LEPETA CÆCOIDES, Carpenter.

Proc. Phil. Acad., April, 1865, p. 60.

The first perfect specimen of this shell was dredged by Dr. Kennerley; a larger, broken shell, received before by Mr. R. D. Darbishire from the Farrallones Islands, having been passed over as *Scurria mitra*. A number of small, but beautifully perfect specimens have lately been sent to the Smithsonian Institute from Sitcha. They are thin; white, tinged with greenish at the margin, and often with pink within; and very delicately sculptured. It is known at once from all the *Acmææ* by its semitransparent texture and white color; and from the young of *Scurria mitra* by its broad, flat shape, obtuse apex, and excurved posterior profile. The striulæ are more or less expressed, more or less distant, and rarely slightly granular; they are always most developed on the back, and subobsolete in front. The genus (as described by Forbes) is curiously like an *Emarginula* without a slit. The Sitcha specimens range to long. .57, lat. .48, alt. .2. In color, sculpture, &c., it exactly resembles *L. cæca*; but that species, as dredged off Norway, by M'Andrew, and as represented in the Cumingian collection, is conical, while *cæcoides* is Ancyloid. Messrs. Adams figure *Propilidium ancyloide*, Forbes and Hanl., under the name of *Lepeta cæca*; but the examples above quoted

are widely different. My most reliable friend, Mr. Arthur Adams, collected specimens both of *cæca* and *cæcoïdes* in the Japanese waters. The shells collected by Dr. Stimpson in the North Pacific Exploring Expedition (Hakodadi and Arctic Ocean) were marked *Lepeta* "*cæca*, var. *concentrica*, Midd." by Dr. Gould: Smiths. Cab. no. 1718.

Montreal, C. E., June 20th, 1866.

REMARKS ON THE DISTRIBUTION OF THE INOPER-
CULATED LAND SHELLS WHICH INHABIT
THE CONTINENT OF AMERICA AND
THE WEST INDIES.

(In continuation of Papers pp. 54—58 and 136—143.)

BY THOMAS BLAND.

In previous Papers my remarks were confined chiefly to the operculated land shells of the American Continent and the West Indies, but I propose now briefly to discuss the subject of the distribution of the inoperculates.

† Pfeiffer (*Mon. Hel. Viv.*) divides them (exclusive of *Proserpinacea*) into 31 genera, and describes over 5000 species,—to the present date the number known and described may be estimated at, but probably exceeds, 5500. Without assuming absolute correctness, it may be stated, that while the American Continent has 10 per cent. and the West Indies 39 per cent. of the operculates, the former has about 23 per cent. and the latter about 14 per cent. of the inoperculates.

According to Pfeiffer's classification, the following genera are represented, both on the Continent and Islands, viz: *Helix*, *Streptaxis*, *Bulimus*, *Spiraxis*, *Orthalicus*, *Achatina*, *Oleacina*, *Tornatellina*, *Pupa*, *Macroceramus*, *Cylindrella*, *Bulea*, *Clausilia*, *Vitrina*, *Simpulopsis* and *Succinea*. Considering, however, the great number of different forms embraced in several of those genera, it is not possible, with the use of such generic terms alone, to give a satisfactory view of the special relations of the continental and insular faunas.

Looking, however, at the relative extent to which each of the above-mentioned genera are specifically represented in different portions of the Continent, as well as in each of the West Indian sub-provinces, evidence is afforded of the general relationship of the faunas of the sub-provinces *inter se*, and with the Continent.

Taking, for instance, the number of inoperculated species in the sub-provinces and sections of the Continent, the following are approximately the proportions (per cent.) in which *Helix*, *Bulimus* and *Cylindrella* are represented in each:—

	N. America.	Mexico.	Cent. Amer.	Cuba.	Jamaica.	Haiti.	Porto Rico, &c.	Guadeloupe, &c.	S. America.
<i>Helix</i> ,	64	21	22	32	42	35	36	36	19
<i>Bulimus</i> ,	10	21	31	9	8	10	31	28	64
<i>Cylindrella</i> ,	3	13	7	26	20	25	5	6 fraction.	

Thus it appears that *Helix* predominates in North America, *Bulimus* in South America, and *Cylindrella* in the West Indies. The closer relations of the subprovinces, embracing Cuba, Jamaica and Haiti with North America, and of the Porto Rico and Guadeloupe subprovinces with South America, are shown by the greater numerical representation of *Helix* in the former, and of *Bulimus* in the latter. *Bulimus* has comparatively few species in North and *Helix* in South America, while the specific development of those two genera are more nearly balanced on the Continent, in Mexico and Central America, and in the Islands, in the Porto Rico and Guadeloupe subprovinces. The distribution of *Cylindrella* (and it is the same with *Oleacina* and *Spiraxis*) shows that Cuba, Jamaica and Haiti are more closely allied to Mexico and Central America than the Porto Rico and Guadeloupe subprovinces, in which, as well as in South America, those three genera are comparatively feebly represented.

In previous pages I referred the "origin" of genera to the country in which there is the maximum specific representation, and presented a statement showing the genera, both operculated and inoperculated, the origin of which might, on such data, be assigned to the American Continent or the West Indian Islands. I remarked that the majority of the genera of operculates common to the Continent and Islands have the greater number of species on the Islands, but that the reverse is the case with the majority of such genera of inoperculates.

Of the before-mentioned genera, represented both on the Continent and Islands, those which appear to have a majority of species in the latter are *Achatina*, *Pupa*, *Macroceramus* and *Cylindrella*, but in no sense can the two former be said to be of West Indian origin.

The generalizations to which I have referred are at least interesting, but less satisfactory as to the inoperculates than the operculates, if Pfeiffer's classification be used, because, as already observed, some at least of his generic terms embrace very various forms, the geographical distribution of which should be considered.

Pfeiffer includes in *Bulimus* and *Achatina* many species now better known as of the genus *Stenogyra*, and in *Bulimus*

the genus *Bulinulus*, the latter represented in the West Indies generally, but the former only in the Guadeloupe subprovince. *Liguus*, now with much reason separated from *Achatina*, belongs to the West Indies, in which *Achatina* proper is not represented. *Tornatellina* embraces *Leptinaria*, a few species of which inhabit tropical America and the West Indies. *Pupa*, in its wide signification, is not West Indian, but the subgenus *Strophia* may be so termed.

It is worthy of notice, that of the genera common to the Continent and Islands, the largest species of each genus, speaking generally, is found where the genus has the greater number of representatives, *Cylindrella* being the most striking exception; and I believe that this will be found to be the case with a majority, at least, of the well established subgenera.

I stated (p. 137) that species of operculates and inoperculates common to the Continent and Islands are, with few exceptions, of West Indian rather than American forms,—this, however, is not entirely correct as regards the inoperculated species. Of such species about one-half of the whole number are found in North America (including Mexico), and the Cuba subprovince,—they are of West Indian and Mexican forms, and about one-fourth of them are distributed in the other insular subprovinces. The remainder of such species inhabit the Southern Continent and chiefly the Guadeloupe subprovince, and are of West Indian and South American forms. The species of *Helix* common principally to the French Islands and French Guiana (with *Liguus virgineus* of Haiti), I am disposed to consider West Indian.

With respect to the occurrence of identical species in more than one of the subprovinces, the greater number are in Cuba and Jamaica, and Cuba and Porto Rico,—they are, at least, numerous in Haiti and Jamaica, and Haiti and the Guadeloupe subprovinces.

The annexed Table, (illustrative and explanatory of the foregoing remarks,) in which Pfeiffer's classification is used, gives the names of the genera represented both on the American Continent and in the West Indies, with the number (approximate, rather than positively correct) of species in each province or subprovince:—

Inoperculates.	North America.	Mexico.	Central America.	South America.	Cuba, sp.	Jamaica, sp.	Haiti, sp.	Porto Rico, sp.	Guadeloupe, sp.
<i>Helix</i> ,	150	38	23	141	101	94	36	29	27
<i>Streptaxis</i> ,				19					1
<i>Bulinus</i> ,	23	39	32	473	30	18	11	25	21
<i>Spiraxis</i> ,		24	7	6	5	7	3		
<i>Orthalicus</i> ,	1	4	2	18	1	1			2
<i>Achatina</i> ,	2	7	3	7	16	19	3	3	3
<i>Oleacina</i> ,	8	22	19	5	13	22	5	5	1
<i>Tornatellina</i> ,			1	5		1		3	2
<i>Pupa</i> ,	19	3	3	12	27	9	3	6	3
<i>Macroceramus</i> ,	2	1	3		28	1	11	1	
<i>Cylindrella</i> ,	4	25	7	3	83	46	26	4	4
<i>Balea</i> ,				2	1				
<i>Clausilia</i> ,				8				1	
<i>Vitrina</i> ,	3						1		
<i>Simpulopsis</i> ,		5		9			1	1	1
<i>Succinea</i> ,	22	3	3	12	11	4	2	4	10

In order to elucidate the facts as to the distribution of the inoperculated land shells on the American Continent and in the West Indies, more completely than can be done by the use of Pfeiffer's classification, I prepared the subjoined Catalogue from the last edition of the "Die Heliceen" of Albers.

The Catalogue gives, with the name of a typical species of each, the names of all the genera and subgenera, from the work referred to, which are known to be represented either on the Continent or Islands, distinguishing as distinct faunas those of Eastern North America, the West Coast of North America, Mexico, Central America, South America, and of the five subprovinces into which, in my former papers, I divided the West Indian Islands. A single asterisk (*) indicates the occurrence of species (of the genus or subgenus mentioned in the first column) in the province named at the head of the column,—two asterisks (**) that in such province the genus or subgenus has its greatest specific development.

I do not, by any means, accept or adopt, as a whole, the classification of Albers, but I use it as the most convenient for my present purpose, considering that it enables me to present a very interesting and approximately correct view of the relations of the faunas in question.

HELICEA.

ACHATINA, Lam.

Liguus, Montf. *

virginica, L.

D. ORTHALICEA.

BULMULUS.

Otostomus **

auris leporis, Brug.

Drymaeus, Alb..... *

Knorri, Pfr.

Liostracus, Alb *

vittatus, Spix.

Auctus.... .. **

anchistomus, Wagn.

Mesembrius, Alb. *

elongatus, Bolt.

Thaumastus, Alb..... *

exilis, Gm.

Mormus, Alb..... *

papyraceus, Mawe.

Scutalus, Alb..... *

proteus, Brod.

Ataxus, Alb. **

umbilicaris, Soul.

Bostryx, Trosch. **

solutus, Trosch.

Pyrgus, Alb. **

turritus, Brod.

Peronaeus, Alb..... **

pupiformis, Brod.

Leptomerus, Alb. *

linnaeoides, Fer.

Eudioptus, Alb *

pseudo succinneus, Moric.

Rhinus, Alb. **

heterotrichus, Moric.

Plectostylus, Alb..... **

coquimbensis, Brod.

ORTHALICUS, Beck.

Orthalicus, Beck. *

zebra, Mull.

Corona, Alb **

regina, Fer.

Porphyrobaphe, Shutt..... **

ioistomus, Sowb.

East. N. Amer.

W. Coast N. Am.

Mexico.

Central America.

Cuba, subpro.

Jamaica, subpro.

Haiti, subpro.

P. Rico, subpro.

Guadeloupe, s. p.

South America.

HELICEA.	East. N. Amer.	W. Coast N. Am.	Mexico.	Central America.	* Cuba, subpro.	Jamaica, subpro.	Haiti, subpro.	* P. Rico, subpro.	* Guadeloupe, s. p.	South America.
Pineria, Poey.					*					
<i>Beathina</i> , Poey.										
Leucochila	*		*		*	*	*	*	*	
<i>fallax</i> , Say.										
Strophia, Alb.....	*				**		*	*	*?	*
<i>munia</i> , Brug.										
Ennea, H. & A. Ad.								*	*	
<i>bicolor</i> , Gould.										
STREPTAXIS, Gray.									*	**
<i>contusus</i> , Fer.										
F. SUCCINEA.										
SIMPULOPSIS, Beck.			*				*	*	*	*
<i>sulculosa</i> , Fer.										
SUCCINEA, Drap.										
Amphibulima, (Lam.) Blainv.									*	
<i>patula</i> , Brug.										
Succinea, s. str.	*	*	*	*	*	*	*	*	*	*
<i>obliqua</i> , Say.										
Brachyspira, Pfr.	*								*	
<i>tigrina</i> , Lesueur.										
Omalyonyx, Orb									*	*
<i>unguis</i> , Fer.										

In the following pages I offer a more detailed description of the peculiar features of the distribution of the inoperculates, in the different West Indian subprovinces.

1. *Cuba, the Isle of Pines, the Bahamas and Bermudas.* In this subprovince there are very many peculiarly West Indian forms. The subgenera of *Helix* most characteristic of Cuba are: *Eurycampta* (*H. Bonplandi*, Lam.), *Coryda* (*H. alvula* Fer.), *Thelidomus* (*H. auricoma*, Fer.), *Polymita* (*H. muscarum*, Lea), *Polydontes* (*H. imperator*, Montf.), and *Caracolus* (*H. Sagemon*, Beck). In the Bahamas, *Plagioptycha*, which belongs rather to Haiti, is represented by *H. Bahamensis*, Pfr., and other species.

Liguus (*L. fasciatus*, Müll.), found also in Florida and the adjacent Keys, confined in the Islands to Cuba and Haiti, has most species in the former. Several of the subgenera of

Stenogyra are represented by peculiar species,—*Obeliscus* by *S. gigas*, Poey, *Melaniella* by *S. acuticostata*, Orb., *Pseudobalea* by *S. hasta*, Pfr., found also in Haiti and Porto Rico.

Strophia, (*P. mumia*, Brug.,) subgenus of *Pupa*, has its chief development in Cuba and the Bahamas, and is found in the Haiti and Porto Rico subprovinces, but not in Jamaica.

Macroceramus has the greatest number and most varied forms (*M. Pazi*, Gund., *M. claudens*, Gund., *M. turricula*, Pfr.,) in Cuba. Albers places *Cylindrella torquata*, Morel., with other species in *Anoma*, subgenus of *Macroceramus*, but with doubtful propriety. Whether the buccal plate is present as in *Macroceramus*, or wanting as in *Cylindrella*, I am not informed; but *C. torquata* and its immediate allies have revolving laminae on the axis, as is common in the latter genus, but only known in *M. amplus*, Gund., which, however, may be a *Cylindrella*, as I have elsewhere suggested (Ann. Lyc. N. Y., VIII., p. 163.) *Macroceramus* is also found in the Bahamas, but not in the Bermudas.

Pineria, established by Poey for two species found in the Isle of Pines, allied to *Macroceramus*, but placed by Pfeiffer in *Bulimus*, is adopted by Albers as a subgenus of *Pupa*. A Guadeloupe species is described as *Helix Schrammi* by Fischer. *B. Viéquensis*, Pfr., of Viéque in the Porto Rico subprovince, and of Barbadoes in the Guadeloupe subprovince, belong to *Pineria*.

In the Cuban subprovince, indeed in the Islands generally, there is a marked absence of Eastern North American forms of *Helix*. Albers has two in *Polygyra*, (a subgenus characteristic of Mexico and the Southern United States;) of one *H. auriculata*, Say, is the type, and *H. septemvolva*, Say, of the other. The only insular representatives are, of the former, *H. notata*, Poey, of Cuba; of the latter, *H. paludosa*, Pfr., of that Island and Jamaica, and *H. microdonta*, Desh., of the Bahamas and Bermuda.

The inopereulated land-shell faunas of Cuba, Jamaica and Haiti have special generic relations with that of Mexico and Central America, as shown by the distribution of species of *Glandina*, *Spiraxis* and *Cylindrella*, but different subgenera are developed on the Continent and Islands. Of the first, the subgenus *Glandina* (*G. Sowerbyana*, Pfr.) prevails on the former, but *Oleacina* (*G. oleacea*, Fer.) in Cuba, and *Varicella* (*G. leucozomias*, Walch) in Jamaica. *Streptostyla* (*S. Nicoleti*, Shutt.), subgenus of *Spiraxis*, is continental, while *Chersomitra*? is represented in Cuba, and *Euspiraxis* (*S. costulosa*, C. B. Ad.) in Jamaica. I should remark that *S. Cubaniana*, Orb., and *S. episcopalis*, Morel., of Cuba, appear to me to be improperly placed by Albers in *Oleacina*.

Cylindrella has an extraordinary number of species in Cuba, and of very varied forms, both externally, and internally as regards the characters of the axis. The subgenera *Urocoptis* (*C. Ghiesbreghtii*, Pfr.) and *Holospira* (*C. Pilocerei*, Pfr.) are rather continental, while *Gongylostoma* (*C. elegans*, Pfr.) and *Tracheliu* (*C. porrecta*, Gould) may be especially referred to Cuba.

The occurrence in Cuba of both operculated and inoperculated species with well developed spinous processes is curious, —I allude to *Choanopoma hystrix* and *echinus*, Wright, to *Melaniella acuticostata*, Orb., and *Cylindrella Elliotti*, Poey.

The family *Proserpinacea* belongs to Mexico,—the subgenus *Proserpina* (*P. depressa*, Orb.) has insular representatives only in Cuba, the Isle of Pines and Jamaica.

Strictly South American forms are rare in the West Indies, excepting in the Guadeloupe subprovince. In Cuba there are a few species of *Bulimulus*, but of subgenera which are rather of Mexican and Central, than South American form, viz: *Liostracus Marielinus*, Poey, found also on the Florida Keys, and *Leptomerus sepulchralis*, Poey, which, as well as *Mesembrinus Bahamensis*, Pfr., inhabits New Providence.

Orthalicus is most numerously represented in South America. It has one species (*O. unilatus*, Brug.) in Cuba, found also in Jamaica and in the Guadeloupe subprovince.

In South America there are two species of *Balea*, and it is remarkable that one (*B. Canteroiana*, Gund.) is found in Cuba, the only West Indian species, referred, indeed, to the genus *Balea* by Pfeiffer, with some doubt.

There are several species in the Cuban subprovince, which have most probably been introduced from Europe,—*Stenogyra decollata*, L., found at Havana, also at Charleston, S. Carolina, *Helix ventrosa*, Fer., and *Cionella acicula*, Müll., at Bermuda,—the latter also inhabiting Florida, and lately discovered at Princeton, N. J., by Mr. A. D. Brown.

2. *Jamaica*. Many West Indian forms belong to, and, as is the case with Cuba, are peculiar to this subprovince. The most characteristic subgenera of *Helix* are: *Cysticopsis* (*H. tenerrima*, (C. B. Ad.), *Pleurodonta* (*H. lucerna*, Müll., *H. soror*, Fer., and *H. sinuata*, Müll.), and *Leptoloma* (*H. fuscocincta*, C. B. Ad.) *Coryda* and *Thelidomus*, more particularly Cuban, are represented, the former by several species, of which *H. Gossei*, Pfr., may be called the type, and the latter by *H. cognata*, Fer., and *H. aspera*, Fer.

The genus *Sagda* (*S. Cookiana*, Gmel.) is peculiar to Jamaica, with the exception of the subgenus *Odontosagda*, which belongs to Haiti.

Liguus and *Strophia*, found both in Cuba and Haiti, are not present in Jamaica.

Macroceramus, most numerous represented in Cuba and Haiti, has 1 species only in this subprovince, *M. Gossei*, Pfr., found also in Cuba and New Providence. Albers places in *Anoma*, *Cylindrella tricolor*, Pfr., and other Jamaica species, and in *Lia* (both subgenera of *Macroceramus*), *C. Maugeri*, Wood, and its allies, an arrangement which I am not, as at present informed, prepared to accept.

Stenogyra has representatives of *Opeas* and *Subulina*, but not of *Pseudobalea* or *Melaniella*.

Of genera characteristic of Mexico and Central America, *Glandina*, *Spiraxis* and *Cylindrella* are represented in Jamaica. *Varicella* (*C. leucozonias*, Walch), subgenus of *Glandina*, has its principal development in Jamaica. The species of *Spiraxis*, unlike those of the Continent, are small, and belong to the subgenus *Euspiraxis*. Of *Cylindrella*, the subgenera *Urocoptis*, (*C. nobilior*, C. B. Ad.) and *Mychostoma* (*C. subula*, Fer.) are numerous represented. *Casta* (*C. elongata*, Chem.) is peculiar to this subprovince.

The genus *Proserpina* (*P. nitida*, Sowb., *P. pisum*, C. B. Ad.) has a greater number of species in Jamaica than in Cuba.

In this subprovince, as in Cuba, *Bulimulus* is feebly represented,—*Liostracus* by *B. erubescens*, Pfr., and *Leptomerus* by *B. immaculatus*, C. B. Ad.

Leptinaria, subgenus of *Cionella*, has two or three species in South America; and *C. monodon*, C. B. Ad., of Jamaica, is, I believe, properly placed in it.

Orthalicus, as in Cuba, is represented solely by *O. undatus*, Brug.

There are no species in this subprovince which can be spoken of as European or introduced from Europe.

3. *Haiti*. The peculiar forms of *Helix* in this subprovince belong to the subgenera *Plagioptycha* (*H. loxodon*, Pfr.), *Euryratera* (*H. Dominicensis*, Pfr.), *Cepolis* (*H. cepa*, Müll.) and *Caracollus* (*H. caracolla*, L.)

H. Anlebarði, Pfr., with its ally *H. Luguillensis*, Shuttll., of Porto Rico, seem to be very inconsistently placed by Albers in the subgenus *Polybontes*, of which *H. imperator* is the type. *Obolotosypla* (*S. polyodon*, W. and M.), subgenus of *Sypla*, is peculiar to Haiti.

Liguus is represented by *L. virginicus*, L., which occurs also in French Guiana, and *Strophia* (*S. glans*, Kust.) has several species in this subprovince.

Of *Stenogyra*, the subgenus *Obeliscus* has *S. tereb aster*, Lam., *Pseudobalea*, *S. hasta*, Pfr., both found also in Cuba, and *Opeas*

has *S. Caraccasensis*, Rv., which inhabits the Guadeloupe subprovince and South America.

Melaniella is not represented.

Macroceramus (*M. formosus*, Wood), with the exception of Cuba, has the largest number of species in Haiti. *Anoma tricolor*, Pfr., is found in this as well as in the Jamaica subprovince. The occurrence in Haiti of *Vitrina* (Malak. Blatt., 1858, p. 146), which belongs rather to Eastern North America, is somewhat remarkable.

The genus *Hyalina* is widely distributed, but the subgenus *Mesomphix* (*H. fuliginosa*, Griff.) likewise more especially of Eastern North America, is represented in the West Indies by one species only, *H. ptycoraphe*, W. and M., of Haiti, where *Hyalina indentata*, Say, common in the United States, also occurs.

Glandina, *Spiraxis* and *Cylindrella*, to which I have referred as characteristic of the faunas of Mexico and Central America, are represented in Haiti,—the two first by comparatively few species. Those of *Glandina* belong to the subgenera *Vari-cella* (*G. biplicata*, Wein.), and *Oleacina* (*G. o'acea*, Fer., found also in Cuba.) *Oleacina Paivana* Pfr., a sinistral species, is a remarkable form. Of *Spiraxis*, the subgenus *Euspiraxis* (*S. Dunkeri*, Pfr.) is alone represented. *Cylindrella* has a considerable number of species, chiefly of the subgenus *Urocoptis* (*C. Menkeana*, Pfr.)

In this subprovince *Orthalicus* and *Leptinaria* (South American) are wanting. Of *Bulimulus*, the subgenus *Thaumastus* is represented by *B. exilis*, Gmel., widely distributed in the Porto Rico and Guadeloupe subprovinces; *Liostracus*? by *B. Dominicanus*, Rv., referred also to Mexico, and *Mesembrius* by *B. Moussoui*, Pfr.

The genus *Simpulopsis* has species in Mexico, but is more especially South American. It is not found in Cuba or Jamaica, but there is one representative in each of the Islands of Haiti (*S. Dominicanensis*, Pfr.), Porto Rico (*S. Portoricensis*, Shuttl.), and Trinidad (*S. corrugatus*, Guppy.)

Haiti, as remarked with reference to the operculates, has, the inoperculates also considered, more relationship with Cuba than with Jamaica, as evidenced especially by the occurrence of *Liguus* and *Strophia*, and the many species of *Microceramus*

Seeing that *Vitrina* and *Mesomphix*, as well as *Hyalina indentata*, Say, are found in this subprovince, it may be said to have a greater connection than Jamaica with Eastern North America.

4. *Porto Rico, with Vieque and the Virgin Islands including also Anguilla, St. Martin and St. Bartholomew.* This sub-

province, compared with the preceding, has fewer peculiar forms of *Helix*. *Caracolus* is represented by *H. caracolla*, L., and *H. marginella*, Gmel.; the former found also in Haiti, the latter of the same type as *H. Sagemon*, Beck, of Cuba. *Eury-cratera* (*H. angulata*, Fer.) and *Plagiptycha* (*H. Riisei*, Pfr.) are represented in Porto Rico and Viéque, and the last by *H. nemoralina*, Pet., in the Virgin Islands. *Thelidomus*, especially Cuban, has in this subprovince, according to Albers, several species, of which *H. lima*, Fer., is the type, but he has *H. castrensis*, Pfr., its very near ally, in *Dentellaria*, to which it scarcely belongs. *Mörchia*, subgenus of *Hyalina*, is represented in Porto Rico by *H. concolor*, Fer.

Strophia has *P. microstoma*, Pfr., and *P. striatella*, Fer., in Porto Rico, and the latter, I believe, also in Anegada,—both are found in Haiti.

Stenogyra has *Obeliscus terebraster*, Lam., and *Pseudobalea hasta*, Pfr. in Porto Rico, and *Melaniella gracillima*, Pfr., (found also in Cuba and Florida) in St. Thomas.

Macroceramus has two species, *M. microdon*, Pfr., in Porto Rico, St. Thomas, St. John and Tortola, *M. signatus*, Guild, in the latter Island and Anguilla. *Anoma* and *Lia* are absent.

In this subprovince there are no strictly North American forms.

Oleacina (*G. glabra*, Pfr.) and *Varicella* (*G. terebræformis*, Shuttl.) are represented in Porto Rico alone, and by few species. *Spiraxis* does not occur. *Cylindrella* has a small number of species, chiefly of the subgenus *Mychostoma*, one of which, *C. pallida*, Guild., is widely distributed.

There is in this subprovince, as compared especially with Cuba and Jamaica, a marked diminution of Mexican and Central American forms. It may, in fact, be said that eastward from Cuba to the eastern limit of the Porto Rico subprovince, those, as well as strictly West Indian forms, diminish gradually in number, being at their minimum in the Guadeloupe subprovince.

Orthalicus does not occur, but more subgenera of *Bulimulus* are represented than in the Islands to the westward. Besides *Mesembrinus* (*B. elongatus*, Bolt.), *Thaumastus* (*B. exilis*, Gmel.), *Leptomerus* (*B. fraterculus*, Fer.), and *Liostracus?* (*B. Hjalmarsoni*, Pfr.), *Drymaeus* has *B. liliæus*, Fer.

Leptinaria (*C. Antillarum*, Shuttl.) has three species, and *Simpalopsis* one, as already mentioned.

The only West Indian species of *Clausilia*, *C. tridens*, Schweig., of the subgenus *Nenia*, inhabits Porto Rico. The genus is not represented on the Northern, but there are several species on the Southern Continent.

Enuca (subgenus of *Pupa*), which is more especially devel-

oped in Africa, has a single species (*P. bicolor*, Gould), probably introduced from the East Indies where it is widely distributed, in St. Thomas, and in Trinidad embraced in the Guadeloupe subprovince.

Several subfossil species are found in St. Croix, and among them *H. caracolla* and *H. marginella*, Gmel.,—also two species of *Strophia*, none of which are now living on the Island. Impressions of an undetermined species of *Strophia* occur also in the fossil guano of Sombrero.*

The fauna of the Porto Rico subprovince has closer relations with that of Haiti, than of Jamaica or Cuba.

5. *Guadeloupe and Martinique, with Baruda and the Islands between it and them, and also Islands to the South, to and inclusive of Trinidad.* There is, as before observed, a very marked decline in this subprovince of genera especially characteristic of the West Indian fauna. Of *Helix*, the subgenus *Thelidomus*, belonging to Cuba and Jamaica, and *Cepolis* of Haiti, are represented in Martinique, the former by *H. discolor*, Fer., and the latter by *H. auridens*, Rang. *Mörchia*, (subgenus of *Hyalina*) has *H. Baudoni*, Pet. (closely allied to *H. concolor*, Fer., of Porto Rico) in Guadeloupe.

With very few exceptions, the rest of the *Helices* in this subprovince belong to the subgenus *Dentellaria*. That subgenus is represented in most of the Islands, and is, indeed, the characteristic form of this subprovince, but it is not found in St. Vincent or Trinidad.

Albers places *H. lychnuchus*, Müll., (erroneously attributing it to Porto Rico) in *Dentellaria*: but St. Simon (Jour. de Conch., 1853), with reference to some anatomical peculiarity and the form of the buccal plate, refers it to *Zonites*. He suggests that *H. acuta*, Lam., the shell of which is somewhat analogous to that of *lychnuchus*, may have a similar organization, and also belong to *Zonites*,—the buccal plate of the former is, however, strongly ribbed, and has marginal denticles.

It is remarkable that *Thelidomus discolor* and the following species of *Dentellaria*, as well as various species of other genera, found in the Guadeloupe subprovince, also inhabit French Guiana, viz: *orbiculata*, *Isabella*, *dentiens*, *nux denticulata*, and *badia*.

Dorcasia (Helix) similaris, Fer., found in South America and other parts of the world, also occurs in Barbados.

The existence of *Stenopus (S. lividus*, Guild., and *S. cruentus*, Guild.) in the Island of St. Vincent is a very marked feature of the fauna of the Guadeloupe subprovince. This genus is allied to *Nanina* (an Asiatic form), in which the

* A very interesting paper on the Geology of the Key of Sombrero, by Alexis A. Julien, will be found in the Ann. of the Lyceum, VIII., 1866.

above named species were placed by Pfeiffer (Vers. p. 113, 119, 1855), and *H. zonites*, Pfr., of Mexico, by Gray (Pulm., p. 140, 1855.) In 1865 I described (Ann. Lye., VIII., 157) *Stenopus Guildingi*, from Porto Cabello, Venezuela, and, from information given by Dr. Berendt, there is some reason to believe that at least one species inhabits Mexico. The occurrence of *Stenopus* in the Guadeloupe subprovince alone, affords additional evidence of the close alliance of the faunas of that subprovince and of South America.

Liguus and *Macroceramus*, mentioned as West Indian forms, are not represented in this subprovince, and *Strophia* only by *Strophia wa*, L., in Curaçao.*

Stenogyra has no peculiar species; *Opeas Caraccasensis*, Rv., occurs in several of the Islands, and also inhabits South America. *Pineria Schrammi*, to which I have already referred, is found in Guadeloupe, and *P. Viéqueensis*, Pfr., in Barbadoes, as well as in Viéque of the Porto Rico subprovince.

There is a diminished number of representatives of Mexican and Central American, as well as West Indian forms in the subprovince under consideration. *Glandina* has only *Varicella Guadeloupensis*, Pfr., (Guadeloupe), and *V. semitarum*, Rang. (Martinique.)

Spiraris is wanting and *Cylindrella* has 3 species, the subgenus *Mychostoma* being represented by *C. costata*, Guild., in Barbados, *Gongylostoma* by *C. collaris*, Fer., in Guadeloupe and Martinique, and *Trachelia?* by *C. Trinitaria*, Pfr., in Trinidad.

Proserpina, as before mentioned, is confined to the Cuba and Jamaica subprovinces.

The Guadeloupe subprovince is peculiarly rich in South American forms. *Bulimus*, which belongs to the Southern Continent, has of the subgenus *Pelecychilus*, *B. auris Sileni*, Born., in St. Vincent, *B. auris-sciuri*, Guppy, in Trinidad, and an allied, possibly the same species, (both enumerated in my Catalogue, Ann. Lye., VII., as *B. glaber*, Gmel.) in Grenada; of *Borus*, *B. oblongus*, Müll., in St. Vincent, Tobago, Trinidad, and Barbados, introduced in the latter, from St. Vincent, by the late Rev. J. Parkinson; of *Eurytus*, *B. aulucostylus*, Pfr., in St. Lucia. *B. auris Sileni* and *oblongus* also inhabit French Guiana.

Several subgenera of *Bulimulus* are represented, viz.: *Drymaeus*, *Liostracus*, *Mesembrinus*, *Thaumastus* and *Leptomerus*.

* In my former paper (p. 143) I noticed *H. pentodon*, Menke, of Curaçao, overlooking the remarks of v. Martens (Malak. Blatt., 1859, p. 209), who, with much apparent reason, refers to it as a young example of *S. wa*. *Strophia Antonii*, Kust., of Berbice, is the only known South American species.

No less than four of the species, *B. multifasciatus*, *elongatus*, *exilis* and *fraterculus* are also found in French Guiana.

Orthalicus, confined in the other subprovinces to Cuba and Jamaica, has *O. undatus*, Brug., in Trinidad, and *O. undulatus*, Guild., in the Grenadines.

Leptinaria has *L. Antillarum*, Shuttl., in several of the Islands, *L. Funcki*, Pfr. in Grenada (also in British Guiana), and *L. lamellata*, P. and M., in Guadeloupe, as well as on the Southern Continent.

Streptaxis has one species only in the West Indies, viz: *S. deformis*, Fer., also in Trinidad, where *Simpulopsis corrugatus*, Guppy, occurs.

Several of the forms of *Succinea* in this subprovince are peculiar. The subgenus *Amphibulina* is represented by *S. patula*, Brug., in St. Christopher and Guadeloupe?, *Succinea* by *S. rubescens*, Desh., in Guadeloupe and Martinique (also in French Guiana), *Brachyspira* by *S. tigrina*, Lesueur, in St. Vincent, and *Omalonyx* by *S. unguis*, Fer. (found also in Brazil), and *S. appendiculata*, Pfr., in Guadeloupe.

The distribution of the land shells in the West Indies seems to warrant the division of the islands into the five above-mentioned subprovinces, but it is very interesting to notice that the distribution of plants renders a different division necessary, especially of the islands comprised in my Porto Rico and Guadeloupe subprovinces.

Grisebach, in the Preface to his "Flora of the British West Indian Islands" (London, 1864), remarks, that the Islands, though reaching beyond the tropics, "present a tropical character in their vegetable productions, and the Northern Bahamas in this respect are quite distinct from the opposite continental shore of Florida, from which it is separated by the Gulf Stream; while Trinidad, lying almost contiguous to the delta of the Orinoco, partakes of the flora of Venezuela and Guiana. Jamaica, again, from its mountainous character and more distant position,—most of the Leeward islands from being wooded volcanoes,—and a majority of the Windward ones, with a dry climate, and a low, calcareous soil, form three divisions of this tropical archipelago, which show as many peculiarities."

The author adds, that the whole of the British West Indies, as comprised in his "Flora," may be divided into five natural sections, each with a distinct botanical character, and including the following islands, viz.:—

I. Bahamas and Turk Islands.

II. Jamaica.

- III. Western Caribbean Islands (most Leeward, and including some of the Windward islands), viz.: Virgin Islands, St. Kitts, Nevis, Montserrat, Dominica, St. Lucia, St. Vincent, Grenada and Grenadillos.
- IV. Eastern Caribbean Islands (most Windward, and some Leeward islands), viz: Anguilla, Barbuda, Antigua, Barbados and Tobago.
- V. Trinidad.

It will be noticed that the Virgin Islands and Anguilla, embraced, with islands to which by their land-shell faunas they are closely allied, in my Porto Rico subprovince, are placed by Grisebach, the former in his third, and the latter in his fourth section, and both with islands, to which they are not so allied, comprised in my Guadeloupe subprovince.

The boundaries (shown by the distribution of the land shells) of the Porto Rico and Guadeloupe subprovinces are somewhat sharply defined, and, in connection with an explanation as to their limits, there are some facts (for which I am indebted to Mr. Julien) relating to the geological position of part of the former subprovince, which deserve consideration.

The Eastern portion of the Porto Rico subprovince consists of the Virgin and St. Martin banks and the Key of Sombrero, the latter dividing the channel between the banks into two passages,—the Anegada on the west, and the Sombrero passage on the east of the Key. The Virgin bank, the nearest point of which is forty miles from the Key, encircles St. Thomas, St. John, Tortola, Anegada and the other islets of the Virgin group,—deep water soundings off the edge of this bank vary from 140 to 160 fathoms. The Key of Sombrero is also surrounded by a submarine bank, the dimensions of which are about three and a half by five miles,—soundings off the outer edge give from 105 to 150 fathoms. The St. Martin bank, south-east of and about twenty miles from the Key, comprises the islands of Anguilla, St. Martin and St. Bartholomew; soundings off the edge of the bank vary from 102 to 190 fathoms.

The northern part of the Guadeloupe subprovince consists of the islands immediately south and east of the St. Martin bank, viz.: St. Kitts, Barbuda and Antigua, with the smaller islands of St. Eustatius and Nevis.

The following are the principal differences in the distribution of genera and species of land shells, on which I rely as authority for separating the last mentioned islands from the Porto Rico subprovince, and placing them, with the islands to the south, in the Guadeloupe subprovince:—

Megalomastma and *Alcalia* are found in Porto Rico, also

in St. Thomas and St. John. *Macroceramus* (*M. microdon*, Pfr.) inhabits Porto Rico, St. Thomas, St. John and Tortola, and *M. signatus*, Guild., Tortola and Anguilla, the latter on the St. Martin bank. *Strophia* occurs in Porto Rico, St. Croix (subfossil), Anegada and subfossil remains only of a species on Sombrero. *Megalomastoma*, *Alcubia*, *Macroceramus*, excluding *Pineria*, treated as subgenus of it by II. and A. Adams, and *Strophia*, *S. uva*, L., of Curacao alone excepted, are not represented in the Guadeloupe subprovince.*

Helix notabilis, Shuttl., is found in St. Thomas (subfossil), St. John, Tortola and Anegada of the Virgin bank, and in St. Bartholomew of the St. Martin bank, but not in the Guadeloupe subprovince.

Dentellaria (subgenus of *Helix*), of which *H. nux denticulata*, Chem., and *H. formosa*, Fer., are types, is especially characteristic of the Guadeloupe subprovince. It is represented in Barbuda and Antigua by *H. formosa*, in St. Kitts by *H. Josephinæ*, Fer., subfossil†, and occurs also in Guadeloupe, Dominica, Martinique, Barbados, &c., but not in the Porto Rico subprovince. *H. castrensis*, Pfr., of Porto Rico, placed by Albers in *Dentellaria*, and by Pfeiffer with species of that type, is a questionable exception,—it appears to me to belong to the same group as *H. notabilis*, and *H. lima*, Fer.,—of the latter, indeed, I have considered it a variety.

The species common to the Porto Rico and Guadeloupe subprovinces, of which a list is annexed, are few, and of a character, their general distribution also considered, favorable to my views as to the separation of the two faunas.

(Those marked * occur also in one or more of the other subprovinces, ** also in North America, † also in South America.)

	<i>Helicina fasciata</i> ,	Lam.
**	<i>Helix vortex</i> ,	Pfr.
†*	<i>Bulimulus exilis</i> ,	Gmel.
†	“ <i>elongatus</i> ,	Bolt.
†	“ <i>fraterculus</i> ,	Fer.
	<i>Pineria Viequensis</i> ,	Pfr.
	<i>Leptinaria Antillarum</i> ,	Shuttl.
*	<i>Stenogyra Goodalli</i> ,	Mil.
†*	“ <i>octona</i> ,	Chem.
*	“ <i>octonoides</i> ,	C. B. Ad.
**	“ <i>subula</i> ,	Pfr.

* I have already noticed that *Megalomastoma* and *Strophia* do not occur in Jamaica, the most southerly of the larger islands, and that *Macroceramus* is there represented by *M. Gossei*, Pfr., only,—a species found also in Cuba and Florida.

† The occurrence in St. Croix, St. Thomas, Sombrero and St. Kitts, of subfossil, or at least of species not now living on those islands, is a subject of much geological interest.

** <i>Pupa pellucida</i> ,	Pfr.
<i>Succinea approximans</i> ,	Shuttl.
<i>Ennea bicolor</i> ,	Gould.

I may add, that, both generically and specifically, there are more intimate relations between the subprovinces of Haiti and Porto Rico, than between those of the latter and Guadeloupe.

DESCRIPTIONS OF NEW SPECIES OF NORTH
AMERICAN LAND SHELLS.

BY THOMAS BLAND.

HELIX JACKSONII, nov. sp.—Plate 21, fig. 8.

T. anguste umbilicata, depressa, nitida, fusco vel pallide cornea, superne vix elevata, striata subtus convexa, striis exilioribus; anfr. 6, convexiusculi, lente accrescentes, ultimus antice subito deflexus, pone aperturam constrictus, superne gibboso-inflatus; sutura impressa; apertura obliqua, lunato-circularis, tridentata; perist. callosum, fusco-roseum, breviter reflexum, marginibus vix conniventibus, dente, albo, linguiformi, bicuri, profunde intrante junctis, basali plica valida, obliqua, sinuosa, dextro dente profundo immerso munito.

Shell narrowly umbilicate, depressed, shining, dark or pale horn-colored, little elevated above, striated, convex beneath, with finer almost obsolete striae; whorls 6, slightly convex, gradually increasing, the last suddenly deflected, contracted and above gibbously inflated behind the aperture; suture impressed; aperture oblique, lunate-circular, with three teeth; peristome thickened, brownish-red, shortly reflected, with the scarcely approaching margins joined by a white, linguiform, bicural, deeply entering tooth, the basal margin with a strong oblique, sinuous fold, the right with a deeply seated tooth.

Dimensions.—Diam. maj. 7, min. 6, alt. 4 mill.

Large dead specimens, brought down from the upper country by the streams flowing into the Arkansas River, measure: Diam. maj. 9, min. 8, alt. 4 mill.

Habitat.—Fort Gibson, Indian (Cherokee) Territory, (V. B. Hubbard!)

Remarks.—This species belongs to the same group as, and is most nearly allied to *H. Hazarli*, Bland, (*H. plicata*, Say,) from which, however, it may be readily distinguished by the very different character of the parietal and basal teeth. This species has no internal tubercle.

I am indebted for specimens of this interesting shell to Dr. Hubbard, of Tottenville, Staten Island. They were collected by his son, Mr. V. B. Hubbard, Assistant Surgeon U. S. Army, at whose wish I dedicate the species to his late friend and fellow-Surgeon, R. M. S. Jackson, Corr. Memb. Acad. Nat. Sci., Philadelphia. Dr. Jackson, at the time of his death, a year since, at Chattanooga, was diligently engaged in studying the fauna of that part of Tennessee.

HELIX SIGNIFICANS, nov. sp.—Plate 21, fig. 9.

T. umbilicata, depressa, discoidea, tenuis, irregulariter et leviter striatula, striis subtus subobsoletis, nitens, pallide cornea: spira parum elevata; sutura vix impressa; anfr. 6, subplanulati, ultimus rotundato-inflatus, basi subplanus, circa umbilicum excavatus; umbilicus pervius, fere $\frac{1}{2}$ diametri æquans; apertura obliqua, depressa, lunaris; perist. simplex, acutum.

Shell umbilicate, depressed, discoidal, thin, with fine irregular striae, which are almost obsolete at the base, shining, pale horn-colored; spire little elevated; suture slightly impressed; whorls 6, subplanulate, the last roundly inflated, rather flat at the base, excavated around the umbilicus, which is pervious, and equal almost to $\frac{1}{2}$ of the diameter of the shell; aperture oblique, depressed, lunate; peristome simple, acute.

Dimensions.—Diam. maj. $4\frac{1}{2}$, min. 4, alt. 2 mill.

Habitat.—Fort Gibson, Indian Territory, (V. B. Hubbard!)

Three specimens were found,—one apparently adult, the others having respectively 4 and 5 whorls only.

Remarks.—This species belongs to the group of peculiarly North American type, embraced by Albers in *Gastrolonta*, subgenus of *Hyalina*. It is especially allied to *H. multidentata*, Binney, from which it differs in being of larger size, with wider umbilicus, and in the absence in the last whorl of the series of numerous small teeth which characterize Binney's species.

In a young specimen of *H. significans*, having four whorls only, there, however, three small teeth, one by itself, and at some distance from it, two others, situated as the teeth are in *H. multidentata*. Whether these teeth are or not constant in the antepenultimate whorl of *H. significans*, I am unable to determine.

II. FEBIGERI, nov. sp.—Plate 21, fig. 10.

T. umbilicata, orbiculato-plana, tenuis, nitida pallide vel rufo-cornea, superne subdistanter costulato-striata, subtus substriata; spira planata; sutura profunda; anfr. $5\frac{1}{2}$ –6, convexiusculi, regulariter accrescentes, ultimus ad peripheriam angulatus, infra angulum inflatus; umbilicus infundibuliformis; apertura obliqua, subreniformis; perist. incrassatum, breviter reflexum, sinuosum, marginibus callo valido triangulari junctis.

Shell umbilicate, orbicular, flat, thin, shining, pale or reddish horn-colored, with rather distant rib-like striæ above, finely striated beneath; spire almost level; suture deep; whorls $5\frac{1}{2}$ –6, rather convex, regularly increasing, the last angular at the periphery, inflated below; umbilicus funnel-shaped; aperture oblique, kidney-shaped; peristome thickened, little reflected, the margins joined by a strong triangular callus.

Dimensions.—Diam. maj. $8\frac{1}{2}$, min. $7\frac{1}{2}$, alt. $3\frac{1}{2}$ mill. A small specimen measures: Diam. maj. $7\frac{1}{2}$, min. $6\frac{1}{2}$, alt. 3 mill.

Habitat.—New Orleans, (Major G. L. Febiger, U. S. A.!)

Remarks.—This species certainly differs from *H. cereolus*, Muhl., *H. septemvolva*, Say, *H. volvoxis*, Parr., and *H. Carpenteriana*, Bid., the four species of the same group hitherto found on the North American Continent.

Compared with *H. paludosa*, Pfr., of Cuba, the rib-like striæ are more regular and prominent, it is more decidedly angular at the periphery, and the form and armature of the aperture are different. In *H. Febigeri* there is no such excavation below the angle of the periphery as prevails, more or less, in the other above-named continental species. In this respect, and in the form of the aperture, *H. Febigeri* appears to be most nearly allied to *H. microdonta*, Desh., of Bermuda and New Providence, but it is more coarsely striated, and the last whorl is more inflated below.

I am indebted for specimens of *H. Febigeri* to Mr. Isaac Lea, who sent them, believing the species to be new. Many examples were collected and forwarded to Mr. Lea by his nephew, Major Febiger, who has long been interested in the land shells of the United States, and to whom I dedicate the species.

SUCCINEA HIGGINSI, nov. sp.—Plate 17, fig. 24.

T. depresso-ovata, tenuis, oblique striata, pellucida, nitidula, pallide cornea; spira brevis, obtusa; sutura profunda; anfr. 3, convexi, ultimus depressiusculus; columella vix arcuata, superne conspicue plicata; apertura angulato ovalis, dente parvo, obliquo, albo, in pariete aperturali sæpe armata; perist. simplex, regulariter arcuatum.

Shell depressed-oval, thin, obliquely striated, pellucid, somewhat shining, pale horn-colored; spire short, obtuse; suture deep; whorls 3, convex, the last rather depressed; the columella scarcely arched, above conspicuously plicate; aperture angularly oval, frequently armed with a small, oblique, white tooth on the parietal wall; peristome simple, regularly arcuate.

Dimensions.—Long. 15, diam. 7 mill.; aper. 11 mill. longa, medio 5 lata; anfr. ult. fere 14 mill. longus.

Habitat.—Put in Bay Island, Lake Erie, (Frank Higgins!)

Remarks.—This species is allied to *S. Sulleana*, Pfr., *S. Haydeni*, W. G. Binn., and especially to *S. ovalis*, Gould, non Say. Compared with the latter, the last whorl is less convex, the aperture is more angular above, the columella less arcuate, and more distinctly plicate.

The measurements given are of one of the largest specimens. This is the only North American species in which I have noticed the parietal tooth mentioned in the description. Three of my specimens have this tooth,—it is lamelliform, about 1 mill. in length at the base, the pointed apex having an elevation of about $\frac{1}{2}$ mill.

Editor's Table.

REVIEWS.

I.—AMERICAN

Conchological Notes, Nos. 1 and 2. BY W. H. DALL. (From Proceedings of the California Academy of Natural Sciences, 1866.)

On the Dentition of Octopus punctatus, Gabb.

On a New Subfamily of Fluviatile Mollusca.

In the latter paper, *Pompholyx effusa*, Lea, is made the type of subfamily *Pompholinæ* of the family *Limnæidæ*.

Proceedings of the Academy of Natural Sciences. Philadelphia, 1866, No. 1.

Remarks on a Species of Aturia from the Cretaceous of New Jersey. BY PROF. E. D. COPE.

Descriptions of Twelve New Species of Unionidæ from South America. BY ISAAC LEA.

U. peculiaris.

" *firmus.*

" *rugosulvatus.*

" *apprimus.*

" *locellus.*

" *parvus.*

U. acutirostris.

" *ampullaceus.*

" *Paraguayensis.*

Monocondylæa lentiformis.

" *Pazii.*

Anodonta Pazii.

Supplement to A. D. Brown's Catalogue of Shells. Princeton, N. J., August, 1866, 4 pp., 8vo.

American Journal of Science and Arts. Second Series, XLII., No. 124, July, 1866.

A Classification of Mollusca, based on the Principle of Cephalization. BY EDWARD S. MORSE.

We reviewed this excellent paper at length when originally published in the "Proceedings of the Essex Institute."

II.—FOREIGN.

BRITISH.

Proceedings of the Zoological Society of London. 1865. Part I., January-March.

On the Synonymy of Sistrum cancellatum. BY W. HARPER PEASE.

Description of a New Species of Latirus, and Remarks on others, inhabiting the Pacific Islands. BY W. HARPER PEASE.

Latirus gibbus.

Descriptions of Two New Species of Shells in the Collection of George French Angas. BY HENRY ADAMS and GEO. FRENCH ANGAS.

Subulina, new S. Genus *Cœliaxis*, Ad. and Ang.

Description.—Shell umbilicate; spire attenuate above.

Subulina (Cœliaxis) Layardii, Cape of Good Hope.

Truncatella (Taheitia) clathrata, Solomon Islands.

Descriptions of Ten New Species of Shells, chiefly from the Australian Seas. BY GEORGE FRENCH ANGAS.

<i>Voluta (Alcithoë) kreusteræ</i> ,	South Australia.
“ (<i>Lyria</i>) <i>Archeri</i> ,	Montserrat, W. Indies.
<i>Mitra Rosettæ</i> ,	Rosetta Head, Encounter Bay, South Australia.
<i>Siphonalia fuscozonata</i> ,	South Australia.
<i>Columbella interrupta</i> ,	“ “
<i>Eulima augur</i> ,	“ “
<i>Patella alticostata</i> ,	Port Lincoln, South Australia.
“ <i>Gealei</i> ,	“ “
<i>Crepidula immersa</i> ,	“ “
<i>Myobora convexa</i> ,	New Caledonia.

Supplementary Notes to the Review of Vermetidæ. BY O. A. L. MÖRCH.

Tenagodus Reentzii.

“ *Möbii*,

Manilla?

Thylacodes melanostomus,

Zanzibar.

Descriptions of Four New Species of Marine Shells from South Australia. BY GEORGE FRENCH ANGAS.

Nassa compacta.

Acmæa scabrilitata.

Patella latistrigata.

“ *subundulata.*

On the Marine Molluscan Fauna of South Australia, with a List of all the Species known up to the present time; together with Remarks on their Habitats and Distribution, &c. BY GEORGE FRENCH ANGAS.

This is a very complete paper of 45 pages, giving the synonymy of the species and their geographical and bathymetrical distribution. 231 species, in all, are enumerated.

List of Mollusks collected by Mr. R. Sutchoe in Formosa.

Diagnoses of New Forms of Mollusca from the Vancouver District. BY PHILIP P. CARPENTER.

Terebratula unguicula. *Saxidomus brevisiphonatus.*
Darina declivis.

A new subgenus, *Netastomella*, is formed for *Pholas Darwinii*, Sowb., which inhabits Vancouver, San Diego, and Monterey, California, as well as the supposed original locality, Chili. Mr. Carpenter remarks, that "we had probably not seen a specimen of this species, else we could hardly have placed it in the synonymy of *Pholadidea penita*." He is correct in his supposition; our judgment was made up from the imperfect figure of Sowerby's Monograph and the description. We gracefully yield the point.

The following is the diagnosis of *Netastomella*: "*Pholadidea*; valvæ postice in calycem testaceum planatum prolongatis; calyce coriaceo nullo."

List of the Land and Fresh-water Shells of the Zambesi and Lake Nyassa, Eastern Tropical Africa, collected by John Kirk, M. D., &c. BY DR. H. DOHRN.

Streptaxis Kirkii. *Lanistes Nyassanus.*
Ennea levigata, *Melania nodicincta.*
Buliminus Kirkii. " *Victorie.*

Diagnoses of New Species and a New Genus of Mollusks from the Reigen Mazatlan Collection; with an Account of Additional Specimens presented to the British Museum. BY PHILIP P. CARPENTER.

Cycladella, N. Genus, (*Kelliidae*?)
Cycladella papyracea. *Diala paupercula*, C. B. Adams.
Montacuta obtusa. *Mangelia subeata.*
Scissurella rimuloides. *Mucronalia involuta.*
Vitrinella ornata. *Leiostraca producta.*
" *tenuisculpta.*

Descriptions of New Species and Varieties of Chitonidae and Acmæidae from the Panama Collection of the late Prof. C. B. Adams. BY PHILIP P. CARPENTER.

<i>Lepidopleurus Adamsii.</i>	<i>Callochiton pulchellus.</i>
“ <i>tenuisculptus.</i>	<i>Acmæa (? floccatu var.) filosa.</i>
<i>Ischnochiton Elenensis.</i>	“ <i>subrotunda.</i>
“ <i>expressus.</i>	“ <i>vernica.</i>

Diagnoses of New Species of Mollusks from the West Tropical Region of North America, principally collected by the Rev. J. Rowell, of San Francisco. BY PHILIP P. CARPENTER.

<i>Tellina (Angulus) decumbens.</i>	<i>Mangelia albolaqueata.</i>
<i>Lucina undata.</i>	<i>Eulima falcata.</i>
<i>Calliostoma (?lima, var.) æqui sculpta.</i>	<i>Cerithiopsis intercalaris.</i>
<i>Narica insculpta.</i>	<i>Columbella humerosa.</i>
<i>Drillia eburnea.</i>	<i>Muricidea dubia, var. squamulata.</i>

Part 2. April—June.

List of the Land Shells collected by Mr. Wallace in the Malay Archipelago, with Descriptions of the New Species by Mr. Henry Adams. BY ALFRED R. WALLACE.

The new species described by Henry Adams:—

<i>Helix (Dorcasia) compta.</i>	<i>Helix (Geotrochus) Blanfordi.</i>
“ (<i>Planispira</i>) <i>aspasia.</i>	<i>Leptopoma scalare.</i>
“ (<i>Geotrochus</i>) <i>Waigioniensis.</i>	<i>Pupina Pfeifferi.</i>
“ “ <i>turris.</i>	<i>Truncatella (Taheitia) Wallacei.</i>

Description of a New Species of Gouardia from Port Jackson.
BY GEORGE FRENCH ANGAS.

G. Australis.

Descriptions of Two Species of Chitonidae, from the Collection of W. Harper Pease. BY PHILIP P. CARPENTER.

<i>Lophyrus perviridis.</i>	<i>Acanthopleura nigropunctata.</i>
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Descriptions of New Genera and Species of Marine Shells from the Islands of the Central Pacific. BY W. HARPER PEASE

<i>Libratula</i> , new gen. (<i>Galeommidae</i> .)	
<i>Libratula plana.</i>	<i>Mitra nigricans.</i>
<i>Mitra saltata.</i>	<i>Neritina rubida.</i>
<i>Eugina fusiformis.</i>	<i>Eulima subpellucida.</i>
“ <i>ocata.</i>	<i>Purpura marmorata.</i>

<i>Nassa obliqua.</i>	<i>Cypræa fusco maculata.</i>
<i>Coralliobia sculptilis.</i>	“ <i>caudata.</i>
<i>Torinia conica.</i>	<i>Planaxis abbreviata.</i>
<i>Turricula putillus.</i>	<i>Pedicularia Pacifica.</i>
<i>Mitroidea</i> , n. gen. (<i>Mitridæ.</i>)	
“ <i>multiplicata.</i>	

To this paper is added the following, by P. P. Carpenter, which we copy for the benefit of American conchologists:—

“The following list of synonyms, drawn out from a careful comparison with the Cumingian Collection, and with the types described in Dr. Gould’s ‘Otia,’ which happened, fortunately, to be temporarily in my possession, may be useful to those who have received the shells under Mr. Pease’s MS. names.”—P. P. C.

Atys debilis appears to be identical with *A. succisa*, Ehr., and simply a slender variety of *A. alieula*, A. Ad.

Fissurella granifera, Pse., is a good species of *Glyphis*.

Rimula fenestrata, Pse., is a very young *Glyphis*.

Conus fusiformis, Pse., (= *C. pusilla*, Pse., Olim.) is a small species of *Conella*, Swains.

Daphnella bella, Pse., belongs to one of the *Columbelloid* genera, probably to *Anachis*.

Cithara costulifera, Pse., = *Anachis atomella*, Sowb., var.

C. varia, Pse., is probably an *Anachis*, = *Columbella virginica*, Gld., (from type.)

G. Garretti, Pse., is a *Mitrella*.

Borsonia corrugata, Pse., = (*Clathurella*) *nebulosa*, Pse., (teste H. Cuming.)

Natica unbulata, Pse., = appears to be the young state of the Pacific variety of *N. maroccana*, Chemn.

Nassa plicata, Pse., is a dwarf, strongly sculptured variety of *N. olivacea*, Brug., (teste H. Cuming.) The characters of the mouth exactly agree.

N. microstoma, Pse., is a white variety of *N. dermestina*, Gld.

N. turricula, Pse., and *N. unifasciata*, Pse., appear to be varieties of *N. paupera*, Gld., = *plebecula*, Gld., (from types.)

Columbella pellucida, Pse., is probably a *Nitidella* (or *Mitrella*.)

C. flammea, Pse., belongs to the same section; it appears to be a variety of *C. tenuata*, Ad. and Reeve, (not Phil.) *C.*

* We suppose Mr. Pease will scarcely acquiesce in all of these decisions.

lineolata, Gld., and *C. devolor*, Gld., are conspecific, (teste type specimens in Mus. Smiths.)

Columbella, sp. ind., (like *australis*,) Pse., = *C. araneosa*, Gld., var. It belongs to *Amycla*.)

C. sagitta, Gask., is also an *Amycla*. In Mr. Pease's series of specimens, the arrow-pattern gradually passes away.

Sistrum seminodosum, Pse., = *elatum*, Blainv. var.

Mitra brunnea, Pse., = *Strigatella fuscescens*, Pse., var. (teste H. Cuming.)

M. tessellata, Pse., = *M. puella*, Rve. (teste H. Cuming.)

Triton crenulatus, Pse., = *Epidromus antiquatus*, Hds.

Descriptions of Four New Scintilla and One New Pythina from the Collection of Mr. H. Cuming. BY G. B. SOWERBY.

<i>Scintilla semiclausa</i> ,	Borneo.
“ <i>lactea</i> ,	“
“ <i>rosca</i> ,	Lizard Islands.
“ <i>oblonga</i> ,	Borneo.
<i>Pythina striatissima</i> ,	“

Descriptions of Two New Species of Conus from the Collection of A. Cuming, and Two from the Collection of the late Mr. Denisson. BY G. B. SOWERBY.

<i>C. subcarinatus</i> ,	Nicobar Isles.
<i>C. straturatus</i> ,	Borneo.
<i>C. sagittatus</i> ,	?
<i>C. multicaenatus</i> ,	?

Report on the Terrestrial and Fluvial Mollusca of Palestine. BY H. B. TRISTRAM.

“The character of the Molluscan fauna of Palestine partakes, as might have been expected, of the same variety which marks the other branches of its fauna and flora. There are, however, fewer exceptions to its general character as a part of the Mediterranean basin, and fewer traces of the admixture of African and Indian forms. Northern types, especially of the genus *Chausilia*, are frequent in the Lebanon and on its southern spurs in Galilee. The Molluscan fauna of the maritime plains and the coast possesses no features distinct from those of Lower Egypt and Asia Minor. The shells of the central region are scarce, and not generally interesting; while on the borders of the Jordan valley and in the southern wilderness, we meet with very distinct groups of *Helix* and of *Balimus*, chiefly of species peculiar, or common in some few cases to the Arabian desert.

“The fluvial Mollusca are of a type very much more tropi-

cal in its character than that of the terrestrial shells. There are here but few species similar to those of the east of Europe. Most of the specimens are identical with, or similar to, those of the Nile and of the Euphrates; and some of the genus *Melanopsis* are peculiar to the Jordan or its feeders. It seems probable that the inhabitants of the waters were better able to sustain the cold of the glacial epoch than the Mollusks of the land; and from the post-tertiary remains found by the Dead Sea, we may infer that the species now existing have been transmitted from a period antecedent to the glacial; while the more boreal forms introduced at that epoch have maintained their existence in the colder districts of Northern Palestine, to the exclusion of the southern species, which have not succeeded in re-establishing themselves. The beautiful group, *Achatina*, requiring a degree of moisture not generally found in Palestine, is only represented by a few insignificant and almost microscopic species."

One hundred and nineteen species are enumerated, collected by the author, of which the following are new:—

<i>Succinea globosa.</i>	<i>Clausilia Genezerethana.</i>
<i>Helix Carmelita.</i>	“ <i>Medlycotti.</i>
“ <i>Musalka.</i>	<i>Melania rubro-punctata.</i>
<i>Bulimus Urv.</i>	<i>Melanopsis ammonis.</i>
<i>Pupa Libanotica.</i>	“ <i>Eremita.</i>
“ <i>Hebraica.</i>	<i>Unio Simonis.</i>
	“ <i>episcopalis.</i>

Conchologica Iconica. BY LOVELL REEVE. Parts 254, 255. 4to., London, 1866.

The following monographs are contained in the present issue:—

Vertagus. (Concluded.) Plates 3 to 8. March, 1866.

Eulima. (Concluded.) Plates 5 and 6. March, 1866.

Telescopium. 1 plate. March, 1866.

Cerithidea. 2 plates. March, 1866.

Unio. (Continued) Plates 31 to 38. March, 1866.

“*U. complanatus*, Lea, &c.,” is made a synonym of *U. coarctatus*, Lam. Had Solander been quoted for this species by American authors, instead of following the pernicious practice of changing the authority for the name with every change of genus, this error would not have occurred. We are further informed that “The synonymy of this species has been much confused with that of Lea’s *Symplegnota complanata*,” which belongs to the genus *Margaritana*.

We doubt if *Unio heterodon* has ever been found in "Georgia," or any other Southern State.

Unio Hildrethianus, Lea, species 192, is a *Margaritana*.

Unio olivarius is described (species 195) without authority or habitat. They are: Dr. Lea, and India.

Unio lens. The specimen figured at species 200 is not characteristic.

The coloring of the *Unio* plates continues to be very superior.

FRENCH.

Journal de Conchyliologie. Third Series, Vol. VI., No. 2, April 1866.*

The present number contains over 100 pages of contributions, and is illustrated by three colored plates.

Note sur les Volutes operculées, et catalogue des espèces vivantes qui appartiennent au genre Lyria. BY H. CROSSE.

Note complémentaire sur l'opercule du Chrysostoma Nicaricum, Gmelin. BY H. CROSSE.

The operculum being corneous, instead of calcareous, excludes this shell from the Turbos. In this respect, and also in the smooth callous columella, it approaches very close to *Rotella* or to *Isandra*.

Observations sur la faune malacologique de la Cochinchine et du Cambodge, comprenant la description des espèces nouvelles. BY JULES MABILLE and GEORGE LE MESLE.

<i>Veronicella Crosseana.</i>	<i>Hemisus Bauloniensis.</i>
<i>Zonites Ramburianus.</i>	<i>Paludina Cambodjensis.</i>
" <i>Bourguignatianus.</i>	" <i>Fischeriana.</i>
<i>Limnaea Crosseana.</i>	

Descriptions d'espèces nouvelles de l'Archipel Calédonien.
BY M. SOUVERBIE and R. R. MONTROUZIER.

<i>Narica joveolata</i> , Mont.	<i>Columbella troglodytes</i> , Souv.
<i>Trochus scrobiculatus</i> , Souv.	<i>Scalaria subauriculata</i> , Souv.
" <i>Reerei</i> , Mont.	<i>Melampus Montrouzieri</i> , Souv.
<i>Monodonta Fischeri</i> , Mont.	<i>Voluta deliciosa</i> , Mont.
<i>Columbella lutescens</i> , Souv.	

* This excellent Journal is published quarterly by M. H. Crosse, No. 25 Rue Tronchet, Paris. Price 20 francs (=about \$8 per annum. It may be ordered through any of our importing booksellers.

Description d'un Hélicéen nouveau des Philippines. BY O. SEMPER.

Cochlostyla Dattaensis, Semper.

Coquilles nouvelles recueillies par le Dr. Fr. Welwitsch dans l'Afrique équatoriale, et particulièrement dans les provinces Portugaises d'Angola et de Benguella. BY A. MORELET.

<i>Helix Welwitschi.</i>	<i>Achatina polychroa.</i>
<i>Ennea pupaeformis.</i>	“ <i>Hortensie.</i>
<i>Limicolaria chromatellus.</i>	“ <i>specularis.</i>
“ <i>jaspideus.</i>	“ <i>barbigera.</i>
<i>Bulimus Welwitschi.</i>	“ <i>strigosa.</i>
<i>Achatina Bandeirana.</i>	“ <i>monticola.</i>
“ <i>Welwitschi.</i>	“ <i>Petrensis.</i>
“ <i>Tavaresiana.</i>	<i>Limnaeus succinoïdes.</i>
“ <i>Bayana.</i>	<i>Physa Welwitschi.</i>
“ <i>colubrina.</i>	“ <i>globosa.</i>
“ <i>Paivana.</i>	“ <i>Angolensis.</i>
“ <i>zebriolata.</i>	

The specific name of *Ph. globosa* being pre-occupied by Prof. Haldeman for an American species, we suggest that the one above be called *Ph. Moreletii*.

Description d'espèces nouvelles. BY H. CROSSE.

Pupa canaliculata, loc. ? *Columbella isabellina*, loc. ?

Leptopoma achatinum, loc. ?

Notice relative à la Syndosmya strigilloides, Vaillant. BY O. SEMPER.

Mr. Semper gives the description of *Strigulina lactea*, Dunker, of which he states the above to be a synonym.

Description d'un Rimula de la Nouvelle-Calédonie, accompagnée d'observations sur la valeur du genre et du catalogue des espèces vivantes. BY H. CROSSE.

R. Mariei, Crosse.

Description de coquilles fossiles des terrains tertiaires supérieurs. BY M. C. MAYER.

Turritella aspera, Sismonda.

“ *Bellardii*, Mayer.

“ *lavrissima*, “

“ *Sundbergeri*, “

“ *Sismondai*, “

Un Mollusque bien maltraité. BY H. CROSSE.

We publish in this number of our Journal a translation of this sprightly article, furnished by Mr. Daulte. As a brochure, it has reached a second edition in Paris.

Bibliographie.

SCIENTIFIC INTELLIGENCE.

WE LEARN from the Annual Report of the Trustees of the Museum of Comparative Zoology, at Cambridge, for 1865, that Mr. John G. Anthony's collection of land and fresh-water shells, recently acquired by the Museum, numbers about five thousand species, and an unusually large stock of duplicates for exchanges. From other sources, 2,616 species have been obtained, including a portion of the Brazilian collections of Prof. Agassiz and party. A few of the latter are new to science, and will, probably, be described in this Journal at a future period.

The Report shows great activity and improvement in the several departments of the Museum.

SINCE OUR LAST NUMBER was issued, the premises of the New York Lyceum of Natural History, the Chicago Academy of Science, and the Portland Society of Natural History, with most of their contents of books and specimens, have, unfortunately, been destroyed by fire. These are very severe losses to the members of these useful institutions, as well as to science at large. At Chicago most of the Conchological collection was saved.

THE FINE COLLECTION OF SHELLS, part of the estate of the late Judge Cooper has been purchased by George C. Walker, Esq., of Chicago, for presentation to the Chicago Academy of Sciences. The collection numbered nearly 3000 species.

We are pleased to announce the intended publication by this very enterprising Society, of "Proceedings" and "Mémoires," the former in 8vo., the latter in 4to.; both to be fully illustrated.

BUILDING FUND OF THE ACADEMY OF NATURAL SCIENCES OF PHILADELPHIA.—The subscriptions to this Fund now amount to over \$54,000, leaving \$46,000 yet to be obtained during the present year, in order to enable the Academy to render properly available to the public its immense collections in Natural History. Contributions, large or small, are solicited, and may be enclosed to the Editor of this Journal. For this purpose, a subscription paper is inserted with this number.

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Fig. 1. <i>Colanina Leai</i> , Tryon .	Fig. 7. <i>Hemistinus simplex</i> Tryon .
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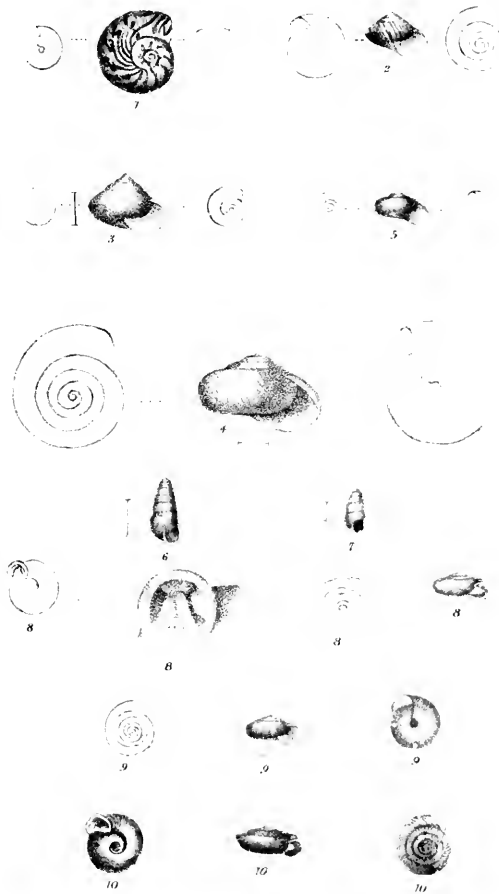
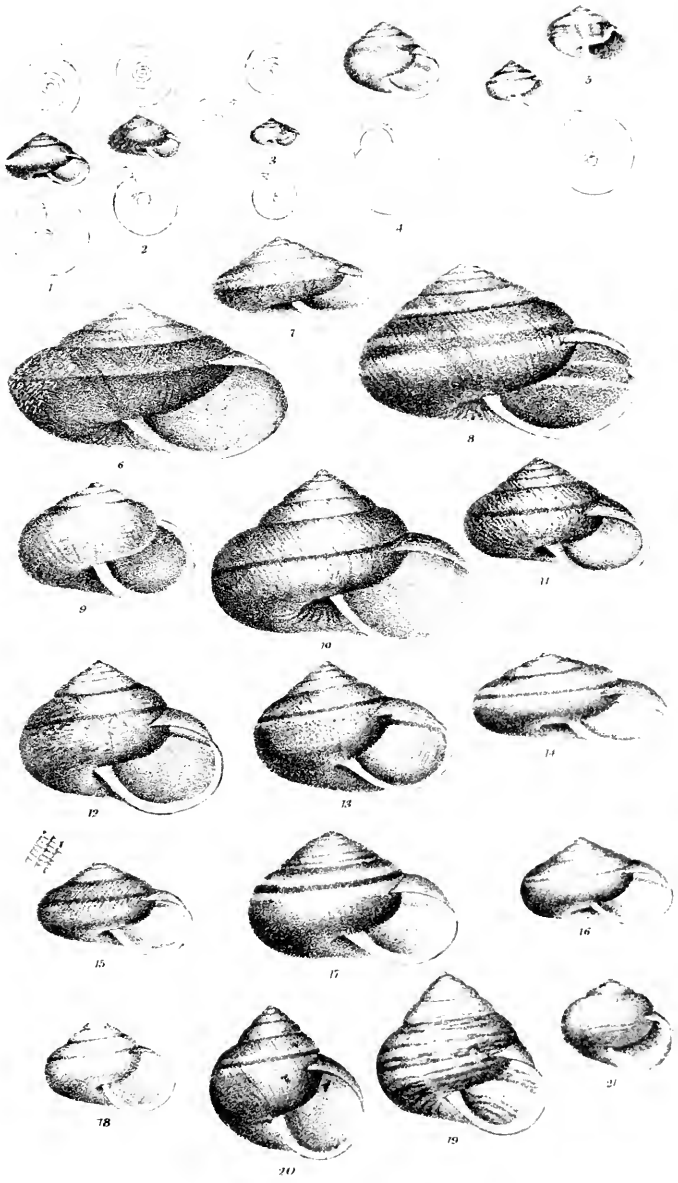
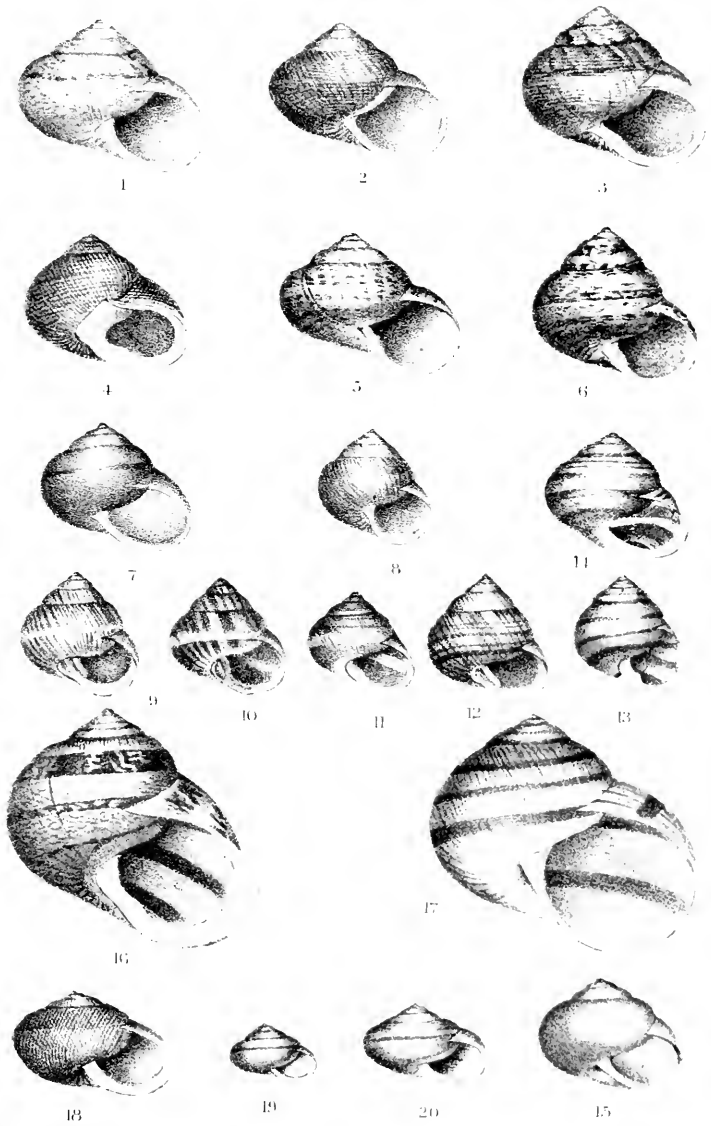


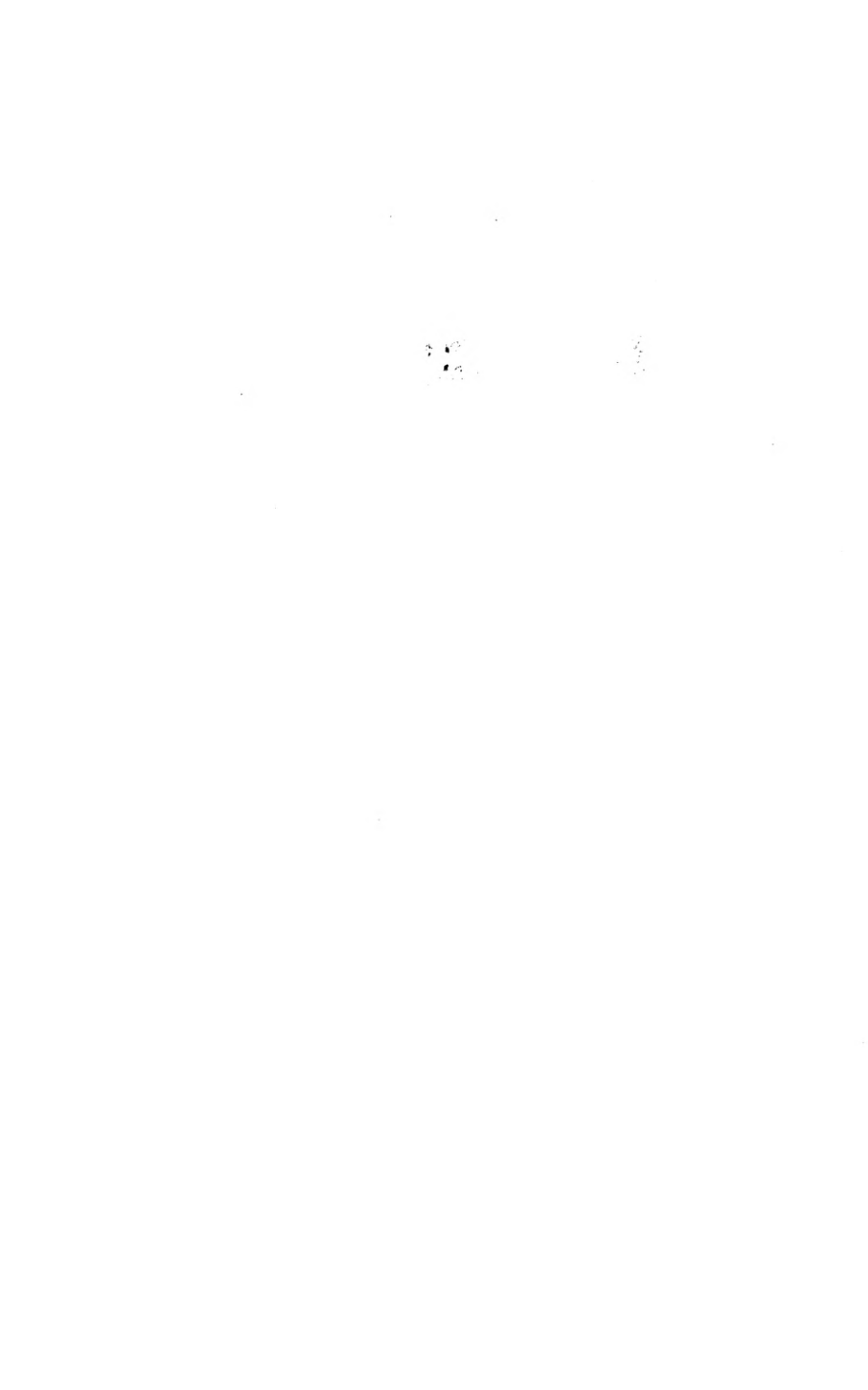
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