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INDEX

TO

THE NAUTILUS, VOL. XXI.

INDEX TO SUBJECTS, GENERA AND SPECIES.

INDEX TO AUTHORS.

THE NAUTILUS.

VOL. XXI. MAY, 1907. No. 1.

THE DIFFERENCES BETWEEN THE TWO NEW ENGLAND SPECIES OF ACMAEA.

BY HENRY JACKSON, JR.

During the summer of 1906, at North Haven, Penobscot Bay, Maine, I collected about fifteen specimens of *Acmaea testudinalis* (Müller) and thirty *Acmaea alveus* (Conrad), *alveus* being by far the more common. I put *A. alveus* here as a species rather than a variety of *A. testudinalis*, in accordance with one of the latest lists of New England mollusks which gives Conrad's species *alveus* specific rank. From this material I procured the radulas with the intention of studying the differences between the species *testudinalis* and *alveus*, The shell in *testudinalis* is a roundish and as a rule regular shell, there not being so much variation in form as in *alveus*. The shell of *alveus* is a narrower, laterally more compressed shell than that of *testudinalis*, and is found on eel grass, wharf piles and occasionally on rocks, but at North Haven it is most commonly found on eel grass which grows in great profusion, much to the disadvantage of boats and boatmen, all along the muddy shores. *A. testudinalis* is commonly found on flat stones between tide marks. The coloring of *testudinalis*, as far as observed at North Haven, has much less variation than that of the form *alveus*, which runs from nearly white to dark, blackish-brown, with many intermediate shades. This narrow, compressed form of *alveus*, it would seem, might have been caused by its being on eel grass which has narrow leaves and might cause a shell to be narrow by the lack of space to grow on. But Mr. Blaney has found *alveus* at Iron Bound Island, Frenchman's Bay, Maine,

on the under side of stones on a coarse, pebbly beach, and here it still retained its characteristic, long, narrow form. See Proceedings of Boston Society of National History, Vol. 32, No. 2, Nov., 1904.

All the illustrations here are of the same magnification. In the fifteen specimens of *Acmaea testudinalis* collected and studied the radulas were all the same with no observed variation, see Pl. II, Fig. 1. All had two central (C C), two lateral (L L), and two outermost teeth (U U), while among the thirty *A. alveus* were several abnormal radulas, in all of which abnormal cases there were three teeth in the center, Pl. II, Fig. 4, instead of two, Pl. II, Fig. 2, which is the normal number for *alveus*. The additional or third tooth (A), see Pl. II, Fig. 4, is on the left side and is a narrower tooth than the other two (C C). These abnormal radulas came from three very different individuals: one from a large, blackish, distorted shell, an adult, and one from a small, regular, white specimen of the nepionic age, and so on, all being different. There are several differences between the radulas of *testudinalis* and of *alveus*, and these differences were constant throughout the specimens examined.

FIG. 5.

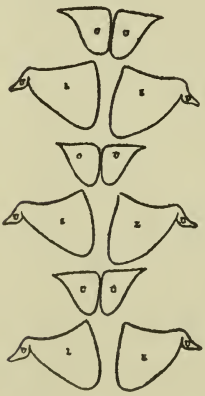


FIG. 6.

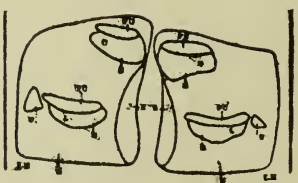


Fig. 5 (in text). *Acmaea testudinalis* (Müll). Normal adult radula. Developing teeth of the posterior portion of the same radula as Fig. 1. Lettering the same.

Fig. 6 (in text). Portion of anterior part of radula of *Acmaea testudinalis*, showing small bases (B), proximal portion of cusp (P C),

where the rest has been broken off, and plates (P) on lingual membrane (L M). U, outermost; L, lateral; C, central teeth. R, turned over part of plate. B, base.

There is a distinct dip in the proximal portion of the cusp of *testudinalis* in the laterals : this does not appear in *alveus*. In *testudinalis* the bases project from the proximal portion of the cusp at an obtuse angle, while in *alveus* the proximal portion of the cusp is the same size as the adjoining portion of the base. In *testudinalis*, Pl. II, Fig. 1, the apex of the cusp is just inside of the letter (L), from here it slopes down to the base; while in Pl. II, Fig. 2, *alveus*, the apex of the cusp runs the whole length of the foremost line bordering the shaded portion. In *testudinalis* the lateral teeth form a letter v, while in *alveus* they form an inverted v, thus ʌ. In *alveus* the laterals are less underneath the centrals than in *testudinalis*. The teeth of *testudinalis* are sharply rounded at the apex of the cusp, while those of *alveus* are nearly square, Pl. II, Fig. 2, and the younger, undeveloped teeth of the radula of an adult shell of *alveus* are perhaps the squarest of all, Pl. II, Fig. 4. This figure is of the developing teeth of the posterior portion of the same radula as Pl. II, Fig. 2. That is that portion hidden within the throat which will later come forward to take the place of worn-out teeth. I thought of the various causes of these differences, but it could not be individual variation, because the differences were constant throughout the forty-five specimens examined. It could not be because the teeth were worn square, as the squarest of them in *alveus* are in the early, developing part of the radula and before they had been used at all, see Pl. II, Fig. 3. There were five less important differences between the radulas of *testudinalis* and of *alveus*, these are : First the outermost tooth (U) is, in *alveus*, larger in proportion to the lateral tooth (L) than the outermost tooth of *testudinalis* is to its lateral tooth (L). In both species this little outside tooth (U) is nearly at right angles to the next tooth and the cusp of U faces in center of the lingual membrane (L), also it is very close to it, and at first glance appears to be the same tooth, only being a cusp of the larger denticle, but when viewed in a sideways, sectional view it is seen to be distinct. In the species *testudinalis* the tooth (U) cannot take much part in cutting food as it so much underlies the larger tooth (L), but in *alveus*, where it is more outstretched, it may do a good deal of work. Secondly, in *A. testudinalis* the cusps and bases alternate

large and small, see Pl. II, Fig. 1, that is, the base of the centrals (C C) being large and the cusps small; whereas in the laterals (L L) the bases are very small and the cusps large. The teeth in both species are set on separate plates, two on each plate. These plates are arranged in two rows, one down each side of the lingual membrane. The divisions between these separate plates are not distinct in the developing portion of the radula, but the plates seem to wrinkle with age, and in the center of the radula an elongated oval space is seen between the two. The first two or three rows of teeth in *A. testudinalis* are slightly blunter than those behind, but by no means so blunt as in *A. alveus*. What I mean by first teeth are those teeth in the anterior portion of the radula, these teeth are replaced by new ones which come forward from the developing portion.

Fig. 6, drawn by the author, showing plates and proximal portion of cusps in *A. testudinalis* where the rest is broken of.

Again the cusps of the teeth of *testudinalis* are very much more slanting backward or posteriorly than those of *alveus*, especially the laterals (L L). Lastly, the cusps of *testudinalis* are minutely granulated, while those of *alveus* are indistinctly striated. This was seen in some cusps broken off their bases, placed on a separate slide and viewed with a one-sixth inch objective.

In summing this matter up, one might say without much doubt that these two shells were distinct species. Also one may say that both radulas are exceedingly strange. They have no central tooth speaking strictly, as, with the exception of the abnormal radula of *A. alveus*, all radulas had an even number of teeth. Their deep chestnut color is another curious feature. Also they are very hard radulas to draw as they are raised more than most teeth and the angles and focuses are hard to get.

My thanks are due to Mr. R. T. Jackson, of Cambridge, and to Mr. J. A. Cushman, of the Boston Society of Natural History, for drawings of the radula.

EXPLANATION OF PLATE AND FIGURES.

Fig. 1. *Acmaea testudinalis* (Müll). Normal adult radula. L, lateral; C, central; U, outermost teeth. The cusps are shaded.

Fig. 2. *Acmaea alveus* (Conrad). Normal radula. Lettering the same as before. The outermost teeth (U) are so close to the laterals (l) that in this view they seem to be joined.

Fig. 3. *Acmaea alveus* (Conrad). Normal radula. Developing teeth of the posterior portion of the same radula as Fig. 2. These teeth have little or no coloring. Lettering the same.

Fig. 4. *Acmaea alveus* (Conrad). Abnormal radula. L, lateral; C, central; U, outermost; A, additional teeth.

PULMONATES OF THE MATINICUS ISLANDS, MAINE.

ARTHUR H. NORTON.

The Matinicus Islands form a group of off-shore islands outside of Penobscot Bay. They constitute the most isolated land mass of any size in the state, their nearest point of approach to the mainland being thirteen nautical miles. In the group there are eight islands, seven dry and numerous half-tide and sunken ledges. The total acreage I have roughly estimated at about fifteen hundred acres.

Matinicus is the largest of the group, containing about eight hundred acres. It is quite well wooded and diversified in topographical features. Exploration of this island would doubtless increase the following list materially.

Seal Island lies six miles east of Matinicus harbor, and Matinicus Rock five miles south of the harbor, both forming isolated points of great exposure and long separation.

Several plants are found in abundance on these two points which are nowhere else abundant on this coast west of Petit-Menan point. Both are destitute of trees. As would be expected from their long isolation and great exposure, they are completely "rock bound," in fact, enormous ledges, with their valleys and seams filled with soil, which is partly coarse gravel, deeply overlaid with decayed vegetation, and everywhere strewn with fragments of rock, rent by frost and the action of time, or hurled by the fury of unusually severe storms.

The southwestern exposures of both are bluffs dropping immediately into water of considerable depth. At the rock, the history of which has been made known through the medium of the light-house establishment, the surges generated by gales from the southeast not infrequently break over the island notwithstanding the fact that it is about fifty feet above mean high-water mark.

The character of the soil, and the copious moisture from dews and fogs are conducive to very rank growth of several species of maritime plants, affording suitable conditions for the mollusca enumerated.

During my visits to the islands, shell collecting has been entirely secondary. Yet the isolation of the islands lends so much interest to the collection that the following records do not seem entirely superfluous, especially as a thorough investigation is not practicable at present:

Helix hortensis Müller. In June, 1896, I found this species in great abundance on Seal Island. They inhabit the rank vegetation toward the western end. The yellow, unbanded phase predominated, only three or four banded ones being found. Some young specimens having but two and a half whorls were also found on the occasion of this visit. I have not found it on any other island of the group. It was recorded by Mr. C. W. Johnson from Seal Island in THE NAUTILUS for November, 1906, page 77.

Vallonia costata Müll. Rather abundant on Seal Island in 1896 among rank herbage and driftwood.

Pupilla muscorum Linn. Four specimens were found with the last-named species. They are but 3 millimeters long, half a millimeter shorter than specimens taken on the adjacent mainland. One is a rich brownish, the others opaque white, all edentulous.

Cochlicopa lubrica Müll. One specimen was found under a log, stranded high on Matinicus Rock, August, 1905.

Vitrina limpida Gould. Found rather plentiful among stranded chips and rank vegetation on Matinicus Rock, July, 1903.

Zonitoides arborea Say. Matinicus Rock. Three specimens under logs, stranded high above normal tide mark, August, 1905.

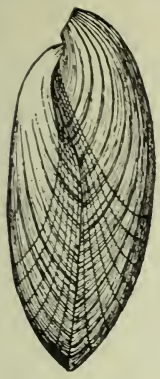
Agriolimax agrestis Linn. Several specimens were found under logs and stones or hidden by rank vegetation on Matinicus Rock, August, 1905.

Pyramidula alternata Say. A single dead and broken shell was found at the northern part of Matinicus Island, August, 1905.

Pyramidula striatella Anth. Common with the other small species on Seal Island, June, 1896.

Succinea obliqua totteniana Lea. One found on Matinicus Rock, July, 1903.

Succinea avara Say. Two obtained at Seal Island, June, 1896, and one very small one at Matinicus Rock, July, 1903.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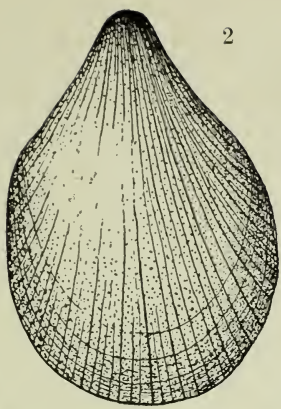
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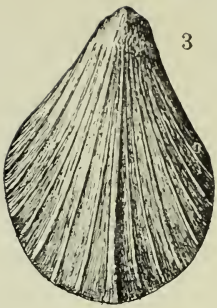
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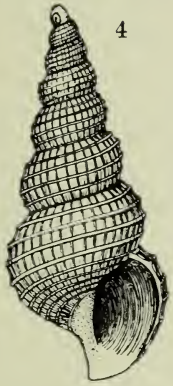
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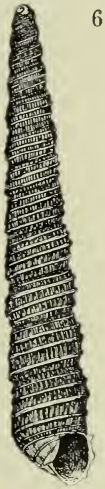
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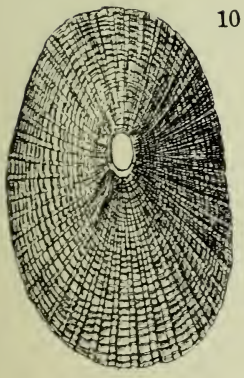
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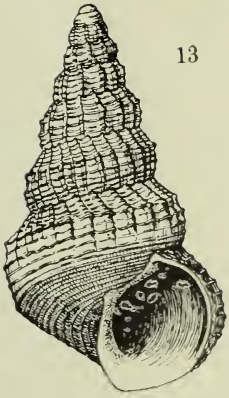
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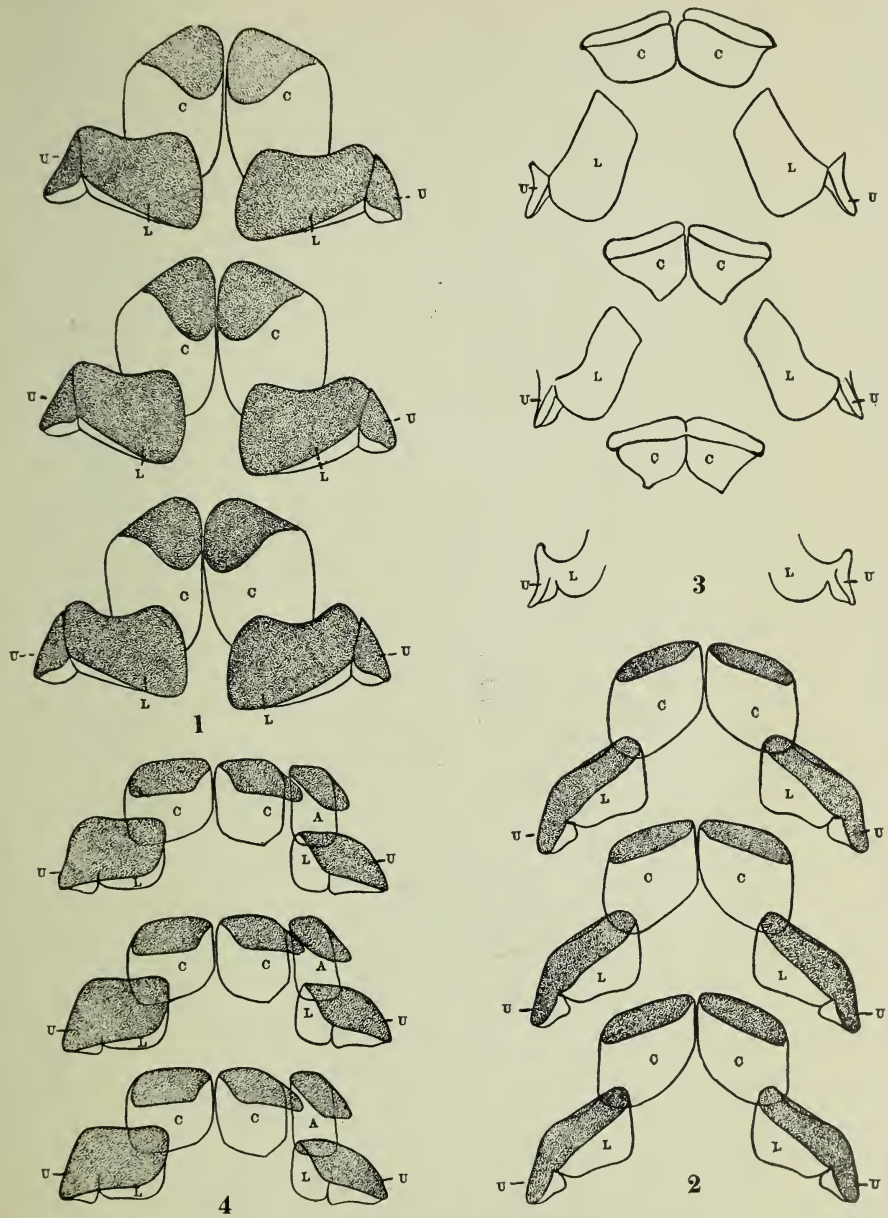
ALDRICH. NEW EOCENE FOSSILS.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A LIST OF LAND AND FRESH-WATER SHELLS OF YEMASSEE, SOUTH CAROLINA.

BY JOHN B. HENDERSON.

In the early part of March last I spent a week upon a plantation near Yemassee, Beaufort Co., South Carolina, the greater part of my time being spent in snail hunting. Beaufort is a low-lying county within the Atlantic coastal plain. Its features are of three distinct sorts: a sandy, dry-pine area, the "knolls" of live oak with rather dense deciduous vegetation, and the swamp lands. The swamps are extensive, often containing forests of cypress and rank growths of aquatic vegetation. In places these swamps are drained and converted into rice fields, the latter furnishing excellent stations for fresh-water mollusca. The pine lands harbor a scant molluscan fauna. The great majority of land shells are to be found only in and about the edges of the deciduous forests. In the depths of the swamps I found almost nothing, the fresh-water species seeming to prefer more open and smaller bodies of water—particularly the little ditches which drain the rice fields.

The prevailing *Polygyra* is *hopetonensis*, a typical costal plain species, as it ranges along the Atlantic border from Norfolk to St. Augustine. It obviously belongs to the *fallax-tridentata* series and I think is a descendant of the former, which, having migrated into the lowlands of the coast, has been modified by its new environment. The species has become well enough marked to separate it readily from the upland *fallax*. It admits, however, of several local races which may some day be christened with varietal names. The extreme forms are *hopetonensis obsoleta* Pils. of Newbern and Wilmington, N. Car., a large form entirely without teeth upon the outer lip, and a Yemassee race which is very small and with strongly developed denticles.

I was surprised to find *Euglandina truncata* an abundant species so far north. The Yemassee specimens are large, stout fellows of very brilliant pink, rather darker than typical Florida specimens.

The following is a complete list of my catch, though it cannot be faunally complete. The entire absence of *Amnicolids*, *Unionidæ*, *Viviparidæ* and of *Ancylus* is rather striking. I owe many thanks to Dr. Pilsbry for his critical identification of my shells:

Polygyra thyroides Say.

Polygyra hopetonensis Strebel.

Polygyra postelliana Bland.
Polygyra pustuloides Bland.
Euglandina truncata Gmel.
Circinaria concava Say.
Gastrodonta cerinoidea Anth.
Zonitoides arborea Say.
Zonitoides minuscula Binn.
Vitrea indentata Say.
Helicodiscus parallelus Say.
Euconulus chersinus Say.
Bifidaria contracta Say.
Bifidaria procera Gld.
Succinea campestris unicolor Tryon.
Succinea aurea Lea.
Planorbis parvus Say.
Planorbis tumidus Pfr.
Physa cubensis Pfr.
Physa heterostropha Say.
Lymnaea columella Say.
Sphaerium partumeium Say.
Pisidium sp.

SOME NEW EOCENE FOSSILS FROM ALABAMA.

BY T. H. ALDRICH.

The shells described below are all in the cabinet of the writer, and are believed to be new. They are mostly small species or else very rare, and represented by very few or single specimens.

TEREBRATULINA BRUNDIDGENSIS n. sp. Pl. I, figs. 1, 2, 3.

Shell medium, narrower than high, radial threads very strong in the young shell becoming finer in the older, and in the oldest forms appearing as very fine lines only. A central, raised rib doubled shows on the ventral valve, replaced with a depression between two ribs on dorsal valve; foramen oblong. Longest diameter 14 mm., width 11 mm. Smallest form figured is 9½ mm. and 7 mm.

Locality: Eocene of Brundidge, Ala.

Remarks: This species occurs in a stratum of white limestone which was exposed in a large well close to the R. R. station. This well was dug for water for a supply for the engines, but when the

limestone stratum was dug into it failed as a water tank. Associated with the species is *Terebratula wilmingtonensis* L. & S., *Ostrea vomer* Morton and several other species which occur in the white limestone or Jackson horizons. The area surrounding the well is typical Nanafalia lignitic deposits. So far no other outcrop of this limestone has been observed in the vicinity, but careful search is yet to be made. This discovery was called to my attention by Dr. E. A. Smith, State Geologist of Alabama, who sent me a number of specimens. We subsequently visited the well together and went over the locality south of the town, failing to find an outcrop. Dr. Smith thinks his discovery is an "overlap" of the white limestone or Vicksburg, somewhat as in certain Georgia localities. All the different forms of *Terebratula wilmingtonensis* mentioned and figured by Prof. Dall in Vol. 3 of Wagner Free Inst. of Science, p. 1537, pl. 58, figures 14–20, are found here.

Turbonilla (Strioturbonilla) harrisi n. sp. Pl. 1, fig. 8.

Shell as figured, small, with approximately parallel sides. Whorls eight, the two apical ones smooth; spire obtuse; whorls longitudinally striated with numerous impressed lines; base of shell smooth; aperture ovate, pillar lip bearing one fold. Length 3 mm.

Locality: Wood's Bluff, Ala.

Remarks: This species is doubtless the same one mentioned by Prof. G. D. Harris in Bulletins of American Paleontology, No. 11, p. 96, pl. 12, fig. 10, 1899, as *Turbonilla* sp.(?), but he evidently had an immature shell. Named in honor of Prof. Harris.

Turbonilla (Cingulina) anita n. sp. Pl. 1, fig. 12.

Shell medium, spire obtuse, whorls nine, the two apical ones smooth, balance with about six spiral impressed lines; lines of growth very fine and rather close set, aperture ovate. Pillar lip twisted and slightly prolonged at base. Length 6 mm, breadth of body whorl $2\frac{1}{2}$ mm.

Locality: Wood's Bluff, Ala., and same horizon 6 miles east of Thomasville, Ala.

Cerithiopsis regularoides n. sp. Pl. 1, fig. 7.

Shell small, fragment from which this description is made with seven whorls; these have two raised spirals, which form nodules at the intersection with the longitudinal lines. The spirals are placed one above and the other below the centre of each whorl; longitudinals coarse and prominent; a smooth raised spiral encircles each

whorl below the suture. The base appears to be smooth, canal twisted. Length of fragment 7½ mm., breadth of basal whorl 2¼ mm.

Locality: Wood's Bluff horizon six miles east of Thomasville, Ala.

Remarks: This species has a general resemblance to *Cerithiopsis fluviatilis* Ald., but differs in the position of the raised spirals.

MATHILDA ELONGATOIDES n. sp. Pl. 1, fig. 6.

Shell small, exceedingly narrow and elongated, whorls about fourteen, well rounded, carrying three nearly equidistant strong spirals on the main part of each whorl and also a slight one just below the suture. The longitudinals between the spirals are numerous and close set, and rather fine. Body-whorl at base shows several spirals in addition to those above mentioned. Aperture nearly circular. Apical whorls reversed. Length 6 mm., breadth of body-whorl 1 mm.

Locality: Wood's Bluff, Ala.

MATHILDA SINGULARIS n. sp. Pl. 1, fig. 11.

Shell small, whorls profusely ornamented; number of whorls five, besides the embryonic apex; apical whorls twisted and pointed horizontally or at right angles to the axis of the shell. The main whorls are angulated by a very strong peripheral line with a smaller one above, and from one to two still finer ones between. Body-whorl shows several (about four) fine spirals below the central one, extreme base nearly flat. Aperture ovate; pillar lip reflected, and slightly prolonged into a canal.

Locality: Wood's Bluff, Ala.

MATHILDA LEONA Aldrich. Pl. 1, figs. 4, 5.

This species was described from the Wood's Bluff horizon. The present specimen is from the Matthew's Landing beds, one mile west of Oak Hill, Ala. The original description was drawn from a young shell, and in this example the embryonic whorls are twisted to the left and the spire projects horizontally. This specimen also shows a small umbilicus.

SCALA VETUSTA n. sp. Pl. 1, fig. 9.

Shell as figured, number of whorls unknown, but four showing in type; they are rapidly expanding and ornamented with about twenty raised ribs; suture defined with a strong carina which makes a raised and angulated boundary for the base; the ribs continue over this line, and disappear into a deep and wide umbilicus. The spiral lines do not show upon the base. The figure is natural size.

Locality: Midway stage on McConnico plantation, Wilcox Co., Alabama.

Remarks: This specimen is quite imperfect, but the species is so well marked that it deserves a name. It is probably the same form mentioned by Prof. Harris in Bulletin of Am. Pal., No. 4, p. 232.

SCALA DOLOSA n. sp. Pl. 1, fig. 13.

Shell rather small, cancellated; whorls eight, the first two smooth, balance with spiral lines which are coarse near the middle of each whorl, these lines give each whorl an angulated profile. The spirals are nodular in part at the intersections with the longitudinals. The figured specimen shows a varix; aperture nearly circular, outer lip expanded and rounded, interior smooth. Umbilicus open, and carrying a groove. Base of shell carrying numerous spirals, but no nodes, the lines of growth being very fine. Length 7 mm., breadth 4 mm.

Locality: Near Grave Yard Hill, Wilcox Co., Ala. Midway Stage.

FISSURELLA UNILINEATUS n. sp. Pl. 1, fig. 10.

Shell small, rather thin, depressed conic, cancellated. The radial lines are equal and regularly spaced, while the longitudinals are bowed between the radials, giving to the surface a wavy appearance, no nodules at the intersections, the lines crossing regularly. Hole oval, with a complete oval callus inside. Longest diam. 13 mm., breadth about 7 mm., height 3 mm.

Locality: Wood's Bluff, Ala.

NOTES.

ASHMUNELLA. On page 134 of the last number, the second line from bottom should read ASHMUNELLA RHYSSA HYPORHYSSA Ckll., in place of "*Ashmunella rhyssa* (Ckll.)." Owing to my absence in Florida I had no opportunity to see the proofs of this article.

H. A. P.

THE ORIGIN OF THE LUNG IN AMPULLARIA.

BY W. K. BROOKS.[1]

Through the courtesy of Dr. Alfred G. Mayer I was able to visit and partially explore the Everglades of Florida in March, 1906. As we pushed our way through the tall reeds and grasses that cover the

[1] From the Report of the Department of Marine Biology, Tortugas, Florida. Extracted from the Fifth Year-Book of the Carnegie Institution of Washington, p. 109, 1907,

shallow water of the Everglades, we found great numbers of small eggs attached to the stems of the reeds and grasses above the surface of the water but close to it.

The eggs were arranged in vertical rows, and were enclosed in calcareous shells, resembling in these respects the eggs of terrestrial pulmonate gasteropods.

We also found in the water in great abundance the prosobranchiate gasteropod *Ampullaria*, and when some of the older eggs were opened they were found to contain young specimens of this genus.

The *Paludinidæ*, which are closly related to the *Ampullaridæ*, are aquatic, viviparous, and breathe by gills, and their structure indicates that they are true prosobranchs, descended from and closely related to the marine prosobranchs. *Ampullaria* has gills, is partly aquatic, and seems to be a true prosobranch, so far as its general structure is in question, but as it has a lung, and is able to breathe air and live out of the water, and as it also lays, in the air, eggs in calcareous shells, like those of the terrestrial pulmonates, the question whether it is primarily a pulmonate, with secondary resemblance to the prosobranchs or primarily a prosobranch with secondary resemblance to the pulmonates, suggests itself.

As the embryonic history of the breathing organs may be expected to throw light upon this question, a quantity of the eggs were collected and taken to the Marine Laboratory in the Dry Tortugas. There the eggs were opened, the embryos removed and sketched, and then hardened and preserved for embryological examination.

On my return to Baltimore I placed the material in the hands of Mr. B. McGlone, who has studied the development of the respiratory organs under my supervision, and has nearly completed his work, which will soon be ready for publication. He has shown that the lung of *Ampullaria* is a member of the series of gill-filaments, and that it must be regarded as a modified gill, homologous with a ctenidium, or with more than one. It is therefore an organ which has been secondarily acquired, and not derived from the lung of the terrestrial pulmonates.

Both lung and gills arise very early in the embryonic history of *Ampullaria*, and at about the same time. In a very young embryo, soon after the mantle makes its appearance, a ridge or thickening of the epithelium of the inner surface of the mantle indicates the region from which the gill-filaments, the lung and the osphradium are to arise. The osphradium is developed from one end of this ridge, the gill-filaments from the other, and between the two the ridge becomes infolded into the substance of the mantle to give rise to the lung, which may be regarded as a modified and invaginated gill-filament.

The similarity between the lung of the pulmonates and that of *Ampullaria* is therefore nothing more than a new illustration of a resemblance between organs that have been acquired independently under like physiological conditions.

The Nautilus.

Vol. XXI. JUNE, 1907. No. 2.

A NEW POLYGYRA FROM NORTH CAROLINA (P. SOELNERI).

BY JOHN B. HENDERSON.

On a collecting trip to the coastal plain region of North Carolina last autumn, with Mr. Soelner, of Washington, the following undescribed *Polygyra* was found :

Polygyra soelneri n. sp. Plate III, figs. 1, 2.

Shell globosely depressed ; spire low conoid, periphery rounded ; perforate, the opening half covered by columellar lip. Surface very glossy, closely, deeply and evenly ribbed throughout except on first $1\frac{1}{2}$ whorls which are smooth. Whorls $5\frac{1}{2}$, regularly increasing, the last falling abruptly and shortly in front, having a pale spot at the deflection. Narrowly and deeply contracted behind the lip. Aperture oblique and irregularly crescentic. Lip reflexed with a flange-like internal thickening which is widest basally and terminates short of the columellar end of the lip. A rather long curved white parietal tooth stands upon a hardly-perceptible parietal film. Color mahogany, with a glossy satin-like sheen ; lip purplish outwardly, the inner flange buff. Alt. 7, greater diam. 11, lesser diam. $9\frac{1}{2}$ mm.

Habitat among cypress logs in a swampy region on the north shore of Lake Waccamaw, North Carolina.

This remarkably pretty little *Polygyra*, which is very distinct from any other known species, might be included in the section *Mesodon*, its nearest ally being *P. christyi*, from which, however, it differs in being larger, less depressed and umbilicated. I take pleasure in naming the species after Mr. Soelner, my enthusiastic companion in the field when it was first found.

NOTES ON GUNDLACHIA. I.

BY BRYANT WALKER.

The validity of the genus *Gundlachia* Pfr. is one of the disputed points in systematic conchology.

The article by Hedley, reprinted with notes by Dr. Pilsbry in the NAUTILUS in 1895 (Vol. IX, p. 61), gives a very complete summary of the data down to that date. The only omission in regard to the North American forms that I have found, being the citation of *G. ancyliformis* Pfr. from Palma Sola, Manatee Co., Fla., by Simpson in 1888 (Con. Ex., II, p. 96).

So far as I have been able to ascertain, no additional data in regard to our species have been published.

In the NAUTILUS for January, 1904, Dr. Dall called attention to a very interesting account by Nordinskiold of a septa-forming *Ancylus* from South America and expressed the opinion that the so-called *Gundlachiæ* are merely *Ancyli*, which under favorable conditions are able to protect themselves from drought and cold by forming an epiphragm and subsequently "to secrete an enlarged and somewhat discrepant shell."

The occurrence with typical *Gundlachia* of non-septate individuals indistinguishable in shell characteristics from *Ancylus* has been noted by several writers. Hedley, who believes the genus a valid one by reason of anatomical differences, apparently inclines to the view that "in unfavorable circumstances a septum is never formed." While Dr. Pilsbry (NAUT., IV, p. 48), speaking of this apparent coexistence of two forms, remarks, that if correct, "*Gundlachia* will furnish the most extraordinary case of dimorphism known among our American mollusks."

During the last few years I have had occasion to examine critically large numbers of our Eastern American *Ancyli*, and until within the last year, with the exception of a small series collected by Ferriss near Joliet (to be discussed later), I have discovered no tendency whatever to septa-forming in any instance.

Recently, however, material from Ohio, Indiana, Alabama and Mississippi has been received, which is of considerable interest as bearing on the question, and the evidence thus afforded is herewith submitted for consideration.

The examination of this material leads necessarily to a study of the described forms of North American *Gundlachia*, and the results of this work may properly precede the consideration of the new material referred to.

I.

Gundlachia stimpsoniana Smith. Plate IV.

This species was described in 1870 (Ann. N. Y. Lyc. N. H., IX, p. 399, fig. 6) from specimens collected in ponds at Greensport, Long Island, N. Y., and on Shelter Island. Only the "primary" stage was figured. It has not been found elsewhere, so far as I know.

Through the kindness of Mr. J. B. Henderson, Jr., I have been able to examine the original lot of this species from the Smith collection. It consists of 71 specimens from Greensport and 1 from Shelter Island.

The Shelter Island example is a young shell that has completed the septum and is similar to the one figured (figs. 10–12). The Greensport set may be divided into four groups:

1. 60 examples of the primary stage, with the septum in all stages of development, from the first beginnings at the posterior margin to the completed septum. With one exception, these specimens, although varying somewhat in size and shape, are similar in all other respects. The matured, or rather, perfected examples, vary from $1\frac{1}{2}$ to 2 mm. in length, $\frac{3}{4}$ to 1 in width and from $\frac{1}{2}$ to $\frac{3}{4}$ in height. The shape is an elongated oval, the ends bluntly rounded, the anterior extremity being usually somewhat more expanded. The sides are nearly parallel, usually somewhat constricted in the centre, and rather more so on the right than on the left, but in the smaller specimens are occasionally slightly convex. The apex is blunt, slightly projecting and inclined to the right. It is radiately striate as in *Ferrissia*. The anterior surface is distinctly ribbed with fine radiating ribs, which, however, do not extend to the apex. The septum for the posterior half or two-thirds is either flat or, more usually, slightly convex. From about the centre of the shell it is flattened and descends slightly to the aperture. This depression is, no doubt, caused by the body of the animal in moving in and out of the constantly decreasing aperture. The lines of growth are curved and delicate, but quite distinct. On completion of its growth the edge of the septum is abruptly turned upwards to the level of the edge of the shell, and the whole margin of the aperture thus formed is slightly

thickened and becomes continuous as shown in figure 11. The exceptional specimen noted above is noticeably larger, but proportionately more depressed than the other, measuring $2\frac{1}{2} \times 1\frac{1}{4} \times \frac{1}{2}$ mm. But in sculpture it is precisely the same, and I have no doubt that it belongs to the same species. In this, the septum is but partially developed. A very similar specimen in size and appearance, but without any appearance of a septum, is noted under group 2. Nearly all of these specimens are "amber-colored," as stated by Smith, but this is caused by a slight ferri-oxide deposit on the surface, which disappears on the application of oxalic acid, and leaves the whole shell of a clear, transparent, corneous color.

2. Five examples of the primitive stage with no trace of septum. Evidently that growth had not yet begun. Four of them are of the usual size and shape of the "primary" shell. The fifth is somewhat larger and, barring the lack of septum, almost a duplicate of the aberrant individual noted in group 1.

3. Three examples in which the secondary growth had been made without forming a septum. In all of them the primary stage is sharply defined by the difference of color, and in color and shape agrees substantially with the usual appearance at that period. In one of them (figs. 3, 6, 9) the posterior slope is not continuous externally, there being a well-marked "break" between the two stages of growth, and internally the secondary growth flares out at a decided angle all around the posterior margin of the primary shell.

In the other two examples, the primary shell is rather more contracted laterally than usual, but the secondary growth is, on all sides, in a substantially direct continuation of the primary shell. It becomes more or less irregular, however, as it progresses and the general effect of the entire shell is that of abnormal growth. None of these shells, however, are referable to any of the described species of *Ancylus*. Smith states that the Greensport *Gundlachia* were associated with *Ancylus fuscus* and with "more elevated specimens, probably belonging to another species." If his identification of *A. fuscus* was correct, the difference in the apical sculpture, to say nothing of the general contour of the shell, forbid the union of the two forms. What his other species were, must remain uncertain until his specimens can be examined. Possibly they were non-septate examples of "*stimpsoniana*," in which the line of demarcation between the primary and secondary growths was not so distinctly indicated as in these specimens, which he included with his *Gundlachiæ*.

4. Three examples having both a septum and a more or less complete secondary growth. Smith states that of about one hundred examples collected in the course of three years, only two were fully mature. Of the specimens now in the collection, only one is apparently mature, and that is much smaller than the dimensions given by Smith for the fully mature shell, *i. e.*, $5\frac{1}{4} \times 3\frac{1}{4} \times 1\frac{1}{2}$ mm. As shown by the figures (figs. 2, 5 and 8), it is somewhat defective along the left margin. Allowing for the broken edge it measures $3\frac{3}{4} \times 2\frac{1}{2} \times 1$ mm. In shape, however, it agrees substantially with Smith's description, and in the absence of a better, may be considered as typical.

The second specimen, if ever mature, has had the secondary growth broken back on all sides nearly to the primary shell, so that it is quite impossible to say what the original size or shape was.

The third example is apparently the one referred to by Smith (p. 400) as having begun the secondary growth with a septum covering "less than a quarter of the aperture." As shown by the figures (figs. 1, 4 and 7), it has been broken along the posterior margin, but enough remains to give a good idea of its original appearance. It measures $2.75 \times 2 \times \frac{3}{4}$ mm. If this is the specimen mentioned by Smith, and is "about two thirds" grown, the shell represented by figs. 2, 5 and 8 is not far from being fully matured. The shape of this specimen is quite different from that of the "typical" shell, owing probably to the difference in the size of the septum. The resemblance in outline between it and the non-septate specimen figured is quite strong, as shown by figures 4 and 6.

This species is apparently quite distinct from both *G. meekiana* and *G. californica*, being characterized by its larger and more widely-expanded secondary growth. More material showing the mature form is very desirable, and it is to be hoped that collectors resident on Long Island will make its rediscovery a matter of special consideration.

MOLLUSCAN FAUNA OF MONTEREY BAY, CALIFORNIA.

BY S. S. BERRY.

During the summer of 1906, the writer attended a six weeks' session of the Marine Biological Laboratory of Stanford University, at Pacific Grove, California. While there considerable attention was

given to molluscan life in particular and an extremely interesting collection was made of the different forms. 394 species were obtained, a practically complete list of which follows. In addition to the mollusks, four species of brachiopods were collected.

The major part of the collecting was done along the shore about Pacific Grove, especially at what is locally known as the "Third Beach," and an interesting expanse of rocks called the "Big Tide Pool." In addition to this, a number of dredging excursions were undertaken with the aid of a gasoline launch, which resulted very successfully. Most of the dredging was done in quite shallow water, although one trip was made to a point off Moss Landing near the middle of the bay. On this occasion we twice pulled up the dredge filled to the brim with living echinoderms of the genus *Echinarachnius*, the common "sand-dollar," some two bushels in all. All of the mollusca collected on such occasions were given over to the writer, and his sincere thanks are due to Professor George Clinton Price, in charge of the laboratory, to Mr. Frank A. Woodworth, of Pacific Grove, and to many of his fellow-students for much valuable aid in the way of numerous specimens, pertinent suggestions and help of every description in the preparation of this paper.

The writer is also greatly indebted to Dr. William H. Dall and Mr. Paul Bartch, of the United States National Museum, who kindly determined all doubtful material and who have now in hand the description of the many new or undescribed species found. The new species are marked with an asterisk.

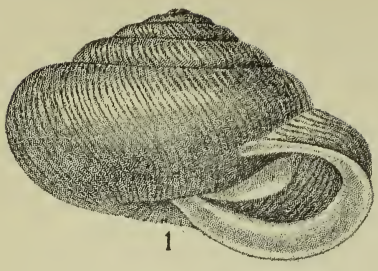
BRACHIOPODA.

Glottidia albida Hinds. Several living specimens were obtained at from twelve to forty fathoms' depth.

Terebratulina caput-serpentis Linné. A few very young specimens, presumably of this species, were dredged. Adult specimens are occasionally brought in from deeper water by the fishermen, usually attached to coral. They are of the form which used to be known as var. *unguicula* Carpenter.

Terebratulina transversa Dall. A few poor specimens were dredged at various depths, adhering to fragments of hard blue clay, shells, etc.

Laqueus californicus Koch. We obtained no good specimens of this handsome brachiopod, but I saw numbers of fine ones which had been brought in by the fishermen.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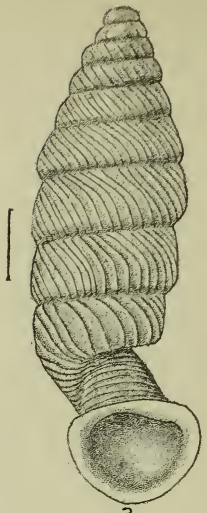
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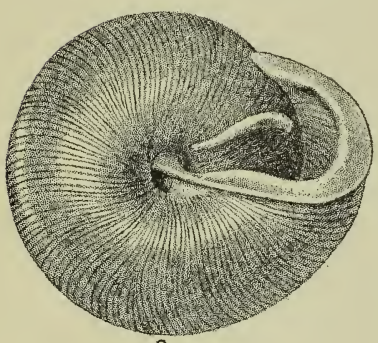
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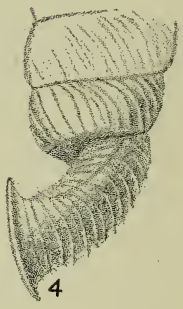
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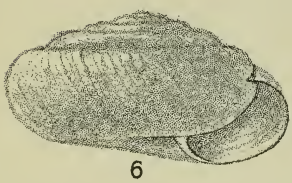
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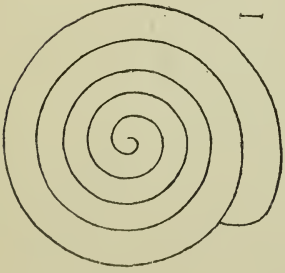
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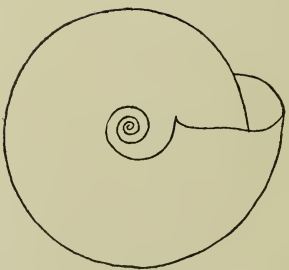
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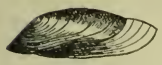
HENDERSON: POLYGYRA SOELNERI.
PILSBRY: MEXICAN LAND SHELLS.



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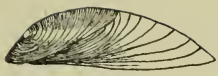

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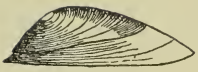

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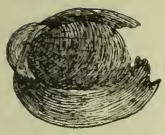

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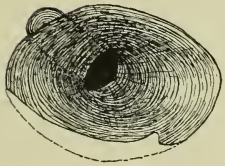

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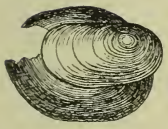

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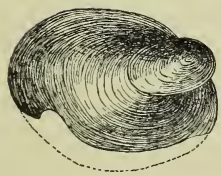

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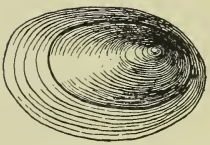

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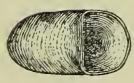

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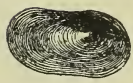

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MOLLUSCA.

Nucula belloti A. Adams. One live specimen from about 40 fathoms.

Leda taphria Dall. Many empty valves and a few small live specimens were obtained almost everywhere that we dredged in the bay. 12 to 40 fathoms.

Leda hamata Carpenter. Occasionally found with the preceding.

Barbatia gradata Sowerby. Living; 12 fathoms.

Glycimeris intermedia Broderip. No living specimens were obtained, but fresh valves were dredged in twelve fathoms of water.

Philobrya setosa Carpenter. 12 fathoms. Found attached by its byssus to bunches of coralline, which it closely resembles in color and is exceedingly difficult to distinguish. Not rare, and many were doubtless thrown away before we discovered the habitat of this tiny but none the less interesting mollusk.

Mytilus californianus Conrad. This animal covers the rocks just above the low-water mark and may be gathered by the tubful, if one is willing to risk the almost certain wetting he will get, if he clambers too far out on the exposed headlands, which are the mussel's favorite haunts.

Septifer bifurcatus Reeve. Not rare between tides.

Modiolus fornicatus Carpenter. 12 to 40 fathoms.

Modiolus rectus Conr. 20 fathoms.

Modiolus rectus var. *flabellatus* Gould. One enormous specimen of this variety was obtained which had been brought in by the fishermen. It far exceeds in size any other Mytilid in my cabinet.

Adula falcata Gould. Living in the hard blue clay with other borers. 12 fathoms.

Lithophagus plumula Hanley. With the above; not uncommon.

Crenella divaricata Orbigny. 25 fathoms.

Pecten hastatus Sowerby. 12–40 fathoms. No very large or brightly-colored specimens were obtained.

Pecten hericeus Gould. One fine valve came up in the dredge from the blue clay region off Del Monte. 12 fathoms.

Pecten diegensis Dall. Young specimens were dredged with *P. hericeus* and *P. hastatus*. The fishermen sometimes bring in beautiful adult specimens from the coral banks.

Pecten (*Hinnites*) *giganteus* Gray. A few were found at low-tide attached to the under surfaces of rocks. At the great Tide Pool,

where a good "minus" tide lays bare several acres of rocks and weeds, and which teems with all sorts of marine life, this species seems fairly common.

Lima dehiscens Conrad. Living; 12 fathoms.

Monia macroschisma Deshayes. Living; from shore line to 12 fathoms.

Cardita subquadrata Carpenter. Living; shore line to 12 fathoms.

Milneria minima Dall. 12 fathoms; not common, as we found it.

Kellia laperousii Deshayes. Found living on shore and also dredged at 12 fathoms.

With it occurs the following:

Kellia suborbicularis Montagu.

Rochfortia tumida Carpenter. Shore line to 40 fathoms.

Diplodonta orbella Gould. Valves were found on the beach and the species was dredged at 25 fathoms.

Phacoides californicus Conrad. Low-tide to 40 fathoms. Fairly common.

Phacoides approximatus Dall. 40 fathoms.

Phacoides annulatus Reeve. One valve was dredged at a depth of about 25 fathoms.

Chama pellucida Sowerby. Low-tide to 12 fathoms.

Cardium quadrigenarium Conrad. 12 fathoms; only a few very young valves found.

**Cardium fucanum* Dall. One live specimen and several valves dredged at 20 fathoms. It is notable that *C. corbis* Mart. was not obtained. See description in NAUTILUS, XX, p. 111.

Protocardia centifilosa Carpenter. Living; 12 to 30 fathoms.

Pisidium occidentale Newcomb. Found in numbers in an old watering-trough at Pacific Grove.

Transennella tantilla Gould. Living; between tides.

Tivela stultorum Mawe. Between tides.

Tivela (?) *marginata* Cpr. One valve, found between tides, was thus identified at the National Museum.

Saxidomus nuttalli Conrad. 40 fathoms.

Marcia subdiaphana Carpenter. 25 fathoms; valves only.

Paphia staminea Conr.

Paphia staminea var. *petiti* Deshayes.

Paphia staminea var. *orbella* Carpenter. All found nestling among the rocks between tides.

Paphia tenerrima Carpenter. 12 fathoms; immature valves only.

Venerupis lamellifera Conrad. Some very pretty specimens of this species were found from the shore line down to 12 fathoms.

Psephidea ovalis Dall. 12 fathoms.

Petricola carditoides Conrad. 12 fathoms; in the blue clay.

Petricola californica Conrad. 25 fathoms; valves only.

Psammobia californica Conrad. Low-tide to 12 fathoms; not common.

Tellina salmonea Carpenter. 40 fathoms; rare.

Macoma yoldiformis Carpenter. 40 fathoms; off Moss Landing. One specimen.

Semele rubropicta Dall. 25 fathoms; valves only.

Semele pulchra Sowerby. 12 fathoms; valves only.

Cumingia californica Conrad. Not uncommon at low-tide.

Cooperella scintilliformis Carpenter. 40 fathoms; one live but immature specimen.

Sphenia californica Conrad. Low-tide to 15 fathoms; not rare.

Corbula luteola Cpr. 15 fathoms.

Saxicava arctica Linné. Low-tide to 12 fathoms.

Saxicava pholadis Linné. Low-tide to 12 fathoms. Several very large specimens were found in the abandoned holes of borers.

Siliqua lucida Conrad. Living; 15 fathoms; rare.

Solen sicarius Gould. Living; 40 fathoms.

Spisula planulata Conrad. Very common at about 12 fathoms' depth.

Spisula catilliformis Conr. One valve only; 40 fathoms; off Moss Landing.

Lyonsia nitida Conrad. 12 fathoms; rare.

Lyonsia spongiophila Dall. Low-tide to 12 fathoms; quite rare.

Mytilimeria nuttalli Conrad. Found at low-tide curiously embedded in sponges or colonies of ascidians. The live animals would be passed over and found rarely, except by accident, were it not for the distortion in the masses of their hosts caused by their presence, or for the oddly-shaped openings which permit the sea water to reach them.

Entodesma saxicola Baird. Among the rocks at low-tide.

Parapholas californicus Conrad. 12 fathoms. At this depth the dredge often brought up large fragments of a hard, blue clay which, upon examination, was found to be filled with dead and living specimens of this and other boring mollusks, such as *Petricola*, *Adula*,

Pholadidea, etc. Other crevices of this same blue clay yielded *Ocinebra* and many of the finest *Chitons* obtained.

Pholadidea penita Conrad. Found with the above.

Pholadidea sagitta Stearns. Found with the above and at a depth of 40 fathoms off Moss Landing.

Pholadidea parva Tryon. In *Haliotis* shells.

Pholadidea (Netastomella) darwinii Sowerby. 12 fathoms; in the blue clay.

Dentalium neohexagonum Pilsbry. 12 fathoms.

Dentalium rectius Carpenter (?). 12 fathoms. One beautiful specimen over an inch long is probably referable to this species.

Cadulus nitentior Carpenter. 12 fathoms; not uncommon.

Tornatina harpa Dall. 12 to 40 fathoms.

(*To be concluded.*)

A NEW CERITHIUM FROM THE FLORIDA KEYS.

BY WILLIAM HEALY DALL.

CERITHIUM STANTONI n. sp.

Shell solid, acute, conic, the nine whorls rapidly enlarging; sculpture of 7–9 strong, rounded, axial ribs extending from the suture to the periphery, crossed by small, sharply elevated, subequal, some times alternate, close set spiral threads which cover the whole shell; these threads behind the periphery are white, the striæ between them tend to be blackish-brown except on the most prominent part of the ribs where they are yellowish cream color; from the periphery to the canal the threads as well as the interspaces are brown, and on the canal become lighter again, but are probably more or less variable as in other species of the genus; last whorl with a single varix opposite the outer lip; aperture semi-lunar, on the body callous, with a strong subsutural ridge setting off a posterior sulcus; the pillar callous, twisted, very short, smooth; the outer lip thickened, reflected, internally sharply lirate; interior white. Lon. of shell 35, of last whorl 16, of aperture 12, max. diam. of shell 17, of aperture 6 mm.

Shoals near St. George Cay, Belize, Rev. W. A. Stanton (150294); Florida Keys (110469).

A hermit crab fragment retaining its coloration, sent by Father Stanton, was long believed to be due to foreign ballast, as nothing of the sort was known from the West Indies. The recent acquisition of a bleached but entire specimen from the Florida Keys has confirmed its American habitat.

The species is nearest the *C. guiniacum* Philippi (1849) from the Gaboon, West Africa, but is more conical, and wider in the last whorl, and rather larger. The sharp regular striation and few large rounded ribs are its most striking characteristics.

AMONG THE CEPHALOPODS.

BY R. E. C. STEARNS.

According to the papers, the big steamship *Northwestern* that went ashore last March on La Touche Island, southeastern Alaska, has been floated and is now at Valdez.

Divers making the survey of the bottom of the sea where the steamer rested, were driven away repeatedly by "great cuttlefish, which swarmed in the vicinity of the wreck." It was feared that these "sea monsters" would prevent the saving of the vessel, but the divers proved game, made the necessary survey, drilled the holes for the dynamite, and laid the charge which blew to atoms the rock that had trapped the steamer, without damaging the vessel.

May 3, 1907.

PUBLICATIONS RECEIVED.

The Mollusca of Colorado (University of Colorado Studies, vol. iv, no. 2, 3, Feb. and Apr., 1907). By Junius Henderson. This useful addition to the series of state hand-books of mollusks gives an epitome of earlier work by Ingersoll, Cockerell and others, with substantial additions to the list of species (some 25 being here first reported from Colorado), and to the locality records. A key to species and a bibliography are given. Most of the species are illustrated, the *Unionidæ* by excellent original figures, the snails by cuts

borrowed from Binney's works. "The study of the influence of altitude upon mollusks in this region has given chiefly negative results. Instead of dwarfing the species, as in Montana and other regions where the cold of high altitudes is more intense, the higher altitudes seem more favorable to land snails than lower levels, because of the increased humidity. The finest specimens of *Oreohelix strigosa* and *Vitrina alaskana* found have been at 11,000 and 9,300 feet respectively." "Among bivalves we have found *Pisidia* at 11,000 feet, *Calyculina* at 8,500 feet."

Regarding some of the older records the author remarks upon "doubts as to the accuracy of identification in many instances in the early reports." Such difficulties are always encountered, and their removal costs much time and labor. The identification of "*Zonitoides conspectus*," *Succinea salleana*, *nuttalliana*, *rusticana*, *Ancylus fragilis* and *caurinus* and *Physa heterostropha* should especially be looked into. The paper will form an excellent basis for further work in Colorado, and will be useful for work anywhere in the Rockies.

The Results of Deep-sea Investigation in the Tasman Sea. Mollusca from eighty fathoms off Narrabeen. By C. Hedley (Records of the Australian Museum, vi, pp. 283–304, pls. 54–56). This paper contains descriptions of 18 new species, including a new genus, *Coriareus* related to *Lasæa*. The species are all beautifully illustrated.

NOTES.

Errata.—The differences between the two New England species of *Acmaea*. The Nautilus, May, 1907. About half way down the 3d page: " . . . radula of an adult shell of *alveus* are perhaps the squarest of all, fig. 4." This should be "fig. 3." Also several lines farther down " . . . nearly at right angles to the next tooth and the cusp of (U) faces the center of the lingual membrane (L)." The (L) should be after the word "tooth."

Henry Jackson, Jr.

THE NAUTILUS.

VOL. XXI. JULY, 1907. No. 3.

DESCRIPTION OF A NEW MEXICAN PACHYCHEILUS.

BY ANSON A. HINKLEY.

PACHYCHEILUS VALLESENSIS n. sp. Pl. 5, figs. 1–10.

Shell conic, solid, smooth; suture impressed; aperture widely ovate, circular at the base, obtusely angular above, purple within; whorls 7, convex; on young and also well preserved specimens the apical ones are slightly carinate or striate; spire about half the length of the shell.

Operculum corneous, spiral, nucleus subcentral; when viewed from above has a little resemblance to a small *Planorbis*.

Length 32, diam. 16 mm.

Length 33, diam. 19 mm.

Habitat. Valles river, Valles, State of San Luis Potosi, Mexico.

"This species resembles short forms of *P. lævissimus*, from which it differs by the absence of fine spiral lines, the more heavily calloused columellar lip, and the darker interior. No other *Pachycheilus* has been found so far north." [1]

The species is named from the river in which it is the most plentiful mollusk. Figure 1 may be considered the type, though its size is above the average. There is often a flattening of the body whorl and occasionally a constriction or shallow groove, as on some of the *Pleurocera*. Mature specimens usually show 6 whorls; when the spire is well preserved, as in fig. 8 and fig. 9, there are 8. In young specimens the aperture is angular below, see fig. 5. In mature

[1] Note from Dr. H. A. Pilsbry. The plate illustrating this species will appear in the next number.

specimens the callous deposit on the columella is heavy, and where it meets the labium above, it is very thick. This is well shown in figs. 3 and 8; within the aperture the outer lip is bordered by a lighter-colored or white zone.

All mature specimens and many of the immature ones are more or less covered with a deposit of calcareous matter, which is often so thick as to mislead as to the form of the shell, see figs. 4 and 9.

Individuals are very numerous in some places, and scattering ones can be found almost anywhere in the river. The very young were found where there was little or no current, on sand or mud bottom, or on roots and plants at the water's edge; older ones were common on rocks or the river bed where the current was strong.

At two places the alluvial soil, though above any indication of high-water, contained large numbers of this species, reminding the writer of the remains of *Tulotoma magnifica* at places along the Coosa river in Alabama.

Figures 8 and 9 are from the stream of a spring, and are more perfect in the spire than those from the river, fig. 8 has the deposit all removed, and fig. 9 has enough removed to show the spire. Fig. 10 is not mature; it will be seen that the heavy columellar callus is not yet formed. Fig. 2 is an extra large one; it and figs. 3 and 7 are more than usually inflated. Much smaller ones were found than the one shown in fig. 5.

DESCRIPTIONS OF NEW MEXICAN LAND SHELLS.

BY HENRY A. PILSBRY.

A full account of the mollusks collected by Mr. A. A. Hinkley in the vicinity of Tampico and in the State of San Luis Potosi will later be submitted by him; meantime some of the new forms are described below.

Polygyra (?) *martensiana* n. sp. Pl. V, figs. 11, 12.

The shell is rather thin, depressed, about the shape of *P. texasiana*, umbilicate, the umbilicus rapidly contracting within; surface glossy, pale brownish-corneous with a faint brown band above the periphery, weakly marked with unequal growth-lines. Upper surface nearly flat, the spire being very low conic; periphery above the middle, the base convex. Whorls $4\frac{1}{2}$ to $5\frac{1}{4}$, convex, slowly increasing, the first

smooth, the last whorl very indistinctly subangular in front of the aperture, elsewhere rounded peripherally, slightly descending in front. The aperture is very oblique, wider than high, about one-fourth of its circumference is excised by the preceding whorl; peristome evenly, rather narrowly reflexed throughout, slightly dilated at the axial termination; parietal callus thin and transparent.

Alt. 6, diam. 11, width of umbilicus 2 mm.

Alt. 8.8, diam. 4.8 mm.

Tampico, Mexico, type loc.; also Valles, farther inland, in the State of San Luis Potosi.

This species is remarkable for the complete absence of teeth in the aperture, in other respects having a general resemblance to Polygyras of the *texasiana* group. Its generic position can be decided only by examination of the soft anatomy. It may possibly be a *Praticolella.* Six examples were taken at Tampico, one at Valles. Named for the late Professor E. von Martens.

Holospira hinkleyi n. sp. Pl. III, figs. 3, 4.

The shell is fusiform, widest above the middle, at the seventh whorl, above which it tapers rapidly and below slowly; whitish. Whorls nearly 10, the first smooth, projecting, flattened above, with a central dimple, the second whorl narrower, very convex, smooth; following whorls sculptured with very oblique well raised threads, rather sparse on the early whorls, then more numerous, but separated by spaces wider than the threads. The whorls of the cone are somewhat flattened, except near the lower suture where they are abruptly curved, and the threads are a little enlarged. On the penult and last whorls the threads become strongly arcuate; the whorls are convex, with very deep sutures. The latter part of the last whorl becomes free and descends deeply. It is somewhat flattened on the upper and outer faces, elsewhere rounded. The aperture is transversely ovate, brown within, with a continuous, very broadly expanded, flattened, thin peristome. Internally there are four laminæ: a strong parietal which arises in the latter part of the penult and continues to where the last whorl becomes free; a shorter columellar, in the median part of the last whorl; a high basal lamina in the first half of the last whorl, and a thin but well-developed palatal lamina, below the middle of the outer wall, in the first half of the last whorl.

Length 9.8, diam. 2.9 mm.

El Abra, State of San Luis Potosi, Mexico, collected by A. A. Hinkley.

This species is well characterized by the freely descending last whorl, the "neck" being much longer than in any other member of the typical subgenus of *Holospira*. The four internal laminæ are well developed, and situated somewhat lower than in *H. goldfussi*. Eight specimens were taken, part of them immature.

Zonitoides pentagyra n. sp. Pl. III, figs. 6, 7, 8.

The shell is slightly larger than *Z. minuscula*, umbilicate, the width of the umbilicus contained between 4 and 4½ times in that of the shell; thin, whitish in the dead specimens seen, similar in color to *Z. minuscula*. Surface glossy, marked with very weak growth-lines, and with very faint fine spiral striæ on the base, more distinct in immature shells.

Spire quite convex. *Whorls 5, narrow and very slowly increasing*, convex, the last well rounded peripherally. Aperture somewhat oblique, quite *small, and narrowly lunate*. Peristome simple as usual.

Alt. 1.4, diam. 2.7 mm.

Tampico, in river drift, with *Z. minuscula* and *Z. singleyana* and various *Pupillidæ*, etc. Type no. 93796 A. N. S. P., from Mr. Hinkley's collection.

This species is readily distinguished from the two associated forms of *Zonitoides* by the closely coiled whorls and the small, narrowly lunate aperture. It has some resemblance to *Pycnogyra berendti*, of the region of Vera Cruz. It is comparatively rare in the river debris, while *Z. minuscula* and *singleyana* occur in copious quantity.

Spiraxis tampicoensis Pilsbry. Pl. III, fig. 5.

Drift debris at Tampico. This very slender shell has been described in the current number of the *Manual of Conchology*, p. 24.

Cecilioides (Cæcilianopsis) jod n. sp.

The shell is imperforate, very minute, oblong, slowly tapering to an obtuse summit, whitish (probably clear corneous when living), smooth and glossy. Whorls 4½, slightly convex. Aperture less than half the total length, piriform, shaped like that of *Euglandina*, the outer lip arcuate, thin, columella very concave, covered with a thin callous film, distinctly truncate at the base. Length 2.1, diam. 1 mm.

Tampico, in river debris, abundant.

This tiny snail seems to be at least subgenerically distinct from *Cæcilianella* (*Cecilioides*) by the very obtuse summit and short wide spire. It is closely related to *A. consobrina* Orb.

IN RE CYTHEREA PETECHIALIS OF CARPENTER'S MAZATLAN CATALOGUE.

BY ROBERT E. C. STEARNS.

In Dr. Dall's "Synopsis of the Family Veneridæ,"[1] etc., he remarks "*Cytherea petechialis* Lamarck, 1818, is listed by Carpenter from Mazatlan having been found among the Reigen shells, but it is certainly exotic, none having appeared from there for half a century."

It is not unlikely that the shell collected by Reigen was an example of the exceedingly rare and handsome variety of *Macrocallista* (*Chionella*) *squalida*, the color markings of which are suggestive of the Asiatic *petechialis*. In my paper on "The Shells of the Tres Marias,"[2] etc., etc., under *Cytherea* (*Callista*) *chionæa* I refer to the matter. I have never seen more than half a dozen examples of the variety. The National Museum contains if I am not mistaken two or more specimens.

I am quite familiar with *squalida* as well as *petechialis* having had a great many of both species, and for many years distributed both freely in the course of exchanges. The West Coast species is common in Scammon's Lagoon with *Macron Æthiops* Reeve (= *M. Kellettii* Hinds) and elsewhere on both sides of the peninsula and in the Gulf of California.

THE U. S. COAST SURVEY EXPEDITION TO ALASKA IN THE YEAR 1867.

BY ROBERT E. C. STEARNS.

If not a stroke of genius, it was a timely inspiration that caused Dr. C. Hart Merriam to expand what might have been hardly more than a notable pleasure excursion into an important scientific expedition. Probably never before were so many eminent scientific men brought together, and under such agreeable circumstances, as formed

[1] Proc. U. S. Nat. Museum, p. 408, vol. xxvi, 1902.

[2] Proc. U. S. Nat. Museum, p. 153, vol. xvii, 1894.

the party that went north on the steamer *G. W. Elder*, constituting the Harriman Alaska Expedition.

It was also a happy thought that led Dr. Dall to utilize the opportunity for publication in the Harriman Expedition Series, of his volume on the "Land and Fresh-Water Mollusks," which has been appropriately reviewed by Dr. Pilsbry.[1] It will doubtless be a standard reference book for the next quarter of a century.

The number of species collected by the expedition is nowhere stated. With a copy of Dr. Dall's volume before me, memory recalls what was an important event in its time, forty years ago, the U. S. Coast Survey Expedition to Alaska,[2] in charge of Professor George Davidson, which left San Francisco, July 21, 1867, and returning, arrived in San Francisco on the following 18th of November.

In this, the first expedition under the flag in connection with the acquisition of Alaska, or perhaps more accurately, Russian America, provision was made for biological investigation, hence my special interest in it, and further, for the reason that two members of the biological staff were kindly appointed by Professor Davidson on my suggestion. Mr. W. G. W. Harford was the conchologist and general collector. The season proved unfavorable, the weather being bad, and the collection of mollusks, therefore, in number of species, was small. Of the marine forms 69 species were taken; the *Buccinidæ* were determined by Dr. William Stimpson, the rest by the writer. The few land shells as named below, were identified by Dr. J. G. Cooper.

Helix columbiana Lea, Sitka; Chilcot River, 59° 9′ N.
Helix vancouverensis Lea, Sitka; Vancouver Island.
Helix ruderata Stud., Ounalaska.
Helix fulva Drap., Sitka; Ounalaska.
Vitrina pellucida Müll. (?).
Zua lubrica Müll., Sitka; Kodiak.

The list as it appeared in the Coast Survey volume, contained many typographical errors; it was subsequently revised and published by me.[3]

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[1] The NAUTILUS, Vol. XIX, December, 1905.

[2] Report of the Supt. U. S. Coast Survey, during the year 1867. Appendix No. 18, pp. 187–329. Washington, D. C., 1869.

[3] Shells collected by the U. S. Coast Survey Expedition to Alaska in the year 1867. Proc. Cal. Acad. Nat. Sciences, Dec. 2, 1867.

This and the other paper[1] mentioned in the foot-note, which contained a few pages on the circumboreal distribution of molluscan species, were omitted from the bibliography of Dr. Dall's volume.

A FEW NOTES ON SAY'S EARLY WRITINGS AND SPECIES.

BY V. STERKI.

Again and again, these last years, I have looked over a copy of T. Say's "Conchology" in the "British Encyclopedia" (Nicholson's),[2] and found a few things which caught my attention particularly and appear worth mentioning and discussing if compared with our present interpretation. It is unnecessary to say that the remarks are not written for the sake of criticizing the father of conchology in this country. His difficulties were doubtless great with respect to both working up his material and having the articles printed according to his intentions.

Of the introduction and general description, I would refer only to one point or two. Say justly protests against the view then prevalent, that the beaks of a bivalve mark the under side, stating that in the natural position of the mussel they are above. At the same time, what we now regard as anterior and posterior parts, he designates as the right and left sides, evidently from lack of knowledge of the organization of the soft parts. Hence also the terms: "æquilateral and inæquilateral," for which we now must say "equipartite and inequipartite." He calls the distance from the beaks to the opposite or "posterior" margin as length, the one at right angles to it as breadth, as some noted conchologists have done up to recent years. It is interesting to note, however, that soon he approached a more correct conception, even in the same article: in descriptions, *e. g.*,of *Unio ovatus* and *ochraceus*, and *Anodonta marginata*, he speaks of a front and a posterior end, only mistakes them for each other, a view which also has been held tenaciously for a long time by many conchologists. In this way apparent contradictions are

[1] On the History and Distribution of the Fresh-water Mussels, etc. Proc. Cal. Acad. Sciences, Nov. 20, 1882.

[2] Probably of 1818 or 1819; there is no date, and nothing referring to the time of publication, except that the author mentions his "detached essays in the Journ. Acad. Nat. Sc.," and to the "former editions of this work."

easily explained. That Say terms primary teeth what we now call cardinals or pseudocardinals, may be mentioned by the way.

As to the arrangement it is interesting to note that the first genus is *Helix* (made up of our *Polygyra*, *Zonitidæ*, *Vallonia*, *Strobilops*, *Patula* [*Pyramidula*], *Helicodiscus*, variously mixed up); then follow: *Polygyra* (P. s. str.), *Oligyra* (= *Helicina*), *Planorbis*, *Lymnæa* (including *Physa*), *Succinea*,[1] *Cyclostoma* (*Valvata*), *Ancylus*, *Palu-*

These things are mentioned just for an historical reminiscence, and also to show the changes brought on by anatomical examination and more minute distinction.

Some notes on species:

Helix lineata. Reference is made to Journ. Acad. Nat. Sc., I, p. 18, but no mention of *Planorbis parallelus.*

Succinea ovalis. Alt. 11.25, aperture alt. 8.75 mill.[2] Say states that the species is common; how is it, then, that no larger specimens were found, if *ovalis* were identical with *obliqua?* and that Say described the latter as new, only a few years later? (as 17.5 mill. high). A. Binney (Terr. Moll., II, p. 71) asserts that the two are identical, or varieties of the same species, yet does not use the older name; and he does not state whether there are any undoubtedly authentic *ovalis* Say on hand, giving evidence of the identity. In the absence of such, doubts should be permitted. Dr. Dall seems to have the same view.

Unio crassus. From the description it is evident that not only several species are included under the name—as the author himself suspects—but that rather forms of *Unio*, resp. *Quadrula* are understood, including *undulata* Barnes,[3] and probably *tuberculata* Raf. A description of *Lamps. ligamentina* would be quite different, and especially so of the prevalent form of the Ohio river (= var. *gibbus* Simpson). The figure has resemblance to a female *L. liga-*

[1] Yet he adds the remark: "The characters of the inhabitant (= soft parts) are widely distinct from the animal of the *Lymnæa*, and are somewhat allied to those of the inhabitants of the *Helices.*"

dina (our *Amnicola*, *Pomatiopsis*, *Lioplax*, *Goniobasis*, *Vivipara*, *Campeloma*), *Pupa*, *Polyphemus* (= *Glandina*), the bivalves: *Unio*, *Alasmodonta*, *Anodonta*, *Cyclas*, *Cyrena.*

[2] Say gives the dimensions in inches; for convenience of comparing, they are reduced to millimeters.

[3] As even more evident from the description of *U. plicata*, following.

mentina. Except eventually for that, *U. crassus* cannot be regarded as a synonym of the species named, and it would be best to drop the name.

Unio plicata. Unfortunately, the author failed to cite the dimensions. To judge from the description and also the locality, Lake Erie, it seems that not the large "typical" *plicata* of *e. g.*, the Mississippi and Ohio rivers was understood, but the well marked "variety," known also *e. g.*, from the Kankakee river.

U. ochraceus. Description and figure evidently are drawn from a young, resp. adolescent specimen, two or three years old, and the differences as pointed out from *cariosus* (the figure represents a mature female) are mostly due to this fact.

Cyclas similis. The description shows decidedly that the mussel understood is not what has been taken for *Sphærium simile*, resp. *G. sulcatum* Lam.; the size given is: long. 10, alt. 8.75 mill. Any specimen of *G. sulcatum*, 10 mill. long, is rather young, not "suborbicular," but elongate, and little inflated. The figure also, however imperfect it may be, cannot represent a *G. sulcatum.* The species described seems to be either *G. striatinum* Lam, or *stamineum* Con., probably the former. The statement that "a specimen measured in length[1] nearly three-fifths of an inch," makes it probable that a *G. sulcatum* was mixed in. Whether there are any authentic specimens in a collection, and what they prove, I know not; but from what has been said, we will do well to revert to the name *G. sulcatum* Lam., which seems well established.

There are a number of typographical and other errors, and mistakes in the article; *e. g.*, under *Paludina*, three species are designated as "L.": *Subcarinata*, *Virginica*, *Vivipara;* evidently the author had ranged them under *Lymnæa* previously, and then forgot to change the genus initials. Under *Anodonta marginata*, pl. 3, fig. 3, is cited; evidently it should be fig. 5, although the dimensions do not agree exactly with the description, as they do with respect to other species. *Helix thyroidus* is described. What good reason is there now to spell *thyroides*, after the original spelling had been generally adopted until 1850, and partly later? I allude to this, as compared with *Planorbis exacuous*, which is not in the article considered, that Say himself changed, corrected, the nonsensical and

[1] Probably altitude, in conformity with Say's terminology; no "breadth" is given.

impossible word into *exacutus*, or others did, is enough to show that it was an error. The purpose of nomenclatural rules is to prevent mistakes and misunderstandings; the means, to adhere to the original spelling, so far as consistent with sense. In the case of *Pl. exacutus* for *exacuous*, there is no possibility of a mistake, and I, for one, shall write *exacutus* after this.

In Say's article there is under Cyrena: "Shell triagonally rounded . . .," evidently an error; it should be "trigonally." If this were in a name it would be perpetuated like "exacuous."

MOLLUSCAN FAUNA OF MONTEREY BAY, CALIFORNIA.

BY S. S. BERRY.

(*Continued from p. 22.*)

Cylichna eximia Baird. 12 fathoms.

Cylichna attonsa Carpenter. 28 fathoms; one young specimen.

Tethys (= *Aplysia*) *californica* Cooper (?). The common sea-hare of Monterey Bay seems to differ somewhat from those of the southern part of the state, and may prove to be distinct when a careful anatomical examination has been made of both. The form obtained is quite common along the shore. It is large and of a brown color, irregularly blotched.

Tethys (*californica*, var.?). A small red form was dredged at 12 fathoms depth, which may or may not prove distinct from the shore form. At any rate, it is very different in appearance.

Archidoris montereyensis Cooper. 25 fathoms. Whether one collects along the shore or dredges in the bay, the Nudibranchs form one of the most striking and characteristic features of marine life in the Monterey region. Neither individuals, nor species, nor even genera, are few in number, as the following incomplete list will show. For the identifications, Professor MacFarland's careful paper on the Monterey Bay opisthobranchs (Bulletin of the Bureau of Fisheries, Vol. XXV) is the best work, and was constantly used by us as a text book in their study. It is beautifully illustrated, and should be in the library of every Pacific coast student.

Anisodoris nobilis MacFarland. Very common at low tide.

Rostanga pulchra MacFarland. A few of these bright-red animals found at low tide.

Diaulula sandiegensis Cooper. Low tide.

Cadlina marginata MacFarland. Very common from the shore line to 25 fathoms.

Chromodoris (sp.?) One specimen dredged. A most elegant creature; brilliant blue marked with yellow. It is now in the hands of Professor MacFarland for dissection and determination.

Doriopsis fulva MacFarland. Shore line to 25 fathoms; very common.

Cregires albopunctatus MacFarland. At low tide.

Laila cockerelli MacFarland. A few found at low tide.

Triopha carpenteri Stearns. Between tides; common.

Triopha maculata MacFarland. Between tides; common.

Polycera atra MacFarland. One specimen found at low tide.

Acanthodoris brunnea MacFarland. 12 fathoms; one specimen.

Hopkinsia rosacea MacFarland. A beautiful rosy pink in color, its body covered with long, tapering papillae, this is one of the most exquisite beings imaginable. It is by no means an uncommon creature in the little rocky tide pools along the shore.

Aeolid (sp.?). Numerous aeolids of many sorts were found along the shore and were dredged, particularly off Moss Landing. Some species were exquisitely beautiful in form and color, but they proved almost impossible to preserve and none were determined.

Selenites duranti Newcomb. Several were found under bits of bark on Cypress Point.

Vertigo (sp. *undet.*). Found rather commonly on Cypress Point.

Punctum conspectum Bland. Cypress Point; one specimen.

Punctum conspectum, var. *pasadenæ* Pilsbry. Near Pacific Grove; one specimen.

Helix aspersa Müller. Pacific Grove; in gardens.

Epiphragmophora californiensis Lea. Cypress Point; rather uncommon there at least.

Epiphragmophora dupetithouarsi Deshayes. Cypress Point, etc. Common, as land shells go in California. One curious specimen obtained is half albino.

Siphonaria peltoides Carpenter. Found at low tide, and live ones were also dredged at 12 fathoms, to my great surprise.

Gadinia reticulata Sowerby. At low tide; Santa Cruz, etc.

Physa heterostropha Say (?). Santa Cruz, etc.

Planorbis parvus Say. Del Monte pond.

(*To be concluded.*)

NOTES.

Note on Cypræa Coxeni Cox.—Having recently had the good fortune to obtain a specimen of this rare and interesting species, my attention is directed to certain particulars in which it differs materially from the only figure and description at present available to me—those contained in Mr. Roberts' monograph in Tryon's Manual of Conchology. This specimen, which appears to be somewhat worn, has the irregular chestnut-brown markings described as characteristic of the species, but is otherwise entirely white. Instead, however, of being a tapering shell, as shown in the figure referred to, or of being similar to *C. cribraria*, to which it has been compared by Mr. Brazier and Mr. Roberts, it is cylindrical, opaque and heavy in appearance, and its form throughout is almost precisely that of *C. rhinoceros* Souv. (*C. interrupta* Gray, var.?), the white base and margins being the same, but the columellar teeth extending further across the base, as mentioned by Mr. Melvill in his "Survey of the Genus Cypræa" (p. 230). This species should not be confused with *C. Coxi* Braz., a thin yellowish or cream-colored shell, which Dr. Cox believes (MS. letter) is not entitled to specific rank and which Mr. Roberts thinks may have been based upon a young specimen of *C. errones*.—Fred. L. Button.

PUBLICATIONS RECEIVED.

The Conchological Magazine: A monthly devoted to the study of Japanese shells. Published by Y. Hirase, Kyoto, Japan.[1] A new expression of the activity of our neighbors across the Pacific is before us in this handsomely printed and illustrated Magazine edited by Mr. Hirase, of which four numbers have come to hand. It is a gratifying evidence that the progress of Japan is to be intellectual as well as material. The April number contains articles on collecting shells, the philology of shell names. Japanese marine mollusks, the classification of Japanese land shells, etc., etc., a total of 34 pages and three excellent phototype plates. The text is of course in Japanese, but the plates make it interesting to conchologists of the Western World, and should give the Magazine a circulation outside of Japan among all interested in Pacific shells. The Nautilus heartily welcomes the new *Conchological Magazine*.

[1] Subscription to foreign countries $1.50 per annum.

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A NEW SUBSPECIES OF POLYGYRA MULTILINEATA.

BY JAS. H. FERRISS.

POLYGYRA MULTILINEATA CHADWICKI n. var.

This is a dentate form. In a lot of thirty specimens twenty-five had a lunate parietal tooth or thickening of the callus about three mm. in length extending obliquely across the aperture nearer the outer lip. In other respects, compared to multilineata, the shell is heavier, the spire higher, the whorls more ventricose, the suture deeper; it is moderately polished, the sculpturing is less acute, the furrows shallow; the aperture is less oblique, less lunate; the peristome thicker, face more rounded, contracting the aperture more. In some examples the parietal callus is a mere ribbon in front of the aperture 5 mm. in width, not extending within the aperture itself. The greatest diameter 21 mm., alt. 13 mm.

In color these run from yellowish-white to light cherry. In five specimens only were the revolving lines observed, and these faintly. In general appearance it is quite like the Arkansas mountain forms, bearing a neighborly likeness to *albolabris alleni*, *indianorum*, *binneyana* and *edentata*. It was collected on the banks of the Kaw river, near Lawrence, Kansas, by W. C. Chadwick, of Cleveland, Ohio, and is named in his honor.

In the Illinois river valley we have two sizes of *multilineata*, one in the open bog measuring from 18 to 23 mm. in diameter, the other in wet timber land measuring from 25 to 28 mm. in diameter, well supplied with revolving lines. The smaller size varies in color from

a solid cherry-brown to white, and when lined there is a wide variation in the number of lines.

NEW LAND AND FRESH-WATER SHELLS FROM MEXICO.

BY H. A. PILSBRY AND A. A. HINKLEY.

POLYGYRA POLITA n. sp. Pl. 5, fig. 11.

The shell is narrowly perforate, with a rather long rimation, discoidal, the spire very slightly convex; whitish corneous (probably partially bleached), glossy, with faint sculpture of weak growth lines only. The whorls increase slowly; the last one is rounded at the periphery and descends abruptly at the aperture; it is constricted and opaque white behind the lip, and there is a short oblique groove within the umbilicus. Aperture very oblique. The peristome is thick, expanded outwardly, reflexed below, the ends connected by a rather thick callus, which bears a rather long, obliquely V-shaped tooth, the upper branch of which, though not so high as the lower, is well developed and connects with the peristome. There are two strong lip teeth, the upper one peripheral in position, tubercular, the lower one basal, compressed, entering across the lip-callus; a low, rather sharp lip-callus, more immersed at its lower end, is above the upper tooth.

Alt. 4, diam. 9.6 mm.; width of umbilicus 2.6 mm.; whorls 5.

Tampico, in river débris, coll. by A. A. Hinkley.

This species closely resembles *P. texasiana hyperolia* Pils. and Ferr., but it differs by the wider constriction or furrow behind the peristome, and the decidedly more deeply immersed upper lip tooth. The umbilical rimation is also longer than usual in that form.

POLYGYRA AULACOMPHALA n. sp. Pl. 5, fig. 12.

The shell is very narrowly perforate, with a rather long rimation, subdiscoidal, with low spire; whitish corneous (probably bleached), glossy, faintly, finely striate above, smoother below, where faint traces of spiral striæ are visible. Whorls slowly increasing, the first projecting slightly, the last rounded peripherally, descending a little in front, constricted behind the outer and basal margins of the peristome, with shallow pits in these positions. A long, deep furrow on

the last whorl within the umbilicus runs parallel to the rimation, but does not quite reach to the peristome. The aperture is oblique, peristome thin, well expanded, reflexed below, terminations converging, joined by a rather heavy callus, which bears a large obliquely and narrowly V-shaped parietal tooth, the upper branch connecting with the peristome, the lower branch somewhat sinuous. The upper lip tooth is peripheral, the lower basal, both compressed and entering. There is an acute, obliquely entering ridge within the lip, above the upper lip tooth, and connected with its inner end. Inside the last whorl a low columellar lamella indicates the position of the external furrow.

Alt. 4.3, diam. 10, width of umbilicus 3 mm.; whorls 5.

Tampico, in river débris, coll. by A. A. Hinkley.

This species is closely related to *P. polita*, but differs from that by the very long and deep groove on the last whorl within the umbilicus, the thin lip, longer teeth and smaller perforation. Further fresh specimens are needed to complete the descriptions of both, since the types are bleached shells from river débris.

PALUDESTRINA TAMPICOENSIS n. sp. Pl. 5, fig. 13.

The shell is very minutely perforate or imperforate, rather narrowly conic, thin, corneous, nearly smooth, the glossy surface but slightly striatulate; apex acute. Whorls 6, moderately convex; suture moderately impressed, with a gray margin by transparence. Aperture slightly oblique, ovate, angular above; lip thin and simple, the columellar margin concave, hardly reflexed.

Alt. 3.7, diam. 1.8 mm.

Tampico, in river débris, coll. by A. A. H.

Of this little species only a few specimens were taken. It is related to *P. monroensis* Ffld., and is not close to any species yet known from Mexico or Texas.

MOLLUSCAN FAUNA OF MONTEREY BAY, CALIFORNIA.

BY S. S. BERRY.

(*Continued from page 35.*)

Conus californicus Hinds. Shore to 12 fathoms.

Pleurotoma carpenteriana Gabb. Several individuals of this

beautiful species were dredged in from 12 to 15 fathoms. It is one of the most attractive shells to be found in the Bay.

Daphnella fuscoligata Dall. One good specimen was found between tides by some little children who gave it over to me.

Drillia inermis Hinds. 12 fathoms; living; one specimen.

Drillia torosa Carpenter. 12 fathoms, and dead specimens on the beach.

Clathurella canfieldi Dall. Living under rocks at the big Tide Pool.

Mangilia angulata Carpenter. 12 fathoms.

Mangilia hexagona Gabb. 12 fathoms.

Mangilia sculpturata Dall. 12 fathoms.

Cancellaria cooperi Gabb. 15 fathoms; one living, but immature specimen.

Olivella biplicata Sowerby. Between tides.

Olivella pedroana Conrad. 12 fathoms.

Olivella intorta Carpenter. 15 fathoms, sand; occurring with the "sand-dollars."

Marginella jewettii Carpenter. Between tides; dead, but good shells common on the beach.

Marginella pyriformis Carpenter. Shore to 12 fathoms.

Marginella regularis Carpenter. 12 fathoms; with the preceding.

Mitra maura Swainson. 12 fathoms; several specimens. One magnificent live individual was nearly three inches long.

Mitromorpha filosa Carpenter. Between tides.

Mitromorpha aspera Carpenter. 12 fathoms.

Fusus luteopictus Dall. On and under stones between tides; not rare.

Fusus robustus Trask. 12 fathoms; living; occasional examples.

Nassa mendica Gould. 12 fathoms; evidently exceedingly common at moderate depths.

Nassa mendica, var. *cooperi* Forbes. With the preceding and perhaps even more common.

Nassa perpinguis Hinds. 12 fathoms; few obtained.

Nassa fossata Gould. Fishermen.

Nassa californiana Conrad. Fishermen and a few examples dredged in 40 fathoms, off Moss Landing.

Amphissa versicolor Dall. Exceedingly common from the shore into 12 fathoms.

Columbella aurantiaca Dall. Between tides; rare.

Columbella tuberosa Carpenter. Low tide to fifteen fathoms; common.

Columbella gausapata Gould. Common from the shore line to 12 fathoms.

Columbella gausapata, var. *carinata* Hinds. With the preceding and in greater numbers.

Murex carpenteri Dall. 12 fathoms; one of the finest species in the Bay. It is very different in appearance from the *M. carpenteri* of San Pedro.

Murex petri Dall. A few young shells referred to this species by Dr. Dall were dredged with *M. carpenteri* and the *Calliostoma* in the blue-clay region.

Murex foliatus Martyn. 12 fathoms; with the preceding; three or four splendid examples.

Murex nuttalli Conrad. At low tide.

Murex (*Ocinebra*) *barbarensis* Gabb. 12 fathoms; two good live and several dead shells.

Murex (*Ocinebra*) *squamuliferus* Carpenter. Two living examples dredged with the preceding.

Murex (*Ocinebra*) *gracillimus* Stearns. Between tides.

Murex (*Ocinebra*) *circumtextus* Stearns. Fairly common at low tide. The specimens run much larger than in the southern part of the state.

Murex (*Ocinebra*) *luridus* Middendorf. Between tides; rather common. Specimens were found connecting this species with the following variety.

Murex (*Ocinebra*) *luridus*, var. *asperus* Baird. Between tides; not common.

Murex (*Ocinebra*) *luridus*, var. *mundus* Carpenter. Between tides; less common than typical *luridus*.

Murex (*Ocinebra*) *interfossus* Carpenter. Shore to 15 fathoms; not uncommon.

Murex (*Ocinebra*) *peritus* Hinds. One living specimen found at low tide.

Murex (*Ocinebra*) *subangulatus* Stearns. Low tide; one specimen.

Purpura saxicola Valenciennes. Between tides; very common.

Purpura lima Martyn. Between tides; rare.

Monoceros lapilloides Conrad. Between tides.

Scala hindsii Carpenter. Between tides; the most common species of the genus. It may be found living by searching among the sea-anemones.

Scala subcoronata Carpenter. With the preceding, but less abundant.

Scala crebricostata Carpenter. Living at 12 fathoms, off Del Monte, and dead on the beach at Santa Cruz.

Scala berryi Dall. A small species occurring in almost every dredge haul in some localities, but good specimens rare. 12 fathoms.

Scala rectilaminata Dall. 15 fathoms. (NAUTILUS, xx, p. 127.)

Scala (*Cirsotrema*) *montereyensis* Dall. 25 fathoms.

Scala (*Opalia*) *borealis* Gould. Between tides rather rare.

Scala (*Opalia*) *pluricostata* Carpenter. 12 fathoms; one specimen.

Scala (*Opalia*) *spongiosa* Carpenter. Two specimens of this pretty, but tiny species. 12 fathoms.

Eulima rutila Carpenter. 12 fathoms; rather scarce.

Eulima thersites Carpenter. With the above. Living example rare.

Turbonilla aurantia Carpenter. 12 fathoms.

Turbonilla (*Mormula*) *tridentata* Carpenter. 12 fathoms.

Turbonilla (*Strioturbonilla*) *torquata* Gould. 12 fathoms.

Turbonilla (*Strioturbonilla*) *serræ*. Dall & Bartsch. 12 fathoms. All of these are rare species, this being of most often occurrence.

Turbonilla (*Strioturbonilla*) *vancouverensis* Baird. 28 fathoms; one living specimen.

Turbonilla (sp. *undet.*). 12 fathoms.

Odostomia (*Chrysallida*) *oregona* Dall and Bartsch. Rare; 12 fathoms.

Odostomia (*Chrysallida*) *montereyensis* Dall and Bartch. 12 fathoms; not so rare as most of the other *Odostomia.*

Odostomia (*Amaura*) *montereyensis* Dall and Bartsch. 12 fathoms.

Odostomia (*Iolæa*) *amianta* Dall and Bartsch. 12 fathoms; not infrequent.

Odostomia (*Evalea*) *straminea* Carpenter. On abalone shells brought up from just below the low-tide mark. Common, but found in no other locality.

Odostomia (*Evalea*) *angularis* Dall and Bartsch. Shore line to 12 fathoms; rare.

Odostomia (*Ividea*) *navisa* Dall and Bartch. 12 fathoms.

Odostomia (*Evalea*) *valdezi* Dall and Bartch. 12 fathoms, two specimens.

Priene oregonense Redfield. Fishermen ; rare.

Gyrineum californicum Hinds. Fishermen. Also dredged in 12 fathoms. Of rather frequent occurrence.

Pedicularia californica Newcomb. On corals brought in by the fishermen. One beautiful specimen is over half an inch in diameter.

Trivia californica Gray. 12 fathoms ; one live specimen.

Radius variabilis C. B. Adams. The dealers and fishermen often show examples of this species said to have been found in the bay, but the first really authentic specimen from Monterey seen by the writer, was a single immature specimen dredged by him. 12 fathoms ; living.

Radius barbarensis, Dall. Fishermen. Quite rare. The only specimen obtained is over an inch in length and one of the most beautiful products of the bay.

Erato columbella Menke. Low tide.

Erato vitellina Menke. Several beautiful examples were found alive at low tide.

Triforis adversus Montagu. Between tides.

Triforis montereyensis Bartsch. 12 fathoms; a single broken specimen.

Metaxia diadema Bartsch. 12 to 28 fathoms ; rare.

Seila assimilata C. B. Adams. Between tides.

Cerithiopsis purpurea Carpenter. Between tides. Dead shells common.

Cerithiopsis munita Carpenter. 12 fathoms.

Cerithiopsis tuberculata Carpenter. Low tide.

Cerithiopsis interfossa Carpenter. On the beach ; one specimen.

Bittium filosum Gould. Between tides ; plentiful.

Bittium esuriens Carpenter. Between tides ; not common.

Cæcum californicum Dall. 12 fathoms ; plentiful.

Cæcum quadratum Carpenter. Found occasionally with the preceding.

Cæcum crebricinctum Carpenter. Rather commonly with the preceding. The specimens were unusually large and fine.

Vermetus lituella Carpenter. Between tides.

Vermetus squamigerus Carpenter. Between tides ; not common.

Bivonia compacta Carpenter. Shore to 25 fathoms. Found either singly or in contorted masses and not at all rare.

Littorina planaxis Nuttall. Abundant.

Littorina scutulata Gould. Abundant.

Lacuna unifasciata Carpenter. Dead shells common and living individuals not rare at low tide.

Fossarus (Isapis) fenestratus Carpenter. Shore to 12 fathoms.

Diala marmorea Carpenter. Shore to 12 fathoms.

Rissoa acutilirata Carpenter. 12 to 25 fathoms; plentiful, but usually dead.

Rissoina bakeri Bartsch. 12 to 25 fathoms; rare.

Rissoina purpurea Dall. 12 fathoms; a single specimen.

Barleia haliotiphila Carpenter. Between tides; plentiful.

Calyptræa mamillaris Broderip. 12 fathoms; no living specimens found.

Crepidula adunca Sowerby. Shore to 20 fathoms and everywhere plentiful. Found almost invariably on shore attached to the shells of the black turban, *Chlorostoma funebrale.* Specimens dredged were usually of a lighter color, deeper, and distorted.

Crepidula nivea Gould. Found at low tide, adhering to the under surfaces of stones.

Crepidula dorsata Broderip. Low tide to 20 fathoms, particularly among sponges and kelp-roots.

Crepidula lessonii Broderip. Low tide to 20 fathoms; rather uncommon, but usually in old holes of Pholads, etc.

Amalthea antiquata Linné. Found in large colonies attached to the under surfaces of rocks at the Big Tide Pool.

Lunatia lewisii Gould. Fishermen, etc. Not rare.

Lunatia draconis Dall. Fishermen, etc. Also dredged alive in 12 fathoms of water. An examination of a number of individuals of each of these species, as to whether the shells showed any very noticeable sexual differences failed to reveal anything striking.

Eunaticina oldroydii Dall. Fishermen, etc. None were dredged by our party, though this mollusk seems to be a characteristic feature of the Bay.

Velutina lævigata Linné. 12 fathoms; one immature shell.

Lamellaria rhombica Dall. 15 fathoms; living; one specimen.

Acmæa asmi Middendorf. Not rare on the shells of the black turban (*Chlorostoma*), but occurring nowhere else. Perhaps this is a case of commensalism.

Acmaea incessa Hinds. On seaweed at low tide.

Acmaea instabilis Gould. With the preceding.

Acmaea triangularis Carpenter. 12 fathoms. Not rare among red sponge on the hard clay and always accompanied by the following species.

Acmaea rosacea Carpenter. 12 fathoms; all quite small specimens. Also on shore.

Acmaea mitra Eschscholtz. Between tides, but usually far out on exposed rocks. Shells always encrusted with a growth of "coralline," etc.

Acmaea patina Eschscholtz. Between tides; plentiful.

Acmaea patina, var. *scutum*. Between tides.

Acmaea patina, var. *fenestrata* Nuttall. Between tides; rather rare.

Acmaea scabra Reeve. Between tides; abundant.

Acmaea pelta Eschscholtz. Between tides; common.

Acmaea pelta, var. *nacelloides* Dall. Between tides; not rare.

Acmaea persona Eschscholtz. Between tides; common.

Acmaea spectrum Nuttall. Between tides; common.

Acmaea (*Lottia*) *gigantea* Gray. Between tides; abundant.

Phasianella compta Gould. Shore line to 12 fathoms.

Phasianella (*compta*, var.) *pulloides* Carpenter. With the preceding.

Eucosmia variegata Carpenter. Between tides; uncommon.

Eulithidium substriatum Carpenter. A few specimens dredged at 12 fathoms depth.

Pachypoma inequale Martyn. One of the finest species in the region. It occurs all the way from low water mark at least down to a depth of fifteen fathoms and is by no means rare. A few specimens obtained are extraordinarily large and heavy.

Leptothyra bacula Carpenter. Between tides; common.

Leptothyra paucicostata Dall. Between tides; one poor specimen.

Leptothyra carpenteri Pilsbry. Between tides; common. Also to 20 fathoms depth.

Norrissia norrissii Sowerby. 12 fathoms; one very yonng specimen.

Calliostoma annulatum Martyn. 12 fathoms; not rare. Several beautiful examples of this exquisite species.

Calliostoma canaliculatum Martyn. 12 fathoms, and a number of

exceptionally large examples obtained from the Chinamen. Young specimens were often found living also at the low water mark.

Calliostoma costatum Martyn. Shore to 12 fathoms; common. Young specimens often lined with bright blue.

Calliostoma supragranosum Carpenter. Low tide to 12 fathoms; rare.

Calliostoma splendens Carpenter. 12 fathoms; quite rare.

Calliostoma gloriosum Dall. Dead shells on shore, and a few living but small specimens dredged in 12 fathoms of water.

Margarita lirulata Carpenter. Between tides; common.

Margarita pupilla Gould. A few specimens were found at low tide. They are of the form known as var. salmonea Carpenter.

Gibbula parcipicta Carpenter (= M lirulata var.). 12 fathoms.

Chlorostoma funebrale A. Adams. Between tides; abundant.

Chlorostoma brunneum Philippi. C. funebrale covers the rocks everywhere, but one must go at low tide to successfully search for C. brunneum, although it is common.

Chlorostoma montereyi Kiener. 12 fathoms; dead. Also from the fishermen.

Chlorostoma pulligo Martyn. 12 fathoms; not rare but usually rather small.

Halistylus pupoides Carpenter. 12 fathoms; common, occurring invariably with Caecum crebricinctum, and the two species run through the same variations in color.

Scissilabra dalli Bartsch. 12 fathoms; one specimen.

Liotia acuticostata Carpenter. 12 fathoms.

Vitrinella eshnauri Bartsch. 12 fathoms.

Vitrinella berryi Bartsch. 12 fathoms. Described with other Vitrinellidæ in the Proceedings of the United States National Museum, Vol. XXXII, pp. 167, 176.

Cyclostremella californica Bartsch. 12 fathoms.

Haliotis cracherodii Leach. Between tides; abundant.

Haliotis rufescens Swainson. Especially plentiful just below low water mark.

Haliotis gigantea Chemnitz. 15 fathoms; one dead shell. An animal and shell in alcohol among the laboratory collections was undoubtedly collected in the bay. Both specimens were but two or three inches long.

Fissurella volcano Reeve. Between tides to 12 fathoms; common.

Fissuridea aspera Eschscholtz. Between tides to 12 fathoms; not rare.

Fissuridea murina Dall. Shore to 12 fathoms; some specimens quite fresh but all dead and then not of common occurrence.

Lucapina crenulata Sowerby. Low tide.

Megatebennus bimaculatus Dall. Quite a number found alive at low tide.

Subemarginula yatesi Dall. A single fine specimen was obtained which had been brought in by fishermen from deep water. It is evidently extremely rare.

Puncturella cucullata Gould. 12 fathoms. This also seems to be quite rare in this locality, though one living and several dead shells were dredged from a depth of twelve fathoms.

Lepidopleurus rugatus Carpenter. Not rare at low tide.

Lepidopleurus ambustus Dall. Several examples were found on the fragments of blue clay dredged in 12 fathoms of water.

Lepidopleurus (Oldroydia) percrassus Dall. 12 fathoms. On the blue clay with the other chitons were found two fine specimens.

Tonicella lineata Wood. Between tides to 12 fathoms. The species does not run so large here as further north, but is often very beautifully colored.

Trachydermon ruber Lowe. 12 fathoms; one specimen. It was a surprise to find this cold-water species at Monterey.

Trachydermon hartwegii Carpenter. Common on the rocks between tides everywhere.

(*To be concluded.*)

NOTES.

Additions to the "Catalogue of the Shell Bearing Mollusca of Rhode Island," 1889, are the following:

Lucina filosa, Stimps.

Odostomia impressa, Say.

Pisidium Streatori, Sterki.

Pisidium Roperi, Sterki.

Pisidium Noveboracense, Prime.—H. F. Carpenter.

Oysters are Wild Animals.—"Domesticated, tame or garden oysters are assessable as personal property, according to an opinion

of Attorney-General Jackson, written in answer to a query addressed to the tax commission by G. Frank Tuthill, supervisor of the town of Southold, inquiring whether oyster beds should be assessed as real or personal property and to what purpose the taxes derived therefrom are to be devoted. The courts have held, says Mr. Jackson, that oysters are wild animals and become personal property when they are reclaimed or artificially planted. Such domesticated, tame or 'garden' oysters would be assessable as personal property under the ordinary rules."—(*Boston Globe.*)

Students of the Unionidæ may be interested to know that on June 10th I have collected a number of female *Tritogonia tuberculata* (Barnes) gravid. All four branchiæ were charged with ova. More details will be communicated later.—V. Sterki.

PUBLICATIONS RECEIVED.

A Preliminary Catalogue of the Land and Fresh-water Mollusca of Ohio. By V. Sterki (Proc. Ohio State Acad. of Science, iv, part 8). This very valuable addition to our State catalogues gives an epitome of Dr. Sterki's work in Ohio in the past twenty years, with such other species as have been reported on good authority from the State. The total number, 310 species, is probably exceeded by no Northern State. Attention is called to species which should specially be looked for in Ohio, such as *Gastrodonta gularis*, *Omphalina lævigata*, etc. A separate list is given of species from pleistocene deposits. Dr. Sterki's notes on the various species will be read with interest by those engaged in similar studies, his intimate acquaintance with inland mollusks giving weight to the views expressed.

A New Parasitic Mollusk of the Genus Eulima. By Paul Bartsch (Proc. U. S. Nat. Mus., 1907). *E. ptilocrinicola* lives parasitic on *Ptilocrinus pinnatus* Clark, dredged by the steamer *Albatross* off British Columbia in 1588 fms. The proboscis is deeply inserted in the side of the body of the crinoid. This is like *Stylifer*, yet the apex is not mucronate as in that genus, and there is an operculum. The largest specimen is 9.5 mm. long.

The Nautilus.

Vol. XXI. SEPTEMBER, 1907. No. 5.

NOTES ON SOME EXOTIC UNIONIDÆ.

BY L. S. FRIERSON.

The collation of some private notes upon *The Synopsis of the Naiades* by Mr. Chas. T. Simpson called my attention to several errors in this great work. In the *Synopsis* Mr. Simpson dealt not only with a great number of species, but with an enormous mass of references to an involved and difficult literature. The following notes are therefore offered in no unduly critical spirit.

Unio gigas (Swainson) Sby., U. cumingii Lea.

Page 608, Mr. Simpson places (it is true, somewhat in doubt) as a synonym of *Tritogonia tuberculata*, Barnes, the figure of *Unio gigas*, Swainson (Sowerby, in *Conchologia Iconica* xvi, 1867, Plate LVI, fig 287).

This really fine figure has been totally misunderstood by both Mr. Simpson and Mr. R. E. Call, the latter having more than once referred it to *Unio multiplicatus* Lea. It is probable that the habitat assigned the shell by Sowerby—the Ohio river—is responsible for these singularly poor determinations. Mr. Lea was not much misled by the habitat, for in his synopsis he placed it among the foreign shells, and in his scheme of classification he placed *U. gigas* immediately next to his *Unio cumingii*. The fact is that *gigas* is only *an adult cumingii*. The type of the latter was a shell not one-third grown, and hence only slightly resembling a full-grown specimen.

As Mr. Lea afterwards received several large *cumingii* he was of course acquainted with its appearance, and hence his placing the two shells together. But the tenacity with which Mr. Lea "hung on" to his names is an old story, and accounts for his placing them as *allied* but *distinct* species, in his classification.

However, even though synonymous with each other, it is probable that *gigas* has not precedence, since it was published by Sowerby long after Lea's *U. cumingii*. Moreover, *U. gigas* Sowerby is probably not the undescribed *U. gigas* of Swainson.

An adult specimen of the species under discussion is illustrated on Plate VI, from the writer's collection. It is 209 mm. long, and was received from China.

The remains of the high wing, and the broad biangulated posterior, the purplish color inside, and the *wrinkled umbones* amply distinguish *U. gigas* (*cumingii*) from either of the shells with which it was united by Mr. Simpson and Mr. Call.

ANODON MORETONIANUS Sowerby.

On page 925 of the synopsis Mr. Simpson makes a variety *moretonianus* Sowerby of *Glabaris trapesialis* Lamarck. The variety being shown in Sowerby, Conchologia Iconica xvii, 1867, Pl. IX, fig. 20. This appears to be a singular error. The shell figured not only is *not trapesialis* Lk., but is nothing like it. It is more than probable that Mr. Simpson in haste, made a "*lapsus pennæ*" and really intended to make a variety *susannæ* Gray; for this shell *is* close to, if not identical with *trapesialis*, and is figured on the *same plate* to which we are referred. But be this as it may, the *Anodon moretonianus* of Sowerby (as of Lea) is nothing like *Glabaris trapesialis* Lam.

UNIO PLICATULUS Lea.

A singular *lapsus* seems to have been made on page 353 when the genus *Ctenodesma* is described and the type assigned is the *Unio borneensis* Issel, better known perhaps as the *U. plicatulus* of Lea. But there can be but little doubt that this shell (i. e., the *U. plicatulus* Lea.) is not a member of the *Ctenodesma* at all, but unquestionably belongs to the next described genus *Rectidens*.

MOLLUSCAN FAUNA OF MONTEREY BAY, CALIFORNIA.

BY S. S. BERRY.

(*Concluded from page 47.*)

Trachydermon flectens var. montereyensis Bartsch. 12 fathoms; several specimens.

Chaetopleura gemmea Carpenter. Low tide to 12 fathoms; quite common in places. Most of the specimens are a rather bright orange-red in color.

Chaetopleura rosetta Bartsch. A very small species dredged in 12 fathoms depth. One specimen was likewise found at low tide.

Ischnochiton magdalenensis Hinds. This is the commonest shore chiton and lives under boulders in dozens. The young specimens are often very handsome and vary considerably in coloration and marking.

Ischnochiton mertensii Middendorf. Low tide to 12 fathoms. Not rare. This is also a variable species as regards color and markings, though generally of a brownish-red. The sculpture of fine specimens is wonderfully distinct and is but rarely obscured by foreign growths, or eroded as in the case of so many of the other species.

Ischnochiton cooperi Carpenter. Low tide; but few found.

Ischnochiton clathratus Reeve. A single oddly-marked specimen was found at low tide by a fellow-student at the laboratory.

Ischnochiton radians Carpenter. Low tide to 12 fathoms. Two of the specimens found were nearly black, almost unmarked, and with so exactly similar a color pattern (not in the least intergrading with the ordinary form) that the writer was very doubtful as to whether they were properly referred to this species, but they were identified as radians by Dr. Dall. They seem at least a very well marked variety.

Ischnochiton berryi Bartsch. Six adult specimens and a young one were found in the crevices of the blue clay from 12 fathoms. They were generally living with a purplish sponge which they resembled in color. The largest specimen taken measured one and a-half centimeters in length in the living state.

Ischnochiton veredentiens Carpenter. 12 fathoms; two or three specimens.

Ischnochiton regularis Carpenter. Three or four specimens were found at low tide. I am told that this is generally a common species around Pacific Grove, but we did not find it so.

Callistochiton palmulatus Carpenter. 22 fathoms. Two specimens.

Callistochiton palmulatus var. mirabilis Pilsbry. Low tide; not rare.

Callistochiton crassicostatus Pillsbry. Low tide; not rare.

Nuttallina californica Nuttall. Exceedingly common between tides on the rocks.

Mopalia muscosa Gould. Low tide to 12 fathoms. Very common.

Mopalia hindsii Sowerby. Low tide; not rare. No specimens showing any intergradation between this species and the preceding or the next were observed.

Mopalia lignosa Gould. Between tides; common.

Mopalia ciliata Sowerby. 12 fathoms; four specimens. All the specimens taken were predominantly red in color, but sometimes mottled with white, brown and green. A very striking and handsome species.

Mopalia ciliata var. wossnesenskii Middendorf. 12 fathoms; one specimen.

Placiphorella velata Carpenter. A number of specimens of this interesting species were found at low tide.

Katherina tunicata Sowerby. Several specimens were obtained far out on the rocks among the mussels.

Cryptochiton stelleri Middendorf. A few specimens found at low tide.

In conclusion it may be well to call attention to several interesting features of Monterey's mollusk fauna which are presented by the foregoing list: the extraordinary development of the chitons (some twenty-six species and four varieties); the large representation of Ocinebra (ten species and varieties), of Scala (eight species), and of the Pyramidellidae (fourteen species); and the prominence of Acmaeidae in the shore fauna, both as regards number of species and varieties (fifteen) and of individuals.

TWO NEW SPECIES OF LYMNÆA.

BY FRANK COLLINS BAKER.

LYMNÆA JACKSONENSIS n. sp.

Limnea catascopium BINNEY (part), Land and Fresh-water Shells of North America, II, 1865, p. 56, fig. 86, two central figures.

Shell ovately fusiform, solid; color very dark horn; surface shining, lines of growth coarse, crossed by deeply incised spiral lines sagrinating the surface; one or two rest periods are discernible as longitudinal bands on the body whorl or spire; apex smooth, very dark chestnut color; whorls $5\frac{1}{2}$, rounded, rather rapidly increasing in size; body whorl large, ovately-inflated; sutures well impressed; spire about equal to the aperture in length, broadly conical; aperture regularly elongate-ovate, narrowed at both ends, somewhat effuse anteriorly; outer lip with a chestnut-bordered internal lip; inner lip in the adult rather broadly reflected over the umbilicus, leaving a small, narrow chink; juvenile specimens are almost imperforate; parietal callus rather heavy in some specimens, in which case making a continuous peritreme; axis very slightly twisted; columella with a well-marked fold, more strikingly developed in young than in old specimens.

Length 19.0, width 10.0, aperture length 10.1, width 5.0, mm.
Length 16.5, width 9.5, aperture length 9.1, width 4.8, mm.
Length 14.5, width 8.5, aperture length 8.5, width 4.0, mm.
Length 14.0, width 7.5, aperture length 7.5, width 3.4, mm.
Length 12.5, width 7.5, aperture length 8.0, width 3.5, mm.

Types: Chicago Academy of Sciences, 6 specimens.

Cotypes: Collections of Acad. Nat. Sci., Phila., and of A. A. Hinkley.

Type locality: Jackson Lake, drained by the south fork of the Snake River, Wyoming.

Records: Oregon: Grindstone Creek (Hayden, Smithsonian collection). Wyoming: Jackson Lake; Philips Lake, eight miles north of Jackson Lake (H. O. Hinkley, A. A. Hinkley).

Remarks: This species was received from Mr. A. A. Hinkley, of Du Bois, Illinois, under the name of *L. binneyi.* Comparison with Tryon's types at once showed that it was not that species, which is larger, of a different color and with a differently-shaped shell, inner lip, umbilicus, etc. It approaches *L. gabbi* Tryon, but the aperture is more regularly elongate-ovate, the whorls are rounder, the inner lip is broader, there is an umbilical chink and the whole shell is more fusiform. Comparison has been made with Tryon's types and with a set in the Chicago Academy of Sciences received from Tryon from the original lot. The species resembles very closely in color and in the form of the columella certain forms of *apicina* (=*solida* preoccupied) but the spire of *jacksonensis* is longer and the aperture, narrower.

It has some resemblance to *L. catascopium* but the columella is quite different and the aperture is differently shaped. Binney's two central figures in Land and F.-W. Shells, fig. 86 accurately picture the species and the original specimens in the Smithsonian (No. 8304) seem to be the same. It has probably been named *binneyi* or *solida* in collections but it seems to be a distinct species, related to the *binneyi-solida-catascopium* group of Lymnæas. Mr. H. O. Hinkley collected the specimens.

LYMNÆA PSEUDOPINGUIS n. sp.

Shell globose or globosely ovate, thin and fragile; color very light corneous inclining to yellowish, sometimes brownish; surface dull to shining, but not polished, growth lines very heavy and spiral lines deeply incised; whorls 4 +, rounded; the body-whorl globosely inflated, the whorls increase very rapidly in size, the last whorl occupying from $\frac{3}{4}$ to $\frac{5}{6}$ of the length of the shell; spire usually short, depressed, dome-like, sometimes more elongated; sutures well-marked, bordered below by a wide, yellowish band; aperture ovate or roundly-ovate, sometimes a trifle expanded and somewhat effuse anteriorly; inner lip rather broadly expanded, triangular, reflected over but not closing the umbilicus, which is a conspicuous chink; there is no columellar plait in the majority of specimens; the parietal callus is very thin or wholly lacking. The axis is but slightly twisted.

Length 9.0, width 6.5, aperture length 6.0, width 3.5, mm.

Length 9.0, width 6.0, aperture length 6.0, width 3.5, mm.

Length 9.5, width 6.75, aperture length 6.5, width 3.5, mm.

Length 8.2, width 5.5, aperture length 5.4, width 3.0, mm.

Length 8.0, width 5.5, aperture length 5.0, width 3.0, mm.

Length 14.0, width 8.0, aperture length 8.0, width 4.3, mm.

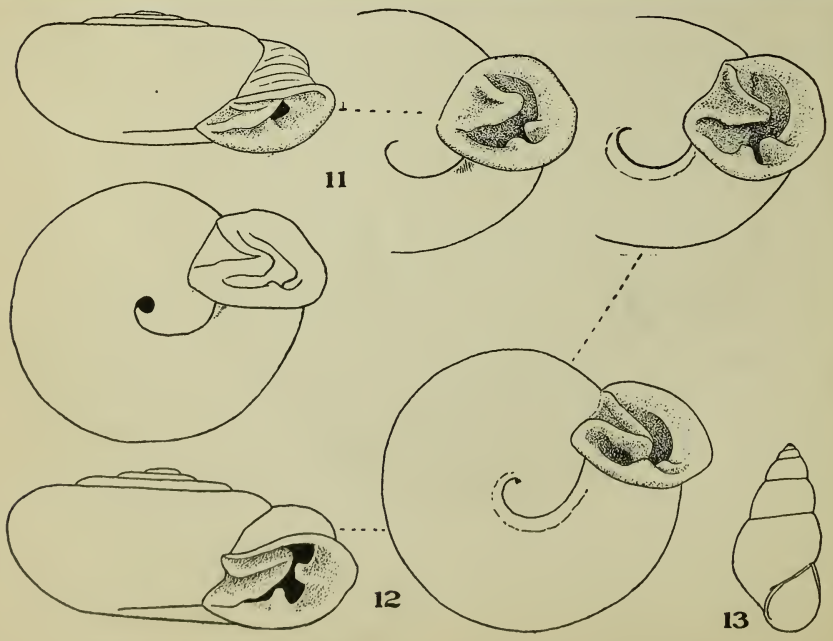
Length 12.5, width 7.5, aperture length 7.3, width 4.0, mm.

Length 11.0, width 7.0, aperture length 7.0, width 3.5, mm.

Length 7.2, width 5.0, aperture length 5.0, width 3.0, mm. Mt. Sinai.

Length 7.5, width 5.0, aperture length 5.0, width 2.5, mm. Mt. Sinai.

Types: Chicago Academy of Sciences; *Cotypes*, collection Miss Mary Walker, Buffalo, N. Y., Mr. Bryant Walker, Detroit, Mich., Academy Natural Sciences, Philadelphia and the Smithsonian Institution, Washington.



1-10, PACHYCHEILUS VALLESENSIS. 11, POLYGYRA POLITA.
12, P. AULACOMPHALA. 13, PALUDESTRINA TAMPICOENSIS.

UNIO GIGAS 'SWAINS.' SOWB (HYRIOPSIS CUMINGII LEA). CHINA.
(About ¾ nat. size).

Type locality: Crystal Brook, Long Island, N. Y.

Records: Crystal Brook and Mt. Sinai, Long Island, N. Y.

Habitat: In salt or brackish water, "at low tide in shore of bay fed by springs" (Crystal Brook); in ice-cold spring (Mt. Sinai.)

Remarks: This peculiar Lymnæa has been somewhat of a puzzle for a long time. It was at first thought to be a variety of *L. catascopium pinguis* but it differs from that form in its thinner shell, more globose form, more dome-shaped spire and particularly in its triangular, smooth, reflected inner lip and distinct umbilical chink. The form of the shell and of the inner lip resembles the *bulimoides* group of Lymnæas of the subgenus *Galba.*

It is probably a variation from the *catascopium* stock, produced by unfavorable conditions, which have dwarfed the shell. It is a significant fact that the icy-cold spring at Mt. Sinai has produced the same shell characteristics as the brackish water of Crystal Brook.

There is some variation in the height of the spire in the numerous specimens examined, some individuals having an elongated spire a trifle less than the aperture in length, while in others the spire is less than half the length of the aperture. This shell also varies in corpulency. The inner lip is peculiar and, together with the form of shell, will easily separate this species from *catascopium*, its nearest ally.

The shell was first brought to the notice of the writer by Miss Mary Walker of Buffalo, N. Y., who suggested its resemblance to *L. bulimoides*, and later by Mr. Bryant Walker, of Detroit, Michigan.

ANNOTATED LIST OF THE MOLLUSCA FOUND IN THE VICINITY OF LA JOLLA, SAN DIEGO CO., CAL.

BY MAXWELL SMITH.

Several winters ago I spent a few months at La Jolla, California. Here an old friend, Mr. Joshua L. Bailey, initiated me in the study of shells. The town lies twelve miles north of San Diego, directly on the coast, and at the base of Mount Soledad. Alternate stretches of beach and rock, caves and muddy shores, afford a congenial home for mollusks. Miniature canyons slope from the hills down to the coast. On the sides of these are found two species of land shells. A

short distance to the south stands Pacific Beach, facing both False Bay and the ocean. Several miles to the north are the Torrey Pines. Here stand, on the bluffs overlooking the sea, splendid specimens of *Pinus torreyanus*. At the base of these cliffs, in a wild spot, a number of interesting finds were made.

Where no locality is given the species is understood to have been found at La Jolla. No dredging was done. Species found on the surface of anemones are marked with a star.

Ostrea lurida, Cpr. False Bay. On stones.

Anomia macroschisma, Desh. After storms.

Anomia lampe, Gray. False Bay. Not rare, but difficult to detach from rocks.

Pecten æquisulcatus, Cpr. False Bay. In mud.

Pecten monotimeris, Conr. Washed ashore on kelp.

Hinnites giganteus, Gray. Single valves.

Lima dehiscens, Conr. Several specimens.

Modiolus californianus, Conr. On rocks.

Septifer bifurcatus, Conr. With above.

Adula falcata, Gld. In soft rock.

Lithophaga plumula, Hanl. A few in rock.

Arca reticulata, Gmel. One alive under stone.

Barbatia gradata, Sby. Many examples under stones.

*Cardita subquadrata, Cpr. Uncommon.

Milneria minima, Dall. On spire of Haliotis.

Diplodonta orbella, Gld. A few at very low tide.

Chama exogyra, Conr. Mostly dead.

Chama pellucida, Sowb. Beautiful examples.

Cardium substriatum, Conr. Small shells.

Cardium quadrigenarium, Conr. Brought in by fishermen.

Tivela stultorum, Mawe. In the sand.

Amiantis callosa, Con. False Bay. A few good examples.

Tapes staminea, Conr. With Donax.

Chione succincta, Val. A few living.

Chione undatella, Sby. Pacific Beach. Several examples.

Petricola carditoides, Conr. In rock.

Donax laevigata, Desh. Very abundant in sand.

Heterodonax bimaculatus, D'Orb. Pacific Beach. Soft parts gone.

Tagelus californianus, Conr. Pacific Beach. Living in mud banks.

Sanguinolaria nuttallii, Conr. False Bay. Mostly dead shells.

Tellina bodegensis, Hinds. Pacific Beach. Single valves.

Metis alta, Conr. False Bay. One example.

Macoma nasuta, Conr. Not rare.

Semele decisa, Conr. Pacific Beach. A single valve.

Semele rupium, Sby. A few beautiful examples.

Lyonsia californica, Conr. False Bay. Fine shells in the drift.

Pandora bicarinata, Cpr. Pacific Beach. Many single valves.

Platyodon cancellatus, Conr. Torrey Pines. Fresh specimens.

Solen rosaceus, Cpr. False Bay. Young specimens.

Parapholas californica, Conr. Not rare with Adula.

Penitella penita, Conr. In soft rock.

Dentalium neohexagonum, S. & P. Pacific Beach. In sand.

*Cadulus quadrifissus, Cpr. One fine shell.

*Cavolinia tridentata, Forsk. Worn specimens.

Actaeon punctocaelatus, Cpr. False Bay. Among the drift.

*Tornatina culcitella, Gld. A single young specimen.

Tornatina cerealis, Gld. False Bay. Abundant in drift.

Bulla gouldiana, Pils. False Bay. Very plentiful.

Haminea vesicula, Gld. False Bay. Empty shells.

Haminea virescens, Sby. South La Jolla. On alga-covered rocks.

Tylodina fungina, Gabb. On brown algae.

*Pedipes unisulcatus, J. G. C. Several hundred in two days.

Melampus olivaceus, Cpr. False Bay. Abundant with Cerithidea.

Siphonaria peltoides, Cpr. One washed ashore.

Gadinia reticulata, Sby. On the beaches.

Physa sp. indet. In a small reservoir back of the town.

Succinea rustica, Gld. San Diego Mission. On the muddy banks of a small stream.

Helix aspersa, Muller. I took several dozen to the town and released them in a garden. Today they may still be found.

Epiphragmophora tudiculata, Binney. Among the roots of cacti.

Epiphragmophora stearnsiana, Gabb. False Bay. A few specimens on the beach, probably washed from Point Loma.

Glyptostoma newberryanum, W. G. B. Plentiful ten miles inland.

Terebra simplex, Cpr. Pacific Beach. Uncommon.

Conus californicus, Hds. Plentiful under rocks.
Pleurotoma carpenteriana, Gabb. Torrey Pines. Several dozen.
Drillia moesta, Cpr. Under stones.
Drillia inermis, Hds. Pacific Beach. Several specimens.
Drillia penicillata, Cpr. Mostly dead.
*Mangilia striosa, C. Adams. Fine large specimens.
Cancellaria cooperi, Gabb. Torrey Pines. One example.
Olivella biplicata, Sby. Common in the sand.
Olivella pedroana, Conr. With above.
Marginella jewettii, Cpr. Several worn specimens.
*Marginella pyriformis, Cpr. Plentiful.
Marginella varia, Sby. Living, under stones.
Mitra maura, Swain. Several found living. The pure white animal contrasts strongly with the dark shell.
Mitromorpha aspersa, Cpr. Rare.
*Mitromorpha filosa, Cpr. Not plentiful.
Siphonalia kellettii, Fbs. Brought in by fishermen.
Macron lividus, A. Adams. Under stones.
Nassa fossata, Gld. One living shell.
Nassa mendica, Gld. Pacific Beach. A few worn specimens.
Nassa mendica, Gld., var. cooperi, Fbs. False Bay. One example.
Nassa perpinguis, Hinds. Mostly inhabited by hermit crabs.
Nassa tegula, Rve. False Bay. Common in muddy stations.
Columbella guasapata, Gld. On eel-grass.
Columbella guasapata, Gld., var. carinata, Hds. With above.
Amphissa corrugata, Rve. Several found living.
*Amphissa versicolor, Dall. One shell.
Murex festivus Hds. Under rocks.
Murex incisus, Brod. Common in rock pools.
Murex nuttallii, Conr. Pacific Beach. Many examples.
Ocinebra interfossa, Cpr. On the beaches.
Ocinebra poulsoni, Mutt. Pacific Beach. With Murex festivus.
Ocinebra gracillima, Strs. Among drift.
Trophon belcheri, Hds. Brought in by fishermen.
Monoceros engonatum, Cpr. Not rare.
Monoceros lapilloides, Conr. Several living shells.
Scala crenatoides, Cpr. Crevices of rock.
Scala hindsii, Cpr. Common.

Scala tincta, Cpr. Young specimens.
Janthina exigua, Lan. Found on beaches after storms.
Janthina sp. indet. False Bay. A single example.
*Eulima micans, Cpr. Several large shells.
*Eulima rutila, Cpr. One specimen.
*Eulima incurva, Ren. Bleached specimens.
Pyramidella conica, Ads., var. variegata, Cpr. A single example.
Turbonilla tridentata, Cooper. Large specimens.
*Odostomia nuciformis, Cpr. One fine shell.

(*To be concluded.*)

NOTES.

NOTE ON TRIVIA PILULA KIENER.—This minute species, heretofore known particularly through specimens from the Hawaiian Islands, was described by Kiener in his "Coquilles Vivantes," (no date, but about 1840) p. 151, pl. 54, f. 2, the habitat being then unknown. It was mentioned by Reeve (Conch. Iconica, 1845, p. 56, f. 524*) as a synonym of the very much larger West Indian species, *Tr. globosa* Gray. Sowerby in his "Thesaurus Conchyliorum" (1870), Melvill, in his paper on the "Survey of the Genus Cypræa, (1888), and Roberts, in his monograph in Tryon's Manual of Conchology" (1885) all followed Reeve in this respect. Weinkauff, however, in his Systematisches Conchylien-Cabinet" of Kuster (1881, pp. 159, 152), deemed it entitled to specific rank. This view, in which my study of these species has long since led me to concur, is is now further confirmed by the opinions of three other conchologists in the recent "Report to the Government of Ceylon on the Pearl Oyster Fisheries of the Gulf of Manaar—Supp. Rept. on the Molluscan Shells, by Robert Standen and Alfred Leicester," (1906). Among the species found are mentioned both *Tr. globosa and Tr. pilula* (by typographical error named as "*Tr. fibula*"), with the remark added, as to the last named species, that they "agree with Mr. J. M. Williams (of Liverpool), to whom the specimens were submitted, that they are not the same as *Tr. globosa* Gray."

FRED L. BUTTON.

THE ANCEY COLLECTION OF SHELLS.—We learn that the collection of shells of the late C. F. Ancey, of Mascara, Algeria, has

been acquired by Monsieur Geret, Conchologist, 76 rue Faubourg, St. Denis, Paris, France. This collection, which is one of the most important in Land and Fresh-water shells, will be sold to suit the purchaser. Collectors can from now on send to M. Geret to reserve any species or type which they may desire from this magnificent collection.

ANGELO HEILPRIN.

Professor Angelo Heilprin, the well-known naturalist died in New York City, July 17. He was born in Hungary, March 31, 1853, and came to the United States in 1856. He was Professor of Invertebrate Paleontology and Geology, (1880–1900), and Curator, from 1883 to 1892 of the Academy of Natural Sciences, and Professor of Geology at the Wagner Free Institute of Science 1885–90. For several years past he held the Lectureship on Physical Geography at Yale University.

While most of the works of Prof. Heilprin pertained to geology and physical geography, there are a number which are of special interest to conchologists. "Animal Life of the Seashore," and the "Bermuda Islands": a contribution to the physical history and zoölogy, both treat extensively of the mollusca. "Explorations on the West Coast of Florida" (Trans. Wagner Free Inst. Sci. Vol. I). On this expedition the richly fossiliferous pliocene of the Caloosahatchie was discovered and many of the interesting species of mollusks described, together with a number of those from the "silex-bearing marl" of Tampa Bay, now classed as Oligocene. Professor Heilprin has also published numerous papers in the Proceedings of the Academy of Natural Sciences. His later works deal principally with volcanic phenomena, especially Mont Pelée, where he was one of the first scientific observers on the ground.

Professor Heilprin possessed to an unusual degree the ability to interest non-scientific people in scientific matters; and to the inspiration of his personal teaching many owe the beginnings of a deep interest in geology, geography and other natural history studies. Personally, Professor Heilprin was infectiously optimistic and confident. He successfully organized and led numerous scientific expeditions; and his death was due to the effects of a tropical fever, contracted on an expedition to the Orinoco river, about a year ago.

The Nautilus.

Vol. XXI. OCTOBER, 1907. No. 6.

NOTES ON PLANORBIS.—I.

BY BRYANT WALKER.

Planorbis multivolvis Case. Plate VIII.

This species was described by William Case, of Cleveland, O., in 1847 (Am. Jour. Sc. [2], III, p. 101), from specimens collected by Captain B. A. Stannard, "in the northern part of Michigan." Most, if not all, of these specimens, apparently, were given by Case to Dr. Gould, who distributed a few and deposited the balance in the collection of the Boston Society of Natural History. Examples were sent to the Cuming Collection (now in the British Museum), from which the species was well illustrated in the Conchologia Iconica by Sowerby, whose figures were copied in the Conchylien Cabinet.

A single specimen found its way into the Jay Collection now in the American Museum of Natural History, and another was given to the Smithsonian Institution. Subsequently Dr. Gould gave several specimens to Dr. W. H. Dall, which are now in the National Museum. So far as I have been able to ascertain, the original lot is not represented in any other collections.

From that time until 1906 nothing further has been known of the species. In 1888 (J. of C., V, p. 330), on the authority of the late Geo. W. Tryon, Jr., I announced the re-discovery of the long-lost species in Marl Lake, Roscommon County, Mich. But a subsequent comparison with genuine specimens showed that the identification was erroneous. The Marl Lake shells are probably *P.*

campanulatus rudentis Dall (See Harriman Alaska Exped., XIII, p. 90).

The citation of *P. multivolvis* from Newfoundland by Farrer in 1892 (NAUTILUS, VI, p. 36) was, as stated by him, based on a comparison with the Marl Lake shells, and his specimens are apparently referable to the same variety.

Through the kindness of Mr. E. A. Smith I have had the opportunity of examining specimens in the British Museum from Labrador labelled "*multivolvis*." They are not that species, however, but a form of *P. campanulatus*.

In the summer of 1906, Dr. Chas. A. Davis of Ann Arbor, Mich., while in the field for the State Geological Survey, had the great good fortune to rediscover the genuine *multivolvis* on the north shore of Howe Lake, Marquette County, Mich., about forty miles west of the City of Marquette. Nine specimens only were obtained. Three of these are figured on the plate (figs. 4 and 8 to 11) and for comparison with them are given figures of one of the original specimens in the National Museum (figs. 1–3) and of the specimen in the Jay Collection (figs. 5–7).

Through the kindness of Mr. L. P. Gratacap of the American Museum, I have been able to make personal comparison of the latter specimen with those from Howe Lake. As shown by these figures, there can be no question as to the identity of the Howe Lake shells with Case's species.

Both of the original specimens figured are apparently much less elevated than the Howe Lake shells, but the upper whorls of the "Jay" specimen were badly eroded so that it was difficult to make out the exact number of whorls, and the depressed spire of the National Museum shell is evidently owing to the very irregular growth, as shown in fig. 3. That some of the original lot were quite as elevated as the Howe Lake specimen is shown by Sowerby's figure 72*a*, for comparison with which fig. 4 is given. The dimensions of this specimen are almost exactly the same as those of Sowerby's figure, and figure 4 would almost pass as an outline facsimile of the other.

It is equally clear that *multivolvis* is a valid species and quite distinct from *campanulatus*. Compared with the latter it is distinguished by its elevated spire with more numerous and narrower whorls and the wide, deep umbilicus.

An apparent peculiarity of Howe Lake shells is the very irregular growth. Of the eight 1906 specimens before me only one (fig. 4) is entirely regular in the coiling of the whorls. Of the others the shell represented by figs. 9–11 is least distorted and figure 8 is most so. That this was also a peculiarity of the original lot is shown by figure 3.

P. multivolvis is apparently a scarce shell in Howe Lake at the present time. Two visits there in July, 1907, each involving a careful search of the entire north shore, only yielded three specimens. It seems probable that the species lives in comparatively deep water during the summer and only comes in towards shore, if at all, for spawning purposes. Such seems to be the habit of the Lymnæidæ in Pine Lake, Marquette County, which I have been familiar with for more than ten years, and a similar habit has been noticed by Kirkland in *Lymnæa mighelsi* in Crystal Lake, Benzie Co., Mich. (NAUTILUS, XIV, p. 8.)

The dimensions of the specimens figured are as follows:

	Major diam.	*Minor diam.*	*Axis.*
Figs. 1–3	14.00 mm.	11.50 mm.	6.00 mm.
Fig. 4	16.25 mm.	13.00 mm.	9.00 mm.
Figs. 5–7	16.25 mm.	13.00 mm.	7.00 mm.
Fig. 8	18.25 mm.	15.25 mm.	8.25 mm.
Figs. 9–11	18.00 mm.	15.00 mm.	9.00 mm.

The actual occurrence of this species in Michigan having thus been definitely determined, there still remains the question as to the locality where the type specimens were obtained. Unfortunately, Capt. Stannard failed to give any definite information on this point, and after the lapse of sixty years, there is no hope of getting any exact information. But it is a fair subject for speculation. One fact is clear, that although but a very small portion of the Upper Peninsula has as yet been explored conchologically, the work that has been done there has, with this one exception, failed to discover it. The species was described in 1847, and the specimens were probably collected within a year or two previous to that time. It is to be borne in mind that at that time the Upper Peninsula was an unbroken and practically an unknown wilderness. The rapid development incident to the growth of the copper, iron and lumber industries had not begun. Marquette was not settled until 1846,

and at that time Houghton was only known to the Indians and voyageurs. What little navigation there was on Lake Superior was between the "Soo" and a few small towns at the upper end of the lake, such as Eagle Harbor, Bayfield, Ontonogan, etc. Stannard was at that time captain of a small sailing craft which plied between these ports. On one of his voyages he discovered the famous rock in the center of the lake now known as Stannard's Rock. It seems clear enough, therefore, that the original locality for the *Planorbis* must have been somewhere on or near the south shore of the lake. The Hon. Peter White, who has lived in Marquette since 1849, informs me that the Indians told him that after Stannard discovered the rock in the middle of the lake, he was very cautious about sailing in stormy weather for fear of getting wrecked on some similar reef, and that at one time during a heavy stress of weather he took refuge under the lee of the Huron Islands and remained there for some days. Now the Huron Islands are only about three miles from the south shore of the lake, and Howe Lake is less than one mile inland and almost directly south of the islands. If during his enforced stay under the shelter of the islands Stannard had gone ashore to fish or hunt it is quite conceivable that he reached the north shore of Howe Lake and there found the shells he afterwards gave to Case.

While of course this is all speculation based on a mere tradition of fact, it certainly raises a possibility, at least, that Howe Lake may have been the original locality for this very interesting species. And, unless in the years to come, the species shall be found in some other locality, which seems more likely to be the original place of discovery, this possibility may prove to be a very good probability.

Note: My last visit to Howe Lake was on August 3d. On August 28th my sister made another visit to the lake and found seven more specimens all but one, unfortunately, more or less broken. During the interval several heavy storms had taken place which stirred up the lake and no doubt brought the shells in to shore. Of these specimens only one was irregularly coiled. The others were all similar to figures 4 and 10 which evidently represent the normal aspect of the form as it occurs in that locality. Considerable variation in size is shown, the largest specimen measuring $10\frac{3}{4}$x$17\frac{3}{4}$ and the smallest $7\frac{1}{2}$x$13\frac{3}{4}$ mm.

ANNOTATED LIST OF THE MOLLUSCA FOUND IN THE VICINITY OF LA JOLLA, SAN DIEGO CO., CAL.

BY MAXWELL SMITH.

(*Concluded from p. 59*).

Plate VII, view of La Jolla.

*Odostomia pupiformis, Cpr. Mostly worn specimens.

Gyrineum californicum Hds. Pacific Beach. Buried in mud.

Cypraea spadicea, Gray. After violent storms.

Trivia californica, Gray. False Bay. A few living, dead shells common at La Jolla.

Trivia solandri, Gray. Not rare.

Erato columbella, Menke. In the drift.

Erato vitellina, Hds. Seldom collected alive.

*Triforis adversa, Mont. Fine shells not rare.

Cerithiopsis tuberculata, Mont. A few small specimens.

*Cerithiopsis metaxæ, Della Chiaje. False Bay. A single shell.

Bittium quadrifilatum, Cpr. False Bay. On sponges.

Cerithidea californica, Hald. False Bay. With Melampus.

Cæcum californicum, Dall. Uncommon.

Cæcum crebricinctum Cpr. Under rocks resting on clean sand.

Vermetus squamigerus, Cpr. Plentiful under stones.

Littorina scutulata, Gld. On the rocks.

Littorina planaxis, Nutt. With above.

*Lacuna unifasciata, Cpr. Plentiful.

*Fossarus fenestratus, Cpr. Rare.

*Rissoa compacta, Cpr. Not often found.

*Rissoina aequisculpta, Cpr. Not often found.

Truncatella californica, Pfr. False Bay. In drift.

Truncatella stimpsoni, Sby. False Bay. With above.

Crucibulum spinosum, Sby. Pacific Beach. Several specimens have long spines.

Crepidula aculeata, Gmel. On the beaches.

Crepidula navicelloides, Nutt. In aperture of Natica. Identical with C. plana.

Crepidula onyx, Sby. Pacific Beach. On stones.

Amalthea antiquatus, Linn. Under layers of rock.

Amalthea cranioides, Cpr. With above.

*Amalthea tumens, Cpr. Young specimens.

Natica draconis, Dall. Rare with N. lewissii.

Polinices lewissii, Gld. Pacific Beach. Common, below tide.

Polinices recluziana, Desh. Pacific Beach. Abundant at low tide.

Polinices uber, Val. False Bay. A Lower California shell. Not before reported from California.

Lottia gigantea, Gray. Small specimens plentiful on the rocks.

Acmaea asmi, Midd. On Chlorostoma.

Acmæa scabra, Rve. Not uncommon.

Acmæa incessa, Hds. Several shells, soft parts gone.

Acmæa mitra, Esch. Torrey Pines. One specimen.

Acmæa paleacea, Gld. On eel-grass, common.

Acmæa patina, Esch. Abundant at all times.

Acmæa persona, Esch., var. umbonata, Nutt. Many examples.

Acmæa spectrum, Nutt. On rocks.

Acmæa depicta, Hds. On grasses.

Acmæa rosacea, Cpr. One faded shell.

Phasianella compta, Gld. In drift.

Leptothyra carpenteri, Pils. Two specimens.

Pomaulax undosus, Wood. Many shells at low tide.

Norrisia norrisii, Sby. In algæ.

Calliostoma canaliculatum, Mart. One small shell.

Calliostoma tricolor, Gabb. Pacific Beach. Under small round stones.

Calliostoma gemmulatum, Cpr. Dead shells, rare.

Chlorostoma aureotinctum, Fbs. Not uncommon.

Chlorostoma funebrale, Ad. Many examples.

Chlorostoma gallina, Fbs. Not rare.

*Halistylus pupoides, Cpr. Not common. A northern species.

*Ethalia supravallata, Cpr. Rare.

*Liotia acuticostata, Cpr. Several examples.

Liotia fenestrata, Cpr. Beautiful specimens.

*Vitrinella complanata, Cpr. Three shells.

Haliotis corrugata, Gray. Pacific Beach. One small example.

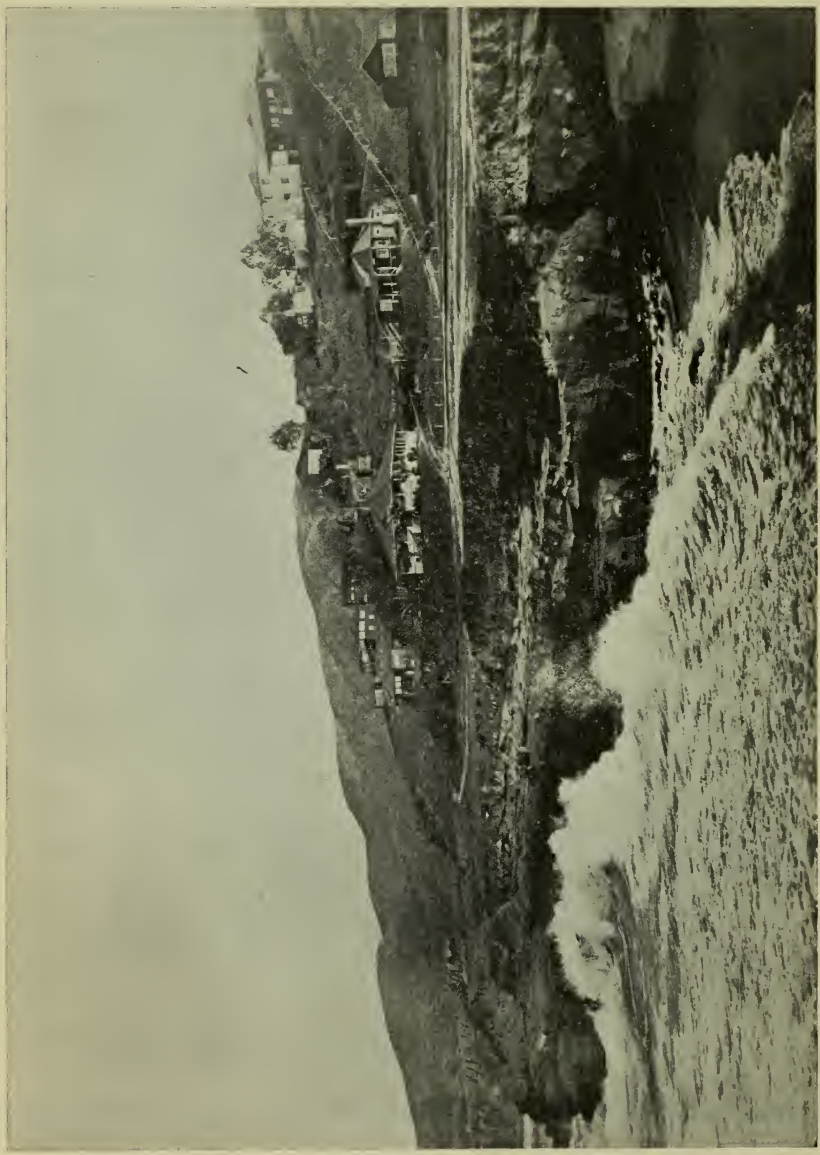
Haliotis fulgens, Phil. The most abundant Haliotis.

Haliotis rufescens, Swains. Several fine specimens.

Fissurella volcano, Rve. Under stones, common.

Fissuridea murina, Dall. Dead shells.

Lucapina crenulata, Sby. Occasionally found alive.



LA JOLLA, CALIFORNIA.
(See article by Maxwell Smith, p. 55).

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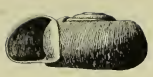

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WALKER: PLANORBIS MULTIVOLVIS.

*Lucapinella callomarginata, Cpr. Mostly worn shells.
Megatebennus bimaculatus, Dall. In drift.
Mopalia muscosa, Gld. Fine specimens.
Mopalia ciliata, Sby. Several shells.
Nuttallina scabra, Rve. On rocks.
Ischnochiton conspicuus Cpr. Under flat rocks.

NOTES ON THE CONCHOLOGY OF POCONO MANOR, MONROE CO., PA.

BY JOSHUA L. BAILY, JR.

During the past summer it was my fortune to spend six weeks at Mt. Pocono, Monroe Co., Pa., the largest mountain summer-resort in Pennsylvania, and while there had an excellent opportunity to explore the molluscan fauna of a region which has been neglected by conchologists heretofore. The Pocono Inn, at which I stayed, the only hotel on Pocono Manor, is located on Little Pocono Mountain, about 1850 feet above sea-level. From the Inn a fine view may be had on clear days of the Delaware Water Gap. Three miles to the westward lies the source of Swiftwater Creek, which after passing the falls, reaches Lake Minausin, about 500 feet below the level of the Inn. On the other side of the mountain is a smaller stream known as Indian Run, which flows into the Swiftwater about a mile below the lake. The temperature of the water is 45° F. or lower, except in the lake, where the sun shines on it. Perhaps this is why I have never been able to find any fresh-water shells at all during four summers' collecting. And also, as implied by the name, the water is so swift that no mud settles on the bed rock, which is always clean. Shells there must be, somewhere, for I have frequently found clusters of eggs adhering to the aquatic vegetation, which is very abundant; but although I have searched the Swiftwater to its source, and the other stream nearly as far, I have never been rewarded by finding any of our friends at home when I called. Last year my brother found one specimen each of an undetermined *Physa* and *Pisidium* in Paradise Valley, but as this was five miles from Pocono Manor I will not include them in the list.

With respect to land forms, however, a greater variety is encountered. The country is exceptionally rocky, the predominating rocks being red shale. The soil is very fertile, and in the woods the

ground is covered several inches deep with decaying leaves. Most of my collecting was done on hillsides having a northeastern exposure and at an elevation of about 1550 feet. The list of species follows:

Tebennophorus carolinensis Bosc.

Vitrea indentata Say.

Vitrea hammonis Ström.

Vitrea ferrea Morse.

Zonitoides arborea Say.

Euconulus chersinas polygyratus Pils. Found under decaying leaves far from the water. Rare.

Pyramidula cronkhitei catskillensis Pils.

Helicodiscus parallelus Say.

Polygyra albolabris Say. Exceedingly common in a man-hole on the pipe line which takes water from the Manor Spring to the Inn.

Polygyra dentifera Say.

Polygyra tridentata Say. Only the typical form. I saw no var. *juxtidens* Pils.

Polygyra hirsuta Say. I was much surprised to find this species only under boards in fields exposed to the sun, and never in shady places at all.

Polygyra fraterna Say.

Bifidaria pentodon Say.

Cochlicopa lubrica Mull. Although I searched diligently I was never able to find this species alive, four dead specimens being the best I could do.

Succinea ovalis Say (*obliqua* Say). Another shell of which it is hard to obtain good specimens. The broken shells of this species are quite common.

Next year I hope to add some more names to this list.

Haverford, Montg. Co., Pa., Sept. 9, 1907.

SHELLS COLLECTED IN NORTHEASTERN MEXICO.

BY A. A. HINKLEY.

The species here listed were collected in December and January of the past winter. At Tampico land and fresh-water forms were scarce and had it not been for the rich find in a windrow of river débris or drift the list would have been much smaller. This drift

was sifted through a small net and the siftings were worked over after returning home.

In both Panuco and Tamesi rivers there seemed to be very little molluscan life. Nearly all the living fresh-water forms listed from Tampico were taken from small ponds near LaBarra.

The mouth of the Panuco river is protected by jetties, on the gulf side of which most of the living marine species were taken. Not a specimen of any species was noticed on the river side of the jetties. Two days were spent on the beach and jetties, but no other effort was made to secure the marine forms.

In the vicinity of Valles the land shells were no more plentiful than about Tampico, but the Valles river was much richer in both species and individuals than the rivers at Tampico. With two exceptions the small streams seemed destitute of molluscan life.

It has been thought desirable to publish the full list because the shell fauna of this part of Mexico is but little known. No information has before been published on the marine forms between Texas and Vera Cruz; and the only data on the land shells of the region is contained in Pilsbry's paper on Rhoads' collection, which was made somewhat further inland, north of the localities here dealt with. It is likely that some of the old species hitherto credited to Texas were really taken at or near Tampico, such as *Helicina chrysocheila* and *Euglandina corneola*. The occurrence of *Adelopoma* so far north is remarkable.

The larger part of the species of this list were passed on by Dr. H. A. Pilsbry. Thanks are also due to Dr. Wm. H. Dall for assistance with some of the marine and fresh-water forms.

MARINE MOLLUSKS.

Spirula spirula (L.). Only broken ones taken.

Ostrea sp. Scattering young were on the jetties. In different places along the river and canal are beds of oyster shells exposed to view, overlaid by the surface soil. These shells are often dug out and burnt for lime.

Chama arcinella L., odd valves.

Pecten exasperatus Sby., odd and broken valves, common.

Pecten gibbus irradians Lam., odd valves.

Pecten nodosus Linn., broken valves.

Pecten raveneli Dall (?), one lower valve.

Mytilus hamatus Say, common on the jetties.

Mytilus exustus Linn., associated with *hamatus*, from which it is easily separated by its finer striæ and smaller size.

Modiola polita Verrill, 3 young specimens.

Congeria cochleata Kirby, found among clusters of *M. hamatus* as if seeking protection.

Arca floridana Conrad, odd and broken valves were plentiful.

Arca incongrua Say, 3 living specimens taken, odd valves common.

Arca occidentalis Ph., odd valves and pieces.

Phacoides pectinatus Gmel., odd and broken valves.

Cardita floridana Conrad, odd valves plentiful.

Cardium iscoardia Linn., odd and broken valves common.

Cardium magnum Born, odd valves common.

Cardium robustum Sol. (?), one young odd valve.

Dosinia discus Reeve, a few living ones taken, dead ones common.

Donax variabilis Say, one of the most plentiful species on the beach both living and dead.

Chione cancellata L., odd valves.

Chione intapurpurea Conrad, odd valves.

Tellina radiata Linn., odd valves.

Macoma constricta Brug., odd valves.

Iphigenia braziliana Lam., a few live ones taken.

Martesia cuneiformis Say. An old water-logged banana stalk thrown up by the tide, contained a number of nice specimens which were secured by the aid of a knife; also the shell-lined burrows of a *Teredo* were in this stalk.

Pinna sp., broken pieces.

Siphonaria lineolata Orbigny., numerous on the rocks of the jetties.

Crepidula aculeata Gmel., one poor specimen.

Cerithidea iostoma Pfr., a few dead specimens.

Terebra cinerea Gmelin. Living ones were common, mostly quite young, exposed to view as the waves receded, always turning head toward the current and immediately burying themselves in the sand.

Natica duplicata Say, one young specimen.

Natica brunnea Link, two dead and not mature.

Columbella obesa C. B. Adams, three found on a log thrown up by the tide.

Melongena melongena L., one specimen, dead and poor.

Purpura haemastoma Linn., common on the rocks of the jetty, no full-grown ones found.

Modulus modulus L., a few poor specimens noticed.

Littorina nebulosa Lam., var. *columellaris* Orbigny. A few were found on logs along the beach, but it is common on the jetties. Dr. Dall referred it to *L. flava*. Pilsbry says "*L. flava* is very thick inside the lip, exactly like *irrorata*. It resembles *nebulosa* in color, but is evidently a distinct species close to *irrorata*. I have never seen *L. flava* from north or west of Trinidad."

Littorina ziczac Dillwyn., very numerous on the jetties.

Cassis inflata Shaw, two young and dead.

Nerita præcognita C. B. Adams, three on the rocks of the jetty.

Neritina lineolata Lam. Plentiful in low places along the river and young ones were found on the gulf side of the jetties.

Neritina virginea L., a few were found with *lineolata* on one jetty.

Solarium granulatum Lam., two dead specimens.

Fissurella alternata Say, a few dead ones.

Vermicularia spirata Phil., young and dead.

Melampus coffea L., a few immature specimens.

Melampus floridanus Shuttl. Only a few specimens of this small species were found. Dr. Dall referred them to young *Tralia cingulata* Binney.

HELICINIDÆ.

Helicina chrysocheila Binney. Tampico and Valles. Scattering specimens were found over considerable territory. The species is very variable in color. Dead specimens were numerous in some places.

Helicina flavida Mke. This species was found only in the drift on the river bank, mostly dead.

Schasicheila hidalgoana Dall. El Abra, on the mountain side with *Opeas* and *Holospira*, only 3 taken.

HELICIDÆ.

Trichodiscina coactiliata Fér. Tampico, in drift.

Praticolella griseola Pfr. This was the most widely distributed species found. It seems to prefer the open fields and pastures.

Polygyra martensiana Pils. Tampico and Valles.

Polygyra oppilata Moric. Tampico and Valles.

Polygyra implicata Beck. Tampico.

Polygyra polita Pilsbry and Hinkley. Tampico.

Polygyra aulacomphala Pils. and Hinkley. Tampico.

Thysanophora conspurcatella Morel. El Abra, found with *Opeas*.

Thysanophora fischeri Pilsbry. Tampico, drift.

Thysanophora horni Gabb. Tampico, drift. "Not before known from the littoral region of the Gulf" (*Pilsbry*).

BULIMULIDÆ.

Bulimulus dealbatus Say. A few dead specimens noticed in the vicinity of Valles.

Bulimulus schiedeanus Pfr. One dead specimen, Tampico.

Drymæus multilineatus Say. Valles. A few dead ones with colors nearly as bright as in life. Pilsbry says "The specimens are almost exactly intermediate between *D. multilineatus* and *D. discrepans* Sowb., having the coloration of the latter except that the apex is dark bluish, as in *multilineatus*. There is no dark subsutural band."

(*To be concluded.*)

NOTES.

We regret to record the death of Mr. Sloman Rous, of Brooklyn, N. Y., who died at sea on July 8th.

PUBLICATIONS RECEIVED.

The Mollusca of the Persian Gulf, Gulf of Oman and Arabian Sea, etc.—Pt. II, Pelecypoda, by James Cosmo Melvill and Robert Standen. (Proc. Zoöl. Soc., London, 1906, pp. 783–848, pls. 53–56.)

In this part some 426 species are enumerated, of which 35 species are new. The richness of the fauna is dwelt upon, the total number of mollusca recorded from this area being 1618. The two parts constitute a valuable addition to our knowledge of mollusks of this region.

New and Characteristic Species of Fossil Mollusks from the Oil-Bearing Tertiary Formations of Southern California, by Ralph Arnold. (Proc. U. S. Nat. Mus., XXXII, pp. 525–546, pls. 38–51, 1907.)

An interesting and profusely illustrated paper, in which 21 species and varieties are described as new. The geological formations represented are the Lower Miocene and Pliocene.

The Nautilus.

Vol. XXI. NOVEMBER, 1907. No. 7.

EYES OF HELICODISCUS LINEATUS.

BY EDWARD S. MORSE.

Last year in studying the eyes of the smaller Helices I discovered that *Helicodiscus lineatus* was destitute of any pigmental organ functioning as an eye. A further examination with a higher power reveals apparently rudiments of a structure which may indicate the traces of an eye but not the slighest evidence of pigmentation was seen. The body and tentacles are a clear white.

In the volume on Mollusks in the Cambridge Natural History series the Rev. A. H. Cooke gives an interesting resumé of what is known of the molluscan eye. He says, "In land mollusca which live beneath the surface of the ground or in absolute darkness the eyes are generally more or less modified. Thus in *Testacella*, which usually burrows deeply in the soil but occasionally emerges into the open air, the eyes are very small, but distinct and pigmented. Our little *Cæcilianella acicula*, which is never seen above the surface, is altogether destitute of eyes. A species of *Zospeum*, a *Helix* and a *Bithynella* from dark caves in Carniola have suffered a similar loss."

The habits of *H. lineata* do not differ apparently from the other smaller species with which it is associated. I hope later to make some experiments in phototaxis.

CAPE COD NOTES.

BY. REV. HENRY W. WINKLEY.

The month of July was spent at Provincetown. August at the head of Buzzard's Bay. Unfortunately without a dredge, I can report only low tide results. The hook on the end of Cape Cod is, geologically speaking, a late formation, composed entirely of coarse sand with limited vegetation; hence not a paradise for land and fresh-water forms. I examined two fresh-water ponds but found no shells. On the land *Helix hortensis* has a colony. No banded forms were found. The lemon-yellow and a very light nearly transparent form are the chief colorings. The latter compared with the specimens of this species found by Mr. C. W. Johnson, at Chatham, are of the same color but more nearly transparent. While the Cape is not an absolute barrier between northern and southern forms, it is usually counted as a boundary. Provincetown being at the tip end, I was curious to know its fauna, and can pronounce it southern. *Bittium nigrum* and *Odostomia trifida*, *bisuturalis*, *fusca*, *seminuda*, and an undescribed species occur more or less abundantly. Both *Lunatia heros* and *Neverita duplicata* occur on the sand flats. *Litorinella minuta* is abundant but small. *Mya arenaria*, living in the clean sand, is abundant and the whitest shells I ever saw. *Venus mercenaria*, *Clidiophora gouldiana* and other forms show the general character of the fauna. Without attempting to make a detailed list, the forms are the same one would find south of the Cape. *Purpura lapillus*, living on the wharves, gave a few curiosities. Several specimens of deep yellow color in last year's growth had changed in this year's addition to pure white.

The outer side of Cape Cod is the home of *Ceronia arctata*. A visit to Highland Light at North Truro gave me a half hour at high tide, but I found a good set of the species and of fine large size. Odd valves of *Astarte castanea* show that it abounds. One or two specimens of *Cochlodesma leanum* demonstrate its home there.

A day spent at Woods Holl gave me an hour's collecting at low tide in the eel pond. The only record I would make would be one or two species of *Turbonilla* secured from a row boat. It is the first time I have ever collected any species of this genus in shallow water. My headquarters during August were at Wareham on an arm of

Buzzard's Bay, not quite on the Cape but near enough. As Pat says, "contagious" to it. The marine forms here are affected by brackish water. In one arm I could get *Ilyanassa obsoleta* in abundance, but failed to find Bittium and the Odostomias. In another arm with the fresh water they occur, but more or less eroded. A colony of fine specimens of *Paludestrina salsa* occurs in a pot hole on the marsh, and my daughter, Miss Ruth Winkley, located the same form sparingly among the flags along the border of the Agawam river at East Wareham. More should be said of the fresh-water collecting. The Agawam river is rich in specimens. *Unio complanatus* abundant and large, *Anodonta cataracta* occasional, and *Anodonta implicata* abundant and the finest specimens I have seen. My largest is $6\frac{1}{2}$ inches long and weighs $5\frac{1}{2}$ ounces. (Gould gives the largest as $4\frac{1}{2}$ inches long.) *Sphaerium secure* is very abundant. I obtained an unusually fine series of Anodonta beaks at this spot. On the whole I may say that a section of this stream is the richest in animal life I have ever seen in New England.

Ditches in the older cranberry bogs and small brooks abound in specimens of *Pisidium*, and *Amnicola limosa* and *porata* occur sparingly. Other fresh-water species occur like *Planorbis*, *Physa*, etc., but they are in better form earlier in the season, so I neglected them. I failed to find land shells. It has been an exceedingly dry season, and that may be the reason. I regret that I had no dredge with me. The good results from shore collecting would indicate the same from deeper waters.

A NEW SPECIES OF FLUMINICOLA.

BY H. A. PILSBRY.

The genus *Fluminicola* of Stimpson comprises globose, *Somatogyrus*-like snails of streams and springs in and west of the Rocky Mountains. A list published by the writer in 1899[1] enumerates seven species and one subspecies. A new form was among the mollusks collected by the late Rev. Mr. Ashmun in Idaho, during the last year of his life.

[1] The NAUTILUS, XII, March, 1899, pp. 123, 124.

FLUMINICOLA MINUTISSIMA n. sp. Plate IX, fig. 1.

The shell is perforate, obliquely globose, thin, smooth, olivaceous yellowish, composed of three rapidly enlarging whorls, which are convex, and separated by an impressed suture, which becomes very deep in the last half-whorl. The spire is very short, the summit obtuse, the first whorl being nearly flat. The last whorl enlarges rapidly, and is well rounded peripherally, less so below ; its last half descends rapidly. The aperture is quite oblique, nearly circular, but is angular above. The outer lip is thin, distinctly retracted at the upper insertion; the slightly concave columella is very strongly calloused within, flattened on the face. Below the umbilical perforation there is a narrow, crescentic, slightly excavated area, bounded outwardly by a low angle.

Alt. 1.5, diam. 1.75 mm.

Price Valley, Weiser Canyon, Washington Co., Idaho. Types no. 94273 A. N. S. P., collected by the Rev. E. H. Ashmun.

This species is smaller than any other of the genus, and is further distinguished by its very short spire and the rapid descent of the last half whorl. The columellar callus is unusually heavy for so small a shell.

SHELLS COLLECTED IN NORTHEASTERN MEXICO.

BY A. A. HINKLEY.

BULIMULIDÆ.

Oxystyla princeps Brod. Tampico and Valles. Only dead specimens secured.

UROCOPTIDÆ.

Macroceramus mexicanus Martens. El Abra.

Holospira hinkleyi Pils. El Abra, on the mountain side with *Opeas*.

PUPILLIDÆ.

Strobilops hubbardi A. D. Brown. Tampico, scarce in drift.

Pupoides marginatus Say. Tampico, drift.

Bifidaria contracta Say. Tampico, drift, the most abundant species.

Bifidaria pellucida Pfr., var. *hordeacella* Pils. Tampico, drift, almost as numerous as *B. contracta*.

Bifidaria procera Gld. Tampico, found under pieces of wood in an open field, also in the drift.

Vertigo milium Gould. Tampico, two specimens in the drift.

ACHATINIDÆ.

Opeas gracile Hutton. El Abra, plentiful on the mountain side.

Opeas beckianum Pfr. Tampico, drift.

Opeas micra Orb. Tampico, drift.

Leptinaria tamaulipensis Pils. Tampico, scarce in the drift.

Leptinaria mexicana Pfeiffer. Tampico, drift.

Spiraxis tampicoensis Pils.[1] Tampico, drift, numerous.

Cecilioides (Cæcilianopsis) jod Pils. Tampico, drift.

OLEACINIDÆ.

Euglandina corneola Binn. Valles, a few dead ones.

Euglandina texasiana Pfr. Tampico and Valles, found about decaying logs, the most plentiful species of this family. Pilsbry says "Not *G. turris*. I find that they agree fully with Texas examples."

Euglandina sp. Valles.

Streptostyla gracilis Pils. Tampico and Valles, dead specimens.

Salasiella joaquinæ Strebel. El Abra, one specimen.

ZONITIDÆ.

Guppya elegans Strebel. Tampico, a few in the drift.

Zonitoides minuscula Binney. Tampico, numerous in the drift.

Zonitoides singleyana Pils. Tampico, common in the drift.

Zonitoides pentagyra Pils. Tampico, drift.

Zonitoides elegantula Pfr. Tampico, drift. This minute species was not plentiful. Pilsbry says "This is *Helix elegantula* Pfr., very badly figured as *Chanomphalus elegantulus*, by Strebel. Hitherto not known north of Vera Crnz. It has about the size and general appearance of a *Radiodiscus*, but the embryonic whorl is without spiral striæ."

LIMACIDÆ.

Agriolimax sp. undet. Valles, scarce.

ENDODONTIDÆ.

Pyramidula victoriana Pils. Tampico, in the drift, mostly immature examples.

[1] This species appears to belong to the genus *Cœlostele*, which has not hitherto been known in America.—Ed.

SUCCINEIDÆ.

Succinea luteola Gould. In the vicinity of Tampico this species was numerous in a pasture; near Valles they were found along the wagon road, but more plentiful on a railroad embankment. They are richly colored, reddish with pale and dark streaks; some albino specimens were taken.

Succinea luteola Gld., var. *subtilis* Marts. Valles; only two examples taken.

Succinea sp. Tampico. Found in a loose pile of decaying vegetation and on the skull of a cow. The specimens taken are not quite as large as *S. luteola*, and are thinner.

VERONICELLIDÆ.

Veronicella sp. Valles; scarce, in shaded places.

CYCLOSTOMATIDÆ.

Adelopoma stolli Martens. Tampico. A single specimen found in the drift. Pilsbry says "This small species was described by Prof. Von Martens as *Diplommatina stolli*. This example is a little smaller than typical *stolli*, with weaker ribs and less swollen penult. whorl. The last whorl is gibbous above the columella, a character not noticed by Von Martens in his description of *stolli*. The number of riblets is about the same as in *stolli*, or perhaps somewhat greater. Until further examples are found the value of these differences from *stolli* is uncertain."

LYMNÆIDÆ.

Lymnæa cubensis Pfr. Valles. Taken from a pool by the roadside.

Planorbis cultratus Orb. Tampico. This small flat species was noticed in but one place; they were taken from the edge and underside of a piece of board and other driftwood lying on the land near the edge of a small pond. A few *Seg. obstructa* were taken with them.

Planorbis liebmanni Dkr. Tampico and Valles; only dead specimens found in river débris.

Planorbis sp. Tampico. A very small form found in the drift.

Segmentina obstructa Morelet. Tampico and Valles. A common species in ponds; dead ones were numerous in places in the drift.

Physa mexicana Phil. Tampico and Valles. Young shells were numerous in some of the shallow pools, the larger ones being rather scarce.

Physa osculans Hald., var. *rhyssa* Pils. Roadside pool near Valles with *Lym. cubensis*, the only place these two species were found. Differs from *P. mexicana* in having a more attenuate spire, one more whorl, and the body whorl is less inflated.

Physa sp. This is thicker than the *P. mexicana* and has the chestnut-colored callus within the outer lip, which in the larger examples shows at previous stages of growth.

Ancylus excentricus Morelet. Found on plants in Tamesi and Valles rivers; scarce; a fragile species.

VALVATIDÆ.

Valvata humeralis Say. Valles river.

AMNICOLIDÆ.

Cochliopa riograndensis Pils. & Ferr. Valles river. More elevated than *Valvata humeralis* and differs from it in having several colored spiral lines, giving it a striking resemblance to a small *Helix*. The operculum and teeth, examined by Dr. Pilsbry, show it to be correctly referred to *Cochliopa*. The aperture is angular above, thus differing from that of *Valvata*.

Amnicola guatemalensis C. & F. Tampico, on pieces of wood in ponds.

Amnicola tryoni Pilsbry. Tampico, drift; a smaller species than *guatemalensis*.

Potamopyrgus coronatus Pfr. Tamesi river, Tampico. The spines on the shoulder are well developed for so small a species.

Potamopyrgus coronatus texanus Pils. Valles river, only two examples secured, they do not show the spines.

Paludestrina tampicoensis Pils. & Hinkl. Tampico.

MELANIIDÆ.

Pachycheilus vallesi Hinkley. Plentiful in the Valles river.

UNIONIDÆ.

Unio tampicoensis Lea. Valles river.

Unio popei Lea. Valles river. Pilsbry says of these shells "I think they are correctly referred to *popei* Lea, as a variety. It differs from typical Texan *popei* in the dark nacre and the more distinct green rays. It is related also to *U. soledadensis* Crosse &

Fischer, but differs in the wide posterior end and the distinct rays. *U. soledadensis* was omitted by Simpson, evidently inadvertently. It should go in the *Synopsis* next to *U. popei*."

Unio sp. Valles river. The most plentiful *Unio* found. Dall referred it to *soledadensis*. Pilsbry says "A new species, related to *popei*, yet with some features of *U. medellinus*."

CYRENIDÆ.

Cyrena carolinensis Bosc. Panuco river, Tampico; found but few.

Cyrena germana Prime. Panuco river, Tampico. A single example, more compressed, and lighter colored, but possibly intergrades with *carolinensis*.

Pisidium singleyi Sterki. Valles river; Valles and drift of Panuco river, Tampico.

Eupera singleyi Pils. Valles river, Valles; and Tamesi river, Tampico.

MACTRIDÆ.

Mulinia lateralis Say. Panuco river.

PELSENEER'S TREATISE ON MOLLUSCA.

A TREATISE ON ZOOLOGY, edited by E. Ray Lankester, PART V, MOLLUSCA, by Paul Pelseneer, London, 1906. This admirable book, of 355 pages, should be studied by every conchologist, although it is not quite elementary, and some fundamental knowledge of zoölogy is required to fully understand it. The text is well illustrated by 301 figures, partly diagrammatic, many of them from Prof. Lankester's article "Mollusca" in the ninth edition of the Encyclopedia Britannica, 1883. It is interesting to note the considerable changes of classification from Lankester's article to the present book. The editor of the NAUTILUS may permit to cite the main groups here, side by side:

LANKESTER, 1883.	PELSENEER, 1906.
Branch A. Glossophora.	Grade A. Isopleura.
Class 1. Gastropoda.	Class I. Amphineura.
Br. *a*. Isopleura.	Grade B. Prorhipidoglossomorpha.
Br. *b*. Anisopleura.	Class I. Gastropoda.
Class 2. Scaphopoda.	Class II. Scaphopoda.
Class 3. Cephalopoda.	Class III. Lamellibranchia.
Br. *a*. Pteropoda.	Grade C. Siphonopoda.
Br. *b*. Siphonopoda.	Class I. Cephalopoda.
Branch B. Lipocephala.	
Class 1. Lamellibranchia.	

It is seen that the PTEROPODA have disappeared as a division of higher order; they are ranged under two tribes of the sub-order *Tectibranchia*, order *Opisthobranchia*, of Gastropoda (pp. 170 and 173).

Many conchologists and zoölogists may be surprised to find the class Lamellibranchia[1] ranged under the same group with the Gastropoda and Scaphopoda, as in contrast to the *Isopleura* and the *Siphonopoda*. It still appears that the arrangement as adopted by Lankester and other zoölogists, is more natural: Lipocephala or Acephala, and Cephalophora. Not alone is the presence or absence of a head a distinguishing feature. On pp. 6–7 the author says: "the radula is characteristic of the phylum mollusca. It exists throughout the series . . . and is only absent in the most specialized types, in which it has evidently been lost, such as . . . the Lamellibranchs . . ." If it was lost in the latter there should be traces of it in the embryo, the more so since the embryonal and larval stages of at least many Lamellibranchia are of very well marked forms and existing as such through a long time and under various conditions. Also for other reasons it might appear that the Lamellibranchia are not a specialized or retrograde group, *e. g.*, from the Gastropoda or some primitive form near them, as must be inferred from Pelseneer's arrangement, but one primitively different. At any rate, I believe that they represent a group of decidedly inferior organization, and that their proper place is not in the same group with the Gastropoda, and between the latter and the Cephalopoda. The formation, and especially the functions of the ctenidia (branchiæ), are certainly significant;[2] and although the Lamellibranchiata have been decidedly, and as it seems, definitely separated from the Bryozoa, etc., the fact should not be overlooked that the branchiæ of the former have not only the same functions—principally nutritive—as the tentacles of the latter, but that, in many instances at least, the filaments are of similar formation, even to minute details. Something else might be said in this connection: it is the tendency of our day to found classification on a single organ, or organ system—rather than on the ensemble of the whole organization.

[1] On p. 197 the author says that the name *Scaphopoda* has been more generally used than *Solenoconcha*, for the sake of uniformity; for that same reason he might have adopted the name *Pelecypoda* in place of *Lamellibranchia* (better: *Lamellibranchiata*).

[2] Confer also Lankester l. c., pp. 684 and 685.

While studying the book I made some notes on minor items, and a few of them may be mentioned here.

A somewhat strange incongruity is shown in the synoptic tables at the head of each class, that of the Isopleura is carried down to families, those of Gastropoda and Lamellibranchia to sub-orders (the tribes of the former are omitted), that of Cephalopoda to tribes. In a general way, the grouping is carried down to genera, giving shorter or longer diagnoses of the latter where it seemed desirable.

Pp. 7 and 89–91. Radula. It should have been stated that the radula with its teeth is constantly formed anew, and advancing; while the teeth at the anterior end are becoming blunt and useless, and dropping off, new teeth at the posterior end are formed. The whole radula is renewed several and probably many times during the life of a snail. Also it should have been said that at least in some Gastropods and probably in many of them, the first teeth on the radula of the embryo are of a shape entirely different from those of the post-embryonal animal.

P. 18. "The otocysts . . . contain auditory granules or otoliths." But in closing the paragraph, the author says: "through them the creeping molluscs preserve their orientation and swimming molluscs their equilibrium." I would emphatically endorse the latter view, as against the otocysts being auditory organs, their structure as well as location, in most mollusca, seems to point in that direction.

P. 186. *Physidæ* . . . "with a narrow aperture." How does that agree with forms like our *Ph. ancillaria*, etc.? Nothing is said about the radula so very different from those of other Basommatophora.

P. 186. *Zonites* evidently comprises[1] *Zonites* s. str., *Zonitoides*+ *Gastrodonta*, *Hyalina*, etc., (conf. p. 129, l. 4, *Zon. cellarius*); no mention is made of the differences of the genitalia, the foot, the radula, etc.

P. 187. *Helix* also is understood in the ancient, Pfeifferian sense, with "more than 4,000 species, a large number of sub-genera have been established," and some of them are cited. *Macroön* with its immense (probably meroblastic) ova might have been mentioned.

P. 188. *Pupa*, "shell cylindrical, dextral with obtuse summit . . . ." This will fit most of the *Pupilla*, *Orcula*, etc.; but how about most of the *Torquilla*, *Bifidaria*, *Pupoides*, etc., which are evidently included?

[1] According to English-French conchological—not political—coalition.

P. 253. "There are 1,000 *Unionidæ*," pp. 267–268, "*Unio*, Retzius, shell thick, hinge toothed [sic!]. This genus includes more than a thousand species." Seven other genera are cited, *e. g.*, *Anodonta*, *Quadrula*, but *Lampsilis* is not, although mentioned on p. 240. (A few points on the morphology and anatomy of *Unionidæ* will be reviewed elsewhere). That the larval embryo of the *Mutelidæ* is a lasidium, might have been added.

P. 251. In fig. 228 A it is surprising to find the brush- or candle-like processes of the soft parts of a glochidium designated as "teeth of the shell" (S); the figure and explanation are taken over from Lankester's article (fig. 149 A), after Balfour.

These few criticisms on details do not mean to detract from the merits of the book in a general way. It cannot reasonably be expected that a man writing a book on a certain large group of animals be familiar with every detail. V. Sterki.

FREDERICK STEARNS.

Frederick Stearns was born in 1832, and died in January of the present year. He was the founder of one of the greatest pharmaceutic establishments in this country. In 1887 Mr. Stearns retired from active business partly for the purpose of recuperating his health, which too strenuous devotion to business had somewhat impaired. The following years were devoted to travel abroad. Always observant and critical, he began as an amateur collector, and among his earliest achievements in this line is a magnificent collection of Japanese and Korean art objects, some 16,000 of which he donated to the Detroit Museum of Art—having a few years previously by his money and influence assisted in building the fine museum itself. Various smaller collections, such as coins, precious stones, etc., claimed his attention for a time. Then he took up conchology and devoted his time and money for several years to what was to him an absorbing diversion, and to science a work of great value. Over 10,000 species of shells classified and arranged in systematic order and catalogued are in the Detroit Museum as a monument to his activity in this line of human endeavor—almost a life-work in itself. His book, "Marine Mollusks of Japan," on which Dr. H. A. Pilsbry of Philadelphia collaborated, is a standard work based on his collection.

A considerable number of Japanese shells named after Mr. Stearns remind students of his labors on that fauna. Among invertebrates of other groups, he discovered *Scalpellum stearnsi*, a very large and handsome pedunculate barnacle.

SLOMAN ROUS.

Sloman Rous died at sea July 8, 1907. Mr. Rous had been ill for several months, and upon the advice of physicians resolved to return to his old home in South Africa at Port Elizabeth. He arrived at Southampton, and died when two days out from England on his way to Africa. He became very ill in the morning of July 8th, and expired in less than two hours.

Mr. Rous was born August 3, 1838, in England. He had lived the greater part of his active life in South Africa, where previous to the Boer war he accumulated a small fortune. The embargo, or what practically amounted to that, imposed by the Boers on imported articles ruined his business. He then came to the United States, which he had previously visited and, bringing with him a valuable collection of shells, opened a store in Jersey City, afterwards transferred to Brooklyn. He became well-known among collectors. His shells were desirable species, and the accuracy of his identifications was unquestioned. In South Africa he had devoted his leisure time to the gratification of his love of natural history. He made very important collections of South African insects, a large part of which were unfortunately destroyed, and he also contributed to a knowledge of the molluscan life of the Cape and the neighboring coasts. Many species of shells bear his name, and he almost or quite alone among dealers possessed specimens of the rare *Achatina* (*Cochlitoma*) *linteræ*, the locality of which is now deserted.

During the last five years of his life he was attached to the Department of Conchology in the American Museum of Natural History, New York. He was painstaking to the last degree, enthusiastic and discriminating. When disabled by his sickness—an asthmatic affection—he was engaged in studying the revision of the Amphibolidae, and was also at work revising the nomenclature of the collection of land shells.

Mr. Rous was a man distinctively strong and independent in thought, agreeable in address, and unfailingly courteous and considerate.—L. P. Gratacap.

THE NAUTILUS.

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ON A CYMATIUM NEW TO THE CALIFORNIAN FAUNA.

BY WM. H. DALL.

Having heard from Dr. R. H. Tremper that he had recently obtained from the fishermen of San Pedro, a species of *Cymatium* which could not be referred to any of the forms heretofore known from that region, he was requested to send the specimens for examination.

A careful study of it shows that it is different from any member of the group previously known from either coast of America, but so close to the Mediterranean "*Triton*" *corrugatus* Lamarck, that it seems impossible to separate it more than varietally.

Cymatium corrugatum var. Tremperi nov. Shell agreeing closely with *C. corrugatum* except in the following particulars: the periostracum in the latter is light colored, velvety, with the processes or hairs of a uniformly even length; in *Tremperi* it is blackish-brown, coarse, lamellose with, on the varices, strong, sparse, projecting hairs reaching 6 mm. in length. In all the specimens I have examined of the Mediterranean shell, there are, between the revolving primary ribs, numerous small subequal minor threads; while in *Tremperi* there are in the channels only one or two coarse, irregular, markedly larger riblets. The other differences are all apparently of an individual character. The shell measures: length 85; aperture, including the canal, 36; max. diam. 38 mm. There are five rather prominent axial ribs on the last whorl between the last pair of varices. The operculum is exactly like that of the Mediterranean form.

The animal was alive when captured, and was brought up from a depth of about 42 fathoms, bottom temperature about 51° Fahr. I have not been able to compare it with the *C. Krebsi* Mörch of the Antilles, which is said to have a short spire.

The discovery of this species adds another to the list of Mediterranean forms which reappear either directly or by closely related varieties or species, on the Pacific coast, attention to which had been called already by the late Dr. Philip Carpenter. Among them are:

California.	Mediterranean.
Cymatium var. tremperi,	C. corrugatum,
Leptothyra carpenteri,	L. sanguinea,
Gibbula canfieldi,	G. adriatica,
Williamia peltoides,	W. gussoni,
Arctonchis borealis,	A. celtica,
Leda cuneata,	L. cuneata,
Crenella decussata,	C. decussata,
Verticordia novemcostata,	V. novemcostata,
Lima orientalis,	L. tenera,
Zirphæa crispata,	Z. crispata,
Platidia anomioides,	P. anomioides.

To these many more might be added without stretching the comparisons unduly.

A NEW MEXICAN MUSSEL, LAMPSILIS FIMBRIATA.

BY L. S. FRIERSON.

LAMPSILIS FIMBRIATA, n. sp.

Shell large, elliptical, thin, and compressed. Dorsal line incurved in front of the beaks. Anterior margin somewhat obtruded, and obtusely pointed or sharply elliptically curved. Basal margin nearly straight, occasionally slightly arcuated. Posterior margin broadly roundly biangular. Beaks low, and without sculpture. Posterior ridge elevated, rounded and obsolete. The greatest diameter of the shell being about the center of the ridge. Sides flattened, and generally somewhat constricted in the middle. Behind the posterior ridge, down the siphonal area extends a raised line, enclosing a triangular area (having its apex at the beak) which is sculptured

with small pustules arranged in upcurved lines. Epidermis yellow, horn color, sometimes obsoletely rayed, on the posterior slope. The shell would seem to be nearly smooth, but in all the specimens seen there are numerous irregular, radial, pit-like impressions and concentric striae, and shallow sulci. The radial impressions or pits, extend through the shell, and are visible inside and out. Hinge ligament, stout and rather long. Muscle scars well marked, separate in front, confluent behind. Teeth stout, double in the left, and single in the right valve. Beak cavities shallow, with a row of muscle scars running downward, forward and onto the base of the cardinal tooth. Nacre white, flesh color or dark purple, very irregularly laid on, and very thin. Except in old shells, the prismatic structure extends far beyond the nacre, and the epidermal layer, in turn, extends still further.

Length 80, height 47, diameter 25 mm.

Habitat: Valles River.—Collected by Mr. A. A. Hinkley.

A cotype in coll. A. N. S. Phila., measures, length 81, height 51, diam. 22 mm.

The shell is not related very closely to any species that I know of. In fact I am undetermined whether to place it in *Lampsilis* or in *Nephronaias*. In the absence of any data regarding the animal, it is provisionally placed in *Lampsilis*. Mr. Hinkley informs me that it is near to, if not identical with an undescribed species labeled by Mr. Chas. F. Simpson as *Lampsilis salinasensis*, which however Mr. Simpson has not described, and which he informed me, he does not intend doing.

The prismatic layer is $\frac{3}{16}$ inch wide at the edge in some cases. This peculiarity accounts for the *pitting*, and numerous irregular sulcations being, it is evident not normal, but the result of numerous accidents which befall the extremely delicate edge of the shell.

Plate 12, two upper figures represent the type specimen; lower left-hand figure is a young shell.

THE GRAVID PERIODS OF UNIOS.

BY CHARLES H. CONNER.

About four years ago, I began to collect systematically data relative to the gravid periods of Unios. Some of the results are presented herewith, in the hope that they will be of interest.

The scene of most of my observations has been along the Delaware river and Big Timber creek, in the vicinity of Newbold and Washington Park, New Jersey.

All along the extensive flats there mussels abound, and their empty shells lie scattered along the banks in thousands.

For the purpose of these observations I have made it a point to patrol that section at low tide some time during every month of the year.

The work has been attended by many disadvantages, otherwise I should have been able to present a complete record of the matter.

The varying periods during which the glochidia are extruded by the various species, tends (so it appears to me) to effect their distribution; those spawning when fish are migrating, for instance, would have their distribution extended farther, or more rapidly than other species. Of the species hereabouts, *Unio complanatus* (Sol.), has given me the best results for the labor expended. My records show that they are gravid but once annually, from April–May to July–August, or, approximately, during four months of the year.

I have found *Lampsilis radiatus* (Gmelin), and *Unio nasutus* (Say) gravid all the year around. Both appear to spawn in June and November, if not also at other times. All the individuals do not spawn at the same time. On June 22, 1907, I found some *U. nasutus* with the gills half empty, and some still full.

Anodonta cataracta (Say) is gravid about eight months in the year, the interim occurring during the warm period (May–October). I have found them gravid as late as May 27, and as early as October 13. I have found them spawning the latter part of December, to the early part of January * which indicates approximately, as is the case with *U. complanatus*, a gravid period of about four months.

I have had the good fortune to discover the use of the byssus also. I isolated a gravid specimen in an aquarium, and when the glochidia were extruded, using a magnifying glass, I discovered several of them, with the valve opened wide, hanging suspended by the byssus, from the *Anacharis canadensis* plants with which the aquarium was stocked.†

From further observations it appears that they hang thus sus-

* NAUTILUS, Vol. XIII, pp. 142.

† April 19, 1905, *Anodonta cataracta*, SAY.

pended, and when a passing fish touches them they fasten upon it by means of the hooks, and the glochidium is wrenched from its mooring. I observed frequently the sudden jump which my goldfish made, and I afterwards found glochidia attached to them.

A NEW ZONITOID SHELL FROM THE MIOCENE, FLORISSANT COLORADO.

BY T. D. A. COCKERELL.

Although fresh-water shells (*Lymnea*, *Planorbis* and *Sphœrium*) are abundant in the Florissant shales, terrestrial species are extremely rare. In 1906 we found a species of *Omphalina*, in a fragmentary condition. The 1907 expedition has yielded a better-preserved specimen which is referred to *Vitrea*.

VITREA FAGALIS n. sp.

Diameter 7 mm.; with seven and a half closely coiled whorls, the first three not increasing at all, but having a uniform diameter of about 340 micromillimeters; the fourth barely larger, diam. about 357 m.; the fifth with diam. about 391 m.; the sixth twice as broad as the inner ones; the seventh much larger, diam. 1 ¾ mm. Last whorl very smooth and shining, not or hardly striate, but inner whorls delicately striate, with the exception of the apical whorl and a half, which are quite smooth. Spire gently convex, the sides regularly ascending to the apex. No internal lamellæ, so far as can be seen. One example, with reverse; on a slab with a leaf of *Fagus*, showing that it probably lived in the proximity of that tree.

This shell appears to be a *Paravitrea*, very close in all respects to *Vitrea andrewsæ*. In the number of whorls and absence of internal lamellæ, it is like *V. placentula;* but the whorls appear to be more closely coiled than in that species, and the radial sculpture is much closer and less regular.

The resemblance of the Florissant flora to that of the uplands of the southeastern states has already been noted; the discovery of *Vitrea fagalis*, and the previous finding of *Omphalina*, point in a similar direction.

A NEW CALIFORNIAN VERTIGO.

BY V. STERKI.

VERTIGO OCCIDENTALIS, n. sp. Plate XI, fig. 2.

Shell of the shape, size and appearance of a smaller *Vert. ovata* Say, but perforated; short ovate, chestnut-colored, transparent; slight impressions over the palatal folds, no crest, no callus inside; lamellæ and folds: parietal and angular close together, coherent, short, low, somewhat massive; columellar only indicated by a slight, angular projection; the two palatals quite small, short, the upper closer to the margin. Alt. 2 mill. Soft parts not seen.

Habitat: San Bernardino Mts., California, at alt. 7600 feet, collected in the summer of 1907, by Mr. S. S. Berry, one specimen.

It is rather inopportune to establish a species on a single specimen. But the one seen is mature, with no trace of a deformity, and with all its external resemblance to *V. ovata*, is evidently distinct. It has been carefully compared with many *ovata* from New Mexico, Arizona, California e. g., the Cuyamaca Mts. near San Diego, to Montana and Washington, etc. None of them was perforated, and the lamellæ and folds of *occidentalis* are different as to size, shape and location from those of *ovata*, even in immature specimens. It has been pointed out, years ago, that their location and shape are of more consequence than their mere presence or absence, at least in some forms.

NOTES.

Specimens of *Planorbis magnificus* Pilsbry have been kept alive in small aquaria at the National Museum for more than a year. Those which were adult when collected in 1906 (October) are all dead, apparently from old age, but before dying they left progeny now about six months old and one-third grown. It is therefore probable that the life of the species is about two years in length. The young have well-pigmented eyes, in the usual situation, but in the adult these have so degenerated that no trace of pigment or lens is visible in the living animal by transmitted light. Their favorite food is lily-pads, which they devour with great rapidity and on the lower surface of which they are most likely to be found.—W. H. DALL.

Among common "beach-stuff" from the Florida Keys the writer recently found a well-preserved sinistral specimen of *Marginella apicina* Menke, in excellent condition.—W. H. Dall.

Mr. E. W. Gifford of Alameda, California, while collecting on the "planted" oyster beds of San Francisco Bay last July, found *Ilyanassa obsoleta* Say living in abundance. This is the first time it has been reported from the coast. The drills, *Urosalpinx cinereus*, which had previously been numerous, seemed to have all died, at least none living were found.—W. H. Dall.

Messrs. Ferriss and Daniels have just returned from a collecting trip in Arizona. Several new and interesting species of *Sonorella* and *Ashmunella* are among the spoils. Some account of the expedition will be given next month.

Helix hortensis on Bass Island, Me.—While at Kennebunkport, Me., this summer, Mr. John B. Henderson discovered that Bass Island at Cape Porpoise was well stocked with *H. hortensis*, so I made a trip over there, and in about an hour collected seventy-five specimens. The ground and weeds were covered with young shells, but the adults were not so plentiful, as the field mice (?) are good collectors and make a specialty of fine large shells, and when they get through with them the shells are of very little use to the two-legged collector. Also saw a good many *Polygyra albolabris*, which had been eaten, but only found one alive. The specimens of *Helix hortensis* show the following variations:

Bands.		*No. Specimens.*
12345		19
12345	Transparent bands, Var. *arenicola* MacGill.	4
12300	Transparent bands, faint.	1
00345	Transparent bands, faint.	1
12345	(Two broken, almost gone).	1
00300	Band distinct.	3
00300	Band faint and broken, but in most of them the band is more or less transparent, some also show traces of other transparent bands.	35
00000	Yellow.	9
00000	Whitish.	2
Total		75

Band 3 is the one most persistent, and even in the shells which I have put down as 00000 yellow there is a very faint indication of it. In many of the 35 this band shows as a distinct patch back of the lip, with fragments at other places, while the balance of the band is more or less transparent as in Var. *arenicola.*

At Bar Harbor and on Bar Island, Frenchman's Bay, Mr. Henderson and I collected a number of *hortensis* all of which are 00000, and of a bright canary yellow.—Geo. H. Clapp.

Shells of La Jolla, California.—Having read an article in the Nautilus by my friend Mr. Maxwell Smith about the conchology of La Jolla, Cal., I send a list of a few species which were not mentioned in Mr. Smith's article, but which I think are of interest in this connection, as one species has not been found in California before to my knowledge.

Zirphaea crispata.
Nettastomella darwinii.
Macoma secta.
Modiola recta.
Bryophila setosa. One collected by Mr E. P. Rawle of Philadelphia.
Leda hamata.
Yoldia cooperi.
Dentalium pretiosum.
Chromodoris porterae.
Hopkinsia rosacea.
Diaulula sandiegensis.
Triopha maculata.
Aplysia californica.
Circinaria transfuga.
Marginella regularis.
Eulima bistorta.
Eulima compacta.
Odostomia terricula.
Crucibulum imbricatum.
Crepidula excavata.
Acmaea pelta var. nacelloides.
Acmaea pelta.

Neritina sp. indet. (perhaps picta?) One specimen found by Mrs. Frank Pierce of Madison, Wis.

Leptothyra bacula.

Calliostoma gloriosum.

Ethalia invallata.

Haliotis cracherodii.

Nuttallina californica.

Octopus punctatus.

These species have all been collected by me except where otherwise noted. I was unable to compare the *Neritina* with any authentic specimens, but Mr. Kelsey, of San Diego, to whom I mentioned it, said that he had not heard of any Neritina found so far north, but thought it might be *N. picta.* The specimen of *Nuttallina californica* Reeve was a seven-valved individual.

JOSHUA L. BAILY, JR.

CHARLES AUSTIN DAYTON.—We regret to announce the death of Mr. C. A. Dayton who died at his residence in Brooklyn, N. Y., Nov. 7, 1907.

Mr. Dayton was a lifelong admirer and collector of shells, and was widely known through his correspondence with collectors. He was the first president of the Brooklyn Conchological Club and a regular attendant at its meetings until his recent illness confined him to his home. He possessed in high degree all those qualities which make the honored citizen and the esteemed friend.—SILAS C. WHEAT.

A CONTRIBUTION TO THE FAUNA OF THE COAST OF LOUISIANA. —By L. R. Cary (Gulf Biologic Station Bull. No. 6, Cameron, La.). A considerable list of mollusks is given, pp. 54–58.

BULLETIN OF THE BUFFALO SOCIETY OF NATURAL SCIENCES, Vol. VIII, No. 6 (1907) contains an interesting historical sketch of the Society, illustrated with portraits of the presidents and other men of science prominent in its annals.

PROPOSALS FOR AN AMERICAN CONCHOLOGICAL SOCIETY.

The Brooklyn Conchological Club, which has maintained a successful organization for several years, proposed last May the formation of a society of national scope, appointing a committee to form a preliminary organization. This committee elected the following officers: President, Dr. H. A. Pilsbry, Philadelphia; Vice-President, Louis A. Gratacap, New York; Treasurer, Silas C. Wheat, Brooklyn; Secretary, Maxwell Smith, New York. These officers to serve until a permanent national organization can be formed.

At the International Zoölogical Congress held in Boston in August, those interested in mollusks held an impromptu meeting, and appointed the following committee to consider the question of organizing a society: Dr. W. H. Dall, Dr. H. A. Pilsbry, Elizabeth J. Letson, Silas C. Wheat, John Ritchie, Jr.

If sufficient interest in the proposed society is manifested a permanent organization will be effected. A general expression of the feeling among conchologists towards the project is desired.

Suggestions may be sent by those interested to Mr. Maxwell Smith, Secretary, 265 West 72d street, New York City, or to the Editors of THE NAUTILUS. It is hoped that some abstract of the responses may be received in time for publication in the issue of January 1st next.

Dr. Dall, Chairman of the Boston Committee, has drafted the following:

MEMORANDUM OF SUGGESTIONS FOR THE ORGANIZATION OF AN AMERICAN CONCHOLOGICAL ASSOCIATION OR SOCIETY.

NAME.—The AMERICAN Conchological Society would be better than "NATIONAL," as Mexican, Cuban, or Canadian members, whom it would be desirable to include, might object to the term "National" as excluding them.

OFFICE.—To promote intercourse between the students of Mollusca, recent or fossil, in North America, the Antilles and Hawaii; to encourage the study of Mollusks by meetings and publications, or other means suitable for the purpose, and to interest the general public in the study of shells.

OFFICERS.—The officers shall comprise a president, a vice-president for each section, a general secretary and a treasurer, and an executive council consisting of nine members.

MEMBERS.—The membership of the Society shall be divided into the follow-

ing classes: Patrons, life members, active annual members, associates, and corresponding members. A limited number of honorary corresponding members may be authorized by the council if deemed desirable.

Qualifications.—A patron shall be a donor to the Society of any sum exceeding the total of two life-membership fees, and shall be entitled to all publications of the Society and to receive gratis any periodical which may be distributed, as its organ, to the members by the Society. A life membership may be secured by the payment to the Society's treasurer of the sum of one hundred dollars; active membership by the annual payment in advance of the sum of five dollars;[1] associate membership by the annual payment in advance of one dollar and a half by American associates and two dollars by foreign associates or corresponding members. Honorary members may be relieved of payment at the time of election by the vote of the executive council.

All members shall be nominated to the council by the application of any three members or associates in good standing through the secretary, and shall be elected by a majority vote of the council, but no election shall be deemed effective until the treasurer has received the first annual subscription from the nominee, and the publications of the Society shall not be sent to any member subsequently, more than two months in arrears. All membership fees shall be due and payable at the beginning of the year, and no subscription for the benefit of any member or associate to the organ of the society shall be made by the treasurer until this annual fee shall have been paid.

Sections.—To facilitate local intercourse by meetings or otherwise, the Society may establish sections for the members of the Atlantic coast, Pacific coast and Mississippi valley (or other) regions. Meetings within each sectional area may be arranged by the local sectional vice-president, and the members of the section may elect temporary officers, except the vice-president when present, and by a majority vote assess such local subscriptions as may be needed to carry on local work in addition to the regular annual fees.

Nominations and Elections.—Owing to the scattered distribution of the membership, voting may be by ballot mailed to the secretary, who shall announce the result through the organ of the Society, in the number next following the limit fixed for counting the vote, but no votes by proxy shall be accepted.

Nominations for officers may be made by any three members or associates, so as to be announced at least one month before the annual election in the Society's organ. Nominations for membership may be made at any time, but at least one month before they are to be acted upon.

The secretary, treasurer and members of the executive council shall be active or life members, and serve until the election of their successors. Elections shall be annual. The president, vice-presidents, secretary and treasurer shall

[1] Members of the Brooklyn Club and some others think the annual dues would better be fixed at two or three dollars.

be ex-officio members of the Council. The term of office for the members of the Council (not ex-officio) shall be three years, but three members shall retire each year, and of the nine members elected to the Council at the first election three shall serve one year, three two years, and three the full term, the individuals to be determined by lot; after which three members shall be elected annually.

The Council.—The Council shall conduct the business of the Society, elect members, control expenditures, audit the treasurer's accounts, prescribe the duties of Secretary and Treasurer, make rules or by-laws to carry out the details of the organization of the Society, and shall annually report to the Society at least one month before the annual election. All new members or associates shall be elected by a majority vote of the Council, not less than five members constituting a quorum.

Active Members.—Active members shall be elected from those persons actively engaged in research, the collection, or the study of the Mollusca, and their qualifications shall be stated in the nomination papers. Associates may be any one of good character interested in the general subject or the study of natural history. Corresponding members shall be residents of foreign countries.

Official Organ.—The Council may select a periodical, not issued by the Society, as its official organ, and may from the annual fees pay such subscription for the several members and associates as may be arranged for with the proprietors of such periodical.

Amendments to the Constitution and By-Laws.—The constitution may be amended by a majority vote of the life and active members at any annual meeting, provided notice of the proposed amemdment shall have been given in the official organ at least three months previously. Amendments to the by-laws may be made at any meeting of the Council called for the purpose, at least one month's notice having been given to the members of the Council.

Permanent Funds and Expenditures.—The sums paid in by patrons and life members shall be invested and constitute a permanent fund, of which the interest only shall be available for expenses as directed by the Council. All expenditures must be authorized and all investments approved by a vote of the Council, which shall have the Treasurer's accounts annually audited, the result to be included in the annual report to the Society.

Loss of Membership.—Any member or associate two months in default in his annual subscription shall be notified by the Secretary, and any member or associate who shall be over one year in arrears shall, *ipso facto*, lose membership; provided that, on a majority vote of the Council and payment of all arrearages, such member or associate may be reinstated without a formal re-election.

The Nautilus.

Vol. XXII. JANUARY, 1908. No. 9.

POMATIOPSIS ROBUSTA N. SP.

BY BRYANT WALKER.

Shell ovate-conic, perforate, smooth and shining, lines of growth subobsolete; light greenish-yellow becoming lighter towards the apex; spire elevated, apex blunt, the initial whorl being perceptibly flattened. Whorls 5½, convex, with a well impressed suture, body whorl large and inflated. Aperture ovate, narrow above and well rounded below, between one-third and one-half of the length of the shell; peritreme continuous and adnate to the parietal wall above the perforation; lip sharp.

Alt. 6, diam. 3½ mm.

Jackson Lake, Wyoming.

Type in the collection of A. A. Hinkley, Du Bois, Ill.

Although only a single specimen of this species was found, it is so obviously distinct from any of the known species of the genus, that I do not hesitate to describe it.

It is a much stouter shell than *P. hinkleyi* and differs from both that and *californica* in the less convex whorls and less impressed suture. In these particulars it resembles more *P. lapidaria*, but differs from that entirely in shape. The narrow perforation and sharp lip as well as the general contour easily separate it from *P. cincinnatiensis*.

A COLLECTING TRIP AT NORTHPORT, N. Y.

BY WM. H. WEEKS, JR.

It was my good fortune to have a vacation during the month of October, and I decided to go to Northport, in search of shells. Northport is situated on a fine harbor on the north shore of Long Island, some forty miles from New York City. The conchologist here has a fine field before him for work, and if not easily discouraged, shore-collecting will yield good results. It usually means however long tramps each day of some five to ten miles. I expected to use the dredge but could not make satisfactory arrangements. It is here that the scallop (Pecten borealis) abounds, but this year only small quantities have been brought in by fishermen, and the much-prized red variety is decidedly scarce.

Where I had found some five years ago countless numbers of *Crepidula convexa* on the beach not a specimen was to be seen, but a few were gathered at low tide from dead specimens of *Litorina littorea* and *Nassa obsoleta*. *Mya arenaria* were everywhere on the beach in fine order, and also many *Ensis directus*. Usually one has to dig for them. *Lævicardium mortoni* were found in small colonies and seemed to be larger than usual. Numerous odd valves of *Astarte undulata* were taken at low tide. It is evidently a deep-water species. No search was made for land shells. The following is a list of species obtained:

Ostrea virginica Gmel., cultivated extensively.
Anomia simplex Orb., abundant.
Pecten gibbus var. borealis Say, fairly common.
Mytilus edulis Linn., abundant.
Modiolus modiolus Linr., scarce.
Modiolus demissa var. plicatula Lam., abundant.
Arca transversa Say, abundant.
Arca pexata Say, abundant.
Astarte undata Gld., odd valves.
Laevicardium mortoni Conr., fairly common.
Venus mercenaria L., abundant.
Petricola pholadiformis Lam., fairly common.
Tellina tenera Say, one specimen.
Macoma balthica Linn., scarce.

Ensis directus Conr., abundant.
Spisula solidissima Dillw., fairly common.
Mulinia lateralis Say, scarce.
Lyonsia hyalina Conr., scarce.
Mya arenaria Linn., common.
Busycon canaliculata Say, fairly common.
Busycon carica Gmel., fairly common.
Nassa trivittata Say, fairly common.
Nassa obsoleta Say, very abundant.
Nassa vibex Say, scarce.
Astyris lunata Say, scarce.
Eupleura caudata Say, scarce.
Urosalpinx cinereus Say, common.
Odostomia trifida Totten, scarce.
Bittium nigrum Stimp, common.
Litorina rudis Donov., common.
Litorina littorea Linn., very common.
Crepedula fornicata Linn., common.
Crepedula plana Say, common.
Crepedula convexa Say, scarce.
Neverita duplicata Say, fairly common.
Chaetopleura apiculata Say, scarce (usually on oysters).

A LIST OF THE LAND SHELLS OF LEE COUNTY, FLORIDA.

BY E. G. VANATTA.

The following species were collected in Lee County, Florida, by Mr. Clarence B. Moore. The smaller forms were picked from leaf-mould sent in bags, each with the exact locality carefully marked on it.

Practically nothing has been known hitherto of the land-snail fauna between Key Marco and Cape Florida, the Ten Thousand Island region being accessible only to the collector cruising in his own boat.

It is interesting to note the occurrence of *Bifidaria rhoadsi* Pils. and *Vertigo variolosa* Gld. on the west coast of Florida; also that many of the shells of *Zonitoides minuscula* Binn. have internal

laminæ or teeth. The use of the name *Euglandina rosea* Fér. instead of *Glandina truncata* has been explained by Dr. Pilsbry in the last number of the Manual of Conchology, p. 191. All the specimens listed are in the collection of the Academy of Natural Sciences of Philadelphia.

Blue Hill Id., near Goodland Point, Marco Key.

Truncatella bilabiata Pfr.
Thysanophora selenina Gld.
Polygyra cereolus f. carpenteriana Bld.
Polygyra uvulifera Shutt.
Drymæus multilineatus Say.
Euglandina rosea Fer.
Euglandina rosea parallela Binn.

Buttonwood Key.

Polygyra cereolus f. carpenteriana Bld.
Bifidaria p. hordeacella Pils.
Bifidaria rupicola Say.
Zonitoides singleyana Pils.

Chokoloskee Key.

Pupoides modicus Gld.
Bifidaria rupicola Say.
Zonitoides minuscula Binn.

Dismal Key.

Truncatella bilabiata Pfr.
Helicina orbiculata Say.
Thysanophora plagioptycha Shutt.
Polygyra cereolus f. carpenteriana Bld.
Strobilops hubbardi A. D. Brown.
Pupoides modicus Gld.
Bifidaria rhoadsi Pils.
Bifidaria p. hordeacella Pils.
Bifidaria rupicola Say.
Microceramus floridanus Pils.
Euglandina rosea parallela Binn.
Vitrea dalliana ' Simpson ' Pilsbry.
Guppya gundlachi Pfr.
Zonitoides minuscula Binn.
Zonitoides singleyana Pils.

Fakahatchee Key.

Truncatella bilabiata Pfr.
Helicina orbiculata Say.
Thysanophora selenina Gld.
Polygyra cereolus f. carpenteriana Bld.
Pupoides modicus Gld.
Bifidaria rupicola Say.
Microceramus floridanus Pils? (young).
Drymæus (young multilineatus Say?)
Drymæus dominicus Rve.
Euglandina rosea Fer.
Euglandina rosea parallela Binn.
Vitrea dalliana 'Simp.' Pils.
Guppya gundlachi Pfr.
Zonitoides minuscula Binn.

Georgia Fruit Company's land, S. of Marco.

Praticolella jejuna Say.
Vitrea dalliana 'Simp.' Pils.
Guppya gundlachi Pfr.

Gilberts (near Matanzas Pass).

Polygyra cereolus f. carpenteriana Bld.
Pupoides modicus Gld.
Bifidaria p. hordeacella Pils.
Bifidaria rupicola Say.
Vitrea dalliana 'Simp.' Pils.
Guppya gundlachi Pfr.
Zonitoides minuscula Binn.
Zonitoides singleyana Pils.

Goodland Point, Marco Key.

Polygyra c. f. carpenteriana Bld.
Bifidaria p. hordeacella Pils.
Euglandina rosea Fer. (near parallela Binn.)
Zonitoides minuscula Binn.
Succinea floridana Pils.

Little Marco.

Truncatella caribæensis succinea C. B. Ad.
Truncatella bilabiata Pfr.

Helicina orbiculata Say.
Helicina orbiculata var. clappi Pils. Mss.
Thysanophora plagioptycha Shutt.
Polygyra cereolus f. carpenteriana Bld.
Polygyra uvulifera Shutt.
Bifidaria contracta Say.
Bifidaria p. hordeacella Pils.
Bifidaria rupicola Say.
Vertigo variolosa Gld.
Microceramus floridanus Pils.
Euglandina r. parallela Binn.
Vitrea indentata Say.
Vitrea dalliana ' Simp ' Pils.
Guppya gundlachi Pfr.
Zonitoides minuscula Binn.
Zonitoides singleyana Pils.

Marco, N. end of Marco Key

Polygyra cereolus f. carpenteriana Bld.
Bifidaria p. hordeacella Pils.
Bifidaria rupicola Say.
Euglandina rosea Fer.
Euglandina rosea parallela Binn.
Vitrea dalliana ' Simp.' Pils.
Guppya gundlachi Pfr.

Mound Key, Estero Bay.

Truncatella caribæensis succinea C. B. Ad.
Truncatella bilabiata Pfr.
Helicina orbiculata Say.
Thysanophora plagioptycha Shutt.
Polygyra cereolus f. carpenteriana Bld
Pupoides modicus Gld.
Bifidaria contracta Say.
Bifidaria p. hordeacella Pils.
Bifidaria rupicola Say.
Euglandina rosea parallela Binn.
Euglandina rosea minor Binn.
Guppya gundlachi Pfr.
Zonitoides minuscula Binn.
Succinea floridana Pils.

Nameless Key (Mr. Addison's) two miles east of Marco.

Helicina orbiculata Say.
Thysanophora selenina Gld.
Polygyra cereolus f. carpenteriana Bld.
Pupoides modicus Gld.
Bifidaria contracta Say.
Bifidaria p. hordeacella Pils.
Bifidaria rupicola Say.
Microceramus floridanus Pils.
Euglandina rosea parallela Binn.
Vitrea dalliana 'Simp' Pils.
Guppya gundlachi Pfr.
Zonitoides minuscula Binn.
Zonitoides singleyana Pils.

Near Punta Rassa.

Truncatella bilabiata Pfr.
Polygyra cereolus f. volvoxis Pfr.
Euglandina rosea parallela Binn.

Aboriginal shell-heap about one mile east of St. James, Pine Island.

Truncatella clathrus Lowe.
Truncatella caribæensis 'Sby.' Rve.
Truncatella caribæensis succinea C. B. Ad.
Truncatella bilabiata Pfr.
Praticolella jejuna Say.
Polygyra cereolus f. volvoxis Pfr.
Bifidaria p. hordeacella Pils.
Bifidaria rupicola Say.
Guppya gundlachi Pfr.
Zonitoides minuscula Binn.
Zonitoides singleyana Pils.

Pine land, N. W. end of Pine Island.

Helicina orbiculata Say.
Bifidaria contracta Say.
Bifidaria p. hordeacella Pils.
Bifidaria rupicola Say.
Euglandina rosea Fer. near var. parallela Binn.
Guppya gundlachi Pfr.
Zonitoides minuscula Binn.

N. E. end Pine Island, Lee Co., Florida.

Euglandina rosea parallela Binn.

Russell's Key.

Helicina orbiculata Say.
Helicina orbiculata var. clappi Pils. Mss.
Thysanophora selenina Gld.
Thysanophora plagioptycha Shutt.
Polygyra cereolus f. carpenteriana Bld.
Pupoides modicus Gld.
Bifidaria p. hordeacella Pils.
Bifidaria rupicola Say.
Microceramus floridanus Pils.
Euglandina rosea parallela Binn.
Guppya gundlachi Pfr.
Zonitoides arborea Say.
Zonitoides singleyana Pils.

Turner Place, Turner River (a key near Chokoloskee).

Truncatella bilabiata Pfr.
Polygyra cereolus f. carpenteriana Bld.
Polygyra uvulifera Shutt.
Bifidaria rupicola Say.
Microceramus floridanus Pils.
Euglandina rosea parallela Binn.
Vitrea indentata Say.
Zonitoides minuscula Binn.

About five miles up Whitney River (mainland).

Polygyra cereolus f. carpenteriana Bld.
Bifidaria rupicola Say.
Euglandina rosea parallela Binn.
Guppya gundlachi Pfr.

Wiggins' Key, Sandfly Pass.

Euglandina rosea parallela Binn.

Lossman's Key.

Euglandina rosea minor Binn.

CANCELLARIA OBTUSA DESH.

BY SLOMAN ROUS.

Among some shells handed to me by my friend Mr. D. W. Ferguson, of Brooklyn, is a specimen of *Cancellaria obtusa* Desh. Tryon writing in 1885 says (Man. of Conch., Vol. VII, p. 68): "The unique specimen formed part of the Cumingian collection. Hab. unknown." As far as I am aware no other specimen has since been recorded, and it seems worth while to note the appearance of another specimen and at the same time to amplify the somewhat meager description given in the Manual.

The specimen is unfortunately what is called a dead shell but it retains its color and is perfect, its principal imperfection being a worm groove in the aperture, but this in no way detracts from showing its characteristics and the species can be perfectly described from the specimen.

Spire much depressed, regularly spirally costate, the ridges flattened, the intervening grooves about half the width of the ridges, growth lines somewhat obsolete, but deeply pitted where they cross the spiral grooves; light yellowish-brown; whorls three; rather narrowly umbilicate, columellar plications three, the inferior somewhat obsolete, upper part of aperture very heavily calloused, aperture white. Lon. 24, lat. 18 mm. Hab. Panama.

Mr. Ferguson received this specimen with a number of other species from Mr. McNeill, well known as a collector of shells of Central America, Panama, etc. All were labeled Panama, and all the other species were undoubtedly Panama shells. I think there is but little doubt but that this habitat will prove correct.

NOTES.

MUREX CARPENTERI, FORM ALBA.—During the past year the fishermen of Newport, Orange County, California, have brought up a number of specimens of *Murex carpenteri* Dall, in their nets. Most of them are the ordinary form, but among them are two or three specimens of a pure white color, showing little or none of the usual brownish coloration so characteristic of the species. This is a really beautiful variation, but as yet it seems to be very rare. Ac-

cording to the usual custom, this form may be referred to as the form or variety *alba*.—S. S. Berry.

Triton gibbosus Brod., in California.—Ralph Arnold in The Paleontology and Stratigraphy of San Pedro, quotes the range of the living *T. gibbosus* as West Tropical America and Panama. At this time Dr. Dall supposed that a single example from San Pedro Bay had been washed from the fossil beds on the beach. Another writer reports the species from San Pedro Bay (see Nautilus, Vol. VII, p. 75). At the time I brought the La Jolla material together (Nautilus, September, 1907), three specimens were secured by Miss Mary A. Williams, Joshua L. Baily and myself. These were not included in the L. J. list, as at the time the identity was doubtful. The species can now safely rank in the fauna of the state.—Maxwell Smith.

Shells of the Lake Region of Maine.—The following mollusks were collected at Capens, Deer Island, Moosehead Lake, during July, 1907: *Polygyra fraterna* Say, *P. albolabris* Say, *P. sayana* Pils., *P. dentifera* Binn., *Vitrea hammonis* Ström., *Euconulus fulvus* Müll., *Zonitoides arborea* Say, *Pyramidula alternata* Say, *P. cronkhitei anthonyi* Pils., *Sphyradium edentulum* Drap., *Succinea ovalis totteniana* Lea, *Philomycus carolinensis* Bosc., and *Planorbis bicarinatus* Say.—C. W. Johnson.

Mollusca of La Jolla, California.—To the lists which have appeared in the Nautilus, the following nudibranchs may be added:

Chromodoris macfarlandi Ckll. Forms a distinct subgenus or genus.

Chromodoris californiensis Bergh (*universitatis* Ckll.).

Archidoris montereyensis Cooper (?). Specimens immature.

Cadlina flavomaculata McFarl.

Cadlina marginata McFarl. (?). Specimens small.

Doridopsis nigromaculata C. & E. (*vidua* Bergh, var. (?).

Thecacera velox Ckll.

Several others have been found at San Pedro and San Diego, and, therefore, may be expected at La Jolla.

In the Journal of Malacology, 1905, p. 42, is given a brief account of a new *Triopha* from San Pedro. No specific name was offered, because the notes on the external characters had been mislaid.

These have now been recovered, and the animal may take the name originally given in MS., *Triopha aurantiaca*. It is close to *T. carpenteri* Stearns, in external characters, but instead of being white it is orange, with the appendages tipped with vermilion.—T. D. A. COCKERELL.

HENRY VENDRYES.

Mr. Henry Vendryes, well known to students of the Jamaican fauna, died at Kingston, Jamaica, Nov. 20, 1907, in his 86th year.

Mr. Vendryes was of French extraction, his father having served with Napoleon, and was born on the island Oct. 30, 1822. He became a student of law with Donald Campbell, a noted solicitor of that day. After making a temporary experiment as a business man, he soon returned to his first choice. In 1879 he was appointed an advocate of the Supreme Court, and was offered but declined the position of resident magistrate on the island. He distinguished himself in private practice of the law, and was for a time the editor of a local paper now extinct, the "Colonial Standard." His accomplishments in music were exceptional, but it is as a conchologist and the friend of conchological students interested in the Jamaican fauna that the readers of the NAUTILUS will chiefly remember him. He contributed largely to the cabinets of Adams, Chitty, Bland, Guppy and others as their publications show, and was most courteous and generous in extending aid to all who were interested in his special science. He leaves a large family connection. He suffered serious financial losses by the Kingston earthquake, and his uniquely complete collection of Jamaican shells and fossils has been offered for sale, particulars of which can be learned from his late partner and son-in-law, Mr. R. W. Bryant, of Kingston. W. H. DALL.

SOME PERSONAL RECOLLECTIONS OF HENRY VENDRYES.

BY J. B. HENDERSON, JR.

The news of Henry Vendryes' death in Kingston, Jamaica, a few weeks ago has awakened many pleasant memories of his personality. On our collecting trips to Jamaica, Mr. Simpson and I always paid our respects to this veteran conchologist, and we passed many pleas-

ant hours in his "shell room" inspecting his large collections and enjoying his generous hospitality.

Mr. Vendryes was then—ten years ago—an old man carrying somewhat unsteadily the weight of seventy-five years, but he radiated about him the indefinable charm of the gentleman of the old school. He talked freely of days in the field with C. B. Adams, Chitty and Gloyne, those forefathers of Jamaican conchology, and the spirit of their work and methods remained with him, for he evolved with difficulty from that conchological era when every roundish land shell was a Helix, and every marine shell with a long canal stood firmly on the name of Fusus.

The large collections which he brought together were almost wholly made up of Jamaican and Haitan forms both marine and land. They were large and of undoubted scientific value, although their beauty was marred by the presence of too many dead and worn specimens of the commoner species which he seemingly lacked the courage to throw away. His shells were mounted upon glass slides the specimens fixed by cement and the names and localities painted upon the glass in white. What appeared to be a most unsatisfactory cabinet method he assured me was made necessary in that tropical climate by the swarms of insect pests which would relish paper trays and labels.

Owing to the lack of modern titles in his library Mr. Vendryes was much handicapped in his literary labors. He acknowledged the necessity of anatomical work and fully approved of the more modern methods of biological research, but before such a task as applied by himself to his collections he sank back exhausted.

Notwithstanding such discouragements Mr. Vendryes published an excellent list of Jamaica shells which is to-day the best we have, and he also had in preparation the great undertaking of a monograph of the most exhaustive kind, of the Jamaican fauna. He gave me a section of this MS of literally hundreds of pages of closely written (in his own hand) observations, critical notes, descriptions, synonomy, etc., and asked me to find a publisher for it in the United States. The preparation of this unpublished monograph involving as it must have done an enormous amount of physical as well as mental effort, was, after all, a labor of love, and from the way he handled the MS it was apparent how he loved the monument he was with such infinite pains building for himself.

The Nautilus.

Vol. XXII. FEBRUARY, 1908. No. 10.

HYGROMIA HISPIDA (LINNÆUS) IN MAINE.

BY N. W. LERMOND.

In 1904 I found a snail considerably smaller in size than *Polygyra fraterna* Say, and very numerous on walls of old lime quarries, on wooden sidewalks and on the under sides of rocks from the lime quarries at Rockland, Knox County, Maine. Specimens sent Dr. Pilsbry for identification were pronounced by him *Hygromia hispida* (Linn.), and the first record for this species for the state of Maine.

In his 1898 list of "Land Shells of America North of Mexico," on page 3, Prof. Pilsbry gives *Hygromia hispida* (Linn.) as found at Quebec and Levis, Quebec, Canada—"a species of northern Europe, imported." In 1905 I found them quite as plentiful in and about old lime quarries at Thomaston, and in 1906 collected them in a garden in the same town under cabbage plants. They literally "swarmed" on the ground and on the under side of the cabbage heads. This garden is on the banks of "Mill River," and near a lime kiln.

This season I found them just as numerous—and they are by far the most abundant species in this locality—in the Rockland and Thomaston localities, but have not as yet found them elsewhere in the county, although they quite likely are already established in the lime quarries of Camden and Rockport.

ON CERTAIN IMMATURE ANCULOSÆ.

BY BRYANT WALKER.

Anculosa prærosa was described by Say in 1824 from specimens collected at the falls of the Ohio. In the following year he described a second species from the north fork of the Holston River in Virginia as *A. subglobosa.*

In 1838 Dr. Lea described a very small bicarinate species from Cincinnati as *A. cincinnatiensis*, and, in 1845, another species from "Tennessee and Tuscaloosa, Ala.," as *A. tintinnabulum.*

Tryon in his preliminary "Synonymy of the Strepomatidae" (1865) stated that *cincinnatiensis* was "undoubtedly the quite young of *prærosa*," and placed *tintinnabulum* as a variety under *subglobosa.* He considered *A. virgata* Lea, a small, smooth, rounded form, to be the young of *tintinnabulum* and *A. globula* Lea, a very similar but more globose shell, the immature form of *subglobosa.*

In 1871, Dr. James Lewis published a paper in the American Journal of Conchology (VI, p. 216) on the shells of the Holston River, in which he identified a small bicarinate form from that river as *A. cincinnatiensis*, and, by a series of specimens graded in size, satisfied himself that this form was the young of Lea's *tintinnabulum.*

He further states that "some of the varieties (so-called) of *Anculosa prærosa* have bicarinate young, but their *forms* are such that when the dimensions of Mr. Lea's typical *cincinnatiensis* (diameter .16 inch) they *do not exactly*, but only *approximately*, correspond thereto, and therefore must yield to the claims of *titinnabulum.*" Dr. Lewis did not specify the peculiar characteristics of the young of *A. prærosa*, as distinguished from the young of *tintinnabulum*, beyond stating that the species is extremely variable and that "in one variety carinæ are scarcely discernible in the smallest specimens. In others there are traces of carinæ upon shells of nearly or quite $\frac{1}{4}$ inch in diameter."

In regard to *A. subglobosa* he described the young as "smooth, shining, depressed, subglobose, with a somewhat pointed, elevated apex," and states that in his numerous series of that species "none are carinate, nor can I find any evidence by which I might identify *subglobosa* with *tintinnabulum.*"

His conclusion therefore was that Lea's *cincinnatiensis* was the

very young of a valid species distinct from both *prærosa* and *subglobosa*, of which *A. tintinnabulum* was the adult form.

Subsequently Tryon reviewed Dr. Lewis' paper (Am. Jour. of Con., VII, p. 86) and, without discussing at all the facts on which the latter had based his conclusions, reiterated his former conclusions, stating that Mr. Anthony did not find *tintinnabulum* in the Ohio, but did find *cincinnatiensis*, and satisfied himself that it was the young of *prærosa* and that he, himself, had examined "thousands of specimens from many localities" and was "fully convinced that *subglobosa* and *tintinnabulum* are the same species." And this position was maintained in his elaborate monograph of the *Strepomatidæ* published by the Smithsonian Institution in 1873.

Since then, so far as I have been able to ascertain, nothing has been published on the subject.

It is obvious that, if these different forms of *Anculosa* exhibit as claimed by Lewis persistent and characteristic differences in the young shell, a valuable standard of comparison can be established, which will, when thoroughly worked out, enable us to definitely determine their relationships and their claims to specific or varietal recognition. And although, for a complete solution of the questions of synonymy involved, full suites of all ages of all the different forms would be necessary, any detailed information will be of value, both as leading the way towards the final settlement of the matter and as an incentive to further investigation and systematic work in the field for the acquisition of the material still necessary for successful results. For these reasons, the following notes have been compiled and, with full recognition of the fact that they are necessarily incomplete and quite insufficient for any broad generalizations and are of value only so far as they deal with material under observation, are published with the hope that they may lead others to review the material in their possession and incite additional effort toward securing the missing links.

I. Anculosa prærosa Say. Pl. X., figs. 1–6.

Unfortunately I have not been able to obtain any of the minute young of this species from the Ohio River, the smallest specimens seen having passed the carinate stage. But from a comparison of these with those of corresponding size and development from a very complete series of all sizes, ranging from .0125 mm. in diameter to

the fully matured shell, from the Tennessee river at Florence, Ala., collected by Mr. A. A. Hinkley, there seems to be no doubt but that the changes in growth of the two series have been identical.

The minute young in the Florence series have the apical whorls carinate and the body-whorl bicarinate. I have no difficulty in identifying this form with Lea's *cincinnatiensis*. The type had four whorls and measured 4 mm. in height by 3.5 in diameter. As a standard for comparison I have selected an individual of exactly these dimensions (Fig. 1); although most of the specimens of that diameter are more depressed, the altitude and width being substantially the same.

This specimen agrees with the original diagnosis in every particular with one exception. Lea states that the type had three bands and that the two carinæ were colored. Whether the three bands included the two carinal bands, he does not say. All of my specimens, with one exception, exhibit four bands within the aperture. Two are carinal, one is between the upper carina and the suture, and the fourth between the lower carina and the umbilical depression. These bands are continuous or broken into spots, and sometimes the upper and lower pairs are more or less confluent. The exception has only the upper pair of bands, the lower carina and basal area being uncolored. I do not regard the variation in banding of any material importance and, therefore, have no hesitation in proceeding on the assumption that these bicarinate individuals are the *cincinnatiensis* of Lea. As shown by Fig. 1, the typical form of *A. cincinnatiensis* has four whorls; the spire is acutely conical, its whorls flattened and bounded below by the projecting carina, the suture of the succeeding whorls being on the under side of the carina and slightly within the outer edge; the body whorl is strongly bicarinate, flattened above the superior carina, *concave* between the carinæ and with the basal arc area flattened and very oblique. The shell is rather translucent, light horn-color, more or less tinged with green; apex is red, lighter than the supracarinal band, and the bands dark reddish-brown; the superior band is broad and on the apical whorls fills nearly the entire space between the carina and the suture, so that the whorls appear wholly dark colored; the basal band is broad, the color extending to same degree over the entire umbilical area; the columella is more or less tinged with purple. The aperture is large "rounded,"

but slightly modified, however, by the carinæ. The nepionic whorl is smooth, or very slightly and irregularly roughened or pitted; this perhaps may be the result of incipient erosion. Below this, the lines of growth on the second and third whorls are strong, straight and quite regular, and intersecting these are numerous stronger, parallel, revolving striæ, which give a reticulated appearance to the surface; on the fourth whorl the revolving lines sensibly diminish in strength and towards the aperture become subobsolete. This sculpture is uniformly present and is apparently characteristic of the bicarinate form. The persistence of the revolving lines varies in different individuals. Usually they fade out as the shell assumes the globose form, but occasionally continue until the shell is nearly mature.

There is considerable variation in the height of the apical whorls. Most of the specimens in the bicarinate stage are more depressed than the type and the carina is less prominent on the superior whorls. Fig. 2 is the most depressed individual seen, and the spire is wholly flattened with no projection of the carina above the body whorl. As the shell increases in size, the superior carina becomes less prominent, the lip of the lower whorl rises and gradually passes over its edge, and, thenceforth, the shallow suture characteristic of the mature shell is maintained. Erosion begins, the acute spire and, generally, all the sculptured whorls disappear, and the shell assumes the characteristic globular shape of maturity.

During this stage, the carinæ progressively diminish in strength and become mere angles and finally disappear. The groove between them widens and becomes plane and persists in the half-grown and mature shells as the characteristic flattening of the body whorl. The superior carina is the less persistent and completely disappears in the regularly rounded curve of the upper part of the whorl. The lower carina and the resulting angle remain longer in evidence and cause in the mature shell the greater width of the lower part of the body whorl. The carinæ persist longer in the more conical specimens (Fig. 4) than in the depressed individuals (Fig. 3). For comparison with this stage in the Florence series, the smallest example seen from the Falls of Ohio is figured (Fig. 5). It measures 5.5x5.5 mm. The apical whorls are somewhat eroded, but enough is left to show that they were carinate and had the characteristic sculpture ascribed to *cincinnatiensis*. They are more depressed

than any of the Florence series, and the body whorl is much more gibbous. This feature is still more emphasized in a small series of *prærosa* from the Ohio at Golconda, Ills., also collected by Mr. Hinkley. In these (Fig. 6), as the shell advances beyond the bicarinate stage, the lip passes over the superior carina and overlaps the preceding whorl, forming a slight shoulder around it, so that upon the completion of an entire whorl, the spire appears, as it were, in a flattened depression with the short, apical elevation in the centre. Whether this is constant in the *prærosa* of the Ohio, the series under examination is too small to establish. But the similarity of the specimen from the Falls of the Ohio (the type locality) suggests that it may be. It is very desirable that a full series of all sizes from the Ohio should be examined, so that the manner of growth of the typical form may be definitely determined.

By a careful selection of the less eroded specimens, the whole process of growth can be traced from the typical bicarinate form of the young to the smooth rotundity of the adult shell and there is apparently no question but that the *cincinnatiensis* of Lea is the young of the *prærosa* of Say.

II. Anculosa subglobosa Say.

This species, in some localities at least, seems to be less subject to erosion than its associated species of the genus; and specimens nearly if not quite mature, with perfect apices, are not uncommon. The tracing of the growth of the shell from the early stages to maturity is, therefore, a matter of comparative ease.

The series of young shells in the Lewis collection, of which the smallest (Fig. 9) measures alt. 3.25, diam. 3.55 mm., with one exception, is very uniform, and there can be no doubt but that they are the young of the typical form as figured by Tryon (Mon. figs. 799 and 800). They are gibbous, translucent, light horn-color, unicolored or banded, smooth and shining, apex acutely conical, the tip tinged with dark brown, whorls rounded, suture well impressed, with no trace of any carina whatever. The shell increases very rapidly in size, but retains its peculiar form until nearly mature. For comparison with Figs. 3 and 8 a larger specimen (5x5 mm.) is also figured (Fig. 10).

The exception above noted (Fig. 11) is quite different in shape and would seem to be specifically distinct. It measures 5.5x5 mm.,

and is of a light greenish-yellow and much more globular than the others and barring the bands, which are three instead of two as called for by the original description, has great resemblance to *A. globula* of Lea. The aperture is almost exactly two-thirds of the length of the shell. Among a small set from the Holston at Knoxville, Tennessee, collected by Mr. A. C. Billups, are larger specimens (10x8.5 mm.) of the same form, but I have been unable to trace it with entire satisfaction to maturity. It is, however, apparently the immature form of the species that Dr. Lewis identified with the *A. virgata* of Lea. But whatever the relation of the form to *subglobosa* may be, it agrees with it in its smooth, shining, rounded whorls with no impressed spiral lines and no carinæ.

III. A. TINTINNABULUM Lea.

Dr. Lewis' series of this species is very complete and as he states, there can be no question but that the bicarinate form that he identified with Lea's *cincinnatiensis* is the young of *tintinnabulum.* But they are quite different from the true *cincinnatiensis* if I am right in my identification of that form, and seem to be specifically distinct. Compared with *cincinnatiensis* of the same size, these shells (Figs. 7 and 8) have a more elevated spire and are much thicker, being quite opaque and noticeably more heavily moulded; the surface of the whorls above the superior carina is decidedly convex above and excavated below as it approaches the carina, so that on the third and fourth whorls there is a well-developed groove immediately behind the carina; the carinæ are much stronger, the superior projects upwards rather than laterally, and is formed more by the excavation of the upper surface of the whorl behind the uplift of the intercarinal area, than by the lateral projection of the carina, as in *cincinnatiensis;* the lower carina is much stronger and projects laterally; the intercarinal area is relatively wider and very flat, being scarcely at all concave; the basal area is much more excavated immediately below the inferior carina. While color is, perhaps, the least reliable factor in specific distinction in *Anculosa*, in this series it is remarkably uniform and very striking. The shells are uniformly light greenish-yellow with two broad reddish-brown bands on the body whorl, one above the superior carina and the other on the basal area immediately below the inferior carina; the apical whorls are reddish-brown; the intercarinal area has no band, the carinæ are

noticeably lighter in color than the rest of the shell and stand out conspicuously against the dark bands above and below them. As the shell grows, the superior band widens and invades the region of the superior carina, sometimes before it has entirely disappeared, and occasionally divides into two narrow bands, the basal band persists and in the adult the space between them represents the intercarinal area of the young shell.

The spiral lines are uniformly present and rather stronger than in *cincinnatiensis* and apparently persist longer as the shell approaches maturity.

As the shell increases in size, the superior carina diminishes and finally disappears entirely; the lower carina persists much longer, descends somewhat in position and becomes a characteristic feature of the half-grown shell and, in the adult, causes the bell-shaped form which gives to the species its specific name.

IV. Conclusions.

From the examination of the material as above detailed, the following conclusions may be drawn.

1. That in these species of *Anculosa* at least, the very young shells have characteristics which are constant and available for specific distinction.

2. That the young shell of *A. prærosa* is bicarinate and spirally striate and was described by Lea as *A. cincinnatiensis*.

3. That the young shell of *A. subglobosa* is ecarinate and without spiral, impressed lines.

4. That the young shell of *A. tintinnabulum* is bicarinate and spirally striate, but specifically different from Lea's *cincinnatiensis*.

5. That *A. tintinnabulum* Lea is specifically distinct from both *A. prærosa* and *A. subglobosa*, and is a valid species.

6. That collectors and especially those in the field should give special attention to securing full *suites* of all the species of all ages, particularly the very young, so that the exact relations of all the described species may be definitely determined.

Explanation of Plate X.

All the figures are on the same scale, × 48.

Fig. 1–4. *A. prærosa* Say—Tennessee River, Florence, Ala.

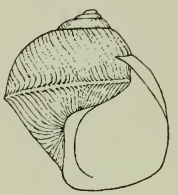
Fig. 5. *A. prærosa*—Falls of the Ohio.

1.

2.

7.

9.



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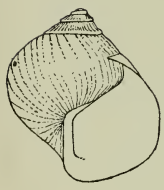

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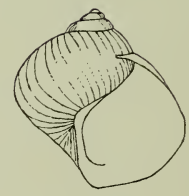

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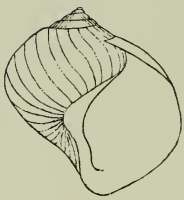

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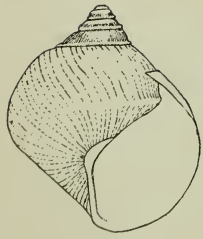

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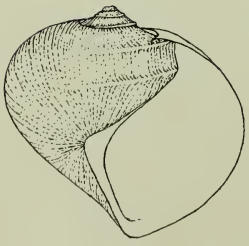

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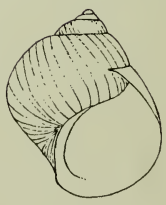

11.

WALKER· YOUNG STAGES OF ANCULOSA.

Fig. 6. *A. prærosa*—Ohio River, Golconda, Ills.
Fig. 7–8. *A. tintinnabulum* Lea—Holston River, Tenn.
Fig. 9–10. *A. subglobosa* Say—Holston River, Tenn.
Fig. 11. *A. globula* Lea?—Holston River, Tenn.

A NEW SPECIES OF PYRGULOPSIS.

BY A. A. HINKLEY.

The finding of a new species of *Pyrgulopsis* is a surprise, coming as it does from such a well-known stream as the Wabash, a river which has furnished many forms of shells found nowhere else north of the Ohio river, though common in southern streams. There was found associated with the new species *Somatogyrus strengi* Pilsbry and Walker, a recently described southern species, which adds another to that list of, shall we call it freak geographical distribution? or is there some known cause for the occurence of southern forms in the Wabash? It seems a little strange that no species of shells bears the name of the Wabash river. The writer thinks now a good time to use the name.

PYRGULOPSIS WABASHENSIS, n. sp.

The shell is imperforate, pupiform, smooth, horn-colored; growth lines faint; composed of five convex whorls separated by an impressed suture. The periphery is rounded or slightly angular. The aperture oblique, ovate, angular above, rounded below. The columella a little reflected. Columellar callus thickened; on the parietal wall the outside edge straight and raised.

Length .12, diam. .06 of an inch.

Found in shallow water of the Wabash river, at the Chains in Posey county, Indiana, by the writer's son, George Hinkley. Compared with *P. mississippiensis* this species is smaller, has not the angular or carinate body whorl, the spire is not so acutely conical, and the aperture is not as wide. The *mississipiensis* is conical with flat whorls; this species is pupiform with rounded whorls. Some examples of *wabashensis* have a slight shoulder on the penultimate whorl just above the suture, others have an impressed line on the body whorl a little distance below the suture.

Examples are in the collections of the Academy of Natural Science, Philadelphia; The National Museum; The Chicago Academy of Science, Mr. Bryant Walker, and the writer.

NOTES ON SOME AUSTRALIAN UNIONIDÆ.

BY L. S. FRIERSON.

A series of shells covering nearly the whole range of species credited to Australia having been received from the well-known conchologist, Mr. Wm. T. Bednall of Adelaide, reveals several interesting points, which may constitute as many "addenda and corrigenda" to Mr. C. T. Simpson's "Synopsis of the Naiades."

Page 891. *Unio bednalli* Tate was described in 1882, Proceedings Royal Society of South Australia, page 56. The shell, as evidenced by notes, and a fine series of specimens from Mr. Bednall, is not a form of *Diplodon australis* (Lam.) Hanley, but is much nearer to *D. wilsonii* Lea (= *stuarti* Adams and Angas). A specimen of *bednalli* is over $3\frac{1}{2}$ inches long by $1\frac{3}{4}$ high, whereas a specimen of *D. australis* var. *legrandi* (an elongated variety) is 3 inches long and 2 inches high). *D. bednalli* Tate therefore should be removed as a synonym of *australis*, and restored to specific rank, from whence, should it ever be degraded, it must fall under *D. wilsonii* Lea, as a variety.

A series of shells labeled *U. angasii* Lea revealed the following facts: *U. angasii*, credited to MSS. of Lea, was described by Sowerby in Conchologia Iconica, and placed by Mr. Simpson as a synonym of *D. shuttleworthii* Lea. A casual observation of the lot seemed to indicate two species. A critical study of both the actual specimens with the original descriptions of both species confirmed this impression. *Diplodon shuttleworthii* Lea (besides being apparently larger) has a deeply and coarsely sulcated disc, and is covered with a heavy, thick, scaly epidermis resembling that of *D. cucumoides*.

On the other hand the *D. angasii* Sowerby is apparently a smaller species, is much *thinner*, with a smooth surface and covered with a *thin* epidermis, with nothing more than *fine* sulcations, scarcely noticeable. But as a final clincher, a young specimen of *D. angasii* (having beaks so perfect as to show the glochidial shell) shows a

beak having not a trace of radial sculpture, but only a *fine*, concentric sulcation. Hence the shell not only is not *D. shuttleworthii*, but strictly speaking is not even a *Diplodon*. The beaks of *D. shuttleworthii* have " strongly, irregularly radiate, curved bars."

Mr. Bednall was unable to procure for me a single example of *D. vittatus* Lea, or *D. evansii* A. & A., or of *D. wilsonii*, having uneroded beaks. But from the general similarity of the shells, it is, I believe, more than probable that a subgenus composed of these and possibly other Australian shells, having concentric beak sculpture or none, should be made and the definition of *Diplodon* be correspondingly broadened.

NOTES.

NOTICE TO SUBSCRIBERS.—Among the amendments to the Postal Laws and Regulations, to take effect Jan. 1, 1908, is the following —" a reasonable time will be allowed publishers to secure renewal of subscriptions, but unless subscriptions are expressly renewed after the term for " which they are paid within the following periods: [monthlies within four months] they shall not be counted in the legitimate list of subscribers." Subscribers will confer a great favor by paying promptly. A bill is sent when subscription is due.

H. A. P., C. W. J.

PUBLICATIONS RECEIVED.

A NEW PTEROPOD FROM NEW ENGLAND.—By C. H. Danforth, (Proc. Boston Soc. Nat. Hist., vol. xxxiv, pp. 1–19, pl. 1–4).

This new pteropod, *Pædoclione doliiformis*, which also proves to be a new genus, was taken in the plankton of Casco Bay, Me., on the nights of Aug. 28 and Sept. 5, 6, 7 and 8, 1902. On a hasty examination it was referred to a larva of some gymnosomatous pteropod. Later, in making some sections, they were found to be sexually matured adults. " This genus does not properly fall under any established family although perhaps it approaches most nearly the *Clionidæ*, from which it differs in having an odd number of cephalocones and in having the entire posterior part of the body filled by the viscera." The species is described as : " Transparent;

barrel-shaped ; small, about 1.5 mm. in length ; head when expanded elliptical in outline ; anterior ciliated band broken up into segments ; expanded parapodia (wings) flat, long-ovate ; middle lobe of foot rather large." The author gives a very exhaustive account of its general features, musculature, digestive and nervous systems, heart and nephridium, and the reproductive system. The paper is illustrated by four plates and two figures in the text.—C. W. J.

The Haliotis or Abalone Industry of the Californian Coast.—By Mrs. M. Burton Williamson (Am. Hist. Soc. S. Cal., vol. vii, pp. 22–30, 1907). An exceedingly interesting account of this important industry. The law protecting these shells is like the law protecting the lobster on the Atlantic. The young are protected but those which produce young are not. The author asks the pertinent question—" If these mollusks are destroyed as soon as old enough to propagate, of what use to the State is the preservation of the young? " The present method in time can only lead to their extermination. The shells should be protected at least during their breeding period.—C. W. J.

The Mollusca of Mast Head Reef, Capricorn Group, Queensland, Pt. II.—By C. Hedley (Proc. Linn. Soc. N. S. Wales, vol. 32, pp. 476–513, pls. 16–21, 1907). In this paper 37 new species are described and beautifully figured. A list containing some 447 species from this reef, procured within a week, in a six-mile radius from one spot, shows the richness of the fauna.

The Pyramidellid Mollusks of the Oregonian Faunal Area—By William H. Dall and Paul Bartsch (Proc. U. S. Nat. Mus., XXXIII, pp. 491–534, pls. 44–48, 1907). The species described in this paper have been selected from a monograph of West American *Pyramidellidæ* upon which the authors have been at work for some time, but which has been unavoidably delayed. The Oregonian Faunal Area includes the region extending from the northern limit of the Alexander Archipelago southward along the coast to Pt. Conception, Cal. Thirty-eight new forms are described and beautifully figured together with many others already known imperfectly from this region.—C. W. J.

THE NAUTILUS.

VOL. XXI. MARCH, 1908. No. 11.

MOLLUSCAN FAUNA OF THE SAN BERNARDINO MOUNTAINS, CALIFORNIA.

BY S. S. BERRY.

In view of the extraordinary researches carried on in the neighboring regions of Arizona and New Mexico by Messrs. Ashmun, Ferriss, Pilsbry, and other recent collectors, the writer has often wondered what might be the result of an equally diligent effort in the mountain ranges of Southern California. But little work seems to have been done in the region, and reports on that little are scattered and fragmentary.

During the month of August, 1907, the writer spent two weeks camping in the San Bernardino Mountains, California, and although he had other business on hand than the advancement of a hobby, he kept his eyes open for mollusks, and is thus enabled to add another fragment to the records.

The San Bernardino Mountains range in height from about five thousand to nearly twelve thousand feet above sea-level, and abound in grand and beautiful scenery. Extending, as they do in an easterly-westerly direction, the northern slope of the mountains drains into the Mojave Desert, the southern into the Pacific. No mollusks whatever were found in the desert drainage, but the writer was able to give only a superficial examination to all but one or two spots, and has no doubt but that his collections represent a far from complete index to the life of the region.

The cañons and higher regions are well wooded, but the soil is

generally dry at this time of the year, although there are numerous brooks and rills, with here and there an open swampy meadow or cienaga.

Bear Lake is a partly natural, partly artificial reservoir, some five or six miles long by perhaps a half a mile wide, and about sixty-five hundred feet above sea-level. It is the home of multitudes of small forms, most of them being species of wide distribution. High up on the mountain to the south of the lake is Bluff Lake, a small summer resort, at an altitude of 7,550 feet. In this case the " Lake " is only a large cienaga with a swamp at its lower end. This swamp, with the creek which flows from it, proved a very interesting locality, while all the land mollusks seen on the trip were found either under sticks and logs at the edge of the meadow or nearby in the woods.

It is notable that none of the larger *Helices* were found, although *Glyptostoma newberryanum* should occur here just as it does in the neighboring San Gabriel Range, and I have seen living specimens of *Epiphragmophora tudiculata* W. G. B. from the base of these mountains.

A list of the species obtained is herewith appended :

Pisidium californicum Newcomb (?). Two " somewhat different forms " were thus determined by Dr. Sterki, who says that *P. californicum* itself is somewhat in doubt. They occur together, and are rather common in the quieter pools of Bluff Lake Creek, in ditches in the meadow, and in the swamp.

A number of minute *Pisidia* found in a spring on a nearby hillside are probably young of the same.

Pisidium (sp. ?). Two specimens from the swamp are of " different shape from the remainder," according to Dr. Sterki, but whether or not distinct he was unable to say.

Musculium raymondi J. G. Cooper. Found commonly in the swamp, and rather rarely in the creek at Bluff Lake.

Valvata (*sincera*, Say ?) var. Bluff Lake Swamp (two specimens) and in Bear Lake, where it seems fairly common on and under stones.

Lymnæa palustris Müll. A small variety of this species occurs commonly in Bear Lake. It is extremely variable, generally tending toward the form called *nuttalliana* by Lea. The maximum longitude of the numerous specimens collected in Bear Lake is but about ten millimeters.

Lymnæa palustris nuttalliana Lea. Occurring with the preceding in Bear Lake and intergrading with it, this form is also abundant in Bluff Lake Creek and the swamp at its head. The specimens from these localities are very distinct and uniform, and several hundred examples showed no tendency to grade into typical *palustris*. All the specimens found here are very much larger and less fragile than those from Bear Lake.

Physa cooperi Tryon. Common in Bear Lake, and a smaller form was found in myriads in a watering trough on the City Creek Cañon Road. (Alt. about 2000 ft.)

Physa sp. May be a variety of the preceding with which it occurs in Bear Lake, but it has a much more ventricose body-whorl.

Physa politissima Tryon. Bear Lake—common. A fine, large species.

Planorbis trivolvis Say. Bear Lake; Bluff Lake Creek; swamp at Bluff Lake. Very common, but specimens generally much eroded.

Planorbis parvus Say. Swamp at Bluff Lake. Specimens identified by Dr. Pilsbry.

Planorbis vermicularis Gould. Not uncommon in Bear Lake. Specimens identified by Dr. Dall. It seems to me that this species is hardly more than a mere form of the preceding, although the specimens from Bear Lake have a more rounded and less flattened body-whorl, and are quite readily separated from those found in the swamp.

Vitrina alaskana Dall. Two specimens under sticks in the meadow at Bluff Lake.

Zonitoides arborea Say. About a dozen specimens found about an old stump in the border of the woods at Bluff Lake.

Euconulus fulvus Draparnaud. Bluff Lake; two specimens under logs at the edge of the meadow. This species has already been reported from "San Bernardino County" by Binney.

Vertigo occidentalis Sterki. One specimen (the type, No. 1860 of my collection) was found near a spring in the cañon side below Bluff Lake Swamp. Diligent search on two occasions produced not another specimen, but this was enough for Dr. Sterki to pronounce as "evidently of an unknown species." It is described in NAUTILUS XXI, p. 90, q. v.

Epiphragmophora tudiculata W. G. Binney. At the base of the mountains near Highland (1904); near Mentone (1906); also reported from above San Bernardino.

SUBDIVISIONS OF THE TEREBRIDÆ.

BY WILLIAM H. DALL.

Having recently had occasion to review the genera of *Terebridæ*, it seemed that the synoptical table might have some interest for students.

Genus TEREBRA Bruguière, 1789.

A. Presutural sulcus present.

Sculpture uniform at all ages, persistent, suture appressed. Subgenus STRIOTEREBRUM.

Shell short, small.

1. Sculpture reticulate. Section *Strioterebrum* s. s.
2. Axial sculpture emphatic, spiral obsolete. *Fusoterebra.*
3. Axial sculpture obsolete, spiral emphatic. *Perirhoë.*

Shell elongate, whorls mesially constricted.

4. Whorls nodulous at both margins. *Triplostephanus.*

B. Sculpture in youth and age discrepant. Subgenus TEREBRA.

5. Young nodulous, sulcus persistent. Section *Myurella.*
6. Young nodulous, sulcus present in youth. *Terebra* s. s.

Young axially ribbed, sulcus persistent.

7. Adult slender, smooth. *Subula.*
8. Adult small, obsoletely ribbed. *Abretia.*

Sulcus obsolete in the adult.

9. Whorls rapidly enlarging. *Oxymeris.*

C. Sulcus wholly absent. Subgenus ACUMINIA.

10. Adult slender, smooth. Section *Acuminia.*

Genus HASTULA Adams, 1853.

Presutural sulcus absent, suture appressed.

A. Sculpture uniform, persistent.

a. Shells small, slender. *Hastula* s. s.

B. Sculpture discrepant.

b. Whorls rapidly enlarging. *Impages.*

Genus DUPLICARIA Dall, 1908.

A. Sculpture persistent, suture channeled.

a. Shell axially ribbed, sulcate. *Duplicaria.*

Genus SPINEOTEREBRA Sacco, 1891.

A. Sulcus absent, suture appressed.

a. Columellar border callous, axis impervious. *Spineoterebra.*

b. Columellar border bare, axis pervious.[1] *Mazatlania.*

This table is not intended to exhibit all, or even the more important characters upon which the main subdivisions (which will be treated elsewhere) are based, but is rather a key by which the shells may be conveniently assorted. The sections are typified as follows:

Strioterebrum Sacco, 1891. *T. basteroti* Nyst.

A recent example is *T. dislocata* Say.

Fusoterebra Sacco, 1891. *Fusus terebrina* Bonelli.

A recent example is *T. benthalis* Dall.

Perirhoë Dall, 1908 (*nov.*). *T. circumcincta* Deshayes.

An American example is *Acus rushii* Dall.

Triplostephanus Dall, 1908 (*nov.*). *Terebra triseriata* Gray.

This is *Myurella* Hinds, in part.

Terebra s. s. Lamarck, 1799. *T. subulata* (Linné).

Myurella Hinds, s. s. 1844. *Terebra myuros* Lam.

Subula s. s. (Schumacher, 1817) Gray, 1847. *T. dimidiata* (Linné).

Abretia H. and A. Adams, 1853. *T. cerithina* Lam.

Oxymeris Dall, 1900. *Terebra maculata* Lam.

This is *Acus* Gray, 1847, not Edwards, 1771.

Acuminia Dall, 1908 (*nov.*). *T. lanceata* (Linné).

Hastula H. and A. Adams, 1853. *T. strigillata* Lam.

Impages E. A. Smith, 1873. *T. cœrulescens* Lam.

Duplicaria Dall, 1908 (*nov*). *T. duplicata* Lam.

This is *Myurella* Troschel, not of Hinds.

Mazatlania Dall, 1903. *T. aciculata* Lam.

Spineoterebra Sacco, 1891. *T. spinulosa* Doderlein. Miocene.

Mazatlania is *Euryta* Adams, 1853, not of Gistel, 1848.

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[1] I use the term "pervious" technically, to denote an axis gyrate about an empty space which penetrates the center of the shell internally, in contradistinction to "umbilicate" or "perforate," which would imply a space external to the inner wall of the whorls and circumscribed by them.

NEW SPECIES OF ANCYLIDÆ.

BY BRYANT WALKER.

NEOPLANORBIS SMITHII n. sp. Pl. IX, figs. 1 and 2.

Shell minute, planorboid, perforate, slightly convex above and below; periphery obtusely angulate; thin, translucent, whitish, shining with a silky luster from the fine, closely set, regular lines of growth. No trace of spiral sculpture. Whorls 2, rapidly enlarging; apex sunken; the last half of the first whorl elevated above the outline of the body whorl; apical whorl convex, the convexity rapidly diminishing towards the aperture; suture well impressed, rising somewhat at the aperture; aperture large, oblique, slightly expanded, equally curved above and below; columellar margin dilated, straight and vertical, callously thickened below, smooth; umbilicus a mere perforation.

Alt. 1, diam. 2 mm.

Types (No. 27149, Coll. Walker) from the Coosa river at Higgin's Ferry, Chilton Co., Ala. Co-types in the collection of T. H. Aldrich, Geo. H. Clapp, John B. Henderson, Jr., and the Philadelphia Academy.

This little species differs from *tantillus* and all the other known forms of the genus by the entire absence of spiral sculpture and the elevation of the spire above the level of the body whorl. The animal is black and the shell consequently appears of that color until cleaned.

NEOPLANORBIS UMBILICATUS n. sp. Pl. IX, figs. 3 and 4.

Shell minute, planorboid, umbilicate, convex above and below, but flattened above as it approaches the aperture and obliquely flattened below the periphery; periphery obtusely carinate; brownish horn-color; lines of growth fine and regular; surface sculptured by raised spiral lines, which are heavier below than above the periphery. Whorls 2, rapidly enlarging, apex sunken; apical whorl very convex; body whorl nearly flat in the sutural region, but curving down rapidly toward the peripheral carination; suture well impressed and depressed below the periphery at the aperture; aperture large, wider than high, flattened above and below, the upper and lower margins being nearly parallel, obliquely flattened below the periphery; columellar margin broadly dilated, curved and partially

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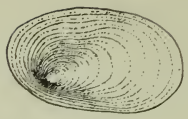

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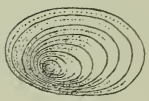

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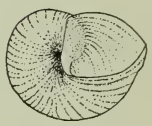

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covering the umbilicus; columella curved, with a heavy callus and obtuse tubercle in the center; umbilicus round and deep. The animal is yellowish.

Alt. 1, diam. 2 mm.

Types (No. 27150 Coll. Walker) from the Coosa River at "The Bar" 2½ miles above Yellowleaf Creek, Chilton Co., Ala. Cotypes in the collection of T. H. Aldrich, Geo. H. Clapp, John B. Henderson, Jr., and the Philadelphia Academy.

This species resembles *tantillus* in being spirally striate but differs in being umbilicate and in having a tooth on the columella, as well as in the general shape. It does not resemble *smithii* in any of its special features, and differs from *carinatus* in being more obtusely carinate and in the wider umbilicus and stronger spiral striation.

NEOPLANORBIS CARINATUS n. sp. Pl. IX, figs. 17 and 18.

Shell minute, planorboid, narrowly umbilicate, nearly flat above, convex below, but obliquely flattened below the peripheral carina, which is strong, but rather blunt; pale horn-color; lines of growth fine, closely set and regular, sculptured above by a few fine subobsolete spiral lines, stronger towards the periphery; under surface with numerous fine spiral lines heavier than on the upper. Whorls 2, rapidly enlarging; apex sunken; apical whorl somewhat flattened above, convexly rounded at the periphery which, at about the beginning of the body whorl, becomes angulate and then carinate; the body whorl above is slightly convex in the center, but flattened toward the suture, and "pinched out" at the periphery to form the carina; suture well impressed, descending toward the aperture below the periphery; aperture large, much wider than high and auriculated at the periphery by the carina; upper and lower margins flattened and nearly parallel; columellar margin dilated, free, slightly curved back over the small, round umbilicus, and obtusely angled where it joins the basal margin; columella somewhat thickened, with a small obtuse tubercle at about the center.

Alt. 1, diam. 2 mm.

Types (No. 27151, Coll. Walker) from the Coosa river at Duncan's Riffle, Coosa Co., Ala. Cotypes in the collections of T. H. Aldrich, Geo. H. Clapp, John B. Henderson, Jr., and the Philadelphia Academy.

In form the species reminds one of a minute *Planorbis oper-*

cularis Gld., its most prominent characteristic being the nearly plane upper surface with a strong peripheral carina. It resembles *umbilicatus* in being spirally striate and having a columellar tooth, but differs in the greater development of the carina, narrower umbilicus and in having the spiral lines much weaker. It differs from *tantillus* in the greater development of the carina, in the small but round umbilicus, dentate columella and weaker spiral striation. The animal is black.

All these species of *Neoplanorbis* were discovered by Mr. Herbert H. Smith in the fall of 1907. They live on the under sides of stones in the more or less rapid current and in suitable localities are very abundant. Mr. Smith took 50 from one small stone. *Neoplanorbis* seems very local in its distribution. It may be abundant on one shoal and not found at all on another. And on the same shoal, it is frequently restricted to one side of the river or the other.

In his progress down the river in 1907, Mr. Smith did not find *Neoplanorbis* at all, until he reached Cedar Island, Chilton Co., three miles above the mouth of the Yellowleaf Creek, where a single specimen of *umbilicatus* was found.

At "The Bar" two miles further down *umbilicatus* was found in some abundance on stones in a strong current, while at the same place *carinatus* was found in a moderate current. There was no intermingling of the species in these two situations. *Umbilicatus* was not met with below this point.

At Butting Ram Shoals, five miles below, in a moderate current, the catch was almost entirely *carinatus*, the exception being three specimens of *smithii*.

At Higgins' Ferry, seven miles further down stream, in a moderate current, with the exception of a single example of *carinatus*, the several hundred specimens were all *smithii*.

While at Duncan's Riffle seven miles below, the catch contained two specimens of *smithii*, the balance being *carinatus*.

Duncan's Riffle is twenty-four miles by river above Wetumpka, so that, in view of these facts, it is not surprising that *N. tantillus* was not met with at all.

The following key may be of assistance in differentiating the four species of *Neoplanorbis* now known:

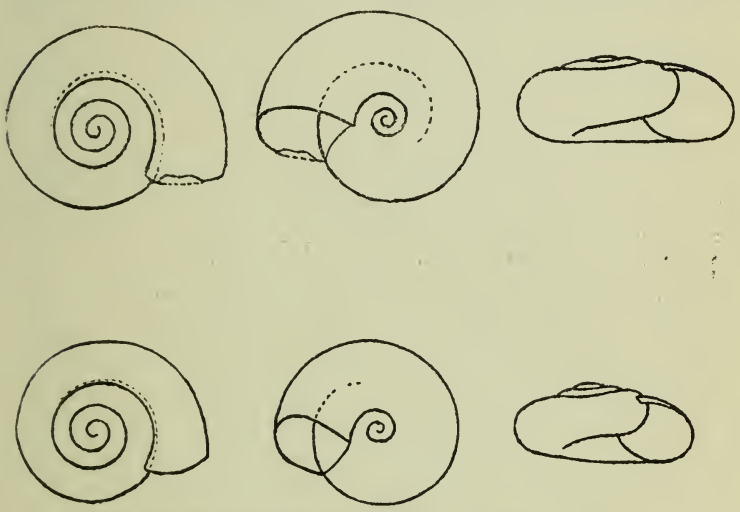
1. Umbilicate, columella dentate . . . . . 3.
2. Perforate, columella smooth . . . . . 4.

3. { Periphery carinate, umbilicus narrow . . . . . *carinatus.*
   { Periphery obtusely angled, umbilicus wider. . . . *umbilicatus.*
4. { Spirally striate, periphery carinate . . . . . *tantillus.*
   { No spiral striæ, periphery rounded . . . . . *smithii.*

VITREA LEWISIANA N. SP.

BY GEO. H. CLAPP.

Shell small, depressed widely, perspectively umbilicate, all whorls showing to the apex, umbilicus contained about five times in the diameter of the shell; yellowish-white, translucent, the inner whorls



Upper figures, *Vitrea lewisiana* Clapp. Type, x8.
Lower figures, " *dalliana* 'Simpson' Pils. x8. Miami, Fla.

showing through the body of the shell, highly polished; the delicate growth lines are very regularly spaced and close together, smooth below. Spire much flattened; sutures well impressed, margined; whorls $3\frac{1}{2}$, slightly convex, the last wide. Aperture oblong-lunate, depressed above, lower margin parallel with the base, lip simple.

Gr. diam. $3\frac{1}{2}$, lesser 2.8, alt. $1\frac{1}{2}$ mm.

Type from Monte Sano, near Huntsville, Ala., also found at Wetumpka and Gurley, Ala., so probably extends over the whole eastern part of the state. *Rare.* Collected by Herbert H. Smith.

I name this species in honor of the late Dr. Jas. Lewis, whose work on the southern mollusca is well known.

The color, and particularly the *very regular, close* lines of growth at once distinguish this shell from all other species. It is perhaps nearest to *V. dalliana*, but differs in color, shape and sculpture. In *dalliana* there is a very minute spiral sculpture, not mentioned in the original description, and only visible under a magnification of about 60 diameters.

NOTES.

NOTE ON HELIX HORTENSIS.—In my article on the distribution of *Helix hortensis* (THE NAUTILUS, XX, p. 73, 1906). I overlooked a very interesting article by Robert Bell, Jr., "On the Natural History of the Gulf of St. Lawrence, and the distribution of the mollusca of Eastern Canada." (The Canadian Naturalist and Geologist, IV p. 215, 1859). As the note on *H. hortensis* has an important bearing on its distribution and is probably inaccessible to many, I quote it in full: "It seems scarcely credible that this species has been imported from Europe, considering how widely diffused and vastly numerous it has become along the Lower St. Lawrence. On the mainland it was first observed on Mount Commis, about nine miles south of St. Luce and on the coast at Metir, where it was abundant and below which it seems to occupy the place of *H. albolabris*, but is generally much more numerous. In 1857, I found vast numbers of them on the Brandy Pots and Hare Island in the middle of the St. Lawrence opposite Rivière du Loup. The climate of Gaspé seems to be very favorable to their propagation, as they appear to have spread over the country for a considerable distance in land. The yellow and banded varieties seem to be about equally numerous. Where land has been recently cleared and burnt over, their withered shells may be seen strewed in thousands over the surface of the soil. In the valley of the Marcouin they were observed to extend 12 miles inland, which was farther than at any other place. The height at which the last specimen was found was about 1500 feet above the sea, as indicated by the barometer which we had with us. The young from the size of a grain of duck shot to half that of the adult shell were met with in our journey up this valley in the end of July." With this record as a basis it would be

interesting to know to what extent the species has spread during the past fifty years, or whether with advancing civilization and the clearing and burning of the woods it has diminished. We have no recent records outside of the Gaspé region.—C. W. JOHNSON.

WE regret to announce the death of Charles Abbott Davis, Curator of the Roger Williams Park Museum, Providence, R. I. He died January 29, at the age of thirty-nine years.

NOTE ON TURBONILLA CASTANEA AND ODOSTOMIA MONTEREYENSIS.—In the hurry of departure for the Philippine Islands, Dr. Bartsch applied to two new Pyramidellids in our recent paper (No. 1574) in the U. S. Nat. Museum Proceedings, the names *Turbonilla* (*Pyrgiscus*) *castanea* (p. 509) and *Odostomia* (*Amaura*) *montereyensis* D. and B., (p. 531). These names being preoccupied, I propose to substitute *T.* (*P.*) *castanella* and *O.* (*A.*) *canfieldi*.—WM. H. DALL.

MILAX GAGATES AND VITREA CELLARIA IN COLORADO.—Four of my students, Messrs. Walter Groom, Floyd House, Merrit Hunt and William Winner, recently examined the greenhouses of Boulder for Mollusca, to be used for class purposes. Quite to my surprise, they obtained five species, two of which had not previously been found in Colorado. *V. alliaria* was first found in Colorado last year, also in a Boulder greenhouse. The species obtained were:

(1) *Milax gagates* (Drap.). Many, of various ages, all of the variety *plumbea*, and with the keel rather inconspicuous in life. They probably came from the Pacific coast, and represent the *hewstoni* form, which I have never been able to separate from *gagates*.

(2) *Agriolimax agrestis* (L.). Several, from light reddish to almost wholly black.

(3) *Agriolimax campestris* (Binney). One.

(4) *Vitrea cellaria* (Müller). Many specimens, some of good size.

(5) *Vitrea alliaria* (Miller). Several, with the garlic odor very strong.

P. S., Feb. 6.—The examination of the Boulder greenhouses has been continued, and to-day Mr. Ivan Beck brought in a number of *Vitrea lucida* (Drap.), also new to Colorado. One specimen has a diameter of almost 15 mm. There was also secured an example of *Vitrea cellaria*, var. *margaritacea* Schmidt, the white variation. As the introduced species of *Vitrea* are not very generally known, a brief table may be of service.

Shell small, about 6 mm. diameter; shell and animal both quite dark; in life nearly always with a strong garlic odor.

V. alliaria (Miller).

Shell much larger when mature, and not smelling of garlic.

Shell about 10 mm. diameter, compact, nearly circular in outline, pale brownish or (var. *margaritacea*) white; animal pale, darker dorsally. *V. cellaria* (Müller).

Shell larger when mature, broader, with the last whorl broader and flatter, dark-colored; animal very dark bluish or bluish slate, the basis of the upper tentacles swollen.

V. lucida (Draparnaud).

T. D. A. Cockerell.

PUBLICATIONS RECEIVED.

Bermuda in Periodical Literature, with occasional references to other works: A Bibliography, by George Watson Cole 1907. Pp. xii+275. "By far the greater part of what has been written concerning Bermuda has appeared in various periodicals and the publications of learned societies. These writings may roughly be divided into historical and descriptive, and those relating to natural history. Of history, properly speaking, little has appeared; but many descriptive articles have been written by tourists and others who have visited those beautiful islands. Their geographical situation and subtropical fauna and flora early attracted the attention of those interested in scientific phenomena. Soon after beginning this work it became apparent to the compiler that the Bermudas have for the past half-century been a favorite field of the zoölogist, botanist and geologist. Bearing this in mind, a special effort has been made to render the record of their labors as complete as possible. In order to do this, references are made to some works which are not periodicals, mostly, however, by authors who have also made contributions to periodical literature concerning the flora and fauna of those islands."

The scope of this work is sufficiently indicated in the above quotation from the author's preface. Mr. Cole has made the bibliography of Bermuda a labor of love for many years, and the number of titles brought together here will surprise even those who have been interested in things Bermudian. The notes given under all important titles amount to a digest of the papers. Thus in dealing with biological articles, all species described from Bermuda are cited, and extracts are given to show what of interest any paper contains. To the naturalist interested in Bermuda the work will take its place as an indispensable reference book; but Mr. Cole's delightful notes give the opus a merit all its own; it is really a *readable* bibliography.

H. A. P.

The Nautilus.

Vol. XXI. APRIL, 1908. No. 12.

NOTES ON PLATE XI.

Several references to the figures grouped on this plate were published before the plate was made up, and require correction in the text.

Figs. 1, 2, 3, *Polygyra martensiana* Pils., Tampico, Mexico. Described in the July number, p. 26. The dimensions are wrongly given in the text. The type measures, alt. 5.5, diam. 11 mm., another specimen, alt. 4.8, diam. 8.8 mm.

Fig. 4, *Fluminicola minutissima* Pils. Idaho. Description in November number, p. 76. Alt. 1.5 mm.

Fig. 5, *Vertigo occidentalis* Sterki. Bluff Lake. San Bernardino Co., California. Described on p. 90. In our opinion this form should be ranked as a subspecies under *V. modesta* nearest to *V. modesta castanea* St., from which it differs in the shorter, wider, less cylindric shape, and the slightly larger teeth. If this view is correct it will stand, as *V. modesta occidentalis*, among several other slightly differentiated races of *modesta*, all variable, and especially developed in the Canadian zone of the Rocky Mountains.[1] *V. m. occidentalis* is illustrated from the unique type, by courtesy of Mr. S. S. Berry. It is No. 1860 of his collection. See also p. 123.

Figs. 6–10, *Micrarionta desertorum* Pils. & Ferr. Described on p. 134. H. A. P.

[1] See in this connection the figures in Pilsbry and Vanatta, Partial Revision of the American Pupæ, 1900, p. 600, pl. 23.

A NEW MICRARIONTA FROM ARIZONA.

BY H. A. PILSBRY AND J. H. FERRISS.

When at the Grand Canyon of the Colorado in the autumn of 1906 the writers met Mr. W. J. Gilchrist, who at that time was about to leave the Canyon for the mining region of the lower Colorado. Besides various friendly and helpful services in connection with our work at the Canyon, Mr. Gilchrist volunteered to look out for snails in the region he was about to visit. It was with a great deal of pleasure that one of us received a letter and package of snails, making good his offer of assistance.

In that desert country snails are not common, and for a long time none were found. Finally, Mr. Gilchrist writes, "I was building a stone monument on a mining claim just after a heavy rain and found three live snails on a rock. These and four dead ones were all I have been able to find. They came from a small range of mountains 12 miles south from Parker, Yuma Co., Arizona."

The snails prove to be of a new species, which may be described as follows.

MICRARIONTA DESERTORUM n. sp. Plate xi, figs. 6–10.

The shell is small, depressed, openly umbilicate, the width of umbilicus contained nearly 5 times in that of the shell, glossy, opaque, pinkish-white with some oblique streaks of flesh-color, and sometimes a few corneous dots; the inner $2\frac{1}{2}$ whorls fleshy-corneous. The spire is convex but very low, whorls about $4\frac{1}{3}$, the inner ones rather slowly increasing, the last much wider, about double the width of the preceding. The embryonic shell consists of $1\frac{1}{2}$ whorls, the first fourth of a whorl smooth, the rest with close, even sculpture of minute papillæ, which are lengthened in a direction parallel to the sutures, and form a regular pattern of oblique, forwardly descending and ascending rows. The post-embryonic whorls have fine, irregular, somewhat wavy striæ in the direction of growth-lines, and papillæ like those of the embryonic whorls but much more sparsely placed, and disappearing near the end of the penultimate whorl. The last whorl has weak growth-lines only. It is rounded periferally and descends slowly to the aperture. The suture is deeply impressed, especially at the last whorl. The aperture is oblique, rounded-oval.

Peristome slightly expanded, with a narrow, rusty edge; upper and outer margins very slightly expanded; basal margin more expanded; columellar margin rather broadly dilated. The ends converge and are joined by a short glossy callus.

Alt 7.5, diam. 12.9, aperture alt. 5.8, width 6.7 mm.

Alt. 6.8, diam. 11.6 mm.

Alt. 6.7, diam. 11.1 mm.

The whole upper surface, head and tentacles, are blackish-slate color, finely irregularly granulose. There are no distinct dorsal or genital furrows. The sole is tripartite, the areas separated by indistinct longitudinal impressed lines, in drowned alcoholic examples. The middle area is twice as wide as the others, slaty-white; side areas darker slate color. The mantle is whitish, the venation of the lung outlined delicately with gray.

The genital system (pl. XI, fig. 9) resembles that of *M. hutsoni*. The penis (*p.*) is swollen near the base, and has a slender retractor muscle (*p. r.*), and a moderately long flagellum. The vagina is very short, the spermatheca globular, its duct very long, and inserted unusually low, much farther down than in *M. hutsoni*. The dart sack (*d. s.*) is large, and near its base, on the side facing the vagina, the two mucus glands (*m. gl.*) are inserted close together (as shown in fig. 10, a diagrammatic view of these organs). The mucus glands descend and their enlarged ends lie near the base of the dart sack. The measurements are: length of penis (to insertion of retractor), 3 mm.; length of epiphallus, 1.8 mm.; length of flagellum, 4 mm.; length of vagina, 1.8 mm. The jaw has about 6 unequal ribs, grouped in its median part.

This species is doubtless related to both *Sonorella baileyi* and *S. fisheri* Bartsch, both of which differ in various details of sculpture. It stands nearest to *Micrarionta hutsoni* Clapp, having the same type of embryonic sculpture; but that species has a dark band above the perifery, bordered with white above, and a much larger aperture.

Cotypes are in the collections of Ferriss and the Academy of Natural Sciences (No. 94783).

The anatomical data obtained from living examples of the species *hutsoni* and *desertorum* by the junior author, indicate that we went too far in referring species from the lower Colorado basin to the genus *Sonorella*. It now seems likely that the species *wolcottiana*, *indioensis*, *baileyi*, *fisheri*, *lohrii*, and perhaps some others, belong to

Micrarionta; a group which should apparently be given generic rank. Anatomically, *Sonorella* is not closely related to the *Micrarionta* series, which has its center in southern and Lower California, and the adjacent border of Arizona. Data to be presented in our forthcoming report on southwestern snails collected in 1906 and 1907 indicate that *Sonorella*, while remarkably varied in anatomy specifically, yet shows no forms in any way connecting with the Californian types of Helices.

EXPLANATION OF FIGURES.

Plate XI, figs. 6, 7, 8. *M. desertorum.*

Fig. 9, genitalia of the same specimen; *d. s.*, dart sack; *epi.*, epiphallus; *fl.*, flagellum; *m. gl.*, mucus glands; *p.*, penis; *sp. d.*, lower portion of the duct of the spermatheca. The mucous glands and their ducts are shaded.

Fig. 10. Diagram of dart sack and mucous glands viewed from the side towards the vagina, showing the contiguous insertions of the mucous ducts.

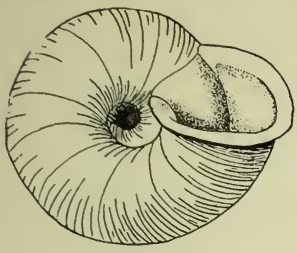
SOME NEW CALIFORNIAN SHELLS.

BY WILLIAM HEALEY DALL.

RISSOA (ALVANIA) GRIPPIANA Dall, n. sp.

Shell small, brownish, solid, cancellate, with one and a half smooth nuclear and five and a half sculptured whorls, nucleus flattish, blunt, remaining whorls rotund, evenly enlarging; last whorl with 13–14 axial ribs crossed by somewhat more slender, equal, equidistant, spiral threads not tuberculate at the intersections, with three somewhat stouter spirals on the base; earlier whorls with two and then three spiral threads between the sutures; suture indistinct, aperture obovate, rounded in front, slightly angular behind, with a much thickened lip which in senile specimens is duplex at the margin. There is a very minute chink but no umbilicus. Length 3, max. diam. 1.5 mm.

Type specimens from Todos Santos Bay, Lower California, between tides, Hemphill, U. S. Nat. Mus. 46171; others from 12 fathoms sand, off the entrance to San Diego harbor, C. W. Gripp;



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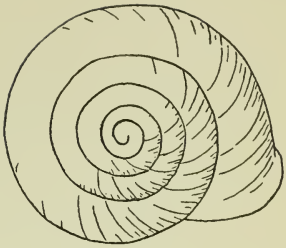

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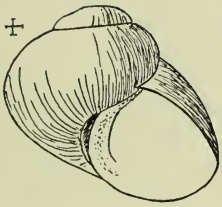

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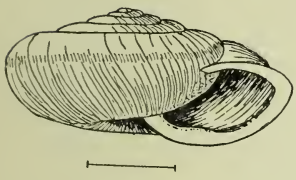

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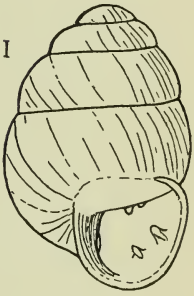

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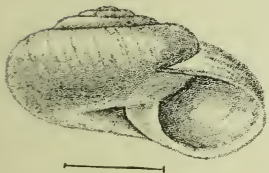

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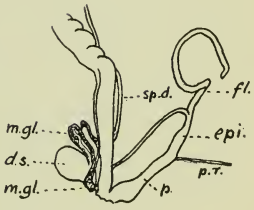

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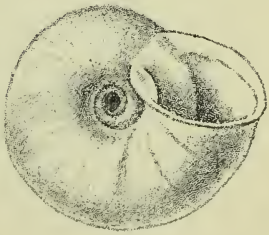

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others at various localities north to San Pedro and Catalina Island, California, mostly beach specimens. The species recalls *R. tumida* Carpenter, but is much more elevated, though less so than *R. incurvata* Cpr., which is also a thinner shell. All three have very nearly identical sculpture.

BELA GRIPPI Dall, n. sp.

Shell small, straw-color or pale brown with occasional spiral bands of darker brown, or all brown; six-whorled, of which the first whorl and a half are white, polished, smooth and turgid, the subsequent portion of the shell having a dull surface; earlier whorls with the periphery nearer the anterior suture, the whorl behind the periphery somewhat flattened and compressed, crossed by low obscure riblets, about a dozen on the fourth whorl, which become obsolete later; the whorl in front of the periphery shows no axial sculpture; the whole whorl is spirally sculptured with narrow sharp incised lines, one dividing the space behind the periphery, and about five in front of the periphery on the penultimate whorl; on the last whorl between the periphery and the siphonal fasciole there are about twelve of these lines, though they probably vary in number with the individual, while the incremental lines are moderately conspicuous; outer lips thin, simple; pillar lips with a small deposit of white callus; aperture narrow, lunate; canal very short, wide, with an inconspicuous fasciole. Length 9, of spire 5, of aperture 4; max. diam. 3.5 mm.

Dredged off San Diego Bay, about five miles south of the entrance in fifteen fathoms, by C. W. Gripp, on a bottom of broken shell. This is a very well marked species, hardly to be compared with any other known from the coast. Seven specimens were obtained of which two are in Mr. Gripp's collection.

The shell has much the aspect of an *Anachis* but one specimen retained the dried animal and by carefully soaking it out it proved to be a Pleurotomoid, with a short oval operculum with apical nucleus like that of *Bela*, though the shell from the absence of the strong axial ribs characteristic of most of the northern *Belas* has a very different aspect from the familiar forms of that genus. The animal is white, with short acute tentacles and very small black eyes.

NEW SPECIES OF ANCYLIDÆ.

BY BRYANT WALKER.

ANCYLUS (FERRISSIA) HENDERSONI n. sp. Pl. ix, figs. 8–10.

Shell small, thin, delicate, oval, slightly wider anteriorly, right side nearly straight, left side regularly curved; obtusely elevated; light horn-colored, apex very obtuse, depressed, not projecting above the normal outline of the shell, and only slightly deflected toward the right; apical pit in the centre and looking upwards; apical striæ strong and regular, originating from the circumference of the apical pit and projecting down towards the whole upper surface of the shell, becoming lighter and more irregular below, comparatively few reaching the edge of the shell; lines of growth irregular, but rather strong, glving a reticulated appearance to the surface where they cross the radial striæ; anterior slope, especially above, very convex, the highest point of the shell being in front of the apex; posterior slope slightly concave, nearly straight; left lateral slope convex, right slope nearly straight.

Length 2.5, width 1.5, alt. .75 mm.

Type (No. 25707 Coll. Walker) from Lake Waccamaw, N. C. Cotypes in the collections of Messrs. Jno. B. Henderson, Jr., and G. W. H. Soelner, of Washington, D. C. This small species was found by Messrs. Henderson and Soelner in the pools of the swampy woods around the shore of Lake Waccamaw in the fall of 1906.

It is well characterized by its obtusely elevated shape, blunt apex and radiating ribs or striæ. In sculpture it resembles *A. borealis* Mse., but differs from its thin, delicate shell, smaller size and different proportions, being relatively less elevated and with a longer and more sloping posterior outline.

ANCYLUS (FERRISSIA) NOVANGLIÆ n. sp. Pl. ix, figs. 5, 6 and 7.

Shell small, depressed, elongate oval, sides nearly parallel, the left being slightly more curved than the right; regularly rounded at the extremities; apex prominent, bluntly rounded, situated on the posterior third, very eccentric, turned decidedly to the right, apical striæ prominent; lines of growth fine and regular; anterior slope long, convex with numerous, fine, radiating ribs, which extend to the periphery; posterior slope oblique, nearly straight below the

swell of the apex; left slope very convex, more or less compressed toward the apex; right slope nearly straight below the protrusion of the apex.

Length 3.25, width 1.75, alt. 1 mm.

Types (No. 22502 Coll. Walker) from a small pond near Cambridge, Mass., collected by Owen Bryant. Cotypes in collections of Mr. Bryant and the Philadelphia Academy.

This little species is easily distinguished by its narrow, elongated, depressed form, very eccentric apex and the costulate anterior slope.

Ancylus (Ferrissia) hinkleyi, n. sp. Pl. ix, figs. 11–13.

Shell oval, slightly wider anteriorly, sides equally curved, elevated, conic; apex nearly central, being only slightly behind the longitudinal center and very slightly deflected toward the right, acute, erect, with strong radial striæ; light greenish horn color with the apex bright rose color; anterior slope slightly convex, posterior slope slightly concave, lateral slopes of about the same slight convexity; surface smooth, lines of growth fine, but irregular, no trace of ribs or radial striæ, except at the apex. Length 4.75, width 3.5, alt. 2.25 mm.

Type (25661 Coll. Walker) from the Ohio River at Golconda, Ill. Cotypes in the collection of A. A. Hinkley, DuBois, Ill. Also from the Ohio at Elizabethtown, Ill. (Coll. Hinkley), and from Kentucky. (Coll. Am. Mus. Nat. Hist.).

Four specimens were submitted for examination by Mr. Hinkley from the above localities. In two of the specimens, in which the apices are not at all eroded, the truncation is oblique, the apical pit opening towards the left. The right margin of the truncation is high and smooth, the apical striæ beginning just below the smooth border of the truncation. On the left and lower margin of the pit the apical striæ radiate from the center. *A. hinkleyi* by reason of its rosy apex groups, apparently, with *A. elatior*, *filosus* and *rhodacme*. Unfortunately the shells had been cleaned, so that at present it is impossible to say whether it shares the anatomical peculiarities common to those forms.[1]

It differs from *elatior* by its smaller size, acute, erect apex and

[1] These species and probably all the pink-tipped *Ancyli* have a very peculiar lingual dentition, quite different from any of the other *Ancyli* and form a group of probably generic rank, a full description of which will be published shortly.

concave posterior slope. It stands nearest to *A. filosus* from which it differs by the nearly central, acute apex, proportionately longer and concave posterior and less convex anterior slope and smooth surface. It is so entirely different in shape from *rhodacme* that there is no danger of confounding them.

The two specimens from Kentucky, received by the Am. Mus. of Nat. Hist. from Anthony as *A. elatior* are apparently identical with this species (see NAUT. XVIII, p. 79).

ANCYLUS (LÆVAPEX) HEMISPHÆRICUS n. sp. Pl. ix, figs. 14, 15 and 16.

Shell obtusely elevated, broadly oval or subcircular, sides almost equally rounded; apex subcentral, very obtuse and only slightly inclined toward the right; smooth, light yellowish horn color; anterior slope very convex, posterior somewhat less so; lateral slopes about equally convex, the left being as usual, somewhat the longer; lines of growth rather prominent and irregular, more or less rippled by subobsolete, irregular radial striæ.

Length (type) 3.5, width 3, alt. 1.5 mm.

Length (cotype) 3.8, width 3.1, alt. 1.8 mm.

Length (Decatur) 4.1, width 3.25, alt. 1.8 mm.

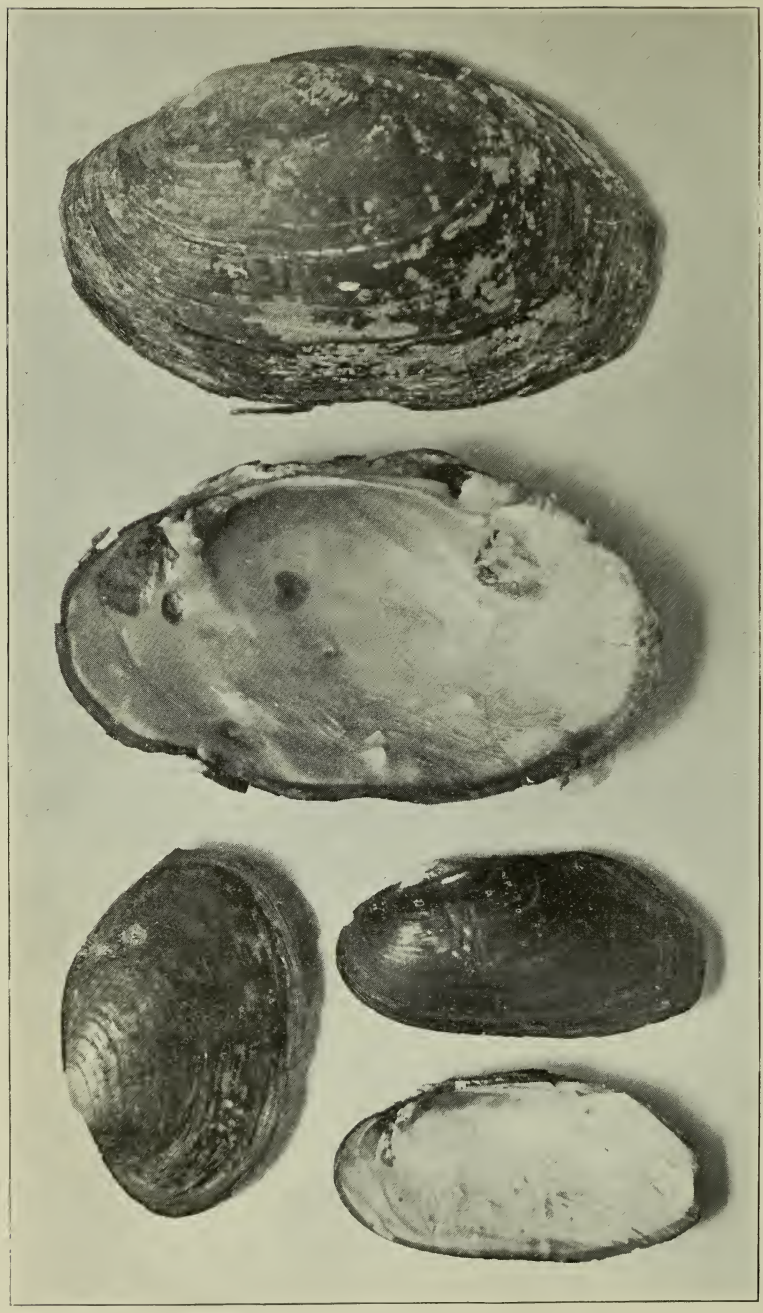
Types (No. 20785 Coll. Walker) from Georgia. Cotypes in the collections of the Kent Scientific Museum, Grand Rapids, Mich., and the Philadelphia Academy. Also from Decatur, Alabama.

The type lot formed part of the DeCamp collection now in the Kent Scientific Museum. Unfortunately no definite locality is given and no further information as to the history of the specimens is attainable.

This species is very distinct by its globose, almost hemispherical shape. None of the shells have a perfect apex.

The type is not quite full grown, but was selected as being less eroded and showing more exactly the contour of the shell. The other measurements given are from mature shells which show the length and width accurately, but owing to erosion are proportionately less elevated. With the erosion of the apex the anterior and posterior slopes have nearly the same convexity, and the specific name adopted becomes even more appropriate than in the type.

The specimens from Decatur, Ala., also collected by De Camp, are slightly larger and heavier than the types, but evidently the same species.



LAMPSILIS FIBRIATA.

L. FIMBRIATA. L. IRIDELLA.

CLAMS AND THE EARTHQUAKE.

BY ROBERT E. C. STEARNS.

Under the head of "Abalones and the Earthquake," in the April, 1907, number of THE NAUTILUS, my brief article contained all that I had been able to learn up to the preceding February, of the effect of the earthquake of April 18th, 1906, upon the marine life of the coast. The Abalones (*Haliotis*) in the neighborhood of Morro Rock, about 190 miles south of the entrance to San Francisco Bay, were found in abundance, but all dead, and the earthquake it was presumed did the killing. Recently the Indians and the Spanish population about Marshall's and Tomales Bay, who for several years have been engaged in supplying the local "clam" *Paphia staminea* Conr. (= *Tapes staminea* auct.), for the San Francisco market, have been, it is so reported, thrown out of employment, the bay having become so shallow as to preclude the use of boats, and clam-diggers state that since the great earthquake no clams have been found there. In many instances these toilers of the clam banks have been reduced to poverty.

In and around Tomales Bay which is about fifty miles north of the entrance to the Bay of San Francisco, the quake was far more severe than at the southerly abalone locality mentioned, being in the direct northwesterly line of the main movement. Dr. Gilbert[1] remarks "the only notable water waves generated by the shock were in Tomales Bay where a group of waves estimated to be 6 or 8 feet high, came to the northeastern shore. The mud which forms the bed of the bay, was shifted and ridged and more or less horizontal displacement occurred as well as a marked shallowing of the waters." At Bolinas, which is north of the Golden Gate, and about thirty miles south of the Tomales locality, the shore of the lagoon or little inner bay, the home, when I was there in June, 1866, of *Tresus nuttalli* Conrad (*Schizothærus nuttalli* of Carpenter), was cracked, and the mud near the head of the lagoon was disturbed as well as the general region thereabout according to Mr. Gilbert. The "little round clam" as the Tomales form is called, is a favorite with many epicures,

[1] Bulletin No. 324. The San Francisco Earthquake, etc., etc., of April 18, 1906. Washington, 1907.

but its tough little foot is not conducive to the happiness of persons of feeble digestion. The fine clam *Tresus* is seldom, if ever, seen on the stalls in the San Francisco markets. It is noble in size and a patrician in quality, and makes a most delicious soup or chowder.

Los Angeles, Cal., March 8, 1908.

THE MOLLUSCA OF NORTH HAVEN, MAINE.

BY HENRY JACKSON, JR.

The Fox Islands constitute an archipelago in the mouth of Penobscot River. The largest of these islands is Vinal Haven, and next in size and position is North Haven. On either side are bays ranging from 4 to 8 fathoms in depth, with many varieties of bottom. The land is equally well adapted for shell collecting, except that there are practically no hard-wood trees. It is very peculiar that quite a number of species have one small place in which they are abundant, and they are not to be found elsewhere. The fresh-water shells have a very fair chance; there is a large pond about one mile long which promises large returns in time. There are also several semi-marshy tracts in which many smaller Limneas are found. Unfortunately I have not been able to dredge beyond 30 fathoms. So it is to be hoped that more species will soon be turned up.

My sincere thanks are due to Dr. Charles G. Weld, Prof. Edward S. Morse, Mr. Dwight Blaney and Mr. C. W. Johnson, for identification of various mollusks and other acts of kindness.

POLYPLACOPHORA.

Trachydermon ruber, Linné. Common.

Trachydermon albus, Linné. Rather common.

PELECYPODA.

Nucula proxima, Say. Very common. Large specimens were found in four fathoms mud.

Yoldia limatula, Say. Very common. Beautiful specimens over two inches long were obtained.

Yoldia myalis, Couthouy. Rare. A few specimen dredged in eight fathoms water.

Yoldia lucida, Lovén. Two specimens dredged in twenty fathoms mud. The eggs were in the shell.

Yoldia thraciæformis, Storer. Several old broken valves and an occasional young specimen.
Anodonta cataracta, Say.
Unio complanatus, Say.
Pecten magellanicus, Gmelin.
Pecten islandicus, Müller. Rare. Single valves occasionally.
Anomia simplex, d'Orbigny.
Anomia aculeata, Müller.
Mytilus edulis, Linné.
Modiolaria nigra, Gray. Rare. Several broken specimens.
Modiolaria discors, Linné.
Crenella glandula, Totten.
Crenella decussata, Montagu. Rare. Same locality as *C. glandula*.
Periploma fragilis, Totten.
Thracia conradi, Couthouy. Rare.
Thracia myopsis, Möller.
Pandora gouldiana, Dall.
Lyonsia hyalina, Conrad. Common. Sandy mud, ten fathoms.
Lyonsia arenosa, Möller. Extremely rare. Same localities as *L. hyalina*.
Cyclas islandica, Linné.
Astarte undata, Gould.
Astarte subaequilatera, Sowerby.
Pisidium abditum, Hald.
Sphærium partumeium, Say.
Venericardia novangliæ, Morse. Rare.
Venericardia borealis, Conrad.
Thyasira gouldii, Philippi.
Cardium pinnulatum, Conrad.
Cardium ciliatum, Fabricius. Rare.
Callocardia morrhuana, Linsley. Rare.
Macoma balthica, Linné.
Macoma calcarea, Gmelin.
Mya arenaria, Linn.
Saxicava arctica, Linn.
Lymnæa humilis, Say.
Lymnæa umbilicata, Adams.
Lymnæa desidiosa, Say.
Lymnæa columella, Say.

SCAPHOPODA.

Dentalium entalis, Linné. Common in deep water, mud.

GASTROPODA.

Acmæa alveus, Conrad. Very common on *Zostera marina*.
Acmæa testudinalis, Müller. Rarer than *alveus*.
Lepeta cæca, Müller.
Puncturella noachina, Linn.
Margarita helicina, Fabr.
Margarita groenlandica, Gmelin. Very rare.
Natica clausa, Broderip & Sowerby. Rather rare.
Lunatia heros, Say.
Lunatia heros, var. *triseriata*, Say. Very common. Found both in deep and shallow water, but never in company with *Lunatia heros*.
Velutina lævigata, Linn.

Velutina zonata, Gould. Rarer than *V. lævigata.*
Crucibulum striatum, Say. Rare alive. Common dead.
Littorina littorea, Linn.
Littorina rudis, Donovan.
Littorina palliata, Say.
Lacuna vincta, Montagu, on *Zostera marina.*
Lacuna vincta, var. *fusca.* On large *Laminaria.*
Cingula aculeus, Gould. Common at base of *fucus.*
Cingula carinata, Mighels & Adams. Rare. A few specimens in sandy mud, ten fathoms.
Skenea planorbis, Fabricius.
Amnicola limosa, Say.
Trichotropis borealis, Broderip & Sowerby.
Purpura lapillus, Linn. Very abundant; var. *imbricata* is also common.
Buccinum undatum, Linn.
Chrysodomus decemcostatus, Say. Rather uncommon.
Tritonofusus stimpsoni, Mörch. Rare.
Tritonofusus pygmæus, Stimpson.
Nassa trivittata, Say.
Nassa obsoleta, Say.
Columbella rosacea, Gould. Rare.
Bela incisula, Verrill.
Bela nobilis, Möller. One specimen.
Bela harpularia, Couthouy.
Bela decussata, Couthouy. Rare, in company with *B. incisula.*
Retusa gouldii, Couthouy. Rare.
Retusa pertenuis, Mighels.
Cylichna alba, Brown.

PULMONIFERA.

Zoögenites harpa, Morse. Very common.
Vallonia pulchella, Müller.
Polygyra fraterna, Say.
Strobilops labyrinthica, Say.
Bifidaria pentodon, Say.
Pupilla muscorum, Linné.
Vertigo gouldii, Binney.
Cochlicopa lubrica, Müller.
Vitrea indentata, Say. One immature specimen.
Vitrea hammonis, Ström.
Zonitoides arborea, Say.
Pyramidula alternata, Say.
Pyramidula cronkhitei anthonyi, Pilsbry.
Zonitoides exiguus, Stimpson.
Zonitoides minuscula, Binney. Extremely rare.
Carychium exiguum, Say.
Helicodiscus parellelus, Say.
Aplexa hypnorum, Linn.
Succinea retusa, Lea.
Succinea avara, Say.
Succinea ovalis var. *totteniana*, Lea.

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H. A. Pilsbry, Special Curator of the Department of Mollusca, Academy of Natural Sciences, Philadelphia.

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CONTENTS:

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Boston, Mass.

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INDEX

TO

THE NAUTILUS, VOL. XXII.

INDEX TO SUBJECTS, GENERA AND SPECIES.

INDEX TO AUTHORS.

C. F. ANCEY

1860-1906

The Nautilus.

Vol. XXII. MAY, 1908. No. 1.

A REVISION OF THE SOLENOMYACIDÆ.

BY WM. H. DALL.

Having recently to review the species of the Lamarckian genus *Solemya*, and having nearly all the known species for study it was a surprise to find that the group contains three well marked subgenera and several subordinate sections. A full account is in preparation, meanwhile the following synopsis may serve to call attention to the subject:

Genus Solemya Lamarck, 1818.

I. Subgenus *Solemya* s. s.

Ligament amphidetic, chiefly internal. Type *S. australis* Lamarck.

Ligament appearing on the internal face of the valve in advance of the chondrophore.

A. Proximal part of the chondrophore prolonged as a thickened ridge part way across the interior surface of the valve, *S. australis* Lam.

B. Base of the chondrophore divided, anterior part extended as a narrow ridge; posterior part forming a thickened prop to the chondrophore; exposed ligament linear. *S. parkinsonii* Gray.

C. Chondrophore thickened, without props or extended rib. *S. solen* v. Salis.

II. Subgenus *Petrasma* Dall, *nov.* Ligament not exposed internally in front of the chondrophore; type *S. borealis* Totten.

A. Chondrophore supported by two strong props with a deep cavity between them.

1. *S. borealis* Totten.
2. *S. velum* Say.

B. Chondrophore with an anterior prop extended as a slender rib in front of the adductor scar; no posterior prop.

1. *S. occidentalis* Deshayes.
2. *S. pusilla* Gould.
3. *S. panamensis* Dall, n. sp.

C. Chondrophore without props. *S. valvulus* Carpenter.

III. Subgenus *Acharax* Dall, *nov.*

Ligament opisthodetic, wholly external, visible internally only where it crosses the gap between the margins of the valves. Nymphs without props. Type *S. johnsoni* Dall.

1. *S. johnsoni* Dall.
2. *S. patagonica* E. A. Smith.
3. *S. agassizii* Dall, n, sp.
4. *S. ventricosa* Conrad, fossil.
5. *S. grandis* Verrill and Bush.

NOTES.—*S. togata* (Poli) auct., and *S. mediterranea* Lamarck, are synonyms of *S. solen.* *S. japonica* Dunker, is the adult of *S. pusilla* Gould. *S. macrodactyla* Rochebrune and Mabille is probably identical with *S. patagonica*, though the unique type of the latter seems pathologically callous dorsally.

S. protexta Conrad, if not the young of *S. ventricosa* Conrad, from the Miocene of Oregon, probably belongs to *Petrasma.*

S. occidentalis Deshayes, is common to the Mediterranean, West Indies and Gulf of Mexico. *S. panamensis* extends from off Santa Barbara, Cal., to Panama Bay; *S. valvulus* Carpenter, from San Pedro, Cal., to the Gulf of California; *S. agassizii* from off Tillamook Bay, Oregon, south to Aguja Point, Peru, in 1036–1800 fathoms, and *S. johnsoni* Dall, from Puget Sound to Panama Bay in 60 to 1740 fathoms.

The rarity of these species, and the fact that they usually break up into fragments in drying, are probably the reasons why the remarkable differences between the hinges of the different species have not previously attracted attention.

CUBAN NOTES.

BY J. B. HENDERSON, JR.

Mr. C. T. Simpson and the writer this winter yielded to the call of the wild, and we have just concluded another of our collecting orgies in the Antilles. This time we descended upon Cuba, and all of those delights of the chase formerly experienced together in the mountains of Jamaica and Haiti we renewed in this island of conchological joys.

Now the collector with two months at his disposal can pretty well clean up Jamaica, barring, of course, the rareties and the elusive small fry, but Cuba is an altogether different proposition. The island becomes surprisingly large after leaving Havana, and then it is only in the mountains that the really good picking is to be found. Then, too, the mountains seem always to be far away from the railroad or the towns where accommodations are to be found. If all the extensive plains and lowlands of Cuba could be eliminated by some Aladdin's lamp process and the mountain systems shoved up together, as they are in Jamaica, then indeed Cuba would present a field to the snail-hunter that no other place on earth could equal. The mountains are excessively rich in molluscan life, and the species found are for the most part of exceptional beauty and interest. The lowlands are not wholly without their mollusks, only there they are more scattered and difficult to find. The range of the lowland species seems to be much greater than that of the mountain forms. In fact one may travel all day by train and still find quite the same species of land shells. In the moutains, however, the distribution of species is often very restricted, sometimes to one side only of one particular hill. But as a rule a species occurring typically at a certain spot in a range of mountains gradually changes through varietal forms as one follows the range until it acquires a new name, and perhaps still another one later on. Thus it is in Cuba there are so many species of *Urocoptis*, of *Chondropoma*, of *Helicina*, *Eutrochatella*, etc., which belong to strongly-defined groups having a central typical form. One is constantly trying to verify a suspicion that the central typical form represents the ancestor that lived upon the higher land and survived a subsidence of the lower country, and that the other forms of the group are the descendants that have wandered away into new

surroundings and conditions as the island was raised to its present altitude.

There is need for much study on the distribution and evolutionary history of the Cuban land shells, and perhaps right here will be found the answers to some Cuban geological problems that fairly call aloud to the traveler. There is evidence, for instance, that Cuba was not very long ago divided and separated into several islands—a large east and a large west one—with several smaller islands lying between and projecting high above a shallow sea. Almost beyond question there has been a considerable exchange of species between Florida and that portion of Cuba lying directly south of Florida. This may be accounted for most plausibly by the migrating water fowl which divide their seasons between the great swamps of this portion of Cuba, the Everglades in Florida and the more northern waters of the United States.

If the editors of the NAUTILUS can afford me space later on I would like to give accounts of some of our personal experiences in the field, particularly about the southern edge of the great Zapata swamp, at Vignales in the Organ Mountains of Pinar del Rio, and finally of our race to catch those two most astonishing shells, *Urocoptis elliotti* and *U. dautzenbergiana*, which live only upon the lofty cliffs of two isolated mountains near Guane.

NEW MICHIGAN LYMNÆAS.

BY BRYANT WALKER.

A careful review of the *Lymnæas* of Michigan, incident to the preparation of Part II of the Michigan Catalogue, has increased the number of species represented in the state fauna from 18 as recorded in 1894 (Rev. Mich. Moll., p. 11), to 28 at the present time.

In the material examined, the following forms occurred, which seem worthy of specific or varietal recognition :

Lymnæa pilsbryana n. sp., Pl. I, figs. 2, 8–11.

Shell ovate-conic, slightly perforate; dark brownish-yellow, frequently tinged with purple, with a light line just below the suture; whorls 5, convex, with a deeply impressed suture, the three apical whorls small, forming a short conical apex, penultimate whorl twice

as long as the three preceding, inflated and convex, body-whorl large and well rounded; lines of growth strong and regular, cut by numerous fine spiral lines giving a shagreened appearance to the surface, in some specimens the last half of the body whorl is obsoletely malleated; aperture broadly oval, somewhat more than one-half of the entire length of the shell, dark brownish-yellow within, with a liver colored band just within the lip; lip sharp, regularly rounded and slightly expanded toward the basal margin; columella thick, white with a strong fold, broadly reflected over and appressed to the axial region, leaving only a very small perforation, and connected with the upper insertion of the lip by a broad white and rather thick (for the genus) callus; axis thick, solid, twisted.

Alt. (Fig. 8) 22; diam. 13½; length of ap. 13; width 10 mm.

Alt. (Fig. 11) 24; diam. 14; length of ap. 14; width 10 mm.

Type (No. 21345, coll. Walker) from Washington Harbor, Isle Royale, Lake Superior, Mich. Cotypes in the collection of the Philadelphia Academy and Chicago Academy of Sciences.

Immature specimens of this species were first taken by the University of Michigan expedition of 1904, and in the report of that trip (Rep. Geol. Surv. Mich., 1905, Separate, p. 97) was stated to be "related to *L. sumassi* Bd., but probably undescribed."

The expedition of 1905 was fortunate in securing fully-matured specimens. And a comparison of these with a photograph of cotypes of *sumassi* from the British Museum, kindly furnished by Mr. F. C. Baker, of Chicago, showed that the two forms were entirely dissimilar.

The affinities of *pilsbryana* are entirely with *L. emarginata* Say, a species of general distribution through the Great Lakes from Saginaw Bay northward.

It differs from that species in its darker color, more inflated whorls, especially those of the spire, and the entire absence of the emargination characteristic of that species.

L. emarginata was also found on Isle Royale, and there maintained the acute conical spire with a less impressed suture characteristic of the usual form of that species. The axis of the Isle Royale *emarginata* (fig. 1) is more slender, more curved and less twisted than that of *pilsbryana* (fig. 2). Both of these figures are made from immature specimens.

Lymnæa petoskeyensis n. sp., Pl. I, fig. 3, 5–7.

Shell elongate oval, acutely conic, perforate; thin, pale horn-color, almost white, translucent; whorls 6, regularly increasing, convex, with a well impressed suture; spire elongated, acutely conical, apical whorl minute; body whorl somewhat inflated, elongate oval; lines of growth fine and regular, cut by numerous very fine revolving, spiral lines, surface more or less malleated; aperture oval, subangulate above and rounded below, slightly more than one-half the entire length of the shell; lip thin and sharp; columella nearly straight without any fold, inner lip expanded and reflected over the round deep umbilicus and continued as a thick white callus over the parietal wall; where this callus passes over the umbilicus toward the basal margin it is abruptly depressed into the umbilical opening, forming a well marked furrow between the columella and the parietal wall, and giving the appearance of a twist to the face of the columellar enlargement, but the columella itself is scarcely affected by it; the axis is large for the size of the shell, without any trace of a fold, and nearly cylindrical, the base of the preceding whorl abruptly flattened around the insertion of the upper end of the pillar.

Alt. (Fig. 5) 23.5, diam. 11.25, ap. length 13, width 8 mm.

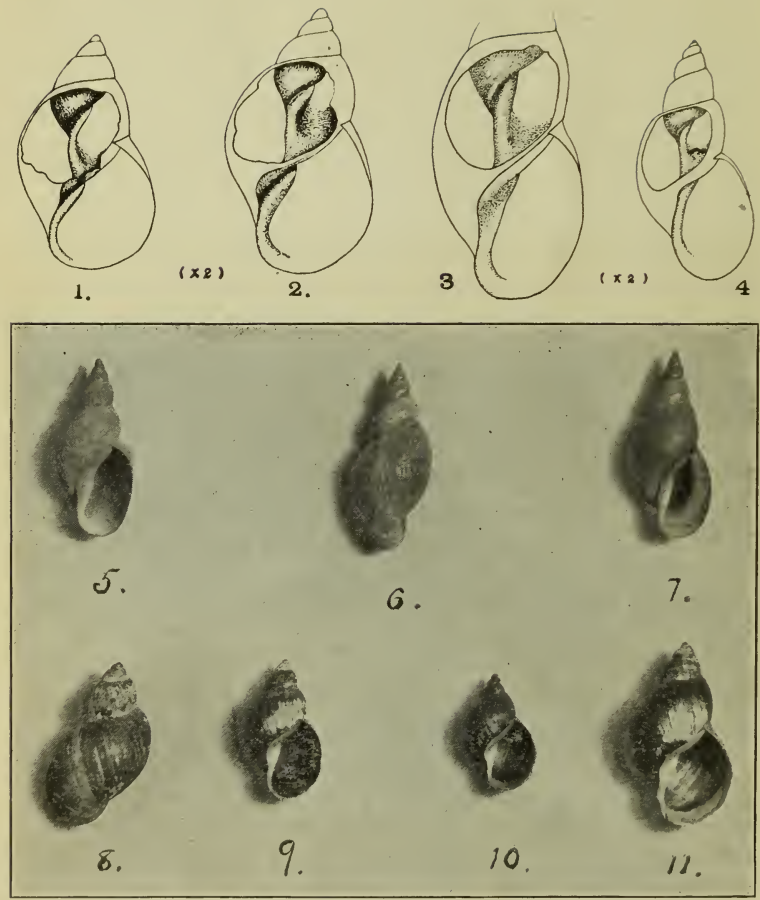
Alt. (Fig. 6) 24.5, diam. 11, ap. length 13.5, width 7.5 mm.

Alt. (Fig. 7) 25, diam. 10.5, ap. length 12, width 7 mm.

Types (No. 14347 coll. Walker) from a small spring-brook flowing into Little Traverse Bay, near Petoskey, Mich. Cotypes in the collections of the Philadelphia Academy and the Chicago Academy of Sciences.

This species was at first supposed to be a very thin, fragile form of the elongate variety of *L. catascopium*, characteristic of the lake region. But upon cutting into the shell, the peculiar shape of the axis forbade its reference to that species.

Under Dr. Dall's arrangement of *Lymnæa* (Harr. Exp. XIII, p. 64) it would belong to the section *Galba*. Compared with *L. desidiosa* Say, (Fig. 4) the axis of *petoskeyensis* (Fig. 3) is proportionately much larger, more elongated and more cylindrical, but the general features of both are the same. The peculiar contraction of the base of the whorl around the upper end of the pillar, so remarkably developed in *petoskeyensis*, is present, but not at all marked, in *desidiosa*. The umbilicus in *petoskeyensis* is round and deep, and is more conspicuous in the immature shells, as the expansion of the broadly reflected columella nearly covers it in the adult.



NEW MICHIGAN LYMNÆAS.

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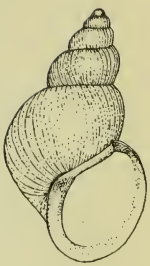

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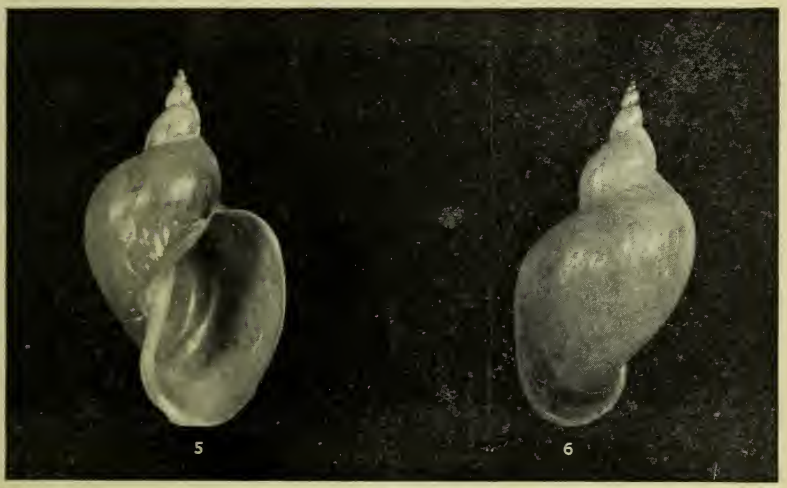

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NEW MICHIGAN LYMNÆAS.

The little brook, only a few hundred feet long, in which the species lives, is also the type locality for *Physa walkeri* Crandall.

Lymnæa cyclostoma n. sp. Pl. II, fig. 4.

Shell ovate conic, turreted, umbilicate, light yellowish horn-colored, shining; lines of growth fine, irregular, subobsolete on the body whorl, stronger on the apical whorls, reticulated by indistinct revolving, impressed spiral lines. Spire elongated, apex subacute; whorls 5, very convex, those of the spire somewhat shouldered, suture deeply impressed; body whorl large, inflated, very convex. Aperture broad oval, subcircular, rounded above and below. Columella broadly reflected over the round, deep umbilicus, convex, smooth with no fold, parietal wall with a thin transparent callus. Lip sharp, but thickened within by a heavy white callus.

Alt. 7.5, diam. 3.25 mm.

Types (No. 13599 Coll. Walker) from Indian Creek, Kent County, Mich. Also from Alma, Gratiot County, Mich.

This very distinct little species was first collected by Dr. R. J. Kirkland, of Grand Rapids, Mich., and was listed as *L. cubensis* Pfr. (*umbilicata* C. B. Ads.) in my Review of the Moll. Fauna of Michigan (1894). Through the courtesy of Mr. E. A. Burt, curator of the Museum of Middlebury College, I have been able to examine the specimen of *L. umbilicata* deposited in that museum by Adams, and for comparison have figured it (fig. 1). The two species are so obviously distinct that verbal comparison is hardly necessary. *L. cyclostoma* differs in its more elevated, turreted spire, more broadly reflected columella and thickened white lip. It resembles *umbilicata*, however, in the sculpture, and is no doubt derived from the same stock.

In this connection it may not be out of place to add that the inspection of the authentic specimen of *L. umbilicata* confirms Dr. Pilsbry's reference of that species to *L. cubensis* Pfr. It is evidently distinct from *L. caperata* Say, and its reference to that species as a synonym by Haldeman, Tryon, Binney and others is quite erroneous.

The Middlebury specimen is not quite mature. It has $4\frac{1}{2}$ whorls and measures 6 mm. in height and 4 mm. in diameter. For further comparison I have figured (Fig. 2) a Rhode Island specimen, which is apparently typical; the dimensions (6.5 x 4.25) agreeing almost precisely with those given by Adams. It is however, somewhat

more inflated than the Middlebury specimen. The apparent fold on the columella is evidently an individual malformation, as it does not appear in any of the other specimens in the same lot. Compared with typical *cubensis* (Fig. 3), *umbilicata* is more globose, with a shorter and more obtuse spire. If the difference holds good for the northern form, *umbilicata* would be entitled to varietal rank.

A single small specimen from Otter Lake (Lapeer? County), Michigan, (Text Fig. 1.) collected by the late Dr. Manly Miles, seems referable to *umbilicata*. It is smaller than the Rhode Island specimens (3.5 x 2) and differs somewhat in shape, the body whorl being somewhat shouldered and the spire more acute and slightly more elevated. But the characteristic axial (longitudinal) sculpture is present although there is no trace of any spiral lines. The lip is decidedly thickened within, and both it and the columella are pink. The umbilicus is not as large as in the Rhode Island form.

Fig. 1.

Lymnæa stagnalis v. perampla n. var. Pl. II, figs. 5 and 6.

This variety differs from the usual North American form, var. *appressa* Say, by its shorter, rapidly acuminating spire and larger, strongly shouldered body whorl; the first three whorls of the spire are slender and increase regularly in size; the penultimate whorl is disproportionately enlarged, swollen and subangulated by the flattening of the upper part of the whorl, which in the body whorl develops into a prominent shoulder.

Alt. (fig. 5) 45.5, diam. 26, length ap. 28, width 18 mm.

Alt. (fig. 6) 45, diam. 23.75, length ap. 26, width 17 mm.

Types (No. 1834 coll. Walker) from Houghton Lake, Roscommon County, Michigan. Cotypes in the collections of the Philadelphia Academy and the Chicago Academy of Sciences. Also from Douglas Lake near Petoskey, Michigan. All the specimens of *stagnalis* from Houghton Lake that I have seen, more than 30, are of this peculiar form, which apparently a well-marked local race.

I have been informed by the late Dr. W. H. DeCamp that the late A. O. Currier of Grand Rapids, who was the first to make known the peculiar Lymnæids of Houghton Lake, intended to describe this form under the very appropriate name which I have adopted for it.

An elevated, almost scalariform example of this variety was figured in the Nautilus, Vol. VI, pl. 1, fig. 6. It is interesting to

note that in Marl Lake a small enlargement of Marl River, which connects Higgins and Houghton Lakes, the typical *L. stagnalis appressa* was the only form found.

Lymnæa desidiosa var. peninsulæ, n. var. Pl. II, fig. 7.

Shell slender, elongated, spire long and acute, subturreted, whorls of the spire very convex, with a very deeply impressed suture, body-whorl elongated, subcylindrical, aperture oval, not very much expanded.

Alt. 13.50, diam. 6.25 mm.

(*To be continued.*)

LIST OF MOLLUSKS FROM AMARILLO, TEXAS.

BY J. B. HENDERSON, JR.

The "Pan Handle" of Texas is a flat, treeless plain where the traveler could make good use of nautical instruments. I could find no vestige of molluscan life there except in the deep cañons, a few of which are encountered on a journey across the "Handle." The following is a list of species taken from one of these cañons at a point about 15 miles S. E. of Amarillo. All were found in drift debris—none actually alive and crawling about. The identifications are by Pilsbry and Vanatta.

Zonitoides singleyana Pils.
Zonitoides minuscula Binn.
Vallonia perspectiva Sterki.
Vallonia gracilicosta Reinh.
Helicodiscus parallelus Say.
Pupoides marginatus Say.
Bifidaria pellucida hordeacella Pils.
Bifidaria tappaniana C. B. Ad.
Bifidaria armifera Say.
Bifidaria procera cristata P. & V.
Vertigo ovata Say.
Planorbis parvus Say.

A few specimens of Physa, Lymnæa and Pisidium too young for identification were also found.

NOTES AND NEWS.

THE NASON COLLECTION.—The University of Illinois has lately acquired the collection of shells of Dr. Wm. A. Nason, of Algonquin, Illinois. The collection numbers approximately 50,000 specimens, representing 10,000 species. Among these are large series of the species found in Illinois, together with many beautiful specimens from various parts of the world.

THE ANCEY LIBRARY.—The books and many of the papers of the late C. F. Ancey can be obtained from Mr. Gerat, 76 rue du Faubourg St. Denis, Paris, France.

NOTE ON CYPRÆA GRACILIS, GASK.—A few months ago, among some small shells from unknown localities which came into my hands, there appeared a small cowry which for a time puzzled me exceedingly, being very different from any of the species then known to me. Upon careful study, however, in connection with the various monographs of the *Cypræidæ*, it has proven unmistakably to be the very rare *Cypræa gracilis*, Gask, the type of which was brought from the China Seas by the "Samarang" and which has since been found only at Mauritius and Reunion I. (Weinkauff, Hidalgo). Although the coloration of the back has been obliterated, the specimen being beach-worn, it has the peculiar lip, the narrow, bent aperture, sparsely scattered reddish-brown dots and fine teeth called for in the Gaskoin description, and it also corresponds, as to base and contour, to the figure in the Sowerby monograph, probably copied by Weinkauff and Roberts. Length, 10 mm.

FRED L. BUTTON.

NOTE ON TRIVIA MAUGERIÆ, GRAY.—Of this very rare species —sometimes also known as Tr. "Maugeri," (Roberts, Hidalgo) and thus far found only at the Galapagos Is.—I have known but three examples in all the West American collections. The first which appeared was a badly bleached one which I detected among the molluscan material brought back by the Stanford University expedition of 1898, the specimen being now in the University collection. The second, a fine one in the Arnheim collection at San Francisco, was unfortunately destroyed in the great fire of 1906; while my own specimen, although beach-worn, is in fair condition and color. Length, 13 mm.—FRED L. BUTTON.

NOTE ON TRIVIA GALAPAGENSIS MELV.—Upon examination of the molluscan material brought back by the Stanford University expedition to the Galapagos Is. in 1898, I noticed this novelty and sent it to Mr. Melvill for description (Ann. & Mag. Nat. Hist., Aug., 1900.) Although the small type lot of this interesting species were all jet black and shiny, I have since then obtained from the same locality another specimen which is clearly referable to this species but which is of a reddish-brown color, while all the other specific characteristics, including the two whitish spots on the back, are well marked. As already noted by me (Jour. of Conch., Oct., 1902) this species proves to be ribbed throughout when perfect, instead of smooth on the back, as described.—FRED L. BUTTON.

PUBLICATIONS RECEIVED.

A SURVEY OF THE SPECIES AND VARIETIES OF PUPA DRAPARNAUD, OCCURRING IN SOUTH AFRICA. By JAMES COSMO MELVILL and JOHN HENRY PONSONBY (Ann. & Mag. Nat. Hist., I, ser. 8, pp. 70–86, pl. i, ii, 1908). The paper is based on a collection made by Mr. Henry C. Burnup, to whom credit is given for two new forms. The figures are excellent. In all 28 species are recorded, with several varieties.

DESCRIPTIONS OF NINE TERRESTRIAL MOLLUSCA FROM SOUTH AFRICA. By JAMES COSMO MELVILL and JOHN HENRY PONSONBY, INCLUDING ANATOMICAL DESCRIPTIONS OF TWO PROPOSED NEW GENERA (*Afrodonta* M. & P. and *Peltatus* G.-A.). By Lt.-Col. H. H. Godwin-Austen (Ann. & Mag. Nat. Hist., I, ser. 8, pp. 129–136, pl. 7 and 8, 1908).

C. F. ANCEY.[1]

César-Marie-Felix Ancey, administrator at Mascara, Algeria, was born in Marseilles, November 15, 1860. His father, well known

[1] Taken in part from the obituary by Mr. H. Fischer (Jour. de Conch., LV, pp. 404–496), to whom we are also indebted through Mr. Geret for the accompanying portrait. A complete list of Mr. Ancey's writings will be found in the above publication, pages 406–412.—EDITORS.

for his publications on entomology and author of valuable work on malacology, encouraged his well-developed inclination for zoölogical studies. At the age of twenty-three he was appointed conservator of the fine Oberthur entomological collection at Rennes. This position not promising material success, he returned to Marseilles, where he studied law, and obtained his diploma in 1885. He then entered the government administration in Algeria; was married in 1889, and the same year was appointed deputy administrator, and filled successively positions at Fort National, Boghari and Dra-el Mizan. After thirteen years spent in that locality he was promoted to acting administrator at Mascara. It was a just reward for his great qualifications and for the esteem which he had been able to win amidst duties that were frequently of a difficult character.

Mr. Ancey hoped shortly to fill a State mission to the Cape Verde Islands, which was sure to furnish opportunities for malacological studies. After a brief illness he died at Mascara, October 10, 1906. His death was a painful surprise to his scientific correspondents.

Most of his writings were on conchology, and his many papers, some 140 in all, give an idea of the importance of his work, devoted principally to the malacological fauna of Hawaii, Central Africa, Polynesia, Central Asia, etc. He was especially interested in the study of the smaller land shells, of which he had a large collection. As his appointment to Mascara promised to be permanent, he expected to be able to work up his large accumulation of undetermined species, still packed just as he had received them. It was his purpose some day to study the land mollusks of Algeria; although thoroughly competent for the work, he hesitated to undertake it on account of the difficulties arising from the many doubtful species, which made the study of the Algerian fauna a most ungrateful task.

Mr. Ancey is authority for many generic or subgeneric names, among which may be mentioned: *Boysidia*, *Parabalia*, *Haplotrema*, *Pseudomphalus*, *Monomphalus*, *Micromphalia*, *Platystoma*, *Rhytidiopsis*, *Pararhytida*, *Microphyura*, *Ochroderma*, *Tomostele*, *Mabilliella*, *Thomsonia*, *Lechaptoisia*, *Thaanumia*, *Baldwinia* and *Armandiella*. The genus *Anceyia* was dedicated to him by Bourguignat. Remarkably gifted and thoroughly acquainted with the bibliography of the subject, he leaves behind him work which marks a real progress in our knowledge of the terrestrial mollusks. His untimely death is a great loss to science.

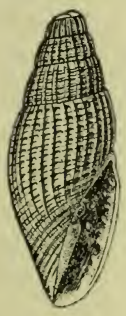
THE NAUTILUS.

VOL. XXII. JUNE, 1908. No. 2.

A NEW EOCENE FOSSIL FROM CLAIBORNE.

BY T. H. ALDRICH.

MITROMORPHA EOCENENSIS, n. sp.



Shell small, but five whorls remaining (the embryonic whorls are broken off), sulcate, the longitudinals close set and prominent, the spirals the same on the smaller whorls, but on the body whorl more prominent at the suture and the base; suture distinct and rather deep; outer lip denticulated; pillar lip with two tubercles, the one nearest the canal long and tapering. Canal short, slightly widened and slightly twisted.

Length 7 mm., breadth 3 mm.

Locality: Claiborne Sand Bed, Claiborne, Alabama.

Remarks: In *Mitromorpha pygmaea* Dall and others examined, the spiral sculpture seems to predominate, but in the species described above the longitudinal is the stronger.

TWO INTERESTING NEW ENGLAND NUDIBRANCH RECORDS.

BY FRANCIS N. BALCH.

The absolutely lamentable state of our present knowledge (or rather ignorance) of the New England Nudibranchs is in no small part due to the capricious and baffling occurrence of that interesting

group. Here to-day and gone to-morrow, perhaps abundant one year and not observed again for decades, even on shores where they are in most years common if rightly sought at the right season, they remain practically unknown to many whose collecting is done only in summer.

A good deal of evidence has accumulated to show that many of the forms, chiefly Aeolidians, have a peculiar life-history, somewhat as follows: Coming on the shore in early spring they breed in the rock-pools or not far below low-water mark, and almost immediately die. The young, growing slowly at first and escaping observation by reason of their minute size and often marvelously "protective" (?) coloration, work their way slowly off shore with the coming of warmer weather, migrating still further out as the cold sets in, and attain their growth over winter in comparatively deep water, only to perform the reverse migration, breed and die the next spring. They are thus annuals. This is supposed to be the case particularly with Aeolidian forms, but not even for them is the theory universally accepted. There are certainly grave objections to it. It has been urged that neither the on-shore nor the off-shore migration has been followed; that the young ought not to escape observation over summer even though minute and inconspicuous; that they occasionally, though rarely, occur in summer adult or nearly so; that the dredge fails to reveal them of nearly adult size in winter when they should occur. On the other hand it is a fact that many of the species have a fairly definite season (usually early spring, more rarely late autumn, and still more rarely at other times) when in most years they are with us in fair numbers and of full size, and thereafter—and suddenly—thence depart and are seen no more till the next year at the same season or perhaps many years later at the same season. This holds good of the rocky shores in the neighborhood of Boston, and I imagine few of us have ever seen there, except in spring, more than very scant and scattering examples of the Aeolid type.

The following captures, therefore, have a distinct interest, even though, by the fault of the writer, it is much less than it should be.

On November 15, 1905, Owen Bryant, Esq., of Cohasset, Mass., took from kelp dislodged by a storm from water of moderate (but uncertain) depth more than sixty Nudibranchs of at least eleven different species practically in company at that one spot. Not one was very young (less than say 3–4 mm.) Not one was adult.

He very kindly notified me and gave a Sunday to a trip to Cohasset where I saw the remarkable haul still alive. The early darkness of a November afternoon, the absence of apparatus and books and my absorption in professional work which precluded the possibility of my attempting to transport and preserve the living creatures for further study, may be held sufficient excuse for my failure to identify the species at the time fully and reliably, but not for my apparent failure to preserve some of the more interesting forms for later working over. To my great regret, however, the single Dorid form is the only one I am now able to find.

The species identified were as follows according to my notes:

Cratena gymnota (Couth.). "1 specimen quite juv., cores of cerata very dark."

? *Cratena veronicae* Verrill. "1 specimen, abt. $\frac{3}{4}$ in., cerata very green, *very* like viridis A. & H." *

Coryphella mananensis (Stimps.) "1 specimen, abt. $\frac{1}{2}$ in., juv."

? *Coryphella salmonacea* (Couth.). "> *diversa* Couth., 1 nearly adult spec., abt. 1 in." Unfortunately *salmonacea* (Couth.,) [now Bergh] does *not* include *diversa* (Couth.), as I then supposed, and both species are in utmost need of further elucidation. Wherefore I much regret my failure to preserve this specimen as a consequence of which I am now quite unable to say what I really had before me—at all events something wholly distinct from *mananensis*.

Dendronotus frondosus (Ascanius). "3 specimens, abt. 1 in."

Dendronotus robustus Verrill. "1 specimen, abt. $\frac{3}{4}$ in."

Palio lessonii (d'Orb.) "2 specimens, abt. $\frac{1}{2}$ in., like A. & H's. figures of adult but anal tubercles very conspicuous and white instead of yellow."

Lamellidoris aspera (A. & H.) > *pallida* A. Ag. "1 specimen, juv., abt. $\frac{1}{2}$ in."

The above enumeration certainly includes all the species (and likewise all the specimens) of all except the Aeolid forms. But of the Aeolid species enumerated there were in all likelihood many more specimens, while I noted that there were at least three obviously different Aeolid species which I did not undertake to name. Quite probably there were more. The whole enumeration only

* I had Alder & Hancock's figure before me in making the comparison.

accounts for eleven specimens out of more than sixty. I only had time to note the larger and more conspicuous ones.

On September 19, 1907, Mr. Bryant made a somewhat similar haul, although less interesting. He most kindly brought the material to me still alive, and I was able to study it more adequately.

There were twenty-nine specimens of three species, and all were taken together from the bottom of a floating clam-car.

The species were as follows:

Facelina bostoniensis (Couth.) now *Coryphella bostoniensis* (Couth.). Bergh et auct. al. Europ., "7 specimens, 4 to 10 mm."

Coryphella mananesis (Stimps.). "2 specimens, 8 mm., 14 mm."

Palio lessonii (d'Orb.). "20 specimens, 1 abt. 12 mm., the rest abt. 5 mm. Seem browner in coloration and much more sparsely tuberculated, with relatively more conspicuous circum-anal tubercles than the European type as figured."

It will be noted that here again not one is adult, while not one is very young.

It seems to me that these two captures suggest strongly an autumnal condensation of the half-grown *Nudibranch* population (of certain groups) in moderate depths, just off the shore perhaps, best explained tentatively as a "wave of migration" to deeper water for the winter. It is clear enough how a population, which would be very sparse if spread over the whole area from three fathoms, let us say, to extreme low-water mark, might be much condensed if the cooling waters or failing food supply set them all moving off shore about the same time, only to check and bank up at the edge of some particular deep channel or cold current or on some specially favorable hunting-ground which all hitherto living anywhere inshore of it must cross.

NEW MICHIGAN LYMNÆAS.

BY BRYANT WALKER.

(*Concluded.*)

Lymnæa desidiosa peninsulæ

Types (No. 20040 Coll. Walker) from the headwaters of the Union River, Ontonagon County, Michigan. Cotypes in the collections of the Philadelphia Academy and the Chicago Academy of Sciences. Also from Little Iron River, Ontonagon Co., Salmon

Trout River, Marquette Co., and the St. Mary's River at Saulte Ste. Marie, Mich.

This variety differs from the usual and more typical form (pl. I, fig. 4 and pl. II, fig. 8) of general distribution in the lower Peninsula, by its slender, elongated form. It is apparently characteristic of the small rivers tributary to Lake Superior. With the exception of a few specimens from Saulte Ste. Marie, the typical form of *desidiosa* has not been as yet found in the Upper Peninsula at all. *Peninsulæ* is very similar in shape to a small form of general distribution through the State, which is probably referable to some one of Lea's indefinite species, but differs by its much greater size, being twice as long with the same number of whorls. As a characteristic local form of a large region, it seems worthy of a name.

Lymnæa davisi n. sp. Pl. II, fig. 9–10.

Shell of medium size, globose-conic; perforate; light horn-color; whorls 5; the spire about one-third of the entire length of the shell, rapidly acuminating and with a minute, sharp apex; the whorls of the spire are flattened and but slightly convex, with a distinct, but not deeply impressed, suture; body whorl large, inflated, ovate, flattened above and rounded below; lines of growth distinct, fine and regular, minutely decussated with revolving spiral lines; aperture large, pear-shaped, acutely angled above and broadly rounded below, about three-fifths of the entire length, lip sharp, slightly thickened within, straight above, somewhat expanded below, broadly reflected over and nearly covering the small umbilical perforation; columella with a very slight fold; axis rather thick, round, scarcely if at all folded.

Alt. (Fig. 9) 15.2, diam. 7.5 mm.

Alt. (Fig. 10) 15, diam. 7.5 mm.

Types (No. 20092 coll. Walker) from Fish Point, Tuscola County, Mich. This species is well characterized by its large, ovate body whorl and its very acute spire; the apical whorls are flattened and the straight line of spire is prolonged over the upper part of the body, giving a "pot-bellied" appearance to the shell.

Named in honor of Prof. Charles A. Davis of Ann Arbor, its discoverer, in recognition of the many valuable contributions he has made to our knowledge of the distribution of the mollusca in Michigan.

Lymnæa bakeri n. sp. Pl. II, figs. 11–12.

Shell slender, elongate, perforate; whorls 5; spire elongated, turreted; apex acute; body whorl narrow, elongated, compressed below; suture deeply impressed; lines of growth fine and regular with fine subobsolete, revolving, spiral lines; aperture narrow, elongated, within the flare of the lip, the sides are nearly parallel, and about equally rounded above and below; lip thin, sharp, suddenly and broadly expanded, subreflected, continuous, not appressed to the parietal wall, and roundly reflected over the perforation, columella straight, without a fold; axis round and smooth.

Alt. (fig. 12) 16.5, diam. 7.5, length ap. 8.5, width 4.5 mm.

Types (No. 9353 Coll. Walker) from Pine Lake, Charlevoix County, Mich.

This remarkable species was dredged from the marl bottom of Pine Lake. No living specimens were found, and in all probability it is extinct. In its external characteristics it is more nearly related to *L. jayi* Dunker (*gracilis* Jay) than to any other of the described species, but the resemblance is a general one only, the two species differing in nearly every detail. The continuous, free lip and straight columella are exceedingly like those of *jayi*, and would naturally cause it to be referred to the subgenus *Acella*. But the axis is not gyrate, as in that group, but is rounded and without a fold, as in *Galba*.

The young shell (fig. 11) is subcylindrical, and with its heavily-shouldered, turreted whorls and narrow aperture reminds one of the curious *L. contracta* Currier from Houghton Lake. I take pleasure in dedicating this very peculiar species to Mr. Frank C. Baker, of the Chicago Academy of Sciences, who has made a special study of the North American *Lymnæas*.

Explanation of Plates.

plate i.

Figures 1–4 inclusive are enlarged. The remainder are of natural size.

Fig. 1. *L. emarginata* Say (immature), Isle Royal, Mich.

Figs. 2, 9 and 10. *L. pilsbryana* Walker (immature), Isle Royal, Mich.

Fig. 3. *L. petoskeyensis* Walker, Petoskey, Mich.

Fig. 4. *L. desidiosa* Say, Ann Arbor, Mich.

Figs. 5, 6 and 7. *L. petoskeyensis* Walker (types), Petoskey, Mich.

Figs. 8 and 11. *L. pilsbryana* Walker (types), Isle Royal, Mich.

PLATE II.

Figures 1 to 4 inclusive are enlarged on the same scale. Figures 7 and 8 are also equally enlarged, but on a smaller scale. Figures 5, 6 and 9 to 12 inclusive are natural size.

Fig. 1. *L. umbilicata* C. B. Ads. (ex auct.), New Bedford, R. I.

Fig. 2. *L. umbilicata*, Rhode Island.

Fig. 3. *L. cubensis* Pfr., Enterprise, Fla.

Fig. 4. *L. cyclostoma* Walker (types), Indian Creek, Kent County, Mich.

Figs. 5 and 6. *L. stagnalis perampla* Walker (types), Houghton Lake, Mich.

Fig. 7. *L. desidiosa peninsulæ* Walker (types), Union R., Ontonagon, County, Mich.

Fig. 8. *L. desidiosa* Say, Oakland County, Mich.

Figs. 9 and 10. *L. davisi* Walker (types), Fish Point, Tuscola County, Mich.

Fig. 11. *L. bakeri* Walker (young) Pine Lake, Charlevoix, Mich.

Fig. 12. *L. bakeri* (type), Pine Lake, Charlevoix, Mich.

ADDITIONAL SHELLS FOUND IN AROOSTOOK COUNTY, MAINE.

BY OLAF O. NYLANDER.

Circinaria concava Say, one small living shell of this species found at Sherman, in 1904.

Physa sayii, Tappan, very fine, large specimens found in Callen's mill pound, Caribou stream, Caribou, Maine, at Salmon brook, Lake Perham and in the dead water on Salmon brook in Woodland.

Lymnæa palustris Mull., a large colony of this species was found in a small brook on G. C. Hall's farm 3 miles south of Caribou village.

Planorbis bicarinatus var. The carinations on this are extremely developed; Portage Lake, Square Lake and Cross Lake all on Fish River.

Volvata sincera var. *nylanderi* Dall., Portage Lake, Square Lake and Cross Lake, dredged at various depths to 25 feet.

NOTE ON LYMNAEA DESIDIOSA SAY.

BY FRANK COLLINS BAKER.

An examination of Say's specimens of *L. desidiosa* in the Academy of Natural Sciences of Philadelphia reveals the fact that all subsequent naturalists have misunderstood this species and have given the name to a species belonging to a different group of Lymnaeas. The true *desidiosa* is a member of the *palustris* group, as shown by Say's specimens and by a close study of Say's descriptions. The two specimens in the Philadelphia Academy may be described as follows:

Shell oblong-ovate, rather solid, color pale horn; surface dull, lines of growth crowded, conspicuous, crossed by impressed spiral lines; whorls $5\frac{1}{2}$, convex; the body whorl is quite convex; spire acutely conic, about as long as the aperture; sutures well impressed; apex of $1\frac{1}{2}$ whorls, brownish horn; aperture long ovate; outer lip thin, with an internal rib or varix; inner lip reflected over and appressed to the parietal wall, leaving a small umbilical chink; columelar axis with a distinct plait.

Length 15.00, breadth 7.50, aperture length 8.00, breadth 3.00 mill.

Length 14.25, breadth 7.50, aperture length 7.75, breadth 3.50 mill.

The specimens bear the following label in the original handwriting:

Lymnaea desidiosa Say, Journ. Acad., v. 2, p. 169. T. Say, Penn.? (No. 58731).

The figure in Binney (fig. 68) is said to be from an authentic specimen in the Philadelphia Academy, but no such specimen is now in existence, nor are the specimens mentioned from Cayuga Lake to be found. In the absence of any other authentic material Say's specimens must be taken as typical of *desidiosa*. A close analysis of Say's description would seem to indicate that he did not have the shell before him which has so long borne the name of *desidiosa*. He says "It is closely allied to *elodes*, but the whorls are more convex, one less in number, and the two terminal ones are proportionately smaller."[1] This statement is repeated in the American Conchology. This statement of its relation to *elodes* would

[1] Journ. Acad. Nat. Sci., ii, p. 169.

scarcely have been made by Say, who possessed a peculiarly discriminating sense of minute differences between shells, if he had been describing the shell now known as *desidiosa*. The size of the Philadelphia specimens (15 mill.) also corresponds pretty well with the size given by Say ($\frac{1}{70}$ of an inch = about 17 mill.). The most convincing fact to the writer is the presence of a specimen of "*desidiosa*" of authors in the Philadelphia Academy marked "*Lymnaea* . . . . . , Canandaigua Lake, T. Say" (No. 58732), showing that the form usually called *desidiosa* is not the one so called by Say. Prof. Edward S. Morse, who made the drawings for Binney's work, has been unable to give any information concerning the specimen figured by Binney.

Last summer the writer made three trips to Cayuga Lake, one to the south end at Ithaca and two to the north end at the town of Cayuga, with the hope of securing specimens which would correspond with Say's specimens. Three whole days were spent in exploring several miles of the shore and the small creeks, and while specimens of both *palustris* and *obrussa* were obtained, not a single specimen was found which agreed with Say's *desidiosa*. The *palustris* were the large, thin-shelled form and the *obrussa* were rather small specimens, not at all like the description or specimens of *desidiosa*. As Say gave no particular part of Cayuga Lake as the identical spot in which the types were collected, it renders the task of finding locotypes well nigh impossible, since the lake is 38 miles in length.

Recently, Miss Mary Walker, of Buffalo, New York, sent the writer a number of shells from Young's Quarry, Williamsville, New York, which are identical with Say's specimens of *desidiosa*, having the same number of whorls and almost the same measurements. These are given for comparison:

Say's specimens:

Length 15.00, breadth 7.50, aperture length 8.00, breadth 3.00 mill.

Length 14.25, breadth 7.50, aperture length 7.75, breadth 3.50 mill.

Miss Walker's specimens:

Length 15.00, breadth 8.00, aperture length 8.00, breadth 4.00 mill.

Length 14.00, breadth 8.00, aperture length 8.00, breadth 3.50 mill.

Say's figure in the American Conchology (plate 55, fig. 3) corresponds with the specimens from Williamsville, all having the peculiar obese body whorl. Say himself identifies *desidiosa* from western New York in Long's expedition, II, p. 263, where he says, "*Lymneus desidiosus* nob. Falls of Niagara."

The history of *desidiosa* in the American monographs is interesting and clearly indicates that since Say's time little attention has been given to closely analyzing this species. In all of his references Say distinctly indicates a shell of the *palustris* type.

Haldeman describes and figures the form now distinguished as *obrussa* and not the true *desidiosa* (compare his plate with Say's figure 3). Many of Haldeman's figures are abnormal and do not represent *obrussa* as it is usually developed. Tryon, in his continuation of Haldeman's work, (p. 104) states that many of the figures on this plate are not *desidiosa* but a form of *columella* (*macrostoma*). In this statement Tryon is wrong and could scarcely have seen Haldeman's specimens, for a recent examination proved them all to be referable to *obrussa* (*desidiosa* of authors) although as stated above several of the specimens are abnormal. The writer has collected many specimens similar to those figured on Haldeman's plate.

Binney, in his Land and Fresh-water Shells of North America, Part II, makes *obrussa* a synonym of *desidiosa*, thus showing that he considered the latter the small, smooth form and not the true *desidiosa* of Say and his figure 68 is questionable for the reason and is probably of a long-spired *obrussa*. In Baker's Mollusca of the Chicago Area *obrussa* is described and figured as *desidiosa*.

Recently Dr. W. H. Dall, in his Alaska Mollusks (p. 73, fig. 51) figures Say's *obrussa* under *desidiosa*, but also refers in his synonymy to Binney's figure 68. The European monographs have given figures referable to *obrussa* rather than to *desidiosa*.

Amidst the uncertainties caused by the absence of Say's types we must look for a shell which is closely allied to *elodes*, but is smaller, with more convex whorls, and possesses 5 instead of 6 full whorls. Such a shell is found in the autotypes of *desidiosa* in the Philadelphia Academy, and this type of shell occurs in several localities in the eastern part of the United States, and is easily separable from any other known species or variety. The spire varies considerably, being short, or long, or even scalariform. There are from 2 to 5 rest varices on the whorls.

Desidiosa, then, differs from *obrussa* (*desidiosa* of authors) in its generally larger and more solid shell, longer and more turreted spire, more pronounced and heavier sculpture and more convex whorls, with deeper sutures; in having an internal rib inside the outer lip and in the presence of a fold on the columella. Compared with *palustris*, *desidiosa* is smaller, usually more solid and with a more obese body whorl and a more dilated aperture. The spire, too, is more sharply conic and the whorls are more tightly coiled, producing a deeper suture. The inner lip is also more expanded, producing a heavier callus. The shells called *elodes* by Say are larger, more flat-sided, with a longer spire, and the whorls are not so rounded and are more oblique.

If we accept the evidence afforded by Say's specimens (and there seems to the writer to be no other course), then the shells usually called *desidiosa* must bear the name of *obrussa*, which is the first available name, and *desidiosa* must be used for the shells so-called by Say.

Explanation of Plate III.[1]

Fig. 1. *Lymnæa desidiosa* Say, Williamsville, Erie Co., N. Y. (from collection of Miss Mary Walker, Buffalo, N. Y.)

Fig. 2. Say's figures of *Lymnæa desidiosa* in Amer. Conch., pl. 55, fig. 3.

NORTHERN OPISTHOBRANCHIATA.

BY F. M. MACFARLAND.

Northern and Arctic Invertebrates in the Collection of the Swedish State Museum (Riksmuseum). III. Opisthobranchia and Pteropoda. By Nils Odhner (Kungl. Svenska Vetenskaps Akademiens Handlingar, Band 41, No. 4, pp. 1–118, pl. I–III, 1907).

The above work will be welcomed by American zoölogists as a valuable contribution to our knowledge not only of the Opisthobranch fauna of Scandinavian waters, but also as of great convenience in studying the quite similar fauna of our own North Atlantic shores. The classic *Index Molluscorum Scandinaviæ* of Lovén, 1846, and the *Mollusca Regionis Norvegiæ* of Sars, 1878, have been for

[1] Plate III will appear in the July number.

many years the principal extended sources of information upon this subject. The paper of Mr. Odhner is based upon the large collection of Northern and Arctic forms which the Swedish State Museum has accumulated from various expeditions and other sources since its foundation, and which have been studied in part only by scientists. The geographical area represented is a wide one, nearly completely circumpolar in its extent. It includes principally the Arctic Ocean off Siberia, the Kara and White Seas, the Arctic and Atlantic Oceans off the coast of Norway, the waters surrounding the whole Scandinavian peninsula, and to a less extent the coasts of Spitzbergen, Iceland and Greenland, the North Atlantic, Davis Strait, Baffin Bay and Bering Sea.

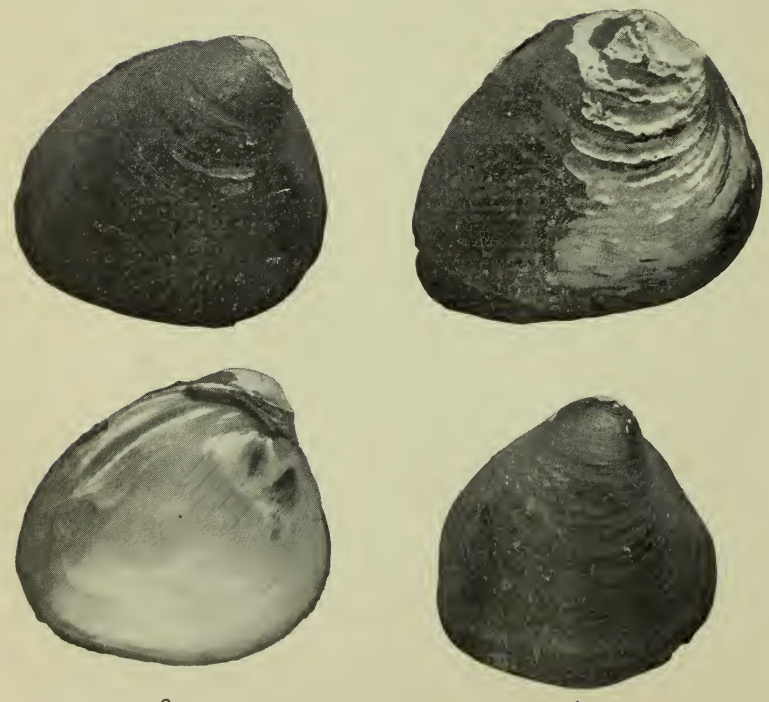
The first section of the paper gives a useful systematic synopsis of the Opisthobranchs and Pteropods studied, based largely upon the well-known works of Fischer, Bergh and Pelseneer. Following this is a detailed summary of the geographical and bathymetrical distribution.

The third section of the work is devoted to a description of the new forms found in the collection. These are *Diaphana hyalina* Turton var. *spirata*, *Diaphana glacialis*, *Goniæolis lobata*, *Archidoris nobilis* Lovén MS., *Issa villosa*, *Doridunculus pentabranchus*, *Idalia pulchella* A. & H. var. *fusca*, and *Cumanotus laticeps*, the last named being the type of a new genus of Aeolidiadae.

Of especial interest and value to students of this group of Mollusca are the three excellent plates, the second and third being especially welcome. These two present artistic reproductions in the natural colors of sixty-one figures of forty-one different species, prepared under the direction of Professor Lovén by the artists W. and F. v. Wright, but never yet published. These form a valuable supplement to Lovén's Index, the original numbers assigned by him being given in parentheses upon the plates. Those who have studied these beautiful animals in life and compared them with even the very best museum specimens, in which original color and body form have alike disappeared, will fully appreciate this preservation in a permanent manner of these important records.

The usefulness of the paper is further enhanced by a chronological bibliography and a very complete index. The convenience of the former might have been increased somewhat by the addition of abbreviated titles of all the papers cited, which are omitted in most cases, the date, author, journal and place alone being given.

1 2



3 4

1, 2. LYMNÆA DESIDIOSA SAY.
3, 4. PLEUROBEMA TOMBIGBEANUM FRIERSON.

THE NAUTILUS.

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ON EUCONULUS FULVUS AND E. TROCHIFORMIS.

BY HENRY A. PILSBRY.

Helix fulva as described by Müller (1774) was a composite of two species: (1) adult *Helix fulva* of Draparnaud and later authors, and (2) immature *Helix bidentata* Gmelin. Müller's idea exactly reversed the age-relations of the two forms; he considered (1) to be the young stage of (2), and while he described both forms satisfactorily, and gives the measurements of both, a fuller description is naturally given of the form he considered adult. The somewhat unusual conic shape, etc., rendered it easy for subsequent authors to recognize both forms from Müller's description. Indeed it would be hardly possible to mistake any other snail of the region for either.

The next notice of the forms was by Gmelin (1791), who admits Müller's *H. fulva* without recognizing its composite nature, his account being merely compiled from Müller. Gmelin moreover described and named the adult stage of *Helix bidentata*, referring to unmistakable figures in the *Conchylien Cabinet* of Chemnitz. There has never been any controversy about the validity of Gmelin's *H. bidentata*.

Ten years later (1801), Draparnaud, in his *Tableau des Moll. terr. et fluv. de la France*, p. 72, restricts *Helix fulva* to the *Euconulus*, giving an excellent description. He also recognized and described *H. bidentata*, the two being quite rightly placed in different groups. Up to the present time this arrangement has been followed almost universally.

Two years later, in 1803, Montagu described and figured *Helix trochiformis* (*Testacea Britannica*, p. 427). The account agrees well with our *Euconulus fulvus* except in the number of whorls, Montagu giving it six, which is one more than *E. fulvus* usually has. Montagu did not recognize Müller's snail in his new species. His knowledge of the work of continental authors seems to have been extremely restricted.

So far as I know, the name *trochiformis* has been adopted only by Beck, in his catalogue of 1837, and by Dall, 1905.[1] No description of the snail under Montagu's name has been published since the original one in 1803.

So much for the evidence from original documents. I am acutely aware that on any question of nomenclature there may be from two to a dozen opinions, each supported by arguments which to some will appear conclusive, yet in a case like this, where the concholo gists of a century have been practically of one mind, a reversal of their judgment should not be made without full consideration of all aspects of the question. It might reasonably be argued that Müller's description, covering the adult stage of one species (*fulva* auct.) and the immature stage of another (*bidentata* Gmel.), should be restricted to the former, even though Müller himself mistook the real relations of the forms. It is hardly necessary to discuss the inexpediency of discarding all composite species, since everybody admits that either with species or genera some member of the original *melange* must conserve the original name unless all be synonymous with earlier names. It seems to me that the case may be summarized thus:

1774. Müller described as *H. fulva* a composite of two species (*Hygromia bidentata plus Euconulus fulvus* of modern authors).

1791. Gmelin eliminated *H. bidentata* from the composite by his unmistakable diagnosis and reference.

1801. Draparnaud recognized the composite nature of Müller's *H. fulva* and restricted that name to the *Euconulus*, which he well described and later figured.

I venture to submit the opinion that no action by Montagu or any other subsequent author should affect the status of either of the two species in question. *Euconulus fulvus* therefore should stand.

[1] Land and Fresh Water Mollusks of Alaska and adjoining regions, Harriman Alaska Expedition, Vol. xiii, p. 40.

DESCRIPTION OF A NEW PLEUROBEMA.

BY L. S. FRIERSON.

PLEUROBEMA TOMBIGBEANUM n. sp. Plate III, figs. 3, 4.

Shell short, triangular, thick, solid and heavy; truncated in front, roundly pointed behind at the post-base. Beaks high and incurved, their sculpture not seen. Post ridge rounded, and close to the post margin. The sides are slightly flattened just in front of the post-ridge, and an inflated, raised area extends from the beaks to the anterior base. This area is to a considerable degree concentrically sulcated, the sulci becoming obsolete behind, where it becomes striated; epidermis rayless, dark reddish brown or having faint greenish rays near the beaks. Lunule triangular, and membranaceous. The shell is markedly flattened in front, half way from beaks to base, showing a sort of so-called "secondary lunule." Nacre white, to rose color, and iridescent. Muscle scars well impressed, and separate. Beak cavities shallow. In the left valve there are two low, thick curved laterals, somewhat striate, and a stout, upright, bifid, striate, acuminate cardinal. In the right valve a single low, stout curved lateral upon a very wide heavy plate, or shelf, and a single wedge-shaped cardinal arising from a pit surrounded by a semicircular, low ridge. Cardinal plate thick, on the inner surface of which may be noted the dorsal muscle scars.

Length 48, alt. 40, diam. 32.3 mm.

Length 41, alt. 39, diam. 27.5 mm.

Tombigbee river. Types from Demopolis, Marengo Co., Alabama, in coll. Frierson and A. N. S. Phila. Also found at Columbus, Mississippi.

The shell may be mistaken by the casual observer, for a small *Quadrula pyramidata*, Lea, but may easily be distinguished by its smaller size, and especially its shallower beak cavities, lower beaks, and less pronounced sulcus from beak to post base. It seems a rather rare shell in the Tombigbee and Alabama Rivers. Four and a half specimens were received in three "envois" from the former river. Mr. Bryant Walker informs me that he has two specimens, from the Alabama River. One from the collection of Dr. Lewis, and labeled by him "*U. plenus*," and the other received

from Mr. R. E. Call, and placed among his "*pyramidata.*" Mr. William A. Marsh has examples, which have been labeled "southern variety of *pyramidata.*" Mr. Walker thinks the shell is however a *Pleurobema*, rather than a *Quadrula* and he places it in the scheme of classification next to *Pleurobema taitianum*, Lea. Compared with that species, ours is less convex, with a more or less distinct sulcus back of the convexity. Uniologists having southern *pyramidata*, may perhaps find specimens of *P. tombigbeanum* in the lots.

SOME NEW BRACHIOPODS.

BY WM. H. DALL.

During the researches of the U. S. S. Albatross party in 1906 a good many brachiopods were obtained, and the range of some known species much extended. The examination indicates that two species of those obtained are undescribed. Diagnoses are now given and figures are in preparation.

Terebratula (*Liothyris*) *sakhalinensis* n. sp.

Shell large, solid, of a rather dark and ruddy brown color and nearly smooth surface which bears faint concentric lines of growth and usually fainter, irregularly radial impressed lines on the anterior portion of the shell; valves moderately convex, the anterior margins slightly flexuous, the middle of the ventral valve is slightly squarely impressed and produced, the extension fitting into an analogous excavation in the dorsal valve; beak stout, moderately recurved, usually much eroded, with a large, entire foramen; the deltidial plates form a solid arch with no mesial groove; internally a thickened collar or short tube surrounds the peduncle, and an evident, but not prominent, short septum extends mesially about 2 mm. from the collar forward, in one specimen. Hinge of the ventral valve solid, with no props to the dental processes; in this valve the pallial sinuses exhibit two strong parallel trunks which extend nearly to the anterior margin before they begin to bifurcate; the genital glands extend as a fine, brown, irregular reticulation over the main cavity of the sinuses outside the inner line of the respective trunks on either side; dorsal (or hæmal) valve with a small but evident cardinal

process; the dental processes small and narrow; the loop is peculiar, the two supporting arms are appressed and soldered to the wall of the valve for a distance of 8 or 9 mm., so that the loop appears to spring from the valve and not from the hinge; it abruptly bends upward at a point about 12 mm. in front of the beak, forming a very wide, slender, frail, almost flattened loop with short triangular crura; the width of the loop is about 12.5 mm., the height of its arch about 3 mm., while the crura, which are curved inward parallel with the limb of the arch, are about 3 mm. long. A mesial septum, low and narrow but distinct, extends forward as far as the anterior edge of the adductor scars; the pallial margin carries minute setæ, which do not project beyond the edge of the valve. Length of ventral valve 45, breadth 34.5, max. diam. of shell 26 mm.

Dredged on the southeast coast of Sakhalin Island, Okhotsk Sea, in 64 to 100 fathoms, bottom temperature 30° F. Type, U. S. N. Mus., 110, 786.

The remarkable loop of this species is sufficient to distinguish it from any other of the genus; the characters mentioned are found in all the specimens.

Laqueus morsei n. sp.

Shell thin, smooth, polished, ruddy brown, rounded lozenge-shaped, somewhat attenuated in front up to a 10 mm. wide truncation; ventral valve with a short beak, entire foramen and short, wide, flattened area; deltidial plates united, but showing a groove at the junction; dental processes short, triangular, strong, supported by strong props with deep funnel-shaped cavities behind them; pallial sinuses with two inner trunks bifurcating at the anterior third of the valve, and two outer ones branched on the outer side from the beginning; genital glands in two longitudinal lines on each side extending along the middle of the main trunks of the sinuses and barely distally bifurcated; dorsal valve with a small but well developed hinge-plate, but no cardinal process or cavities under the dental processes; the septum is short and delicate; the loop normally formed but extremely slender, except the bight of the recurved portion, which is much wider than the rest; the valves meet in a nearly uniform plane, an extremely faint indication of a truncation in front forms the only approach to a flexuosity. Length of ventral valve 32.5, of dorsal valve 29.0, breadth 30.5, diameter of shell 18.0 mm.

Dredged at station 4,860 in the Japan Sea, in 122 fathoms, mud and stones, bottom temperature 34° 1 F. U. S. N. Mus. 210,800.

The species is named in honor of Prof. E. S. Morse of Salem, whose work on the brachiopods is well known. The most nearly related species is *Laqueus mariæ*, A. Adams, which is more ovate, with a narrower and more recurved beak, the genital glands differently distributed, and the mesial septum of the dorsal valve, long, high, and prominent; reaching to the anterior fourth of the valve, while in *L. morsei* it barely reaches the middle of the valve.

A white variety (*albida*) of *Waldheimia* (= *Eudesia*) *raphaelis* Dall, was also dredged, the specimens being more compressed laterally and with sharper anterior flexures than in the type. A dwarf form of the same species with all the characteristics of the adult, except that it measures 17 mm. long instead of 37, was dredged in Kagoshima Gulf. The normal adults of the species show little or no flexuosity anteriorly, until nearly full grown, but the dwarf referred to possessed them in perfection.

A NOTE ON HELIX HORTENSIS.

BY OLOF O. NYLANDER.

I have been much interested in your articles on *Helix hortensis* in America. When a small boy they were among my choicest playthings and I gathered large numbers of them together with *H. nemoralis* in south-eastern Sweden.

In 1899 among a lot of marine shells collected at Grand Manan, and given to me for identification were three land shells. One specimen had five narrow, dark brown bands on a light yellow ground, a common form of *Helix hortensis;* both were of larger size than any specimens in my collection from Sweden, Germany and England. One specimen is of a rich yellow color, comparing in every way with European specimens in my collection. The third specimen was a young shell, light yellow in color and like the plain-colored *Helix hortensis* of the Maine coast. Mrs. S. Page who collected the specimens, informed me that they were plentiful on the Island of Grand Manan, her native home. As there is so much

speculation relative to the origin and distribution of *Helix hortensis*, in America, I will state that in my opinion they were introduced by the early French settlers in Canada, at Gaspé and along the St. Lawrence River; and that their distribution only along the coast is due to the more favorable conditions. The long cold winters—sometimes commencing in September and lasting into the middle of May in Canada and Maine, are too severe and long for *Helix hortensis* to spread over the interior. Along the coast, and on the islands, the winters are not as long or as intensely cold as in the interior. I have gone over a very large part of northern Maine and a good part of New Brunswick and have never seen *H. hortensis*.

I have collected *Helix hortensis* at Hörte and Sherlotenlund on the south coast of Sweden within a few steps of the water edge of the Baltic Sea.

A NEW WEST INDIAN NITIDELLA.

BY WM. H. DALL.

During a recent visit to Cuba Mr. John B. Henderson, Jr., collected a few marine shells from the rocks along shore, between tides, at Ensenada de Cochinas, on the south side of the island. Among them was the following species which I have been unable to identify among the described forms of the genus.

Nitidella hendersoni n. sp.

Shell thin, fusiform, with an elongate, very acute spire, and about eight whorls; nucleus minute, white, smooth; subsequent whorls flattish with an appressed suture, pinkish near the nucleus, later becoming translucent with dark chestnut-brown lineolations, zigzags or dots, frequently with white, protractive, oblique flammulations at the suture of which the anterior margins are bordered with a dark chestnut line; also on the periphery is often a narrow articulated band, of white and brown spots; the surface is covered with a conspicuous greenish periostracum, which on the body whorl is elevated in axial lamellæ not close enough to give a velvety effect but separated by wider polished spaces; surface nearly smooth under the periostracum, polished, with faint indications of fine axial or revolving striæ; on the base there are numerous spiral grooves which

become stronger and channeled near the end of the nearly straight canal; aperture white, within purplish; outer slightly thickened, not reflected, smooth within; posterior angle of the aperture grooved and produced a little, with a subsutural obscure callosity on the body which elsewhere has the surface smoothly erased, edge of the pillar with one faint and one very strong marginal fold; operculum normal. Alt. of shell 19, of last whorl 13.5, of aperture 10, max. diam. 8.0 mm. Found in crevices of the rocks a little below low-water mark.

MOLLUSCA OF KEENE, NEW HAMPSHIRE.

BY R. D. WALKER AND WM. H. COOLIDGE, JR.

The shells that comprise this list were found in Keene, N. H., by the late George Alexander Wheelock, and form a small part of the extensive general collections which he made. The list is perhaps worth publishing as local data in regard to the shells of Keene and the surrounding regions. Mr. Wheelock spent almost his entire life in Keene (1816–1906) investigating the natural history of Monadnock. The determination of the species is through the kindness of Mr. Charles W. Johnson.

Planorbis parvus Say.
Planorbis bicarinatus Say.
Planorbis campanulatus Say.
Segmentina armigera Say.
Lymnea humilis Say.
Physa heterostropha Say.
Aplexa hypnorum.
Succinea ovalis Say.
Polygyra albolabris Say.
Polygyra fraterna Say.
Zonitoides arboreus Say.
Pyramidula cronkhitei anthonyi Pils.
Lyogyrus granum Say.
Amnicola limosa Say.
Unio complanatus Sol.
Alasmodonta undulata Say.
Lampsilis nasutus Say.
Anodonta cataracta Say.
Sphaerium rhomboideum Say.
Sphaerium secure Prime.
Sphaerium partumeium Say.
Sphaerium simile Say.
Pisidium variabile Prime.
Pisidium compressum Prime.

These specimens are in the Thoreau Museum of Natural History, Middlesex School, Concord, Massachusetts.

NOTES.

THE VERRILL COLLECTION.—Prof. A. E. Verrill of Yale University has sold to the University his great collection of marine invertebrates, acquired during his work for the United States Fish Commission in the 16 years from 1873 to 1887. The collection is the duplicate of one secured at the same time and since transferred to the National Museum of the Smithsonian Institution at Washington.

FORMATION OF EPIPHRAGM BY LYMNÆA PALUSTRIS (Müller). —A few days ago while collecting fresh-water shells in the dry bed of a pond near Alum Rock Park, San José, the author found several live specimens of a form of *Lymnæa palustris* Müller lying on the dry mud surface with the aperture sealed down by thick dried mucous and withdrawn into their shells half a whorl. The pond usually contains water at least half the year but on account of the dry spring has contained none since April 1st at least. The bed is thinly covered with tall tulas so that the shells were not in the direct rays of the sun. This form is the only one which occurs in the lake and dead shells up to barely mature are abundant, and some larger. —HAROLD HANNIBAL, San Jose, Cal.

EXOTIC VIVIPARA IN CALIFORNIA.—Amongst the fresh-water molluscan fauna of the "Artesian Belt," between San José and San Francisco Bay, is a large operculate edible snail introduced by the Chinese fifteen or twenty years ago. 4 mm. when born, carinate till mature, 6 months 20 mm. Occasionally in sub-brackish water, grows as large as a duck's egg. Plain yellow-green or with spiral fringes of epidermis.

Specimens were sent to Dr. Dall, who identified it as *Vivipara lecythoides* Bens.

It is very common where planted, but spreads slowly.

In the NAUTILUS XV, p. 91, is a reference to *Vivapara stelmaphora* Bgt., from a dry bed of a lake or pond "at the foot of Mt. Hamilton." The author has been over the San José, Mt. Hamilton road collecting, and of the four lakes and ponds on the route only one, on the Grant ranch in Hall's Valley, appears to answer the description, as it had been dry at the time that article was written for

several years. The fauna was exactly the same as in the neighboring parts of Santa Clara Valley, except extremely large, and contained not a sign of an operculate snail of any kind, nor did the son of a neighboring rancher know of any such form, though he knew the other species by sight. The other ponds were no better. Either the locality given was incorrect or the species was killed out by the drying-up of the lake while the other forms were not for some reason. Certainly it does not occur there at present for no traces could be found.—Harold Hannibal, San José, Cal.

PUBLICATIONS RECEIVED.

A New Species of Cavolinia, with Notes on Other Pteropods. By Wm. H. Dall (Smithsonian Misc. Coll., Vol. 50, Jan., 1908). *Cavolinia couthouyi*, n. sp., from Fiji Is. and New South Wales.

Gonidea angulata Lea, with Description of a New Variety. By Wm. H. Dall (Smiths. Misc. Coll., Vol. 50, Jan., 1908). *G. a. haroldiana* is a new form from Guadalupe Creek, between San José and San Francisco Bay, "remarkable for the almost total absence of lateral angulation," etc.

Notes on the Fresh-water Mollusk Planorbis magnificus and Descriptions of Two New Forms. By Paul Bartsch (Proc. U. S. Nat. Mus., Vol. 33, pp. 697–700). *Planorbis magnificus* Pilsbry occurs in Greenfield Pond, near Wilmington, N. C., where it is rather scarce and local. *P. eucosmius*, n. sp., was found in the same pond. It is very close to *P. bicarinatus striatus*, but distinguished by having two chestnut bands. *P. eucosmius vaughani*, n. subsp., is from Burke's Place, La. All are illustrated with photographic figures.

The Physiology of the Nervous System of the Razor-shell Clam, Ensis directus Conrad. By Gilman A. Drew (Journal of Experimental Zoölogy, V, No. 3, March, 1908). Among other interesting conclusions, Dr. Drew finds that "the

pedal ganglia are apparently dependent upon the cerebral for initiative." When isolated, stimulation causes only local responses. Impulses may pass in both directions through any of the commissures and connectives. Impulses may be sent by roundabout connections when the usual connections are destroyed.

First Additional Catalogue of Land Shells of Japan. By Y. Hirase, Kyoto, 1908. In this list of 24 pages Mr. Hirase catalogues the species and varieties from Japan, the Bonin and Loochoo Islands and Formosa, obtained since the publication of his former list. It is interesting as showing the results of the latest work on these wonderfully rich faunas. Copies of the catalogue will be sent free, we believe, to those interested in the collection of Japanese shells. A handsome plate illustrates various new or interesting species.

Zoological Record, Vol, xliii, pt. viii, Mollusca.—By E. R. Sykes, completed by S. Pace and R. M. Pace. This complete record of all that has been published on Mollusca for the year 1906 together with every generic and specific name used, is indispensable to all working conchologists. The part containing 103 pages can be obtained for 4 shillings of Harrison & Sons, 45 St. Martin's Lane, London, Eng.

The Williams Collection of Shells.—By George Halcott Chadwick, Chicago, Ill., 1908. A brief account of the conchological cabinet of Mrs. Alice L. Williams, which contains so many rare and beautiful shells. It is undoubtedly the finest private collection in America. The collection contains 26,000 shells, "a number unexceeded, I believe, by any private shell cabinet in America since the day of John Jay. While the collection is rich in species representing almost every family, one naturally turns to those gems of the sea, the Cypræidæ. Here we find *Cypræa broderipi*, the only one in America, *C. nivosa*, *castanea*, *chrysalis*, *coxeni*, *crossei*, *similis*, etc., etc., while species considered by many rare are represented by series to show variation. There are 10 *C. aurantia*, 10 *decipiens*, 10 *thersites*, 7 *scotti*, 4 *umbilicata*, etc. Among the Conidæ is enthroned *Conus gloria-maris* while the rare

cervus is also there. The beautiful Volutidæ are represented by many species one scarcely sees in a lifetime. *Pleurotomaria beyrichii* is also among the treasures, but space will not permit us to go into details. It has been admirably described by Mr. Chadwick, who says: "My desire in this writing is to make this remarkable collection better known. It has been a labor of love, and I can wish for those who read no greater pleasure than to come under the fascinating spell of this great collection. It deserves a place in some great hall of science, and it is Mrs. Williams's hope that it may some day be thus installed through public or private munificence."

Descriptions of new species of mullusks from the Pacific Coast of the United States, with notes on the other mollusks from the same region. By William Healey Dall (Proc. U. S. Nat. Mus. vol. 34, pp. 245–257. Numerous new species and subspecies chiefly discovered by Dr. R. H. Tremper, Messrs. Herbert W. Lowe, F. W. Kelsey, and the U. S. Bureau of Fisheries, are described, with notes on previously known forms.

Smell the dominant sense in Diabrotica 12-punctata and Limax maximus. By Robert E. C. Stearns. (Proc. Biol. Soc. Washington xxi, pp. 137–140). *Limax* is guided to its food by smell. Salt liberally strewed on the floor is recommended as a check to their depredations.

On the synonymic history of the genera Clava Martyn and Cerithium Bruguiere. By W. H. Dall. (Proc. Acad. Nat. Sci. Phila. 1907, pp. 363–369). The history of these old names is fully exposed and various errors in matters of fact in M. Cossmann's review of the Cerithiacea are pointed out.

New and characteristic species of fossil mollusks from the oil-bearing tertiary formations of Santa Barbara Co., Cal. By Ralph Arnold. (Smith's Misc. Coll. vol. 50, pt. 4. 1907). Numerous interesting fossils from Eocene, Miocene and Pliocene horizons are described and well illustrated. Among them are *Venericardia planicosta* Lam., from Little Falls, Washington, "the most widespread and characteristic eocene species in the world," *Lymnæa alamosensis* n. sp., from the pliocene of Los Alamos Valley.

The Nautilus.

Vol. XXII. AUGUST-SEPTEMBER, 1908. No. 4-5.

MISCELLANEOUS NOTES ON CALIFORNIAN MOLLUSKS.

BY S. S. BERRY.

A specimen of *Cypræa spadicea* Gray has recently been brought to the writer's notice by Mrs. C. H. Fackenthall, of Pacific Grove, who some years ago found it alive on Chinatown Point, Monterey Bay. This extends the known range of the species many score of miles beyond the most northern locality which has previously been recorded.

Mrs. Fackenthall also collected in March, 1907, over sixty specimens of *Ianthina exigua* Lam. where they had been washed ashore near Point Pinos. This is a new locality for this species likewise.

Another *Ianthina*, which is apparently the *I. globosa* of Swainson, and is new to the Californian fauna, was found in considerable numbers at Oceanside, San Diego county, by Mrs. T. E. N. Eaton and Miss Grace Eaton in the summer of 1906. This species was found in company with *I. exigua* and another undetermined form of the same genus (*I. communis*?) cast up on the sandy beach, and for the most part still retained the animals.

* * * * * * *

In July, 1903, the writer made a small collection of fossils from the pleistocene deposit which forms the cliff just west of the bath-house at Santa Barbara, among which many of the species are of interest because not included by Arnold in his lists[1] of the mollusks of the Santa Barbara pleistocene. Such species are marked with an asterisk. One or two forms are likewise entirely new to the formation.

[1] Paleontology and Stratigraphy of San Pedro, p. 52 q. v.

Margarita pupilla Gld. Several.
* Margarita optabilis knechti, Arnold. One specimen.
* Calliostoma canaliculatum Mart. Several juv.
Leptothyra bacula Cpr. Not rare.
* Leptothyra carpenteri Pils. Not rare.
Leptothyra paucicostata Dall. Not rare.
* Acmaea mitra Esch. Two juv.
* Acmaea (sp.). One juv.
Natica clausa B. and S. Young specimen and opercula.
Crepidula navicelloides Nutt. One specimen.
Crepidula adunca Sby. Two examples.
Rissoa acutilirata Cpr. Two specimens.
*Rissoa (sp ?). One example.
*Diala marmorea Cpr. Several.
Lacuna compacta Cpr. The most abundant form.
Bittium asperum Gabb. Common.
Bittium (quadrifilatum Cpr.?). Common.
Bittium (sp.). Common.
*Epitonium (Opalia) borealis Gld. One specimen.
Ocinebra perita Hds. Several.
*Ocinebra interfossa Cpr. One specimen.
*Ocinebra lurida Midd. *var.* tending toward Carpenter's *var.* munda. Several.
*Ocinebra (sp.). One specimen.
Boreotrophon gracilis Perry. One example.
*Boreotrophon stuarti Smith. One example.
*Boreotrophon stuarti praecursor Arnold. Several.
Amphissa corrugata Rve. Common.
Columbella tuberosa Cpr. Common.
*Nassa mendica cooperi Fbs. One example.
Fusus robustus Trask ? One example.
Fusus (sp.). Several.
*Mitramorpha filosa intermedia Arnold.
[*Note:* This form was likewise found in a living condition by the writer at Pacific Grove, Cal., in April, 1908.]
Clathurella conradiana Gabb. Two specimens.
*Tornatina cerealis Gld. Two examples.
*Dentalium indianorum Cpr. One perfect adult specimen.
*Psephidea (ovalis Dall ?). One valve.

Venericardia ventricosa Gld. Abundant.

Pecten jordani Arnold. Fragments and two juv.

Pecten caurinus Gld. Fragments.

Pecten (sp.). Fragments.

Pecten hastatus Sby. Several valves.

*Monia macroschisma Desh. One valve.

*Glycymeris barbarensis Conr. One valve.

Strongylocentrotus purpuratus Stimp. Fragments of the test and loose spines of this sea-urchin.

*Platidea anomioides Scacch. One perfect shell probably referable to this species was found which agrees well with specimens from San Pedro Bay (200 fathoms), except that the foramen is relatively smaller and the posterior and anterior angles are more acute.

* * * * * * *

In the Proceedings of the U. S. National Museum, Vol. XXX, Messrs. Dall and Bartsch propose the specific name *montereyensis* for the preoccupied *Turbonilla gracillima* of Gabb. The authors must have overlooked the fact that Dr. Cooper in his Monterey list published in the American Journal of Conchology for 1870 likewise noticed the untenability of Gabb's name and rechristened the species *Chemnitzia gabbiana*, so that this name having priority must stand as *Turbonilla* (*Chemnitzia?*) *gabbiana* (J. G. C.).

* * * * * * *

Nassa perpinguis, var. *bifasciata*, *nov.* Among the mollusca collected recently at San Pedro by various collectors has been a color form of *Nassa perpinguis* Hds., which is strikingly distinct and is certainly worthy of a varietal name if color forms must be named. It differs from the ordinary form in the presence of two broad spiral bands of a deep chestnut color in abrupt contrast to the grayish-buff ground color of the shell. One of these bands is situated just below the suture, one about the periphery, and occasionally a fainter band makes it appearance at the extreme base of the last whorl. The bands vary considerably in width, but as yet I have seen no specimens having but a single band.

Additional Notes on Monterey Mollusks.

In my paper on the Molluscan Fauna of Monterey Bay, California, which appeared in the numbers of this magazine running from June to September, 1907, there were a few unavoidable errors and omis-

sions which may well be remedied. The following corrections should be made:

June No., p. 18, near top. *304* species were listed; not *394*.

P. 18, near bottom of page. "*Terebratulina*" *transversa* is a misprint for "*Terebratalia.*"

P. 19. The identification of *Barbatia gradata* is a very doubtful one and the species should probably be removed from the list.

July No., p. 35. "*Cregires*" *albopunctatus* should be *Aegires.*

Aug. No., p. 43. *Odostomia* (*Ividea*) *navisa* should be changed to *O.* (*Ividia*) *navisa delmontensis*, Dall & Bartsch. New subsp.

P. 43. "*Triforis adversus*" is not this species but an undetermined form.

P. 43. "*Seila assimilata* C. B. Adams" was identified according to the common misconception of that tropical species. My specimens should be listed as "*Seila montereyensis* Bartsch," n. sp. One of the co-types came from this lot.

P. 44. "*Rissoina*" *purpurea* is a *Rissoa.*

Sept. No., p. 52, near end of article. Should read as follows: ". . . of Scala (*nine* species), and of the Pyramidellidae (*eighteen* species)," etc. This last figure includes the additional forms enumerated below.

The following species and varieties have been determined from the same lot of material since the publication of the main report:

Adula stylina Carpenter. 12 fathoms; not rare with the other borers in the hard mud.

Cadulus quadrifissatus Carpenter. 12 fms.; one specimen.

Actaeon punctocaelatus Carpenter. 12 fms.; young specimens only.

Epiphragmophora sequoicola J. G. Cooper. Big Trees Station, near Santa Cruz; one immature specimen.

Epiphragmophora arrosa Gould. Big Trees Station, near Santa Cruz; several examples.

Epiphragmophora exarata Pfeiffer. Near Santa Cruz. Specimens were also seen from various localities in the Santa Cruz mountains and from Watsonville.

Epiphragmophora californiensis nickliniana Lea. Big Trees Station, near Santa Cruz.

Polygyra columbiana Lea. Big Trees Station, near Santa Cruz.

Polygyra columbiana armigera Ancey. One specimen found a few miles south of Pacific Grove in the pine woods.

Murex (*Ocinebra*) *interfossus* var. *muricatus* Cpr. Pacific Grove; not rare at low tide.

Turbonilla (*Turbonilla*) *gilli delmontensis* Dall and Bartsch. 12 fathoms; the type lot.

Turbonilla (*Strioturbonilla*) *stylina* Carpenter. 12 fathoms; one specimen.

Turbonilla (*Pyrgolampros*) *berryi* Dall and Bartsch. Two or three specimens, including the type, dredged in 39 fathoms.

Turbonilla (*Pyrgiscus*) *canfieldi* Dall and Bartsch. 12 fms.; the type lot.

Turbonilla (*Pyrgiscus*) *morchi* Dall and Bartsch.? One specimen dredged in 29 fathoms was doubtfully referred by Messrs. Dall and Bartsch to this species.

Cancellaria crawfordiana Dall. Specimens brought in by the fishermen.

The foregoing bring the total collection, after due corrections, up to about 318 named species and varieties, including types or co-types of fourteen new species and two subspecies, besides nine other species not previously described, but the types of which were collected elsewhere.

LAND SHELLS OF THE OKI ISLANDS, JAPAN.

BY H. A. PILSBRY AND Y. HIRASE.

The Oki Islands, in the Sea of Japan north of western Hondo, consist of one large and three smaller islands and several islets, the the whole group about 23 miles long. Saigō is the chief harbor. It is on the southeast side of the largest island, which has a diameter of about 10 miles. The highest elevation is said to be about 1700 feet.

The mollusks of Oki have not before been noticed.

Out of 24 species of land shells there are 9 forms which have as yet been found only on the Oki Islands. Two of these forms are reckoned to be of specific value; the other seven are subspecies of forms found on the adjacent portions of the Main Island of Japan, or in one case on Tsushima, though the two Ganesellas are so distinct that they might with some reason be ranked as species. All of the other forms occur on the Main Island of Japan.

The very close relation of the fauna of the Oki Islands with that

of the adjacent Main Island places these islands in harmony with Sado, Tsushima, Iki, and other islands in the Sea of Japan and Korea Strait, all of which have faunas which show them to have been joined at no remote period to the large islands of Japan.

In the following list, the forms peculiar to Oki are marked with an asterisk (*).

CYCLOPHORIDÆ.

Alycæus melanopoma Pils. (?). Nakamura.

Diplommatina cassa Pils. var. Saigō.

* *D. okiensis* Pils. & Hir. Nakamura. A subspecies of this snail, *D. o. tsushimana*, occurs on Tsushima.

HELICIDÆ.

Eulota (*Euhadra*) *peliomphala* (Pfr.) var. Nakamura.

Eulota (*Euhadra*) *senckenbergiana* (Kob.) var. Nakamura.

Eulota (*Euhadra*) *callizona minor* Gude. Nakamura.

Eulota (*Plectotropis*) *æmula* Gude. Nakamura.

* *Trishoplita cretacea pergranosa* Pils. & Hir. Nishinoshima.

Trishoplita endo Pils. & Hir. Nakanoshima.

* *Ganesella ferruginea okiensis* P. & H. Nakamura.

* *Ganesella myomphala euomphala* P. & H. Nakamura and Chiburijima.

Chloritis tosanus okiensis P. & H. Nakamura.

CLAUSILIIDÆ.

Clausilia (*Hemiphædusa*) *harimensis* Pils. Nakamura.

Clausilia japonica vespertina Pils. Nishinoshima.

Clausilia japonica ultima Pils. Nakamura.

Clausilia nishinoshimana Pils. Nishinoshima.

ZONITIDÆ.

Macrochlamys subelimatus P. & H. Nakamura and Daimanji-yama.

Microcystina vaga P. & H. Nakamura.

Microcystina ceratodes (Gude). Nakamura.

Kaliella ruida Pils. var. Nakamura.

Kaliella fraterna Pils. Nakamura.

* *Kaliella okiensis* Pils & Hir. Nakamura.

ENIDÆ.

Ena reiniana (Kob.) var., shaped like *ugoensis*. Nishinoshima.

AURICULIDÆ.

Carychium nipponense Pils. Saigō.

The descriptions of new species and subspecies follow:

Diplommatina okiensis n. sp.

The lower half of the shell, comprising two whorls, is cylindric, the upper half tapering in a rather long cone with straight sides. Adult shells are generally red-brown, rarely whitish, but the young are nearly white. There are nearly 7 moderately convex whorls, the penultimate, seen from the back, being the largest. The last whorl ascends in front, and has a strong, rather sharp ridge or collar a short distance behind the peristome, and preceded by a rather wide opaque whitish streak. The constriction is slight and median in front. The whole shell, after the smooth apex, has a sculpture of very fine, delicate, oblique, moderately close thread-striæ. The aperture is nearly circular, the parietal callus having a slightly thickened edge, reaching up nearly to the suture. Peristome well reflexed, usually very slightly angular at the foot of the columella. Palatal plica very short, half covered by the parietal callus. Columellar tooth moderately strong, deeply placed, thin but rather high within. Internal parietal lamella strongly developed.

Length 4, diam. 2 mm.

Nakamura, Oki. Types no. 95663 A. N. S. P., from no. 296 *c* of Mr. Hirase's collection.

This species differs from *D. paxillus* (Gredler) by its strongly developed collar. It is closely related to the common Japanese *D. collarifera* Schm. & Bttg., but that species has a much longer palatal plica, a decidedly thicker and stronger columellar lamella inside, and only a weak internal parietal lamella.

Trishoplita cretacea pergranosa n. subsp.

The shell is depressed-conic with obtusely subangular periphery, thin, whitish corneous, with a broad brown band on the base, extending from just below the periphery nearly to the umbilicus, and a narrow brown band above the periphery, ascending the spire above the suture. The surface has a minute sculpture of fine, somewhat waved or irregular striæ, which are minutely and very elegantly granulose; no distinct spiral lines.

Alt. 8.3, diam. 13.3 mm.; whorls $5\frac{1}{2}$.

Nishinoshima, Oki. Types no. 95840 A. N. S. P., from no. 1575 of Mr. Hirase's collection.

This snail, of which only 7 examples were taken, is most nearly related to *T. c. bipartita* of Nagato province, which is less depressed,

less angular, and has no band above the periphery. The minute and very beautiful granulation is somewhat variable.

Ganesella myomphala euomphala n. subsp.

The shell is more depressed than *myomphala*, with the umbilicus open, though partially arched over by the dilated columellar lip, which, however, is not in the least impressed in the axial region. The form is much less depressed than *G. m. omphalodes.*

Alt. 24, diam. 36 mm.; whorls $6\frac{1}{2}$.

Alt. 23.5, diam. 35 mm.; whorls $6\frac{1}{2}$.

Alt. 22.5, diam. 31 mm.; whorls $6\frac{1}{2}$.

Nakamura, Oki. Cotypes No. 95835, A. N. S. P., from No. 1560 of Mr. Hirase's collection.

A smaller form of this subspecies was taken in small numbers (10 individuals) on Chiburijima, Oki. Two measure:

Alt. 18.2, diam. 24.5 mm.; whorls 6.

Alt. 17, diam. 23 mm.; whorls 6.

Ganesella ferruginea okiensis n. subsp.

The shell is much elevated, bullet-shaped, the outlines of the spire strongly convex; narrowly, obliquely umbilicate; rich chestnut-brown, encircled with a narrow yellow band at the periphery and ascending the spire above the suture; surface nearly lusterless, rather weakly marked with growth-wrinkles and minute spiral lines, some intermediate whorls of the spire punctate or subpapillose. Whorls convex, the last rounded periferally, convex beneath. Aperture very oblique, the upper and columellar margins subparallel; baso-columellar margin straightened, thickened within, the edge reflexed.

Alt. 19.5, diam. 17 mm.; whorls $6\frac{1}{3}$.

Alt. 17, diam. 16.2 mm.; whorls $6\frac{1}{4}$.

Alt. 17, diam. 15.5 mm.; whorls $6\frac{1}{3}$.

Nakamura, Oki. Types No. 95820, A. N. S. P., from No. 1564 of Mr. Hirase's collection.

This form is well distinguished by its high contour. It may prove to be specifically distinct, but for the present we prefer to attach it to the widely distributed *G. ferruginea* of the main island.

Chloritis tosanus okiensis, n. subsp.

Umbilicus wider than in *C. tosanus*, contained six times in the diameter of the shell. Hairs of the surface not so close.

Alt. 8.8, diam. 16.8, width of umbilicus 2.8 mm.

Nakamura, Oki. Types No. 95821, A. N. S. P., from No. 1567 of Mr. Hirase's collection.

Kaliella okiensis, n. sp.

The shell is perforate, conic, amber-colored, glossy, the spire conic with slightly convex outlines, perifery thread-carinate, the base convex. The surface is smoothish, above, with faint growth-lines, and minute radial striæ just below the suture on the intermediate whorls; the base having faint spirals, not close together. Whorls 6, convex, slowly increasing, the last having a narrow, thread-like periferal keel. Aperture semilunar, rather narrow, the peristome rather broadly dilated near the axial insertion.

Alt. 2.7, diam. 3.6, mm.

Nakamura, Oki. Types No. 95849 A. N. S. P., from No. 1568 of Mr. Hirase's collection. Also No. 1569.

This species stands near *K. sororcula*, but it differs in having the whorls crenulated below the suture on the spire.

A NEW AMERICAN PLANORBIS.

BY FRANK COLLINS BAKER.

PLANORBIS BICARINATUS PORTAGENSIS n. var.

Shell with the dorsal and ventral sides sharply carinated, the spire and umbilicus typically forming deep, cone-like depressions; sculpture of strong growth-lines and distinct spiral lines, as in *bicarinatus striatus;* aperture strongly auriculate, the upper and lower extremities forming a strikingly developed V-shape.

Height 8.00, breadth 14.00; aperture height 10.00, breadth 5.50 mm.

Height 8.00, breadth 13.00; aperture height 9.00, breadth 5.00 mm.

Habitat: Portage Lake, on Fish River, Aroostook County, Maine. (Collected by O. O. Nylander; types in collection of Chicago Academy of Sciences.)

This peculiar variety may be known by the strong keels on the shoulder and base and by the V shaped upper and lower margins of the aperture, which produce a notably auriculate aspect. It was at first thought to be a form of Walker's variety *major*, but a comparison with specimens of the latter received from the author shows that the two are distinct varieties.

LAND SHELLS OF TANGULANDANG (TAGOLANDA.)

BY H. A. PILSBRY.

Tagolanda or Tangulandang is a small island between Celebes and Mindanao, about fifty miles from the N. E. extremity of the former, and between that and Sangi (Sangir). So far as I know, nothing has been known of its mollusks. A collector for Mr. Walter F. Webb, of Rochester, N. Y., took a number of land shells there, which show that the fauna has relations with both Celebes and Sangi. The list follows.

Cyclotus politus Sowerby.

Found also in Celebes, Flores, Timor and some other islands of the same region, but not north of Tagolanda.

Leptopoma tagolandense n. sp. Pl. IV, figs. 1, 2.

A species of the group of *L. manadense.* The shell is narrowly umbilicate, acutely carinate, slightly wider than high; typically corneous-whitish densely speckled with brown and encircled with a dark chestnut band below the periphery, but sometimes wanting this band. The brown spots are larger and rather regularly spaced just above the periphery and below the suture; the first three whorls are uniform yellowish-corneous or brown. Whorls $5\frac{1}{2}$, all rather strongly convex, the last having an acute, projecting periferal keel, below which it is moderately convex. The first half-whorl is smooth; then 5 to 7 fine spiral threads begin. On the fourth whorl interstitial spiral striæ appear, continuing to the end, the primary spirals retaining their prominence as subequally spaced cords among the fine spiral striæ of the later whorls. The base is finely striate the striæ slightly unequal. Aperture oblique, sub-circular; lip white, not continuous, the upper margin expanded, basal margin reflexed; columellar circular dilated. Alt. 14, diam. 15 mm.; width of aperture 8 mm.

This species differs from *L. menadense* in sculpture. It stands near *L. vexillum*, well figured by the Sarasins, but the last whorl is more convex above than below the keel (whereas *vexillum* is more convex below), and there are fewer major spiral cords, 5 to 7 on the upper surface of the last whorl, while *vexillum* has 10.

There is also a form without brown markings, the shell bluish-white, yellowish-white at the spire. This may be called var. *immaculata.* Some individuals have a dark chestnut band below the keel.

Obba marginata (Müll.).

Elsewhere found widely distributed in the Philippines. The var. *sororcula* Marts. in Celebes.

Helicostyla leucophthalma tagolandensis n. subsp. Pl. IV, figs. 5, 6, 7.

Shell smaller than *leucophthalma*, slightly more solid, the lip more broadly expanded; bluish-white with many light green revolving bands and lines on the last half or more of the last whorl. Whorls only $3\frac{1}{2}$.

Alt. 21, diam. 32 to 35.5 mm.

H. leucophthalma Pfr. was thought at first to be from Celebes, but the locality Great Sangi Island was pointed out by Ancey several years ago, and the Sarasins collected it there, and have figured the snail laying its eggs in a folded leaf, in their great work on Celebes (p. 204, plate 27). Pfeiffer described and figured *leucophthalma* as covered with a thin tawny cuticle, irregularly streaked, and having two narrow brown bands above, two wider ones on the base; and it measured, alt. 21–22, diam. 42 mm., whorls nearly 4. His description and figures are reproduced in Manual of Conchology, Vol. VII, p. 113, pl. 26, f. 16, 17.

The specimens I have seen from Great Sangi agree better with those described by Sarasins. The spire is transparent-white, as usual; the last whorl is covered with a chestnut or wood-brown or olive-brown cuticle, which is darkest behind the lip, and fades out to almost white at the beginning of the whorl. This cuticle is obscurely streaked with darker, and shows traces of darker spiral bands and lines. Around the axis there is a paler area. In another shell, a ground similar to that just described is cut into bands above the periphery by white spiral zones, and there is a large white axial area. These shells are figured, plate IV, figs. 3, 4. They measure 39 to 41 mm. in diameter. *H. leucophthalma* evidently belongs to the subgenus *Corasia*, not to *Crystallopsis*.

It is possible that Pfeiffer's types were from another island of the same group, or they may have been merely from another colony on Great Sangi. Such local color-races often exist in close proximity.

Xesta cincta (Lea).

Also found in Celebes, in several varieties.

PUBLICATIONS RECEIVED.

How Fulgur and Sycotypus Eat Oysters, Mussels and Clams. By Harold Sellers Colton (Proc. Acad. Nat. Sci., Phila., 1908). The behavior of specimens kept captive in a salt-water aquarium in the vivarium of the University of Pennsylvania has been studied by Mr. Colton. His observations contradict the prevalent impressions as to the feeding of conchs, and should lead to further work on the subject. We quote part of Mr. Colton's observations on *Fulgur* (*Sycotypus*) *canaliculatum*: "The *Sycotypus*

had not been fed for a month or so . . . . It attacked one of the oysters five minutes after I placed them with it. . . . The *Sycotypus* crawled on top of the oyster, which closed its valves. The conch waited two minutes when the oyster opened its valves. Rotating its shell on the axis of the columella through an angle of 70°, it thrust its own shell between the valves of the oyster and introduced its proboscis between the shells. Forty minutes later it left the empty shell.

"*Sycotypus* does not wedge the shells of *Mya* apart, because it can get at the soft parts without doing so, since the valves gap slightly. To test this I introduced an oyster that had had three-quarters of an inch broken from the margins of both valves on the end away from the hinge so that the valves appeared to gap. I found that *Sycotopus* attacked this one in the same manner as it attacked *Mya* and did not wedge the shells apart.

"*Fulgur* eating *Venus* is a much more complicated case. The conch (*Fulgur perversa* or *F. carica*) grasps the *Venus* in the hollow of its foot, bringing the margin of the *Venus* shell against its own shell margin. By contracting the columellar muscle it forces the margins of the shells together, which results in a small fragment being chipped from the shell of *Venus*. This is repeated many times and, finally, the crack between the valves is enlarged to a width of 3 mm. or more. The proboscis is normally about 5 mm. to 8 mm. in diameter. There are three ways in which it may get at the animal. First, it may flatten out its proboscis so that it will go through the crack; secondly, it may pour in a secretion between the valves which kills the clam, and, thirdly, it may wedge its shell between the valves of the *Venus*. By contracting its columellar muscle it may actually wedge the valves apart. *Venus* never opens its valves of itself when it is in the grasp of a *Fulgur*, while *Ostrea*, after the first shock, opens wide its valves as if no danger was near.

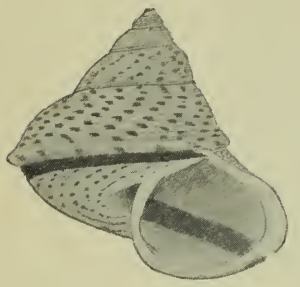
"*Fulgur* and *Sycotypus* often break their own shell when opening oysters and clams, and this accounts no doubt for the irregular growth-lines seen on their shells.

"This method of inserting the margin of a gasteropod between the valves of a Lamellibranch has been noticed before. Francois (1890) briefly reports that *Murex fortispina* has a special tooth on the margin of its aperture for the purpose of inserting between the valves of *Arca*. It may be that this manner of attacking the soft parts of bivalves is a very common habit of Prosobranch mollusks."

The several stages in the processes described are fully illustrated.

NOTE.

The scarcity of "copy" during the summer months has caused us to issue a single number for August and September. The usual number of pages for the year will be made up by enlarging a future number. Plate IV. will appear next month.



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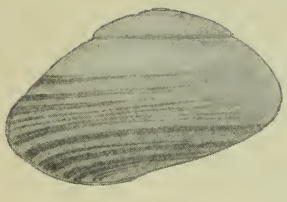

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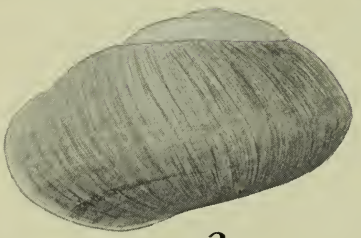

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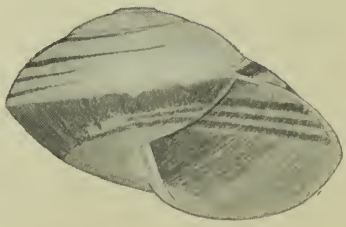

LAND SHELLS OF TANGULANDANG AND SANGI.

The Nautilus.

Vol. XXII. OCTOBER, 1908. No. 6.

SOME NOTES ON THE LOCOMOTIVE DISK OF STYLOMMATOPHORA.

BY V. STERKI.

During 1907 I made some studies and observations on the morphology of some of our land snails, and especially on the foot. The results were very incomplete and fragmentary; but the notes respecting the sole and "locomotive disk" appear to be of some interest, and a summary of them is here given.

Of about thirty-seven species, I had occasion to observe living animals, and of some of them preserved specimens could be compared. The results obtained are somewhat at variance with those published by other conchologists, which appear to have been obtained mainly from preserved material.

It may be mentioned that a piece of thin glass is conveniently used to let the snails creep on. In this way, the sole can not only be seen with the naked eye, but lenses and even strong doublets can be used, and the foot seen in both reflected and transmitted light. If kept on a slide, upside down, minute snails can be examined and observed under a low-power microscope. It is recommended to fasten a few small slips or narrow strips of glass on the glass plate, best a pair of them close together, in order to observe the shape and motions of the sole when detached from the even surface, while a snail creeps over these obstacles.

The majority of the snails showed locomotive waves on the under surface of the foot while creeping. On about one-third, none could be seen. The waves proceed from the posterior end, or from near

the same, following each other towards the anterior, but in some instances do not reach the latter. The number of simultaneous waves is various in the several species, genera and groups, but rather constant in one species; they also vary in extent, and may be faster or slower, regular or irregular, very distinct to more or less obscure. In most species, they are confined to a median zone of the sole, narrower or wider, corresponding with the so-called locomotive disk. In some species, resp. groups, that disk is marked off from the marginal zones by a more or less marked line, more or less distinct in alcoholic specimens. But in some the zones are not noticeable on the dead body, while in the living, creeping animal, the waves are very distinct and sharply restricted to the median zone. This was especially noticed in *Polygyra* (*Stenotrema*, *Triodopsis* + *Mesodon*), and in *Helix hortensis*, for which the existence of a disk has been denied; also in some of the *Zonitidæ*, *Agriolimax*, *Vertigo*, *Succinea*. But there are noticeable differences, as will be stated later on.

In a few snails, of various groups, the waves extend over the whole width of the sole, *e. g.*, in *Circinaria concava* Say, *Vallonia* sp., *Bifidaria armifera* Say. There are no marginal zones in these, so far as I was able to see, and it is probable that the muscles of the sole are different, comparatively wider than the others.

In a number of others, no waves could be seen, and no differentiated longitudinal zones. Such were: part of the *Zonitidæ*, such as *Gastrodonta ligera*, *Zonitoides nitidus*, *arboreus*, *minusculus*, all *Patula*, *Helicodiscus*, *Philomycus*. Moreover, it appears that at least in the *Zonitidæ* cited, the sole is of a formation different from that of, *e. g.*, the *Polygyræ;* it seems that an additional layer of tissue is superposed on the under surface of the foot. The surface has a different appearance, the sole seems thicker, and the double lateral lines, above the margins of the foot appear to point to the same conclusion. Unfortunately, I had no time to make exact anatomical and histological examination of these parts, but some anatomist may take the subject up.

It is interesting and significant that such differences are found among our *Zonitidæ*. It has been pointed out, long ago, by some scientists, that the family includes some widely different forms or types, with all similarity of the shells, and even the radula, etc. And it will be noted that, *e. g.*, *Gastrodonta* and *Zonitoides*, which were denoted as showing no locomotive waves, no longitudinal zones,

and a peculiar formation of the sole, are among those *Zonitidæ* which are provided with a dart sack and dart, while *Omphalina* and *Hyalina* (= *Vitrea*) are devoid of such. It is possible that the formation of the foot may add features of distinction between various natural groups of this complex family, and in close connection with it may be the presence or absence of a caudal mucus gland (and mucus pore).

Systematic Review.

ZONITIDÆ.

Omphalina fuliginosa Griff. Locomotive waves in a median zone which is marked off by slight superficial lines, which are slight furrows when the sole is detached from a surface. The waves are not as distinct as, *e. g.*, *Polygyra*, and apparently more remote from the surface of the sole.

Hyalina (*Vitrea*) *indentata* Say and *radiatula* Ald. Waves in a median zone, in the anterior $\frac{2}{3}$ or $\frac{3}{4}$, indistinct, and mostly not seen at all near the posterior end. The surface layer undulating forward and backward over [under] each advancing wave.

Gastrodonta ligera Say. No waves seen. Foot and sole as described above, for this and the four following species. A darkish median line is ill-defined and has nothing to do with a locomotive disk.

Zonitoides nitidus Müll., *arboreus* Say, *minusculus* Binn., *Euconulus chersinus* Say. No waves; no zones seen.

LIMACIDÆ.

Agriolimax campestris Binn. Waves in narrow median zone, following each other in rapid succession, about ten simultaneously, while the surface layer of the sole shows forward and backward undulation with each wave. When the animal proceeds slowly (for a snail!), the waves are more or less irregular, even undulating, and sometimes no waves can be seen when the animal moves very slowly. This has been noticed also on some other snails.

CIRCINARIIDÆ.

Circinaria concava Say. The waves extend over the whole width of the sole; the same was seen on a very small, young specimen; no zones seen.

HELICIDÆ.

Polygyra hirsuta, fraterna, tridentata, fraudulenta, inflecta, palliata, mitchelliana, thyroides, albolabris and var. *minor*, *profunda:* waves very distinct, in a rather sharply defined median zone, regularly proceeding from the posterior end to the anterior, about 7 or 8 simultaneously in *hirsuta* and *fraterna*, 10 to 12 in the large species. Marginal zones with fine radiating lines.

It may be noted here, in a general way, that the number of waves is easily over-estimated, and it is somewhat difficult to count them, if more than two to four.

Helix (*Tachea*) *hortensis* Müll. Zones plainly visible! the marginal areas rather narrow; waves, in the median, distinct.

Vallonia pulchella, excentrica, costata: no zones seen; waves extending over the whole width of the sole, rather fast, about four simultaneously. The waves can be seen in lateral view, in transmitted light.

NOTE.—There is a possibility, however, that in these and other minute snails, narrow marginal zones exist and have been overlooked, to which the waves are transmitted.

ENDODONTIDÆ.

Patula solitaria, alternata, perspectiva, striatella, Helicodiscus lineatus Say: no zones seen, and no waves. It seems that the formation and texture of the sole are rather different from those of *Polygyra*, and more like those of *Gastrodonta* and *Zonitoides*.

PHILOMYCIDÆ.

Philomycus carolinensis Bosc., and another species which is probably distinct: no zones, and no waves seen.

PUPIDÆ.

Bifidaria armifera Say. No zones seen; waves extending over the whole width of the sole, about four simultaneously, rather irregular, and often disappearing before reaching the anterior end, and apparently commencing anywhere, also stopping and quasi rebounding anywhere; in short, more irregular than in any other species. This seems to be concordant with the jerky motion of the animal.

Vertigo ovata Say. Sole with three zones, the median one widen-

ing towards the anterior end so that the marginals disappear. Waves distinct, in the median zone, two to three simultaneously.

Vertigo tridentata Wolf. Waves seen; other details in doubt.

SUCCINEIDÆ.

Succinea avara Say. Sole with three zones; waves in the median, 3–4, rapidly moving forward, each one drawing along parts of the marginals. The surface layer moves forward and backward, undulating, with every wave passing. When part of the foot is detached from its support, the waves can be seen there proceeding on the more or less contracted and folded sole.

S. retusa Lea. Three zones, median one with 4–5 waves.

PALUDESTRINA SALSA, PILSBRY.

BY REV. HENRY W. WINKLEY.

It seems odd that a species so widely distributed, and fairly abundant, should have escaped the eyes of New England collectors so long. Yet its dwelling-place is peculiar. A word as to where it occurs may be of interest. It was first noticed by the writer at a spot where a brook enters the marsh at Branford, Conn. The site is probably three miles inland from Long Island Sound, and the water at this spot must be fresh. Later I found it more abundant on vegetable matter in a ditch in the marsh near the railroad in Branford and a mile nearer the sound. The waters here would be brackish. I have not seen the locality where Mr. Owen Bryant found it at Cohasset. Last summer I located it in a pot hole in the marsh at Wareham, Mass. This locality showed it in a pot hole without an outlet. I have not seen it in such a place elsewhere. The locality mentioned in my last article in the NAUTILUS (vol. XXI, p. 75) where my daughter found it at East Wareham, was among flags near the border of the Agawam river. The character of the water may be understood from the fact that I was in mid-stream examining *Unio complanatus* when she found *P. salsa* in the same river. Last winter I took up a residence in Danvers, Mass., and have found *P. salsa* here. Two localities reveal it; both are spots where the water ebbs and flows, and not closed pot holes.

Danvers lies back of Salem and Beverly at the headwaters of a branching bay. A few days ago I made a trip to Plum Island. Leaving the train at Rowley, I found *P. salsa* in a small ditch close to the railroad station. A half-mile further down *Litorinella minuta* was abundant in closed pot holes, but *P. salsa* not there. I do not recall finding the two in company, yet they are often near neighbors. We now have a distribution of this species from the New Haven area in Conn., to Rowley, Mass., just north of Cape Ann, and very near the New Hampshire line.

A NEW CŒCUM.

BY REV. HENRY W. WINKLEY.

Cœcum Johnsoni n. sp.

Shell minute, tusk-shaped, slightly tapering, lightly curved. $2\frac{1}{2}$ mm. in length, $\frac{1}{2}$ to $\frac{3}{4}$ of a millimeter in diameter. Apex plug protrudes in a dome shape. Aperture circular, end of the tube at the apex is at right angles to the longer axis of the cylinder. Aperture end at an angle, sloping towards the convex side, color dull white to horn color, surface marked by lines of growth, but not ribbed.

Dredged at Woods Hole, Mass., on gravel bottom in 2 to 3 fathoms. Easily mistaken for *C. pulchellum*. In size, color and form it resembles that species but lacks the ribs, and the dome-shaped plug in the apex is not seen in *pulchellum*. Types in Winkley collection.

It gives me much pleasure to name this shell for one who has shown himself a lover of the science, and a friend to his fellow-workers, Mr. C. W. Johnson, of the Boston Society of Natural History.

A SMALL ADDITION TO THE KNOWLEDGE OF THE DANISH MOLLUSCAN FAUNA.

BY HANS SCHLESCH, COPENHAGEN.

About 15 miles north of Copenhagen on the beautiful coast of the Sound stands the pretty village of Rungsted, where many well-to-do people from Copenhagen have their summer villas. Between Rungsted and Horsholm (German Hirschholm) and a mile to the

west, where King Christian VI erected a castle, we find a woods called "Polehaven." It was formerly used as a park for the now demolished castle. In the edge of the woods opposite the railway station of Rungsted and in the meadow between the woods and Rungsted I found the species of mollusks mentioned below. My friend Mr. Niels Petersen has assisted me in collecting these.

Limax maximus Linné, is very rare. I have also found some other species of *Limax*, but up to now I have not been able to determine them.

Vitrina pellucida Müller, is very common.

Arion empiricorum Ferussac is found over the whole place.

Besides *Polita cellaria* Müller, some other species of *Hyalina* as *Conulus fulvus* Müller are found at both localities.

Punctum pygmaeum Draparnaud.
Patula rotundata Müller.
Vallonia pulchella Müller.
Vallonia costata Müller.
Trichia hispida Linné.
Monacha incarnata Müller.
Eulota fruticum Müller.
Eulota f. v. fasciata Moq. Tand.
Eulota f. v. alba-unifasciata Hesp.
Eulota f. v. abina.
Arianta arbustorum Linné.
Arianta a. v. trochoidalis Roffiaen.
Arianta a. v. roseolabiata Schlesch nov. var.[1]
Arianta a. f. scalaris. One specimen only.
Tachea nemoralis Linné.[2]
Tachea n. f. major.
Tachea hortensis Müller.
Tachea h. v. roseolabiata.
Tachea h. v. fascis-transparenti bus (= *v. albina*).
Helicogena pomatia Linné.
Clausiliastra laminata Montagu.
Clausiliastra l. v. granulata Ziegler.
Pirostoma bidentata Strom.
Pirostoma b. v. septentrionalis A. Schmidt.
Pirostoma plicatula Draparnaud.
Pirostoma pumila Ziegler.
Napaeus obscurus Müller.
Vertigo antivertigo Müller.
Vertigo pusilla Müller.
Vertigo angustior Jeffreys.
Cochlicopa lubrica Müller.
Succinea putris Linné.
Succinea p. v. albina.
Succinea pfeifferi Rossmässler.
Succinea p. v. albina.
Carychium minimum Müller.

[1] The mouth brim is rose-colored as *Tachea hortensis* Müller var. *roseolabiata* Rare.

[2] Mr. Niels Petersen has given me some specimens found at Rungsted, the ribs of which are so marked that they look as if they belonged to *Tachea austriaca* Mühlfeldt.

MESESCHIZA GROSVENORII, LEA.

BY A. A. HINKLEY.

A few remarks on this subject in addition to the writer's notes in the NAUTILUS for May, 1901, may not be amiss. The Wabash river was visited in August of the present year, at several places in Posy county, Indiana. The writer was determined to find the form described by Dr. Lea under the above name if it still existed.

On the "Chains" where a stream of water passed with considerable current, the young *Angitrema armigera* were in large numbers on the under side of the rocks. Here the *Meseschiza* form was found quite plentiful, and some three hundred specimens were taken. It is a characteristic lot of young *Angitrema armigera*, with the exception of the notch in the lip, showing all the variations of color markings. The notch varies as to development and location. Of the specimens taken, twenty-five per cent. or more have the notch at the perifery; in many of these a line of lighter color is left to mark the former positions of the notch, this line does not precede the notch on any other part of the shell.

These notched forms were only found where the water had a strong current; and it was not confined entirely to *Angitrema armigera*, for specimens of *Pleurocera* and *Vivipara subpurpurea* were taken in the same situation with the same peculiar notch.

Pyrgulopsis wabashensis was found on water plants in quiet water, on moss-covered rocks and timbers where there was some current at the water's edge, and at the old dam near New Harmony they were found in mid-stream, on rocks covered with a little moss and sediment.

DESCRIPTIONS OF NEW HAWAIIAN MARINE SHELLS.

BY H. A. PILSBRY AND E. G. VANATTA.

BITTIUM HILOENSE n. sp. Fig. 1.

The shell has the usual oblong-turrite shape, and is uniform yellowish gray-white except the swollen, slightly exserted first whorl,

which is opaque white and smooth. Subsequent whorls are flattened but separated by a deep suture, the earlier ones having two spiral beaded cords. At the end of the first $3\frac{1}{2}$ to 4 whorls a third spiral cord appears. The last whorl is rounded periferally, and has about 10 spiral cords, separated by spaces of about their own width; the upper 5 or 6 are nodose at the intersections of low, narrow, vertical folds, which do not extend below the perifery. The last whorl has a low, rounded, rather massive varix behind the outer lip. Aperture oval, produced in a short, deep channel at the base.

Length 3.34, diam. 1.39 mm.; whorls $6\frac{1}{2}$.

Hilo, Hawaii. Types no. 95906 A. N. S. P., collected by Mr. D. Thaanum.

This tiny *Bittium* is somewhat related to *B. leucocephalum* Wat-

Fig. 1.

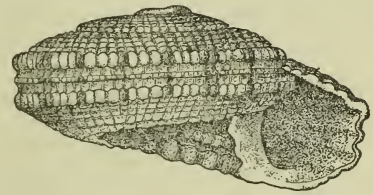

Fig. 2.

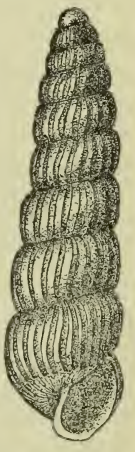

Fig. 3.

son, described from the reef at Honolulu, from which it differs in many details of shape and sculpture. Watson's type is evidently an immature shell, smaller than *B. hiloense*, but it has 8 whorls, while *hiloense* has but $6\frac{1}{2}$.

Torinia discoidea sterkii n. subsp. Fig. 2.

The shell is depressed, biconvex with flat perifery, widely umbilicate, the width of umbilicus contained 2.6 times in that of the shell.

First whorl is smooth, convex and bicolored, a spiral deep reddish-brown band half the width of the whorl revolving below the suture; on the second whorl this band spreads, becomes diluted, and finally disappears. Last whorl grayish, with white and brown spots along the periferal beaded cords. The last whorl has 5 beaded spiral cords above, the first and fifth larger; a beaded spiral lies between the two cords at the periferal angles. The base has 7 beaded spirals, the outer one and three inner larger than the others. Suture channeled. Alt. 2.3, diam. 4.6 mm.

Waikiki Beach, Honolulu, H. I. (F. Stearns). Types in the collection of the Academy of Natural Sciences of Philadelphia, No. 93833.

Differs from typical *T. discoidea* Pease in having one more spiral row of beads on the upper surface of the whorls and in having a small spiral row of beads between the two peripheral larger rows. It is also darker in color. The type specimens were picked from shell-sand by Dr. V. Sterki, in whose honor it is named. The same form was taken at the Marquesas Islands by C. D. Voy.

Turbonilla (Chemnitzia) thaanumi n. sp. Fig. 8.

The shell is very slender, turrite, slowly tapering, a little more rapidly so near the summit; somewhat translucent white. One nuclear whorl is planorboid, its axis not quite at a right angle with that of the shell, but a little oblique. Post-nuclear whorls are sculptured with rounded ribs, slightly oblique and gently sigmoid, equal to the intervals, and extending from suture to suture. On the last whorl there are 22 axial ribs; and the intervals parting them stop abruptly a short distance below the periphery, leaving the rest of the base smooth. There is no spiral sculpture. The sutures are deeply impressed; whorls evenly convex. The aperture is about one-fifth the total length, ovate. Columella nearly straight, somewhat concave below, gently convex above.

Length 3.1, diam. 0.82 mm.; post-nuclear whorls $8\frac{1}{2}$.

Hilo, Hawaii. Type no. 95907 A. N. S. P., collected by Mr. D. Thaanum.

This species differs from the Hawaiian *T. decussata* Pease by the absence of spiral sculpture.

NOTES.

Those interested in that most fascinating group, the Cephalopods, are quite likely to overlook a recent interesting contribution to our knowledge of the natural history of two of the larger species of cuttlefish and squid. The reference is to a chapter called (somewhat misleadingly since largely occupied with an account of the Californian octopus *Polypus punctatus*) "Ten Armed Game," occupying pp. 49–64 in Charles F. Holder's book "Big Game At Sea" (The Outing Publishing Co., 1908).

The book is an account of sporting experiences written for sportsmen and by no means pretends to be scientific, but bears internal evidence that the author is quite aware not only of the difference between imagination and testimony to fact, but of the distinction between first and second-hand testimony. In short, one judges that he has actually seen and done just about what he says he has—though he does not purport to state with the accuracy of a trained naturalist—and if so he has had experiences with giant forms of cephalopods most rare to men sufficiently educated to put them before the public.

There are three excellent full-page photographs, two of "giant octopi" from California (one "fifteen feet across"—*i. e.*, tip to tip of spread tentacles—the other, size not given, said in text to grow to twenty-five or thirty feet), and one of a "large squid caught at Avalon, Santa Catalina Ids.," by the author. The latter picture is extraordinary if not absolutely unique. It does not look "faked," unless perhaps about the eye, and the animal appears fresh if not actually alive, while the detail is clear. Unfortunately no measurements are given, nor is there any object in the picture to serve as a scale, while the text is annoyingly ambiguous. The author states that the length of the largest squid actually handled and measured by him was fifty feet (of which the long pair of tentacles made thirty), but rather implies that this was a Newfoundland specimen, presumably of *Architeuthis princeps* which Verrill has so elucidated.

Squids ranging from seven to eight feet in length are stated to be common on the California coast, where they may be watched in schools from boats—one would think with some slight misgivings if the boat were very small. Probably the figure is of one of these, though it somehow gives the impression of being larger—at all events it is self-evidently not an *Architeuthis*.

Those interested must read the chapter for themselves and regret its shortness and shortcomings, with the hope that the author may give students the benefit of a more full and exact account of the results of his unusual opportunities in this direction.

Anyone who has ever studied living squids cannot but delight in his simile of the sheet-lightning of a setting thunder-storm for the color-play of the chromatophores. At all events it bears the hall-mark of genuine observation.—F. N. Balch.

Lotorium felipponei *n. sp.* by H. von Ihering, Buenos Aires, 1908. A new species of the "*Triton*" *pileare* group is described and figured in this paper, issued as a separate publication. It was found at Maldanado, Uruguay, by Dr. Florentino Felippone, of Montevideo.

Errata.—In the June number, the following corrections should be made. Page 15, line 19, for "[now Bergh]" read [*non* Bergh].

P. 16, line 9, for "now" read "*non* Coryphella bostoniensis (Couth.)."

Mrs. George Andrews died at her home, Circle Park, Knoxville, Tenn., on Saturday, September 5th. Many conchologists, especially those of us whose activity in the science dates back twenty years or more, were friends or correspondents of Mrs. Andrews, and will hear of her death with sorrow. A notice of Mrs. Andrews's life will follow.

Mr. Jas. H. Ferriss is exploring the mountains of Arizona for land shells, ferns, etc., intending to return about the first of November.

Dr. John B. Trask, a pioneer of science on the West Coast, is the subject of an interesting article by Dr. R. E. C. Stearns (*Science*, Aug. 21). Trask went to California in 1850 and was one of the little coterie who founded the California Academy of Science. He discovered many mollusks, among other scientific labors, *Epiphragmophora traski*, and several other species bear his name.

The Nautilus.

Vol. XXII. NOVEMBER, 1908. No. 7.

A GIGANTIC SOLEMYA AND A NEW VESICOMYA.

BY WILLIAM HEALEY DALL.

In the course of the Albatross dredgings in the Philippines during the period in which Dr. Paul Bartsch of the U. S. National Museum was attached to the scientific staff of that vessel, a dredging was made between the islands of Ticao and Masbate in 600 fathoms. Among the objects obtained from this haul (station 5215) was the fresh shell of a *Solemya*, which, compared with the previously known species, may be regarded as enormous. Nothing remained of the soft parts which had evidently been but recently lost.

Solemya (*Acharax*) *bartschii* n. sp.

Shell subcylindrical, gaping at the ends and along the base, covered with a strong polished black periostracum which extends over the margins, being continuous over the dorsal portion between the valves and produced beyond the edges of the shelly portion, basally about 40, in front about 35, and behind about 15 millimeters. In life this produced periostracum, undoubtedly covers and protects the portions of the surface of the animal not sheltered by the calcified valves; the margin at the anterior end is not split into strips corresponding to the radii of the shell as in the large American species of the group, but preserves its continuity and is contracted marginally so that in life it must closely cover the whole anterior end of the animal, in a dome-like manner. Internally the ligament is wholly

opisthodetic but in front of the beaks the periostracum is produced inside the dorsal margin as well as externally. This interior extension covers a narrow strip of the thickened dorsal margin of each of the valves, leaving about two-thirds of these pseudo-nymphs bare and strongly radially grooved and striate, the radii diverging from the dorsal margin of the valves slightly in front of the beaks, and doubtless serving to make more efficient the local attachment of the periostracum, which is here thickened and expanded. The ligament is wide and strong, external, but visible in the gap between the valves behind the beaks and supported by heavily calcified nymphs. Behind the nymphs the dorsal margin of the shell on each side exhibits a long and conspicuous indentation. The valves are heavily calcified, internally radiately striate, the ventral margin straight, the dorsal margin nearly parallel to it except as modified by the nymphs, the two valves touching only near the beaks, which are low but swollen, the rather narrow dorsal interval between the valves being covered by a continuous sheet of the thick periostracum. The posterior muscular impression is of moderate size and obliquely ovate, the anterior smaller, narrow and rhomboid in shape; the pallial line is obscure and continuous, situated close to the margin of the valves; externally the surface is smooth except for lines of growth and a number of shallow, wide, radiating channels which proceed from the beaks toward the margin of the valves, where they produce a certain amount of undulation. Anteriorly there are eight, posteriorly six of these channels, with a median space which has no rays, and, on the basal margin of the valves, is about 50 mm. wide. The beaks are about 75.0 mm., in front of the posterior end. The shelly part of the valves is 191 mm. long (the total length including periostracum is about 240 mm.), the height 62 mm. (with periostracum about 100 mm.), and the estimated diameter of the valves in life about 60 mm.

The perfect condition of this specimen enables us to understand the origin and use of the striated and thickened area of the anterior dorsal margin of the values, already noted by me in *S.* (*A.*) *agassizii* from the Gulf of Panama. To preserve it in its present satisfactory state it will be kept in alcohol.

With this remarkable specimen was obtained an interesting shell of *Vesicomya*, also without the soft parts, which may be described as follows:

Vesicomya ticaonica n. sp.

Shell ovate, tumid, inequilateral, with the beaks within the anterior fourth of the length, low, prosocoelous, tumid, overhanging a large cordate lunule, of which the left valve carries a somewhat large portion; surface rude, sculptured irregularly and strongly by incremental lines; periostracum brownish, covering a livid whitish shell; ligament rather long, set in a deep, narrow groove; hinge as usual in the genus; interior chalky-white except the polished muscular impressions; pallial line broad, slightly irregular, with a feeble insinuation below the posterior adductor scars; shell thin, margins entire. Length 63, height 45, diameter 30, the beaks behind the anterior end 15 mm. The ligament is about 22, and the lunule 14 mm. in length. The shell is more tumid and more attenuated in front of the beaks than any other described species and exceeds most of them in size.

THE MOLLUSCA OF MCLENNAN COUNTY, TEXAS.

BY JOHN K. STRECKER, JR.

In 1883, Mr. Henry Hemphill sent a few species of shells from Waco, to Dr. W. G. Binney. These specimens are now in the Binney collection in the United States National Museum (see Manual of American Land Shells, Bull. U. S. Natl. Mus., No. 28, 1885, pp. 477, 485, etc.). I have been unable to find any examples of two of the species recorded, i. e., *Praticolella griseola* Pfr. and *Vitrea sculptilis* Bland.[1]

In Singley's list of Texas Mollusca (Report Geol. Survey of Texas, 1893, pp. 299–343) several species of McLennan county shells are mentioned. I include *Bulimulus d. schiedianus* Pfr. in my list on this authority, although I have not collected it personally.

Examples of all of the other species mentioned in this paper have been collected by me during the past two years. Future investigations will doubtless bring others to light but as local lists of Texas

[1] The records of these two species from Waco are in all probability erroneous; the specimens identified as *griseola* must be a thin form of *P. berlandieriana*, and the supposed *V. sculptilis* is *V. indentata umbilicata*.—Ed.

Mollusca are exceedingly few and far between, I feel that my list is sufficiently complete for publication at this time.

During the present year, the heavy rises and great floods have played havoc with the various species of univalves inhabiting our smaller streams. In 1907 a light-colored variety of *Planorbis tumidus* Pfr. was found in Waco Creek in countless thousands but in July of the present year repeated visits to the most favorable places on this stream failed to result in the finding of a single living specimen.

In April, 1908, I collected a large number of examples of *Lymnæa bulimoides techella* Hald and *Physa mexicana conoidea* C. & F. in a small stream flowing through Lindsey's Hollow. As my time was limited, I left the collecting of a still larger series until another time. A month later, during the flood, all of the mollusks in the stream were washed into the Brazos River.

On the other hand, the drying-up of most of the smaller water courses in the latter part of the summer is also responsible for the destruction of many species. In places along Hog Creek, during the dry season, I have found thousands of fresh dead shells of *Physa forsheyi* Lea, *Planorbis bicarinatus* Say and *Planorbis tumidus* Pfr. lying together in one heap. In the same place, on a bed of sand and gravel, I have found half-grown living examples of *Anodonta imbecilis* Say. The bed of this stream, in some places, is composed of pebbles and small boulders to a depth of 18 or 20 inches, and when the naiads are left high and dry it is impossible for them to burrow down to the line of moisture.

At Day's Lake I have found living specimens of a variety of *Unio tetralasmus* Say that must have been out of the water for several months. They were half buried in a bank of dry earth about five feet above the water line. This Unio is much more tenacious of life than our species of *Quadrula* and *Lampsilis*, as a very few hours in the sun usually suffices to kill them.

Thanks are due to Mr. Bryant Walker of Detroit who kindly identified most of the species on the list. Also to Mr. W. B. Marshall, U. S. Natl. Mus. Washington, D. C., and Dr. W. S. Strode, Lewistown, Ill., to whom the others were referred.

Helicina orbiculata tropica Jan.
Praticolella berlandieriana Moricand.
Praticolella griseola Pfr.
Polygyra dorfeuilliana Lea.
Polygyra dorfeuilliana sampsoni Weth.
Polygyra mooreana W. G. B.
Polygyra texasiana Moricand.
Polygyra roemeri Pfr.
Polygyra monodon fraterna Say.
Bulimulus dealbatus liquabilus Rve.
Bilimulus dealbatus mooreanus Pfr.
Bulimulus dealbatus schiedianus Pfr.
Strobilops labyrinthica texasiana P. & F.
Pupoides marginatus Say.
Bifidaria armifera Say.
Bifidaria contracta Say.
Bifidaria tappaniana C. B. Ad.
Bifidaria pentodon Say.
Bifidaria procera cristata P.& F.
Bifidaria pellucida hordeacella Pils.
Vitrea sculptilis Bland.
Vitrea indentata Say.
Vitrea indentata umbilicata Singley.
Vitrea dalliana roemeri P. & F.
Euconulus fulvus Mull.
Euconulus chersinus trochulus Reinh.
Zonitoides arboreus Say.
Zonitoides minusculus Binn.
Zonitoides singleyanus Pils.
Limax flavus Linn.
Philomycus carolinensis Bosc.
Pyramidula alternata Say.
Helicodiscus eigenmanni P. & F.
Punctum pygmæum Drap.
Succinea avara Say.
Carychium exile H. C. Lea.
Planorbis bicarinatus Say.
Planorbis liebmanni Pfr.
Planorbis parvus Say.
Planorbis trivolvis Say.
Planorbis tumidus Pfr.
Physa mexicana Ph.
Physa mexicana conoidea C. & F.
Physa forsheyi Lea.
Physa rhomboidea Crandall.
Physa osculans Hald.
Amnicola peracuta P. & W.
Lymnæa desidiosa Say. (Variety?)
Lymnæa bulimoides techella Hald.
Calyculina transversa Say.
Tritogonia tuberculata Barnes.
Quadrula forsheyi Lea.
Quadrula aurea Lea.
Quadrula pustulosa Lea. (Smooth variety.)
Anodonta imbecilis Say.
Lampsilis gracilis Barnes.
Lampsilis purpuratus Lamarck. (Variety.)
Lampsilis berlandieri Lea.
Lampsilis berlandieri Lea. (Variety.)
Lampsilis anodontoides Say.
Lampsilis parvus Barnes.
Lampsilis texasensis Lea.
Lampsilis ventricosus satur Lea.
Lampsilis lævissimus Lea.
Plagiola macrodon Lea.
Unio tetralasmus Say.
Unio tetralasmus manubius Say.
Unio tetralasmus camptodon Say.

NOTES.

Polygyra mooreana W. G. B.

Near the gravel pit north of Waco, I found two adult and three juvenile specimens of a variety of this species with a hirsute epidermis. Three of these were found under a rock lying at the foot of gravel bank. A fourth was attached to the under side of a plank lying across a spring about three or four yards away. The fifth example was crawling around in the damp grass about a yard from the spring. In the living specimen, the hairs are very conspicuous and stand straight out from the shell. Living examples of the ordinary type were afterwards found on all the surrounding elevations, but the hirsute variety seems to be confined to the vicinity of the spring.

Limax flavus L.

This species is now common, but must have been introduced within the last three years. Prior to that time a great many slugs were collected by students of the Biological Department of Baylor University. These are now in the University Museum, and all prove to be specimens of the native species *Philomycus carolinensis* Bosc. Most of my examples of *L. flavus* were captured during the spring of the present year.

Planorbis trivolvis Say.

This pond snail is rare. All of the examples I have seen came from Day's Lake about five miles notheast of Waco.

Planorbis tumidus Pfr.

This species is our most abundant *Planorbis*. A large, light-colored variety was formerly abundant in Waco Creek. A small, depressed form is found in Hog Creek in considerable numbers.

Physa sp.

Imperfect specimens of an indeterminate *Physa* were picked out of drift material on the Middle Bosque River. The spire was broken in all these specimens and while Bryant Walker stated that he was certain that they were different from anything that I had sent him before, he was unwilling to attempt to name them until he could examine more perfect material.

Lymnæa sp.

We have at least one other species of *Lymnæa* but of this form only juvenile examples, too young for determination, have been collected.

Quadrula pustulosa Lea.

A smooth variety of this species is found associated with *Quadrula aurea* Lea. In this variety there are only a few small pustules near the umbones and in some specimens even these are lacking. Specimens identified by F. C. Baker and Bryant Walker. Several pustulous shells of this species that were supposed to have been collected in this county, prove to have come from southern Illinois.

Lampsilis purpuratus Lamarck (Variety).

A number of shells from near Mussel Island in the North Bosque River were first identified as typical *L. purpuratus* Lk. Later examples of the same type were identified as typical *L. berlandieri* by Dr. W. S. Strode and Mr. Bryant Walker. The last-mentioned gentleman found three different forms in a second sending from the same locality. These he designates as

Lampsilis berlandieri Lea.

Lampsilis berlandieri Lea var.

Lampsilis purpuratus Lamarck var.

The variety of *L. berlandieri* Lk., is very variable in the color of the nacre which ranges from white, through pink and salmon, to dark purple. These shells were found in the ripples above Mussel Island while the examples of the typical form and the specimens of *L. purpuratus* var., were found in a large bed some distance below.

DESCRIPTIONS OF NEW SPECIES OF ACHATINELLIDAE, FROM THE HAWAIIAN ISLANDS.

BY D. D. BALDWIN.

Partulina winniei n. sp.

Shell sinistral, subperforate, rather thin, elongately conical, apex subacute; surface shining, striated with fine growth lines, and under a lens showing very close and delicate decussating spiral striæ; nuclear whorls faintly decussated. Color white, striped and mottled irregularly with longitudinal dark brown streaks; apex white. Whorls 6, slightly convex, margined above. Aperture oblique, oval, purplish-white within. Peristome acute, thickened within, columellar margin reflexed. Columella terminating in a slight, flexuous, white fold.

Length 16; diam. 8 mm.

Habitat, Kahakuloa, West Maui.

This shell is the Maui counterpart of *Part. theodorei*, Bald., a much larger shell found on the Island of Molokai.

Named in honor of Miss Winnie of Walluku, Maui.

Partulina mutabilis, n. sp.

Shell dextral or sinistral, minutely perforated, somewhat solid, acuminately conical, apex subacute; surface shining, marked with delicate incremental striæ, under a lens exhibiting very close decussating, spiral striæ; apical whorls smooth. Color varying from pure white to dark fulvous, often variously striped with brown lines and bands, some on the base and others spiral. Whorls 6, convex, margined above, suture well impressed. Aperture oblique, oval, white within, columella margin reflexed. Peristome acute, thickened within. Columella terminating in a well-developed, flexuous white fold.

Length 16; diam. 10 mm.

Habitat, Waichu Valley, West Maui.

This shell seems to be the Maui counterpart of *Partulina variabilis*, Nc. a larger shell which is found on the neighboring island of Lanai.

Laminella duoplicata, n. sp.

Shell sinistral, sometimes slightly perforated, thin, elongately conical, apex obtuse; surface shining, marked with fine growth striæ, nuclear whorls smooth. Color light yellow, marked with somewhat regular black lineations, apex black, whorls six, convex; suture well impressed. Aperture a little oblique, oval, white within. Peristome simple, very thin. Columella white, biplicate, the terminal plication a thin, oblique lamellar plait, the inner one less prominent.

Length 12; diam. 6 mm.

Habitat, Waichu Valley, West Maui.

This and the following species are important additions to the Laminellæ of Maui. The only previously described Maui species of this section are *Lam. picta*, Migh., *Lam. alexandri*, Nc. and *Lam. erecta* Pse.

Laminella aspera, n. sp.

Shell sinistral, minutely perforated, thin, conical, apex obtuse,

surface exhibiting very coarse and irregular growth striæ. Color yellow, plain or marked with irregular black lineations, apex black. Whorls 6, convex; suture well impressed. Aperture a little oblique, sub-rotund, yellowish within. Peristome simple, very thin. Columella white, biplicate, not prominent.

Length 10; diam. 7 mm.

Habitat, Wailuku valley, West Maui.

This species is remarkable for the very coarse and irregular growth striæ exhibited on its surface.

Cotypes of these species deposited in the Acad. Nat. Sci. Phila. will be figured in the next volume of the Manual of Conchology.

THE MIOCENE SPECIES OF LYMNAEA.

BY T. D. A. COCKERELL.

In Bull. Am. Mus. Nat. Hist., Dec., 1906, I described two small species of *Lymnæa* from the miocene beds of Florissant. In 1907, at station 1, I found a much larger species, unfortunately not in the best state of preservation. I hoped to find more material in 1908, but as none was obtained, a description from the original type is now offered.

Lymnæa florissantica, n. sp.

Length 21 mm.; diameter about $10\frac{1}{2}$; spire short, scarcely over 5 mm. long, the whorls moderately convex; body-whorl not very convex, with coarse, shallow, vertical grooves. In Baker's key in his Mollusca of the Chicago Area, it runs nearest to *L. palustris*, but it is not at all like that species. It is in reality a miocene representative of *L. emarginata*. In Mr. O. O. Nylander's series of figures of *L. emarginata* (published by the author in a pamphlet, 1901), it closely resembles Pl. 1, f. 7, except that it is distinctly more slender, and the base is narrower, about as in fig. 8, though the rest of the shell is not at all like fig. 8.

The following table separates the miocene species of *Lymnæa*.

Spire short and rather obtuse,
body-whorl large . . . . . 1.

Spire rather or quite long, acute, the apex slender	2.
1. Length over 20 mm., apparently related to *L. emarginata* . . .	*L. florissantica*, n. sp.
Length 6 mm. or less, perhaps related to *L. catascopium* . .	*L. scudderi* Ckll.
2. Small species, about 8 mm. long, closely related to *L. truncatula* .	*L. sieverti* Ckll.
Larger species, over 18 mm. long .	3.
3. Smaller, aperture about half length of shell; apparently related to *L. palustris*	*L. shumardi* Meek & Hayden.
Larger, aperture over half length of shell; apparently related to *L. stagnalis*	*L. meekii* Evans & Shumard.

L. shumardi and *meekii* are from the White R. beds; the others are from Florissant. *Lymnæa* was extraordinarily well developed in the Oligocene of Britain. As my memory serves me it seems that the minor modern groups were already well marked, and it may be considered probable that the types of *L. stagnalis*, *palustris* and *truncatula*, at least, were developed first in the old world, and reached America during the tertiary period. This is also suggested by the fact that the older (Laramie and Eocene) American species of *Lymnæa* do not suggest the modern circumpolar groups.

FALSE SHELLS.

BY C. W. JOHNSON.

Among the many specimens received from young collectors for determination there are occasionally non-molluscan forms so closely resembling shells, that they have been mistaken for mollusks; in fact, they have even deceived some of the more experienced conchologists.

In the more primitive crustacea, including the *Phyllopoda*, especially in the family *Estheriidæ* and the *Cladocera* and *Ostracoda*, the carapace is largely developed and forms a broad oval shell covering

entirely or most of the body, and divided into right and left halves, and hinged together on the dorsal line, thus giving the appearance of a bivalve mollusk.

Some of the insects also afford interesting examples. The larvæ of several species of caddice-flies, including the genus *Helicopsyche*, make spiral cases in which they live clinging to the rocks and stones in rapidly flowing streams. The little spiral cases composed of grains of sand, fastened together with silken threads resemble so closely the form of a *Trochus* or *Valvata* that Swainson (Treatise on Malacology, p. 353, f. 113, 1840), described one as the *Thelidomus braziliensis*, placing it in the family *Trochidae*, sub-family *Rotellinæ*. Dr. Isaac Lea (Trans. Amer. Phil. Soc., iv, 104, pl. xv, f. 33, 1830), described a similar larva case as *Valvata arenifera*.

In the Entomologist's Monthly Magazine, xxi, p. 1, 1884, Robert McLachlan describes and figures an "extraordinary heliciform lepidopterous larva case from East Africa." These closely resemble a high-spired *Helix* or *Vivipara*, both sinistral and dextral. The larva case of an allied species of Southern Europe, *Psyche* (*Cochloplanes*) *helix* is also figured, having the form of a small irregular helicoid shell. Larvæ of the genus *Microdon* of the dipterous family *Syrphidæ* have twice been described as land mollusks.

Numerous worm tubes of the family *Serpulidæ* formed by species of *Ditrupa* and *Pomatoceras* have frequently been described as *Dentalium* (see Pilsbry and Sharp, Manual Conch., xvii, 240).

NOTES.

Caught in a living trap.—In the window of a Salem, Mass., store may be seen a unique sight, that of a kingfisher held tightly in the grip of a mussel. The story is this:

This forenoon patrolman Michael J. Little while crossing Beverly bridge, saw the bird fluttering on the flats, and he asked a fisherman to investigate. The latter went to the spot and there found the bird drowned.

It had swooped down and poked its bill into the open shell of a mussel, which suddenly closed on the bill of the bird. There the the two remained, until the incoming tide drowned the bird. Hundreds have viewed the singular sight today.—(*Boston Globe*).

MARTYN'S UNIVERSAL CONCHOLOGY.—In the course of his very instructive paper on "Thomas Martyn and the Universal Conchologist," in the Proc. U. S. N. M., xxix, 1905, Dr. William H. Dall writes as follows (p. 425), "I am not aware of any other copies of the "Universal Conchologist" in America than the one I have described [a copy in the U. S. National Museum comprising the first eighty plates] and a similar copy in the Academy of Natural Sciences, Philadelphia. Later in his "Supplementary Notes, etc.," in the same Proceedings, vol. xxxiii, 1907, p. 185, Dr. Dall describes a third copy in the possession of Mr. John B. Henderson, Jr., of Washington, likewise consisting of eighty plates, "elegantly bound."

It may be of interest to readers of THE NAUTILUS, especially those residing on the Pacific Coast, to know that there is a fourth copy of this rare work in the library of the Leland Stanford Junior University. This copy comprises all four volumes of the work, including beautiful impressions of the entire 161 plates, and is complete save for the explanatory table for the plates of the third volume. The series was the gift of Mr. Timothy Hopkins, and in this case, also, each volume is "elegantly bound." A copy of the prospectus of the work, similar to the one described by Dr. Dall is laid into the first volume. Beyond this the copy agrees very well with those already described by Dr. Dall. S. S. BERRY.

HELIX ARBUSTORUM var. ROSEOLABIATA.—The var. *roseolabiata*, described as new by Mr. Schlesh in NAUTILUS, October, p. 55, is var. *roseolabiata* Roberts, described from the British Islands many years ago. T. D. A. COCKERELL.

MR. J. H. FERRISS, who has been getting snails, ferns and health in the Chiricahua range, Arizona, expects to return about November 15th. He has not yet turned up the *multicornis*—a shell reported to be as big as a tin-cup, with horns—but he has found many other good things.


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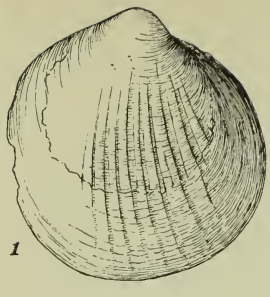
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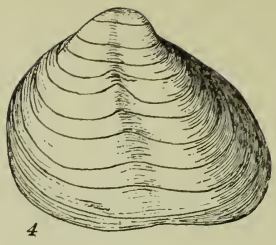
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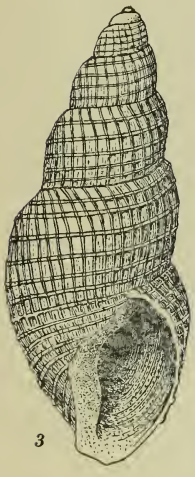
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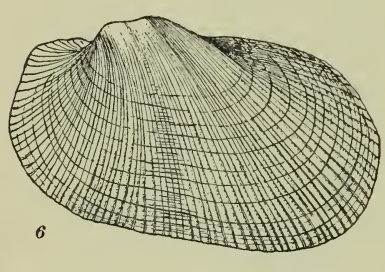
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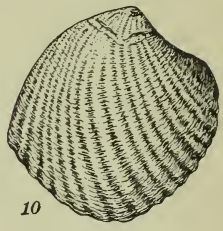
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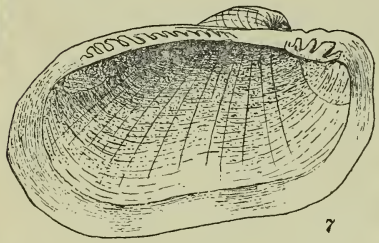
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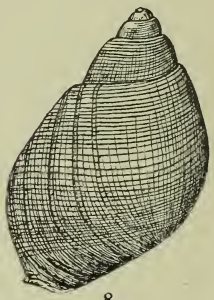
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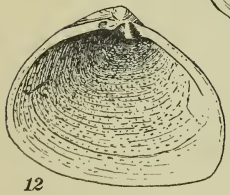
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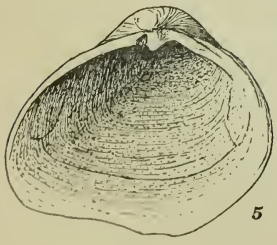
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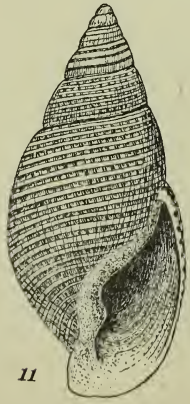
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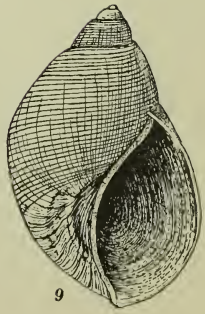
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ALDRICH: NEW EOCENE MOLLUSCA.

THE NAUTILUS.

VOL. XXII. DECEMBER, 1908. No. 8.

A NEW HAWAIIAN KALIELLA.

BY H. A. PILSBRY AND E. G. VANATTA.

KALIELLA GAETANOI n. sp. Fig. 1.

The shell is perforate, thin, cream-white (the specimens being fossil). Spire straightly conic, the apex rather obtuse. First 1½ whorls white, smooth and convex; following whorls are flattened, finely, rather weakly and irregularly striate radially, the base being irregularly radially striate, with fine microscopic engraved spiral lines. Whorls 5½, very slowly widening, the last acutely carinate, this carina showing immediately above the suture as a narrow seam. The base is convex. The aperture is narrow, truncate at the ends, basal and parietal margins parallel. Columellar margin is short, subvertical, with the edge narrowly expanded.

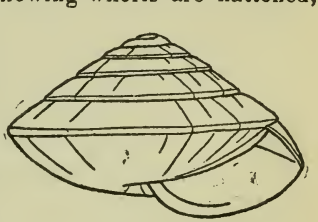

FIG. 1.

Alt. 2.87; diam. 4.84 mm.

Palihoukapapa, Hawaii, fossil. Type No. 95779 A. N. S. P., from No. 4730 of Mr. D. Thaanum's collection.

Kaliella subtilissima (Gld.) and *K. konaensis* Sykes are both less elevated species, otherwise related. Named for the discoverer of the Hawaiian Islands.

NEW EOCENE FOSSILS FROM ALABAMA AND MISSISSIPPI.

BY T. H. ALDRICH.

KELLIA INTERSTRIATA n. sp. Pl. v, figs. 1, 2.

Shell orbicular, slightly inequilateral, very much the shape of a tumid *Diplodonta*, surface smooth except in the medial part where it is distinctly striated. These striae are rather coarse, extending to the basal margin, but they stop at the umbo. Beaks rounded, fairly prominent, pointing inward, and terminate directly above one of the semi-laterals; no lunule. Dentition normal. Length, breadth and thickness about 5 mm.

LOCALITY. Enterprise, Miss. Top of Burrstone.

REMARKS: This shell has the general shape and outline of *K. suborbicularis*, Mont., also a similar dentition. It is peculiar in carrying the medial striations.

Kellia prima Aldr. is a Bornia according to Prof. W. H. Dall.

CANCELLARIA? SOTOENSIS n. sp. Pl. v. fig. 3.

Shell small, whorls about seven, the first two and a half embryonic and smooth, the cancellation beginning on the second half of the third whorl: the remaining whorls strongly cancellated, the body whorl contains 12 spiral lines, while the longitudinals are nearly three times as many; slightly nodular at the intersection points, suture very deep. Whorls strongly rounded. Base somewhat rounded. Aperture oblong, outer lip denticulated within, inner lip rather twisted, and carrying a small fold near the base. Umbilicus not entirely closed.

Length 8 mm.; width body whorl 3 mm.

LOCALITY. De Soto, Miss. Claibornian.

REMARKS: This little shell is more slender in shape than the drawing shows, and the suture is much more deeply impressed. It has somewhat the aspect of a *Scala*.

CORBULA CLARKEANA n. sp. Pl. v, figs. 4, 5.

Shell small, medium thickness, valves moderately inflated. Beaks not very prominent, polished, a groove running from beaks to base in the largest specimens, nearly in the middle of the shell. Valves marked with a few impressed lines of growth wide apart; the outer

surface having a polished look; smooth internally, cardinal tooth large, projecting.

Lon. 3½ mm.; alt. 3 mm.

LOCALITY. Wood's Bluff, Ala.

REMARKS: This little shell differs from any Corbula known to the writer by its polished appearance, and its few impressed lines, rare. One small valve does not have any depression running from beak to base, but is quite regularly rounded.

ARCA (BARBATIA) LIGNITIFERA n. sp. Pl. v, figs. 6, 7.

Shell small, thin, extremities rounded, moderately convex, beaks small and flattened; surface marked by many radial riblets crossed by irregularly spaced lines of growth; a depressed area running from beaks to base nearly central; valves smooth internally, but showing faint lines corresponding to some of the riblets. Hinge line long, slightly curved; the hinge carries four close-set teeth anteriorly, next a short vacant space, and then ten to thirteen small teeth, larger and more nearly parallel to the hinge line as they approach the posterior.

Lon. 5 mm.; alt. 3 mm.

LOCALITY. Six miles east of Thomasville, Ala., Wood's Bluff horizon.

SIGARETUS (EUNATICINA) ERECTOIDES n. sp. Pl. v, figs. 8, 9.

Shell small, thin, whorls five rapidly enlarging, apex somewhat twisted; the first two whorls smooth, the others covered with very numerous fine raised lines which become coarser on the body whorl. Aperture oblong, nearly twice as long as broad; outer lip slightly thickened; umbilicus channeled, and slightly open.

Lon. 6½ mm.; diam. 4 mm.

LOCALITY. De Soto, Miss., Claibornian.

REMARKS: This little shell has very much the form of a small *Succinea*, and resembles in miniature the living forms of the subgenus.

VERTICORDIA (HALIRIS) GRANULOIDES n. sp. Pl. v, fig. 10.

Shell small, rather rotund, surface with numerous rounded ribs, about nineteen in the type; they are granulated under a glass, and rather scabrous between the ribs, especially on the anterior. Posterior slope slightly angulated; basal margin crenulated. The ribs

also show through the body of the shell. Beak small and smooth, the cardinal tooth strongly projecting.

Lon. 2½ mm.; alt. 2½ mm.

LOCALITY. Wood's Bluff, Ala.

REMARKS: This species is mentioned by Prof. Dall as *Verticordia* sp. indet. The description is made from a good specimen found by the writer. The shell is rather small for even this genus.

ACTEON POMILIUS *Con.*, var. MULTANNULATUS. n. var. Pl. v. fig. 11.

The specimen here figured differs from the typical form by having much more numerous raised lines with shallower interspaces. The spire is higher and the shell more slender. The *Acteon* found by me at Wood's Bluff is different from the form figured by Prof. G. D. Harris, not having any smooth space on the body-whorl. These so-called species appear to belong in one basket.

Height 9 mm.; diam. 6 mm.

LOCALITY. Six miles east of Thomasville, Ala., Wood's Bluff beds.

LEPTON VAUGHANI n. sp. Pl. V, fig. 12.

Shell small, surface smooth and shining; lines of growth very fine, shell rather triangular in shape, longer than high; slightly inequilateral. Muscular scars showing, the posterior one rather long and narrow.

Long. 3 mm.; alt. 2 mm.

LOCALITY. Wood's Bluff, Ala.

REMARKS: This species seems to be an undoubted member of this genus, as it has the proper dentition; some specimens are equilateral. Named in honor of T. Wayland Vaughn of the U. S. Geological Survey. This seems to be the first *Lepton* found in the Eocene.

NEW LAND SHELLS FROM ARIZONA AND NEW MEXICO.

BY GEO. H. CLAPP.

Bifidaria (Chænaxis) tuba subsp. intuscostata.

Differs from the type, externally, by its larger size, length 4, diam. 2 mm. and the greater number of whorls, 6½. The smallest normal

shell measured is $3\frac{1}{4}$ x $1\frac{4}{5}$ mm. with about $5\frac{1}{2}$ whorls, and the largest $4\frac{1}{8}$ x 2 mm. with $6\frac{3}{4}$ whorls. Internally there is a strong lamella on the columella, which can only be seen by breaking the shell, *about 2 whorls long* in fully adult shells. Examination of a large number of shells of all ages shows that this lamella is a mark of maturity, as it does not appear until after the angular, parietal and outer columellar lamellæ have begun to form.

The arrangement and number of the other lamellæ and plicæ are the same as in the type, with the usual variation as to extra denticles, ordinarily seen in *Bifidaria*. The body whorl is decidedly angular at the umbilicus, and flattened below the periphery.

Foothills of the Plumosa Range, about eight miles east of Quartzsite, Yuma county, Arizona, in drift. Collected by Mr. Geo. S. Hutson.

Type No. 5769 of my collection. Cotypes in Academy Natural Sciences, Philadelphia, and U. S. National Museum.

In the peck or more of drift from which these shells were picked, there were only two other species, *Bifidaria hordeacella* Pils. and *Pupoides marginatus* (Say), with not even a fragment of anything else.

In the Eagle Tail Mountains, twelve miles north of Kofa, Yuma county, at an altitude of about 2,000 feet, Mr. Hutson found a form which is apparently intermediate between the type and *intuscostata*, in that the columellar lamella is weaker and does not extend in so far. This is probably the form referred to by Pilsbry in Proc. A. N. S., 1906, page 146, taken by the late Dr. Ashmun at Tempé, Maricopa county. The habitat given by Hutson is: "In moist places among piles of loose rock covered by decaying cactus. Associated with these were also *Bif. hordeacella* and *P. marginatus*.

The finding of this species in Cochise, Maricopa and Yuma counties, shows a distribution of *B. tuba* clear across the territory.

ASHMUNELLA KOCHII n. sp.

Shell very much depressed, almost flat above, convex below, carinated, the carina about in the plane of the upper surface; sutures well impressed, whorls $5\frac{1}{2}$; surface almost smooth, with faint and closely-set incremental lines; nuclear whorl and a half finely granulated; base convex, flattened around the umbilical region; umbilicus deep, about $1\frac{1}{4}$ mm. wide, showing a full turn of the penultimate

whorl, termination of the body-whorl sharply descending at the aperture to about the middle of the whorl. Aperture very oblique; lip obtusely angled and almost perpendicular below the middle of the whorl; strongly constricted behind the reflected lip; peristome well expanded above, narrower below, somewhat flexuous, united over the body by a thin callus; parietal lamellæ two, converging, but not united at the inner end into a V; the lower lamella stout, sinuous, the outer end bent sharply towards the umbilicus; the upper lamella low, narrow and straight, starting near the upper insertion of the lip and terminating back of the front end of the lower lamella; basal part of the peristome with two strong lamellæ transverse to the lip, the upper ends converging and united at the base on the lip, forming a U; a broader and less transverse lamella set more deeply within the aperture on the upper lip, a small internal lamella on the base of the body whorl about three or four mm. long, showing faintly through the shell.

Greater diameter 20½, lesser 18, alt. 6¾ mm. Black Mountain, at the southern end of the San Andreas Range, Donna Ana county, New Mexico, at an elevation of about 6,800 feet.

This interesting shell was first collected by Mr. Walter E. Koch over a year ago. He sent me one perfect and one broken shell. Lately he has sent me three additional specimens, also dead. He reports dead shells quite plentiful in the crevices of a limestone cliff, but was unable to find living ones. I take great pleasure in naming the shell after him.

Type no. 5765 of my collection.

A. kochii is undoubtedly closely related to *A. mearnsii*, but is very much larger, more strongly carinated, and differs markedly in the umbilical region.

Both of these species will be figured on plate VI, to appear next month.

NOTES ON THE GENUS STROBILOPS.

BY HENRY A. PILSBRY.

The small forest-snails known as *Strobilops* are spread throughout all parts of North America east of the Rockies where sylvan conditions prevail, from Canada to Florida, Mexico and Central America.

Southward the genus extends to Venezuela, and even to the Galapagos Islands, if I am right in referring the little snail described as *Endodonta helleri* Dall to this genus.

For many years similar snails have been known from the European Tertiaries, beginning with the Eocene and running up with numerous species through the Miocene, when the group apparently died out in that region, though many of its companion groups survived.[1]

Père Heude, the keen and brilliant Jesuit missionary-naturalist, described the first Asiatic *Strobilops*, in his memoirs on Chinese snails, under the name *Helix diodontina*. He did not recognize its kinship with other forms of *Strobilops*, nor has this been noticed by any other author until the present year, when the receipt of specimens of a *Strobilops* from Korea gave occasion for referring the Chinese *H. diodontina* to its proper genus. The Korean species, which I have decribed as *Strobilops hirasei*,[2] is conic, like most American species, but it is simply striate instead of being ribbed. Quite lately a third Asiatic species has been sent by Mr. Hirase, discovered in the main island of Japan. It will be described in the Japanese *Conchological Magazine*. The finding of three species, in China, Korea and Japan, indicates Eastern Asia as another evolution-center for species of *Strobilops*. Probably still more will turn up there as the country is further explored.

But this is not all. Several years ago Dr. O. von Moellendorff described several small snails from the Philippine Islands under the generic name *Plectopylis: P. quadrasi* with a variety *brunnescens* from Luzon, and *P. trochospira* from Bohol. In his able and exhaustive work on *Plectopylis*,[3] Mr. G. K. Gude has erected a subgenus *Enteroplax* for these species, rightly holding that they differ markedly from true *Plectopylis*. In reality, these Philippine snails are nothing more or less than *Strobilops*, having the form, sculpture, peristome and internal armature of this genus, the entering lamellæ or cords on the parietal wall being minutely nodose, as in American and East Asiatic *Strobilops*. These Philippine species will stand as *Strobilops quadrasi* (Mlldff.) and *Strobilops trochospira* (Mlldff.).

[1] The identification of *S. labyrinthica* as a European fossil, recorded in Woodward's Manual and copied in some American works, is erroneous. The foreign species is quite distinct.

[2] The Magazine of Conchology, II, p. 39, figs. Y. Hirase, Kyoto, 1908.

[3] The Armature of Helicoid Land Shells, Science Gossip, 1899, p. 149.

As to the place of origin of *Strobilops* we have no reliable data. The presence of typical forms of the genus in the Eocene shows that the group is a very old one, evolved in the Mesozoic. It is, moreover, strikingly distinct from all other genera, and wonderfully conservative in general morphology. Until information from Mesozoic strata comes to hand, we can only surmise with some probability that *Strobilops* arose somewhere in the northern hemisphere. It probably overran the entire Holarctic realm a long time ago, pushing southward into the Oriental region and the American tropics at a time remote enough to permit the evolution of strongly marked species in these areas.

ANOTHER LARGE MIOCENE SCALA.

BY W. H. DALL.

Mr. W. W. Atwood of the U. S. Geological Survey has been making a study of the Miocene strata of Alaska Peninsula and the Shumagin Islands during the past summer, and collected a number of interesting fossils. Among these is a specimen of a species of *Scala*, or *Epitonium*, belonging to the group of giant Scalidae which is so characteristic of the Miocene of Oregon and some other parts of the Pacific coast. The list comprised the following species already described and figured.

Opalia rugifera Dall,

Arctoscala condoni Dall,

Catenoscala oregonensis Dall;

together with the species about to be described. The type of *Arctoscala* is *A. greenlandica* Perry, a recent species. *Opalia rugifera* is a member of the group represented in the San Diego Pliocene by *O. varicostata* Stearns, and in the recent fauna by *O. borealis* Gould. *Catenoscala* is a new group in which the anterior third of the whorl is covered with a thick layer of enamel.

Epitonium (*Acrilla*) *atwoodi* n. sp.

Shell large, with rotund whorls rapidly increasing in size; surface covered with a low reticulate sculpture comprising low axial lamellæ, about 1.5 mm. apart on the periphery of the whorls, slightly

retractive, pinched together and more prominent, and slightly angularly bent, at the suture; these are crossed by low rounded threads, with wider interspaces, about a dozen on the penultimate whorl between the sutures; the surface is also finely sharply axially striate; the aperture is rounded, the outer lip slightly reflected and crenulate by the spiral threads, but not thickened; whorls more than five, closely adjacent; base (?); max. diam. 34; diam. at the truncate apex 10.0; alt. of five whorls (the apex lost) about 60.0 mm.

The type specimen of this fine species, consisting of internal and external casts, was collected about five miles south of the head of Port Moller, in the pass leading across Alaska Peninsula called Low Pass Cañon, U. S. Nat. Mus. 111072. Illustrations are in preparation.

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DESCRIPTION OF A MEXICAN LAMPSILIS.

BY H. A. PILSBRY AND L. S. FRIERSON.

Lampsilis iridella P. & F.

The shell is oblong, wider posteriorly, with the beaks at the anterior two-ninths of the length; anterior end rounded; posterior part sloping above, subtruncate at the end, compressed below the hinge. Surface glossy, smoothish, obliquely corrugated along the posterior slope (but sometimes very indistinctly so), and usually having a group of short impressed lines or furrows vertical to the basal margin, near the middle of the disk. Of a dull straw or pale greenish color, profusely marked with green rays, which are usually quite distinct and narrow. The valves are thin, nacre bluish silvery, very iridescent posteriorly. Cardinal teeth small, a single rather stout one in the right valve, two more compressed and generally subequal teeth in the left valve. Lateral teeth very narrow, double in the left, single in the right valve.

Length 49, alt. 26, diam. 15 mm.

Valles, Mexico. Type no. 93810 A. N. S. P., collected by Mr. A. A. Hinkley. Cotypes in collections of Hinkley and Frierson.

L. iridella, NAUTILUS, XXII, no. 8, pl. 12, two lower right hand figs.

This species was decided to be new when we studied Mr. Hinkley's Mexican shells in 1907, and so indicated in correspondence between the authors and Mr. Hinkley. It was figured as *Lampsilis iridella* in this journal for December, 1907. It is related to *V. popei* and *U. medellinus* (see NAUTILUS, Nov., 1907, p. 80).

In this connection attention may be called to the newly-described *Lampsilis salinasensis* Simpson, in Dall, Proc. U. S. Nat. Mus., 1908, p. 181, pl. 30, f. 3, type loc., Salinas River, Coahuila, also reported from Valles River, Valles, Mexico. This form is closely related to *L. fimbriata* Frierson, from the same place, figured on the same plate of the NAUTILUS with *L. iridella.*

NOTES.

A NOTE ON THE TYPE LOCALITY OF PALUDESTRINA SALSA, AT COHASSET, MASS.—The largest and finest specimens were found on rocks and eel-grass in about a foot of water and not more than three hundred yards from where the creek empties into Cohasset harbor. A dam and tide gates over which the salt water flows for only one or two hours at the top of each tide prevent the water at the spot where the shells were found from being as salty as one would expect, while a considerable amount of fresh water received by the upper part of the creek flows out on top of the salt water without mixing with it completely. Therefore the surface water is only brackish, not salt, and forms every winter very good black ice almost to the dam. Specimens were also found on floating plants about a mile further up the creek where the water has practically no salt in it. Dr. Pilsbry had specimens from both localities at the time he described the species.—OWEN BRYANT.

VALVATA HUMERALIS CALIFORNICA n. subsp. The shell is much more depressed than *V. humeralis*, the last whorl descending less; whorls convex below the suture, not flattened there as *V. humeralis* is. Alt. 2.7, diam. 4 mm. Bear Lake, San Bernardino Mts., California, collected by Mr. S. S. Berry.—H. A. PILSBRY.

HERON HELD PRISONER BY CLAM. BLOOMSBURG, PA.—Walk-

ing along the river at Beach Haven, Augustus Remaley saw a fine specimen of blue heron evidently unable to fly. Attracted by the beautiful bird's distress, he discovered that a clam or fresh water mussel had closed tightly about one of the bird's toes and held it so securely that it could not get away. In the bird's mouth was a small fish.—*N. Y. Herald, Aug. 16, 1908.*

TYPE OF AMPULLA BOLTEN.—This name, proposed in the Museum Boltenianum p. 110, for species of *Achatina*, *Limicolaria* and *Halia*, evidently has precedence for some part of this assemblage. I propose to restrict it to the last genus, *Ampulla priamus* Bolt. being the type.—H. A. PILSBRY.

THE DEVELOPMENT OF LITTORINA.—"The eggs of *L. litorea*, each enclosed in a hat-shaped capsule, are laid freely on the shore, not aggregated together in a gelatinous mass. There are trochosphere and veliger stages. *L. litorea* lives down in the zone of Laminaria and *Fucus serratus*. *L. obtusata* lives higher among *Fucus vesiculosus*; its larva leaves the egg as a veliger. *L. rudis* and *L. neritoides*, which live near high-water mark, are both viviparous. Thus the genus exhibits three stages in the evolution of the land from marine mollusca, with the suppression of larval forms with successive specialisations of habit."—M. M. TATTERSALL, M. Sc., in The Irish Naturalist, Nov. 1908, p. 238.

PUBLICATIONS RECEIVED.

REPORTS ON THE DREDGING OPERATIONS OFF THE WEST COAST OF CENTRAL AMERICA TO THE GALAPAGOS, TO THE WEST COAST OF MEXICO, AND IN THE GULF OF CALIFORNIA * * * BY THE U. S. FISH COMMISSION STEAMER "ALBATROSS" DURING 1891. REPORTS ON THE SCIENTIFIC RESULTS OF THE EXPEDITION TO THE EASTERN TROPICAL PACIFIC, ETC., "ALBATROSS," 1904–'05. By WILLIAM HEALEY DALL. Bull. Mus. Comp. Zool. xliii, no. 6, October, 1908.

The dredging operations of the "Challenger," "Blake" and "Albatross" have made us reasonably familiar with the deep water fauna of the western Atlantic, Caribbean Sea and Gulf, but hitherto practically nothing has been known of the deep water fauna off the west-

ern shores of Middle and South America, with which this Report deals. A comparison of the two faunas reveals many interesting facts. The known fauna of the eastern Pacific deep sea contains about 300 species of mollusks, belonging to 134 generic and subgeneric groups. The Antillean region possesses 174 groups and a much larger number of species. "There are practically no species common to the two regions except at the southern extreme of South America, where a few species extend northward on both shores of the continent, but do not reach the Antillean or Panamic regions."

The 300 species known from the Eastern Pacific deep sea fauna belong to 67 families, but 159 of them belong to only 8 families, of which the *Turritidæ* or *Pleurotomidæ* (57species), *Ledidæ* (35 species), *Dentaliidæ and Pectinidæ* are the most abundantly represented. The Antillean deep water fauna has 174 generic and subgeneric groups, against 144 in the Pacific, but of this number only 89 are common to the two regions. Very many characteristic and prolific groups in either fauna are unrepresented in the other. "These statistics would indicate, if confirmed by further researches, that the separation between the abyssal fauna of the Pacific and that of the Antilles is very ancient indeed, for in the shallows many of these groups are represented on both sides of the isthmus of Darien, yet have not yet succeeded in reaching the deep water." The total absence of *Triphoridæ*, *Cerithiopsidæ*, *Marginellidæ* and *Pyramidellidæ* in deep water on the Pacific side is especially remarkable.

Some 254 new species of mollusca are described. A very useful synopsis of the recent species and subspecies of *Argonauta* is given, 8 species being recognized. Much new and interesting material for the systematic student is given, especially in the *Terebridæ*, *Turritidæ*, *Solemyacidæ*, etc., and as in all of Dr. Dall's papers, there is a large store of information of value far beyond the limits of the particular fauna under consideration. The changes in nomenclature consequent on the resurrection of Bolten's Catalogue, are numerous, and important to those engaged in similar work. Several lists are appended, of interest to those engaged in faunistics: shells from the reefs and beaches of Easter Island and of Flint Island; and a single valve of a Pisidium, *Corneocyclas magellanicus* n. sp., was taken in Magellan Straits, evidently washed in from some adjacent stream.

As the pioneer work in a new fauna, this scholarly report will be welcomed by conchologists the world over.

THE NAUTILUS.

VOL. XXII. JANUARY, 1909. No. 9.

NEW AMNICOLIDÆ FROM ALABAMA.

BY BRYANT WALKER.

In the fall of 1907 Mr. Herbert H. Smith explored about twenty-five miles of the Coosa River, lying between Chilton and Coosa counties. *Amnicolidæ* were very abundant, and more than 15,000 specimens have been passed under examination. Among them were the several species herein described, which appear to be new.

The principal collecting points were Cedar Island, three miles above Waxahatchee Creek (in THE NAUTILUS, xxi, p. 128, this island was erroneously stated to be that distance above Yellowleaf Creek); The Bar, two miles further down stream, and two and one-half miles above Yellowleaf Creek (the second creek of that name); Butting Ram Shoals, five miles below The Bar; Higgins Ferry, seven miles further down; and Duncan Riffle, seven miles below the Ferry. Duncan Riffle is about twenty-four miles above Wetumpka. This interval still remains for some enterprising collector to explore.

All of the Coosa River species collected by Hinkley were also found by Smith, with the exception of *Som. aureus*. *S. hinkleyi*, *crassus* and *nanus* occurred in great quantity, the latter being the most numerous. *S. coosaensis*, *obtusus* and *aldrichi* were less abundant, but were fairly common in some localities. *S. constrictus* still remains the rarest of the Coosan *Somatogyri*, a bare half-dozen representing the total catch. An interesting "find" was that of *S. substriatus*, originally collected by Hinkley at Florence, Ala., and Columbus, Miss.

As none of the *Amnicolidæ* collected by Mr. Smith in his journey

by boat down the Coosa from Rome, Ga., to Widuska Shoals, Shelby county, Ala., in 1904–5, have been worked up, it is not at present possible to say how far up the river any of these species extend.

SOMATOGYRUS DECIPIENS n. sp. Pl. vi, figs. 10 and 11.

Shell obtusely conic, imperforate, thick, solid, light greenish-yellow, smooth, lines of growth very fine and inconspicuous. Spire elevated, obtuse; whorls 4, roundly shouldered below the suture, which is well impressed; body whorl large, shouldered above, flattened on the sides and obliquely angled below and descending to the axis. Aperture very oblique, obovate, obtusely angled above and widening toward the base, which is slightly emarginate. Columella concave, with a heavy, wide, flattened callus which extends over the parietal wall. Lip sharp, heavily thickened within.

Alt. (fig. 11) (apex eroded) $3\frac{1}{2}$, diam. $2\frac{1}{2}$ mm.

Types (No. 28431, Coll. Walker) from the Coosa River at The Bar, Chilton county, Ala. Co-types in the collections of T. H. Aldrich, G. H. Clapp, John B. Henderson, Jr., and the Philadelphia Academy. Also from the Coosa at Cedar Island, Butting Ram Shoals, Higgins Ferry, Duncan Riffle and other points in Coosa and Chilton counties, collected by Smith, and from the Coosa at Wetumpka, five miles above Wetumpka, Wilsonville, Fort William, and Montevallo, collected by Hinkley.

A careful study of many hundreds of specimens has convinced me that under the description of *Somatogyrus hinkleyi* (NAUTILUS, xxii, p. 135) I confounded two distinct species, one imperforate, and the other perforate. As both the figured types of *hinkleyi* fortunately belong to the same form, the perforate one, that species will retain the name under the amended description given below. The imperforate form is the species here described as *decipiens*. The distinctive characters of the two species are so marked that, once appreciated, there is no difficulty in separating them at sight, and it is a matter of some chagrin that the difference was not realized in the first instance.

S. decipiens is a smaller, thicker species than *hinkleyi*, and always imperforate, without any suggestion of an axial groove. While both species are alike in the elevation of the spire, *decipiens* is at all stages of growth distinctly biangulate, with the intervening side of the whorl flattened; in some instances the lower angulation becomes a distinct carina, but this is not usual.

For comparison with the similar state in *S. hinkleyi*, a young specimen of $3\frac{1}{2}$ whorls ($2\frac{1}{4}$ x $1\frac{1}{2}$ mm.) is also figured. (Fig. 10.)

The following amended description should be substituted for that originally published for

SOMATOGYRUS HINKLEYI Walker. Pl. vi, figs. 8 and 9.

Somatogyrus hinkleyi Walker, NAUTILUS, xvii, 135, pl. v, figs. 1 and 2.

Shell globose, conic, narrowly umbilicate when young and perforate when mature; light horn-colored, smooth, growth-lines scarcely evident. Spire elevated, obtuse; whorls 4–$4\frac{1}{2}$, those of the spire convex, body whorl large, more or less shouldered above, but regularly rounded at the periphery, suture deeply impressed. Aperture large, rounded above, somewhat flattened at the base, and decidedly angled at the junction of the lip with the base of the columella, and angular at the upper insertion of the lip; lip simple, acute, in aged examples somewhat thickened within. Columella heavy, callused, flattened and nearly straight, reflected over and nearly concealing the narrow umbilicus, callus thinner on the body wall.

For better illustration and comparison with *S. decipiens* I have refigured the original mature type (fig. 8) and have added another of a young shell (fig. 9) of $3\frac{1}{2}$ whorls ($2\frac{1}{2}$ x 2 mm.) for the purpose of showing the open umbilicus at that stage; the thin, shining shell and rounded whorls are very characteristic.

S. hinkleyi, when mature, has a larger, thinner shell than *decipiens*, the columellar callus is not so heavy, and the persistent perforation, very rarely entirely obliterated, as well as the general shape, are distinctive.

This species was found by Mr. Smith at the localities mentioned in connection with *S. decipiens*.

SOMATOGYRUS HENDERSONI n. sp. Pl. vi, fig. 2.

Shell globose, perforate, thick, solid, greenish-horn-color, smooth, lines of growth slight, but regular. Spire short, subacute, whorls 4–$4\frac{1}{2}$, flattened above, and roundly shouldered, body-whorl very large, inflated, somewhat constricted immediately below the suture, which is deeply impressed and then flatly expanded and roundly shouldered. Aperture large, subcircular, expanded; lip sharp, callously thickened within, rather abruptly bent in above and meeting the parietal wall at nearly a right angle, broadly rounded below and

curving regularly into the columella. Columella narrow, thickened, rounded and concave, separated below from the body-whorl by a small but profound umbilicus and a strong axial groove, adnate only on the parietal wall, which is heavily callused. Alt. (apex eroded) 4.5, diam. 4.5 mm.

Types (No. 28432, Coll. Walker) from Coosa River at Duncan's Riffle, Chilton County, Ala. Co-types in the collections of T. H. Aldrich, G. H. Clapp, J. B. Henderson, Jr., and the Philadelphia Academy. Also from the Coosa at Wilsonville, Ala.

This species is about the size and general appearance of *S. depressus* Tryon, and *sargenti* Pils. It differs from the former in its heavier shell, sub-sutural constriction, large umbilicus and strong axial groove. The latter species is rather larger, not so thick and imperforate. A single specimen from Williamsville was recently sent in by Mr. Hinkley, which was not included in the material sent to me in 1904.

Named in honor of Mr. J. B. Henderson, Jr., who has been a hearty supporter of Mr. Smith's work on the Coosa.

SOMATOGYRUS PYGMÆUS n. sp. Pl. vi, fig. 3.

Shell minute, globose-conic, imperforate, rather thin, light greenish horn-colored, smooth, lines of growth indistinct. Spire obtusely elevated, whorls 4, convex, suture deeply impressed; body whorl large, convex, regularly rounded, impressed at the axis. Aperture subcircular, not much expanded. Lip simple, sharp, thin, regularly curved from the upper to the columellar extremity. Columella concave. Columellar callus narrow, flattened, closely appressed to the body whorl and extended over the parietal wall to the upper insertion of the lip.

Alt. (apex eroded) 2.5, diam. 2 mm.

Types (No. 28433, Coll. Walker) from the Coosa River, at The Bar, Chilton county, Alabama. Co-types in the collections of T. H. Aldrich, G. H. Clapp, J. B. Henderson, Jr., and the Philadelphia Academy.

About twenty-five examples of this diminutive species were collected at The Bar. It did not occur elsewhere. I have been wholly unable to identify this form as the young of any of the associated species. Though so small, the shells have every appearance of maturity. Compared with young *S. nanus* of the same size, *pygmæus* differs in the thinner shell, regular convexity of the whorls and

lighter columellar callus. It is easily distinguished from other described species by its size.

CLAPPIA, n. gen.

Shell small, globose-turbinate, narrowly, but deeper *umbilicate*, aperture large, lip simple, *columellar lip simple*, adnate to body-whorl only at the extreme upper portion, oblique, expanded and subangulate to its union with the basal lip, operculum corneus, paucispiral, *nuclear whorls large and subcircular, slowly and gradually increasing.*

Rachidian tooth of the radula short and broad; intermediate tooth with sub-quadrate body with a strong tooth projecting from the infero-anterior angle and a large peduncle; laterals multicuspid: Formula of the denticles: $\frac{6\text{–}1\text{–}6}{4\text{–}4}$ 10–1–10, 50+, 50+ (Fig. 7).

Type: *Clappia clappi* Walker.

This genus stands close to *Somatogyrus*, but differs in several important particulars, which forbid the reference of the type species to that group.

The central tooth of the radula is very similar both in shape and in the arrangement and number of the denticles to that of *S. depressus* as figured by Stimpson. But the intermediate tooth lacks the perforation, which is found in that species, and has a prominent tooth at the infero-anterior angle which is lacking in the other. The laterals are multicuspid. In this respect, *Clappia* stands in the same relation to *Somatogyrus* that *Cincinnatia* does to *Amnicola.*

In shell characters, *Clappia* differs from *Somatogyrus* in the conspicuous deep umbilicus, the straight, thin inner lip without any callus thickening, which is entirely separate from the body whorl, except for a very short distance at the upper extremity.

The operculum is also very different. In all the species of *Somatogyrus* examined, the nuclear whorls of the operculum are very small, while the last is enormously expanded (see Fig. 6, *S. subglobosus*, Fig. 5, *S. depressus*). In *Clappia* (Fig. 4), on the other hand, the nuclear whorls are large and nearly circular, and form nearly one-half of the whole operculum. Indeed, in looking at the operculum *in situ*, the first impression is that it is completely circular as in *Valvata.*

CLAPPIA CLAPPI n. sp. Pl. vi, figs. 1, 4 and 7.

Shell small, globose-turbinate, narrowly and deeply umbilicate;

rather thin, translucent, pale horn-color, smooth, shining, lines of growth very fine, close and regular; spire obtuse. Whorls 3½, round, very convex, rapidly increasing toward the aperture, separated by a deep suture. Aperture large, slightly oblique, scarcely expanded, subcircular, equally rounded above and below, but flattened on the columellar side. Columellar lip thin, straight, oblique, adnate to the body-whorl only at the upper extremity, emarginate in the central portion, below which it is expanded, forming a rounded angle at its junction with the basal lip. Lip thin, sharp, not expanded nor callously thickened within. Operculum paucispiral, nuclear whorls large and subcircular. Animal black.

Alt. (apex eroded) 3, diam. 3 mm.

Types (No. 28434, Coll. Walker), from the Coosa River at Duncan's Riffle, Chilton County, Ala. Cotypes in the collections of T. H. Aldrich, Geo. H. Clapp, John B. Henderson, Jr., and the Philadelphia Academy. Found also at The Bar, Butting Ram Shoals and Higgins' Ferry.

Deprived of its operculum, this species at first sight, from its general shape, rounded whorls and deep umbilicus, would be taken for a *Valvata* allied to *V. sincera* Say. But the straight columellar lip and the decided projection of the lip at its junction with the peritreme show its affinity to *Somatogyrus*.

The peculiarities of the radula and operculum have been sufficiently stated under the generic description. I am indebted to Dr. Pilsbry for the figure of the dentition. It seems eminently proper that this very distinct addition to the fauna of Alabama should both generically and specifically bear the name of Mr. Geo. H. Clapp, the original promotor of the explorations of Mr. H. H. Smith, which have added so much to our knowledge of the mollusca of that State.

Explanation of Plate VI.

Figures 1, 3, 9 and 10 are on the same scale, x8.

Figures 2, 8 and 11 are x6.

Figs. 1, 4 and 7. *Clappia clappi.* Duncan's Riffle, Coosa R., Ala.

Fig. 2. *Somatogyrus hendersoni.* Duncan's Riffle, Coosa R., Ala.

Fig. 3. *Somatogyrus pygmæus.* The Bar, Coosa R., Ala.

Fig. 5. *Somatogyrus depressus.* Watertown, Wis.

Fig. 6. *Somatogyrus subglobosus.* Big Muddy R., Blairville, Ills.

Fig. 8. *Somatogyrus hinkleyi.* Coosa R., Wetumpka, Ala.

Fig. 9. *Somatogyrus hinkleyi.* Coosa R., The Bar, Ala.

Figs. 10 and 11. *Somatogyrus decipiens.* Coosa R., The Bar, Ala.

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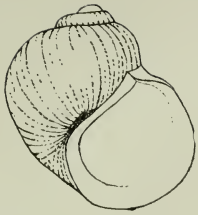

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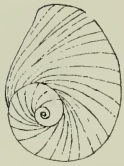

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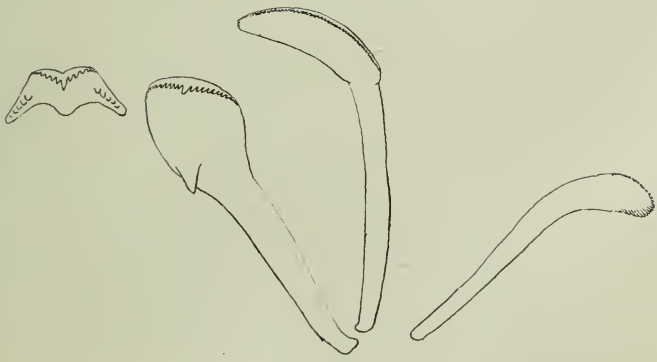

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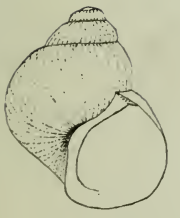

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WALKER: NEW SPECIES OF SOMATOGYRUS AND CLAPPIA.

THE BREEDING SEASON OF UNIONIDÆ IN PENNSYLVANIA.

BY DR. A. E. ORTMANN.

Since C. T. Simpson published his new system of the *Unionidæ* (Proc. U. S. Nat. Mus. 22, 1900), which is founded, in a large part, upon the "marsupium" of the female, this latter organ must be regarded as one of the most important features of the soft parts of the mussels, and should be known in every species. Yet there is a large number of species, in which it has never been seen by anybody. That certain species are very rarely found with the marsupium developed, is, in my opinion, chiefly due to the fact that they are not easily obtained at the period when they are gravid. As Sterki has first suggested (NAUTILUS, 9, 1895, p. 91), there are *two groups* among our mussels with regard to the period of gravidity[1]): *summer breeders* and *winter breeders.* In the summer breeders the short "breeding season" falls into the early summer months (May, June, July); now since many of the species which belong or may belong here are characteristic for the larger rivers, avoiding smaller streams, and since just at this time the rivers very generally are swollen and muddy by copious summer-rains, it is practically impossible to collect them in the gravid condition.

During the summer of 1908 we had exceptionally dry weather in our region; the stage of the rivers in Pennsylvania was already in the beginning of July very low, and thus the writer succeeded in finding several species in a gravid condition, which generally at that season are out of reach. In addition, he has collected other species in the smaller streams at various seasons, and has found gravid females, both of summer and winter breeders. The following is a list of them, which also intends to give the previous records for those species which are found in Pennsylvania:[2]

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[1] In order to avoid misunderstanding, I want to state expressly that by "period of gravidity" or "breeding season" I mean the time when the gills, or part of the gills, which forms the "marsupium," are filled with eggs or embryos.

[2] See: Lea, I; Observations, II, 1838, p. 51 ff.; III, 1842, p. 231; VII, 1860, p. 221; X, 1863, p. 412, etc.; Sterki, V, NAUTILUS, 9, 1895, p. 91; 12, 1898, p. 18; Amer. Natural., 37, 1903, p. 103; Baker, F. C., Bull. Chicago Ac., 3, 1898 (passim); Conner, C. H., NAUTILUS, 21, 1907, p. 87.

GROUP A. WINTER BREEDERS.

Truncilla triquetra Raf. Found gravid by the writer repeatedly in the months of September and October.

Truncilla perplexa rangiana Lea. Winter breeder (Sterki, '95). Found gravid in September.

Micromya fabalis Lea. July–August (Lea, III, '42).

Lampsilis ventricosa Barn. Winter breeder (Sterki, '95); autumn (Lea, III, '42); March, October (Lea, *ibid.*). Found gravid by the writer in all months from May to October. Marsupium partly empty (ovisacs extruded) on May 11; marsupium just beginning to be filled, July 30. (Breeds apparently "all the year round." See below.)

Lampsilis ovata Say. Autumn (Lea, III, '42); November (Lea, X, '63). Found gravid in August, September, October. (This is merely a variety of *L. ventricosa.*)

Lampsilis cariosa Say. October (Lea, II, '38). Found gravid in August.

Lampsilis ochracea Say. June and November (Lea, II, '38).

Lampsilis multiradiata Lea. Autumn (Lea, III, '42); July, August (Lea, *ibid.*). Found gravid in May, June, August, September, October. Only few specimens being found in June and July, it is uncertain whether there is an "interim" in the summer.

Lampsilis luteola Lam. March, July–August, October (Lea, III, '42); July (Baker, '98). I found gravid specimens in April, May, June, July, August, September, October. The species is a typical winter breeder, only the end of one season and the beginning of the next partly overlap in summer. In June, and chiefly in the beginning of July, sterile females (with the marsupium not charged) are much more frequent than in other seasons, while gravid females are very rare at the same time.

Lampsilis radiata Gmel. "All the year round" (Conner, '07); November (Lea, II, '38); May (Lea, X, '63). Discharge of ovisacs observed from November to March (Lea, X, '63).

Lampsilis ligamentina Lam. Winter breeder (Sterki, '95); autumn (Lea, III, '42). Found gravid by the writer in August, September, October, but not in July. Among numerous specimens collected, July 8, '07, July 3, 10 and 13, '08, not a single gravid female was discovered. The earliest date for the latter is August 3, but from that time on they were found regularly. This species pre-

fers the larger rivers, and thus no dates could be secured for the spring months, yet the "interim" in July is very sharply marked.

Lampsilis orbiculata Hildr. Autumn (Lea, III, '42). Found gravid in August and September.

Lampsilis recta Lam. Winter breeder (Sterki, '95); autumn (Lea, '42). Found gravid in July, August, September, October. No records at hand for the early summer.

Lampsilis nasuta Say. "All the year round" (Conner, '07); winter breeder (Sterki, '95); November (Lea, II, '38). I found this species gravid in September (Delaware River), and on June 2 and 3 (in Lake Erie), when numerous gravid females were found.

Lampsilis iris Lea. I found three gravid females on May 11.

Lampsilis parva Barn. Winter breeder (Sterki, '95); May and November (Lea, VII, '60). Extrusion of ovisacs observed by Lea (*ibid.*) in May.

Lampsilis (*Proptera*) *alata* Say. Winter breeder (Sterki, '95); autumn (Lea, III, '42). Found gravid end of August, September, October.

Lampsilis (*Proptera*) *gracilis* Barn. Winter breeder (Sterki, '95); autumn (Lea, II, '42). Found gravid in September.

Obovaria retusa Lam. Autumn (Lea, III, '42). I found a gravid female of this species on August 29, '08.

Obovaria circulus Lea. Winter breeder (Sterki, '95); autumn (Lea, III, 42); March, July–August (Lea, *ibid.*). I found gravid females on May 27, '08. Both forms *O. circulus* and *lens* are included here: they pass into each other.)

Obovaria ellipsis Lea. Winter breeder (Sterki, '95); autumn (Lea, III, '42).

Plagiola securis Lea. Autumn (Lea, III, '42). Gravid females not rare in September and October.

All species mentioned so far possess the "Lampsilis-type" of marsupium, *i. e.*, the posterior part of the outer gills is charged, at the period of gravidity, with eggs or embryos contained in distinct ovisacs. When not gravid, this part of the gills differs in structure from the rest, and females are always recognizable.

Cryptogenia irrorata Lea. Winter breeder (Sterki, '95); autumn (Lea, III, '42).

Marsupium very peculiar, but allied to the Lampsilis-type.

Ptychobranchus phaseolus Hildr. Winter breeder (Sterki, '95);

autumn (Lea, III, '42). Found gravid in August, September, October. A specimen found on May 11, '07, had most of the ovisacs discharged. None of the numerous specimens collected by the writer in June and July were gravid.

The peculiar shape of the marsupium of this species is well known.

In the following species, belonging to Group A, the marsupium occupies the whole of the outer gills, and while in *Strophitus* distinct "placentae" (Sterki) are developed, such structures or ovisacs are not present in the rest.

Strophitus undulatus Say. Autumn (Lea, III, '42); March, October (Lea, *ibid.*); September, December (Lea, II, '38); discharge of placentæ observed in January and February (Lea, X, '63). I found this species gravid in the months of July, August, September, October; also in May. The latest date is May 22, '08 (one out of eleven individuals). Among numerous specimens collected on May 14 and May 27, '08, no gravid females were present, and during the month of June such were never found, although a good number of specimens were collected. The earliest date again is July 11. This gives an "interim" from the end of May to about the middle of July.

The eastern *S. undulatus* Say is absolutely undistinguishable from the so-called *S. edentulus* Say of the western waters.

Anodonta cataracta Say. Breeding season, eight months during the year; the interim May to October (Conner, '07); gravid in October and November (Lea, II, '38). I have seen gravid specimens collected on July 23, '08, and August 21, '08. The first date, no doubt, represents an exceptional case: there was only a single gravid individual among forty to fifty specimens. The other date (also a single individual, but only one found at that date) possibly marks the beginning of the season. At any rate it is very probable that the breeding season occasionally lasts longer than indicated by Conner, and may be extended in individual cases beyond May and may begin earlier than October, as is the case in other winter breeders.

Anodonta imbecillis Say. Autumn (Lea, III, '42); March (Lea, *ibid.*). Found gravid May 21, '08 (outlet of Lake Leboeuf, Erie county), and June 2, '08 (Lake Erie). This species is hermaphroditic, according to Sterki (NAUTILUS, 12, '98, p. 87).

Anodonta grandis Say. Autumn (Lea, III, '42); July, August (*ibid.*); October (Baker, '98). In Pennsylvania gravid females are frequent in August, September, October. I have found a single

gravid female on May 22, '08, out of a large number collected. Among numerous specimens collected on April 24, June 23, July 17 none were gravid. Thus the "interim" appears to extend over the month of May to July, with occasional individual exceptions.

Anodontoides ferussacianus Lea. Autumn (Lea, III, '42); October (*ibid.*). Found gravid in May, August and October. Among a dozen specimens, collected June 5, '08, in Little Shenango River, and among numerous specimens of the var. *subcylindraceus* Lea, collected on June 2, '08, in Lake Erie, not a single one was gravid. This would establish an interim at least in June. No dates are at hand for July.

Symphynota compressa Lea. Autumn (Lea, III, '42); March, September (Lea, *ibid.*). Gravid in May and beginning of June (June 2 in Lake Erie; only part of the outer gills charged). No gravid females taken during the rest of June, and during July, but only a small number of specimens was secured during this time. Beginning August 6, all through the month, and during September and October, gravid females were abundant. The color of the marsupium is very variable in this species: whitish, pink, orange, brown, and probably depends on the stage of development of eggs and embryos.

(*To be continued.*)

NOTES.

Shells new to the New England fauna.—In a very small portion of shell-sand gathered by Mr. John Robinson at Hampton Beach, New Hampshire, I discovered a genus new to America, namely *Homalogyra atomus* Phil. A subsequent visit to this place enabled me to add a number of forms new to the New England Coast north of Cape Cod. Among those thus far determined is a *Scissurella*, probably *crispata* Flem., and *Cœcum pulchellum* Stimp. A few years ago Miss Marjorie C. Newell discovered specimens of *Tagelus devisus* Spengl. on Coffin's Beach, and Miss M. W. Brooks has detected a specimen of this species at Hampton Beach.

Later I hope to make an extended paper with illustrations of these and other new additions to our molluscan fauna.—Edward S. Morse.

In his "Economic Zoology, an introductory text-book in Zoology with special reference to its applications in Agriculture, Commerce and Medicine," by Herbert Osborn, M. Sc., 1908, the chapter on Mollusca (p. 147–173) is partially illustrated by original figures. Figs. 94 and 95, labeled "Common Snail, *Patula alternata*" is apparently *Polygra profunda!* Except for a very brief allusion to the pearl and pearl-button industry, the only "economic" mollusks mentioned are the oyster and *Mya arenaria*, although to go no further away than our own coast, commercially the round clam or quahog is much the more important of our clams, and the scallop industry has assumed large proportions.

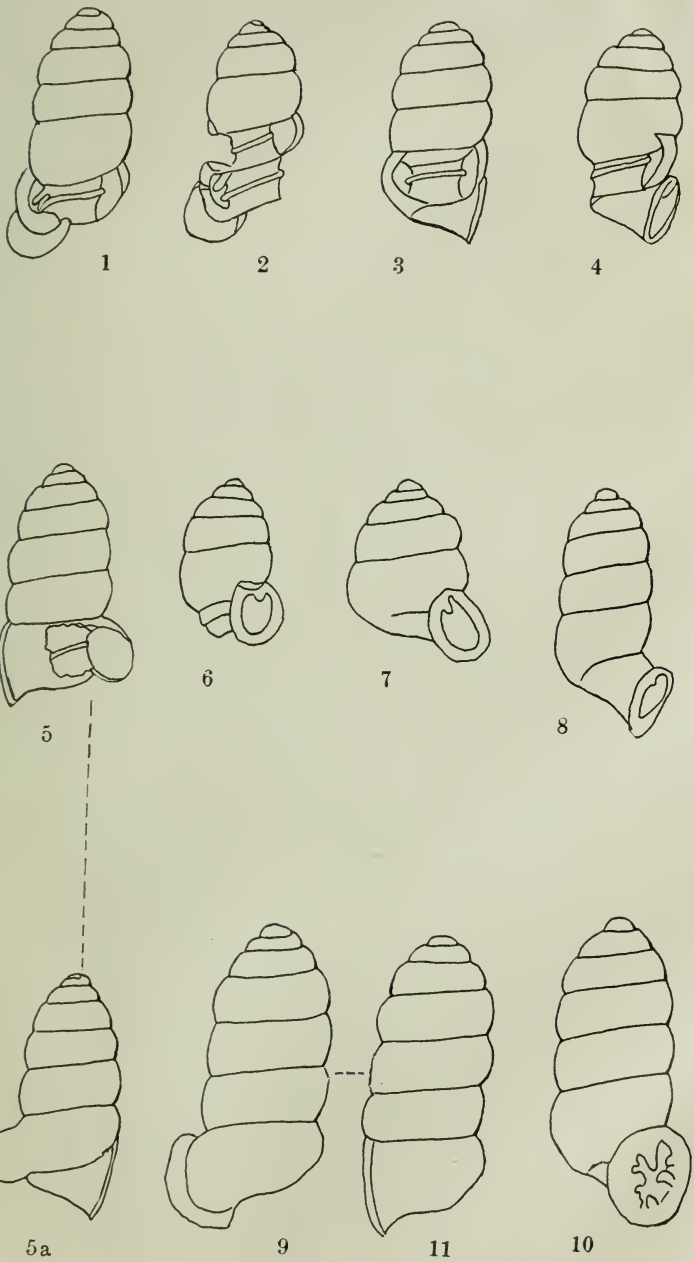
Alcadia pusilla intermedia, n. var. Shell intermediate in size between *A. pusilla* and *A. hollandi*, alt. 5.2, diam. 7.7 mm.; operculum roughened externally much as in *A. hollandi*, its columellar margin with sharp comb-like costulæ. Jamaica, (S. Raymond Roberts.) —H. A. Pilsbry.

Bifidaria tuba intuscostata Clapp. Plate VII, figs. 1, 2, 3, 4, Broken shells showing internal lamella × 10. 5, 6, 7, 8, Abnormal shells × 10. 9, 10, 11 Typical × 12.

PUBLICATIONS RECEIVED.

Description of New Cretaceous and Tertiary Fossils from the Santa Cruz Mountain, California. By Ralph Arnold. (Proc. U. S. Nat. Mus. xxxiv, p. 345, plates 31–37, 1908.) Descriptions of the various geological formations with lists of species, followed by descriptions of some thirty-seven new species.

Descriptions and Figures of some Land and Fresh-water Shells from Mexico, Believed to be New. By Wm. H. Dall, (Proc. U. S. Nat. Mus. xxxv, p. 177, plates 29–33, 1908.) A new species of Cœlocentrum (*C. palmeri* Dall and Bartsch) forms the type of a new section *Crossostephanus*. Three new *Streptostylas*, one *Euglandina* and one *Lampsilis* are described and figured. *Anodonta coarctata* Anton and *Diplodon websteri* Simpson are also figured. The latter from New Zealand, was described in The Nautilus, Vol. xvi, p. 30, 1902.



BIFIDARIA TUBA INTUSCOSTATA CLAPP

THE NAUTILUS.

VOL. XXII. FEBRUARY, 1909. No. 10.

A WEEK AT CLAIBORNE, ALABAMA.

BY REV. H. E. WHEELER.

A part of my October vacation was spent with a party of geologists on a house-boat trip from Tuscaloosa, on the Warrior river, to Jackson, on the Tombigbee. The party consisted of the State Geologists from South Carolina, Georgia, Florida and Alabama, namely, Mr. Earle Sloan, Mr. T. W. McCaloie, Dr. E. H. Sellards, Dr. Eugene A. Smith and Dr. F. W. Prouty, besides Dr. George Little, of Tuscaloosa; Dr. Roland M. Harper, of New York, botanist; Hon. T. H. Aldrich, of Birmingham, paleontologist; and Dr. T. Wayland Vaughan, of the U. S. Geological Survey, who was studying in detail the correlation of the coastal plain geology of the Southern States.

One of the results of the expedition was the confirmation of our Alabama nomenclature for the cretaceous and tertiary formations so typically illustrated in this State. Another result was the fine series of fossils collected along the route.

From Jackson some of the party went to the sections about Mobile to study the Grand Gulf formation, while I made my way to the classic locality—Claiborne, on the Alabama river. To one who has but recently delved into the mysteries of paleontology no more encouraging formation could be desired than this. Made famous by the early work of Lea and Conrad, a fascination for every student since, it will not fail to yield treasures new and old to any zealous collector. A year ago I gathered a quantity of shells there, enough to fill the winter's evenings with rare pleasure, but this year I was even more fortunate.

The beautiful *Corbis lamellosa* Lam. was found in a thin layer of white sand in the ferruginous bed—quantities of them in perfect condition. Just as I was leaving I picked up a *Cypræa nuculoides* Ald.,[1] so far as I know never before reported from this locality. A fine large *Fusus* (*Clavilithes*) *protextus* Con. rewarded my laborious digging, as well as perfect specimens of most of the common species. It was on my last visit that I was fortunate enough to find the very rare *Cancellaria priama* Harris,[2] the type of which had unfortunately been broken. I obtained two enormous *Trochiformis infundibulum* Lea, and among other interesting, though not in every case rare, species may be mentioned the following: *Pisania claibornensis* Whitf., *Lutraria papyria* Con., *Avicula limula* Con., *Papillina papillata* Con. (very rare), *Fusus inauratus* Con., *Conus sauridens* Con., *Cornulina armigera* Con., a *Melongena* n. sp., *Limopsis cuneus* Con., *Fissurella tenebrosa* Con., *Sigaretus declivis* Con., *Actæon inflatior* Meyer, *Mathilda leana* Ald., *Leiorhynus prorutus* Gabb.

The locality ought also to be interesting to the collector of recent shells. I noted on the bluff the dainty *Glandina rosea* Fer.

Passing through the overgrown and deserted streets of the village,[3] one would hardly suspect that in former times it was important enough to be visited by General Lafayette (1825) in his tour of the States. But the old Masonic Hall in which he spoke still stands, though now removed to Perdue Hill, two miles away. Here (in Claiborne) Conrad taught the children of a wealthy family while he named the treasures of the ancient eocene sea. Two of Alabama's Governors—Bagby and Murphy—were residents of Claiborne when elected, and Charles Tait, to whom the scientific world is indebted for its first knowledge of this famous bed, was Alabama's first Federal Judge. On the "Bluff" itself stood old "Fort Claiborne," whose guns frowned vengeance on the crafty Choctaws; but gone now is the glory of the once proud river town, scattered are its families, and almost past recovery are its traditions.

But for how many years to come will these ancient seas continue to give up the secrets entrusted to them? Monuments that crumble and yet survive; frail shells on which the order of creation is too finely graven for human skill to imitate.

Blocton, Alabama.

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[1] NAUTILUS, Vol. XVI, p. 98, pl. 3.

[2] Bull. Am. Pal., Vol. I, p. 49, pl. 1, fig. 20.

[3] There are less than fifty inhabitants (white) in Claiborne to-day.

THE BREEDING SEASON OF UNIONIDÆ IN PENNSYLVANIA.

BY DR. A. E. ORTMANN.

(*Concluded from page 95.*)

Symphynota viridis Conr. August 24, '08, four gravid females were found among a dozen specimens; of 35 specimens collected by Dr. D. A. Atkinson on July 11, '08, not a single one was gravid.

Symphynota costata Raf. Autumn (Lea, III, '42); March, October (Lea, *ibid.*). I found gravid specimens in April, May (latest date, May 26), and then again in August (earliest date, August 9), September, October. Numerous specimens were collected in June and July, but none of them was gravid.

Symphynota complanata Barn. Autumn (Lea, III, '42); March (Lea, *ibid.*). Gravid females found on May 14, '08.

Alasmidonta undulata Say. September and October (Lea, II, '38). Gravid females on July 18 and August 12.

Alasmidonta heterodon Lea. August, September (Lea, II, '38); May (Lea, X, '63).

Alasmidonta marginata Say. October and December (Lea, II, '38). The western form was found gravid in August, September, October. Out of a number of specimens collected on June 5, 8 and 22 none was gravid. No dates at hand for July. The eastern form was found gravid on August 13. The western form (= *truncata* Wright = typical *marginata* Say) is hardly distinguishable from the eastern (=var. *varicosa* Lam.), see Pilsbry and Fox, NAUTILUS, '01, pp. 16 and 17).

GROUP B. SUMMER BREEDERS.

Some of the summer breeders (*Unio*, *Pleurobema*) have the outer gills only serving as marsupium, in others (*Quadrula*) all four gills are supposed to assume this function in the breeding season. Yet in many *Quadrulas* this condition is unknown, and, as we shall see below, the arrangement of the species into genera will need revision and correction. I enumerate the species here according to Simpson's Synopsis.

Unio gibbosus Barn. Summer breeder (Sterki, '95); July, August (Lea, III, '42). I found gravid females of this common species in June and July, and a single belated one on August 13. Hun-

dreds of individuals were collected in April, May, August, September, October, but no gravid females were among them.

Unio crassidens Lam. Summer breeder (Sterki, '95). I collected numerous specimens in July, August, September, October, but never found a gravid female. I never had a chance to get this species earlier in the season.

Unio complanatus Dillw. "But once annually, from April–May to July–August" (Conner, '07); May (Lea, X, '63). I collected this species only in the month of August, and consequently never found it gravid.

Pleurobema clava Lam. July–August (Lea, III, '42). Found gravid on June 18 and July 10. Specimens collected on May 14 and in August, September and October were not gravid.

Pleurobema aesopus Green. Summer breeder (Sterki, '95). Gravid on July 3 and 13, '08. Never found in the gravid state during August, September, October, when many were collected.

Sterki ('95) places this with the species, in which all four gills are charged, and (Pr. Ohio Ac., 4, '97, p. 391) with the genus *Quadrula*. Yet according to my observations only the outer gills serve as marsupium, and are distinguished at that time by a very peculiar red color; already Lea (X, '63, p. 432) enumerates this species among those which have red eggs, but he saw them only in the ovarium. Yet this "red" of the gills is entirely different from that of certain gravid species of *Quadrula*, being rather of a "lilac" hue.

Quadrula undulata Barn. Summer breeder (Sterki, '95). I collected many specimens in August, September, October, but did not find gravid females. The only one was found on July 3, '08; it had all four gills charged, which were whitish (not red).

Lea (X, '63, p. 417) says that only the outer branchiæ serve as marsupium, while Sterki ('95) puts it in group B, where all four branchiæ are said to be charged.

Curiously enough, Sterki ('95, p. 93) places the closely allied *U. multiplicatus* Lea (= *Q. heros* Say) with his group A (winter breeders), giving the date November 1, and says that also the marsupium is of the type A (*Lampsilis* type). Since the latter has been described and figured by Lea (VII, '60, p. 122, pl. 30, f. 105), and is distinctly of the *Quadrula* type, with all four gills charged, I believe that we have to deal with a *lapsus calami* for *U. multiradiatus* Lea.

Quadrula lachrymosa Lea. May (Lea, III, '42).

Quadrula pustulosa Lea. Summer breeder (Sterki, '95).

Quadrula rubiginosa Lea. July–August (Lea, III, '42); June (Baker, '98). I found this species gravid on May 27, June 30, July 3 and July 8. The marsupium corresponds to the account given of it by various writers; it is formed by all four gills, which are at that time deep red.

Quadrula subrotunda Lea. Summer breeder (Sterki, '95). Found gravid July 3 and July 13. During late summer and fall no gravid females were found, although many specimens were collected. All four gills are charged and of deep red color.

Quadrula kirtlandiana Lea. One gravid female was found on August 2, '07, among hundreds of specimens collected; all four gills were charged, and red. Later in the season, in August, September, October, no gravid females were seen.

Quadrula coccinea Conr. Found gravid on June 18, '08 (Neshannock Creek, McKean Co., collected by Mr. Dennis Dally on June 22, '08. There were, altogether, about a dozen of them, and in every case the marsupium did not agree with the type of the genus *Quadrula*, for only the outer gills were charged in their whole extent, and were whitish. This would remove this species from the genus *Quadrula*, and would place it with *Pleurobema*. (Baker, '98, p. 80, gives a description of the soft parts, and says "four gills used as marsupium," but this may not be founded upon personal observation, but may have been inferred from the systematic position of the species.)

Tritogonia tuberculata Barn. Gravid, according to Sterki (NAUTILUS, 21, '07, p. 48) on June 10, '07, and marsupium formed by all four gills. This would place the species with the genus *Quadrula*, where it would group with *Q. trapezoides* Lea. Since the specific name is preoccupied in this genus, and since none of the synonyms are available, a new name should be found, and I propose here: *Quadrula tritogonia* nov. nom. (I have discussed this point with Dr. Sterki, and he is of the same opinion.)

Of the other species of *Quadrula* found in Western Pennsylvania, *Q. hippopæa* Lea, *cylindrica* Say, *metanevra* Raf., *cooperiana* Lea, *obliqua* Lea, *pyramidata* Lea, *tuberculata* Raf., I have never seen gravid females, and nothing is known about their marsupium and breeding season.

The above observations on the breeding seasons of Pennsylvanian

Unionidæ fully bear out Sterki's division into two groups: summer and winter breeders. The breeding season of the summer breeders is short (maximum hardly four months), while in the winter breeders this season is prolonged, extending from late summer, through the winter into spring. Yet it must be borne in mind that probably in the single individual the breeding season does not fully occupy the whole length of the term, since it has been repeatedly observed that the embryos and ovisacs are discharged at various times, even in the beginning of the winter.

In some species belonging to the group of winter breeders the period of gravidity may be extremely long, so that the end of one breeding season (in May, June, July) may overlap with the beginning of the next (June, July, August), and such species may appear to breed "all the year round." This has been hinted at already by Sterki, and Conner gives the following instances: *Lampsilis radiata* and *Lampsilis nasuta.* My own observations make this condition probable in *Lampsilis ventricosa* and *Lampsilis luteola.* Yet in others an "interim" is very distinct in the early summer. This is the normal condition, according to Sterki, and has been found to be true for *Anodonta cataracta* by Conner, and by my observations it is made more or less probable for *Lampsilis ligamentina*, *Ptychobranchus phaseolus*, *Strophitus undulatus*, *Anodonta grandis*, *Anodontoides ferussacianus*, *Symphynota compressa*, *Symphynota viridis*, *Symphynota costata*, *Alasmidonta marginata.*

These peculiar conditions may be explained by the following assumption: *Quadrula*, with the four gills serving as marsupium, is, in my opinion, the most primitive type of our *Unionidæ.* Next to it stand *Pleurobema* and *Unio*, with only the outer gills serving as marsupium, but with the shell more or less resembling that of *Quadrula.* These forms represent also the most primitive type of the breeding season, which is short, and falls into the warm season. These forms existed already at a time when a uniform warm climate prevailed. At that time, possibly, the breeding season was not so restricted, but at the present time it has become so, since only during a short period of the year these old, primitive conditions prevail (in summer). Forms like *Unio* and *Quadrula* actually go back to mesozoic times.

All other genera are more advanced. The group *Alasmidonta*, *Symphynota*, *Anodontoides*, *Anodonta*, *Strophitus* (which is, according to Sterki, characterized by a peculiar glochidium) resembles in

the marsupium the *Pleurobema-Unio* type, but differs by a general tendency to reduce the hinge teeth. Another group is formed by the rest of the genera, in which the marsupium becomes very highly specialized, more or less restricted to a part of the outer gills, and where true ovisacs are developed. All these more advanced genera originated probably at a time when seasonal changes of climate existed already in our continent—in the tertiary—and the shortening of the warm period in summer possibly induced them to prolong the breeding season, that is to say, to postpone the discharge of the embryos to a more favorable time, namely, till the next spring. This made necessary special adaptations for the carrying of the embryos through the winter, and probably the ovisacs of the most highly developed genera belong to these special adaptations. In certain genera, ovisacs are not at all developed, and in *Strophitus* an independent form (placentæ). This lengthening of the breeding season finally led to the merging of the end of the one of them into the beginning of the next (known only in one of the most highly specialized genera, *Lampsilis*), while in less specialized genera, in *Alasmidonta*, *Symphynota*, *Anodonta*, also in *Ptychobranchus* and some species of *Lampsilis*, an "interim" in midsummer still exists.

I think this is a reasonable interpretation of the different types of breeding season and their development, yet it is proposed here as a mere theory, which should be substantiated by further investigations on the marsupium and the breeding seasons of our *Unionidæ*.

MOLLUSKS FROM AROUND ALBUQUERQUE, NEW MEXICO.

BY H. A. PILSBRY AND J. H. FERRISS.

A considerable amount of work has been done on New Mexican mollusks, and the numerous local lists published would make a good showing for the Territory if compiled into one catalogue. The more recent lists were based upon material collected by Professor T. D. A. Cockerell and his pupils, and by Messrs. Joshua L. and Albert Baily, Ferriss and Pilsbry. The records are to be found in NAUTILUS, ix, p. 116; x, p. 42; xi, p. 69; xii, pp. 76, 131; xiii, pp. 13, 36, 49, 79; xiv, pp. 9, 47, 72, 82, 85; xvi, pp. 57, 69, Mollusca of the Southwestern States, I, II, etc.

In 1906 we collected a few shells in the neighborhood of Albuquerque while waiting for trains.

The immediate environs of Albuquerque are barren of molluscan life. Only along the Rio Grande the drift débris affords small shells, the land forms probably washed down from the Sandia mountains, which rise north of the city. A low ridge of black volcanic rock frowning on the western horizon proved to be not worth the excursion. We found only a few *Pupoides marginatus* there. The nearer slopes of the Sandia mountains are also barren. A few small species were found in the canyon beyond the Agricultural College. A much richer fauna no doubt inhabits the higher slopes northward. Miss Maud Ellis found twelve species in Las Huartus canyon, at 8000–9000 feet elevation (NAUTILUS, xiv, 85).

The following forms were taken:

Helicodiscus eigenmanni arizonensis P. & F. Rio Grande drift; Sandia Mts.

Vitrea indentata umbilicata Ckll. Sandia Mts.

Zonitoides arborea (Say). Sandia Mts.; Rio Grande drift débris.

Zonitoides minuscula (Binn.). Sandia Mts.; Rio Grande drift débris.

Euconulus fulvus (Müll.). Sandia Mts.

Vallonia cyclophorella Anc.. Rio Grande drift débris.

Cochlicopa lubrica (Müll.). Sandia Mts.

Pupoides marginatus (Say). Rio Grande drift débris; volcanic ridge about 5 miles west of Albuquerque.

Pupoides hordaceus (Gabb). Rio Grande drift.

Pupilla blandi Morse. Rio Grande drift.

Bifidaria procera (Gld.). Rio Grande drift.

Bifidaria procera cristata P. & V. Rio Grande drift.

Bifidaria pellucida hordeacella (Pils.). Rio Grande drift.

Bifidaria armifera (Say). Rio Grande drift.

Vertigo ovata Say. Rio Grande drift.

Lymnæa bulimoides cockerelli P. & F. Rio Grande drift.

Planorbis trivolvis Say. Rio Grande drift.

Planorbis parvus Say. Rio Grande drift.

Valvata (*humeralis* Say?), one broken specimen. Rio Grande drift.

FOSSIL AND LIVING SHELLS FOUND IN LITTLE MUD LAKE, WESTMANLAND, AROOSTOOK COUNTY, MAINE.

BY OLOF O. NYLANDER.

This small lake is located in the forest near the south line of Westmanland Plantation, and is the headwater of Salmon Brook. This little lake contains some interesting shells not found in the county before. The deposit of dead shells (marl) is many feet in thickness, and is chiefly composed of *Pisidia*.

The living shells are extremely rare in the lake, and those collected came from small spring brooks at the north end of the lake. Dr. V. Sterki has kindly examined all the *Pisidia*. I do not know what the amateur collectors would do with these miserable little shells without his assistance. The fossils collected are as follows:

Lymnæa desidiosa Say. Common.

Planorbis campanulatus Say. Common.

Planorbis bicarinatus Say. A few young shells.

Planorbis hirsutus Gld. One specimen.

Planorbis parvus Say. Abundant.

Ancylus parallelus Hald. One specimen.

Valvata sp.? A variable species; some are nearly flat, others have the apex extremely elevated, a large percentage are decollate and the whorls are sometimes dislocated near the apex.

Mr. Bryant Walker has examined specimens and states: "They are extremely curious * * * I have never seen any like them before. They are no doubt a form of *V. sincera* Say."

Dr. W. H. Dall gives me the following information: "They are exactly like the depauperate form of *V. lewisii* Currier. * * * The distortions are familiar to me as found in marl deposits, the water becoming too much mineralized for the mollusks."

I made special efforts to obtain living specimens of this *Valvata* during the two trips to the lake, but not one could be found.

Anodonta fragilis Lam. Fragments.

Sphærium sulcatum Lam. A few valves.

Sphærium rhomboideum Say. Common.

Musculium sp.? probably *securis* Prime. Small.

Pisidium variabile Prime.

" *compressum* Prime.

" *affine* Sterki.

Pisidium mainense Sterki.
" *ventricosum* Prime.
" *costatum* Sterki.
" *medianum* var. *minutum* Sterki.
" *contortum* Prime.
" *triangulare* Sterki.
" *tenuissimum* Sterki.
" *splendidulum* Sterki.
" *splendidulum*, a new var.—Sterki.
" *abditum?* or closely related to that species.

The following living shells were collected:
Planorbis trivolvis Say. Two specimens.
Planorbis parvus Say. Three specimens.
Anodonta fragilis Lam. One specimen.
Musculium sp.? A small form, probably a new species.
Pisidium variabile Prime.
" *ventricosum* Prime.
" *subrotundum* Sterki.
" *mainense* Sterki.
" *medianum* var. *minutum* Sterki.
" *splendidulum* Sterki.
" *splendidulum*, a new variety.—Sterki.

As additions to the Aroostook county shells, I might mention *Pisidium punctum* var. *simplex* Sterki. Dead water Caribou stream, Woodland. Rare and new to the county.

Pisidium milium Hald. is common in Gelot's Lake, New Sweden. *Caribou, Me.*

REMARKS ON THE SUBFAMILIES HYRIINÆ AND UNIONINÆ.

BY L. S. FRIERSON.

A few facts having important bearing on the classification of the *Naiades*, having come to notice, are herewith given to the readers of NAUTILUS.

Two species of the genus *Pseudodon* were obtained from Sowerby and Fulton, showing beak sculpture. *P. vondembuschiana* Lea has a somewhat doubly looped sculpture. The anterior loops curve upwards; the posterior are straighter, sloping backwards and downwards.

P. walpolei has a sculpture much like that of the *Cristarias*, being heavy bars, more or less parallel with the growth-lines.

The important fact revealed by these specimens shows that the genus must be moved from the subfamily *Hyriinæ* and placed in the subfamily *Unioninæ.*

Two species of *Parreysia* (*P. corrugata*, and *P. wynegungaensis*) were received (numerous specimens) bearing eggs in all four gills, as in *Quadrula.* That these shells would be found bearing ova in all four gills was prophesied as being probable by Mr. Simpson (Synopsis, page 508).

The important bearing of this fact is that it proves that *beak sculpture and manner of carrying ova in the gills are not correlated.*

In this connection Mr. C. T. Simpson wrote (in a letter) several years ago that gravid animals of the group of *Unio* (*Nodularia*) *caffer* Krauss proved to carry eggs in their *outer gills*, and thus necessitated the moving of this group from the subfamily *Hyriinæ*, genus *Nodularia*, to the subfamily *Unioninæ*, genus *Unio.*

But in the light of further knowledge we see that our definition of the subfamily *Hyriinæ* (as differentiated from *Unioninæ*) must be amended. We must choose between beak sculpture ("radial *versus* concentric") or marsupial characters ("Exobranchiæ *versus* Endobranchiæ") in our definitions.

The judgment of the writer would be to drop the *marsupial* feature and adhere to the beak sculpture, thus giving for our definition of the subfamily *Unioninæ:* "Essentially concentric beak sculpture," and for *Hyriinæ:* "Essentially radial beak sculpture." Thus amended, the group of *Nodularia caffer* Krauss remains undisturbed, as originally located by Mr. Simpson.

DESCRIPTIONS OF TWO NEW AMERICAN PUPIDÆ.

BY V. STERKI.

VERTIGO NYLANDERI n. sp.

Shell perforated, oblong, with a rather acute apex, of deep horn color, pellucid; whorls $4\frac{1}{2}$–5, quite convex, with a deep suture, with sub-regular, crowded striæ (except the embryonal), the last occupying about one-half of the altitude, gradually narrowed towards the aperture, which is small; peristome slightly everted, margin not thickened; palatal wall with an indentation barely above its middle, forming a well-marked sinus and sinulus; behind it a trace of a crest, and behind that a long, deep furrow-like impression over the palatal

folds, ascending obliquely from near the base; no callus within; lamellæ and plicæ 6; parietal rather long and curved; parallel with it is a thin, lamelliform angular; columellar and inferior columellar rather small, short, the latter near the base; palatals long, the lower deep-seated, ending close to the beginning of the upper, one appearing to be a continuation of the other.

Alt. 1.6, diam. 0.9 mm.

Soft parts not seen.

Woodland, Aroostook county, Maine, collected in 1896 by Mr. Olof O. Nylander, in whose honor the species is named. I have two specimens on hand, the types (No. 1075 of my collection of North American *Pupidæ*); a few more are in the collection of Mr. Nylander. Ever since '96 the form was regarded as distinct, but not published. The two specimens are alike, mature and perfect, and cannot be deformed ones of some other species. In appearance and surface striæ they are somewhat like *V. gouldii* Binn., but otherwise the shell is quite different. In its shape, with the narrowed last whorl, it somewhat resembles *V. oscariana* St., but the lamellæ and plicæ are very different.

Bifidaria clappi n. sp.

Shell glossy, colorless to milky-whitish, perforate, cylindrical in the lower 3–4 whorls, conical or subconical above, with a rather acute apex; whorls $6\frac{1}{2}$–$7\frac{1}{2}$, the upper ones rather narrow, the lower ones broader and less convex, the last moderately large, ascending at the aperture, somewhat narrow but rounded at the base, slightly flattened over the palate; surface shining, with slight irregular to subregular striæ; aperture nearly oval, margins approximate; peristome everted, not thickened, but there is a slight to rather strong white callus in the palate; lamellæ and plicæ: parieto-angular distinctly complex, rather long, moderately elevated, connecting with the peristome near its outer upper terminus (much as in *B. armifera*), the spur[1] of the parietal moderately large; columellar axial spiral, with the lower end nearer the aperture, thicker and rather abrupt, or somewhat bifurcate; "basal" (inferior columellar) slight or wanting;

[1] In *B. armifera* and *clappi*, near the inner end of the parietal lam., there is a process, or "spur," outward, that is, towards the periphery, at nearly right angles, smaller or larger, generally visible in front view. So far it has been seen in no other species; but in *B. contracta* there is a protracted, curved part, lower than the rest of the lam., and not visible in front view.

upper and lower palatals regular, an interpalatal in many specimens; suprapalatal wanting or quite small.

Alt. 3.5–4 (rarely 3.2–3.4), diam. 1.9–2.1 mm.; aperture alt. 1.5, diam. 1.2 mm.

Soft parts, seen only from one dried Alabama specimen, soaked, very dark from copious, deep brown pigment. Jaw amber-colored, strongly curved, rather broad, rounded at the ends, its surface with numerous radial rib-striæ; the line of the attachment of the tenaculum strong.

Radula with 78 transverse rows of 27 (or 29) teeth, r + 6 + 7 (8); rachidian rather narrow, with a short mesodont and very small ectodonts (barely visible); laterals bicuspid, with the mesodont as long as the plate, the ectodont about one-third as long; the outer posterior angle of the plate raised, cusp-like; seventh and eighth with the ectodont split in two, somewhat intermediate or "transition" teeth; marginals (9–13) serrate, with the mesodont rather long, thin; the fourteenth a barely visible irregular transverse bar, or wanting. As this is from a single specimen, there may be some variation. Other parts could not be examined.

Habitat: Knoxville (various localities); eastern Tenn.; Fayetteville and Columbia, Tennessee; Gurley and Huntsville, Alabama; Grand Rapids, Michigan; "Ottawa, Illinois."?

The species shows little variation, except in altitude, with nearly the same diameter, and such as are noted in the description. There is no tendency towards having the peristome continuous. The types are from Knoxville, Tenn., but almost any good specimen seen from anywhere might be taken for a type.

B. cloppi is remarkable for its resemblance to some forms of *B. armifera* Say, for a variety of which it has been taken. Yet it is quite distinct. Of over 150 specimens carefully compared with more than 1500 *armifera* not one was found doubtful or intermediate. The most tangible difference is in the shape of the columellar lamella. The shell averages somewhat smaller, the apex is more acute, the surface striæ are finer and slighter, the lower palatal plica is always

[1] *B. armifera* shows considerable variation with respect to size and shape, and in connection with it, in the shape of the columellar and lower palatal. These differences mark two main forms, varieties at least, the shell of one of them being more cylindrical aud more or less resembling *clappi*, but the columellar (and lower palatal) are always different.

regular.[1] When one is once familiar with the species it is easily recognized. There is no doubt that specimens are in various collections as, and mixed with, *armifera*, and all such lots should be revised.

Specimens, as "*Pupa armifera*," were received in 1886–92 from the late Mrs. Geo. Andrews, collected at Knoxville, Tenn., at various places, marked: "Garden," "The Thicket," "under stones," aggregating 58 *armifera*, 51 *clappi*. In a lot of 32 from drift on the Duck river, Columbia, Tenn., sent by Prof. B. Shimek in 1892, 18 were *armifera* and 14 *clappi;* 5 specimens, of the latter only, from "Columbia, Tenn.," were received from Mr. A. A. Hinkley in 1887. Lately Mr. Geo. H. Clapp was kind enough to send me all his *armifera* for inspection; among them was a lot from "Eastern Tennessee," all *clappi;* one from Gurley, Ala., the same; and one from Huntsville, Ala., with 36 *armifera* and 1 *clappi*. The latter two were collected by Mr. Herbert H. Smith. Mr. Bryant Walker also kindly sent me his whole *armifera* material, 37 lots. Among them were *clappi* from Fayetteville, Tenn., and Huntsville, Ala., and, much to my surprise, from Grand Rapids, Mich. Also in a lot from "Ottawa, Ill.,"? which I owe to Mr. F. C. Baker, both species were represented. It seems then that the distribution of *B. clappi* is not only southeastern, as had been supposed, and it may be found in other parts of the country also.

I take pleasure in naming the species in honor of Mr. Geo. H. Clapp.

Strange Shells. One specimen: Umbilicate, cylindrical-turriculate; whorls $6\frac{2}{3}$, moderately convex, the last occupying nearly one-half of the altitude; aperture higher than wide, somewhat like that of *Cionella lubrica* except for the columellar part; peristome straight, thin and sharp; no trace of lamellæ and plicæ; colorless to pale horn; shell thin, translucent; surface with fine, irregular striæ; alt. 4, diam. 2 mm.; aperture alt. 1.5, diam. 1 mm.; umbilicus round, of about 0.5 mm. diam., and pervious into the preceding whorls. From Rose Hill, near Buffalo, N. Y., collected and sent by Miss E. L. Letson in a lot of *Bifid. armifera* Say, var. What is it? If it came from a foreign country, or even from some unexplored part of our own continent, one might be tempted to regard it is representing a n. sp., and even a new genus. But in all probability it is a freak, or monstrous specimen of *Bifid. armifera*. This had been written when I received, from Mr. Clapp, a somewhat corresponding

specimen, from Gastonburg, Ala. It was plainly a *B. armifera*, large, especially the last whorl, much larger than the penultimate, evidently overgrown, with a very small and slight parietal lam. A specimen, corresponding especially with the first-mentioned, of *Bifid. corticaria*, from Jackson county, Ala., was received years ago from Mr. H. E. Sargent. 3.1 mm. high; peristome straight and thin; aperture without a trace of lamellæ.

REV. A. B. KENDIG, D. D.

Dr. Amos B. Kendig, one of the best known Methodist clergymen of New England, died January 20, 1909, at Brookline, Mass.

Dr. Kendig was born in Lancaster county, Penna., in 1830, removing to Iowa when a young man. He at first studied law, but changed to the ministry, and was ordained in 1852. In the Civil War he served for a time as chaplain of the 9th Iowa regiment.

In 1875 Dr. Kendig came to Boston and became pastor of the Monument Square M. E. Church in Charlestown. Later he held pastorates in Lynn, Worcester and Boston; then going to Brooklyn, N. Y., East Orange, N. J., and New York City.

Dr. Kendig was known for his energy in all that he undertook. He was a man of devout Christian character, and he brought to his profession the courtesy and the manners of a gentleman of the old school. A man of broad culture and sympathy, he took great interest in scientific matters, and was a member of several learned societies. He took up the study of mineralogy at one time, aad made a large and fine collection of minerals, which he presented to a college in Iowa. Later he made a study of land shells of the world, built up a large and valuable collection, and accumulated a library. In 1903 he decided to give up the study of shells, his collection going to the Franklin and Marshall College, Lancaster, Pennsylvania. Dr. Kendig had many warm friends among conchologists. He is survived by two daughters, Mrs. George F. Kellogg and Mrs. Silas Peirce.

SUPPLEMENTARY NOTES ON THE BREEDING SEASONS OF THE UNIONIDÆ.

BY CHAS. H. CONNER.

Dr. A. E. Ortmann's article, relative to the breeding seasons of the *Unionidæ*, will doubtless be received as an interesting and valuable contribution to the subject, and in order to extend its usefulness, so far as my limited ability will permit, I beg to present a condensed report of my observations, made from 1905 to 1908 inclusive. I, too, have noticed some apparent variations in the breeding periods of individuals, as also in the species, in different years. Possibly this

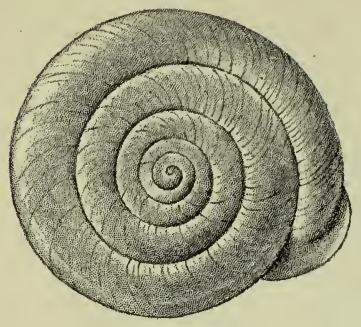
difference may be due more or less to difference in the seasons (weather) from year to year.

The facts already obtained have an important bearing on legislative action already taken or contemplated for the protection and preservation of our fresh-water mussels. Unlike the song and game birds and the mammals, no close season will serve to protect all of the species. The taking of all clams under the fully adult size must be prohibited to prevent their extermination by pearl-hunters and button manufacturers.

TABLE SHOWING GRAVID PERIODS OF THE UNIONIDÆ.

The letter *g* indicates gravid individuals, *n* denoting that none were found gravid, *gn* that some females examined were gravid, others not gravid, either among specimens taken at the same time or in the same month in different years.

	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.
Anodonta cataracta Say. . . .	g	g	g	gn	gn	n	n	n	g	g	g	g
Anodonta implicata Say. . . .	g		g	g	g	n	n	n	g	g	g	g
Anodonta undulata Say. . . .			g	n	n							g
Alasmidonta undulata Say. . .								g				
Alasmidonta varicosa Lamarck.					g	n						
Lampsilis cariosus Say		g	g	n	g	g	g		g	g		
Lampsilis ochraceus Say . . .				g	g	g						
Lampsilis radiatus Gmélin . .		g	g	g	g	g	g	g	g	g	g	g
Lampsilis ventricosus Barnes. .									g			
Lampsilis ligamentinus Lamarck.								g	g			
Margaritana margaritifera L. .	n					g		g			n	
Quadrula multiplicata.											g	
Quadrula perplicata Conrad. .											n	
Quadrula trapezoides Lea . . .											n	
Strophitus edentulus Say. . . .								g				
Symphynota viridis Conrad . .								g				
Unio complanatus Solander . .	n		n	gn	g	g	g	gn	n	n	n	n
Unio heterodon Lea.		g										
Unio nasutus Say	g	g	g	g	g	g	gn	g	g	g	g	g
Unio northamptonensis Lea.	approximately as *U. complanatus.*											
Unio occidens Lea									g			
Unio rectus Lamarck.								g				
Anodonta footiana Lea								g				
Anodonta subcylindraceus Lea .								g				
Lampsilis superiorensis Marsh .								g				



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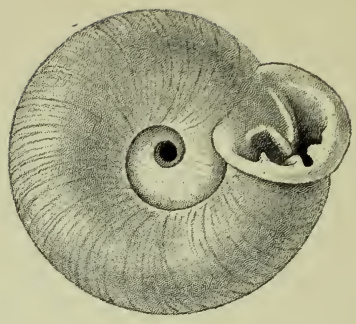

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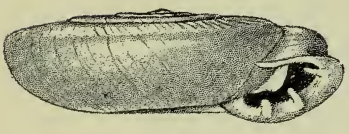

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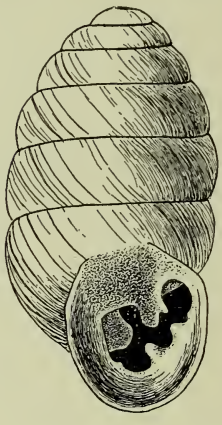

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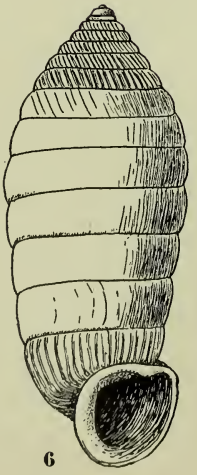

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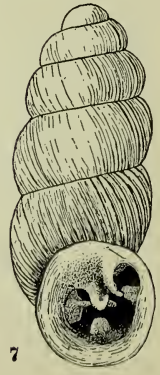

7

1, 2, 3, ASHMUNELLA KOCHII CLAPP. 4, BIFIDARIA CLAPPI STERKI.
5, 6, HOLOSPIRA BARTSCHI P. & C. 7, BIFIDARIA BILAMELLATA STERKI & CLAPP.

The Nautilus.

Vol. XXII. MARCH, 1909. No. 11.

PISIDIUM IN MASSACHUSETTS.

BY REV. HENRY W. WINKLEY.

During the past two summers the writer has had opportunity to collect in various places in Massachusetts, and *Pisidium* has yielded some good series. The species have just been determined by Dr. Sterki, with the following results:

Dalton, in the Berkshire Hills—a brief visit in early spring—yielded *compressum* and *abditum*.

Newton, Upper Falls, gave at one visit *variabile*, *aequilaterale*, *pauperculum*, *affine* and *ferrugineum*.

Woburn, in a small outlet to Horn Pond, had *compressum*, *abditum* and *affine*.

Concord, near the famous battlefield, shows *variabile*, *abditum*, *compressum*.

Wareham is at the head of Buzzards Bay, almost on Cape Cod. It is an important place in cranberry culture. Considerable material was obtained from ditches in the cranberry bogs. The species *variabile* and *abditum* both show local peculiarities; *ferrugineum* also occurs in the bogs. A trout brook in the woods gave excellent sets of *variabile*, with *abditum* quite rare.

The Agawam River at East Wareham is one of the richest collecting grounds I know. *Pisidium* is not abundant, but is peculiar. Dr. Sterki writes of *variabile:* "Rather different from the common form, and representing a variety if found at other places," another form similar yet distinct.

Danvers, my present home, proves an excellent region for this

genus. A few tiny brooks are teeming with fresh-water shells, and the town has the following species: *compressum*, *variabile*, *abditum*, *ventricosum*, *ferrugineum succineum*, *neglectum*, *aequilaterale*, *ferrugineum* and *splendidulum*, "for the first time seen in large numbers from Massachusetts." A few forms not quite settled may show more of interest. A more careful search next summer may yield even more species from this interesting locality.

NOTES ON SHELLS COLLECTED AT BALSAS, GUERRERO, MEXICO, BY MR. WALTER E. KOCH, IN DEC., 1908.

BY H. A. PILSBRY AND GEO. H. CLAPP.

These shells were found in the crevices of the limestone rocks bordering the Rio Balsas, and the ravines leading to it, and about 1000 feet above the river, or at an altitude of 2000–3000 feet. No living shells were seen, and limited time prevented a very thorough search.

EUGLANDINA LIEBMANNI (Pfr.).

The specimens have the more minute sculpture very beautifully developed, agreeing with Strebel's account of the type specimen. There is also a coarser form in some other localities, which seems to be more abundant in collections.

POLYGYRA MATERMONTANA Pils.

A series of eleven specimens shows great variation in size and shape of the umbilicus, and better preserved examples might possibly show the presence of more than one species in the lot. The extremes in size are 7.3 mm. diam. with 5 whorls, and 11 mm. with $5\frac{1}{2}$ whorls.

OXYSTYLA ZONIFERA (Strebel).

Typical examples of this well-marked species.

HOLOSPIRA BARTSCHI n. sp. Pl. viii, figs. 5, 6.

The shell is white, imperforate, oblong, widest at the eighth or ninth whorl, rapidly tapering to the last whorl; terminal cone short, the apex mamillar. Two embryonic whorls smooth, gray, projecting, the first whorl wider than the second; following three whorls

sculptured with slender riblets parted by wider intervals; the riblets then become irregular and weaker; at and below the shoulder they disappear, and the whorls are nearly smooth and flat to the last, which is ribbed, the ribs rather strong but irregular on the last half whorl, which is straightened, tapers to the well-rounded base, and is very shortly produced forward beyond the preceding whorl. The aperture is very shortly piriform, upper margin straightened with a slight callus within near the outer angle; other margins well curved and expanded. Internal axis rather wide throughout, widest above, smooth, its walls slightly concave within each whorl. At the end of the penultimate whorl there is a barely noticeable swelling of the axis, hardly visible in some specimens, and with no superposed callus.

Length 14.8, greatest diam. 5.8 mm.; whorls 14.

Length 15, greatest diam. 5.9 mm.; whorls 14.

Length 18.25, greatest diam. 5.3 mm.; whorls 13¾.

The length is estimated, since all of the examples have the peristome more or less broken basally. While very "top-heavy," it is less obese than *H. imbricata* v. Marts., which is strongly ribbed throughout. No other species of similar shape has the same axial structure. In having a large internal pillar, *H. bartschi* resembles *H. fusca* v. Marts. Neither species is a typical *Haplocion*, but they agree with no other of the defined sections of *Holospira*.

This species is named for Mr. Paul Bartsch, author of an excellent paper on *Holospira* and related genera.

HOLOSPIRA GOLDMANI Bartsch.

One example, 13 x 5 mm., agrees well with a cotype of this species, received from the National Museum through the courtesy of Dr. Dall. *H. gealei* H. Ad., of which the internal structure is unknown, may prove to be allied. It is not unlike *goldmani* externally, so far as can be gathered from Adams' inadequate description.

A NEW SPECIES OF PHOLADOMYA.

BY WM. H. DALL.

The figured type of the genus *Pholadomya* Sowerby is the recent *P. candida* Sow., from the island of Tortola in the West Indies, described in 1823. A large number of fossil species are known, but

during the eighty-four years which have elapsed since Sowerby characterized the genus, only one more recent species which can confidently be affirmed to belong to the typical section of the genus has been described. This is the *P. loveni* Jeffreys, 1881. *P. candida* has its hinge composed of a pair of nymphs sustaining the external ligament, and in front of the nymphs a triangular area, directly under the beaks, which supported an internal resilium, some fibers of which still adhere to the specimen in the National Museum. The anterior edge of the resiliifer is raised into a rib-like prominence, which is what in descriptions of the genus is usually referred to as an "obscure tooth." It is not a tooth, but a reinforcement of the pit or chondrophore. Not having a specimen for study in 1895, my description of this hinge from figures (Trans. Wagner Inst., iii, p. 530) is to this extent inaccurate. It is true that Verrill in 1881, and Locard in 1898, have described two bivalves under the names of *Pholadomya arata* and *P. africana* (Fischer MS.), but these do not belong to the typical section of the group and may belong in a wholly distinct genus. They are wedge-shaped, truncate shells with the chondrophore obsolete, and having an aspect which leads one to doubt whether the resilium was developed at all in either of them. Their soft parts are wholly unknown. It is therefore a matter of especial interest that in recent work of the U. S. S. *Albatross* in the N. W. Pacific, Aug. 10, 1906, at station 4904, in 107 fathoms, a right valve of *Pholadomya* was obtained, which I now propose to describe.

PHOLADOMYA PACIFICA n. sp.

Shell resembling an unusually plump specimen of *Mya arenaria* in general form, white, very thin, the beaks near the anterior third; inner layer of the shell pearly; beaks low, slightly prosocoelous; anterior margin of the valve evenly rounded, posterior a little attenuated and with a slight gape but also rounded; hinge-line thin with a short, narrow nymph, the chondrophore also narrow, directed obliquely backward, under and nearly parallel with the nymph; interior polished when fresh, the specimen rather dull, almost concealing the pallial sinus, which is less deep than in *P. candida.* The muscular impressions are obscure, but seem to agree with those of hat species; exterior largely, finely granulose, like many *Thracias*, sculptured with more or less evident lines of growth, and with abo

nine low radial ridges, starting from the beak, near which there are some intercalary ridges which become obsolete about the middle of the disk; both ends of the shell are destitute of radial sculpture for about one-fourth the total length; there is no defined dorsal area, lunule or escutcheon. Length of valve 48; length behind the beak 30; height 34; height of beak above the hinge-line 2.5; (double) diameter 26 mm. The sparse radial sculpture in the middle of the shell is almost exactly like that of *P. candida*, except that in the latter there are obscure nodosities on the ridges and no intercalaries, while both ends have obsolete radial lines. In one specimen of *P. candida* there are eleven ridges. The sculpture of *P. arata* and *africana* is quite different. The base of *P. pacifica* is gently arcuate. The specimen is registered in the U. S. Nat. Mus. as No. 110,456. It may be added that the granulation of the surface in *P. candida* is much less dense and conspicuous.

THE SHOWALTER COLLECTION.

BY HERBERT H. SMITH.

Every student of North American fresh-water shells is familiar with the name of Dr. E. R. Showalter. He collected, probably, three-fourths of the Alabama *Pleuroceratidæ* described by Lea, and not a few of the *Unionidæ;* many of Anthony's species came from him, and he corresponded for years with Lewis, Hartman and other eminent conchologists. Dr. Showalter resided at Uniontown, Perry county, and afterwards at Point Clear, near Mobile, and he made extended excursions to the Cahaba, Coosa and other rivers of the Alabama system. His work, interrupted by the Civil War, was taken up again about 1867, though not apparently with the same enthusiasm. Until Aldrich took up the task, Showalter was almost the only man in this rich field, and his specimens are scattered through all our collections.

Few naturalists know that Dr. Showalter had a collection of his own, and fewer still imagine that it is in existence. It had, in fact, a narrow escape from destruction. After Dr. Showalter's death the shells were stored for years under his house at Point Clear. Like

most southern houses, this is supported by corner pillars, the space beneath being open to the winds and often to driving rains. Some of the boxes rotted, specimens fell out and labels decayed; when at length the collection became the property of the Alabama Geological Survey, portions of it had literally to be scooped up with a shovel. The condition was not encouraging, but such things always look worse than they really are. No doubt some specimens and labels were irretrievably lost, but by far the greater part of the collection was saved intact, and for this we must thank the able director of the Geological Survey, Dr. Eugene A. Smith. From the first he was keenly alive to the value of the Showalter shells, but with the means at his disposal he could do no more than preserve them from further harm; this he has done conscientiously. For years the collection has been stored in the State Museum at Tuscaloosa, but it could not be made available to students.

Some months ago Mr. Bryant Walker asked me to examine the Showalter collection and, if possible, catalogue the *Unionidæ*. Dr. Smith placed the shells unreservedly in my hands and forwarded the work by every possibly means; ultimately he asked me to arrange the whole collection, and this I am now doing.

Later on I hope to give a more extended account of this historical collection. It is much richer than I had imagined, and nearly all can be saved to science. For the student of Alabama *Pleuroceratidæ* its importance can hardly be overestimated; species which have been among the rarest in our collections are here represented by hundreds, sometimes thousands, of good specimens, and these, if not exactly cotypes, are at least the lots from which types were taken. Generally speaking, the shells are correctly labeled, far better than *Pleuroceratidæ* in the majority of our cabinets. The *Unionidæ* and land shells are also important. Dr. Showalter had a general collection of no great extent, and this will be useful for educational purposes.

Every naturalist will be glad to know that the Showalter collection can be saved, and that it will soon be housed in the new museum building. The liberal character of Dr. Smith is a sufficient guarantee that the specimens will be available to every true student.

State University, Tuscaloosa, Ala., Feb. 9, 1909.

RECORDS OF MINNESOTA MOLLUSKS.

BY L. E. DANIELS.

The month of July, 1905, I spent at various points in Minnesota, and incidentally did some collecting of mollusca; and since there has been so little published on the mollusca of Minnesota, I contribute my mite.

The following is a complete list of my catch. At Thief River Falls and White Earth Lake I collected several days; at the other localities but a few hours, so that this list cannot be taken as a complete fauna of either locality. At the time of my collecting, the rivers and lakes were very high, which will account for the scarcity of fluviatile species.

In order to shorten the names of the localities I will say that Halma is in Marshall county; Anita and Thief River Falls in Red Lake county; White Earth Lake in Becker county; Lake Harriett, near Minneapolis, in Hennepin county; and Cannon Lake in Rice county.

Polygyra multilineata (Say). Minneapolis.

Circinaria concava (Binn.). Minneapolis.

Vitrona limpida Gld. Thief River Falls.

Vitrea hammonis (Strom.). Thief River Falls, White Earth Lake.

Vitrea binneyana (Morse). Thief River Falls, White Earth Lake.

Euconulus fulvus (Müller). Thief River Falls, White Earth Lake.

Euconulus chersinus polygyratus Pils. Thief River Falls, White Earth Lake, Anita.

Zonitoides arborea (Say). Thief River Falls, White Earth Lake.

Zonitoides minuscula (Binney). Thief River Falls.

Zonitoides milium (Morse). Thief River Falls, White Earth Lake.

Pyramidula alternata (Say). White Earth Lake, Minneapolis.

Pyramidula cronkhitei anthonyi Pilsbry. White Earth Lake, Cannon Lake, Anita.

Helicodiscus parallelus (Say). Thief River Falls, White Earth Lake, Anita.

Punctum pygmæum (Drap.). Thief River Falls.

Succinea retusa Lea. White Earth Lake, *var.* Thief River Falls.

Succinea ovalis Say. Thief River Falls, *var.* Minneapolis.

Succinea avara Say. Thief River Falls, Cannon Lake.

Succinea avara vermeta Say. White Earth Lake.

Strobilops virgo (Pils.). Thief River Falls, White Earth Lake.

Bifidaria contracta (Say). Thief River Falls, White Earth Lake.

Bifidaria pentodon (Say). Thief River Falls.

Bifidaria tappaniana (C. B. Adams). White Earth Lake.

Bifidaria holzingeri Sterki. White Earth Lake.

Cochlicopa lubrica (Müller). Thief River Falls. Also a form which seems to be *C. l. morseana* Doherty.

Vallonia costata (Müller). Thief River Falls, White Earth Lake.

Carychium exile canadense Clapp. Thief River Falls, White Earth Lake.

Lampsilis luteola Lam. Thief River Falls.

Anodonta kennicotti Lea. Thief River Falls.

Unio gibbosus Barnes. Thief River Falls.

Quadrula lachrymosa Lea. Thief River Falls.

Sphærium simile Say. Lake Harriett.

Sphærium occidentale Prime. Thief River Falls.

Musculium jayanum Prime. Thief River Falls.

Pisidium sp. Thief River Falls.

Campeloma subsolidum Anthony. Mississippi River, Minneapolis.

Campeloma rufum Hald. Lake Harriett.

Campeloma milesii Lea. Thief River Falls.

Valvata sincera danielsi Walker. Cannon Lake.

Valvata tricarinata Say. Cannon Lake.

Valvata tricarinata simplex Gld. Cannon Lake.

Amnicola limosa Say. *Var.* Cannon Lake.

Physa ancillaria Say. Lake Harriett.

Physa gyrina Say. Lake Harriett.

Physa gyrina hildrethiana Lea. Thief River Falls.

Physa gyrina oleacea Tryon. White Earth Lake.

Aplexa hypnorum (Linn.). Thief River Falls, Halma.

Lymnæa stagnalis appressa Say. Thief River Falls, White Earth Lake, Halma, Lake Harriett.

Lymnæa stagnalis var. Lake Harriett.

Lymnæa obrussa Say. Thief River Falls, Cannon Lake.

Lymnæa obrussa modicella Say. Thief River Falls.

Lymnæa sterkii Baker. Thief River Falls.

Lymnæa coperata Say. Thief River Falls, Anita.

Lymnæa palustris Müller. Thief River Falls, Cannon Lake, Halma, Anita.

Planorbis bicarinatus Say. Lake Harriett, Cannon Lake.

Planorbis trivolvis Say. Thief River Falls, Cannon Lake, Halma, Lake Harriett.

Planorbis campanulatus Say. Thief River Falls, White Earth Lake, Cannon Lake, Lake Harriett.

Planorbis hirsutus Gld. Cannon Lake.

Planorbis parvus Say. Thief River Falls, Anita.

Segmentina armigera Say. Thief River Falls.

TWO NEW VARIETIES OF CYPRÆA FROM N. E. QUEENSLAND.

BY H. B. PRESTON.

Among a number of *Cypræa* from N. E. Queensland recently received there occur two varieties, one of *C. xanthodon* Gray and one of *C. miliaris* Gmel., which, though undoubtedly belonging to these species, possess such marked varietal characters as to merit notice. I therefore venture to describe them, as follows:

Cypræa xanthodon Gray, var. *carnicolor*, n. var.

Dorsal surface flesh-colored without bands, indistinctly freckled with pale rusty-red; base white; posterior and median columellar denticles red, anterior columellar denticles white; denticles on lip pure white throughout; thinner and more piriform than the type; the posterior extremity of the outer lip is more produced, while that of the columellar lip is less so than in the typical form; moreover, there is no dark blotch on the columellar anterior extremity of the dorsal surface.

Alt. 24, diam. maj. 14 mm.

Hab.: N. E. Queensland.

The above has all the appearance of a deep-water shell.

Cypræa miliaris Gmel., var. *nivea*, n. var.

Differing from the typical form in having the dorsal surface grayish-white, gradually shading to pure white towards the base,

spotted indistinctly with numerous small white spots; there is scarcely any sign of lateral punctation on the columellar side.

Alt. 35, diam. maj. 22 mm.

Hab.: N. E. Queensland.

NOTES.

Pearl-hunting in the Fox River, Illinois.—Pearl-hunting commenced in the Fox river this last summer. One or two pearls were found by accident before. Now several tons of the shells have been taken out, perhaps as much as ten tons. Many of the nearby residents have done some hunting for sport, but two parties made a business of pearl-fishing, and perhaps worked 90 days. They received $1,800 for the pearls taken out. Two pearls were valued at $600 each. Jewelers from New York city wrote to a firm in Aurora, Ill., telling them to buy all the Fox river pearls they could get, as they were of the finest quality. Thus the craze spread late in the fall until, I am told, one could count fifty persons in sight hunting clams. They worked until the law to protect clams during breeding season went into effect.—L. A. Keene, Waterman, Ill.

Planorbis bicarinatus.—In order to complete the records of distribution of *Planorbis bicarinatus*, records, preferably accompanied by specimens, are desired from Newfoundland, Nova Scotia, Florida, Louisiana, Mississippi, South Carolina, South Dakota, Wyoming, Utah, Nevada, Arizona and California. The data obtained will be published in The Nautilus.—Bryant Walker, 205 Moffatt Building, Detroit, Mich.

Dr. W. Hoyle, Director of the Manchester Museum, has been appointed Director of the National Museum of Wales at Cardiff.

PUBLICATIONS RECEIVED.

Pyramidellidæ of New England and Adjacent Region. By Paul Bartsch (Proc. Boston Soc. Nat. Hist., Vol. 34, pp. 67–113, pl. 11–14, 1909). An interesting and valuable paper giving in detail the work done by various authors, followed by descriptions of all the genera, subgenera and species. Under Pyramidella are placed two subgenera—Eulimella and Syrnola. One new species,

P. (*Syrnola?*) *winkleyi*, is described from Branford, Conn. Turbonilla is divided into five subgenera—Ptycheulimella, Chemnitzia, Turbonilla, Strioturbonilla and Pyrgiscus. A new subspecies, *T.* (*Strioturbonilla*) *bushiana abyssicola*, is described from 1290–1537 fathoms off Martha's Vineyard. *T. verrilli*, *vineæ*, *branfordensis*, *buteonis*, *winkleyi*, *senilis*, *sumneri*, *cascoensis*, *whiteavesi* and *edwardensis* of the subgenus Pyrgiscus are described as new; the last two are from Prince Edward Island. *T. mighelsi* is proposed for *T. costulata* Verr. 1873 (*non* Risso 1826). Under Odostomia six subgenera are recognized—Chrysallida, Evalina, Iolaea, Menestho, Odostomia and Liostomia. The following are new: *O.* (*Chrysallida*) *bushiana* and *willisi*, *O.* (*Evalina*) *winkleyi*, *O.* (*Iolaea*) *hendersoni*, *O.* (*Menestho*) *trifida bedequensis* and *bisuturalis ovilensis*. *O. morseana* is proposed in place of *O. sulcata* Verr. 1880 (*non* A. Adams 1860). The *Pyramis striatula* Couthouy forms the type of a new genus, *Couthouyella*. There are excellent figures of nearly all the species.

C. W. J.

Natural History, Organization and Late Development of the Teredinidæ or Ship-worms. By Charles P. Sigerfoos. (Bulletin of the Bureau of Fisheries, xxvii, pp. 193–231, pl. vii–xxi.) *Xylotrya gouldi*, *Teredo dilatata* and *T. navalis* from Beaufort, N. C., have been investigated. *T. navalis* carries the eggs in the gills, but in the other species they are laid free into and fertilized in the water. In one case *T. dilatata* was estimated to produce one hundred million eggs. The egg develops into a typical small bivalve having a swimming organ (velum). Throughout the summer these may be found crawling over wooden structures in search of favorable crevices for attachment. Once attached by a single long byssus thread, the larva loses the velum, scrapes away the surface of the wood with the ventral edges of the shell-valves, and the foot develops into a pestle-shaped organ which assists the shell in burrowing. On the external surface of the valves at the anterior edges is formed the first row of small teeth, which at this and later stages are the mechanical agents by which the animal bores into the wood. This transformation has taken place within two days from the time the larva has settled, and afterwards the animal rapidly becomes an elongate ship-worm. Evidence is given showing that the ship-worm may reach a length of 4 feet and diameter of 1 inch in about one year. The sexes are separate in adult ship-worms, but young individuals of *X. gouldi* are frequently hermaphroditic, in which case the male cells develop first. The anatomy is very fully described and illustrated. This timely paper, a valuable addition to our knowledge of Pelecypod morphology, can be obtained of the Bureau of Fisheries.

H. A. P.

DAVID W. FERGUSON.

The Brooklyn Conchological Club mourns the loss of its esteemed member, Mr. David W. Ferguson, whose death occurred on February 7th, in his 75th year.

Mr. Ferguson began collecting shells in his eighth year, continued up to the time of his death, and became one of the most discriminating collectors in New York city. His knowledge of shells and ability to recall names was remarkable. In his early life he enjoyed the friendship of Bland and the elder Sowerby, and also of Dr. Jay, Stuart, Steward, Constable and all the collectors in New York of the last half of the 19th century. One of his most intimate friends in later years was the late Sloman Rous, who described several unusual species in his collection in THE NAUTILUS some time ago. Mr. G. B. Sowerby named a large white cone, *Conus fergusonii*, which Mr. Ferguson had sent him for identification. It is a fine and distinct species.

Mr. Ferguson was also a collector of Indian relics, and at the time of his death possessed a very large collection, all local to Long Island and nearby New Jersey. The region where these were obtained is now entirely built over, rendering the collection quite valuable at the present time.

DR. LORENZO G. YATES.

We regret to announce the death of Lorenzo Gordin Yates, of Santa Barbara, California. Born in England, January 8, 1837, he came to the United States in 1853. He taught in the public schools of Wisconsin, and studied medicine and dentistry. Later, Dr. Yates was on the staff of the Whitney Geological Survey of California. He was especially interested in conchology, mineralogy and botany, and published numerous papers on various zoological and botanical subjects. His principal papers relating to conchology are: "The Mollusca of Santa Barbara County, California," and "New Shells from the Santa Barbara Channel" (Bull. No. 2, Santa Barbara Soc. Nat. Hist., 1890). A new variety of *Helix carpenteri* from southern California (NAUTILUS, vol. iv, pp. 51, 54, 1890), and other notes. He was a fellow of the Linnæan Society of London, member of the Southern California Academy of Sciences, of the Geological Society of America, etc.

THE NAUTILUS.

VOL. XXII. APRIL, 1909. No. 12.

SOME NOTES ON CYPRÆA OF THE PACIFIC COAST.

BY WILLIAM HEALEY DALL.

In 1906–07 Senor Don Joaquin Gonzales Hidalgo published in the Memorias of the Real Academia de Ciencias, Madrid, a useful review of a monographic character, without figures, on the genus *Cypræa*, in which the author includes *Trivia*.

In looking over the species of the west coast of America, and referring to the above-mentioned paper, some questions were raised in my mind, leading to the following notes being recorded.

CYPRÆA EXANTHEMA L. and var. *cervinetta* Kiener. Both the typical form and the variety are found on both sides of the Isthmus of Panama, and no constant differences seem to exist between Atlantic and Pacific specimens, when a sufficiently large series is compared.

CYPRÆA ROBERTSI Hidalgo, 1906. This name is proposed for the well-known *C. punctulata* Gray, 1824; not of Gmelin 1791.

CYPRÆA ANNETTÆ Dall, n. nom. The name *C. sowerbyi* applied by Kiener in 1845, to a well-known West American species, is pre-occupied by Anton (1839) and Gray (1832). Kiener figured a worn specimen under the name of *C. ferruginosa*, a name which had also been used by Gmelin, 1791, for another species. Sowerby in the Conchological Illustrations (1837) referred the *C. sowerbyi* Kiener, to the *C. zonata* Lamarck, 1810; but the latter, though allied, is distinct and comes from the African coast. I may note that the *C. zonata* of Lamarck and Sowerby (after Chemnitz) had

already been named *C. zonaria* by Gmelin (1791). Our shell being nameless, I propose to call it *C. annettae.*

Cypræa caput-draconis Melvill, lives on the reefs at Easter Island and the locality "Hong Kong" is probably erroneous.

Cypræa mexicana Stearns, is omitted by Hidalgo.

Trivia californiana Gray, (1828) was inaccurately monographed by Reeve under the name of *T. californica;* which, having been inadvertently adopted in Carpenter's British Association reports, has been more or less commonly in use ever since.

Trivia costispunctata Gaskoin, 1870, reported from California, if correctly located, is probably only a mutation of *T. radians* Lamarck.

Trivia solandri Gray, and Cypræa spadicea Swainson, are reported from Vancouver Island by Hidalgo, but his authority was doubtless inaccurate, as neither species is known north of latitude 34° 30′ N., and even *T. californiana* is not yet reported north of Bodega Bay in latitude 38° 15′.

It is much to be desired that Californian naturalists will determine from the living animals whether the important differences stated to exist between *Trivia* and *Cypræa* are really as stated; since, if confirmed, the two genera can hardly be retained in the same family.

Erato is not included in Hidalgo's lists, though so closely related to *Trivia;* but I may add that since describing *E. albescens* in 1905 (Nautilus, xviii, p. 124) the details of the station have come to hand and it seems that the type specimen was dredged in 30–41 fathoms, sand, off the western Santa Barbara Islands, California.

BIFIDARIA BILAMELLATA STERKI AND CLAPP, N. SP.

BY V. STERKI.

Shell small, slender, cylindrical or slightly attenuated above, with an obtusish apex, perforate; whorls 5½, subequal, the apical ones comparatively large; colorless to pale or reddish-horn,[1] transparent; surface shining, with very fine, crowded, subregular striæ, on the apex microscopically rugulose; the last whorl ascending above, somewhat flattened at the base close to the aperture, keel-like further

[1] So far as can be seen from drift specimens.

back, somewhat flattened over the palate, with a slight to strong, not sharp, crest behind the margin, with two spiral impressions, one over the lower palatal and another near the base; aperture broadly elliptical to almost circular, peristome continuous or its ends closely approximate and connected by a raised callus, well everted, with a slight to rather strong lip thickening; lamellæ and plicæ, parietal and angular, well differentiated, connected, large, the angular connecting with the peristome; columellar complex, with a lower axial and an upper horizontal part, "basal" a short, transverse lamella, rather abrupt; lower palatal far remote from the margin, but visible in front view, rather long, lamellar, thin, upper palatal somewhat less deep-seated, close to the lower, somewhat oblique, shorter.

Alt. 2–2.4, average 2.2, diam. 0.9 mm.; aperture alt. 0.8 mm. Soft parts not seen.

Habitat: Foothills of Plumosa Range, about 8 miles east of Quartzsite, Yuma county, Arizona, in drift, in company with *B. hordeacella* Pils. and *B. tuba intuscostata* Clapp, discovered by Mr. Geo. H. Clapp, who states that the ratio of *bilamellata* and *hordeacella*, in the drift, was almost exactly 1:16. Large numbers of both species were found.

B. bilamellata is very distinct and different from all other *Bifidaria*. At first sight it might be taken for *hordeacella* for its size and shape, but a glance at the aperture is sufficient to recognize it, and also the posterior aspect is different. With respect to the peristome it approaches *B. ashmuni*; the parieto-angular lamella is of the same formation, and the palatal plicæ are similar but not so deep-seated; the "basal" is the same as in *B. dalliana*. The n. sp. is very interesting by the combination of features of apparently widely different species, and appears to be intermediate between two groups.

Explanation of Plate VIII.

Figs. 1, 2, 3. *Ashmunella kochii* Clapp. Type, No. 5765, coll. G. H. Clapp. Description on p. 77.

Fig. 4. *Bifidaria clappi* Sterki. Cotype, Knoxville, Tenn., No. 98279, A. N. S. P. Description on p. 108.

Figs. 5, 6. *Holospira bartschi* P. & C. Two cotypes, coll. A. N. S. P. and G. H. Clapp. Description on p. 114.

Fig. 7. *Bifidaria bilamellata* Sterki & Clapp. Front view of a cotype, No. 98268, A. N. S. P. Description on p. 126.

A SICILIAN COLLECTION.

BY MAXWELL SMITH.

During February and March, 1908, it was my good fortune to spend nearly fifty days on the island of Sicily, and I improved every opportunity which presented itself for mollusk hunting.

Soon after my arrival in Palermo I called upon the Marquis de Monterosato, and obtained from him much valuable information in regard to localities of Sicilian shells. I also viewed his unrivaled collection of Mediterranean shells, which is especially rich in Sicilian species.

After a few weeks in Palermo the following towns were visited in the order named—Girgenti, Siracuse, Taormina and Messina. Excursions were made from each, but at no time were shells taken more than twelve miles from the sea. From the above will be noticed that the northern, southern and eastern coasts were visited; but the interior and western mountains were untouched. The mountains in the west are exceedingly rich in peculiar species, including the most striking of the latticed *Clausilia*. Each mountain and plain on the island contains its own species or group of species.

Monte Pellegrino, above Palermo, supports a rich snail fauna. The mountain is largely composed of perforated limestone, in the recesses of which a large proportion of the land mollusca live. At the base of Pellegrino in the grass live *Helix hamilcaris* Kobelt. Under stones at the base of the cliffs *Ferussacia folliculus* Gron. Half way up the trail *Helix mazzulli* Jan. and *Helix sicana* Fer. first appear and extend nearly to the summit. Within a hundred feet of the summit *Clausilia grohmanniana* Phil., which was rare below, I found in comparative abundance. Near the signal station on the top *Helix macrostoma* Muhlf., one of the few Sicilian *Campylæas*, was discovered in crevices of the rock. Thus these species apparently prefer various elevations above the sea.

The most remunerative season for terrestrial mollusks in Sicily is during November and December, when the rainy season is usually at its height. At this time every wall is said to teem with shell life. But as I found at Girgenti even the dry season is not unpopular with land mollusca. On the first limb of a single almond tree I counted no less than two hundred and fifty specimens of *Helix*. The opercu-

lates though avoid the direct rays of the sun, living under boulders among the ruins. Siracusan land shells adapt themselves to the dry surroundings by living at the edge of the cliffs overhanging the sea.

Upon reaching Taormina aud the base of Etna, I was surprised to find the terrestrial mollusca reduced to a minority. The country here reaches the wildest form, deep crevices and small canyons intersect the mountains and the vegetation is luxurious in early spring. The scarcity of land mollusca is accounted for in the prevalence of lava instead of limestone formations, which are so characteristic of the rest of Sicily.

In the vicinity of Taormina a few small permanent streams were explored. In these, under stones, in swiftly running water, two species of *Ancylus* were collected. The fresh-water genera are not well represented on the island; but near Siracuse the Anapo, a small permanent river, supports a few peculiar species. Many of the Sicilian streams after heavy rains are raging torrents, which, under normal conditions, run underground or in the dry season cease. The absence of mud is also unfavorable for molluscan life. The Anapo rises in a pool of considerable depth, is uniform in width throughout, and after many windings empties into the Bay of Siracuse a few miles below its source. Its banks are lined with papyrus, on the roots of which *Amnicola*, *Bithinia* and other small genera live. Of the lakes in the south I visited none, partly because of their inaccessible location, but particularly on account of their unhealthiness The fauna of each is in the main peculiar, if we include extreme variations.

Romagnala, a small town near Palermo, was found an excellent station for marine species. Facing the open sea, the shore combines sand and algae-covered rocks. Over sixty species were secured in a few hours after a storm, the small species in fresh condition and the larger often containing the animal. Two days later the sand had covered the rocks, and it was with difficulty that ten species were secured. At Siracuse the bay yielded a few marine, and the rocky coast many genera not found at Palermo. *Cypræa lurida* L. and *Fusus syracusana* L. are seldom found near shore at Siracuse, but are frequently brought in by the fishermen. The violence of the surf, combined with the absence of drift on the beaches at Taormina, prevented frequent collecting. *Argonauta argo* L. and *Calliostoma conulus* L. occurred, which were not noticed in the north. Being in

close proximity with the Straits of Messina, a number of shells common at Messina were found at Taormina and Giardine.

At Messina there is an excellent market, in which at 5 a. m. each morning a surprising variety of fish are offered for sale. The early start required is amply repaid. The octopus, *Polypus vulgaris* L., is considered as an especial delicacy as food, both in Sicily and Italy.

In preparing the following list I have determined, for condensation, to omit separate annotations. For convenience I have arranged the *Helices* in alphabetical order, excepting *Leucochroa.*

For the identifications I am indebted to Marquis Monterosato, Mr. C. Payton Gwyer, Mr. E. A. Smith, of the British Museum, and for difficult fresh-water species to Mr. Bryant Walker. The Malacological Laboratory, Paris, has also given free use of its valuable library.

Argonauta argo L. Taormina.

Sepia officinalis L. Taormina, Palermo.

Poiretia algira Brug. Taormina, Girgenti.

Daudebardia brevipes Drap. Palermo.

Hyalinia suburbana Mont. Palermo.

Vitrea hydatina Rossm. Palermo.

Leucochroa candidissima Drap. Girgenti.

Helix acuta L., apicina Lam., conica Dr., conoidea Dr., muralis Müll., pisana Müll., squalida Monts. Siracuse.

Helix agrigantina Ad. Girgenti.

Helix andromica Monts. Taormina.

Helix gregaria Ziegl., moesta Parr. Palermo.

Helix aperta Born, hamilcaris Kob., macrostoma, mazzuli Jan., sicana Fér., variabilis Drap., vermiculata Müll. Monte Pellegrino.

Helix florida Ziegl., ingoi Cafici.

Ena pupa Brug. Girgenti, Palermo.

Pupa avenacea Brug., P. philippii, Cantr. Taormina.

Clausilia agrigantina Brug. Girgenti.

Clausilia affinis Ph., C. affinis Ph. var. taurominica Monts. Taormina.

Clausilia familiaris Monts., C. grohmanniana Phil. Monte Pelligrino.

Clausilia septemplicata Phil. Monreale.

Clausilia syracusana Phil. Siracuse.

Rumina decollata Linn. Well distributed.

Ferussacia folliculus Gron. Monte Pelligrino.

Ferussacia vescoi Bgt. Girgenti.
Succinea megalonyxia Bourg. Siracuse.
Succinea pfeifferi Ross. Palermo.
Alexia myosotis Drap. Siracuse.
Ancylus costulatus Kust. Sigone River near Taormina.
Ancylus striatus Q. & G. Above Letojanni near Taormina.
Lymnæa benoiti Bourg., L. palustris Müll. var. anapensis Monts. Anapo, Siracuse.
Lymnæa truncatula Müll. Palermo.
Planorbis cristatus L. Mondello near Palermo.
Planorbis subangulatus Phil. Siracuse.
Physa cyanea Pirajno. Anapo, Siracuse.
Gadinia garnoti Payr. Romagnola.
Actaeon tornatilis L. Bay of Siracuse.
Bulla striata Brug. Romagnola.
Haminea navicula globosa Jeff. Siracuse.
Philine aperta L. Siracuse.
Conus mediterranea Hw. Siracuse, Romagnola.
Mangilia attenuata Monts. Romagnola.
Marginella miliaria L. Romagnola.
Marginella philippii Monts. Siracuse.
Mitra ebenus Lamk. Romagnola, Siracuse.
Fusus pulchellus Phil. Romagnola, Siracuse.
Fusus syracusanus L. Siracuse.
Latirus lignarius L. Siracuse.
Tritonidea orbignyi Payr. Romagnola.
Euthria cornea L. Romagnola.
Nassa cornicula Oliv. Romagnola.
Nassa costulata Ren. var. flavida Monts. Romagnola.
Nassa cuvieri Payr. Romagnola.
Nassa reticulata Lamk. var. nitida Jeff. Siracuse.
Cyclonassa neritea L. Siracuse.
Columbella rustica L., C. scripta L. Romagnola.
Murex brandaris L. Palermo, Siracuse.
Murex edwardsi Payr., trunculus L. Romagnola, Siracuse.
Murex trunculus L. var. portulana Monts. Palermo.
Typhis tetrapterus Bronn. Romagnola.
Lachesis mamillata Risso. Romagnola.
Purpura haemastoma L. Romagnola.

Lotorium cutaceum L. Palermo.
Lotorium reticulatum Beek. Romagnola.
Cassis sulcosa Brug. Siracuse.
Morio echinophora L. Siracuse.
Cypræa lurida L. Siracuse.
Cypræa pyrum L. Palermo.
Cypræa spurea L. Near Taormina.
Trivia europea Monts., T. pulex Sol. Romagnola.
Chenopus pespelicani L. Messina, Siracuse.
Triforis perversus L. Romagnola.
Cerithium mediterraneum Desh. Romagnola.
Cerithium mediteranneum Desh. var., C. vulgatum Brug. Siracuse.
Bittium lacteum Phil. Romagnola.
Vermetus subcancellatus Bivon, V. subdentatus. Romagnola.
Turritella communis Risso. Siracuse.
Littorina obtusata L. var. neritoides L. Siracuse.
Rissoa cimex L. var. turrita Monts., R. monodonta Biv., R. subcostulata Schw. Romagnola.
Rissoa venusta Phil. Siracuse.
Rissoina bruguieri Payr. Romagnola.
Amnicola subcarinata Monts. Anapo, Siracuse.
Bithinia anapensis Benoit. Anapo, Siracuse.
Cyclostoma elegans Müll. var. villicum Monts. Monreale, Palermo, Siracuse, Taormina.
Cyclostoma siculum Sowb. = costulatum Ziegl. Girgenti.
Pomatias paladilhianus S. Simon. Monte Pelligrino.
Natica millepunctata Lamk. Romagnola, Tamorina.
Natica josephinæ Risso. Romagnola.
Scala communis Lamk. Romagnola, Siracuse.
Odostomia polita Bivon. Romagnola.
Eulima boscii Payr. Romagnola, Siracuse.
Neritina fluviatilis L. Anapo, Siracuse.
Neritina meridionalis Phil. Siracuse.
Neritina viridis L. Romagnola.
Phasianella pulla L. Romagnola.
Phasianella punctata Mich. Siracuse.
Leptothyra sanguinea L. Siracuse.
Astralium rugosum L. Taormina.
Trochus turbinatus Born. Romagnola.

Clanculus cruciatus L. var. rosea Monts. Siracuse.
Monodonta articulata Lamk. Siracuse.
Gibbula adansoni Payr. Siracuse.
Gibbula divaricata L. Romagnola.
Calliostoma conulus L. Messina, Taormina.
Calliostoma depictum Desh., C. laugieri Payr. Romagnola.
Haliotis lamellosa Lamk. Siracuse, Taormina.
Fissurella gibberula Lamk., F. græca Lamk., F. litoralis Monts., F. neglecta Resh., F. nubecula L. Romagnola.
Emarginula solidula Costa. Taormina.
Patella cærulea L. Messina, Romagnola.
Patella lusitanica Gm. Siracuse.
Ischnochiton polii Phil. Romagnola.
Dentalium novemcostatum Lamk. Romagnola.
Ostrea edulis L. Palermo, Taormina.
Anomia ephippium L. Taormina.
Spondylus gæderopus Lamk. Palermo.
Chlamys multistriatus Poli, C. pes-felis L. Taormina.
Chlamys sulcatus Born. Siracuse.
Chlamys varius L. Palermo.
Lima inflata Chem. Palermo.
Mytilus edulis L. Taormina.
Modiola barbata Lamk. Romagnola.
Arca barbata L., A. lactea L., A. noae L. Romagnola.
Unio requieni Lamk. Anapo, Siracuse.
Cardita calyculata Lamk. Taormina.
Cardium aculeatum L., C. paucicostatum Sowb. Siracuse.
Cardium tuberculatum L. var. Romagnola.
Chama gryphoides L. Romagnola.
Tapes beudanti Payr., T. geographica Gm. Romagnola.
Venus gallina L. Siracuse.
Venerupis iris L. Romagnola.
Donax trunculus L. Romagnola.
Solen vaginoides Lamk. Siracuse.
Mactra corallina L. Mondello.
Lucina lactea L. Messina.
Lucina desmoresti Par. Romagnola.
Tellina tenuis Da Costa. Siracuse.
Gastrana fragilis L. Romagnola.
Solemya mediterranea Lamk. Romagnola.

DREDGING OFF SAN DIEGO, CALIFORNIA.

BY C. W. GRIPP.

During the summer of 1908 the writer made a dredging trip outside of the entrance to San Diego harbor, dredging in from 15 to 60 fathoms of water. The following list includes all the species obtained and also a few deep-water species secured from fishermen. This locality is very rich in molluscan life, especially in smaller forms. Including the *Opisthobranchs* my list of San Diego shells contains over 600 species and varieties. I am greatly indebted to Dr. William H. Dall, Mr. Paul Bartsch and Prof. F. W. Kelsey for assistance in determining doubtful species.

Murex californicus Hds.
" carpenteri Dall.
" festivus Hinds.
" incisus Brod.
" santarosana Dall.[1]
Ocinebra foveolata Hds.
Ocinebra interfossa Cpr.
Ocinebra interfossa muricata Cpr.
Ocinebra interfossa atropurpurea Cpr.
Cuma muricata Hds.
Trophon belcheri Hds.
Trophon triangulatus Cpr.
Fusus kobelti Dall.
Gyrineum californicum Hds.
Chrysodomus aphelus Dall.
Chrysodomus kellettii Fbs.
Nassa cooperi Fbs.
" fossata Gld.
" insculpta Cpr.
" mendica Gld.
" perpinguis Hds.
Mitra lowei Dall.
Mitra maura Swains.
Erato columbella Mke.
Erato vittellina Hds.
Marginella jewettii Cpr.
" pyriformis Cpr.
" regularis Cpr.
" varia Sby.
Olivella biplicata Sby.
Olivella pedroana Conr.
Columbella carinata Hds.
" chrysalloidea Cpr.
" gouldii Cpr.
" guasapata Gld.
" hindsi Rve.
" tuberosa Cpr.
Engina carbonaria Rve.
Amphissa corrugata Rve.
Amphissa versicolor Rve.
Myurella simplex Cpr.
Cancellaria cooperi Gabb.
Cancellaria crawfordiana Dall.
Pleurotoma carpenteriana Gabb.
Pleurotoma perversa Gabb.
Pleurotoma montereyensis Stearns.
Pleurotoma santarosana Dall.
Pleurotoma stearnsiana Raymond.

[1] Six or seven specimens at 17 fathoms.

Pleurotoma tryoniana G abb.[2]
Turris (Surcula) halcyonis Dall.
Drillia empyrosia Dall.
" hemphilli Stearns.
" penicillata Cpr.
Bela grippi Dall n. sp.[3]
Mitromorpha aspera Cpr.
Cythara cranneri Arnold.
Mangelia angulata Cpr.
" fuscoligata Cpr.
" hamata Cpr.
" merita, Gld.
" sculpturata Dall.
" striosa C. B. Ad.
" variegata Cpr.
Conus californicus Hds.
Trivia solandri Gray.
Trivia californica Gray.
Ovula spelta Lam.[4]
Polinices lewisii Gld.
Polinices recluziana Desh.
Lamellaria stearnsiana Dall.
Macromphalina californica Dall.
Crepidula aculeata Gmel.
" adunca Sby.
" dorsata Brod.
Crepidula navicelloides Nutt. In aperture of Polynices.
Crepidula onyx Sby. On Pomaulax undosus.
Capulus californicus Dall. On Pecten diegensis.
Amalthea tumens Cpr.
Scala bellastriata Cpr.
" catalinæ Dall.
" near hemphilli Dall.
" hindsi Cpr.
" lowei Dall.
" retiporosa Cpr.
" sarvinae Dall.
Turritella cooperi Cpr.
Mesalia californica Dall.
Mesalia tennisculpta Cpr.
Vermicularia fewkesi Yates.
Cæcum californicum Dall.
" crebricinctum Cpr.
" magnum Stearns.
" orcutti Dall.
" regulare Cpr.
Eulima bistorta Van.
" micans Cpr.
" rutila Cpr.
" solitaria C. B. Ad.
" thersites Cpr.
Liostraca varians Sby.[5]
Turbonilla castanea Cpr.
" eschscholtzi D. & B.
" kelseyi D. & B.
" laminata Cpr.
" oldroydi D. & B.
" painei D. & B.
" tenuicula Gld.
" torquata Gld.
" tridentata Cpr.
Odostomia americana D. & B.
" amianta D. & B.

[2] One young shell in dredge. Specimens 90 mm. in length from fishermen.

[3] Ten specimens at 17 fathoms.

[4] Three large specimens at 18 fathoms, new to the Pacific Coast.

[5] A beautiful little brown shell polished like a *Eulima*, which it resembles. Eight specimens dredged at 18 fathoms, new to the California coast.

Odostomia astricta D. & B.
" avellana Cpr.
" delmontensis Bartsch.
" gouldi Cpr.
" helga D. & B.
" nuciformis Cpr.
" straminea Cpr.
Odostomia straminea grippi D. & B. on Haliotis assimilis Dall.
Odostomia straminea insculpta Cpr.
Odostomia valdezi D. & B.
Odostomia virginalis D. &. B.
Pyramidella conica Cpr.
Lacuna unifasciata Cpr.
Fossarus fenestratus Cpr.
Fossarus obtusus Cpr.
Alabina californica Dall.
Bittium asperum Cpr.
" armillatum Cpr.
" esuriens Cpr.
" interfossa Cpr.
" quadrifilatum Cpr.
Seila assimilis C. B. Ad.
Cerithiopsis metaxæ Chiaje.
Cerithiopsis tuberculata Mont.
Triforis adversa Mont.
Rissoina bakeri D. & B.
Rissoina kelseyi Dall.
Barleeia subtennis Cpr.
Rissoa grippiana Dall.
Rissoa reticulata Cpr.
Liotia acuticostata Cpr.
Liotia fenestrata Cpr.
Phasianella compta Gld.
Phasianella pulloides Cpr.
Eulithidium cyclostoma Cpr.
Eulithidium substriatum Cpr.
Pachypoma inæquale Mart.
Pomaulax undosus Wood.
Chlorostoma aureotinctum Fbs.
Chlorostoma pulligo Mart.
Gibbula parcipicta Cpr.
Gibbula optabilis Cpr.
Leptothyra carpenteri Pils.
Leptothyra bacula Cpr.
Turcica caffea Gabb.
Halistyluspupoides Dall.
Halistylus subpupoides Tryon.
Vitrinella complanata Cpr.
Vitrinella subplana Cpr.
Norrisia norrisii Sby.
Calliostoma gemmulatum Cpr.
Calliostoma gloriosum Dall.
Calliostoma canaliculatum parvum Williamson.
Calliostoma supragranosum Cpr.
Calliostoma tricolor Gabb.
Calliostoma turbinum Dall.
Haliotis assimilis Dall.[6]
Haliotis rufescens Swains.
Fissuridea aspera Esch.
Puncturella cooperi Cpr.
Puncturella cucullata Gld.
Emarginula bella Gabb.
Lepidopleurus (Oldroydia) percrassus Dall.
Chætopleura gemmea Cpr.
Callistochiton crassicostatus Pils.
Ischnochiton clathratus Rve.
Ischnochiton cooperi acutior Cpr.

[6] Four live specimens found on rocks hauled up in the dredge. Of *H. rufescens* I got one specimen attached to lobster trap.

Acteon punctocœlatus Cpr.
Tornatina cerealis Gld.
" culcitella Gld.
" harpa Dall.
" inculta Gld.
" planata Cpr.
Volvula cylindrica Cpr.
Cylichna attonsa Cpr.
Bulla quoyi Auct.
Cadulus quadrifissatus Cpr.
Cadulus nitentior Cpr.
Dentalium neohexagonum Pils.
Dentalium vallicolens Raymond.
Siliqua lucida Conr.
Corbula luteola Cpr.
Corbula luteola rosea Williamson
Periploma discus Stearns
Lyonsia californica Conr.
" inflata Conr.
" nitida Gld.
Mactra dolabriformis Conr.
Spisula hemphillii Dall.
Semele pulchra Sby.
Semele rubropicta Dall.
Cooperella subdiaphana Cpr.
Rochefortia tumida Cpr.
Tellina bodegensis Hds.
" buttoni Dall.
" carpenteri Dall.
" idæ Dall.
" modesta Cpr.
" santarosana Dall.
Venerupis lamellifera Conr.
Psephidea ovalis Dall.
Psephidea salmonea Cpr.
Paphia tenuissima Cpr.
Cardium substriatum Conr.
Cardium quadrigenarium Conr.
Protocardia centifilosa Cpr.
Phacoides annulata Rve.
Phacoides approximatus Dall.
Serridens oblonga Cpr.
Crassinella varians C. B. Ad.
Cardita subquadrata Cpr.
Milneria minima Dall.
Venericardia ventricosa Gld.
Nucula castrensis Hds.
Leda cuneata Hanl.
" hamata Cpr
" taphria Dall.
Arca solida Sby.
Glycymeris intermedia Brod.
Modiolus rectus Conr.
Philobrya setosa Cpr.
Lima dehiscens Conr.
Pecten diegensis Dall.[1]
Pecten giganteus Gray.
Monia macroschisma Desh.
Terebratulina caput-serpentis L.
Terebratulina caput-serpentis unguicula. Cpr. 20 faths.
Terebratalia transversa Sby.
Platidea anomioides Scacchi.
Glottidea albida Hinds.

[1] Several young specimens dredged. Have secured from fishermen several large and beautiful specimens.

NEW MOLLUSKS COLLECTED BY MR. A. A. HINKLEY IN SAN LUIS POTOSI, MEXICO.

BY H. A. PILSBRY.

COELOCENTRUM HINKLEYI, n. sp.

The shell is shortly rimate, imperforate, the lower third or half cylindric, the rest slowly tapering to the truncate summit; rather solid; brown. Sculpture of backwardly arched narrow ribs, much narrower than their intervals except on the last whorl, where they are more slender and closely crowded. There are about 65 ribs on the penultimate whorl. On some of the later whorls the ribs are sometimes weak and rather irregular. The apical breach is closed by a steep, slightly convex plug densely covered with strongly projecting granules. Whorls remaining slightly convex, at least the upper ones have a delicate keel close under the suture; last whorl rounded basally, having a very weak, inconspicuous, spiral basal cord. Last half whorl straightened, produced forward beyond the preceding whorl. The aperture is oblique, rounded ovate; peristome obtuse, narrowly recurved. The internal column is moderately large, its diameter contained 3.7 to 4 times in that of the shell. Within each whorl it is rather strongly obliquely swollen, and typically bears a few oblong granules in place of the obliquely vertical laminæ of typical species of Cœlocentrum.

Length 35, diam. 8.1 mm.; whorls remaining 12.

Length 37, diam. 8 mm.; whorls remaining 13.

Length 35, diam. 8 mm.; whorls remaining 11.

Length 39, diam. 8 mm.; whorls remaining 14.

San Luis Potosi: highest Mt. on south side of river at Mecos Falls, and bluff 3 miles north of San Dieguito.

This is a variable species, represented by many specimens from two localities. In some examples the rather large internal column bears distinct elongated granules; others have low nodes, while still others have whitish lines which project only slightly from the surface of the column.

Five specimens of a series from San Dieguito measure:

Length 46, diam. 8.5 mm.; whorls remaining 18½.

Length 41, diam. 9 mm.; whorls remaining 12½.

Length 38.5, diam. 7.7 mm.; whorls remaining 15½.

Length 36.5, diam. 8.7 mm.; whorls remaining 12½.

Length 32, diam. 8.2 mm.; whorls remaining 10½.

At the Mecos Falls locality there is a small, slender form occurring with the types, having only very slight, hardly noticeable nodes on the spiral swelling of the axis. The aperture is carried forward further than in the typical examples. Two of these measure:

Length 35, diam. 7.1 mm.; whorls remaining 12½.

Length 32.2, diam 7.1 mm.; whorls remaining 12.

CÆLOCENTRUM ISCHNOSTELE, n. sp.

The shell is shortly rimate, imperforate, the lower half cylindric, upper half slowly tapering to the truncate summit; thin; pale brown. The surface has a silky luster, and is densely sculptured with thread-like ribs, which arch backward, and are about as wide as their intervals except on the last whorl, where they are finer and more closely crowded. On the penultimate whorl there are about 90 (88 to 92) ribs. The breach at the summit is closed by a very convex, granulose plug. Remaining whorls 11½ to 14½, slightly convex, having a minute carina below the suture and very close to it. The last whorl is convex and has a scarcely noticeable basal cord; its last half is straightened, and projects shortly (about 1½ mm.) forward. The aperture is oblique, rounded-ovate, the upper margin straightened. Peristome obtuse, narrowly recurved throughout. The internal axis is very slender throughout, weakly sinuous within each whorl, smooth, its diameter contained 8⅓ times in that of the shell. It opens by a minute perforation at the summit.

Length 32, diam. 6.8 mm.; 13½ whorls remaining.

Length 32.8, diam. 6.2 mm.; 14½ whorls remaining.

Length 30, diam. 6.5 mm.; 11½ whorls remaining.

Length 27.8, diam. 6.4 mm.; 12 whorls remaining.

Length 27.8, diam. 6.2 mm.; 11½ whorls remaining.

This form occurred in the same locality with *Streptostyla bartschi*, near Mecos Falls. It stands close to the preceding species, but differs by its much more numerous ribs, the much more slender internal axis, and the last whorl does not run forward so far. It is remarkable for the small size of the internal column.

In a young shell 11 mm. long with 14½ whorls the first 1½ whorls forming the hemispherical summit are perfectly smooth and measure 1½ mm. in diameter. Then very fine very short riblets appear

below the suture, and to the 6th whorl the caliber of the shell decreases slightly. Beyond this the caliber increases slowly, and the riblets gradually become longer, though a smooth band persists along the middle of each whorl as far as about the 16th whorl, after which the ribs are continuous.

The above forms, with others, will be figured in a future report on the shells collected by Mr. Hinkley.

A NEW SPECIES OF LYMNÆA.

BY FRANK C. BAKER.

LYMNÆA HENDERSONI n. sp.

Shell globose, very thin and fragile; periostracum light yellowish or brownish-horn; surface dull; sculpture of fine growth-lines, without spiral lines; whorls $3\frac{1}{2}$, very rapidly increasing in diameter, the body whorl seven-eighths the length of the entire shell, very globose; spire very short, depressed, dome-like, the first two whorls flat and coiled in the same plane so that a profile view shows only two full whorls. Nuclear whorls flat, partly concealed by the volutions of the spire; sutures impressed; aperture round or roundly elliptical; outer lip thin; inner lip broad, triangular, reflected over the columellar region, but leaving a deep, well-marked chink; the inner edge of the inner lip is usually bent downward near the body whorl, partly concealing the umbilical chink; parietal callus thin; axis smooth, hourglass-shaped.

Length 7.00, breadth 5.50; aperture length 4.75, breadth 3.00 mm.

Length 6.25, breadth 5.00; aperture length 4.00, breadth 2.50 mm.

Length 6.75, breadth 5.00; aperture length 4.80, breadth 3.00 mm.

Length 5.50, breadth 4.10; aperture length 4.00, breadth 2.50 mm.

Types: Chicago Academy of Sciences, six specimens, No. 24534; Co-types: University of Colorado, Boulder, Colo.

West of Fort Collins, Laramie county, Colo.

Ecology: Inhabits lagoons and intermittent bodies of waters. Judge Henderson writes of the habitat as follows: "I am informed that there had been no water in the lagoon for many months, probably since last summer or autumn. The ground was cracked to a depth of several inches and the mollusks were found down in the cracks in the mud. Therefore, it seems to be another species capable of æstivating."

Remarks: This species was at first thought to be *Lymnæa sonomaensis* Hemphill, but a comparison with that species shows that the present species differs not only from *sonomaensis*, but from all related species in the form of the spire and aperture. The first two whorls of the spire are coiled in the same plane, producing an abruptly truncated appearance. The inner lip is triangular and not evenly rounded as in *techella* and its varieties, but similar to that of *bulimoides*, from which it differs in its truncated spire. The only form likely to be confounded with *hendersoni* is *sonomaensis*, which differs in the form of the spire and inner lip.

I take great pleasure in dedicating this interesting species to Judge Junius Henderson, of the University of Colorado.

SPHÆRIUM PILSBRYANUM, N. SP.

BY V. STERKI.

Mussel large, high, inequipartite, oblique, well inflated; beaks rather large, rounded, prominent, inclined towards the anterior; upper margin strongly and regularly curved in the adult, less so or nearly straight in young specimens, ventral margin rather well and regularly curved; anterior part of the mussel much smaller than the posterior, its outlines rounded or slightly truncate, posterior rounded or truncate obliquely, the end rather drawn downward, rounded or subangular; surface with rather coarse to medium, sharp, concentric striæ, regular over the beaks, less so over the balance of the valves, and with about six to eight impressed lines of growth, deepest posteriorly, with the interstices somewhat bulging; color chalky-whitish to light or deep gray, in some specimens with alternate zones of light and dark; shell thick; muscle insertions slightly marked, large, not impressed; hinge strong, plate moderately broad, rather long; cardinal teeth small, rather typically to irregularly formed, the posterior of the left valve often wanting or rudimentary; laterals rather large, those of the right valve projecting inward, those of the left only slightly so; anterior short, the left raised cusp-like, the posterior all rather long, not raised to cusps.

Long. 18, alt. 16, diam. 11–12 mm.; average; the largest, 21 mm. long.

Fossil, in pleistocene or possibly later deposits on the shore of Bear Lake, Utah, collected by the Hayden Survey, in company with *Planorbis trivolvis* Say (var.), *Carinifex newberryi* Lea, *Lymnæa utahensis* Call, and *Fluminicola fusca* Hald. There are about 200 valves in the lot, including one right and one left of rather small juv. The specimens are in the collection of the A. N. S. P., No. 62825.

This *Sphærium* cannot be ranged under any of the described recent species. Of about the same length with *S. sulcatum* Lam., the mussel is of very different shape and appearance: much higher, much more inequipartite, the beaks are much narrower and more prominent; the shell and hinge are stronger. It resembles more some forms of *S. aureum* Pr. (resp. forms ranged under that species), but is larger, more inequipartite and oblique.

It is worthy of notice that in numerous specimens the hinges are partially or wholly reversed, just as in most of our recent species of this group, and the posterior cardinal tooth of the left valve is wanting or rudimentary, in some specimens well enough preserved to show such details. So far as can be seen from a few fresher, not chalky, specimens, the color was whitish or reddish to grayish, and the surface shining.

The species is named in honor of Dr. H. A. Pilsbry, to whom I am indebted for the opportunity of examining this fine lot of fossils.

NOTES.

Note on *Pholadomya pacifica* Dall. This species was first diagnosed in the Smithsonian Miscellaneous Collections, Quarterly Issue, July, 1907, no. 1727, p. 172. The fuller description and account which appeared in the March number of the NAUTILUS (1909) had been prepared and sent to the editor in May, 1907, as the publication of my paper in the Quarterly was then indefinitely delayed. As I saw no proofs of the NAUTILUS issue, this fact is not stated in it, but I now make the correction. Since both notices were prepared, another complete specimen in excellent condition was discovered in the Albatross collection, but unfortunately, though fresh, it did not contain the soft parts. The presence of a resilium was confirmed. The localities of the two dredgings have been received.

They are station 4904, near Nagasaki, in 107 fathoms, sand and shell, bottom temperature about 53° F., and station 4807, off Hakodate, in 44 fathoms, gravel, temperature about 45° F., judging from that at nearby stations. The fresh specimen is of a creamy white, faintly pearly internally. I may add that the two species of alleged *Pholadomya*, referred to in the text of the NAUTILUS article, are now considered to belong to the genus *Panocca* (Dall, 1905) with several others dredged in the deep waters of the Atlantic.—WM. H. DALL.

MR. L. V. DALTON, in the Quarterly Journal of the Geological Society (London), lxiv, Nov. 1908, p. 631, records *Busycon canaliculatum* (L.) from the Miocene of Burma. His figure will scarcely convince skeptical American conchologists. From what we know of the geological history of the shell in question and its allies, and taking into consideration the fact that the veliger stage in *Busycon* (*Fulgur*) is passed through inside the egg-capsule, and hence it has no free swimming period, a record of its distribution half round the earth needs better evidence than Mr. Dalton is satisfied with.

SHELLS OF AROOSTOOK COUNTY, MAINE.—Dr. V. Sterki has this winter examined a part of my collection of small land shells, and the result of his labor has been the identification of the following additions to those already reported from Aroostook county, Maine:

Strobilops affinis Pils.
Vertigo ovata Say.
Vertigo nylanderi Sterki.
Euconulus chersinus Say.

All the above were collected in the town of Woodland.—OLOF O. NYLANDER.

The oyster is cool and clear and calm,
Admired by the many and not the few;
Yet, sorry to say, possesses a way
Of getting himself in a stew.

ERRATA.—Numbers 8, 9 and 10 of Vol. xxi were marked by error "Vol. xxii" on the date lines, pages, 85, 97, 109, but not on the cover of those numbers. This note is published to obviate errors in binding Vol. xxi.

The following corrections should be made in Vol. xxii:

P. 47, end of line 4, delete 7.

P. 78, 7th line from foot, for plate vi, read vii, viii.

P. 82, top line, for NAUTILUS xxii, read xxi.

P. 101, under *Quadrula coccinea*, in place of "*Found gravid on June 18*," *etc.*, it should read: *Found gravid by the writer on June 18, '08, in Neshannock Creek, Lawrence Co., and received gravid from the Allegheny River, McKean Co. (collected by Mr. Dennis Dally on June 22, '08).*

THE marriage is announced of Miss Elizabeth J. Letson, Director of the Buffalo Academy of Natural Science, to Mr. William Alanson Bryan, of the Pacific Institution of Science, on March 16th. Mr. and Mrs. Bryan will be at home in Honolulu after May 4th.

DR. V. STERKI is spending the month in studying *Sphærium* and *Pisidium* in the museums of Boston, Cambridge, Philadelphia and Washington.

MR. A. A. HINKLEY, who returned from a collecting trip in Mexico last month, reports good collecting, especially in freshwater mollusks.

AN interesting biographical memoir of William More Gabb, the palaeontologist and conchologist, read by Dr. W. H. Dall at the November meeting of the National Academy of Sciences, has just been published. A bibliography of Gabb's scientific works is appended.