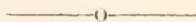


THE
NAUTILUS

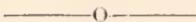
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MAY, 1898.

No. 1.

NOTES ON SOME LAND AND FRESHWATER SHELLS FROM SUMATRA, WITH DESCRIPTIONS OF NEW SPECIES.

BY T. H. ALDRICH.

In the fall of 1890, the writer received from Marang, Sumatra, a small collection of shells made by Wm. Doherty, Esq., at that place. A partial list of same is here given, with descriptions of some new forms:—

1. *Nanina gemina* Busch.
2. *Ariophanta weyersi* Smith.
3. *Ariophanta dohertyi* Aldrich.
4. *Hemiplecta marangensis* n. sp.
5. *Sitala carinifera* Stol., var. *marangensis* n. var.
6. *Trochomorpha dohertyi* n. sp.
7. *Amphidromus palacens* Busch.
8. *Helicina parva*.
9. *Clausilia aenigmatica* Sykes.
10. *Cyclophorus eximius* Mous.
11. *Cyclophorus perdix* Brod.
12. *Crossopoma bathyraphe* Smith.
13. *Lagocheilus marangensis* n. sp.
14. *Omphalotropis (Selenomphala) dohertyi* n. sp.
15. *Diplommatina livanensis* n. sp.
16. *Leptopoma fultoni* n. sp.
17. *Cyclotus* sp.
18. *Melania lirata* Bens.
19. *Melania artecava* Mouss.

20. *Melania javanica* v. d. B.
21. *Melania rustica* Mouss. (?)
22. *Melania perplicata* Brot.
23. *Melania sobria* Lea.
24. *Melania rudis* Lea.
25. *Melania scabra* Mull.
26. *Melania tuberculata* Mull.
27. *Melania* (*Tiara*) *setosa* Sw.
28. *Melania mitra* Meuschen.
29. *Melania winteri* V. de B.
30. *Melania scabra* Müll.
31. *Melania herklotzi* Petit.
32. *Faunus ater* L.
33. *Ampullaria ampullacea* L.
34. *Pythia scarabæus* L.
35. *Melampus fasciatus* Dh.
36. *Cerithidea cornea* A. Ad.
37. *Navicella tessellata* Lam.
38. *Batissa sphaericula* Prime.

DESCRIPTIONS OF NEW SPECIES.

Nanina (*Hemiplecta*) *marangensis* n. sp. Pl. I, fig. 9, 10.

Shell thin, narrowly umbilicated, obliquely striated above, smooth below; spire obtuse; color light brown; whorls seven, body whorl carinated, outer lip sinuous, expanded.

Diam. of largest specimen 22 mm.

This shell resembles *H. accidota* Bttg. from Java, but is more acutely keeled and has no band, the substance of the shell is thinner, and when adult is larger; it also resembles *N. naninoides* Bens.

Sitala carinifera Stol. var. *marangensis* n. var. Pl. I, fig. 6.

The specimens before me differ from the description by Stolicka. It is characterized by having six whorls, base rounded, body whorl bilirate, the others with but a single raised line, moderately umbilicated. The largest specimen shows six whorls, the others but five, base is more rounded than typical forms. It also is close to *S. bilirata* W. T. Blanf., except having one whorl less, and not being so openly umbilicated.

Alt. 4 mm.

Trochomorpha doherityi n. sp. Pl. I, figs. 7, 8.

Shell thin, lenticular, whorls six to seven, body whorl acutely keeled, whorls bordered by a yellow band covering the suture, peri-

phery of body whorl also with a yellow color band, both above and on base, suture moderately impressed. Aperture oblique, acute oval, umbilicus wide and deep, base somewhat rounded.

Diameter 17 mm.

This handsome shell is similar to the well known *T. bicolor* Mts., but is larger, has a different and wider umbilicus, is flatter and differs in its coloration; the base is a uniform brown, except at periphery of body whorl.

Type in my collection, examples also in Academy of Natural Sciences of Philadelphia.

Lagocheilus marangensis n. sp. Pl. I, fig. 5.

Shell turbinate, umbilicate, whorls six, convex, epidermal lines of growth prominent at sutures, shell with a dotted band of red just below suture, and also another one on base below periphery of body whorl; aperture circular, with a very thin callus on the body whorl; lip expanded, partially reflected over the umbilicus.

Diam., maj. 8 mm., alt. 9 mm.

This species is very close to *L. ciliocinctus* Von Martens, but authentic specimens of that species do not show the dotted red band on the base. The body wall has a connecting callus, the lip is also somewhat exerted, while our species differs in both these particulars.

Omphalotropis (Selenomphala) dohertyi n. sp. Pl. I, figs. 1, 2.

Shell umbilicated; ovate conical, very finely striate; whorls 6 to 7, convex, suture deeply impressed, aperture ovate, peristome simple, color yellowish brown.

Diam. 3 mm., alt. 4½ mm.

This species is close to *O. colombiana* Heude, but has one more whorl, and a more expanded outer lip. Dr. O. Von Mollendorf pronounces it new and of a group not heretofore known from Sumatra.

Leptopoma fultoni n. sp. Pl. I, figs. 11, 12.

Shell medium, conical, narrowly umbilicated, whorls six, the first three smooth, the others with numerous revolving lines, aperture oblique, rounded, exerted lip expanded and tinged with red within; a few specimens show a dark green band extending from the back of the inner red coloring half around the body whorl, gradually narrowing to a point. Those with this green band are invariably smaller than those without it.

Height 12 mm., max. width 13 mm.



This species resembles *L. matildae* Dohrn, and may eventually be classed as a variety of that species. The peculiar color markings constituting the chief differences. The red color within is always present. Over 60 specimens received.

Diplommatina liwaensis n. sp. Pl. I, figs. 3, 4.

Shell dextral, fusiform, thin, sculpture fine and close, covering all the whorls, color pale brown, whorls rounded, apex not acuminate, suture impressed, whorls seven, antipenult. largest, constriction in front. Aperture ovate, outer lip reflected, columellar tooth small.

Maj. diam. $1\frac{3}{4}$ mm., alt. 4 mm.

Locality: Liwa, at 4,000 ft. altitude.

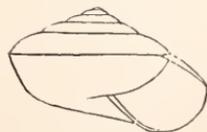
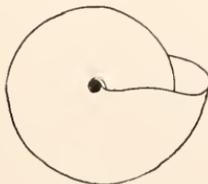
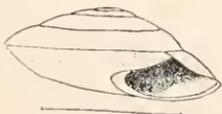
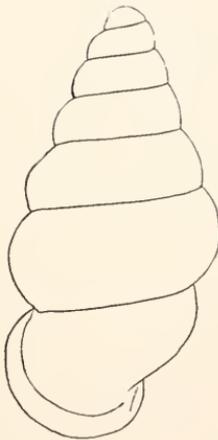
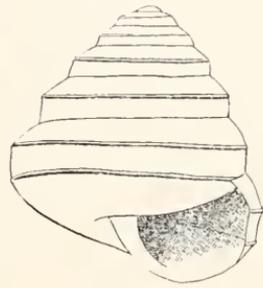
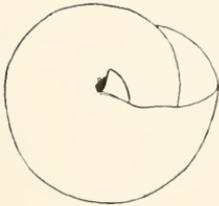
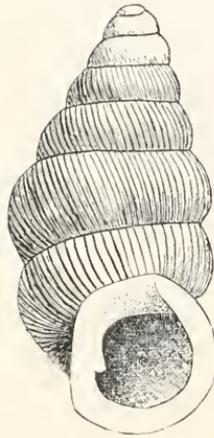
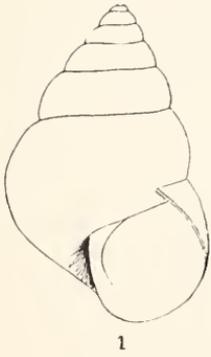
Close to *D. gracilis* Beddome, but has much finer sculpture, is larger and has one more whorl.

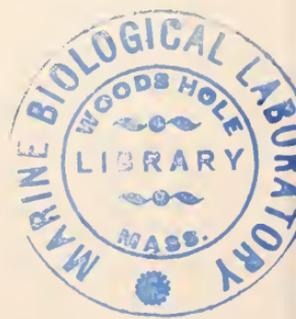
ON A NEW SPECIES OF FUSUS FROM CALIFORNIA.

BY WM. H. DALL.

Fusus Roperi n. sp.

Shell small, rather short and wide, with a short, subacute spire and about six whorls; color ferruginous brown, faintly spirally zoned and lighter on the siphonal fasciole, pillar and throat whitish, outer lip between the white of the throat and the margin showing narrow spiral brown lines on a yellowish ground, whorls with a tendency to a white, narrow peripheral line most evident on the summits of the ribs; whorls excavated behind, somewhat rounded before the periphery, the margin at the suture strongly appressed with the whorl in front of it somewhat constricted; suture distinct, hardly undulated, the spiral thread in front of it slightly minutely imbricated; axially directed sculpture of finely wrinkled silky incremental lines and (on the last whorl) nine rounded ribs with rather wider interspaces, the ribs are obsolete near the suture, on the early whorls, and on the base; spiral sculpture of numerous flat strap-like threads with the interspaces much narrower and sharply reticulated by the incremental sculpture which rises in the interspaces nearly to the level of the tops of the threads; the nucleus (lost) is small, the first two or three whorls are more coarsely reticulate than the later ones; aperture elongated and insensibly passing into a rather wide and short canal; siphonal fasciole rather marked,





though the siphon is not recurved; pillar smooth, nearly straight with little callus; the body with no subsutural callus; the outer lip slightly flaring, hardly thickened; lon. of shell 26, of aperture 15.5, lat. 13.0 mm.

San Pedro, Cal., in rather deep water, E. W. Roper; in whose honor the shell is named.

This is a singular species, recalling *Ocinebra* or *Muricidea* by its surface sculpture and the constricted and appressed sutural region of the whorls. I have not been able to find any species with similar characters in the monographs or in the National Collection. It is probable that it should be separated sectionally from the group typified by *F. colus*, and it cannot be associated with *Sipho* or *Chry-sodomus*, so it may be regarded as typifying a new section, *Roperia*.

NEW UNIONIDÆ.

BY BERLIN H. WRIGHT.

U. Strodeanus sp. nov.

Shell smooth, subtriangular, not inflated, inequilateral, rounded before, obtusely angular behind, slightly arched above and gracefully rounded beneath. Substance of the shell solid and nearly uniform throughout. Beaks gracefully pointed, not prominent, scarcely extending above the short red ligament and surrounded by a few coarse, low undulations which do not extend back as much as usual. Umbos flattened. Epidermis olive-black, rayless. Not polished and with distant, faint marks of growth. Umbonial slope obtusely angular or rounded; posterior slope slightly compressed and with two or three slightly impressed lines extending from beaks to margin. Cardinal teeth strong, deeply cleft and inclined to be direct. Lateral teeth prominent, curved and inclined to be double in both valves. Shell cavity moderate and quite uniform. Beak cavity slight and abruptly rounded. Cicatrices small, barely distinct and well impressed. Nacre white and only slightly iridescent towards the margins. Width 2 in., length $1\frac{1}{4}$ in., diam. $\frac{1}{2}$ in.

Habitat: Escambia River, West Florida.

Type in National Museum.

Remarks: Affinity, *U. reclusus* nobis and *U. simulans* Lea. From the former it differs in having a darker and rougher epidermis, not so pointed behind, flatter sides, shorter and teeth heavier. From

the latter it differs in its shorter dorsal line, more pointed posterior, red ligament and greater length. It has the outline of *U. Genthii* Lea but it is darker, rayless and the teeth are heavier, the single lateral being uniformly tapered off to its posterior end instead of ending abruptly. Twelve specimens were taken along with *U. succisus (cacao)* Lea, *U. incrassatus* Lea, var. *boykinianus* Lea and *neissleri* Lea, var.

We name it in honor of our esteemed friend, Dr. W. S. Strode, of Lewiston, Ill.

U. cylindricus Say, var. *strigillatus* nov.

The chief distinguishing characters of this variety are: Much more compressed, sculptured throughout, and lateral teeth widely diverging and curved downwards. The umbonal ridge is very low and broad, and fluted with elongated, divergent, flattened elevations. Nacre usually pink.

Habitat: Clinch River, Lee Co., Va. Type in National Museum.

Remarks: A large number of these shells was received several years ago from Mr. J. F. Sword, of Jonesville, Va., and sent out under Mr. Say's name. Recently several young ones were found which convinced me of their varietal value, indicating a connecting link with *U. tuberculatus* Barnes.

ISAAC LEA DEPARTMENT.

[Conducted in the interest of the Isaac Lea Conchological Chapter of the Agassiz Association by its General Secretary, Dr. W. S. Strode].

INTERGLACIAL SHELLS AT TORONTO, CANADA.

[Extract from the report of James H. Lemon. From the Transactions of the Isaac Lea Conchological Chapter for 1897.]

The most interesting deposit from a conchological standpoint is found at Taylor's Quarry on the banks of the Don River, a mile northeast of the city of Toronto. At this point a good section of the Drift has been exposed. The underlying rocks are Hudson River shales belonging to the Silurian period, rising about 30 feet above the bed of the river. They are immediately covered by a layer of till three feet thick, and which fills in all irregularities of the underlying shale. The fossils are found in a few inches of clay

just above this till. Dr. Coleman, of the School of Practical Science, collected and sent a number of the species to Dr. Dall and C. T. Simpson, who identified them as follows: *U. phascolus*, *U. clavus* *U. pustulosus*, *U. pustulosus* var. *schoolcrafti*, *U. occidentis* (?), *U. luteolus*, *U. undulatus*, *U. rectus*, *U. trigonus* and *U. solidus*.

Besides these a number of other shells have been found, viz.: *Pleurocera subulare*, *P. elevatum*, *Goniobasis*, *Valvata sincera*, *V. bicarinata*, *Campeloma decisum*, *Annicola*, *Physa*, *Planorbis*, *Pisidium*, *Sphaerium*, etc.

A peculiar fact is the comparative rarity of *Campeloma*, *Planorbis* and *Physa*, shells which are very abundant to-day in the waters of the Don. Of the 10 species of *Unio*s identified by Dr. Dall and Mr. Simpson only *U. luteolus* and *U. rectus* are found here to-day. *Unio phaseolus* and *U. undulatus* have been found in small numbers in Lake Erie, but not in Lake Ontario.

Three of the species, *Unio pustulosus*, *U. solidus* and *U. clavus* are not found to-day in the St. Lawrence drainage system at all, but are confined to the Mississippi area where they are extremely common.

The presence of the Mississippi forms seems to indicate that the climate existing during the first interglacial period was somewhat more southern than it is to-day, and this conclusion is also borne out by the nature of the plant remains.

Along the shores of Lake Ontario to the east of Toronto is a long line of cliffs known as Scarboro' Heights, composed entirely of Drift deposits. Only a very few shells have as yet been found here, but the beds are very rich in insect and plant remains.

The deposits along the Don River have yielded by far the most interesting results in the shell line.

QUATERNARY FOSSIL SHELLS, LONG BEACH, CALIFORNIA.

[Excerpts from report of Julia E. Campbell, 1896].

One day in April, 1896, while out for wild flowers, we drove to Signal Hill, which lies back from the ocean about 2½ miles. Down one side of the hill runs a narrow ravine or little cañon as it is often called.

While climbing up in the center of this ravine we found the banks on either side literally filled with fossil shells. We secured the following species, viz.: *Nassa mendica* Gld., *N. perpinguis* Hds., *Den-*

talium pretiosum Nutt., *Lutricola alta* Conr. and *Callista (Amiantis) callosa* Conr.

UNIO COLLECTING, BY DR. STRODE.

On October 1st I went to London Mills on Spoon River, about 40 miles up stream in the hope of finding *U. capax* and *U. aesopus*, but was disappointed. I was surprised to find *U. undulatus* Bar. superceding *U. plicatus* and *U. multiplicatus*, so common lower down the stream. *M. complanata* Bar. was here in great numbers; *U. occidentis* and *U. gibbosus* were also quite abundant.

On Nov. 10th, while on a picnicing expedition at Duncan Mills, 20 miles from the mouth of Spoon River, I observed on the opposite side of the stream a rocky ledge and beach below extending for quite a distance up and down the river.

The thought at once struck me that my giant *multiplicatus* might be once more found here. Accompanied by Dr. Maguire and our wives we crossed over and lost no time in getting into the water among the rocks. Almost the first shell brought up was one of these big fellows. They were here in company with scores of big *plicatus*, *ligamentinus*, *tuberculatus* and a dozen other species. In two hours' time we had found over fifty of the *multiplicatus*, one good *U. capax* and one *M. confragosa* four inches long. The doctor's bird dog Belva, partook of our enthusiasm and manifested a desire to also search for shells. After a little showing she understood how it was done, and it was amusing, indeed to see her with head submerged hunting a shell and then after securing it the air of importance assumed as she waddled ashore with it. We hope, the coming season, to make an expert collector of her.

One of the most pleasant and profitable collecting trips of the season was made in September at a place called "The Devil's Elbow," five miles below Havana on the Illinos River. At this place the south bank for nearly a half mile is a sand-bar, full of little bayous, and in these places was where we found the Unios. Prof. Hart, of the State Biological Station, who was one of the party, brought with one sweep of his dredge-net over fifty specimens, covering a dozen species. All of the following species were found plentiful, viz.: *U. plicatus*, *U. multiplicatus*, *U. alatus*, *U. gracilis*, *U. pustulosus*, *U. pustulatus*, *U. lachrymosus*, *U. anodontoides*, *U. gibbosus*, *U. ligamentinus*, *U. ebenus*, *U. ellipsis*, *U. solidus*, *U. donaciformis*, *U. cornutus*, *U. elegans*, *M. confragosa*, *M. rugosa*, *M. complanata*. A half-dozen *U. securis* were found, the first record of this species for the county.

ORANGE, CALIFORNIA.

[Excerpts from report of Mrs. M. F. Bradshaw].

To-day (February 13) we went to the blue rock above Laguna and had great success, finding some species not before collected by us. Digging in the soft rock with a hatchet and turning over loose rocks brought us the following species: *Ischnochiton conspicuus*, *Mopalia muscosa*, *Trachydermon dentiens*, *T. hartwegii*, *Lepidopleurus rugatus*, *Cumingia californica*, *Lucina californica*, *Diplodonta orbella*, *Chlorostoma fuscenscens*, *C. gallina*, *C. aureotinctum*, *Volvaria varia*, *Parapholas californica*, *Pholudidea penita*, *Nettastomella darwinii*, *Norrisia norrisi*, *Leptothyra bacula*, *Phasianella compta* var. *pulloides*, *Mytilus bifurcatus*, *Septifer bifurcatus*, *Lasaea rubra*, *Chama pellucida*, *Fissurella volcano*, *Adula falcata*, *Lithophagus plumula*, *Astyris gausipata*, *Cerostoma nuttalli*, *Conus californicus*, *Corbula luteola*, *Hipponyx antiquatus*, *Macron lividus*, *Monoceras lapilloides*, *Milneria minima*.

Went to day (February 14), to Fisherman's Bay, and were at last successful in finding the *Semele rupium*. Down deep in the sand where they were built upon themselves two or three stories high, down cellar under water, here hide the beautiful Semele. The incoming waves kept us from looking long or carefully, which was greatly to be regretted, as it is a long walk to this place and only to be approached at the very lowest tide; even then one is continually obliged to run from the waves, so that it will never be possible to get many. We also found a few *Diplodonta orbella*, *Kellia suborbicularis*, *Rupellaria lamellifera*, *Megatebennus bimaculatus*, *Trivia californica*, and nearer to shore in the weeds on the rocks one live *Chama muricata*.

GENERAL NOTES.

NOTE ON MARIAELLA DUSSUMIERI.—It is tolerably evident that we have all along been making a stupid blunder about the type locality of this slug. The original specimen, in the British Museum, is labelled simply as from "Mahé" by Valenciennes. This must be Mahé the French colony on the southeast coast of India, not far from the Travancore Hills, whence came *Mariaella beddomei* (G.-Aust.), which is, to all appearances, the same animal. I had been

provisionally keeping *beddomei* as a subspecies, thinking that the Seychelles type (as it was supposed to be) *dussumieri* might, when examined anatomically, show some distinctive characters. But since *dussumieri* is from Mahé, India, it is doubtless the same as *beddomei*, which must sink as a synonym. For a general discussion of the synonymy of *Mariaella* see Ann. & Mag. of Nat. Hist., Jan., 1891, pp. 103-104.

The removal of *Mariaella* from the Seychelles fauna gets rid of an apparent anomaly in geographical distribution.

While on the subject of Oriental slugs I may as well refer to certain section-names proposed in the plural in the paper just cited, and again published in the Check-List of Slugs (1893). I did not change them to the singular number, because I thought that might be left to special students of Oriental slugs; but as no one has taken the matter up, the changes are made herewith:—

Ibycus, sect. *Cryptibycus* (*Cryptibycci*, Ckll., 1891) type *I. magnificus*, Nev. & G.-A.

Austenia, sect. *Euaustenia* (*Euausteniæ*, Ckll., 1891); type *A. scutella*, Bs.

Austenia, sect. *Cryptaustenia* (*Cryptausteniæ*, Ckll., 1891); type *A. planospira*.—T. D. A. COCKERELL, March 21, 1898.

RECENT PUBLICATIONS.

NOTICE OF SOME NEW OR INTERESTING SPECIES OF SHELLS FROM BRITISH COLUMBIA AND THE ADJACENT REGION, by William Healey Dall (Nat. Hist. Soc. B. C., Bull. No. 2, 1897. 18 pp., 2 plates). While based largely upon material collected by Dr. C. F. Newcombe, Rev. Geo. W. Taylor, Mr. Whiteaves, and other Canadian naturalists, material from Alaskan waters has also been utilized by Dall in preparing this paper. The occidental species of *Crenella* and *Modiolaria* are discussed, *C. columbiana*, *Leana* and *japonica*, *M. Taylori* and *seminuda* being new. *Nucula charlottensis*, *Leda cellulita*, *conceptionis* and *leonina* are also new or lately described forms. Other new species of bivalves belong to *Yoldia*, *Malletia* and *Macoma*. Two *Cadulus*, *Hepburni* and *Tolmiei*, and species of *Cythara*, *Turbonilla* and *Odontostomia* are described as new. *Rissoina Newcombei*, *Molleria quadra*, and *Eucosmia lurida* are also new; all being illustrated by very good figures.

BIOLOGIA CENTRAL-AMERICANA: MOLLUSCA, by E. von Martens. After an interval of several years, during which no parts of this work appeared, its publication has been resumed, we hope to be continued without interruption; two parts having been issued in November and December, 1897. These treat mainly of the *Cylindrellidæ*, comprising the genera *Eucalodium*, *Cœlocentrum*, *Holospira*, *Cylindrella*, *Macroceramus*.

The most remarkable feature of von Marten's treatment of this family is not what he has to say about it, which, so far as it goes, is well enough, but what he leaves out. It would seem that the Berlin authorities are not only excluding American fruit, but have been excluding American malacology as well for several years past. Papers published in periodicals as well known as the Proceedings of the U. S. National Museum and of the Academy of Natural Sciences of Philadelphia, seem to be quite unknown in Berlin.

Eucalodium is divided into several sections, based upon size, color and external form. Of these sections *Resupinata*, for *E. speciosum*, *edwardsianum* and *deshayesianum*, is new, and *Anisospira* of Strebel is regarded as another section. The division based upon the presence or absence of a strong spiral plait upon the columella, and the dentition, published in September, 1895, is not mentioned, and the sectional name then proposed for *E. blandianum* and its allies is ignored, even in synonymy.

Some fine new species of *Cœlocentrum* are described, while others made known by Dall are omitted.

It is in the genus *Holospira*, however, that eccentricity seems most pronounced. An American malacologist, whom we had supposed was not unknown in Berlin, published a new classification of this genus in September, 1895 (two years and three months before the appearance of the genus in the *Biologia*), in which the species were distributed into some six sections or subgenera according to the presence and arrangement or absence of folds, laminae or plaits within the shell. This was a great advance in the study of the genus, as the species are so similar externally that their determination without such an aid as this was difficult and uncertain; to say nothing of the gain in knowledge of the interrelations and descent of the species. In the *Biologia* not only are these subgenera completely ignored—denied a line in the synonymy—but even the facts of nature which they represent are unnoticed in the tables of specific characters. After this it does not seem worth while to mention such

trifles as that *H. claviformis* Martens, 1897, was described and figured as *H. elizabethæ* as long ago as May, 1889, from specimens taken at the same locality, or that species published from Mexico in 1896 are not mentioned.

The peculiar group *Epirobia* Strebel is made a subgenus of *Holospira*. Whether this rank is or is not correct, may fairly be held a matter of opinion; but that von Martens errs radically in including all of the Mexican "*Cylindrella*" in *Epirobia* is not a matter of opinion but of fact. The true *Epirobia* species have teeth considerably like *Holospira* correlated with a hollow shell axis (as in *Holospira* and *Cælocentrum*); and here belong *apiostoma*, *polygyra*, *polygyrella*, and, perhaps, some others. Other continental species, such as *bourguignatiana*, *morini*, *speluncea*, *subtilis*, have the entirely different dentition of the slender Antillean species of *Cylindrella*, such as those of the Caribbean Islands, correlated with a solid shell axis, and unquestionably belong to a widely different genus.

The only species left in "*Cylindrella*" by von Martens is *C. bourguignatiana* Ancy, of which he says "unknown to me," curiously forgetting to cite the figures of it published in 1891, although the paper which these figures illustrate is freely quoted in the earlier parts of the *Biologia*. Want of inclination as well as lack of space forbids allusion to numerous other infelicities in the text; and it is a pleasure to say that the plates are superb examples of lithography.

It cannot but be a matter of serious regret to conchologists interested in Mexican and Central American land snails that the later parts of this great work fail to sustain the high standard of the earlier, and that they fall short of what all have learned to expect from their brilliant and eminent author.—H. A. P.

ON THE ANATOMY OF *Apera Burnupi*, E. A. SMITH, by Walter E. Collinge, (*Ann. Mag. N. H.*, Aug., 1897). The detailed anatomy of this South African Testacelloid slug is prefaced by a *resumé* of the history of the genus, which was originally established by Binney under the preoccupied name *Chlamydophorus*. The pedal (sub-oral) gland, as usual in Agnatha, is very large. The genital system is rather simple, with very short vas deferens hardly differentiated from the slender penis, and the spermatheca is large and of peculiar form. The genus is held to be nearer to *Testacella* than to *Schizoglossa* of the Rhytididæ; but while this is probably correct, it is difficult to form an estimate of its affinities without some knowledge of the muscular system, kidney, etc.

THE NAUTILUS.

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No. 2.

A LIST OF LAND AND FRESH WATER SHELLS OF ENGANIO WITH DESCRIPTIONS OF NEW SPECIES.

BY JOHN B. HENDERSON, JR.

The shells forming the subject of this paper were collected in the Island of Enganio by Mr. William Doherty, by whom they were sent to Mr. Aldrich, of Birmingham, Ala. Enganio, or Pulo Telanjang, is a small island surrounded by deep sea, off the southwest coast of Sumatra, about one hundred miles west of Benkoelen. Mr. Doherty has published in the "Asiatic Journal" of Bengal, 1886, his observations upon this island. From geological features and the faunal relations of the birds and insects collected, he concludes that Enganio forms a continuation of a submerged mountain chain, isolated peaks of which constitute the present Nias group. He finds the fauna of Enganio to be more closely related to that of the Andamans and the Nicobars than to that of Sumatra, and also to possess decided Javan affinities. He finds other evidence of the long isolation of this island from either the mainland or neighboring islands. A study of these shells tends to confirm the correctness of his views. The land and fresh water mollusks of Perak, and, in general, of the entire Malay Peninsula, bear a striking resemblance to those of Enganio. I have been unable to learn anything about the molluscan fauna of the Nias group, which, if known, would probably furnish additional evidence of the one-time closer connection of Java and the mainland through Enganio, the Nias group, the Nicobars and the Andamans. As will be seen, several of the species herein enumerated are identical with Javan forms, and others strongly

suggest Andaman and sometimes Indian species. None may be directly referred to any Sumatra species. These species of Enganio and Sumatra that do most resemble one another are widely distributed throughout the Malayan province, yet none of them are identical. It should be admitted, however, that the Sumatran land shells are less perfectly known than those of either Java or the mainland, and it is possible that a more thorough conchological exploration of the island might disprove the conclusion that Enganio bears to it so distant a relation.

1. *Melania (Melanoides) herculea* Gld. var. Pl. 2, fig. 6.

This species with *variabilis* Bens., *episcopalis* Lea, of India; *julieni* Desh., *chaperi*, *perakensis* from the Malay peninsula; *bocceana* Brot. from Sumatra; *varicosa* and *infracostata* from Java, etc., constitute a natural group of allied forms admitting a considerable range of specific variation. Many of the more recently published species of this group, will, I believe, be found to be no more than local varieties of Benson's well known *Melania variabilis*. Dr. Brot suggests the identity of *M. herculea* and *M. variabilis*, which, if correct, will reduce the former to varietal rank; nevertheless I have thought it best to refer these specimens to *herculea* as they agree almost perfectly with authentic examples in the National Museum. In the Enganio shells the whorls are slightly less rounded than in the typical form, and the number of heavy longitudinal ribs is somewhat greater (16 to 20). The inside of the aperture is bluish-white with two purplish-brown revolving color bands to be seen upon the outside of the shell only in young specimens.

2. *Melania (Melanoides) badia* n. s. Pl. 2, fig. 7.

Shell heavy, strong. Whorls 14 to 15, excavated below the suture, the first 3 or 4 generally lost; remaining upper whorls decorated with sharp longitudinal riblets which are crossed just above the suture by a series of four revolving striæ. The balance of the shell is perfectly smooth, no trace of other than faint growth lines being visible under the glass. The median whorls of the spire are ornamented with a revolving row of spots, or broken line, of dark chestnut. Suture simple; below the suture a zone of somewhat lighter color on the last three whorls. Aperture small, widened below, pointed above, outer lip simple, columella callous. Bluish within, a rich chestnut without. Height 40, diam. 12½ mm.

The main characters of this shell are—(a) its solidity, (b) costate upper whorls, (c) smooth lower whorls, (d) interrupted line of dark

chestnut along the upper middle whorls just below the suture. In most specimens the first three or four whorls are broken off, leaving only about two that show the sharp costulation.

3. *Melania hastula* Lea.

One young specimen, apparently referable to this species.

4. *Neritina zigzag* Lam.

5. *Neritina cornea* L.

6. *Neritina turrita* Chemn.

All of these have a wide distribution throughout the East Indies.

7. *Melampus fasciatus* Desh.

Color pattern very variable. A variety, "*javanica*," occurs in Java (Mousson, p. 46).

8. *Pythia striata* Reeve.

This agrees more perfectly with the mainland form than with the Javan *P. pyramidata*, yet for geographical reasons it may be likely that this is a localized variety of the latter. The two species seem to be very close.

9. *Cassidula mustellina* Desh.

Quoted from the Philippines to Java.

10. *Amphidromus enganoensis* Fulton. Ann. and Mag., series 6, Vol. 17, p. 71.

11. *Trochomorpha Hartmani* Pfr.

Originally described from Java. The largest of three specimens collected measures: height 11.5, greater diam. 35, lesser diam. 29 mm.

12. *Planispira Aldrichi* n. s. Pl. 2, figs. 4, 5.

Shell depressed, deeply umbilicate, low conic above, rounded beneath; acutely carinated at periphery. Whorls $4\frac{3}{4}$, the last not descending, excavated above and below the keel. Aperture somewhat oblique, subtriangular. Lip simple above, expanded below, basal lip reflexed partly over the umbilicus. Ends of lip connected by a faint callous. Sutures not impressed. Light chestnut brown, a darker space above and below the keel and above the sutures. Sculpture of faint wrinkles of growth, covered with very faint, revolving striæ below the keel; under the glass showing a minutely pitted-granular surface, the granulation more pronounced below the keel.

Alt. 15, greater diam. 28, lesser diam. 23 mm.

The nearest neighbor is *Planispira trochalia* Benson, from the Andamans, from which, however, it is very distinct. This species would probably fall within the subgenus *Trachia*, even though its last whorl is not descending. The pitted surface indicates the presence of hairs in young specimens—a special character of this group.

13. *Macrochlamys Dohertyi* n. s. Pl. 2, figs. 8, 9.

Shell perforate, depressed, nearly planulate above, thin, shining; excavated about the umbilical region. Whorls $4\frac{1}{2}$, convex, excavated at the sutures. Aperture lunate-circular. Lip simple, slightly reflected over the umbilical perforation. Growth lines strong below the suture, becoming faint on the periphery, a trace of faint revolving striæ on the base.

Alt. 6, maj. diam. $13\frac{1}{2}$, min. diam. 11 mm.

Spire more depressed than in *M. amboinensis* Mart., var. *perforata* Bttg. (Java) and umbilicus smaller. Resembles also *M. malaccana* Pfr. (Sumatra), but has more impressed sutures.

14. *Helicarion albellus* Mart. var.

I refer this doubtfully to *albellus*, which has a somewhat shorter spire. Probably a localized variety of the Javan species.

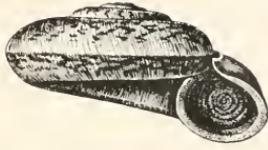
15. *Glessula* ?

Specimen too poor for satisfactory identification.

16. *Prosopeas argentea* n. s. Pl. 2, fig. 10.

Whorls fully 8, slightly convex. Apex obtuse. Sutures well impressed. Aperture oblique, elongate, pointed above, dilated in the middle, narrow below. Lip sharp and thin; columella slightly arcuate; ends of lip connected by an exceedingly thin shining callos. Growth lines closely crowded, strong and roughened. First or apical whorls regularly costulate. Color shining silvery white, becoming yellowish toward the base. Height 23, diam. 6 mm.

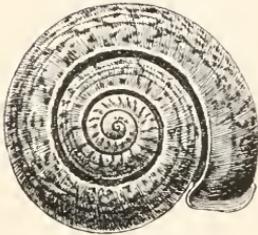
The *Stenogyras* are widely distributed throughout the Malayan province, being represented in all the islands by more or less closely allied species. This resembles *Opeas acutissima* Bttg. (*O. hastatus* Bttg.), of Java, in color and sculpture, but is less slender and has fewer whorls. It is a much larger shell than *O. achatinacea* Pfr., of Java. It differs from *Opeas paroensis* Bock, of Sumatra, in being a larger shell with a smaller apex. *Stenogyra echelensis* de Morg. of Perak, bears a strong resemblance to this Enganio form.



1



8



2



6



9



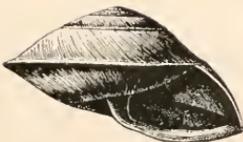
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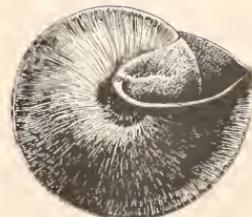
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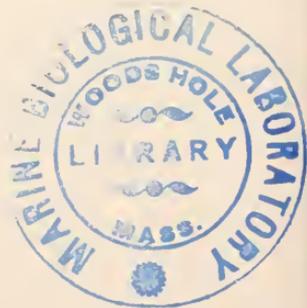
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4



5



17. *Lagochilus ciliferus* Mousson.

The typical form (Javan) is somewhat carinated, but this does not seem to be a persistent character. These bear scarcely a trace of carination.

18. *Leptopoma vitreum* Less.

Slightly heavier than typical.

19. *Crossopoma enganoense* n. s. Pl. 2, figs. 1, 2, 3.

Shell much depressed. Whorls $5\frac{1}{2}$, well rounded. Sutures channeled, the channel being partially covered by succeeding whorl below. Aperture oblique, scarcely descending, round. Peristome double, the outer border expanding above into a sutural fold, slightly descending and sinuate, reflected below. Inner peristome deeply notched above, elsewhere continuous and almost exactly round. Umbilicus wide, showing all the whorls. Growth lines prominent. Sometimes a series of heavy cord-like spiral lines on last whorl. Light yellowish-brown above, mottled with irregular patches of dark chestnut; a white band at periphery; a dark chestnut band below this of more or less solid color; base light chestnut with a wide, white (denuded) band within the umbilicus. Operculum horny 4, nearly flat, multispiral, edges slightly raised and bevelled, nucleus central, slightly concave below.

Alt. 15, greater diam. 30, lesser diam. 24 mm.

The color pattern is somewhat variable, though following in general that of the type. In many specimens the sutural canal is entirely covered. It bears a strong superficial resemblance to *Crossopoma planorbulum* Lam. (Sumatra), but differs in being higher, more deeply umbilicated, and in the notched inner peristome. It differs also from *Pterocyclus sluiteri* Btg. (Java), in its higher spire, less oblique aperture, less developed wing on outer peristome and more pronounced notch upon the inner peristome as well as in the general color pattern. The operculum of this shell is rather that of *Cyclophorus* than of *Pterocyclus*, but its shell characters are essentially of the latter. It is a third species of von Marten's genus *Crossopoma*, based upon the crenate or toothed edges of the outer lamella of the operculum.

20. *Helicina* ?

I am unable to refer this to any known species.

21. *Truncatella ceylonica* Pfr.

A widely distributed shell.



SOME OBSERVATIONS ON THE GENITAL ORGANS OF UNIONIDÆ,
WITH REFERENCE TO CLASSIFICATION.¹

BY DR. V. STERKI.

The classification of the Unionidæ is undergoing considerable changes, owing to a closer study of their anatomy, and we are awaiting Mr. Simpson's publication with considerable interest. In the meantime a few observations made on many of our species, especially from the Ohio river drainage, may be worth communicating.

1. The difference in the *season of maturing* ova and sperma, and discharging the young, in the different groups, has been confirmed by the examination of thousands of specimens from different waters. In *Lampsilis*², the ova and sperma are matured, and the former transferred to the branchiæ, during summer. The young are mature in fall, and a part of them discharged during October and November, but most of them are retained until spring. Some of the branchial sacks, single, or in groups of several, were found empty before winter, *e. g.* in *L. alatus* and *subovatus*, and the same was found early in spring; but in most species, the marsupium was still fully charged at that time. Very probably the time of spawning, as it has been called, depends, to a certain degree, on the weather and the temperature of the water. It would be of value to make such observations in the south, and also on the Great Lakes.

Quite different it is with the other Uniones, with a few exceptions. Their branchiæ are invariably found empty during fall, winter and early spring, while the ovaries are charged with ova and the testes with mature sperma. Their season of charging the branchiæ, bringing the young to maturity and dismissing them, is in the summer, and naturally lasts a considerably shorter time than in *Lampsilis* and the other winter breeders.

This discrepancy in the season of propagating, in connection with the different types of the uterus sacks, and the characters of the shell, I consider very significant and pointing at a different phylogenetic origin of the several groups. They probably originated at different geological ages and under different climatic conditions.

In many species, the ovaries and testes were seen beginning renewed activity while the young were still in the branchiæ, and this is probably so in general.

¹ See the articles of Mr. C. T. Simpson in *Am. Naturalist*, April, 1895 and the NAUTILUS XI, p. 19, and by the writer, the NAUTILUS IX, p. 91.

² A well characterized and well defined genus.

Sometimes mature, or apparently mature glochidia and quite undeveloped ova are found mixed up in the branchial sacks. Whether the latter will develop into embryos later, or remained unchanged for want of impregnation, remains to be studied up.

2. *Branchial sacks, or uteri.* On *Lampsilis*, the branchial sacks are differentiated even when not charged with ova or young. They are situated in the posterior part of the outer branchia, in a group, the marsupium, which, when charged, is very considerably enlarged, often exceeding half the length of the shell, and crowding away the unchanged anterior and posterior parts of the branchiæ. It has already been said that the number of sacks is, to a certain degree, characteristic for each species, yet rather variable even in individuals of the same size, and it is also hardly ever the same on the two sides. In the young, there are only a few, and their number is increasing with the age of the animal. They are also not all of the same size, and each one may occupy a smaller or greater number of branchial filaments.

In younger animals, there are always a number of small, empty sacks adjacent to the gravid ones, preformed to be charged in the following year.

The shape of the uterus sacks in *U. irroratus* Lea is known from the author's description and figure. There is considerable variation in their numbers. Of three specimens from the same place, all medium sized, one had seven sacks on one side, four on the other, the second had eleven and ten, the third, ten and eight. At the proximal ends there were exclusively ova; at some distance, those in the periphery had transformed into glochidia, and at the distal ends the latter were in excess, while a great number of ova had still remained unchanged. In accordance with this, the flesh color was much more intense at the proximal than at the distal ends, as the ova are colored, the young colorless.³ The ova are packed closely together and coherent by some intermediate substance, so that the whole worm-like cylinder can be extracted in toto from the enclosing membrane.

The young, in the uterus, show marked differences from those of all other species seen, as to soft parts and shell. The latter is considerably longer than high and has numerous distinct, crowded, concentric lines of growth. Its length is 0·21, alt. 0·17, diam. 0·14 millimeters.

³ In one specimen, the ova, and so the whole cylinders, were colorless, a rare exception.

In *cornutus* Bar., the sacks are also permanently differentiated, about six or seven on each side, near the middle of the outer branchiæ, and considerably projecting over their edges, much as in *irroratus*. But while the latter were found gravid in fall, the few *cornutus* seen, had the marsupia empty at that time, (late in October); the ovaries were filled with ova and the testes with sperma. More observations are necessary.

U. phaseolus is so different from all other species and groups that Simpson and Wetherby are certainly right in regarding it as the representative of a distinct genus. The outer branchiæ, in their whole extent, are permanently differentiated, much less high than the inner ones, and with a brownish edge. Thin and even while barren, they are much larger when gravid, and heavily, somewhat irregularly plaited, the folds being caused by the considerable increase of the length of the branchiæ. The sacks are very numerous; in a large specimen, 283 were counted on one side. Each one is formed by a thin, translucent, yet rather strong and somewhat rigid membrane, enclosing the ova, or the young, loosely inserted in the substance of the branchiæ, with a projecting, half-globular head. It can easily be extracted, and, when the young are mature, probably, is expelled in toto.

The young, although in the shape of the shell not much different from other species, shows marked peculiarities of the soft parts.

The uteri were found charged from July, or August to April, in numerous specimens. More exact data must still be obtained.

Most of the remaining species of the old genus *Unio* show no differentiation of the branchiæ or parts of them which are destined to lodge the ova and the young animals. The outer branchiæ, in adult specimens, are charged in their whole extent, and often⁴ also the inner pair; while gravid, they show only a general bulging, but no differentiated or prominent parts, and after the young are discharged, they are in no way different from "common" gills, except a somewhat ragged margin now and then in old specimens. Of a number of species, those cited by Lea, and some others, we know that also their inner branchiæ were found charged, but we do not know whether this is constantly so or not, and whether in all species it may be found occasionally. This uncertainty is partly

⁴ In the writer's article, l. c., p. 91 there is a sad, unintentional lapsus, and cited by Mr. Simpson (l. c.), about this point; the correction will be found in the above.

due to external causes ; probably nine-tenths, or more, of all collecting has been done during late summer and fall, since in spring and early summer the water is usually high, muddy and cold, and collecting is difficult, and in many places almost impossible. Now it is necessary that we overcome those difficulties and secure large numbers of muscles just in the time when the *Lampsilis* discharge their young and those under consideration become gravid.

(*To be continued.*)

DESCRIPTION OF A NEW HELIX.

BY C. F. ANCEY.

Helix disparilis Ancey. (Pl. I, fig. 13).

Testa imperforata, lenticularis, solidula, subnitida, carinata, superne et infra subtus carinam læte fulva et maculis strigisque virenti luteis irregulariter conspersa, circa regionem umbilicarem luteovirens, concolor. Spira depresso-fornicata, convexa, valde obtusa. Anfractus 5, regulariter crescentes, perparum convexi, sutura lineari et superficiali discreti ; embryonales lævigati, concolores, sequentes oblique striatuli, ultimus lineis impressis spiralibus confertisque, subtus præsertim perspicuis striatus, æqualiter utrinque convexus, carina acuta mediana insignis, antice lenissime vixque deflexus, in umbilici loco impressus. Apertura perobliqua, diagonalis, securiformis, fauce pallidula, marginibus distantibus, callo tenui ad insertionem subincrassato junctis, supero antice rotundatim producto, declivi, obtusato, basali elliptico, subincrassato. Peristoma haud, nisi infra carinam expansiusculum.

Diam. max. $17\frac{1}{2}$, min. $14\frac{1}{2}$, alt. $7\frac{1}{2}$ mill.

Locality unknown.

This is a very ambiguous and highly interesting shell. It is unknown to Mr. E. A. Smith of the British Museum, to whom it was submitted by Mr. John Ponsonby, of London. Its color is very striking, reminding one of that of *Helix parilis* Rang, while the form is nearly that of *Helix Josephinæ*, but it has no teeth on the peristome and the sculpture is peculiar. Notwithstanding its external facies, I however think the true affinities of this remarkable species are with *Dendrotrochus* Pilsbry, such as *D. Cleryi*, *Eva*, etc., and Mr. Ponsonby shares my opinion. The absence of locality is unfortunate, as it would, perhaps, enable us to guess to what group it might belong.



The type has been in my collection for about 20 years ; it is very perfect. A similar, but partially broken example, is in my father's hands. I never saw others.

NOTICES OF NEW SPECIES AND VARIETIES OF AMERICAN LAND SHELLS.

BY HENRY A. PILSBRY.

The following forms were included by name in the recently published catalogue of American Land Shells, but have not hitherto been described.

Epiphyragmophora arrosa var. *expansilabris* n. v.

Compact and globose-turbinata, imperforate or nearly so, wrinkle striate, malleated in places ; band above periphery broad and dark ; spire conic, whorls $5\frac{3}{4}$; lip very broadly expanded, reflexed below, thickened within, white. Alt. 19-20, diam. 23-25 mm.

Near Eureka, Humboldt Co., California. The specimens described were received from Mr. Fred L. Button. The band is sometimes wanting.

Epiphyragmophora tudiculata var. *umbilicata* n. v.

Shell smoothish, the malleation weak or subobsolete ; umbilicus widely open. Alt. $16\frac{1}{2}$, diam. 27, width of umbilicus 3 mm., or smaller with similar proportions.

San Luis Obispo Co., California. Types were presented to the Academy by Mr. John Ford.

Polygyra lawæ var. *tallulahensis* n. var.

Very small, shaped like *P. jejuna* Say, the peristome expanded, subreflexed, thickened within, no teeth or lamellæ ; umbilicus minute. Whorls $4\frac{1}{2}$, the last with a slight ridge or crest and then a wide groove behind the peristome, slightly descending in front. Surface nearly lusterless, with faint growth lines and sparse, subobsolete spiral striæ. Alt. $3\frac{1}{2}$, diam. $5\frac{1}{2}$ mm.

Tallulah Falls, Georgia.

This is apparently the toothless form mentioned in Man. Amér. Land Shells, p. 317.

Polygyra tridentata var. *complanata* n. var.

Shell large, depressed and glossy, with weak striation ; whorls 6, umbilicus rapidly expanding in the last whorl, between $\frac{1}{5}$ and $\frac{1}{6}$ the

diameter of shell; lip teeth of aperture typical in position, but very small, almost obsolete. Alt. 10, diam. 23 mm.

Burnside, Ky. (James H. Ferris). Types No. 71,399 coll. A. N. S. P.

Macroceramus texanus n. sp.

Shell resembling *M. Gossei* of Jamaica, but constantly stouter, decidedly less attenuated above. Sculpture of thread-like oblique striæ, finer and closer; sutural crenulation more irregular on the lower whorls, and disposed to be subobsolete. Whorls $9\frac{1}{2}$ to $10\frac{1}{2}$.

Alt. $10\frac{1}{2}$, diam. of penultimate whorl $3\frac{1}{2}$ mm.

Alt. $8\frac{2}{3}$, diam. of penultimate whorl $3\frac{1}{2}$ mm.

New Braunfels, Comal Co., Texas.

Macroceramus floridanus n. sp.

Shell resembling *M. Gossei* somewhat, but smaller, very much more finely and closely striated, the sutural denticles less pronounced, mainly formed by the confluence of three or several striæ (instead of one or two, as in *Gossei*); striation of the spire finer than in *M. texanus*. Whorls 9 to $9\frac{1}{2}$. Alt. $7\frac{1}{2}$ to 8, diam. of penultimate whorl 3 mm.

Little Sarasota Bay, Florida.

A comparison with good series of the true *M. Gossei* Pfr. from Jamaica, the type locality, with series from Florida and Texas, shows that there are certain readily observable differences. The Jamaican shell is more coarsely and distantly striated than any Continental specimens; the denticles at the suture are formed by single striæ or the confluence of two, and the shell is more conspicuously variegated than the generality of Floridan or Texan specimens. If fig. 458 of the "Manual of American Land Shells" was drawn from a Continental shell, or from the Jamaican *M. Gossei*, it is incorrect in showing all the striæ simple at the sutures. That figure, however, is probably incorrectly drawn. *M. Gossei* var. *arctispira* Anc. from Uvilla Island, Honduras, is apparently a small race of *M. concisus* Morelet, a common species in Yucatan.

NOTES AND NEWS.

ERRATUM.—Correct the following in February NAUTILUS, p. 113, 2d line from foot of page for "in the valve" read "in the left valve."

CONCHOLOGY IN THE KLONDYKE.—The following extract from a letter just received from Mr. P. B. Randolph, of Seattle, Wash., who is now in the Klondyke, may be of interest to readers of the NAUTILUS. Mr. Randolph left Seattle on July 31st of last year, and was 28 days in reaching Dawson City. He writes: "On my way in I collected a number of the smaller land and fresh water shells of the coast region at Dyea, on the ocean side of the mountains, and at Lake Linderman on the Yukon water shed. They consisted, on the Dyea side, of *Patula pauper*, *Conulus fulvus*, *Vertigo ovata* (?); on Lake Linderman of the same with *Vitrina* sp., *Limnea* two species and *Valvata sincera* (?).

"At Duncan's Island, on the trip up, I collected a number of *Selenites vancouverensis* and *Mesodon townsendiana*. I found two dead shells here (Dawson City) of *Succinea* sp., and hope to find specimens when the snow melts, though the fires ran through this country last year completely destroying the undergrowth and moss."—*Geo. H. Clapp*.

Sometime ago Mrs. Mary P. Olney of Spokane, Washington, sent to me a small lot of *Pyramidula strigosa* Gld. and young taken from the oviducts of some found in Rathdrum, Idaho. In reply to my inquiry about them she writes: "I had cleaned several hundred *strigosa* and never found but one specimen with young, until a lot of fifty from which these came, and which contained from 6 to 15 each.—*S. Raymond Roberts*.

A specimen of *Unio complanatus* Sol. (dead shell, but good and rather large), has recently been found at New Philadelphia, Ohio, in a mill race on the Tuscarawas River, Ohio River drainage. Probably the species has spread from Lake Erie by way of the Ohio Canal over the divide.—*Dr. V. Sterki*.

LIST OF A COLLECTION OF SHELLS FROM THE GULF OF ADEN, by W. H. Dall (Field Columbian Museum Pub., No. 26). A brief list of shells collected by the well known ornithologist D. G. Elliot. There are numerous typographical errors such as *Nerita* "*albicola*," *Trochus* "*saya*," *Turritella* "*torutosa*," etc., etc., and two *Olivas* are put in the *Trochidae*. The value of the list hardly warrants the pretentious style of publication, but as it *was* published, it would have been better had the proof been submitted to the author for correction, for, of course, the blunders are not Dall's.



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No. 3.

A NEW JAMAICAN LAND SHELL.

BY J. B. HENDERSON, JR.

Ravenia Hollandi n. s.

Imperforate, rather thin, subtranslucent, pale horn color. Whorls 10, well-rounded, sutures impressed; from 30 to 35 somewhat strongly developed longitudinal waving ribs upon each whorl, except upon the two apical which are perfectly smooth. Apex obtuse. Aperture ear shaped, much narrowed in the middle, suggestive of the figure 8. Columella strongly twisted like the letter "S," and thickened. Outer lip slightly pinched in the middle where it is armed with a prominent tooth. Alt. 9 mm.



"Jamaica," Dr. W. J. Holland.

The genus *Ravenia* was created in 1873 by Crosse (Journal de Conch., Vol. 21, p. 69) to include a single species from Curacoa, *R. blandi* (do. Vol. 22, pl. 2, fig. 4). The author remarks that the form is an eccentric one "between *Spiraxis* and *Pupa*." Tryon, in St. and Syst. Conch. (Pt. 3, p. 18), includes the genus within the *Streptaxidæ*. The exact position of this curious genus is doubtful, and, without a knowledge of the anatomy, cannot definitely be placed. It is not unlikely, however, that it will fall within the *Stenogyridæ*, probably next to *Spiraxis*. The character of the constriction in the centre of the outer lip is common to *Spiraxis*, and is sometimes to be observed in *Varicella*, the Jamaican section of *Glandina*. There

are one or two of the rarer species of *Spiraxis* described by Adams that are suggestive of *Ravenia*. An examination of the types of these may necessitate their removal from *Spiraxis*.

Note.—I am inclined to believe that the relation between the Jamaican *Glandinas* and the various genera of *Stenogyra* found in the same island is much closer than supposed. Often the dividing line between *Opeas*, *Subulina* and *Varicella* is annoyingly close. It is to be regretted that a comparative anatomical study of the *Glandina* and *Stenogyra* in Jamaica has never been made.

LAND SHELLS OF GUN CAY, BAHAMAS.

BY HENRY A. PILSBRY.

Gun Cay is a tiny islet on the extreme western border of the Bahama group. It is low, with very scant vegetation—"a few scattered specimens of cactus, wild grapes, wild geraniums and ver-bena"—with the usual Bahaman shore plants. There is a light-house, but no settlement.

Dr. Wm. H. Rush, U. S. N., some years ago collected there the following species:

1. *Ctenopoma bahamense* Shuttl.? One very young specimen.
2. *Cepolis* (*Hemitrochus*) sp. (young; rib-striate, like *C. filicosta* Pfr.).
3. *Thysanophora vortex* Pfr.
4. *Cerion incanum* Binney. Basal volution more distinctly costate than in Key West examples.
5. *Cerion Pillsburyi* Pilsbry & Vanatta.¹ A new form resembling *C. regina*, but with narrow umbilical area. It is named at the request of Dr. Rush, in honor of Lieutenant-Commander John Elliott Pillsbury, of the U. S. Coast Survey steamer "Blake."
6. *Cerion glans* Küster, var.

The only previous record from this islet is in Bull. Mus. Comp. Zool., vol. xxv, no. 9, p. 119, 1894, where Dall enumerates three species collected by Prof. A. Agassiz: *Cerion cinereum*, *C. pannosum* and *Cepolis* (*Hemitrochus*) *Troscheli*. The young *Hemitrochus* taken by Dr. Rush may be an immature *Troscheli*, but it is more strongly ribbed than usual in that species.

¹ Described in Proc. Acad. Nat. Sci., Phila., 1897, p. 366.

C. pannosum is a species of Little Cayman, south of Cuba, and as none of the Cayman species have been known to occur in the Bahamas, it is not unlikely that the identification might be modified on further comparison of good specimens; I think it likely that the form described as *C. Pillsburyi* is what was identified as *pannosum*, which it somewhat resembles. *C. cinereum* of Maynard is the typical *C. glans* Küster of New Providence, so that this corresponds with what Dr. Rush collected.

At all events, it appears that at least six or seven species of land shells inhabit Gun Cay.

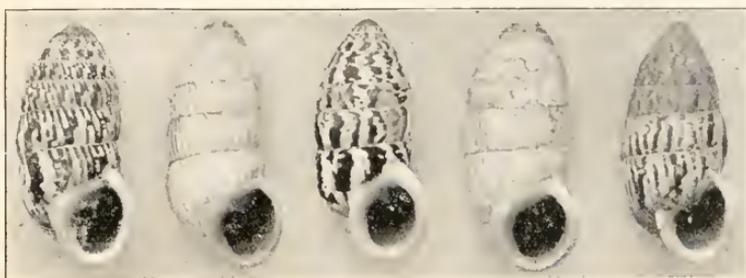


Fig. 1.

Fig. 2.

Fig. 3.

Fig. 4.

Fig. 5.

Figs. 1, 2, 3, 4, *Cerion Fordii* Pillsbury and Vanatta; Fig. 5, *Cerion Pillsburyi* P. & V., the latter from Gun Cay.

A NEW SPECIES OF CERES FROM MEXICO.

BY W. H. DALL.

Ceres Nelsoni n. sp.

Shell large, depressed, with a sharp, somewhat upturned keel over which the inner edge of succeeding whorls is laid; color from pale lemon-yellow to deep orange, the umbilical region polished, translucent and always pale lemon-yellow; whorls seven, the nucleus polished, smooth, translucent, slightly prominent, of a whorl and a half; succeeding whorls flattened above, with an appressed suture, with low, fine raised threads in harmony with the incremental lines tending to break up into granules, which, with the growth of the shell, gradually come to take on a centrifugal direction, and, in the adult, near the aperture, have a trend nearly at right angles to the lines of growth; on the base the rugosities have a more punctate or vermi-

cular aspect, and in the young are much obscured by the polish of the base of the shell; base rounded moderately, about as much as the spire, slightly depressed, with a very thin, brilliantly polished callus near the axis; aperture with the upper lip projecting considerably beyond the lower one, moderately thickened and rounded, overrunning the keel at the inner corner where there is a narrow, sharp sulcus, of which the termination in fully adult shells makes a a decided notch in the edge of the lip; lower lip receding, flexuous slightly thickened; throat with three basal, one axial and two parietal, strong, subequal, spiral laminae, much as in *C. salleana*, the pillar very short, rendered flexuous by the end of the keel; the internal walls of the preceding whorls and most of the axis, absorbed. Lat. of base (major) 30, (minor) 26, alt. 11 mm.

Habitat, Pilitla, San Luis Potosi, Mexico, E. W. Nelson.

This is the finest species of the genus, more evenly divided by the keel, more depressed, and larger than *C. salleana* or *C. colina*, the only species hitherto known.

SOME OBSERVATIONS ON THE GENITAL ORGANS OF UNIONIDÆ,
WITH REFERENCE TO CLASSIFICATION.

BY DR. V. STERKI.

(Concluded.)

“*Margaritana*.” Considerable changes will be necessary about those species hitherto ranged under this genus, and some evidently related forms, *e. g.* *Unio pressus* Lea and *Anod. edentula* Say. The latter two species seem to stand near *Marg. truncata*, *rugosa* and *complanata*. In all of them, the soft parts are of rather the same appearance, and especially so are the branchiæ, of which the outer are gravid, in almost their whole extent, from fall to spring. *U. pressus*, *Marg. rugosa* and *A. edentula* were found with the posterior halves of the branchiæ empty—evidently just emptied, the anterior part still filled with young, in spring. Some of them were seen with the branchiæ empty, the gonads charged, in July.

In *edentula*, the young are arranged in a singular way, apparently different from others. There are small, cylindrical, worm-like, whitish masses, of about one mill. diameter, lying transversely in the branchiæ, closely packed together. In them, the young are located, six to ten or more in each one, in single or double file, each one in

an isolated cavity, which is evidently corresponding with, and descendant from an ovum. These cylinders seem to be not homologous with the "sacks" in *Lampsilis* and other groups, and may properly be called *placentæ*. When removed from the branchiæ and surrounded by water, they swell up, at the same time becoming more translucent, and each embryo is dislodged from its cavity, evidently expelled by the swelling of the surrounding substance, and the exit facilitated by its softening. But each one is still hanging on the cylinder, held by a short byssus thread, whose proximal end is attached to the soft parts of the young, the distal to the inner lining of the ovum cavity. Very probably these *placentæ* are discharged as such by the parent, with the young first enclosed, and then attached for some time.

In the other species named above, the arrangement is rather similar; the young are attached to and held together by filaments which seem to be homologous with the *placentæ* of *edentula*. And the same byssus has been seen in the young of *marginata*, coiled up at the distal end.

The embryonic young of these species as well known, are all of the same type, *i. e.* pointed below and strongly "hooked," quite different from those of other groups, a very significant character. The shells of the adult show some common features, and their nacre is of rather the same appearance. All these qualities combined seem to prove that the several species under consideration, with some nearly related forms, constitute a rather well characterized genus. That the hinge of *edentula* is still more rudimentary than that of most of the others, can be no valid argument to the contrary, and also the more developed *placentæ* are, in my opinion, of secondary significance.

3. *Gonad and gravid branchie in the young and old; Parasite.*— It has already been stated that in young individuals, two, three, or possibly four years old, the gonads are not yet developed at all, and at that period the shells show no distinction of sexes, even in *Lampsilis*. The animals seem to be asexual and, in this respect may be regarded as larvæ. There are very few animals, of higher or lower order, showing this peculiarity in their apparently definite state, except possibly some of their congeners, marine Pelecypods. When the gonads commence growing, there are at first few acini developed, producing small quantities of either ova or sperma. It is a question, however, whether at that juvenile age the future sex of an in-



dividual be already established in some way, or becomes so only with the development of the gonad.

On the other hand, in very old specimens, the ovaries and testes seem to become atrophied, and lose their capacity of producing ova and sperma, respectively. There is a mass of fibrous, connective tissue, while the glandular elements are considerably diminished or entirely lost.

Yet it must be mentioned here that there is another cause of that degeneration. In the ovaries and testes of many species and different genera, from the Ohio and Tuscarawas Rivers, the Ohio canal, and other places, I have found a singular, polymorphous, worm-like parasite, of microscopic size and low organization, sometimes in immense numbers. It is very common, in old and middle-aged specimens, and wherever it occurs, the products of the gonad are considerably diminished or entirely suppressed. Details will be found in another place.

It has been stated that in young *Lampsilis* the number of sacks in the marsupium is considerably smaller than in older ones. In the younger specimens of most other groups only a small area of the outer branchiæ may be charged, and slightly so, usually about the middle. The same is found in *phaseolus*. One specimen, 62 mill. long, had 12 sacks on one side, 38 on the other; all of them were quite small, but of rather unequal sizes.

4. *Hermaphroditism, etc.*--It has been asserted, by different writers, partly long ago, that some, if not all, of the Unionidæ are hermaphroditic, as some other groups of Pelecypods are. From my own observations I can say that it is found occasionally, rather an exception than the rule, in the large majority of our species. In a number of specimens, ova and sperma were found in the same gonad, but usually one product was greatly in excess of the other. Very probably it has been overlooked in many instances, as there may be only a few acini producing sperma in an "ovary," or vice versa. It takes a very keen eye to see that unaided, and to look over every parcel of a large gonad, requires an undue amount of time, when scores and hundreds of specimens are to be examined. And so it would be with microscopic examination, either by looking over samples from all parts of the gonad, or by section series on hardened specimens. Yet the question should be studied carefully, especially as to *Anod. imbecillis* and some other species. That would be a task for persons having a good deal of time at their disposal.

One specimen of *U. rubiginosus* Lea, (Ohio Canal, May) had a few acini producing ova in the gonad charged with copious sperma. In that instance the distinction was easy, for the bright crimson color of the ova. Among 120 specimens of *U. pyramidatus*, from the Ohio River, collected late in September, two were found containing ova and sperma in the same gonads. Of *U. parvus* Barnes one specimen had a good quantity of sperma beside ova in abundance. This case especially needs revision. Among a limited number of *Anod. imbecillis* four specimens (Ohio Canal, May) were found with ova and sperma in various proportions.

The question whether such individuals are capable of self-impregnation, might be decided by experiment on such species where hermaphroditism is frequent.

It has also been said that a total change of the sexes may take place in an individual, and that question also could be settled only by long continued observation and experiments. Or a large number of specimens might be marked in some way, in a pond or certain place of a river or creek, and as many as can be found again, would be controlled year after year. That, however, would be necessary only for such forms in which the shells show no sexual differences. While such a change is *a priori* improbable in all Uniones, it appears really absurd in regard to those forms in which the sexes are established and manifested by permanent characters of the branchiæ, and also the shells, as in *Lampsilis* and some others.

It may be mentioned here that, as to my knowledge, observations on the question of possible *agamogenesis* and *parthenogenesis*, in *Unionidæ*, have not been made. Carefully conducted experiments might give interesting results in that direction. They would necessarily be difficult, for the possibility of hermaphroditism and self-impregnation, in every instance.

5. *Sexual differences of the shells.*—In *Lampsilis*, as well known, the posterior inferior part in the female mussel is dilated to make room for the marsupium, yet this dilatation is very various in kind and degree. But the differences sometimes are in a certain measure relative, owing to the nature of the habitat, and to inheritance. *L. luteolus*, e. g., in certain localities, is so short and inflated that the males may closely resemble the females from other places where the mussels are more slender.

In most other "Uniones," the differences are little marked. Yet, in general, the females are more inflated than the males, as in

undulatus, *pustulosus*, etc. In *U. gibbosus* the sexes may be recognized with a fair degree of probability by the more inflated shells of the females.

A decided difference we find in *U. verrucosus* Raf. (*tuberculatus* Barn.), where the older females are considerably elongated at the posterior end, that part of the shell being rather even, without the characteristic undulations and warty prominences. In younger, though fecund specimens, that feature is yet little marked.

U. phaseolus shows no constant differences in the sutural shape of the shell, but a decided one on the inner surface, in older specimens. The female has, in each valve, a deep, oblique sulcus corresponding with and leaving room for the gravid outer branchiæ.

In the female *Marg. marginata* the posterior end is directed downward and more inflated (with a stronger umbonal ridge), and the same can be said of "*An.*" *edentula*, although it is less marked.

6. *Numerical proportion of Sexes.*—In most species, the number of males is in excess over that of the females, often considerably. A few examples may be cited. Of 50 specimens of *L. subrostratus* Say, from a lake in Indiana, only about one-third were females, and the same must be said of a lot of *L. nasutus* from Ohio. Here, as in many species, the females were averaging considerably smaller. Of 115 *U. pyramidatus*, from the Ohio River, 71 were males, and of eight *retusus*, seven were males, the eighth was young with the gonad undeveloped. It is a question whether this be the normal condition or due to local causes, or an evidence of beginning degeneration.

In concluding, it may be said that the time has come when new species should be based not only upon the shells, but also the soft parts, if such be obtainable.

New Philadelphia, Ohio, April, 1898.

A NEW UNIO.

BY BERLIN H. WRIGHT.

Unio villosus sp. nov.

Shell ovate-elliptical, somewhat inflated, smooth, very inequilateral, bluntly rounded or subbiangular behind, subtruncate before, umbonal slope uniformly rounded above, disappearing at the lower margin. Substance of the shell moderately thin; very slightly

thickened before. Ligament long, thin and reddish. Beaks prominent and surrounded by coarse, oblique undulations, about four in number and rather acute at summit. Epidermis fuscous, black and deeply striate; strong transmitted light shows a light-olive texture, densely covered throughout with broad, greenish rays. Cardinal teeth rather solid and deeply serrated. Lateral teeth long, slender, straight, nearly smooth and extending to the posterior cardinal. Posterior cicatrices scarcely visible; anterior ones distinct. Beak cavities slight and rounded. Nacre tinged with salmon under the umbos, milky white anteriorly and of a bright blue and iridescent behind. Width, $2\frac{1}{4}$ in., length $1\frac{1}{4}$ in., diam. $\frac{5}{8}$ in.

Habitat.—Suwannee River, Suwannee County, Florida.

Type in National Museum.

Remarks.—This species seems to be related to both the *amygdalum* and *parvus* groups, is readily distinguishable from any of its associates by its remarkable width, beautiful rays and pointed, compressed posterior. It reminds one most of *U. minor* Lea, with which it is found, having the same dark, fuscous epidermis, and like that species is disposed to be sub-truncate before, but the rays, light teeth, thinner substance and greater size at once distinguish it. Some forms of *U. trossulus* Lea approach it, but the beak sculpture, outline and teeth are radically different, besides that species is never rough, but is smooth, polished and yellowish when taken from the water; the rays of the two species are quite similar, except that those of our species are only visible by the aid of transmitted light.

RECENT PUBLICATIONS.

SYNOPSIS OF THE RECENT AND TERTIARY PSAMMOBIIDÆ OF NORTH AMERICA, by W. H. Dall (Proc. Acad. Nat. Sciences of Philadelphia, pages 57 to 62). The title of this paper gives some idea of the ground covered by it. In the genus *Psammobia* a new section *Grammatomya*, is made by Dr. Dall, and in the group *Sanguinolaria* another one, *Nuttallia* is formed, with *Sanguinolaria Nuttallii* Conrad as the type. *Heterodonax* has been removed from the family *Donacidæ* into this family. This will be gladly received by collectors who have been sorely puzzled to find affinities in *Heterodonax bimaculata* Lin. with *Donax*. Besides a full synonymy, the geographical distribution of the species are given. By the way,

Heterodonax bimaculata is not only collected at San Pedro all the year round, but is reported as far north as Anacapa Id.—one of the Channel Islands—off Ventura Co., California. Fossil species of Psammobiidae of the Eocene, Miocene and Pliocene formations are listed. A long list of shells that have been incorrectly named are appended under the title "Synonyms and Corrections." Some idea of the confusion which must have existed among some of the fossils of this family may be inferred when we find no less than five names have erroneously been bestowed upon *Heterodonax bimaculata* Lin. Dr. Dall's revision will be especially valuable to conchologists on the S. Atlantic and Pacific Coasts.—*M. B. W.*

ON THE MODIFICATIONS OF THE APEX IN GASTROPOD MOLLUSKS, by Frank C. Baker, (Ann. N. Y. Acad. Sci., IX, 1897). The apices of numerous species, including representatives of the main families of Gastropoda are described and illustrated by three plates of outline figures, drawn by the author. No considerable departures from a simple form occurred except in the Rhachiglossa.

THE POST-PLIOCENE NON-MARINE MOLLUSCA OF ESSEX, by A. S. Kennard and B. B. Woodward, (Essex Naturalist, X, 1897, pp. 87-109). This extensive paper apparently covers the subject in a thorough manner. Individual variation in the Pleistocene was even more marked than at the present day. The absence of *Helix pomatia* furnishes additional proof of the theory that it is post-Roman in its introduction into England; but *H. aspersa* has been recognized from pre-Roman deposits. *Eulota fruticum* (now extinct in England) occurs; and *Cyclostoma elegans* was more widely diffused than at present. Some of the fossil species are more boreal in the modern fauna; however there are also some species more southern in present distribution, so that a colder climate is not necessarily to be predicated. *Helicella caperata* is the only species which has increased in size since the Pleistocene, all the other forms having certainly diminished. "There can be no doubt that the Pleistocene molluscan fauna was in every way a finer one than that now existing," a conclusion of considerable interest, agreeing as it does with the mammalian fauna, which however has, of course, been affected by human intervention. The comparative age of the several exposures is fully discussed.

Another paper, "THE MOLLUSCA OF THE ENGLISH CAVE DEPOSITS" by the same authors, appears in Journ. Malac. Soc. Lond.,

Nov., 1897, supplements the preceding. "*Hygromia umbrosa* Partsch (from Ightham fissure) is by far the most noteworthy form, since it has not been met with previously on this side of the channel. Its present range is southern Germany, Bohemia, Switzerland, etc., and according to Mörch, near Holstenburg in Denmark." A peculiar form of *Carychium minimum* also occurs. The exact age of this deposit is somewhat doubtful, but it is certainly Pleistocene. "Taken altogether, the shells from our cave deposits are decidedly larger than recent examples, and there can be no doubt that there has been a marked diminution in the size of our indigenous mollusca, and probably also in their numbers since Pleistocene times." In America the only extensive Post-Pliocene deposit, the Loess, shows an opposite tendency, and the few Pleistocene caves, such as the fissure at Port Kennedy, which proved to be rich in sloth, sabre-tooth, peccary and other mammalian remains, have so far yielded no mollusca.

M. le Dr. JOUSSEAME describes an alleged new genus and species of *Nuculidæ* as *Diabolica diabolica* (Le Naturaliste, Nov., 1897, p. 265). Comment is superfluous.

VERZEICHNISS DER AUF DEN PHILIPPINEN LEBENDEN LAND MOLLUSKEN, by Dr. O. von Möllendorff. (Abhandl. naturforsch. Gesellsch.). In this timely list the multitudinous new species added to the Philippine fauna in recent years by Hidalgo and especially von Möllendorff are intercalated with those made known by Semper and the older authors, the whole classified, with references to descriptions and localities; forming an indispensable handbook to the Philippine fauna. One thousand and seventy-nine species is the grand total of land shells. As an instance of the additions to this fauna made by von Möllendorff and his collaborator Quadras, we may mention the section *Diaphora* of *Ennea*, in which 32 of the 35 known species were described by him. This is an extreme case, but many genera have been more than doubled in species by von Möllendorff's researches. A very large number of the new species were described in the "Nachrichtsblatt" without figures; and it is to be hoped that the author's intention of figuring these forms will be fulfilled. We understand that another volume of Semper's great work will be devoted to this purpose.

MR. W. MOSS has been investigating the genitalia of the English *Zonitoides* species, and has given a preliminary notice of some interesting results before the (Brit.) Conch. Soc., May 12, 1897. He announces the finding of a channel-shaped calcareous organ with

a rim or collar at one end, in the penis, similar to that which he had previously described and figured in *Helix* (*Cochlicella*) *acuta*. Further investigations are in progress.

GENERAL NOTES.

NOTE ON MOLLUSKS FROM ARCADIA, MISSOURI.—Mr. Frank M. Woodruff, while on a collecting trip during the latter part of May and first part of June, incidentally picked up a few mollusks, a list of which may be of some value and interest in the study of geographic distribution. The region is reported by Mr. Woodruff to be rather stony and arid, the rock being granitic, and pulmonate mollusks, therefore, were very scarce. The Mississippi River was very high, in fact a veritable torrent, and but one fresh-water mollusk was found. The list of species is as follows:—

Lampsilis ventricosus Barnes. Arcadia.

Polygyra exoleta Binney. Vineland.

Polygyra thyroides Say. Vineland.

Polygyra clausa Say. Arcadia.

Polygyra appressa Say. Arcadia.

Polygyra dorfeuilliana Lea. Arcadia.

Vitrea indentata Say. Arcadia.

Pyramidula alternata Say. Arcadia.

All of the specimens were typical. One specimen of *appressa* had a rather flat spire, but was otherwise normal.—FRANK C. BAKER.

FOSSIL PEARLS.—Not having read anywhere that “fossil” pearls have been found or noticed in the literature, I submit the following facts:—

Some years ago, while looking over some sand (very carefully) that I had collected on the Chipola River in west Florida, from Oligocene strata, I found and saved a pretty little pearl. I afterwards found one in some Pliocene sand from California collected by Dr. R. E. C. Stearns. I also found one other in some sand from Claiborne, Ala., which I had collected from the Eocene. Lately, while looking over some fossils from the “Woods Bluff” Eocene from Thomasville and Choctaw Corner, Clarke Co., Ala., I found one other pretty little fellow, so that we now have four of them here for investigation.

Such fossil specimens may be in other museums, but I have not seen or heard of the fact after diligent enquiry among the wisest of our workers here.—FRANK BURNS, PH. D.

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No. 4.

THE MOLLUSKS OF THE GREAT AFRICAN LAKES.

Mr. J. E. S. Moore has recently studied the Mollusk fauna of the African Lakes Nyassa and Tanganyika, and has recorded a portion of his results, which prove to be of very great interest.¹

It is pointed out that the molluscan genera constituting the lake faunas of Africa fall into two categories; those genera more or less widely distributed in Africa such as *Unio*, *Spatha*, *Iridina*, *Corbicula*, *Limnæa*, *Isidora*, *Planorbis*, *Ancylus*, *Ampullaria*, *Vivipara*, *Bythinia*, *Melania* and their immediate allies, these constituting a perfectly normal group, all or most members of which occur in most of the lakes yet explored. The second group comprises *Typhobia*, *Nassopsis*, *Limnotrochus*, *Syrnolopsis*, *Tanganyicia*, *Bathaulia*, *Paramelania*, *Bythoceras* and some other forms, and is confined to the single lake Tanganyika. This series of genera is called by Mr. Moore the "Halolimnic group." With few exceptions, they are deep water forms, mainly ranging from 200 to 1000 ft. which was the greatest depth reached, while the species of the "normal" group of genera live mainly within the 100 ft. line. After a thorough discussion of the geological and biological aspects of the case, Mr. Moore concludes that the Halolimnic mollusks in Tanganyika owe their origin to an ancient connection with the sea.

¹ Proc. Roy. Soc., LXII, no. 387, March 29, 1898. Quarterly Journ. Mic. Sci., XLI, pt. 1, p. 159, March, 1898.

“ Instead of the Halolimnic molluscs being restricted to the shallow creeks and bays about the coast, they swarm on the rough surf-swept rocks and on the open beach. And what is more remarkable than this, they extend in great profusion to the deepest portions of the lake. Thus, dredging in water which varied in depth from 800 to 1,200 feet, I always obtained plenty of *Typhobia*, *Paramelania*, *Bathanalia*, and *Bythoceras* among the Gastropods, as well as the so-called *Unio Burtoni* among the Lamellibranchiata; and how far these genera extended beyond these depths I cannot say, but they showed no signs of dying out, but rather the reverse. On the lake floors which were not so deep as this, from 200 to 300 feet below the surface, but which were yet deep enough to have yielded nothing by dredging in Nyassa, there was an abundance of *Limnotrochus*, *Syrnolopsis* and *Neothauma*, together with those varieties of *Melania* which inhabit Tanganyika. It is thus rendered apparent by these observations that the Halolimnic molluscs are all either surf-swept rock dwellers, or entirely deep-water forms. It is thus apparent that the Halolimnic molluscs are completely dissociated from the normal fresh-water forms, along with which they exist in Tanganyika, not only by their singular geographical isolation, but by their bathymetric distribution also; the conclusions to which the facts of their geographical distribution seem to point being thus completely substantiated from another point of view. There are, however, yet other ways in which the fact that the Halolimnic fauna is entirely distinct from, and unconnected with the more normal series becomes clear. For in many branches of biological inquiry we are often rightly guided by impressions which, like the types of human physiognomy, are real enough, but quite incapable of definite expression. Impressions of this character are at once produced on reaching Tanganyika, as I did, after studying the fauna of several neighboring lakes. For there is a singular and oceanic profusion of life in Tanganyika, which is quite peculiar, and it quickly becomes evident that this numerical increase in the aquatic population does not affect the normal fresh-water stock, it is solely produced by the astonishing abundance of the members of the Halolimnic group.

“ In contrast with the shallows of Nyassa, the creeks and bays of Tanganyika swarm with crabs and prawns, and the open sandy beaches are strewn with empty Halolimnic shells; dead detached fragments of the deep-water sponges are tossed up by hundreds on

the shore. And on the extensive rocky coasts the barely submerged stones are covered with the so-called *Lithoglyphus* and *Nassopsis*, just as the half-tide rocks swarm with *Natica* and *Litorina* on an English beach. Further, on putting out into the lake itself, the deep open water is filled and discolored with clouds of pelagic Protozoa (chiefly *Peridinia* and *Condylostoma*); and during the dry season swarms of the lake jelly-fish are seen pulsating at all depths.

“Recapitulating, it may be said, then, that the facts of the geographical and bathymetric distribution of the great lake molluscs lead to the following results:—That among all the fresh-water lakes of the African continent which have hitherto been explored there exists a type of fauna which is curiously similar throughout. It differs only in the specific representation of the same genera which these lakes contain. This generalized African lake fauna contains only those families and genera of molluscs which would be regarded as typically fresh-water, lake, river, and pond dwellers, in whatever continent the fresh-water might occur. In one African lake, however, but in one lake only, there have been found to exist, super-added to this normal lacustrine stock, a number of Gastropods which do not closely resemble any other forms either living or extinct; these molluscs are also completely dissociated from the remaining normal series of the lake in which they occur by their modes of life. Together these molluscs constitute the molluscan section of a whole faunistic series, which in Tanganyike is added to the normal fresh-water stock the lake contains. This fauna forms what I have called the Halolimnic group, and the *tout ensemble* of all the Halolimnic genera is marine.”

The detailed anatomy of the Halolimnic genera is described in the second part of Mr. Moore's paper. *Typhobia* and the allied new genus *Bathanalia* are extremely peculiar in many respects. The dentition resembles most that of the *Strombidæ* and *Calyptwidæ*. The nervous system is most like *Strombidæ*, *Cancellaria*, *Voluta*, etc., with some peculiar features, and totally unlike any freshwater families. There is a crystalline style in the stomach, such as occurs in *Pterocera*. The external penis is a new development in the mantle-wall. The gills are like those of *Strombidæ*. A respiratory siphon is developed. On the whole, *Typhobia* and *Bathanalia*, for which the family *Typhobiidæ* is proposed, may fairly be held to be an old branch of the stock whence *Strombidæ* arose.



ON A NEW SPECIES OF MYLLITA.

BY W. H. DALL.

The genus *Myllita* was founded in 1850 by d'Orbigny and Récluz on a species named by Récluz *M. Deshayesii*, which was subsequently wrongly united to *Pythina* Hinds by Adams and others. This error was pointed out by E. A. Smith in a discussion of the genus *Pythina* in 1891. The original authors wrongly ascribed a triangular pallial sinus to *Myllita*. The name was subsequently changed to *Myllita* by Kobelt but there does not seem to be ground for the assumption that the original name was based on that of the city. The essential characters of the genus are as follows:

Shell small, equivalve, with a small anterior and posterior dorsal gape, with an obsolete external amphidetic ligament and a strong internal resilium, the latter with a mesial calcareous coating; pallial line simple, with rather large adductor scars; foot strong, byssiferous; the young incubated, as in *Kellia*, within the mother's tissues, numerous, vitreous, smooth; the adult strong, with concentric and radiate or divaricate sculpture, the surface more or less punctate or sagriate; hinge with, in the left valve single lateral laminae in front and behind, with a \wedge -shaped or petaloid cardinal; the right valve is similar but with double laterals, the resilium set in a well marked sulcus below the ventral posterior lamina. Type *M. Deshayesii* Récluz.

Two species have since been described as *Pythina*: *Myllita tasmanica* Tension-Woods (1875) from Tasmania and *M. Stoweii* Hutton (1873) from New Zealand. The former proves from authentic specimens to be quite distinct from *M. Deshayesii*. Smith added, in 1891, *M. auriculata* from Tasmania.

M. Deshayesii has the right cardinal merely grooved, not \wedge -shaped; in *M. tasmanica* both are conspicuously \wedge -shaped. In *M. Stoweii* the right cardinal is small, slender and simple, the anterior laminae very short and stout, the posterior laminae quite long and slender. The resilium in the latter is rather short, and there is a small impressed lunule over the dorsal anterior lamina. In all, the external ligament is feeble but present and amphidetic. The following new species is in the collection of the Academy of Natural Sciences Philadelphia.

Myllita inæqualis n. sp.

Shell obovate, very inequilateral, equivalve, solid whitish, with moderately convex valves, the beaks at about the posterior third, not prominent; sculpture of concentric punctate striæ and, toward the ends of the shell, feeble radial ribs not prolonged to the medial part of the disk from which they appear to divaricate; hinge as in the *M. Deshayesii* except that the cardinal tooth is petaloid rather than \wedge -shaped; posterior laterals short; the pallial line somewhat sinuous or impressed anteriorly, ventral margins of the valves plain.

Lon. 3, alt. 2.4, diam. 1.7 mm.

This was received from South Australia where it was collected by E. H. Matthews, Esq. It is immediately separable from any of the other species of *Myllita* by its form and inequilateral, feebly sculptured valves.

The shell of *M. tasmanica* contained the dried animal and a multitude of minute young fry included in the parental tissues. The dry foot was ligulate with a very large byssal sulcus.

The hinge of *Myllita* seems quite close in its essential features to that of *Lascea rubra*.

NOTE ON ISCHNOCHITON ONISCUS Krauss AND I. ELIZABETHENSIS Pilsbry.

BY E. R. SYKES, B. A., F. Z. S.

In a paper by Mr. Pilsbry¹ specimens previously recorded from South Africa under the name of 'Chiton marginatus' were described as a new species under the name of *Ischnochiton Elizabethensis*. About the same date I expressed² the opinion that these specimens should really be referred to *I. oniscus*. My paper was in type when Mr. Pilsbry's appeared, but I was able to call attention to his views in a foot-note.

Recently I have had submitted to me a series of specimens, carefully preserved in spirit, and have come to the conclusion that Mr. Pilsbry was quite right in his separation of *I. Elizabethensis*, and that the species I now have from Durban, Isipingo, and Umkomaas

¹ NAUTILUS, viii, p. 9 (May, 1894).

² Proc. Malac. Soc., i, p. 133 (June, 1894).

is the true *I. oniscus*. The main difference in sculpture is that in *I. oniscus* the lateral areas are longitudinally striolate, and the median areas more elevated than in *I. Elizabethensis*; further, the girdle scales in the former species are minutely striated, while in the latter they are smooth. The coloration in *I. oniscus* is very variable; it may be pure white; white stained with brown; lilac with or without brown, yellow, or green markings; green or yellow with blackish dots; indeed the variations are Protean. The girdle coloring is in general co-related to the colors of the shell and is usually marked in a somewhat similar pattern. One specimen measures in length 16 mill. and 7 mill. in breadth. Geographically, *I. oniscus* appears to be confined to Natal, and *I. Elizabethensis* to Cape Colony.

NOTES ON NEW AND LITTLE-KNOWN AMNICOLIDÆ.

BY HENRY A. PILSBRY.

Lyogyrus granum (Say).

This species has long been known as an *Ammicola*. It was originally described as *Paludina grana* by Thomas Say, from the "fish ponds at Harrowgate," now within the city of Philadelphia. Say did not describe the operculum. Haldeman merely quotes Say's description in his monograph. Binney does the same in L. and Fr.-W. Sh. N. A. III, p. 86, but he gives a figure of a type, which is still preserved in the Philadelphia collection.

Tryon and Gabb both collected specimens within the city limits, and later it has been found in various localities in Pennsylvania and New Jersey. The following lots are now in the collection of the Academy: Philadelphia (Say, Tryon); Fairmount [Park] (Gabb); Macerating tub at A. N. S., fed from city water main (McCadden); Paradise, Lancaster Co., Pa. (Witmer Stone); near Kaighn's Point, N. J. (M. Schick); Paulinskill, Hainesburgh, and Cedar Lake, Warren Co., N. J. (Pilsbry).

Numerous specimens identified by various conchologists as "*A. grana*," from Canada, Ohio, Illinois, Missouri, etc., prove to be other species upon close examination; and so far as present information goes, Say's species extends from Lancaster Co., and Philadelphia, Pa., and Camden, N. J., northward to the ponds and lakes of north-

ern New Jersey. As Say remarks, it is found "crawling on the dead leaves which have fallen to the bottom of the water."

I have learned by the examination of numerous specimens, that the operculum is multispiral, and the species will, therefore, be transferred to the genus *Lyogyrus* of Gill. This character will readily separate the shell from small forms of *Ammicola*.

Ammicola missouriensis n. sp.

One of the forms labelled "*Ammicola grana*" in the collection of the Academy proves to be a new and very distinct species, which may be described as follows:

Shell minute, imperforate, obliquely ovate, light brown; surface smooth except for slight growth-lines; composed of $3\frac{1}{2}$ very convex whorls separated by unusually deep sutures; apex obtuse, often eroded; the last whorl shortly deflexed in front in adult specimens. Aperture rotund-ovate, being slightly narrowed above, but not angular there; not modified in form by the preceding whorl; moderately oblique; peristome continuous, not closely appressed at the upper left side; columellar margin calloused within, thick. Alt. 1.7, diam. 1.3 mm.; length of aperture 0.8 mm.

Carter County, Missouri (John Wolf).

Much smaller than *Bythinella Aldrichi* Call, shorter, with thick and heavy columellar lip.

Ammicola Walkeri n. sp.

Shell thin, narrowly umbilicate, conic, shaped like *Lyogyrus Brownii* Carpenter; slightly yellowish corneous; thin, smooth, with faint growth-lines. Whorls 4, very convex, separated by deeply constricting sutures, the last whorl rounded below; apex obtuse. Aperture oblique, rather small, mainly basal, a little longer than wide, but nearly circular, the inner margin a trifle straightened above; peristome continuous, in contact with the preceding whorl for an extremely short distance above. Operculum and dentition Amnicoloid.

Alt. 3, diam. 2; length of aperture $1\frac{1}{4}$, width $1\frac{1}{8}$ mm.

Alt. $2\frac{1}{2}$, diam. $2\frac{1}{8}$; length of aperture 1.08, width 1 mm.

Lake Michigan at High Island Harbor, Beaver Is., at 10 meters depth; Reed's Lake, Grand Rapids, Mich.; River Rouge, Wayne Co., Mich.; the types from the first locality mentioned.

This species has been under examination by Mr. Bryant Walker and myself for some months. It was thought at one time to be Say's

granum; but besides certain differences in form, this has an Amnicoloid operculum, while in *granum* it is Valvatoid.

The specimens from River Rouge are smaller and more elongated than average shells of the type lot; those from Reed's Lake are fairly typical in form, but perhaps a little thinner.

The name is in honor of Mr. Bryant Walker, to whose acumen the discovery of the form, and of its distinctness from known Michigan Amnicolidæ, is due.

While investigating the characters of the above species, I have had an opportunity, through the courtesy of Prof. W. H. Dall, to examine the types of *Amnicola parva* and *A. orbiculata* Lea, described from Springfield, Ohio.

A. parva is like *A. limosa* in the umbilicus and obtuse apex, but is smaller with the whorls particularly tumid just below the suture, producing a somewhat shouldered appearance, such as characterizes *Amnicola cincinmatiensis* (Anth.). The same form occurs at Joliet, Illinois, Muscatine, Iowa, etc. It measures alt. 3.8, diam. 3.2 mm. or somewhat smaller. Whether it is a stunted form of *limosa* due to unfavorable station, or is constantly distinguishable I have not ascertained; but it is at all events quite recognizable. The types show more or less blackish incrustation about the spire, and evidently did not occur with Lea's specimens of *orbiculata*.

A. orbiculata is absolutely identical with *A. limosa* var. *porata* Say. The specimens vary between the widely umbilicated *porata* form, and an intermediate form. They are finely grown shells, quite fresh though without opercula, and rather corneous than "yellowish" as Lea says. There was no "mistake" about Lea's "specimen of this species among many small shells which were thrown together in a box, as being collected from our vicinity" (Philadelphia), for *limosa* and *porata* are abundant in both the Delaware and Schuylkill rivers. Two of Lea's type lot measure:

Alt. 5, diam. 4 mm.

Alt. 4, diam. 4 mm.

A NEW SPECIES OF TEREBRA FROM TEXAS.

BY W. H. DALL.

Some years ago the Hon. J. D. Mitchell, of Victoria, Texas, sent to the National Museum a much dilapidated specimen of *Terebra*

from the Gulf coast of Matagorda Island, which could not be identified with any described species. Subsequently Mr. Mitchell sent the upper part of the spire of another specimen in rather better preservation.

A specimen in perfect condition in the hands of a lighthouse keeper was heard of, and a description was deferred in the hope that this shell might be obtained for the purpose. After a long delay the loan of it was secured, but it proved to be merely a common Indo-pacific shell and not the Texan one. The following description is therefore drawn up from the two known specimens in the hope that, attention being thus drawn to it, some one may succeed in securing fresh specimens.

Terebra Texana n. sp.

Shell large, solid, strong, with more than 21 slightly rounded whorls, color pale yellowish with darker yellow or brown flammulae; sculpture of two revolving grooves one on each side of a peripheral slightly raised band, a little narrower than the areas between it and the sutures; the whorls are crossed by numerous small flexuous riblets in harmony with the lines of growth, those on the band and posterior area oblique but nearly straight, those on the anterior area concavely arcuate, these are stronger on the spire and more feeble on the last whorl or two; suture appressed, distinct; last whorl moderately rounded; pillar twisted, strong, with a sharp revolving keel and a feeble revolving ridge above it, continuing up the axis of the shell, but not visible in the aperture where the pillar seems only callous and rounded; siphonal notch and fasciole strong. Length (of 21 whorls) 137 mm., diameter of last whorl 24 mm.

This is the first typical *Terebra* known from the tropical waters of eastern America, and is much stouter and larger than the *T. (Subula) floridana* Dall. I do not find any other species with closely similar sculpture.

GENERAL NOTES.

The death of DR. W. H. DECAMP on July 4th is announced. A biographical sketch will appear in our next number.

COLUMBELLA AVARA IN BRAZIL AND URUGUAY.—Dr. E. von Martens has recently described the form from Maldonado Bay re-

ferred to *Columbella avara* Say, in this journal for May, 1897, as a new species, *C. brasiliana* (Archiv für Naturg., vol. 63, p. 171). The only difference he notes between this and the *avara* is that the intervals between ribs are smooth, not spirally striated. In the series of *C. avara* from Florida examined by me, this supposed distinction proves to be invalid, some of them being quite as smooth as the South American shells. At most, *C. brasiliana* is only a variety. In the same paper, the *Columbella nissera* Duclos (not Sowb.) is renamed *C. japonica*.—H. A. P.

NOTES ON URUGUAY AND ARGENTINE FRESH-WATER SHELLS supplemental to the list in NAUTILUS, X, pp. 76–81.

Amalia gagates Drap. Maldonado, Uruguay.

Chilina Rushii Pilsbry. The largest specimen collected measures: alt. $22\frac{1}{2}$, diam. $13\frac{1}{2}$ mm.; alt. of aperture 16 mm.

Limnæa columella Say. Maldonado, Uruguay.

The specimens seem to be the northern species; and if I am right in the identification it is probably a form introduced by man. No similar *Limnæa* is known to me from South America. *L. columella* occurs as far south as Florida.

Ancylus obliquus B. & S., was collected also at San Carlos R., Uruguay.

The *Sphærium* and *Pisidium* mentioned on p. 80 are as follows:

Sphærium argentinum d'Orb. Creek in the Prado, Montevideo. Mr. E. R. Sykes of London has, with his accustomed good nature, compared specimens collected by Dr. Rush with the types in B. M. He writes: "There is only one valve of *Cyelas argentina*, somewhat damaged, in the Museum, with which, as far as one can judge from such a wreck, your shell is identical."

Pisidium Sterkianum Pilsbry. Same locality.

Pisidium vile Pilsbry. Same locality.

Requesting Mr. E. R. Sykes to compare these with Orbigny's type of *P. pulchellum*, he wrote "These are no specimens of *Cyelas pulchella* in the Museum and none were presented by d'Orbigny, as you will see by Gray's Catalogue. I am, therefore unable to compare these."

Glabaris latomarginatus Lea and *G. tenebricosus* Lea were picked up at Buenos Ayres, dead valves only.—H. A. P.

NOTE ON HALISFYLUS. This group was founded by Dall to contain a small, pillar-shaped shell, *H. columna*, from the east coast

of South America, which has the operculum and dentition of the *Trochidæ*. Subsequently Dr. W. H. Rush dredged the same species with a new one, *H. circumstriatus* Pils., in Maldonado Bay, Uruguay. Dall has referred the Californian *Fenella pupoidea* of Carpenter to *Halistylus*; quite correctly, as it closely resembles the South Atlantic species in operculum and shell contour. There was, however, an earlier *Fenella pupoides* of A. Adams, which was ruled by Tryon to preoccupy Carpenter's name; so that the West Coast species should be called *Halistylus subpupoides* (Tryon).—H. A. P.

RECENT PUBLICATIONS.

REVISION OF THE NORTH AMERICAN SLUGS: BINNEYA, HEMPHILLIA, HESPERARION, PROPHYSAON AND ANADENULUS.¹ By H. A. Pilsbry and E. G. Vanatta.—This admirable paper contains so much that is new and interesting that one can only recommend the malacologist to read it for himself. No mere abstract would do it justice. The whole subject is newly presented so as to bring out clearly the generic and specific characters, and while the work is complete up to date, it is full of suggestions for further investigation, so that the reader is stimulated as well as instructed.

The authors excellently insist at the very beginning, that "all the facts of morphology should be taken into account in systematic classification," and "those who starve their souls on a mere study of the genitalia and oral armature miss the best part of the feast." This is very well shown in what follows. *Prophysaon ceruleum* is not especially marked by its genitalia or radula, but differs entirely from the other species of the genus in the external grooves on the body. *P. humile*, on the other hand, has the grooves much as in the other forms, but differs greatly in the color-markings and genitalia. *P. joliotatum*, again, has a good specific character in the radula. Thus the species of *Prophysaon* could not be well elucidated without examining all their characters, for *the specific peculiarities do not reside in the same organs throughout the series.*

The Arionidæ are divided into three subfamilies, Arioninæ, Binneyinæ (which was proposed by the present writer several years ago) and a new one, Ariolimacinae. Eight genera are recognized,

¹ Proc. Acad. Nat. Sci. Phila. [June 30], 1898, pp. 219-261. Pls. IX-XVI.

Pheuaearion being very properly suppressed. *Prophysaou pacificum* is referred to *P. andersoni*, a proceeding I had not expected, but which is probably correct. In this case *P. andersoni* v. *pacificum* will be the name of the yellow variety, the type being greyish—a dichroism like that offered by the European *Arion subfuscus* Drap. A more perplexing question relates to the probable identity of *P. humile* and *fasciatum*. These slugs are practically alike, except that the former has the jaw striate, while in the latter it is plicate or ribbed. It appears that they occur together at Seattle, so it is hard to consider the difference as due to anything but variation; yet it is certainly a curious case. In *Philomyces* such differences appear to have specific value.

Pheuaearion hemphilli W. G. B., is provisionally regarded as a synonym of *Proph. foliolatum*. It is probably a variety distinguished by having yellow slime covering the body. *Arion subfuscus* has such a form, which is quite distinct from the one having a yellow skin, as in *P. pacificum*.

While the authors had a considerable amount of material at their disposal, it is evident that the region occupied by these slugs has by no means been adequately searched. Not only may it be possible to define several subspecies or races of *Proph. andersoni*, but further new species, and even genera, may be discovered. *Anadenulus* is still only known from one locality, where it was found by Hemphill, and the distribution of most of the species is quite limited; so there is plenty of room for striking novelties in those parts of the Pacific coast region where the foot of the sluggist has never trod.

In the East, those who will hunt in gardens and greenhouses ought surely to turn up some of the European species of *Arion*, in addition to *A. hortensis*.—*T. D. A. Cockerell*.

DESCRIPTIONS OF TEN NEW SPECIES OF TERRESTRIAL MOLLUSCA FROM SOUTH AFRICA.² By James Cosmo Melvill and John Henry Ponsoby.—The new species of this installment are mainly Enneas. A new *Doreasia*, *D. isomerioides*, is described, the new subgenus *Tulbaghinia* being instituted for it. Another *Achatina* is described. The richness of the fauna of South Africa, made known through the researches of Messrs. Melvill and Ponsoby, is remarkable.

² Annals and Magazine of N. H., Jan. 1898.

THE NAUTILUS.

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No. 5.

BIFIDARIA ASHMUNI, A NEW SPECIES OF PUPIDÆ.

BY DR. V. STERKI.

Shell cylindro-conical, with the apex rather acute, base perforated-
rimate; whorls five, convex, with a rather deep suture, regularly
increasing, the last somewhat protracted, with a crest remote from
the aperture and forming a projecting angle at the base, at last
ascending; aperture strongly lateral, rounded subtriangular, equal-
ling one-third the altitude of the shell, highest near its columellar
side, with a sinus above on the palatal side; margin continuous,
strongly everted, broadest so below, without a lip thickening;
parietal lamella very large, strongly curved, nearer the periphery
at its inner end; angular lamella large, at its inner end united with
the side of the parietal, at the outer with the palatal margin, thus
closing the sinus above; columellar lamella large, spiral, ascending
to the body whorl between the parietal and columella; basal lamella
and inferior palatal fold deep in the throat, the former radial, the
latter above it, oblique; superior palatal short, tooth-like, rather
remote from the margin; surface shining, with slight, irregular
striae and microscopically rugulose, as is also the nucleus; shell
horn colored, transparent; lamellæ and folds whitish; alt. 2.0, diam.
1.1 mill.

Habitat: Arizona and New Mexico.

The soft parts could not be examined. In one living specimen,
the foot and head were almost colorless, the mantle was slate-
colored.

In size, shape and color, our species rather resembles *B. procera* Gld., but is somewhat more conic above, and less slender. In the formation of the last whorl and the aperture it stands near *B. contracta* Say, but is very different as to the formation of the angulo-parietal lamella and the presence of a strong, transverse basal. It is a highly remarkable and significant species, being intermediate between different groups, and showing strong features of its own. No other species of the genus has the angulo-parietal lamella so highly developed.

It is somewhat variable, in the few specimens seen; the height varies from 1.9 to 2.3 millimeters, the color from pale to deep horn; the parietal lamella in one New Mexico specimen is more tortuous and so large as to cover from sight the whole inferior palatal fold, which is visible only from the outside, and parts of the columellar and basal lamellæ.

The first three specimens seen were from the Santa Rita Mts., Arizona, kindly forwarded for examination and description by the U. S. National Museum, and at the request of Dr. Wm. H. Dall, the species was named *B. ashmuni*. Later, two other examples, from Cook's Peak, N. M., were sent, also by the National Museum. For one specimen I am indebted to Mr. T. D. A. Cockerell, who collected it at Dripping Springs, Organ Mts., N. M.

New Philadelphia, O., July, 1898.

NOTES ON A FEW CHITONS.

BY H. A. PILSBRY.

JAPANESE SPECIES.

From the crevices of some valves of *Ostræa* recently sent to the Academy, I obtained specimens of the following forms.

Tonicia sp. Very young, length $6\frac{1}{2}$ mm.; intermediate valves with 4-6 eyes in a single curved series on the forward part of each lateral area. A series of short, subobsolete grooves in front of the diagonal riblets. Head valve with 8 radial series of eyes. This is probably a new form, but too young for characterization. It is noted here because *Tonicia* is a genus new to the Japanese fauna. Locality, Yokohama, on *Ostræa denselamellosa*.

Several valves of a different *Tonicia* with rugose lateral areas and head valve, lirate pleural tracts, and sparse, excessively minute eyes also occurred.

Ischnochiton comptus Gld.

Ischnochiton Mitsukurii n. sp.

Shell small, elevated, carinated, the side slopes slightly convex; whitish, profusely speckled and clouded with brown, which color predominates toward the periphery.

Valves not beaked, the sutural margins straight; lateral areas somewhat raised, sculptured with three or four very shallow, inconspicuous, radial sulci, hardly visible on some valves; the diagonal line not conspicuous; entire surface cut into a fine, even granulation by the intersection of a series of forwardly converging with somewhat stronger forwardly diverging grooves. Anterior valve evenly granular; posterior valve evenly granular, with central, scarcely projecting mucro, the slope behind it straight.

Interior with the valve callus delicate purple; in front of it and at the insertion plates green. Suturel laminae small, widely separated by a wide sinus. Slits in valve i, ; in valves ii to vii, 1-1; in valve viii, 11. Teeth short, smooth; eaves narrow and solid.

Girdle compactly covered with small, rather coarsely striated scales, measuring 0.14 mm. in average width.

Length about 8 mm. Angle of divergence 90°.

Japan. Exact locality not known. The name is in honor of the well known Japanese zoologist.

SOCORRO ISLAND, off Cape St. Lucas.

A few species were collected by Mr. R. C. McGregor some time ago, and kindly presented to the Academy.

Chiton articulatus Sowb. Very large specimens, measuring 90 mm. long.

Chatopleura sp. undet. A species allied to *Ch. columbiensis* but with very few pustules on the lateral areas. The surface having suffered from immersion in strong formalin, it is hardly in condition for description.

Trachydermon dentiens (Gld.).

Rather small, black with indistinct dirty yellowish speckling and the usual sutural dots. Gills ambient, 15 on the right, 13 on the left side. Socorro Island lies over 500 miles south of the southernmost previous locality for this species.

LIST OF MARINE SHELLS COLLECTED AT PORT GUEYDON, KABYLIA,
WITH DESCRIPTION OF A NEW CYCLOSTREMA.

BY C. F. ANCEY.

The following is a list of marine shells mostly collected by the writer during a part of the summer of 1895. A few not personally collected are also included here and these are marked with an asterisk. Much attention has been paid to the minute shells; thus the larger and less interesting ones have been somewhat neglected, and there is but little doubt that some, not rare indeed on the North African shores, are also to be found at Port Gueydon. This is not so good a locality for collecting as many other places visited by me, but as no list of marine shells of Kabylia has hitherto been published I thought the present one should be useful; moreover I discovered here some little known or very rare forms, two of which at least I consider as new.

- | | | | |
|---|---|--|---|
| <i>Murex trunculus</i> Lin. | One specimen is unusually large and has an orange-tinged aperture. Others are rather small, but very thick. | <i>Nassa mutabilis</i> Lin. | |
| <i>Ocenebra Edwardsi</i> Payr. | | <i>Triton nodiferus</i> Lam. | |
| <i>Ocenebra aciculata</i> Lam. | Both alive. | <i>Mitra Savignyi</i> Payr. | Living specimens. |
| <i>Muricidea cristata</i> Brocchi. | Fragments only. | <i>Mitra ebenus</i> Lam. | Living. |
| <i>Purpura haemastoma</i> Lin. | | <i>Marginella miliaria</i> Lin. | Living. |
| <i>Pseudomurex Meyendorffi</i> Calc. | A single specimen, found under a stone, at low water. | <i>Marginella Philippii</i> Monter. | Living. |
| <i>Pisania maculosa</i> Lam. | | <i>Marginella clandestina</i> Brocchi. | Living. |
| <i>Pisania Orbigny</i> Payr. | | <i>Columella rustica</i> Lin. | Living. |
| <i>Euthria cornea</i> L., f. <i>minor</i> . | | <i>Mitrella scripta</i> Lin. | Living. |
| <i>Cyllene granum</i> Lam. | | <i>Cassis sulcosa</i> Brug. | Empty shells. |
| <i>Nassa incrassata</i> Ström. | | <i>Natica Dillwyni</i> Payr. | |
| <i>Nassa costulata</i> Ren. | | <i>Scala communis</i> Lam. | |
| <i>Nassa costulata</i> Ren., f. <i>minor</i> . | | <i>Opalia crenata</i> Lin. | Very rare. |
| <i>Nassa costulata</i> Ren., f. <i>minor-levis</i> Monterosato. | | <i>Cioniscus unicus</i> Mont. | A single living specimen. A littoral species. |
| | | <i>Odostomia turrata</i> Hanley. | Rare. |
| | | <i>Odostomia rissoides</i> Hanley. | |

- Odostomia* sp.? (A very small species, not identified, found alive with the *Cioniscus*.
Auriculina dilucida Monter.
Auriculina scandens Brugnone.
Parthenina excavata Phil.
Parthenina turbonilloides Brusina.
Parthenina monozona Brus.
Parthenina Jeffreysi, Bucq., Dautz., Dollf.
Parthenina tricincta Jeffr.
Parthenina scalaris Phil.
Parthenina gracilis Phil.=*emaciata* Brusina.
Parthenina interstincta Mont.
Turbonilla obliquata Phil.
Turbonilla lactea Lin.
Chemnitzia pallida Mont.
Eulima polita Lin.
Eulima distorta Desh.
Eulima intermedia Cantr.
Eulima incurva Ren.
Eulima microstoma Brus.
Cerithiopsis minima Brus.
Cerithiopsis tubercularis Mont.
Cerithiopsis bilineata Hoernes.
Cerithiopsis Metaxa Delle Chiaje.
Conus Mediterraneus Hwass.
Hadropleura septangularis Lin.
Mangilia tæniata Desh.
Mangilia multilineolata Desh.
 Light and dark-colored specimens.
Defrancia Philberti Michaud.
Lachesis Foliæ Delle Chiaje.
Lachesis turritellata Desh.
Lachesis retifera Brugnone.
Trivia Europæa Mont.*
Cerithium rupestre Risso=*C. mediterraneum* Desh.
Bittium lacteum Phil.
Bittium Jadertinum Brusina.
Bittium reticulatum daCosta.
Triforis perversus Lin.
Littorina neritoides Lin.=*cærulescens* Lam.
Rissoina Bruguieri Payr.
Barleeia rubra Ad. var. The Algerian variety, brown with the base white around the columella.
Alvania Algeriana Monterosato.
Alvania Algeriana. Dark variety.
Alvania Montagui Payr.
Alvania lineata Risso.
Alvania pagodula Bucq., Dautz. and Dollfus. For the identification of this and other puzzling species in the present list, I am indebted to the kindness of Mr. P. Dautzenberg. White and colored specimens.
Alvania subareolata Monterosato.
Alvania cimex L. = *calathiscus* Mont.
Alvania Weinkauffi Schwartz.
Alvania subrenulata Schwartz.
Alvania sculptilis Monterosato. Extremely rare.
Alvania rudis Phil.
Alvania mutabilis Schwartz.
Apicularia Guerini Recl.
Apicularia similis Scacchi.
Apicularia dolium Nyst.
Apicularia dolium f. *castanea*. One example, of an uniform brown color.
Rissoa pusilla Phil.

- Rissoa violacea* Desm.
Rissoa simplex Phil.
Manzonina costata Ad.
Cingula semistriata Mont.
Cingula contorta Jeffr.
Cingula contorta f. *major*.
Setia sp.?
Setia Benjaminina Monterosato.
Setia amabilis Monterosato. Living.
Setia micrometrica Seguenza. Living.
Peringiella nitida Brus., var. *elongata* Monterosato. Very rare.
Pisinnua (= *Hagenmülleria*) *punctulum* Phil. = ? *glabrata* Mühlf.
Pisinnua punctulum f. *elongata*. Larger and more produced. Very rare.
Pisinnua (?) *seminulum* Monterosato. This little known species was found living in quantities with *P. punctulum*.
Zippora auriscalpium Lin.
Rissoa sp.?
Rissoa sp.?
Rissoa sp.?
Hersilia Mediterranea Monterosato. Extremely rare.
Vermetus triqueter Bivona.
Vermetus glomeratus Lin.
Cæcum subannulatum Folin.
Truncatella lævigata Risso.
Skenea planorbis Fab.
Homalogyra Fischeriana Monterosato. A single specimen found alive, of this extremely minute but beautiful little species. A littoral species.
- Adeorbis subcarinatus* Mont.
Crepidula uguiformis Lin. In the interior of a large *Turbo*.
Capulus hungaricus L. Young.
Ringicula auriculata Ménard.
Astralium rugosum Lin.
Phasianella (*Eutropia*) *pulla* Lin.
Cyclostrema nitens Phil. Rare.
Cyclostrema Dautzenbergianum Anc. New species. Shell very minute (diam. 1, height $\frac{1}{2}$ mill.), white, depressed, widely and openly umbilicated; spire short, obtuse, convex, but little raised above the level of the last whorl. Whorls 3, rapidly increasing, with regular and delicate arched costellæ, the last one furnished besides these with three conspicuous raised and revolving liræ, the lower one below the periphery. Aperture somewhat oblique, circular, entire. A full description and figure of this delicately sculptured little shell will be given at some future time. Only two specimens collected.
- Another very distinct and also new species from Algiers differs from the former in lacking the riblets and in having a very minute spiral striation, both above and below. There are only two revolving keels below the middle of the last whorl, the lower one being around the umbilicus, and the spiral sculpture is quite con-

- spicuous in the latter. For this very scarce and distinct species, I would propose the name of *C. Monterosatoi* Anc. A single specimen was obtained. Very rare.
- Gibbula adriatica* Phil. Rare.
- Gibbula Racketti* Payr. Living and abundant on Algæ.
- Gibbula Drepanensis* Brugnone. Living specimens, but very small.
- Gibbula varilineata* Michaud. Very common.
- Gibbula Richardi* Payr. Also very common.
- Gibbula varia* Lin. Somewhat rare.
- Gibbula villica* Phil.
- Trochocochlea turbinata* Born.
- Trochocochlea articulata* Lam.
- Zizyphinus depictus* Desh.
- Zizyphinus Gravinae* Monterosato. Living, on Algæ, but not very common.
- Clanculopsis glomus* Phil.=*C. fussiani*, var. *cingulata* Weink. A few living specimens.
- Schismope striatula* Phil. Living specimens in various stages of growth. A littoral species.
- Haliotis lamellosa* Lam.
- Fissuridea græca* Lin.
- Fissurella nubecula* Lin.
- Emarginula tenera* Monterosato. Rare.
- Emarginula solidula* Costa.
- Tectura unicolor* Forbes.
- Tectura virginea* Müll. Living near the the shore, on stones.
- Patella cœrulea* Lin. Abundant.
- Patella cœrulea* L., var. *Tarentina*, von Salis. Also very common. The Patellas are edible mollusca on the coast.
- Patella lusitanica* Gm. Rare.
- Patella aspera* Lam.
- Siphonaria Algesiræ* Quoy. Not common. Found with *Patella*. Probably the most eastern locality for the species.
- Utriculus truncatulus* Brug.
- Utriculus umbilicatus* Mont.
- Utriculus striatulus* Forbes = *cuneatus* Tiberi.
- Utriculus minutissimus* Martin.
- Volvula acuminata* Brug.
- Haminea elegans* Leach.
- Aplysia virescens* Risso.
- Lepidopleurus siculus* Poli.
- Lepidopleurus Algesirensis* Capellini.
- Lepidopleurus Rissoi* Payr.
- Lepidopleurus Meneghini*, var. (?) *Dautzenbergi* Anc. Only two specimens. I extract the following note from M. Dautzenberg's observations on my shell: "Je possède un exemplaire semblable de Sardaigne étiqueté *Chiton Rissoi* Payr., par le Dr. Tiberi, Ces deux spécimens qui concordent absolument, ne peuvent être rapprochés que du *Chiton Meneghini*, Capellini (Journ. de Conch., 1858), mais ils possèdent sur les aires latérales des valves des côtes ou plutôt des séries de tubercules rayonn-

antes beaucoup plus saillantes et moins nombreuses; il n'y existe non plus aucune trace des sillons transverses ondulés qui ornent d'une manière très-caractéristique cette partie du test chez le *Ch. Meneghinii*, ainsi que chez le *Rissoi*. L'assimilation qu' a faite Monterosato du *Meneghinii* au *Rissoi* dans sa monographie des *Chiton* de la Méditerranée paraît déjà un peu forcée, mais pour ce qui concerne votre coquille, elle me paraîtrait tout à fait inadmissible." (Dautz., in litt.)

Not having seen an authentic specimen of *Meneghinii*, I now prefer to make this a variety of the latter, although I am reasonably certain it will eventually be considered as a distinct species. I have much pleasure in associating with it the name of M. Dautzenberg, the well known writer on marine shells.

Chiton fascicularis Lin.

Saxicava arctica Lin.

Mactra corallina Lin.

Donax trunculus Lin.

Donax semistriata Poli.

Dosinia lupinus Poli.

Callista chione Lin.

Venus verrucosa Lin.

Venus gallina Lin.

Tapes decussata Lin.

Tapes geographica Chemn.

Petricola lithophaga Retz.

Venerupis irus Lin.

Cardium exiguum Gm.

Cardium paucicostatum Sow.

Cardium papillosum Poli.

Cardium tuberculatum L.

Lucina reticulata Poli.

Lucina divaricata Lin. (?)

Kellia Geoffroyi Payr.

Montacuta sp.?

Lepton sp.?

Lasca rubra Mont.

Cardita calyculata Lin.

Chama gryphoides Lin.

Astarte triangularis Mont. Very rare.

Nucula nucleus Lin.

Area Noë Lin.

Area lactea Lin.

Pectunculus violacescens Lam.

Very common and sometimes used for food and bait.

Modiola barbata Lin.

Modiola Petagne Scacchi.

Modiola Adriatica Lam.

Mytilus africanus Chemn.*

Mytilus minimus Poli.

Modiolaria costulata Forbes.

Lithodomus lithophagus Lin.

Pecten varius Lin.

Lima tenera Turton.

Lima squamosa Lam.

Anomia ephippium Lin.

Ostrea cochlear Poli.*

Argiope cuneata Risso.

Argonanta Argo Lin.

Octopus vulgaris L.

Since writing the above, I saw, from Dr. Vayssiére's studies on *Homalogyra Fischeriana* (No. 110 of the present list) that the above

named shell was generically distinct from *Homalogyra* and must be labelled *Ammonicera Fischeriana*. Altogether, I am not quite certain that my shell is really the same as the one referred to by Dr. Vayssi re. It is smaller, *horny*, with 3 brown lines, has only 3 whorls and is but striate, lacking the very remarkable distant and regular sulci somewhat like those of *Spirula Peroni*.

NOTES ON THE GENUS ODONTOSTOMUS.

BY HENRY A. PILSBRY.

This group of peculiar land snails is widely spread in southern South America, extending from middle Brazil south well into Patagonia. It is not known to occur in the valley of the Amazon or its tributaries, and is absent in and west of the main chain of the Andes.

It is allied to *Auctus*, *Tomigerus* and *Anastoma*, all Brazilian genera. In conjunction with Mr. E. G. Vanatta I examined the species in the collection of the Academy some time ago, and we agreed that the following subgenera may be distinguished, based mainly upon apical sculpture :

1. ODONTOSTOMUS Beck (s. str.), type *pantagruelinus* Moric.
2. CYCLODONTINA Beck (restricted), type *pupoides* Spix, *inflatus* Wagner.
3. MORICANDIA Pils. & Van. (n. s.-g.), type *fusiformis* Rang.
4. SPIXIA Pils. & Van. (n. s.-g.), type *spixii* Pfr., *wagneri* Spix.
5. PLAGIODONTES Doering, type *dentatus* Wood.
6. MACRODONTES Swains., type *odontostomus* Sowb.

Typical *Odontostomus* includes the largest and most solid forms, with very large aperture-teeth and folds; all are from eastern Brazil; *Moricandia* is also a Brazilian group. Part of the species, such as *angulatus* Wagn., *auriscervina* F r., *fusiformis* Rang, *willi* Dohrn., *nasutus* Mart., *bouvieri* Dautz., would naturally be referred, as most of them have been, to *Goniostomus*; but their affinities are with *O. bahiensis*, *punctatissimus*, and other dentate species. *Spixia* has vertical riblets at the apex, as in the Bulimulid group *Orthotouium*. *Cyclodontina*, which we revive in a much restricted sense, is mainly a group of southern Brazil. *Plagiodontes* is an Argentine group, with a host of species, many of which have not been properly defined. The apex is densely wave-striolate. *Macrodontes*

differs from the foregoing in the conspicuous development of a continuous peristome and the strong spiral striation of the earlier whorls. The species are few—*O. odontostomus* Sowb., *grayanus* Pfr., *fasciatus* Dohrn (Novit. Conch. III, p. 473, pl. 102, f. 16, 17), *degeneratus* v. Iher. & Pils., and finally *O. cordovanus* Pfr., for which the subgeneric names *Scalarinella* and *Ciessinia* have been proposed, is probably a slender member of the subgenus *Macrodontes*.

POSTAGE ON NATURAL HISTORY SPECIMENS TO FOREIGN COUNTRIES.

No doubt many of our readers wish to renew or open exchanges with foreign Conchologists, at present impracticable, owing to the fact that letter rates have to be paid on natural history specimens. Reference to this matter was made in THE NAUTILUS, Vol. VII, p. 58 and Vol. X, p. 127. The Academy of Natural Sciences of Philadelphia took the initiative in securing the admission of specimens of natural history to the mails of the Universal Postal Union as "samples of merchandise" and appointed a Committee, which reported as follows:

Your Committee have now but to make its official report of the generally well-known fact that the proposed modification as regards Natural History specimens was adopted at the Washington Congress of the Universal Postal Union in May last. The adoption of this modification is referred to by the Superintendent of Foreign Mails of the U. S. Post Office, Mr. N. M. Brooks, in his Report for the fiscal year ended June 30, 1897, and dated Washington, Oct. 13, 1897. The reference is as follows: Alluding to the work of the Universal Postal Congress, Mr. Brooks says (p. 7), "The following are, however, matters of general interest or importance which it may be well to mention, viz.: . . . (4) Natural History specimens are admitted at the rate and under the conditions applicable to samples of merchandise." The same Report contains the full text of the convention concluded by the congress, and on page 42 contains the paragraph in question (chap. iii, art. xvii, parag. 5) as follows: "There are likewise admitted at the rate applicable to samples, articles of natural history, dried or preserved animals and plants, geological specimens etc., which are not transmitted for a commercial purpose, and which are wrapped in conformity with the general stipulations concerning samples of merchandise." The rate for samples is fixed at 5 centimes for every fifty grams, that is 1 cent for every two ounces. According to art. 28 of chapter i. this Convention is not to be put into execution until January 1, 1899.

Your Committee has, therefore, fulfilled its labors and congratulates the Academy that the end aimed at in the first circular [see the NAUTILUS for

September, 1893, p. 58] issued by the Academy has been completely achieved. This result is the more gratifying in view of the predictions of failure freely expressed when your Committee entered upon its labors. It would, of course, be presumptuous to claim that the Academy's endeavors have been more than one of the factors in this achievement, but in such an international matter every such factor is of great importance.

It may not be amiss to add here, for the benefit of our readers, further extracts from the above quoted Convention of the Universal Postal Union contained in Mr. Brook's Report pp. 27 et seq.

"Packets of samples of merchandise may not contain any article having a salable value; they must not exceed 350 grams [12.35 Avoirdupois ounces] in weight, or measure more than 30 centimetres [11.8 inches] in length, 20 centimetres [7.87 inches] in breadth, and 10 centimetres [3.93 inches] in depth, or, if they are in the form of a roll, 30 centimetres [11.8 inches] in length and 15 centimetres [5.9 inches] in diameter." (chap. i, art. 5, sect. 5).

"It is forbidden: First, to send by mail: (a) sample and other articles which, from their nature, may prove dangerous to the postal employees, soil or injure the correspondence; (b) explosive, inflammable or dangerous substances, animals and insects, living or dead, excepting the cases provided for in the Regulations of detail."* (chap. i, art. 16, sect. 3).

The conditions which must be observed for the transmission of samples of merchandise remain as before—the packages to admit of easy inspection, not to "bear any manuscript other than the name or the social position of the sender, the address of the addressee, a manufacturer's or a trade-mark, number of order, prices and indications relating to weight and size, as well as to the quantity to be disposed of, or those which are necessary to precisely indicate the origin and nature of the merchandise," while articles of glass, liquids, oils, fatty substances and dry powders must be packed to prevent their damaging, or escaping into, the other contents of mails (chap. iii, art. xvli).

*The "Regulations of detail and order for the Execution of the Convention" form chapter iii, from which the most important—to naturalists—of our preceding quotations is taken.

GENERAL NOTES.

SHELLS OF REDDING, SHASTA CO., CALIFORNIA.—Mr. Richard C. McGregor, one of the enterprising ornithologists of California, has been so good as to collect some mollusks at Redding, on the Sacramento River, for the Academy of Natural Sciences. He found a specimen of *Polygyra Roperi*, of which only the original three examples found by Mr. E. W. Roper have been known hitherto. The discovery of "*Ancylus*" *patelloidea* Lea, living and abundant, is the most important find. The list is as follows:

Epiphragmophora mormonum Pfr., one young specimen.

Polygyra Roperi Pils. One specimen.



Vallonia pulchella Müll. "In a yard at base of rose bushes" not before reported from California. Possibly imported with the roses.

Pompholyx effusa Lea.

Planorbis tumens Cpr.

Planorbis parvus Say.

Limnaea adelinae Tryon.

Ancylus oregonensis Clessin.

Lanx patelloidea Lea. This species, originally described as an *Ancylus*, is the only species of Ancylinæ with variegated, opaque coloring. It looks a good deal like *Aemæa testudinalis* var. *alveus* Conr. Notes on the anatomy with illustrations, will be given later.

NOTE ON THE SUBGENUS EUCOSMIA CPR.—*Eucosmia* comprises a number of minute shells like *Phasianella* in smoothness and the stony operculum, but differing in being depressed with very short spire. Carpenter described four species from Cape St. Lucas and Mazatlan,—*variegata* with var. *substriata*, *punctata*, *cyclostoma* and *striatula*. Dall has lately described another *lurida*, from British Columbia; perhaps *Turbo phasianella* C. B. Adams, from Panama belongs here, and *minima* Phil. from Peru pretty certainly does. In the Gulf of Mexico we have *E. brevis* Orb. No species from other than American waters are known to belong here. It has hitherto escaped notice, I believe, that the name *Eucosmia* is pre-occupied in zoology for a group of moths established by Stephens in 1829. The Molluscan *Eucosmia* may therefore be called *Eulithidium* to distinguish it from the group of Lepidoptera.

PUBLICATIONS RECEIVED.

NOTES SUR LA FAUNA DU HAUT TONQUIN, par H. Fischer (Bull. Sci. France et Belg. xxviii, 1898). The present paper relates to shells collected by Dr. A. Billet. Interesting new species of *Camæna*, *Plectopylis*, *Clausilia* etc., are described and figured.

ARMATURE OF HELICOID LAND SHELLS, by G. K. Gude (Science-Gossip iv, No. 44, 45). We have already alluded to this very important series of papers. The present installments continue the genus *Plectopylis*, the following being new: *P. leucochilus*, *P. perrieræ*, *P. blanda*.





WILLIAM HENRY DECAMP.

THE NAUTILUS.

VOL. XII.

OCTOBER, 1898.

No. 6.

WILLIAM HENRY DECAMP.

BY BRYANT WALKER.

Thirty-five years ago, Grand Rapids might fairly have been called the scientific center of Michigan. Through the energy and enthusiasm of a little group of men interested in natural history, the Kent Scientific Institute was organized, and a great deal of good work was accomplished in developing the fauna and flora of the western part of the State.

Prominent among the founders of the infant institution were three men, who were particularly interested in conchology, and through whose efforts the richness of the molluscan fauna of Michigan was developed with a thoroughness that has few parallels in the States west of the Allegheny Mountains.

The names of A. O. Currier, J. A. McNiell and W. H. DeCamp will always be familiar to the students of Michigan who may follow their footsteps in the field of their favorite pursuit.

By the death of Dr. DeCamp, which occurred on July 4th, the last of this little group has been called away from the activities of this life to "the unknown bourne."

Dr. DeCamp was born at Mt. Morris, Livingston County, New York, November 6, 1825. He received his medical education in the medical department of the University of New York and the Medical College of Geneva, New York, where he graduated in 1847. He at once entered upon active practice in his native State, where he remained for eight years. In 1855, compelled by failing health,

he removed to Grand Rapids, Michigan, and resided there continuously until his death. From 1855 to 1857 he was engaged in the drug business, but having been ruined by the destruction of his store by fire in that year, he resumed the active practice of his profession in which he continued until overtaken by his last illness.

He made a specialty of surgery and acquired a large and successful practice. He was a member of the American Medical Association, the Michigan State Medical Society and the Grand Rapids Medical and Surgical Society, and, by the latter two, was, at different times, honored with the presidency. He was the author of a number of papers on medical and surgical subjects, which appeared in the proceedings of these societies and in different medical journals. He was also a member of the American Association for the Advancement of Science, the Academy of Natural Sciences of Philadelphia, and other scientific societies.

Upon the breaking out of the war in 1861, he was commissioned surgeon of the First Michigan Regiment of Engineers and Mechanics, and remained in the service until 1864, when he was mustered out with his regiment. During the winter of 1862-3, he was Post Medical Director at Harrodsburg, Ky., where 1,500 Confederate wounded had been left by General Bragg in his retreat from Kentucky after the battle of Perryville.

From an early day, Dr. DeCamp was an active and enthusiastic student of natural history. Geology, botany, ornithology, entomology and conchology all received his attention and contributed to the fine collection which, in course of many years collecting, was accumulated by him.

It was conchology, however, that, from the time of his removal to Grand Rapids, especially occupied his attention, and his work in this department will be his most lasting monument.

He was an assiduous collector. During his army life he took advantage of his opportunities in the south to pursue his favorite study and thereby acquired many interesting species. This material was forwarded by him to Mr. Currier, and by the latter to Dr. Isaac Lea and other eastern naturalists for determination. A somewhat hasty review of the literature has shown that the following new species were discovered by him during this period:—

Pleurocera currierianum Lea.

Pleurocera bicinctum Tryon.

Goniobasis decampii Lea.

Goniobasis louisvilleensis Lea.

Goniobasis informis Lea.

Eurycalon leaii Tryon.

Campeloma decampii W. G. Binn.

Somatogyrus currierianus Lea.

Unio depygis Con.

Two new species were added to the fauna of Michigan from his collection, viz.: *Succinea decampii* Tryon and *Vertigo morsei* Sterki. The types of *Limnæa desidiosa* var. *decampii* Streng, recently described in THE NAUTILUS, were also found by him.

In 1881, under the auspices of the Kent Scientific Institute, Dr. DeCamp published an elaborate "Catalogue of the Shell-Bearing Mollusca of Michigan." This, which is his only publication in conchology, contains a list of 221 species and 9 varieties, and was the most complete list of the State fauna published up to that time. Eliminating synonyms and doubtful forms, it gives a total of 185 species as now recognized as against 149 species cited in Currier's catalogue of 1868. It also is of particular value as containing descriptions and figures of three species named but never formally described by Currier, viz.: *Limnæa contracta*, *Physa parkeri* and *Anodonta houghtonensis*. He was an enthusiast in his scientific work, and his time and collection were always at the service of his fellow collectors.

Through his generosity the first set of his Michigan shells, upon which his catalogue was based, is a cherished part of the writer's collection, and the remainder of his shells have been deposited in the Kent Scientific Institute, where they "will be kept to benefit and instruct those who come after him."

A DAY ON THE CHICAGO DRAINAGE CANAL.

BY FRANK C. BAKER.

July 30th, the Chicago Academy of Sciences spent its annual field day on that wonderful engineering triumph, the Chicago Drainage Canal, and conchological results of the excursion may be of some interest to the readers of the NAUTILUS.

The day was all that could have been desired, the sun being more or less obscured by clouds, which made collecting more comfortable

than under the boiling sun. The first stop was made at a point a few miles from the city, where the canal cut through the glacial clay or till. In a small stream by the side of the Santa Fé tracks, the conchologists picked up *Vivipara contectoides*, *Planorbis trivolis*, *Sphærium stamineum* and *S. simile*, the first named species being very abundant.

The second stop was made just east of Summit, where the canal cut through blue till, in some places almost as hard as rock.¹ In one corner of the canal at this locality the bank and ground was fairly paved with minute shells perfectly preserved and of a whitish or chalky color. From this spot we collected *Bythinella nickliniana*, *Amnicola limosa*, *A. lustrica*, *Cincinnatiensis*, *Planorbis truncatus*!, *P. campanulatus*, *P. deflectus* and *Valvata tricarinata*, the last two species being represented by thousands of individuals. These mollusks are all referable to the Pleistocene deposits; *P. truncatus* was typical and very rare, as but one specimen was found. From the Desplaines River Mr. Woodruff collected *Alasmodonta complanata*, *A. deltoidea*, *Anodonta grandis*, *Lampsilis luteolus* and *Calyculina truncata*, the later very large.

At Willow Springs, which was the next station, I spent about three-quarters of an hour hunting for *Anodonta imbecilis*, but only succeeded in finding one half grown specimen. This is the only locality, so far as known, for this species in the Chicago area, and we had entertained high hopes of finding a "colony" of them, but such was not to be. The specimen collected was found in a soft, slimy, black mud, filled with broken bottles, tin cans, etc. Under an old bridge we found *Succinea retusa* very plentiful.

A long stop was made at Lemont to enable the palaeontologists to examine the many piles of limestone, which had been blasted from the canal, in search of Niagara fossils. Only a few were found, and those were very imperfect. Some brachiopods, a few mollusks, including several large *Cyrtolites amplicornis*, and an occasional Crinoid or trilobite was all that rewarded the geologists. The small boy got suddenly rich selling the common Niagara Calymene (*C. niagarensis*) at from five to twenty-five cents each, according to quality. No recent mollusks were found.

At Romeo, Dr. H. N. Lyon and myself walked half a mile north to the Desplaines River, and found a good collecting spot where the river ran over a bed of limestone arranged in ledges, and was quite

¹ See Leverett, Bull. 2, Geol. & N., 16 Surv., Chi. Acad. Sci., p. 49.

shallow. Here we found *Planorbis trivolvis*, *P. bicarinatus*, *Limnæa desidiosa* and *Goniobasis livescens*. Among the latter there were many which connected *livescens* with *depygis*, having well marked color bands and a purple tinted columella.

The last stop was made at Lockport where the train waited over an hour, and while the majority of the party studied the bear trap dam, the conchologists "pocketed" their cans and bottles and climbed (or fell) to a good sized creek (a branch of the Desplaines River). *Limnæa palustris* was here so abundant that it could be collected by the quart, and they were all large, fine specimens. Many specimens were very long and pointed and seemed to show a tendency toward *L. reflexa*. The stream was very rapid, and *Limnæa* and *Planorbis* seemed to be the only genera able to live in any numbers. *Physa* was abundant dead, but only three or four living specimens could be found. It decidedly prefers still water in this region. A single specimen of *L. palustris* was found in which the base had suffered some injury, and the aperture was thrown off to the right, leaving a wide and deep false umbilicus. We collected here *Limnæa palustris*, *L. caperata*, *L. humilis*, *Planorbis trivolvis*, *P. bicarinatus*, *Aplexa hypnorum* and *Physa heterostropha*.

Physa heterostropha at this locality shows a wide range of variation. Some are long and cylindrical, others broad and stumpy, and the spire runs from obtuse to pointed. The number of whorls was invariably the same. In this lot one could easily pick out such pseudo species as *gyriua*, *cylindrica*, *parva*, *oleacea* and *sayii*. The writer has recently tried Crosse and Fischer's suggestion in regard to specific characters in the form of the teeth on the radula, but thus far with a decidedly negative result.

The results of the field day, conchologically, may be summed up as follows: Pleistocene species 8, recent species 19. We carried home several quarts of mollusks.

A NEW SPHÆRIUM.

BY F. C. BAKER.

Sphærium lilycashense sp. nov.

Shell differing from typical *striatinum* in being larger, more regularly oval, much more inflated and with the umbones more inflated

and placed nearer the centre; the posterior end is broadly rounded in the variety, while in the typical form it is much produced and somewhat ram-shaped; the color varies from light yellowish horn to rather dark horn, with an occasional zone of yellowish; the surface is smooth and polished, the growth lines being faint on the umbones, but stronger on the ventral border.

Length 14.00, height 11.00, breadth 8.50 mill.

Length 12.50, height 9.75, breadth 7.50 mill.

Habitat.—Lilycash Creek, near Joliet (coll. by J. H. Handwerk).

This variety was referred to Dr. V. Sterki by Mr. Handwerk, and considered by him to be an unusual form of *striatinum*, but he did not consider it distinct from the typical form. After examining a large number of specimens the writer has concluded that it is a form distinct enough for a specific name. Its beautiful polished surface and inflated shell will at once distinguish it from *striatinum*. It is shaped differently from *stamineum* and the beak sculpture is very much finer.

Another form is found associated with the variety which is in a sense intermediate between the typical form and the variety, having a more oval shell than the type, but not being so much inflated as the variety; it is very dark chestnut or dark brown in color. Several specimens of this form had the hinge wholly or partly inverse.

DESCRIPTION OF A NEW SPECIES OF OLIVELLA.

BY JOHN FORD.

Olivella Blanesi n. sp.

Shell ovate, white, somewhat translucent, ornamented with three spiral series of irregularly formed crimson spots, one (of very small spots) at the suture, the others central and basal; the rest of the surface showing a faint reticulation of the same color in some specimens. Whorls 5, spire produced, rather acute; suture chanelled. Aperture half the length of the shell, acuminate above, widest below the middle; basal notch wide, columella very short, vertical, cylindrical and smooth, making a decided angle with the parietal wall, forming a deep sinus; basal fasciole smooth.

Length 8.9, diam. 3.8, length of aperture 4.75 mm.

Length 7.5, diam. 3.2, length of aperture 4 mm.

Locality.—Cardenas, Cuba.

The species has apparently heretofore been mistaken for *O. rosalina*, although the one is quite distinct from the other, especially so in general form, number of spiral whorls, and the non-appearance in *O. Blanesi* of the rose colored base of the columella, which is seldom if ever absent in *O. rosalina*.

A fine suite of these shells has been in my collection for several years, unnamed. Though convinced that they were an undescribed species they remained neglected until I recently found in the fine collection of Mr. Francisco E. Blanes, late of Cuba, a large number of the same form mistakenly labelled *O. rosalina* Duclos. All, or nearly all of this entire lot had been collected by himself near Cardenas, Cuba. A brief explanation and comparison with genuine *O. rosalina* was sufficient to satisfy him of their distinct character, and the result is the new name, *Olivella Blanesi*.

Specimens entirely white, secured at the same locality might well be termed var. *alba*. Some suspicion that these colorless shells might be identical with *O. pura* or *O. bullula* as figured by Reeve being felt, specimens were submitted by a friend to Mr. E. R. Sykes of London for comparison with Reeve's types. To his kind assistance the following report is due: "I have compared your *Olivella* (with Mr. Smith's ever ready helping hand). It does not seem to be either *pura* or *bullula*. *Pura* may not be the actual type, as it is recorded by Reeve as in 'Mus. Metcalfe.' It is much more drawn out than your shell. The one specimen is in pretty good condition and seems never to have had much color marking, certainly not like yours. *O. bullula* here is snow white, but is thin and worn, so may have had some color. It is slightly more elongate and does not show the sinus that your species has in the columella. Very probably yours is new."

A figure will be given later.

AN INTERROGATION IN REGARD TO SEPTIFER BIFURCATUS RVE.,
AND MYTILUS BIFURCATUS CONR.

BY MRS. M. BURTON WILLIAMSON.

Shells that vary from the type sometimes raise a question in regard to the stability of their specific or generic values. Typical shells of *Septifer bifurcatus* Rve. and *Mytilus bifurcatus* Conr. are

unlike in the shape of their valves as well as in the presence or absence of a septum. Yet some shells of the latter resemble the former so closely that it is sometimes necessary to open each shell in order to distinguish one from the other. The approximation appears too close for not only a generic, but a subfamily distinction to be maintained between them. It appears to rest upon the presence or absence of a septum. A shell having the same shape as the typical *Mytilus bifurcatus* has, upon examination, revealed the deck or septum. On December 1, 1888, on one of the wooden piles of the old wharf at Santa Monica, Cal., I found shells of *Mytilus bifurcatus* in company with young examples of *Mytilus californianus* Conr., and some goose barnacles. One specimen was $\frac{7}{8}$ of an inch from umbo to ventral margin, and in its widest part $\frac{5}{8}$ of an inch. It was curved as in the type. There were three other shells, all like this one, only smaller. They were together and attached either by their own or the byssus of *M. californianus*. Three shells were opened and the absence of a septum noted. One specimen got broken and one was sent to another Los Angeles collector. In an exchange with Mr. W. J. Raymond, of Oakland, Cal., the one shell that had not been opened was sent to him, and I was surprised when he wrote that he had found a good-sized "deck in it!" They were all typical *Mytilus bifurcatus* in appearance.

My confidence in the constancy of the form of *Mytilus bifurcatus* was further shaken by receiving what appeared to be four young shells of *Septifer bifurcatus* that Mr. Raymond had received from San Diego. One of these was *without a deck*, and Mr. Raymond called my attention to it as a proof that *M. bifurcatus* could resemble, in shape, a *Septifer* more closely than a *Mytilus*. Here we have an illustration that a shell found among young *Septifers*, and their counterpart externally, is a *Mytilus bifurcatus*, and one shell, in form, that looks like a typical *M. bifurcatus*, proves to be a *Septifer*.

The San Diego examples from Mr. Raymond all have purple interiors, and the Santa Monica example has a white interior. But some shells, collected at one of the "Points" in Los Angeles County and sent for identification by Mrs. E. A. Lawrence, are also white in their interiors. But there is a marked difference between the Santa Monica *Mytilus* and those from the "Point" and San Diego in their outward appearance.

In order to determine the genus to which each belongs, the value

seems to rest upon the presence or absence of a septum. As this generic character may be present or absent in some of the shells found in the same place, an interrogation naturally arises as to the value to be placed upon the septum in separating approximate forms into two different subfamilies, the Mytilinæ and Dreissensinæ.

NOTE ON SEPTIFER BIFURCATUS CONRAD.

BY H. A. PILSERY AND W. J. RAYMOND.¹

Among the shells brought home by Thomas Nuttall from his journey to the Pacific coast and the Hawaiian Islands, were specimens of a mussel which Conrad named *Mytilus bifurcatus*.² Two specimens of this species were presented by Nuttall to the Academy of Natural Sciences,³ where they are still preserved.

Conrad gave the locality "Sandwich Is." for his species; but the specimens were probably from California. In the *Conchologia Iconica*, vol. 10, *Mytilus*, pl. 9, fig. 41 (1851), Reeve figures and describes a specimen from Cuming's collection as *Mytilus bifurcatus* Conrad, giving no locality. I do not know that the interior of this shell has been examined; but Nuttall's shells in the Academy collection prove to belong to the genus *Septifer*, having a well-developed septum or little deck across the apices of the valve cavities. There is no especial reason for believing Reeve's specimen to be a true *Mytilus*; but if they should be, the name *M. bifurcatus* Reeve cannot be retained, on account of the conflict with Conrad's prior *M. bifurcatus*.

As Mrs. Williamson's article (above) shows, Californian conchologists find two species excessively similar externally upon the Cali-

¹ In placing Mr. Raymond's name with my own, it should be mentioned that he is directly responsible only for the passages placed in quotation marks; though indirectly for the positions taken in the remainder of the article.—H. A. P.

² Journal of the Academy of Natural Sciences of Philadelphia, VII, 1834, p. 241, pl. 18, fig. 14.

³ Neither of these shells seems to be the original of Conrad's figure, and probably that particular shell has been smashed and discarded, the specimens having been glued to a card and consequently exposed to such accidents. A nearly complete series of Nuttall's shells is in the Academy Collection, including some not described by Conrad.



fornian coast, one a true *Mytilus*, the other a *Septifer*. As long ago as 1882, Dr. R. E. C. Stearns⁴ noticed this fact. It would seem, therefore, that the shell called *Mytilus bifurcatus* by West Coast conchologists requires another name. I have not seen *Mytilus multiformis* Carpenter,⁵ but from the description and measurements of that species I would consider it a distinct polymorphic species or a composite of two species. In the latter case the smooth form may retain Carpenter's name. At all events, nothing like the variability in sculpture or degree of inflation, which Carpenter says characterize his species, are found in the Californian *Mytilus* under consideration, which is invariably corrugated and never green in color. I would, therefore, in conjunction, with Mr. Raymond, propose that our form "be called *Mytilus Stearnsi*, since Dr. Stearns was the first to definitely show that a true *Mytilus* of this type is found on our coast." "Usually the two species can be separated by external characters. In the *Mytilus* the umbonal (diagonal) ridge is strongly developed, the valves of the adult shell are very deep, and the ventral margin is generally incurved. Inside, besides the absence of the septum, there are several denticles at the angle of the hinge line, which are rather stronger than the corresponding crenulations of *Septifer bifurcatus*; *Mytilus* is also lighter colored ventrally.

"I have no doubt Nuttall's shells came from this State, for from Santa Barbara southward it is an extremely abundant species, covering the rocks in places. The *Mytilus* is smaller and might easily be passed over as the young of *Septifer*. I have many *Septifers* from Santa Barbara, but no *Mytilus* among them. I have *Septifers* from San Diego collected by Crawford, and among these I found the few *Mytilus* mentioned by Mrs. Williamson." *Septifer bifurcatus* was collected by Henry Hemphill at San Hippolite Point, Lower California, and *Mytilus Stearnsi* he found at the same locality and also at San Ignacio Lagoon on the peninsula.

The type of *Mytilus Stearnsi* Pils. & Raym. (plate 4, figs. 1, 2, 3), is a San Diego specimen. So far as the series before me shows, *M. Stearnsi* does not grow so large as *S. bifurcatus*, a length of 25 mm., or one inch being a good size, while *bifurcatus* may measure nearly double that. An "unusually large" specimen of Carpenter's

⁴ Proc. Acad. Nat. Sci. Phila., 1882, p. 241. See also Dall and Orcutt, Proc. U. S. Nat. Mus., 1885, p. 551, and Keep, West Coast Shells, pp. 171, 173. In the latter work Conrad's name is misapplied.

⁵ Mazatlan Catalogue, p. 118.

M. multiformis measured : length 0.45, width 0.24, diam. 0.32 inch. This would be very small for *M. Stearnsi*. As to color, our species seems to be invariably brownish-purple above, with the ventral face straw colored, white beneath the cuticle. None of the specimens I have seen could be called green. Carpenter describes *M. multiformis* as "*purpureo, ad marginum ventralem viridi,*" with a variation "*omnino viridi.*"

Regarding the question raised by Mrs. Williamson, it may be said that all the main genera of *Mytilidae* have both corrugated and smooth species, and experience has shown that the characters upon which the genera are founded, such as the presence of a septum, the position of the beaks and sculpture of the hinge line, are largely independent of the surface sculpture, the latter being a comparatively trivial character. At the same time, it is remarkable that two species of different genera, and so similar in external characters, should be found living together. It is probably a case of convergence of specific characters through the influence of identical external conditions.

NOTES AND NEWS.

The death of Mons. J. C. HIPPOLITE CROSSE, on the 7th of August, removes one more prominent French conchologist from the ranks. For many years editor of the *Journal de Conchyliologie*, Crosse had become known to malacologists the world over as one of most able and industrious workers on mollusca ; and by many conchologists to whom he was personally known and esteemed, his loss will be felt with deep regret. A biographical notice will follow later.

VALLONIA ON THE PACIFIC SLOPE.—In THE NAUTILUS for September, in a note on "Shells of Redding, Shasta Co., California," *Vallonia pulchella* Müll., is quoted as "not before reported from California." In my collection I have this species from Oakland, Cal., collected by Mr. Fred L. Button of that city, and in Dr. J. G. Cooper's Catalogue of West North American Shells, he quotes this species as "circumboreal" and found as far south as "Mono County, California." In "Subalpine Mollusca of the Sierra Nevada," by W. J. Raymond, he reports finding *V. pulchella* var.

costata in one of the cañons—represented by one example. In the same bulletin Dr. Cooper adds additional notes, and he lists *V. pulchella* at Donner Lake and near Truckee, both in Nevada County, California. Of the presence of this species in Oakland, probably Mr. Button could supply more data.—M. BURTON WILLIAMSON.

NOMENCLATURE OF SOME AFRICAN LAND SHELLS.—When studying the African mollusks, I remarked that the name *Ennea microstoma* Smith, proposed for an African species, already is preoccupied by Möllendorff for a Chinese species. Hence I should propose to call the former *E. strictilabris*; also *Vertigo thaumasta* Melvill & Ponsonby is the same as *V. sinistrorsa* Craven; also *Hapalus* is preoccupied in entomology, and must be called *Curvella* Chaper; also *Faula* preoccupied in Coleoptera, must be relegated to the synonymy of *Fauxulus*, Schaufuss.—C. F. ANCEY.

ISCHNOCHITON ONISCUS.—The words “lateral” and “median” were transposed in line 2, p. 42 of the August number, in describing this species.

NEW PUBLICATIONS RECEIVED.

REVISION OF THE MARINE GASTROPODS REFERRED TO CYCLOSTREMA, ADEORBIS, VITRINELLA and related genera, with descriptions of some new genera and species belonging to the Atlantic Fauna of America, by Katharine Jeannette Bush (Trans. Connecticut Academy, x). An attempt to define and limit these difficult groups by determining their type species, which are mostly figured, and enumerating the Atlantic coast species. Several described groups, such as *Cullomphalus* Ad. & Ang. are omitted, and the details of dentition are rather scanty and insufficiently illustrated, but the paper is sufficiently complete to be of very great assistance to those who in future work upon these genera. The new genera *Lissospira*, *Leptogyra*, *Mölleropsis*, *Choristella*, *Cyclostremella* are established.

THE NON-MARINE MOLLUSCS OF ESSEX. By Wilfred Mark Webb.—Reprint from *The Essex Naturalist*, Vol. X, pages 27-48 and 65-81, 1897.



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No. 7.

SHELL COLLECTING AT MT. DESERT, MAINE.

BY JOHN B. HENDERSON, JR.

The coast of Maine has been thoroughly explored by biologists for many years, and has, indeed, become a classic ground in the annals of American conchology. Frenchman's Bay and the waters immediately about Mt. Desert seem to have been less exploited than other localities in Maine. Collectors of marine invertebrates going "down East" generally take their dredges and trawls to Casco Bay, or, if more ambitious, they hurry on to the famous old collecting region about Eastport and Grand Menan. A few notes from the shores of Mt. Desert Island may, however, prove acceptable.

Frenchman's Bay is a large body of water with a wide pass out to sea which is somewhat obstructed with bold, rocky islands. Through the openings between these islands the twelve and fourteen feet tides flow with great swiftness, scouring out the channels to a depth of from forty to fifty fathoms. In these deep places a tough form of algae clings tenaciously to the rocky bottom, and harbors within its tangle of branches and stems a vast multitude of small crustaceans (often phosphorescent), many curious star-fishes, and a wealth of molluscan life. *Margarita cinerea*, an occasional *Scala groenlandica*, abundant *Trophon clathratus*, *Bela turricula* and *decussata*, *Cemoria noachina*, young *Sipho*, and the lively little *Nassa trivittata* were observed. Dredging in these deep, rocky places is attended with many difficulties, but often yields satisfactory results.

The general average depth of the bay is twenty to thirty fathoms. The bottom is mud, with patches here and there of hard, pebbly

ground, becoming rocky. These stretches of hard bottom are often the resort of great numbers of *Pecten magellanicus*, known to the natives as "scallops." This giant among the Pectens is gathered somewhat extensively for the markets, but does not make a particularly dainty dish. It is best collected by sinking or dragging along a fishing-line over the bottom of the scallop beds. The big fellows seize the line viciously and permit themselves to be hauled out of the water; unfortunately, adult specimens are usually badly eroded.

Such stations contain *Crenella glandula*; they swarm with *Nassa trivittata*, and seem literally to be paved with *Nucula proxima*. The mud bottom is fairly rich in *Lunatia triseriata*, *Yoldia limatula* and *thraciiformis*, and again *Nucula proxima*. *Leda tenuisulcata* is occasionally met.

Passing out to the open sea the water very gradually deepens, and patches of shelly bottom are frequent. These places, made up for the most part of broken shells, fine gravel and sand, offer good rewards to the collector. *Dentalium entalis*, *Turritella erosa*, *Pecten islandicus* (dead), *Cardium pinnulatum*, *Astarte sulcata* and *Terebratulina septentrionalis*, the latter, invariably imbedded in sponges, may be readily obtained.

Upon the rocks between tides, the usual Litorinas, together with *Purpura lapillus*, are always abundant, a splendid red variety of the latter occurring near Otter Cliffs. Just below the low-tide mark, *Chrysodomus decemeostatus* and a degenerate form of *Buccinum undatum*, range. Their home among the rocks protects them from the dredge, but they may be easily tempted by bait. In all rocky places of moderate depth the pretty little *Margarita undulata*, tinged with red and iridescent within, can be found.

On flats, exposed by the receding tide, of which there are a few in the vicinity of Mt. Desert, the soft clam, *Mya arenaria*, lives buried several inches below the surface. The number of these creatures annually taken by fishermen for bait from the "Bar" at Bar Harbor, figures well into the hundreds of thousands, yet the supply never seems to diminish.

A few dead valves of *Arctica islandica* indicates the presence of this boreal species in the bay. A more thorough examination of the depths of the harbor would undoubtedly reveal many more interesting things to the explorer than I came across in my two or three moderately successful dredging expeditions at Bar Harbor last summer.

A NEW POLYGYRA FROM NEW MEXICO.

BY W. H. DALL.

Polygyra miorhyssa n. sp.

Shell depressed, dark brown with about five and one third rounded whorls, the periphery somewhat above the middle of the outer whorl; suture distinct, umbilicus small, deep, narrowing rapidly toward the apex; surface polished, with microscopic revolving striæ and fine, small, slightly irregularly distributed oblique transverse ridges; aperture subcircular with a reflected white peristome continued over the body by a thin, translucent callus; within the aperture is small, oblique, white parietal tooth, the reflected peristome has an obscure thickening inside the peripheral part, and another more distinct inside the base. Alt. 8.5, lat. 15.5 mm.

Habitat: Sierra Blanca, Lincoln Co., New Mexico, Rev. E. H. Ashmun and C. H. Tyler Townsend, from localities between 7,500 and 8,500 feet above the sea.

This species is one of a group comprising the species described by me under the names of *Polygyra Ashmuni*, *pseudodonta*, *chiricahuana* and *rhyssa*, all characteristic of high altitudes in the mountains of New Mexico and Arizona, and doubtless derived from a single original stock. To this *P. Levettei* also seems allied, or, perhaps, is conchologically intermediate between the above group and the species like *P. Mearnsii*. The present species is most nearly related to *P. rhyssa*, which is a coarser, more rugose and lighter colored shell and usually of larger size.

DESCRIPTION OF A NEW AMPULLARIA FROM FLORIDA.

BY WM. H. DALL.

Ampullaria Pinei n. sp.

Shell large, thin, with a depressed spire, polished surface and five rounded whorls separated by a narrowly channelled suture; sculpture of obscure incremental lines and numerous indistinct low revolving ridges, variably prominent in different specimens; besides these there are very fine, sharp, minute, obscurely beaded revolving threads with rather wide interspaces, which are occupied by microscopic revolving striæ; this sculpture is often more or less obsolete, but traces of it can usually be found on any specimen; color of the

shell dark livid olive, often lighter near the aperture with a broad band near the suture and numerous, narrow revolving bands below, of a paler olive; near the base there is usually an area somewhat darker; throat deep livid purple, with a light subsutural band, and the smaller bands visible by transmitted light, the peristome bordered with a conspicuous vitreous red margin, especially on the inner lip; aperture rounded above and below, with a thick parietal callus, umbilicus narrow and deep. Alt. of shell 60, of last whorl 58, of aperture 47; lat. of shell 65, of aperture 35 mm. Operculum thin, horny, externally finely concentrically striated, and of a blackish olive-green.

Habitat: Homosassa River, Florida, collected by Mr. George Pine.

This species is related to *A. depressa* Say and *A. Ghiesbreghtii* Phil., but separated from both by its form, sculpture and color. It is most readily recognized by its deep red border to the aperture, wide shell and very depressed spire.

NEW POLYGYRAS FROM WHITE MOUNTAIN, NEW MEXICO.

BY T. D. A. COCKERELL.

Polygyra altissima n. sp.

Shell with $5\frac{1}{2}$ whorls, pale yellowish-brown, suture moderately deep, spire flattened and low, periphery rounded; apical whorls nearly smooth, with little sculpture as far as the middle of the penultimate whorl, after which the shell becomes distinctly and strongly obliquely ribbed, the ribs near the aperture being particularly strong; the last whorl bears about 48 of these ribs. Umbilicus narrow and deep. Aperture obliquely semilunar; the peristome subcircular except where interrupted by the parietal wall, strongly thickened, recurved with a sharp edge, yellowish-white, without teeth. No parietal denticle. Diam., max. 12, min. 10 mm.; alt. 6 mm.

Hab.—Highest summit of White Mountain (Sierra Blanca), Lincoln Co., New Mexico, altitude 11,092 feet; three under a rock, Aug. 14, 1898. Collected by Prof. C. H. T. Townsend.

The specimens are practically alike, and differ greatly from *P. rhyssa* Dall, to which they are most nearly related, and from which they are presumably descended—or ascended, I suppose we should say, considering the altitude at which they are found!

Compared with *P. rhyssa*, *P. altissima* is not only much smaller, but also much flatter, with the aperture consequently narrower and the last whorl less evenly rounded. I have specimens of *P. rhyssa* from the original locality, collected by Mr. Ashmun; the species was also found by Prof. Townsend in the White Mountains, at an altitude of about 8,000 feet.

The following form, also from the White Mountains, seems worth defining:

Polygyra rhyssa var. *hyporhyssa* v. nov.

Like *P. rhyssa* in size and form, but umbilicus wider, exposing the penultimate whorl; sculpture finer, consisting of striæ rather than riblets. Collected by Prof. C. H. T. Townsend on the lower slopes of Sierra Blanca, N. M., above head of Ruidoso Creek, in aspen belt, about 9,500 ft. alt., Aug. 14, 1898. One specimen, diam., max. 15, min. $12\frac{2}{3}$, alt. 9 mm. This is clearly a variety of *rhyssa*, and is not the same as Dall's MS. *P. miorhyssa*, which appears to me to be a perfectly distinct species.

NEW PISIDIA.

BY DR. V. STERKI.

P. roperi n. sp.

Mussel rather large, strongly inflated when mature, very little so when young; oblong to ovoid in outline, margins regularly curved, with no projecting angles (in the adult); scutum and scutellum scarcely marked; beaks moderately posterior, very broad, surface somewhat glossy, with irregular, not sharp, striæ and some strongly marked lines of growth; color of the dry shell straw to yellowish-horn, often with one to several fine, concentric lines of purple; shell rather thin, nacre whitish, muscle insertions scarcely marked, hinge comparatively fine and short; cardinal teeth quite small, the right one moderately curved, slightly thickened at the posterior end; the left ones very short; the inferior slightly angular, truncated or pointed on top, the superior sometimes almost obsolete; lateral teeth short, small, scarcely projecting into the interior; ligament rather fine.

Long. 5·5, alt. 4·4, diam. 3·8 (4) mill.

Long. 4·5, alt. 3·7, diam. 3·0 mill.

Soft parts pink, especially so the foot and mantle edges; the living mussel appears pale red; but the color soon fades away after the death of the animal; it is also very pale, scarcely noticeable in the young, becoming more intense with the age of the animal.

Habitat: Maine, Rhode Island, Indiana, Illinois and Minnesota; probably also Utah, California and Washington.

Pis. roperi can not be mistaken for any other species except some forms of *P. abditum* Hald., but is at once distinguished from the latter species by its comparatively very broad beaks, the more elongated and more regular outline, the different appearance of its surface, usually the lighter color, the comparatively finer and shorter hinge, and, in the living animal, by the pink color of the soft parts, shining through the shell. It is the only species in which that color has been noticed so far, yet it remains to ascertain whether this be a constant character. But, however that may be, the species is valid. From several places specimens were obtained in company with *P. abditum*, and at once recognized as distinct. It was first noticed among *Pisidia* sent by Mr. E. W. Roper, in whose honor it is named. The largest and most beautiful specimens were collected in Higginbotham's spring, near Joliet, Ill., by Messrs. J. H. Ferris and G. H. Handwerk, who, from April, 1896, to this summer, repeatedly forwarded me lots of living specimens together with *P. abditum* and another species.

There are specimens from the Wasatch Mountains, Utah (sent by Mr. Bryant Walker), the Sierra Nevada (Mr. Roper), and Seattle, Wash. (Mr. P. B. Randolph), resembling the present species, although somewhat different from it as well as among themselves, and it is with some doubt that they were referred to *P. roperi*.

Pis. fallax var. *septrionale* n.

Differs from the type by the following characters: it is more rounded in outline, less inflated, the beaks are less prominent and without ridges; the striation is less sharp; usually there are whitish dots and irregular blotches, evidently caused by disease.

This seems to be a northern form. Pine and Mountain Rivers on the south shore of Lake Superior, collected by Mr. Bryant Walker; Clear Water River, Minn., in company with rather typical and intermediate specimens (Mr. H. E. Sargent), Little Madawaska River at New Sweden, and Aroostook River at Caribou, Me. (Mr. Olof O. Nylander), from the latter river in 1896 and '98, and there are some specimens with distinct ridges on the beaks, or indications of such.

It may be mentioned here that typical *P. fallax* has been collected in the Sand Creek, Ottawa Co., and Plaster Creek, Kent Co., Mich., by Dr. R. J. Kirkland.

Pis. walkeri var. *mainense* n.

Differs from the type in the following points: it is smaller, shorter, especially so the anterior part, and less saccate. But it resembles *P. walkeri* by the small beaks situated near the very short and truncated posterior end, the surface sculpture and color, and the thin shell. Placed side by side with typical specimens, which, in outline, have a marked resemblance with *P. virginicum*, it would hardly be ranged under the same species. But by comparing numerous specimens from different places, I came to the conclusion that they are not distinct.

Habitat: Different waters near Caribou, Aroostook Co., Maine, collected by Mr. Olof O. Nylander.

New Philadelphia, Ohio, Sept., 1898.

HALLOTIS CRACHERODII Var. **CALIFORNIENSIS** Swainson.

BY H. A. PILSBRY.

In his "Zoological Illustrations," Vol. II, pl. 80 (1821-2) Swainson describes and figures the "small-holed Californian ear-shell," which differs, he states, from the ordinary black ear-shell by its more numerous smaller holes, deeper spiral, differently shaped outer lip, etc. Mr. Fred L. Button, of Oakland, has lately forwarded to me a specimen from Guadaloupe Island, off Lower California, which agrees well with Swainson's account and figures, and unmistakably indicates, I think, a valid variety of *H. Cracherodii*. Mr. Button writes: "It came to me as *H. Cracherodii* var. *californica* Stearns, as I wrote you. On looking it up I find it mentioned several times by Dr. Carpenter, both in his Brit. Asso. Report, 1856 (pp. 174, 199, 291, 320, 350 and 351), and in his Smithsonian Report, 1872 (pp. 6, 6, 13, 84, 100 and 137). In the latter, he speaks of it as the rare var. of *H. Cracherodii*, and calls it an 'extreme var. of *H. cracherodii*,' having 10-11 holes (p. 13).

"Swainson's *H. californiensis* was figured in Zool. Ill., II, 80, with 10 small holes. I have one with 16 holes. The specimen I send is from Guadaloupe Island, Lower California, nearly 1,000 miles south



of Monterey, the home of the type *H. Cracherodii*. The type runs usually 5-7 holes, with rarely as few as 2-4" or as many as 8 or 9. The specimen now before me measures: extreme length, 112, width 87, convexity 38 mm. There are 12 holes, with the thirteenth nearly closed. The holes measure 2 mm. diam. except the first and third, which are a little smaller. A young specimen in the collection of the Academy measures 74 mm. in length and has 9 holes, with the tenth nearly enclosed. This variety is probably restricted to the south, and, perhaps, to this single island. It will be interesting to learn whether other West Coast collectors have the form, and what its distribution is.

C. E. BEDDOME.

BY S. RAYMOND ROBERTS.

"Died on Thursday, September 1, 1898, at his residence, 'Hillgrove,' Brown's River road, near Hobart, Tasmania, Charles Edward Beddome, retired Lieutenant of the late Indian Navy, aged 59 years."

In the death of Mr. Beddome, natural science, particularly as relating to Australian malacology, has met with a severe loss, for he was a careful observer and an indefatigable worker in its field. This has been evidenced through his various writings upon the subject, his last contribution to conchological literature being an admirable paper entitled "Notes on Species of *Cypræa* Inhabiting the Shores of Tasmania," which appeared in the Proceedings of the Linnean Society of New South Wales, Sept. 29, 1897.

GENERAL NOTES.

Note on *Cypræa rashleighana*.—The above Cowry was described in 1887,¹ and in the following year was refigured, the original description being repeated in the "Survey of the Genus *Cypræa*, 1888."² Although the habitat was queried it seems probable that the type came from the neighborhood of Hong-kong. Since this time three or four specimens have occurred amongst the Hadfield mollusca from Lifu; these, however, are either too young or in a not very satisfactory state of preservation. My object in alluding to this species at the present opportunity is to call attention to a very beautiful and large example which has been for years in the National Collection at South Kensington, having formed part of the Cumingian stores. This was figured by

Mr. Lovell Reeve³ as a stunted form of *C. tabescens* L., but has been overlooked by Sowerby⁴ and by Mr. Raymond Roberts in the "Monograph of *Cyprica*."⁵ Rather blindly following Reeve in 1888,⁶ I signalized this as var. *a* of *C. tabescens* under the proposed varietal name of *latior*. Mr. Edgar Smith being disposed to allow it specific rank, labelled it in the National Collection "*latior* Melv." Last year, however, it was closely examined by us both, in comparison with the original type of *C. rashleighana*, and pronounced identical. The pyriform shape, different dentition, narrower aperture, small clearly defined dark brown lateral punctuation, with other characteristics, differentiate this species from its allies, *C. tabescens*, *C. teres* and *C. interrupta*.-- JAMES COSMO MELVILL, *Journal of Conchology*, July 1898.

1 *J. Conch.*, vol. 5, p. 288. 2 *Monch. Mem.* (4), vol. 1, p. 218, 219. 3 *Conch. Icon.*, pl. 14, no. 66a, 1845. 4 *Thes. Conch.* 5 Tryon, *Man. Conch.*, vol. 7, 1855. 6 *Loc. cit.*, p. 218.

PUBLICATIONS RECEIVED.

THE DISTRIBUTION OF THE UNIONIDÆ IN MICHIGAN, by Bryant Walker. (Read before the Michigan Academy of Science, March 31, 1898). This paper is based upon the reports filed in connection with the census of Michigan mollusca undertaken by the Conchological Section of the Academy. A sketch of the plan of these reports may be found in this journal for January, 1898. Of the Unios, 7 or less than one-fifth, are known to range over the whole State, 3 are characteristic of the northern portion, while 30, or 75%, are confined to the southern portion of the State, and do not extend north of the valleys of Grand and Saginaw Rivers. As no natural barrier prevents the spread of these species northward, an explanation is sought in the physical conditions of the region during the glacial period, when the lakes drained into the Mississippi from the southern end of Lake Michigan and into the Ohio from the western end of Lake Erie. On the partial recession of the ice-sheet a channel was formed across the State along the Saginaw-Grand valley. "There can be no doubt that it was through these ancient channels that the barren waters of the lake region were peopled by an immigration of southern forms." A map illustrates the records of distribution of *Unio luteolus*, *rubiginosus* and *Anodonta footiana*.

THE MOLLUSCA OF THE CHICAGO AREA: THE PELECYPODA, by Frank Collins Baker, Chicago Academy of Sciences, Bull. no. iii. This bulletin of 130 pages and 27 plates forms the first installment

of an illustrated monograph on the mollusks of Cook and DuPage Counties and adjacent portions of Will Co., Illinois, and Lake Co., Indiana. Mr. Baker prefaces his account by a useful general consideration of the structure of mollusks, their preparation for study, collection, etc., with full notes on the general character of the Chicago fauna, localities where the various forms occur, and other information and statistics which will prove of great use both to subsequent naturalists in that locality, and to those who may have occasion to compare the fauna with that of some other district.

In the treatment of the species, full descriptions of each at various stages of growth are given, with the synonymy, distribution, judicious comparisons with allied forms, and more or less extended account of the soft parts.

In the generic arrangement, the assistance of Mr. C. T. Simpson has been secured; and the old genera *Unio* and *Margaritana* have been dismembered, and their species distributed among *Alasmodonta*, *Strophitus*, *Unio*, *Anodontoides* (a new genus for *Anodonta ferussaciana* and *subcylindracea*), *Quadrula*, *Obliquaria*, *Plagiola* and *Lampsilis*, the latter with subgenera *Metaptera*, *Euryma* and *Corunelina* (new section for *U. parvus*). Those familiar with Mr. Simpson's studies of this family will probably agree with us that these genera are well founded, and their recognition is a distinct advance in our knowledge of the group. Most of them were originally founded by Rafinesque; but their limitation and definition is essentially Mr. Simpson's own work.

The plates are excellent half tone reproductions of photographs. Some of them are among the best figures of Uniones we have seen; and while a few do not show the details of the teeth as well as could be desired, and we would prefer them to be printed in a different color, still there is little to criticize. They are a distinct success.

Conchologists throughout the middle west, as well as others interested in the shells of that region, will find Mr. Baker's book of great service. While there are a few slips, such as the statement on p. 12 that the mollusca are "of quite recent date geologically," and on p. 11 that in one group (Gastropoda) the mouth is provided with a radula, where the author probably meant that a radula is present in all but one of the groups (Pelecypoda), still such oversights are few.

We heartily congratulate the Chicago Academy of Sciences upon the appearance of the work, and their success in placing before its

people such a complete account of the present status of their molluscan fauna. We only wish it were possible to have similar works prepared in all of our large cities, before advancing civilization destroys or locally exterminates many species.

CONTRIBUTIONS TO THE TERTIARY FAUNA OF FLORIDA, by Wm. H. Dall. (Transactions of the Wagner Free Institute of Science, Vol. III, pt. 4, 1898). This volume is a continuation of Professor Dall's great work on the Tertiary Mollusks of Florida, and treats of two orders of the Pelecypoda: Prionodesmacea and Teleodesmacea. "Including in many cases a complete revision of the generic groups treated of and their American Tertiary species."

In the *Nuculidæ* and *Ledidæ* the generic and specific synonymy is fully given and 18 new species described. The name *Paralloydontidæ* is substituted for *Macrodontidæ* (in pt. 4) since the generic name *Macrodon* is preoccupied. In the family *Arcidæ* 30 new species are described and many changes are made in the nomenclature. *Glycymeris* DaCosta 1778, is used instead of *Pectunculus* Lamarck 1799, and a number of Conrad's species are reduced to synonyms. *Arca occidentalis* Phil. is adopted for the Florida and West Indian species that has been referred to *Arca noæ* Linn. by many authors. "A careful comparison shows that the American shell should not be united with the Mediterranean *Arca noæ*." *Arca campechensis* Dillwyn has precedence over *A. pexata* Say. *Arca americana* Gray is also considered a synonym.

We cannot altogether approve of Dr. Dall's manner of treating the names of subgenera and sections; more uniformity in writing the name of a shell would simplify matters greatly. We do not think that subgeneric names should be used instead of generic, or the names of sections in place of subgeneric names.

In the family *Pinnidæ* 5 new species are described. *Melina* Retzius, 1788, is adopted instead of *Perna* Lamarck, 1799, which necessitates changing the family name to *Melinidæ*. In the family *Pteriidæ*, *Pteria* Scopoli, 1777, takes the place of *Avicula* Olivi, 1792. A very interesting account of the "origin of the mutations of *Ostrea*" is given, followed by a review of the described species. The family *Pectinidæ* is well represented in the American Tertiary, including the fossil species from the Pacific Coast. One hundred and twenty-five species and varieties are enumerated, 21 of which

are new, including 5 from the Pacific Coast. Under *Spondylus echinatus* Martyn, the common recent *Spondylus* of the West Indies, fall no less than 21 synonyms. *Plicatula gibbosa* Lam., 1801, is used instead of *P. ranosa* Lam., 1819. In the family *Limidae* 7 new species are described and *Lima lima* Linn. is adopted for *L. squamosa* Lam. Five new species of *Anomidae* are described. For *Placunanomia rudis* Brod. and *P. macroschisma* Desh. the genus *Pododesmus* Phil. is used. To the *Mytilidae* are added 10 new species. *Lithophagus forficatus* Ravl. and *L. candigerus* are synonyms of *Lithophaga aristata* Dillwyn.

Dreissina or *Mytilopsis leucophæta* Conrad has been placed in the genus *Congerina*. *Julidae* is adopted in place of *Prasinidae*. *Julia* Gould antedating *Prasina* Deshayes by one year. The Recent and Tertiary *Pholadidae* are thoroughly reviewed and two new species described. *Zirphæa* "Leach, 1817," Gray, 1847, is adopted instead of *Zirphæa* Leach, 1852. But one species of *Panopea* is recognized from the Florida Pliocene. The many generic or subgeneric names proposed for various forms of *Corbula* are either placed in the synonymy or used as sections. Ten new species are described.

In the study of the family *Mactridae* Dr. Dall presents an immense amount of valuable systematic work on the Mactroid hinge. "To make these details clear and avoid excessive verbiage, it becomes necessary to name the parts of the hinge, and for clearness I prefer to use, for the most part, plain English terms, applied for the occasion in a particular and exclusive sense." These characters are clearly shown by ten figures. The classification is that given in THE NAUTILUS, Vol. VIII, pages 25-28, 39-43. Fourteen new species are described. The work closes with the family *Mesodesmatidae* in which six new species of *Ervillea* are described. The volume contains 13 plates.

The Pliocene fauna is so closely allied to the Recent that much of Professor Dall's work bears upon the latter quite as much as on the Tertiary, and we shall, therefore, notice the work applying particularly to recent shells and their evolution separately next month.

Typographically the volume is a beautiful one, most creditable to the Trustees of the Wagner Free Institute and to those engaged in its mechanical execution. We take exception to only one feature, the date "April, 1898" upon title-page and cover. The first copies, we believe, were distributed October 29, 1898.

THE NAUTILUS.



VOL. XII.

DECEMBER, 1898.

No. 8.

DESCRIPTIONS OF NEW SPECIES AND VARIETIES OF AMERICAN ZONITIDÆ AND ENDODONTIDÆ.

BY HENRY A. PILSBRY.

Pyramidula Cockerelli n. sp.

Shell having the general shape of *P. striatella*; thin, greenish, more or less streaked and dotted with light yellow; a little shining, very irregularly wrinkle-striate, some specimens unequally ribbed in places above and at the margin of the umbilicus. Spire convex, the first whorl a little protruding. Whorls $4\frac{1}{2}$, the first whitish-corneous and glabrous when unworn, the rest convex, regularly widening, separated by a deep suture; last whorl obtusely angular at the periphery in front, becoming rounded on its later portion; base well rounded, the umbilicus showing all the whorls, its width contained about 3.7 times in that of the shell. Aperture oblique, rounded, the penultimate whorl cutting out a segment of about one-fourth the whole circle of the thin and simple peristome; the greatest diameter of aperture contained about 2.4 times in that of the shell.

Alt. 2.8, diam. 5.5 mm. (specimen from New Mexico).

Alt. 3.2, diam. 6.5 mm. (specimen from Colorado).

This species is based upon a series of shells from Labelle, Taos County, New Mexico, collected by Rev. E. H. Ashmun, and specimens from Custer and Saguache Counties, Colorado, collected by Prof. T. D. A. Cockerell. It is what has been very generally known as *Patula Croinkhitei* Newc.; but reference to co-types of

that species in the collection of the Academy (part of the original lot), shows it to be very strongly ribbed. Indeed, Dr. Newcomb himself bases its claim to distinctness from *P. striatella* upon the stronger ribs and smaller size. *P. Cockerelli* is far smoother than *P. striatella*, and, indeed, is so distinct from that species that no detailed comparison is needed. *P. Cockerelli* is far more like the Japanese *P. pauper* Gld. than any American species; but there is no evidence showing *P. pauper* Gld. or *P. flocculus* Morel. to occur in American territory. The latter was described from Kamchatka, and has been found on Bering Island in the western Aleutians. Dr. von Martens has well figured the type specimen in his conchological miscellany, "Conchologische Mittheilungen."

P. Cronkhitei is barely distinguishable from *P. striatella* by the features alluded to above, and its standing even as a sub-species of *striatella* is dubious. It occurs commonly in northern California, in the counties draining into the Sacramento, and the same form has been found in Alaska; but I have not seen it from intervening territory.

Pyramidula striatella catskillensis n. var.

Sculpture sharper than in the typical form, umbilicus wider and shallower, and periphery angulated. Tannersville Valley, Catskill Mountains, N. Y.; White Pond, Warren County, N. J.

Mentioned in the Catalogue of Amer. L. Shells (No. 344a), but not before described.

Omphalina fuliginosa polita n. v.

Similar in general features to *O. fuliginosa*, but the surface glossy, as though varnished. Mountain region of eastern Tennessee and western North Carolina, particularly the ranges along the boundary. Mentioned, but not described, in the Classified Catalogue of Land Shells of America, No. 246a.

Gastrodonta Clappi n. sp.

Shell depressed, shaped much like *G. multidentata*, the upper surface somewhat convex, lower surface flattened, deeply indented around the minute umbilicus; thin, a little transparent, deep chestnut-amber colored and brilliantly glossy; composed of fully $6\frac{1}{2}$ very narrow and closely coiled whorls, the initial one rather coarse, the first half turn smooth, the rest of the shell sculptured with closely spaced impressed radiating grooves, which extend with

undiminished strength over the base; last whorl broadly rounded at the periphery. Aperture very narrowly lunate, the convex outline of the crescent somewhat angular in the middle; peristome thin and simple. Alt. 3, diam. 5.7 mm.

Mirey Ridge, Great Smoky mountains, Tennessee, near the North Carolina boundary.

This is one of the fruits of Messrs. Ferriss and Clapp's summer journey to the Great Smokies and Unakas, the story of which will be given to our readers by Mr. Ferriss, who suggested to me the propriety of naming the species in honor of Mr. George H. Clapp.

Though both the adult and young specimens I have seen are toothless, *G. Clappi* seems to be allied to *G. lamellidens* and *multi-dentata*, but with a decidedly smaller umbilical perforation, the same number of whorls with twice the diameter, and a decidedly different ornamentation, the radiating grooves reminding one of *Vitrea sculptilis* Bld. *V. capsella* is more widely umbilicated.

Zonitoides Randolphi n. sp.

Shell depressed, with the general form of *Pyramidula striatella*, thin, somewhat translucent, brownish; the upper surface somewhat convex, the first $1\frac{1}{2}$ whorls decidedly protruding, glossy, whitish-corneous, contracting at the beginning of the next whorl; surface irregularly but strongly striated, both above and below. Whorls $3\frac{1}{2}$, decidedly convex, the last convex below; width of umbilicus somewhat over one-fifth the diameter of shell, showing all the whorls. Aperture oblique, subcircular, somewhat less than one-fourth of the circle excised by the penultimate whorl.

Alt. 2.7, diam. 4.8 mm.

Lake Linderman, Alaska.

The last whorl is less flattened than in *Z. limatulus*, the umbilicus narrower, and there are fewer whorls.

ANODONTA IMBECILLIS, HERMAPHRODITIC.¹

BY DR. V. STERKI.

On October 28th, last, I chanced to secure a good number of *Anodonta imbecillis*, Say, for a more careful examination about hermaphroditism. Of forty specimens opened, all, without an ex-

¹ See THE NAUTILUS, XII, p. 30 (July).

ception, showed the outer branchiæ charged with ova, most of them containing young embryos. At the same time their gonads contained ova in various stages of development in the inferior parts, and sperma, mature and immature, in the superior and usually more anterior parts, both elements being in somewhat various proportions as to quantity and the space occupied. In one specimen sperma bearing nuclei were not distinctly seen, but microscopic examination showed spermatozoids among the ova, the two evidently mixed up artificially.

The shells of these specimens were of somewhat different shapes: a part had the inferior margin evenly curved, while in others it was more straight, or even slightly sinuous in the middle, still others being intermediate. These differences are regarded as indicating sexual differences in other (true) Anodontæ by many conchologists, and it remains to prove or disprove that by examining large numbers of specimens.

SAN DIEGO, CALIFORNIA, AS A COLLECTING GROUND.

BY F. W. KELSEY.

This subject has probably been thoroughly discussed by collectors far better versed in conchology than I, but a few lines from this quarter may be of interest to those who, like myself, are comparatively speaking, novices.

About two years ago I began to feel an interest in shells, other than that caused by a mere admiration of their diversified forms, colors, markings, etc., and since that time, I have spent much of my spare time collecting, studying, and classifying the many mollusks which abound in our bay and in the waters of the adjacent coast.

The weather and other circumstances permitting, I spend at least two Saturdays of each month collecting, and the following list of species obtained on my last trip, Saturday, October 29th, will give the reader some idea of the variety of little rock dwellers of this locality.

On the above date, my wife and I landed in a skiff on the reef extending out from Pt. Loma, just below the light-house where several acres of rocks are laid bare by the receding tide. We hunted from noon until four o'clock among the eel grass, sea anemones, ribbon kelp and rocks, with such keen enjoyment that we

were sorry to leave the fascinating search and return to the more commonplace affairs of every-day life.

On cleaning up the result of the day's hunt, we counted the following list consisting of 83 species, aggregating 1,117 specimens nearly all of which are live shells in good condition :

- | | |
|-----------------------------------|-------------------------------------|
| Erato columbella, Menke. 1 | Lucina Californica, Conr. 5 |
| Erato vittellina, Hds. 1 | Hipponyx antiquatus, Linn. 4 |
| Norrisia Norrisii, Sby. 16 | Hipponyx tumens, Cpr. 4 |
| Phasianella compta, Gld. 41 | Haminea virescens, Sby. 4 |
| Haliotis splendens, Rve. 29 | Acmæa depicta, Gld. 3 |
| Haliotis cracherodii, Leach. 2 | Acmæa inessa, Hds. 7 |
| Haliotis corrugata, Gray 1 | Acmæa palacea, Gld. 6 |
| Haliotis sp. 1 | Crepidula adunca, Sby. 3 |
| Acmæa asmi, Midd. 11 | Crepidula dorsata, Brod. 3 |
| Acmæa mitra, Esch. 1 | Crepidula aculeata, Gmel. 2 |
| Acmæa patina, Esch. 7 | Crepidula navicelloides, Nutt. 4 |
| Acmæa persona, Esch. 12 | Fissurella volcano, Rve. 25 |
| Acmæa scabra, Nutt. 3 | Caliostoma gemmulatum, Cpr. 4 |
| Acmæa spectrum, Nutt. 6 | Chama exogyra, Conr. 2 |
| Opalia crenatoides, Gld. 6 | Chama pellucida, Sby. 1 |
| Lazaria subquadrata, Cpr. 1 | Nassa Cooperi, Fbs. 37 |
| Monocerus engonatum, Conr. 6 | Omphalius fuscescens, Phil. 36 |
| Monocerus var. spiratum, 3 | Cerostoma Nuttalli, Conr. 58 |
| Ocenebra interfossa, Cpr. 2 | Saxicava arctica, Linn. 2 |
| Ocenebra circumtexta, Stearns 2 | Litorina planaxis, Nutt. 14 |
| Chlorostoma aureotinctum, Fbs. 47 | Litorina scutulata, Gld. 7 |
| Chlorostoma gallina, Fbs. 4 | Mopalia muscosa, Gld. 5 |
| Chlorostoma funebre, A. Ad. 3 | Ischnochiton magdalenensis, Hds. 31 |
| Mitra manra, Swains. 9 | Ischnochiton regularis, Cpr. 6 |
| Macron lividus, A. Ad. 24 | Trachydermon Nuttalli, Cpr. 8 |
| Volvarina varia, Sby. 154 | Trivia Californica, Gray 1 |
| Mytilus bifurcatus, Conr. 10 | Pomaulax undosus, Wood. 2 |
| Olivella buplicata, Sby. 60 | Ianthina trifida, Nutt. 1 |
| Actæon punctocaelatus, Cpr. 1 | Odostomia nuciformis, Cpr. 6 |
| Leptothyra carpenteri, Pils. 72 | Odostomia gouldii, Cpr. 1 |
| Leptothyra bacula, Cpr. 17 | Astyris gausapata, Gld. 7 |
| Leptothyra pausicostata, Dall. 3 | Astyris tuberosa, Cpr. 15 |
| Diplodonta orbella, Gld. 1 | Scalaria Hindsii, Cpr. 7 |
| Drillia moesta, Cpr. 2 | Conus Californicus, Hds. 3 |
| Lacuna unifasciata, Cpr. 12 | 12 species unknown to me, 96 |
| Amphissa versicolor, Dall. 12 | |

NEW SPECIES OF BIFIDARIA.

BY DR. V. STERKI.

Bifidaria perversa n. sp.

Shell sinistrorse, oblong-cylindro conical, horn-colored, translucent; apex rather acute; base umbilicate-rimate, the umbilicus partly overlaid by a projecting part of the last whorl; whorls $5\frac{1}{2}$, rather slowly and regularly increasing, convex, with the suture moderately deep, the last equaling two-fifths of altitude, slightly narrowed at the periphery, at last somewhat ascending and then protracted horizontally beyond the periphery of the spire, for a length equal to one-third of the diameter, with a rather high, oblique crest-swelling all around, in front of that contracted, and margins broadly everted all around at the aperture; on the palatal side of the protracted part, behind the aperture, a deep longitudinal (= spiral) impression; surface slightly shining, with fine, almost regular, crowded striæ; nucleus microscopically rugulose; aperture of moderate size, rounded below, truncated above, with a sinus occupying the upper half of the palatal side. Lamellæ and folds: angulo-parietal large; angular at its inner end joining the side of the parietal, with a curve reaching the margin at the superoparietal angle; parietal very high, strongly curved, the (inner) convexity toward the columella, its front end at a rather large distance from the supero-columellar angle; columellar spiral, with its front end on the parietal wall, its inner part not visible; basal radial, lamellar, high; inferior palatal fold very deep in the throat, long, lamellar, curved downward over the basal, visible only from the outside; superior quite short, high, tooth-like, in front of the inferior.

Alt. 2.3, diam. of spire 1.1, whole diam. 1.5 mm.; apert. alt. 0.8, diam. 0.6 mm.

Habitat.—Nogales, Arizona, on the Mexican border. Collected by Mr. E. H. Ashmun, together with *Bif. Ashmuni* (see below) and the following species:

Bif. perversa is unlike any other species of the genus, by its being sinistrorse and the last whorl protracted considerably beyond the periphery of the spire. In size, shape, color, striation, the con-

figuration of the aperture with its lamellæ and folds, it stands nearest *Bifid. Ashmuni*. These two species represent a new type among the already very different groups of the genus.

Bifidaria Dalliana n. sp.

Shell minute, ovate-turriculate, perforate-rimate, pale horn-colored, translucent; apex somewhat obtuse; whorls 5, regularly increasing, convex, with the suture deeper between the upper than the lower whorls; the last whorl ascending at the aperture, compressed at the periphery, especially so toward the aperture, with a slight, shallow crest-elevation, its base narrow except just behind the aperture, where there is a slight depression; surface with very fine, crowded striæ; aperture equaling a little over one-third of altitude, almost as wide as high, rounded below, with three almost equal angles above, margins approximate, somewhat extended upward and connected by a slight, straight callus, somewhat everted, especially below, without a thickened lip. Lamellæ and folds: angular and parietal rather large, connected but distinct, the former ending at the margin; a nodule-like infraparietal; columellar rather large, lamellar, horizontally encircling the somewhat projecting columella; basal transverse (radial) on the impressed part of the base, short lamellar, abrupt; parietal folds approximate, the superior rather short, the inferior longer, deeper in the throat, somewhat oblique.

Alt. 1.6 to 1.8, diam. 0.8 to 0.9, apert. alt. 0.6 mm.

Soft parts very light-colored. Jaw rather strongly arcuate, with rather fine, irregular, crowded, tubercular ribs projecting as irregular denticulations on the cutting edge. Radula 0.48 mm. long, 0.13 wide, with 72 transverse rows of 19 teeth, c : 4 : 5; the central narrow, with three short cuspids, the laterals bicuspid; marginals: one tricuspid, the others serrate—four to six-cuspid.

Habitat.—Nogales, Arizona, with the preceding species.

Bifid. Dalliana stands near *B. hordeacella* Pilsbry, for the smallest forms of which it might be mistaken, and some of the smallest West Indian species of the genus. From *hordeacella* it is distinguished by its being less cylindrical, the presence of the infraparietal nodule, and the basal being lamellar, placed radially upon the impressed part of the base, and nearer the margin than is the basal of *hordeacella*. These differences appear to be trifling, but they are significant. Over thirty lots of *B. hordeacella*, from Key West, through Florida, Mississippi, Texas, New Mexico, Arizona, and from dif-

ferent stations along the Mexican border, have been carefully compared, and the characters noted were found constantly different in both species. The n. sp. has been named in honor of Dr. William H. Dall.

Bifid. Ashmuni, form minor.

In company with the two preceding *Bifidariae*, Mr. Ashmun found some specimens of *Bif. Ashmuni*, which are not only smaller than the types, 1.5 to 1.9 mm. high, but the shell is also thinner, the color paler, the everted part of the lip less broad, the number of whorls one-half to one less.

NOTE ON THE GENERIC NAMES OF TWO GROUPS OF ACHATINIDÆ.

BY C. F. ANCEY.

When writing on the terrestrial mollusca collected by Mr. P. Duzen, Dr. Y. Sjöstedt, and Dr. J. R. Jungner in the German colony of Cameroon, Mr. Adolf d'Ailly has thought to propose a new generic name for *Achatina Shuttleworthi*, Pfr. and *Barriana*, G. B. Sowerby. The author overlooked the fact that I had some years ago (*Bulletins de la Society Malacologique de France*, 1888, p. 69), proposed a name for the same group, of which *A. Shuttleworthi* was made the type. Thus *Ganomidos*, d'Ailly, becomes a synonym of *Callistopepla*, Ancey.

Mr. d'Ailly was not aware that *Petitia*, Jous., established for *Achatina pulchella*, von Mart. (or rather *Petitia Petitia*, Jous., which is a synonym), already being used for another group of shells—a section of *Stoastoma*—has been changed by me to *Leptocala* in the same paper (page 70, foot-note 3). *Achatina mollicella*, Morelet, probably is the oldest name for the type of the genus, as I believe (and Mr. E. A. Smith, i. l., agrees with me in that respect) that *A. pulchella*, v. Mart. (= *Petitia Petitia*, Jous., = *Achatina Smithi*, G. B. Sow., not Craven = *Achat. Sowerbyi*, Smith) is a synonym or at least a mere smaller, more solid and conic variety of the same. I have in my collection a typical specimen of *A. mollicella*, Mor., one of the two original ones collected at the Gaboon by Captain Vignon, and also examples of *A. pulchella*, von Mart., sent me by the author, and cannot detect any characters of specific value to distinguish them from authentic *mollicella*, Morelet.

A NEW UNIO FROM TEXAS.

BY BERLIN H. WRIGHT.

U. Iheringi, sp. nov.

Shell sub-plicate or slightly folded on the posterior slope and forward over the umbonal area, sub-quadrate; substance of the shell rather thick and uniform; beaks prominent, small, angular, and ornamented with three or four doubly looped and corrugated ridges; epidermis yellowish green to very dark red and nearly covered with coarse faint green rays; teeth solid, remarkably smooth, single in the right and double in the left valves; cicatrices almost confluent, smooth and well impressed; cavity of the beak moderate; nacre a clear, lustrous white.

Diam. 1, length (height) $1\frac{3}{4}$, width 3 inches.

Habitat.—San Saba River, Menard Co., Texas.

Type in National Museum.

REMARKS.—This species was discovered by Mrs. John Alex. Smith, of Menardville, Texas, who found it in company with *N. coloradoensis*, Lea, *houstonensis*, Lea, *gracilis*, Bar. (?) *tuberculatus*, Bar. *petrinus*, Gd., *pauciplicatus*, Lea, *speciosus*, Lea, *anodontoides*, Lea, and *An. undulata*, Say? Its affinities are with *U. pliciferus*, Lea and *U. Mitchellii* Simpson. It differs from the first in being less rayed, lighter epidermis, white nacre, sharper umbonal angle, and more produced posterior dorsal margin, and lower and flatter umbo. From the latter it differs in the beak sculpture, which in *Mitchellii* is coarser and not looped, sharper umbonal ridge, higher umbo, more generally folded, and in being rayed.

It gives us great pleasure to name this species in honor of Dr. H. von Ihering, Director of the Museum Paulista, Sao Paulo, Brazil, who has done so much valuable work in many departments of Natural Science.

To Mr. Charles T. Simpson, of the National Museum, I am indebted for his comparisons with the type of his species.

RECENT PUBLICATIONS RECEIVED.

THE JOURNAL OF CONCHOLOGY VOL. IX, NO. 3, JULY AND OCTOBER, 1898.—Additions to "British Conchology" (continued) By J. G. Marshall; "The Marine Mollusca of Madras and the



immediate neighborhood" by J. Cosmo Melvill and R. Standen; "Notes on some Anglesea land and fresh water Mollusca" by Chas. Oldham; "Observations on the pairing of *Limax maximus* L." by Lionel E. Adams; "Notes on a Collection of Marine Shells from Lively Island, Falkland, with list of species," by J. Cosmo Melvill and R. Standen, the following new species are described and figured. *Lachesis euthrioides*, *Cyamium falklandicum*, *Thracia antarctica*. "Observation on abnormal specimens of *Planorbis spirorbis* and other fresh water shells at Tenby," by A. G. Stubbs. The article is illustrated by a very interesting plate showing the various abnormal forms. "Notes on the land Mollusca of Grange-over-sands, Lancashire" by R. Standen; "On *Latirus armatus* Ad." by J. Cosmo Melvill.

JOURNAL DE CONCHYLOGIE, Vol. 46, Jan. 1898 (received Sept. 23). "Note sur quelques Mollusques terrestres des Isles Philippines encore peu répandus dans les collections," par. H. Crosse (1 plate).

"Coquilles nouvelles provenant des récoltes de M. L. Levay dans le Haut-Mékong pendant la campagne du Massie (1893-'94-'95), par. A. Bavay. New species described and figured: *Anphidromus Laosianus*, *Paludina simonis*, *P. Lagrandierei*. Additions à la Faune Malacologique terrestre et fluviatile de la Nouvelle-Calédonie et de ses dépendances, par. H. Crosse.

Description de coquilles fossiles des Terrains tertiaires inférieurs (suite), par. M. C. Mayer Eymar (2 plates) 12 new species are described.

The 436te and 437te Lieferungen of the Systematisches Conchylien Cabinet have appeared. The former, by Clessin, treats of *Aplysia*, and it is so inexpressibly bad that it is beyond criticism. Lieferung 437 continues Kobelt's account of the *Auriculida*, including *Zoospeum*, *Carychium*, *Pythia*, *Alexia* and *Cassidula*, and is by far the best monograph yet published on these forms, though omissions are more numerous than we could wish. Thus in *Carychium*, Bourguignat's description and figures of his two worthless species, *existelium* and *euphaeum*, are given, while *exile*, *occidentale* and *jamaicense*, all well marked American species, figured years ago in the Proceedings of the Academy of Natural Sciences, Philadelphia, and in this journal, are not mentioned. The Californian form of *Alexia* is also omitted, etc., etc.

ON THE ANATOMY OF *BULIMUS SINISTRORSUS* DESH., by Wm. Moss and W. M. Webb (Journ. of Malacol., VI, 1897, no. 1). Specimens from Lifu of this species, the type of the group *Draparnaudia* Montrouzier,¹ yielded preparations of the genitalia, dentition, etc., which are figured and briefly commented upon. The penis has a terminal retractor and bears a well differentiated epiphallus, but no flagellum. Jaw apparently almost smooth, judging from the figure. Radula with mesocones only developed on the rachis, laterals with large ectocone, marginals 4-denticulate from deep splitting of both mesocone and ectocone. The details given are sufficient to show that *Draparnaudia* is not a subordinate group of *Papuina*. It lacks the arboreal or subarboreal type of teeth, the weak, wide ribbed jaw, and the insertion of the retractor on epiphallus. The dentition and jaw also exclude it from the immediate neighborhood of *Amphidromus*. Penial accessories are absent, so it cannot be a *Buliminus*. *Draparnaudia* would seem to be a valid genus, not a satellite to any larger group; and the evidence offered indicates its position to be among the epiphallonous Helices; though until the pallial region is investigated, we cannot be certain that it is not a member of the *Bulimulidæ*.

NEW CRETACEOUS FOSSILS from an artesian well-boring at Mount Laurel, New Jersey, by C. W. Johnson (Proc. A. N. S. Phila., 1898, pp. 461-464). A list of some 36 species is given, obtained from depths of 100 to 160 feet. The fauna is regarded by Mr. Johnson as equivalent to the Ripley bed of the Alabama and Mississippi Cretaceous. *Cinulia costata*, *Anchura pergracilis*, *Turritella quadrilira* and *Tuba reticulata* are described and figured as new, and the lip of another new *Anchura* is figured but not named. Mr. Johnson states that *Trigonia enjalensis* is merely the young of *T. thoracica* Morton.—H. A. P.

NOTES AND NEWS.

We regret to announce the death of our esteemed friend, Mr. John Shallcross, which occurred at his home in Frankford, Philadelphia, on October 30th. He was born in that suburb January 4th, 1827, where he spent his entire life. He was a prominent

¹ See NAUTILUS, Feb. 1897.

lawyer, being admitted to the bar in 1856. As a member of the Academy of Natural Sciences he was especially interested in conchology, his collection being notably rich in Volutidæ and Cypræidæ.

The Boston Society of Natural History has purchased the Rev. J. T. Gulick's personal collection of Achatinella of the Hawaiian Islands. In his annual report, the curator, Prof. Alpheus Hyatt says: "This accession makes the Society's collection the most complete in existence, if to the list of species and the number of shells we also add the facts that it is accurately labelled, contains seventy-two originals of the species already described, has a full representation of a number of now extinct varieties and species, and was collected so many years ago that it can be used in some localities to show that new species have arisen upon Oahu within the past ten or twenty years. There are at present under this roof about fourteen or fifteen thousand shells of this one group, which many naturalists consider to be but one genus. These practically all belong to the Society, and there are also about six thousand more, the property of Mr. Oleson, of Worcester, kindly loaned to the curator for study; in all about twenty thousand shells."—*E. W. R.*

NEWSPAPER CONCHOLOGY.—"One of the most beautiful shells found along our coast is that of a large snail which climbs certain trees and grows delicately fat on the young birds. The shell is as thin as tissue paper, oddly curved and almost as transparent as the finest glass. It belongs to the family of edible snails so prized as a delicacy on the coast of France, and if properly prepared makes a delicious dish. It is most abundant about New River inlet, where the slight shake of a tree about sunset will bring a shower of them to the ground. The breakage of a shell seems to be of little trouble to the snail—he repairs the damage and moves on."—*Jacksonville (Fla.) Citizen.*

The JOURNAL DE CONCHYLOGIE is to be published hereafter under the direction of Messrs. H. Fischer, Ph. Dautzenberg and L. Dolfus. We wish the new directors success equal to that enjoyed or so many years by the late directors, Crosse and Fischer.



THE NAUTILUS.

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No. 9.

COLLECTING IN THE GREAT SMOKIES.

BY JAMES H. FERRISS.

For three summers I have collected in the Great Smokies, principally upon Thunderhead and Mirey Ridge and in Cade's Cove. Clingman's Dome was skimmed over a couple of times and also the bluff of the Little Tennessee at Tallassee ford, and this year I gave three days to the Unaka range. This range is also on the line between Tennessee and North Carolina.

When a tenderfoot in shells, Mrs. M. L. Andrews, of Knoxville, sent me *Vitruvionites latissimus*. I felt that if a woman could do as well as that, a man might find something as large as a tin cup, with spines. At the first opportunity the wonderful shell land was surveyed, and since then I have seen some of the most delightful days of my life. These mountains are covered with a luxuriant growth of trees and plants of many varieties, fungi and shells. It is an enchanted land surely, for I am homesick until I return.

This year, George H. Clapp, of Pittsburgh, a careful student, a tireless collector, a regular cracker-jack, to speak professionally, and my wife went with me. From Knoxville we go southward thirty-five miles in a farm wagon. There the road and telephone ends, and collectors are at home with William Blair in Cade's Cove, as good a man as was ever made up to this time. Cade's Cove, six miles in length, is thickly settled, but from this point one must ride a mule or walk.

Mr. Clapp arrived in the Cove about noon a few days after I had completed a little hasty prospecting. Late in the afternoon we

bagged twenty *Polygyra Chilhowcensis*. These were fine, some pearly white and dentated. We also obtained a few *P. appressa perigrapta* Pils. and other good shells. There were none to throw away, for even the *Pyramidula alternata* were a beautifully ribbed variety, *var. costifera* Lewis, perhaps.

P. Chilhowcensis is an active snail, and whenever a piece of shaded open woods in some level cove was found it was almost sure to be there in the old brush piles or around old logs and stumps. *P. perigrapta* is a bark shell, sometimes found in the moss upon the trunks of the poplar trees and basswood, but usually under the old bark of dead trees. We found ninety in one hour among the slabs of an old mill yard. The favorite trees for snails are the basswood, buckeye and poplar, the latter known in other localities as tulip or white wood. The stumps of the latter, when damp, are covered with the small varieties of Zonites, Pupa and Strobilops.

The next day a short trip was made to a piece of oak barrens where *Poly. Christyi* was to be found among the dead leaves. Here we also found a beautiful rose-colored *albolabris*, called "redii" for short, of about thirty mm. in width; *tridentata* with double teeth; *Gastro's intertexta*, *demissa* and *gularis*; also *Omphalina Andrewsæ* and variety *montivaga*, Pils; *fuliginosa* and variety *polita*, Pils.; *Helicodiscus jimbriatus*, Wetherby; *Poly. Clarki* and a *Strobilops* I am waiting to hear what Mr. Pilsbry has to say about it.

The third day we took our dinner pails and went further and found plenty of *Poly. Wheatlyi* and some fine *stenotrema depilata* Pils. It rained and Mr. Clapp had difficulty with a pair of rubber boots. Wet boots are hard on the feet. With the aid of two canes he could do but little more than crawl coming down the mountain. Not being very much acquainted with him at that time, not knowing how far to press him, fearing he might think I wanted to run off with his boots, he was punished a little more than really necessary. When he had about come to a standstill I persuaded him to trade for my moceasins. I then carried the boots upon my back to show good faith, and we rolled homeward with light hearts, though our feet were heavy.

For collecting small shells Mr. Clapp had wooden pill bottles with wooden stoppers. For the Helices I had a small fisherman's creel with a wide rubber band over the mouth, in which there was a slit. To turn over stieks and barks and kill rattlesnakes I had something of a ginseng hook made of a soeket garden hoe, the blade cut down to an about an inch and a half in width and about four inches in length,

running to a point. Mrs. Andrews lent us a surgeon's hook. Mr. Clapp had a surgeon's abscess syringe and I had a brush, or swab with a flexible handle, made by twisting small copper wire around a piece of sponge. Our collections were cleaned up every day and the shells are clean. In cooking we kept the water at a boiling point, and with a dipper made of wire netting boiled the large *Poly. Andrewsæ*, a few at a time, the *albolabris* or *Chilhowcensis* 40 seconds; *appressa* and *Ferrissii* 18; the *Omp. Andrewsæ* 8, and *Christyi* and *Stenotromas* 5, the small *Zonites* 3 seconds.

The evening of this third day Mr. Clapp powdered his feet with talcum and the next morning was ready to go up to Thunderhead with a mule. Here we camped several days to recuperate, and opened a mine for *Gastro. lamellulens*. These snails are under the shingle or spawls of rock from one to two feet down. With these we found a new *Gastro.* about the size of *Gastro. Andrewsæ*, which Mr. Pilsbry named "*Clappi*." It is exceedingly frail, and before we understood this many of our few examples were broken. There will be only enough for Pilsbry and the National Museum this time. We also found it at Mirey Ridge, about twelve miles further east.

The mules were brought up again to move us, but were so loaded with our camp dunnage we walked. Mrs. F. could not walk half a mile to the street cars at home. Mr. Clapp left us at this camp for home, and Mrs. F. and I stayed another week alone and then took a hasty trip to Clingman's Dome when the mules came again. It rained all that part of the trip and we went back to the Cove in one day in the rain. There were twenty miles to cover and a number of those sat upon edge, so they didn't count, but Mrs. F. had her mule to ride this time. I only found the red and banded varieties of *Poly. Andrewsæ* and *Ferrissii* upon Clingman in the two hours I was there. I was a little afraid of bears and may not have looked close enough for the smaller varieties.

Before leaving, Mr. Clapp helped to open a mine for *Ferrissii* upon the slope of Mirey Ridge. The shingle was soon abandoned, for we found the snails under heavy, damp slabs of stone from three to twenty feet across, piled up at the foot of slides. By clearing away the moss and roots and getting light under, and by taking different angles of observation we could often find two or three under one roof, and occasionally a *Whcatleyi*, and I once found the new *Gastrodonta*. The young of *Ferrissii* were hirsute. We wore our finger nails down to the sore point and crawled around on the damp soil until our lady

partner made a protest. The soil in itself was clean, but when plastered all over with it we looked bad. It will always be worth a dollar apiece to collect *lamellidens* and *Ferrissii* unless some higher grade localities are discovered, Mr. Clapp has since written me that he has found *lamellidens* from New Hampshire.

Poly. Clarki had climbed higher or dug deeper this year. Very few were found, and those only by accident. Our largest was one of 18 mm. in width. In our opinion the dark coves at the base of the mountains are the best collecting grounds. But as the recuperation of health is the only excuse I have to get away from business partners. I led the way to the mountain tops. At 6,000 feet it is cool and braeing when hot below. It is also too high for mosquitoes and flies.

Polygyra Andrewsæ, *Omp. Andrewsæ*, *Polygyra Rugeli*, *Circinaria concava* and *Gastro. accera* are the most active snails at all elevations. *Vitrinizonites latissimus* is active upon the slopes near the mountain tops. It is found in damp situations and there are two varieties, one light horn color with a smooth, firm shell; the other, known as the grape skin variety for convenience, larger, nearly black, very thin shelled and nearly always crumpled. Both social, but usually colonized separately.

The large white or light horn colored variety of *Foly. Andrewsæ* is the most active variety of this species, and is to be found in the paths, among the leaves, upon the trunks of trees or old logs everywhere, and it is very sociable. I found twenty-three around one stump. This species bothered us. The large variety does not colonize with the smaller. We found it 37 mm. wide and 25 in height. The smallest smoky, typical variety, with a round aperture and about 22 mm. in width, was found upon the top of Thunderhead. It was usually a rest under the moss of the trees or under the rocks, but it is nearly as active as the larger variety. It has a banded variety. Upon Mirey Ridge, upon the Tennessee slope, was a larger, banded form of about 27 mm. with a white variety. Here we found the dark, cherry-red form of about 27 mm., with a white lip, resting in the moss upon old logs or the lower corner of large rocks lying up from the ground. The animal was light colored also, and when it rolled out from under the moss its shining red whorls and white lip glittered like a jewel, and Mr. Clapp never failed then to whoop like an Indian. The shell is solitary in its habits and never found traveling. We only found two at once upon the same stone. Upon the North Carolina side of the ridge we found a form about the same size as the latter, which we called

“half and half” for convenience. The lower half of the body whorl was light colored, the upper dark.

Upon Clingman the habits seem to change. The mountain is covered with balsam and the moss is very deep, and as this mountain is the highest of the group the clouds hang about the peak continually. Here the red *Andrewsæ* was active, sometimes in the grass, which grows as high as one's head, and sometimes two or more were upon the roof of large rocks, in company with a light colored form and *Ferrissii*. But only one *Ferrissii* was found under a rock at a time, and the last whorl was much larger than those upon Mirey Ridge.

The next trip I went alone with some deer hunters about forty miles to the south into the Unaka range. Tarrying at the Little Tennessee I found *Poly. pustuloides* Bld., *Gastro. significans* and a beautiful form of depressed *Omphalina lævigata*. In color the latter had that peculiar blue of the Campelomas, and it was 25 mm. in width. I also found *Unio regularis*, Lea, in the river, and of ferns I found the *incisum* form of *Asplenium trichomanes* heretofore found only in San Diego, Cal., and Vermont.

Upon the deer hunt we left our tent, coats and blankets behind and carried cooking utensils, corn meal and bacon upon our own backs. We slept under sheds large enough for a fire made of hemlock bark on the spot. The fire was needed every night. We slept on bark, good bark. Alone and so far away, among bears, rattlesnakes and strangers, I felt timid and did not get many snails, but I know it will be good ground for next year. The snail hulls, as they call them in Tennessee, were very large. One of my *Chilhoweensis* measured 40 mm.; a *Poly. Andrewsæ*, 39; *Wheatleyi*, 24; *Palliatæ* and an *Omphalina subplana*, 25 each. I also found the rose-colored variety of *albolabris* upon the hillsides, colored through and through and shining like a piece of china. It measured about 20 mm.

When Mr. Pilsbry's report comes in I may send THE NAUTILUS a list of the snails found upon the Smokies by Mrs. Andrews, Mr. Clapp and myself.

NEW AMERICAN LAND SHELLS.

BY H. A. PILSBRY.

Vitrea rhoadsi, n. sp. Similar to *V. indentata*, but differing from that species in the distinct umbilicus, about one-half mm. wide, showing the penultimate whorl within; radial grooves more numerous, and therefore closer. The same characters, and the smaller size, separate

rhoadsi from *V. carolinensis*. Alt. 2.5. diam. 4.8 mm., or somewhat smaller.

Distribution, mainly along the Blue Ridge and for some distance each side of it, and south to the Great Smokies. It is lacking, so far as we know, in New York, Ohio, the whole trans-Alleghanian region and the Gulf States, where *V. indentata* is of common occurrence. Special localities are as follows:

Connecticut: W. Granby, Hartford County (Benton Holcomb).

New Jersey: White Pond, Warren County (Pilsbry & Rhoads, type locality).

Pennsylvania: Top of High Knob, Pike County (S. N. Rhoads); Philadelphia (Tryon); Monterey, Adams County (Pilsbry); Fulton County (C. W. Johnson).

Maryland: Cumberland (Howard Shriver).

West Virginia: Wirt County (William J. Fox).

North Carolina: "Roandale Farm," near Magnetic City (A. G. Wetherby).

Tennessee: Roe's Flat, Cade's Cove, in the Great Smoky Mountains (James H. Ferriss).

This *Vitrea* seems to be especially characteristic of the somewhat mountainous northern portion of New Jersey and Pennsylvania traversed by the Blue Ridge. It often occurs associated with typical *V. indentata*, from which it is perfectly easy to separate it by the well-marked umbilicus. The series before me shows constantly the differences mentioned above, with no intergradation whatever, even when *rhoadsi* occurs with *indentatus*.

It is named in honor of Mr. S. N. Rhoads, who collected the types with the writer. Mr. Rhoads found it also in Pike County, Pennsylvania.

Probably the "variety with an open umbilicus," which Mr. Binney mentions without locality under *Z. indentatus* (Manual of American Land Shells, Bull. U. S. Nat. Mus. No. 28, p. 63, p. 17) is this form.

Collectors who will look through their series of *V. indentata* and *V. hammonis* from the region indicated above will probably find specimens of *V. rhoadsi*. It is much easier to separate from *indentata* than *carolinensis* is.

VITREA INDENTATA AND VARIETIES.

The widely distributed *V. indentata* varies from distinctly perforate to a scarcely punctured condition. In Say's types the perforation may be

seen with a good lens, though it was not noticed by Say, who probably worked with what would now be thought an inferior glass. In central and southern Texas a large race occurs, in which the shell attains a diameter of 6 mm. It is always distinctly perforate, pale and pellucid. The difference between this and the form from other regions is slight, but seems correlated with geographic position. Some hundreds of specimens have been examined, from New Braunfels, Hidalgo, San Antonio, etc. I have seen this form labelled "*Z. sculptilis*" by some collectors, and Mr. Binney so identified the specimens collected in Texas by Hemphill, some of which are before me. (Man. Amer. L. Sh. p. 219). It is quite unlike true *sculptilis*, but approaches *Vitreca carolinensis* Ckll., which is a geographically separated mountain form, very close to *indentata*, though, I believe, sufficiently distinguishable.

SUCCINEA RETUSA MAGISTER n. var. Distinguished from *S. retusa* Lea (*ovalis* Gld. not Say) by its larger size, less developed spire and larger aperture. Alt. 18, greatest width $9\frac{1}{2}$ -10, length of aperture 13-14 mm.

A common form in the northern Mississippi valley, sufficiently unlike "*ovalis*" to be separated therefrom by collectors generally, and frequently called "*S. Higginsi*." It is No. 358a, of the catalogue. Types are from Rock Island, Illinois, collected by myself.

PUPA DECORA AND ITS ALLIES.—An excellent series of the typical *Pupa decora* having been secured by Mr. P. B. Randolph in the Dyea Valley, it is possible to institute more satisfactory comparisons with allied forms than the limited number of specimens before available permitted. *P. decora* seems to vary but little. Of its immediate allies *P. corpulenta* Morse is very near *decora*, perhaps only varietally distinct. *P. concinnula*, Ckll. is a smaller shell, with elongated laminae rather than denticles within the outer lip. It occurs in Colorado, and I have received specimens from the Jemez Mountains, New Mexico, collected by Rev. E. H. Ashmun. *P. columbiana* Sterki is an apparently valid species of this group, though not yet described; and I have still another form from near Lake Superior which is allied to *P. decora*, but differs in smaller size, in having another denticle at the foot of the columella (five in all, instead of four), and a sharper, higher crest behind the outer lip, the edge of the latter more projecting in a point above, when seen in a profile view. This may be called *Pupa (Nearctula) superioris*. The west coast

Nearctulas, *P. Californica* and its allies, differ from those of the interior in wanting the crest behind the outer lip.

From a study of Moreh's description and figures in the *American Journal of Conchology*, vol. IV, p. 30, pl. 3, f. 6-9, it is obvious that *Pupa hoppii* Moller is not identical with *P. decora*. Binney's figure in *Man. Amer. L. Sh.*, f. 190, does not represent the true *hoppii*: and no reliable record of its occurrence outside of Greenland has been made.

IN MEMORIAM—M. H. CROSSE. (1)

BY REV. A. H. COOKE, KING'S COLLEGE, CAMBRIDGE, ENG.

The scientific world in general, and malacologists in particular, will have learned with profound regret the news of the death of M. Joseph Charles Hippolyte Crosse, which took place on August 7, 1898, at his country residence, the Chateau d' Argeville, at Vernon, near Paris. No man of his time has done more, few have done as much, to promote the study of the mollusea, and in him France has lost one of her most distinguished men of science. It was one of those strange coincidences that sometimes occur to us all, that I should have been walking down the Rue Tronehet, Paris, and wondering whether I should call at No. 25, only the day before I returned home to hear of his death, and receive the request to write this obituary notice.

Born in 1827, it was in 1851 that Crosse contributed his first paper (*Notice sur l'habitat du Panopæa aldrovandi de Sicile*) to the *Journal de Conchyliologie*, which was then in the second year of its existence, edited by M. Petit de la Saussaye. It gives some idea of the strides which the science has made since those days to learn that then malacology was still governed by the systems of Lamarck and of Cuvier. Reeve, Sowerby and Kuster had but recently commenced their iconographies; Kiener had suspended his; the Adams *Genera*, Philippi's *Handbuch*, Gray's *Guide*, Woodward's and Chenu's *Manuels* were yet to appear. Geographical distribution, as a serious study, was absolutely unknown.

It is with the *Journal de Conchyliologie* that Crosse's memory will be forever associated. His name first appears in the title page of that periodical in 1861, and it is not too much to say that to him and his distinguished colleague, Dr. P. Fischer, who, considerably the younger man, pre-deceased him by nearly half a decade, is due the entire

(1) From *The Journal of Malacology*, Vol. vii, p. 4, December, 1898.

credit of carrying on for more than thirty years a publication which has consistently maintained the highest standard of excellence in the articles which have appeared in its pages. Not to speak of innumerable minor notices and reviews of books, Crosse contributed from his own pen alone, 249 articles, 85 in conjunction with P. Fiseher, and 13 more in conjunction with A. C. Bernardi, T. Bland, O. Debeaux, E. Marie and Dr. Souverbie, making a grand total of 348. He was singularly faithful to his own journal, for the only contributions he ever appears to have made to any other recognized scientific paper were six articles which appeared in the years 1855-59 in the *Revue et Magasin de Zoologie*.

Crosse's knowledge of the mollusea was not confined to any special group or groups, but was far-reaching and comprehensive. Naturally his acquaintance with anatomical details was subordinate to his familiarity with other portions of the study. The land mollusca of New Caledonia and New Mexico are, perhaps, the two fields on which he will be found to have left the most permanent traces of his ability. The former he dealt with in the columns of the *Journal* alone; the latter, in collaboration with Dr. P. Fiseher, in the *Etudes sur les Mollusques terrestres et fluvialiles du Mexique et du Guatemala*, which formed, with an atlas of 71 plates, the two large quarto volumes making up Part VII of the *Recherches Zoologiques*, compiled by the *Mission Scientifique au Mexique et dans l' Amerique Centrale*, and published by order of the Minister of Public Instruction in France (1870-1893). He also began, in conjunction with the same author, the *Histoire naturelle des Mollusques terrestres et fluvialiles de Madagascar*, 1889, but this work does not appear to have been completed. He was especially fond of cataloguing the molluscan fauna of islands. Some of his lists thus compiled are invaluable to the student of geographical distribution, remarks upon which generally accompanied the lists. Among the islands thus treated are Rodriguez, Kerguelen, Socotra, Prince's and St. Thomas Islands (W. Africa), Nossi-Be and Nossi-Comba, Trinidad, Cuba (177 pp.), San Domingo (143 pp.), Porto Rico and New Caledonia (315 pp.). His sympathy with problems of geographical distribution is further shown by such articles as the following: *Distribution géographique et synonymie des *Bulinus auriculiformes* de l' Archipel Viti: Catalogue des mollusques qui vivent dans le Detroit de Behring et dans les parties voisines de l' ocean Arctique: Faune malacologique du Lac Tanganyika, du Lac Baikal.*

Another marked feature of his writings is the cataloguing of all known species of certain genera, often with synonymie and geographical distribution appended. Among the genera thus treated are *Cancellaria*, *Conus*, *Holospira*, *Hybocystis*, *Lyria*, *Mera*, *Opisthostoma*, *Parmacella*, *Pirena*, *Placobranchus*, *Pleurotomaria*, *Pomatias*, *Rapa*, *Rhoda*, *Risella* and *Voluta*.

It naturally befel one who had the handling of vast masses of material to found new genera, as well as innumerable new species, yet he was no sympathizer with the "splitting" school, and discountenanced, rather by example than rebuke, the folly of those who reduce the science to confusion by manufacturing a new species for every second specimen. To Crosse are due, either singly or in conjunction with P. Fischer, the following, amongst other genera: *Acroptychia*, *Berendtia*, *Diplomphalus*, *Eucalodium*, *Geostilbia*, *Guestieria*, *Pereirra*, *Strebelia* and *Xanthonyx*.

PRELIMINARY DESCRIPTION OF A NEW VARIETY OF HALIOTIS.

BY ROBERT E. C. STEARNS.

Haliotisfulgens, Phil., var. *Walallensis*, Stearns.

On the coast of Mendocino county, California, in the extreme southwest corner, close to the northerly boundary line of Sonoma county, is an embareadero or shipping point of the lumber interests of that neighborhood; here is situated a small settlement known as Gualalla.* The coast hereabout is broken and rocky, with bluffs fifty to a hundred feet high. In the immediate vicinity of this village Mr. J. J. Rivers some years ago collected the forms herein described, specimens of which are contained in the National Museum (No. 98,327) and in the museum of the University of California. The examples in the National collection were kindly presented to me by Mr. Rivers, and are a part of the original lot. The largest adult is of much smaller size than the average adult examples of the ordinary form of *H. fulgens*; my examination of the entire series collected by Mr. Rivers suggested the European *H. tuberculata* of the Channel islands. There is a Japanese figure in Reeve's Conch. Icon., *H. planata*, which it somewhat resembles. As my note book containing the diagnosis, etc., of the above was unfortunately destroyed some years ago, I am indebted to

* Gualalla, which is the official post office name of the village, is a localized corruption of the Indian *Walalla*, which latter, I think, should be perpetuated.

the courtesy of my friend, Dr. W. H. Dall, for the following description from the National Museum examples:

Shell of an oval form, considerably flattened and with about two and a half whorls; color, dark brick red, with occasional mottlings of pale bluish green; holes, four in the young to six in the adult; sculpture, of fine, somewhat irregular spiral threads, crossed by fine, close, slightly elevated, sharp, concentric lamellæ, and a few small obscure wavelets which radiate obliquely from the apex; nacre rather pale, with pink and pale green reflections, but much less deep in color than the typical *fulgens* Lon., 100; lat., 68; alt., 17 mm.

This variety differs from the type in its more elongate and flattened form, its constantly finer, spiral threading and its paler nacre. The concentric lamellation is sometimes undeveloped on the young shells. It has the same number of holes as the type.

This varietal form may be regarded as the extreme northerly expression of *H. fulgens*; the latter, if my memory is not at fault, has not heretofore been credited to any part of the coast north of Point Conception; from that point to Gualalla is an immense jump, about 320 nautical miles.

GENERAL NOTES.

A NEW GENUS OF HELICES.—Upon dissecting specimens of *Polygyra miorhyssa* Dall, recently, Prof. Cockerell noticed several important points of divergence in the genitalia as compared with what has been observed in *Polygyra*, and sent fresh material to Prof. Pilsbry, stating that a new group seemed to be indicated, and requesting further examination. This resulted in the confirmation of the features first noticed and the discovery of others, indicating a new generic group, which may be called *Ashmunella*, in honor of Rev. E. H. Ashmun, whose researches in New Mexico and Arizona have added materially to our knowledge of the mollusk fauna of those regions. The type is *P. miorhyssa* Dall. An illustrated account of *Ashmunella* will appear in the Proceedings of the Academy of Natural Sciences of Philadelphia.

H. A. P. & T. D. A. C.

MELAMPUS FLORIDANUS SHUTTL.—In August, 1894, I collected some *Melampus* on Chambers' farm, Queen Anne county, opposite Chestertown, Md. They were put in the collection of the Academy under the name, *M. lineatus* Say, but on examination they prove to be *M. floridanus*, Shuttl. May not other collections have this Floridian species from northern localities?

E. G. VANATTA.

PUBLICATIONS RECEIVED.

THE LOWER CRETACEOUS GRYPHÆAS OF THE TEXAS REGION. By ROBERT T. HILL and T. WAYLAND VAUGHAN. (Bull. 151, U. S. Geol. Survey.) In the introduction to this work there is an account of the great controversy that arose between Prof. Jules Marcou and other American paleontologists "concerning the species *Gryphæa pitcheri*, Morton, and the formation in which it was found."

"By the erroneous impression given to Dr. Roemer, through the careless preservation of original type specimens, the first confusion of Morton's *G. pitcheri* with other species of *Gryphæa* was started, and the nucleus was created for an almost endless misrepresentation and confusion of forms, which has so permeated all the literature of the country that the task of correcting it at times seemed almost impossible."

The variations of *Gryphæa corrugata*, Say 1823 (*G. pitcheri*, Morton, 1834), called by Marcou in 1851 *G. tumucarii*, are now known to be Lower Cretaceous.

"Mr. Stanton's (Bull. 106, U. S. Geol. Sur., pp. 60-62), recent studies of Newberry and Schiel's *Gryphæa pitcheri* from the Upper Cretaceous of New Mexico and Utah shows it to be a distinct species (*G. Newberryi*, Stan.), and removes the last vestige of *G. pitcheri* from the Upper Cretaceous.

"A review and classification of the fossil Ostreidæ of the Texas region is given, after which is a historical statement of the discovery of the forms referred to, *G. pitcheri*, Mort., and the geographical and stratigraphical distribution of the Lower Cretaceous Gryphæas."

A description of species follows. *G. wardi* is described as new, and for *G. pitcheri*, Blake (not Morton) the name of *G. marcoui* is proposed. The other forms that have been referred to, *G. pitcheri*, etc., by various authors, are here arranged under four species: *G. corrugata*, Say; *G. varia*, Hall; *G. washitaensis*, Hill, and *G. mucronata*, Gabb. The work contains 66 pp. of text and is profusely illustrated by 35 plates.

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COLLECTING SHELLS IN THE KLONDIKE COUNTRY.

BY P. B. RANDOLPH

We left Seattle, Wash., on August 1, 1897, for the Klondike gold fields. Our first stop was made at New Metaketta, Duncan's Island, Alaska. We only made a short stop here to take on water. I made a rush for shore, and, in a short time, had collected a few each of *Circinaria sportella hybrida* Anc., *Circinaria vancouverensis* Lea and *Polygyra columbiana* Lea. These were found under the logs and boards just above high tide mark. No further stop was made until we reached Dyea, at the head of Lynn canal. From here we had to be our own pack-horses to the lakes. The Dyea valley is heavily timbered and the narrow bottom land covered with alder. We laid over one day, about half-way to the Dyea cañon, and I improved the time collecting the small species found there, consisting of *Pyramidula striatella cronkhitei* Newc., very plentiful under dead leaves and sticks, *Conulus fulvus alaskensis* Pils., *Punctum conspectum* Bld., and *Pupa decora* Gould. This last was very plentiful, and I think that in one day's faithful collecting I could supply the cabinets of the world.

Packing 100 pounds over a pass 3,000 feet high did not tend to arouse my conchological ambition, but at each stop I prospected the dead leaves and sticks with varying success.

We laid over one day at Lake Linderman, resting from the past week's hard work, and I had time to hunt over the flat at the head of the lake, where a small stream empties in. Here I found several dead shells of the *Vitrina exilis* Morel., and was despairing of finding any alive, but at the last moment found three under a small dead stick. These were the first of this genus that I had ever seen alive, and I felt

well paid for the time spent. I also found *Pyramidula striatella cronkhitei* Newe. and *Conulus fulvus alaskensis* Pils. Associated with these were two shells that Mr. George H. Clapp and Mr. H. A. Pilsbry considered new, and were kind enough to name in my honor, *Zonitoides randolphi* Pilsbry and Clapp. At the head of the lake, near our camp, the rocks were covered with *Valvata sincera* Say and *Limnæa palustris* Müll.

The next day we put together our canvas boat, made of twenty-ounce duck, ready for our 600 miles trip down the Lewes and Yukon rivers to Dawson. At Marsh lake found dead shells of *Limnæa ampla* Migh., some very large, one measuring one inch and a half long and one inch across, and a dwarf variety of *Limnæa palustris* Müll.

The only shell collected going down the Lewes river was *Succinea nuttalliana* Lea.

We ran the famous Miles cañon in our canvas boat, but packed our outfit and boat around the White Horse rapids.

I had no further opportunity for collecting until we reached Dawson, Northwest Territory. There I found dead shells of a *Succinea*, where a fire had run through the moss, but they were too fragile to handle.

Snow commenced to fall on September 12th, and that put an end to collecting trips.

We spent the winter on one of the claims on Bonanza creek, in the ordinary occupation of a miner in that latitude, which would be another story.

After the clean-up in the spring we rebuilt our canvas boat in the shape of a scow to go down the Yukon river 1,800 miles to St. Michael's. We left Dawson on June the 9th and leisurely floated with the current, enjoying the days twenty-four hours long; that is, at Fort Yukon the sun was visible all the time. As I heard one man ask another "the time of day," "Eight o'clock" was the answer. The first said: "I am worse off than before; I do not know whether it is night or morning." I did not find any live shells on the upper river, but on the bars found a few dead shells of *Succinea chrysis* West.

The mosquitoes were very bad on the lower river, and it was nearly suicidal to go into the brush; but when about twenty miles below Andreafsky we were compelled to lay over on account of wind and rain. I tried the experiment of building a smudge in the goldpan and carrying it with me. I was rewarded by finding that the ground and stalks of grass were alive with *Succinea chrysis* West., and before the day was done I had nearly a pint cup of them cleaned.

The next day we left the main river and followed a slough that led us into three large lakes that run to the foot of the mountains. The banks are ten to twenty feet high and perpendicular. Near the water was a stratum of shells (*Macoma inconspicua* Brod.), about four inches thick. This locality is about 100 miles from the Aphroon mouth of the Yukon.

At an Indian camp below Holy Cross Mission I saw the right valve of an *Anodonta* used as a spoon by an old squaw. She could not understand, or would not, so I could not learn where it was found. She also prized it so highly that, though offered a good trade, she would not part with it. It was the size and color of our *Anodonta oregonensis*.

We made an early camp at Point Romanoff, which is about half way from the mouth of the river to St. Michael's, on the Arctic Ocean. Here I had to make use of the same expedient that I used before to "stand off" the mosquitoes, and found on the drift wood on the beach specimens of *Conulus fulvus alaskensis* Pils. and *Pupa decora* Gould. After entering the canal that connects the Arctic Ocean with Norton's Sound I found the small ponds that are common on the trundra full of *Linnæa palustris* Müll., most of them of large size. I also found a small bivalve very plentiful that was new to me, and I collected a large number of them; but, alas! they belong to the Crustaceans and the other fellows are enjoying them.

I did not find any marine shells at St. Michael's, but when we stopped at Unalaska, on the Aleutian Islands, I had a low tide to work on, and on the rock spit near the dock collected and recognized the following species:

- Purpura lima* Mart.
- Buccinum fischerianum* Möreh.
- Volutharpa ampullacea* Midd.
- Margarita helicina* Fabr.
- Margarita albula* Gould.
- Littorina sitchana* Phil.
- Tritonium oregonense* Redf.
- Eulina* sp.
- Acmæa patina* Eseh.
- Pecten* sp., dead shell.
- Saxicava rugosa* L.
- Saxidomus squalidus*.
- Modiola modiolus* Lam.
- Mytilus edulis* L.



Tapes staminea Conr.

Placunanomia macroschisma Dh.

Katherina tunicata Wood,

and two species that I have not located as yet.

At low tide *Tritonium oregonense* is very plentiful and busy filling their egg cases. Out of the hundreds seen, but one miniature specimen possessed the beautiful epidermis that characterizes the species; the rest were eroded so badly that in some cases the body whorl was alone whole.

At the high tide mark Littorinas were so thick that both hands could be scooped up full, and the color varieties were all there.

Under the stones at near low tide the beautiful Eulimas were so plentiful that under one stone, not larger than a dinner plate, I gathered over 100; but the tide would not wait for me, so I had to leave this rich field before I had half explored it. The steamer had finished coaling; so I bid adieu to the northern country with much regret.

I wish to thank Messrs. Dall, Clapp and Pilsbry for straightening out the material which I brought down.

UROSALPINX CINEREUS IN SAN FRANCISCO BAY.

In THE NAUTILUS for June, 1894, I called attention to the occurrence of the eastern "oyster drill," *Urosalpinx cinereus* (*Fusus cinereus* Say), on the beds of transplanted eastern oysters near Belmont, as announced in Mr. Charles H. Townsend's paper* on "The Oyster Resources and Oyster Fishery of the Pacific Coast." The Belmont beds are on the *western* shore of the bay on the flats of San Mateo county. Within a few days I have received from Mr. Henry Hemphill several examples of this familiar form, collected by him on the old oyster beds on the *eastern* shore or flats of Alameda county. In course of time this species will no doubt be found elsewhere, and become numerous on both sides of the southerly portion of San Francisco bay. Mr. Hemphill, it may be remembered, was the first to detect the presence of *Mya arenaria* hereabout (named by Dr. Newcomb at the time *M. Hemphilli*). It is not unlikely the mussel so frequently found adhering to the eastern oysters, *Mytilus hamátus* Say, will sooner or later turn up in the bay region, and Mr. Hemphill may be the first to find it.

ROBERT E. C. STEARNS.

LOS ANGELES, CAL., December 7, 1898.

* Report of the U. S. Fish Commissioner, etc., 1889-91, published in March, 1893

POTAMOLITHUS JACUHYENSIS, N. SP.

BY H. A. PILSBRY.

Shell turbinate globose, the last whorl with a "shoulder," produced by an obtuse but distinct angulation of the whorl above its middle; solid and strong, smooth, except for light growth lines, covered with a strong, dark brown cuticle, becoming reddish on the spire and green behind the outer lip. Spire low conic, whorls about $4\frac{1}{2}$, those of the spire but slightly convex, the last large, obtusely angular above, rather flattened peripherally, the base somewhat concavely tapering. Aperture large, rather dilated, oblique, livid within, becoming blue-white toward the lip and on the inner margin; peristome continuous, blunt, thickened within at the upper angle, the outer lip a little waved or sinuous, inner margin heavily calloused, rounded, a narrow columellar crescent defined by an arcuate angle. Alt. 6.5, diam. 5.3, greatest length of aperture 5 mm.

Rio Jacuhy, Rio Grande do Sul, Brazil (Dr. H. von Ihering)

This species differs from *P. lapidum* in the angular last whorl, more heavily calloused, parieto-columellar margin, much larger aperture, and the angle defining a narrow, crescentic columellar area. *P. orbigny* Pils. is more closely allied than any other known species, but in that the body whorl is more distinctly biangular, the outer lip is more expanded and distinctly varixed, etc.

The species of this genus already described by d'Orbigny and myself, came from La Plata, Parana and Uruguay rivers. The present form is interesting as being from the Jacuhy, a stream flowing into the Atlantic instead of into La Plata.

For previous references to this genus, under the names *Paludetrina*, *Lithoglyphus* and *Potamolithus*, see d'Orbigny, Amér. mérid., p. 382; E von Martens, Malak. Blätter, 1868, p. 192; H. von Ihering, Malak. Blätter (n. F.) VII, p. 96, and Pilsbry, Nautilus X, pp. 86, 119.

REMARKS ON THE AMERICAN SPECIES OF CONULUS.

BY HENRY A. PILSBRY.

In most parts of the world there occur small land snails with thin, yellow or brown glossy shells, conical, pyramidal or teocalli shaped, with the axis imperforate or barely perforated. The foot has pedal grooves and the side-teeth are thorn-shaped, with two or more points.

In North America, Europe and Siberia these shells are known as *Conulus*; in middle and South America as *Guppya*; in India and the Orient generally they bear the names *Sitala* and *Kaliella*; while still other names cover species of Polynesia, etc.

Belonging to the great family, *Zonitidæ*, these are among the least known snails of that group. The anatomy of only a few species has been investigated; the limits of specific variation are ill understood; and while it is moderately certain that there are several genera, still the boundaries and contents of them remain to be decided.

Of the several generic names mentioned above, *Conulus* of Fitzinger (1833) is the oldest,* the type thereof being the familiar, though not well known, *Helix fulva*.

Herr Reinhardt† was, I believe, the first to point out the fact that under *C. fulvus* of European authors, more than one species was included. He distinguished two: the true *C. fulvus*, living in the woods, and a new one, *C. praticola*, which is darker colored, brownish yellow, very glossy, the height very nearly equalling the diameter, whorls rounder, the keel almost wholly disappearing, the mouth less wide but higher, and the base shows distinct spiral striation. It lives in meadows.

Bourguignat,‡ dealing with the forms of southern and western Europe and northern Africa, agrees with Reinhardt as to the identity of the typical *fulvus*: and, ignoring *C. praticola*, he recognizes and defines some eight species inhabiting this area, all but two of them, *fulvus* Müll. and *Mortoni* Jeffr., being new. This, however, seems to be rather an extreme view, and it is likely that there are not more than half this number, if so many as that, in Europe.

A number of forms have been described from Japan; but, like the Japanese *Helices*, *Clausilias* and most other snails, they apparently belong to Chinese and Indian types, rather than to the *C. fulvus* group. The senior species, *H. pupula* Gould, is far larger than *fulvus*, measuring some five mm. in height.

In America, Thomas Say defined two forms: *Helix chersina*, based upon one hardly mature specimen from the Georgia Sea Islands, and *H. egena*, from a locality in the suburbs of Philadelphia. Both of these have been considered synonyms of *C. fulvus*. In 1883 Herr

* Syst. Verzeich. Oesterreich Weichtiere, p. 94. The group originally contained some *Helices* also.

† Sitzungsber. Ges. naturforsch. Freunde zu Berlin, 1883, p. 40.

Bull. Soc. Malac. de France, VII, 1890, p. 325-338, plate 8.

Reinhardt described another, *C. trochulus*, from Texas. I do not know that this has ever been noticed by any subsequent writer.

Finally, Dr. V. Sterki, that indefatigable observer of small shells, whose researches have added so much to our knowledge of American inland mollusks, described a toothed *Conulus*, the first dentate form of the genus known, as *C. fulvus* var. *dentatus*. §

The shell figured by Binney in the Manual of American Land Shells (p. 67, fig. 26), is evidently *C. fulvus*. It will be noticed that he records considerable divergence in dentition between the observations of various observers, Morse giving 18-1-18 as the formula of teeth, with 7 laterals on each side; Binney, 30-1-30, with 8 laterals, and Lehmann, 25-1-25. This, as Binney remarks, is more variation than often, if ever, occurs among individuals of one species, especially in view of the comparatively small number of teeth. The difference between the two American observations is 24 teeth in a row, the totals being 61 (Binney) and 37 (Morse). This probably indicates that two different species were under observation by the two observers. Unfortunately the limited time at my disposal, and the limited number of specimens with the soft parts dried in, has prevented me from examining the dentition, which I hope to do when more abundant material collected alive and with the animals dried in, is available. We may now notice the American forms in detail.

Conulus fulvus (Müller).

The species was originally based in part upon a larger shell of the genus *Hygromia*, but authors agree in considering as the true *fulvus* a shell much less elevated than *chersinus*, with five whorls, not so closely coiled as in the several forms of *chersinus*, the last one distinctly angular in front, the angle disappearing on the latter part of the whorl; base convex, indented and minutely perforate or subperforate at the axis. Distinguished from *chersinus* and its varieties by the fewer, wider whorls and generally less elevated contour. *Helix egea* Say seems to me to be equivalent to *fulvus*. It is widely distributed over the northern half of the Union and Canada. The Rocky Mountain and California *C. fulvus* seem to be nearly typical *fulvus*, though slightly diverging forms are present.

Conulus fulvus mortoni (Jeffreys).

Rather more depressed, the periphery of the last whorl distinctly earinated throughout; whorls about $4\frac{3}{4}$. Described from England.

§ This journal, Vol. VII, p. 4 (May, 1893).

It occurs in Massachusetts, New York and at Hamilton, Ontario, but I have not seen this from the South or West. It is the size of typical *fulvus*, the young of which must not be mistaken for *mortoni*.

***Conulus fulvus alaskensis*, n. var.**

Similar to *C. fulvus* but with only $4\frac{1}{2}$ whorls, the last one wider; periphery a little angular in front, becoming well rounded; columellar insertion of the lip reflexed over the perforation, nearly or quite closing it. Alt. 2.6, diam. 3.25 mm. Dyea valley and Point Romanoff, Alaska (P. B. Randolph).

***Conulus chersinus* (Say).**

This is very much elevated, the height of fully mature examples exceeding the diameter, the general form being somewhat like that of an immature *Cerion*. Outlines of spire quite convex; whorls $6\frac{1}{2}$, appearing very closely coiled, as seen from above, the last only faintly angular, though in immature shells it is ecarinated. The base is quite convex and the umbilical perforation very narrowly open. The lunate aperture forms a less attenuated crescent than in the following variety. Alt. 3, greatest diameter 2.8 mm. This form occurs from the Sea Islands of Georgia to Florida, the specimen illustrated being from Volusia county (coll. Pilsbry and Johnson, 1894).

***Conulus chersinus trochulus* (Reinhardt).**

Similar to the preceding, but lighter colored, less elevated (though still high), the crescentic aperture narrower. Alt. 2.75, diam. 2.8 mm. New Braunfels, Texas. Though near *chersinus*, this form is not difficult to distinguish, and will probably stand as a southwestern subspecies.

***Conulus chersinus polygyratus*, n. v.**

Similar to the preceding, but less elevated, with narrower aperture; whorls over 6, very narrow, the last one bluntly but decidedly angular in front, the angle above the middle of the whorl, base peculiarly sloping below the periphery; upper surface with the lustre of silk; base glossy, with a silky band around the outer margin. Alt. 2.2, diam. 3 mm., sometimes larger. Color generally deep, brownish amber. Hamilton, Ontario (associated with *C. fulvus mortoni*); Grand Rapids, Michigan (with *C. fulvus*). Differs from typical *chersinus* and *trochulus* chiefly in the peculiar form of the base, produced by the high situation of the periphery, and the narrower aperture. The numerous narrow whorls readily distinguish it from *fulvus*.

***Conulus chersinus dentatus* (Sterki).**

Rather small, with the narrow whorls of the species, the last whorl

containing 1 to 3 low, radial teeth, forming transverse barriers on the basal wall, and appearing when the shell is viewed from the base as white radial stripes. Jackson county, Alabama, on hills (H. E. Sargent); Washington, D. C. (E. Lehnert). The radiating "teeth" are of exactly the same type found in *Gastrodonta lamellidens* Pils.—a species of very different form.

SOME STUDIES ON THE MORPHOLOGY OF THE CYCLADIDÆ.

BY DR. V. STERKI.

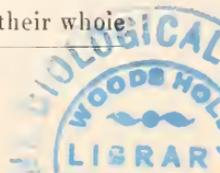
1. It has been said that there are two *cardinal teeth* in the right valves of *Pisidium amnicum* Müll. and *P. virginicum* Gmel., while all the other *Pisidia* have only one, and a group has been founded mainly on that character. Examination of numerous specimens of both species have shown me that that feature is only apparent. In young and half-grown shells the cardinal teeth of the right valves are single, just as in other species, only more curved, and as they grow older there is a slight indentation in the middle. There the growth of the tooth ceases, while both ends keep on growing, until at last there are apparently two teeth, which, however, can usually be seen more or less distinctly coherent, even in mature mussels. The same character has often been noticed in specimens of *P. variabile* and *compressum*, where the "two teeth" were sometimes completely separated.

2. *Reversed hinges.* A few years ago Mr. Bryant Walker published some interesting notes* about abnormal hinges in *Sphaeria*. I had made some observations on the same subject, and have continued doing so since. Three different arrangements were found:

1. The posterior laterals are reversed.
2. The anterior laterals and the cardinals.
3. The whole hinge is reversed, laterals and cardinals.

As Mr. Walker says, the posterior laterals and the cardinals alone were never seen reversed, nor both pairs of laterals alone, nor did I see the anterior laterals alone, nor the cardinals alone reversed. Evidently the anterior laterals plus the cardinals form a kind of a unity, being situated in front of the ligament, and when one part of them are reversed all are so, while the posterior laterals stand alone. And the reversion does not only affect the numbers of the teeth, but their whole

*THE NAUTILUS, IX., p. 135. (April, 1896.)



character. In the normal hinge the (single) lateral teeth of the left valve are higher than those of the right one, usually projecting above the level of the valve-edge. The reversed teeth are so in the right valve. Reversion in one or other degree was seen in hundreds of specimens of the *Sphaeria* s. str.: *simile*, *striatum*, *stamineum*, (v.) *emarginatum* and other forms, *flavum*, *fabale*, *nobile*, *primeanum*, and in lots from some localities in 20 to 30 per cent. of all specimens. Might it be inferred, from the great instability of the hinge characters, as well as the almost endless variability in shape, size and striation of some species, that the whole group is of a recent geological age, with the features not fully established? Has any such variability been noticed in *Corbicula*, etc., or in the marine *Cardiacea*?

In *Sphaeria rhomboideum*, *occidentale*, *corneum*, etc., reversion seems to be rare; and so in *Calyculina*. It has been noticed in *Pisidium virginicum* (three specimens, cardinal and anterior laterals), *abditum* (totally and partly), and *politum* (one specimen, totally reversed). These were the only instances noticed among many hundred, probably thousands, of *Pisidia* examined for the hinge characters.

3. *Ridges on the beaks of some Pisidia.* Ridges (or appendages) are known to be present on the beaks of a number of species, such as *supinum*, *henslowanum*, *compressum*, *fallax*, *cruciatum*, *punctatum*, *ferrugineum*, and for some of them they have been described as characteristic. Of the North American species they have been seen wanting in *P. compressum*, *fallax* and *punctatum*, usually in forms which are characterized also by other peculiar features, and must be regarded as varieties. But sometimes all possible intergradations may be seen among specimens from one locality and ranging under the same "form" or variety. In *P. cruciatum* the singularly shaped ridges have been found absolutely constant so far.

On the other hand, beaks with their tops more or less flattened, and with slight indications of ridges, may be seen in species where they are usually rounded, as in *P. variabile*, *abditum*, *splendidulum*. Among lots of the latter species, from Aroostook county, Maine, specimens were found with very strong ridges, just as in *P. ferrugineum*, and they would have to be regarded as representing a widely distinct species, if it were not for intermediate forms.

This is one well marked example of the often perplexing variability of those small mussels, and strongly urges the student not to rely on one or other ever-so-striking feature for the distinction of species, but to carefully consider the *ensemble* of all the different characters, all of

which may be variable to a lesser or higher degree. It shows also that it is impossible to find a species upon one or even a number of specimens from one locality with any degree of certainty.

4. *Beaks of Calyculina.* The presence of "calyculate" beaks and of caps on them, has been regarded as characteristic, first, for the type species (*C. lacustris* Müll.), and then for the genus. Both these characters had to be given up, as being not shown by all species (e. g. *transversa*) of the otherwise well-defined genus. As to the "caps," they are by no means a constant feature of such species as *C. partumeia*, *securis*, etc., and during the last years numerous specimens were seen with the beaks simply rounded and having not even traces of caps. These caps are nothing else but the embryonic shell of the mussel, which is oblong or elliptical in perpendicular section, and the additional growth is formed at an angle as a rule. It seems that the specimens without caps were hatched during the warmer season, when the young may be expelled at an earlier stage of growth, while in cold weather they are retained longer in the brood pouches of the parent and there grow more convex. Numerous young have been seen with several narrow stripes, separated by lines of growth, along the edges of the valves. On the other hand, specimens of *C. transversa* are now and then seen with caps, and occasionally also *Sphaeria* and different species of *Pisidia*. This point deserves to be studied more exactly.

GENERAL NOTES.

STATION OF LIMNÆA GRACILIS.—We have received from Mr. Bryant Walker the following note on the above species, extracted from a letter from Dr. R. J. Kirkland :

"Perhaps you will be interested in an observation respecting *Limnæa gracilis* Say. I think Dr. DeCamp was the only person who found it in Reed Lake, near this city (Detroit, Mich.), and he only found it one year in May. He once told me he collected eighty-five on the rushes, where 'they had come to spawn.' I have searched for it in the spring for the past three years, but have never found one. Last fall, as I wrote you, I found quite a number in November. This fall, I found five on September 17, in the same place as last fall. A week later found eighteen, two weeks later found fifty. After that only two or three on each of several visits. I think it was because the community was exhausted. Have searched at other points in the lake, but unsuccessfully. They were found

on rushes at an average distance of from six to eight inches from the bottom, adhering unusually firmly with spire uppermost on a line with the rush stalk. They did not seem to be in water over four feet deep, nor in that shallower than six inches. They clung so tightly to the rush that, in three instances, in the act of removing them the muscle attaching them to the shell was fractured, and the animal remained attached to the rush, leaving me with a clean shell in my fingers. Twice the shell broke without disengaging the animal from his position."

NOTES ON THE INDENTATA GROUP OF *VITREA*.—Referring to the remarks on this topic in the January NAUTILUS, I would note here that the perforated form of *Vitrea indentata* from Texas is var. *umbilicata* Singley. In "*British Naturalist*" April, 1893, p 81, I wrote :

"*Z. indentatus*, var. *umbilicatus*, Singley, n. var. Mr. Singley has kindly sent me this from Lee county, Texas. It is the form figured in Man. Amer. Land Shells, fig. 17."

If the figure of Binney cited by me is *V. rhoadsi*, the name *umbilicata* must still apply to the Texan shell, as that is the only one Singley or I had seen. I do not remember, however, that the shell was much larger than usual.

In case there is any misunderstanding as to what *carolinensis* is, I enclose a note giving my original description, not published hitherto in full in THE NAUTILUS :

Vitrea carolinensis, (Ckll). The original type was thus described : Max. diam. 10, alt. 5 mm., whorls 5. Pale horn, shiny, semi-transparent, umbilical region somewhat whitened. Surface of shell with strong transverse growth lines and distinct transverse grooved lines. The grooved lines are about 26 on body whorl. Umbilicus small, narrow. Aperture obliquely large-lunate, the upper angle much smaller than the lower. Peristome not sinuate.

Vitrea sculptilis (specimen from W. G. Binney). Max. diam. 10, alt. 5 mm. Impressed striæ very numerous ; 90 or more on body whorl. Peristome sinuous, reflected so as to nearly cover umbilicus. Aperture narrower.

These were originally sent to me by Mr. Binney as "two forms" of *sculptilis*. He afterwards agreed that they were distinct, and that the form referred to *sculptilis* was that species.

T. D. A. COCKERELL.

AS *POLYGYRA EDWARDSI* Bld. seems to be a rather locally restricted species, it may be of interest to record that Mr. Simpson and myself found it not uncommon at Elizabethton, Tenn. *Polygyra tridentata complanata* also occurred there.—BRYANT WALKER.

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No. 11.

CATALOGUE OF THE AMNICOLIDÆ OF THE WESTERN UNITED STATES.

BY HENRY A. PILSBRY.

In the course of preliminary studies for a monograph of American species of this family, projected some years ago by Dr. C. E. Beecher and myself, I found that the Western species, or at least part of them, have been very imperfectly understood by most conchologists who have collected them. Thus, the name *Bythinella* or *Pomatiopsis intermedia* has been applied to several distinct species of middle California, a region where it does not occur. *Bythinella binneyi* and some *Amnicolas* have been equally misunderstood, and some of the *Fluminicolas* need revision. I have, therefore, drawn up a list, with the localities of specimens in the collection of the Academy, and descriptions of some new species.

With a view to extending our knowledge of the range of any of the species, I will willingly examine and identify specimens of the group for collectors desiring to have their shells compared with types or typical specimens of the several species.

The types of *Amnicola limosa*, *A. micrococcus*, *Paludestrina imitator*, *P. stearnsiana*, *P. hemphilli*, *Fluminicola columbiana*, *F. merriami*, *F. erythropoma*, *Pomatiopsis binneyi* and *P. californica*, as well as of the synonyms *Bythinella intermedia*, *Melania exigua* and *Amnicola turbiiformis*, and author's specimens or co-types of all of the other species except *Fluminicola seminialis*, are in the collection of the Academy of Natural Sciences. My opportunities for determining the status of the various species, and their synonymy, have therefore been favorable.

Genus AMNICOLA Gld. and Hald.

A. MICROCOCCUS Pilsbry. Nevada: Small spring in Oasis Valley, Nye Co. (Merriam); Aurora, Esmeralda Co. (W. M. Gabb). Cali-

foria: Death Valley, Inyo Co. (Nelson and Bailey); seven miles from Fort Tejon, Kern Co. (W. J. Raymond).

It is a species of the desert region.

A. LIMOSA (Say). Utah Lake (Hayden and others), and Spring Lake (Putnam), Utah.

A. (*Cincinnatia*) CINCINNATIENSIS (Anth.). Lake Point, (Hemphill) and terraces, ("Bonneville") and Salt Lake, (Hayden); Sevier Lake Valley, Utah (Wheeler Exped.).

Genus PYRGULOPSIS Call and Pils.

P. NEVADENSIS (Stearns). Pyramid Lake, Nevada.

Genus PALUDESTRINA Orb.

[Includes *Bythinella* Moq. Tand., and of authors generally.]

P. LONGINQUA (Gould). Colorado Desert, southern California, at Indio, etc. (fossil specimens); Campo, and springs in Cayamaca Mts., San Diego Co., (Hemphill); Arizona Desert (R. E. C. Stearns); near White Pine, Nevada (Hemphill); Weber Cañon, near Provo, near Brigham City, near Salt Lake City (Hemphill); Bear Lake (Hayden), and Utah Lake, Utah (Putnam); Crooked creek, a tributary of the Owyhee R., southeastern Oregon (Gabb.) *Bythinella intermedia* Tryon is a synonym. An extremely variable, widely distributed species, often incorrectly identified.

P. IMITATOR Pilsbry. Sonoma, Alameda and Santa Cruz counties, California.

P. STEARNSIANA Pilsbry. Marin, Alameda, Tuolumme, Santa Clara and Santa Cruz counties, California.

P. HEMPHILLI (Pils.) near Kentucky Ferry, Snake River, Washington (Hemphill).

P. PROTEA (Gld.) Colorado Desert; Death Valley, Cal; States of Durango and Michoacan, Mexico.

Bythinella seemani Ffd. is a synonym or smooth local race; *P. protea* varies, as Dr. Stearns has shown, from latticed to smooth. "*Bythinella*" *æquicostata* Pils., of Fla., is extremely similar. *Tryonia* is probably only a subgenus of *Paludestrina*. (See Stearns, N. A. Fauna No. 7, p. 278).

Genus TRYONIA Stimpson.

T. CLATHRATA Stimps. "Colorado Desert"; Pahranaġat Valley, Nevada (Merriam).

Genus FLUMINICOLA Stimps.

F. VIRENS (Lea). Oregon: Willamette R. at Portland and Oregon City; Columbia R. at the Dalles; upper Des Chutes R.; Umpqua R.

at Elkton, Douglas Co. Washington: Olympia and San Juan Co., Vancouver Id. (*Paludina nuclea* Lea is a synonym.)

F. NUTTALLIANA (Lea). Oregon: Willamette R. at Oregon City; Crooked creek, a tributary of the Owyhee R., Malheur Co. (*Amnicola hindsii* Baird, described from Kootenay R., a tributary of the upper Columbia, in British Columbia, is a synonym.) This species probably inhabits the entire Columbia Valley.

F. COLUMBIANA Hemphill. Columbia R., near Wallula and near mouth of Snake R., in southwest Washington; Snake R., near Weiser, western Idaho (Hemphill!).

F. SEMINALIS (Hinds). California: Sacramento R. (Hinds, Newcomb); Shasta Co. (Newc.); Pitt R. (Gabb); South Fork of Pitt R., at South Fork P. O., Modoc Co., head of Fall R., Siskiyou Co., small creek, Eagle Lake, Lassen Co. (MacGregor); Surprise Valley, northeast Cal. (Gabb) Oregon: Klamath R.; west side of Stein's Mts., Harney Co. (Gabb).

Var. *dalli* (Call). Brook flowing into north end of Pyramid Lake, Nevada, (Call).

Var. ———. Crane Lake Valley, northeast California. (Gabb.)

Amnicola dalli Call, *A. turbiniformis* Tryon and *Lithoglyphus cumingi* Ffd. seem to be synonyms, the former perhaps a tenable small variety.

F. FUSCA (Hald.) Wyoming: Black's Fork, Green River, at Millersville, and Smith's Fork Green R. (Dr. Jos. Leidy). Utah: Utah Lake; Bear Lake (Hayden), Malad River (Hemphill). South Dakota: Cheyenne Pass (Carter). The localities "California" and "Oregon" for this species probably refer to former wide extension of these territories to the eastward.

F. ERYTHROPOMA Pilsbry. A spring in Ash Meadows, Nye Co., Nevada (Stephens). (*F. fusca* Hald. var. *minor*, Stearns, N. A. Fauna No. 7, p. 282). Differs conspicuously from *F. fusca* in the less rapidly widening whorls of the operculum.

F. MERRIAMI Pilsbry and Beecher. Warm Springs, Pahranaagat Valley, Nevada (Merriam).

Genus POMATIOPSIS Tryon.

P. BINNEYI Tryon. Bolinas, Cal.

P. CALIFORNICA Pilsbry. San Francisco and Oakland, California.

Hydrobia californica Tryon is an *Assiniuea*; "*H. egea* Gld." of some collectors is the large form of *Paludestrina imitator*, the original

"*Amnicola egena*" of Gould being a spineless *Potamopyrgus* from New Zealand.

Descriptions of New Species.

Paludestrina imitator, n. sp.

Shell narrowly perforate or nearly closed, narrowly ovate, thin, light corneous, subtranslucent, nearly smooth, not glossy; whorls $4\frac{1}{2}$, the first planorboid, causing the apex to be decidedly obtuse, the rest quite convex, separated by a deep suture. Spire slender, conic. Aperture somewhat less than half the shell's length, ovate, angular posteriorly, the parietal margin somewhat flattened; peristome thin, the inner margin adnate to the preceding whorl for a short distance above. Alt. 3, diam. 1.6, greatest axis of aperture 1.28 mm.

Counties near San Francisco Bay, California. Types from Santa Cruz.

This species, though corneous and subtranslucent, resembles a young *Bythinella nickliniana* in form. It is evidently a common shell in the region mentioned above. In a lot from Oakland the shells are larger length $4\frac{1}{2}$ mm, with five whorls. This is analagous to the *attenuata* form of *nickliniana*, in the East. The same large form is before me from Petaluma Creek, Sonoma county (J. B. Davy) and Santa Cruz in brackish water (W. J. Raymond); and I have seen similar but deeply eroded specimens, the earlier whorls wholly removed, from San Pedro. It may be that the types and other specimens before me of small size, perhaps some 200 shells in all, are only half grown, and all would attain a length of 4 to 5 mm. when adult. It is conspicuously unlike "*Bythinella intermedia*" Tryon and *Pomatopsis binneyi* Tryon, and is less attenuated than the smooth "*secmani*" form of "*Tryonia*" *protea*. *P. stearnsiana* is not attenuated above, but stout spired, more on the style of *P. longinqua* Gld. (*intermedia* Tryon), while in *imitator* the spire is slender above, though the apex itself is quite obtuse.

P. stearnsiana, n. sp.

Shell narrowly perforate, ovate, thin, corneous, nearly smooth, somewhat glossy, whorls nearly $4\frac{1}{2}$, convex, separated by rather deep sutures, the spire with convexly conic lateral outlines, stout. Apex rather obtuse. Aperture half the shell's length or somewhat less, ovate, the posterior angle blunt and rounded, peristome continuous, the inner margin well defined, generally quite free at the edge from the adjacent whorl. Alt. 2.6, diam 1.7, or larger up to 3.2 mm. alt.

Near Oakland (type locality); Marshall's, Marin Co.; Tuolumme Co. (Hemphill). San Francisco Peninsula? (G. W. Dunn.)

Differs from *P. imitator* in the decidedly convex outlines of the upper part of the spire, making it stouter, the rounded posterior angle of the mouth, free inner lip, etc. In some specimens which I refer to this species as a variety or form, the aperture and peristome are less typical, but the shape of the spire readily distinguishes them from *P. imitator*. Localities for this variety, if such it is, are Lyndon Gulch, near Los Gatos, and a tributary of the same, Santa Clara Co., Strawberry Creek, Berkeley, Contra Costa Co., and Conly Gulch, Santa Cruz Co., all collected by Mr. W. J. Raymond.

Named in honor of a West Coast friend. I wish for his sake it was a foot long instead of two or three millimeters.

***Fluminicola columbiana* Hemphill, n. sp.**

Shell subglobose, with very short, conic spire, and imperforate of nearly imperforate axis. Moderately solid, of a dark olive or brown color, glossy, with fine growth-striae. Whorls 4, separated by deep sutures, the last whorl with a narrow ledge or shoulder below the suture, then flattened and sloping, the periphery decidedly below the middle of the whorl, broadly rounded; base convex. Aperture large, irregularly piriform, being narrow and angular above, bluish inside; outer lip quite thin and sharp; columella broadly concave, heavily white calloused; parietal wall almost free from callous, dark. Alt. 7.5, diam. 6.8, longest axis of aperture 5.2 mm.

Columbia River, Washington, near Wallula and near mouth of Snake R.; Snake River, near Weiser, Idaho (H. Hemphill).

The dark color, superior constriction and narrow but prominent shoulder of the last whorl, acuminate narrowed posterior portion of the aperture, and absence of callous on the inner lip, posteriorly, are characters easily distinguishing this species from its congeners. It has been known for some years under Mr. Hemphill's MS. name of "*F. nuttalliana* var. *columbiana*," but it seems to be one of the most distinct species of the genus.

***Fluminicola erythropoma*, n. sp.**

Shell small, globose-turbinate with short spire, perforate, thin but moderately solid, silvery corneous in color, black where the soft parts are retained, not glossy, nearly smooth. Whorls $3\frac{1}{2}$, separated by impressed sutures, the last half more rapidly descending; last whorl well rounded throughout. Aperture oblique, broadly ovate, angular above; outer lip thin, inner lip concave below, slightly expanded,

moderately calloused; adnate portion above very short, somewhat calloused. Operculum light red, composed of about 3 slowly increasing whorls, the nucleus sunken. Alt. 2.7, diam. 2.3, longest axis of aperture 1.5 mm.

Ash Meadows, Nye Co., Nevada.

Like *F. fusca* in color, and at first referred to that species as a stunted local form by Dr. R. E. C. Stearns and myself (see N. A. Fauna No. 7, 1893, p. 282); but on renewed examination it was noticed that the operculum is very different from that of other known members of the genus, in having the latter part of the last whorl far narrower, the spiral portion consequently larger, and the nucleus nearer the middle. It differs from *F. merriami* Pils. in the calloused inner lip, among other features; and the different operculum and pale translucent tint of the shell readily separate it from "*Amnicola*" *turbiniformis*, "*Amnicola*" *dalli*, and other small varieties of *Flumnicola seminalis* Hinds. The red color of the operculum seems to be constant, and the size varies but little in the large series collected.

***Pomatiopsis californica*, n. sp.**

Shell turritid-conic, umbilicate, rather thin, chestnut-brown. Surface somewhat shining, with slight, irregular growth wrinkles and more conspicuous wrinkles or incipient epidermal lamellæ at unequal intervals, especially on the upper portion. Spire conic, the apex slightly obtuse, glossy, generally eroded in adult shells. Whorls $5\frac{1}{2}$, extremely convex, separated by deep sutures, the last whorl short and convex. Aperture vertical, ovate, scarcely angular above; peristome continuous, the inner margin less convex than the outer, nearly straight where it is in contact with the preceding whorl for a short distance posteriorly; edge simple, the collellar margin a trifle expanded above the umbilicus. Alt. 5, diam. 3.3, longer axis of aperture 2.14 mm.

San Francisco, California (R. E. C. Stearns); Oakland (Beecher coll.)

Two lots of this species are before me from "San Francisco," one received from Dr. R. E. C. Stearns, the collector of the other unknown. Another lot (Beecher collection) is from Oakland, collector also unknown. All were labelled "*P. intermedia* Tryon."

P. californica resembles the Eastern *P. lapidaria* and *P. hinkleyi* in color, texture and general appearance. It differs from *P. lapidaria* in being conspicuously wider, less turritid, more *Amnicola*-shaped. From *P. hinkleyi*, described from Alabama (NAUTILUS X, 37, Aug.

1896), it differs in being rougher, and of chestnut rather than of olive-brown color; but the contour is nearly the same. *P. Cincinnatiensis* Lea is paler in color, with shorter, more nearly circular aperture, and different texture. The true *Bythinella intermedia* of Tryon is a wholly different thing.

Thirty-eight specimens examined. Types from the locality and collector first mentioned above. The denticle formula is $\begin{matrix} 3 \\ 1-1 \end{matrix}$, 5, 6, 6.

Since the above was written, additional specimens from San Francisco have been received from Mr. W. J. Raymond. They agree in all respects with the types.

ON A NEW SPECIES OF DRILLIA FROM CALIFORNIA.

BY WM. H. DALL.

Drillia empyrosia, n. sp.

Shell solid, with a high acute spire and polished surface; color yellowish with a burnt sienna brown tint on the later whorls, a paler peripheral band develops white patches where it crosses the ribs; transverse sculpture of (about 11) slightly oblique somewhat flexuous ribs, obsolete below the periphery and upon the anal fasciole, sharpest on the earlier whorls; Spiral sculpture of coarse, sometimes nearly obsolete threads, most obvious below the periphery; whorls nine, the nucleus lost in the specimen; aperture short, wide, with a deep wide notch leaving a wide fasciole, a callous lump above the notch on the body, and a rather strong whitish callus, externally brown-edged, on the pillar; siphonal notch wide with a marked fasciole, the caudal slightly recurved. Lon. of shell 31, of last whorl 16; of aperture 10, max. diam. 10 mm.

Found in deep water off San Pedro, Cala., by Mr. and Mrs. T. S. Oldroyd.

This species resembles *D. unimaculata* Sowerby, but is smaller, with a different coloration, with less nodular and more oblique ribs, and more slender form. Though not the largest, it is perhaps the most elegant Pleurotomoid of alta California.

NEW PUPIDAE.

BY DR. V. STERKI.

BIFIDARIA QUADRIDENTATA, n. sp. Shell narrowly perforate-rimate, conical-turriculate, with the apex somewhat obtuse; colorless glassy;

surface very slightly striated, shining; whorls six, gradually increasing, with the suture rather deep between the upper, less so between the lower whorls; the last whorl moderately ascending at the aperture, rather rounded at the base, slightly expanded near the aperture, with an impression over the inferior palatal fold; aperture rather oval, truncate above, margins well everted, the palatal somewhat more curved than the columellar, the two connected by a thin callus; lamellæ and folds four, subequal; angulo-parietal appearing almost simple, inclined toward the columella; columellar horizontal, rather short and strong, palatals rather short and stout, in normal position, the inferior somewhat larger and more remote from the margin; size: alt. 2.4 to 2.8, diam. 1.3; apert. alt. 1.0 mm.

Hab.: Capitan Mts., Lincoln Co., New Mexico. Over a hundred good, fresh specimens were collected by Rev. E. H. Ashmun.

In size, shape and color, our species has much resemblance to *Bif. contracta* Say, but the aperture, with its lamellæ and folds, is very different, as is at once apparent from the description. *Bif. quadridentata* rather ranges with *Bif. pilsbryana*, which, however is very much smaller, usually has a basal lamella and whose angulo-parietal shows hardly its being complex.

BIF. HORDEACELLA Pils. var. **PARVIDENS**, n. Quite small, apex more acute than in typical examples, and outline more obovoid; peristome rather abruptly but narrowly everted; lamellæ and folds small, especially so the upper palatal, often being a mere trace; basal absent or very small; color pale horn; alt. 1.5 to 2 mm. Jerome, Arizona, a good number of specimens, collected by Rev. E. H. Ashmun.

PUPA (PUPILLA) SONORANA, n. sp. Shell perforate-rimate, cylindrical, apex obtuse, rounded; color brownish horn; surface finely striated-rugulose, more coarsely so near the aperture; whorls $6\frac{1}{2}$, gradually increasing; suture rather deep; the last whorl comparatively small, compressed in its inferior part, the base narrow, almost keeled; near the aperture a high, sharp bulging filled with a strong whitish callus, shining through the shell; a narrow, deep constriction in front of it, and an impression over the palatal fold; aperture rather small; margins abruptly but rather narrowly everted; lamellæ and folds 3, white; parietal rather deep seated, long, spiral; columellar perpendicular (along the columella), lamellar; palatal (the inferior) rather strong, often with a thread-like prolongation inward. Size: alt. 2.6, diam. 1.3.

Hab.: White Oaks, Mescale, Gilmores, New Mexico, and of one lot the origin is unknown, (very probably New Mexico or Arizona) collected by Rev. E. H. Ashmun.

Var. TENELLA, n. Shell rather oblong or ovoid; the bulging in the palate less high, and only with a slight callus inside. Most specimens are less high than the types (2.3 to 2.6).

Capitan Mts., New Mexico, Mr. Ashmun, a dozen specimens.

This Pupilla is distinct from all our American forms; but it stands very near *P. triplicata*, Studer, of Europe, and may prove to be distinct only as a var. It is smaller than *P. blandi*, the last whorl is more compressed below, and the granular surface, the long parietal, and the perpendicular, elongated, lamelliform columellar lamella, are other distinguishing features.

IN MEMORIAM—EDWARD W. ROPER.

Edward Warren Roper was born in Revere, Mass., October 12, 1858. When he was three years old his mother died, and he was taken into the family of her sister, Mrs. Benj. F. Perry, where he grew up to manhood. When six years of age his uncle and aunt removed to a farm in Lynnfield, Mass. This farm was his home until the age of fifteen.

The creatures of the woods and fields were his favorite companions. He was especially interested at this time in birds and wild flowers. An essay on "The Nesting Habits of Birds," won him a prize while in High School, and led to his early recommendation for membership in the Boston Society of Natural History.

The family having removed to Revere, Edward's education was finished in the Chelsea High School, from which he graduated in June, 1877. The treasures of the sea, shore and marsh had begun to interest him, and he now determined to concentrate his scientific efforts on conchology.

Three years after leaving school Mr. Roper became employed in newspaper work, which he followed for eleven years, editing the "Revere Journal," and afterwards a paper in Somerville, "The Truth," and for several years the "Chelsea Record."

In December, 1893, he suffered a severe attack of grippe. As soon as he was able he went to Jamaica for the remainder of the winter, and returned apparently fully recovered.

In October, 1894, he married Miss Flora G. Allison, of Dublin, N. H.

The following winter brought a return of the former illness, and again he went to Jamaica, accompanied by his wife. They spent four months on the island and collected and brought home a large number of land shells and ferns.

The spring and summer of 1895 Mr. Roper spent in putting his affairs in order preparatory to becoming a permanent exile from New England.

The next year was spent in Colorado Springs. Mr. Roper was occupied a great part of the year in arranging and cataloguing his special collection. And here a daughter was born in March, 1896.

In September, 1896, Mr. Roper and family went to California, going first to Pasadena, a year later to Long Beach, and last July to San Diego.

Mr. Roper's health never really improved, but he was able most of the time to do some collecting. Even Southern California is not free from grippe, and in the early part of October Mr. Roper had an attack from which he could not recover. In November he was somewhat better and made several trips to the beach. As late as November 27th he was driven with his family to La Playa and spent the day on the shore. He usually succeeded in finding a choicer shell than any of the rest of the party.

About the middle of December his health began to fail quite rapidly. His indomitable energy kept him from giving up, and he was confined to his bed only one day. The end came on the last day, of the year 1898.

Mr. Roper's collection of about 3000 species, including his special collection of Cyrenidæ, becomes the property of the Boston Society of Natural History.

Mr. Roper was well known to conchologists through his papers in THE NAUTILUS. His articles were always of the greatest interest, including such subjects as: "Collecting Land Shells in Southern California," "In a Maine Conchologist's hunting ground," "Collecting at Eastport, Maine," "Pleurodonte Brainbridgei and other Jamaican Shells," etc., etc. Later Mr. Roper made a special study of the Sphæria and Pisidia, and contributed the following articles on the subject: "Notes on Sphærium secure Prime," "A new American Pisidium," (*P. idahoense*) Vol. iv, page 85, December, 1890. "Notes on the

Washington Sphaeria and Pisidia with Description of New Species," (*P. randolphii*) Vol. ix, page 97, January, 1896. "A Word About Sphaeria."

The species *Polygyra Roperi* and *Fusus Roperi*, were discovered by Mr. Roper and named in his honor. The latter is type of *Roperia* a new section of *Fusus*.

ANOTHER NEW SNAIL FROM NEW MEXICO.

BY T. D. A. COCKERELL.

Ashmunella pseudodonta (Dal.) subsp. *capitanensis* Ashmun & Cockerell, n. subsp.

Shell depressed, shining, dark horn color or even reddish; the usual striae distinct but not sharp; spiral impressed lines visible with a lens; whorls $5\frac{1}{2}$ rounded; aperture oblique, semi-lunar; lip expanded, broad, reflected, strongly tinged with pinkish or coffee color, edentulous, except that the basal part bears within a distinct but slight callus, which is more or less livid; parietal denticle either rudimentary or distinct, but never large; umbilicus broad, exposed, broadly exposing the penultimate whorl. Diam., max. 17 to $18\frac{1}{2}$; min., $14\frac{1}{2}$ to 15; alt., 8 to 10 mm.

Habitat; Near Baldonado Springs, Capitan Mts., Lincoln Co., New Mexico, alt. 8,200 feet. (E. H. Ashmun.)

This is to *pseudodonta* practically as *chiricahuana* is to *ashmuni*.

GENERAL NOTES.

STATION OF LIMNÆA GRACILIS.—By a curious blunder, Reed's Lake was said to be near Detroit instead of Grand Rapids, Mich., in the February NAUTILUS, page 119.

Canon A. M. Norman, in the "Annals and Magazine of Natural History," for January, 1899 (page 79), gives an interesting account of two recent specimens of the gigantic Madeiran *Helix Lowei* Fer. This species, which attains a diameter of upwards of 2 inches, is not uncommon in the calcareous beds of Porto Santo, but only two recent specimens are known: one collected by Sr. J. M. Moniz some years ago, the other recently acquired by Canon Norman, formerly in the collection of the late Baron von Maltzan.

CONULUS CHERSINUS var. DENTATUS.—The toothed form of *Conulus* was first noticed by Mr. W. G. Binney (Man. Amer. Land Shells, p. 69). A note on the dentition of *Conulus* by Dr. V. Sterki will be found in NAUTILUS VI, p. 106.

ISAAC LEA DEPARTMENT.

[Conducted in the interest of the Isaac Lea Conchological Chapter of the Agassiz Association by its General Secretary, Dr. W. S. Strode.]

CARING FOR SHELLS.

[Extract from the report of Prof. Josiah Keep. From the Transactions of the Isaac Lea Conchological Chapter for 1898.]

During the past year the time that I have been able to give to conchology has chiefly been spent upon my cabinet of shells. There is one enemy that is ever present, namely, *dust*; and my work has largely been in the line of erecting fortifications to repel its intrusion. Shells will get dusty in the best kept houses, and labels are liable to be lost or grow dim. So now it is my practice to put all my small shells into some dust-tight receptacle and to put the labels with them or else secure them firmly upon the outside of the box. The cost of suitable boxes and vials has been an obstacle in the past; but that has been now largely overcome, and I can do no greater service to "Isaac Lea" comrades, than to suggest one means at least of securing the desired end.

In past years I have used homœopathic vials for the smallest shells, and one or two-ounce, wide-mouthed bottles for the larger ones; but neither of these were very satisfactory. The homœo. vial has too small a mouth, and the bottles were coarse and clumsy. Last Summer I purchased a quantity of "seal shell vials," which are merely short pieces of glass tubing, sealed at one end and ready to receive a cork at the other. These vials I obtained from Whitall, Tatum & Co., 410 Race street, Philadelphia. I bought three gross, of different sizes, the smallest being about $\frac{1}{2}$ inch in diameter and $1\frac{3}{4}$ inches in length; the largest is $\frac{3}{4}$ inch diameter and $2\frac{1}{2}$ inches long. The cost, with corks, was only about one cent on an average. For my very small shells I use short $\frac{1}{4}$ dr. homœo. vials.

The shells are safely corked in these vials, with the label inside, where they may defy the old enemy, dust; and a little wiping of the tubes will make them appear as good as new at any future time. But these vials will not answer for flat shells, like limpets or small pectens. So, for these, I bought, of the same firm, a quantity of turned wooden boxes, $\frac{1}{2}$ ounce, 1 ounce and 2 ounces, phoenix pattern. They cost even less than the vials, and are very convenient for many purposes.

After filling a box, I paste a label on the top of the cover. I use Dennison's labels, Nos. 204, 208 and 212. They are very inexpensive and convenient.

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No. 12.

ON A RECENT COLLECTION OF PENNSYLVANIAN MOLLUSKS FROM THE OHIO RIVER SYSTEM BELOW PITTSBURG.

BY SAMUEL N. RHOADS.

Owing to the steady extermination of the molluscan life of the Ohio river in western Pennsylvania, due to the pollution and damming of the waters of that river and of the Monongahela, and to a smaller extent of the Allegheny river, any information relating to the species still existing in these waters must be quickly put on record to be preserved. It is the aim of this paper to give a list, briefly annotated, of the fresh water species recently collected by the writer in the vicinity of Pittsburg. While the time devoted to this collection was limited to less than a week's work, and the number of species taken do not duplicate all those hitherto secured by local collectors in that region, it seems desirable to publish, if only to inspire others more favorably situated than myself to record their knowledge in this line before it is too late. Indeed, it is remarkable, when we consider the amount of molluscan research carried on by the conchologists of Pennsylvania that as yet nothing in the nature of a faunal list of the aquatic mollusca of western Pennsylvania has yet appeared.* Before giving the list it is proper to enumerate some of the agencies which are surely accomplishing the extinction of so much of the fluviatile life of the Ohio river and its tributaries. Above the city of Pittsburg the Monongahela is bordered for the greater part of its navigable length with factories, furnaces, refineries, mines, and oil and gas wells, whose refuse products are continually draining into the river. The sewage of the towns on this river is also a factor in its pollution. Great as this pollution may appear, it is not likely that it would cause the death

*Some Unionida from the Allegheny river in Warren county, Pennsylvania, were listed by W. B. Marshall in *Bulletin of the New York State Museum*, Vol. 1, but as no localities are given in the list it is impossible to determine what species were taken in Pennsylvania and what in New York.

of many mussels and fish, which now no longer exist in the lower half of the Monongahela, if the waters had their free course; but the damming of the river has so concentrated this sewage during low water that the imprisoned animals have no relief from the free flow of the current nor means of escape from the limits of the dammed area. The Monongahela is said to be now dammed for purposes of navigation throughout its entire length in Pennsylvania and for some distance farther into West Virginia. Old rivermen told me that it was useless to try and get live mussels below Cheat river, though only a year since, a small collection of unioes from the Monongahela near Charleroi, Washington county, was made for the Carnegie Museum. It is noteworthy, however, that most, if not all, of these were "dead" shells. At McKeesport, the junction city of the Monongahela and Youghiogheny rivers, I was unable to find any evidences of molluscan life in the waters of either river, nor were any dead shells to be found on the mud banks and shoals exposed by the very low stage of water then prevailing. A boatman stated that there was little hope of finding any live mussels below Connellsville on the Youghiogheny.* A similar condition exists in the Allegheny river above Pittsburg, as far as my search extended a few miles above Sharpsburg, only dead shells of the larger unioes being found where three years since a member of the High School Naturalists' Club of Pittsburg told me he had secured the living animals. The same remarks apply to Chartier's creek within the city limits and flowing into the Ohio river at McKees rocks, just above the Davis Island dam. A few dead shells of *U. ligamentinus* were picked up in the bed of this creek. Following the instructions of Mr George H. Clapp, of Edgeworth, Allegheny county, Pa., who kindly gave me the full benefit of his intimate knowledge of the Ohio river between his home and Pittsburg, I searched for water mollusca at the lower end of Neville Island opposite Coraopolis, but without success, only a few east-up shells of *ligamentinus* and *crassidens* being noted. Just as I had given up the search and was waiting for a trolley car on the bridge above Coraopolis, connecting the city with Neville Island, I espied some live unioes in the shallow running water of the "back river" which flows beneath the

* This is, no doubt, largely due to the immense volume of "mine water" now discharged into the river. This "mine water" is heavily charged with sulphuric acid, due to the leaching out of the sulphate of iron in the coal measures. At times of excessively low water the percentage of free acid in the water is so high that works along the banks of the Youghiogheny and Monongahela rivers as far down as Pittsburg have been forced to suspend operations, due to the eating out of the steam boilers, and the railroads which use this water in their engines, for lack of a better supply, have spent large sums of money in putting up treating tanks in which to neutralize the acid before pumping into the boilers.—G. H. C.

bridge at that point. Here, and for a distance of two and a half miles above it, the small stream, to which the "back river" dwindles at extreme low water on the south side of Neville Island below the wing dam, is more or less thickly populated with living uniones. This stream is supplied almost wholly by fresh water springs rising along its bottom. From the absence of live mollusks in any part of the main river and other parts of the "back river" where these fresh springs exert no influence, it is just to conclude that to these alone is due the existence of the only living uniones which I was able to locate in Allegheny county. A special collecting trip for mussels was taken to Beaver, Beaver county, search being made in the Ohio river at the junction of Beaver river, and at several points below Beaver to the mouth of Raecoon creek and up that creek two miles. Living shells were very scarce anywhere along this route, most of them being taken where the less polluted waters of the Beaver joined those of the Ohio. Below this, along the bed of the Ohio, nearly all the uniones found were dead or dying, a condition of affairs which the ferryman at Vanport told me had come to pass largely in the last two years. The subjoined list will also contain an enumeration of the species found during a day's hunt in the Beaver river below Wampum, in the southern border of Lawrence county, about fifteen miles north of Beaver. The conditions obtaining among the water mollusca in that locality are probably normal.

Mr. Clapp has kindly consented to read the manuscript of this paper and make such annotations as may be of special interest. To such notes his initials are appended. In the identification of this collection the author was accorded every facility afforded by the collection of uniones in the Carnegie Museum, identified by Mr. Simpson and by the historic collections of the Academy of Natural Sciences, where the final determinations were made. To Dr. W. J. Holland, of the former, and Prof. Henry A. Pilsbry, of the latter, I am especially indebted for services rendered in this connection. For sake of convenience in reference the nomenclature of Lea's Synopsis (1870) is adopted for the Uniones; and the sequence of the genera and species of *Unionidæ* is alphabetic.

Annotated List of Species.

Family UNIONIDÆ.

Anodonta edentula Say. Ohio R., Coraopolis, 16; Beaver, 1
Beaver R., 14.



Anodonta gracilis Lea. Ohio R., Beaver, 9; Coraopolis, 9.

Anodonta marginata Say. Ohio R., Coraopolis, 4; Beaver R., Wampum, 100.

Margaritana rugosa Bar. Ohio R., Coraopolis, 5; Beaver, 1; Beaver R., Wampum, 6.

Unio aesopus Green. Ohio R., Coraopolis, 3; Beaver R., Wampum, 1.

Unio alatus Say. Ohio R., Coraopolis, 14; Beaver, 1.

Unio coccineus (Hild) Lea. Beaver R., Wampum, 7.

Unio cooperianus Lea. Ohio R., Beaver, 1; Coraopolis, 4.

Unio cornutus Bar. Ohio R., Beaver, 1; Coraopolis, 1.

Unio cylindricus Say. Ohio R., Coraopolis, 1; Beaver, 1; Beaver R., Wampum, 2.

Unio crassidens Lam. Ohio R., Coraopolis, 40; Beaver, 3.

Unio donaciformis Lea. Ohio R., Coraopolis, 2. The larger specimen is 66 mm. long.

Unio elegans Lea. Ohio R., Coraopolis, 3. These specimens outwardly appear like *rubiginosus* from the same locality, in this respect being much more elongated and less sharply carinated than the typical *elegans*.

Unio gibbosus Bar. Ohio R., Coraopolis, 41; Beaver, 9; Beaver R., Wampum, 28.

Unio irroratus Lea. Ohio R., Beaver, 1.

Unio kirtlandianus Lea. Beaver R., Wampum, 150.

Unio lens Lea. Ohio R., Coraopolis, 3; Beaver R., Wampum, 25.

Unio ligamentinus Lam. Ohio R., Coraopolis, 100*; Beaver, 20; Beaver R., Wampum, 70. In the Ohio this was the most abundant mollusk, exceeding in numbers all the other *Unios* put together.

Unio luteolus Lam. Ohio R., Coraopolis, 16; Beaver R., Wampum, 18.

Unio metanever Raf. Ohio R., Coraopolis, 12; Beaver, 5.

Unio multiradiatus Lea. Beaver R., Wampum, 14.

Unio obliquus Lam. (*U. subrotundus* and *varicosus* Lea.) Ohio R., Coraopolis, 31; Beaver, 8. Forty adult specimens of the *obliquus* type presents so many gradations corresponding on either hand to *subrotundus* and *varicosus* in the series at the Academy of Natural Sciences named and presented by Isaac Lea, that I am obliged to lump them as above. There is also a complication regarding the applicability of the name *mytiloides* Raf., to some of these. It is probable

that my series represents two species, but the task of separating them must be left to a specialist.

Unio ovatus Say. Ohio R., Coraopolis, 29; Beaver, 1; Beaver R., Wampum, 3.

Unio parvus Bar. Beaver R., Wampum, 1.

Unio phascolus Hild. Beaver R., Wampum, 37.

Unio pilaris Lea. Ohio R., Coraopolis, 1.

Unio plicatus Lesueur. Ohio R., Beaver, 1; Beaver R., Wampum, 10. A more careful examination may show some of these to be *undulatus*. The distinction between these two species as identified in the Academy collection is not correlated by constant differences.

Unio pressus Lea. Beaver R., Wampum, 3.

Unio pustulosus Lea. Ohio R., Coraopolis, 1; Beaver R., Wampum, 8.

Unio rectus Lam. Ohio R., Coraopolis, 4; Beaver, 5.

Unio rubiginosus Lea. Ohio R., Coraopolis, 5.

Unio securis Lea. Ohio R., Coraopolis, 1.

Unio triangularis Bar. Ohio R., Coraopolis, 17; Beaver, 10; Beaver R., Wampum, 15.

Unio trigonus Lea. Ohio R., Coraopolis, 3. These specimens are so young that their identification is not satisfactory.

Unio tuberculatus Bar. Ohio R., Coraopolis, 1; Beaver, R., Wampum, 2.

Unio verrucosus Bar. Ohio R., Coraopolis, 2; Beaver, 1; Beaver R., Wampum, 2.

Family CYRENIDÆ.

Sphaerium stamineum Cour. Ohio R., Coraopolis, 20; Raccoon Creek, Beaver Co., 4.

Sphaerium striatinum Lam. Ohio R., Coraopolis, 15; Raccoon Creek, Beaver Co., 3; Beaver R., Wampum, 2.

Family PLEUROCIDÆ.

Goniobasis depygis (Say). Ohio R., Coraopolis, 150; Beaver, 10; Beaver R., Wampum, 60;

Pleurocera canalculatum Say. Ohio R., Coraopolis, 50; Beaver, 16.

Family VIVIPARIDÆ.

Campeloma subsolidum (Anth). Beaver R., Wampum, 20.

Family PHYSIDÆ.

Physa heterostropha Say. Ohio R., Coraopolis, 3; Beaver, 20; Allegheny R., 6 m. Isl., Pittsburgh, 60; Beaver R., Wampum, 27.

Physa integra Hald. Ohio R., Coraopolis, 1; Beaver, 6.

Family LIMNÆIDÆ.

Limnaea columella Say. Shenley Park, Pittsburgh, 20; Ohio R., Beaver, 1.

Planorbis trivolvis Say. Ohio R., Coraopolis, 15.

Planorbis bicarinatus Say. Ohio R., Coraopolis, 20.

Family ANCYLIDÆ.

Ancylus diaphanus Hald. Near mouth of Raccoon Creek, 20; Allegheny R., 6 m. Isl., Pittsburgh, 50.

Ancylus rivularis Say. Beaver R., Wampum, 6; Raccoon Creek, Beaver Co., 3.

A NEW PTERONOTUS FROM CALIFORNIA.

BY W. H. DALL.

Pteronotus Carpenteri, n. sp.

Shell trialate, reddish brown, with obscure spiral lines of darker brown, the aperture whitish with a darker throat; nucleus brownish, whorls about eight, the last much the largest; suture distinct, appressed, intervarical surface smooth or obscurely spirally striate, the apical whorls with reticulate threading; the last two or three whorls with a single obscure nodulosity on the periphery between the varices; varices continuous up the spire; posterior face of the varices smooth with obscure radial ridges which slightly crenulate the margin, in adolescent shells; but in full grown ones there are about five rather wide, low radial ridges, each of which terminates in a digitation of the margin; anterior face of the varices with profuse, close-set crenulate imbrications, which in fully grown shells show radial depressions corresponding to the ridges on the back of the varix; digitations excavated in a shallow manner anteriorly, terminating in somewhat blunt projections, thin and sharp edged; aperture small, oval, with a continuous, raised, smooth margin without denticulations; canal closed, moderately wide, bent to the right in front, a disused smaller canal bordering its posterior two-thirds on the left. Length of shell 57, of last whorl from the suture, 42; width including varices, 35; width of aperture, 9.5; length of aperture, 13 mm.

Monterey, Cala., F. L. Button; at station 2908, off Pt Concepción, Cala., in 31 fms., sand, U. S. Fish Com.; and at the Farralone islands, Cala., J. S. Arnheim. This shell recalls *P. macropterus* Desh., of the Antilles, and like it belongs to the section *Pteropurpura* Jous. Young specimens are more pointed, and with narrower, less digitate varices,

than the adults. A specimen without locality, but probably from Monterey, was in the collection of Mr. F. Button, now belonging to his son, F. L. Button.

HOW UNIONES EMIGRATE.

BY LORRAINE S. FRIERSON.

In the June number of NAUTILUS, 1891, is an article by Mr. C. T. Simpson, on "The Means of Distribution of Unionidæ in the South-eastern United States," in which he says that he had often found *U. obesus* Lea in dry places, where for nine months of the year they must have been in a dormant condition.

This Unio, which is no doubt a variety of *U. declivis*, *U. symmetricus*, etc., is one that can stand such changes. I have obtained them in places where they must have spent half of their lives in such a dormant condition. On the other hand, some Anodontas and *Margaritana confragosa* Say are so intolerant of heat that they are frequently killed by the sun's rays while yet in water six inches deep. For the spread of these species of Unionidæ some other means than those which would suffice for *U. obesus* must be employed. Should it be shown that embryonic unios become encysted in fish, of course the problem would be solved in large part. There is, however, a method employed in nature which I have not seen mentioned, and which is to my mind a complete solution of the problem. Did any of my fellow Unio "cranks" ever catch Unio during the winter months by means of a long slender switch? You go to a bed of mussels in clear water, and standing on the shore you gently poke the end of your switch into the gaping shell of the unsuspecting unio. As soon as it feels the stick it closes the shell tightly on it; then you gently pull the mussel out and put it in your game bag.

Now suppose that this mollusk was an *impregnated female*, and that instead of a switch it was a wild duck's toe, which was accidentally caught between the valves. What would happen? Why, that the duck would fly out of the Black Warrior river in Alabama, and finally alight in Lake Kissimee, Florida, and by this time either the unio would let go or the duck's toe be cut off; and presto, a whole colony of unios is established. This is no fancy, but an observed fact, that is, so far as the *transportation* of unios is concerned.

Twice I have killed wild ducks with unios attached to their toes,

and have seen what I *believed* to be unios *hanging* from the feet of others flying overhead. What has come under my individual observation *twice* must have happened *thousands* of times. How else could Unionidæ from the Mississippi drainage get into Florida?

DESCRIPTIONS OF NEW AMERICAN LAND SHELLS.

BY HENRY A. PILSBRY.

Gastrodonta coelaxis, n. sp.

Shell rather widely umbilicate, the width of umbilicus contained 6 to $6\frac{1}{2}$ times in the greatest diameter of the shell; thin, somewhat fragile, yellow-corneous, sub transparent, the last suture readily visible through the base; much depressed, the periphery subangular, upper surface convex; surface glossy, sculptured with irregular wrinkles in the direction of growth lines above, almost smooth beneath, and in favorable lights showing subobsolete spiral striæ. Whorls $6\frac{1}{2}$, slowly widening a little convex, the last moderately convex below. Aperture oblique irregularly lunar, deeply excised by the preceding whorl, not calloused inside, two-toothed a short distance within; one thin and rather short lamella projecting from the lower part of the outer wall, and another smaller one from the middle of the baso-columellar wall; both sometimes wanting; pristome thin and sharp, the outer margin well rounded, baso-columellar margin straightened. Umbilicus well-like, but widening at the opening and showing the penultimate whorl. Alt, 3, diam. 6 to $6\frac{1}{2}$ mm.

Cranberry, North Carolina (Mrs. George Andrews).

This species adds another to the long series of mountain snails discovered by Mrs. Andrews, whose success in finding new and rare species has been remarkable. Future students of the snails of this "Cumberland" mountain region will always gratefully remember two ladies who have done much of the pioneer work—MRS. ANDREWS and MISS LAW.

G. coelaxis is intermediate between *G. gularis* (Say) and *G. lasmodon* (Phill). It is more widely umbilicate than the former and has a narrower umbilicus than the latter species. There is no callus within the basal lip, such as shows a yellowish blotch in most specimens of *gularis*.

This species is perhaps what Mr. Binney identified as *Zouites macilenta* Shuttl. in First Supplement to Terr. Moil. V, p. 143, but is not the *macilenta* of Shuttleworth, which is an absolute synonym of

G. lasmodon Phill. That so good a conchologist as Shuttleworth should have described a known species is readily explicable in this case; "*H. lasmodon*" having been described but a short time before in the proceedings of a society probably not in Shuttleworth's possession, it had not been figured and was not contained in any general work on the shells of America. However this may be, so good a diagnostician as Shuttleworth could have used the words, "*late et perspective umbilicata*" of no other species of the region, and the rest of the description,* as well as the comparison with *Patula*, agrees excellently with *lasmodon*. This conclusion will remove *incilenta* from the list of valid species and place it under *lasmodon* as a synonym.

The *gularis* group of *Gastrodonta* is a peculiarly perplexing one. Both *gularis* and *cuspidata* were originally described as *imperforate*; but both have perforate forms also. *G. gularis* was described from Ohio, and I will be most grateful to anyone who has Ohio specimens, for a few. Shell out, brethren! Mr. Vanatta, who has recently overhauled the series in the Academy collection, informs me that he finds great difficulty in separating *G. collisella* from *gularis*, and it seems likely that that form should be ranked as a variety of *gularis* rather than a distinct species. He finds, too, that there is a narrowly umbilicated variety (already noticed by Binney) and another with notably excavated base, consequently straight baso-columellar lip, and more or less deficient internal teeth. This was named by Mr. A. D. Brown in his collection (now in coll. A. N. S. P.); but pending a thorough examination of the *gularis* group, it is scarcely fair to worry a long-suffering generation of conchologists with any names for these local races. The genitalia of the various forms should be examined.

***Polygyra postelliana subclausa*, n. v.**

Differs from *P. postelliana* in the greater development of all the oral obstructions. The parietal process enters more deeply; the upper lip-tooth is more deeply placed, more strongly hooked than usual in the typical form, and the apertural orifice decidedly narrower throughout, shaped like an interrogation mark (?) without the terminal dot. Surface regularly rib-striate, below as well as above. Whorls $5\frac{1}{2}$ to 6. Alt. 5.7, greatest diam. 10 m.m. Alt. 5, greatest diam. 9 mm.

Baldingsville; Baldwin, Baker county, and Imri, Hamilton county, Florida.

A smaller form of this variety, smoother below, occurring in Volu-

* A slightly inaccurate translation is given by Binney in Manual of American Land Shells, p. 227.



sia county, Florida, differs as follows: Aperture similar to the preceding, but anterior outline of the parietal wall more elevated, straighter, less excavated in front of the parietal fold. Surface almost or quite free from rib-striate below. Whorls $4\frac{1}{2}$ to 5. Alt. 4, greatest diam. $7\frac{1}{2}$ mm. Alt. $3\frac{1}{3}$, greatest diam. $6\frac{1}{2}$ mm.

Typical *P. postelliana* occurs in Glynn and Wayne counties, Georgia, and South Carolina. I have not seen it from Florida.

ISAAC LEA DEPARTMENT.

[Conducted in the interest of the Isaac Lea Conchological Chapter of the Agassiz Association, by its General Secretary, Dr. W. S. Strode.]

SHELLS OF LAKE WORTH, FLORIDA.

[Extract from the report of J. J. White. From the Transactions of the Isaac Lea Conchological Chapter for 1898.]

Having had occasion to visit the soldiers stationed at Miami, in July last, I could not let such an opportunity pass without profiting by it. Heavy rains kept me within doors the greater part of the time. When dry enough I was out in the woods skirting the town and was amply repaid by finding large quantities of the beautiful *Liguus fasciatus* Brug. These I found on trees, sometimes as high as twenty feet from the ground. I had to procure a long pole to detach them from trees, catching them in my hands, so as to prevent them from breaking by falling on the rocks and roots of trees. I soon found that I must have a safer way to collect them; so I made a little basket of twigs and bark, and attached it to the end of my pole, and found it to work admirably. I soon collected all I thought I would need. While sitting in the car, waiting for the train to start for Palm Beach, I counted twenty-seven on the trees close by the station.

During my stay of five weeks at Palm Beach and Lake Worth I made a number of trips up to the new and old Lake Worth inlets, which have been my favorite collecting grounds in years past. Finer collecting grounds would be difficult to find on the Atlantic coast, and those who visit them always come away well repaid. Lake Worth is about the northern limit for the *Strombus*, except *S. pugilis*, which is sometimes found further northward. While stopping with W. E. Spencer, of Lake Worth, he helped me make a water glass, which was a great help in collecting. We took a small butter tub, and, after taking out the bottom, we cut a sheet of window glass to fit in its place

and cemented it with beeswax, and it was a great benefit to me during my visits to the inlets. Inside the inlets there are vast sand flats, which are mostly covered at high tide and exposed at low tides.

When the flats were exposed at low tides we found a great many fine shells, such as *Tagelus gibbus*, *Fulgur pyrum*, *Natica livida*, *Sigaretus perspectivus*, *Neverita duplicata*, *Cardium magnum*, *C. isocardia*, *Lucina tigerina*, *L. divaricata*, *L. pennsylvanica*, *Oliva literata*, *Venus cribrarea*, *V. cancellata*, *Cerithium literatum*, *C. muscarum*, *C. minimum*, *C. floridanum*, *Neritina virginia* and *Nassa vibex*. In the shoal waters around the outside of the flats, on the open bottoms and among the grasses, we waded around, using the water glass by resting it on the surface of the water, looking through it. We could then see the bottom and everything on it as plainly as though there was no water above it. There we found *Strombus gigas*, *S. pugilis*, *S. berculatus* and *S. accipitrinus* by the hundreds and in all stages of growth, *Fasciolaria distans*, *Arca ponderosa*, *Atrina rigida* ("Pinna muricata"), *Dolium galea* and *Plicatula ramosa* in limited numbers, and one each of *Fulgur perversum* and *Fasciolaria gigantea*, each one ten inches in length. At the old inlet, in the shoal waters, I found a great many *Bulla occidentalis*, *Venus macrodon*, *Macoma tampaensis*, *Modiola plicatula*, *Liocardium mortoni* and *Marginella apicina*. On the rocks at the mouth of the inlet we collected several hundred *Purpura hæmastoma* and *P. hæmastoma* var. *undata*, while everywhere the rocks were literally covered with *Siphonaria lineolata* and *Littorina lineata* Orb.; but, as I already had all I wanted of these last, I did not molest them.

I do not know how many shells I would have collected during my stay there, but Mrs. White put up a vigorous protest, declaring I had more than I needed; and, of course, I had to respect her wishes, and stopped. I, however, came home with a large trunk full of very fine specimens. By this time, however, I have disposed of the greater part of them, showing that her judgment about the number of shells needed is not to be relied on. I believe, as the Means did in "The Hoosier Schoolmaster," "While you are a gittin', git a plenty." Acting on that advice, while collecting *Anpullaria caliginosa* and *Planorbis trivolvis*, in the fresh water ponds back of Rockledge, I gathered at least half a bushel of the large *Anpullaria* and hundreds of the *Planorbis*.

GENERAL NOTES.

THE DENTATE VARIETY OF *Conulus* was first noticed by William Doherty in the Quarterly Journal of Conchology (Leeds), I, p. 344, in 1875. He found it at several points near Cincinnati, Ohio, describing the shell as follows: "The 'teeth' are placed as in *Z. multidentatus* Binn., and vary from one slight shapeless roughening of the inner surface of the outer whorl, to four large elongate teeth, radiating from the umbilicus like the spokes of a chariot wheel. As is usual with gastrodont snails, these teeth attain their greatest development in the half-grown shell. From the chief locality of this variety I obtained 39 young *fulvus*, of which 18 or nearly half were more or less dentate, while of 17 adult *fulvus* from the same place, one had in the next to the last whorl a single tooth, much flattened and eroded, while all the others were toothless. Hence I suppose that the teeth are gradually worn away by the motions of the animal. In *Z. multidentatus*, rows of teeth appear at an early age, and as often as the shell grows a quarter of a whorl a new row is introduced, while the earliest is worn away. So the shell grows to maturity, always having three or four rows of denticles. In this variety of *fulvus*, however, this process seems to cease long before the shell reaches maturity and the last whorl is thus left without teeth."

POLYGYRA RICHARDSONI var. LINGUALIS n. var.—Similar to the type in size (alt. $5\frac{1}{2}$, diam. $10\text{--}11\frac{1}{2}$ mm.), very smooth and glossy, depressed above and below, though the base is convex, projecting downward as far as or below the basal lip; umbilicus filled by the preceding whorl except for a minute axial puncture; parietal fold of the aperture decidedly longer than in *richardsoni*, extending to within one-half or one-third of a millimeter from the broad lamina on the outer lip. Whorls $4\frac{1}{2}$ (instead of 5). Rosario, near Mazatlan, N. W. Mexico, collected by M. A. Knapp, received from W. J. Raymond.—H. A. PILSBRY.

PLANORBIS DILATATUS Gould has recently been found by Hon. J. D. Mitchell in the Guadalupe river, in Victoria Co., Texas. This is further south and west than previously recorded.

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ASSOCIATE EDITOR :

C. W. JOHNSON, Curator of the Wagner Free Institute of Science.

Vol. XII.

MAY, 1898.

No. 1

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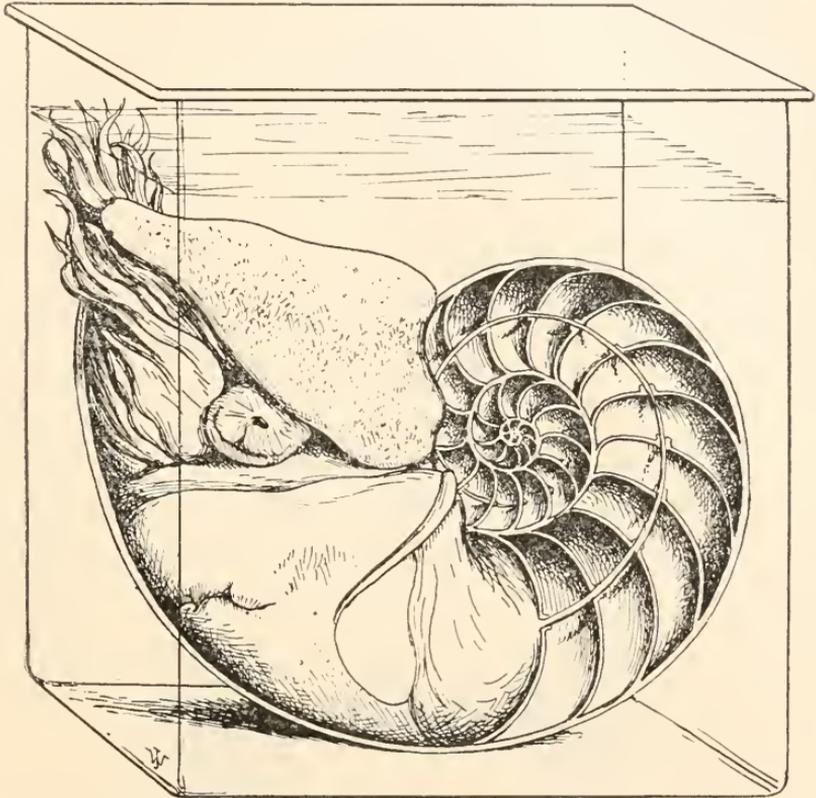
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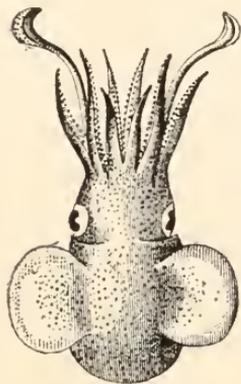
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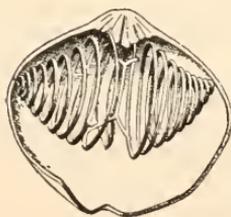
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JULY, 1898.

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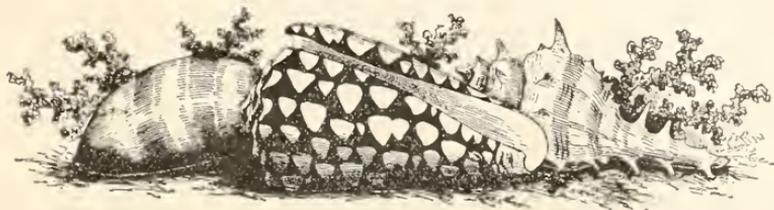
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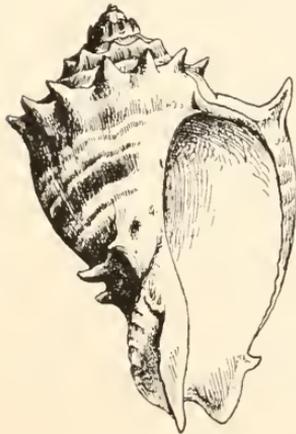
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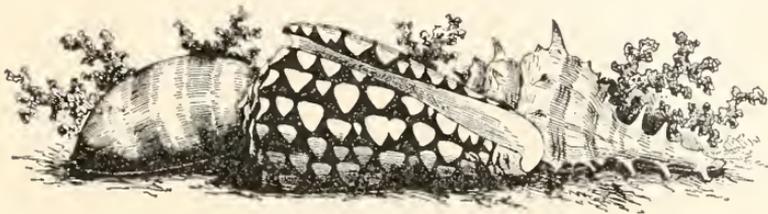
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NOVEMBER, 1898.

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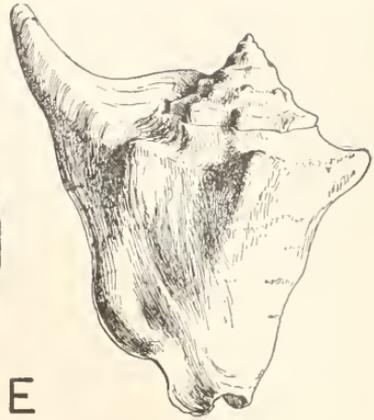
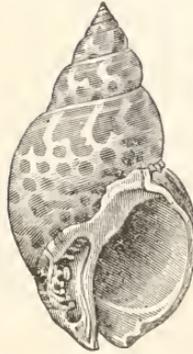
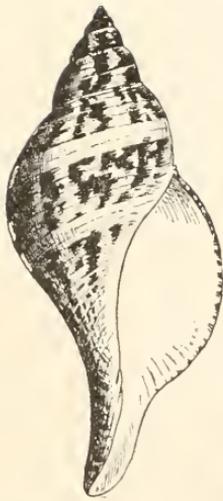
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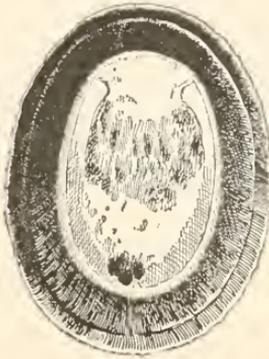
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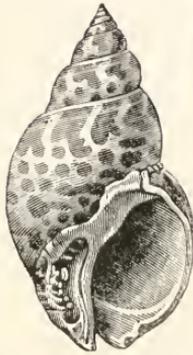
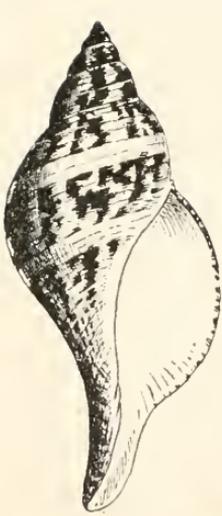
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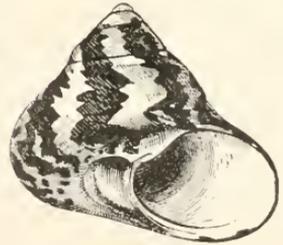
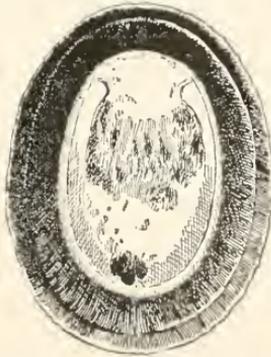
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JANUARY, 1899.

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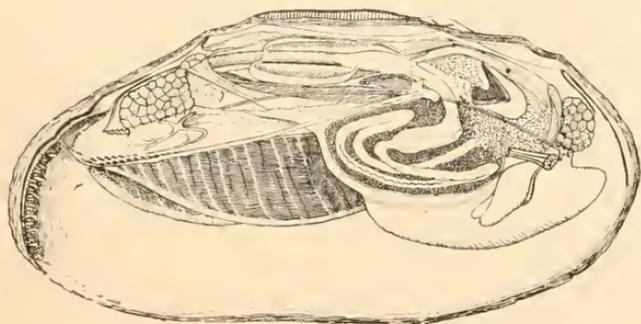
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H. A. PILSBRY, Conservator Conchological Section, Academy of Natural Sciences,
Philadelphia.

ASSOCIATE EDITOR:

C. W. JOHNSON, Curator of the Wagner Free Institute of Science.

Vol. XII.

FEBRUARY, 1899.

No. 10.

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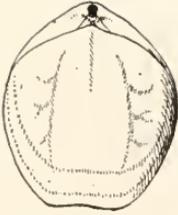
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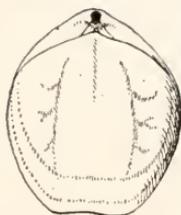
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