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THE
NAUTILUS.

A MONTHLY JOURNAL
DEVOTED TO THE INTERESTS OF
CONCHOLOGISTS.



VOL. XI.

MAY, 1897, to APRIL, 1898.



PHILADELPHIA: E

Published by H. A. PILSBRY and C. W. JOHNSON.

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THE NAUTILUS.

VOL. XI.

MAY, 1897.

No. 1.

UVANILLA REGINA, A NEW LOCALITY.

BY ROBT. E. C. STEARNS.

A few days since, Mr. Charles H. Lawrence, who resides on Boyle Heights in this city, submitted to me for identification a specimen of this fine species which he collected about Christmas, 1895, on San Clemente Island, latitude $32^{\circ} 55' N.$, longitude $118^{\circ} 30' W.$ This find of Mr. Lawrence's carries the species so far to the north as to include it in the faunal list of California proper. The preliminary description of *U. regina* was published in the THE NAUTILUS for December, 1892, and was subsequently described more fully in the Proc. U. S. Nat. Museum, Vol. XVI, 1893, pp. 350-51, from a specimen collected by Capt. J. D. Porter, of San Diego, Cal., on Guadaloupe Island off the coast of Lower California in latitude $29^{\circ} N.$, longitude $118^{\circ} W.$

As this easily recognizable species is exceedingly rare at this date, it may be well to note that examples are contained in the collections of the National Museum (No. 125314), of Henry Hemphill and Miss Cooke, San Diego, and of Mr. Lawrence, above-named. The Hemphill and Cooke specimens are part of the lot collected by Capt. Porter.

In my paper on "The Shells of the Tres Marias and Other Localities along the Shores of Lower California and the Gulf of California," this form is listed, as the island of Guadaloupe belongs to Mexico.

In Dr. J. G. Cooper's "Catalogue of Marine Shells collected chiefly on the eastern shore of Lower California," etc., published in

the Proc. Cal. Acad. Sciences (Series 2, Vol. V, p. 36), he makes the following remarks concerning my "Tres Marias, etc.," list: "Out of 294 in the catalogue, about 200 occur in the Gulf and several others on the west coast. It is not, therefore, as complete a list of Gulf shells as we might expect from collections made by the U. S. Fish Commission Steamer 'Albatross,' with its facilities for dredging and collecting otherwise." As my paper does not purport to be a list of the "Albatross" collections in the regions under consideration, but only includes incidentally such species as were collected by the "Albatross" naturalists at a few points only, viz., "Baelenas and Pichelinque Bays, etc., so far as the same have been worked up at this date," as is distinctly stated, further comment is unnecessary.

Los Angeles, Cal., April 5, 1897.

ON A NEW FORM OF POLYGYRA FROM NEW MEXICO.

BY W. H. DALL.

Polygyra rhyssa Dall, n. sp.

Shell of six rounded whorls, dark yellowish-brown, the suture rather deep and the spire low but not flattened; nuclear whorls nearly smooth, the rest of the shell rather coarsely obliquely striated, the last fourth of the last whorl with rather sharp elevated riblets with wider interspaces and a marked constriction behind the reflected peristome; umbilicus small, deep; periphery above the middle of the whorl rounded, the entire surface more or less distinctly finely spirally striate; aperture subcircular, oblique, with a reflected and rather solid peristome with a small obscure thickening on its basal part, a light wash of callus over the body, and slightly within the aperture a small oblique elongated parietal denticle. Major diameter 17, minor diameter 14; height 9 mm.

White Mountains of New Mexico, Ashmun.

This species is about the size of *P. chiricahuana* Dall, from which it differs by its strong sculpture, somewhat larger umbilicus, more distinct suture and oral armature. The form of the mouth resembles that of *P. pseudodonta* Dall, but the basal thickening of the lip is not notched and the shell is decidedly larger, more coarsely sculptured and somewhat darker in color. It forms another illustration of the effect of insulation on the mountain peaks by arid lowlands

in producing differentiation in a single type of shell. *P. levettei*, *chiricahuana*, *ashmuni*, *pseudodonta* and *rhyssa* are obviously offshoots of a common stock.

CONCHOLOGICAL NOTES FROM LOUISIANA.

BY LORRAINE S. FRIERSON.

Being, so far as I know, the only student of conchology in Louisiana, perhaps a few notes may be of interest.

My station consists of an arm of Red River (Bayou Pierre), a lake and numerous creeks.

In these waters occur about 50 species of Mollusca, of which 30 are Unionidæ. An interesting fact, and one which I have never seen mentioned, is the sharp line of separation between the forms found in the creeks and those growing in the Red River waters.

In the creeks are found 5 Unios and 2 Anodontas. While in the Red River waters are found 25 Unionidæ. No creek shell grows in Red River waters (with but two exceptions noted below) and no species living in Red River waters are ever found in the creeks.

At the junction of a creek with the river occurs a zone where *no mollusca can be found*. The exceptions noted are *U. texasensis* Lea, which, while pre-eminently a *creek* shell, is found *sparingly* in Red River waters. Another possible exception is in the case of *U. declivis* Say. This shell is found abundantly in the creeks, and grows to a large size. A rather rare shell is found in the Red River waters which is said by our authorities to be a form of *U. declivis* Say known as *tetralasmus* Say or *geometricus* Lea.

Declivis proper never occurs in the Red River waters, nor does *tetralasmus* ever grow in creek waters. Perhaps this fact will help show that these shells are really distinct species and not synonyms.

The most variable and, perhaps, the most abundant Unio is *U. multiplicatus* Lea. West of the Mississippi drainage this shell merges into *U. eightsii* Lea, and here, at the middle ground, a mixture of types is seen. An interesting shell is sparingly found here, close to its extreme southern limit, probably. It is a dwarfed, almost "run out" form of *U. donaciformis* Lea. Another "Yankee down south" is a very small but brilliantly colored *Anodonta suborbiculata* Say. It is found in the soft, deep mud of Edwards' Lake, and disputes its territory with *Anodonta virens* Lea. *A. imbecilis*

also grows with these, but does not live in the *mud*, but escapes this by growing in the fissures of the cypress trees, a prisoner for life, by choice.

Thus far my researches have been productive of one new species, *U. friersoni* Wright, and the extending of habitat of three shells. But I hope to accomplish much more in the future, which, if successful, will be given to the readers of THE NAUTILUS.

Frierson Mill, De Soto Parrish, Louisiana.

CONTRIBUTION TO A KNOWLEDGE OF UNITED STATES UNIONIDÆ.

BY S. HART WRIGHT.

(*Concluded.*)

Unio Swordianus sp. nov.

Shell oval, massive, very inequilateral, rounded before, highly arched above and rounded at base, very bluntly pointed behind. Sides flattish, constricted slightly or not at all, and the umbonal ridge usually obsolete. Epidermis brownish or somewhat horn-colored, rayless, and the surface roughened with close growth-lines. Ligament darkened, heavy, short and much elevated. Beaks pointed, small and very low. Beak cavity shallow, extending slightly under both cardinal and lateral teeth, thus making it very broad and with obtusely rounded sides. Cardinal teeth double in the left valve, single in the right and smoothish, or crested and short. Lateral teeth heavy, slightly curved, wide apart, arising from a thick dorsal plate. The cardinal of right valve with an oblong groove at its base. Cicatrices distinct; dorsal cicatrices confluent into an oblong groove under the dorsum. Pallial impression deep and denticulate. Nacre usually pure white, often more or less with waxy discolorations or mottlings or even dirty white. Width 4 inches, length 2, diameter $1\frac{5}{8}$.

Habitat: Powell's Creek, Lee Co., Va.

Remarks: Affinity, *U. bursapastoris* B. H. Wright and *U. abacus* Hald. Our shell differs from the first in having a lighter epidermis, an arched dorsum, shell cavity greater, beak cavity very much less, being nearly extinct, and the posterior dorsal area narrower and very abrupt in its descent. From *U. abacus* it differs in the beak cavity, and is much more inequilateral. Ten specimens were obtained from the collector, Mr. T. F. Sword, for whom it is named.

Unio Diazensis sp. nov.

Shell small, oval, thin, bluntly or truncately pointed behind, and biangulated there; rounded obliquely in front, the curve meeting the dorsal line with a distinct angle. Epidermis reddish-brown, lighter above on the first growth, finely and obscurely striate with minute scales, more apparent near the base. Lines of growth distant, about two. Rays nearly obsolete, or, if present, seen faintly on the anterior end, or on the first growth. Umbonal ridge well-defined, rather narrow. Posterior slope rather *broad* and raised into a keel. Dorsal line nearly straight. Umbos small, broad and not raised. Beaks with a double series of granular undulations. Dorsal plate thin. Shell cavity rather deep and broad. Beak cavities slight. Cardinal teeth very small and light, more or less compressed. Lateral teeth very narrow, *slim* and nearly straight. Anterior cicatrices distinct; posterior confluent. Cardinal of right valve single. Dorsal scars under the plate. Nacre salmon or copery. Width $1\frac{1}{2}$ inches, length $\frac{7}{8}$, diameter $\frac{1}{2}$.

Habitat: Lake Diaz, Volusia Co., Florida.

Remarks: In 1887 we gathered about 2,000 of these little thin shells in Lake Diaz, no other *Unio* being found in that lake, except *U. amygdalum* Lea. They were always in white sand, with clear and rather shallow water, and nearly all of one size. Affinity, *U. fuscatus* Lea, from which our shell differs in being smaller, less transverse, more inflated, having a much higher umbonal ridge well marked, while in *U. fuscatus* the ridge is nearly or quite obsolete. From *U. coruscus* Gould the Diaz shell differs in having always *thin* lateral teeth, a *thin* dorsum and smaller cardinals and a high keel, and is always a thinner shell. It differs from *U. fryanus* B. H. Wright in being much less polished, lighter, less solid, fewer rayed, greater umbonal ridge and more attenuated in front. In a "Check List of N. A. Unionidæ," published in 1888, a species of *Unio* was listed as "*U. diasensis*," but was never published, and therefore does not preoccupy the *similar* name now given above.

Note.—Types of all the above species will be sent to the National Museum and duplicates of the types to the Academy of Natural Sciences of Philadelphia.

ERRATA.—In THE NAUTILUS, X, No. 12, page 136, first line, for "triangular, clavate," read "triangular-clavate." Eighth line, for "narrower," read "narrow." Page 137, ninth line above the bottom, for "groove in the," read "groove under the."

LIST OF MOLLUSKS COLLECTED IN MALDONADO BAY, URUGUAY, BY
DR. WM. H. RUSH, U. S. N.

BY HENRY A. PILSBRY.

In the NAUTILUS for September, 1896, a list may be found of the non-marine mollusca collected in Uruguay and Argentine Republic by Dr. Rush. Descriptions of the new species mentioned in that paper have been published in subsequent numbers, and in the Proceedings of the Academy of Natural Sciences of Philadelphia for 1896, pp. 360-365, and plates 26, 27, and Manual of Conchology, 2d ser., Vol. XI.

The marine shells obtained by him while with the South Atlantic Squadron were nearly all taken in Maldonado Bay, dredged in from three to six fathoms of water, the limpets, etc., from the shore excepted. The few forms collected elsewhere than at Maldonado and vicinity have the localities indicated below. In this connection it may be mentioned that the squids which jumped aboard the Yantic, as described by Dr. Rush in NAUTILUS, VI, p. 82, turn out to be *Ommastrephes Bartramii*. Among the forms enumerated below and in the several published lists of shells from this general region, it is somewhat remarkable that some groups usually rather numerous, such as *Rissoidea*, are not represented. The occurrence of a number of northern species is also noteworthy. There are also in the series collected about a dozen forms found only in poor condition and not yet identified. The descriptions of new species will shortly appear, with figures, in Proc. Acad. Nat. Sci. Phila.

GASTROPODA.

Acmæa onychina Gould. Gorriti Island, Maldonado Bay. This bay was the type locality of *Patella mülleri* Dkr., a synonym of Gould's species.

Bittium sp.

Bullia cochlidium Kien.

Bullia globulosa Kien. Maldonado Bay. Very heavily caloused fossil specimens occurred in the wall of fort at the Mus. La Plata, Argentine Republic.

Bullia Uruguayensis n. sp. Shell somewhat like *B. globulosa* Kn., but more slender, the spire much longer. Surface smooth except for two to four spiral impressed lines separated by convex low cords, just below the impressed suture, and fine spiral striæ on the

base; growth-lines fine and slight. Light flesh colored. Whorls about $6\frac{1}{2}$, the first globose, the second and third with rather coarse longitudinal folds, which persist longer at the upper part of the whorl; remaining whorls convex, foldless; the last whorl oval, regularly convex, contracted below, with a wide arcuately striate siphonal fasciole bounded above by a strong narrow spiral rib. Aperture a little over half the alt. of shell. Columella broadly concave above, having a strongly twisted fold below, which projects at the junction of the short basal canal with the cavity of the aperture, sloping strongly to the left below the projecting fold; anterior notch wide. Parietal callus rather thin, spreading far forward.

Length 22.5, diam. 12 mm.

Maldonado Bay. This species is certainly not the young of *B. cochlidium*, although in my opinion d'Orbigny's fig. 25 of plate 61 of the *Voy. Am. Mérid.* was drawn from a specimen of the form here described. The characters of columella and sculpture also incline me to consider the present species distinct from *B. Lamarekii* Kiener (*Iconogr.*, pl. 3, figs. 6, 6).

Chlorostoma (Omphalius) corrugatum Koch. *Trochus patagonicus* Orb. is a synonym.

Columbella avara Say.

Columbella obesa var. *decipiens* C. B. Ad.

Columbella sertulariarum d'Orb.

Crepidula aculeata Gmel.

Cylichnella bidentata Orb.

Fissuridea patagonica d'Orb.

Halistylus columna Dall.

Halistylus circumstriatus n. sp. Similar to *H. columna* in size and contour, but the whorls are encircled by numerous impressed brown lines. *H. pupoideus* (Cpr.) Dall, of California, (*Proc. U. S. Nat. Mus.*, xv, 1892, pl. 19, f. 2) is a third species of this interesting group. It is spirally sculptured like *circumstriatus*, but has very convex whorls, and there are other differences.

Natica Isabelleana d'Orb.

Natica maroccana Dillw. (?). Worn young shells.

Ocenebra cala n. sp.

Olivancillaria auricularia Lam. Maldonado Bay; also fossil specimens in the Fort wall at La Plata Museum.

Olivella Puelchana d'Orb.

Scala elegans d'Orb. (probably).

Scala tenuistriata d'Orb.

Siphonaria Lessoni Blainv. Gorriti Island, Maldonado Bay.

Triforis sp.

Turbonilla interrupta Totten.

Turbonilla sp. Specimens worn.

Turbonilla dispar n. sp.

Turbonilla uruguayensis n. sp.

Urosalpinx Rushii n. sp.

POLYPLACOPHORA.

Chætopleura Isabellei d'Orb. Maldonado Bay, with the following.

Chætopleura Tehuelcha d'Orb. Maldonado Bay. Carpenter's *Ch. armillata* (Man. Conch., xiv, p. 39) described from Gorriti Island, is a synonym.

PELECYPODA.

*Azara*¹ *labiata* Maton. Pond near Maldonado.

Azara labiata var. *nimbosa* Sowb. Pond near Maldonado; brackish or nearly fresh water.

Corbula caribæa d'Orb.

Corbula Iheringiana n. sp.

Corbula Lyoni n. sp.

Corbula patagonica d'Orb.

Crassatella (Eriphyla) lunulata Con.

Crassatella (Eriphyla) maldonadoensis n. sp.

Cytherea rostrata Koch.

Diplodonta semiaspera Phil. (*Lucina semireticulata* Orb.).

Donax hanleyanus Phil.

Lyonsia hyalina Conrad.

Lyonsia sp. A nearly equilateral species, new to me.

Lucina squamosa Lam.

Mactra isabelleana d'Orb.

Mulinia near *lateralis* Say.

¹ Carlos Maria de Pena has called attention to the fact that padre Dámaso A. Larrañaga, a naturalist of Montevideo, in his "Memoria Geologica sobre la formacion del Rio de La Plata, deducida de sus conchas fosiles," written in 1819 (? published in 1821), created the genus *Matonia* for *Mya labiata* of Maton, thus antedating d'Orbigny's name *Azara*. I have not seen the work, and would decline to make a change until the proper publication and date of *Matonia* is made positive. See Anales del Mus. Nac. de Montevideo, I, 1894, p. 1.

There were also worn valves of several other *Mastridæ* collected. *Mesodesma arechavalettoi* (Ihering MS.) Pilsbry. Maldonado Bay, Uruguay (young); Mar del Plata, Argentina.

Mytilus darwinianus Orb.

Mytilus edulis L. (?*platensis* Orb.).

Mytilus canaliculus Hanl.

Nucula puelcha d'Orb. *N. uruguayensis* E. A. Smith does not seem to differ materially from this species.

Ostræa puelchana d'Orb.

Pecten nucleus Born, var. ?

Pecten sp. undet.

Pectunculus longior Sowb.

Petricola like *pholadiformis*, but less strongly sculptered. One valve.

Plicatula ramosa Lam.

Semele (*Abra*?) *uruguayensis* n. sp.

Tagelus gibbus Spengl. (*platensis* Orb.).

Tellina uruguayensis E. A. Smith.

Thracia Rushii n. sp.

ISAAC LEA DEPARTMENT.

[Conducted in the interest of the Isaac Lea Conchological Chapter of the Agassiz Association by its General Secretary, Mrs. M. Burton Williamson.]

The name of Miss Zeola Downing, Long Beach, California, is added to the membership roll of our Chapter.

When last heard from Miss Anna Goodsell of San Diego, California, was in Cairo, Egypt, after having visited many countries in the Orient.

FRESH WATER SHELLS IN THE NORTHEAST OF MAINE.

[From the report of Mr. Olof O. Nylander. From the Transactions of the Isaac Lea Conchological Chapter for 1896].

This article is devoted to the fresh water shells found in the Fish River Lakes and Aroostook River, northeast of Maine. After securing a good supply of provisions, tent, boat and apparatus needed for a long collecting trip in the forest region, a man was employed to accompany us through the journey, and a man with a team to haul me the distance of 25 miles to Cross Lake on the Fish River.

Arriving at Cross Lake my work was immediately to collect and my companion's duty throughout the journey to prepare the tent, cut wood and cook, and other duties connected with camp life in the woods.

At the Cross Lake inlet the following were collected: *Unio complanatus*, *Margaritana undulata*, *Anodonta fragilis*, *Sphærium sulcatum*, *Pisidium compressum*, *P. variable*, *P. n. sp.*, *Planorbis campanulatus*, *P. bicarinatus*, *P. deflectus*, *Limnæa emarginata*, *L. desidiosa*, *Pomatiopsis cincinnatiensis*, etc.

The second place visited was on the west side about 2 miles south from the inlet. *Planorbis trivolvis* was obtained in a place that appeared to be covered with water only in the Spring. *Ancylus parallelus* was found in large numbers, and a lot of good large specimens of *Limnæa emarginata* in two feet of water. They seemed to feed on vegetation on the rocks. A little further down on the west side was a small stream in which a lot of *Sphæria* and *Pisidia* were obtained. *Unio complanatus* Sol., *Margaritana undulata* Say and *Anodonta fragilis* Lam., are found all over the Fish River Lake, and need not be referred to as of especial interest to any locality.

On the east side where some large hills rise from the lake a small lot was obtained by dredging; nearest the shore *Pomatiopsis cincinnatiensis* were plentiful in 15 feet of water; *Campeloma decisum*, of small size, *Pisidium variable* and *P. compressum* were found from the shore to 25 feet, showing some variation in forms. On the shore *Succinea ovalis*, and, near by, in the woods under rocks, *S. avara* were found. Also *Conulus fulvus*, *Strobila labyrinthica*, *Zonites exiguus*, *Carychium exiguum* and fragments of *Pupa* or *Vertigo*.

The south end of Cross Lake afforded the best dredging ground, and some time was spent here. *Pomatiopsis cincinnatiensis* Lea, was very plentiful, and *Valvata tricarinata* Say, *V. sincera* Say, were collected from 5 to 20 feet. *Planorbis trivolvis*, *P. campanulatus*, *P. bicarinatus*, *P. deflectus* and *P. hirsutus* were not plentiful.

One of the most interesting collecting grounds is Square Lake, which is the largest and handsomest lake in Aroostook Co. At the inlet from Cross Lake the bottom is covered with large and fine specimens of *Limnæa emarginata* and the var. *Mighelsi*. *Planorbis parvus* (?) Say, *Planorbis* sp.?, a peculiar specimen, *P. campanulatus*, a form of small size, *P. bicarinatus*, *Physa ancillaria* Say, are plentiful in this place, but nowhere else in this region to my knowledge. The shore is covered with dead shells of the above named species.

From the inlet at the northeast of Square Lake, the east side was followed to the south, a distance of about 8 miles. The wind blowing prevented us from doing any dredging, and the bottom is generally stone.

In the south end of the lake the bottom is covered with fine sand and afforded very fine dredging ground for 2 or 3 square miles. From the shore to 10 feet deep *Pomatiopsis cincinnatiensis* was very common, and a few specimens of *Pisidium* were found from 10 to 25 feet. *Valvata tricarinata* and *V. sincera* were found, but beyond the depth of 25 feet all the shells seemed to disappear, and the dredge was filled with nothing to collect. The western shore of the lake is rocky and the only place visited is Limekiln Point, where I have spent a good deal of time in past years. This very interesting locality of the Upper Silurian limestone of the Lower Helderberg group, contains many fine specimens of fossils, many of them peculiar to this locality. A very fine collection has been found at this place. * * * From Limekiln Point to Eagle Lake every part was carefully surveyed, yet nothing of special interest appeared. Eagle Lake is the longest of Aroostook Lakes, being about 18 miles long and 1 wide. In one place I could not reach bottom with a 100 foot line.

Along the north shore I obtained the same species as I found in Cross and Square Lakes, and from the deep water I obtained only rocks and gravel, and not a fragment of a shell. Where the south branch of Fish River enters Eagle Lake, in a sand bar, a lot of fine living specimens of *Sphærium striatinum* Lamk., and *Margaritana undulata* were collected. Throughout the thoroughfare to Portage Lake *Sphærium striatinum* is plentiful. * * * * Nothing new was added. A good deal of hard work was done dragging the boat through the rapids and over rocks and ledges to Portage Lake.

Portage Lake is in parts surrounded by high hills and a very attractive place for tourists. The western part is a good finding place for mollusks. *Pomatiopsis cincinnatiensis* Lea, is obtained somewhat larger in size as it approaches deep water; *Planorbis companulatus* and *P. bicarinatus* are also of large size, and the angles of the whorls in *bicarinatus* are very sharp. *Planorbis deflectus* is found at the bend of the lake, very large, from 8 to 9 mm.; *Valvata tricarinata* and *V. sincera* are also of good size.

Near the south and east corner of the lake a colony of good, large specimens of *Campeloma decisum* in 6 inches of water were found. This

was the first place I had any opportunity to see them in any number in the north of Maine. From this place I had intended to go to Big Fish Lake, about 20 miles west from Portage Lake, but some of my provisions were spoiled by hot and rainy weather and I was not able to obtain any from the farmers, therefore at the south of the lake I engaged a team to transport us to Aroostook River, a distance of 10 miles, over a good road.

Aroostook River is rapid and rocky the whole distance from Ashland to Caribou, and shells are seldom found. *Margaritana margaritifera* Lin., are found among the rocks in from 5 to 6 feet of water; a dozen living specimens were obtained in the distance of 40 miles. *Anodonta fragilis* lives in the small streams which empty into the river. *Planorbis bicarinatus* and *Physa heterostropha* are sometimes plentiful. *Sphærium truncatum* and a few *Pisidia* have been found. *Campeloma decisum* were collected in two places, and *Ancylus tardus* Say, was found on rocks in a place near Caribou in the summer of 1895.

After three weeks have been spent in the woods it is pleasant to arrive at home again. The specimens collected during this trip have not all been identified.

In past years I have received valuable assistance from Professor H. A. Pilsbry. Mr. Bryant Walker, of Mich., sent me a dredge which has been of great value, and Dr. V. Sterki has kindly determined *Pupidæ*, *Vertigos* and *Pisidia*. My thanks are due to these gentlemen.

TO SUBSCRIBERS.

We wish to impress upon our readers that subscriptions to THE NAUTILUS are payable *in advance*, and that we do not discontinue until notified. Were it not that some subscribers forget to pay at the end of the year it would not be necessary to thus emphasize the terms of subscription. What is a small matter to each individual reader, becomes in the aggregate a large one to us. Our deficit in publishing Vol. X has been somewhat less than in the previous year, but is still more than we can afford to lose. Our screed upon this topic in January seems to have been misunderstood by some cautious persons we have heard from, who for fear THE NAUTILUS would be discontinued, kept their dollars! With this kind of support we could not have continued another month; but stalwart friends of the cause in Massachusetts, Michigan and California said "THE NAUTILUS shall not stop; we will stand by if needed." With this assurance we enter upon another volume.

All who are in arrears are requested to "pay up" *this month*.

H. A. P. & C. W. J.

THE NAUTILUS.

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No. 2.

HELICINA DYSONI.

BY CHARLES T. SIMPSON.

While collecting shells in the Island of Utila, on the north coast of Honduras, I frequently visited a Brickly Thatch palm grove¹ which lay on the south shore. The Brickly Thatch is a curious, small palm, with straight, slender stems, a little larger than one's wrist, and about twenty feet in height, surmounted by a crown of shining, fan-shaped leaves. The bases of these trees are slightly enlarged, and they stand on a cone of stilted roots, which, with the soil and rubbish among them, fill the conical space almost solid. They grow thickly to the exclusion of all other vegetation, and the curious bunches of roots completely fill the space on the ground and make it quite difficult and awkward to get around. Under the almost twilight of this dense copse I found excellent collecting, and I there discovered *Colobostylus andrewsæ*, *Cylindrella bourguignatiana* and several other new species. Among other shells I kept finding specimens of the pretty little *Helicina dysoni*, but always dead and generally faded. An enterprising collector is never satisfied with dead shells, and I searched everywhere to find this mollusk alive—under the dead, fallen palm leaves, in what rubbish lay around, on the stems of the palms, and among their tough, matted roots—but in vain, and I finally concluded that the colony, of which these were remnants, had either died out or migrated.

One day I visited a part of the grove that I had not seen before, a spot at its edge, and here I found a single living tree which had

¹ *Thrinax radiata*.

fallen over. I was interested in the crown of it from a botanical standpoint, and on examining the flowers and leaves I found a half a dozen or more of the snails I so much wanted on the under side of the latter. Then I looked up over head and saw, to my astonishment, that there were thousands of them. I had been walking day by day under a firmament of palms that was literally star-spangled with the pretty *Helicina dysoni*. It was like the story of the navigators who were perishing with thirst while sailing in the fresh water off the mouth of the Amazon.

But finding the *Helicinas* was one thing and getting them was quite another. I tried to shake the trees, but so thickly did they stand that their tops touched each other everywhere, and I might as well have tried to shake the post of a piazza. Then I started to climb one of them, but the hard, sharp fibres of the wood filled my hands and tore my clothes, and I gave that up. I looked for a pole but there was none to be had. The mangrove scrub between me and the sea was all short and crooked, and I found nothing suitable in the heavy tropical forest north of me, so I went home to the ship that night with the dozen or so I had captured, and a few dead shells. The next day I came by way of some clumps of a curious little palm, with slender stems an inch or more in diameter, growing in low ground and crowned with feathery leaves. I found a straight one among these, some 15 or 16 feet long, cut it and trimmed it with my pocket-knife, and when I reached the palm grove I soon had a shower of *Helicinas* falling around me. One soon tires of collecting anything that is very abundant, and in a little while I had all I cared for.

The moral of this little sketch, if it has any, is that in collecting it is necessary to look everywhere, even in the most unlikely places, and my experience has been that the collector who never allows anything to escape his eyes is, as a rule, the most successful.

DESCRIPTION OF A NEW SPECIES OF ACTAEON FROM THE QUATERNARY BLUFFS OF SPANISH BIGHT, SAN DIEGO, CALIFORNIA.

BY ROBERT E. C. STEARNS.

Actaeon Traskii.

Shell small, conical above, rounded below, rather solid, glossy; sculptured by numerous fine impressed lines or grooves which be-

come wider toward the base of the body whorl, making the sculpture of this part of the shell lirate; the liræ sometimes slightly grooved; otherwise sculptured by sharp, close set incremental threads, these are subordinate to the spiral sculpture. Color dull cream-white with two obscure rufous bands on the body whorl. Spire short, obtusely conical; whorls six; sutures distinct, narrowly channelled; aperture about two-thirds the length of the shell, sharply angulated above, rounded and effuse below, finely lirate and glossy within, with a thin glazing on the body whorl. Outer lip simple. Columella short, with a fold curving around to and thickening the edge of the lip below, which is moderately produced.

Length of shell 11 millimetres.

Length of body whorl 9 millimetres.

Breadth 6 millimetres.

The foregoing description is based on a single example in the collection of Mr. Homer Hamlin, of Los Angeles, Cal. The above form was collected by me in the same locality in the fall of 1887 the specimens are now in the U. S. National Museum.

It is a more robust and solid shell than the related species *punctocælatatus* Cpr., which occurs in the same locality, and which is found living in many localities along the shore from Monterey, southerly. I have named the above for the late Dr. John B. Trask, one of the founders of the California Academy of Science, and a pioneer in natural history investigations on the West Coast.

Los Angeles, Cal., March 15, 1897.

NOTES ON AGRIOLIMAX.

BY T. D. A. COCKERELL.

The accompanying figures were drawn by the writer several years ago, and sent to Mr. W. G. Binney, who kindly had them engraved along with others which were published in the Supplements to Terr. Moll., vol. V. These three, however, were not published, and it is thought well to present them at this time.



Fig. 1 represents the head and anterior part of the mantle of a specimen of *Agriolimax agrestis* (L.) collected by Mr. Pilsbry in Philadelphia in 1889. The mantle is bilobed in front, and the specimen represents the monstrosity *bilobatus* Férussac.



FIG. 2.

Fig 2 represents the jaw of a specimen of *Agriolimax campestris* var. *hyperboreus* (Westerlund), collected by Prof. H. F. Wickham at Soda Spring, Yakima Co., Wash., in 1889.



FIG. 3.

Fig. 3 represents a parasitic worm, believed to be a *Leptodera*, from *A. campestris* var., collected by Prof. H. F. Wickham at Quincy, Calif., 1889.

DESCRIPTIONS OF THREE NEW EULOTÆ (HELICES) FROM
CENTRAL ASIA.

BY C. F. ANCEY.

I. *Cathaica Funki* n. sp.

Shell much depressed, openly and rather widely umbilicated, of a somewhat solid substance, opaque, bluish-white, paler beneath and also above the periphery, more or less spotted with a few punctiform and pellucid dots beneath, a little shining, but not much so above. Spire greatly flattened, generally scarcely raised, barely convex, apex obtuse, corneous or dark colored. Whorls 5, convex, regularly increasing, furnished with oblique smooth lines of growth, somewhat irregular; the last whorl barely and gently deflected in front, subdepressed above, more or less roundly angled above the middle, the angle being very obtuse and obsolete towards the aperture; more convex around the umbilicus. Aperture oblique, well rounded, scarcely lunate, ample, margins not remote. Peristome simple, widened, briefly expanded, chiefly at the columellar edge, moderately thickened at the base and columella, not reflected.

Greater diam. 16–17; lesser $13\frac{1}{2}$ –14; height $7\frac{3}{4}$ –8; of aperture $6\frac{3}{4}$ – $7\frac{1}{2}$ mill.

Karghalik, Central Asia (*teste* E. Funk).

Some years ago, I received this new species under the unpublished name of *Helix Funki* "Böttg.", and do not think it was ever described since. In form it is like *Helix obvia* Hartm., but the shell is of the same type and has the same characters of aperture as *Helix stoliczkana* Nevill, of Yarkand; it, however, lacks the two straight brown bands of that species, in which they are a constant feature, and is more shining and less rugose. The style of color is quite similar to that of *Helix rubens*, although paler, at least as regards the three specimens now before me.

From the same source and locality (Karghalik), I also obtained the form I have described as *Bul. kuschakewitzi*, var. *Funki*.

II. *Pseudiberus uniformis* n. sp.—*Helix plectotropis* (in parte) von Mart. et al.—*H. plectotropis* var. *uniformis*, Anc. olim.

This is the so-called variety that I had formerly looked upon (Le Naturaliste, 1887, p. 167) as a variety of Martens' *Helix plectotropis*. At that time I had a single specimen of the latter, but I now have more of the typical form (from Lake Tssyk-Kul and Karghalik) for comparison, so that I consider *uniformis* a very distinct, although allied form. Altogether it comes from a different district (Arassan Culak) and appears to be very constant. The characteristic features having already been described by myself in the paper I alluded to, I shall simply say that *uniformis* is a paler and more depressed shell than *plectotropis*, with a wider umbilicus and much more acute keel.

III. *Pseudiberus anisopleurus* n. sp.

Shell rather thin, of a greenish-horn color, coarsely sculptured, somewhat shining, closely related in form, size and shell characters to Nevill's *mataianensis*, found in the Dras Valley, region of Ladak, but of different and uniform color. Spire convex, not much elevated, obtuse. Whorls 5, convex, furnished with broad, distant and irregular ribs, closer and more regular on the under side, but never obsolete. Suture furnished with an appressed keel, canaliculate above. Body whorl briefly, but not abruptly falling in front, convex above the inserted keel, more so below, the keel somewhat irregular, margined on both sides, especially above where the impressed line is very conspicuous. Umbilicus medium-sized. Aperture oblique, transversely oval, livid within, scarcely angular internally, barely lunate. Peristome white, moderately thickened, expanded, reflected below, chiefly towards the umbilicus. Margins not remote, connected by a thin shining callosity.

Great. diam. $14\frac{1}{2}$, less. $12\frac{1}{2}$; height 8, of aperture $6\frac{1}{2}$ mill.

Locality unknown, but judging from its very well marked affinities, this fine new species for which I am indebted to my friend Dr. A. Vayssiere, is undoubtedly from Central Asia. At a glance, I had mistaken it for *mataianensis*, which is known to me from the description and figure only, but am now satisfied it is very distinct. The color, sculpture and characters of the suture are not the same. In the latter respect the present *Pseudiberus* is more like the true *P. plectotropis*, but the color is equally different, the size smaller and the ribs larger and much less numerous and regular.

NOTES ON THE CLASSIFICATION OF THE UNIOS.

BY CHAS. T. SIMPSON.

In 1834, Dr. Jared P. Kirtland published the statement that the sexes of the North American Unios were distinct, and that the shell of the female was characterized by a swelling in the post-basal region, which was wanting in that of the male.¹ He seems to have thought at that time that all the American species were thus distinguished, but in a later publication he stated that he believed that about two-thirds of the American species have differentiated shells.²

This was corroborated by Dr. Isaac Lea,³ who showed that this enlargement of the shell of the female was for the purpose of holding the charged oviducts, which, in such forms, were found in the posterior part of the outer branchiæ. Lea, at various times, described the soft parts of some 250 species of *Naiades*, mostly North American Unios, and in a considerable number of these he found that the embryos occupied the entire outer branchiæ, while in four species—*Unio multiplicatus* Lea, *U. rubiginosus* Lea, *U. subrotundus* Lea and *U. kleinianus* Lea—they filled all four leaves of the branchiæ.

In a statement made before the Boston Society of Natural History,⁴ Agassiz proposed to divide up the *Naiades* into genera founded on the differences of structure of the animal as well as the characters of the shell, and to include under one genus a number of species of Unios, some of which (including *U. alatus* Say, the first one in the list) have the post-basal inflation of the female shell, and others in which it is lacking. Subsequently he used the name *Lampsilis*, of Rafinesque, with *L. cardium* Raf. as a type, and he gives in his list under this genus a number of species, all of which have the differentiated shells, and carry the young in the posterior part of the outer branchiæ.⁵

In THE NAUTILUS, for December, 1895, Dr. V. Sterki published the results of his observations on American Unios, and gives some

¹ Observations on the Sexual Characters of the Animals belonging to Lamarck's family of Naiades. Am. Jl. Sci. and Arts, XXVI, 1834, p. 117-120.

² Remarks on the Sexes and Habits of some of the Acephalous Bivalve Mollusca. Proc. Am. Assn. Adv. Sci., 1851, p. 85.

³ Description of New Freshwater and Land Shells. Tr. Am. Phil. Soc.

⁴ Proc. Bost. Soc. Nat. Hist., III, 1848-51, p. 356.

⁵ Ueber die Gattungen unter den Nordamerikanischen Najaden. Arch. für Naturg., 1852, pp. 41-52.

very interesting statements regarding their anatomy. He places those species in which the young are carried in the posterior part of the outer branchiæ, and the female shell is inflated in the post-basal region, in a group designated as A, which he states, as a rule, have bright shells, and are gravid from late summer to winter. In group B all four branchiæ are charged throughout their length; the shells are generally dull colored, and do not show marked differences between male and female.

In my earlier attempts at classifying the *Naiades*, I based my arrangement almost wholly on shell characters. I did this because in the splendid collections of the National Museum we had either the types or authentic specimens of a very large proportion of the known, valid species, and because I was anxious to see whether a classification could be based on the shells alone that would be supported by the evidence of the anatomy. I have since then examined the soft parts of a large number of species, and carefully tabulated the results of the work of Lea and others, and I am exceedingly gratified in being able to say that in almost every case the characters of the animal and shell seem to essentially agree. In a few instances, the evidence of the former has thrown important light on relationships which could not be determined with certainty from shell characters alone, and *vice versa*. In some cases, where there at first seemed to be a contradiction, more careful study has shown essential agreement.

There are certainly two great groups of North American Unios. In the first the shell is generally, though not always, covered with a hard, smooth, bright epidermis, which is often rayed or marked with patterns of attractive color. It is rarely sculptured with anything beyond slight concentric ridges, and in only a few instances has it any ridge on the posterior slope, and, with possibly one or two exceptions, the outline is never arcuate, even in old age. The female shell is usually decidedly swollen in the posterior basal region to accommodate that part of the outer branchiæ which contains the embryos. The beak sculpture is generally delicate, consisting, for the most part, of close, fine, paralld ridges, which have a tendency to fall into an anterior and posterior loop, the latter sharp pointed below.

The embryos are contained in the posterior part of the outer branchiæ. The ovisacks are distinct, being separated by a suture, and the whole marsupium is rounded below, projecting generally,

especially when filled with young, below the inner gill. A slight fold commonly runs around it near the base, and parallel with it, which is often seen even when the whole is distended with young. The specialized marsupium of this group may be easily detected, even when it is empty, and when full it is a most beautiful object, the bases of the ovisacks being often rounded and colored. There are three or four, perhaps more, groups of this great division; one typified by such oblong, smooth forms as *Unio anodontooides*, *luteolus*, *cariosus* and *lævissimus*; another in which the inflated part of the shell is of different texture from the rest, is often distinctly marked out, and sculptured with radiating ridges ending in teeth at the edge, including *Unio perplexus*, *sulcatus*, *brevidens* and the like; a third containing short forms with a distinct posterior ridge and remarkably painted epidermis, such as *Unio securis*, *donaciformis* and, perhaps, *caperatus* and *dromus*.

This great group is certainly entitled to generic rank, and the divisions I have indicated may perhaps be made into subgenera. I believe that the name *Lampsilis*, proposed by Rafinesque, and afterwards used by Agassiz, may be applied to this genus.

The second great group contains forms in which there does not appear to be any special differentiation in shells due to sexual characters, and which are true Unios. In fact I consider the question as to the distinction or separation of the sexes in the true Unios and Anodontas far from being settled, although it is one which has been fought over since the time of Leuwenhock until the present. A number of excellent authorities have declared, after making many careful dissections, that the sexes of these forms were separate; others equally capable have concluded that they were united, others that the earlier stage was that of a male and later on a female, while still others claim to have found the sexes united in some individuals and separated in others.

The shells of this great group are usually rather dull in color externally, they often have a decided posterior ridge, and generally become arcuate in outline in old age. The beak sculpture, as a rule, is rather coarse and irregular, in most cases consisting of a few nearly straight bars, which are thickened where they pass over the posterior slope. At the extreme anterior and posterior dorsal portions of the young shell there are often found fine, radiating ridges, which sometimes pass below into the heavy, horizontal undulations. The embryos are distributed throughout the whole length of the

gills, the branchiæ when distended with them being perfectly smooth outside, and looking like pads. There seem to be two great groups of these forms, one characterized by simple, oval or oblong shells destitute of any strong sculpture, and probably carrying the young, as a rule, only in the outer branchiæ, and this includes in the United States such forms as *Unio gibbosus* Bar., *U. tetralasmus* Say, *U. buckleyi* Lea, *U. crassidens* Lam. and *U. complanatus* Sol., and these are probably closely related to the European species. The other group has short, rather solid, often inflated shells, with a wide, heavy hinge plate, and it includes nearly all the pustulous, and all the plicate sculptured forms. Lea found the inner and outer gills filled with embryos in four of these species: *U. multiplicatus* Lea, *subrotundus* Lea, *kleinianus* Lea, and *rubiginosus* Lea, and it is probable that, under favorable conditions, all or most of these species carry young to some extent, in the inner as well as the outer gill, though so far as I have observed the inner gill is never so compactly filled as the outer, and it is quite probable that with unfavorable conditions the former may not be used as a marsupium.

Besides these there are a few aberrant forms which may be, as Wetherby has suggested, "geological remnants," such as *Unio phaseolus* Hild., *U. irroratus* Lea, and *U. cornutus* Bar., having remarkable modifications of the branchial uterus or marsupium. These three species will probably have to stand as the types of as many genera.

But little is known concerning the anatomy of the foreign Unios. The soft parts of all the European species have been examined, I believe, and descriptions which go into the minutiae, so far as color and trifling peculiarities of form are concerned, have been published, but which give no idea of vital characters or structure. From all that I can learn the anatomy of the European forms is very much like that of the circumboreal *Unio margaritifera*, which is much like that of *Unio gibbosus*, *crassidens*, *tetralasmus* and the like. Of the Oriental and African forms I know almost nothing. I have examined the soft parts of gravid specimens of *Unio gabonensis* Kuster from Tropical West Africa, and found that in them the embryos filled the inner branchiæ alone.

It has been surmised that there was a close relationship between the Australasian Unios and those of South America. The shells of the species of the two faunas agree very closely in all characters; in being destitute of rays, and having a uniform olive-green epider-

mis and a slightly concentrically sculptured surface, simple outlines, rather dull, bluish-white nacre, compressed cardinals and imperfectly radial beak sculpture. Lea examined gravid specimens of *Unio peculiaris* Lea, and *firmus* Lea from South America, and found that only the inner gill was filled with embryos. Suter reported the same thing from an examination of *Unio menziezi* Gray from New Zealand. I recently received some fine alcoholic specimens of that species from him, and on examining them found, to my astonishment, that they agreed with Lea's descriptions of the soft parts of the South American forms as exactly as if they were the very animals that he had described. In all three species the outer gill is greatly produced below in the middle, the anal opening is destitute of papillæ, and there is no super anal opening at all, characters which are conspicuous in the South American species. I had previously placed these Australasian and South American Unios in a subgenus by themselves, for which I used the name *Diplodon*, applied by Spix to some Brazilian forms,⁶ but I am satisfied that they are entitled to generic rank, and Spix's name may be used for the group. I do not believe that they belong to the same phylum with the *Unio gabonensis* which, from conchological characters, seems much more closely related to the forms of Southern India. This seems to add another link to the chain of evidence which goes to prove a relationship between the faunas of Australasia and South America, and it is a question whether this relation came about on account of migration, by way of an Antarctic land way from one continent to another, or whether the two faunas are remnants of an earlier and generally distributed northern fauna that was driven south and superceded by more modern forms. The Unios of South America and Australasia are simple forms, both anatomically and conchologically. Long ago Ihering predicted that the earliest Unios would be found to have radial beak sculpture; and two of the fossil species recently described by the writer⁷ from what are supposed to be the Triassic freshwater beds of Texas have that which is strictly radial. In the Australasian and South American forms the beak sculpture is imperfectly radial, the central rays curve together and generally coalesce, and in some

⁶ The Classification and Geographical Distribution of the Pearly Fresh-water Mussels. Proc. U. S. Nat. Museum, XVIII, 1896, p. 302.

⁷ Description of Four New Triassic Unios from the Staked Plains of Texas. Proc. U. S. Nat. Museum, XVIII, 1896, pp. 381--385.

cases they are slightly broken. In some of the Indian and African forms this sculpture becomes irregularly rayed and zig-zagged; in the European forms it becomes somewhat concentric and often broken, while in *Lampsilis* we have the farthest departure from the simply radial, that is, the rays are all looped and joined in the center, where they are drawn up towards the beak. This genus has without doubt the most highly developed animal of any of the Unios, and is, in all probability, the most modern. I have seen no extinct forms which certainly belong to it, and it was probably developed in North American waters, to which it is still confined.

ISAAC LEA DEPARTMENT.

[Conducted in the interest of the Isaac Lea Conchological Chapter of the Agassiz Association by its General Secretary, Mrs. M. Burton Williamson.]

COLLECTING IN MONTEREY BAY.

(Extract from the report of Mrs. E. H. King. From the Transactions of the Isaac Lea Chapter for 1896.)

In the month of September I spent two weeks at Monterey Bay, and collected shells on about three miles of shore-line, rocky headlands and sandy beaches. Along the shore I found many patches of soil literally packed with fossil shells. In the black soil they are soft and crumple easily, but in the sand hills near the light house they are quite firm. *Haliotis rufescens* Swains, is the most abundant, but there are also great numbers of *H. cracherodii* Leach, and a variety of limpets; also *Chlorostoma funebre* A. Ad. I found in the sand hills a large perfect shell of *Purpura canaliculata* Duclos, much larger than any of the live shells I have seen.

We go down on the rocks as the tide goes out, take our lunch with us, and work until the tide rises and compels us to return. The first shells we find are the Littorinas, so very plentiful that large spaces and crevices are full of them. Two species abound *L. planaxis* and *L. scutulata*. There also the limpet appears, *Acmea spectrum* is the highest, but is also found low down, and larger near low water. Next were *Acmea patina* Esch., and *A. scabra* Nutt., then appears *A. persona* and *A. pelta* Esch. *Lottia gigantea* Gray, is very near low water mark, and a few large specimens of nearly all the others, the lower on the rocks they were the larger were their thin shells. Here also I found a few shells of *Gadinia reticulata* Sby.

Acmæa asmi was numerous on *Chlorostomas*. *A. mitra* Esch. and *A. rosacea* Cpr. were found on the sandy beaches.

Monoceros lapilloides Conr., are quite abundant in the crevices of rocks constantly washed by the tide, and in the same localities a few *M. engonatum* Conr. Here also in the roaming breakers were large quantities of *Purpura saxicola* Val. There seem to be three well defined varieties, white with many large varices, almost black with small varices, and smooth with bands of brown. Among the rocks and in little pools of water were large quantities of *Chlorostoma funebre* A. Ad. They seem to be of two varieties, one plain and smooth and the other with a crinkled band around the body-whorl. The latter most abundant and largest in size. *Chlorostoma brunneum* Phil., is in the same locality but not nearly so numerous. Many of the *C. brunneum* are dead shells inhabited by the hermit crabs. In the same pools were *Calliostoma costatum* Mart. but numbers of them dead and the hermit crab in possession of the premises. A few *C. canaliculatum* Mart. and *C. annulatum*, were also found but they were not such fine shells, as those washed upon the shore by the storms of winter. Low down on the rocks in the roaring waves were found some *Haliotis cracherodii* and some fine sea urchins. With the *Haliotis* we found a large beautiful *Rupellaria lamellifera* Conr. The mussels are very abundant in some places, literally darkening the rock. I think I found four species; *Modiola modiolus* L., *M. recta*, *Mytilus edulis* and *M. californianus* Conr. *Crepidula adunca* Sby., was very abundant on the shells of *Chlorostoma* and *C. navicelloides* Nutt. in the apertures of dead shells. I found a number of Chitons but have not yet been able to classify them.

On the beaches I found many species of shells that I have never found alive, *Olivella buplicata* Sby., *Conus californianus* Hds., *Nassa mendica* Gld., *Amphissa corrugata* Rve., *Astyris gausapata* Gld., *Marginella jewettii* Cpr., *Lacuna unifasciata* Cpr., *Bittium quadrifilatum* Gld., and many others.

On the large beach at Monterey I found many rocks containing dead shells of borers, *Parapholas californica* and *Pholadidea penita*. In deep quiet pools at Point Pinas I found beautiful starfish. Some of a deep orange color, others dark red, some dark purple, others pale yellow. I saw some beautiful Anemones differing from any I had seen, they were eight or ten inches in diameter, and beautifully iridescent, the play of colors resembling a great opal with greenish lights. The holidays ended, and reluctantly I said good-bye to the beautiful bay.

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SYNOPSIS OF THE PINNIDÆ OF THE UNITED STATES AND WEST INDIES.

BY WM. H. DALL.

In revising the Tertiary *Pinnidæ* it became necessary to examine the recent species and their synonymy. As certain changes in the accepted nomenclature appear necessary, the following synopsis may be useful.

Family PINNIDÆ.

Genus PINNA Linné, 1758.

Valves medially sulcate.

Pinna rudis (Linné) Chemn., (+ *pernula* Reeve non Chemn.); Bermuda, Bahamas.

Pinna carnea Gmelin, (+ *pernula* Chemn. non Reeve; + *degenera* Link, 1807; + *flabellum* (Lam.) Reeve, 1858; + *varicosa* (Lam.) Orb., 1853; + ? *bullata* (Swains.) Reeve, 1858).

Florida Keys, north to near Hatteras and south to Trinidad; also in the Red Sea.

Genus ATRINA Gray, 1847.

Valves entire.

Atrina rigida Dillwyn *apud* Solander, 1817, (+ *pectinata* Born non Linné; + *seminuda* Lam., 1819, non Reeve; + *alta* Sby., 1835; + *subviridis* Reeve, 1858; + *dorbignyi* Hanley, 1858; + *carolinensis* Hanley, 1858; + *ramulosa* Reeve, 1858; + *seminuda* Holmes, 1859; + *muricata* of American authors, but not of Linné or Reeve).

Cape Fear, North Carolina, to the northern shores of South America.

Atrina serrata Sowerby, 1825, (+ *squamosissima* Phil., 1849; + *seminuda* Reeve, non Lam.; + *muricata* Holmes, non Linné or Reeve; + *seminuda* of American authors, not Lam.).

Cape Hatteras, North Carolina, to Guadeloupe, West Indies.

The type of *serrata* was a very young shell with finely developed sculpture. The true *Pinna muricata* (L.) Reeve, is probably an Oriental species, it is not at present known from America.

ON TWO SO-CALLED "BULIMI" FROM THE NEW HEBRIDES.

BY C. F. ANCEY.

Several years ago, Dr. Wm. D. Hartman described and figured two very interesting land shells from Segon Island, New Hebrides Archipelago, under the names of "*Bulimus*" *ruga* and "*Bulimus*" *Bernieri*. The English diagnoses and illustrations of these appeared in the Proceedings of the Academy of Natural Sciences of Philadelphia, 1890, page 284, plate III, figs. 1 and 2. These shells were until quite recently known to me from the figures and descriptions quoted above, but I succeeded when in Paris in December, 1896, in procuring specimens. My opinion was they were not at all "Bulimi" as suggested by Dr. Hartman, but modified forms of the *Diplomorpha* type. I now think there can be but little doubt they belong to the latter genus. The texture of shell, outline and external characters are not dissimilar, and in the best preserved specimens of *Diplomorpha ruga* and *bernieri* both have the throat tinged with blood-red color as in the typical *D. layardi*, although the describer mentioned the fact in one of them only. No epidermis remains on the shells, not very numerous indeed, observed by me, but it may be very deciduous, and its absence gives the shells a rough and uneven appearance. I am indebted to Mr. Ph. Dautzenberg for a nice example of *bernieri*, and the shell is somewhat straw-colored like *ruga*. Of the latter, I procured two specimens, one much larger than the type, the other, on the contrary, considerably smaller. The parietal denticle is wanting in the species under consideration, as well as in *Diplomorpha delatouri*.

Segon Island, the locality where *ruga* and *Bernieri* were found, is, I believe, in the *Espiritu Santo* group, that is, in the northern

portion of the Archipelago, but is not on the maps accessible to me.

Mr. Crosse, in his recent paper on the New Caledonia land and freshwater shells published in the "Journal de Conchyliologie," said that "*Helix*" *singularis* and its allies, represent in that fauna the New Hebrides *Diplomorpha*, but I fail to detect so great an analogy. It is right to observe, by the by, that *singularis* is really found on Aneitum, one of the New Hebrides; Mr. E. L. Layard sent me two specimens from there, much smaller than any one I ever saw from New Caledonia, but otherwise quite the same. I must add that the true *Pseudopartula* (type *Helix galericulum* Mousson), has nothing to do with this Melanesian group, and are evidently related to *Amphidromus*. Montrouzier's name *Drapar-naudia* should be applied to *singularis* and *sinistrorsa*. The affinities of the genus are difficult to state until the soft parts are examined.

I avail myself of the opportunity of adding three species to the list of New Caledonian species of Mr. Crosse who certainly overlooked them, viz., *Helicina nehoueensis*, *bourailensis* and *saxoniana*, all of Hartman.

A NEW CANCELLARIA FROM THE ALABAMA EOCENE.

BY T. H. ALDRICH.

Cancellaria lanceolata n. sp.

Shell elongated, whorls seven, first three nuclear and smooth, the others cancellated and having three strong revolving lines, the middle one much the larger, the costæ numerous and fine. Whorls are shouldered, suture deeply marked; body whorl with seven or eight revolving raised lines. Aperture oblong, outer lip serrated by the raised lines, nearly smooth within. Columella lip without callus, bearing two or more folds, part of the raised lines passing into the aperture to form them; canal short, oblique, slightly twisted, no umbilicus. Length $7\frac{1}{2}$, diam. $3\frac{3}{4}$ mm.



Locality.—Choctaw Corner, Ala. Woods Bluff horizon.

This little shell has some resemblance to *C. pulcherima* H. C. Lea, but Mr. C. W. Johnson, of the Wagner Free Institute of Science, has compared the two and finds the above distinct. The

specimens are not fully matured. One of the two specimens has been presented to the "Lea Collection," in the Academy of Natural Sciences of Philadelphia.

ON A COLLECTION OF MOLLUSKS FROM GRAND TOWER, ILLINOIS.

BY FRANK C. BAKER.

During the latter part of April and first part of May, Mr. Frank M. Woodruff spent two weeks collecting birds in Jackson and Union Counties, Illinois, and incidentally picked up a number of mollusks, and the general conditions of the locality, and the small number of shells collected seem to warrant a few notes. This locality is situated on the Mississippi River, north of Big Muddy River, in the southwestern part of the State.

Of the localities visited Mr. Woodruff says: "The shells were found in a rocky glen or cleft in the center of the chain of high precipices known by the names of Fountain Bluff, Devil's Bake Oven and Backbone. This cleft or ravine begins about three-quarters of a mile from the face of the cliff and gradually descends in a northwesterly direction until the bottom is reached, and one may stand upon a broad shelf of rock ten feet from the ground, with high overhanging cliffs of bare rock on both sides. A stream of clear spring water flows down this ravine and falling over the high shelves of rock has formed numerous round pools or basins. I was surprised to find no shells in the stream, and could only collect a few specimens of *Limnæa humilis*, which I found clinging to the wet moss under the falls. The balance of the shells were found under the moss and old logs at the base of the cliff. Fountain Bluff is five miles from the town of Grand Tower, and is three miles long from north to south and about one and a half miles wide. According to Worthen's Geology of Illinois, the Backbone or ridge is formed by an uplift of Devonian strata which is tilted to an angle of about 25°, and dips to the northeast. The bluffs consist of Chester limestone and sandstone overlaid by conglomerate. The top of the bluff is covered with a rich growth of timber, among which are Willow, Sweet Gum, Qupelo tree, Sycamore, Cottonwood, Honey Locust, Hock Berry, Box Alder, Red Birch, White Ash, Black Ash, Red Oak, Mulberry, Persimmon, White and Black Oak, etc., are the most common."

Thirteen species were obtained, and may be noted as follows:

1. *CIRCINARIA CONCAVA* Say. A number of large and typical specimens of this species were collected and kept alive for a long time on the writer's desk. On May 18th two individuals were noted in coitu, the coitus lasting from 8 o'clock A. M. to 6 o'clock P. M. During this time both animals were perfectly quiet, the eye peduncles and tentacles drawn into the head and the foot contracted to form a rounded oval. During the coitus the heart, which normally beats about 75 times per minute, was reduced to 19 very slow and long beats. The foot of the snail taking the active part was partly covered by the passive snail, and the former's head was slightly lifted. The specimens measured about 15 mill. in greatest diameter.

2. *VITREA ARBOREA* Say. A few specimens of this species were obtained under and in rotting logs. All were perfectly typical.

3. *OMPHALINA FULIGINOSA* Griffith. The specimens obtained were rather dark in color and about half grown, the umbilicus wide and deep.

4. *POLYGYRA (MESODON) ALBOLABRIS* Say. But a single specimen of this species was obtained alive, and that was very large, measuring 34 mill. in greatest diameter. The animal was kept in captivity for several weeks, and was more active than any of the other species of *Mesodon* that the writer has studied. It was started at the bottom of a book case door four feet long and reached the top in about half an hour. The examination of the lingual membrane gave 45-1-44 teeth with ten perfect laterals. In this membrane the 38th tooth was abnormal in having three well formed cusps of equal size, instead of a bifid inner cusp.

5. *POLYGYRA (MESODON) EXOLETA* Binney. Several typical specimens of this species were collected, among which there was one without the parietal tooth. The lingual membrane of one specimen gave 47-1-47 teeth with eight perfect laterals. The marginals were very variable, some being with and some without side cusps. It is probable that several teeth were torn away from this membrane, although there could not have been the normal number given by Binney, 60-1-60.

6. *POLYGYRA (MESODON) THYROIDES* Say. All specimens were of the normal form.

¹ For the change in names of several of the genera and species here listed, see Pilsbry, Proc. Phila. Acad., 1894-97, where adequate reasons are given.

7. *POLYGYRA* (*TRIODOPSIS*) *TRIDENTATA FRAUDULENTA* Pilsbry. A single specimen of this subspecies was collected by Mr. Woodruff. Its radula differed considerably from that given in Binney's Manual of American Land Shells (p. 292), where 40-1-40 teeth with 12 perfect laterals is given. The present specimen had 27-1-27 teeth with 11 perfect laterals. The 17th tooth had a bifid inner cutting point, but all before it were simple. The 13th tooth showed a decided modification. The jaw was as usual, with 12 rather stout ribs.

8. *POLYGYRA* (*TRIODOPSIS*) *INFLECTA* Say. The specimens collected were of the usual form.

9. *POLYGYRA* (*STENOTREMA*) *MONODON FRATERNA* Say. The specimens examined had 31-1-31 teeth on the lingual membrane with 10 perfect laterals, and the 13th tooth had a bifid inner cutting point.

10. *POLYGYRA* (*STENOTREMA*) *HIRSUTUM* Say. The specimens obtained were of the normal form. One specimen measured $8\frac{1}{2}$ mill. in greatest diameter. The radula was as given by Binney, 22-1-22 teeth with 10 perfect laterals, and the jaw had eight ribs.

11. *PYRAMIDULA ALTERNATA* Say. The specimens collected are rather coarsely striated (or ribbed) and approach var. *mordax* Shuttl., but the ribbing is not quite as strong as in that variety.

12. *PYRAMIDULA PERSPECTIVA* Say. Among the specimens obtained was one measuring 10 mill. in greatest diameter.

13. *LIMNÆA HUMILIS* Say. A number of specimens were collected in the moss under a waterfall. Mr. Woodruff reports finding all the specimens out of the water.

It was remarkable that so few species of mollusks were found, and also that the species were so few in individuals. Mr. Woodruff says that a part of the region is made up of sandstone and conglomerate, and this may account for the great paucity of molluscan life. Mr. Woodruff searched diligently many times, particularly for the smaller forms, and states that at no time did he find more than one shell at one time, all seeming to live solitary lives.

ISAAC LEA DEPARTMENT.

[Conducted in the interest of the Isaac Lea Conchological Chapter of the Agassiz Association by its General Secretary, Mrs. M. Burton Williamson.]

Through the courtesy of Mr. Herbert Lowe, the writer had the pleasure of meeting our former member, Mr. Edward W. Roper of

Revere, Mass. Mr. Roper is now in Pasadena, Cal. He was one of the founders of our chapter. One of his contributions to the Transactions of the chapter in its early days was an interesting paper on "Studies in the Genera *Sphærium* and *Pisidium*," in 1889.

Mr. J. J. White, of Rockledge, Florida, has gone to Frankfort, Mich. for the summer months. The Vol. of Transactions should be sent to him at the latter address.

One of our valued members, in a letter, tells of a unique way in which devil-fish are caught by some foreigners. The following is an extract from the letter, written from San Diego County, Cal.; "We met two men and a woman, apparently Portuguese and from La Playa, who were making a collection of devil-fish. One of the men carried a pail of lime water, and when they came to a devil-fish residence, he would pour half a pint or so of the lime water into the hole, and await developments. And they would come every time, too. It would be a very short time till the devil-fish would come squirming out of his hole, to get away from the lime, and be picked up by the men, thrown down on the rocks two or three times, until he was partially stunned, and then put with his fellows in a pail carried for the purpose. We watched the proceedings two or three times, and G. asked what they were going to do with them; 'eat them, they are fine,' was the astounding answer. It sounded like the biggest kind of a joke, but the people did not look or act so." As the Chinese are said to eat these mollusks there is no doubt they were in earnest. How they could locate the Octopus in each hole, is, to the writer, a mystery.

FLORIDA SHELLS.

[Extract from the report of Mr. J. J. White. From the Transactions of the Isaac Lea Conchological Chapter for 1896.]

Business calling me to Miami and Palm Beach in July, I determined not to let so fine an opportunity for collecting pass without improving it. After concluding my business at Miami and Coconut Grove, I started out to hunt for the beautiful *Orthalicus undatus* Brug. and *Liguus fasciatus* Müll., but much to my regret was soon compelled to stop my search on account of the myriads of mosquitoes which infested the dense hummocks in which I was searching. I only succeeded in finding three live *Orthalicus* and one dead *Liguus* and some live *Helix varians*. Hoping for

better success I started out on the waters of Bay Biscayne, and was well repaid for doing so by discovering a colony of seventeen *Pyrula papyratia*. They were all moving along, a compact body, to the northward, and it was one of the finest sights I have ever seen while collecting. The animals were beautifully marked with crimson and brown spots. Their eyes were large and black, and their long, flat heads and necks were light gray. It seemed hard to have to take them from their native element and kill them for their shells.

Four very fine *Cypræa exanthema* were found clinging to some mangrove roots, while close by on some rocks, several feet above the water, was a colony of hundreds of *Tectarius muricatus* and among them a handful of small *Nerita versicolor*. Already having a good supply of *Tectarius* at home, I only collected a few of the largest, and the *Neritas*. *Littorina lineata* covered the rocks everywhere, but I did not molest them. One very fine *Arca noae* was soon added to those already in the basket. Some fine *Arca ponderosa* were also found. *Fulgur perversum*, *F. carica*, *F. pyrum* were quite plentiful, but they were only small ones, so only a few of each were taken.

My time being limited, I had to get back to Miami to take the train for Palm Beach, on Lake Worth—Lake Worth being my old and favorite collecting place. It would be difficult to find a better collecting place, for its size, than the flats around Lake Worth Inlet. Lake Worth is a fine body of salt water lying parallel with the Atlantic Ocean, and separated from it by a narrow strip of land which, in some places, is only a very few rods in width. It is twenty-two miles long and averages from one-half to three-quarters of a mile in width. The sands washing in from the ocean have formed a large flat inside the lake at the inlet, and it is there we do our collecting. I have spent many days there very profitably. In the two days spent there in July I collected about three hundred *Strombus pugilis* in all stages of growth; *Strombus accipitrinus*, *S. bituberculatus* and *S. gigas* to be had for the taking. I also found, in limited numbers, *Lucina tigrina*, *L. pennsylvanica* and *L. divaricata*, *Dosinia elegans*, *Dolium galea*, *Cassis canaliculatus*, *C. testiculus*, *Cardium magnum* and *C. isocardia*, while on every hand *Nassa vibex*, *Cerithium minimum*, *C. muscarum*, *C. literatum*, *C. floridanum*, *Neritina virginica* and *Iphigenia brasiliensis* were found by the thousands.

On the rocks on the north side of the inlet were found numbers of *Purpura hæmastoma* and *P. hæmastoma* var. *undata*. The rocks

there are literally covered with *Siphonaria lineolata* and *Littorina lineata*. One thing was very noticeable to me while collecting there, and that was the great numbers of *Strombus pugilis*. While living on the lake for seven years, I only found six living ones in the lake, and now there are thousands. The largest, *S. gigas*, are fast disappearing.

While on the flats at the old inlet, one mile below the present inlet, I discovered a colony of *Cerithium minimum* which attracted my attention by their distorted growth, and I at once collected half a pint of them. The spot where they were located was somewhat higher than the main flat, and at low tide would be exposed for several hours at a time. Whether this exposure caused this strange growth, or some other condition of immediate surroundings, I am at a loss to determine. I took especial pains to examine those at the present inlet, and I failed to find the distorted ones there, although they, at times, are exposed to the sun at low tides.

I found some *Calistas* on the mud flats east of Pitt's Island, a mile north of the inlet, which were new to me. On sending them to Professor Pilsbry they proved to be *Calista varians*, and are said to be the first reported from Florida. Suites of these have been sent to the Academy of Natural Sciences at Philadelphia and to the Smithsonian Institution and to some members of the Chapter, and so the list was soon disposed of. I also found a nice suit of *Venus cribraria*, which was also given to the Smithsonian Institution. I came away from Lake Worth well pleased with the results of two days' collecting.

During the past year I have made thirty-seven exchanges with persons in all sections of the country, and have added four hundred and twenty different varieties to my collection. My correspondence with the members of the Chapter has been pleasant, and all the exchanges very satisfactory. (Mr. White's generous offer to send shells to the members of our Chapter was published in THE NAUTILUS for February. By this time the stock would be exhausted).

NOTES AND NEWS.

SINISTRAL AMPULLARIA.—It may be of interest to readers of the NAUTILUS to know that in the collection of *Ampullaria* of the Academy of Natural Sciences of Philadelphia, numbering about an hun-

dred species, but one sinistral individual was found, of the species *A. conica* Wood. It is a clearly defined *Ampullaria*, and could not be confounded with the genus *Lanistes*.—*Jennie E. Letson*.

HELICINA RABEI, n. sp. Shell lenticular, acutely carinated low-conic above; yellowish- or fleshy-white or red variously banded and figured; surface finely sulcate spirally. Whorls $3\frac{1}{2}$, flat above, the last convex below the acute peripheral keel. Aperture subtriangular, oblique, dark red within, at least in part; peristome well expanded, white; axial callous heavy, rugose, varying from dark reddish-brown to translucent white in color. Alt. 6·3, greatest diam. 11, lesser 8·7 mm. Another specimen measures, alt. 5·2, diameters 9 and 7·5 mm. Pelew Is. (Dr. Rabe). This acutely keeled and spirally lirate species is remarkably variable in coloration. Types, no. 68,854 coll. A. N. S. P., presented by Mr. John Ford.—*H. A. Pilsbry*.

RECENT PUBLICATIONS RECEIVED.

Professor Wm. H. Dall's Report on the Mollusks collected by the International Boundary Commission of the United States and Mexico, 1892-1894 (Proc. U. S. Nat. Mus., 1896, issued in 1897), is one of the most important documents yet published upon the inland mollusk fauna of the southwest. It treats of a region rarely visited by snail collectors, and consequently but little known, and places the conchology of the region on a solid basis. The region north of Mexico, between the Rio Grande and the Colorado, seems to be a prolongation northward of the fauna of the mountains of northern Mexico, rather than a southern extension of that of the Great Basin west of the Rocky Mountains. It presents features due to contributions from the Californian and Mexican regions, the latter predominating, with a few stragglers from the north. The plains are almost uniformly arid and frequently alkaline, and nearly all the Pulmonates were collected at the upper levels of the various mountain ranges near the boundary. *Epiphragmophora* extends into the region, being represented in Arizona and New Mexico by four species, of which two, *arizonensis* and *hachitana* are new. The *Polygyra levettei* groups proves to be prolific in species, five, of which four are described by Dall, being found. The classification of *Holospira* proposed in the last volume of THE NAUTILUS is fully set forth

and new species figured. *Cionella lubrica* and *Pyramidula strigosa* are among the northern species occurring in the Boundary region. The discussion of the Boundary fauna is followed by an extended treatment of the Lower Californian *Bulimuli*, in which a number of obscure matters are righted. In conclusion is given a list of marine mollusks from the termination of the international boundary and from San Clemente Island.

Evidence is adduced indicating that within comparatively recent geologic time, probably Post-Pliocene, Mexico has been almost insulated from the Continent north of it.

The Journal de Conchyliologie for April, 1896 (issued about April 7, 1897), contains an important article on *Pleurobranchus* and related genera, by Prof. A. Vayssière, of Marseilles.

Dr. R. Ellsworth Call has added a valuable paper to the scant literature of American cave faunas in his Notes on the Flora and Fauna of Mammoth Cave, Ky. (American Naturalist, May, 1897). The only mollusk found by him in the cave is a *Carychium*, considerably like *C. exiguum*, which he describes as *C. stygium*. About 150 examples were collected in "Mammoth Dome," on the wet surfaces of old bridge timbers, which have been lying undisturbed for forty or fifty years.

Dr. Heinrich Simroth gives a preliminary communication upon Russian slugs,¹ based upon the study of materials in the Zoological Museum of the Imperial Academy and the Senckenberg Museum at Frankfurt. The Caucasus Mountain region is the district of greatest peculiarity, having a number of special types. Simroth truly says that for the satisfactory working out of the species and their inter-relationships, the investigation of the genitalia and intestinal tract suffice; but for the understanding of the genera and their phylogeny, the other organs, especially the heart, pallial region, kidney and lung must be examined, a condition very rarely fulfilled. The *Testacellidæ* and *Arionidæ* are briefly commented on, and the following genera of *Limacidæ* noted: *Agriolimax*, *Paralimax*, *Lytopenella*, *Gigantolimax*, *Metalimax*, *Monochroma*, *Parnacella*. *Metalimax* and *Monochroma* are new, the former near *Paralimax*, but differing in the male genitalia; the latter is near *Limax*, but the eye-retractor does not pass between branches of genitalia,

¹Annuaire du Mus. Zool. de l'Acad. Imp. des Sci. de St. Petersburg, 1896.

etc. It is hoped that nothing will hinder the timely completion of this important work.

Another thorough anatomical paper, "*Beitrag zur Kenntniss der Coniden*," by Dr. R. Bergh, has appeared (Nova Acta der K. Leop.-Carol. Deutschen Akad. der Naturforscher, LXV, No. 2). It is a well illustrated work on the soft anatomy of one of the most prominent families of marine Gastropods, the *Conidæ*, which, like many other groups, has long been well known conchologically, but only slightly anatomically. *C. Pealii* is the only United States species investigated.

In their "Diagnoses d'Esp. Nouv. de Pélécypodes et de Gastéropodes" (Bull. Soc. Zool. France, 1897), by Ph. Dautzenberg and H. Fischer, a good many species from the eastern Atlantic dredged by the "Hirondelle" and "Princesse Alice," are described but not figured. *Amphirissoa*, *Basilissopsis* and *Aliceia* are new genera. Species of *Turcicula*, *Cocculina*, *Cetoconcha* and other interesting genera are included. Mons. H. Fischer seems to be following in the footsteps of his distinguished father. In M. Dautzenberg he has an experienced and able collaborator.

Mr. Charles Hedley has recently described and figured a second fine species of *Thersites* from New Guinea, *T. septentrionalis*. It is more elevated than *T. broadbenti*, more like the Queensland *T. etheridgei* (Rec. Austr. Museum, III, No. 1). In conjunction with Dr. Arthur Willey, the same author describes a new *Astralium* of the subgenus *Guildfordia*, from New Britain. It is some 45 mm. in diam., and resembles the well-known *A. triumphans* from Japan.

Messrs. Melvill and Ponsonby have contributed to the Annals and Magazine of Natural History for June, 1897, another article upon Land and Fresh Water Mollusca from South Africa. New species of *Achatina*, *Ennea*, *Pupa* and other genera are described, and also a species of *Hapalus*, a Bulimoid group not hitherto found so far south.

An interesting paper by Mr. Harold Heath (Proc. Acad. Nat. Sci. Phila.) demonstrates the possession of small but well developed tegmenta upon the valves of young Californian *Cryptochiton Stelleri*. There are also small "sutural tufts," homologous with those of *Acanthochites*. A good plate illustrates these and other features.

THE NAUTILUS.

VOL. XI.

AUGUST, 1897.

No. 4.

NOTE ON LANDSHELLS FROM THE MALAY PENINSULA.

BY W. H. DALL.

The National Museum has received an interesting small lot of landshells from Dr. W. L. Abbott, collected in the vicinity of Prang, on the Malay Peninsula. One of them appears to be new, and particularly elegant. The others have been identified by the aid of Mr. Charles T. Simpson and Professor H. A. Pilsbry. The list is as follows :

- Ariophanta retrorsa* Gould.
- Planispira hardouini* De Morgan.
- Hemiplecta Leechi* De Morgan.
- Macrochlamys resplendens* Phil.
- Macrochlamys diadema* Dall, n. sp.
- Helicarion lineolatus* von Martens.
- Amphidromus sinensis* Benson, small var. ?
- Amphidromus xiengensis* L. Morelet.
- Amphidromus* sp. indet. (immature).
- Cyclophorus Nevillei* von Martens.
- Cyclophorus Pfeifferi* Sowerby.
- Cyclophorus Cantori* Benson.
- Leptopoma vitreum* Lesson.
- Vivipara quadrata* Benson.

Nanina (*Macrochlamys* ?) *diadema* n. sp.

Shell translucent yellow-brown, polished, depressed, with six and a half whorls, of which the apical two and a half are pale and smooth, the remainder show a deeply channeled suture outside of

which the whorl rises abruptly, its rounded crest cut into rounded nodules like the joints of a millipede by deeply incised lines in harmony with the lines of growth; there are about 38 of these divisions on the last whorl; the incisions override the crest and extend nearly to the periphery, becoming gradually fainter; periphery and base marked only by incremental lines, rounded, with a minute perforate umbilicus, over which a small portion of the inner lip is bent; peristome thin, sharp, the body showing hardly any callus; max. diam. 16, min. diam. 13, alt. 10 mm.

This elegantly sculptured species seems to differ much from any yet described. Its nearest relatives are *M. compluvialis* Blauf., and *M. convallata* Benson, which have a channelled suture, but do not have the transverse sculpture cutting the crest of the enclosing whorls. The types are in the National Museum.

ON A NEW HOLOSPIRA FROM TEXAS.

BY W. H. DALL.

Holospira (*Haplostemma*) *Hamiltoni* n. sp.

Shell slender, polished, spindle-shaped, pinkish-white, with a darker livid apex, and about 13 whorls; nucleus blunt, smooth, later three whorls delicately obliquely striated, central whorls smooth, last whorl with delicate oblique riblets with wider interspaces; aperture projected, rounded, subangular at the right posterior corner, the lip entire, reflected, the pillar rather wide; the last whorl flattened and attenuated. Lon. 19, max. diam. 5 mm.

Collected in the Rio Grande Mts., Brewster Co., Texas, at a height of 3,500 feet, living on *Selaginella lepidophylla* Spring, by Mr. James M. Hamilton, and presented to the National Museum through Dr. R. W. Shufeldt.

This species is very much like *H. (Metastoma) semistriata* Stearns, externally, differing in its smaller and more slender shell and finer and more delicate sculpture of the later whorls near the aperture.

QUARTER-DECKS AND JINGLES.

BY ROBERT E. C. STEARNS.

Several years ago, in the course of a conversation with Captain J. W. Collins, of the U. S. Fish Commission, relating to the various

materials used by the oyster planters for collecting the spat or forming spawning-beds, certain shells were mentioned by him that were systematically collected and sold to the oystermen. These shells were locally known by the names given in the above title. On looking into the matter, the "Quarter-decks" proved to be *Crepidula fornicata* Linné, and the "Jingles" a species of *Anomia*, presumably *A. simplex* Orbigny. As popular names go, these are not so bad, for there is a peculiar jingle produced by *Anomia* valves when many are shaken together, and the septum in *Crepidula* considered in connection with the boat-like shape of the species, *C. fornicata*, suggests a partially decked vessel.

The abundance of these forms in the region referred to, is indicated by the following data kindly furnished (July, 1889) by Dr. H. M. Smith, of the Fish Commission, on "The Fertilization of Certain Shell-fish at Greenport, N. Y., locally known as 'Jingles' and 'Quarter-decks.'"

Since 1880, these shells have been extensively used for the purpose of forming spawning-beds for oysters, the idea of so employing them having originated with Captain James Monsell, of Greenport. The shells are taken with dredges between the first of October and the first of July, and are sold by the fishermen to dealers at the rate of four cents a bushel. At times they bring more, according to the demand. A law prohibiting the taking of them between the first of July and the first of October went into effect in 1888. The shells lie on the docks until July, when they are taken to the planting grounds and sold to the oystermen. Unlike the scallops used for the same purpose, the jingles and quarter-decks are not opened when caught.

The *Crepidulas* or quarter-decks being gastropods (univalves), no opening is possible, and the two pieces or parts of the bivalve *Anomias* or jingles, readily separate when dead and dry. The scallop or *Pecten* shells (*P. irradians* Lam.) are opened in order to extract the meats, the sales of which yielded the men engaged in the scallop-fishery of Massachusetts, Rhode Island and Connecticut, principally the two first States, in the year 1892, \$114,695, the product of 137,284 bushels of this species of *Pecten*. The emptied shells, a residual product, are utilized as before indicated.

"Investigations by an agent of the U. S. Fish Commission show that in 1887 there were taken 130,000 bushels of 'quarter-decks' and 'jingles' valued at \$5,200. In 1888 the output of the fishery

was 110,000 bushels, valued at \$4,400, while the catch in 1889, up to and including the 19th of June, was 75,000 bushels, valued at \$3,000."

The marvellous abundance in certain localities of the various species above named, is, aside from the economic value of the fishery, of exceeding interest to the naturalist. What proportion of the total quantity, 315,000 bushels of jingles and quarter-decks, belong to the latter species, *Crepidula*, is not stated; probably much less than half, and quite likely not more than a quarter; presumably the quarter-decks are attached to, or are adherent upon, the jingle or *Anomia* shells, domiciliares upon the valves of the latter species, the same as the West American species.

Crepidula rugosa is a domiciliare on the shells of *Pecten æquisulcatus* Cpr., the Californian analogue of *P. irradians*. It is not at all infrequent to find from three to six individuals of the West Coast *Crepidula* on a single specimen of the *Pecten*.

Beside the use of oyster, clam, scallop, quarter-deck and jingle shells for forming spawning-beds, the oystermen in some instances and in some places, are utilizing old tin cans as catchment objects for the spat to fasten upon. What with the packing of adult oysters at the canneries and the entrapping of the innocent unsophisticated fry on old tin pots and cans, the situation may be said to look to an old man in a balloon, or a young man "up a tall tree," like canning the oysters at both ends.

Los Angeles, Cal., June, 1897.

NEW UNIOS.

BY BERLIN H. WRIGHT.

Unio Pinei sp. nov.

Shell wide or oblong, moderately and uniformly thin, dorsal and ventral margins usually parallel, subtruncate or obliquely rounded before, biangular and truncated behind. Epidermis reddish-brown; olive above, polished and thickly covered with unequal rays. Beaks scarcely elevated above the dorsum, and surrounded by four or five fine concentric, undulating ridges. Ligament thin, reddish, long and depressed. Greatest diameter in the centre of the shell. Beak cavities slight. Cavity of the valves ample and tray-shaped. Nacre

brilliant and copper-colored, very iridescent and remarkably coruscated; the upper third being stained darker. Lateral teeth equal, long, slender, slightly curved and extending fully to the cardinals. Cardinal teeth inclined to be double in both valves, compressed, oblique and serrulate. Cicatrices well impressed, showing the prismatic layers, the anterior ones being roughened in the posterior portion and widely distinct, and the posterior ones confluent. Pallial lines obscure. Dorsal notch long and shallow. Width 3 inches, length 1.5 inches, diameter 1 inch.

Habitat.—An unnamed lake in Withhacoochee River region of Hernando Co., Florida.

Type in National Museum.

Remarks.—It is difficult to assign a place to this shell, partaking as it does of the features of several members of the *Buckleyi* group. It has the subtruncate anterior of *U. coruscus* Gould, and approaches that species in nacre, which in our shell is of a deeper and richer tint, and is not so pointed behind, is more inflated, straighter dorsum, lighter teeth, more rayed and has a red instead of a blackish epidermis, and attains a much greater size. From *U. Hinkleyi* B. H. W., it differs in the abrupt anterior, sides more rounded, darker nacre, and in the reddish, instead of black epidermis. It is in every way more gracile than *U. Buckleyi* Lea, and is not so pointed behind. Nor has it the ponderous umbos, arched dorsum and rounded base of that species.

Sixty specimens of all ages have been observed, showing a remarkably perfect uniformity of characters. It is named for the discoverer, Mr. George Pine, of Aripeka, Hernando Co., Florida.

(To be Continued.)

MELANIA YOKOHAMENSIS, N. SP.

BY W. D. HARTMAN.

Shell elongate, conic, gradually tapering to an acute apex. Whorls 7, suture lightly impressed; surface smooth, with obscure spiral lines, color yellowish-green; aperture white, opercle brown, oval and corneous. Length 35 mill., width 13 mill.; width of aperture 6 mill., length of aperture 10 mill.

Locality.—Yokohama, Japan, B. Schmacker collector.

This shell was given me by Mr. Schmacker several years ago. Some sent Dr. Brot, of Geneva, were pronounced new at the time.

ISAAC LEA DEPARTMENT.

[Conducted in the interest of the Isaac Lea Conchological Chapter of the Agassiz Association by its General Secretary, Mrs. M. Burton Williamson.]

May 28th, the volume of Transactions was forwarded from San Diego east. Since that date the General Secretary has received no word regarding it.

SEEING EYES.

[From the report of Mrs. E. A. Lawrence. From the Transactions of the Isaac Lea Chapter for 1896].

Lowell says, "Eyes are not so common as people think, or poets would be plentier," and, what he has said of poets, could be said with equal truth of naturalists. Nature, to ninety-nine per cent. of the human family, is a closed book, not because she is not willing to have her pages opened, but because people have no eyes to see with. Thoreau could find in his back-door yard, or, on the shore of Waldon Pond, the material for printed volumes. It was not because these places had more of interest in them than similar places elsewhere, but it was because Thoreau had trained his eyes to see. How many people, of all those who yearly visit our sea-shore, have seeing eyes? They will tell us of the beauty of the foam-capped waves, or the brilliant tints of the water at sunset; but they will pass with unseeing eyes on careless feet over myriads of living creatures, creatures so wonderful in their mechanism, so beautiful in their form and coloring, and so cunning in their instincts, that they show to the observer the perfect workmanship of the great master, Nature.

About two years ago, I began to view the sea-side world through open eyes, and in that time I have collected over two hundred species of mollusca in the vicinity of San Pedro Bay. This past year I found beneath shelving rocks the little *Megetabennus bimaculatus* Dall, and nestling in hollows in the rough rocks I found a number of *Gadinia reticulata* Cpr.; the latter are so nearly the color of the

rocks that it takes sharp eyes to discern them. Upon goose barnacles I found a small *Aemœa* which I hoped might be a new species, but I found my eyes were not very wide open even after a year's experience in the opening process, for I sent the *Aemœa* to Dr. Dall and he said they were only a small variety of the *A. pelta*. But in classifying my shells I have made two varieties of them, as I think there is enough difference in them to warrant such division.

Going down on the sand one day at low tide, I saw a small upheaval of the sand, and since I have been travelling the world with seeing eyes, I always investigate these tiny mounds, and, this time, I was rewarded by finding a *Tornatina culcitella*, and a diligent search soon revealed several of these cunning little creatures. With these are *T. inculta* and *T. carinata*. While out in a boat among the kelp I found a number of *Lacuna unifasciata* and some *L. porrecta*, these latter were three-eighths of an inch long. Among the tiny shells, seeing eyes are called into requisition, and I find the aid of a strong lens often necessary to bring out their distinctive features. The tiny *Marginella (Volvarina) varia* is more beautiful than a *Cyprœa spadicea*, and yet the blind world never finds them hidden away under stones, and covered with their thin tents, which are quite a protection for them, as it hides their shining surface and makes them much less conspicuous. The *Turbonillas*, the *Odostomias*, the *Mitromorphus* and many others have enriched my cabinet, and opened my eyes to the wonders and beauty of small things this past year.

When I began to classify, I had many a struggle with the different authorities, and many a despairing appeal I sent to our General Secretary, who never failed to come to my relief, and I have much to thank her for, inasmuch as she has given me light where before I dwelt in darkness. * * * * To sum up the year's work, no greater gain has come to me than has come by the opening of my eyes, and the knowledge I have gained by seeing. The earth has taken on new beauty and the sea has opened some of its wonderful storehouse and bidden me enter, and all nature beckons me with kindly finger to further discoveries by the aid of seeing eyes.

NOTES AND NEWS.

NAUTILUS POMPILIUS IN SOUTHERN NEW SOUTH WALES.—What surprised me most was to find large numbers of rather broken speci-

mens of *Nautilus pompilius* thrown up in Eden Bay. It is difficult to conceive how they get there; it is an enormous expanse to be drifted away from any of the Pacific Isles. Can it be possible that they are eaten by whales and that the shells is extruded as excrement? I make this suggestion because great schools of whales come in there, it is said, to rub themselves on the coarse gravel bottom of the bay.—*Dr. J. C. Cox, in letter to Editor.*

PARTULA: NOTES AND CORRECTIONS.—*Partula eximia* Hartm. = *P. macgillivrayi*.

P. Brazieri Pse. is a good species.

The type example of *Partula neweenitiarum* was lost with the vessel on its return to Mr. Garritt at Tahiti.—*W. D. Hartman.*

A NEW SPECIES OF HEMPHILLIA.—In examining the slugs referred to *Hemphillia glandulosa* in the collection of the Academy of Natural Sciences, we found that two species have hitherto borne this name. The true *H. glandulosa* is a small slug, with distinctly papillose mantle; the pedal line hardly rises at the tail, and the caudal gland is surmounted by a conspicuous horn. The other form, which we call *H. camelus*, is much larger, the mantle is not papillose, and the pedal groove rises abruptly and conspicuously at the tail, and there is no noticeable horn there. Types from Old Mission, Idaho, collected by Hemphill. The species are easily separated by external characters, but the internal anatomy shows even more important differences, which will be described and figured in the second installment of our "Revision of American Slugs," now in preparation.—*H. A. Pilsbry & E. G. Vanatta.*

RECENT PUBLICATIONS RECEIVED.

An apparently very thorough monograph of the *Cephalopoda* of the Gulf of Naples, by Guiseppe Jatta, has appeared in the "Fauna and Flora des Golfes von Neapel" (23d monograph). The illustrations are incomparably magnificent.

Mr. Felix Bernard¹ has detected a stage of shell-growth in bivalves earlier than the prodissoconch, which he proposes to call *protostracum*. He finds the protostracum on the summit of the prodissoconch. The Glochidium stage in Unionidæ is its equivalent.

¹ *Compt. Rend. Acad. Sci. Paris*, Vol. 124, p. 1165; *Natural Science*, July, 1897, p. 10.

A CLASSIFIED CATALOGUE OF AMERICAN LAND SHELLS, WITH
LOCALITIES.

BY HENRY A. PILSBRY.

Almost a decade has elapsed since the publication of the "Check List of American Land Shells" (Proc. Acad. N. S. Phila., 1889), and the frequent calls for copies of that list since the reprint edition was exhausted, as well as the progress of the science during that period, have induced the editors of THE NAUTILUS to offer a new list covering the same ground.

In the nomenclature of this list we have admitted changes shown to be necessary; and in the classification have frequently forsaken the old roads for paths lately "blazed out," and as yet not much travelled.

Additions and corrections of any kind will be gratefully received.

Class GASTROPODA.

Subclass STREPTONEURA.

Order PROSOBRANCHIATA.

Suborder *Tænioglossa*.

Family CYCLOSTOMATIDÆ.

Genus CHOANOPOMA Pfeiffer, 1847.

Subgenus *Ctenopoma* Shuttleworth, Pfr., 1856.

1. CHOANOPOMA BAHAMENSE Shuttl. Key West, Fla. (Dr. W. H. Rush). Also Bahamas.

Genus CHONDROPOMA Pfeiffer, 1847.

2. CHONDROPOMA DENTATUM (Say). Key West and Naples, near Gordon's Pass, Fla. Also Cuba.

Family TRUNCATELLIDÆ.

Genus TRUNCATELLA Risso, 1826.

3. TRUNCATELLA CARIBEENSIS 'Sowb.' Rve. Key Largo and Anclote Key, Fla. Also West Indies.

4. TRUNCATELLA CARIBEENSIS PULCHELLA Pfr. Marco and Cedar Keys, Fla. Also Bermuda, Cuba, Yucatan, etc.

5. TRUNCATELLA BILABIATA Pfr. Key West, Key Largo, Biscayne Bay, Micco, Indian River, Furguson's Pass, Marco, Cedar Keys, Fla. Also Bermuda, Cuba, etc.

6. TRUNCATELLA STIMPSONI Stearns. False Bay, near San Diego, California.

7. TRUNCATELLA CALIFORNICA Pfr. San Diego, California.

[Note.—*T. subcylindrica* "Gray" has been reported from Florida. The identity of the species is doubtful, and the occurrence in Florida of the form so-called by Pfeiffer, equally so].

Suborder *Rhipidoglossa*.

Family HELICINIDÆ.

Genus **HELICINA** Lamarck, 1801.

8. HELICINA CHRYSOCHEILA Binney. Texas, near mouth of the Rio Grande. Also State of Tamaulipas, Mexico.

9. HELICINA ORBICULATA Say. St. Simon's I., Ga., Chattanooga, Tenn., Eureka Springs, Ark., Stone Co., Mo., southward to southern Florida, and southwest to the Rio Grande; type locality near mouth of the St. John's River, Florida. [*H. Hanleyana* Pfr. is a synonym].

9a. HELICINA ORBICULATA TROPICA 'Jan' Pfr. Texas, mainly south and southwest. An ill defined race.

10. HELICINA OCCULTA Say. Western Pa. to Minn., south to Tenn. Distribution markedly discontinuous and local. Allegheny Co., Pa.; Athens, Ill.; near Iowa City and Eldora, Iowa; Winona, Minn.; Sheboygan, Whitefish Bay near Milwaukee, and near Du Pere, Wis.; Lexington and at Natural Bridge, Va.; Harriman and South Pittsburg, Tenn. An abundant fossil of the Post-Pliocene Loess formation in eastern and central Iowa, the adjacent parts of Ill., western Ia. and E. Neb.; also fossil at New Harmony, Ind., the type locality.

[Note.—*H. subglobulosa* Poey, a Cuban species introduced into United States works on the evidence of specimens found at Key Biscayne and Fort Dallas, Fla., many years ago, has not yet been shown to be actually living in Florida].

Subclass EUTHYNEURA.

Order PULMONATA.

Suborder *Stylommatophora*.

(Superfamily *HOLOPODA*).Family **HELICIDÆ**.Subfamily **Helicinæ** (*vel Belogona*).

(Belogona Siphonadenia).

Genus **HELIX** Linné, 1758.Section *Helicogena* Férussac.

11. **HELIX ASPERSA** Müll. Charleston, S. C.; New Orleans; Santa Barbara, Santa Clara and San Jose, Cal. Imported from Europe.

Section *Tachea* 'Leach,' Turton, 1831.

12. **HELIX NEMORALIS** Linn. Burlington, N. J.; Lexington, Va.; ? Baraboo, Sauk Co., Wis. Imported from northern Europe.

13. **HELIX HORTENSIS** Müll. Labrador; Anticosti I.; Barachois, Gaspé region; Nova Scotia; Casco Bay, Me.: Eagle, House, Kettle, and Nantucket Is., Mass.; also New Bedford, Marblehead, Manchester and Magnolia, Mass.

Genus **HYGROMIA** Risso, 1826.Section *Fruticicola* Held, 1837.

14. **HYGROMIA HISPIDA** (L.). Halifax, N. S.; Montreal. A species of northern Europe, imported.

15. **HYGROMIA RUFESCENS** (Penn.). Quebec and Levis, Quebec, Canada. A species of northern Europe, imported.

Genus **HELICELLA** Férussac.Section *Trochula* Schlüter, 1838.

16. **HELICELLA TERRESTRIS** (Penn.). Charleston, S. C. A native of southern Europe.

Subgenus *Cochlicella* Risso, 1826.

17. **HELICELLA VENTRICOSA** (Drap.). Sullivan's I., S. C. Imported from Europe.

Subgenus *Theba* Risso, 1826.

18. **HELICELLA CANTIANA** (Montagu). Quebec. A native of northern and central Europe.

(Belogona Euadenia).

Genus **GLYPTOSTOMA** Bland & Binney, 1873.

19. **GLYPTOSTOMA NEWBERRYANUM** (W. G. Binn.). Los Angeles, Cal., to Todos Santos Bay, Lower Cal., and about 40 miles inland.

Genus **LYSINOE** H. & A. Adams, 1855.

20. **LYSINOE HUMBOLDTIANA** (Val.). Altuda, Texas. Also Mexico.

Genus **EPIPHRAGMOPHORA** Doring, 1875.Subgenus *Monadenia* Pilsbry, 1895.

21. **EPIPHRAGMOPHORA FIDELIS** (Gray). Humboldt and Shasta Co., Cal., to Vancouver I.

21a. **EPIPHRAGMOPHORA FIDELIS**, *f. flava* Hemph.21b. **EPIPHRAGMOPHORA FIDELIS** *f. minor*.

21c. **EPIPHRAGMOPHORA FIDELIS SUBCARINATA** Hemph. Humboldt Co., Cal. This is directly intermediate between *fidelis* and *infumata*.

21d. **EPIPHRAGMOPHORA FIDELIS INFUMATA** (Gld.). Coast counties of Cal. from Siskiyou to Alameda.

22. **EPIPHRAGMOPHORA MORMONUM** (Pfr.) Shasta Co. to Tulare and Santa Barbara Co., Cal.

23. **EPIPHRAGMOPHORA HILLEBRANDI** (Newc.) Calaveras, Tuolumne and Mariposa Cos., Cal.

24. **EPIPHRAGMOPHORA CIRCUMCARINATA** (Stearns). Near Turloch, Stanislaus Co., Cal.

Subgenus *Helminthoglypta* Ancey.

25. **EPIPHRAGMOPHORA DUPETITHOUARSI** (Desh.). Monterey, Cal.

26. **EPIPHRAGMOPHORA SEQUOICOLA** (Coop.). Santa Cruz Co., Cal.

27. **EPIPHRAGMOPHORA AYRESIANA** (Newc.). Santa Cruz, San Miguel, San Clemente and Santa Rosa Islands.

28. **EPIPHRAGMOPHORA TRASKI** (Newc.). Los Angeles to Ft. Tejon and to San Luis Obispo, Cal.

28a. **EPIPHRAGMOPHORA TRASKI PROLES** Hemphill. Fraser's Mills, Tulare Co., Cal.

(To be Continued.)

THE NAUTILUS.

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No. 5.

BOLINAS, CALIFORNIA; THE CONCHOLOGISTS PARADISE.

BY WILLIARD M. WOOD.

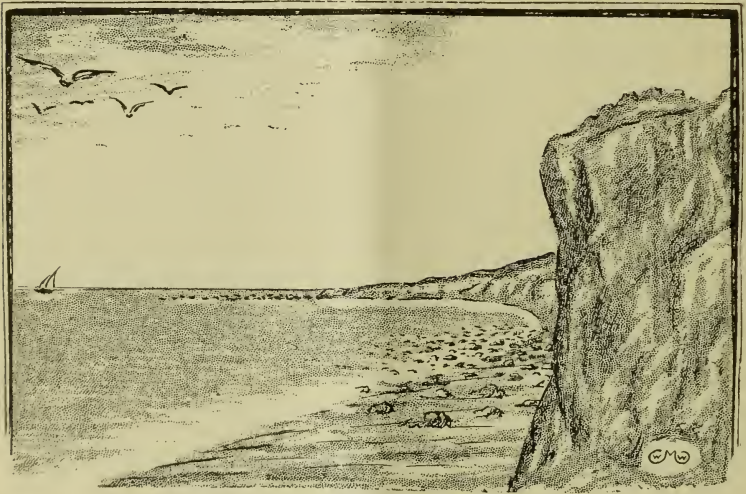
Aqui estoy otravez!

Once more I have reached the rocky shores of dear old historic Bolinas. I could never tear myself from this antique Spanish town by the Ocean. How I love to hear the mighty waves beat wildly against the solid rocks, and see the lofty yellow bluffs which rise so majestically from Neptune's enchanting home.

Annually, during the summer months, I find that I am—like the proverbial Snail, wending my way, through exquisite redwood forests and inhaling the salubrious mountain air. The point of destination is always Bolinas. Bolinas, thou art and ever shall be my Mecca.

This year, Mr. George E. Townsend and the writer concluded to pitch tent and camp upon one of the smaller bluffs, by the side of a delightful rippling creek, within a stone's throw of the beach which is used for bathing purposes, in lieu of making the hotel our headquarters during our stay. We also decided to "tramp it," and as each possessed a good pair of strong limbs, the start was made from San Anselmo Station, Marin County. The distance from the station to Bolinas is estimated at about twenty miles. Ten miles of this number is entirely devoted to up hill climbing, and so steep, that in portions where there is no shelter from the sun as it sends forth its penetrating rays, one becomes quite exhausted, especially when one is principally confined in a down town office, pondering over innumerable books and papers, and not used to mountain climbing.

While going toward the "Summit," how truly beautiful were the rustic wooden bridges over which we passed, and the cool-looking, shaded, rainbow-tinted and trout laden streams. How the saucy big blue-jays scolded when we ventured too close to their nesting places! Then there were numerous tiny golden-breasted wild canaries; how beautifully they did sing! The peacock-green throated humming-birds were busy flying hither and thither, abstracting the honey from the delicately scented flowers. Cotton-tails would occasionally be seen running frantically across the broad road and hiding among the heavy brush, so that they would not fall victims to the many hawks and red-necked buzzards which appear at all times to hover overhead.



The beach, bluffs and Duxbury Reef.

Several times we came across a flock of mountain quail. The minute we were observed by them, they would take to the wing. The noise caused by their flying resembled greatly an immense buzz saw revolving with great rapidity and cutting through heavy timber.

When we reached "the ridge," we were rewarded by a superb view of the surrounding country. Not a particle of fog was within sight. The atmosphere was as clear as crystal. The view covered an expanse of scenery which could not be emulated for picturesque variety. Mountains, forests, lakes, valleys, rocks, straits and capes, cities, towns and villages spread themselves in a magnificent panorama.

The ten mile descent of the mountain on its western side was comparatively easy as the road was in excellent condition. The weather has been delightful since we have been here and trust that it will continue so throughout our stay.

Although the ground on the mountain's side was quite dry, careful searching with the aid of a short limb of a tree, raking deeply among the fallen leaves, revealed to us, quantities of the following Helicis, all with the living animal within.

Helix arrosa, *nickliniana*, *Polygyra armigera* and *Selenites vancouverensis*. No fresh-water shells were found in the streams and pools on the way over. In fact, I do not believe there are any in the vicinity of this place, for I have been unable to secure a single specimen during the past six years.

The tides so far, have been very good and several species have been added to my collection, which are entirely new to me.

The beach from the bluffs near the channel (entrance to the Bay of Bolinas) out to the dangerous reef—Duxbury reef—is at intervals composed of billions of particles of shells, ground so fine that the casual observer would naturally suppose they were grains of sand. Certain spots I have seen on the beach are almost wholly composed of these diminutive bits to a depth of about five or six inches.

The reef upon which I had formerly seen attached thousands of immense *Chlorostoma funebre* and fairly good sized *Chrysodomus dirus* are now almost destitute of the above named species. The reason of their disappearance is unknown to me. The species observed attached to the rocks and the blue clay at the present date are *Monoceros engonatum* and *Litorina scutulata*. *M. engonatum* predominating. Of *Chlorostoma brunneum*, I have gathered hundreds at previous visits, from a point just a short distance from the reef in a north-westerly direction. Not one in a living state have I found since arriving.

Strolling up the sandy beach in the early morning, (4.30) until we reached the stretch of mossy rocks which had been left bare by the retreating tide, we secured dozens of the common edible clam, *Tapes staminea*, which is sold by the sackful in the markets of San Francisco. These were brought back to our camp and served at breakfast.

The Bay of Bolinas, which at one time was quite commodious, is now almost completely filled with sand and mud. The channel, no

doubt will soon be closed and not even the smallest boat will be able to enter this once beautifully situated bay.

When low tide occurs in the bay, the "necks" of thousands of *Schizothærus Nuttalli* may be seen projecting an inch or so out of the gray mud. Although the shells themselves are buried quite deeply under the surface, it is with difficulty that these huge specimens may be obtained. Think of gathering clams almost the size of dinner plates. We managed to secure several splendid specimens. The "necks" when fully extended are about three feet long. It requires several persons with rubber boots, shovels and pails to "catch" one, as they will withdraw their "necks" quickly and bury themselves out of view and reach, if disturbed. The strength of one person is required to hold the neck on the surface while another person digs around it and bails out the fast in-coming mud and water. It is indeed hard work to capture one of them, but well worth the trouble and time spent over them.

The Bay also produces thousands of dead, yet fresh-looking specimens of *Macoma secta*. These are found either upon the surface or an inch or two below, imbedded in the soft mud. Hundreds were secured and after having given them a thorough washing, they were packed away carefully in cotton batting.

Living *Cryptomya californica* in considerable numbers seem to be washed upon the mud flats. They range in size from a pin head to a quarter of a dollar.

When low tide occurs at the reef, one may dig in the clay for borers and be rewarded with several species. The clay is fairly alive with them.

Occasionally I have found cast up on the beach by the waters, fine examples of that immense "rock oyster" *Hinnites giganteus*. Several contained the living animal. One specimen picked up measures almost ten inches in diameter. Who says we do not have large oysters! The beach is covered with great numbers of worn valves. The young shells are easily mistaken for *Pecten hastatus* and I have often been fooled in this respect. Fresh, full grown specimens are very hard to obtain.

What do you suppose to-day—the glorious fourth of July—brought forth? Two most interesting species that I have found up to date. I had not searched for these and they were entirely a surprise to me. Doubly welcome are my new friends on this day. We were sitting lazily upon the pebbly beach watching the waves as

they washed upon the shore. Suddenly a larger wave than those which I had been accustomed to see, rushed forward and with a mighty splash, broke within a few feet of us. The water and foam crept so quickly in our direction that my shoes were soon filled with the cold sea-water. With a quick spring, I was upon my feet and hurrying from the scene of the unfortunate event. When returning to the spot where we had left a stick half buried in the sand, I came across unexpectedly two valves of *Semele rubrolineata* and a most delicate and perfect fresh-looking specimen of *Mytilimeria Nuttalli* Conr.

How truly patriotic were the little shells to come and cast themselves at my very feet, upon this eventful day. The rose colored radiations on the *Semele* were beautiful and looked like many sky-rockets going heavenward.

Among the species collected which are not mentioned above, are as follows :

Acmæa asmi, mitra, patina, pelta, persona, spectrum, incessa, instabilis, Adula falcata, stylina, Amphissa corrugata, Amycla carinata, Bittium filosum, Calliostoma costatum, Cardium corbis, Cerosoma foliatum, Chama pellucida, (valves only) Chlorostoma montereyi, Pfeifferi, ? Crepidula adunca, navicelloides, Entodesma saxicola, Lithophagus plumula, Fissuridea aspera, Haliotis fulgens, (large but poor specimens, washed ashore) Hipponyx tumens, Kellia Laperousii, var. Chironii, Lacuna unifasciata, Lазaria subquadrata, (valves), Litorina planaxis. Lunatia Lewisii, (half a foot in length) Lyonsia Californica, Macoma nasuta, inquinata, Siliqua patula, Mytilus Californianus, Nassa fossata, Cooperi, Margarita pupilla, Ocinebra lurida, interfossa, Olivella biplicata, Petricola carditoides, Pecten hastatus, (valves) Pholadidea penita, parva, Platyodon cancellatus, Parapholas californica, Placunanomia macroschisma, (valves) Purpura crispata, lima, saxicola, ostrina, Saxicava arctica, Saxidomus aratus, Tapes staminea, tenerrima, rudrata, Tellina Bodegensis, (valves) Zirphæa crispata, Cryptochiton Stelleri, (seven inches long) Ischnochiton Cooperi, Mopalia Hindsii and muscosa.

I have not gone carefully over the species collected—doubtless many others might be included in this list—but the above will serve to show the rich molluscan fauna of this certainly delightful peninsula. The territory worked over by me cannot be more than four miles square. The specimens collected already number many thousands and the rate at which they are being gathered, who knows but

it shall require the chartering of the small schooner now lying in the channel, to carry them down to the City!

Deseo que el lugar que ha sieto tan atractivo y productivo en lo pasado para el que se suscribe para siempre permanetea inmutable.
Bolinas, Cal., July 4th.

NOTE ON A CALIFORNIAN HELIX.

BY HENRY A. PILSBRY.

In the "Manual of American Land Shells" Mr. Binney figured a shell from San Pablo as a form of "*Arionta californiensis* var. *ramentosa* Gld." It would seem that the same form has been subsequently described by both Dall and myself, although until recently collating materials for the new catalogue of U. S. land shells, I had entirely forgotten that I had ever noticed the form in question. The published references are as follows:

- 1885.—"A smaller form of this variety [*i. e. ramentosa*] from San Pablo," W. G. Binney, Man. Amer. L. Sh., Bull. 28 U. S. Nat. Mus., p. 133, f. 108 (no description).
1895, Feb. 2.—*Epiphragmophora californiensis* v. *contracostæ* Pilsbry, Guide to the Study of Helices, Man. Conch. (2), IX, p. 199 (a nude name).
1895, Oct. 1.—*Epiphragmophora californiensis* var. *contracostæ* Pilsbry, Nautilus IX, p. 72 (description).
1896, Apr. 23.—*Epiphragmophora Arnheimi* Dall, Proc. U. S. Nat. Mus. XVIII, p. 6 (no description; refers to Binney's figures).
1897, Jan.—*Epiphragmophora Arnheimi* Dall, Proc. U. S. N. M. XIX, p. 375 (full description).

As will be seen from the above, the form was recognized by myself in 1894 when reviewing the Helices for the "Guide" but the number in which the name appears although printed in 1894, was not issued until February, 1895, and it was in no way defined at that time; the brief diagnosis then prepared being overlooked for some months, finally appearing in October, 1895. I do not know when the form was first recognized by my friend in Washington, but from the notorious tardiness of the Proceedings of the Nat. Mus., and the fact that a partial abstract of Dall's article appeared in NAUTILUS for Sept., 1895, and was furnished by him a month or two

earlier, it is likely that Prof. Dall recognized the form after the publication of the nude name in *Man. Conch.*, but before it was scantily clothed with a description in the October *NAUTILUS*.

Dall's first notice of the form referred merely to Binney's figures; but lately he has given an account of it which leaves nothing to be desired save an equally good notice of the soft anatomy.

NEW UNIOS.

BY BERLIN H. WRIGHT.

Unio Buxtoni sp. nov.

Shell very transverse or wide, subcylindrical, moderately and uniformly inflated, subsolid, bluntly pointed and attenuated behind, obliquely rounded in front and straight on the dorsum. Epidermis olive-black and obscurely rayed throughout. Growth lines obscure. Umbos depressed. Beaks pointed and very small, with two or three distant, nodose undulations. Umbonal ridge rounded or subangular. Beak cavities slight; cavity of valves ample. Lateral teeth straight, slender, thin and long, the inner one thicker and higher, and both extending to the cardinals, which are erect, short, with many curved ridgelets on the upper faces, double in the left and single in the right valves. Cicatrices slightly impressed but well defined, the anterior ones distinct, the smaller ones being crescent-shaped, which divides occasionally into *two* separate pits; posterior ones confluent and much elongated; dorsal ones well impressed and in the beak cavity. Pallial line distinct, at which the coruscations end. Nacre uniform and of a brilliant copper tint. Width $2\frac{1}{2}$ inches, length $\frac{3}{4}$ inch, diameter $\frac{5}{8}$ inch.

Habitat.—Lakelets of Marion Co., Florida.

Type in National Museum.

Remarks.—Affinity, *U. Waltoni* B. H. Wright, and *U. nasutulus* Lea. From the former it differs in being smaller, more solid, cylindrical, darker colored, more prominent umbonal ridge, not sub-emarginate at base, and in having a more prolonged dorsal line behind. Behind, and in size and structure, it reminds one of *U. nasutulus*, which never has an upturned keel in front as in our shell, and has a livid nacre.

We have great pleasure in naming this species for our good friend and naturalist, Mr. William W. Buxton, of Milo Centre, N. Y., whose company has so often enlivened our collecting excursions.

Unio Suttoni sp. nov.

Shell oblong, roughened by growth lines and solid, sides dilated almost to the extremities, and slightly constricted near the middle of the base. Base slightly convex or submarginate, bluntly pointed behind and very abruptly rounded or subtruncate before and slightly arched above. Epidermis reddish or pale olive, with *very* obscure rays or rayless, slightly wrinkled on the posterior dorsal area or smooth. Beaks depressed and umbos flattened or slightly rounded. Umbonal ridge obtusely rounded and elevated from beak to base. Cavity of the shell ample and quite uniform; cavity of beaks slight. Nacre heavy, and varying from satin white to dark copper color, and slightly thinner behind. Cardinal teeth erect, somewhat compressed and bluntly notched. Lateral teeth long and slightly curved, rather slender and compressed. Width $2\frac{1}{4}$ inches, length $1\frac{1}{8}$ inches, diameter $\frac{3}{4}$ inch.

Habitat.—Lake near Candler, Marion Co., Florida.

Type and forms in National Museum.

Remarks.—This is an exceedingly variable species like the type of the group to which it belongs, *U. Buckleyi* Lea. It may always be distinguished from that species by the greater fullness in the posterior portion, and has a slight constriction where that is usually enlarged. It may be distinguished from *U. Ferrissii* Marsh, by its greater and more uniform inflation, straighter base, more obtuse umbonal angle, and is in every way a more massive shell. Fifty specimens have been received from Mr. B. Sutton, of Candler, Marion Co., Florida, for whom we name the species.

ISAAC LEA DEPARTMENT.

[Conducted in the interest of the Isaac Lea Conchological Chapter of the Agassiz Association by its General Secretary, Mrs. M. Burton Williamson.]

After the General Secretary had forwarded the MS. for THE NAUTILUS for August, she received a letter from Mr. A. H. Gardner notifying her *in re* the vol. of Transactions. Mr. J. J. White, and Mr. M. Leon Walker have also reported. At this writing Aug. 10 the vol. is in Mass. The Secretary appreciates the notification when the book has been forwarded.

It is not too early to canvass for our next General Secretary. The present one would nominate Dr. W. S. Strode, Lewiston, Ill. for General Secretary for 1898. Dr. Strode has been a valued member for years.

PURPURA LAPILLUS L.

(Extract from the report of Mrs. D. J. Wentworth. From the Transactions of the Isaac Lea Chapter for 1896.)

No shell is more common on our New England shores than *Purpura lapillus* Linné, and yet, no shell of this region has to me, at least, so much of interest connected with it.

Purpura lapillus is an humble but most worthy descendant of the aristocratic Muricidæ, and surely the Murex is an aristocrat among shells, with its beautiful forms, dainty sculpturing, delicate coloring, and its long traditions of usefulness and importance.

Plain in its general aspect, as it certainly is, *Purpura lapillus* has nevertheless, much in common with its more highly favored relations. It is an old member of an ancient race, fossil remains of *Purpura lapillus* are found in the Red Crag deposits of Europe.

This species is remarkable for its variation in solidity of shell, form, sculpture size, coloring and habitat. It varies in thickness from three-sixteenths of an inch to a shell so thin one could easily perforate the outer lip with a pin. In form they vary from a short broad shell with obtuse spire and flattened whorls to a long shell with acute spire and convex whorls,

In some the coarse revolving ridges are barely discernable, while in others they are very prominent. The faint lines of growth which intersect the revolving ridges of this shell are, in some specimens, brought into marked prominence by rows of ruffles or scallops, and this sculpturing undoubtedly gave Lamarck reason for naming this variety *Purpura umbilicata*. Many of the solid shells have rows of nodules or teeth within the aperture on the outer lip,

These solid shells are usually grayish-white or white outside, with reddish-purple, yellow or white apertures; but the thinner shells are often brown, orange or lavender, and these colors are frequently banded with white. I have never seen two specimens banded just alike. The orange and white combinations are especially pretty. The variety called by Lamarck *P. umbilicata*, so far as I have observed, are always a greyish-white on the outside, with a reddish-purple aperture. This variety I have found only in a brackish river where they are often seen crawling about in the mud, and their color is so nearly the color of the mud on which they are found that it undoubtedly serves to protect them from the ravages of their enemy. Associated in this river with *Purpura lapillus*, and much resembling it in size, color and general shape, is the *Urosalpinx cinerea*. The usual habitat of the *Purpura* is in the nooks and crevices of rocks. Why do these river shells choose the mud?

Purpura lapillus is an arctic species and ranges from Norway to New York. It is found on the coast of Europe, where, according to Sowerby, it grows much larger than on our own coast.

This species confines his daily rambles to that part of the shores left bare by the tides, seldom venturing below low water mark. There on the rocks or other hard substances he finds his favorite food, the succulent barnacle, sometimes varying his diet with a choice bit of *Mytilus edulis*, to obtain which he will bore through the shell. Finally the mussel becomes so weakened that its valves fly open, when the *Purpura* promptly accepts the more favorable opening and proceeds to gorge himself with the delicious morsel, after which he will lie inactive waiting for a return of appetite. Limpets, Littorinas, clams, mussels, etc., are said to find a place on his menu.

From time to time throughout the year the *Purpura* deposits its eggs enclosed in little vase like capsules. These capsules may be found in clusters attached to the undersides of rocks. In confinement it takes about four months for these eggs to mature and then the young do not immediately leave the capsule, seemingly preferring to try their strength a little before venturing on the broad ocean. The young hatched in captivity instinctively leave the water every day, remaining out about the time it takes for the tide to ebb and flow.

A few years ago while fishing I had occasion to crack some *Purpura* for bait. After cracking their shells I placed the snails in my handkerchief to keep them safely until needed. I soon found that the snails had stained my handkerchief with bright purple spots which repeated washings only served to render more brilliant. Thus I was reminded of the Tyrian purple of the ancients, and led to fancy that perhaps in a somewhat similar manner, the dye was discovered. In later years this dye was manufactured in Ireland but so little was obtained from each animal, and other cheaper dyes being discovered, our humble shell-fish were left to die a natural death, and are now useful only to amateur fishermen and so-called "queer people," or "cranks" who go around collecting shells and studying them.

Purpura lapillus commonly called "dog winkle" by the English, has many scientific names, among which are *Buccinum lapillus*, *Tritonium lapillus*, etc. But what is a name? The *Purpura lapillus* under whatever name he has crawled or sailed has a long, interesting honorable history; has during his day and generation been useful and ornamental in the world, doing his duty faithfully according to the light given him and making no pretensions to superiority, and who of us can do better than that?

28b. *EPIPHRAGMOPHORA TRASKI CUYAMACENSIS* Hemp. Cuyamaca Mt., San Diego Co.

28c. *EPIPHRAGMOPHORA TRASKI TULARENSIS* Pilsbry. Fraser's Mills, Tulare Co.

29. *EPIPHRAGMOPHORA CARPENTERI* (Newc.). Coronado Is., and vicinity of San Diego, Cal. Probably a subspecies of *E. traski*. Original locality, "Tulare Valley," perhaps erroneous.

30. *EPIPHRAGMOPHORA INDOENSIS* (Yates). Indio, Riverside Co., Cal.

31. *EPIPHRAGMOPHORA ROWELLII* (Newc.). Fort Grant, Arizona.

32. *EPIPHRAGMOPHORA ARIZONENSIS* Dall. Banks of Santa Cruz River, Tucson, Arizona.

33. *EPIPHRAGMOPHORA MAGDALENENSIS* (Stearns). Johnson Canyon, near the Panamint Valley, and near Resting Springs, Southern California. Also State of Sonora, Mexico.

34. *EPIPHRAGMOPHORA HACHITANA* Dall. Fort Huachuca, Huachuca Mts. and Tucson, Arizona; below San Quentin, Lower California; Peloncello Mts., top of Hachita Grande Mt., Grant Co., near Carrizollilo Springs, New Mexico; and at some adjacent localities south of the international boundary.

35. *EPIPHRAGMOPHORA COLORADOENSIS* (Stearns). Grand Canyon of the Colorado River, Arizona, opposite the Kaibab plateau, elevation 3,500 feet; also Inyo and San Diego Cos., Cal.

36. *EPIPHRAGMOPHORA ARROSA* (Gld.). Coast counties from Humboldt to Santa Cruz.

36a. *EPIPHRAGMOPHORA ARROSA f. holderiana* Cooper. E. side San Francisco Bay.

36b. *EPIPHRAGMOPHORA ARROSA f. stiversiana* Cooper. Marin Co.

36c. *EPIPHRAGMOPHORA ARROSA f. marinensis* Pils. Marin Co.

36d. *EPIPHRAGMOPHORA ARROSA EXPANSILABRIS* Pils. Humboldt Co., near Eureka.

37. *EPIPHRAGMOPHORA EXARATA* (Pfr.). Santa Cruz Co. to Marin Co., Cal. Probably intergrades completely with the preceding.

38. *EPIPHRAGMOPHORA CONTRACOSTÆ* Pilsbry. Byron Hot Springs, San Pablo, and Pt. Isabel, Contra Costa Co.; Nachogueno Valley. (*Epiphragmophora Arnheimi* Dall is the same).

39. *EPIPHRAGMOPHORA CALIFORNIENSIS* (Lea). Monterey, Cal.

39a. *EPIPHRAGMOPHORA CALIFORNIENSIS NICKLINIANA* (Lea). Santa Cruz Co., north (? to Mendocino Co.).

39b. EPIPHRAGMOPHORA CALIFORNIENSIS ANACHORETA (W. G. B.).

39c. EPIPHRAGMOPHORA CALIFORNIENSIS RAMENTOSA (Gld.). Napa Co. to Santa Clara Co.

39d. EPIPHRAGMOPHORA CALIFORNIENSIS BRIDGESI (Newc.). San Pablo.

39e. EPIPHRAGMOPHORA CALIFORNIENSIS DIABLOENSIS (J. G. Coop.). San Francisco to Yolo Co.

40. EPIPHRAGMOPHORA TUDICULATA (Binn.). Tulare Co., (typical form).

40a. EPIPHRAGMOPHORA TUDICULATA CYPREOPHILA (Newc.). Calaveras, Tuolumne, Merced, Tulare and Los Angeles Cos.

40b. EPIPHRAGMOPHORA TUDICULATA SUBDOLUS Hemph. San Jacinto Valley, San Diego Co.

40c. EPIPHRAGMOPHORA TUDICULATA UMBILICATA Pils. San Luis Obispo Co.

40d. EPIPHRAGMOPHORA TUDICULATA TULARENSIS Hemph. Fraser's Mills, Tulare Co.

Subgenus *Micrarionta* Ancey, 1880.

41. EPIPHRAGMOPHORA GABBI (Newc.). San Clemente Island.

41a. EPIPHRAGMOPHORA GABBI FACTA (Newc.). Santa Barbara and San Nicholas Is.

42. EPIPHRAGMOPHORA RUFICINCTA (Newc.). Santa Catalina Island.

43. EPIPHRAGMOPHORA INTERCISA (W. G. B.). San Clemente and Santa Cruz Is. Forms *minor*, *elegans*, *nepos* and *albida* Hemph. and *callojunctis* Pils. have been named.

43a. EPIPHRAGMOPHORA INTERCISA REDIMITA (W. G. B.). San Clemente Is. Color varieties *castanea* and *hybrida* Hemph. have been named.

44. EPIPHRAGMOPHORA KELLETTII (Forbes). Santa Catalina Island. Color forms *castanea*, *nitida*, *multilineata*, *frater*, *californica*, *forbesi*, *bicolor*, *tricolor*, *albida* Hemph. have been named.

44a. EPIPHRAGMOPHORA KELLETTII STEARNSIANA (Gabb.). San Diego, southward, on the mainland.

45. EPIPHRAGMOPHORA TRYONI (Newc.). Santa Barbara and San Nicholas Is. Color varieties *varius*, *nebulosa*, *fasciata*, *californica* and *albida* Hemphill.

45a. EPIPHRAGMOPHORA TRYONISUBCARINATA Hemphill. Santa Barbara I.; fossil.

(To be Continued.)

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No. 6.

NEW LAND SHELLS FROM MEXICO AND NEW MEXICO.

BY W. H. DALL.

Holospira (*Haplostemma*) *Cockerelli* n. sp.

Shell small, pupiform, blunt-tipped, with two smooth nuclear and about a dozen subsequent whorls; those following the nucleus are rather strongly obliquely ribbed with close set fine riblets which become fainter over the main body of the spire and reappear again on the last whorl; aperture entire, simple, rounded, but a little angular at the posterior outer corner; the umbilicus closed, the spire gradually enlarging to the eleventh whorl, then slightly attenuated. Alt. 12·5, max. diam. 3·2 mm.

Found in the débris of the Rio Grande at Mesilla, New Mexico, by Prof. Cockerell.

This is the second species of *Haplostemma*, and one of the smallest, if not the smallest, *Holospira* yet recorded. It forms an addition to the fauna of the United States.

Eucalodium hippocastaneum n. sp.

Shell of moderate size, with 8 (decollate) whorls, the penultimate the largest, thence gently tapering to the decollate apex; surface very dark chestnut brown covered with fine, slightly wavy, close set riblets accompanied by fine axial wrinkles near the sutures, a few irregular spiral threads occasionally appear, suture distinct, umbilicus closed, a faint keel below the periphery of the last whorl, aperture simple, rounded, the peristome slightly thickened, not reflected. Alt. 32, max. diam. 9·2, aperture 8 mm.

The species is near *E. Boucardii* Sallé from Cordova, but differs by smaller size, darker color, less sharp sculpture and the presence of spiral lines.

From San Sebastian, Jalisco, Mex., E. W. Nelson.

Coelocentrum astrophorea n. sp.

Shell pale yellow brown, decollate, with 15 remaining whorls, the first six of which taper, while the rest are subequal; suture distinct minutely channelled, or with a sharp edged thread on each side of it, surface polished with concavely flexuous small ribs with wider interspaces, on which is visible obscure spiral striation; last whorl keeled below, projecting, aperture rounded triangular, slightly reflected, simple; axis large, pervious except at the base; within the whorl with a medial keel on each side of which it is excavated and vertically ribbed, while from the junction of keel and ribs small spines like the rays of a star project into the lumen of the whorl. Alt. 30, max. diam. 7, aperture 4·7 mm.

From Encarnacion, Hidalgo, Mex., E. W. Nelson.

Though the spines are obviously merely an evolution from the usual nodes, they are remarkable and hitherto unrecorded in any species.

Schazicheila hidalgoana n. sp.

Shell trochoid depressed with a rather pointed spire and nearly five whorls; white with extremely fine close-set rounded riblets in harmony with the lines of growth; nucleus rounded, smooth; suture very distinct, slope of the spire flattened a little, periphery obscurely keeled; aperture rounded-triangular, outer lip reflected with a shallow sinus at its posterior extremity, rounded below with a thick body callus (on which is a keel for the edge of the operculum) uniting the lips; umbilicus covered by a thin callus, base moderately rounded; operculum (lost)? Alt. 8·5, mag. diam. 12, min. diam. 9·5, aperture 6 mm.

Found at Encarnacion, Hidalgo, Mex., by Nelson.

This species is obviously distinct from any of those heretofore described in this very limited genus.

ON TWO NEW SPECIES OF AMPHIDROMUS.

BY C. F. ANCEY.

Amphidromus Fultoni Anc.

Shell sinistral, short, ovate-conic, minutely perforate, thin, obliquely striate, subangulate at the periphery, chiefly at the begin-

ning of the last whorl. Spire rather briefly conic, apex dark brown; whorls 6, the first ones distinctly, the last barely, convex; apical whorls white, lower of a pale lemon color; the third ornamented with two faint series of pale brownish and very small spots; the last with a narrow yellow zone below the suture, circumscribed by an indistinct, broad, white band, and furnished with two fine brown revolving lines more or less evanescent towards the aperture, the upper one at the periphery, the other around the yellow umbilical area. Aperture oblique; columella straight, thin, expanded, white. Lip thin, white, slightly expanded.

Length $23\frac{1}{2}$, diam. 14, length of aperture 11 mill.

Locality: Cochinchina.

This, as well as the following, are members of the group of *A. flavus* Pfeiffer, according to Mr. Hugh Fulton, who kindly examined the specimens and declared them to be new species. From the former it differs in being shorter, in having 6 whorls only, a dark colored apex, two narrow revolving bands on the last whorl, and other particulars. Named in honor of Mr. Fulton, who has very thoroughly and carefully monographed this difficult genus.

Amphidromus Eudeli Anc.

Shell sinistral, rather solid, oblong-conic, obliquely striate, narrowly rimate; spire conic, apex dark brown; whorls 7, convex, the first ones dull white, the fourth and lower ones cream, with oblique bluish-gray stripes, interrupted at the middle on the penultimate and preceding whorls, and evanescent at the suture; last half whorl bluish-gray, with a cream-yellow band and umbilical area of the same tinge; a narrow infra-sutural line of a reddish-brown color on the last and penultimate whorls. Aperture small, oblique, expanded, interior grayish. Columella thick, reflected, paler at the upper part. Lip thickened, dark brown externally, purple inside, particularly so near the umbilicus.

Length 28, diam. 14, length of aperture 11 mill.

Locality: near Binh-Dinh, Annam, in forests (E. Eudel).

This is allied to *A. zebrinus* Pfeiffer, from Siam, but is apparently larger and more solid, and differs in having a purple peristome; externally black-brown, and several striking characters.

NEW SPECIES OF TERTIARY MOLLUSCA FROM VANCOUVER ISLAND.

BY JOHN C. MERRIAM.

The species here described have already been mentioned by the author as being new forms in a short paper¹ on the age and general character of two Tertiary faunas from the southern coast of Vancouver Island.

These faunas were referred to two horizons occurring at different localities, one at Carmanah Point at the entrance to the Strait of Fuca, the other near Muir and Coal Creeks in the Sooke district. The horizon at the first-named locality was temporarily designated as the Carmanah Point beds, and is correlated with Conrad's Astoria Miocene, excluding the lower portion of his series which has been supposed to be Eocene. The second horizon was named the *Sooke beds*, and is, as nearly as can be determined from the study of the known fauna, of *Middle Neocene* age.

The material on which the descriptions are based was collected by Dr. C. F. Newcombe, of Victoria, B. C., who has kindly permitted the author to study the extensive collections which he has made at both of the above-mentioned localities.

Cytherea Newcombei n. sp.

Shell subquadrate to oval, high, moderately thick, truncated anteriorly. Beaks not prominent. Lunule faintly marked. Surface ornamented with numerous, irregularly placed growth lines and ridges. On some well-preserved specimens a large number of very faint radial lines are visible. Length of large specimen 70 mm., breadth 55 mm. Hinge of right valve with three cardinal teeth and a short pit for the anterior lateral tooth of the opposite valve. This pit for the reception of the anterior lateral tooth is shallower and much shorter than in the following species.

Locality: Sooke beds, Vancouver Island.

Cytherea vancouverensis n. sp.

Shell oval, narrowly rounded anteriorly. Beaks prominent. Lunule well marked. The somewhat weathered surface of the shells ornamented by numerous, irregularly placed growth ridges. Length of type specimen 62? mm., breadth 48 mm. Hinge of right

¹ Note on Two Tertiary Faunas from the Rocks of the Southern Coast of Vancouver Island. Bull. Geol. Dept. Univ. of Calif., Vol. 2, No. 3.

valve with three cardinal teeth and a long, deep tooth pit for the reception of the anterior lateral tooth of the left valve. Pit between the two anterior cardinal teeth of right valve ordinarily narrower and deeper than in *C. Newcombei*.

Locality: Sooke beds, Vancouver Island.

Patella geometrica n. sp.

Shell large and heavy, up to 50 mm. or more in length, suborbicular. Apex elevated, well forward. Surface ornamented by about twenty broad, strong, radial ribs, which are much wider than the interspaces. Radial ribs crossed by numerous, prominent, narrow, sometimes leafy, transverse ridges.

Locality: Sooke beds, Vancouver Island.

Turritella diversilineata n. sp.

Shell medium size. The imperfect type specimen shows seven flattened whorls, which are strongly bevelled below. Flattened sides ornamented by five revolving ribs of which the lowest, standing on the angle of the whorl, is much stronger than the others. On some of the whorls there are indications of revolving sculpture on the bevelled surface between the lowest rib and the suture.

Locality: Carmanah Point, Vancouver Island.

Nassa Newcombei n. sp.

Shell between 25 and 30 mm. in length. Whorls five, with a well marked shoulder, ornamented by numerous longitudinal and transverse ribs which give the middle portion of the whorls a tessellated appearance. The upper revolving rib, which forms the angle of the shoulder, is stronger than the others and is usually separated from them by a distinct groove. On the last whorl the transverse ribs (about 25) are dominant on the upper portion, excepting the shoulder, and are latticed by the less conspicuous revolving sculpture. On the lower portion of the whorl the transverse ribs disappear, leaving the well-defined revolving ribs uninterrupted.

Bullia buccinoides n. sp.

Shell ovate, whorls five. Spire short. Suture partially or entirely covered. Aperture with strong anterior notch. Outer lip thin, sharp; inner lip with broad callus. Length 25-30 mm.

Locality: Sooke beds, Vancouver Island.

University of California, August, 1897.

EDITORIAL CORRESPONDENCE.

MARSHFIELD, OREGON (COOS BAY), Aug. 23, 1897.

My Dear Pilsbry:—Though I have had good success as far as fossils are concerned, it has been the wrong season for land shells in southern Oregon. Everything is three inches deep in impalpable dry dust, and even the trees are dusty. Barring a few *Helix fidelis* and *vancouverensis* in aestivation and an occasional *Ariolimax*, I have seen nothing in the woods, and the rare brooks here are curiously bare of insect or molluscan life.

Since coming to the sea coast I have been too busy to do more than note the commoner species on the beaches, and observe a few items of distribution. The eastern clam, *Mya arenaria*, has become acclimated, and is one of the best and most abundant bivalves. It was introduced unintentionally with seed oysters from the East. The Pacific oyster, *O. lurida*, is not now found living in the bay, but specimens (which may have been brought here from other places) occur sparingly in the Indian shell heaps. Unexpected was the presence of *Nassa fossata* in numbers, I think not before reported so far north. A rarity of the rocks at Cape Arago is the black abalone, *Haliotis cracherodii*, of which this must be nearly, if not quite, the northern limit. Among rubbish on the beach were a dead specimen of *Mitra maura*, and a valve, also dead and worn, of *Tivela crassatelloides*. These I suspect to be ballast specimens. The beaches offer a poor collecting ground, even Littorinas are scarce. I noted the following species of shells near the entrance of the bay, though winter collecting would doubtless afford a longer list:—

Acmaea patina, *pelta*, *persona* and *mitra*; *Olivella biplicata* and *battica*; *Purpura crispata*, *decemcostata* and *ostrina*; *Litorina scutulata*, *Priene oregonensis*, *Nassa fossata*, *Fissuridea aspera*, *Cryptochiton stelleri*, *Katherina tunicata* and *Mopalia muscosa*; *Mya arenaria*, *Entodesma saxicola*, *Cardium nuttalli*, *Saxidomus squalidus*, *Tresus nuttalli*, *Tapes rigida*, *Petricola carditoides*, *Saxicava arctica*, *Macoma nasuta* and *inconspicua* (pink and white varieties), *Siliqua patula*, *Hinnites giganteus*; a fragment of *Pecten caurinus*, and in holes in the sandstones *Pholadidea penita*, *Parapholas californica*, *Zirphara crispata*, *Adula stylina* and *Kellia laperousei*.

Yours very truly,

W. H. DALL.

ISAAC LEA DEPARTMENT.

[Conducted in the interest of the Isaac Lea Conchological Chapter of the Agassiz Association by its General Secretary, Mrs. M. Burton Williamson.]

The annual reports will be due in December. Promptness in sending reports will be appreciated by the General Secretary. The annual dues are due in December. The election of President and General Secretary is held in the same month.

Our President, Prof. Josiah Keep, conducted a class in conchology at Pacific Grove this last summer.

COLLECTING AT BALLAST POINT.

(Extract from the report of Mrs. L. T. From the Transactions of the Isaac Lea Chapter for 1896.)

On Thursday, Dec. 31, 1896, at 8 A. M., our family started out to finish up the year by collecting shells on that day. We went to San Diego—a ten minutes' trip by rail—and then took a naphtha launch for somewhere, we were not sure where, until we could take our bearings, and see what places were possible to us.

Out past the ships from England and Australia we made our way, and could soon see the row of little settlements, if such they may be called, along the north end of the bay. Farthest to the east is Roseville, then La Playa, Quarantine, Ballast Point, and farthest to the west, Pt. Loma, a promontory, five hundred feet high, surmounted by its lighthouse.

As we studied our geography lesson, it was decided that our boat should drop us at Quarantine and call for us at 3.30 P. M., at Ballast Point, a distance one and one-half miles if you ride, and two miles or more if you walk.

About 10.30 we set our foot on the beach at Quarantine, and, a few minutes later, having eaten our lunch to get it out of the way, we began to work. At high-tide the walk we contemplated would have been impossible, as the water comes quite up to the bank, which, much of the way, is a high and precipitous cliff. But the tide was going out rapidly, and not only making a pathway, but uncovering for us what we had come to see. Mr. T., with his Zoology class in mind, walked along at the water's edge, watching closely for all kinds of animal life.

I walked up on the just uncovered beach, seeing what I might capture. My first prize proved to be a "giant key-hole," *Lucapina*

crenulata, animal and shell still in partnership. As this was the first one I had seen alive, I was more delighted than if I should have been over the discovery of a continent. I have all the continents I want, but am always ready for another giant key-hole.

Having all paid our respects to our new acquaintance, and recovered somewhat from the shock of finding something we really wanted, we gently put him to rest in the pail of sea water carried by the "zoologist," and we proceeded on our way to other "finds." Not many minutes later another *Lucapina* met my delighted gaze, and with fewer demonstrations than before, he was seized and sent at once to join his brother.

By this time we had come to the bed of mussels, clams and oysters which had begun to be exposed to view. We had reason to look for rock oysters, *Hinnites giganteus*, in that section of the country. but as collecting them had never been much in our line before, it took us some time to learn how to find them. They were so muddy and looked so much like other things for which we had no use, that we could'nt always be sure of what we were getting, till afterward. While Mr. T. wrestled with that problem, I amused myself by springing pleasant surprises on cup and saucer limpets, *Crucibulum spinosum*, and transferring them to my basket from their happy homes on stones, old shells, broken glass, etc. As this was a new kind of limpet for me to collect alive in any quantity, and of good size, I laid in a good supply. Occasionally specimens of *Lutricola alta*, *Semele decisa*, *Sanguinolaria Nuttalli*, *Psammobia rubro-radiata*, *Bulla nebulosa* and *Haminea virescens* were found along here.

A little further on we began to find quantities of *Heterodonax bimaculatus*, of a larger size than we had found in San Pedro Bay, of various colors, purple, salmon, white and striped, every one too beautiful to leave!

A few minutes before time for our return boat, our most exciting capture was made, that of a devil fish, presumably 18 inches or more from tip to tip (he would'nt lie still to have his measure taken). He was ruthlessly torn from the hole under a stone where he was domiciled, and, in spite of his writhes and wriggles, was consigned to the sea water pail, which by this time was filled to overflowing with star-fish, sea-cucumbers and the not to be overlooked giant key-holes. Now the star-fish were respectfully invited to take a back seat in some of the numerous bags, etc., which we have learned to carry for just such emergencies, that his majesty, the devil fish,

might have their room. Ashamed of himself, as he well might be (or was it only a becoming modesty which impelled him?) he immediately began to squirm his way to the very bottom of the pail, and there he remained for the home trip.

Then with heavy loads but light hearts, we found our way to the light house on Ballast Point, where our launch soon called for us. As we went down to the water to step on board, Mr. T., who led the way, saw directly in his path, as if waiting for him, our third *Luca-pina*. Back to San Diego, six miles, we went, and by six o'clock were at home, and preparing to put in formalin "pickle" for future use, the finds of the day.

GENERAL NOTES.

A few months ago I received from H. Rolle, Berlin, two specimens of *Achatina crawfordi* Melv. One of the shells was broken when received, and noticing that there appeared to be something loose inside, I investigated, and got out three embryonic shells about 8 mm. in diameter. As the *Achatinidæ* are said to be oviparous, this was quite a surprise to me, and I thought a note of it might be of interest to you. As there was no sign of a "calcareous shell," it would appear that this species, at least, is viviparous.

—*Geo. H. Clapp.*

POLYGYRA MEARNsii Dall, has been found by Prof. J. D. Tinsley in the Organ Mts., New Mexico, high up in Filmore Cañon, one dead shell. I am responsible for the identification.

T. D. A. Cockerell.

Dr. Lorenzo Yates, of Santa Barbara, Cal., has a short article on the shells of Santa Barbara Channel in the August number of the "Overland Monthly."

PUBLICATIONS RECEIVED.

Messrs Ph. Dautzenberg and H. Fischer have issued their final report on mollusks obtained by the dredgings made by the "Hiron-delle" and the "Princesse Alice," 1888-1896.¹ A useful table of the stations precedes the report on species. The operations were nearly all conducted around the Azores Is. New species are de-

¹ *Mém. de la Soc. Zool. de France*, X, 1897.

scribed of the genera *Pleurotoma* (sensu latissimo), *Cerithiella*, *Amphirissoa* (a new Rissoid genus with continuous, reflexed peristome), *Basilissopsis* (a new genus resembling *Basilissa*, but not pearly, etc.), *Eulima*, *Niso*, *Turbonilla*, *Turcicula*, *Cyclostrema*, *Cocculina*, *Puncturella*, *Acmæa*, *Aliceia* (name preoccupied), *Isomonina* (new group of *Anomiidæ*), *Chlamys*, *Amussium*, *Myrina*, *Arca*, *Leda*, *Malletia*, *Cardium*, *Axinus*, *Diplodonta*, *Cuspidaria*, *Verticordia*, *Thracia* and *Poromya*. All the new forms are figured, but the phototypes are not so clear in detail as we could desire, being decidedly inferior to those illustrating "Les Mollusques Marins du Roussillon," for example. Otherwise the work seems well done in every respect.

In treating the *Scalidæ* and the genus *Mathilda* obtained by the same expedition,² Mr. Dautzenberg has the able assistance of Mr. E. de Boury, well known for his studies on *Scalidæ*. Thirteen species are recorded, of which seven are new.

BREEDING SINISTRAL HELICES.—Arnold Lang, in Vierteljahr-schr. Naturf. Ges. Zürich, XLI, 1896, Jubelband, p. 448, gives the results of two experiments to ascertain whether as a rule sinistral individuals of normally dextral snails produced sinistral or dextral young. The experiments were conducted two consecutive years, once with seven, another time with nine individuals of *Helix pomatia*. They were completely isolated; and the result was only dextral young. No less than 241 young were obtained from the lot of seven.

Edwin Grant Conklin, Professor of Comparative Embryology in the University of Pennsylvania, has published in the Journal of Morphology for April, 1897, an elaborate work on the Embryology of *Crepidula*, with especial reference to the "cleavage of the ovum, the formation of the germinal layers and definitive organs, and the axial relations of the ovum to the larval and adult axes." The work is too extensive for abstract here, being, in fact, one of the most thoroughly worked out studies in "cell lineage" yet produced in America, and especially valuable for the attention given to the later stages with the object of tracing the individual blastomeres of the cleaving egg onward to the germ layers. The interesting observations upon the natural history of *Crepidula* forming part of the prefatory portion of Prof. Conklin's memoir, we hope to reprint later.

² Same volume.

Genus **CEPOLIS** Montfort, 1810.

Section *Hemitrochus* Swainson, 1840.

46. **CEPOLIS VARIANS** (Menke). Key West; Lower and Upper Matacumbe Keys; Biscayne Bay. Also New Providence, Inagua, etc., Bahamas.

Genus **ACANTHINULA** Beck, 1846.

The systematic position of this genus and of *Vallonia* is unknown.

Section *Zoögenites* Morse, 1864.

47. **ACANTHINULA HARPA** (Say). Northern tier of States from Maine to Minnesota; Canada; Bering Island (Vega); also Sweden, Kamchatka, etc.

Genus **VALLONIA** Risso, 1826.

48. **VALLONIA PULCHELLA** (Müll.). Montana eastward, from Canada to, or nearly to, the Gulf of Mexico. Europe.

49. **VALLONIA EXCENTRICA** Sterki. Quebec and Maine to Maryland, west of Ohio; also Europe.

50. **VALLONIA COSTATA** (Müll.). Quebec to Washington, west to Colorado, Europe.

50a. **VALLONIA COSTATA MONTANA** Sterki. Rocky Mts.

51. **VALLONIA ALBULA** Sterki. Quebec, Manitoba, British Columbia.

52. **VALLONIA PARVULA** Sterki. Illinois to Nebraska, south to Indian Territory (*V. americana* Ancey is the same).

53. **VALLONIA GRACILICOSTA** Reinh. Mingusville, Mont.; Fort Berthold, Dakota.

54. **VALLONIA CYCLOPHORELLA** Ancey. Washington to Montana, south to New Mexico.

55. **VALLONIA PERSPECTIVA** Sterki. Northern Alabama and Tennessee to Iowa; Mingusville, Montana.

Subfamily **POLYGYRINÆ** (vel *Protogona*).

Genus **PRATICOLELLA** v. Mørtens, 1892.

56. **PRATICOLELLA BERLANDIERIANA** (Moricand). Texas, Anderson and Bosque Counties southward; also Mexico.

57. **PRATICOLELLA GRISEOLA** (Pfr.). Southern-central Texas; also and mainly Mexico, as far south as Vera Cruz.

Genus **POLYGYRA** Say, 1818.

(Typical Section).

58. **POLYGYRA CEREOLUS** (Mühlf.). Florida Keys and the adjacent mainland.

58a. **POLYGYRA CEREOLUS CARPENTERIANA** (Bld.). Florida, mainly on the west coast.

59. **POLYGYRA SEPTEMVOLVA** Say. Central and northeastern Florida.

59a. **POLYGYRA SEPTEMVOLVA SANCTIJOHANNIS** Pils. Valley of the St. John's River.

59b. **POLYGYRA SEPTEMVOLVA VOLVOXIS** (Pfr.). St. Simon's I., Georgia, to Florida and west to New Orleans, La., and Galveston, Texas. (*Poly. febigeri* Bld. is a synonym).

59c. **POLYGYRA SEPTEMVOLVA FLORIDANA** Hemphill. Oyster Bay, Florida.

* * *

60. **POLYGYRA AURICULATA** Say. Indian River region and St. John's valley to Cedar Keys.

60a. **POLYGYRA AURICULATA MICROFORIS** Dall. Johnson's Sink, Alachua Co., Fla.

61. **POLYGYRA UVULIFERA** (Shuttl.). Florida, Key West and Cape Sable north to Tampa Bay; Lake Apopka.

62. **POLYGYRA AURIFORMIS** (Bld.). Comal, Bexar and Burleson Counties, Texas, east to Uniontown, Ala. and Georgia.

63. **POLYGYRA ESPILOCA** ("Rav." Bld.). Sullivan's I., S. C. and St. Simon I., Ga., west to New Orleans, La. and Indianola, Texas.

64. **POLYGYRA POSTELLIANA** (Bld.). Coast counties of Georgia to Baldwin, Florida.

65. **POLYGYRA AVARA** Say. Valley of the St. John's River, Florida.

66. **POLYGYRA PUSTULA** (Fér.). South Carolina and Lee Co., Ga., south to St. Augustine and Cedar Keys, Florida.

67. **POLYGYRA PUSTULOIDES** (Bld.). St. Simon I., Ga., west to eastern Tennessee and Jackson Co., Ala.

68. **POLYGYRA LEPORINA** (Gld.). Henry Co., Indiana, through Ky. and Tenn. to Ga.; Cape Girardeau and Barry Counties, Mo., south and southwest to Ft. Gibson, Ind. Terr., and Anderson, Lee, Washington, and Ft. Bend Counties, Texas. The only typical *Polygyra* extending north of the Ohio River.

(To be Continued.)

THE NAUTILUS.

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No. 7.

NEW SPECIES OF MEXICAN LAND SHELLS.

BY W. H. DALL.

Helix (Lysinoe) *Queretaroana* n. sp.

Shell large, rugose, with a pale yellow-brown periostracum over a livid whitish, finely granular surface; whorls five, sloping above, with a well marked suture, to a rather elevated narrow apex; below rounded; nuclear whorl and a half smooth, perhaps with microscopic punctuations when unworn; the rest of the surface rugose from irregular incremental lines and densely covered with minute rounded pustules; apex with a few darker flecks on the whitish ground, but otherwise the shell is destitute of color pattern and entirely without banding; aperture ample, oblique, outer lip simple, not reflected, internally somewhat thickened by a livid rose-colored callus; inner lip rose color, reflected, nearly covering a small perforate umbilicus; throat brownish, deeper just below the suture on the body whorl, a thin callus connecting the somewhat incurved outer lip with the pillar; base turgid, rounded. Alt. 37, max. diam. 39, min. diam. 32 mm.

Pinal de Amoles, Queretaro, Mexico, E. W. Nelson.

This fine species is related to *H. Humboldtiana*, from which it is easily distinguished by its color, more pointed spire and less depressed apex. The rose color of the interior becomes less bright with time.

Helix (Lysinoe) *sebastiana* n. sp.

Shell large, moderately depressed, of four and a half whorls, with a well marked suture; nepionic whorls two, smooth, plum colored;

subsequent whorls obliquely flattened above, full and rounded below; surface marked only with incremental lines and irregular minute vermiculations in general harmony therewith; color a dark plum hue, which where covered by the brownish epidermis appears nearly black; at the periphery a narrow white or yellowish band, above it two narrower, nearly equidistant smaller ones, that nearer the suture more or less obscure on the last whorl; the whitish bands are visible inside the aperture, the rest of the shell is dark; aperture ample, produced above, the lip slightly thickened, the pillar broadly reflected over a moderate umbilicus. Alt. 30, max. diam. 40, min. diam. 32 mm.

This species is more depressed than *H. eximia*, and has one less whorl, a darker base and less reflection of the peristome. The granulation is rather sparse and very irregular.

Near San Sebastian, Jalisco, Mexico, Nelson.

Polygyra Nelsoni n. sp.

Shell dark brown, of five and a half rather depressed whorls; suture distinct, surface with well-marked even riblets, separated by wider interspaces, except on the nepionic shell which is smooth, and of two whorls; periphery above the middle of the whorl, base rounded with a deep subcylindrical umbilicus; aperture depressed above, with a wide, reflected, white peristome; basal lip with two well developed teeth and wide callus on the inner edge of the peristome outside of the outer tooth; body with a long sigmoid or nearly V-shaped tooth nearly parallel with the basal lip. Alt. 7.2, maj. diam. 14.5, min. diam. 12.0 mm.

With the last. This species differs from *P. matermontana* Pils. (from Colima) by its coarser ribbing, larger size and smaller umbilicus, the peristome is also more oblong. *P. plagioglossa* Pfr. is smaller with a rounder aperture. A smaller relatively more elevated variety, *collisella*, alt. 7, maj. diam. 11, min. diam. 9.5 mm., was found at San Sebastian and La Laguna, Jalisco, by Nelson. The latter is on the Sierra de Guanacatlan.

DESCRIPTION OF A NEW VARIETY OF LAND SHELL FROM IDAHO.

BY HENRY HEMPHILL.

Helix devia variety *Clappi* Hemphill.

Shell very much depressed; light horn-color; striæ of growth very fine with occasional coarser ones at irregular intervals on some

of the specimens; epidermis thin, a little brownish in color, and appearing very minutely hirsute in some shades of light under a strong pocket lens; whorls about five, the last flatly convex not descending at its termination, or very little in the largest specimens; spire depressed, very little elevated above the plane of the shell; suture distinct and well defined; aperture transversely lunar, a little flattened beneath; peristome reflected, moderately thickened, with a faint, long lamellar basal deposit on its inner edge, sometimes absent; parietal wall bearing a small white rather sharp-pointed denticle just within the aperture and near the termination of the upper lip, rarely absent; lower surface of the shell flatly convex, with a deep broad umbilicus showing a portion of the penultimate whorl.

Greater diam. of the largest specimen, 15, lesser 12 mm.

Greater diam. of the smallest specimen, 11, lesser 9 mm.

Height of the largest specimen, 5 mm.

Height of the smallest specimen, 3 mm.

Habitat, Salmon River Mts., Idaho.

This interesting form belongs to a large and very variable, but closely related group of shells that has a wide geographical range, some of its members inhabiting every state and territory of the United States, and even passing beyond its limits. The west coast forms of this group revolve around *Helix devius* Gld., as a common centre, and radiate from it in every direction, greatly but gradually diminishing in size, increasing, decreasing, diminishing and varying in the number, size and form of the apertural denticles, and with all the intermediate stages of a broad open, to a closely sealed umbilicus. Our new variety differs from all the other known forms of this group of shells, by the combination of its very depressed spire, basal lamellar deposit, and its large umbilicus. Its nearest ally is variety *Blandi*, from which it is separated by the basal deposit and larger umbilicus.

I take much pleasure in dedicating this form to my young friend, Mr. Geo. H. Clapp, of Pittsburg, Pa., an intelligent student and enthusiastic collector of American land shells.

NOTES ON SLUGS.

BY T. D. A. COCKERELL.

My esteemed friend, Mr. Pilsbry, in conjunction with Mr. Vanatta, has favored us with the first part of a "Revision of North

American Slugs," which is, in all respects, a most valuable and timely production.

As might be supposed, the authors find it necessary to criticise their predecessors in the study—just as, no doubt, their successors will criticise them. But whatever criticism may be offered, it will always be recognized that they put our slugs on a sounder basis than before, supposing that they finish the work so well begun.

Nevertheless, if they are not careful, they are liable to be troubled by the the shades of the departed; and they have, in fact, woke out of his malacological grave the present writer, who has a few posthumous observations to make herewith.

Ariolimax californicus.

In Nov., 1889, Mr. H. F. Wickham sent me two examples of this species, which he found at Los Gatos, California. I have before me the drawings I then made of their internal anatomy, which agree with those of Messrs. Pilsbry and Vanatta, except that the epiphallus is less swollen and the retractor penis is not so broad. The epiphallus is clearly shown running to the end of the so-called "flagellum" of the penis; so that this point in the anatomy, which our authors seem to think they were the first to observe, was known to me long ago. Of course they could not be supposed to know anything about an unpublished observation, but had they carefully examined the literature, they would have read Simroth's statement: "Herr Cockerell fand, nach brieflicher Mittheilung, dass ein echtes Flagellum nicht vorhanden ist, sondern dass das vas deferens sich bis zu dessen blinden Ende verfolgen lässt." (Malak. Bl., N. F., XI, p. 114). They might also have observed fig. H, pl. V, of W. G. Binney's 3d Suppt., which, though rather rough, is practically correct. Binney himself says the vas deferens "enters the penis at the end of the flagellum below the bulb," (Man. Amer. Land Shells, p. 100), which cannot be considered far wrong. Simroth's figure in Mal. Bl. is, however, unquestionably wrong as to this matter, supposing that he had real *californicus* before him.

Our authors assume that *californicus* f. *maculatus* is really *columbianus*, on the wholly insufficient grounds that they have never seen spotted *californicus*. Yet they may be correct, as I never had a spotted *californicus* I could dissect. My notes on the British Museum specimens are as follows:—

"*Ariolimax californicus*, from W. G. Binney. Big spot on mantle. 45 mm. long.

"*Ariolimax columbianus*, from W. G. Binney, 45 mm. long.

"Really, there is no external difference between these slugs!—at least, nothing specific. *Californicus* is more keeled, and has a narrower sole (sole lat. of *cal.* 11, of *columb.* 13 mm.). Sole of *columb.* is unicolor grayish ochre, that of *calif.* has lateral tracts grayer; both are transversely wrinkled. Reticulations on body appear to me to be the same. In color both are ochreous, *columb.* has black mottling on body (v. *maculatus* Ckll.); *calif.* has similar black marbling on body, but mantle, instead of being unicolor, has a large black spot, diam. 6 mm., over place of shell (v. *maculatus*, nov.). This spot on mantle is in fig. of *columb. mac.* in Binney, Pl. vi, f. A." (Ckll. MSS.).

Ariolimax costaricensis.

Here again our authors must be convicted of hasty judgment. They complain that there is nothing in the description to identify the slug, except the locality; but they overlook the peculiar olivaceous color. British Museum slugs are not permitted to be dissected, and I gave the best account of the creature I could under the circumstances. It is to *californicus* much what *Parmacella* var. *olivacea* is to *P. maculata*, or *Anadenus schlagintweiti* to *A. altivagus*. Whether it is a good species or only a color variety cannot at present be determined, but at least it will be easily recognizable.

Prophysaon.

In their introductory remarks, our authors allude to the difficulty of identifying West Coast slugs. I believe this difficulty is by no means a serious one, if one is familiar with the literature, and will exclude certain forms which are probably not distinct. The following table may help to separate the recognized species of *Prophysaon*:—

- (1.) Epiphallus stout, sausage-shaped. A pale dorsal stripe.
 - a. Ochreous species, *P. pacificum* (incl. *flavum*).
 - b. Grayish species, *P. andersoni* (incl. *hemphilli*).
- (2.) Epiphallus banana-shaped, but tapering at the end. No pale dorsal stripe, . . . *P. cœruleum* (Epiphallus rather slender, flattish, tapering, somewhat curved. Shell 2 mm. long, narrow, white, shiny).
- (3.) Epiphallus slender, gradually tapering to a point. Body with a blackish dorsal band.

- a. Jaw ribbed, *P. fasciatum*.
 b. Jaw only striate, . . . *P. humile*. (Until more material of *humile* is seen, it cannot be made sure that the jaw-character is a specific one.)

My present opinion is that *Phenacarion* must be merged in *Prophysaon* s. str.

In order to further elucidate some of the forms of *Prophysaon*, I give below some of my notes, made years ago, but not published at the time.

Prophysaon hemphilli W. G. Binney (as *Phenacarion*).

This must not be confounded with *P. hemphilli* B. and B., which I consider specifically identical with *andersoni*. I know little more about it than may be gathered from Mr. Binney's account. Mr. Binney sent me one from near the mouth of the Chehalis River, and I noted at the time: looks like type *foliolatus* in alcohol. Sole pale yellowish white. Edge of foot dark, with darker transverse lines. Body bluish-gray, tapering; mantle more brownish.

Prophysaon foliolatum (*Arion foliolatus* Gld.).

Comparing this with *P. hemphilli* B. & B., I noted:—Sole white, oblique transverse grooves visible. Transverse dark streaks on edge of sole more strongly marked, alternating strong and weak. Body exactly the same color (in alcohol) as *hemphilli* B. & B. Pale dorsal line very slightly indicated. Reticulations practically as in *hemphilli*, but foliations more distinct. Mantle not so dark and brownish-tinged; bands represented by subcoalesced black marks; black spots scattered about. As I wrote in An. Mag. N. Hist., 1890, "it is most difficult to separate *P. foliolatum* and *Proph. hemphilli* (i. e. *andersoni*) specifically." An alcoholic example of *hemphilli* differed from *foliolatum* as under—

Prophysaon hemphilli B. & B.

Sole slightly yellowish, only wrinkled transversely. Marks on edge of sole quite similar, but not so well marked. Body purplish mouse-color, i. e., gray with a lilac tinge. Mantle dark, with indistinct "smoke colored band." Body tapering. No mucus pore. A pale dorsal line is barely indicated just behind mantle to half length of back. Slug 42 mm. long.

Prophysaon andersoni (Cooper).

An alcoholic from Olympia was described thus:—Twenty-four mm. long. Sole yellowish-white. Oblique grooves as in *foliolatus*. Markings on edge of sole as in *hemphilli* B. & B., but not so dark. Body same color as *hemphilli*, but paler at sides; in fact, white above sole at sides. Reticulations as in *hemphilli*, showing out lilac-gray on the whitish sides. Pale (rather brownish) dorsal line. No indication of any keel. Body much less tapering than in *hemphilli*. No mucus pore. Mantle smaller and more rounded at ends than in *hemphilli*, decidedly brownish, its edges pale. There are indistinct subdorsal bands on mantle. Ototestis imbedded in liver; in *fasciatum* it is visible without moving liver.

A living *P. andersoni* from Haywards, California, sent by Dr. Cooper, agreed with the above, but differed in its mantle, which was not brown but grayish, heavily marbled with dark gray dorsally, so as to appear almost uniform blackish, and at sides with dark gray or blackish marbling showing out plain on the pale ground. The surface of the mantle is beautifully beaded-granular. The pale dorsal line is brownish tinged, thus differing from the rest of the body.

The epiphallus of *P. andersoni* v. *suffusa*, from Chehalis, Wash., is very stout, shorter than that of typical *andersoni*.

Prophysaon humile.

A Cœur d'Alene example, compared with *fasciatum*, differs thus:—Sole gray instead of yellowish. Transverse wrinkles not oblique. Grooves on edge not dark. Reticulation practically the same. Dorsal band on body much reduced. Ground color grayish.

Prophysaon fasciatum.

Specimens in alcohol were sometimes tinged with scarlet, but I could not be sure whether this was natural or due to some accidental staining.

In conclusion, I hope it will not be supposed that all the characters above given are believed by the writer to be specific. The purpose is, simply to point out differences between the specimens which have been differently named, without deciding how far those differences are specific. In my Check-List of Slugs, and elsewhere, I have indicated my opinion about the species as such.

Mesilla, New Mexico, Sept. 15, 1896.

ISAAC LEA DEPARTMENT.

[Conducted in the interest of the Isaac Lea Conchological Chapter of the Agassiz Association by its General Secretary, Mrs. M. Burton Williamson.]

For the benefit of our new members I will say that while the *Popular Science News* is the official organ of the Agassiz Association, THE NAUTILUS is the official organ of our Conchological Chapter.

Please bear in mind the annual reports and dues are to be sent in next month. This department is made up from the reports of our members. Let us make this year's volume of Transactions the best we have ever had.

The volume when last heard from had just been forwarded by Mr. Hilles Smith to Mr. James H. Lemon, Toronto, Ontario. The book has "gone the rounds" rather slowly this year.

COLLECTING DURING THE SUMMER OF '96.

[Extract from the report of Mr. H. Howe. From the Transactions of the Isaac Lea Chapter for 1896].

During the summer months I collected around San Pedro and Long Beech. A very pretty and rather rare shell is the *Actæon punctocelatus* Cpr., commonly called the "barrel shell." It may be found alive during June, July and August, at the roots of the eel-grass where it comes to breed. The eggs are almost microscopic and are laid in coiled masses about one inch in length, which is twice the size of the entire Mollusk shell and all. The *Actæon* (also called *Rictaxis*) lives in deep water and can only be collected during the breeding season.

In August I made a trip to Anaheim Landing in company with a friend, also a collector. As the low tide occurred at four o'clock in the morning (and we live about ten miles away) we had to start at two o'clock in the morning. On arriving at our collecting ground we set to work and soon had excavated several fine *Glycimeris generosa* and *Schizothærus Nuttalli*. These are about the hardest shells to collect that I know of, for they live from two to three feet down in the mud. In the soft clay we dug out some fine *Pholus pacifica* and *Zirphæa crispata*, *Bulla nebulosa* and *Pecten æquisulcatus*, were very large and plentiful. At this place I found my first live *Nassa perpinguis*. When hunting for the burrows of

the *Glycimeris*, unless an expert, one is apt at the end of his search, to be very much disgusted at finding instead of the desired mollusks, nothing but a "sea cucumber."

At San Pedro I secured a dozen or more living specimens of *Chrysodomus Kelletii*, brought in from deep water by a fisherman, and, collected on the mud-flats a few *Trophon Belcheri* and a large *Mactra Hemphillii*.

In the pholas bed at San Pedro I found some large specimens of *Adula styliana* and *Lithophagus plumula*, three young *Parapholas Californica* and a few specimens of *Nettastomella Darwinii*, a little borer about three-fourths of an inch long and gaping widely at the posterior end.

After a heavy tide at Long Beach one may collect occasional specimens of *Periploma planiuscula* Sby., *Clidiophora punctata* and odd valves of *Raeta undulata* and *Yoldia Cooperi*.

While on a camping trip this summer to Maliban Ranch, a rocky strip of sea coast about twenty miles north of Santa Monica, I collected my first specimens of *Lasea rubra*. It is a tiny bivalve about the size of a pin-head, and the smallest Pelecypod on this coast. I found them on the byssus of *Mytilus Californicus*. On the same rocks with, and feeding on the *Mytilus* I found a fine series of *Purpura saxicola* the largest and most beautiful I have seen. In color they varied from white and orange to jet black, some striped, some plain, others smooth, and still often slightly roughened. I think this is about the only place in Los Angeles County where *Purpuras* are to be found. (Two or three collectors have found *Purpuras* at Portuguese Bend, in Los Angeles County. *Purpura saxicola* and *Purpura lima* var. *emarginata*, are synonymous terms used for one of our *Californica* *purpuras*. The shell figured in "West Coast Shells" as *P. lima* refers to another shell.—M. B. W.).

NOTES AND NEWS.

In *L'Echange* for June, 1897, p. 46, Mr. Locard establishes a new genus *Assiminopsis* for the new *A. abyssorum*, from the Atlantic south of Portugal in 1,205 metres depth. It is probably Rissoid.

M. Jules Mabille's "Observations sur le genre *Bulla*" in Bull. Soc. Philomathique de Paris, 1895-96 (published in 1897), is prac-

tically a monograph of the group, although there are numerous omissions. *B. ampulla* is split into several species formerly (and justly) regarded as varieties. *B. vernicosa* Gould is described as new under the name "*B. secunda*." *B. adamsi* Mke., which has already had several synonyms, figures as "*B. subaustralis* sp. nov." *B. dubiosa*, habitat unknown, and *B. delorti*, Japan, are also described as new. The first is certainly well named. In all 23 species are mentioned, this number including several not entitled to that rank. In the monograph published in Manual of Conchology, 1894, there are 32, not counting "bad" species.

In his "*Contributions a la Connaissance des Mollusques Terrestres et d'Eau Douce de Kaméroun*,"¹ Mr. Adolf d'Ailly has made a substantial addition to the rather meagre literature of west African land shells. The shells described were collected by three Swedish naturalists, Mr. P. Duzén and Drs. Y. Sjöstedt and J. R. Jungner. The Cameroon fauna is rich in species of *Ennea*, 17 being enumerated, 8 of them new. The Zonitoid genera *Helicarion*, *Zonitarion*, *Thapsia* and *Trochozonites* are represented by numerous species with many new forms. In the *Achatinidæ* a new genus, *Ganomidis*, is proposed for *Achatina Shuttleworthi* Pfr. and *A. Barriana* Sowb. The genus *Petitia* Jousseau (of tautologic fame) is recognized for *Achatina pulchella* Martens, of which *Petitia Petitia* Jous. and *Ach. Smithi* Sowb. are reckoned synonyms. *Pseudachatina*, *Perideris* and *Limicolaria* are well represented. M. d'Ailly has independently arrived at the conclusion that the sculpture of the embryonic shell is frequently a character of high value in the Pulmonate snails. Five well-drawn lithographic plates illustrate the new species described.

VALLONIA PARVULA AND PUPA HOLZINGERI.—In the October NAUTILUS just received to-day I notice that *Vallonia parvula* Sterki, is not given as occurring east of Illinois. In the summer of 1891 I discovered this species on Put-in Bay Island, Lake Erie. The specimens were submitted to Dr. Sterki, and determined by him. Associated with it was *Pupa Holzingeri* Sterki, which is also a Mississippi Valley form. The occurrence of these two species so far east may be of interest to you.—BRYANT WALKER.

¹ In Bihang till K. Svenska Vet.-Akad. Handl. Bd. 22.

POLYGYRA PPLICATA Say. Kentucky, Tennessee and the adjacent parts of Georgia and Alabama. *Helix hazardi* Bld. is synonymous. The name *plicata* was not preoccupied in *Polygyra*, to which genus Say originally referred this species.

POLYGYRA DORFEUILLIANA Lea. Washington to Cooke Counties, Texas, through Indian Territory, Ark., La. to the Coosa River, Ala., north to Arkansas City, Kansas, Benton County, Mo., and Kentucky opposite Cincinnati.

POLYGYRA DORFEUILLIANA SAMPSONI Wetherby. Texas, Indian Terr., Mo., Ark.

POLYGYRA FASTIGIATA Say. Henry Co., Ky. to Montgomery and Franklin Counties, Tenn. *Helix fastigans* Lucy Say in Bld., is a synonym.

POLYGYRA JACKSONI (Bld.). Indian Territory, Ark., and Mo. north to Camden Co.

POLYGYRA JACKSONI DELTOIDEA Simpson. Fort Gibson, Indian Territory.

POLYGYRA TROOSTIANA Lea. Tennessee, Kentucky.

* * *

POLYGYRA OPPILATA (Moric). Cedar Keys (Binney). A southern Mexican and Yucatan species, the occurrence of which in Florida requires confirmation.

POLYGYRA MOOREANA (W. G. Binney). Central and southern Texas.

POLYGYRA MOOREANA THOLUS (W. G. B.). Washington County, Texas.

POLYGYRA BICRURIS (Pfr.). Brownsville and mouth of Rio Grande River, Texas. A Mexican species.

POLYGYRA VENTROSULA (Pfr.). A species of northwestern Mexico, reported from Texas by Binney.

POLYGYRA VENTROSULA HINDSI (Pfr.). Texas, according to Binney.

POLYGYRA MATERMONTANA Pils. Texas; also Sierra Madre, Mexico.

POLYGYRA TEXASIANA (Moric). Indian Territory and throughout Texas.

POLYGYRA TRIODONTOIDES (Bld.). Barry Co., Mo., Indian Territory, southwestern Louisiana, south to Corpus Christi, Texas.

POLYGYRA LATISPIRA Pils. Western Texas.

POLYGYRA ARIADNÆ (Pfr.). Texas, on the Rio Grande, according to Binney.

POLYGYRA HIPPOCREPIS (Pfr.). Near New Braunfels, Comal Co., Texas.

POLYGYRA LEVETTEI (Bld.). New Mexico, Santa Fé Canyon, near Santa Fé; Arizona, near Tucson; Fort Huachuca, Huachuca Mts.

POLYGYRA LEVETTEI THOMSONIANA Ancey (var. *orobæna* Anc. is probably not distinct).

POLYGYRA CHIRICAHUANA Dall. Arizona near Tucson, Fly Park, Chiricahua Mts., Cochise Co., at 10,000 ft. alt.; New Mexico, Jemez Mts. near Bland, and at Jemez Sulphur Spring, 8-10,000 ft. above the sea.

POLYGYRA ASHMUNI Dall. Bland, New Mexico.

POLYGYRA PSEUDODONTA Dall. White Oaks, New Mexico.

POLYGYRA RHYSSA DALL. White Mountains of New Mexico.

POLYGYRA MEARNSII Dall. Huachuca Mts., Arizona, and Hachita Grande Mt., Grant Co., New Mexico, at 8,000 to 9,400 ft. altitude. Also Filmore Canyon, Organ Mts.

Section *Triodopsis* Rafinesque.

POLYGYRA TRIDENTATA (Say). Canada to Michigan, south to northern Alabama.

POLYGYRA TRIDENTATA JUXTIDENS Pils. Southern New York to North Carolina and West Virginia.

POLYGYRA TRIDENTATA EDENTILABRIS Pils. Cumberland Mts.

POLYGYRA TRIDENTATA COMPLANATA Pils. Burnside, Ky.

POLYGYRA FRAUDULENTA Pils. (*Helix fallax* of authors, not Say). Ontario, Canada, to Michigan and Illinois, south to Georgia.

POLYGYRA FALLAX (Say). (*Helix introferens* Bld.). Eastern Pennsylvania and New Jersey from Philadelphia southward to Fanning Co., Ga.; Holston Valley, Tenn.; W. Va.

POLYGYRA FALLAX OBSOLETA Pils. Newbern, N. C.

POLYGYRA HOPETONENSIS (Shuttl.). Newbern, N. C. to Georgia Sea Is. and Mayport, Fla., west to Cedar Keys, Fla.

POLYGYRA VANNOSTRANDI (Bld.). Aiken, S. C.; Augusta, Ga.; Jacksonville, Fla.

POLYGYRA VULTUOSA (Gld.). Eastern Texas and Indian Terr., north to Pettis Co., Mo.

POLYGYRA VULTUOSA HENRIETTEÆ (Mazyck). Angelina, Lee and Robertson Counties, Texas.

POLYGYRA VULTUOSA COPEI Weth. Hardin Co., eastern Texas, Calcasieu Parish, La.

POLYGYRA VULTUOSA CRAGINI (Call). Neosha and Bourbon Counties, Kansas; Eureka Springs, Ark.; Wood Co., Texas.

(To be Continued.)

THE NAUTILUS.

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No. 8.

NEW WEST AMERICAN SHELLS.

BY W. H. DALL.

Sigaretus Oldroydii Dall, n. sp.

Shell large, thin, naticoid, with a short spire and 3-4 inflated whorls; color pale brown, livid on the spire, fading to waxen on the base; surface sculptured with extremely fine wavy spiral striæ; aperture ample, oblique, the outer lip thin, a little patulous, the body covered with a thin callus, the pillar lip obliquely cut away, wide near the junction with the body, the basal part of the margin receding; umbilicus large, pervious, its walls covered with a thin, silky, brown wrinkled epidermis. Alt. 35, diam. 37 mm.

A single specimen in deep water off Catalina Id., Cala., collected by Mr. and Mrs. T. S. Oldroyd.

This species is easily distinguished from any other recorded, by its very thin shell, naticoid form and wide pervious umbilicus.

Pecten Palmeri Dall, n. sp.

Shell thin, orbicular, compressed, equilateral, white to yellowish-brown, with concentric or zig-zag narrow bands or flecks of dark rose color; 15 strong ribs rounded in the young, mesially keeled and longitudinally threaded in the adult, separated by narrower channelled interspaces, each with a mesial thread; all crossed by lamellose, concentric, rather sparsely distributed elevated lines; sub-margins and ears closely radially threaded with imbricated threads. Both valves similarly sculptured; alt. 47.5, lat. 53, diameter about 20 mm.

A number of valves collected near the head of the Gulf of California by Dr. E. Palmer some years ago.

Pecten Randolphi Dall, n. sp.

Shell small, thin, glassy, unsculptured, except by minute "camptonectes" striation which covers both valves, and more or less obscure concentric undulations which are most distinct on the right valve near the umbo, and in some specimens altogether absent; hinge straight and short, anterior ears distinct, posterior ears not defined by any fold or sinus, outline suborbicular, valves compressed, especially the right one; right anterior ear with six small imbricated radii above, below a wide, transversely striated fasciole derived from a well marked byssal sinus; ctenolium with four or five functional spines. Alt. 27.5, lat. 26, diam. 5 mm.

Off Destruction Island, State of Washington, in 516 fathoms, bottom temperature, 38° Fahr., U. S. Fish Commission.

This species was obtained at a number of stations, from Bering Sea to West Mexico, in 225 to 1005 fathoms. It is named in honor of Mr. P. B. Randolph, of Seattle, who has done excellent work on the Puget Sound fauna.

Pecten Davidsoni Dall, n. sp.

Shell small, suborbicular, compressed, waxen white, the left valve with 21 rounded ribs, surmounted by (when not worn off) continuous rows of minute subglobular scales, the interspaces wider, flat and perfectly smooth, ears very small, the anterior with five or six imbricated radii; sculpture obsolete near the umbones; right valve sculptured with faint concentric impressed lines over the whole surface, and distally with numerous minute, obsolete, fine, scaly riblets; posterior ear transversely striated, very small, anterior one with four or five scaly radii, a well marked sinus leaving an imbricated fasciole and no ctenolium. Interior polished, the left valve fluted internally in harmony with the external ribs. Alt. 14, lat. 14, diam. 3.5 mm.

On the Davidson Bank, Alaska, in 280 fathoms, green mud, and north of Unalashka, in Bering Sea, in 351 fathoms, sand; U. S. Fish Commission.

This little shell resembles somewhat *P. (Propeamusium) alaskensis* Dall, externally, but wants the radiating liræ internally, is smaller, and has faint radiating sculpture on the right valve, which is wanting in *P. alaskensis*.

NOTE ON TWO SPECIES OF HELICINA.

BY C. F. ANCEY.

1. *Helicina Rabei* Pils., recently described in the NAUTILUS from specimens collected by Dr. Rabe, must be the same as the previously described *H. rufocallosa* Anc., based on the examples long ago distributed by Dr. J. D. E. Schmeltz, of the Museum Godeffroy, under the erroneous name of *H. Fischeriana*¹ Montr. (which may be identical with "*H. Picheriana*" of Paetel's Catalogue). The species is from Peleliu, Pelew Islands, and the color is very variable. The type specimen is grayish with a red basal callosity, but I have, since I published *H. rufocallosa*, procured other specimens having different shades of coloring.

2. *Helicina Funcki* Pfeiffer, originally described from New Granada (Funck), is also found at Greytown, Nicaragua. It has also been detected on Monkey Hill, near Colon, Isthmus of Panama, by Mr. Aillaud. The size of the two specimens collected in the latter spot is different, one of them being considerably smaller and tinged with pink-red on the last whorl.

OXYCHONA UNMASKED.

BY H. A. PILSBRY.

Those who have interested themselves in South American land shells will recall the group *Oxychona* of Mörch, containing a few acutely keeled, trochus-shaped Brazilian species, the best known of which is *Helix bifasciata* Burrow.

In Costa Rica and southern and eastern Mexico there are some similar Helices which had been placed in *Geotrochus*, *Corasia*, etc., but which the present writer in 1889² transferred to *Oxychona*. This disposition also commended itself to von Martens, who in 1893,² adopts the same view. In my "Guide to the Study of Helices," 1894, no doubt was expressed regarding the alliance of the

¹ The true *Fischeriana* is a larger shell, allied to *rufocallosa* (= *Rabei*) and is probably confined to the islands near eastern New Guinea.

² Man. Conch. (2), v, p. 128.

³ Biol. Centr. Americana, Moll., p. 152.

Brazilian and Mexican species, and by the kindness of Professor Gwatkin, of Cambridge, England, who supplied a mounted preparation, I was enabled to figure the jaw and teeth of *Helix bifasciata*, the type of *Oxychona*, and up to this time, the only species of the group to be dissected. At that time I called attention to the resemblance in dentition between *Oxychona*, *Papuina*, *Polymita* and other arboreal Helices, ending with an allusion to the teeth of *Otostomus* (now known as *Drymæus aurisleporis*). Recently while studying the *aurisleporis* group of *Bulimi*, I was again struck with the extreme resemblance of their radulæ to that of *Oxychona*. Now, since my former examination of *Oxychona*, the study of *Bulimulid* groups has been revolutionized by the discovery of extremely characteristic generic and subgeneric characters in the sculpture of the nepionic shell, as the part formed within the egg is called; so that I at once examined the apex of the *Oxychona*. The lens revealed in *H. bifasciata* and the other Brazilian species, the minutely "grated" sculpture of *Drymæus*! This combination of the very characteristic and peculiar nepionic sculpture of *Drymæus*⁴ with the equally characteristic dentition, conclusively show that *Oxychona* is a *Drymæus* masquerading as a *Helix*. The Central American and Mexican species referred to *Oxychona* have smooth apices, very different from the Brazilian group. There can be little doubt that these are true Helicidæ; and as they must now be cut adrift from *Oxychona*, I propose to reinstate for their reception the group name *Leptarionta* Crosse & Fischer, based upon *Helix bicincta* Pfr. This will stand as a genus, and may still be left in my group *Belogona euadenia* (dart bearers with true glands), next to *Lysinœ*, until more is known of the soft parts. At least one of the species, *L. trigonostoma*, is known to have a serrate keel on the tail like *Lysinœ*.

Figures of the apices of *Oxychona* and its *Bulimulid* allies may be found in the current volume of the Manual of Conchology. The evidence supplied by Semper, Hedley and myself that true Helices often appear disguised as *Bulimi*, now finds its counterpart in the *Bulimulidæ*, in such Helicoid species as *Bulimulus eremothauma* Pils., and that worst cheat of all, *Drymæus* (*Oxychona*) *bifasciatus* Burrow.

⁴ *Drymæus* includes not only the *Aurisleporis* group and the flaring lipped *Bulimuli* like *serperastus*, but also "*Bulimulus*" *dormani* and *multilineatus* among Floridian species, either of which, if unworn, will show the apical sculpture alluded to under a sufficiently strong lens. See NAUTILUS, IX p. 114.

ISAAC LEA DEPARTMENT.

[Conducted in the interest of the Isaac Lea Conchological Chapter of the Agassiz Association by its General Secretary, Mrs. M. Burton Williamson.]

A number of good reports have been promised. The volume of Transactions has been forwarded by Mrs. Mary P. Olney to Mrs. Drake, who will forward it to Mrs. King at Napa, Cala. By that time all our members will have received it.

In the November NAUTILUS Mr. Herbert Lowe's name appeared as "Howe" in the article on "Collecting During the Summer of '96."

The following nominations have been made for the officers of the Chapter for 1898: for President, Prof. Josiah Keep; for General Secretary, Dr. Wm. S. Strode.

Dr. William Healey Dall has named a new shell collected in Alaskan waters *Crenella Leana*, in honor of Dr. Isaac Lea, for whom our Chapter was named. The shell, a little bivalve, is described in a Bulletin issued by the Natural History Society of British Columbia, entitled "*Notice of Some New or Interesting Species of Shells from British Columbia and the Adjacent Region*," by William Healey Dall, Hon. Curator Dept. of Mollusks, U. S. National Museum. The Bulletin contains 18 pages, 2 plates, with 38 figures, and an index to all species mentioned in the text. Of the 30 species figured in this pamphlet, 27 are Dr. Dall's species, 23 are new species and 4 have been described by him but not figured in THE NAUTILUS. *Leda taphria* Dall, known on the West Coast as *L. cœlata* Hinds (non Conrad) is figured.—The October NAUTILUS for 1896, contains a note on this species.—The genus *Malletia* is for "the first time recorded from the northwest coast of America."

MORNING TIDES.

[From the report of Mrs. M. L. Beck. From the Transactions of the Isaac Chapter for 1896].

One bright day in June I was told we were to go collecting the next day at San Pedro, and as the tide would be low at half past three in the morning, we would have to go to the beach the evening before and stay all night at the cabin on the island. * * We ate supper, and while two of us got things ready for the night, the

rest went out on the breakwater to admire the scene. The high tide by moonlight was exquisitely beautiful.

At three o'clock, after having breakfasted, we started out to collect while the moon was still shining brightly on the water. The tide was so low it seemed to me we could have walked over to San Pedro. Mrs. O. and I lingered back of the other collectors, and soon she picked up a *Ranella californica* Hds., a fine specimen which now has a corner in my cabinet. How I did wish I could find one. I poked around with my trowel and suddenly I struck a lump; picking it up, it proved to be a perfect specimen of *Pleurotoma carpenteriana* Gabb, four and a quarter inches long. As I was afterward told, the only live one found in the bay. After returning to the cabin we put it in water, and when disturbed it exuded a purple fluid.

We walked to Dead Man's Island and found a number of *Actæon punctocelatus* Cpr. in the pools, *Marginella Jewettii* Cpr., *Phasianna compta* Gld. clinging to the sea grass on the rocks; plenty of *Fissurella volcano*, *Chlorostoma aureotinctum* and *Littorina planaxis* all along the breakwater. On our way back to the cabin we collected *Haminea virescens* Sby., *Bulla nebulosa* Gld., *Conus californicus* Hds. and *Nassa tegula* Rve. We also brought home a good many *Chione*, from which we made delicious soup.

In July we went to Alamitos Bay, five miles from Long Beach; it was another fine low tide. This time seven of us went in a wagon at four o'clock in the morning. We found *Crucibulum spinosum* Sby. on oyster shells, *Cerithidia californica* and *Melampus olivaceus* crawling up the grass stalks near the edge of the water, *Edalia subdiaphana*, *Angulus variegatus*, *Liocardium substriatum* and *Donax flexuosus* living as it seemed in harmony together, also *Amiantis callosa* Conr., *Tapes staminea* Conr., *Olivella batika* Cpr., and many other shells.

NOTES AND NEWS.

MOLLUSCAN FAUNA OF FRESHWATER LAKES IN CENTRAL CELEBES.—Herrn P. and F. Sarasin direct attention to the remarkable molluscs which live in the large and deep inland lakes of Celebes. The forms they were able to capture point to the existence of a fauna perhaps as interesting as that of the Lake of Baikal.

The authors begin with the new Gasteropod *Miratesta celebensis*, for the reception of which it seems necessary to establish not only a new genus, but a new family (Miratestidæ). The structure, which is briefly described, shows a combination of characters distinctive of various families. The animal is nearest the fresh water Pulmonates, especially the Limnæidæ, as is suggested by the *Planorbis*-like structure of the radula, the nervous system without chiastoneury, the hermaphroditism, and the absence of an operculum. But any very close affinity is impossible, as is shown by the large gills, the very peculiar pouched feelers, and the structure of the shell. Distant relations may, perhaps, be found in the so-called Thalassophilæ (*Amphibola* and *Siphonaria*). In any case, the family is phylogenetically old, near the base of the fresh water Pulmonates.

Bulletin 142 U. S. Geol. Survey, 1896, contains a valuable paper upon the geology and paleontology of northwestern Louisiana by T. Wayland Vaughan. A number of new mollusks from Lower Claiborne and Jackson stages of the Eocene are described and figured.

Mr. Charles Schuchert has given a very useful "Synopsis of American Fossil Brachiopoda, including Bibliography and Synonymy" in Bull. No. 87, U. S. Geol. Survey, 1897. The geological distribution, terminology, biological development and classification are discussed, and a valuable chapter contributed by Prof. Charles E. Beecher treats of the morphology of the brachia, a subject which in Beecher's hands has assumed great importance as an index of phylogeny and rank.

Mr. Félix Bernard has given a very thorough account of the anatomy of *Chlamydoconcha Orcutti* Dall, in Annales Sciences Naturelles (zool.), iv, 1896, pp. 221-252, with 2 plates.

A NEW PLICATE UNIO.

BY BERLIN H. WRIGHT.

Unio Walkeri sp. nov.

Shell solid, ovate, inflated at the umbos, rough, plicate-nodulose on posterior slope and indistinctly so anterior to the umbonal ridge; gradually fading out near the centre of the disk. Umbonal ridge uniformly rounded below and sharply angulate above. Epidermis nearly black; transmitted light showing a light-colored texture. Very faintly marked anterior to the umbonal angle with broad, widely separated, interrupted rays. Posterior margin bluntly rounded or somewhat disposed to biangulation, uniformly rounded before, dorsum arcuate, base nearly straight or emarginate, cavity uniform, moderate and scarcely extending under the dorsal plate. Teeth solid, single in the right and double in the left valve. Anterior cicatrices barely distinct. Thinner behind, showing the plica-

tions through. Nacre livid or bright pink. Width 2 in. length 1 in. diam. $\frac{5}{8}$ in.

Habitat: Suwannee River, Madison Co., Florida.

Remarks: A large series of this peculiar shell shows considerable variation in strength of, and area covered by the plications, sharpness of the umbonal ridge and color of nacre. It cannot, however, be mistaken for any other species. Its natural place is between *Unio subtentus* Say and *Unio penicillatus* Lea. We name it in honor of our esteemed conchologist Mr. Bryant Walker of Detroit, Mich.

POLYGYRA FERRISSI n. sp.

BY H. A. PILSBRY.

Shell resembling *Polygyra dentifera* Binn. in size and general form. Imperforate, thin, glossy, last two whorls of a very bright chestnut color, becoming light green on the earlier whorls. Spire very low, convex. Whorls $4\frac{2}{3}$, all rather convex, the first minutely rugose, granulate, following whorls of the spire slowly widening arcuately striate and sparsely granulate, the granules oblong, generally upon the striæ; last whorls rapidly widening, a trifle constricted behind the peristome, very little descending in front, sculptured with fine, rather low striæ of growth and very fine, sub-obsolete close spiral impressed lines; base very little impressed at the center. Sutures well impressed throughout. Aperture oblique, wide-crescentic; peristome white, shading through pink to a broad purple band at the margin, *very broad and flatly reflexed*, appressed over and closing the umbilicus; parietal wall with a transparent film between the lips, and bearing a small oblique tooth nearer to the termination of the outer than to that of the basal lip.

Alt. 13, greatest diam. 21.5, least 18 mm.

Alt. 11, greatest diam. 20, least 16.5 mm.

Klingman's Dome and Mirey Ridge, Great Smoky Mountains (between Tenn. and N. C.).

Mr. Jas. H. Ferris found this very beautiful *Helix* during his summer journey in the Great Smoky range this year, with the banded form of *Polygyra Andrewsæ*, a very dark, unicolored form of the same, *P. Clarkii* of extraordinary size, and other interesting snails.

P. Ferrissi is intermediate between several very distinct *Helices*. It has the convex green and granulate inner whorls of *P. subpalliatata* Pils., the fragile substance and flat, wide lip of *P. dentifera* Binn., and the sculpture of the last whorl somewhat like *P. appressa perigrapta* Pils.

The combination of these characters, together with the deep, rich reddish chestnut color of the body-whorl, emphatically negative a reference of the specimens to any of these species. The half-grown shell, 14 mm. diam., has an umbilicus 1 mm. wide and is very obsoletely angular at the periphery.

96. POLYGYRA RUGELI (Shuttl.). Wythe Co., Va., south to Columbus, Ga., and west to Clinton, Ark.

97. POLYGYRA INFLECTA (Say). Pennsylvania west of the Allegheny Mts., west to Illinois, south to Sea Islands of Georgia, Alabama, Mississippi and Indian Territory.

98. POLYGYRA EDENTATA (Sampson). Boston Mts., Washington and Crawford Counties, Arkansas (*Triodopsis edentula* W. G. Binney is the same).

* * *

99. POLYGYRA DEVIA (Gld.). Vancouver Is. and Puget Sound region south to 46° N. Lat.

99a. POLYGYRA DEVIA HEMPHILLI (W. G. B.). Kingston and Old Mission, Idaho; Spokane, Wash. (synonyms are *Helix binominata* Tryon, *H. mullani* var. *olneyæ* Pilsbry).

99b. POLYGYRA DEVIA MULLANI (Bld. & Coop.). Near Coeur d'Alène Mission, Coeur d'Alène Mts., Idaho; west side of Bitter Root Mts., Wash.

99c. POLYGYRA DEVIA HARFORDIANA (W. G. B.). Salmon River, Idaho (*H. salmonensis* Tryon and *H. commutanda* Ancey are synonyms).

99d. POLYGYRA DEVIA CLAPPI (Hemph.). Salmon River, Idaho.

99e. POLYGYRA DEVIA BLANDI (Hemph.). Salmon River, and Post Falls, Idaho.

99f. POLYGYRA DEVIA OREGONENSIS (Hemph.). Eastern Oregon.

100. POLYGYRA SANBURNI (W. G. B.). Kingston and Old Mission, Idaho.

101. POLYGYRA COLUMBIANA (Lea). Sitka to Santa Cruz, Cal.

101a. POLYGYRA COLUMBIANA LABIOSA (Gld.). Coeur d'Alène Mts., Idaho; Deer Lodge Valley, Montana.

102. POLYGYRA ARMIGERA (Ancey). San Francisco, Cal., to Vernon, B. C.

103. POLYGYRA ROPERI Pilsbry. Redding, Shasta Co., California.

104. POLYGYRA LORICATA (Gld.). Eldorado to Fresno Co. west to Sonoma Co.

* * *

105. POLYGYRA PROFUNDA (Say). Western New York to Minnesota and Wyandotte Co., Kansas, south to Lee Co., Va., and Vicksburg, Miss.; not east of the Allegheny Mts. in Pennsylvania and Maryland.

106. POLYGYRA SAYII (Binn.) Quebec, Ont., northern Maine and Mich., south to Great Smoky Mts., N. C.

106a. POLYGYRA SAYII CHILHOWEENSIS (Lewis). Mountains of east Tennessee and western North Carolina.

107. POLYGYRA KIOWAENSIS (Simpson). Kiowa Station, Limestone Gap and near Eufaula, Indian Territory.

107a. POLYGYRA KIOWAENSIS ARKANSÆNSIS Pils., near Hot Springs, Ark.

108. POLYGYRA TOWNSENDIANA (Lea). Del Norte Co., Cal., to Seattle, Wash.

108a. POLYGYRA TOWNSENDIANA PTYCHOPHORA (Brown). Deer Lodge, Montana, west through northern Idaho to Spokane, Wash., and in northern Oregon west to the Dalles. There is a color form, *castanea* Hemph.

* * *

109. POLYGYRA ALBOLABRIS (Say). Canada to Kansas, Arkansas and Georgia. The form *dentata* Walker occurs in Michigan, etc.

109a. POLYGYRA ALBOLABRIS ALLENI Wetherby. Arkansas.

109b. POLYGYRA ALBOLABRIS MARITIMA Pils. New Jersey shore. Var. *traversensis* Leach ms. from Michigan is scarcely distinguishable.

109c. POLYGYRA ALBOLABRIS MAJOR (Binn.) Northern Alabama and eastern Tennessee to North Carolina and Macon, Ga.

110. POLYGYRA EXOLETA (Binn.). Western New York and Pennsylvania to Illinois and Missouri, south to Virginia, Georgia and Alabama.

111. POLYGYRA MULTILINEATA (Say). Western New York to Minnesota and Iowa; Wyandotte, Ks.

112. POLYGYRA DIVESTA (Gld.). Vernon Co., Miss., to Indian Terr.; Louisiana, Arkansas and Barry, Jasper and Dade Counties, Mo.

113. POLYGYRA ROEMERI (Pfr.). Central Texas, Fort Worth to Bexar Co.

114. POLYGYRA WETHERBYI (Bld.) Whitly and Pulaski Co., Ky., and Roane County, Tenn.

115. POLYGYRA DENTIFERA (Binn.). Province of Quebec, Canada, southwest to Swaim Co., N. C.

116. POLYGYRA FERRISSII Pilsbry. Mirey Ridge and Klingman's Dome, Great Smoky Mts.

117. *POLYGYRA SUBPALLIATA* Pils. Roan Mt. region to Cranberry, N. C.

118. *POLYGYRA PALLIATA* (Say). Ontario to Michigan, south to Georgia and Louisiana.

119. *POLYGYRA OBSTRACTA* (Say). Ohio and Indiana south to northwestern Georgia and Batesville, Ark.

119a. *POLYGYRA OBSTRACTA CAROLINENSIS* (Lea). South Carolina; northern Alabama, and adjacent parts of Tennessee and Georgia.

119b. *POLYGYRA SARGENTIANA* (Johnson & Pilsbry). Near Woodville, Alabama. *Helix sargenti* J. & P., not Bld., is a synonym.

119c. *POLYGYRA APPRESSA* (Say). Western Pennsylvania and Scott Co., Virginia, west through Ohio, Indiana, Illinois and Missouri, south to Arkansas and Kentucky.

119d. *POLYGYRA APPRESSA PERIGRAPTA* Pils. Tennessee and adjacent parts of bounding States N., E. and S.

* * *

120. *POLYGYRA ELEVATA* (Say). Western New York to Wisconsin, south to northwestern Georgia and Missouri; Wyandotte, Kansas. The form with a brown band has been called *f. cincta* Taylor. Chattanooga and Knoxville, Tennessee.

121. *POLYGYRA CLARKII* (Lea). Cherokee and Clay Counties, N. C., E. Tennessee, N. W. Georgia.

122. *POLYGYRA PENNSYLVANICA* (Green). Western Pennsylvania to Illinois, S. to Monroe Co., Virginia, and Tennessee.

* * *

123. *POLYGYRA ANDREWSÆ* (W. G. Binn.). Roan and Great Smoky Mts., Tenn., Habersham Co., N.-E. Ga., and Bibb Co., Central Ga.

124. *POLYGYRA THYROIDES* (Say). Canada to Minnesota, south to St. Simons I., Ga., and Texas.

124a. *POLYGYRA THYROIDES PULCHELLA* Ckll. Toronto, Canada.

124b. *POLYGYRA THYROIDES BUCCULENTA* (Gld.). Louisiana and Texas. Hardly recognizable as a variety.

125. *POLYGYRA CLAUSA* (Say). Western Pennsylvania to Minnesota, south to Wyandotte, Kansas, Jackson Co., Ala., and Sea Islands of Georgia.

126. *POLYGYRA WHEATLEYI* (Bld.). Mountains of western N. C.; Habersham Co., Ga.

127. *POLYGYRA CHRISTYI* (Bld.). Mountains of Cherokee, Swain and Rutherford Counties, N. C.

128. *POLYGYRA MITCHELLIANA* (Lea). Western Pennsylvania, Ohio and Kentucky, Monroe Co., Va., and Cherokee Co., N. C.

129. *POLYGYRA DOWNIEANA* (Bld.). Whitley Co., Ky.; eastern half of Tennessee.

130. *POLYGYRA LAWÆ* (Lewis). Hayesville, Clay Co., N. C.; Monroe Co., Tenn.; Houston, Hall and Habersham Counties, Ga.

130a. *POLYGYRA LAWÆ TALLULAHENSIS* Pils. Tallulah Falls, Georgia.

131. *POLYGYRA MOBILIANA* (Lea). Mississippi to Baldwin, Florida, along the Gulf.

132. *POLYGYRA JEJUNA* (Say). Savannah, Ga., S. to Indian River and No Name Key; west to Pensacola, Florida.

Section *Stenotrema* Rafinesque.

133. *POLYGYRA SPINOSA* (Lea). Eastern Tennessee, N. Alabama, and northwest Georgia.

134. *POLYGYRA LABROSA* (Bld.). Northern Alabama, Arkansas, southern Missouri.

135. *POLYGYRA EDGARIANA* (Lea). Mountains of Tennessee and Alabama.

136. *POLYGYRA EDWARDSI* (Bld.). Fayette or Greenbrier County, W. Va., Laurel, Whitley and Pulaski Counties, Ky.

137. *POLYGYRA BARBIGERA* (Redf.). Habersham and Hall Counties, Ga.; Cherokee Co., N. C., also Alabama.

138. *POLYGYRA STENOTREMA* (Fér.). Henry Co., Ill. to Virginia, south to Georgia, southwest to Indian Territory.

138a. *POLYGYRA STENOTREMA SUBGLOBOSA* Pils. Woodville, Alabama.

138b. *POLYGYRA STENOTREMA DEPILATA* Pils. Thunderhead Mt.; near Nashville, Bellevue and Johnson City, Tenn.

139. *POLYGYRA HIRSUTA* (Say). Canada to Minnesota, south to Wyandotte, Kansas, and Jackson Co., Ala. (also reported from near Guaymas, northwestern Mexico).

139a. *POLYGYRA HIRSUTA ALTISPIRA* Pils. Magnetic City, Roan Mountain, and Black Mountains, N. C.

140. *POLYGYRA MAXILLATA* (Gld.). Mountains of Tennessee, Alabama and Georgia (near Columbus).

141. *POLYGYRA MONODON* (Rack). Canada to Minnesota, south to North Carolina and San Antonio, Texas.

(To be continued.)

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SOME NEW EOCENE FOSSILS FROM ALABAMA.

BY T. H. ALDRICH.

Anomia navicelloides n. sp.

Shell thin, pearly, with lines of growth on the outer surface of the superior valve, very nacreous and shining within, the upper valve having a distinct beak, not marginal. Surface bearing traces of broad radial color bands; interior showing three cicatrices, the larger one with semicircular lines and fine striations crossing them.

Breadth of superior valve 13 mm., width 23 mm.

Locality.—Near Choctaw Corner, Ala., Wood's Bluff horizon. Has very much the appearance of a *Navicella*, which has suggested the name. Only the upper valve so far discovered.

Odontostomia matthewsensis n. sp.

Shell small, medium thickness; smooth, whorl six, spire rather blunt, suture impressed; aperture rather narrow, with one strong fold on the columella, also partly reflected and rather pointed at base.

Length $3\frac{1}{2}$ mm., width 1 mm.

Locality.—Matthews Landing, Alabama.

Cancellaria annosa n. sp.

Shell small, spire obtuse, whorls four, shouldered, strongly cancellated, nodular at junction of lines, the revolving line below the suture more strongly nodular than the others; outer lip expanded, nodular within; columella with two folds.

Height $2\frac{1}{2}$ mm., breadth $1\frac{1}{2}$ mm.

Locality.—Matthews Landing, Alabama Rv., Alabama. While the type specimen is a young shell, yet the characters are very distinct from any other species known.

Cancellaria graciloides n. sp.

Shell broadly fusiform, spire elevated, whorls 6-7, rounded, slightly shouldered, cancellated, first three smooth, on the others the revolving lines are numerous, strongly defined; lines of growth smaller and much finer than the revolving lines, suture deeply impressed, outer lip expanded, strongly nodular within, columella with three folds, aperture pointed and canaliculate at base.

Height 12 mm., width 7 mm.

Locality.—Gregg's Landing, Alabama Rv., Alabama.

Cancellaria graciloides var. *bella* n. var.

Characterized by strong, rounded varices, as many as three on the body whorl. Shell is smaller than the type.

Height 10 mm., width 6 mm.

Locality.—Gregg's Landing, Alabama Rv., Ala.

A PROPOSED CENSUS OF MICHIGAN MOLLUSCA.

BY BRYANT WALKER.

At the Annual Meeting of the Michigan Academy of Science in December, 1895, a suggestion was made that the conchologists of the State should form a "Section of Conchology" for the purpose of united work in that department.

A circular of inquiry elicited such favorable responses, that in the spring of the following year a temporary organization was effected with a membership of fourteen as noticed in the NAUTILUS for April, 1896. At the present time the membership includes every active collector in the State so far as known. Practical work being the object of the Section, it was decided, as a preliminary step to the complete knowledge of the fauna of the State, to undertake the compilation of all the known localities for every species known, or supposed to belong to it. A form of blank was prepared for distribution upon which the individual reports should be made, and another upon which these reports should be tabulated. A special map of the State has also been printed showing the principal river and lake systems upon which it is proposed to spread these tabulated

results, and thus form a permanent record, which should show at a glance all that was known of the distribution of every species belonging to the State. These maps it was believed would be of value in studying the various questions which might arise in regard to the present distribution of the fauna and the means by which it has been brought about. Up to the present time there have been filed twelve reports, which include all the private collections of the State and nearly all the public museums. The collection of the University of Michigan is now being worked over and arranged by Mr. H. E. Sargent, and the report from the Kent Scientific Institute of Grand Rapids is expected during the coming winter. As soon as these are received, the Section will be in possession of all existing data to be obtained from State sources in regard to the extent and distribution of the molluscan fauna.

These reports aggregate more than 4,500 entries, and include nearly every species that has ever been quoted from Michigan.

It is proposed also that every member of the Section shall annually file a supplemental report containing such additional information as he can supply. In this way it is expected that the records of the Section will be continually kept up to date, and at all times afford the collectors of the State and others interested in the subject, not only a correct statement of what is actually known of the State fauna, but also indicate in what sections of the State field work should be done and what species require further investigation.

The value of this work has already been demonstrated by a series of charts which have recently been completed showing the distribution of the *Unionidæ*. Some of the results deduced from them were quite unexpected, and are believed to be of great value in determining the manner in which geological and geographical factors have influenced the present range of many of the species. This will be made the subject of a special report to the Academy at its Annual Meeting.

It has been suggested that there are undoubtedly in the cabinets of many of the readers of the NAUTILUS interesting material from Michigan, a record of which would be a valuable addition to the data now in the possession of the Section. In all probability a large amount of collecting has been done in the State at one time or another by those who were not residents, and whose collections are not represented in any of the reports thus far received. It is very desirable that every possible source of information should be made

available for the work in progress, and the members of the Section will be very grateful for any assistance they may receive from their brethren of other States.

In behalf of the Section of Conchology, I would therefore earnestly request that all collectors, who have any Michigan shells in their collections, would furnish a list of the species and localities, which may be filed for permanent record. Blanks will be gladly furnished for that purpose to any one who will address the writer at 18 Moffat Building, Detroit, Michigan.

ON A NEW SPECIES OF VITREA FROM MARYLAND.

BY WM. H. DALL.

The land shell fauna of the north-eastern U. S. has been so thoroughly searched, and by so many collectors, that we do not expect the addition to it of good and valid new species, unless among the minuter forms like *Vallonia*. However, as if to prove that hope may spring eternal in the conchological breast, a new species with undoubtedly distinct characteristics has come to hand from Maryland.

Vitrea Raderi n. sp.

Shell depressed, four-whorled, smooth except for faint rather regularly spaced incremental lines above, of a pale waxen whitish color; spire hardly raised above the last whorl, which is much the largest; periphery evenly rounded, suture appressed, base moderately rounded, the umbilical slope of the last whorl somewhat flat-tish; umbilicus very wide, exhibiting all the volutions; aperture wider than high, the upper margin slightly in advance of the lower lip, the two connected by a thin wash of callus over the body. Alt. 1.5, max. diam. 4.0, min. diam. 3.0 mm.

Received from Prof. Howard Shriver, as collected at Cumberland, Md., in the summer of 1897; a single specimen.

The nearest relative of this species is *Zonites wheatleyi* Bland, which is a larger shell with higher spire, more rounded whorls and a much smaller and more steep sided umbilicus. It may be mentioned that the figure of *Vitrea wheatleyi* in Binney, Bull. 28, U. S. Nat. Mus., is inaccurate in representing the umbilicus as wider than it really is in that species. The large form of *Z. wheatleyi* referred

to by Binney (p. 222) as collected by Hemphill at Clingman's Peak, North Carolina, is doubtfully identical with Bland's type, and should take the varietal name of *V. clingmani*, which may eventually prove of specific rank.

The present species is named in honor of Mr. Rader, an interested student of the land shells of Cumberland, at the request of Prof. Shriver. The type is in the National Museum.

A NEW UNDULATE UNIO FROM ALABAMA.

BY BERLIN H. WRIGHT.

Unio triumphans sp. nov.

Shell sub-triangular, with an elevated wing which is connate at its point, coarsely and interruptedly undulate over the entire disk, except on the extreme anterior and superior parts where pustulations and lacerations replace them. Disk gradually and uniformly flattened out to the margins from the highest point near its centre: the indistinct umbonal ridge dividing the disk area into two nearly equal parts. Substance of the shell moderately thick; thicker before. Epidermis dead black. Greatest diameter in the center of the shell. Dorsal notch very long and deep. Cavity of the beaks deep. Posterior cicatrices confluent; anterior ones distinct. Lateral teeth short and distant from the cardinals which are depressed. Nacre dull white in front and a bright coppery tinge behind, and very iridescent. Width 4 inches, length 5 inches, diameter 2 inches.

Habitat, Coosa River, St. Clair Co., Alabama.

Type in National Museum.

Remarks: For several years we have had old specimens of this shell and could not place them satisfactorily with any known form. In a recent collection of one thousand shells from this vicinity we found twenty specimens of all ages which at once made its novelty apparent.

The natural place we assign the species is between *U. boykinianus* Lea and *U. multiplicatus* Lea, and it also possesses characters of *U. undulatus* Barnes. Compared with the first, our shell is more winged and therefore more triangular in outline; the ridges are fewer, not so prominent and more broken, like *Unio undulatus*

Barnes, and the umbonal ridge is not as well defined; the laterals are shorter and the shell is more transverse; the undulations cross the umbonal elevation instead of running parallel with it and the beaks are less prominent. Compared with *U. multiplicatus* Lea our shell is subtriangular in outline instead of trapezoidal, always more winged and shorter, and the laterals are also shorter; the posterior slope is more gradual and the umbones are not flattened, and are more depressed than in that species, the highest point being nearly in the centre of the disk where there is quite a prominence; the cardinals are more depressed and the pustulations extend more generally over the anterior portion.

In old specimens the sculpture diminishes almost to smoothness except in the superior parts, the umbonal elevation becomes obsolete and the shell is more elongated. Twenty specimens of all ages have been compared with specimens of corresponding ages of all the allied species, and comparisons with the type forms in the National Museum have been made through the kindness of Mr. Charles T. Simpson.

MODIOLA PLICATULA LAMARCK—AN EXTINCT LOCALITY.

BY R. E. C. S.

Fifty years ago, more or less, that part of the city of Boston which includes the Public Garden and the grand array of fine avenues and streets that reach out east and west, north and south, and form what is locally known as the Back-Bay Section, was a portion of a larger territory, some six hundred acres, of wet and dry marsh and mud flats, that extended from Charles Street at the foot of "Boston Common," to Roxbury. A considerable portion of this region was inhabited by a peacefully disposed and quiet community. In numbers this community, certainly if counted, would have made a bigger showing than the census of human bipeds that constituted the population of Boston at that time. Though numerous, they were not influential and had no social status among the best people of "Modern Athens."

This may have been owing to the fact that *their* ancestors did not come over in the Mayflower, or later with Winthrop and Saltonstall. No, they were here, or their forefathers were, long before the advent of the "Pilgrim Fathers;" they had an older claim, prior-

ity of settlement and occupancy, than any white man. Their title was aboriginal, and they were and had been, from time immemorial, permanent residents "to the manner born." Whether their lack of social position was due to the fact that they did not recognize the merits of "baked beans and brown bread," "cod-fish balls" and "pumpkin pie," etc., as gastronomic delicacies, or were unable to sing "pennyroyal hymns" through their noses—having no noses to sing through—can only be surmised, as they were not given to gossip or backbiting, but always maintained a discreet and dignified silence. While they were the only permanent residents, they often had transient visitors. Various salt-water birds frequented the region at certain times in the year. Yellow-legs, doe birds, curlew, teal duck and other species were pretty certain to make a short visit whenever a "northeaster" was brewing.

The locality now known as Copley Square, with its impressive buildings, Trinity Church, the Art Museum and the new "Old South," was good hunting ground in those days. Most people, including many credulous or unsophisticated Bostonians, honestly regard these church edifices as erected for religious purposes, and think, too, that the "Museum of Fine Arts," of which they are very proud, is intended to foster and encourage the work of painters and sculptors. No one will deny such persons the right of opinion, even if it does rest upon a hallucination; on the other hand a fellow may be pardoned who sees in these "places of worship" simply funeral monuments sacred to the memory of the thousands of harmless mollusks, *Modiola plicatula*, that were buried alive in a so-called Christian city in the nineteenth century, with no one to say a word in their behalf. And the Art Building! What of that? It may be regarded as commemorative of the fact that the spot whereon it stands was good hunting ground in days long since gone by, and that hereabout my father (of blessed memory) and myself oftentimes successfully pursued ornithology for gastronomic purposes.

In course of time, it is highly probable, suitable tablets will be placed in front of the principal buildings bearing the following inscription:—

"The region hereabout was formerly inhabited by a branch of the great aboriginal family MODIOLA. The members of the local tribe, PLICATULA, were peaceful in their lives, simple in their habits, never told lies, never talked back to old people, and met their fate without a murmur.

"Keep their memory green."

ISAAC LEA DEPARTMENT.

[Conducted in the interest of the Isaac Lea Conchological Chapter of the Agassiz Association by its General Secretary, Mrs. M. Burton Williamson.]

As the annual election of officers for 1898 is not held until the last Wednesday in December, the results of the election will not be published this month. Next month the newly-elected General Secretary will have charge of this department.

RECORD OF A LOST YEAR.

[Extract from the report of Mrs. M. T. B. From the Transactions of the Isaac Lea Chapter for 1896].

This year I have found no shells new to my collection, but have learned more about some of the old ones. *Conus californicus*, which I found at Newport, Cal., last year in the mud bottom of the bay, I find among the rocks, clinging to the sea weeds. These last are bright and shining, while those from the bay have an epidermis. A learned friend, to whom I refer all my difficulties, thinks the epidermis is worn off by the action of the water and rocks. But I found them in a deep cut in the rocks, where the high tide covered and the low tide left them—a very sheltered place. We are not credited with two species on our California coast, yet I find two which differ in color and size—one is brown, mottled with lighter spots, the other is plain, paler in color, and reaches double the size of the spotted one. The operculum of *Conus* is the merest excuse, just a thread, and not half the length of the aperture.

Under the same rocks I found *Leptothyra*, with rough, limy surface, but with such exquisite operculi, shelly white, with a spiral line in brown. And then there were the pretty little *Corbula luteola* and *Carditamera subquadrata*, the last place I should have looked for bivalves.

I have become interested somewhat in sea-slugs, and have tried to make water-color drawings of some of them, as I know of no way to preserve them without destroying their color.

Two rare shells have come under my observation during the year, both from Newport, and both were Trophons. *Pecten hastatus*, which is called a northern species, is occasionally found here also, and, though I have seen but few of the northern shells, those I have seen are not nearly so brilliant as those from Newport Beach.

141a. *POLYGYRA MONODON FRATERNA* (Say). Pennsylvania to Texas.

141b. *POLYGYRA MONODON ALICLÆ* Pils. Calcasieu Parish, S.-W. Louisiana.

141c. *POLYGYRA MONODON CINCTA* Lewis. Hayesville, N. C.

142. *POLYGYRA LEAI* (Ward). Ohio and Michigan to Minnesota, south to Nashville, Tennessee, and Neosho Co., Kansas.

143. *POLYGYRA GERMANA* (Gld.). Astoria, Oregon, to Vancouver Island.

Genus **POLYGYRELLA** Binney, 1863.

144. *POLYGYRELLA POLYGYRELLA* (Bld. & Coop.). Coeur d'Alène Mts., Idaho. A variety *montanensis* Ancey is described from Deer Lodge Valley, Montana.

145. *POLYGYRELLA HARFORDIANA* (Coop.). Fresno Co., California, in the "Big Tree" District, 6500 feet above the sea.

Subgenus *Ammonitella* Cooper, 1869.

146. *POLYGYRELLA YATESI* (Coop.). Calaveras Co., California, at Murphy's and Cave City.

Subfamily **Sagdinæ** (*vel Teleophallogona*).¹

Genus **THYSANOPHORA** Streb. & Pfeffer, 1880.

147. *THYSANOPHORA INCRUSTATA* (Poey). Corpus Christi, Galveston and Hidalgo, Texas. Also Cuba.

148. *THYSANOPHORA HORNII* (Gabb). Fort Grant, Arizona; summit of Hachita Grande Mt., Grant Co., New Mexico; also Yaqui River, Mexico.

149. *THYSANOPHORA VORTEX* (Pfr.). Marco, near Cape Sable, and Key West, Florida. Also Bermuda and West Indies.

150. *THYSANOPHORA INGERSOLLI* (Bld.). Colorado, at high altitudes: San Juan, Custer and Mesa Counties; Fly Park, Arizona.

150a. *THYSANOPHORA INGERSOLLI CONVEXIOR* (Ancey). Logan Canyon, Utah; Weston, eastern Oregon.

151. *THYSANOPHORA PLAGIOPTYCHA GRANUM* (Streb.). Archer, Alachua Co., Evans' plantation, Rogers River, and vicinity of Lake Worth, Florida. Also eastern Mexico and Yucatan, and typical *plagioptycha* from Porto Rico.

¹ This subfamily should have preceded the *Polygyrinæ*.

152. *THYSANOPHORA DIOSCORICOLA CÆCA* (Guppy). Lake Worth to St. Augustine in eastern, and near Hillsborough River in western Florida; Hidalgo, Texas. Also Trinidad, and typical *dioscoricola* from Jamaica.

Family **BULIMULIDÆ**.

Genus **BULIMULUS** Leach, 1815.

Subgenus *Orthotomium* Crosse & Fischer.

153. *BULIMULUS DEALBATUS* (Say). Southern North Carolina, west to Kentucky, Central Missouri and Kansas; south to Alabama and the Rio Grande.

153a. *BULIMULUS DEALBATUS RAGSDALEI* Pils. Texas: Cook and Montague Co. on the Red River, and at Comstock, etc., on the Rio Grande.

153b. *BULIMULUS DEALBATUS MOOREANUS* (Pfr.). Texas; mainly from Fort Worth to De Witt and Uvalde Counties. [This is the shell generally known as "*B. schiedeanus*" in American collections].

153c. *BULIMULUS DEALBATUS SCHIEDEANUS* (Pfr.). Western Texas; mainly Mexican, Texas specimens being still rare in collections.

154. *BULIMULUS ALTERNATUS MARLÆ* (Alb.). Texas: two or three tiers of counties north of the Rio Grande, from Corpus Christi to Frio and Valverde Counties. The typical *alternatus* has not yet been found north of the Rio Grande.

Genus **DRYMÆUS** Albers, 1850.

155. *DRYMÆUS SERPERASTRUM* (Say). A Mexican species, said to occur also north of the Rio Grande in Texas.

156. *DRYMÆUS DORMANI* (W. G. Binn.). St. Johns River Valley and east coast; also West Florida, south to Caloosahatchee River.

156a. *DRYMÆUS DORMANI ALBIDA* Wright. Eastern Fla.

157. *DRYMÆUS MARIELINUS* (Poey). S. Florida; Upper Matcumba Key, N. to Micco on the east coast.

158. *DRYMÆUS FLORIDANUS* (Pfr.). Florida.

159. *DRYMÆUS HEMPHILLI* (Wright). East Florida, between Mosquito Lagoon and the Atlantic; Lake Helen, Volusia Co.

Section *Mesembrinus* Albers.

160. *DRYMÆUS MULTILINEATUS* (Say). Key West, Bahia Honda Key and Lower Matacumba Key, and north to Marco on the west coast of Florida; also Venezuela.

Genus *ORTHALICUS* Beck, 1837.

161. *ORTHALICUS UNDATUS* (Brug.). Key West to the neighborhood of Bay Biscayne, Florida; also West Indies, Jamaica, etc.

162. *ORTHALICUS MELANOCHEILUS FLORIDENSIS* Pils. Florida, near Cape Sable; Pavilion Key.

Genus *LIGUUS* Montfort, 1810.

163. *LIGUUS FASCIATUS* (Müller). Southern Florida; Key West, Lignum Vitæ and Grassy Keys, to Key Biscayne; on the Gulf Coast from Cape Sable to Goodland Point, near Marco. There are numerous color varieties.

Family *UROCOPTIDÆ* Pilsbry.

Genus *UROCOPTIS* Beck, 1837.

Section *Cochlodinella* Pils. & Van., 1898.

164. *UROCOPTIS POEYANA* (Orb.). Key West and adjacent keys; Miami Country, Florida.

165. *UROCOPTIS JEJUNA* (Gld.). Near mouth of Miami River, Florida.

Genus *MACROCERAMUS* Guilding, 1828.

Section *Microceramus* Pils. & Van., 1898.

166. *MACROCERAMUS PONTIFICUS* (Gld.). Key West to Key Biscayne, and northward to Tampa, Florida.

167. *MACROCERAMUS FLORIDANUS* Pilsbry. Sarasota Bay and Goodland Pt., Florida (= *M. Gossei* of authors part, not of Pfr.).

168. *MACROCERAMUS TEXANUS* Pilsbry. New Braunfels, Texas (= *M. gossei* auct. part, not of Pfr.).

Genus *HOLOSPIRA* Von Martens, 1860.

Section *Holospira* s. s.

169. *HOLOSPIRA GOLDFUSSI* (Mke.). Texas, on the Blanco and at New Braunfels, Comal Co.

Section *Haplostemma* Dall.

170. HOLOSPIRA MEARNsii Dall. Top of Hachita Grande Mt., Grant Co., New Mexico.

171. HOLOSPIRA HAMILTONI Dall. Rio Grande Mts., Brewster Co., Texas, 3,500 ft. elevation.

172. HOLOSPIRA COCKERELLI Dall. Débris of Rio Grande River at Mesilla, New Mexico.

Section *Eudistemma* Dall.

173. HOLOSPIRA ARIZONENSIS Stearns. Dos Cabezas, Arizona.

Section *Distomospira* Dall.

174. HOLOSPIRA BILAMELLATA Dall. Hachita Grande Mt., New Mexico.

Subgenus *Metastoma* Strebel & Pfeffer.

175. HOLOSPIRA ROEMERI (Pfr.). New Braunfels, Comal Co., Texas.

176. HOLOSPIRA CROSSEI Dall. Top of Hachita Grande Mt., Grant Co., New Mexico.

177. HOLOSPIRA PASONIS Dall. Mule Canyon, El Paso Co., Texas, 4,000 ft. alt.

178. HOLOSPIRA PILSBRYI Dall. Arizona or New Mexico, exact locality unknown. State of Puebla, Mexico.

Genus *CERION* (Bolt.) Morch, 1852.

179. CERION INCANUM (Binn.). Florida Keys and mainland at Cape Florida. (A specimen of the Cuban *C. mumiola* has been found at Tortugas, but probably it was accidentally imported in some manner. No indigenous land shells are known from the Tortugas.)

Family PUPIDÆ.

Genus *STROBILOPS* Pilsbry, 1892.

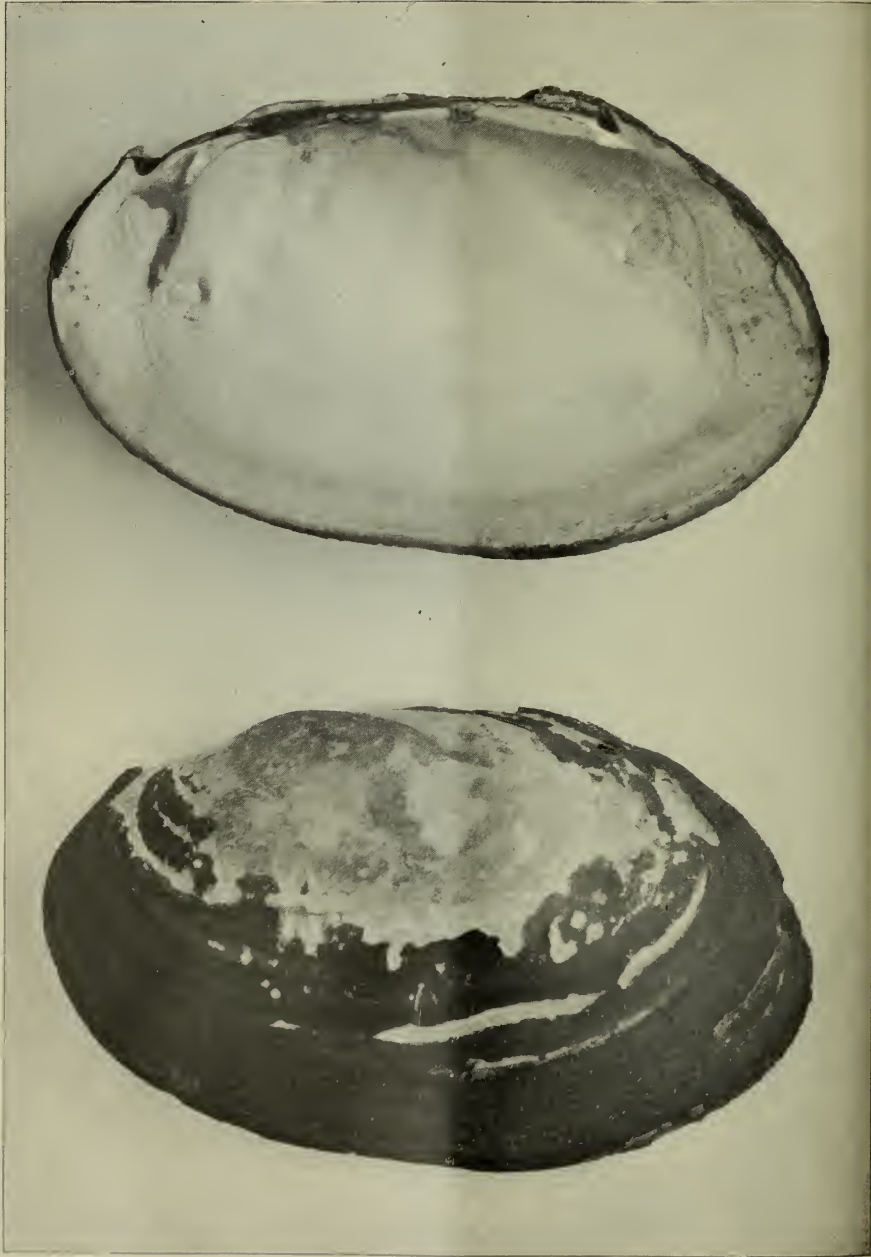
(= *Strobila* Morse, 1864, not of Sars, 1835, Acalepha, nor of Sod., 1837, Lepidoptera, nor *Strobilus* Anton, 1839, Mollusca).

180. STROBILOPS LABYRINTHICA (Say). Most of the eastern U. S., southwest to Texas.

180a. STROBILOPS LABYRINTHICA STREBELI (Pfr.). Jackson Co., Ala.; Northern Florida; Eastern Mexico.

(To be continued.)

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UNIO AMPHICHÆNUS FRIERSON.

THE NAUTILUS.

VOL. XI.

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No. 10.

UNIO (LAMPSILIS) AMPHICHÆNUS, N. Sp.

BY LORRAINE S. FRIERSON.

Shell large, oblong oval, thin, slightly inflated, gaping for one-half its length at the anterior and basal part, and at the upper part of the posterior end, and covered with a shining, black or brownish epidermis which is decidedly wrinkled in places; growth lines strong and irregular; beaks but slightly prominent; hinge line evenly curved; hinge teeth but feebly developed, there being a single, compressed, rather sharp cardinal in the left valve of the young shell which becomes blurred and shows a tendency to split up in the older shells, and two rather short, faint laterals, the inner of which is the stronger; these being placed at the extreme posterior end of the hinge plate, with one cardinal, and sometimes a faint one above it, and a single, compressed, short lateral in the right valve; laterals ending abruptly at the posterior end, with the inner edges slightly curved upwards; area between the teeth narrow and rounded; muscle scars distinct, and quite deep for so thin a shell; posterior retractor scar completely united with the adductor, dorsal scars to the number of five or six extending in a row from the cavity of the beaks just behind their greatest projection towards the anterior base; pallial line showing a tendency to break up into several lines, and distinct traces of a posterior sinus; nacre clouded, varying from deep violet to bluish and white.

Length 106, height 63, diam. 36 mm.

Habitat, Sabine River at Logansport, Louisiana.

This is one of the most distinct and remarkable *Unios* in the United States. In its general structure, the hinge characters, the row of dorsal cicatrices, the incipient pallial sinus, and the gaping shell it shows relationship with *Unio tenuissimus*, and its nacre is something like that of this species, but the female shell is considerably swollen in the post-basal region, and it reminds one a little of a short, compressed, female *Unio rectus*. The posterior opening, however, is its most remarkable character, commencing about midway up the end of the shell, and extending nearly to the ends of the laterals. This gap ends abruptly above, and less so below; the edges of the shell are reflected outwards, and considerably lamellicated, and in old shells the remains of former reflected apertures may be seen. The opening in a fully adult shell is about one-fourth of an inch wide and one and one-fourth inch in length, and is as distinct as that of *Schizothærus nuttalli* of the west coast of the United States, and occupies about the same relative position that it does in this marine bivalve. It may possibly group with *Unio tenuissimus*, but it is quite likely that it will have to be made the type of a new group, related to that species, to the *alatus* and *tampicoensis* groups.

I desire to thank Mr. Chas. T. Simpson for the valuable aid given in the preparation of the above description and remarks.

NOTES ON QUEBEC PUPIDÆ AND OTHER SHELLS.

BY A. W. HANHAM, WINNIPEG, MAN.

My Quebec *Pupidæ* have just been looked over and separated for me by Dr. V. Sterki, to whom I am under many obligations for this labor of love. As a result my list of species, as far as these small things are concerned, requires some corrections and additions.

The following are the species taken, instead of as recorded on page 101, of the last volume of THE NAUTILUS:—

Pupa armifera Say. As already recorded.

Pupa pentodon Say. As already recorded.

Sphyradium edentulum Drap. Not uncommon; Isle d'Orleans and St. Joseph's de Levis.

Vertigo ovata Say. As already recorded.

Vertigo gouldii Binn. The most abundant species taken. Common on mossy rocks at St. Joseph's and St. Romauld's (this species was confounded with *bollesiana*).

Vertigo ventricosa Morse. Nearly as common as *gouldii*, and taken at St. Joseph's and St. Romauld's, as well as on the Island.

Vertigo curvidens Gould. As already recorded.

Vertigo milium Gould. Very rare.

Vertigo pygmæa Drap. Single example.

Vertigo tridentata Wolf. Single example.

A noticeable absentee from the above list is *Pupa contracta*, which however no doubt occurs in the Province.

Carychium exiguum Say. As already recorded.

Carychium exile Ad. One example.

Polygyra leai Ward. Referring to the valuable catalogue of North American land shells now appearing in THE NAUTILUS, I am glad to see that this shell has been recognized as a distinct species, for such I have always considered it. The species extends into Canada. In the spring of 1891, at Brantford, Ontario, in drift along the Grand River, I noticed plenty of dead shells, but never came across any living ones until October. On the 9th and 10th of that month, shortly before leaving for Quebec, I got over 200 specimens from a small corner of swampy land—overgrown with reeds and bushes—adjoining a sluggish stream. *Zonites ligerus* was in even greater abundance. Besides these species (rare in Canada) were taken: *Selenites concava*, *Vitrina limpida*, several small species of *Zonites*, *Pupa contracta*, *Succinea avara* and *ovalis*, and a very handsome small form of *S. obliqua*, *Pomatiopsis lapidaria*, etc. A richer spot could hardly have been found. From a steep bank not far back from the stream, I got a number of pairs of *Polygyra monodon*, but no *P. leai*, and I did not find the former species with *P. leai* down below. The chief object of this note is to show the Canadian record.

DESCRIPTION OF A NEW UNIO.

BY BERLIN H. WRIGHT.

U. reclusus sp. nov.

Shell ovate-triangular, smooth, polished above, nearly equilateral, somewhat inflated. Substance of the shell moderate and quite uniform in thickness. Epidermis finely striate, rayless, brownish, with

two or three distant growth lines. Beaks prominent and surrounded by four or five coarse, sharp, widely separated irregular undulations. Ligament reddish, short, thin and scarcely elevated above the dorsum. Dorsal margin slightly elevated; anterior margin gracefully rounded, base uniformly and slightly curved; posterior margin pointed. Posterior area abrupt with two slightly raised lines formed of irregular elevations from beak to margin. Umbos gracefully and uniformly rounded; greatest diameter in the centre of the disk. Nacre sky-blue throughout, sometimes darker within the pallial line. Beak cavities slight and abrupt. Cicatrices well impressed, smooth and distinct. Cardinals solid, prominent, double in the left valve and single in the right valve, laterals double in the left valve and disposed to be double or tripartite in the right valve and joined to the posterior cardinal by a distinct elevation of the dorsal plate.

Width $1\frac{3}{4}$ in., length 1 in., diam. $\frac{5}{8}$ in.

Habitat: Ocklocknee River, Leon County, Florida.

Type in National Museum.

Remarks:—This anomalous little shell was taken with *U. kleinianus* Lea, *lienosus* Con., *kirklandianus* Wright and *floridensis* Lea. It does not seem to group well with any known species, though the the beak sculpture indicates a relationship with *U. forbesianus* Lea. In some respects it reminds one of *U. macrodon* Lea, but it is more inflated, not as solid usually, darker in epidermis, rayless, with deeper beak and shell cavities. The lateral teeth are longer, higher and end more abruptly, besides being double or tripartite in the right valve. The very young show slight traces of broad, distant rays. It certainly groups with *U. forbesianus* Lea, but is easily distinguished from the young of that species by its want of rays, lighter epidermis, rounded base, rounded umbonal angle, flattened umbos and it is smoother on the posterior area.

NEW PISIDIA.

BY DR. V. STERKI.

Pis. singleyi n. sp.

Mussel small, rather high, somewhat oblique, ventricose, beaks prominent, also in the young, rounded but narrow on top, slightly posterior, vertical section broadly heart-shaped; superior margin moderately curved, rather short, scutellum slightly, scutum well

marked; anterior part somewhat angular with the end rounded; posterior end rounded or slightly truncate, inferior margin regularly curved; shell thin, translucent, colorless to pale horn; surface very finely, almost regularly striated, somewhat shining; interior surface with fine but well marked, crowded pits, visible from the outside; hinge rather fine, plate narrow, cardinal teeth rather short but high, lamellar, the right one almost straight and longitudinal in its anterior part, thickened in the posterior and curved downward beyond the level of the plate; those of the left valve little curved, the inferior somewhat the larger and projecting downward over the edge of the hinge plate; lateral teeth rather small and thin, pointed in the middle and rather abrupt, in the right valve the anterior much the largest, slightly projecting inward.

Long. 2.5, alt. 2.3, diam. 1.7 mill. (Texas).

Long. 3.3, alt. 2.8, diam. 2.4 mill. (Mexico).

Habitat: Texas, Mexico.

In shape, color and striation, it has some resemblance with *P. punctatum*, but the latter is much smaller, its surface is microscopically rugulose, dull, and the hinge comparatively stouter.

It was first seen in drift materials from the Guadalupe River, Comal Co., Texas, collected and kindly sent by Mr. J. A. Singley in 1892, represented by a fair number of specimens in all stages of growth. Then in drift from the same river, sent by Mr. Wm. A. Marsh, a few young specimens. Another lot from the Guadalupe River is in the U. S. National Museum (No. 134,010, Gurley), and under the same head must be ranged one from Itzlan Creek, Guadalupe, Mexico, (No. 102,215). Of the largest specimen of them the dimensions are given above. The species is named in honor of Mr. J. A. Singley.

Pis. splendidulum n. sp.

Mussel small, well inflated, rather ovoid in outline, scutum and scutellum rather well marked, the former often prominent; beaks slightly posterior, somewhat prominent, moderately large, rounded; color pale to deep horn, surface polished, with very fine, somewhat irregular striæ; shell thin, transparent; hinge rather fine but well formed, plate narrow; cardinal teeth longitudinal, lamellar, the right one rather long, slightly curved, most so at both ends, more or less thickened at the posterior end, and often with a groove; the two in the valve nearly equal, parallel, little curved, the superior is anterior for about one-third of its length; lateral teeth compara-

tively strong, all projecting into the interior of the mussel, pointed; ligament rather long.

Long. 2·8, alt. 2·4, diam. 1·7 mill.

Hab.: Maine, Virginia, Michigan.

At Caribou, Aroostook Co., Me., mainly in the Barren Brook, Mr. Ol. O. Nylander collected, and sent me for examination in different lots, more than three thousand specimens. Mr. H. W. Winkley collected some near Saco, Me., and in Mr. J. B. Henderson's collection are a few lots from Old Orchard, Me. Mr. L. H. Streng sent in different lots about 1200 specimens collected near Grand Rapids, Michigan; and the writer has found it rather common in the Potomac River at Washington, D. C., as well as in different runs and ditches in Virginia near the National Capital.

Our species cannot be mistaken for any other *Pisidium*. In shape it has some resemblance with *P. abditum* and *politum*; but its small size, the color and transparency of the shell, the shape of the cardinal teeth, will readily distinguish it. In size, color and transparency of the shell, and the polished surface, it resembles *P. ventricosum* and *vesiculare*; but both the latter are much more inflated, their beaks are quite posterior and larger. It is, however, rather variable in size and coloration, and the striation of the surface.

(*To be concluded*).

ELWOOD PLEAS.

It is with sincere regret that we record the death of our old friend and correspondent, Mr. Elwood Pleas, of Dunreith, Henry Co., Indiana, which occurred on December 31, 1897. He was born May 4, 1831, and the greater portion of his life was spent in Henry County. For a number of years he was Editor of "The Newcastle Courier" and the old files of this and other papers bear ample evidence of his earnest ability as an editor. His most interesting articles were those pertaining to his favorite study, Natural History. Mr. Pleas was well known to many readers of THE NAUTILUS, his principal contribution being "Shells of Henry Co., Indiana," (Vol. VII, page 65). In this article he recorded 123 species and varieties of land and fresh water shells found by him within a radius of five miles from his home.

IN THE NAUTILUS (Vol. V, page 2), Mr. Wm. A. Marsh described two new Unios collected by him, of one of which, *U. Pleasii* Mr. Marsh says: "I name this shell after my friend, Mr. Elwood Pleas, of Indiana, who collected this species with many other rare shells in the interior of Arkansas."

Mr. Pleas also collected extensively through Alabama and western Florida. Being interested in geology he availed himself of the opportunity while in Alabama of securing a large collection of Eocene fossils. Mineralogy, botany and entomology also received a share of his attention, and in his death nature has lost a sincere lover, and science an earnest supporter.—C. W. J.

PUBLICATIONS RECEIVED.

CAMBRIAN BRACHIOPODA: GENERA *Iphidea* AND *Yorkia*, WITH DESCRIPTIONS OF NEW SPECIES of each, and of the Genus *Acrothele*, by Charles D. Walcott, (Proc. U. S. Nat. Mus., XIX, 1897). *Iphidea* is a genus of small brachiopods belonging to the Neotremata of Beecher, possibly with characters that nearly place it in the Protremata. The species, of which 14 are known, range from the lowest known Lower Cambrian horizon to the upper portion of the Middle Cambrian. Five new species are described. *Yorkia* is a new genus of inarticulate brachiopods based upon a new species, *Y. Wanneri*, from the Lower Cambrian near York, Penna. Two new forms of *Acrothele* are also described.

DIE GEHAUSESCHNECKEN DES GALBERGES UND KRAHNBERGES BEI GOTHA, von L. Schmidt, (Gratis-Beiblatt zu den "Gothaer Neuesten Nachrichten," Oct. 1, 1897). A list of 38 species of land snails making substantial additions to the Thüringian mollusk fauna, the literature of which has been scant. The slugs have been omitted. Among the rarer species *Azeca menkeana* may be mentioned. There 24 Helices, including the Zonitidæ, all of them widely distributed species.

A STUDY OF THE FAMILY *Pectinidæ*, with a revision of the genera and subgenera, by A. E. Verrill, (Trans. Conn. Acad., X, 1897). The most elaborate study yet made upon the system of this family is the subject of Professor Verrill's paper. The earlier fossil groups are not fully considered. In the Cretaceous nearly all existing generic and sectional groups had appeared, and probably none has

been evolved since the Eocene. All of the larger forms have very numerous marginal tentacles on the mantle, corresponding somewhat to the external sculpture of the shell in position, and there is also a second inner row of "guard tentacles" on a raised inner pallial fold. The marginal tentacles are accompanied by a series of well formed pallial eyes, very lustrous when living, and having a crystalline lens. These are also arranged according to the ribs of the shell. In some of the deep sea forms there are but few eyes, and in some cases they are not pigmented. Pectens, as is well known, are good swimmers, although the very inequivalve typical forms are rather sedentary. This probably enables them to escape the attacks of crabs, fishes, etc., as well as boring gastropods, for it is certainly true that bored Pectens are rarely seen.

The nomenclature is thoroughly sifted, and the genera and subgenera characterized, 27 being recognized, of which 8 are new. The subdivision seems rather minute to one accustomed to the old order of things, but has doubtless been well considered. Of the genera, PECTEN restricted, scarcely occurs on our coasts. AMUSIUM is represented by a couple of deep sea forms, but the Oriental species is a well known shell. The subgenus *Propeamusium* contains small species such as Dall's *alaskensis*. CHLAMYS, type *islandicus*, is well represented, *C. irradians*, *dislocatus*, etc., belonging here to the subgenus *Æquipecten*. *Lissopecten* is a new subgenus proposed for *C. hyalinus* Poli, and *Leptopecten* another for *C. monotimeris* of California. *Placopecten* is proposed for *P. clintonius* Say, also as a subgenus of *Chlamys*. LYROPECTEN contains *L. nodosus*, *subnodosus*, etc. PECTINELLA is a new genus for *P. sigsbei* Dall of the West Indies in deep water. CYCLOPECTEN is a new genus for *P. pustulosus* Ver. and many other small species, mostly of deep water. *Hyalopecten*, n. gen., type *P. undatus* Ver., contains small forms possibly related to the fossil genus *Syncyclonema*. PARAMUSIUM, type *P. Dalli* Smith, is another new genus.

Several new forms are described, with useful notes on others, among which we may mention with approval the rejection of Gmelin's misleading name *magellanicus* for the well known New England species. Verrill calls it *Chlamys* (*Placopecten*) *clintonius* Say. A very useful analytical key to the genera is given, and six well drawn plates illustrate important structural features and unfigured species.

181. *STROBILOPS VIRGO* (Pils.). Canada to Northern Alabama and west to Minnesota and Kansas.

182. *STROBILOPS AFFINIS* Pils. New York, Ohio, etc.

183. *STROBILOPS HUBBARDI* (Brown). Calhoun Co., Texas; Savannah, Ga.; Eastern and Northern Florida. Also Jamaica.

Genus *LEUCOCHEILA* Martens.

184. *LEUCOCHEILA FALLAX* (Say). Prov. Ontario, Canada, to Florida, and west to Minnesota, Texas and Arizona.

185. *LEUCOCHEILA MODICA* (Gld.). St. Simon's Island, Ga. to Florida; west to Cedar Keys and Ala.

Genus *BIFIDARIA* Sterki, 1891.

Section *Albinula* Sterki.

186. *BIFIDARIA ARMIFERA* Say. Ontario and Quebec, Canada, and nearly the whole U. S. east of the Rocky Mts.

187. *BIFIDARIA CONTRACTA* Say. Ontario, Canada, and the whole U. S. east of the Rocky Mts.; eastern Mexico.

188. *BIFIDARIA HOLZINGERI* Sterki. St. Cloud, Minn., Iowa, S. to Wichita, Kansas and Joliet, Will Co., Ill.

188a. *BIFIDARIA HOLZINGERI FORDIANA* Sterki. Wichita, Kansas.

Section *Bifidaria* s. str.

189. *BIFIDARIA HORDEACEA* Gabb. Arizona, New Mexico.

190. *BIFIDARIA PROCERA* Gld. Minnesota to New Mexico, and eastward.

191. *BIFIDARIA HORDEACELLA* Pils. Comal and Lee Counties, Texas; New Mexico.

192. *BIFIDARIA RUPICOLA* Say. Kansas and New York southward to Texas and Key West, Florida.

193. *BIFIDARIA SERVILIS* Gld. Florida; Cuba.

(An undescribed form of this group has been called *P. riograndensis* Sterki. Hidalgo, Texas).

194. *BIFIDARIA CORTICARIA* (Say). Ontario and Maine to Minnesota, south to South Carolina and Mississippi.

195. *BIFIDARIA HEBES* Ancey. New Mexico, Arizona, Nevada and Utah; type locality White Pine, Nevada. This is *P. arizonensis* W. G. B., not Gabb, and *P. gabbi* Dall. A form *saxicola*¹ Ckll. has

¹Not *Pupa saxicola* Lowe nor *P. saxicola* Moq.-Tand.

been described from Round Mountain near Silver Cliff, Colorado.

195a. BIFIDARIA HEBES MEXICANORUM Ckll. Mesilla, New Mexico.

Section *Vertigopsis* 'Ckll.' Sterki.

196. BIFIDARIA PILSBRYANA Sterki. New Mexico, Arizona.

197. BIFIDARIA CINCINNATIENSIS Judge. Cincinnati, Ohio.

198. BIFIDARIA CURVIDENS Gld. Mass. to Minn.; Ontario and Quebec.

198a. BIFIDARIA CURVIDENS GRACILIS Sterki. Rhode Island, Ohio, Tennessee.

198b. BIFIDARIA CURVIDENS FLORIDANA Dall. Archer, Alachua Co., Florida.

199. BIFIDARIA PENTODON (Say). Ontario and Quebec, Canada, to Minnesota, south to Ga. and Texas; Lincoln Co., Nevada; Laggan, B. C. A form *curta* Sterki, occurs in Ohio.

• Genus PUPA Draparnaud.

Subgenus *Pupilla* Leach, (=typical *Pupa*.)

200. PUPA MUSCORUM (L.). Prov. Quebec, Canada, New England, and the Northern tier of States from Maine to Montana; Colorado, Utah and Nevada. Also Europe. *Pupa sublubrica* Anc. is considered a synonym by Binney.

201. PUPA BLANDI (Morse). New Mexico, Utah, Colorado and western S. and N. Dakota. (Referred to *P. muscorum* var. *bigranata* Rossm. by von Martens; cf. also *P. signata* Mouss.). A form *obtusa* Ckll. is recorded from Custer Co., Colo.

202. PUPA SYNGENES Pils. New Mexico; Arizona; Montana.

203. PUPA STERKIANA Pils. San Diego Co., Cal.; Lower California.

Subgenus *Nearctula* Sterki.

204. PUPA CALIFORNICA (Rowell). San Francisco, etc., California.

204a. PUPA CALIFORNICA ELONGATA Sterki. San Clemente Island.

204b. PUPA CALIFORNICA CATALINARIA Sterki. San Clemente and Santa Catalina Is.

204c. PUPA CALIFORNICA DIEGOENSIS Sterki. San Diego, Cal.

204d. PUPA CALIFORNICA TRINOTATA Sterki. Monterey, Cal.

- 204e. PUPA CALIFORNICA CYCLOPS Sterki. Placer Co., Cal.
 205. PUPA ROWELLI (Newc.). Middle portion of California, Oakland, Monterey, etc.
 206. PUPA CORPULENTA (Morse). Vancouver Id.; Washoe Co., Nevada; North Park, Colorado.
 207. PUPA CASTANEA Sterki. Lake Co., California.
 208. PUPA DECORA (Gld.). Berkshire Hills, W. Mass. to Great Slave Lake. Rare and local.
 208a. PUPA DECORA BOREALIS (Morel.). Bering Island.
 209. PUPA CONCINNULA Ckll. Colorado at high elevations. (*V. ingersolli* Ancey, unpublished, with varieties *haydeni* and perhaps *accedens* Anc., are identical. Perhaps *P. montanella* Ckll. undescribed, belongs here).
 210. PUPA COLORADOENSIS Ckll. Colorado, "mid-alpine."
 211. PUPA HOPPII Möll. Greenland; (? Anticosti Island; Laggan, near summit of Rocky Mts.).
 212. PUPA COLUMBIANA Sterki. Washington. Undescribed. An undescribed var. *utahensis* is mentioned by Dr. Sterki.

Subgenus *Sterkia* Pilsbry, 1898.

213. PUPA CALAMITOSA Pils. San Diego Co., Cal., and southward.
 214. PUPA HEMPHILLI Sterki. San Diego Co., Cal., and southward.
 215. PUPA CLEMENTINA Sterki. San Clemente Island, Cal.

Genus *VERTIGO* Draparnaud.

Subgenus *Angustula* Sterki.

216. *VERTIGO MILIUM* Gld. Hamilton, Ont., Quebec, and Maine to Minnesota, south to Florida and Texas.

Subgenus *Vertigo* Drap.

Section *Haplopupa* Pilsbry, 1898.

217. *VERTIGO DALLIANA* (Sterki). Lake Co., California.

Section *Bothriopupa* Pilsbry, 1898.

218. *VERTIGO VARIOLOSA* (Gld). Southern extremity of Florida.

Section *Vertigo* s. str.

219. *VERTIGO BINNEYANA* Sterki. Manitoba to Seattle, Wash., south to New Mexico.

220. *VERTIGO PYGMÆA* Drap. Quebec, New England and N. Y., south to Va., west to Columbus, Ohio. (= *V. callosa* Sterki, not of Reuss, Palæontographica, II, p. 30, 1849).

221. *VERTIGO RUGOSULA* Sterki. South Carolina, Gulf coast to Texas.

221a. *VERTIGO RUGOSULA ORALIS* Sterki (n. n. for *ovulum* Sterki preoc.).

222. *VERTIGO OVATA* Say. Eastern North America, Ont. and Quebec to Florida; Arizona, New Mexico.

223. *VERTIGO MORSEI* Sterki. Kent Co., Michigan; Northwestern Ohio.

224. *VERTIGO VENTRICOSA* (Morse). Quebec and Maine to Ohio.

224a. *VERTIGO VENTRICOSA ELATIOR* Sterki. New Philadelphia, Ohio; East Saginaw, Mich., Clearwater, Minn.

225. *VERTIGO GOULDII* Binn. Ontario, Quebec and Maine to Montana, south to N. J. and Md.

225. *VERTIGO APPROXIMANS* Sterki. Illinois.

226. *VERTIGO BOLLESIANA* (Morse). Maine to Indiana, south to Virginia and Tenn.; mainly in the N. E.

226a. *VERTIGO BOLLESIANA ARTHURI* Martens. Little Missouri, Dakota.

227. *VERTIGO TRIDENTATA* Wolf. Quebec and Maine to Minnesota, south to Illinois and Ohio.

228. *VERTIGO PARVULA* Sterki. Summit and Lake Counties, Ohio.

229. *VERTIGO OSCARIANA* Sterki. Florida to Texas; Tenn.

Family ACHATINIDÆ.

Genus *OPEAS* Albers, 1850.

230. *OPEAS MICRA* (Orb.). Fort Dallas, Florida; Charleston, S. C. West Indies and South America. *Stenogyra octonoides* is a synonym.

231. *OPEAS SUBULA* (Pfr.). Mobile, Ala. West Indies. (Introduced in some greenhouses North).

[*Opeas goodalli* (Mill.) and an undetermined *Opeas* have been found in Phipp's conservatory, Pittsburgh (Clapp); and the latter occurs also in Washington, D. C. (Lehnert). *Subulina octona* lives in Horticultural Hall, Philadelphia. Until naturalized out of doors, these can hardly be regarded as belonging to our fauna, any more than the animals of zoological gardens.]

THE NAUTILUS.

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No. 11.

MOLLUSCA CONTEMPORANEOUS WITH THE MASTODON.

BY BRYANT WALKER.

IN THE NAUTILUS for March, 1891, (Vol. VI, p. 131) there is given a list of half a dozen species of fresh-water shells which were found associated with the remains of a mastodon discovered in Randolph County, Indiana. Through the courtesy of Mr. W. Hilles Smith of Niles, Michigan, I have recently had an opportunity of examining a quantity of material taken from the muck beneath the remains of a mastodon found near that city.

As the list of species is a considerable one it is of interest not only because of the circumstances, under which they were found, but also as a basis for comparison with similar finds from other localities.

As has been stated by others in reference to the mollusca formed fossil in the loess there is here, in most instances, little, if any, variation from the usual form of the species as they are found living at the present time.

The *Planorbis companulatus* Say and *bicarinatus* Say are both larger than the average size of the species as usually found. In the latter species there is a decided tendency towards a whorl narrow in proportion to its height, with a strong carina on both sides, resulting in a long narrow aperture in mature examples.

One of the most abundant species in the collection was *Valvata tricarinata* Say, which afforded some unusual forms. As is well known, this species is extremely variable in its sculpture, ranging though the bicarinate and unicarinate forms to that which is ecarinate. In this, however, all the specimens are strongly tricarinate and the variation is in the other direction and in the form of additional carinæ. This, in one instance, appears as a fourth carina on the body whorl about half way between the superior and peripheral carinæ in the normal shell. In another specimen, a fourth carina is sud-

denly developed upon the shoulder of the last whorl parallel with superior carina and at about one-third of the distance between it and the suture. The interval between the two being a groove, rather than a continuation of the flat surface of the shoulder. In a somewhat similar specimen there is no distinct carina developed, but simply a sharp edge, where the flattened surface of the shoulder is cut by the groove which encircles it just inside the superior carina. In two other examples, the suture of the last half of the body whorl is decidedly channelled, increasingly so as it approaches the aperture, with an indistinct elevation hardly sufficient to be termed a carina, bordering its outer edge.

Although these variations were found in only half a dozen specimens out of a considerable number, it is nevertheless worthy of notice, that in each instance the growth of the shell had been entirely normal until about the beginning of the last whorl. Then suddenly and apparently after a period of rest, such as hibernation, with a renewal of growth the change of sculpture begins. This would naturally seem to be the result of some change in the environment. But, whatever was its source, it was not sufficient, evidently, to affect the whole colony. However, as some of the examples are not fully grown, it may be possibly attributed to the same cause, which very shortly exterminated them all. Unfortunately, what that was, is purely a matter of conjecture.

The complete list of the species found is as follows :

Zonites radiatulus Ald.	Amnicola lustrica Pils.
Strobilops labyrinthica Say.	Campeloma integra Say.
Succinea ovalis Gld.	Campeloma obesa Lewis.
Carychium exiguum Say.	Campeloma subsolidum Anth.
Limnæa stagnalis L.	Pleurocera elevatum Say.
Limnæa desidosa Say.	Goniobasis livescens Mke.
Limnæa humilis Say.	Unio ventricosus Bar.
Physa ancillaria Say.	Unio spatulatus Lea.
Physa heterostropha Say.	Unio novi-ehoraci Lea.
Physa integra Hald.	Unio pressus Lea.
Planorbis deflectus Say.	Margaritina rugosa Bar.
Planorbis parvus Say.	Margaritina deltoidea Lea.
Planorbis bicarinatus Say.	Anodonta subcylindræa Lea.
Planorbis trivolvis Say.	Anodonta Footiana Lea.
Planorbis campanulatus Say.	Sphærium simile Say.
Ancylus rivularis Say.	Sphærium striatinum Lam.
Valvata tricarinata Say.	Pisidium compressum Prime.
Amnicola limosa Say.	Pisidium sp.

HAWAIIAN CYPRÆIDÆ.

BY D. D. BALDWIN, HAIKU, MAUI, H. I.

In the following list of species reported from these Islands, those not known to me personally as Hawaiian are marked with an asterisk :

Cypræa annæ Roberts.*	Cypræa nucleus Linn.
Cypræa annulus Linn.	Cypræa polita Roberts.
Cypræa arabica Linn.	Cypræa poraria Linn.
Cypræa argus Linn.	Cypræa reticulata Mart.
Cypræa carneola Linn.	Cypræa spadix Migh.*
Cypræa caput-auguis Phil.	Cypræa scurra Chem.
Cypræa caput-serpentis Linn.	Cypræa semiplota Migh.*
Cypræa childreni Gray.	Cypræa staphylea Linn.*
Cypræa cicercula Linn.	Cypræa sulcidentata Gray.
Cypræa erosa Linn.	Cypræa talpa Linn.
Cypræa erroneus Linn.	Cypræa tessellata Sow.
Cypræa fimbriata Gmel.	Cypræa tigris Linn.
Cypræa helvola Linn.	Cypræa unifasciata Migh.*
Cypræa isabella Linn.	Cypræa ventriculus Lam.
Cypræa intermedia Gray.	Cypræa vitellus Linn.
Cypræa limacina Lam.*	Trivia exigua Gray.*
Cypræa lynx Linn.	Trivia grando Gask.
Cypræa madagascariensis Gmel.	Trivia globulus Linn.*
Cypræa mauritiana Linn.	Trivia insecta Migh.
Cypræa moneta Linn.	Trivia oryza Lam.*
Cypræa microdon Gray.	Trivia sphærulea Migh.*

NEW VARIETIES OF UNIONIDÆ.

BY BERLIN H. WRIGHT.

U. gibbosus Barnes, var. *armathwaitensis* nov.

The chief distinguishing characters of this variety are: Broader behind, lateral teeth shorter, darker epidermis, beak cavity more pronounced and angular, longer, posterior cavity greater, nacre usually a brighter purple and it is never as large or as massive as the typical form.

Habitat.—A branch of the South Fork of the Cumberland River at Armathwaite, Fentress Co., Tenn. Type in National Museum.

Remarks.—Mr. E. F. Hassler collected a quantity of these shells

along with *Margaritana ravenelliana* Lea and they seemed to differ from *U. gibbosus* Bar. sufficiently to warrant making a variety of them, in which opinion Mr. Simpson of the National Museum concurred. Its place is between *U. subgibbosus* Lea and *U. gibbosus* Barnes and while it occasionally has the white nacre of the former species it is always larger but less massive, wider and has a darker epidermis.

It is also related to *U. stonensis* Lea and closely resembles that species except in epidermis and nacre. Only three specimens out of fifty had a pure white nacre, and those would be taken for *stonensis* but for the darker epidermis.

Margaritana marginata Say, var. *truncata* nov.

Shell abruptly truncated behind, and more produced in front, causing it to be nearly equilateral. More inflated and usually larger than the typical form.

Remarks.—This well marked variety was noted by Mr. Say and specimens were by him labelled in this name, but no description was ever published, so far as known. It occurs in eastern as well as western waters and into Virginia and Tennessee.

DESCRIPTIONS OF NEW PISIDIA.

BY DR. V. STERKI.

Pis. splendidulum Sterki.

Additional localities are: Upper Red Hook, N. Y., and New Philadelphia, Ohio.

Pis. abyssorum Stimpson, n. sp.

Mussel small, moderately inflated, somewhat elongate and oblique (most specimens somewhat rhombic), superior and inferior margins moderately curved; scutellum slightly, scutum rather well marked; posterior end rounded or slightly truncated above obliquely in postero-anterior direction, merging into the inferior margin with one continuous curve; anterior end a rounded angle situated rather inferiorly; beaks slightly posterior, rather low, comparatively broad; color whitish to pale horn; surface polished, with fine, irregular striæ; shell very thin, translucent; hinge very fine, plate very narrow; cardinal teeth short, lamellar, thin, longitudinal, scarcely curved, the superior of the left valve little anterior, quite small or abortive; lateral teeth very thin, not high, the outer ones of the right valve scarcely perceptible or absent; ligament small.

Long. 2.4, alt. 2.0, diam. 1.4 mill., (long. 2-3 mill.); young, as contained in parent, 0.8 mill. long.

Habitat: Region of the Great Lakes, in deep water.—Lake Michigan: Racine, Wis., dredged (Mr. Geo. T. Marston); different places on the Michigan side, partly from a depth of 24 meters; Pine Lake, Mich., dredged; Green Lake, Wis., dredged; from stomachs of White Fish, Lake Michigan, all sent by Mr. Bryant Walker, in 1894, and partly since. They were believed to be a new form, but publication was deferred.

In March, 1895, Mr. Geo. T. Marston sent me two lots from dredgings, writing: "No. A. 208, *Pis. abyssorum* Stimpson, were from Dr. P. R. Hoy, Racine, Wis. He wrote me that they were first found in the stomachs of White Fish taken in Lake Michigan, near Racine, Wis., in 1870, by a party of gentlemen including Wm. Stimpson and himself. The party were investigating the food of White Fish, then unknown. I quote from Hoy's letter: 'In 1870 we dragged in Lake Michigan—Wm. Stimpson assisted—we got several of the *Pisidium* and three species of Crustaceans, all of which were new. Stimpson described the several new species—the names were published—I do not recollect where published—but the description was written out with the greatest care and were to be published in the Proc. of the Chicago Acad. Sc., of which Stimpson was secretary at the time. All were burnt at the time of the great fire.'" Mr. Marston subsequently had correspondence with several conchologists, but the matter remained unsettled. The two lots contained different forms of small *Pisidia* mixed up; but the most numerous and most conspicuous specimens represented the form now described under Stimpson's name. There is no absolute certainty that this is the same *Pisidium* the author had described, but it is the nearest in probability, and so to-day by the efforts of Mr. Marston, we can do justice to the deceased scientist. For the above description the writer is wholly responsible. The name (only) *Pis. abyssorum* has been published by Smith in his "Sketch of the Invertebrate Fauna of Lake Superior," according to a kind communication of Mr. Bryant Walker.

The form comes nearest *Pis. splendidulum*, in size and shape; but it is less inflated, the beaks are less prominent, the color is much paler (whitish), the shell thinner, and the hinge much finer and, as mentioned, partly defective.

Pis. pauperculum var. *Nylanderii* n.

Different from the type in the following points; it is comparatively

higher (as high as long, or nearly so), quite oblique; the beaks are very large; upper margin and hinge very strongly curved; color pale greenish horn; surface highly polished, with distinct, irregular lines of growth.

Known from Maine and New Jersey. It has been collected in Partridge Lake, in the thoroughfare between Partridge and Long Lakes, in Long Lake, Square Lake, all in Maine, with the dredge, in various depths down to 25 feet, by Mr. Olof O. Nylander. Also dredged in White Pond, N. J., by Messrs. Pilsbry and Rhoads, together with rather typical specimens of *pauperculum* and intermediate forms. The upper margin and hinge are as strongly curved as in *Pis æquilaterale* Pr. and some forms of *P. compressum* Pr. The beaks are so large as to make out almost the whole upper part of the mussel.

This *Pisidium* has been named after Mr. Ol. O. Nylander, who has so assiduously collected both recent and fossil mollusca of northern Maine.

New Philadelphia, Ohio., Jan., 1898.

PUBLICATIONS RECEIVED.

CATALOGUE OF THE HATFIELD COLLECTION OF SHELLS FROM THE LOYALTY ISLANDS, by James Cosmo Melvill and Robert Standen. Originally published in the *Journal of Conchology*, this paper has been reprinted as one of the Manchester Museum Handbooks. The Loyalty Islands belong to the New Caledonian group, and like that island are remarkably prolific in mollusk life. About 600 species, of which a score are new, are catalogued by Messrs. Melvill and Standen. Some idea of the wealth of the fauna may be obtained from the fact that there are 42 species of *Conus*, 53 mitras, 46 *Cypræa* and *Trivia* (among them *C. exanthema* L.² *Rashleighana* Melv., *sulcidentata* Gray, *aurora* (*aurantium*), *clandestina* v. *Artuffeli* Jous., *poraria* var. *albinella* (new), *Trivia childreni*, etc.). Other interesting species are *Turbo moluccensis* and the *Pleurotomida*, of which a large number of small species, including numerous new ones, occurred. Two excellent plates illustrate new forms. The work is very creditable to Mr. and Mrs. Hatfield, who collected the shells, as well as to the authors.

Mr. G. B. Sowerby announces the issue of a supplement to his "Marine Shells of South Africa."

¹ Probably not indigenous.

Subgenus *Melaniella* Pfr., 1859.

232. *OPEAS GRACILLIMA* (Pfr.). Key West, and near Miami River, Florida. Cuba, etc.

Genus *RUMINA* Risso, 1826.

233. *RUMINA DECOLLATA* (Linn.). Charleston, S. C. Introduced from southern Europe.

Genus *CÆCILIOIDES* (Fér.) Hermannsen, 1846.

234. *CÆCILIOIDES ACICULA* (Müll.). Florida (Bartlett, many years ago); Princeton, N. J. (A. D. Brown). Introduced from Europe.

Genus *COCHLICOPA* (Fér.) Risso, 1826.

235. *COCHLICOPA LUBRICA* (Müll.). Canada to D. C. and Alabama, west to Oregon. Also Palearctic. Commonly known in America as "*Férussacia subcylindrica* L."

235a. *COCHLICOPA LUBRICA MORSEANA* (Doherty). Hamilton Co., Ohio; Kenton Co., Ky.; Roan Mt., N. C.

(Superfamily *AGNATHA* Mörch.)

Family *GLANDINIDÆ*.

Genus *GLANDINA* Schum.

233. *GLANDINA TRUNCATA* (Brug.). Georgia Sea Islands to Florida, west to Louisiana and Mississippi. Forms *macer* Dall; *parallela* W. G. Binn., Florida. Form *bullata* Gld., Louisiana and Mississippi. Var. *ovata* Dall, Florida, is the same.

234. *GLANDINA TEXASIANA* (Pfr.). Brownsville, Texas. Probably a mere form of *truncata*.

235. *GLANDINA SINGLEYANA* W. G. B. South central and southern Texas. (*G. decussata* Desh. is a Guatemalan species).

236. *GLANDINA VANUXEMENSIS* Lea. Texas?; Mexico. *A doubtful member of our fauna.*

Family *TESTACELLIDÆ*.

237. *TESTACELLA HALIOTIDEA* Drap. Roxborough, Philadelphia, Pa. Introduced from Europe.

Family *CIRCINARIIDÆ* Pilsbry.

Genus *CIRCINARIA* (Beck, 1837) Pilsbry.

(*Macrocyclus* auct. not Beck; *Selenites* Fischer not Hope; *Haplotrema* Anc.).

238. *CIRCINARIA HEMPHILLI* (W. G. Binn.). Olympia, Walla-walla and Freeport, Wash.; also Oregon.

239. *CIRCINARIA CONCAVA* (Say). Ontario and Quebec, Canada, west to Minnesota, south to Kansas, Mississippi and Georgia.

240. *CIRCINARIA VANCOUVERENSIS* (Lea). Bolinas Bay, Cal., to Sitka, Alaska.

240a. *CIRCINARIA VANCOUVERENSIS OCCIDENTALIS* (Hemph.). Sonoma to Santa Cruz Co., Cal.; Kalama, Wash.

S. concavus var. *tenuis* Hemph., from Napa Co., is practically the same. Mr. Hemphill has described a var. *keepi* from near Oakland, Cal. I have not seen specimens.

241. *CIRCINARIA SPORTELLA* (Gld.). Klamath and Humboldt Co., Cal., to Vancouver I.

241a. *CIRCINARIA SPORTELLA HYBRIDA* (Ancey). Portland, Astoria. The Dalles and Douglas Co., Ore.; Olympia, Freeport, and Seattle, Wash.; Vernon, B. C.

(This is *M. vancouverensis* var. *hybrida* Anc., 1888, and *S. vancouverensis* var. *hybridus* Hemph., 1890).

242. *CIRCINARIA VOYANA* (Newc.). Shasta Co., Cal. to Puget Sound.

242a. *CIRCINARIA VOYANA SIMPLICILABRIS* Ancey. California.

243. *CIRCINARIA DURANTI* (Newc.). Santa Barbara Is. and coast range of southern California.

243a. *CIRCINARIA DURANTI CÆLATA* (Mazyck). San Diego, Cal. to San Tomas River, Lower California. (*Cælatura* W. G. B., Terr. Moll. V, 3d Suppl.).

243b. *CIRCINARIA DURANTI CATALINENSIS* (Hemph.). Santa Catalina Island.

244. *CIRCINARIA TRANSFUGA* (Hemph.). San Diego, Cal. to Todos Santos Bay, Lower California.

(Superfamily *AULACOPODA* Pilsbry.)

Family ZONITIDÆ.

Subfamily Zonitinæ Pilsbry.

Genus *OMPHALINA* Rafinesque.

245. *OMPHALINA KOPNODES* (W. G. Binn.). West Virginia to Ga. and Alabama.

246. *OMPHALINA FULIGINOSA* (Griff.). Ontario, west to southern Michigan, Indiana and Arkansas, south to Volusia Co., Fla.

246a. *OMPHALINA FULIGINOSA POLITA* Pilsbry. Mountain region of Eastern Tennessee and western North Carolina. Great Smokies; Monroe Co., Tenn.

247. *OMPHALINA FRIABILIS* (W. G. B.). Southern Illinois to Washington Co., Texas; northern Kentucky; Franklin Co., Tenn.

248. *OMPHALINA LÆVIGATA* (Pfr.). North Carolina to St. John's Valley, Fla., west to Arkansas and western Louisiana.

249. *OMPHALINA RUGELI* (W. G. B.). North Carolina, Roan Mt. to Cranberry.

250. *OMPHALINA SUBPLANA* (Binn.). Mts. between Tennessee and North Carolina.

251. *OMPHALINA INORNATA* (Say). Ottawa and Hull, Canada, to Georgia and Ohio.

252. *OMPHALINA ANDREWSÆ* Pilsbry. Great Smoky Mts., between Tennessee and North Carolina; Macon Co., Ga.

252a. *OMPHALINA ANDREWSÆ MONTIVAGA* Pilsbry. Thunderhead Mt.

Genus *VITRINIZONITES* W. G. Binney.

253. *VITRINIZONITES LATISSIMUS* (Lewis). Mountains between Tennessee and North Carolina.

Genus *VITRINA* Drap., 1801.

254. *VITRINA LIMPIDA* Gld. Canada and New England, west to Manitoba, south to Pittsburgh, Pa.

255. *VITRINA PFEIFFERI* Newc. California to B. C.; New Mexico, Utah, Colorado.

256. *VITRINA ANGELICÆ* Beck. Godhavn, Greenland.

257. *VITRINA EXILIS* Morel. Unalaska; Bering Id. A Kamchatkan species.

Genus *VITREA* Fitzinger.

258. *VITREA CELLARIA* (Müll). Seaports of Atlantic and Pacific coasts, Quebec, Portland, Me., Phila., Charleston, S. C., occasional in greenhouses inland, Allegheny City, Pa., Detroit, Mich., etc.

259. *VITREA DRAPARNALDI* (Beck.). Greenhouses, etc., Seattle, Wash., Oakland, Cal.

260. *VITREA HAMMONIS* (Ström). North Carolina to Colorado, northward throughout the northern states and British America; also Palæartic. (*Hyalina pellucida* Lehnert, *H. viridula* Mke., *H. radiatula* Ald., *H. electrina* Gld. are synonyms).

261. *VITREA WHEATLEYI* (Bland). Knoxville, Tenn., northern Alabama. (Indiana and Michigan, *Sterki*).

261a. *VITREA WHEATLEYI CLINGMANI* Dall. Clingman's Dome, Great Smoky Mts., N. C.

262. *VITREA RADERI* Dall. Cumberland, Md.

263. *VITREA PETROPHILA* (Bld.). Knoxville, Tenn.; Habersham Co., Ga.; Clarkesville, N. C.; Great Smoky Mts.

264. *VITREA BINNEYANA* (Morse). Quebec and Maine to northern Mich.; also reported from Vancouver Id.

265. *VITREA JOHNSONI* Dall. Seattle, Washington.

266. *VITREA WHITNEYI* (Newc.). Near Lake Tahoe, Cal.

267. *VITREA DIEGOENSIS* (Hemph.). Near Julian City, Cuyamaca Mts., San Diego Co., California.

Section *Striatura* Morse, 1864.

268. *VITREA FERREA* (Morse). Quebec, Ontario and Maine to Northern Mich., south to Ohio and North Carolina.

Section *Glyphyalina* Martens, 1892.

270. *VITREA INDENTATA* (Say). Dakota to New Mexico, Lower California and states of Jalisco and Morelos, Mexico, east to the Atlantic, Ontario to Florida.

271. *VITREA SCULPTILIS* (Bld.). Mountain region near the Tennessee and North Carolina boundary.

272. *VITREA CAROLINENSIS* (Ckll.). Mountain region along the North Carolina and Tennessee boundary; Monroe Co., Tenn.

273. *VITREA SUBRUPICOLA* (Dall). Clinton's Cave, Utah.

273a. *VITREA SUBRUPICOLA SPELÆA* (Dall). Cave City, Calaveras Co., Cal.

Section *Paravitrea* Pilsbry, 1898.

274. *VITREA CAPSELLA* (Gld.). Virginia and Kentucky to Alabama.

275. *VITREA SIMPSONI* (Pils.). Limestone Gap, Indian Terr.; Mablevale, Ark.

276. *VITREA PLACENTULA* (Shuttl.). Great Smoky Mts., etc., Eastern Tennessee; Lexington, Va.; Hot Springs, Ark.

277. *VITREA LAWÆ* (W. G. B.). Eastern Tennessee.

Genus *CONULUS* Fitzinger, 1833.

(Not *Conulus* Klein, pre Linnæan, nor of Raf., 1815, a nude name).

278. *CONULUS FULVUS* (Müll.). All the States; British America, Palearctic.

278a. *CONULUS FULVUS DENTATUS* Sterki. Jackson Co., Ala.; Cincinnati, Ohio.

279. *CONULUS STERKII* Dall. New Philadelphia and Summit Co., Ohio; Mt. Lebanon, La.; Jackson Co., Ala.

280. *CONULUS CHERSINELLUS* (Dall). Calaveras Co., Cal.; Fresno Co.

Genus *GUPPYA* Mörch, 1867.

281. *GUPPYA GUNDLACHI* (Pfr.). Florida; Hidalgo, Texas; also West Indies and Central America.

Subfamily Ariophantinae Pilsbry.

Genus *ZONITOIDES* Lehmann, 1862.

282. *ZONITOIDES NITIDUS* (Müll.). British America and Northern States from New England to Washington; Pa.; Ohio; Ala. Also Europe.

283. *ZONITOIDES ARBOREUS* (Say). All the States; British America north to Great Slave Lake.

284. *ZONITOIDES DALLIANUS* (Simp.). Manatee Co. and Little Sarasota Bay, W. Florida.

Section *Pseudohyalina* Morse, 1864.

285. *ZONITOIDES LIMATULUS* (Ward). New York, Ohio, Michigan, Indiana, local and rather rare. (San Mateo, Cal., *Binney*).

286. *ZONITOIDES LATEUMBILICATUS* (Pils.). Near Woodville, Jackson Co., Ala.

287. *ZONITOIDES PATULOIDES* (Pilsbry). Thunderhead, Great Smoky Mts.

288. *ZONITOIDES SHIMEKII* (Pils.). Loess of Iowa (Extinct).

289. *ZONITOIDES SELENITOIDES* (Pils.). Mariposa Big Trees, Cal.

290. *ZONITOIDES MINUSCULUS* (Binn.). Ontario to Florida, west to Mont., Arizona and New Mexico.

290a. *ZONITOIDES MINUSCULUS ALACHUANUS* (Dall). Alachua Co., Fla.

291. *ZONITOIDES LEVIUSCULUS* (Sterki). Comal Co. and Hidalgo, Texas; Henry Co., Ind.; N.-W. Ohio; New Mexico.

292. *ZONITOIDES SINGLEYANUS* (Pils.). Comal Co., Central Texas; Woodville, Ala.

293. *ZONITOIDES EXIGUUS* (Stimps.). Quebec and Ontario, New England, N. Y., Mich.

294. *ZONITOIDES MILIUM* (Morse). Ontario to Florida, west to Indiana.

294a. *ZONITOIDES MILIUM PUGETENSIS* (Dall). Seattle, Wash.; Ballena, San Diego Co., Cal.

Genus *GASTRODONTA* Albers, 1850.

295. *GASTRODONTA INTERTEXTA* (Binn.). Ontario to Florida, west to southwestern Louisiana and Indiana. A carinated form occurs.

296. *GASTRODONTA ACERRA* (Lewis). Roan Mt., North Carolina, to Montgomery, Ala.; Indian Terr.

297. *GASTRODONTA DEMISSA* (Binn.). Western Pa. to Georgia west to Arkansas and eastern Texas.

297a. *GASTRODONTA DEMISSA BRITTSII* (Pils.). Hot Springs, Ark.

298. *GASTRODONTA CERINOIDEA* (Anth.). Virginia to northern Florida.

299. *GASTRODONTA LIGERA* (Say). Ontario to Michigan, Indian Terr. and Louisiana, south to Virginia and Tennessee.

300. *GASTRODONTA COLLISELLA* Pils. Lookout Mt., Roane, Knox, Monroe and Washington counties, Tennessee; Lexington, Va.

300a. *GASTRODONTA COLLISELLA PERCALLOSA* Pils. Near Chattanooga and Nashville, Tenn.

301. *GASTRODONTA GULARIS* (Say). Mountain region of eastern Tennessee, western North Carolina, northern Alabama and Georgia.

301a. *GASTRODONTA GULARIS CUSPIDATA* (Lewis). Monroe Co., etc., eastern Tennessee; Roan Mt.

302. *GASTRODONTA SUPPRESSA* (Say). Ontario and Michigan to Maryland.

303. *GASTRODONTA MACILENTA* (Shuttl.). Mountains near the Tennessee and North Carolina boundary.

304. *GASTRODONTA LASMODON* (Phillips). Eastern Tennessee, western North Carolina and northern Alabama.

305. *GASTRODONTA ELLIOTTI* (Redf.). Same distribution.

306. *GASTRODONTA INTERNA* (Say). Ohio to northern Florida, chiefly in Tennessee; West Virginia; northern Alabama.

Subgenus *Taxeodonta* Pilsbry, 1898.

307. *GASTRODONTA SIGNIFICANS* (Bld.). Fort Gibson, Indian Terr.; Union Co., Tenn.

THE NAUTILUS.

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No. 12.

DESCRIPTIONS OF NEW AMERICAN LAND SHELLS.

BY HENRY A. PILSBRY.

Punctum clappi n. sp.

Shell minute, openly umbilicated, yellowish-brown, with depressed, nearly level spire, and cylindroid whorls. Whorls $3\frac{1}{2}$, the earlier $1\frac{1}{2}$ smoothish, finely pitted, the last 1 or $1\frac{1}{4}$ whorls sculptured with elevated laminae running with the increment-lines, 30 to over 40 on the last whorl, the intervals closely striated and showing fine spiral striation; suture impressed, descending in front; umbilicus deep and open, its width contained between $3\frac{1}{2}$ and $3\frac{1}{2}$ times in greatest diameter of shell. Aperture short oval, higher than wide, somewhat oblique, but little excised by the previous whorl.

Alt. 1.1-1.2, greatest diam. 2 mm.

Seattle (Randolph) and Tacoma (Hemphill), Washington; Salem, Oregon (Hemphill).

My attention was called to this form some years ago, but its determination at this time is due to Mr. George H. Clapp, who insisting that the shells were neither *Punctum conspectum* nor *Pyramidula asteriscus*, induced me to review the group.

P. (Planogyra) asteriscus is even flatter above; the umbilicus is wider, one-third the diameter, and more open; the cuticular lamellæ are more widely spaced and fewer, 19-25 on the last whorl, and the aperture is relatively smaller.

Punctum conspectum, which also occurs at Seattle, has a much more elevated spire, decidedly narrower umbilicus, less than one-fourth the diameter of the shell, and the aperture is different in shape, wider than high.

On some specimens of *P. clappi* the elevated lamellæ are in part subobsolete.

Dentition not yet examined, so that the species may turn out to be a *Planogyra* rather than a *Punctum*.

Punctum californicum n. sp.

Similar to *P. conspectum* in the small, deep umbilicus and color. Spire somewhat more elevated; whorls fully 4, closely revolving, the last decidedly narrower than in *conspectum* (viewed from above). Surface lusterless, with fine, even, hair-like striation, and in places showing faint traces of spiral striæ. Umbilicus narrow and deep, its width contained $4\frac{1}{2}$ times in greatest diameter of the shell. Aperture wider than high, shaped much as in *P. conspectum*.

Alt. 1.14, greatest diam. 1.85 mm.

Fish Camp, Fresno Co., California.

Gastrodonta (Taxeodonta) lamellidens n. sp.

Shell similar to *G. multidentata*, but larger, with an additional whorl, and instead of radial rows of teeth having partition-like radial barriers, generally three in the young, one, not far within, in the adult shell. Alt. 1.6, diam. 3.7 mm.

Thunderhead, Great Smoky Mts.

This is one of Mr. J. H. Ferriss' finds. It was only obtained in small numbers, but probably is abundant, overlooked on account of the small size. I have not heard of *G. multidentata* being found so far south as this.

Gastrodonta collisella percallosa n. var.

Shell similar to *G. collisella* or a small *ligera* with globose base; having an extremely heavy callus within the outer and basal walls of the aperture, extending about one-third whorl inward; no lamella. Whorls $7\frac{1}{2}$. Size of *G. collisella*.

Mr. Geo. H. Clapp, of Pittsburgh, Pa., when in Philadelphia lately, called my attention to this form. Upon examining the collection of the Academy, two trays of it were found, one set collected by A. G. Wetherby (who also supplied Mr. Clapp's specimens), on the Tennessee river, 3 miles above Chattanooga, Hamilton Co., the other by G. A. Lathrop, at Nashville, Tenn. In correspondence with Mr. Wetherby some years ago, we mutually agreed that the shells were a small, heavily calloused variety of *G. ligera*; but upon reconsideration I am disposed to rank them rather with *G. collisella*.

A NEW SUBGENUS OF CORALLIOPHAGA.

BY W. H. DALL.

Oryctomya n. subg.

Shell with the form of *Coralliophaga*, the surface with radiating very fine lines of minute granulations as in *Eucharis*; hinge with one slender, transverse, more or less trifid cardinal in each valve, that in the left valve larger, and a slender almost linear tooth on the anterior lower surface of the nymph in each valve; an obscure projection on the cardinal margin in front of the cardinal in the left valve; no lateral teeth; pallial sinus short, angular, the adductor scars large and strong, the inner margins of the valves plain. Type *C. (O.) claibornensis* Dall.

This subgenus differs from *Coralliophaga* in its surface and dentition, and has the pallial sinus more distinct and angular. It has the boring habit, the valves are therefore often irregular, the younger ones are thinner, more regular, and with the adductor scars less evident. *Coralliophaga prima* Harris (Bull. Pal. IX, p. 60, pl. 13, figs. 4, 5, 1897), from the Lignitic, may be congeneric, but I have seen no specimens, and the dentition is different according to the description.

C. (Oryctomya) claibornensis Dall.

Shell elongate oval with low beaks, quite anterior, moderately inflated, somewhat mesially impressed; surface with incremental lines which in senile specimens sometimes become lamellose near the posterior end; radial sculpture of rows of small globular granules easily worn off and almost microscopic; ends rounded, the posterior broader; hinge teeth delicate, somewhat pedunculate and slender in the adult; pallial sinus not extending in front of the posterior adductor scar; pallial line in senile specimens radially striated.

Lon. 36, alt. 19, diam. 14 mm.

Claiborne sands, at Claiborne, Ala., Burns.

This species is readily recognized by its peculiar surface. It will be illustrated in a publication now in press.

NOTES AND NEWS.

HOW CAN HE CLEAN 'EM?—A collector asks "How can I get the livers out of my shells? Is there an acid that will eat liver and

let the shell alone; or, is there some absorbent that will contract when cool or in the process of drying that will bring it out? I have put my snails in boiling water, guessing at the cooking necessary for the different varieties, but often I cannot extract the whole animal, leaving a portion to discolor the spire."

For cleaning the exterior of water shells I find fine table salt about the correct thing. Rub it on with a piece of cloth or the hand. It has grit enough to remove lime, algæ and iron stains without being firm enough to scratch the epidermis. Often a weak solution of muriatic acid assists in removing iron stains and lime, and brightens the colors. Rinse thoroughly, and when dry rub over lightly with raw linseed oil.—JAS. H. FERRISS.

NOTES ON SOME PUPIDÆ.—The perusal of the account of the Pupidæ in the new Catalogue suggests the following comments. *Pupa montanella* (p. 119) is not *concinnulla*, but is a weak form of *pentodon*, found in Custer Co., Colorado. The name has never been sanctioned by a description, and should be dropped. *P. pentodon*, it may be remarked, was originally the type of *Vertigopsis*, as I had it in my MS.; but in NAUTILUS, January, 1893, Dr. Sterki takes *curvidens* as the type, and this must now hold good. Ancey's unpublished descriptions of his two forms of *P. ingersolli* are as follows:

"Var. (?) *haydeni* Anc. Testa præcedenti [*ingersolli*] statura formaque simillima, sed dentibus palatalibus 3 parallelis et æqualibus, elongatis, nec. 2, discrepans. Cunningham Gulch (Ingersoll)."

"Var. *accedens*, Anc., Testa typo similis, sed tuberculo parietali distincto prope dentem armata." (May, 1890). *Pupa sublubrica* is hardly *muscorum*; a figure communicated by Mr. Ancey shows, besides a strong parietal tooth, one on the outer wall, and also an obtuse one on the columella. The figure appears to me to represent a form of *blandi*. In May, 1890, Mr. Ancey (*in litt.*) states that *hebes* was near to *muscorum*, and criticised Binney for putting it under *arizonensis*; thus it appears probable that *gabbi* may stand. At that time (1890) a new name was proposed in MS. by Ancey for *arizonensis*, W. G. B., but it was not published. It may be as well to remark here that the name *Holospira ræmeri* var. *minor*, published (NAUTILUS, VI, 6) by Dr. Sterki, without description, belongs to W. G. Binney's var. β , Man. Amer. Land Shells, p. 422.—T. D. A. COCKERELL.

RECENT PUBLICATIONS.

APPENDIX TO MARINE SHELLS OF SOUTH AFRICA, by G. B. Sowerby (30 pp., 3 pl.). The total number of species is brought up to 1051 in this appendix. Among numerous new forms may be mentioned *Fulgur africanum*, a form resembling young *F. carica*; two fine *Ancillas*, a *Basterotia* and several new forms of *Scintilla* as as of special interest. The rare *Voluta festiva* Lam. is also recorded.

ARMATURE OF HELICOID LAND SHELLS. Mr. G. K. Gude still continues his series of articles under this head in *Science-Gossip*. The extensive genus *Plectopylis* still furnishes species for description and illustration. In this group, as in many other genera of land snails, the most important characters for distinguishing species, and for their grouping, are to be seen only by cutting the shell to expose the peculiar system of internal barriers and teeth. In some species of *Plectopylis* these are wonderfully complex, forming truly a "crooked gateway." It must be said that in these papers Mr. Gude supplies a large amount of information not elsewhere to be found.

THE VARIATIONS AND MUTATIONS OF THE INTRODUCED LITTORINA, by Hermon C. Bumpus (Zool. Bulletin I, No. 5, p. 247, February, 1898). "The observations recorded in this communication were made for the purpose of ascertaining additional facts relative to the variability of 'introduced species.'"

Littorina littorea is selected for study. First collected at Bathurst on the Gulf of St. Lawrence in 1855, the southward migration of the species is traced to New Haven (1880). 10,000 shells were collected from ten American, and 3,000 from three English localities for measurement and weighing, the results being summarized as follows: "We may then conclude that the periwinkle, subjected to a new environment, and presumably emancipated from many of the restraining influences of natural selection, has become in any and all American localities:

"I and II, more variable in its stature. III, more variable in its course of growth. IV, more variable in weight. V, more variable in bulk. VI, more variable in limitations and boundaries of the color patterns.

"While presenting these extremes of variation, the American type of *Littorina littorea*, when compared with the European type, is more elongated, lighter in weight, more bulky, and the color markings are less pronounced."

308. *GASTRODONTA ANDREWSÆ* (W. G. B.). Mountains of North Carolina along the Tennessee boundary.

309. *GASTRODONTA MULTIDENTATA* (Binn.). Quebec and Ont. to Michigan, south to New York and Ohio.

310. *GASTRODONTA LAMELLIDENS* Pils. Clingman's Dome, Great Smoky Mts.

Genus **PRISTILOMA** Ancy, 1887.

311. *PRISTILOMA LANSINGI* (Bld.). Astoria, Oregon to Vancouver Island.

312. *PRISTILOMA STEARNSI* (Bld.). Oregon, Washington, British Columbia, Pt. Barrow, Alaska. (*Hyalina arctica* Lehnert, Science Record, June, 1884, is a synonym.).

Family LIMACIDÆ.

Genus **LIMAX** L.

313. *LIMAX MAXIMUS* L. Seaports and principal cities of east and west coasts. New Braunfels, Texas.

314. *LIMAX FLAVUS* L. Seaports and principal cities of the Atlantic seaboard, Boston to Charleston, S. C. (*L. variegatus* Drap. is the same).

Genus **AGRIOLIMAX** Mörch, 1868.

315. *AGRIOLIMAX AGRESTIS* (L.). Seaports of east and west coasts, often spreading well inland. There are many named color-forms.

316. *AGRIOLIMAX CAMPESTRIS* (Binn.). Entire U. S. Varieties *occidentalis* Coop., *montanus* and *castaneus* Ing., *ingersolli* W. G. B., *hyperboreus* West., and a number of color-forms have been described.

317. *AGRIOLIMAX HEMPELLI* (W. G. B.). Julian City, Cal.; San Tomas, Lower Cal. A color-variety *pictus* Ckll. is described.

Genus **AMALIA** Moq., 1855.

318. *AMALIA HEWSTONI* (Coop.). Seattle, Wash. to San Diego Co., Cal. May be identical with the European *A. gagates*.

Family ARIONIDÆ.

Subfamily Arioninæ Pilsbry.

Genus **ARION** Fér.

319. *ARION HORTENSIS* Fér. Boston and New Bedford, Mass.; Poughkeepsie, N. Y.; Seattle, Washington. Introduced from Europe.

Genus **PROPHYSAON** W. G. Binney.

320. **PROPHYSAON ANDERSONI** (Coop.). Middle California to Vancouver Island.

321. **PROPHYSAON FOLIOLATUM** (Gld.). Seattle, Olympia, and Puget Sound region, Washington.

322. **PROPHYSAON CÆRULEUM** Ckll. Seattle and Olympia, Washington.

323. **PROPHYSAON FASCIATUM** Ckll. Old Mission, Idaho: Chehalis and Seattle, Washington.

Genus **ANADENULUS** Cockerell.

324. **ANADENULUS COCKERELLI** (Hemph.). Cuyamanca Mts., San Diego Co., Cal.

Subfamily **Ariolimacinae** Pilsbry.Genus **HESPERARION** Simroth.

325. **HESPERARION NIGER** (Coop.). Neighborhood of San Francisco Bay.

326. **HESPERARION HEMPHILLI** (W. G. B.). Niles Station, Alameda Co., California.

Genus **APHALLARION** Pils. & Van.

327. **APHALLARION BUTTONI** Pils. & Van. Oakland to Santa Cruz, Cal. (*Ariolimax hecoxi* Weth., undescribed, is said to be the same).

Genus **ARIOLIMAX** Mörch.

328. **ARIOLIMAX COLUMBIANUS** (Gld.). Middle Cal. to British Columbia. The black-blotched form *maculatus* Ckll. occurs throughout the same range.

328a. **ARIOLIMAX COLUMBIANUS STRAMINEUS** Hemph. Santa Cruz Island, Cal.

329. **ARIOLIMAX CALIFORNICUS** Cooper. San Mateo, Santa Clara and Santa Cruz counties, California.

Genus **HEMPHILLIA** Binn. & Bld.

330. **HEMPHILLIA GLANDULOSA** B. & B. Puget Sound region to Astoria, Oregon.

331. **HEMPHILLIA CAMELUS** Pils. & Van. Old Mission, Idaho.

Genus **BINNEYA** Cooper.

332. **BINNEYA NOTABILIS** Cooper. Santa Barbara Island, Cal.; Guadelupe I., Lower Cal.

Family PHILOMYCIDÆ.

Genus **PHILOMYCUS** (Raf.) Fér.

333. **PHILOMYCUS CAROLINENSIS** (Bosc). Canada to Florida, west to Iowa and Texas.

Subgenus **Pallifera** Morse, 1864.

334. **PHILOMYCUS DORSALIS** Binn. New England and New York.

335. **PHILOMYCUS WETHERBYI** (W. G. B.). Whitley Co., Ky.

336. **PHILOMYCUS HEMPHILLI** (W. G. B.). Mt. Mitchell, N. C.; Lula, Hall Co., Ga.

337. **PHILOMYCUS PENNSYLVANICUS** Pils. Mountains of southern Pennsylvania.

Family ENDODONTIDÆ Pilsbry.

Subfamily Endodontinæ Pils.

Genus **PYRAMIDULA** Fitzinger, 1833.

Subgenus **Patula** Held, 1837.

338. **PYRAMIDULA ALTERNATA** (Say). Quebec and Ontario to Minnesota, south to Comal Co., Texas.

Forms *fergusoni* Bld. and *carinata* auct. are distinguishable.

338a. **PYRAMIDULA ALTERNATA MORDAX** (Shuttl.). West Virginia, East Tennessee.

339. **PYRAMIDULA CUMBERLANDIANA** (Lea). Marion and Franklin counties, Tenn.; Jackson Co., Ala.; n.-w. Georgia.

340. **PYRAMIDULA SOLITARIA** (Say). Ohio and central Mississippi Valleys, south to Arkansas; Northern Idaho, Eastern Oregon. The Western form has been called var. *occidentalis* v. Martens, but it has only slight differential characters.

340a. **PYRAMIDULA SOLITARIA LIMITARIS** Dawson. Waterton Lake, Rocky Mts., British America.

341. **PYRAMIDULA STRIGOSA** (Gld.). Rocky Mt. region and Great Basin, from State of Sonora, Mexico, north to Wyoming and Washington.

341a. **PYRAMIDULA STRIGOSA IDAHOENSIS** (Newc.). Idaho, between Idaho City and Cœur d'Alène.

341b. **PYRAMIDULA STRIGOSA NEWCOMBI** (Hemph.). North of Ogden, Utah. Form *wasatchensis* Hemph., near Ogden.

341c. PYRAMIDULA STRIGOSA BINNEYI (Hemph.). Box Elder Co., Utah. Forms *cooperi*, *multicostata*, *castanea*, *albofasciata* and *buttoni* Hemph., same locality. Form *gouldi* Hemph., banks of Bear River, north of Brigham City, Utah.

341d. PYRAMIDULA STRIGOSA (Gld.) typical. Spokane, Washington. . Var. *parma* Hemphill is a synonym.

341e. PYRAMIDULA STRIGOSA JUGALIS (Hemph.). Salmon River, Idaho. Form *intersum* Hemph., same locality.

341f. PYRAMIDULA STRIGOSA SUBCARINATA (Hemph.). Rathdrum, Idaho. Includes forms *subcarinata*, *bicolor*, *lactea* and *picta* Hemph.

341g. PYRAMIDULA STRIGOSA COOPERI (W. G. B.). Colorado, etc. Form *globulosa* Ckll., Summit Co., *trifasciata* Ckll., Mesa Co., *confluens* Ckll., Custer, Garfield and Mesa Cos., *elevata* Ckll., Delta Co., *major* Ckll., Mesa Co., *minor* Ckll. near Egeria, Routt Co., all Colorado.

341h. PYRAMIDULA STRIGOSA IOWENSIS Pils. Loess at Iowa City, Iowa (extinct).

341i. PYRAMIDULA STRIGOSA CONCENTRATA Dall. Summits of the Hachita Grande and Huachuca Mts., New Mexico and Arizona.

341j. PYRAMIDULA STRIGOSA HAYDENI (Gabb). Utah. Form *hemphilli* Newc., Arizona, Nevada, Idaho, Utah and Colorado; form *gabbiana* Hemph., Near Salt Lake City; form *bruneri* Ancey (*oquirrhensis* Hemph.), Oquirrh Mts., Utah; form *hybrida* Hemph., near Logan, Utah.

Subgenus *Gonyodiscus* Fitz.

342. PYRAMIDULA PERSPECTIVA (Say). Minnesota to Texas, east to the Atlantic, but wanting from the Middle States east of the Alleghenies, and from New England, Canada.

343. PYRAMIDULA BRYANTI (Harper). Mitchell Co., N. C.

344. PYRAMIDULA STRIATELLA (Anth.). Ontario to Winnepeg, Manitoba, Montana and Vancouver Id., south to New Mexico and Arizona. Kern River region, Cal.

344a. PYRAMIDULA STRIATELLA CATSKILLENSIS Pils. Tannersville valley, Catskill Mts.

344b. PYRAMIDULA STRIATELLA CRONKHITTEI (Newc.). Klamath valley, Oregon. Nevada and California.

Subgenus **Planogyra** Morse, 1864.

345. **PYRAMIDULA ASTERISCUS** (Morse). Quebec, Ont. and Maine (to Vancouver Island?).

Genus **HELICODISCUS** Morse, 1864.

346. **HELICODISCUS LINEATUS** (Say). Ontario and Quebec to Florida, west to Rio Chama and White Oaks, New Mexico.

347. **HELICODISCUS FIMBRIATUS** Wetherby. Tellico Plains, Tenn. A variety is reported from Indian Territory.

Subfamily Punctinæ (*Vel Polyplacognatha*).

Genus **PUNCTUM** Morse.

348. **PUNCTUM PYGMÆUM** (Drap.). Quebec, Manitoba and northern States; Texas; California, Vancouver Id.

349. **PUNCTUM RANDOLPHII** (Dall). Seattle, Washington.

350. **PUNCTUM CONSPECTUM** (Bld.). Middle California to Vancouver Id. and Sitka.

350a. **PUNCTUM CONSPECTUM PASADENÆ** Pils. Pasadena, California.

351. **PUNCTUM CLAPPI** Pilsbry. Seattle and Tacoma, Washington; Salem, Oregon.

352. **PUNCTUM CALIFORNICUM** Pilsbry. Fish Camp, Fresno Co. Cal.

Genus **SPHYRADIUM** Charp.

353. **SPHYRADIUM EDENTULUM** (Drap.). Ontario to Vancouver Id. *Vertigo simplex* Gld. A longer cylindrical form, *alticola* Ingersoll, occurs in the Rocky Mts., Colorado, etc., and Mississippi valley Loess.

(Superfamily **ELASMOGNATHA**.)

Family SUCCINEIDÆ.

Genus **SUCCINEA** Drap.

(*Amphibinæ*.)

(The species of this section are variable and extremely difficult to define from the shells alone, and the soft anatomy is as yet practically unknown).

354. **SUCCINEA SALLEANA** Pfr. New Orleans and Alexandria, La.; Gloucester, N. J.

355. **SUCCINEA EFFUSA** "Shutt." Pfr. Florida.

356. *SUCCINEA SILLIMANI* Bld. Nevada, California.

357. *SUCCINEA HIGGINSI* Bld. Put-in-Bay, Lake Erie.

358. *SUCCINEA RETUSA* Lea. Canada to Montana, southward to Georgia. Includes *S. ovalis* Gld. not Say, *S. forsheyi* Lea, *S. wilsoni* Lea, *S. calumetensis* Calkins, *S. peoriensis* Wolf.

358a. *SUCCINEA RETUSA* MAGISTER Pils. Mississippi valley from Tennessee to Minnesota: Michigan.

358b. *SUCCINEA RETUSA* DECAMPI Tryon. Michigan.

359. *SUCCINEA NUTTALLIANA* Lea. Washington to California.

360. *SUCCINEA HAYDENI* W. G. Binn. Nebraska to Utah. A form *minor* W. G. B. is recorded from Great Slave Lake.

361. *SUCCINEA HAWKINSI* Baird. Lake Osoyoos, B. C.

(*Neritostomæ.*)

362. *SUCCINEA OBLIQUA* Say. Canada to Montana, south to Nebraska, Arkansas and Georgia.

362a. *SUCCINEA OBLIQUA* TOTTENIANA Lea. Canada to Middle States.

(*Campestris.*)

363. *SUCCINEA CAMPESTRIS* Say. Georgia and Florida. *S. inflata* Lea is a synonym.

363a. *SUCCINEA CAMPESTRIS* UNICOLOR Tryon. New Orleans, La.

364. *SUCCINEA LUTEOLA* Gld. Texas; western Florida to the Keys.

365. *SUCCINEA CONCORDIALIS* Gld. Lake Concordia, Texas.

366. *SUCCINEA GROSVENORII* Lea. Louisiana, Mississippi and Texas north through Kansas and Nebraska to Great Slave Lake; Colorado, Montana and Utah. Synonyms are *S. lineata* Binn. not DeKay, *mooresiana* Lea, *greeri* Tryon. Forms *elongata* (Kremmling, Colo.) and *rufescens* Ckll. (Lee Co., Texas) are described.

(*Lucenæ.*)

367. *SUCCINEA AVARA* Say. Canada to Georgia, west to Minn., Mont., Utah, Texas, California. Forms *alba* Ckll., Custer Co., Col. *wardiana* Lea, *vermeta* Say, *compacta* Ckll., *major* Binn. are described.

368. *SUCCINEA AUREA* Lea. New York, Ohio. *S. haleana* Lea, Alexandria, La., is probably synonymous.

369. *SUCCINEA VERRILLI* Bland. Anticosti Island.

370. *SUCCINEA OREGONENSIS* Lea. San Diego to Oregon ; Utah ; Idaho.

370a. *SUCCINEA OREGONENSIS GABBI* Tryon. Utah, Wyoming, eastern Oregon.

371. *SUCCINEA RUSTICANA* Gld. Oregon, Cal., Nevada.

372. *SUCCINEA STRECHIANA* Bld. Nevada, Idaho, Cal.

373. *SUCCINEA GROENLANDICA* Beck. Greenland.

(*Lautæ.*)

374. *SUCCINEA CHRYSIS* Westerl. Port Clarence, St. Michaels and Kadiak, Alaska.

374a. *SUCCINEA CHRYSIS AURELIA* Martens. Port Clarence, Alaska.

374b. *SUCCINEA ANNEXA* Westerl. Port Clarence, Alaska. These three are probably mere variations of one species. They belong to an Asiatic group of the genus. *S. chrysis* occurs also on the Siberian side of the strait.

Suborder *Teletremata* Pilsbry.

Family **VAGINULIDÆ.**

Genus **VAGINULUS** Fér.

375. *VAGINULUS FLORIDANUS* Binn. Florida Keys, Charlotte Harbor and Punta Rassa.

VAGINULUS ? Lobitos, Cal. (Stearns, as *V. olivacea*).

[NOTE.—The family *Onchidiidæ* belongs to this suborder, but as its species are not really terrestrial in habit, it is omitted from this list of land snails. The *Auriculidæ*, and especially *Carychium*, and *Pomatiopsis lapidaria*, might with greater propriety be included; but it has been thought best to omit them.]

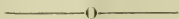
UPON THE PRINCIPLES OF NOMENCLATURE AND THEIR APPLICATION TO THE GENERA OF RECENT MOLLUSCA, by J. Cosmo Melvill; being the Presidential Address delivered before the Conchological Society of Great Britain, September 19, 1896. This address embodies a very readable sketch of the history of nomenclature, from the pre-Linnæan authors to the present time, with a list of molluscan genera about the names of which difference of opinion exists, observations upon the nomenclature of certain genera, and suggestions for the betterment in the future of the existing condition of the subject.

THE
NAUTILUS

A MONTHLY JOURNAL

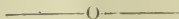
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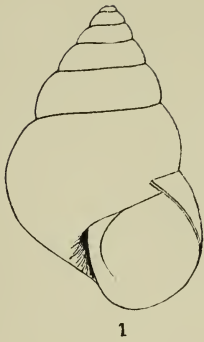
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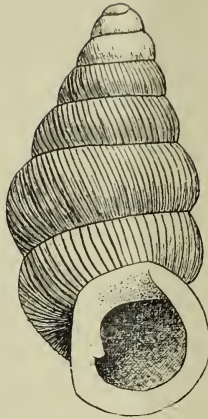
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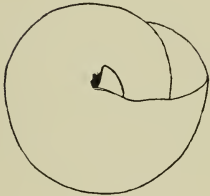
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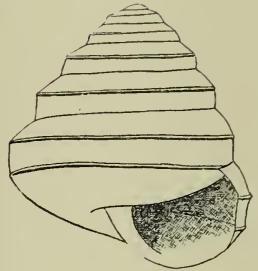
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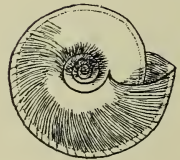
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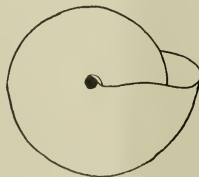
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THE NAUTILUS.

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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 liwaensis* 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 sphericula* 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 dohertyi 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. $4\frac{1}{2}$ 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 *Chrysodomus*, 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. phaseolus*, *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 Unios 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., *Latricola 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. aëopus*, but was disappointed. I was surprised to find *U. undulatus* Bar. succeeding *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 Illinois 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 fusescens*, *C. gallina*, *C. aureotinctum*, *Volvaria varia*, *Parapholas californica*, *Pholadidea penita*, *Nettastomella darwinii*, *Norrisia norrisi*, *Leptothyra bacula*, *Phasianella compta* var. *pulloides*, *Mytilus bifurcatus*, *Septifer bifurcatus*, *Lasæa 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* (*Cryptibyci*, 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. Taylora* 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 CENTRALI-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*, *Cælocentrum*, *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 *Cælocentrum* 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*, *speluncæ*, *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* Ancey, 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 *Chlamydo-phorus*. The pedal (suboral) 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.

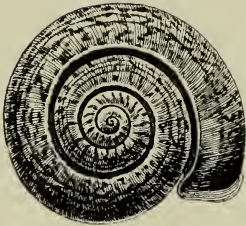
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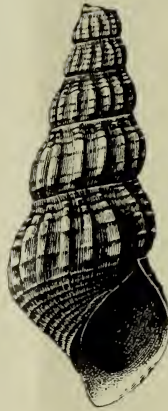
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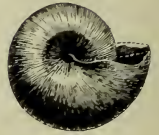
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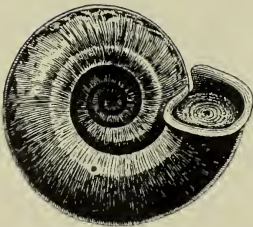
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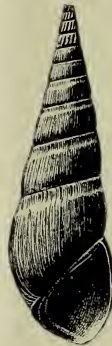
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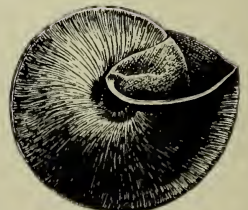
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THE NAUTILUS.

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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 striae. 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 callous. 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.

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.

Epiphragmophora 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.

Epiphragmophora 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. Amer. 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 $\frac{1}{6}$ and $\frac{1}{5}$ 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 Utilla 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., *Limnæa* 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.

THE NAUTILUS.

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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 Curacao, *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 inçanum* 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 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 laminæ, 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. eolina*, 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 branchiæ 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 Psammobiidæ 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 Möreh, 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 *Nuculide* 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*, *Bathanalia*, *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*, *Bathania*, 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 *Calyptroidæ*. 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 *Myllitta* 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. Stowei* 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. Stowei* 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 *Lasæa 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 *Amnicola*.

Amnicola missouriensis n. sp.

One of the forms labelled "*Amnicola 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.

Amnicola 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 $1\frac{1}{2}$, width $1\frac{1}{2}$ mm.

Alt. $2\frac{1}{2}$, diam. $2\frac{1}{2}$; 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 flammulæ; 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. brasiliانا* (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. brasiliانا* is only a variety. In the same paper, the *Columbella misera* 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 *Cyclas 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 *Cyclas 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 HALISTYLUS. 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 cæruleum* 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. foliolatum*, 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, Ariolimaciinæ. Eight genera are recognized,

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

Phenacaron being very properly suppressed. *Prophysaon 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.

Phenacaron 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 slug 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 Ponsonby.—The new species of this installment are mainly Enneas. A new *Dorcasia*, *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 Ponsonby, is remarkable.

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

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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
striæ 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. Sutural 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.

Chaetopleura 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 hæmastoma</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-lævis</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 Folinæ 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 neritooides Lin.=*cærulescens* Lam.
Rissoina Bruguierii 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 subcrenulata 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 a 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.
Pisinnæ (= *Hagenmülleria*) *punctulum* Phil. = ? *glabrata* Mühlf.
Pisinnæ punctulum f. *elongata*. Larger and more produced. Very rare.
Pisinnæ (?) *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.
Cœcum subannulatum Folin.
Truncatella lavigata 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 unguiformis 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 rarilineata* 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 Gravinæ* Monterosato. Living, on Algæ, but not very common.
- Clanculopsis glomus* Phil.=*C. Jussiani*, 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 Meneghinii*, 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 Meneghinii*, 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 tres-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 parait 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.
Mastra 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.?
Lasæa rubra Mont.
Cardita calyculata Lin.
Chama gryphoides Lin.
Astarte triangularis Mont. Very rare.
Nucula nucleus Lin.
Arca Noæ Lin.
Arca lactea Lin.
Pectunculus violacescens Lam.
 Very common and sometimes used for food and bait.
Modiola barbata Lin.
Modiola Petagnæ Scacchi.
Modiola Adriatica Lam.
Mytilus africanus Chemn.*
Mytilus minimus Poli.
Modiolaria costulata Forbes.
Lithodomus lithophagus Lin.
Pecten varius Lin.
Lima tenera Turtón.
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. Vayssiére. 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 *Anctus*, *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* Fér., *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 *Orthotomium*. *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.

Limnæa adelinæ 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 *Acmæa testudinalis* var. *alveus* Conr. Notes on the anatomy with illustrations, will be given later.

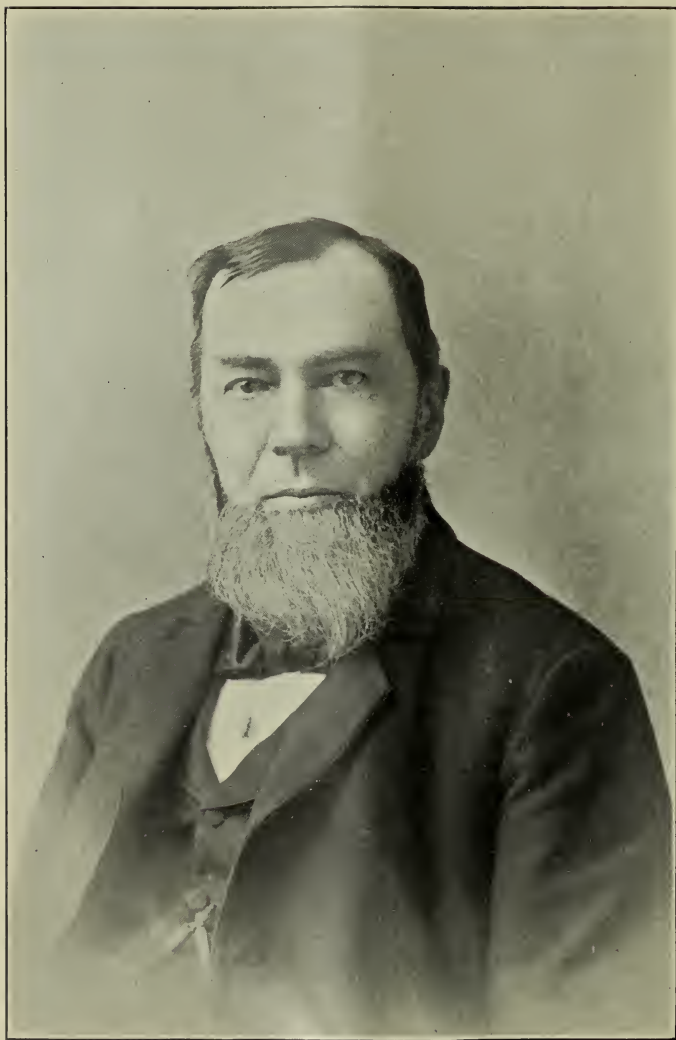
NOTE ON THE SUBGENUS EUCOSMIA CPR.—*Eucosmia* comprises a number of minute shells like *Phasianella* in smoothness and the stony operculum, but differing in being depressed with very short spire. Carpenter described four species from Cape St. Lucas and Mazatlan,—*variegata* with var. *substriata*, *punctata*, *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*.

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WILLIAM HENRY DECAMP.

THE NAUTILUS.

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No. 6.

WILLIAM HENRY DE CAMP.

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 louisvillensis Lea.

Goniobasis informis Lea.

Euryæalon 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 trivolvus*, *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*, *Annicola 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 ampliorne*, 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 *gyrina*, *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. PILSBRY 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 multififormis* 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

⁴Proc. 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.

⁵Mazatlan 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 *Mytilidæ* 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 *Callomphalus* 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 decemcostatus* 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. Ghiesbrechti* 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.

HALIOTIS CRACHERODII Var. **CALIFORNIENSIS** Swainson.

BY H. A. PILSERY.

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 Hongkong. 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 *Cypræa*."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 *Manch. Mem.* (4), vol. 1, p. 218, 219. 3 *Conch. Icon.*, pl. 14, no. 66a, 1845. 4 *Thes. Conch.* 5 Tryon, *Man. Conch.*, vol. 7, 1885. 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 *Corunculina* (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 *Paralledontidæ* 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. ramosa* Lam., 1819. In the family *Limidæ* 7 new species are described and *Lima lima* Linn. is adopted for *L. squamosa* Lam. Five new species of *Anomiidæ* are described. For *Placunanomia rudis* Brod. and *P. macroschisma* Desh. the genus *Pododesmus* Phil. is used. To the *Mytilidæ* are added 10 new species. *Lithophagus forficatus* Ravl. and *L. candigerus* are synonyms of *Lithophaga aristata* Dillwyn.

Dreissina or *Mytilopsis leucophaeta* Conrad has been placed in the genus *Congerina*. *Juliidæ* is adopted in place of *Prasinidæ*. *Julia* Gould antedating *Prasina* Deshayes by one year. The Recent and Tertiary *Pholadidæ* 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 *Mactridæ* 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 *Mesodesmatidæ* in which six new species of *Ervilia* 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 $4\frac{1}{5}$, 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 Cronkhitei* 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 *Vitreu 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 $1\frac{1}{4}$ 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, XI, 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 | Calliostoma 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 | Omphalium 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 seutulata, Gld. 7 |
| Chlorostoma gallina, Fbs. 4 | Mopalia muscosa, Gld. 5 |
| Chlorostoma funebreale, A. Ad. 3 | Ischnochiton magdalenensis, Hds. 31 |
| Mitra maura, 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 biplicata, Sby. 60 | Ianthina trifida, Nutt. 1 |
| Actæon punctocaelatus, Cpr. 1 | Odostomia nuciformis, Cpr. 6 |
| Leptothyra carpenteri, Pilg. 72 | Odostomia gouldii, Cpr. 1 |
| Leptothyra bacula, Cpr. 17 | Astyris gausapata, Gld. 7 |
| Leptothyra paucicostata, 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 tricuspids, 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 Massié (1893-'94-'95), par. A. Bavay. New species described and figured: *Amphidromus 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 epiphallogonous *Helices*; though until the pallial region is investigated, we cannot be certain that it is not a member of the *Bulimulidae*.

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 eufalensis* 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

¹See 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 Chilhowensis*. 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. Chilhowensis 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 fimbriatus*, 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 moccasins. 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 sticks and barks and kill rattlesnakes I had something of a ginseng hook made of a socket 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 *Chilhoweensis* 40 seconds; *appressa* and *Ferrissii* 18; the *Omp. Andrewsæ* 8, and *Christyi* and *Stenotremas* 5, the small *Zonites* 3 seconds.

The evening of this third day Mr. Clapp powdered his feet with taleum 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. lamellidens*. 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 *Wheatleyi*, 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 bracing when hot below. It is also too high for mosquitoes and flies.

Polygyra Andrewsæ, *Omp. Andrewsæ*, *Folygyra 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; *Palliata* 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: Røe'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 *Vitrea 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* Lca (*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 varieties 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

Nearetulas, *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 mollusca, 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 Tronchet, 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, 86 in conjunction with P. Fischer, 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. Fischer, in the *Etudes sur les Mollusques terrestres et fluviales 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'Amérique 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 fluviales 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 Bulimus auriculiformes de l'Archipel Viti*; *Catalogue des mollusques qui vivent dans le Détroit de Behring et dans les parties voisines de l'Océan 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 synonymic and geographical distribution appended. Among the genera thus treated are *Cancellaria*, *Conus*, *Holospira*, *Hybocystis*, *Lyria*, *Meræ*, *Opisthostoma*, *Parmacella*, *Pirena*, *Placobranchus*, *Pleurotomaria*, *Pomatias*, *Rapa*, *Rhodea*, *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*, *Perciræa*, *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 embarcadero 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 ; naere 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 naere. 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 Gualala 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. tucumcarii*, 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. navia*, 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* Newc. 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 gold-pan 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 *Limnæa 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* Mörch.
- Volutharpa ampullacea* Midd.
- Margarita helicina* Fabr.
- Margarita albula* Gould.
- Littorina sitchana* Phil.
- Tritonium oregonense* Redf.
- Eulima* sp.
- Acmæa patina* Esch.
- 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 hamatus* 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 egena* 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 carinated 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 carinated. 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*, *striatinum*, *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 elliptic 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 tri-dentata complanata* also occurred there.—BRYANT WALKER.

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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 turbiniformis*, and author's specimens or co-types of all of the other species except *Fluminicola seminalis*, 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 PYRGULOOPSIS 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 Ffld. 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"; Pahrnagat 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. (*Ammicola 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.)

Ammicola dalli Call, *A. turbiniformis* Tryon and *Lithoglyphus cumingi* Ffld. 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 *Assimineia*; "*H. egena* 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 analogous 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 *Pomatiopsis binneyi* Tryon, and is less attenuated than the smooth "*semani*" 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-striæ. 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 or 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 or 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*" *turbiniiformis*, "*Amnicola*" *dalli*, and other small varieties of *Fluminicola 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 collemar 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. Cincinnatensis* 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 $\frac{3}{1-1}$, 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 canal 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 PUPIDÆ.

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, truncated 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 striæ 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 Loweii* 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. 100.

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 Unionidae 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 uniones 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 uniones 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 cast-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 uniones 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 Raccoon 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; Corapolis, 4.

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

Unio cylindricus Say. Ohio R., Corapolis, 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 phaseolus 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 stomineum Conr. 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 canaliculatum 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 Conception, 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 *Zonites macilenta* Shuttl. in First Supplement to Terr. Moll. 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 *micilenta* 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 mm. 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 tigrina*, *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 *Ampullaria caliginosa* and *Planorbis trivolvis*, in the fresh water ponds back of Rockledge, I gathered at least half a bushel of the large *Ampullaria* 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 1870. 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. 5-5½, diam. 10-11½ 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 4½ (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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