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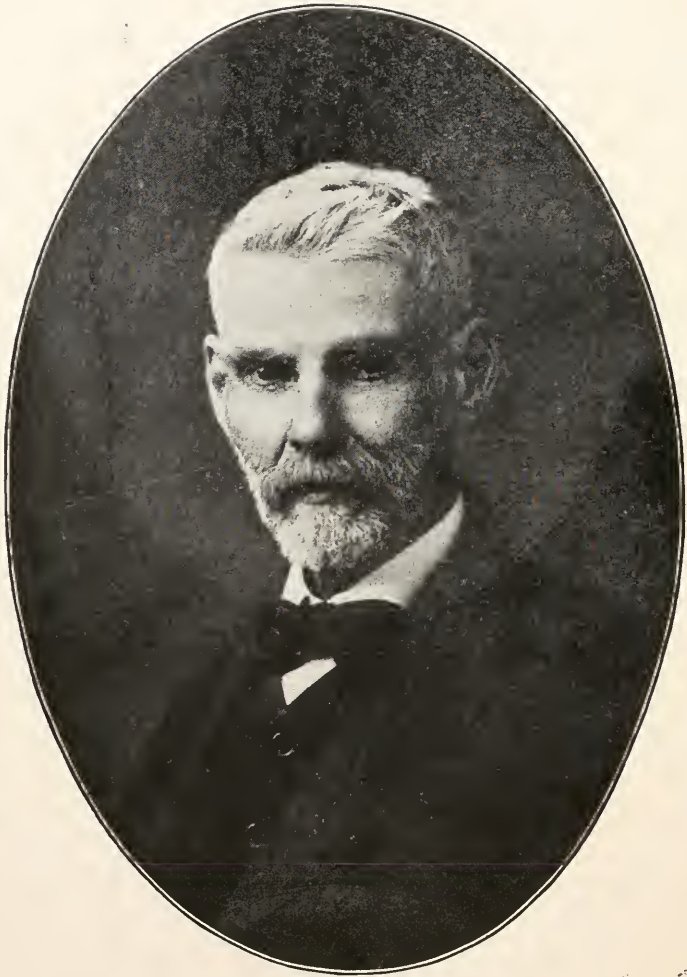
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HERBERT HUNTINGTON SMITH

THE NAUTILUS.

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No. 1.

AN OLD COLLECTING GROUND REVISITED.

BY CHARLES W. JOHNSON.

While a resident of St. Augustine, Florida, from 1880-88, I made a careful study of the mollusca of the harbor and vicinity. The habits of the various species and the factors governing their distribution, which in many cases was much restricted, especially appealed to me. With these facts in mind it was with great interest that I visited the old city after an absence of thirty-one years. Time and the ever-shifting sands have played sad havoc with many of my old collecting grounds, and I looked in vain for some of the rarer species.

The accompanying maps can give only a general idea of the changes that have taken place.¹ The "Lagoon" of the eighties is gone and there are now two inlets with about the same depth of water on each bar according to the government chart, survey of 1910, although I was told that the southern channel has now much less water on the bar than the other. Marsh Island at the mouth of Hospital Creek is also gone, and the sand bar that was formerly only east of the island now extends to the fort. There is no trace of the site of the old Spanish lighthouse,

¹Figure 1 shows the harbor and vicinity about 1883, before the St. Sebastian marsh was filled, also the approximate positions of the "Lagoon" and Marsh Island. The figures refer to the species mentioned in the text that were found at those particular places.

Figure 2 is based on the U. S. coast survey chart, No. 159, survey of 1910, and represents in a general way present conditions.

which was probably at the extreme end of the now exposed ledge of coquina and about 200 feet below the present high-

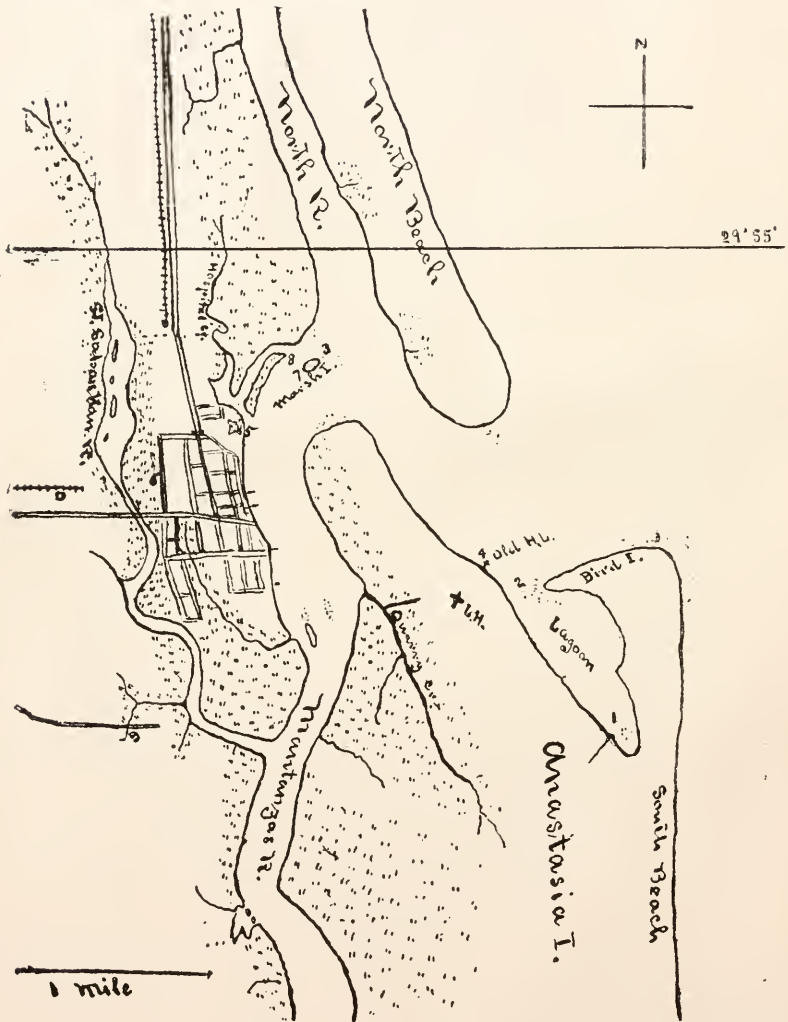


Fig. 1. St. Augustine, about 1883.

water mark. The government has endeavored to prevent the wearing away of this portion of Anastasia Island by construct-

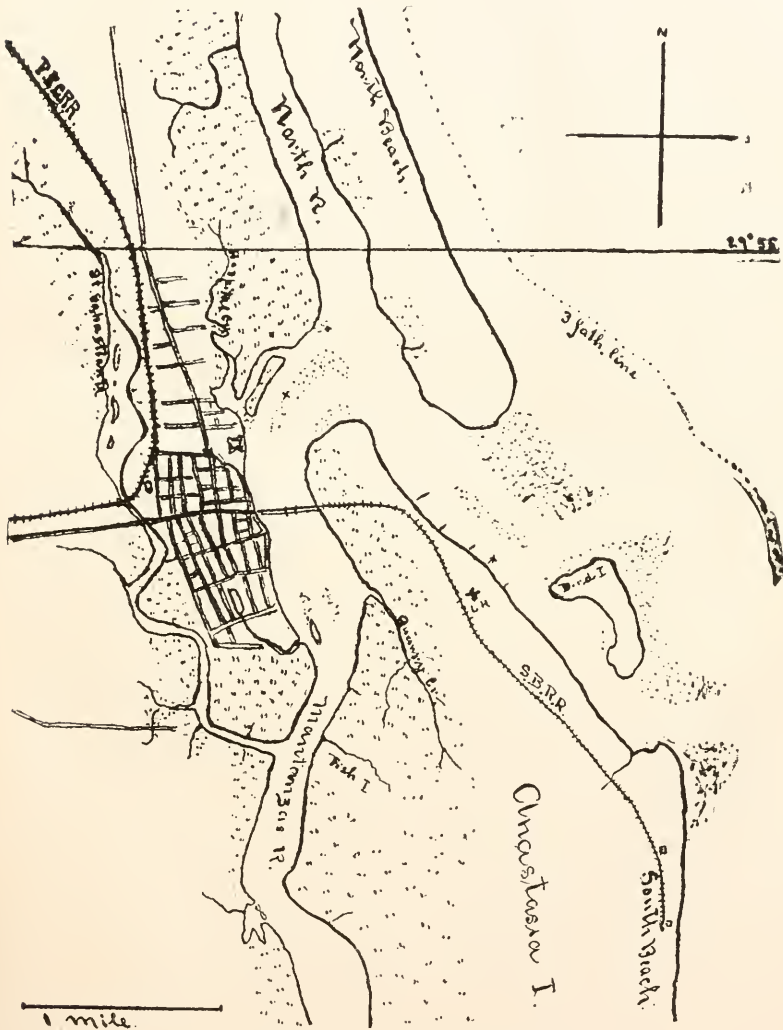


Fig. 2. St. Augustine at present.

ing four jetties, one below and three above the ledge referred to, but the erosion apparently still continues. The following notes are based chiefly on those species that were very limited in their distribution and which therefore may have become locally extirpated by the many changes affecting their environments. A list of about 200 species published by the writer in 1890¹ forms the basis of some of the following remarks.

Macrocallista nimbose Sol. (1) This is the *Callista gigantea* Gmel. of my list. It was found only in the shoal water at the head of the "Lagoon," seeming to prefer the quiet water, as I never found a trace of it on the ocean beach. At most only six or eight specimens were found, and many of these were broken, probably by the large ray or "clam cracker" as the butterfly ray (*Pteroplatea maclura*) is called by the fishermen.

Donax obesa d'Orb. (2) This little chunky species was formerly common on the sand bars at the mouth of the "Lagoon," where there was a slight shifting of the sand at every tide. The larger species, *Donax variabilis* Say, was (and probably is) exceedingly abundant on the ocean beaches, especially the "South beach." I was quite amused at Daytona to hear the popular name of "coquina" applied to this shell, and one young man talking about "coquina bouillon." While this is entirely proper, as the Spanish word coquina means, broadly speaking, shell-fish, the name has become so generally used for the shell-rock (often made up largely of this species) that at first it sounded like pretty hard diet. I am sorry that opportunity did not permit my getting a large series of this species including the young, as I should have liked to have made some comparisons of the young of *D. variabilis* with that of the typical or more northern *D. fossor* Say. As I remember I could never satisfactorily separate the two forms at St. Augustine and omitted the latter from my list, although it is recorded from the entire coast of Florida and westward to Texas. Mazyck in his "Catalog of Mollusca of South Carolina," says of *D. fossor*, "very rare, Sullivan Island."

¹ An Annotated List of the Shells of St. Augustine, Florida, THE NAUTILUS, vol. iii, pp. 103, 114 and 137, vol. iv, pp. 4-6.

On one visit to the South beach I found it literally strewn with perfect specimens of *Divaricella quadrisulcata* d'Orb. (*Lucina dentata* of my list), but never again did I find them in such numbers. At another time quantities of an *Arca* referred to in my list as *Arca americana* Gray, were found. It is more elongated than those found in the harbor, with a thinner and lighter brown periostracum, and probably represents only a variety or ocean form of *A. campechiensis* Dillw. (*Arca pexata* Say).

Lucina philippiana Reeve (*Loripes edentula* of my list). Large single valves were frequently found and occasionally at the mouth of Hospital creek shells were found in the mud with both valves intact, but like the *Phacoides filosa* Conr. in Portland harbor, Maine, always dead. It may also be of interest to note that two specimens of *Solemya velum* Say, and a few single valves of *Mya arenaria* were found on the north beach, the most southern records for the species.

Panopea bitruncata Conr. (3) This large and variable shell which was referred to in my list under both *Glycimeris reflexa* Say, and *G. americana* Conr., was later the subject of a paper by the writer¹ in which the synonymy was straightened out, and a fine specimen found on the bar east of Marsh island was figured. Common in the pliocene of the Caloosahatchie, but recent examples are exceedingly rare. Living deep in the mud they are difficult to obtain, unless on rare occasions extensive harbor dredgings might bring some to the surface. They are also very apt to be destroyed by changes such as encroaching sand bars, sedimentary deposits, and harbor pollution.

The rocks that represented the ruins of the old Spanish lighthouse (the tower of which fell in June, 1880, while the keeper's house had fallen several years before) were a favorite place for *Thais floridana* Conr. (*Purpura haemostoma* var. *floridana* of my list). During my recent visit I failed to find a living specimen of this species either on the ledge or jetties, but the tides were not very low and it may be that they could have been found at a lower tide. On all of the rocks including the

¹THE NAUTILUS, vol. 18, pp. 73-75, pl. 4, 1904.

jetties were great numbers of *Siphonaria naufragum* Stearns (*S. lineolata* d'Orb.). One thing that seemed to impress me more than when I lived there, was the great abundance of oysters on all the rocks, even around the water battery of the fort and also on the piling. In speaking to an old friend regarding the matter, he said he thought that around the fort it was due to cleaning off the rocks a few years ago, thus presenting a clean surface for the young to cling to. This array of bristling oysters around the water battery of the fort deterred me from a hunt for *Nerita peloronta* and *N. versicolor* (5), three living specimens of which I found there together with *Litorina angulifera*, being the most northern record for the three species.

Cerithidea scalariformis Say (6). The only place that I ever found this species at St. Augustine was in the more sandy portion of the marsh west of the city between King street and Orange street, not far from where the Y. M. C. A. building now stands. The filling-in of the marsh has probably locally extirpated this species. Another related species *Cerithium floridanum* Mörch (7), *C. atratum* of my list, was also restricted to a small area, an old oyster bed at the west end of Marsh island. This is now a sand bar and the species may now be entirely absent in the harbor. At the latter place I also found my only living example of *Murex fulvescens* Sowb. (*M. spinicostata* Val.).

At the mouth of Hospital creek was a large patch of the grass-like Gorgonia—*Leptogorgia virgulata*. On this lived the little *Simnia uniplicata* Sowb. 8 (*Ovula uniplicata*), as the Gorgonia varied in color so did the shells of the *Simnia*, agreeing in color with the bunch of Gorgonia on which they were found—either white, light-yellow, orange or pink. On one occasion while hunting for *Simnia* a conspicuous object attracted my attention, its flesh-colored mantle with irregular blackish markings was very striking, and as it contracted I found I had a *Cyphoma gibbosa* Linn. (*Ovula gibbosa*), common to the West Indies. For some time I wondered why the animal of this shell should be so very conspicuous; then the thought occurred to me that in more southern waters probably most of them live on the "sea-fans" (*Rhipidogorgia flabellum*) and with their

reticulated structure as a background the animals would be scarcely distinguishable, like the Sargassum fish (*Pterophryne histrio*) in the gulf-weed (Sargassum).

Cyrena carolinensis Bosc. (9). In making a bridge across a small branch of the St. Sebastian River I first discovered this species. It was a large and interesting variety in which the umbones were unusually high, many of the specimens closely resembling in size and form the figure of *C. olivacea* Carp. from Mexico, as given by Prime (Monograph American Corbiculidae, p. 17, fig. 12, 1865). Although the tide flowed freely up the little creek, there was at low tide a small stream of fresh water even at the driest time. At the junction of this little stream and the high ground there was a small colony of *Neritina lineolata* Lam. (*N. reclinata* Say). I looked in vain for this species during my recent visit, nor did I find *Cyrena* near the little bridge, but it may still exist in other parts of the stream which time did not permit me to examine thoroughly. At the mouth of Pellican creek near the Matanzas Inlet was a colony of *Neritina virginea* Linn. They were the olive-green or more brackish water type and probably represent the most northern limit of this species on the Atlantic coast. About seven miles south of Matanzas Inlet was a large cypress swamp in what was known as "Bike's Hammock," here was found *Ampullaria depressa* var. *hopetonensis* Lea, which seems quite distinct from those of the St. Johns River drainage. There were also fine specimens of *Ancylus peninsulae* Pils. & Johns.—erroneously referred to *A. filiosus* in my list. The east coast canal has drained much of this section now called Bikes Prairie on the coast survey chart. In many places I saw truck arms as I passed through the canal on my way north from Daytona.

These notes suffice to show some of the changes that can take place in a limited area in a comparatively short time, and the probable effect of such changes on certain species. It is not at all peculiar to St. Augustine, for similar changes are going on at many other places along the coast and in the vicinity of our cities. The importance of a careful study of a local fauna cannot be too strongly urged. The destruction of the forests, the

draining and filling of swamps and marshes, the construction of dams, etc., all tend toward lessening the fauna and flora of a given area.

NEW LAND SHELLS FROM ALABAMA AND TENNESSEE.

BY GEO. H. CLAPP.

POLITA CUMBERLANDIANA, n. sp.

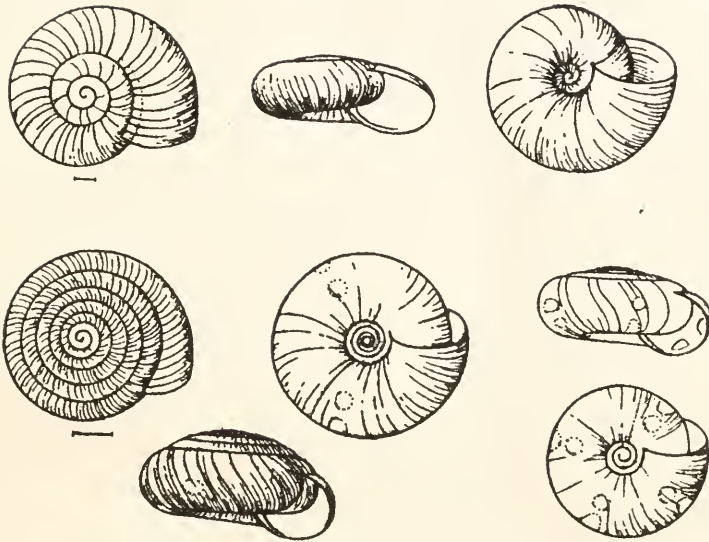
Shell widely umbilicated, flattened, very slightly convex above and below, glossy, thin and translucent, light horn color, regularly but lightly sculptured across the whorls by curved, closely set radiating impressed lines parallel with the lines of growth which are very faint; spire flattened; stature shallow; whorls about 4, rapidly increasing, the last decending at the aperture which is elongate-oval flattened above, lip very slightly reflected at the columellar insertion; umbilicus wide, displaying all the whorls and contained about 4 times in the diameter of the shell.

Greater diameter 3, lesser 2.5, altitude 1.25 mm.

Collected by Herbert H. Smith on the Cumberland Plateau near Stevenson, Jackson Co., Alabama, also near Anderson, and near Sherwood, Franklin Co., Tennessee.

Types No. 9157 of my collection. Paratypes in the collections of the Academy of Nat. Sci., Philadelphia and Bryant Walker, Detroit, Mich.

At first glance this species may be taken for immature *V. radiatula* as the general shape and the sculpture of impressed radiating lines are the same, but it is uniformly small with the same number of whorls, the sculpture is weaker and the shell more flattened. Under high magnification there is merely the faintest trace of impressed spiral sculpture. It is much smaller than *Polita rhoadsi*.



Polita cumberlandiana: upper three figures.

Vitrea pilsbryana: lower five figures, two at the right being immature shells, to show teeth of the neanic stage.

VITREA (PARAVITREA) PILSBRYANA, n. sp.

Shell widely umbilicate, elevated, convex above, flattened below, thin, translucent, highly polished when immature but becoming more opaque and yellowish in adults, light horn color, sculptured with unequally spaced radial grooves stopping at the periphery which is rather high; suture well impressed; whorls about 8 very closely coiled and slowly increasing, the last flattened above and below; lip simple very slightly reflected where it joins the columella, ends united by a thin callus; umbilicus wide, contained a little more than 3 times in the diameter of the shell, and showing all of the apex.

There are 3 or 4 pairs of large, tubercular, sometimes slightly oval teeth, visible thru the base of the shell at all stages of growth and in immature shells the upper teeth are visible from above. The upper teeth, which are slightly below the periphery, are the larger, more elevated and round at the top. The lower teeth are about centrally located on the base and are flattened

on top. When four pairs of teeth are present they are equally spaced at intervals of 90° and this appears to be the normal arrangement as only a few shells show three pairs which are spaced from 100° to 120° . The single fully adult shell (figured) appears to have but 2 pairs of teeth, but the shell is a dead one and quite opaque. Two young shells, 1.5 mm diameter with 3.5 whorls and 2.5 mm. diameter, with 4.5 whorls, each have 3 pairs of teeth.

Greater diameter 5, lesser 4.5, altitude 2 mm.

Collected by Herbert H. Smith in a "Cove" on the Cumberland Plateau, 3 miles north of Anderson, Franklin Co., Tenn.

Types No. 9159 of my collection. Paratypes in the collections of the Academy of Nat. Sci., Philadelphia, and Bryant Walker, Detroit, Mich.

This species belongs to the same group as *V. capsella lacteodens* and *V. andrewsæ*. It differs from both by the smaller size and wider umbilicus and from *andrewsæ* by the tubercular teeth arranged in pairs.

I name this species after Dr. H. A. Pilsbry whose "Revision of Paravitrea", Proc. Acad. Nat. Sci., 1903, pp. 204-212, Pls. X, XI, has done much to clear up this most interesting group.

A NEW FORM OF AMPULLARIA.

BY WILLIAM HEALEY DALL.

AMPULLARIA (FELIPPONEA) NERITINIFORMIS n. sp.

Shell solid, whitish or lurid purple under an olivaceous rather strong periostracum, frequently banded with four or five purple-black broad spiral bands which are most conspicuous on the white inside of the outer lip, the white interspaces being subequal; these bands however show but little on the exterior except at resting stages, in the specimens examined; the form of the shell viewed from behind, strongly recalls that of *Neritina reclinata* or *meleagris* though with a rounded base; from in front it looks like a short spired heavy *Campeloma*. The nucleus is small and

blunt, always more or less eroded; there are about four whorls in the adult with indications of about five resting stages; the surface is smooth except for inconspicuous lines of growth; the young are somewhat naticoid, with a small umbilicus, but this shape rapidly changes; the whorls enlarge rapidly, being as it were appressed toward the suture which is distinct but not channeled, while the umbilicus becomes relatively larger and more or less funicular; the aperture is egg-ovate, entire, the posterior commissure solidly filled with callus, the outer lip internally thickened, patulous not reflected; the inner thickened, continuous over the body; height of shell 33; of last whorl 31; of aperture 23; maximum diameter (in front of the middle of the whorl) 26 mm. U. S. Nat. Mus. Cat. No. 332780.

Habitat. Rio Uruguay, Department of Paysandu.

The operculum is horny, concentric, with the nucleus at the inner third; the radula is typically Ampullarioid and might be quite accurately represented by Troschel's figure of the radula of *A. urceus*, in the "Gebiss der Schnecken."

The literature has been carefully searched, both on the lines of *Ampullaria* and *Campeloma*, but nothing of the sort has been discovered.

The subgenus is named in honor of Doctor Florentino Felipe, whose energy and interest in exploring the fauna of Uruguay are deserving of great praise.

The peculiar form of this species, and its funicular umbilicus, so different from that of any other in the genus, seem to authorize its separation.

A NEW SPECIES OF PHYSA FROM NEW YORK STATE.

BY FRANK C. BAKER.

PHYSA ONEIDA n. sp. Shell of medium size, ovate, slightly inflated; whorls about five, slowly increasing in diameter; spire short, broad, the whorls flattened; color yellowish-horn; surface smooth and shining, with rarely a trace of spiral striae, but the

lines of growth may form more or less marked raised lines in some specimens; sutures slightly impressed, bordered below by a wide white band; protoconch smooth, rounded, rich wine color; aperture long-ovate, twice the length of the spire; peristome bordered within by a thickened rib edged with dark brown; columella thickened, slightly twisted; parietal wall covered by a thin callus which is folded over into and completely closing the umbilical region.

Length, 11.0; width, 7.5; aperture length, 8.0; width, 3.5 mm. Type.

Length, 13; width, 8.5; aperture length, 10.5 mm. Paratype.

Length, 10.5; width, 7.2; aperture length, 7.5; width, 3.7 mm. Paratype.

Length, 15.0; width, 9.0; aperture length, 11.0; width, 5.0 mm. Paratype.

This Physa has been included under *warreniana* Lea by the writer for a number of years. It is a small edition of that species agreeing in outline with Lea's figure and description in all essential details except size (see Lea's Observations, xi, p. 120, pl. 24, fig. 81). Lea's species, however, differs not only in size but has strong spiral lines on the surface which are absent in *oneida*. The shell in the smaller species is also more swollen and less cylindrical, and the spire is more depressed than in *warreniana*. It resembles *ancillaria* and has been constantly associated by the writer with that species as a variety. The shell is not as broad as *ancillaria* and the whorls are not shouldered. It perhaps more nearly resembles Walker's *ancillaria crassa*, but differs constantly in being less solid, lacking the variceal bands, the body whorl is less swollen, the columella is not as heavy, the spire is higher, the outer lip is not as much arched, and the aperture is more elongate. The color of *crassa* is purplish-white with an opaque texture while *oneida* is yellowish-horn, polished, with a translucent texture. *Heterostropha* has a longer, more acute spire, a rounder aperture, somewhat shouldered whorls, and a more twisted columella. There is some variation in *oneida* in the height of the spire, immature specimens having a somewhat longer spire than mature

shells. The surface is usually destitute of spiral sculpture, only a few faint impressions being observable in rare specimens. One individual, however, had been injured when the body whorl was about half completed and the part of the shell succeeding the injured portion is very heavily impressed with spiral lines, while the rest of the shell is perfectly smooth.

This shell was first recorded from Tomahawk Lake, Wisconsin, as *Physa ancillaria warreniana*. The same form occurs in Lake Maxinkuckee, Indiana, on the shore of Lake Michigan at Chicago, and a somewhat similar form has been received from Georgian Bay, Canada. It is the most abundant mollusk in Oneida Lake where it occurs on a wave-beaten shore. It is probably widely distributed, and will be found in collections labeled *ancillaria* and *heterostropha*. Specimens that have survived a second year and are of large size compare favorably with *warreniana* but may at once be separated by the absence of spiral sculpture which is especially strong in shells of Lea's species from South Dakota and other western states.

The bibliography of the new species is as follows:

1902. *Physa heterostropha* Baker (non Say). Moll. Chicago Area, Part II, p. 308, pl. 34, fig. 2 (part). Lake Michigan.
1911. *Physa ancillaria warreniana* Baker (non Lea). Trans. Wis. Acad. Arts, Sci. and Letters, XVII, p. 234. Tomahawk Lake, Wis.
1916. *Physa ancillaria warreniana*. NAUTILUS, XXX, p. 8. Oneida Lake, N. Y.
1916. *Physa ancillaria warreniana*. Tech. Pub., N. Y. State Coll. For., Syracuse Univ., No. 4, p. 273, *et seq.*, Fig. 45, nos. 34, 35. Oneida Lake.
1918. *Physa warreniana*. NAUTILUS, XXXI, p. 89. Oneida Lake.
1918. *Physa warreniana*. Tech. Pub., N. Y. State Coll. Forestry, No. 9, p. 173, *et seq.* Oneida Lake.

MOLLUSCA FOUND IN THE VICINITY OF DUBOIS, ILLINOIS.

BY A. A. HINKLEY.

For the identification of many of the species the author is indebted to Dr. Bryant Walker, Dr. V. Sterki, Dr. H. A. Pilsbry, Mr. F. C. Baker and Dr. Geo. H. Clapp.

Polygyra appressa (Say). Lowland timber, a small form.

Polygyra pennsylvanica (Green). Upland timber, a small rough form.

Polygyra thyroides (Say). General distribution, variable in size, some small and thin.

Polygyra clausa (Say). Upland timber, depauperate, few found.

Polygyra hirsuta (Say). Lowland, a few found but once.

Polygyra monodon (Rack.) Upland timber, once found in numbers about old logs in a pasture from which the timber had been removed. This form has been known as *P. leaii* (Ward).

Strobilops labyrinthica (Say). On decaying logs and under leaves.

Strobilops affinis Pilsbry. Found with the last.

Pupoides marginatus (Say). R. R. embankment, scarce.

Gastrocopta armifera (Say). Common.

Gastrocopta contracta (Say). Common, also a variety for which Dr. Sterki has proposed the name *abrupta*.

Gastrocopta corticaria (Say). Found in numbers on standing trees.

Gastrocopta pentodon (Say). Scarce, found in small numbers in an outside entrance to the cellar of a deserted house.

Gastrocopta tappaniana (Adams). A common species.

Vertigo milium Gould. Scarce, under pieces of board and sticks.

Vertigo ovata Say. But one specimen found.

Circinaria concava (Say). Only one specimen.

Vitrea hammonis (Ström.). Scarce.

Vitrea wheatleyi (Bland). Rarely found.

Vitrea indentata (Say). Common, generally found in open situations.

Vitrea cryptomphala Clapp. With the above but not as plentiful.

Euconulus fulvus (Müll). Not found often.

Zonitoides arborea (Say). All situations, numerous.

Zonitoides limatula (Ward). Lowland timber, scarce.

Zonitoides minuscula (Binney). Not common.

Zonitoides milium (Morse). With the above, scarce.

Taxodonta significans (Bland). One dead specimen.

Agriolimax campestris (Say). During wet seasons they do more or less damage to the fruit in the strawberry fields. In the fall of 1916 they were innumerable in the orchard.

Philomycus carolinensis (Bosc.). Common.

Pyramidula solitaria (Say). Under leaves in timber; like many of the species found here these are of small size.

Pyramidula alternata (Say). A few found in one place.

Pyramidula perspectiva (Say). Common in the bottom lands.

Helicodiscus parallelus (Say). Rather scarce, a few have been found in cellars.

Punctum pygmaeum (Drap.). Generally distributed.

Sphyradium edentulum (Drap.) One specimen only, although careful search was made in the same place three times.

Succinea concordialis Gould. North of the R. R. bridge on the west side of the embankment, where they were found for three or four years; of late they have disappeared.

Succinea avara Say. Individuals are scattering but found in various situations; some difference in size.

Carychium exile H. C. Lea. Wet place below the reservoir, numerous under fallen leaves.

Pseudosuccinea columella (Say). Generally distributed in the creeks.

Galba caperata (Say). In pools of a small branch near Sheller lake.

Galba modicella (Say). Pools and mud of a dry branch, Hinkley farm.

Planorbis trivolvis Say. Beaucoup creek and Sheller lake.

Planorbis antrosus Conrad. Little Muddy and Beaucoup creeks and Sheller lake.

Planorbis parvus Say. Pond north of the R. R. bridge.

Planorbis dilatatus Gould. Generally distributed.

Gundlachia stimpsoniana (Smith). Doubtfully determined. Associated with *Ancylus fuscus*, in the reservoir; generally on the under side of fallen leaves from the surrounding timber, never on the leaves of the elm and hickory. Both species were plentiful in 1908 and 1909, but have since disappeared.

Ancylus rivularis Say. Little Muddy creek.

Ancylus tardus Say. Beaucoup creek.

Ancylus fuscus Adams. Reservoir and Little Muddy creek.

Ancylus kirklandi Walker. Little Muddy and Beaucoup creeks.

Physa heterostropha Say. Sheller lake. (This is a R. R. reservoir.)

Physa gyrina Say. All streams and other bodies of water.

Physa sayi Tappan. Reservoir, one specimen; it may be a freak of *gyrina*.

Physa hildrethiana Lea. Pond north of the R. R. bridge.

Physa elliptica Lea. Above the R. R. bridge.

Physa integra Haldeman. Pond on the Hinkley farm.

Physa oleacea Tryon. Pool near the R. R. bridge.

Physa crandalli Baker. Pond on the Hinkley farm.

Pleurocera neglectum (Anthony). Little Muddy between Du Bois and Sheller lake; quite different from *C. subulare*.

Amnicola cincinnatiensis Lea. Puncheon, Locust and Little Muddy creeks.

Pomatiopsis lapidaria Say. Low land of Little Muddy creek, scarce.

Viviparus contectoides Binney. Beaucoup creek, a small variety.

Campeloma subsolidum (Anthony). Little Muddy, Locust and Beaucoup creeks.

Quadrula latecostata (Lea). Little Muddy creek.

Lampsilis distans (Anthony). Little Muddy and Locust creeks.

Lampsilis subrostratus (Say). Little Muddy creek and Sheller lake.

Lampsilis texasensis (Lea). Little Muddy creek.

Lampsilis parvus (Barnes). Little Muddy, Beaucoup and Locust creeks.

Anodonta imbecilis Say. Creeks and ponds.

Anodonta grandis ovata Lea. Creeks and ponds, plentiful.

Anodonta grandis salmonia Lea. Beaucoup creek.

Unio merus tetralasmus (Say). Little Muddy and Beaucoup creeks.

Sphaerium sulcatum (Prime). Little Muddy and Puncheon creeks.

Sphaerium striatinum (Lam.). Little Muddy and Locust creeks.

Sphaerium stamineum (Conrad). Little Muddy and Locust creeks.

Sphaerium solidulum (Prime). Little Muddy and Beaucoup creeks.

Sphaerium occidentale (Prime). Little Muddy creek.

Musculium transversum (Say). Little Muddy, Beaucoup and Locust creeks.

Musculium contractum (Prime). Little Muddy creek.

Musculium truncatum (Linsley). Little Muddy creek.

Musculium elevatum (Hald.). Little Muddy and Beaucoup creeks and pond on the Hinkley farm. Closed to *Musculium hodgsonii*.

Pisidium compressum Prime. Little Muddy creek, Sheller lake and pond north of the R. R. bridge.

Pisidium fallax Sterki. Little Muddy creek.

Pisidium fraudulentum Sterki. R. R. reservoir.

Pisidium illinoisensis Sterki. Reservoir and pond on the Hinkley farm.

Pisidium politum decorum Sterki. Pond north of the R. R. bridge.

Pisidium punctatum Sterki. Little Muddy and Puncheon creeks.

Pisidium punctatum inerme Sterki. Beaucoup creek.

Pisidium sargenti Sterki. Puncheon creek.

LAND SHELLS OF SOUTHERN FLORIDA.

BY E. G. VANATTA.

The following species of land shells were picked from leaf mould collected in Lee County, Florida, by Mr. Clarence B. Moore on Keys not mentioned in THE NAUTILUS, volume XXVI, page 16.

Weeks Place, Crawford's Key near Marco.

<i>Polygyra cereolus carpenteriana</i>	<i>Gastrocopta rupicola</i> Say.
Bld.	<i>Guppya gundlachi</i> Pfr.
<i>Gastrocopta p. hordeacella</i> Pils.	<i>Zonitoides minuscula</i> Binn.

Addison's Key near Marco.

<i>Polygyra c. carpenteriana</i> Bld.	<i>Polita dalliana</i> 'Simps.' Pils.
<i>Gastrocopta p. hordeacella</i> Pils.	<i>Zonitoides minuscula</i> Binn.
<i>Gastrocopta rupicola</i> Say.	

Demorey Key.

<i>Truncatella bilabiata</i> Pfr.	<i>Gastrocopta rupicola</i> Say.
<i>Polygyra c. carpenteriana</i> Bld.	<i>Strobilops hubbardi</i> Br.
<i>Thysanophora plagiptycha</i>	<i>Guppya gundlachi</i> Pfr.
Shutt.	<i>Zonitoides minuscula</i> Binn.
<i>Pupoides modicus</i> Gld.	<i>Zonitoides singlyana</i> Pils.
<i>Gastrocopta p. hordeacella</i> Pils.	

Josselyn Key, Pine Island Sound.

<i>Truncatella c. succinea</i> Ad.	<i>Gastrocopta rupicola</i> Say.
<i>Helicina orbiculata</i> Say.	<i>Strobilops hubbardi</i> Br.
<i>Thysanophora plagiptycha</i>	<i>Euglandina rosea parallela</i>
Shutt.	Binn.
<i>Thysanophora cæca</i> Guppy.	<i>Polita indentata</i> Say.
<i>Polygyra c. carpenteriana</i> Bld.	<i>Guppya gundlachi</i> Pfr.
<i>Gastrocopta contracta</i> Say.	<i>Zonitoides minuscula</i> Binn.
<i>Gastrocopta p. hordeacella</i> Pils.	<i>Zonitoides singlyana</i> Pils.

NEW LAND SNAILS COLLECTED BY THE FERRISS AND HINKLEY
EXPEDITION OF 1919.

BY H. A. PILSBRY AND JAS. H. FERRISS.

Sonorella montana. Resembling *S. walkeri* in form. Umbilicus one-eighth to one-tenth the diameter. Embryonic whorls densely granulose with rather sparse protractive threads, the next whorl indistinctly granose, later whorls very smooth. Aperture large, the outer margin expanded, basal somewhat reflected. Anatomically it is distinguished by the extremely short and slender penis, smaller than in any other species examined. Montana Peak, near the Montana mine, not far from Oro Blanco, and Bear canyon, further southeast, Pajarito range.

Alt. 14, diam. 23.7, umbilicus 3 mm.; $4\frac{3}{4}$ whorls.

Alt. 16.3, diam. 25.5, umbilicus 2.6 mm.; 5 whorls.

Sonorella hinkleyi, n. sp. The shell is small, depressed, solid, umbilicus about one-sixth the diameter. Embryonic shell radially rugose with sparse, irregular divaricating threads, later whorls slightly striate. Peristome very little expanded. A dark band is normally present, but at Station 244 albinos were found in abundance. Alt. 8.5, diam. 16 mm.; $4\frac{1}{4}$ whorls. Cayetano Mountains. Anatomically characterized by the long penis and vagina, the latter with a weakly marked muscular dilation. Papilla spirally plicate.

Sonorella cayetanensis, n. sp. Shell thin, light, the band pale-bordered above and below, umbilicus contained about 8 times in the diameter. Embryonic sculpture about as in *S. hinkleyi*, the later whorls polished, faintly striate. Peristome thin, little expanded. Alt. 11.7, diam. 21 mm.; $4\frac{3}{4}$ whorls. A thinner, larger, more capacious shell than *S. hinkleyi*, resembling it considerably in soft anatomy. Highest peaks of the Cayetano Mountains.

Sonorella tumacacori, n. sp. Except by its larger size, the shell is similar to *S. hinkleyi*. The genitalia differ by the larger node on the vagina, the more tapering penis-papilla and the very short penial retractor muscle. Alt. 10.4, diam. 17.8 mm.; $4\frac{1}{2}$ whorls. Stations 209, 210, in a large gulch draining the northeastern side of Tumacacori Peak.

Sonorella patagonica, n. sp. The shell is rather capacious with umbilicus about one-seventh the diameter, polished, rather solid, the band rather wide, pale-bordered on both sides, sculpture and form about as in *S. papagorum* P. & F. The vagina is swollen at base; penis-papilla large, tapering, conspicuously wrinkled transversely; flagellum distinct. Alt. 13, diam. 22 mm.; nearly 5 whorls. It is often larger. Mt. Washington, Patagonia Mts.

Bulimulus nigromontanus, n. subsp. Differs from *B. nigromontanus* by the narrower umbilicus, and is therefore temporarily separated as a subspecies. Pina Blanca in the Pajarito Mountains.

Sonorella mustang, n. sp. The shell is rather openly umbilicate, dilute cinnamon-buff with a pale-bordered dark band, glossy, nearly smooth, the embryonic shell coarsely, irregularly wrinkled with some irregular protractive threads. Last whorl descending rather deeply. Peristome expanded, the edge of parietal callus usually distinct. Alt. 15.3, diam. 26.5 mm.; 5 whorls. Mustang Range. Albinos were taken at Station 284.

Sonorella montezuma, n. sp. The shell is small, narrowly umbilicate, cinnamon, fading to nearly white on the base and on both sides of the chestnut-brown band. Embryonic whorls without protractive threads. Peristome slightly expanded. Alt. 9.4, diam. 15 mm.; $4\frac{1}{2}$ whorls. Montezuma Canyon, Huachuca Mts. It is smaller than any known Huachucan species except *S. g. parva*, which inhabits the opposite end of the range.

Sonorella elizabethae, n. sp. Shell dilute cinnamon-buff fading on the base and on both sides of the narrow chestnut-brown band. Embryonic whorl having numerous, irregular protractive threads; later whorls microscopically lineolate-granulose. Aperture small, the peristome slightly expanded. Alt. 10.7, diam. 19.2, umbilicus 3.2 mm. Canillo Hills.

Sonorella cotis, n. sp. Shell dilute cinnamon-buff fading on base and on both sides of the chestnut-brown band. Embryonic whorls with weak protractive threads. Last whorl rather deeply descending in front. Peristome somewhat expanded, edge of the parietal callus distinct. Alt. 12.3, diam. 20, um-

bilicus 3.3 mm.; $4\frac{1}{2}$ whorls. Whetstone Range. Most specimens taken this year are larger than the type lot, collected by Ferriss and Daniels in 1914.

Sonorella insignis, n. sp. The shell is much depressed, rather solid, openly umbilicate. Band is broad with pale borders. Surface roughened by low wave-like ribs in the direction of growth-lines, and microscopic incised lines. Aperture small. Peristome very little expanded, blunt. Alt. 9.8, diam. 20.5 mm.; $4\frac{1}{2}$ whorls. Whetstone Range. One of the finest *Sonorellas* collected in 1919, recalling *S. dalli* by its depressed form.

MOLLUSCA OF FORRESTER ISLAND, ALASKA.

UNIVALVES (Continued from page 69).

BY GEORGE WILLETT.

Tornatina carinata Gld. *Tornatina culcitella* Gld. *Cylichna alba* Brown. These three species were taken occasionally in the dredge, the latter being the most uncommon.

Dentalium pretiosum Nutt. Very plentiful in 10-40 fathoms.

Dentalium dalli Pils. A few young specimens secured in 50 fathoms.

Limacina pacifica Dall. Appeared swimming in the water in great numbers at times during calm weather. Extensively eaten by several species of fish.

Siphonaria thersites Cpr. Abundant in some localities, mostly in short moss growing on the rocks considerably above low tide line.

Crassispira perversa Garb. Dredged occasionally in 40-50 fathoms.

Crassispira rotula Dall. More plentiful than the last in about same depth.

Crassispira (Suavodrilina) sp.? A specimen dredged is now in National Museum. Stated by Dr. Dall to be undescribed.

Mangilia oldroydi Arnold. *Mangilia eriopis* Dall. *Mangilia crebricostata* Cpr. A very few specimens of each of these three species were taken in the dredge.

Bela tabulata Cpr. *Bela fidicula* Gld. *Bela impressa* Beck. *Bela pyramidalis* Strom. The two former fairly common, the two latter rare, all being taken in dredge.

Taranis strongi Arnold. Fairly common in 45-70 fathoms. Dr. Dall informs me that my Forrester Island specimens are the first living ones known to science, the species having been described from fossils taken in California.

Cancellaria modesta Cpr. A few dredged in 40-50 fathoms. Taken in inside channels, between Dall and Prince of Wales islands, in less than 15 fathoms.

Cancellaria couthouyi Jay. Three dead specimens dredged in about 50 fathoms.

Olivella pedroana Conr. Very abundant 15-40 fathoms. Apparently much larger than along the California coast; many specimens being well over 20 mm. in length and correspondingly broad.

Volutella pyriformis Cpr. Dredged occasionally; taken at Waterfall, Prince of Wales Island, under rocks near low tide line.

Mitromorpha gracilior Hemp. A few taken in dredge.

Alectrion mendicus Gld. Common 15-25 fathoms.

Buccinum cyaneum Brug. Common under rocks in many localities well above low tide mark. Occasional on rock walls.

Buccinum plectrum Stimp. Dead shells dredged occasionally in 40-60 fathoms. Not taken alive.

Buccinum erronis Dall. Very few dead specimens taken in 50 fathoms.

Chrysodomus phoeniceus Dall. One dead shell taken in 40 fathoms.

Chrysodomus liratus Mart. One dead young shell dredged. Rather plentiful in some localities in inside waters.

Chrysodomus rectirostris Cpr. Fairly common 40-70 fathoms.

Beringius crebricostatus undatus Dall. A dead young specimen taken in 50 fathoms. Possibly brought to the locality by currents.

Columbella tuberosa Cpr. *Columbella gouldi* Cpr. Former rather common 10-30 fathoms, and latter common in about 50 fathoms.

Columbella californiana Gask. One living specimen taken from root of kelp washed ashore in storm. Common under rocks at Waterfall.

Amphissa corrugata Rve. Common on rocks near low tide line.

Amphissa versicolor reticulata Dall. Abundant 15-20 fathoms.

Purpura foliata Mart. Rather common on rocks near low tide line. Most specimens on Forrester Island are much worn by heavy seas.

Boreotrophon stuarti Smith. *Boreotrophon tenuisculptus*. Cpr. Both of these forms dredged occasionally in various depths, the latter the most plentiful.

Boreotrophon pacificus Dall. Occasional on rocks near low tide line, much more abundant at waterfall.

Ocenebra interfossa Cpr. *Ocenebra lurida aspera* Baird. Fairly common on rocks near low tide line.

Thais emarginata projecta Dall. Locally on rocks well up toward high tide mark. Extremely variable in color, running from gray through brown, purple and green into yellow and red. Practically all seem to have drawn-out spire typical of this form.

Thais lima Mart. *Thais canaliculata* Ducl. Both these species are common on the rocks near low tide line. The former is the more gregarious and appears to favor the smoother rocks, while the latter is more scattered and is found mostly among short moss or in mussel beds. *T. lamellosa* Gmel., abundant in inside waters, apparently does not occur on Forrester Island.

Epitonium wroblemski Morch. *Epitonium pluricostatum* Dall. Both dredged at various depths, the former common, the latter rare.

Epitonium gronlandicum Perry. Only noted from fragment dredged.

Epitonium indianorum Cpr. *Epitonium columbianum* Dall. *Epitonium catalinae* Dall. The first dredged quite commonly in 25-60 fathoms. The latter two taken in about same depths but much less frequently.

Melanella micans borealis Bartsch. *Melanella macra* Bartsch. *Melanella tacomaensis* Bartsch. Four specimens of the first,

three of the second and one of the last species, represent all the *Melanellas* taken during the four seasons spent on the island. They were all dredged.

Turbonilla lordi E. A. Smith. Dredged occasionally in 25-50 fathoms.

Turbonilla canadensis Bartsch (Proc. U. S. N. M., Vol. 52, p. 640). The type and eight more specimens dredged in 25-50 fathoms.

Odostomia satura Cpr. *Odostomia cookeana* Bartsch. *Odostomia amtchitkana* Dall. *Odostomia vancouverensis* D. & B. *Odostomia stephensi* D. & B. *Odostomia columbiana* D. & B. Specimens of all of these forms were dredged, though in small numbers. *Satura* and *Amtchitkana* were seemingly the most common. At Waterfall I also secured specimens of *O. talpa* D. & B., *grippiana* Bartsch, and *willetti* Bartsch (Proc. U. S. N. M., Vol. 52, p. 666).

Priene oregonense Redf. Common from the low tide line to about 15 fathoms. Specimens in former locality are shorter and heavier than those found in deeper water.

Cerithiopsis stephensae Bartsch. A few dredged. Specimens of two other, apparently unnamed, species were also taken.

Bittium filosum Gld. *Bittium attenuatum* Cpr. Common, the former a little above low tide line and the latter in 10-20 fathoms.

Alvania dinora Bartsch (Proc. U. S. N. M., Vol. 52, p. 678). The type and four additional specimens dredged.

Alvania carpenteri Wein. Dredged occasionally.

Rissoina newcombei Dall. Dredged with last.

Trichotropis cancellata Conr. Rather common from low tide line to about 20 fathoms.

Trichotropis conica Moll. Two specimens dredged in 50 fathoms. Dr. Dall informs me that this is the first record for the Pacific coast.

Caecum crebricinctum Cpr. Dredged abundantly in 20-30 fathoms.

Vermetus squamigerus Cpr. Abundant on rocks near low tide line.

Tachyrhynchus lacteolus Cpr. Rather common 50-60 fathoms.

Littorina scutulata Gld. *Littorina stitchana* Phil. The former not very common, the latter abundant and varying greatly in color.

Lacuna divaricata Fabr. Fairly common on rocks.

Calyptrea mamillaris Brod. Common in 15-25 fathoms.

Crepidula nivea Gld. *Crepidula dorsata* Brod. Neither very common, but found occasionally from low tide line to 30 fathoms. The young of the former species is frequently found on the operculum of Priene.

Natica clausa B. & S. Rather common 15-40 fathoms.

Lunatia pallida B. & S. Not rare in 50-60 fathoms.

Velutina laevigata Linn. Fairly common in spongy growth on rocks near low tide line.

Velutina cryptospira Midd. Found common only in one locality. A short distance off shore was a large rock with a crevice ten to fifteen ft. wide worn right through the center from one side to the other. The water in this crevice was deep and the walls nearly perpendicular. On these walls at about the extreme low tide mark were great numbers of Ascidians and in these *cryptospira* was found in abundance. Though it was seldom smooth enough to allow me to enter this crevice with a boat at extreme low tide, I was able to do so on two or three occasions and obtained a fine series of living specimens. Some of these were very large, one measuring 31 by 23 millimeters. I am very much averse to referring this and the next species to the genus *Velutina*, as in life they are so entirely dissimilar to *laevigata*, the type of that genus. In *laevigata* the shell is mossy and is, so far as I have seen, entirely bare, while in these two species the shell is smooth and completely covered by the animal. On the other hand, both the animal and shell differ markedly from the genus *Lamellaria*.

Velutina rubra, new species. Description. In life similar to *V. cryptospira* but animal bright vermilion in color (this color soon disappears in alcohol). Shell smaller than that of *cryptospira*, rounder and with only a trace of spire. The type measures $13\frac{1}{2}$ mm. in length by 9 mm. in breadth. This type together with four additional specimens were taken on Forrester Island by the writer. Three of these specimens were found at

extreme low tide mark and the other two were dredged in 40 fathoms.

Lamellaria stearnsi Dall. Two living specimens taken from among *Velutina cryptospira*.

Acmaea persona Esch. *Acmaea pelta* Esch. *Acmaea patina* Esch. Abundant on rocks, the first being found in somewhat more exposed positions than the other two.

Acmaea instabilis Gld. Three living specimens were taken on stems of holdfast kelp at extreme low water line. One dead specimen also found, as well as a few fragments.

Lepeta concentrica Midd. Dredged rarely.

Molleria quadrae Dall. Two specimens dredged.

Leptothyra carpenteri Pils. Rather common on rocks.

Calliostoma costatum Mart. *Calliostoma annulatum* Mart. *Calliostoma variegatum* Cpr. The first was common on rocks near low water line, the second rather common from low water mark down to 20 fathoms, and the third was much less plentiful and taken only with the dredge in from 15-40 fathoms.

Margarites pupillus Gld. *Margarites helycinus* Fabr. *Margarites succinctus* Cpr. *Margarites laevior* Jeff. All rather common about low water mark. Over 900 of the latter species were taken from the craw of a surf duck (*Oidemia perspicillata*).

Tegula pulligo Mart. Fairly common along extreme low tide line.

Solariella peramabilis Cpr. Abundant in from 15-50 fathoms. Some specimens taken were very large, measuring over twenty millimeters in height.

Solariella cidaris A. Ad. Fairly common in from 30-50 fathoms.

Solariella obscura Couth. Seven specimens dredged in about 50 fathoms.

Halistylus pupoides Dall. Three specimens dredged.

Haliotis kamtchatkana Dall. Common at low water mark.

Puncturella multistriata Dall. *Puncturella cucullata* Gld. *Puncturella galeata* Gld. *Puncturella cooperi* Cpr. All four of these species were dredged in from 15-50 fathoms. *Cucullata* was also taken rarely at extreme low tide mark. *Multistriata* and *galeata* were rather rare.

Submarginula yatesi Dall. It was a very pleasant surprise to find this species—previously known, I believe, only from near Monterey, California—occurring at Forrester Island. It was, however, quite rare and, though particularly sought for, only nine specimens were taken. Five of these were living when found and the other four dead. One small live one was taken at extreme low water mark and all the others were dredged in from 15–30 fathoms. The largest, a dead one, measures 77 x 57 millimeters.

Fissuridea aspera Esch. Common along low water line.

Megatebennus bimaculatus Dall. Fairly common on rock walls near low water mark. Largest measuring 18x13 millimeters.

Leptochiton cancellatus Sby. Dredged in 20 fathoms.

Tonicella lineata Wood. Adults common along low tide line. Young rather common in 15–20 fathoms.

Tonicella ruber Linn. *Tonicella submarmorea* Midd. Dredged in from 15–30 fathoms; the latter the most plentiful.

Cyanoplax raymondi Pils. *Schizoplax brandti* Midd. Common locally along low tide line, generally in crevices in rocks.

Ischnochiton interstinctus Gld. *Ischnochiton mertensi* Midd. Abundant at from 10–20 fathoms.

Ischnochiton willetti Berry. (Proc. Cal. Acad. Sci., vol. 7, p. 236). *Ischnochiton trifidus* Cpr. Taken at about the same depth as the last but in much smaller numbers, *willetti* being fairly common and *trifidus* rare. *I. radians* was taken at Waterfall but not on Forrester.

Ischnochiton retiporosus Cpr. Occasional in from 15–50 fathoms, occurring in deeper water than any other chiton found in the locality.

Trachydermon flectens Cpr. A few dredged in from 15–30 fathoms.

Mopalia ciliata Gld. *Mopalia ciliata wosnessenskii* Midd. Fairly common from a little above low water line to about 15 fathoms. I find considerable difficulty in differentiating these two forms but Dr. S. S. Berry tells me that, while most of my specimens are referable to *wosnessenskii*, there are a few that are nearer true *ciliata*.

Mopalia hindsii Rve. *Mopalia lignosa* Gld. Rather rare on

rocks between tides. Seven specimens of the former and two of the latter were taken. All the former were exceptional in size, one measuring 90 x 45 millimeters.

Mopalia imporcata Cpr. *Mopalia sinuata* Cpr. Dredged in from 15-25 fathoms, the former fairly common, the latter rare.

Placiphorella velata Cpr. Only two specimens, both taken at extreme low tide line.

Placiphorella rufa Berry (Proc. Cal. Acad. Sci., vol. 7, p. 241). The type and about fifteen additional specimens of this new form were dredged in from 15-25 fathoms.

Katherina tunicata Sby. *Cryptochiton stelleri* Midd. The former abundant, the latter common between tides. The *Katherina* is eaten to a considerable extent by the natives.

LAND MOLLUSCS.

Circinaria vancouverensis Lea. Common.

Ariolimax columbianus Gld. Abundant in following colors: white, black, gray, yellow and mottled.

Polygyra columbiana Lea. Abundant.

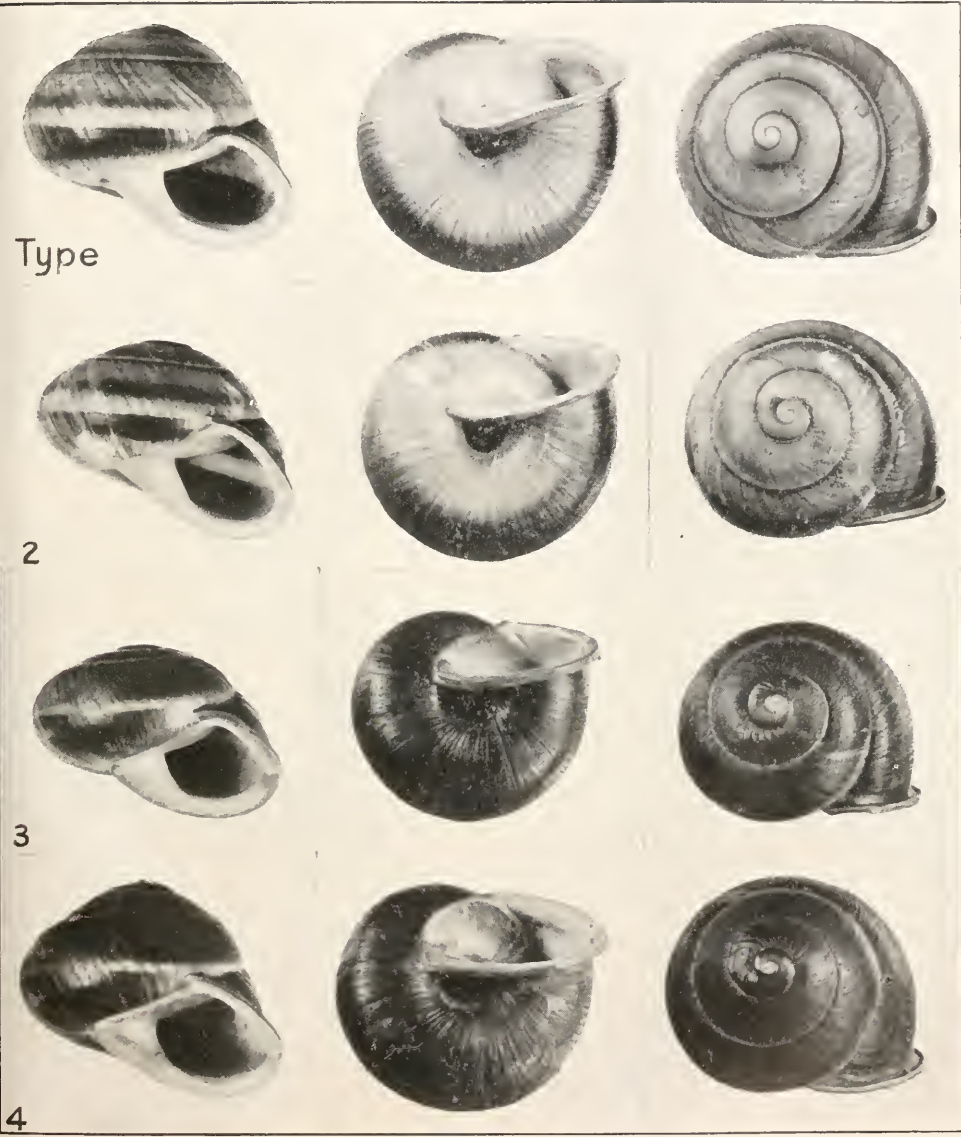
Pupa (sp. ?). A single Pupa was seen in a dead spruce cone. It was lost before being identified.

A NEW CAMAENA FROM THE PHILIPPINE ISLANDS.

BY WM. F. CLAPP.

CAMAENA FORBESI n. sp. PLATE I.

Shell solid, globose, depressed, opaque, with numerous faint oblique growth-wrinkles throughout, faintly spirally striate only on the post-nepionic whorls; the ultimate whorl Naples yellow with a narrow russet line at the suture, a russet band between the suture and the periphery and a broader russet band just below the periphery, the bands becoming fainter on the earlier whorls; whorls five, consisting of two nepionic and three post-nepionic, slightly convex, the last slightly deflexed, suture very slightly impressed, last whorl rounded; peristome expanded, light purple drab, excepting where the light sutural zone terminates; the slightly thickened and reflexed edge walnut brown, margins connected by a very thin transparent



CAMAENA FORBESI W. F. CLAPP

callus; columellar lip reflexed over one-third of the umbilicus; aperture oblique showing the bands within.

Four specimens give the following measurements:

	<i>Altitude.</i>	<i>Greater diam.</i>	<i>Lesser diam.</i>
1 type No. 35601	29.5 mm.	37.5 mm.	33. mm.
2	25.3	36.5	32.
3	24.0	35.	29.5
4	29.3	37.	31.5

Specimens of this new species were included in a large collection of Philippine shells given to the Museum of Comparative Zoology by W. Cameron Forbes, former governor of the Philippine Islands. They were collected by Mr. C. W. Weber at Bacuit, northern Palawan. I have named this shell for Governor Forbes as a slight acknowledgment of the great interest that he has taken, and the work that he has accomplished, in adding to our knowledge of the fauna of the Philippine Islands.

The specimen selected as the type, and described, is the most typical of the species. The specimen designated as number two in the table of measurements, is exactly similar to number one in color, and in the arrangements of the bands, differing only in being more depressed. Number three is very similar to number two in size and shape, but differs from numbers one and two in color, the lower band in this form having spread over the entire base, the upper band extending to the suture, leaving only at the periphery a narrow band of the typical naples yellow. Number four is similar to the type in size and form, and to number three in color. The variation is therefore expressed along two independent lines; first, a tendency for the shell to become more or less depressed; and secondly, for the bands to become broader and darker. Intermediates between all forms are in the series before me. The tendency in each individual specimen for the color to become darker as the shell increases in size, is constant in both the light and the dark forms.

The differences between this species and the description of what appears to be the most closely related species, *Camaena*

avus, as described by Pfeiffer (Proc. Zool. Soc. Lond., 1852, p. 83) are constant and may be tabulated as follows;

<i>Camaena avus</i>	<i>Camaena forbesi</i>
whorls 4	whorls 5
last whorl carinated	last whorl rounded
aperture scarcely oblique	aperture oblique as usual in Camaena
peristome thick	peristome slightly thickened
peristome white	peristome dark
margins joined by thick callus	margins joined by very thin transparent callus
altitude 18 mm.	altitude 29.5 mm.

The figures of *Camaena avus* in the Manual of Conchology (ser. 2, vol. 6, 1890, pl. 27, f. 15, 16, 17) were copied from Pfeiffer's original figures in the Conchylien Cabinet, t. 157, f. 12-14, and, besides showing a much more widely expanded and thickened peristome than occurs in *C. forbesi*, also show that *C. avus* is far more widely umbilicate.

Hidalgo (Obras Malacologicas, Estudios preliminares sobre la fauna malacologica de las Islas Filipinas, 1901, p. 196) states that the *C. avus* in the Quadras collection is similar to the *C. avus* of Mollendorff (Verz. Philipp. Landmollusk., 1898, p. 64) but differs from *C. avus* of Pfeiffer in size, in the bands, and in the umbilicus. It is possible that the *C. avus* of Quadras and Mollendorff is equal to *C. forbesi*. The figures of *C. avus* given by Hidalgo (loc. cit. pl. 133, fig. 4y5), however, do not represent *C. forbesi*.

Note.—In the figures (pl. I) reproduced from photographs by Mr. George Nelson, the reflected light on the glazed surface of the parietal wall greatly exaggerates the parietal callus, making it appear somewhat heavy and opaque, whereas in the specimen photographed it is very thin and transparent. The photographs have also failed to show sufficiently well the dark color of the lip.

NOTES.

MITRA AMANDA: A CORRECTION.¹—In my little preliminary paper "New Marine Mollusks from the Philippine Islands," Proceedings of the Biological Society of Washington, volume 31, pp. 181-188, December 30, 1918, I published *Mitra amanda* new species from the Philippines, type Cat. No. 221815, U. S. N. M., collected by the author at Dumurug Point, Cataingan Bay, Masbate.

In monographing this group I note that the same combination was used by Lowell Reeve, Proceedings of the Zoological Society London, 1842, p. 59, and Conchologica Iconica, 1845, species number 318, type "from the islands of Burias and Negros, Philippines," now known as *Turricula amanda* Reeve.

It is therefore necessary to bestow a new designation on my shell, which may now be known as *Mitra signa*.—PAUL BARTSCH.

OPEAS PUMILUM PFR. IN PHILADELPHIA.—This snail has been living in the decayed boards of fences at the rear of the houses in the 1800 blocks of North 17th and N. Willington Streets for some time. I found the first specimen in 1917 and collected eight others April 30 and May 22, 1919. It may be of interest to record this West Indian species as it is new to Philadelphia. The colony is in the built-up part of the city, at the sides of a cemented alley and not near any hothouse. The animal excretes a white froth like soapsuds when it retracts into the shell. The eyes are very small and black. The body of the living specimens is pale yellow in color, with lighter tentacles. They are quite active in daylight after a rain.—E. G. VANATTA.

DR. HERMANN VON IHERING, formerly Director of the State Museum of São Paulo, Brazil, has accepted the position of Director of the State Museum of Sta. Catharina, to be organized by him. During the last few months he has been sent by the government on a scientific expedition to Argentina and Chile, charged with the study of the fishes and fisheries of these Re-

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publics. He hopes to be back and take up his new work in May. His address is: Director do Museu do Estado, Flerianopolis (Estado de Sta. Catharina, Brazil).

NOTE ON THE NAME DUPLICARIA.—In 1908, in THE NAUTILUS, volume XXI, p. 124, I used the name *Duplicaria* for a subdivision of the old genus *Terebra*. I had omitted to notice that Rafinesque had used the same name for a species of *Chilina* in 1833, in his Atlantic Journal, p. 165. I propose, therefore, to substitute for the preoccupied name the new appellation *Diplomeriza*, with the same type, *Terebra duplicata* Lamarck.—W. H. DALL.

PUBLICATIONS RECEIVED.

TWO NEW LAND SHELLS OF THE EPIPHRAGMOPHORA TRASKII GROUP. By Paul Bartsch (Proc. U. S. Nat. Mus., vol. 54, pp. 523-524, pl. 83, 1918). The new subspecies are *E. cuyamancensis lowei* and *E. traskii isidroensis*.

NEW MARINE SHELLS FROM PANAMA. By Paul Bartsch (Proc. U. S. Nat. Mus., vol. 54, pp. 571-573, pl. 88, 1918). The new species are *Cylichnella zeteki*, *Odostomia zeteki*, *Helicacis panamensis*, *Discopsis panamensis* and *D. argentea*.

NEW MARINE MOLLUSKS FROM THE PHILIPPINE ISLANDS. By Paul Bartsch (Proc. Biol. Soc. Wash., vol. 31, pp. 181-188, 1918). Eight new species and two new subspecies are described.

THREE NEW PHILIPPINE ISLAND LAND SHELLS. By Paul Bartsch (Proc. Biol. Soc. Wash., vol. 31, pp. 189-202, 1918).

A REVIEW OF THE AUSTRALIAN REPRESENTATIVES OF THE GENUS ISCHNORADSLIA. MONOGRAPH ON THE GENUS STENOCHITON WITH DESCRIPTIONS OF TWO NEW SPECIES. NOTES ON SOUTH AUSTRALIAN POLYPLACOPHORA, WITH ADDITIONS TO THE FAUNA, TOGETHER WITH A LIST OF AUSTRALIAN POLYPLACOPHORA, SHOWING THEIR DISTRIBUTION IN THE AUSTRALIAN STATES. By Edwin Ashby (Trans. Royal Soc. South Australia, vol. 42, pp. 62-87, pls. 13 and 14, 1918).

THE DOLABELLINAE. By F. M. MacFarland (Mem. Museum Comp. Zool., vol. 25, pp. 301-348, pls. 1-10, 1918). The systematic characters of the Opisthobranchiata, the bibliography of the described species of *Dolabella* and description of a new species *Dolabella agassizi*, is followed by a most extensive account of its internal anatomy, beautifully and clearly illustrated.

A NEW WEST INDIAN FOSSIL LAND SHELL. By Paul Bartsch (Proc. U. S. Nat. Mus., vol. 54, pp. 605-6, pl. 93). *Pleurodonte debooyi*, from kitchen-midden deposits on Salt River, St. Croix. This is the flat-whorled form long known from St. Croix as *P. caracolla*. The same form occurs living in Vieques and some places in Porto Rico, such as Arecibo and Utuado. At Guayama and in the Sierra de Luquillo the whorls are not quite so flat, and it is rather difficult to say where the line is to be drawn between this race and typical *P. caracolla*.—H. A. P.

ON THE GENERIC POSITION OF SONORELLA WOLCOTTIANA BARTSCH. By H. A. Pilsbry (Proc. Acad. Nat. Sci., Phila., p. 139, 1918). The soft part shows that it belong to genus *Micrarionta*.—C. W. J.

THE JOURNAL OF CONCHOLOGY, SEPT., 1918, VOL. 15, No. 10.
The Pisidium Fauna of the Grand Junction Canal in Herts, and Buck. By A. W. Stelfox, pp. 298-304, pls. 7-9. One new species *P. tenuilineatum*.

Descriptions of a new Zebina and a new Liotina. By J. R. le B. Tomlin, p. 305, pl. 10. (*Z. lis* and *L. cycloma*, Japan.)

Description of three new species of Marginella from South Africa, with a note on M. sutoris Dunker. By J. R. le B. Tomlin, pp. 306, 307, pl. 10. (*M. aphanacme*, *M. ithychila*, and *M. attractus*.)

Neritina fluviatilis at Chester. By W. H. Davies, p. 307.

PROCEEDINGS OF THE MALACOLOGICAL SOCIETY OF LONDON, AUG., 1918, VOL. 13, PARTS 1 AND 2.

On the Radula of the genus Acanthina, G. Fischer. By the Rev. A. H. Cooke, pp. 6-11. A paper of special interest to the West Coast Conchologists. A new subgenus *Acanthicella* is proposed for *A. punctulata* Sowb., (= *lapilloides* Conr.); *A. unicar-*

inata Sowb. (= *engonata* Conr.) and *A. punctilirata* Stearns. The subgenus *Neorapana* is proposed for *Monoceros muricata* Brod. and *M. grandis* Sowb.

On the Taxonomic Position of Zemira H. and A. Adams. By the Rev. A. Cooke, pp. 12-14. The character of the radula would place it in the family Muricidae.

On the Occurrence in England of Hygromia odeca (Locard) [Helix limbata Drap., 1804, non Da Costa, 1778]. By A. S. Kennard and B. B. Woodward, pp. 14, 15.

On Siliquaria wilmana n. sp., from South Africa. By J. R. le B. Tomlin, p. 16.

Note on a white specimen of Ena montana (Drap.) By H. Overton, p. 17.

Description of two new species of land Mollusca. By G. K. Gude, pp. 17, 18 (*Khasiella fultoni*, Assam; *Plectotropis chondroderma* var. *subinflata*) Tonkin.

On Everettia klemmantanica n. sp. from Borneo. By G. K. Gude, p. 19.

Note on the Malacophagous Propensities of Helix nemoralis Linn. By Dr. W. T. Elliott, p. 20.

On the North American genus Oreohelix. By Junius Henderson, pp. 21-24.

On the dates of issue of the parts of Forbes and Hanley's History of British Mollusca. By Alexander Reynell, pp. 25-26.

The Index Testaceologicus of W. Wood and S. P. Hanley. By A. Reynell, pp. 26-27.

Molluscan Nomenclatural Problems No. 1. By Tom Iredale, pp. 28-40. The author starts this interesting article with the following summary:

Tritonia, Cuvier discussed.

Euphurus, Rafinesque, 1815, should replace *Triopa*, Johnston, 1838.

Sphaerostoma, Macgillivray, 1843, must be used instead of *Tritonias* Cuvier, 1803, and of recent authorities not of Cuvier-Lamarck, 1798-1801.

Dotona, gen. nov. for *Melibæa fragilis* Forbes=Doto, Oken, 1815, not 1807.

Eubbranchus, Forbes 1838, should be used for *Galvina* Alder and Hancock.

Laskeya, nom. nov. for *Eumeta*, Mörch, 1868, not Walker, 1855.

Collonista, gen. nov. for *Collonia picta*, Pease.

Talopena, gen. nov. for *Monilea incerta*, Iredale.

Korovina, gen. nov. for *Vanikoro wallacei*, Iredale.

Forskalena, gen. nov. for *Trochus fanulum*, Gmelin.

Enigmonia, gen. nov. for *Anomia rosea*, Gray=*Aenigma aenigmatica*, Ancti.

Amyclina, gen. nov. for *Buccinum corniculum*, Olivi.

Pyreneola, gen. nov. for *Columbella abyssicola*, Brazier.

Caporbis, Bartsch, is a Vermetid nucleus.

Propebela, gen. nov. for *Murex turricula*, Mont.

Calceolata, nom. nov. for *Calceolina* A. Adams.

Mirothyca, not *Microtheca*.

Turrid names discussed:

Colicryptus, gen. nov. for *Buccinum fusiforme*, Broderip.

Siphonorbis marshalli, nom. nov. for *Fusus attenuatus*, Jeffreys.

Cominella and *Euthria* subdivided:

Afrocominella, gen. nov. for *elongata*, Dunker.

Burnupena, gen. nov. for *porcatum* Gmel. = *cincta*, Bolten.

Evarna, H. & A. Adams, must be used for *linea*, Martyn.

Euthrena, gen. nov. for *vittata*, Quoy & Gaimard.

Japeuthria, gen. nov. for *ferrea*, Reeve.

Syntagma, nom. nov. for *Donovania*, Bucquoy, D., & Dollfuss.

Acostæa, Orbigny, will replace *Mulleria*, Ferussac, 1828.

Gistel's Molluscan Generic Names, 1848, enumerated,

Damoniella, gen. nov. for *Bulla cranchii*, Fleming.

Muricodrupa, gen. nov. for *Purpura fenestrata*, Blainville.

Teretianax, gen. nov. for *Scalenostoma suteri*, Oliver.

Presidential Address. By J. R. LeB. Tomlin. *A Systematic List of the Fossil Marginellidae*, pp. 41-56.

A SYNOPSIS OF THE CLASSIFICATION OF THE FRESH WATER MOLLUSCA OF NORTH AMERICA north of Mexico, and a CATALOGUE OF THE MORE RECENTLY DESCRIBED SPECIES, with notes. By Bryant Walker. Univ. of Michigan Mus. of Zoology, Misc. Pub. No. 6. Students of North American fresh-water mollusks of this generation have had as a basis the invaluable manuals

by W. G. Binney, Prime and Tryon, issued by the Smithsonian Institution, 1865-73, and the works of Lea on Unionidae, of about the same date. Some single groups have been elaborately treated since, the Uniones by Simpson, the Lymnaeidae by Baker; but most of the progress in the last fifty years has been recorded in a host of papers, by many authors and in many journals. To systematize this material and make it readily accessible, Dr. Walker has prepared this synopsis of the classification as understood today, giving definitions of the families, genera and minor groups, with figures of types or typical species of each, frequently also of anatomical structures important in classification.

The second paper is devoted to species published since the appearance of the monographic works alluded to above, together with those omitted, formerly misunderstood, or concerning which there has been diversity of opinion. The great utility of such a catalogue will be apparent.

Together, these papers give a most interesting epitome of the progress made by the present generation in the study of our fresh-water mollusks, so far as classification and description are concerned. Dr. Walker's long familiarity with the subject enables him to present it lucidly and completely.—H. A. P.

NEW LAND SHELLS FROM THE PHILIPPINE ISLANDS. By Paul Bartsch (Proc. U. S. Nat. Mus., vol. 55, pp. 291-307, pl. 18-20, 1919). Six new species and subspecies of *Cochlostyla*, one new *Chlorea* and a new *Leptopoma* are described and figured.

DESCRIPTIONS OF NEW SPECIES OF CHITONS FROM THE PACIFIC COAST OF AMERICA. By William H. Dall (Proc. U. S. Nat. Museum, vol. 55, pp. 499-516, 1919). Five new species of the genus *Lepidopleurus*; two new *Nuttallina*, fourteen new *Ischnochiton*, one new *Chaetopleura*, seven new *Callistochiton*, four new *Mopalia*, *M. grisea* being the type of a new subgenus *Semimopalia*, one new *Acanthochiton* and two *Tonicia*. None are figured.

THE UNIONE FAUNA OF ALABAMA. By Bryant Walker (20th Rept. Mich. Acad. Sci., 1918). An interesting summary. The State has the largest Unione fauna of any area of similar size in the world. Three faunas are represented known as the Tennessee, Alabama and Atlantic faunas. Of the 533 species of Unionidae belonging to North America, more than 300 are found in Alabama.—C. W. J.

THE NAUTILUS.

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No. 2.

ALONG THE MEXICAN BORDER, 1919.

BY JAMES H. FERRISS.

New Year's day a turkey dinner in Tuscon with Frank Cole. The next day Sonorellas in the Santa Catalina foothills; but it was not until the 13th, at the Tumacácori Mission, on the Santa Cruz river that the whole party answered roll call. A. A. Hinkley, our Mexican and Central American explorer, of Du-Bois, Ill.; Robert Camp, collecting everything, alive or dead, for the American Museum, of Brownsville, Texas; Miss Elizabeth Pilsbry, of Philadelphia, daughter of our NAUTILUS Editor, and Mrs. Ferriss answered. I called the roll. Miss Rell Gelder, of Detroit, Michigan, joined the party later.

This camp was in easy walking distance of the Tumacácori and San Cayetano ranges, and in an hour by auto we attacked the slides of the foothills south of the Santa Ritas. It was a rich location, also agriculturally and historically. Here came the Spanish priests from Mexico as early as 1601. The foundation of the Mission was laid in 1700 and the building still occupied in 1911. Here too was a mining city, Tubac, in the midst of rich fields of gold and silver. The priests were also miners, and later came a company equipped at Los Angeles, Texas, that prior to the civil war took out silver by the million dollars.

In fact the Aztecs were energetic miners way back, and the ruins of a large city in the Tumacácori mountains is supposed to mark the town site of one of those seven cities of Cibola. Says J. Donald Mitchell, an Arizonian historian: "On the sides

of the mountain lie the ruins of many dwellings and on top, carved from the solid rock, is the Aztec god standing guard over the silent city. Near by on a large flat rock are the basins, or cups, carved in the rock, that held the bleeding hearts of the unfortunate victims that were sacrificed to appease the wrath of this stone god. History tells us that often the victims were pretty little girls chosen from among the thousands who visited these Aztec cities every year during the great fiesta.''

Aztec legends tell us 2050 burro loads of white silver and 905 of gold and silver were buried by those Indians a certain number of paces from a certain point, but the rare and noble *Sonorella walkeri aguacalientensis* P. & F. was again discovered by us in a small group of hills on Josephine Canyon between the Santa Ritas and the Cayetanos. Three new Sonorellas were dug up in the Tumacácoris, *S. tumacacori*, *S. hinkleyi fraterna* and *S. walkeri montana*; in the Cayetanos *S. hinkleyi* and *S. cayetanensis*. Miss Pilsbry put the Mission on canvas and sketching pad. Camp gathered many kinds of bats and lizards. Others have given a lifetime here at Tubac, digging and exploring, tormented by cat-claw, cacti and rough traveling, but have not found the Aztec gold or silver.

These many generations of miners have left but little timber on the hills. A few oaks on the mesas and peaks, and only in the heads of deep gulches is there anything like reforestation. In earlier days, with Arizona snail hunters it was at least a climb of 8,000 ft. for Sonorellas, and rock covering of three feet or no work. In the Cayetanos without regard to elevation they were found in the soil next to boulders and under spawls lying about the gravelly cliffs. Often a cliff or rock slide ten feet square would yield a cocoa-can full. Once we obtained two cans full, 452 by count, and all albinos except 24. Near the peak of the highest mountain at the southern end of the range, on the north-east side, is a gentle sloping cove of about forty acres of Sonorella rocks. But the sun was just going down as it was discovered and only a few Sonorellas were gathered.

The Pajarita Range is a wide expanse of rolling hills, a continuation of the Tumacácori, on both sides of the international line, timbered, well watered and sodded. The Governor

of the state of Sonora has built a barbed-wire fence along the line to keep the cattle thieves on their own side. Although not in the cattle business we did not cross over. It was a different country in character from anything seen in Arizona, and so pleasing we camped in these hills for three weeks.

We spread our blankets under the wide branches of the live oaks and visited the Phil Clark ranch. A couple of caged eagles were at the door and young Clark was found reading by lamp light with a fool quail perched on his shoulder. This is one of the rarest of the quail family, a good introduction. We talked birds and things till a late hour. Clark junior led us to the snail slides and the bat caves the following day, and ever after was a very helpful companion in our excursions. The first day out he heard something in an old mining tunnel he was exploring for bats, and a shot in the dark brought a wild pig. We ate about all but its head and feet. We camped again in Pina Blanca Canyon at the Moon U. S. Forest Station, and I went with Clark to the Bear Canyon, a scenic picnic resort, and found *Asplenium firmum*, a fern rare even in Florida, and again rediscovered *Agave parvifolia*, the smallest of the century plants. We picked up a new pin-cushion cactus large as a table bowl. Also a pair of whip snakes for Camp. We found *Sonorella walkeri montana* here and at the Tumacácori pass and it was also found by Hinkley at the Montana Mine, near Oro Blanco.

Among the smaller Sonorellas in the Pina Blanca Canyon and again across the mesa in the Tumacácori, the first *Bulimulus* for Arizona was noted living in a strange situation, for it is a snail of the grass and brush.

At old Calabasas at the mouth of Sanoita creek, emptying into the Santa Cruz, junction also of the two branches of the Southern Pacific Railway entering Mexico, we camped a few days to work that end and the best of the Cayetanos. Again we were in claw and thorn desert surroundings. At the Mission robins by the thousand, bluebirds, thrashers, cardinals and jays and Gamble's quail came after the hackberries, but the Calabasas camp was a little tame. However Camp secured rats, mice and gophers on the kangaroo plan, and our luck in snails was pleasing.

In the Eighties Calabasas was one of the wonders of that decade, according to the promoters' literature in New York. The Metropolis of the Far West was its name. Side-wheel steamers plied the Santa Cruz, whereas we had a hard time crossing that stream in the dry sand. The docks were piled high with cotton and tobacco bales in the pictures, hogsheads of sugar and pigs of metal. Picturesque Mexicans hustled cattle into the stock yards. The Indians just across the river were chasing buffalo, deer and elk. Lithographs also revealed hotels, boards of trade and banks, their corridors filled with excited investors in silk hats and sombreros. The hotel and another large building remain, but the land for miles around after being in the courts for many years is now in the possession of the heirs of a Spanish grant—the Bacca Float.

On the west side of Mount Washington, of the Patagonia range, *Sonorella patagonica* can be found in the boulder dikes and islands of the canyons and the dead were plentiful in the foot hills west of the Nogales-Duquesne highway. A hard half-day in the brush and briars of the Red Mountain, property of the Red Mountain Mining Co., north side, netted two Sonorellas.

Mt. Washington seemed to be above 8,000 feet high, and our camps about 5,000. There was much snow on both sides, east and west, and the pass was long and steep. Army-truck drivers camped with us for the night as the pass was too difficult for anything except the best of daylight. It took three trips to get our party over and then Hinkley with the empty auto and empty trailer on the fourth trip was hung up on the brow of the mountain in a snow storm all night. Merely for company I was in the party. With a good fire we were fairly warm and dry, and slept some.

At Duquesne *Sonorella parietalis* was found in the same colony with *patagonica*, sixty of them alive. A large collection of Pupae and other small ones were gathered and Mr. Hinkley is now sorting them out of the dirt. He also has the fresh-water collection. This mining property owned by the George Westinghouse heirs was the liveliest camp in our journey. Copper was being rolled out at war-time speed and the ore shipped to El Paso via a Mexican R. R. station, at the foot of the San

Jose peak, where *Sonorella mearnsi* dwelt at the time of the Boundary Survey.

Bound for the Huachucas to pick up better sets of former collections, we dropped down the Patagonia mesa through a thick grove of young oaks with cultivated ranches in the canyons. Then out upon a Kansas prairie landscape where the highway crosses the head of the Santa Cruz running south and the Barbacomari running north. Here are a number of prairies, without brush or thorns as beautiful to the eye as any state can produce. The Canillo Hills for thirty miles or more are covered with a thick growth of oak and juniper. At the high peak east of our road we found *Sonorella elizabethae* in abundance, and in the limestone hills west were small colonies of *Holospira* for three miles under spawls close to the stratified terraces, but a foot or so in height. Also in the rocky hillsides.

Across another beautiful prairie we were again in the Huachucas at the Manilla mine, at the northwestern end. Here we were comfortably housed at the property owned by some of my Joliet friends, and at the home of the typical *Holospira ferrissi* Pils. It seemed convenient to have lamps and a cook stove. Again we camped in Carr Canyon, near the home of our friend Biederman the entomologist and father of walnut grafting. Side trips were made to Garden, Brown, Miller and Ash Canyons.

Around the southeast point of the range we went into new territory, Montezuma and Copper Canyons, and again gathered *Ashmunella heterodonta* at Ida Canyon. These are rich canyons and so extensive they have not been thoroughly explored. One of the smallest of *Sonorellas* turned up in Montezuma Canyon, *Sonorella montezuma*. It was found abundant in lime, granite and porphyry. Again we had splendid quarters, a stove and lamp, on the State of Texas mining property. These mountain ridges run into Mexico, and ranchmen obtain permits from the Mexicans, when they desire to journey into Tombstone, Naco and Douglas with a vehicle.

From the Huachuca camps several raids were made on the Mustang and Whetstone ranges about twenty miles away. The first range, about 6,000 feet, has shells in every stone-pile, and the climbing is easy and clean. It is a model for collectors to

follow. In one colony of large Sonorellas about one in ten was an albino, beautifully modeled and with yellow lips. We worked here into a bank of clay and broken stone until we had a face to our mine high as our heads. The Sonorellas dwelt in the spaces between the clay and stone and at twenty feet in live Sonorellas were found. It was then dark and I had undermined a large Ocotillo that rolled me over and left a bump on my head for this summer. Again we had trouble in finding *Sonorella dalli* Bartsch, at Garden Canyon (Tanner's) in the Huachuclas. Here we followed a wide crevice in the limestone filled with soil. At a depth of about two feet we followed crevices a couple of times and found over seventy alive. The sixty Sonorellas at Duquesne and as many red Sonorellas in Miller Canyon were found in like manner. In Brown Canyon at the foot of a high cliff of limestone dead shells were abundant. Accidentally a scale of the cliff was torn off, and here was the live *Sonorella granulatissima latior*, we were looking for, with *Oreohelix* and *Ashmunellas*.

About this time we admired our skill. After these many years, one of us said, we have become 100 per cent. shell collectors. On my first journey to Arizona I had raked over the leaves and turned logs and stones lying on the soil. I walked through the grand Tanner Canyon disdainfully past these rich Sonorella mines.

But to follow this mutual admiration convention, we did not find live *Oreohelix* in the Mustangs though dead shells covered the ground and crowded the rock slides. Here however the limestone cliffs did not scale. They were cracked apparently from one side to the middle, or the other side.

We made two trips to the Whetstones before finding a shell of any kind. We thought we knew whether a mountain had shells or not by merely looking at it. On the third trip a long slide facing east was discovered. This had a great abundance of the most delicate and artistically constructed Sonorella so far identified. All were dead except a few less than half grown. The colony had been destroyed by some insect that had evidently dissolved the lime with some of its juices, making a hole in the shell large enough to crawl in and eat 'em up. The

opening was usually oblong and about one or two millimeters long. Here the trail was so thorny and the gulches so deep we could walk only about a mile per hour in the mountain. Two days were given to the slide.

We had good success in the Tumacácori, Cayetano, Patagonia and other mountains on *all* sides of the peaks and had forgotten that in some ranges shells lived only on the north side. On the fourth trip to the Whetstone, while passing the north side of a small peak to get to the largest in the range, another *Sonorella* was found alive and plentiful. Also *Oreohelix huachucana* and a *Holospira*.

We feel certain there are a considerable number of undiscovered snails in the limestone, well watered and timbered (8,000 feet) peaks of the Whetstones, on the north side. Some of these we examined, on the south side.

The rains arrive in Arizona in July, which is the best growing month; but this year in the first week of May the Mariposa group of lilies covered the slopes. The west mesa of the Santa Ritas was a golden yellow, for the poppies were in bloom. Also the large white thistle poppy. The Ocotillo (Crown of Thorns) with a deep crimson spike, and cactus bloom, white, crimson and orange, warmed up the desert hills. The last night out blankets were spread in the dry bed of a stream in a pass of the Mustangs. It was really a beautiful place. Gravel makes a good bed, as desert beds run, and the banks were decorated with spreading walnuts and oaks. The junipers and cottonwoods were artistically rounded and all in full leafage. Three kinds of doves were talking, a cardinal, a thrasher and the vermilion fly-catcher were singing just at sundown, and the black and white scolding hummingbird in our tree, nervous in the face of distinguished company, had settled down in his thimble nest for the night.

The Mustangs are not large mountain, but they have pleasing profiles, domes and table tops, for background purposes, when the moon is up a little way and the evening star is in close conjunction. Arizona nights are a cut-glass, crystal affair. Not smoky and beclouded.

When the after-glow was just about right I led the partner

who has made life so pleasant these many years in housekeeping and business, over the shallow bank where only a few nicely terraced oaks were to be seen, and striking an attitude, front of stage, exclaimed "Look at that. That is perhaps the one best view, celestial, we will ever get."

In the morning Henry was halted at the windmill to be filled up. The owner of the pasture, we had learned to like; "he is white" we said, with his helper was doing his chores. He carried a double row of cartridges in his belt; a forty-five and a telescope lay upon a barrel-head, and a rifle rested against the derrick. The equipment was the best.

"Going a hunting?" I asked, innocent-like.

"Not this morning," he answered. "The fact is," he added, "it takes two of us to watch that fellow over in the other house. We have been shot at in this corral several times. Our fences have been cut and three horses and a cow shot this week. He wants me to buy him out and I don't want his ranch at the price he asks."

It is but a short distance from one thing to another all round the world. On the fifth of May we were again in Tuscon having collected at 134 stations.

NOTES ON THE SPECIES OF FASCIOLARIA OF THE SOUTHEASTERN UNITED STATES.

BY CHARLES W. JOHNSON.

The following notes of long standing are brought together for the purpose of pointing out some discrepancies that seem to have passed unnoticed. Another object is to supply a demand from some of our readers for something more pertaining to the marine mollusks.

Fasciolaria gigantea Kiener.

F. papillosa Sowerby, Tankerville Cat. App. p. 16, 1825; Reeve, Conch. Icon., (*Fasciolaria*) vol. 4, pl. 1, f. 1a, 1b, pl. 7, f. 1c, 1d, 1847.

F. gigantea Kiener Icon. Coq. Viv., (*Fasciolaria*) p. 5, pl. 10 and 11.

Tryon's Manual Conch., vol. III, p. 75, fig. 14-16, 1881.

F. crocata Philippi, Zeitschr. f. Malak. p. 25, 1848: Abbild.

Besch. Conch. III, (Fasciolaria) Tab. I, f. 3, 1849.

F. reevei Jonas, in Philippi, Abbild. Besch. Conch. III, (Fasciolaria) Tab. III, f. 2, 1850.

Even this large shell is not free from a nomenclatorial tangle. *F. papillosa* Sowb., as pointed out by Tryon, seems to be the oldest name. I have not access to the Tankerville Catalogue, but if the young specimen as figured by Reeve (fig. 1a, b) and copied by Tryon (fig. 15) is the type, then this name seems somewhat doubtful. The spire and canal are both too long for a specimen of that size, in fact I cannot see any difference in figs. 1a and 1b, and the figure of *F. coronata* Lam. as figured by Reeve (pl. VI, f. 14 a, b.) Figure 1c and d of Reeve and copied by Tryon (fig. 16) is *F. gigantea*. The *F. crocata* Phil. from Yucatan is undoubtedly the young of this species and not related to *F. filamentosa* as suggested by Tryon.

In regard to its size, Tryon says: "Length 1 to 2 feet. This is the largest known species of univalve shell." Charles T. Simpson (Davenport Acad. Nat. Sci., v, 51, 1886), says: "On the Keys I have seen dead shells two feet in length, the largest Gastropod in the world." In THE NAUTILUS, XIX, 108, I had occasion to review Mr. Charles Hedley's paper, "On a large example of *Megalatractus aruanus* (L.), and incidentally mentioned that this Australian giant had a rival on our Florida coast, *F. gigantea*, quoting one of the above references. Mr. Hedley replied in a letter saying: "Give it in inches, I do not like the sound of the word feet." I remember a specimen 23 inches (about 575 mm.) in length, and there was a very large specimen in the collection of the late Joseph Wilcox which I cannot now locate. In writing to Dr. Dall, he says: "The largest specimen we have of *F. gigantea* measures 20 inches in length, with probably half an inch lost from the tip of the spire and as much more from the end of the canal; I have seen a bigger one but I do not remember the exact length of it. Call ours 530 mm. and it would, I think, be fair." The largest in the American Museum of Natural History is 20.25 inches and that in the Academy of Natural Sciences about the same.

Var. *reevei* Jonas.

This is not a form of *F. princeps* as suggested by Tryon. Although the type is comparatively small (135 mm. in length) the form is easily recognized and not uncommon on the Gulf coast of Florida. It was found by the writer at Marco. The prominent nodes become obsolete or wanting, especially on the body whorl; the shell is also thinner and does not reach the size of the typical form. While *F. gigantea* and *F. princeps* (from the west coast of Central America resemble each other superficially, there is a most remarkable difference in their opercula. The former has only the prominent concentric lines of growth on the exterior, while the latter has five deep longitudinal furrows on the middle and inner edge and irregular diagonal ribs on the outer edge.

The large bunches of egg-capsules of *F. gigantea* are conspicuous objects on the Florida beaches. These are poorly figured by Tryon (Manual, Vol. 2, pl. 7, figs. 78 and 79) as "Capsules of an unknown Muricoid mollusk." A bunch of capsules from Key West, Fla., nine inches in length and containing approximately 400 capsules was attached to a broad band which has no doubt contracted considerably in drying. Three of the capsules contained respectively 66, 70 and 76 embryonic shells. If these should average 70 per capsule, the entire bunch would produce upwards of 30,000 shells, but the death rate is enormous and very few ever reach maturity. Each capsule is wedge-shaped, the angles slightly winged and the sides with five or six irregular ridges. It is about 40 mm. in length, attached to the band by a pedicel about 12 mm. long.

The capsules of *F. tulipa* are in small clusters attached to shells and stones. It is also wedge-shaped and pedunculate, the sides are smooth, but the upper edge is ornamented by numerous undulations around its entire margin. In *F. distans* there is only a single indentation on the upper edge, forming a lobe that extends over the opening through which the young shells escape. The latter is figured by Tryon (Manual II, pl. 7, fig. 77) as *F. tulipa*?

Fasciolaria tulipa (Linné).

Colus achatinus Bolten, Mus. Bolt., 117, 1798. A variable

shell both in sculpture and color. A perfect shell of the smooth or more typical form shows interesting phases in sculpture in the early growth of the shell, the protoconch and about half a whorl of the young shell being smooth, followed by about half a whorl with only longitudinal ridges; this is followed by two whorls with prominent spiral ridges which gradually become obsolete or wanting except near the suture, these subsutural ridges increasing in prominence and often becoming crenulated or beaded on the last two whorls. On the anterior portion of the shell are also prominent spiral ridges. Some of the specimens from the Bahamas have a decided shoulder on the body whorl. Color whitish, mottled with brown or reddish blotches and with from 26-33 dark-brown spiral lines on the body whorl. Two specimens from the West Indies are uniformly light brown with the usual dark-brown spiral lines. Simpson says: "A mahogany-colored form is occasionally found on the Keys." It varies in length from 5 to 8 inches (125 to 200 mm.) and is found from North Carolina to the West Indies and Venezuela.

The varietal name of *obsoletu* was applied to a smooth form from St. Thomas, but this cannot really be separated. There is, however, a form in which the spiral grooves and ridges cover the entire shell. Tryon (Manual III, 74) says: "I figure a rugose form which Dunker intended at one time to describe as *F. scheepmakeri* but finally illustrated in his 'Novitates' as a variety of *F. tulipa*." This name might therefore be used in a varietal sense for this form which is quite common on the Gulf coast of Florida.

Fasciolaria distans Lamarck.

As pointed out by Dr. Dall and others, this is a good species and not a variety of *F. tulipa* Linn., as stated by Tryon and later by Miss Rogers in the "Shell Book." It is smaller and smoother, having only faint spiral sulcations on two of the early whorls near the nucleus, and spiral ridges on the narrow anterior portion. There is also present an internal ridge on the body whorl in front of the suture. Color whitish, with bluish-gray or brown blotches and usually with five or six equidistant,

revolving, dark-brown lines. One specimen shows ten, but five of these are somewhat obsolete and close together near the narrow anterior portion of the shell. I have found living specimens at St. Augustine, Fla., in which the blotches were a light rose-pink, with the six revolving lines of a similar color. Dr. Dall records, from Belize, a pale salmon-colored specimen with the lines obsolete. The species varies in length from 65-85 mm. It ranges from North Carolina to Florida and westward to Mexico.

THREE NEW ALPINE VERTIGOS FROM CALIFORNIA.

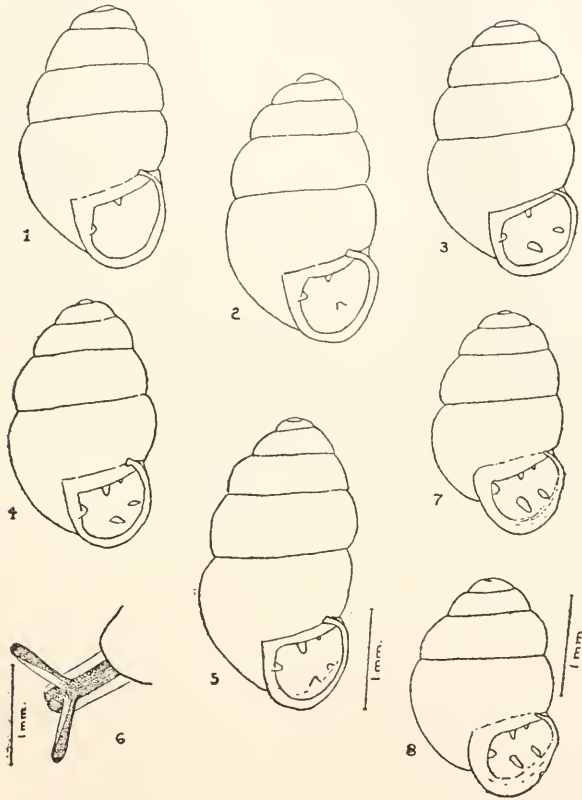
BY S. STILLMAN BERRY.

Among numerous *Pupillidae* collected from the higher mountain regions of California during the past few years appear several apparently undescribed forms, diagnoses of three of which are given below.

VERTIGO MODESTA MICROPHASMA, new subspecies. Figs. 1-6.

The shell is cylindro-conic, rimate-umbilicate, thin, very pale horn color, by transmitted light transparent and colorless. The surface is glossy and distinctly irregularly, obliquely striate, especially on the upper whorls. The spire tapers from the last whorl, at first gradually, then more rapidly, to the obtuse apex. The whorls are strongly convex, the last with an indentation just back of the aperture over the lower palatal tooth, subsequently with a narrow, abrupt, axial constriction, then swollen to form a low, wave-like crest just back of and parallel to the lip. The aperture is rounded triangular, scarcely constricted on the outer margin, the peristome thickened and porcelain white in color, showing through the back of the shell as a white line, but the sharp lip scarcely reflected except over the columella. The posterior angle of the outer lip curves in rather sharply to the body whorl. The number of teeth varies from 2 to 5. The palatal and columellar lamellae are always well developed. In addition there is almost always a well developed lower palatal. A smaller, but variable upper palatal

is frequently present, as also a minute angular lamella. All the teeth are porcelain-white in color.



1-6, *VERTIGO MODESTA MICROPHASMA*. 7, *VERTIGO ALLYNIANA*.
8, *V. A. XENOS*.

Length of type 2.6; diameter to lip edge 1.5; length of aperture 0.9 mm.; whorls 5.

Type: Cat. No. 2740 of the writer's collection. Paratypes in the Academy of Natural Sciences of Philadelphia, California Academy of Sciences, Southwest Museum, United States National Museum, and the private collections of Mr. George H. Clapp and others.

Type Locality: 7,550 feet altitude, cienaga near Bluff Lake, San Bernardino Mountains, California; under sticks and logs at edge of forest; Nina G. Spaulding, G. E. Dole and S. S. Berry, August, 1910; 59 specimens in this and neighboring cienagas.

Also taken at 7,200 feet altitude, west slope of Falls Creek Canyon, near the narrows about one mile above Dobbs Cabin, Dollar Pass Trail, San Bernardino Mountains, California; under small sticks and pine cones on springy slope; G. E. Dole and S. S. Berry, Sept. 29, 1918; 32 specimens.

Remarks: This very puzzling little mollusk is one of the most beautiful of American Vertigos. It is very close to *V. modesta parietalis* and may also be described as an albinistic race of that subspecies, but it is a protean form and some shells are equally close to *V. modesta modesta* or even to *V. m. castanea*. That it is more than a mere "albino" of the recognized type is strongly evidenced by its occurrence in such abundance and at scattered localities, as also by the fact that its distribution is by no means coincident with that of any of the other forms mentioned. Nor, although usually associated, do the white or brown shells occur in any apparent regular ratio. At the second locality above cited diligent outlook yielded but three specimens of the brown *parietalis*. It is evidently a comparatively recent offshoot from the parent stock, but the field evidence is that it already is a race with its peculiar characters heritable to a marked degree.

It seems rather remarkable that such features as the color, shell texture, and similar characters in this form should exhibit such constancy as compared with the variability shown in the development of the lamellae. In 39 specimens of the type lot now before me, 1 has only 2 teeth (columellar and parietal), 15 have 3 teeth (columellar, parietal, and lower palatal), 9 have 4 teeth (an upper palatal usually the one added), and 14 have a full set of 5 teeth. No mature specimens with fewer than 2 nor more than 5 teeth have been noted. This variation in a single well-defined colony (its members having, as shown by the other characters noted, an undoubtedly close phylogenetic relationship with one another) throws a valuable bit of light on the difficulty of attempting the separation of the var-

ious races of the *modesta*-series by means of variations in the number of teeth alone. It chanced that the specimen chosen as type is one of the 3-toothed forms.

The animal is bluish-gray or slate in color, the body quite dark, the foot and peripheral portions much lighter and semi-transparent. A rough sketch of the cephalic region of one of the Falls Creek specimens is offered in fig. 6.

Whether the hereditary value of this race is that of a "form" or a subspecies can only be shown by the more detailed study which must be left for the future. Until then the personal equation must necessarily largely govern. In any case it will prove useful to have a name for it.

VERTIGO ALLYNIANA new species. Fig. 7.

The shell is minute, short, robust, ovate-conic in outline, thin, dark reddish-brown in color, with only a dull gloss; weakly, irregularly striate. The spire tapers with increasing rapidity from the last whorl to the obtuse apex. The whorls are convex, the last having a shallow but distinct excavation in the palatal region and a weaker one over the upper palatal tooth, the latter extending to the lip, which thus becomes flattened or very slightly indented on its outer segment. The aperture is pyriform in outline, and would be rather small except for the quite flaring lip, which is little thickened and very fragile at the edge. There are 5 teeth constantly developed in all the material examined. The parietal, columellar, and upper and lower palatal lamellae are well developed, and there is a distinct, though small angular lamella. The columellar is situated well back in the aperture and quite high up on the pillar. The lower palatal is also rather deeply immersed.

Length of type 2.1; diameter to lip edge 1.3; length of aperture 0.81 mm.; whorls $4\frac{3}{4}$.

Type: Cat. No. 3764 of the writer's collection. Paratypes in the Academy of Natural Sciences of Philadelphia, and the private collection of Allyn G. Smith.

Type Locality: Donner Lake, California; A. G. Smith, May 30, 1916; 22 specimens.

Remarks: I am not quite certain of the relationships of this

small *Vertigo*. The texture of the shell, as well as the shape, are strongly reminiscent of *V. occidentalis* Sterki, a more weakly toothed species from the San Bernardino Mountains. None of the other species with which I am familiar require any special comparison. *V. corpulenta* (Morse) has a somewhat similar outline, but otherwise does not seem especially close.

VERTIGO ALLYNIANA XENOS, new subspecies. Fig. 8.

With the preceding occurred a single specimen of a very similar form having the same number of teeth, but differing abruptly in its shorter, much more robust and swollen outline, its more transparent, glossier texture, and lighter brown color. The columellar tooth is placed distinctly further down on the pillar, and the remaining lamellae differ slightly from those of the shells described above both in size and position.

Length of type 2.0; diameter to lip edge 1.5; length of aperture 0.85 mm.; whorls $4\frac{1}{2}$.

Type: Cat. No. 4128 of the writer's collection.

Type Locality: Donner Lake, California; A. G. Smith, May 30, 1916; 1 specimen.

EXPLANATION OF FIGURES.

Figs. 1-5. *Vertigo modesta microphasma* Berry. Camera drawings of type (Fig. 2) and four other specimens of the original lot, showing variation in number of lamellae and shape of shell.

Fig. 6. *Vertigo modesta microphasma* Berry. Camera drawing of cephalic region of living animal as extended in crawling.

Fig. 7. *Vertigo allyniana* Berry. Camera drawing of type.

Fig. 8. *Vertigo* (allyniana var?) *xenos* Berry. Camera drawing of type.

All figures drawn to same scale.

Redlands, California.

 A NEW CALIFORNIAN MICRARIONTA.

 BY HENRY A. PILSBRY.

MICRARIONTA RIXFORDI n. sp.

The shell is strongly depressed, umbilicate, the diameter of umbilicus contained about 5 times in that of the shell. Embryonic shell of $1\frac{1}{2}$ whorls at first densely pitted, the pitting rather irregular, passing into granulation, and on the last half whorl transformed into short strong wrinkles, roughly parallel to the suture and often anastomosing. Subsequent whorls are delicately marked with growth lines only, moderately convex, the last slowly and rather deeply descending to the aperture, rounded peripherally, and encircled with a brown band above the periphery. The aperture is strongly oblique, irregularly oval. The peristome is thin, basal margin narrowly expanded, columellar margin somewhat dilated, but covering only a very small part of the umbilicus. The parietal callus is very thin.

Alt. 9.5; diam. 16.6 mm.; umbilicus 3.1 mm.; $4\frac{2}{3}$ whorls.

This snail was received too late for illustration in the present number. It was collected by Dr. Emmet Rixford among rocks at the foot of the mountains on the southern edge of the Mojave Desert about 10 miles west of Twentynine Palms, Riverside Co., California. Type and two other specimens, No. 129781 A. N. S. P.

Compared with *M. indioensis* (Yates), which is its nearest neighbor, this species is far more depressed and more openly umbilicate. *M. desertorum* Pils. & Ferr. and *M. hutsoni* Clapp are much smaller related forms from Arizona.

The specimens were picked up dead and except for the shoulder band, show no color.

 A NEW CHINESE CLAUSILIA.

 BY H. A. PILSBRY.

CLAUSILIA (EUPHAEDUSA) STEETZNERI n. s.

The shell is very slender, slowly tapering, the outlines of the spire straight, very slightly concave near the summit; opaque,

not glossy, vinaceous-russet fading to cinnamon-brown at the early whorls. First 3 whorls nearly smooth, the rest ribbed, the ribs straight, narrower than the slightly striate intervals, about 25 on the last whorl. The upper whorls are rather convex, the penult somewhat and the last strongly compressed laterally. The aperture is small, about one-sixth as long as the shell, piriform, the light brown peristome expanded and slightly reflected. Superior lamella rather small, marginal, oblique, not continuous with the spiral lamella, which is about a half-whorl long. The inferior lamella is situate high, converging to the superior; it ascends in a broad spiral a little past the dorsal line. The subcolumellar lamella is very deeply immersed, not visible in the mouth, but rather strong within the back. The principal plica is rather short, dorso-lateral, its lower end visible with difficulty in an oblique view in the mouth. There are quite short, subparallel upper and lower palatal plicae.

The clausilium is quite broad, curved almost in a semicircle, passing without notch or excision into the filament.

Length 13.6; diam. above aperture 2.4 mm.; length of aperture with peristome 2.3 mm.; 13 whorls.

Wenchuan (Wentschuan), Szechuan, China. Type 44660 A. N. S. P., coll. by Mr. Steetzner, received through Dr. Bryant Walker.

The dull, strongly sculptured surface, small aperture and large number of whorls are the more salient external features of the species, and distinguish it from other Euphaedusae having similar palatal structure, such as *C. planostriata* Hde. It is named for the collector.

**A COLLECTING TRIP ON THE ISLAND OF OAHU, HAWAIIAN ISLANDS,
BY THE GULICK NATURAL HISTORY CLUB.**

BY JOSEPH J. GOUVEIA.

Early Sunday morning on May the 25th, 1919, we started on the first trip planned by the *Gulick Natural History Club*. The purpose of this trip was to give the members of the club an opportunity to work on different lines.

Mr. F. Grinnell, with his necessary paraphernalia, started out prepared to collect plants and insects, while Messrs. Bryan, Emerson, Antone Gouveia and the writer for goats and shells.

The writer and Antone Gouveia took the first car towards Waialae, which leaves Kalihi Street at 5:45 a. m., and, after riding fifty minutes, we joined the rest of the members at the end of the car line.

At 6:45 we started out for Keawaawa. We had about eight miles to go before we could reach the foot of the valley and about three miles to go before we reached our hunting grounds.

The day was clear, and while on our way up the valley the talk was upon different subjects pertaining to the Hawaiian Islands and their history, among them the decrease of the Hawaiian population. When the white people first came to these islands they found them thickly populated with pure Hawaiians. To-day, about two-thirds of the Hawaiian population are half-breeds. Discussing the cause of their disappearance, we agreed that it was due to the following: wars, human sacrifice, pestilence, oppression by kings, chiefs and priests, liquor, wearing of clothing, and amalgamation with white people.

After an eight-mile walk along a hard coral road we reached Keawaawa at 8 o'clock. We were now ready to face a trail well overgrown on both sides with the Glue Bush and Lantana. It is not very pleasant to hike through these on account of their thorns. After about an hour's walk we arrived at the forest, our shelling grounds. On our way up we followed cattle trails which led along the bottom of the valley, and up near the drops we followed a zig-zag trail which wound to the top of the west Keawaawa ridge.

When we reached the outskirts of the forest, Grinnell and Gouveia followed a ravine on the right-hand side going up. This is where our day's collecting began. The following shells were collected in the above ravine:

Philonesia baldwini var. 6 specimens.

Lyropupa magdalenæ 6 spec.

Lyropupa microthauma var. 4 spec.

Lyropupa microthauma var. 6 spec.

- Nesopupa plicifera* 3 spec.
Nesopupa wesleyana var. *tryphera* 1 spec.
Tornatellides procerulus var. *acicula* 2 spec.
Tornatellides macromphala var. 63 spec.
Tornatellaria newcombi 6 spec.
Leptachatina gummea 23 spec.
Leptachatina fusca 3 spec.
Amastra tristis 2 spec.

Edwin Bryan, Oliver Emerson and the writer followed the ridge trail. We collected shells on our way up to the backbone. Shelling is not what it used to be, for shells are very scarce in this section of the Koolau Range. We managed to get seven specimens of *Achatinella viridans*: we considered this a lucky find. While on our way to the backbone, we heard some goats in the valley west of Keawaawa (Kuliouou Ike valley). Mr. Emerson carried a 45-70 caliber rifle, an efficient weapon for reducing the mountain pest.

Mr. F. Grinnell and Antone Gouveia joined the other members at the backbone. After a few minutes the party separated again, and this time we all started off in earnest for our different aims. Emerson and Bryan started across the backbone towards Kuliouou over a narrow goat trail about a foot wide in places; barely enough for one to crawl over, while Grinnell, Antone Gouveia and the writer started east looking for insects and shells. We were not able to find any *Achatinella*. We traveled a little further on until we came to a grove of banana and here we found the following shells:

- Nesopupa plicifera* 6 spec.
Tornatellides sp.? 4 spec.
Tornatellides macromphala var. 9 spec.
Tornatellaria newcombi 3 spec.
Helicina rotelloidea 18 spec.
Leptachatina gummea 7 spec.
Amastra tristis 1 spec.
Succinea rotundata 1 spec.

We spent about forty minutes collecting and then returned to the main ridge. On our way back we stopped about three hundred feet east of the Kuliouou-Keawaawa ridge and hunted

on bunch grass about 18 inches high. Here we collected the following:

- Nesopupa boettgeri* 5 spec.
- Pronesopupa acanthinula* 5 spec.
- Tornatellides leptospira* 16 spec.
- Tornatellides brunneus* 9 spec.
- Tornatellides brunneus* var. 3 spec.
- Philonesia baldwini* var. 6 spec.
- Auriculella diaphana* 20 spec.
- Leptachatina gummea* 2 spec.

At 11:30 we ate lunch and after half an hour's rest we started out again; this time we worked down the first ravine east of the main West Keawaawa ridge. While on the backbone ridge we noticed some kukui trees (*Aleurites moluccana*) which looked very promising. On our way down the valley to these kukui trees we collected the following shells:

- Nesopupa plicifera* 2 spec.
- Tornatellaria macromphala* 3 spec.
- Tornatellaria newcombi* 2 spec.
- Helicina rotelloidea* 1 spec.
- Amastra eos* 48 spec.
- Amastra tristis* 31 spec.
- Leptachatina gummea* 27 spec.
- Leptachatina fusca* 12 spec.

After spending about an hour collecting these we headed for the kukui trees. We found a few dead specimens of *Achatinella phæozona* under these trees, and, after a careful search we found twelve live specimens. Two were found on Lantana and the rest were found near the tops of the kukui trees. It was a surprise to us, for we were told that these shells were extinct in Keawaawa. On Lantana and oee weed we found thirty-two specimens of *Achatinella viridans*. Some of them were dark-brown in color and many of them had broad white and light-brown bands around the last whorl.

This was a good find. The forest is dying away fast and in the course of time these shells will be extinct. About three years ago the writer and Antone Gouveia collected a few dead

specimens of *Achatinella viridans* in the valley east of Keawaawa. These shells once thrived there, but the trees that they lived on have died away and consequently the shells have died off with them.

We all met at the foot of one of the small ridges at about 4 o'clock, ready for our homeward journey. Messrs. Emerson and Bryan had returned from their hunting trip. They were successful in wounding a goat and collecting a few specimens of *Achatinella viridans* on the windward side of the backbone ridge. Mr. Grinnell collected some interesting insects and native plants. After two long hours' walking at a good gait, we reached the car line, and about 6 p. m. we boarded the car for home.

Thus the *Gulick Natural History Club* finished its first trip with quite a success in the collecting line.

The shells listed were identified by Dr. C. Montague Cooke, Jr.

A NEW VARIETY OF *OLIVA SERICEA* MINIACEA.

BY H. C. HIGGINS.

Having become greatly interested in the Olividae, their beauty and the great variation of the species are to me a never-ending source of pleasure, marred only by the many perplexities in nomenclature. To what extent names should be given to the various forms, authors differ in opinion, but it seems more convenient to refer to certain well-marked forms by name when they are well figured in standard publications, than to say a variation of *O. sericea* subspecies *miniacea* figured in the Thes. Conch., Vol. IV, pl. 7, f. 110.

Having brought together a remarkable series of 250 specimens of *Oliva sericea* (*tremulina-miniacea* group) showing all the named varieties as well as many intermediate specimens, I was impressed with the fact that a shell in the *miniacea* group corresponding to variety *pica* in the *tremulina* group, has no varietal name, therefore I propose the name *Oliva sericea miniacea* var. *johnsoni* for this shell, in honor of Mr. C. W. Johnson, curator of the Boston Society of Natural History, as a slight acknowl-

edgment of his untiring work with, and published articles on, the Olividae, as well as for the kindly interest he has taken in my own collection of *Oliva*, and the assistance given me in identifying specimens.

This variety is figured by Marrat in Sowerby's *Thesaurus Conchyliorum*, Vol. IV, pl. 7, f. 110. It is represented in my collection by six specimens of which one, no. 1652, has to be selected as the type.

COLLECTING IN THE VICINITY OF NEWARK, NEW JERSEY.

BY FRED TABLEMAN.

During 1917-1918 I decided to study the molluscan fauna in the vicinity of Newark, N. J. Limiting myself to twenty cents car fare for each trip I started to see what I could find within this area.

Most of the work was done in Essex County, in one instance within walking distance from my home. Visiting the Newark Meadows I found a station for *Polygyra thyroides* by seeing some dead shells. I looked for live specimens but could not find any owing to the density of the underbrush and flies. Going later when they were hibernating I collected about 150 and could have gotten more. They live under debris that is overgrown with the balloon-vine on which I believe they feed. This station has been destroyed by the opening of the Port Newark Terminal.

The next place visited was Great Notch Brook, Upper Montclair. On this brook is a small pond formed by a dam at the head of which in a marshy place I found *Lymnaea palustris* in great quantities, and also one specimen of *Pseudosuccinea columella*. I was fishing at the time and ran short of bait, so turning over a rotten log I got not only bait but a nice lot of *Pyramidula alternata*, which are now in my collection. Going to the same place later in the season and exploring one of the mountains as far as possible, I obtained a few small *Pyramidula alternata* and two *Polygyra albolabris*, one dead and one living.

Going to Cable Lake, West Orange, I collected *Planorbis antrosus*. The lake is a small one situated on the top of a mountain, the shore of which is partly sand and stones. Here is the home of the Planorbes, which are covered with algae.

The Rahway River, in Union Co., was next visited in search of Unios. Two specimens of *Anodonta cataracta* in perfect condition were secured, but further search failed to produce more of that species; but about fifty *Unio complanatus* were obtained. I also collected *Physa heterostropha* along the bank in company with *Lymnea palustris*, and in the shallows *Campeloma rufum* was found in company with a small variety of *Planorbis trivolvis* and *Sphaerium* sp.

The last three trips to Bloomfield proved the best. The collecting was done in Great Notch Brook which flows through part of the town where it comes from Brookdale. Starting at the end of the trolley line and working up stream I found small dead *Planorbis trivolvis* that had been washed in hollows and crevices among the stones. Live ones were gathered farther up stream and also *Unio complanatus*, which I will compare with the Rahway River shells later.

Going still further up stream, I found the first specimens of *Goniobasis virginica* in the shallow water near the bank; also broken *Campeloma decisum*, later two perfect specimens were found. The *Goniobasis* were large specimens ranging up to an inch in length, many of them so eroded as to be hardly recognizable except by the animal itself. Still further up the *Goniobasis* became more plentiful and also *Lymnaea palustris*, both alive and dead in the drift, which was composed of the dead of both and a few valves of Unios.

The *Lymnaeas* were found on the stems of water plants and also floating on the surface, foot up; the *Goniobasis* were clinging to the stones and crawling on the bottom. Both the smooth and ribbed variety (*multilineata*) were found, both banded and plain. More Unios were found, so I returned home satisfied with the afternoon work.

On the last trip I found but few specimens of *Goniobasis*. A heavy rain a few days before had made the stream moderately high, and the few specimens that I obtained were buried ver-

tically in the sandy bottom with the body whorl only exposed. I do not know whether they buried themselves or the shifting sands did.

The *Unio complanatus* collected varies greatly with the locality. Those from the Rahway River are cleaner than those from Notch Brook and are not so ventricose. The anterior end is more elongate than the brook form, and the sexes are hardly distinguishable. The Notch Brook females are much shorter than the males and more truncated, as the following measurements of the largest specimens show:

Locality.	Sex.	Length.	Breadth.	Thickness.
Rahway River . . .	Male.	70 mm.	35 mm.	18 mm.
	Female.	75 mm.	38 mm.	20 mm.
Great Notch Brook.	Male.	72 mm.	38 mm.	19 mm.
	Female.	63 mm.	40 mm.	19 mm.

Having collected only in two localities this year I obtained the following species. From Branch Brook Park, Newark, *Planorbis parvus* and *Planorbis antrosus*. These species were found in shallow water near the shore.

At Halcyon Park (Bloomfield) in a small pond, if it can be called such, I found large *Planorbis trivolvis*, the largest of which measures 25 mm.; also *Pseudosuccinea columella* and a species of *Ancylus* which I have not identified. I believe the shells in this pond came with the water-lilies that are growing there.

SHELLS OF LA JOLLA, CALIFORNIA.

BY C. R. ORCUTT.

My acquaintance with La Jolla dates back to 1879, when there was not a human habitation on the coast from San Dieguito on the north to the old lighthouse, 500 feet above the beach, at the extremity of Point Loma at the entrance to San Diego Bay. Now there are several flourishing towns along the way, the delight of summer and winter tourists, among whom not a few have been conchologists.

Taking charge of Hotel Strand at La Jolla in July, 1918, I have since busied myself quite as much with the molluscan fauna of La Jolla as with the hotel business, with some interesting results.

Mr. Maxwell Smith has contributed a list of La Jolla shells to THE NAUTILUS (volume 21, pages 55 and 65), and Mr. Joshua L. Bailey, Jr., has contributed a supplementary list (on page 92). A few additional notes may be of interest.

Haliotis fulgens.—In the spring of 1916 San Diego was visited with great floods, and a great amount of silt was washed into the ocean via San Diego and False Bay with the fresh water. This proved to be fatal to many mollusks, and I am told that many thousands of this shell were washed up along the shore from False Bay to La Jolla. One gentleman told me that a train of cars could have been filled with these shells which were piled a foot deep on the beach in many places. Another filled two sacks with the shells and nearly broke his back tugging them to the top of the cliff at what in early days we called Seal Rock, now named Bird Rock Beach. These he has finally placed at my disposal, and I found the two sacks full chiefly of this species. *Haliotis cracherodii* and *H. rufescens* were missing, as well as *H. assimilis*. Out of the lot I found six specimens of the following species and nine specimens of its variety.

Haliotis corrugata.—These were not very strongly corrugated, but properly referable to the species.

Haliotis corrugata diegoensis.—This form differs in the entire lack of the corrugations typical of the species, but otherwise

with nearly the same characters. All of the corrugated specimens possessed three holes, while of the nine specimens of this variety one had one hole, two had two holes, and the rest had three.

Haliotis californiensis.—The Japanese gardeners at La Jolla are good fishermen also, and frequently gather abalones for the meat. One of them gave me a specimen which for lack of a better name I have given the above name. It is $5\frac{1}{4}$ inches long, $4\frac{5}{8}$ across, 2 high, and has 11 small nearly circular holes outside, showing traces of two closed holes. The inside contains a large "pearl" or muscular impression, triangular in shape, and instead of the clear pearly white of *H. cracherodii*, there are large blotches of brown, green, blue and pink iridescence. I have had many similar specimens from the west coast of Baja California, which have never been determined to my satisfaction. Dr. Stearns I believe tentatively referred them to the above species of Swainson.

Caecum orcutti Dall.—This seems to be absent from the lists given in THE NAUTILUS. The type locality was at a point about two miles south of La Jolla's caves, where under a flat rock I must have found more than 100,000 examples of this minute species. I have sent the U. S. National Museum what I estimated as near 50,000 specimens, which I believe breaks the record for any single collection in this genus. It has been found at San Pedro, Cal., I believe, and at Todos Santos Bay, Baja California.

Helix pisana.—This snail has been recorded in THE NAUTILUS as from La Jolla (though not in the lists referred to above). The first of September, 1918, I found it for the first time, and reported its occurrence as a menace to California horticulture. A representative of the County Horticultural Commission counted nearly 800 living on one bush about a foot high with a spread of three feet. A dozen would frequently be found on one stem of the wild oak. It seemed to have no preference, but was abundant on native and cultivated plants alike, and thousands were observed on the sides of the cement curbing and on the sides of houses near by. But the tens of thousands observed were apparently confined to a district less than half a

mile in extent in any direction. The authorities attempted their destruction, but I have noticed hundreds yet remaining alive. It was first reported to our local society of natural history in 1914, when three specimens donated were "all that could be found."

Bifidaria hemphilli.

Bifidaria calamitosa.

Vertigo californica diegoensis.

Some years ago Mr. Henry Hemphill told me that there were no Pupae in this region, stating as his belief that they could not exist in our arid climate. Then I found a few under the stem of a decaying yucca on the mesas back of San Diego, and later more than 500 under some decaying cacti in the same vicinity. Still later individuals were found not at all rare on decaying plants on the seashore not far south of La Jolla, chiefly on the Hottentot Fig or Beach Strawberry (*Mesembryanthemum æquilaterale*). These were found at Pacific Beach and no doubt exist within the limits of La Jolla, if one will search with care.

Helix traskii Newc.

Helix tudiculata Binn.

These are apparently not rare in the environs of La Jolla. The first was not previously reported.

Helix aspersa Müll.—Mr. Smith reports that he turned a few dozen of these loose at La Jolla. They now exist by the tens of thousands and are very destructive to the vegetables in the gardens. Some way should be found to make Mr. Smith take them away. It seems to be a different form from the one now naturalized in San Diego gardens, where it is also a much hated pest.

Mytilus californianus.—*Modiolus californiensis* of Smith's list was doubtless an error for the above, which occurs plentifully on our coasts. Just south of the international boundary this species has yielded many pretty pearls. The larger shells measure about seven inches long.

Schizothaerus nuttallii.—This favorite clam was formerly abundant in a bed of rocks just inside the entrance to False Bay, which was formerly the home of many choice shells. This was the type locality of *Chlamydoconcha orcutti*, since reported from Monterey Bay by Dr. Berry.

Semele decisa, *Saxidomus nuttalli* and other bivalves were equally abundant, but now nearly exterminated. A list of the mollusca from this bed would be extremely interesting, but now hopeless of ever being written, as it is no longer the ideal home for mollusks that it once was. Over 100 *Cypraea spadicea* were found there in one day, and an equal number of *Ranella californica* were yielded by the adjacent sandy beaches. While the shells from this lagoon do not properly belong with the La Jolla list, yet fragments or dead specimens of all noted by Mr. Smith may occasionally be found at La Jolla.

Tagelus californianus.—This is extremely abundant in False Bay and is gathered in quantities for bait by fishermen, and thus the shells are scattered freely all along the La Jolla shores.

Pedipes unisulcata.—Smith reports many of the dead shells attached to sea anemones, but I found it years ago in company with *Truncatella stimpsoni* on round water-washed boulders in caves near La Jolla.

Pedipes liratus.—This was also found at La Jolla in early days and later by Prof. Kelsey.

Milneria minima.—Abundant. Attached to the under side of stones. Usually reported as living on the shells of *Haliotis*.

Mytilus adamsianus.—This was long called *M. bifurcatus*, later known as *M. stearnsi*. Smith and Bailey, like many other collectors, seem to have overlooked it, probably mistaking it for the young of *Septifer bifurcatus* which it nearly resembles, except for the absence of the septum. It is equally abundant.

Mytilus denticulatus.—This is similar to the last but much smaller. It is *Modiolaria denticulata* of former lists, and might easily be overlooked, but is apparently not rare on our rocks.

Adula diegensis.—North of the Scripps Biological Station about a mile north of La Jolla is a rocky beach at the base of high cliffs. Much of the rock is a soft clay stone, and perforated by millions of pholads. In places this species has entire possession, and often they have made their cells so close together that no partitions of rock are left to separate the shells.

Pholas pacifica.—This is one of the pholads found at the above station with others already noted.

Petricola denticulata.—This is extremely abundant in the

above locality also, square yards of surface of some of the flat rocks being filled with its shells. This species seems to abound from San Pedro, Cal., to Magdalena Bay, Baja Cal., where I found millions of the young shells in the drift (determined by Dr. Dall).

Acmaea patina cumingii.—This is the commonest species at Bird Rock and all along our coast, but seems to have been overlooked by Smith and Bailey.

Tegula ligulatum.—One of the commoner shells on all our beaches.

Pecten hastatus.—In kelp holdfasts washed ashore at Pacific Beach.

Pecten hericeus.—Valves frequent in the drift.

Phacoides californicus.—Frequent in the drift on all our beaches.

Phacoides richthofeni.—Valves occasionally washed ashore. Mr. Emery found it living in False Bay.

Fissurella volcano.—This is probably one of the most abundant and widely distributed species on our coast. I have generally looked with contempt on the gathering of dead shells; but for lack of better material I have gathered several thousand of this from the drift, from very minute to specimens of maximum size. It occurs from Monterey, Cal., south at least as far as Salina Cruz, Oaxaca, where I have collected it in abundance. The beach-worn shells show a beautiful diversity of color not observable in the living shells. About fifteen per cent. of the shells picked up at La Jolla are of the var. *crucifera* Dall, sometimes the arms of the cross extending only halfway down the sides of the shell, sometimes wholly worn away at the apex, often one or more arms missing; in young specimens, say 2 mm. long, frequently only the lateral white arms appear halfway to the lower margin of the shell. The ground work is usually reddish, the gray or black forms being much rarer. From the four white arms of var. *crucifera* there occurs every variation in number up to 20 or 30 or more, the red rays on a white ground—like red-hot lava flowing down the sides of a mountain, having given it its name. This is probably the typical form.

Acmaea triangularis.—One specimen detected in the drift on the beach.

Calliostoma supragranosum Cpr.—Detected in kelp holdfasts.

Cyanoplax hartwegii.—Perhaps our commonest chiton, on rocks near high-water mark, strangely omitted from Smith's list.

Columbella fuscata.—One specimen was found living years ago, but no doubt stray from southern waters as well as a single well-developed living specimen.

<i>Thais biserialis</i> , not rare.	<i>Saxicava arctica</i> .
<i>Corbula luteola</i> , not rare.	<i>Saxidomus nuttallii</i> .
<i>Crepidula rugosa norrisianum</i> .	<i>Terebratella transversa</i> .
<i>Crepidula unguiformis</i> .	<i>Thracia curta</i> .
<i>Crepidula dorsata</i> .	<i>Thracia squamosa</i> .
<i>Hipponyx antiquatus</i> .	<i>Transennella tantilla</i> .
<i>Hipponyx cranioides</i> .	<i>Turbonilla castanella</i> .
<i>Hipponyx tumens</i> .	<i>Odostomia aequisculpta</i> .
<i>Kellia laperousii</i> .	<i>Venerupis lamellifera</i> .
<i>Kellia suborbicularis</i> .	<i>Mactra californica</i> .
<i>Modiola capax</i> .	<i>Mactra falcata</i> .
<i>Mytilimeria nuttallii</i> .	<i>Mactra nasuta</i> .
<i>Pecten latiauritus</i> .	<i>Mactra planulata</i> .
<i>Psammobia californica</i> .	<i>Phacoides nuttallii</i> .

The above are some of the shells omitted from the lists referred to that I have noted on the beach, quite a number of them in kelp holdfasts washed ashore.

A considerable number of minute shells yet undetermined will add considerably to the list, besides several chitons and larger shells that are being studied.

LA JOLLA, CAL., 21 Dec., 1918.

LAND SHELLS OF LAUREL SPRINGS, NEW JERSEY.

BY E. G. VANATTA.

The following species of land shells were picked from forest debris collected by Mr. Bayard Long on the north branch of Timber Creek, at Laurel Springs, Camden County, New Jersey, during 1918 and 1919.

<i>Polygyra fallax</i> (Say).	<i>Striatura milium</i> (Morse).
<i>Polygyra albolabris</i> (Say).	<i>Euconulus fulvus</i> (Müll.).
<i>Polygyra thyroidus</i> (Say).	<i>Zonitoides arborea</i> (Say).
<i>Strobilops floridana</i> Pils.	<i>Zonitoides minuscula</i> (Binn.).
<i>Pupoides marginatus</i> (Say).	<i>Zonitoides minuscula alachuana</i> Dall.
<i>Gastrocopta corticaria</i> (Say).	<i>Agriolimax campestris</i> (Binn.).
<i>Gastrocopta contracta</i> (Say).	<i>Pyramidula alternata fergusonii</i> (Bld.).
<i>Gastrocopta armifera</i> (Say).	<i>Pyramidula cronkhitei anthonyi</i> Pils.
<i>Gastrocopta pentodon</i> Say.	<i>Helicodiscus parallelus</i> (Say).
<i>Vertigo tridentata</i> Wolf.	<i>Punctum pygmæum</i> (Drap.).
<i>Vertigo milium</i> Gld.	<i>Succinea ovalis</i> Say.
<i>Vallonia pulchella</i> (Müll.).	<i>Carychium exiguum</i> Say.
<i>Columella edentula</i> (Drap.).	
<i>Polita hammonis</i> (Ström.).	
<i>Polita indentata</i> (Say).	

PUBLICATIONS RECEIVED.

OBSERVATIONS ON LIVING LAMELLIBRANCHS OF NEW ENGLAND. By Edward S. Morse (Proc. Boston Soc. Nat. Hist., Vol. 35, no. 5, July, 1919). In this valuable memoir Professor Morse describes and figures the expanded animals of 48 species of New England lamellibranchs. Hitherto most of the work on these mollusks has been done with alcoholic examples, which in their contracted condition give little idea of the beautiful and elaborate structures guarding the siphon openings and mantle edges of the living animal. Only those who have attempted to draw living mollusks can appreciate the application and patience required,—they are often stubborn, and refuse to show off; but all will admire the beautiful line drawings of these graceful structures. The figures of *Solemya*, *Nucula* and *Yoldia* are especially interesting. Some of the genera have the foot remarkably specialized.

Professor Morse takes the occasion to land a few resounding whacks on the nomenclature shifters. It is obvious that many of the changes (such as the adoption of Bolten's very German catalogue) were unnecessary and detrimental to science; yet

other changes mentioned were surely essential to progress. We might even recall that Morse himself threw a grenade into the nomenclature of land and fresh-water shells in his Maine Catalogue of 1864.—H. A. P.

DESCRIPTIONS OF NEW SPECIES OF MOLLUSKS OF THE FAMILY TURRITIDAE FROM THE WEST COAST OF AMERICA AND ADJACENT REGIONS. By Wm. H. Dall (Proc. U. S. Nat. Mus., Vol. 56, pp. 1-86, pls. 1-24, 1919). A very exhaustive faunal work on this family. Over 200 species are considered, of which 181 are new. The illustrations are excellent, many of Carpenter's species being figured for the first time. In regard to the family name Dr. Dall says: "Some question having been raised as to the spelling of the family name which I have retained as first proposed by Henry and Arthur Adams in 1853, I submitted the question of Turridae *versus* Turritidae to two expert Latinists, who after due consideration of all the data, concluded that, while either was correct, the latter term under the circumstances was to be preferred."

PELECYPODA OF THE ST. MAURICE AND CLAIBORNE STAGES. By G. D. Harris (Bull. Amer. Paleontology, Vol. 6, 1919). A valuable contribution to American Paleontology. The work contains 268 pages and illustrated by 59 plates, every species and variety being figured. About 250 species and varieties are described, of which more than 50 are new. Two new subgenera—*Mauricia* and *Pachecoa* are proposed. The work is dedicated by the author to the Hon. Truman A. Aldrich.

SEXUAL ACTIVITIES OF THE SQUID, *Loligo pealii* (Lea). By Gilman A. Drew (Journal of Morphology, Vol. 22, No. 2, and Vol. 32, No. 2). An extremely interesting and well illustrated account of phenomena rarely observed. The second paper deals with the structure and activities of the spermatophore. The observations were made upon specimens kept in aquaria at Woods Hole, Mass.

NOTES ON WEST AMERICAN CHITONS, II. By S. Stillman Berry. Proc. Cal. Acad. Sci. (4), IX, 1919. In this well considered and fully illustrated paper the following new forms are described.

Leptochiton (*Xiphiozona*) *heathi*, off Monterey.

Hanleya spicata, Monterey Bay.

Mopalia phorminx, Monterey Bay.

Mopalia egretta, Forrester Island, Alaska.

Ischnochiton (*Lepidozona*) *asthenes*, White's Point, Los Angeles Co., Cal.

Various points of classification are considered, and *Rhombochiton*, a "new group to rank near or under *Lepidozona*, with *L. regularis* (Carpenter) as type" is proposed.—H. A. P.

NOTES.

SHELLS FROM THE CHIRICAHUA MOUNTAINS, ARIZONA.—Dr. Witmer Stone camped in Pinery canyon, on the western slope of the Chiricahua Range, from June to August of this year, studying the distribution of the fauna and flora. Near the top, in the forks of the head of the north branch of Pinery canyon, at approximately 6500 to 7000 ft., he obtained the following snails. The locality is near the high ridge separating Pinery from White Tail canyon, where Ferriss and the writer collected in 1906 (Proc. A. N. S., Phila., 1910, p. 75, fig. 6). The rock is limestone.

Sonorella virilis leucura P. & F.

Oreohelix chiricahuana obsoleta P. & F.

Ashmunella duplacidens Pils.

Holospira cionella intermedia P. & F.

Polita indentata umbilicata (Ckll.).

Gastrocopta ashmuni (St.).

Gastrocopta dalliana (St.).

Gastrocopta pilsbryana (St.).

The last three were found in debris, but some living specimens of all the others were taken.—H. A. PILSBRY.

HELIX HORTENSIS: I am sending under separate cover a specimen of *Helix hortensis* Müller. It was found in a prehistoric shell-heap on Mahone Bay, about 75 miles west of Halifax, N. S.—W. J. WURTEMBERG.

A SYNONYMICAL NOTE: The shell described and named by Pilsbry and Bryan in THE NAUTILUS, XXXI, 3, 1918, p. 99, pl. IX, as *Drupa walkeræ* from Honolulu Harbor, is the same species which was described by G. B. Sowerby in the Annals and Magazine of Natural History, Ser. 8, Vol. XVI, p. 166, pl. X, 1915, as *Pentadactylus fusco-imbricatus*. A recent letter from Sowerby and Fulton suggested this after an examination of a specimen sent to them. A careful comparison of the descriptions and figures convince us of the same conclusion. All the specimens known are from the Honolulu Harbor dredgings from May to August, 1915. The teeth vary from 5 to 7 in the specimens before us. We hope to make a study of the variations of this and other shells later.

F. GRINNELL, JR.,
J. M. OSTERGAARD.

INSECT LARVÆ DESTROYING PHYSA.—There is a small artificial pond in Waveland Park which joined my former home grounds in Des Moines, Iowa, that I had never considered of much importance conchologically, owing to its small size and rather recent construction. A visit to it one day in the summer of 1907, however, only added greater strength to Mr. Simpson's motto, "Look everywhere."

I found here a form of *Physa integra* Haldeman quite plenty, but nearly all dead. They were enveloped in what at first appeared to me to be a growth of moss, but which Dr. C. M. Child of the Department of Zoology, University of Chicago, pronounces as insect cases, "probably some dipterous insect, but none of the men in the Department are able to identify more exactly the insect that is responsible for them." As I have heard nothing further, it is fair to presume that the insect is new or little known.

The deposition and multiplication of these microscopical in-

sect larvæ and their cases had in many instances formed a thick mass over the entire surface of the shell, completely closing the aperture, thus causing the animal within to die. Scarcely a living individual could be found that was not more or less infested in this manner.

Burr-oak trees stand near the margin of the water, and the acorns which had fallen from them in the water were often brought out with my little hand-dredge together with cockle-burrs, in company with the infested shells. The cockle-burrs were often difficult to distinguish from some of the shells, covered as they were with the larvæ cases.

When closely observed, I noticed that the majority of the dead shells were lying on the bottom of the pond with aperture up; some could be seen lying in this manner with but a slight opening remaining in the aperture, in which I could see the yet living animal struggling for freedom.

A few living ones were to be found on the vegetation growing in the water which were in all stages of infection.

I revisited the pond in the fall, after the warm weather, and found a few living shells and plenty of recently dead ones; but scarcely a vestige of the insect cases was to be seen anywhere, thus showing that they flourish during the hot weather and after maturing the cases soon decayed, leaving no trace of the perpetrator that so rapidly devastated the colony.—T. VAN HYNING.

POLYGYRA PLANA BAHAMENSIS Van. n. var.—This variety is distinguished from the typical *P. plana* (Dkr.) of Bermuda by frequently having a spiral internal lamina as in *P. cereolus carpenteriana* (Bld.) of Florida. The surface of the spire has finer sculpture than *P. carpenteriana* (Bld.'s) and a trifle coarser than the typical *P. plana* (Dkr.).

The types are in the collection of the Academy of Natural Sciences of Philadelphia, being tray number 44463, from Current Settlement, Eleutha, Bahama Islands, collected by Mr. C. J. Maynard in 1897.

The Academy's collection contains other specimens of this variety from New Providence and Inagua Islands.—E. G. Vanatta.

THE NAUTILUS.

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No. 3.

GONIOBASES OF OHIO.

BY CALVIN GOODRICH.

Some months ago I had occasion to map the known distribution of *Goniobasis livescens* Menke and *G. semicarinata* Say within the borders of Ohio. This distribution is somewhat peculiar.

Beginning on the western side of the state above the central line we find that *livescens* is the *Goniobasis* of the Maumee river system and of the shallows of Lake Erie as far as Sandusky Bay, where *G. haldemanni* occurs in company with *livescens* in the drift of the beaches. So far as exploration thence east shows, *livescens* appears alone to the northeastern corner of Ohio. It is the species of Sandusky River, flowing into Sandusky Bay, of Rocky and Cuyahoga Rivers which enter the lake at Cleveland, and of Conneaut Creek near the eastern border. Below the divide between the lakes and the Ohio River drainages, I found *livescens* in Beaver Creek, a tributary of the Wabash. There is then a great gap in its occurrence until the Hocking River is reached, east of a north and south central line drawn through the state. Just east of this, again, *livescens* has been collected in the Tuscarawas River of the Muskingum system by Dr. Sterki, and in at least one of the Tuscarawas branches. The *G. gracilor* Anth. of the Summit county lakes is plainly an offshoot of *livescens*, as indicated by connecting forms taken in this same region.

Goniobasis semicarinata, less variable and more easily recognizable even in the field than *livescens*, is the species of the Great Miami, Little Miami and the Scioto Rivers, all in the

Ohio River drainage. Between the Scioto and the Hocking Rivers is a fairly large stream known as Raccoon Creek. It is now polluted with mine waste and at the time of my visit to it three or four years ago I found no living mollusks in the creek, and only one or two dead Unios.

East of the Muskingum system is the Mahoning River and Beaver Creek, crossing the Ohio border into Pennsylvania. I know nothing of the *Goniobases* of these streams, but suspect that if any occur in them it is *G. pennsylvanica* Pilsbry, the *Goniobasis* of the upper Ohio rivers.

The chart of this distribution shows that *livescens* crosses the northern section of Ohio in the drainage of the Great Lakes and down two streams of the Ohio River drainage. *Semicarinata* occupies the three largest streams of the Ohio River drainage from the Scioto at about the center to the Great Miami, discharging at the southwest corner of the state.

If we grant that the same laws which have governed the re-peopleing of Lake Erie with Naiades have controlled in the case of *livescens*, this species entered the Maumee River through the Wabash, spread eastward to the Niagara and beyond. It managed—by means which the geologists might explain—to cross the divide between the Cuyahoga and Tuscarawas River, possibly thence into the Hocking.

Other species of *Goniobasis* than those mentioned have been recognized as occurring in Ohio, and other local races may yet be described, but I feel certain they can all only prove to be descendants of the two parent stocks, *livescens* and *semicarinata*.

SOME LARGE SPECIMENS OF ARGONAUTA.

BY CHARLES W. JOHNSON.

The largest species, or the largest example of a species, is always a subject of special interest, both to the biologist and the collector. Individual variation is not fully understood and cannot always be attributed to favorable or unfavorable environment, or the abundance or lack of nutrition. Individual variation has often led to arguments among conchologists as to

whether certain species dissolve their shells and construct new ones as their bodies increase in size.

A large example of an Argonauta in the collection of the Boston Society of Natural History has been frequently referred to in literature. At a meeting of the Society, held March 15th, 1854 (Proc. Boston Soc. Nat. Hist., vol. 5, p. 35), it was recorded that "Dr. A. A. Gould made some remarks upon the collection of shells presented to the Society by the family of the late Col. Perkins. * * * To one shell in particular he called attention, the large Argonauta, commonly called Paper Nautilus, and which is the largest specimen known to exist. Its measurements are $11\frac{3}{4}$ by $7\frac{1}{2}$ inches; the next largest specimen in the Museum of the College of Surgeons, London, measures $\frac{3}{4}$ of an inch less than this. This large specimen was brought from the Indian Ocean."

In the same vol., p. 370, this shell was again referred to under the title "On the Animal of the Argonauta Shell," by John C. Warren. He says: "The beautiful specimen of the *A. compressa* Blain. presented to the Society by Col. Thomas H. Perkins was also exhibited; this shell, which cost him \$500, is, according to Dr. Cabot who has made the comparison, the largest Argonauta shell in any cabinet in Europe or America. D'Orbigny in his great work gives as the measurements of the largest he has examined: greatest length of the shell $9\frac{1}{2}$ inches, while our specimen is 10 inches; greatest diameter of the opening $6\frac{1}{6}$ inches, in our specimen it is $6\frac{1}{2}$ inches; greatest width of the opening, including the auricular appendages, 3 inches, while in ours it is four inches."

In the Structural and Systematic Conchology, vol. I, p. 151, Tryon says: "The Boston Society of Natural History possesses an *Argonauta argo* or Paper Nautilus shell, which is said to have been purchased for \$500 by the gentleman who presented it to that Society. It is a common species, and the only reason for the great valuation of this specimen is that its diameter is about two or three inches greater than any other individual known to naturalists."

Tryon again refers to this specimen in the Manual of Conchology, vol. 1, p. 136. This specimen was later figured and

mentioned in the Bull. No. 9 of the Boston Society of Natural History, April, 1917, where the exact size, $10\frac{3}{4}$ in greatest diameter was given, as there was a discrepancy of $1\frac{3}{4}$ inches in the two accounts in the Proceedings. The writer is indebted to the Society for the use of the figure illustrating this article.

In regard to the nomenclature, it seems hardly necessary to enter into any discussion when we consider that we are not dealing with a true shell, but a shell-like structure confined to the female, and only in part a secretion of the mantle, for a portion of it is formed by the two expanded tentacles. Internal partitions are lacking and the structure serves as a nest for the eggs. Tryon, in the Manual of Conchology, places the Indo-Pacific *A. compressa* Blainville (*A. maxima* Gualt.) in the synonymy under *A. argo* Linn., of the Mediterranean. In the absence of a thorough knowledge of the animals it seems best to keep the various forms described from distant regions separate until such time as future investigations prove them to be either the same or distinct.

In this connection I would like to call the attention of readers to a rival of the above specimen. It is a very large example of *Argonauta nodosa* Solander, in the American Museum of Natural History, New York, and measures $8\frac{5}{8}$ by 11 inches. I am indebted to Mr. Arthur Jacot for these measurements.

SOME AURICULIDÆ AND PLANORBIDÆ FROM PANAMA.

BY HENRY A. PILSBRY.

The Panamic fauna has a particularly rich and interesting group of Auriculidæ. The following new forms were found among the species collected by Mr. James Zetek.

DETRACIA ZETEKI, n. sp. Figs. a, b, c.

The shell is oval with short, almost straightly conic spire and minute, mucronate apex; dusky buff, the spire, a band near the suture and another near the base, carob brown. Surface glossy, rather closely marked with ripples of growth. Whorls of the spire narrow and flat, the greatest convexity of the last whorl above the middle. Aperture extremely narrow, having a

white, lirate callus a short distance within the outer lip. The very short columella bears a thin, wide, entering and descending lamella. Above it, on the lower part of the parietal wall, there is a low, subtriangular callus. It is much more prominent in young than in adult shells.

Length 8.6, diam. 5, length of aperture 6.7 mm.; 11 to 12 whorls.

Panama City and Paitilla, near by.

This species is very peculiar by its many narrow whorls, very narrow aperture, and the large, inwardly descending columellar lamella. It seems remarkable that it was not found by Professor Adams, but nothing described in his catalogue agrees with it. Perhaps it is his unidentified No. 316.

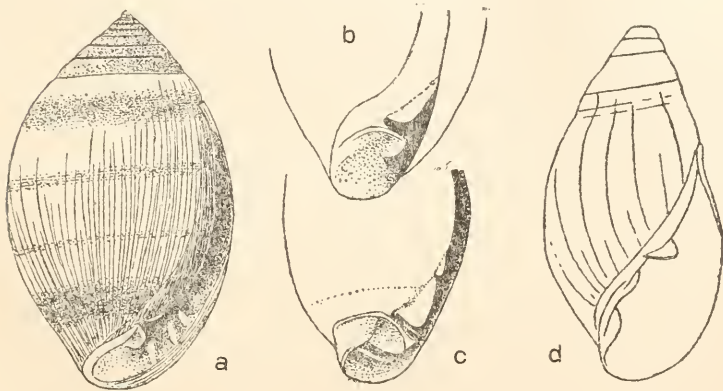


Fig. *a* represents the type; fig. *b* is the basal part of the same specimen rolled more towards the left. Fig. *c* is the lower part of a young specimen, to show the larger lamellae of that stage.

PHYTIA BREVISPIRA. Fig. *d*.

The shell is oblong-conic, not very solid, cinnamon-brown, glossy marked with weak growth-lines only. The spire is straightly conic, shorter than the aperture; whorls very slightly convex, the last somewhat concave below the suture, with one or two spiral lines in the concavity defining a wide sutural margin. The aperture is pinched in above, becoming moderately wide and rounded below, the outer lip thin, without in-

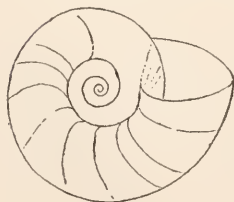
ternal folds or callus. There is a strong, deeply entering diagonal parietal lamella, a smaller one below it; columella terminating in a spirally entering lamella.

Length 8, diam. 4.1, length of aperture 5.1 mm. (fig. d, apex lost).

Panama City and Paitilla, near the city, collected by James Zetek, 1917. Also Taboga Island.

This species stands near *P. triplicata* (Anton) and *P. acuta* (Orb.) both of which have similar teeth. It is, however, decidedly narrower than the first, wider than the second, so that while I hesitate to add another species to this genus, it appears that none of those described will receive it. *Phytia rhoadsi* (Pils.), described as a *Marinula*, and *P. setifer* (Caop.) are more northern species, the former somewhat related to *P. brevispira*. In this species the aperture is longer than the spire, as in *Marinula*, but the other characters are decidedly those of *Phytia* (Alexia).

PLANORBIS ISTHMICUS, n. sp.



The shell is compressed, the thickness about one-third of the diameter, thin, very pale brown, somewhat transparent, glossy. Concavity of the right side showing three whorls and a central pit, that of left side shallow, showing $4\frac{1}{2}$ whorls, the last whorl more convex near the sutures, rounded peripherally, not deflected towards the left near the aperture. Sculpture of fine growth-lines, very distinctly decussated by fine spiral lines on the inner whorls, the spirals weak, in part obsolete, on the last whorl. The aperture is oblique, heart-shaped, the lip thin.

Diam. 10.5, alt. 3.7 mm.

Panama City, in Chinese wells. Collected by James Zetek, Sept., 1918.

Planorbis liebmanni Phil., *maya* and *orbiculus* Morel., are flatter shells, with

the spire wider. *P. boucardianus* Prest. has a more oblique

aperture, no spiral striation, and is smaller. *P. fieldii* Tryon is a much smaller shell without spiral lines, and higher relative to its diameter.

Probably all of this group should be regarded as toothless forms of *Planorbula*.

GUATEMALAN NOTES.

BY A. A. HINKLEY.

Coelocentrum gigas Von Martens, identified by Dr. H. A. Pilsbry as a dark variety,¹ is the largest land shell the writer ever had the pleasure of hunting. On Feb. 20, 1913, the first dead specimen was found by a large log in a banana field. Probably an hour was spent searching for a live one but without success. Leaving the banana field, I followed up a branch of the Cavech River to where it issued from the mountain side. The labor of working through jungle and over rocks was rewarded by finding the finest specimens of *Pachycheilus indiorum* which I secured. From here the return was around the side of another mountain, heavily wooded; on this mountain 5 living *C. gigas* were found. This was considered a great find.

The next day another place was visited beyond the mouth of the Cavech River to where the mountain came out to the shore of the gulf. After working through the thick undergrowth at the foot of a mountain, the vegetation was more open, making it easier to climb up or down. The first shell found was a fine *C. gigas* in the act of depositing eggs in a round pit about $\frac{3}{4}$ of an inch across, and probably a half-inch deep, scooped out of the mellow earth and containing 35 to 40 eggs.

The best part of the day was spent on this mountain, looking for these shells, of which 19 were secured. They were nearly always partly covered with leaves. No more nests of eggs were found, but others were seen which had been destroyed by some enemy.

¹ The specimens are not "yellowish gray," as von Martens described it, but between walnut brown and burnt umber.

LEPTINARIA LIVINGSTONENSIS, n. sp.

The shell is imperforate, oblong-conic, the length twice the diameter, pale yellow, composed of 6 moderately convex whorls. Apex rather obtuse, surface glossy, coarsely but weakly striate. The sharp outer lip is strongly arched forward at its upper third. Columellar plait strong, dividing the columellar margin into two arcs, the lower one slightly shorter and deeper. Parietal lamella present in the embryos of $1\frac{1}{2}$ whorls. It is quite strongly developed in some shells of 6 mm. long, wanting in others. In older shells it becomes very low, and not quite one-fourth of a whorl long; or in others it disappears entirely.

Length 9.5, diam. 4.7, aperture 4.5 mm. (lamella low).

Length 11, diam. 5, aperture 5 mm. (lamella minute).

Found in rubbish about the city of Livingston, Guatemala, with *Subulina octona*, taken February 19, 1913. This shell is about the same size as *L. tamaulipensis*, but differs from that species by having a parietal lamella and an imperforate umbilical region. The last whorl is less enlarged than in *L. lamellata*, *L. elisæ* or *L. convoluta*, which resemble this species in being imperforate with a lamellate parietal wall.

The small lot taken in 1913 seemed divisible into two species, according to whether a parietal lamella was present or not, but in the abundant series collected on the second trip, it appears that the lamella is variable, being present in many but not all immature shells, but always very low or wanting in the large ones.

SOME NOTES ON PHILOMYCUS.

BY V. STERKI.

In Ohio we had known only *P. (Tebennophorus) carolinensis* Bosc. Then a few *dorsalis* Binney were found here and there. Some years ago, near Chippewa Lake, Medina Co., I found two specimens of an entirely distinct species, as listed in the Ohio catalogue; the genitals, etc., remain to be examined. The slug may be the same as *P. pennsylvanicus* Pils., but closer comparison is necessary.

Fifteen and twenty years ago, in this vicinity, I found repeatedly a form which then was taken for one of the color variations of *P. caroliniensis*, although averaging larger, and unfortunately and stupidly I did not examine it exactly. Some time ago one specimen of exactly the same was found, with about a dozen *caroliniensis*, as described by Binney and W. G. Binney. It was evident at first sight that the animal is of a distinct species, and it may be one of those named by Rafinesque, as mentioned in W. G. Binney, *Man. Amer. Land Shells*, p. 247, but I have not the literature for comparing. In order to have a designation, it may be named *biseriatus*, provisionally the specimen was 70 mm. long when fully extended. The color, over most of the back, is brownish, not grayish, somewhat irregularly mottled, and not sharply defined towards the margins. On the back there are two parallel series of 10-12 irregular black spots, streak-like when the animal is fully extended, the largest in the middle, evanescent towards the anterior and posterior ends. Irregularly distributed, mainly along the outer side of each series are irregular "white" spots; that is, they appear whitish, but the ground color is a pale tan, and there are small dots, rather granules, of a glistening bluish white, and such dots are also distributed over the balance of the mantle surface. On each side, between the series of black spots and the lateral margin, there is another series of slightly marked, cloudy, dark spots, some of them barely visible. The sole is whitish without any color tinge, while in *caroliniensis* it has a rusty tinge from minute dots of that color, especially along the margins. Along the middle, mostly in the posterior part, there is an obscure line of dark, as it is also in *caroliniensis* and some other snails. The head and the posterior end of the foot are somewhat slate-colored, the eye peduncles darker. The whole body is different in appearance from that of *caroliniensis*, and somewhat more translucent.

This description may be imperfect, but I believe that any specimens of the same kind will be readily recognized from it. While the genital organs of two *P. caroliniensis*, of the same size, were fully developed, those of "*biseriatus*" will still quite rudimentary, and nothing could be made out of them. The jaw

was of nearly the same shape in both species, but that of "*biseriatus*" was dark-colored, from horn in the upper part to black at the cutting edge, while the jaw of *caroliniensis* is of a yellowish or reddish horn. The details of the surface must be compared with more material. The radula, with its anterior (older) end torn off, had 141 (+ . . .) rows of 45 + C + 45 teeth of rather the same shape as those of *caroliniensis*; only the mesodonts of the outer laterals (about 13th-25th) seemed larger and longer; one of the *caroliniensis* had 210 rows of 54 + C + 54 teeth.

As Mr. T. D. A. Cockerell suggested, some of the so-called color variations of *P. caroliniensis* may prove to be distinct species. This, and their interrelations, and those of variation, or varieties, should be carefully ascertained and also their distribution. It may be mentioned, in this connection, that *P. wetherbyi* W. G. Binney, originally known from Kentucky, has also been found in northern Michigan, as stated by B. Walker.

Scientifically it may not be justified to publish these rudimentary notes. But there is another reason for doing so. The season is already well advanced. These interesting slugs have been badly neglected, and our knowledge of them is still far from satisfactory. Besides, they are getting more and more scarce in consequence of deforestation of the land, and will disappear in many sections before long, and faster than most other snails. Therefore, every conchologist should pay special attention to anything in this line that can be found. And, to mention it again, by the way, the term "shells" is not the proper one to be used in books and catalogues; we should say mollusks!

With respect to the generic name, I agree with W. G. Binney that the forms and species known should be ranged under one genus, whether their jaws be ribbed or not, if there are no other more significant differences. The jaw of the Chippewa slug seems to be really intermediate between the "smooth" and ribbed forms. W. G. Binney rejects the name *Philomycus*, because Rafinesque did not correctly describe this genus under that name. There is hardly a conchologist who doubts now but that Rafinesque really understood the slugs under consider-

ation. In comparing them with *Limax* and *Arion*, he did not find the mantle shield much shorter than the body, and plainly evident, like the one of those slugs, and came to the conclusion that there was none at all; conceded that it was one of the careless things he was in the habit of doing. Also, if *Philomycus* was not the same thing as *Tebennophorus*, etc., the family name *Philomyceidæ*, in the sense as used, has no claim for recognition.

THE SHELL OF *PHILOMYCUS CAROLINIANUS* (BOSC).

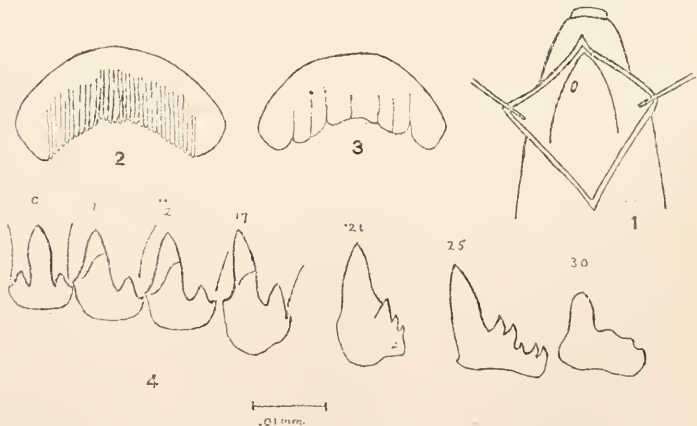
BY WILLIAM F. CLAPP.

Through the kindness of Mr. J. Henry Blake I recently received a specimen of *Philomycus carolinianus* (Bosc.), from Munsonville, N. H., to examine for internal parasites. On laying open the mantle preparatory to removing the stomach and intestine, I discovered a rudimentary shell. When first noticed, it was not attached, either to the mantle or to the inner membrane which covers the viscera, but was floating free in the liquid in which the dissection was made. From its position I believed it to have been dislodged from some portion of the posterior fourth of the animal, between the mantle and the inner membrane. Losing immediately all interest in possible internal parasites, I gave my attention entirely to the problem of the shell, in an endeavour to ascertain its exact position, and also to discover whether it is to be considered a constant, or merely an occasional character in this species.

From Dr. R. C. Rush, of Hudson, Ohio, I received fifty specimens (M. C. Z. 48211) of living *Philomycus* in excellent condition. The specimens in this lot show slight variation in color, the majority being of the typical pattern, of a yellowish-white ground color, variegated with brownish and blackish clouds and spots, forming three ill-defined longitudinal bands, one on the center of the back, and one on each flank. There are, however, three specimens easily separated from the rest because of the reddish tinge in the brownish clouds and spots. In these specimens (M. C. Z. 48211 H) the lateral bands are

lacking entirely, there being one broad dorsal band of darker reddish brown, bounded on each side by a narrow row of more or less connected black spots.

In the eighteen specimens of this lot examined, all possessed a rudimentary shell. In many cases, in spite of the greatest care in making the incision in the mantle, the shell had become dislodged from its normal position. In eight specimens it remained attached to the animal when found. In all of these specimens it was adherent to the outer surface of the inner membrane or peritoneum, and not connected in any way to the inner surface of the mantle. It also, in the specimens in which it remained fastened, was always in the posterior quarter of the animal, and over some portion of the liver. In two of the eight specimens it occurred on the left side, in two directly on top, and in four on the right side of the liver. The diagram (fig. 1) was made from a specimen (M. C. Z. 48211 H) measuring 40 mm. in length in a considerably contracted condition. On opening the mantle, the position of the shell was found to be 5 mm. from the posterior extremity of the animal and on



Figs. 1, 2, 3, *Philomycus carolinianus* (Bosc), Hudson, Ohio.

Fig. 4, *P. rushi*, n. sp.

the right side. It is of a light horn color, transparent, very iridescent, thin, delicate, wrinkled. It measures .5 mm. in length and .25 mm. in width. In appearance it greatly re-

sembles the periostracum of the shell of a *Limax maximus* which remains when the shell has been decalcified in weak acid.

In some of the shells extracted from specimens from Hudson, Ohio, a portion of the delicate membrane contains a few granules of what appear to be calcareous crystals. In outline the rudimentary shell is irregular, the membrane becoming very thin, delicate and transparent at the edge. In some specimens it was folded on itself, but the general tendency is for it to be oblong rather than oval, and in outline, not unlike the shell of *Limax maximus*. Specimens from the following localities were examined, in all but one of which the rudimentary shell was found.

<i>Spec's.</i>	<i>M. C. Z. No.</i>	<i>Locality.</i>	<i>Received from.</i>
1	18540	Isle au Haute, Me.	M. C. Z.
1	48207	Munsonville, N. H.	J. Henry Blake.
1	48217	Mt. Monadnock, N. H.	Dr. W. H. Dall.
2	42145	Duxbury, Mass.	M. C. Z. (shell not found in one).
1	48212	Tannersville, N. Y.	Dr. H. A. Pilsbry.
18	48211	Hudson, Ohio.	Dr. R. C. Rush.
2	48214	York Furnace, Pa.	Dr. H. A. Pilsbry.
2	48213	York Co., Pa.	Dr. H. A. Pilsbry.
4	48215	Wyoming Co., Pa.	Dr. H. A. Pilsbry.

This species was originally described as *Limax carolinianus* (Bosc, Hist. Nat. des Vers, suites à Buffon, ed Deterville, 1, p. 80, pl. 3, f. 1, 1802. Rafinesque (Annals of Nature, p. 10, 1820) gave the name of *Philomycus* to species which differed from *Limax*, principally, in being entirely destitute of a mantle. Rafinesque, however, made no mention of *Limax carolinianus* in this paper and it remained for Ferussac (Tab. Syst., p. 15, 1821) to place the species, which he spells *caroliniensis*, in Rafinesque's genus *Philomycus*. Binney (Bost. Journ. Nat. Hist., 4, p. 163, 1842), recognizing the fact that *carolinianus* Bosc. possessed a mantle covering the entire upper surface of the animal, removed the species from Rafinesque's genus *Philomycus*, where Ferussac had placed it, and made it the type of a new genus,

Tebennophorus, signifying "wearing a cloak". In diagnosing the genus, Binney states that it is "without testaceous rudiment". Wyman (Bost. Journ. Nat. Hist., 4, p. 411, 1844) and Leidy (Terr. Moll. U. S., 1, p. 250, pl. 3, 1851) in describing the anatomy of *Tebennophorus*, did not mention finding a rudimentary shell. W. G. Binney (Terr. Moll. U. S., 5, p. 179, 1878) specifies that *Tebennophorus* has no external or internal shell, and adds (p. 180) that "the internal, rudimentary, nail like shell, described by Dr. Gray, has not been noticed by any American author". Dr. Gray's description (Cat. Pulmon. Brit. Mus., part 1, p. 158, 1855) of the genus *Philomycus*, includes the statement, "Shell minute, nail like, concealed in the front part of the mantle". Yet (p. 155) in describing the tribe *Philomycina*, in which he places the genus *Philomycus*, he states, "Shell none". From Dr. Gray's description of the shell as being "nail-like", and "concealed in the front part of the mantle", I doubt that he had the shell of *Philomycus carolinianus*.

An examination of the jaw and radula of each of the specimens in which a shell was found, disclosed the fact that the jaw varies considerably in specimens apparently otherwise identical. In the fifteen specimens from Hudson, Ohio (M. C. Z. 48211), which I consider typical *carolinianus* (Bosc), as described by Binney, thirteen possessed a smooth jaw, with very faint longitudinal and transverse striae showing only when highly magnified. The remaining two were strongly plaited (figs. 2, 3). Of the three specimens (M. C. Z. 48211 H) separated from the others because of the reddish tinge of the mantle, the jaw of one was similar to fig. 2, the others were smooth. This plaiting of the jaw, although it may be felt with a fine needle, is not to be confused with the ribbing of the jaw as seen in *Pallifera dorsalis* Binney (Morse, Journ. Port. Soc. Nat. Hist., 1, p. 8, f. 5, 1864). That portion of the mouth which carries the jaw in *Philomycus carolinianus*, is always deeply furrowed, and it appears that these furrows may, or may not leave their impression upon the jaw. It is possible that the presence or absence of plaiting in the jaw may be entirely a question of age. In all of the specimens examined none of the other char-

acters showed noteworthy variation, and I have considered them all *P. carolinianus*.

It is worthy of record that the specimens which were sent to me in such excellent condition by Dr. R. C. Rush, were shipped in a small wooden box filled with damp, absolutely clean moss. Every specimen was alive. The slightest amount of dirt or dust in the material in which the specimens are packed is fatal. From one of Dr. Rush's letters I take the liberty of quoting some interesting notes regarding the habits of the species.

"It is very easy to collect specimens of this species, but very difficult to send them any considerable distance and have them live. If kept too moist they suffocate, and if allowed too much air they dry up. I have had five-inch specimens die in twenty minutes in strong sunlight. To keep specimens alive, place them on the under side of an old piece of bark on the basement floor, making certain that they are absolutely in the dark. Feed them with any fungi and they will live for months. Curiously the large specimens of this species are not found in damp places in northern Ohio. They are found here in high, dry, hard-maple and beech forests, on stumps and logs which have not decayed much, in pockets under the bark. They feed at night and go back to the same nest every morning. Very rarely one will find them feeding on the under side of fungi in daylight. It will interest you to know that nine of the specimens I am sending came from a crack in a log, seven inches long by two inches wide, and I left seven behind. They were packed in like sardines."

Philomycus russhi, sp. nov.

In alcohol, mantle smooth, drab gray above (Ridgway, Color Standards and Nomenclature, pl. 46, 1912), lighter on the sides, eye peduncles dark gray, eye spots black, tentacles, situated beneath and very slightly outside the eye peduncles, short, gray. Body terminating posteriorly in a sharp point. Foot narrow, half the width of the body, cream-white below, excepting at the anterior end, where it is dark red, fading at the posterior end. The separation of the foot from the body well defined. The body, showing at the sides between the foot

and the mantle, only as a narrow ridge at the posterior end, but broadening at the anterior, is also stained with red, darker at the anterior end. Respiratory orifice, small, on the right side, 2.5 mm. behind the anterior edge of the mantle, in the center of the narrow mantle furrow which curves upward and backward from the mantle edge. Total length 15 mm., width 3 mm.

Internal rudimentary shell large, similar to that of *P. carolinianus* (Bosc), 6 mm. from the posterior extremity, and fastened to that portion of the peritoneum directly above the ovotestis. Approximately 2 mm. in diameter.

The jaw is similar to that of *P. carolinianus* in shape, and in being but very slightly plicate.

The radula, fig. 4, consists of about 150 rows of teeth having a formula of 38-1-38.

The one specimen received in sufficiently good condition to examine the internal organs, was infested with two stages of parasitic Trematoda. Twenty of these were found in the vicinity of the lung, one beneath the shell, and one in the penis near the retractor muscle. Therefore the reproductive organs in this specimen may be in an abnormal condition, and on this account I refrain from figuring them. One of the most noticeable differences is the complete absence of any glandular portion to the cloaca, a large and constant character in *P. carolinianus*. The ovotestis is nearly black, in sharp contrast to the light-colored liver and other organs in the posterior portion of the animal.

Type M. C. Z. 48220. Hudson, Ohio, collected by Dr. R. C. Rush.

I have connected Dr. Rush's name with this species as a slight recognition of the care and perseverance he has exercised for many years in studying the life history of the land shells of Ohio.

Dr. Sterki (Proc. Ohio State Acad. Sci., 4, p. 377) describes a closely related species as "*Philomycus* sp. *pennsylvanicus* Pils.?" Dr. Sterki's species is similar to *P. rushi* in that it possesses a "sole tinged with blood red" but differs in being twice as large (30 mm. long), and in the jaw having "a num-

ber of rib-like irregular ridges". *P. pennsylvanicus* Pils. (Proc. Acad. Nat. Sci. Phil., p. 22, 1894) is described as being "smaller and less distinctly marked than *P. carolinensis*" and "having the jaw strongly ribbed", a description which could not be applied to *P. rushi*.

CLIMATIC CONDITIONS AS INDICATED BY LAND SHELLS ON THE
ISLAND OF OAHU.

BY J. J. GOUVEIA.¹

Since the early part of 1913 the writer and his brother A. Gouveia have been engaged in making a collection of Hawaiian land shells, both ground and tree. We have accumulated specimens of shells from nearly all valleys and ridges on the island of Oahu. We have complete data as to the exact locality and habits, so it can be seen that the writer has a good proof, from his series, of Gulick's theories of segregation or isolation. This idea has been written and followed out by many other collectors and students until it is well known in the scientific world. One of the best examples of this is seen in Dr. Cooke's paper on *Achatinella multizona*.

DISTRIBUTION OF *Achatinella cestus* FROM MANOA-PALOLO RIDGE TO WAILUPE-NIU RIDGE.—*Achatinella cestus* (Newcomb) is found mostly on lehua or one of its related plants having a rather large dark green and glossy leaf, on Ieie, Opiko and Lantana, and nearly always under leaves, with the exception of the Wailupe-Niu locality where they are found mostly on Lantana stems. They are nearly always found sealed. The only time they are found extended is when they are disturbed by wind or rain or accidentally brushed off, so they must be nocturnal as Dr. Cooke surmises (1).

They are very variable in color from white to very dark brown. They are lighter on the western part of the range and become darker towards the eastern part. The greater part of these shells have a white border band (2).

¹Contribution from the Gulick Natural History Club.

The writer has specimens from five different localities. Four of these localities are on ridges and the other in a valley. First locality, Manoa-Palolo Ridge: Fossil specimens in collection as catalogued, Cat. No. 487, four sinistral and No. 492 three sinistral, making a total of seven sinistral specimens.

Second locality, Palolo-Waiialae Nui ridge: Fossil and living specimens, Catalogue No. 61 nine dextral, No. 382 two dextral and two dextral fossil specimens not catalogued. Total, eleven dextral live specimens and two dextral fossil specimens.

Third locality, Waiialae-Nui valley: Catalogue No. 38 seven dextral specimens, No. 383 one dextral specimen, No. 39 seven dextral specimens. Total, fifteen dextral specimens.

Fourth locality, Waiialae Iki-Wailupe ridge: Catalogue No. 28, fifty-two sinistral specimens.

Fifth locality, Wailupe-Niu ridge: Catalogue No. 14, two hundred and twenty-two sinistral specimens.

Summary.

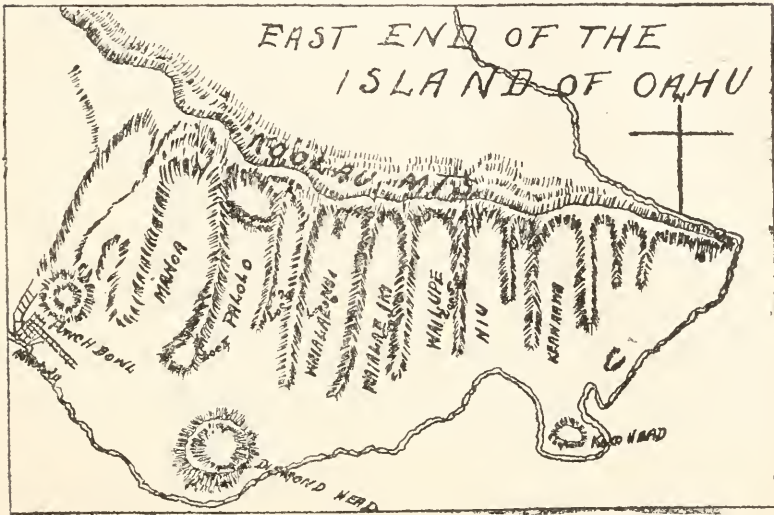
	Fossil.		Live.	
	Dextral.	Sinistral.	Dextral.	Sinistral.
1st locality . . .	—	7	—	—
2nd " . . .	2	—	11	—
3rd " . . .	—	—	15	—
4th " . . .	—	—	52	—
5th " . . .	—	—	—	222
Totals. . .	2	7	78	222

Thus it can be seen from the above given data the specimens increase in number from west to east, the first ridge having no live specimens and the last having the most. What does this signify? Does not this signify that since Diamond Head and Punchbowl came into eruption, climatic conditions have changed which resulted in the elimination of *cestus* from the neighborhood of the two now extinct volcanoes?

Now, in relation to the fossils found on location one, this is the nearest locality to Diamond Head; the second locality a little further away; the third still further; and the fourth and

fifth, the furthest of all, say about seven miles comparing with about two and one-half miles, locality one.

The fossils were found lower than the live specimens on the ridges, and as we go east the live specimens are found higher up on the ridges or further away from the lower limits as indicated by the fossils.



In 1916 while the Honolulu Water Works were digging a ditch for a pipe line, fossils of *Achatinella montaguei* and *buddi* were found by A. Gouveia buried about four feet deep in Manoa valley near Manoa tennis court. The *montaguei* is now extinct and the *buddi* nearly so in other localities. They are however extinct in the above given locality. These shells thrived very low once, and owing to the climatic changes the forest has disappeared, thus explaining the present distribution.

The strongest evidence yet is indicated by fossil ground shells, catalogue numbers 932 to 942 inclusive, *Leptachatina oryza* and a few other unnamed varieties which were collected on the western slope of Diamond Head, also catalogue Nos. 859 to 869 inclusive. *Amastrea transversalis* also *Endodonta* and *Leptachatina*, Nos. 972 to 975 inclusive, collected on the town side of

Punchbowl. These shells are frequent in occurrence and now extinct. Dr. C. H. Hitchcock gives a very good account of the geological occurrence or position of these shells on Diamond Head and Punchbowl (3).

We have also collected *Amastra* fossils from Kahuku, Moku-leia and Kwaihapai.

The cause of recent disappearance is the destruction of the forest, collecting by people, and ravages of cattle and goats. An example of this is found on Olomana where Dr. Gulick collected in or about 1850. In the fifties this peak was covered with forest which has disappeared. *Achatinella phæozona* was found on Olomana where it is not now found owing to the disappearance of the forest.

Papers referred to.

1. Cooke, C. Montague.—Distribution and Variation of *Achatinella multizonata* from Nuuanu Valley. Occasional Papers, Bernice Pauahi Bishop Museum, Vol. II, No. 1-5, pp. 65-76.

2. Thwing, E. W.—Occasional Papers of the Bernice Pauahi Bishop Museum of Polynesian Ethnology and Natural History, Vol. III, No. 1, 1907, pp. 13. Original Descriptions of *Achatinella*.

3. Hitchcock, C. H., and Dall, W. H.—Geology of Oahu, Bulletin of the Geological Society of America, Vol. II, pp. 15 to 60, February, 1900. Notes of Fossil Land Shells on pp. 54-55.

A NEW CYPRAEA FROM HAWAII.

BY J. M. OSTERGAARD.¹

CYPRAEA PACIFICA, n. sp. Plate 2, lower five figs.

Whitish to cream color, richly ornamented with chestnut-brown spots, evenly sprinkled over the dorsal surface; base, aperture and teeth, white; resembles *C. cernica* Sowb. in form, having in common with that species elevated and pitted mar-

¹ Contribution from the Gulick Nat. Hist. Club.



THE LARGE ARGONAUTA COMPRESSA



CYPRAEA PACIFICA OSTERGAARD

gins, though less pronounced; teeth small and delicately cut, not confined to aperture, all extending evenly over a narrow zone of the base.

The largest and the smallest of five specimens, dredged from Honolulu harbor channel in 1915, measure in length 20 and 14 mm. respectively. The shells were all dead, but in a good state of preservation.

Type, one specimen in the author's collection.

REVIEW OF THE THYSANOPHORA PLAGIOPTYCHA GROUP.

BY H. A. PILSBRY.

In the course of identifying specimens of this group from Mexico and Panama it became necessary to examine all of the material in the collection of the Academy, some 46 lots of from one to several hundred specimens each. As some synonymy is involved, it may be well to put the results on record.

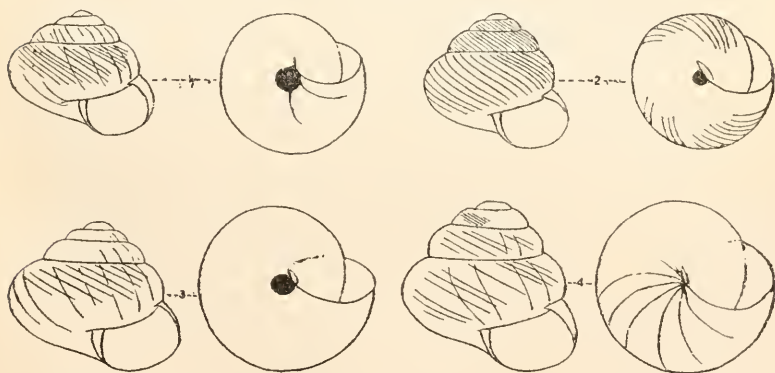


Fig. 1. *Thysanophora fuscula* (C. B. Ad.), Jamaica. Fig. 2, *T. plagioptycha* (Shuttl.), Humacao, Porto Rico. Fig. 3, *T. plagioptycha*, Fikahatchee Key, Florida. Fig. 4, *T. czecoides* (Tate), Panama City.

These forms were considered to belong to the genus *Acanthinula* by Strebel and some other authors. The sculpture, however, is only superficially like that genus, but exactly like such

typical *Thysanophoras* as *T. conspurcatella* and *hornii*. There are also species intermediate in shape, such as *T. fuscula* and *T. intonsa*, leading from the depressed to the conic forms. It would be easy to tell absolutely where these snails belong if specimens containing the animal were available.

Though not strictly germane to the subject of this paper, it may be mentioned that *Trichodiscina crinita* Fulton, Proc. Malac. Soc., London, XII, 240, from Colombia, is a species of *Thysanophora*. Some allied forms are known from Venezuela as well as from Mexico. It has about the shape of *T. conspurcatella* or *hornii*. The latter, when perfectly preserved, also has hairs.

THYSANOPHORA FUSCULA (C. B. Adams). Fig. 1.

Helix fuscula C. B. Ad., Contrib. to Conch. no. 2, 1849, p. 35.

Thysanophora fischeri Pilsbry, Proc. A. N. S. Phila. 1903, p. 763, pl. 49, fig. 6, 6a.

This Jamaican species has a wider umbilicus than others of the group, contained about 6.4 times in the diameter of shell. The figures are from a specimen from Adams, measuring: Alt. 2.15, diam. 2.55 mm., umbilicus 0.4 mm.

The sculpture of rather coarse growth wrinkles and minute, oblique, retractive cuticular threads, does not differ materially from that of *T. plagiptycha*.

I can see no material difference between the Jamaican shells and those taken near Victoria, Tamaulipas by S. N. Rhoads, and in the region of Tampico by A. A. Hinkley, and which I described as *T. fischeri*. In these the umbilicus is contained about 7 times in the diameter. When describing this form I did not think to compare with the Jamaican snail. Like some other minute species of the region, it will probably be found to be more widely spread than now known.

THYSANOPHORA PLAGIPTYCHA (Shuttleworth). Fig. 2.

Helix plagiptycha Shuttl., Mittheil. der Naturforschenden Gesellschaft in Bern, 1854, p. 37 (Porto Rico and Vièque).

Helix ierensis Guppy, Proc. Scient. Asso. Trinidad, 1869, p. 242; Amer. Journ. of Conch. VI, 1871, p. 307, pl. 17, fig. 4. Pfeiffer, Mon. Hel. Viv. VII, p. 549.

A specimen from Humacao, Porto Rico, which may be taken as type locality, is figured. It scarcely shows growth striae, but the oblique cuticular threads are very well developed, extending upon the base. The umbilicus is contained between 10 and 11 times in the diameter. Alt. 2.25, diam. 2.5 mm., umbilicus 0.23 mm.; $4\frac{1}{2}$ whorls.

The specimens from Florida (fig. 3, Fikahatchee Key) are often larger, diam. 3 to 3.2 mm., with the umbilicus slightly larger, $7\frac{1}{2}$ to 8 times in the diameter. The sculpture is rarely so perfectly developed (or preserved) as in the Porto Rico shells. It is a common species on the keys and in some places on the mainland, as at Miami and Osprey.

A single small example from Brownsville, Texas, has the umbilicus remarkably small, contained about 14 times in the diameter. It is more depressed than *T. cæcoides*. It may represent a distinct race, but further material is needed.

Guppy has recorded the species (as *Helix ierensis*) from Trinidad. Specimens are at hand from St. Lucia (Tate), Cariaco, Venezuela (F. R. Cocking) and the U. S. of Colombia (R. Swift coll.). All of these are rather openly umbilicate, like the most widely umbilicate Florida shells, but not as open as *T. fuscula*.

The late Mr. E. A. Smith, in his excellent paper on Trinidad shells (Journ. of Conch. VIII, p. 239), considered *plagioptycha* and *ierensis* synonyms of *fuscula* Ad., but while the difference is not great, I have been unable to trace a real transition in the size of the umbilicus, and for the present it seems best to recognize the distinction. I have seen but three Jamaican specimens, however.

THYSANOPHORA CÆCOIDES (Tate). Fig. 4.

Helix cæcoides Tate, Amer. Journ. of Conch. V, p. 153, Feb., 1870.

Helix guatemalensis Crosse et Fischer, Journ. de Conchyl. XX, p. 222, 1872; XXI, p. 274, pl. 9, fig. 3, 1873; Miss. Sci. Mex., Moll., II, p. 664, pl. 71, figs. 9-9b (Guatemala, Sarg.).

Acanthinula granum Strebel, Beitrag Mex. IV, 1880, p. 31, pl. 4, f. 13 (Plantage Mirador).

Yucatan: Progreso (Heilprin Exped. 1890). Guatemala:

Quirigua (W. P. Coekerell, 1912). Nicaragua: Chontales forest, in moss on trees (Tate, type of *H. cæcoides*). Rep. de Panama: Boco del Toro (Tate, in A. N. S. P.); City of Panama (James Zetek).

This species differs very little from *T. plagioptycha* or *fuscata* in size, general shape and sculpture, but is readily distinguished by the very small, partly covered umbilical perforation. The umbilicus, while small, is much larger in the other species.

Part of the type lot of *T. cæcoides* is in the collection of the Academy, No. 12159, received from Prof. Tate. The original figures of *H. guatemalensis* are hardly recognizable, but those in the Mexican monograph are fairly good. I am not quite sure that the East Mexican *Acanthinula granum* Strebel (1880) belongs to this species, but the photographic figure shows only a very small umbilicus as in *cæcoides*. This may be taken up when topotypes are available.

The locality records are all for specimens in the collection of the Academy. Specimens from Costa Rica are still wanting.

LAND SHELLS OF MAINE.

BY E. G. VANATTA.

While botanizing in Maine in 1916 Mr. Bayard Long collected leaf mould containing land shells at numerous localities. A list of these stations with brief statement of the conditions and the dates is given below, the locality being condensed to a single word in the following list of species.

While most of the species have been known from Maine, it is hoped that the list will have interest to those who may study the details of distribution in the State.

York Co.—In moist woods bordering the salt marsh at Kittery, viii, 11; in moist woods at York, viii, 9; at the edge of a spring rill on the border of the salt marsh at Wells, viii, 8; in moist thickets along a small stream at Limington, viii, 29.

Cumberland Co.—In a moist wooded gully near Steep Falls in Baldwin, viii, 28; around Sand Pond, Baldwin, viii, 30; Douglas Hill in Sebago, viii, 30.

Sagadahoc Co.—Back River Creek, Woolwich, ix, 15; near a marsh at Bowdoinham, ix, 9 and ix, 14.

Hancock Co.—In a deciduous woods near Green Pond, viii, 18.

Kennebec Co.—On wooded terraces along Kennebec River at Sidney, viii, 18.

Somerset Co.—On wooded terraces along Kennebec River at Fairfield, vii, 24.

Piscataquis Co.—Under logs and boards along the Piscataquis River at Abbott, viii, 15.

Penobscot Co.—On the wooded gravel terrace along Souadabscook Stream at Hampden, ix, 8 and ix, 11; from the wooded rocky ledge along the Penobscot River near Hampden Corner in Hampden, ix, 8; near the Penobscot River at Veazie, viii, 4; Orono, viii, 3 and viii, 24; in alluvial woods along the Penobscot River at Old Town, vii, 27; Otter Chain Pond at Milford, viii, 25; in moist river shore thickets at Winn, viii, 10.

Aroostook Co.—In rich woods near Maduxnekeag River at Monticello, vii, 12; in rich woods at Houlton, viii, 13, 1916.

Polygyra fraterna cava P. & V. Sebago, Sidney, Fairfield, Hampden, and Hampden Corner.

Strobilops labyriuthica Say. Kittery, Green Pond, Sidney, Fairfield, Abbott, Hampden, Winn, and Monticello.

Strobilops affinis Pils. Sebago.

Gastrocopta pentodon Say. Sidney, Abbott, Hampden Corner, and Winn.

Gastrocopta pentodon tappaniana Ad. Old Town.

Vertigo ventricosa Morse. Kittery, Green Pond, Fairfield, Orono, and Winn.

Vallonia excentrica St. Kittery and Orono.

Acanthinula harpa Say. Fairfield.

Columella edentula Drap. Sidney and Monticello.

Cochlicopa lubrica Müll. Bowdoinham, Sidney, Abbott, Fairfield, Hampden, Hampden Corner, and Orono.

Circinaria concava Say. Bowdoinham, Sidney, and Fairfield.

Vitrina limpida Gld. Kittery, Old Town, and Winn.

Polita hammonis Strom. York, Limington, Bowdoinham, Green Pond, Sidney, Fairfield, Abbott, Hampden, Orono, Old Town, Winn, and Monticello.

Polita binneyana Morse. Sebago, Sidney, Abbott, and Hampden.

Polita indentata Say. York, Green Pond, and Fairfield.

Paravitrea lamellidens Pils. Green Pond, Sidney, and Abbott.

Euconulus chersinus Say. Abbott.

Euconulus fulvus Müll. Sebago, Bowdoinham, Hampden Corner, and Winn.

Zonitoides arborea Say. Kittery, Sebago, Bowdoinham, Green Pond, Sidney, Fairfield, Abbott, Hampden Corner, Orono, and Monticello.

Zonitoides minuscula Binn. Sidney.

Striatura ferrea Mrse. York, Steep Falls, Green Pond, Sidney, and Houlton.

Striatura exigua Stm. Steep Falls, Sebago, Green Pond, Fairfield, Abbott, Old Town, Winn, Milford, and Monticello.

Striatura milium Mrse. York, Baldwin, Green Pond, Sidney, Abbott, Hampden, Old Town, and Winn.

Agriolimax campestris Binn. Orono.

Agriolimax agrestis L. Orono.

Arion circumscriptus Jhn. Orono.

Pyramidula alternata Say. Sidney, Fairfield, Hampden, and Hampden Corners.

Pyramidula c. anthonyi Pils. Kittery, Sidney, Fairfield, Abbott, Hampden, Orono, and Winn.

Pyramidula c. catskillensis Pils. York, Limington, Sebago, Fairfield, Abbott, Hampden Corner, Winn, and Monticello.

Pyramidula (Planogyra) asteriscus Mrse. Winn.

Helicodiscus parallelus Say. York, Steep Falls, Green Pond, Sidney, Abbott, Fairfield, Hampden Corner, Orono, Old Town, Milford, and Monticello.

Punctum pygmaeum Drap. York, Green Pond, Sidney, Fairfield, Abbott, Hampden Corner, and Winn.

Succinea retusa Lea. Bowdoinham and Fairfield.

Succinea ovalis Say. Kittery, Limington, Woolwich, Bowdoinham, Sidney, Fairfield, Abbott, Hampden, Hampden Corner, Veazie, Orono, Old Town, Milford, Winn, and Monticello.

Succinea arara Say. Limington, Bowdoinham, and Veazie.

Succinea aurea Lea. Wells.

Carychium exile canadense Cl. Sidney, Fairfield, Abbott, and Monticello.

Carychium exiguum Say. Bowdoinham, Old Town, and Winn.

ANCYLUS OBSCURUS HALDEMAN AND SPECIES REFERRED TO IT.

BY BRYANT WALKER.

I.

The available information down to 1903 in regard to Halde-
man's species was summarized in my paper in the NAUTILUS,
XVII, p. 25. The re-discovery of *A. obscurus* by Goodrich in
1913 (NAUT., XXVII, p. 92) in the South Fork of the Powell
River at Big Stone Gap, Wise Co., Va., has enabled the specific
standing of that species to be definitely determined and given
a basis for comparison with other forms that have been referred
to it.

Through the courtesy of Miss Crystal Thompson, the Curator
of the Amherst College Museum, I have been able to examine
all of the *Ancylidæ* in the C. B. Adams collection. This
material with some other in my own collection obtained from
different sources has enabled me to come to conclusions, more
or less definite, in regard to the recorded citations of Halde-
man's species in Florida and the West Indies.

The doubt expressed by Bourguignat, Tryon and Clessin as
to the correctness of the West-Indian citations proves to be
fully justified.

In the Adams collection are two lots labeled "*A. obscurus* ?
Hald." These contain three very distinct species, none of
which is *obscurus*. They will be considered separately.

One of these, however, is identical with a set in my own col-
lection received as "*A. obscurus*" from Sowerby and Fulton
and these again are the same as a set in the MacAndrew collec-
tion labeled "*A. chittyi* Ads." from Guadeloupe. The original

label is with these specimens, but I have not been able to identify the handwriting. It is quite possible that they came from Marie as MacAndrew had considerable material from the Marie collection. These shells do not at all agree with Adams' description of *chittyi* nor with the figure of that species given by Bourguignat in the *J. de Con.*, IV, 1853, p. 172, pl. VI, fig. 10. Unfortunately Bourguignat does not state whether his figure was drawn from the unique type in the Chitty collection or not. It seems possible that the citation of *obscurus* from Guadeloupe by Fischer in 1853, which Mazé in 1883 states had not been verified to his knowledge, may have been based on similar specimens. Curiously enough, however, I have a specimen of this same species received from Geret of Paris as from the Crosse collection, which has no specific name attached whatever.

The citation of *A. obscurus* from St. Thomas rests entirely upon Shuttleworth's citation in his "Catalogue of the Terrestrial and Fluviatile Shells of St. Thomas" (*Ann. Lyc. Nat. Hist.*, N. Y., VI, 1854, p. 72) and repeated in his paper on "The Land and Fresh-water Shells of Porto Rico" (*Diag. Neuer Moll.*, No. 6, 1854, p. 99). Shuttleworth expressly states that he relied on Adams' identification for the name. In the Adams collection is an unidentified set of a small *Ancylus* from St. Thomas received from Bland and, no doubt, collected by him on his visit to that island in 1852, which is entirely different from Haldeman's species. Bland in his notes to Shuttleworth's paper (1. c. p. 68) states that he had sent to Shuttleworth specimens of all the species that he had collected on St. Thomas and, though it is possible that Shuttleworth's specimens were received from his own collector, Blauner, it is probable, especially as he relied on Adams' identification, that were received from Bland and, if so, were, no doubt, part of the same lot in the Adams collection.

As suspected at the time and intimated in my paper (1. c. 26) the Floridan species referred to *obscurus* by Dall is quite different also.

I have not been able to obtain any additional information in regard to the species from Porto Rico referred to *obscurus* by

Shuttleworth (1. c. p. 98). But it is very improbable that it is really Haldeman's species.

All this leads to the very definite conclusion that *A. obscurus* Hald. is restricted to the head-waters of the Tennessee system in Virginia and Tennessee and does not occur in Florida or the West Indies.

Clessin (Con. Cab., *Ancylus*, p. 14) designated *A. obscurus* as the type of his group, *Haldemania*. As both the genuine *obscurus* and the species that he took for it are *Lævapices* it is immaterial which should be considered to be his type. *Haldemania* having been preoccupied by Tryon (1862), Clessin's name can not be used and must fall into the synonymy of *Lævapex*.

II.

FERRISSIA (LÆVAPEX) OBSCURA (Hald.).*

Ancylus obscurus Haldeman, Mon., 1844, p. 9, pl. I, fig. 5; W. G. Binney, L. and F.-W. Shells, Pt. II, 1865, p. 139, fig. 232.

Haldeman's unique type came from the Nolachucky River, below Greeneville, Tenn. It measured: Length 5, width 3.5, alt. 1.5 mm. I have before me three specimens (Coll. Walker, No. 36292) collected by Goodrich in the South Fork of the Powell River at Big Stone Gap, Wise Co., Va. They measure respectively: Length 6.5, width 5, alt. 2.5 mm.; length 6.3, width 4.5, alt. 2 mm.; length 5.3, width 4, alt. 1.5 mm.

It will be noticed that the dimensions of the smallest specimen agree quite exactly with those of Haldeman's type. It also agrees in other particulars with his description and I have no doubt but that it is the same species. If so, the type was not fully matured and the largest specimen given above and to be figured hereafter represents the fully matured form. As shown by the figures it is an obovate shell, broadly rounded anteriorly and regularly, though more narrowly, rounded posteriorly, the lateral margins being about equally curved; the

* The species will be figured in connection with the concluding part of this paper.

anterior slope is nearly straight; the posterior slope slightly concave; the left lateral slope nearly straight or only slightly convex and the right lateral slope concave; the apex is obtuse, smooth except for concentric wrinkles, situated nearly on the median line, slightly turned toward the right and at about one-third of the length; the lines of growth are fine, but distinct and regular, the surface is somewhat obsoletely wrinkled towards the margins, but there are no indications of radial striæ; the color is a yellowish horn-color, slightly tinged with green.

Compared with *F. diaphana* (Hald.) and *F. kirklandi* (Walk.) to which it is most nearly related, it is less circular in outline, the apex is more prominent, the lateral and posterior slopes are unlike and the color is different from the former, and it is less elongated and has the apex more obtuse and less excentric than the latter.

So far as appears from the small series examined, it would seem to be clearly entitled to specific distinction.

III.

FERRISSIA (LÉVAPEX) DALLI, n. sp.

? *Ancylus obscurus* Clessin, Con. Cab., *Ancylus*, 1882, p. 19, pl. VI, fig. 4.

Ancylus obscurus? Walker, NAUT., XIII, 1903, p. 26, pl. I, figs. 16-18.

Type locality, Lake Helena, Volusia Co., Fla.

Type No. 25521 Coll. Walker. Cotypes in the collection of A. A. Hinkley.

The doubt expressed in my paper of 1903 (l. c.) as to the identity of the Floridan species referred to *obscurus* Hald. by Dall proves to have been well taken. As shown by a comparison of the description and figures given in 1903 as cited above and those of the genuine *obscurus* herein, the Floridan species is entirely different and is more closely related to *F. peninsulæ* (P. and J.) than it is to *obscurus*.

I have already (l. c.) called attention to the resemblance of the shell described and figured by Clessin as *A. obscurus* to this form. He gives no information as to the history of the speci-

men figured, but it is so different from the genuine *obscurus*, that I have but little hesitancy in referring it to this species.

As the Floridan form is a well-marked and distinct species, it must be recognized and I take pleasure in associating with it the name of Dr. Dall, who first called attention to its occurrence in Florida.

(*To be continued.*)

A NEW SPECIES OF MITRA FROM CALIFORNIA.

BY WM. HEALEY DALL.

MITRA ORCUTTI, new species.

Shell small, white, mottled with yellow brown, with five whorls of which the white smooth blunt nucleus comprises one; suture distinct, whorls moderately convex; spiral sculpture of (between the sutures four, on the last whorl about a dozen) strong rounded close-set cords closely undulated behind the periphery by numerous low narrow axial riblets with about equal interspaces; the cords in front of the periphery are not undulated, but extend to the end of the canal; there are also very fine axial striae in the interspaces; aperture narrow, simple, the pillar with two plaits, the canal hardly differentiated. Height of shell 5.6; of last whorl 2.6; diameter 2.7 mm. U. S. N. Mus. Cat. No. 334567. La Jolla, near San Diego, Cal.; C. R. Orcutt.

CHANGES IN WESTERN MOLLUSCAN FAUNAS.

BY JUNIUS HENDERSON.

In 1889 Professor T. D. A. Cockerell (*Jour. Conch.*, VI, 61) reported the following species as obtained by Mr. Charles T. Simpson in Lodgepole Creek, Northeastern Colorado:

Lampsilis anodontoides (Lea).

Lampsilis ventricosa (Barnes).

Lampsilis luteola (Lam.).

Anodonta grandis gigantea Lea.

Except the *Anodontu* these species have not yet been recorded anywhere else in Colorado, though we have in the University of Colorado Museum unreported specimens of the *Anodontoides* from Julesburg, Denver and Boulder. Possibly *Lampsilis* no longer lives in the State. In 1912, in company with Dr. Max M. Ellis, I visited Lodgepole Creek and searched the stream from the northern state boundary to its junction with South Platte River. We found no Unionidae except some dead shells of *Anodontoides*. Perhaps that species was still living in a deep pool a few rods south of the state boundary, though in seining it for fishes we found none. A rancher near by told us there were "clams" in the pool. The rest of the stream was shallow and so narrow one could step or jump over it in most places. Probably later in the summer of dry, hot seasons, when the natural flow was diminished and the demand for irrigation water is great, it may entirely dry up in its lower course. I wrote to Mr. Simpson, calling his attention to present conditions and the evident disappearance of the *Lampsilis*, and asking what the conditions were when he was there. He replied that as he recalled it the creek was then from 6 to 10 feet wide, but that the taking of water from the South Platte for irrigation had caused the river to go dry at Julesburg during his three years residence, and suggesting that the same thing had likely since happened in the creek. This seems exceedingly probable. Mr. Simpson also added: "The *Unio anodontoides* is probably *Lampsilis fallaciosus*, not then recognized." My intention in 1912 was to publish an account of our experience, but it was side-tracked and finally passed out of mind. It has recently been brought forward by finding in the report of the Fremont Expedition, 1845, p. 25, the statement that on July 6, 1842, Lodgepole Creek was a "clear, handsome stream" (hence at low water stage), with a "uniform breadth of twenty-two feet and six inches in depth." This confirms the supposed diminution of water in the stream in recent times.

In 1906 the bed of the lower portion of Crow Creek, east and northeast of Greeley, Colorado, was dry, except just after storms, the water percolating through the deep sand in the channel, a characteristic of many western streams. Up stream, just above

where the water disappeared, was a series of clear, rather deep pools, called "water holes," connected by a tiny, clear rivulet. In one of these pools was collected that year the type lot of *Sphaerium hendersoni* Sterki. Then came the "boom" in dry lands in Eastern Colorado. Scores of small tracts of prairie sod, many of them on steep slopes, were broken by the settler's plow. The dry soil, no longer held together by the sod, was carried into the valley by summer storms, filling many of the pools and depositing a thick coat of mud over the whole stream bed. In June, 1912, I revisited the locality, and found no clear water at all, and not a single mollusk of any species. The sluggish stream carried a heavy load of silt so fine it would not settle. Probably the *Sphaerium* is extinct at the type locality.

It is likely that innumerable changes in the faunas of the West are occurring as a result of the settlement of the country and consequent changes in environment. This is known to be true of birds and mammals. For this reason it is desirable that biological work in this vast region be pushed as rapidly as possible, to provide data for future estimates of biological changes.

NOTES.

HODGSON COLLECTION. I have just secured the collection of the late Chas. S. Hodgson, containing some 2500 to 3000 species, a few fossils and books. Besides his work in Illinois he did considerable collecting in other places and added to the collection by exchange and purchase.—A. A. HINKLEY.

DR. G. DALLAS HANNA, who for eight years has been an assistant in the United States Bureau of Fisheries, has been appointed curator of invertebrate paleontology in the California Academy of Sciences. Dr. Hanna has for seven seasons been engaged in scientific work on the Pribilof Islands, Alaska, having taken the census of the fur seal herd for five consecutive years. He brings to the museum of the Academy his collection of mollusks which numbers about 100,000 specimens.

FLUKE IN PHILOMYCUS. It may be of interest to the readers

At the University of California, the following is published in the Journal of the University of California, July 1, 1900. The following is a list of the names of the authors of the papers published in the Journal of the University of California, July 1, 1900. The names of the authors are given in the order in which they appear in the Journal. The names of the authors are given in the order in which they appear in the Journal. The names of the authors are given in the order in which they appear in the Journal.



Fig. 1. a, b, c, showing the structure of the specimens.

CONTENTS

The following is a list of the contents of the Journal of the University of California, July 1, 1900. The contents are given in the order in which they appear in the Journal. The contents are given in the order in which they appear in the Journal. The contents are given in the order in which they appear in the Journal.

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Stenopoda and the *Stenopoda* of *Stenopoda*. By H. J. Brown and L. J. Ann. *Ann. Mag. Nat. Hist.* vol. 49, pp. 115-116, text-figs. (1912).

Notes on Two Groups, *Latreillea* and *Leptostomatella*. By D. S. Sowerby and G. Kroyer. *Ann. Mag. Nat. Hist.* vol. 51, pp. 177-178, text-figs. (1913). *Stenopoda* and *Leptostomatella*. By G. Kroyer. *Ann. Mag. Nat. Hist.* vol. 52, pp. 177-178, text-figs. (1913). The description of *Stenopoda* is the most recent of *Stenopoda* and *Leptostomatella*.

The genus *Stenopoda* and *Leptostomatella*. By A. Sowerby, with notes on the *Stenopoda* of the British Islands. By G. Kroyer. *Ann. Mag. Nat. Hist.* vol. 53, pp. 177-178, text-figs. (1914). The description of the genus is the most recent of the *Stenopoda* and *Leptostomatella*. The *Stenopoda* and *Leptostomatella* are described, with notes on the *Stenopoda* and *Leptostomatella*. The *Stenopoda* and *Leptostomatella* are described, with notes on the *Stenopoda* and *Leptostomatella*. The *Stenopoda* and *Leptostomatella* are described, with notes on the *Stenopoda* and *Leptostomatella*.

Stenopoda and *Leptostomatella*. By G. Kroyer. *Ann. Mag. Nat. Hist.* vol. 54, pp. 177-178, text-figs. (1915). The description of the genus is the most recent of the *Stenopoda* and *Leptostomatella*. The *Stenopoda* and *Leptostomatella* are described, with notes on the *Stenopoda* and *Leptostomatella*. The *Stenopoda* and *Leptostomatella* are described, with notes on the *Stenopoda* and *Leptostomatella*. The *Stenopoda* and *Leptostomatella* are described, with notes on the *Stenopoda* and *Leptostomatella*.

Stenopoda and *Leptostomatella*. By G. Kroyer. *Ann. Mag. Nat. Hist.* vol. 55, pp. 177-178, text-figs. (1916).

Description of the new species and a new sub-genus of *Stenopoda*. By G. Kroyer. *Ann. Mag. Nat. Hist.* vol. 56, pp. 177-178, text-figs. (1917). A new *Stenopoda* (*Stenopoda*) and a new sub-genus and species of *Stenopoda* (*Stenopoda*) are described and figured.

Stenopoda and *Leptostomatella*. By G. Kroyer. *Ann. Mag. Nat. Hist.* vol. 57, pp. 177-178, text-figs. (1918).

The *Stenopoda* and *Leptostomatella* are described, with notes on the *Stenopoda* and *Leptostomatella*. The *Stenopoda* and *Leptostomatella* are described, with notes on the *Stenopoda* and *Leptostomatella*. The *Stenopoda* and *Leptostomatella* are described, with notes on the *Stenopoda* and *Leptostomatella*. The *Stenopoda* and *Leptostomatella* are described, with notes on the *Stenopoda* and *Leptostomatella*.

On the generic names for two British Ellobiidae [olim Auriculidae]. Myosotis, Draparnaud, (= denticulatus Montagu) and bidentatus, Montagu. By A. S. Kennard and B. B. Woodward, pp. 136-139.

E. Forbes's notes in his copy of S. Lovén's Index Molluscorum Scandinaviarum occidentalia habitantium. By A. Reynell, pp. 140-141.

On Opeas strigile (M. & P.) and its allies. By M. Connolly, pp. 142-144, 4 figs.

Addendum to remarks on the recent species of Morum, Bolten. By J. C. Melvill, p. 145.

Notes on the non-marine Mollusca observed in East Ross and the Orkney and Shetland Islands. By K. H. Jones and A. S. Kennard, pp. 146-152.

Description of Ampullaria mermodi, n. sp. By G. B. Sowerby, pp. 152-153, with fig.

On Ammonites navicularis Mantell. By the late G. C. Crick, pp. 154-160, pl. 4.

On a Sandstone cast of Aturia aturi (Basterot), from the miocene of Western Australia. By R. B. Newton, pp. 160-167, pls. 5, 6.

The Mollusca of Marsascirocco Harbor, Malta. By G. Despott, pp. 168-183, with map.

THE JOURNAL OF CONCHOLOGY, VOL. 16, No. 2, AUGUST, 1919.
Brachypodella oropouchensis, nov. sp. from Trinidad, W. I. By Geo. C. Spence, pp. 42-43, pl. 1.

Tropidophora standeni, nov. sp. from Madagascar. By Geo. C. Spence, p. 43, pl. 1.

Field Notes on Helicodonta obvoluta Müll. By H. Beeston, pp. 44-50.

Spirula peroni Lamarck in North Devon. By Alan Gardiner, p. 50.

Occurrence of Hartmannia septemspiralis and H. patula in England. By H. C. Huggins, pp. 51-52.

Genitalia of Azeca tridens and Cochlicopa lubrica. By A. E. Boycott, pp. 53, 54, figs.

Parthenogenesis in Paludestrina jenkinsi. By A. E. Boycott, p. 54.

Sinistral Limnaea pereger Müll. and its progeny. By J. H. Hargreaves, pp. 55-57.

Notes on Limnaea pereger m. sinistrorsum. By W. H. Hutton, pp. 58, 59.

On a colony of Cochlicopa lubrica Müll. By S. S. Pearce, p. 59.

Note on the reproduction of Obeliscus obeliscus. By Geo. C. Spence, p. 67.

THE NAUFILUS, XXXIII.



NAVAJO MOUNTAIN :
Arizona-Utah line

From American Botanist, Phot. U. S. G. 90, Survey

THE NAUTILUS.

Vol. XXXIII

APRIL, 1920.

No. 4.

THE NAVAJO NATION.

BY JAS. H. FERRISS.

Sixty miles west of the corner post of Arizona, New Mexico, Colorado and Utah, the 1919 summer class in archæology, Arizona University, encamped at the foot of Navajo Mountain. Here is the greatest number of ancient cliff cities and villages and the greatest of known natural bridges. In scenery, colors, heroic size and architecture, it is Grand Canyon in character. Navajo Mountain astraddle the Arizona-Utah line stands on the south rim of the Grand Canyon, a short distance above Marble Canyon and Lee's Ferry.

In reality the region from the Mesa Verde National Park, Colorado, on the east, to the Zion National Park, Virgin River, Arizona, on the west, it is something of a wonder-spot of the world, and all of it astonishing. The greater cliff ruins, Mesa Verde, Keet Seel, Betatakin and many others as interesting; the Monument Park, a plateau of natural pinnacles and steeples, and the Chinle and Canyon de Chelly valleys are along the eastern border. Then westward lie the painted deserts, petrified forests, the Grand Canyon, the Kaibab forest, underground lakes of Kanab, lava cones of Mount Trumbull, Hurricane Fault, Grand Wash, canyons of Virgin River, plains of wild horses and the largest Indian population in the United States still living in the Indian way. Except to the explorers, archæologists, geologists and mineralogists it is the great unknown of America, and the farthest from a railway.

Dr. Byron Cummings, dean of archæology, Arizona Univer-

sity, and his explorer-companion, John Wetherill, post-trader and postmaster at Kayenta, Ariz., have explored and studied conditions here at this eastern border for more than twenty years, and by right of discovery (as in conchology) should have their names attached to the greater number of ruins and bridges, for they have been the first discoverers, scientifically. Herbert E. Gregory¹ for the government has made a thorough geologic survey of this eastern section covering the Navajo nation, some 22,725 miles. Others before Gregory have written and surveyed, but he is the latest and best authority. Col. Roosevelt and his boys, Zane Grey, the Kolb Brothers and other strenuous persons have visited the Rainbow Bridge but not over 150 white people all told have made the journey. Thus to the students in botany, archæology, conchology, entomology and the reptile hunters, it is a field of great promise. The health seeker and tourist will soon follow, and with profit.

The Indian population of the Navajo country as estimated in 1912 was 32,000, of which 30,016 were Navajo, 2,272 Hopis ("Moquoi" is a Navajo nickname for the Hopis), and 200 Piutes and 521 white Indian agents, teachers and traders. North of the San Juan River in Utah and Colorado adjoining is another large reservation of Utes.

From a high elevation this country appears to be and it is a plateau formation. The average elevation is about 5,500 feet above the sea. The mountains rise above and the canyons fall below this level. To the traveler negotiating the sand dunes, diving into water-worn gulches, and sliding over the wind-swept bed rocks, the plateau definition may seem a gross exaggeration. However it is a plateau, 32 per cent. from 6,000 to 7,000 feet, and 10 per cent. from 7,000 to 9,000 feet above sea level. The water of the Colorado River is but 3,400 feet at this point, and in a distance of eight miles to the peak of Navajo Mountain, 10,416 feet, a horizontal difference of 4,016 feet.

The mean annual rainfall at eight stations in and around the

¹ Geology of the Navajo Country, Arizona, New Mexico and Utah. By Herbert E. Gregory, 1917, U. S. Professional Paper, 93. Also by the same author, The San Juan Oil Field, Bul. 431.

Nation runs from 5 to 13 inches, but the variation by months or years shows a wide range, varying from one-half to twice the average. Over one-third of the rainfall may be credited to July, August and September; about 12 per cent. to April, May and June.

(To be continued)

ON THE MARINE MOLLUSCA OF STATEN ISLAND, N. Y.

BY ARTHUR JACOT.

During the past summer I was enabled to continue a study of the shells to be found along the southeast shore of Staten Island working beyond the region reported upon in the January (1919) number of "THE NAUTILUS."

A week was spent at Great Kills Bay and vicinity. This bay was formed by a sand-spit dropped by the lower New York Bay waters as they struck the current of the Kills which flow out at this point. Though half a mile narrower than its width (one mile), the bay is very shallow; the upper section, enclosed by high grasses except at the base of the sand-spit, is but two feet deep at low tide and covered with eel-grass, while the lower section is lined on the land side with cottages, hotels, piers, etc., is free from eel-grass, averages six to seven feet deep at low tide and is choked with launches and oyster boats. Throughout its extent, the bottom is formed of a soft, sticky clay, which mixes readily with the water. Due to this clay, the number of gasoline boats, and possibly the sewers near the entrance, the molluscan fauna consists of the hardiest species only.

Although we diluted and strained clay for hours at a time at the stations indicated, we found very few species. At one locality, dug-up clay mixed with a little sand yielded shells which from their leached-out appearance might be considered fossil. These fossil shells were much more numerous than those found above them on the surface. *Barnea truncata*, whose valves I have found in abundance lying on the bottom of the upper part of the bay a year and a half before, was not noticed.

Alectrion obsoleta was everywhere very abundant, the shell reaching a length of an inch, and occasionally having the surface largely eaten away. One was found with a prominent, biangulate carina just above the center of the body whorl so that it appears immediately above the suture on the penultimate whorl, becoming obsolete half way around that whorl. The other shells found, not including the countless fragments, were:

Macoma balthica (Linné) few, mostly young.

Mya arenaria Linné few, mostly young,

Odostomia impressa (Say) few.

Odostomia trifida (Totten) fairly common.

Odostomia bisturalis (Say) few.

Crepidula fornicata Linné occasional.

Paludestrina minuta (Totten) rare.

Lacuna vineta fusca Gould one.

The fossil shells include:

Mya arenaria (Linné) few.

Crepidula fornicata Linné few.

Crepidula glauca convexa Say few.

Crepidula plana Say rare.

Bittium alternatum (Say) The only specimen found measures 7.25 mm. in length by 2.5 mm. in width and has eight closely crowded spiral bands on each of the last two whorls.

Alectrion obsoleta (Say) abundant.

Alectrion trivittata (Say) few.

Urosalpinx cinerea (Say) occasional.

At the base of the sand-spit there is a small influx of sand where the waters of the bay have been cutting across during the last two or three years, and a new fauna is being introduced consisting of:

Venus mercenaria Linné young.

Gemma gemma purpurea (H. C. Lea) abundant.

Mya arenaria (Linné) few.

Ensis directus (Conrad) few.

Crepidula fornicata Linné few.

Alectrion obsoleta (Say) occasional.

Alectrion trivittata (Say) common.

Eupleura caudata (Say) few.

Urosalpinx cinerea (Say) occasional.

The sod-bank or *Modiolus demissus* association was to be found on any clay or hard-mud bank exposed between tides. This association consists principally of *Modiolus demissus plicatulus* packed tight one against the other or separated by *Mytilus edulis* packed just as closely, over both of which crawl *Litorina littorea* and *L. rudis*. *Modiolus demissus demissus* is found very thinly scattered among the individuals of the northern form. That the southern variety was once the predominant form over this area is evident from the fact that the sod banks on which *plicatulus* is now living contain the dead valves of the southern form exclusively, in large numbers and buried to a depth of 8 or 10 inches below the surface in company with *Mya arenaria*. I do not think the two forms interbred.

Half a mile southeast of the bay where there is a stone jetty running out into water four to five feet deep at low tide, the rocks and bottom were searched but with very discouraging results. The water all along this section of the island is heavily laden with fine mud from the red dirt characteristic of that part of the island. This we believe to be the reason for the scarcity of mollusca along the beaches southeastward. A shattered but uneroded and still united pair of valves of *Modiolus modiolus* (Linné) were found at Seaside Beach.

Our survey of the island showed the north and northeast shore of the island to be rocky and built over by commercial interests. From Fort Wadsworth to Prince's Bay (the southeast coast) there are sandy beaches interrupted by sod-banks. As one progresses southeastward these beaches become more and more rocky to Prince's Bay, from which point and around the southern end of the island the shore is characteristically rocky. The remaining (western) coast line is lost in a maze of salt marsh. Thus there are but two places along the southeast coast of Staten Island where Mollusca are of special interest, namely, the sand flats between South and Midland Beaches and the complex about the base of the Great Kills Bay spit. The southern end of the island was not studied.

In connection with this work I have endeavored to learn what work has already been done on the Mollusca of Staten Island. The literature is as follows:

Wheatley, Charles M., Catalogue of the Shells of the United States and their Localities, 12 pp., 1842 & 1845.

Eleven species are here listed as coming from S. I., of which *Periploma leanum*, *Pandora gouldiana*, *Lyonsia hyalina* and *Astarte castanea* are mentioned as fairly common or abundant. The last one I have not as yet found on the island although it is found on the Long Island ocean beaches in increasing abundance with distance from the city.

DeKay, James E., Nat. Hist. of N. Y., Zoölogy of N. Y., Mollusca, 271 pp., 40 pls., 1843.

Pandora gouldiana, *Pholas truncata*, *Odostomia trifida*, *Columbella avara* and *C. lunata* are recorded from the island on the authority of Wheatley.

Hubbard, Eber¹ Ward & Smith, Sanderson, Catalogue of the Mollusca of Staten Island, Annals of the Lyceum of Nat. Hist. of N. Y., vol. 7, pp. 151-154, 1865.

This paper is revised in:

Smith, S., Catalogue of the Mollusca of S. I., Nat. Sci. Ass. of S. I., Proc., vol. 1, p. 35, 1886 and p. 50, 1887.

Of the 78 species listed, *Solemya velum*, *Yoldia limatula*, *Nucula proxima*, *Venericardia borealis*, *Rochefortia planulata*, *Cardium mortoni*, *Cumingia tellinoides*, *Siliqua costata*, *Zirfaea crispata*, *Epitonium lineata*, *E. humphreysii*, *Triphoris perversa nigrocincta*, *Cerithiopsis greenii*, *Bittium alternatum*, *Columbella avara*, *Mangilia cerina* (*M. plicata* not mentioned), and *Acteon punctostriata* are the rarer species listed. *Anomia aculeata*, *Pholas costata*, *Martesia smithii*, *Litorina irrorata*, *Natica pusilla*, *Alectrion vibex* and *Haminea solitaria* are of special rarity. I do not know of their having been again reported from the vicinity of the city. *Astarte castanea* is included on authority of Wheatley. The list is largely based on dredgings made about the southern end of the island by Hubbard whose collection was later sold to Crooke, whose collection now forms part of the American Museum col-

¹The "J" in the literature is an error.

lection. Of these rarest species *Martesia smithii* [*Martesia caribaea*] is the only one now in the Am. Mus. (local) collection.

Davis, W. T., Variations of *Mya arenaria* on the shores of S. I., Nat. Sci. Ass. of S. I., Proc., vol. 1, p. 20, 1885.

On rocky ground the valves are of moderate size, the ends often broken and the exterior corrugated; in sandy ground the valves are very thin, of even growth, the markings complete, they are beautiful in form and color and of largest size; in peat the valves are very much deformed and much rounded.

On the distribution of *Litorina littoralis*, idem., vol. 1, p. 61, 1888 and vol. 3, p. 50, 1893.

It was first noticed by Mr. Hollick at the Narrows in 1888.

Smith, S., & Prime, Temple, Report on the Mollusca of L. I. and its Dependencies, Ann. Lyc. Nat. Hist. N. Y., vol. 9, pp. 377-417, 1870.

Herein *Odostomia trifida*, *O. bisuturalis*, *Polinices triseriata*, *Paludestrina minuta*, *Litorina rudis*, *L. littoralis* and *Lacuna vineta* are recorded as having their southern limit at S. I. This is certainly not the case with the first four species.

From these records one is struck by the decrease in the fauna accompanying the expansion of the city. One of the important factors in the extermination of the less hardy species is the crowding of the beaches for miles beyond the city limits with cottages and bungalows and the accompanying gasoline boats. This evil is obviated by the purchase of the land for large private estates and clubs.

VITREA (PARAVITREA) MULTIDENTATA AND LAMELLIDENS.

BY GEO. H. CLAPP.

Having recently received a specimen of *V. lamellidens* from Norway, Me., I have gone over my collection with the idea of trying to find if *lamellidens* as it occurs in the north is really the same as the typical form from the Great Smoky Mountains or, as Dr. Pilsbry suggests in Proc. Acad. Nat. Sci., 1903, p. 209, merely "accelerated individuals (of *multidentata*), sporadically occurring."

The figures on Pl. III are from camera-lucida drawings all magnified 10 diameters. The shells were selected for size only, that is as near the same size as possible from material at hand, and from localities as near together as I had them in my collection. Figs. 13 to 16 are large shells of each species.

1— <i>lamellidens</i> Thunderhead, Gt. Smoky Mts.	Diam. 2.70 mm.,	Umbilicus .29 mm.	}
2— <i>multidentata</i> Oakdale, Morgan Co., Tenn	" 2.70 "	" .52 "	
3— <i>lamellidens</i> Anderson, Franklin Co., Tenn	" 1.96 "	" .29 "	}
4— <i>multidentata</i> Sherwood, Franklin Co., Tenn	" 2.19 "	" .35 "	
5— <i>lamellidens</i> Banners Elk, Watauga Co., N. C.	" 2.40 "	" .29 "	}
6— <i>multidentata</i> Cranberry, Mitchell Co., N. C.	" 2.65 "	" .46 "	
7— <i>lamellidens</i> Litchfield, N. Y.	" 2.40 "	" .29 "	}
8— <i>multidentata</i> Litchfield, N. Y.	" 2.53 "	" .46 "	
9— <i>lamellidens</i> Deering, N. H.	" 2.13 "	" .20 "	}
10— <i>multidentata</i> Hoosic, N. Y.	" 2.53 "	" .46 "	
11— <i>lamellidens</i> Norway, Me.	" 2.08 "	" .23 "	}
12— <i>multidentata</i> Quebec, Can.	" 2.70 "	" .40 "	
13— <i>lamellidens</i> No. 1, large shell	" 3.90 "	" .46 "	}
14— <i>multidentata</i> Stevenson, Ala., large 14	" 3.11 "	" .69 "	
15— <i>lamellidens</i> No. 1 same size as No. 14	" 3.11 "	" .35 "	}
16— <i>multidentata</i> largest Quebec	" 3.07 "	" .63 "	
17— <i>lamellidens</i> No. 1 same size as 7, 9 and 11.	" 2.21 "	" .29 "	}
18— <i>lamellidens</i> No. 1 same size as 7, 9 and 11.	" 2.27 "	" .29 "	

From the measurements given above it will be seen that in shells of approximately the same diameter the umbilicus in *lamellidens* is about three-fifths of the diameter of that of *multidentata*, the single marked exception being Nos. 3 and 4.

In figures 13, 14, 15 and 16, mature shells, it will be noticed that in *multidentata* the umbilicus widens rapidly in the last whorl while in *lamellidens* it does not. This can also be seen in the other figures, but it is not so pronounced.

A series of 76 *multidentata* from 13 localities and 45 *lamellidens* from 8 localities were measured. Where I had only a few from a given locality all were measured, but in the case of large series a few were picked out at random. These shells ran from 1.85 to 3.28 mm. diameter in *multidentata*, 9 of them being 3.00 mm. diam. and over, and from 1.55 to 4.03 mm. diameter in *lamellidens*, 23 of them being 3.00 mm. and over.

42 *multidentata* and 28 *lamellidens*, 2.50 mm. diameter and over, gave the following averages:

V. multidentata av. diam. 2.79 mm., diam. umbilicus 0.51 mm.

V. lamellidens av. diam. 3.39 mm., diam. umbilicus 0.39 mm.

These averages show that the umbilicus is contained 5.5 times in the diameter of the shell in *multidentata* and 8.7 times in *lamellidens*.

Another difference which is well shown in the figures is the angle made by the teeth and lamellæ to lines drawn parallel to the lip and at right angles to it.

The rows of teeth and the lamellæ were counted in all of the 121 shells measured and were found to vary from 1 to 4 in *multidentata* and from 0 to 3 in *lamellidens*. In both species there is a tendency to complete absorption in the fully adult shell and in my largest *lamellidens*, 4.03 mm. diam. from Thunderhead, Gt. Smoky Mts., I cannot distinguish a trace of the lamellæ. A *lamellidens* from Thunderhead has 4 lamellæ, one of the apparently 3 being double.

The largest *multidentata* have from 6 to 6.25 whorls while the largest *lamellidens* have 6.5 to 7.

V. multidentata when adult has a well-defined callus connecting the end of the lip which is entirely absent in *lamellidens*. In both species the lip is slightly thickened when adult while in immature shells it is very thin and generally broken in cabinet specimens which accounts for the apparent difference in the shape of the aperture of the shells figured, as it was very hard to trace.

I believe that the figures and data given above prove that the two species are distinct and that the northern shells, though smaller, are the same as typical *lamellidens* from the southern mountains. Compare Figs. 17 and 18, from the type locality,

with Figs. 7, 9 and 11 northern shells. An examination of the youngest shells that I have seen would seem to indicate that *lamellidens* may be the ancestral form as in very young *multi-dentata* the teeth are generally fused, so much so in fact that in one of two cases I had separated them as *lamellidens*; but careful focusing of the microscope brought out the fused teeth, and measurements showed the relatively larger umbilicus.

THE NOMENCLATURE AND SYSTEMATIC POSITIONS OF SOME NORTH AMERICAN FOSSILS AND RECENT MOLLUSKS. II.

BY JUNIUS HENDERSON.

Planorbis cirrus White, 1879, from the Tertiary of Wyoming, was the next year cited by the same author as though it were spelled *cirratus*. Since then the latter name has been universally, but improperly, used instead of *cirrus*.

Physa bullata White, 1886 (U. S. Geol. Surv., Bull. 36), from the Eocene of Utah, is preoccupied by *P. bullata* P. and M., 1838, and *P. bullata* Gould, 1855. However, on page 12 of his bulletin, and in the legend of plate 3, White used the name *bullatula* for the same species, the use of *bullata* on page 22, where it was described, perhaps being unintentional. Hence White's species should be known as *Physa bullatula*. Whether Gould's species should be renamed depends upon whether it is a valid form or a synonym of some other form, which I am now unable to determine.

Physa carletoni Meek, 1872, from the Cretaceous of Utah, is incorrectly referred to as *P. carltoni* by Grabau and Shimer, 1900. Such a mistake is easily made, but unfortunately there is a prior use of *carltoni* in this genus by Lea, 1869. Though confusing, I suppose the names are sufficiently distinct so that Meek's name may stand. His species has been so frequently mentioned in various reports that it would be a shame to disturb the name unless required by the rules.

Acella haldemani White (= *Tortacella haldemani*, in Auriculidae), from the Cretaceous of Wyoming, is preoccupied by *Lymnaea haldemani* Deshayes, 1867 (= *Acella haldemani*, accord-

ing to Baker). White's species may hereafter be known as *Tortacella wyomingensis*. To disturb a name so well known is regrettable.

Paludina subglobosa Emmons, 1858, from the Tertiary of North Carolina, is preoccupied by *P. subglobosa* Say, 1825. The type of Emmons' species is lost and the figure too poor for definite generic reference. Indeed, it may even be marine. However, it may sometime be recovered, and as there is no way of eliminating it from the published literature and it must be included in any complete list of described species, it should perhaps have a name. It may be known as *Vivipara? emmonsii*. Conrad identified it with *V. glabra*, which is very doubtful.

Dall, (Contrib. Tert. Fauna Fla., 1892, p. 277) says *Compospleura trinodosa* Conrad=*Scalaria trigemmata* Conrad, "which is a *Goniobasis*." Harris (Bull. Amer. Paleont., III, No. 11, p. 71) places *trigemmata* in *Melania*, says probably related to "*Terebra*" *plicifera* (the quotation marks are Harris's), and omits *trinodosa* from the synonymy. I have not at hand the means for determining whether *trigemmata* is a *Melania* or a *Goniobasis*, if, indeed, it can be determined. If Dall is correct in referring it to *Goniobasis*, and if Harris is correct in supposing that it is related to *T. plicifera* Heilp., a Tertiary fossil, then it would follow that the latter is also a *Goniobasis*, in which case its specific name would be preoccupied by *Melania*=*Goniobasis plicifera* Lea, a recent species, unless the latter should be removed to some other genus, as Hannibal has done. The easiest way out of the dilemma is to leave *trigemmata* in *Melania*, where Harris placed it. I pass the puzzle on to the next fellow, with these clues as a starter.

Limnaea (Polyrhytis) kingii Meek, 1877, was described from beds designated as "probably Miocene," in Cache Valley, Utah. I had supposed these beds to be Pleistocene, and Hannibal has suggested the same thing, but Dr. T. W. Stanton writes me that they are now generally considered Pliocene, or at least older than the Lake Bonneville beds, because they are more disturbed, though I believe Lake Bonneville extended into Cache Valley during its greatest expansion. I believe that *Radix ampla* var. *utahensis* Call, 1884, is a synonym of *Limnaea*.

kingi Meek. It occurs in Utah Lake and Bear Lake, both draining into Great Salt Lake, one from the south and one from the north. Obviously it could not pass from one river system to the other through Great Salt Lake as that body of water now is. Its distribution suggests that it may have passed through during the Pleistocene expansion, when its waters were freshened by overflow to the north. It probably has had a long history in the region, and there is no reason to doubt that it occurred during Pliocene time and so was contemporaneous with *kingi*, if not identical with it. As the lake at its maximum overflowed to the north, it may occur now in Port Neuf River drainage also, though Daniels and I did not find it there during a brief visit. Dr. Dall writes:

“I think your identification of the *Lymnaea* is correct. However it is to be borne in mind that the plications which led Meek to propose a genus for his species are pathological and not specific characters. They are directly due to the increase in alkaline salts in the water inhabited by the mollusks and have been imposed upon various gastropods in the same situation.”

Cyrena californica Gabb, 1869, described from the Pliocene of California, is preoccupied by *C. californica* Prime, 1865, which is itself a synonym of *C. californiensis* Prime. Prime's species was described by Deshayes in 1854 as *Cyrena subquadrata*. That name being preoccupied, Prime changed it to *californiensis* in 1860, without description, but citing Deshayes' publication. In 1865 Prime described it as *Cyrena californica*, citing *subquadrata* Deshayes and *californiensis* Prime as synonyms. The name of Prime's species must therefore stand as *californiensis*. Dall in 1903 transferred Gabb's species to the genus *Corbicula*, subgenus *Cyanocyclus*. Under the circumstances it is unfortunate that Gabb's name should have to be displaced. I propose that it be called *Corbicula gabbiana*.

Cyrena obliqua Deshayes, 1824, from the Tertiary of Europe, has been placed in *Corbicula* by Vincent (Ann. Soc. Roy. Malac. Belgique, XXI, 1886, p. 136) and Taylor (Monog. L. and F.-W. Moll. Brit. Isles, No. 7, 1900, p. 413). Newton (Brit. Olig. and Eoc. Moll. in Brit. Mus., 1891, p. 57) left it in the

genus *Cyrena*. If correctly referred to *Corbicula*, it would have priority over *Corbicula obliqua* Whiteaves, 1885, from the Cretaceous of Canada. Not having access to the literature necessary for the determination of this question, I wrote to Dr. T. W. Stanton about it. He referred it to Dr. W. H. Dall, who replied as follows:

“Deshayes in his revision left *obliqua* in *Cyrena*. *Cossmann* puts it in *Corbicula*. The lateral teeth are smooth as in *Cyrena* but long as in *Corbicula*. It belongs to a small group of ovoid species which is neither typical *Cyrena* nor true *Corbicula*. Of the two attributions I regard Deshayes' as the most nearly correct, but I should include these small oval species in a distinct group from either. However, as the species has been referred at various times to *Corbicula* it would probably be best to regard the combination as preoccupying Whiteaves' name if it was made before 1885, but not otherwise.”

I have no citation indicating that the combination referred to was made before 1885. Under the circumstances I feel that Deshayes' species should be left in *Cyrena* or placed in a distinct genus, and *Whiteaves'* name retained for the Cretaceous species. If anyone thinks the latter should be renamed, then it would be quite fitting to name it in honor of Whiteaves, a name that has not been used for any species of *Corbicula* as far as I can ascertain.

Some of the fossil Mollusca described by Hall in the report of the Fremont Expedition, 1845, are exceedingly troublesome. Though all assigned by Hall to marine genera, he stated that he would have considered several of them fluviatile shells except for the occurrence of *Nucula impressa* and *Cerithium fremonti* “in the same association.” White, in his Review of North American Fossil Non-marine Mollusca, says they probably belong to a fresh-water fauna, and several have been definitely transferred to fresh-water genera, being now well known. Following is the list of Hall's species under discussion:

Nucula impressa=*Yoldia impressa*.

Mya tellinoidea=*Unio tellinoides*.

Cytherea parvula.

Cerithium fremonti.

Cerithium tenerus=*Goniobasis tenera*.

Turbo paludinaeformis=*Vivipara paludinaeformis*.

Turritella bilineata.

Natica? *occidentalis*.

Pleurotoma uniangulata.

I have been unable to locate the types of any of these species. They do not appear to be at Albany, New York, Washington or Philadelphia. The last hope seems to be the Hall material at the University of Chicago, which has not been unpacked. The latitude given for the *Mya*, *Nucula*, *Pleurotomaria*, *Cerithium tenerum*, and *C. fremonti* (Lat. 40), is incorrect, as they are definitely reported to have come from where Fremont crossed the mountains from Muddy River, which flows eastward to Muddy Creek, which flows westward into Bear River. This would be in southwestern Wyoming, above Lat. 41, probably not far from the locality of the *Turbo* and *Cerithium paludinaeformis*, which is given as Lat. 41½, instead of being 115 miles to the southward, as stated by Hall. It is not certain that these were all from the same formation or the same past locality. The *Cytherca*, *Natica* and *Turritella* are said to be from Lat. 43 N., Long. 115 W., which would place them in the Snake River Valley of southwestern Idaho, in a region occupied by freshwater Tertiary Rocks, according to Dr. Stanton.

Nucula impressa Hall is a *Yoldia*, and has priority over *Nucula impressa* Conrad, 1848, from the Tertiary of Oregon, which, as Dr. Dall informs me, is a *Portlandia*, and both are preoccupied by *Nucula impressa* Sowerby (Min. Conch., V, 1825), a Cretaceous shell of Europe. Hall's species may be known at *Yoldia fremonti*, and Conrad's species may be known as *Yoldia (Portlandia) astoriana*.

Natica? *occidentalis* Hall, a "delicate shell," is said to be based upon one "perfect specimen," the mouth of which is not entire but shows that the lip was somewhat expanded, and several casts. Hall was in doubt as to its systematic position, and if the locality given is correct, it is probably not a naticoid shell. However, the name has priority over *Natica occidentalis* Meek and Hayden, 1856, from the Cretaceous of South Dakota, for which I propose the specific name *dakotensis*.

A NEW PLANORBIS FROM ILLINOIS.*

BY FRANK C. BAKER.

While making a study of the larger *Planorbis* of the Big Vermilion River, Illinois, for a paper on the distribution of the mollusks of that stream, it became apparent that two forms were included under *trivolvis* which were quite separable. One of these is the large, wide form to which Say gave the name *trivolvis*. The other is a narrower form which the writer and others have been calling *glabratus* (see Baker, Cat. Ill. Moll., p. 106) but which is not the true *glabratus* of Say, which, according to Walker (Synopsis, p. 99), does not range outside of the State of Florida. Say credited his original specimens to Charleston, S. C. The new Illinois form may be characterized as follows:

Planorbis pseudotricolvis n. sp.

Shell sinistral, whorls 5; body whorl rounded above and below, the inner whorls carinated on both spire and umbilical region; the spire whorls are very flat and slightly concave; the earlier whorls are coiled so that they form a union with the carina of the preceding whorl but the last whorl gradually divides from this line, leaving a V-shaped depression between the dorsal carina and the body whorl; this condition is uniform for the dozen or so specimens examined; the base or umbilical region exhibits three full whorls to the umbilicus; aperture somewhat lenticular, rounded above and below, sometimes a trifle expanded, and bordered with red; color of shell yellowish or corneous inclining to brown; surface notably shining.

Height, 9; greatest diameter, 20.5; aperture height, 8; breadth, 9 mm. Holotype.

Height, 9; greatest diameter, 19; aperture height, 8; breadth, 9 mm. Paratype, 5 whorls.

Height, 6; greatest diameter, 11.5; aperture height, 5; breadth, 5 mm. Immature, 4 whorls.

* Contribution from the Museum of Natural History, University of Illinois, No. 8.

Height, 5; greatest diameter, 5; aperture height, 5; breadth, 2.5 mm. Young, 3 whorls.

(Collection Mus. Nat. Hist., U. of I., No. Z11393A.)

This *Planorbis* differs from typical *trivolvis* in being less high in comparison with its diameter, in the separation of the last whorl, above, from the carina of the preceding whorl leaving a V-shaped trough, which is not present in *trivolvis*, and in showing three full whorls on the umbilical side while in *trivolvis* there are but two full whorls. The sculpture is also more regular than in *trivolvis*, the rib-striæ being more clear cut with wider interstices. The carina on the upper whorls in *pseudotrivolvis* is also sharper and forms a raised keel bordering the spire whorls.

This *Planorbis* has perplexed Illinois conchologists for many years, being uncertainly referred to Say's *glabratus* as figured by Haldeman in the Monograph, plate 2. Whether all of the shells listed under this name in the Illinois Catalogue (p. 106) are referable to the new form is not known, specimens from these localities not being available for examination. The same *Planorbis* occurs in Pleistocene deposits in and about Chicago and has been referred to *trivolvis* in papers and references (cf. Trans. Ill. State Acad. Sci., iv, p. 112). The fossil specimens referred to this species occur at the following places (see the writer's Life of the Pleistocene, now in press by the University of Illinois, for the data concerning these and other sedimentary strata in the Chicago region):

200 feet north Dempster Street, station 47, stratum ix, silt.

200 feet south Dempster Street, station 45, stratum iv, silt.

200 feet north Oakton Avenue, station 42, stratum vii, silt.

Lemont, Lincoln Park extension office, Santa Fé R. R., stratum ii, silt.

Two fossil specimens measure as follows:

Height, 8; greatest diameter, 23; aperture height, 8; breadth, 8 mm. No. P396 (Chicago).

Height, 9; greatest diameter, 21; aperture height, 9; breadth, 9 mm. No. P401 (Lemont).

Pseudotrivolvis is not found in the earlier deposits in Wilmette Bay, Chicago, the *Planorbis* there being true *trivolvis*, while in

the later deposits the new form is the only large *Planorbis* found, an interesting case of distribution in point of time in the same locality.

Whether the new *Planorbis* is to be considered a variety of *tricolvis* or a distinct species the writer is not prepared to decide at the present time. In the material examined, both fossil and recent, there are no intermediate specimens. Until more is known it had better be considered a separate species.

**A NEW FORM OF AMNICOLA FROM THE OHIO PLEISTOCENE DEPOSITS
WITH NOTES ON A PHYSA FROM THE SAME FORMATION.***

BY FRANK C. BAKER.

Recently, Dr. M. M. Leighton, of the Department of Geology of the University of Illinois, placed in my hands for study a large collection of Pleistocene fossil mollusks from a marl deposit near Rush Lake, Logan County, Ohio. One of the species represented appears to be a new race of a recent species. The deposit is in the older Wisconsin drift. A paper is in preparation describing the fauna of this deposit as well as that of a possibly older deposit in Bartholomew County, Indiana, in both of which a number of interesting cases of distribution occur. I am indebted to Dr. H. A. Pilsbry and Dr. Bryant Walker for assistance in determining the affinities of the species discussed in this paper.

AMNICOLA WINKLEYI LEIGHTONI n. var.

Shell differing from *A. winkleyi* in being larger, heavier, wider in proportion to its height, the body whorl being more globose than in the typical form; there are $4\frac{1}{2}$ whorls, the upper part of which is somewhat flat-sided just below the suture; this is especially marked on the last whorl of some individuals; the spire whorls are rounded and the sutures deeply impressed; the first whorl is flatter than in *winkleyi*; the umbilicus is wider and deeper and the aperture is wider in proportion to its height than in *winkleyi*.

* Contribution from the Museum of Natural History, University of Illinois, No. 10.

Length, 5.0; diameter, 3.7; length of aperture, 2.5; width, 2.0 mm. Topotype.

Length, 4.5; diameter, 3.9; length of aperture, 2.4; width, 2.0 mm. Paratype.

Length, 4.0; diameter, 3.0; length of aperture, 2.0; width, 1.5 mm. Paratype.

Specimens of *A. winkleyi* measure:

Length, 4.8; diameter, 3.1; length of aperture, 2.2. Nautilus, Type.

Length, 4.8; diameter, 3.0; length of aperture, 1.8; width, 1.5 mm. Topotype.

Winkleyi is a species of the New England States, its original locality being Saco, Maine, and that a form of this *Amnicola* should be found in Ohio, and in a Pleistocene deposit, is surprising. It is not unlikely, however, that *winkleyi* may occur in recent collections in the central States. The Ohio specimens seem to depart varietally from the typical form as described by Pilsbry (NAUTILUS, XXVI, p. 1, pl. 1, figs. 9-10). Some thousands of specimens from this Pleistocene deposit show little departure from the race as described above. Occasional globose forms occurring with *winkleyi* show the relationship of the form, although none have as wide a body whorl as the fossil race. It is possible that this race may occur in other Pleistocene marl deposits.

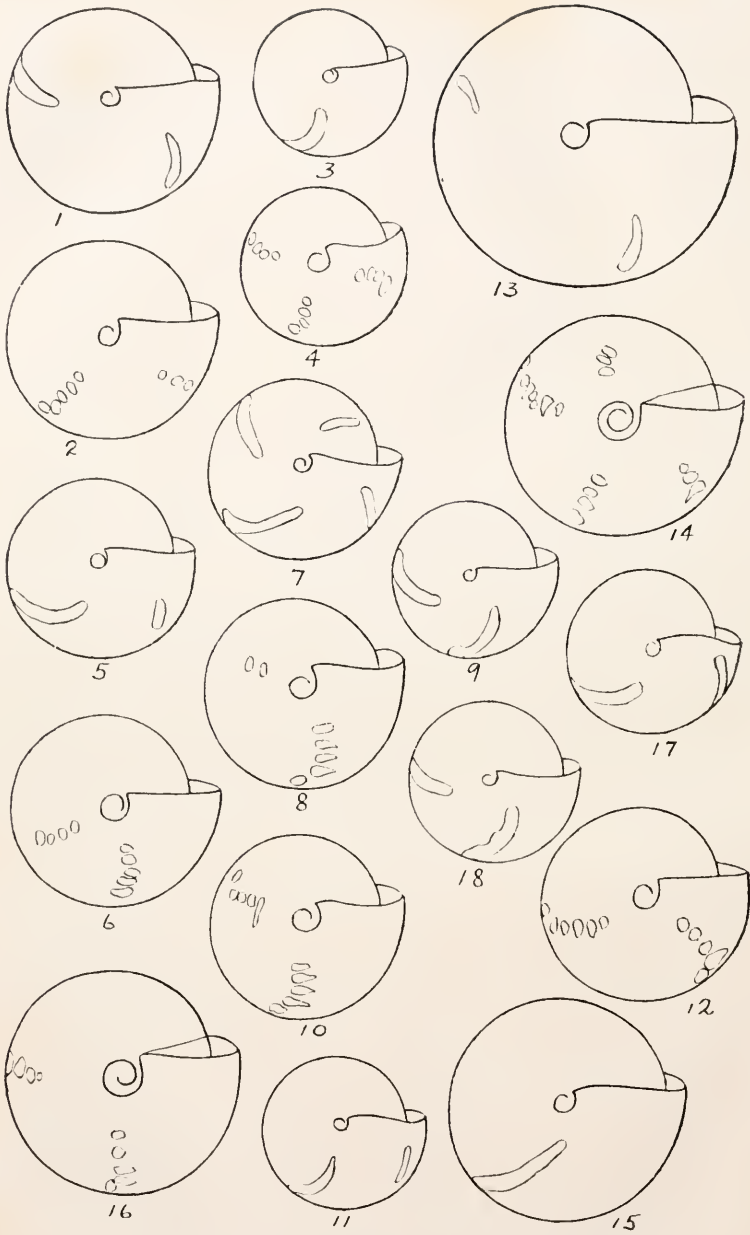
PHYSA ANATINA Lea.

A large *Physa* occurring in the Rush Lake deposits differs slightly from *anatina* in being larger with shallower sutures and more flat-sided spire whorls; the body whorl is wider as is also the aperture; the spire is very sharply pointed and the columella has a distinct plait. Characteristic specimens measure as follows:

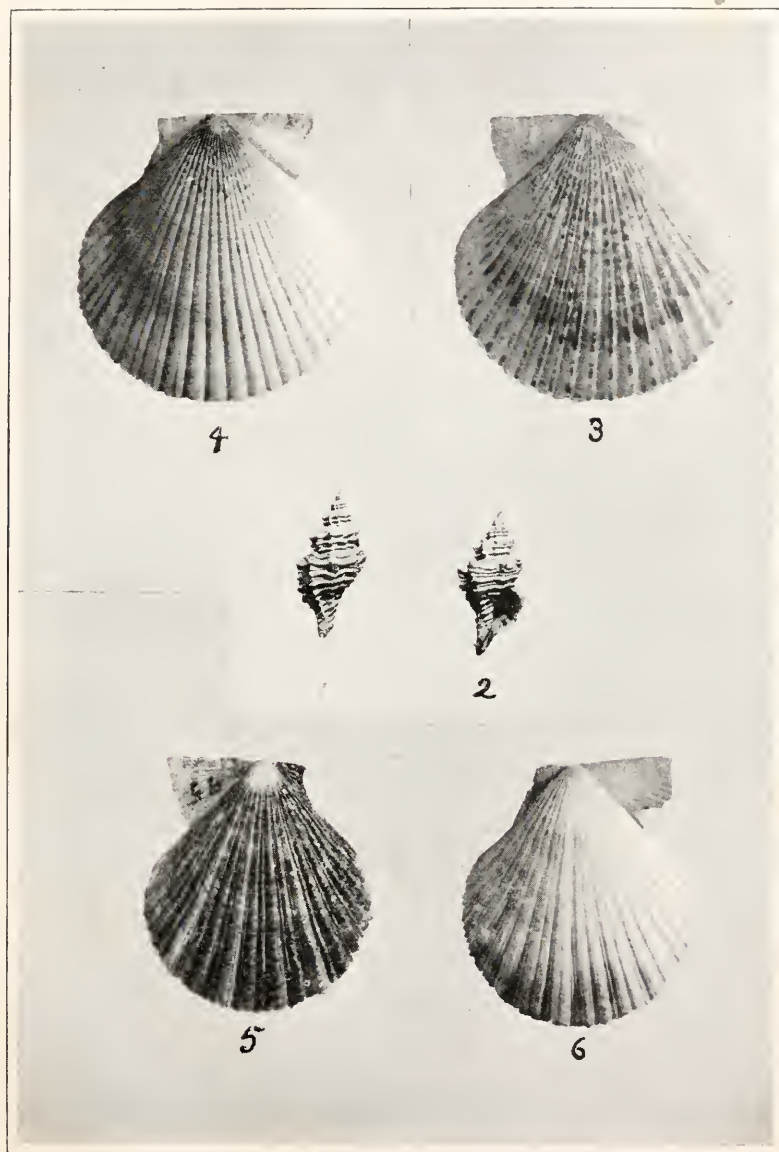
Length, 16.5; width, 9.0; aperture length, 11.5; width, 5.0 mm. Fossil.

Length, 17.5; width, 10.0; aperture length, 13.0; width, 5.5 mm. Fossil.

Length, 12.0; width, 7.0; aperture length, 8.5; width, 3.7 mm. Fossil.



CLAPP: VITREA MULTIDENTATA AND V. LAMELLIDENS



OLDROYD: WEST COAST SHELLS

Length, 12.0; width, 6.0. Lea's specimen.

This *Physa* is related to *Physa anatina* which is so common in the States west of the Mississippi River. The occurrence of this species so far east of its usually recorded range (it is said by Walker to extend clear across southern Michigan, however) is as surprising as is the presence of the race of the New England *Annicola winkleyi*. It was at first thought to be a recognizable race of *anatina* but the presence of narrow individuals indicates its relation to Lea's species. It differs from *Physa walkeri* in having flat-sided whorls, *walkeri* having rounded whorls and deeply impressed sutures. Many of the Pleistocene mollusca differ somewhat from their living representatives but in most cases this difference is not enough to cause their separation as new species or varieties. Among the *Physas*, also, the range of variation in the different species is known for but a few species; when this important characteristic is more generally known it will be safer to describe new species in this polymorphic genus.

LASMIGONA VIRIDIS, RAFINESQUE, 1820.

BY L. G. FRIERSON.

The adoption of the above as the correct specific name of the old *Unio pressus* Lea having been urged by the writer (NAUTILUS, XXIX, Sept., 1915), Mr. Bryant Walker filed an "interference" (NAUTILUS, XXIX, Nov., 1915) for the purpose he stated "of suspending the general adoption of the proposed change until such time as certain important and probably conclusive facts can be obtained."

As the current year will round out a century since Rafinesque published his *viridis* the acquisition of any new facts concerning the case would seem rather remote; and as silence might be construed as consent, and the proposed "suspension" become permanent, the writer, with the consent of NAUTILUS, makes bold to again appear in court.

Rafinesque ascribed to his species the following characters:

Shell inequilateral, elliptical, obliquely truncate posteriorly. A little convex; hardly thick.

Smooth, olive green; sometimes radiate with pale yellow; others are olive-brown. The beaks are seldom eroded, being thickened there by flexuous wrinkles—remarkable because the rest of the shell is smooth.

Nacre bluish. The cardinal tooth is compressed, and *decurrent in shape*.

Being thin, it is crenulate instead of being furrowed (other members of the subgenus have them furrowed); truncature oblique, convex.

Lateral tooth thin. Muscle scars lightly impressed, confluent behind.

A small species, at most one and a half inches in altitude.

(The members of the sub-genus described just previously by Rafinesque are among the largest of the Ohio Naiades.)

Altitude $\frac{5}{8}$ of length; diameter $\frac{7}{16}$.

Rare in the Ohio, but common in the Kentucky and adjacent "*petites rivieres*."

While to the writer the above description can be mistaken for nothing else than the Symphynota compressa Lea, further evidence seems necessary, as Lea quotes one of his friends to the effect that "it equally applies to iris."

Luckily there remains further evidence which we may adduce. Rafinesque, as is well known, divided the Naiades into numerous *Genera*. These divisions being founded upon the more evident features of the shell, it follows therefore that the contained species of any Genus *would naturally sustain a general outward resemblance to each other*.

Rafinesque described this species under the name of *Unio (Elliptio) viridis*. The *Elliptio* contained the *Unio nigra*; *Unio purpureus*, Say; *Unio crassa*, Say, and a few other shells, *all having a general outward similitude, and in such an assemblage the Symphynota compressa finds congenial associates*.

Rafinesque moreover mentions the fact that the "*Unio (Elliptio) leptodon* and *Unio (Elliptio) fragilis*" also "*resemble*" the *viridis* (with some others). The reader can easily select specimens of the two species mentioned, which resemble the *Symphynota compressa* to a remarkable extent—differing, however (as Rafinesque observes), in their teeth.

Finally, we observe that Rafinesque in his description of a variety of "*alasmidonta*" wrote that the latter is *so much like Unio viridis, as to be easily mistaken for it*—for which cause he named the shell *Alusmidonta viridis*.

This statement may be compared with an observation made by Mr. C. T. Simpson, who wrote that the "Unio pressus Lea, and the Margaritana rugosa Barnes sometimes resemble each other so much that one is labeled with the name of the other by competent students."

An Ohio shell, of subsolid texture, elliptical in shape, with an oblique posterior truncature; green, sometimes brownish, sometimes rayed with yellow; having its beaks crowned with flexuous wrinkles; a cardinal tooth thin, compressed and *decurrent*, bearing an outward similitude to the old *Unio gracilis Barnes*, and a still more striking likeness to an "*alasmidonta*" can but be, the writer thinks, the *Symphynota compressa Lea*.

The main objections offered by Mr. Walker for his "interference" arose from the failure of his records to show that the *compressa Lea* ever occurs in the Ohio River—the shell, Mr. Walker informs us, being "*most emphatically a creek or small river species.*"

Mr. Walker's records however might be profitably amended by the inclusion of the interesting circumstance that the type locality of Lea's Symphynota compressa is the Ohio River at Cincinnati (Index Obs. Genus Unio).

Mr. Walker's "reason No. 4" is a slight variant of a statement made by Dr. Lea (Rectification, P. 35).

If Conrad and Say radically differed as to what an identical valve was (which it *is said was seen by both*) the writer fails to see how their disagreement should be chargeable to Rafinesque's diagnosis of the *Unio viridis*.

Walker's "reason No. 5" need be discussed no longer, as it was categorically rejected by Dr. Lea long ago (Rectification, P. 34) with whom the writer is heartily in accord.

The writer has seen it stated that the ratio which the altitude bears to the length, given by Rafinesque for *viridis* (5 to 9) does not agree with specimens of *Symphynota compressa*.

Mr. C. T. Simpson (*Catalogue, 1914*) gives dimensions of three examples of the *compressa*. The writer takes it, that *the*

average of these three, given by such an authority, should satisfy the most exacting.

The average of the examples given by Simpson, gives a percentage of .556. The percentage which Rafinesque gives for *viridis* (5 to 9) is .555.

A closer agreement is not to be found in the history of the Naiades!

Note—The translation of Poulson contains many errors.

1. The dimensions, one and a half inch is that of the *altitude*, not as in Poulson.

2. The lateral tooth is *thin*, not slender.

3. The cardinal tooth is not *divergent*, but is *decurrent*—*quite a different thing!*

TURRITIDAE VS. TURRIDAE.

BY S. STILLMAN BERRY.

The unfortunate rehabilitation of the nondescript names of the Museum Boltenianum has brought about as one direct consequence the overturning of the time-honored generic name *Pleurotoma* Lamarck in favor of Bolten's *Turris*. Accepting the change as most seem to have been impelled to do, it thereupon follows that since *Pleurotoma* was the typical genus of its family, a change in the generic name necessitates a similar alteration in the family name to conform. The reigning regulation in Article 4 of the International Code of Zoological Nomenclature is ostensibly so explicit regarding such matters as the formation of family names that at first thought one would not anticipate much disagreement among students in its specific application. In the instance under consideration, however, two opposing views have found their way into print.¹ Both cannot be equally correct, and since the family is an abundant one and frequently referred to, while a general principle of orthography is likewise involved, it becomes a matter of some importance to determine which of the two, as we may adopt the spelling *Turritidae* or *Turridae*, is strictly the proper form to use. Curiously enough

¹ NAUTILUS, v, 23, pp. 131, 144.

each variant appears to date back to the brothers Henry and Arthur Adams, who, although using the genus *Turris* as of Humphrey rather than Bolten, wrote the family name *Turritidae* in the first volume of their great review of molluscan genera,¹ and then later corrected it to *Turridae*.² Their more mature judgment is therefore plainly in favor of the simpler spelling. It is mainly very recently that the insertion of the extra syllable has been revived.

The essential facts of the case are believed to be fairly stated thus:

1. "The name of a family is formed by adding the ending *idae*, the name of a subfamily by adding *inae* to the stem of the name of its type genus."³

2. The name of the type genus of the particular family in question is *Turris*, presumably an exact transcription of the Latin noun *turris*, meaning in English, "tower."

3. The name of the family in question is variously spelled *Turridae* and *Turritidae* in the literature. The spelling *Turriidae* has also been suggested for consideration.

4. In Latin grammars (*e. g.*, Allen and Greenough), *turris* is often given as the example *par excellence* of an *i*-stem noun, the stem therefore ostensibly *turri-*.

5. A recent proponent of the spelling *Turritidae* writes that he "submitted the question of '*Turridae versus Turritidae*' to two expert Latinists, who, after due consideration of all the data, concluded that, while either was correct, the latter term under the circumstances was to be preferred. Here the matter now appears to rest.

Now the writer has been one of those adhering to the spelling *Turridae*, and being still unconvinced of his error, yet eager to arrive once for all at a correct and therefore permanent usage, he submitted the case essentially as outlined above to a friend, a well-known student of Latin, Professor B. O. Foster of Stanford University, adding thereto the following specific queries:

¹ *Genera of Recent Mollusca*, v. 1, p. 87.

² *Op. cit.*, v. 2, p. 614.

³ *International Rules of Zoological Nomenclature*, Article 4 (Smallwood edition, p. 4).

(1) What is the stem of *Turris*? (2) Is it possible to insert a *t* in the second syllable of this stem without changing the nature of the word itself? (3) In view of the facts as stated, and in strict adherence to Article 4 of the International Rules, what do you consider to be the preferred orthography for the family name based on this genus? (4) Do you consider any alternative spellings permissible?

Professor Foster's reply is so detailed and withal so interesting that with his kind permission I am reproducing the major portion of it here, especially since it seems conclusive regarding the points at issue.

"The stem of *turris* is *turri*; and the ending *ides* would give us *turriides*. But it is a rule of word-formation that 'the final vowel of a stem is lost before the initial vowel of a suffix, e. g., *aur-eus* ('golden') from *auro-* (*aurum*).' (Hale and Buck, Latin Grammar, 205.2.) Therefore we may at once rule out *Turriidae* as a possible derivative, in favor of *Turridae* (I give the plural, as this seems to be what you want; the singular would be *turrides*).

"The ending in question is really a Greek suffix, used to denote that the name in question means the son (or descendant) of the person designated by the simple noun. Thus *Turrides* would mean 'son of a Tower,' and *Turridae*, 'the sons of a Tower,' or 'the Tower family.' When I say that it is Greek, I do not mean that it is not found in Latin; it is found frequently, but always, I think, in Greek patronymics (or Latin patronymics consciously formed in imitation of the Greek ones), which the Latin writer (usually a poet) has occasion to introduce into his text. Examples would be: *Pelides* 'son of Peleus,' *Philyrides* 'son of Philyra.'

"As to the form *Turritidae*, it is obviously meant as a derivative from the adjective *turritus*. The stem of this adjective is *turrito*, but, as above, the final short vowel would be dropped before the initial vowel of the ending *-idae*, and *Turritidae* is therefore correctly formed. But it is to be observed that the suffix, or ending in question is employed in Latin authors only in composition with the names of persons, nouns substantive, and that *Turritidae* would therefore be decidedly anomalous.

We might translate it 'family of a the-turreted,' but the fact remains that the Latin authors would not have said anything like that. . . . Unless there exists some zoological reason for preferring a word that would mean 'members of the family of the thing that is provided with towers' to one meaning 'members of the Tower family,' I should much prefer the shorter and more Latin (or may I say less *un-Latin*?) *Turritidae*."

The facts therefore seem decisive that *Turritidae* is an impossible construction as a direct derivative of *Turris*, and that *Turritidae* is correct and should be used. The spelling *Turrimae* for the typical subfamily logically follows by the same reasoning.

REDLANDS, CALIFORNIA, December 29, 1919.

ON CERTAIN OF LINK'S NAMES IN THE MITRIDAE.

BY J. R. LE B. TOMLIN.

The rarity of Link's work entitled *Beschreib. Nat. Samml. Univ. Rostock* (1807) is doubtless the reason why his specific names are but little known. Coming as it does before Lamarck or Dillwyn began to make their extensive contributions to nomenclature, it will, I believe, eventually be found to have anticipated these two authors in many cases. Link in the above work lists 20 Mitras, of which the following are noteworthy:

Pt. iii, p. 127. *Voluta stictica* Link; *V. papalis* B. Gmel., 3459; Mart. iv, 147, 1356.

It is curious that this shell was not differentiated by any 18th century author. Most of them considered it a var. of *papalis*; Bolten confused it with *cardinalis*. The synonymy is:

1807. *V. stictica* Link.

1811 (early in). *Mitra abbotis* Perry.

July, 1811. *Mitra pontificalis* Lamarck.

p. 127. *Voluta digitalis* Link; *V. pertusa* J. Gmel. 3458; Chem. x, 151, 1432, 1433.

This specific is generally ascribed to Dillwyn. Synonymy as follows:

1807. *V. digitalis* Link.

July, 1811. *Mitra millepora* Lamarck.

1817. *Voluta digitalis* Dillwyn.

p. 127. *Voluta papilio* Link. No fig. quoted, but the excellent description enables one to recognize this as a synonym of *spherulata* Mart.

p. 127. *Voluta clathrata* Link. No fig. quoted, and the description is not determinable. It is said to be like *pertusa* Gmel. but not coronate, cancellate, deeply punctured in the furrows. The name *clathrata* Gmel. is already in use in *Mitra* and therefore *clathrata* Link may conveniently be dropped.

p. 127. *Voluta elegans* Link; *V. plicaria* B. Gmel. 3452; Chem. x, 151 (by error 157), 1444, 1445.

This is a much earlier name for the *Mitra* universally known as *regina* Sow., which dates from 1828; but Link's name cannot be used as it is preoccupied by Gmelin.

Mitra elegans Reeve, Conch. Ic. pl. 29, f. 233, may be called *buriasensis*, and *M. elegans* H. C. Lea, Am. Journ. Sci. & Arts, 40.102, *alabamensis*.

p. 128. *Voluta ornata* Link. No fig. quoted, but I do not think that there can be any doubt that the description is a clear and accurate one of *taeniata* Lamarck as now understood. *Mitra ornata* will therefore supersede *M. taeniata*.

M. ornata A. Ad., P. Z. S. 1851, 135, may be renamed *M. adornata*.

M. ornata Kien.=*M. rossiae* Rve.

M. ornata Schubert and Wagner never seems to have been subsequently recognized.

p. 128. *Voluta variabilis* Link. Mart. iv, 148, 1364.

This is a synonym of *Mitra rugosa* (Gmel.)=*corrugata* Lam.

M. variabilis Rve., Conch. Ic., pl. 13, f. 95, is thus preoccupied and I rename it *polymorpha*.

p. 128. *Voluta schröteri* Link; Schröter's Einl. I, 221, pl. i, f. 13. Dillwyn quite independently founded a *Voluta schroeteri* on the same figure, which has been considered by Martens and E. A. Smith to =*Mitra picta* Rve. (cf. Ann. Natal Govt. Mus. I, pt. i, 32). It seems impossible to identify with certainty.

NEW SPECIES OF WEST COAST SHELLS.

BY MRS. IDA S. OLDROYD, STANFORD UNIVERSITY, CAL.

Tritonalia fraseri n. sp. Plate IV, figs. 1 and 2.

Shell of medium size, very elongate, narrow; whorls including the nucleus, which is present on nearly all the specimens collected, suture distinct and deep, whorls strongly shouldered, with six strong ribs spinose at the shoulder; body whorl with nine strong spiral cords and with incremental ones between. The shoulder is very strongly rugose, and has from one to two spiral cords, the second whorl has four strong spiral cords and three incremental ones; the third has three strong spiral cords and no incremental ones; aperture elongate-oval, interior yellowish to purple-brown, columella thickened and nearly straight, canal long, straight and closed in the adult. It differs from the typical form in the very elongate form, and the absence of the basket-like sculpture in some specimens on the fifth and sixth whorl the basket sculpture shows faintly.

Type locality is Brandon Island, Departure Bay, Vancouver Island.

It is named in honor of Dr. C. Melan Fraser, of the Dominion Station, through whose help we were given every facility possible for collecting while at the Station in May, 1919. The type is in the Oldroyd Collection, Stanford University. Cotypes are at Dominion Station and U. S. N. M.

Pecten kincaidi n. sp. Plate IV, figs. 3, 4.

Shell subcircular, the height and length being nearly equal; equivalve, both valves slightly convex; ears as in *P. islandicus*; base evenly rounded; color yellowish-white with reddish-brown markings. Left valve with 28 narrow round-topped imbricated ribs, and very faint intercalaries, the interspaces wider. Right valve with 25 broader flat-topped ribs, some of which are divided toward the margin. Anterior ear (the larger) with 7 ribs, the posterior ear with 5 ribs. This species resembles *P. jordani* Arnold, but the valves do not tend to contract suddenly at the basal margin as in *P. jordani*, and the right ear is larger.

The ribs on the right valve of *jordani* are all divided from near the umbones.

One fine specimen (the type) living was obtained in July, 1919, and one was taken in July, 1918, but is much thicker shell, a little larger than the type. Named in honor of Prof. Trevor Kincaid, of the Univ. of Washington, to whom we owe so much good material. Type is in Oldroyd Coll., Stanford University, No. 89.

Pecten islandicus pugetensis n. var. Plate IV, figs. 5, 6.

Shell much smaller than the typical, sculpture coarser in proportion to the size. Shell more elongate and the ribs spinose. Ribs 17 with a very fine one in the interspaces.

The type is in the Oldroyd Collection, Stanford University. Type locality off San Juan Island, Puget Sound. 12 specimens were obtained, two from the dredge, and ten from rocks on shore.

HERBERT HUNTINGTON SMITH.¹

BY GEORGE H. CLAPP.

The sudden death of Herbert Huntington Smith on March 22nd last, at University, Alabama, meant more, perhaps, to the conchologists of the United States than we now realize, although the collecting and serious study of shells was the work of the later years of his life.

Born at Manlius, New York, on January 21, 1851, and graduated at Cornell University in 1872, he early in life became interested in natural history, and made some collections in different branches. Mr. Smith told me that his first real work was on fossils; and he later became interested in insects. When he began to collect the mollusca, I do not know; but when he joined the Carnegie Museum of Pittsburgh, he had quite an extensive general collection. Between the years 1870 and 1886 he made several trips to Brazil and altogether spent about eight

¹ A portrait of Mr. Smith was published in the number for July, 1919.

years in exploring and collecting. He collected such shells as he saw, but did not specialize on them.

In answer to my inquiry Mrs. Smith wrote:

"In Brazil I only remember a few odd lots of land shells until we got to Corumbá on our way home; it was rich in land shells, but Mr. Smith said that the mosquitoes were 'frightful.' In order to do a morning's work of collecting, he had to tie his sleeves tight at the wrist, do the same thing with his ankles; tie a bandana around his neck; fill his pockets with cigarettes and matches; put a cigar in his mouth, 'grit his teeth,' and start. All the collecting there was almost a torture, so I imagine shell collecting was quite a cursory affair."

The number of shells collected on that trip was very large, although the species were not numerous; but a number of them were new to science. These shells were widely distributed, probably by Dr. Newcomb, and when we see the locality "Corumbá, Brazil," we may feel pretty sure that we are looking at Smith's shells.

During the time he was in the West Indies, for the Royal Society, and in Mexico, for Mr. F. D. Godman, he collected "everything," and naturally shells proved to be no small part of his "catch."

When he went to Colombia, in 1898, I arranged to take all of his land shells, but he got so interested in collecting mammals, birds and plants that the return in shells was not very large, except in some of the larger and more conspicuous species. There he again ran into the "insect pests," and at one place, near the coast at Santa Marta, he said the "sand flies" poisoned him so that the skin even peeled off the palms of his hands. His final breakdown in 1902, he always attributed to the poison of sand flies, gnats, mosquitoes, and the thousand-and-one other curses of the tropics.

In 1903 his health still being poor, he gave up the fight, and resolved to go to the South to live. He settled at Wetumpka, Ala., and at once started after shells. His first collecting there, so different from work in the tropics, was rather disheartening, and he wrote that there were no shells in that region. A little later he began to get results, and then he wrote, "I didn't know how to collect," and when the first lot came in, it was seen that

he had struck a remarkably rich region. Then a "Syndicate" was formed of T. H. Aldrich, of Washington, D. C., Mr. Bryant Walker, of Detroit, Dr. H. A. Pilsbry, of the Academy of Natural Sciences, Philadelphia, Pa., and the writer, and the work was carried on steadily for over six years. Dr. Pilsbry dropped out in 1906, and he was replaced by Mr. John B. Henderson, of Washington, D. C.

The naming and distribution of the thousands of land shells collected in all parts of Alabama, fell to the part of the writer, and the new species have all been described by him; 13 species and 4 varieties up-to-date, with probably several more to follow, as the material is more carefully studied. After the regular work for the "Syndicate" was stopped, Mr. Smith continued collecting fresh-water shells for Mr. Walker, and land shells for the writer, while collecting Tertiary fossils for the Geological Survey of Alabama, by which he was employed as Curator of the Museum at the University of Alabama. The sorting, naming and distributing of the fresh-water shells, was done by Mr. Walker, and I cannot do better than quote from a letter from him, on this subject:

"I enclose the meager list of n. sp. and vars. that have been described from Mr. Smith's material. But that does not begin to show the enormous amount of work that he did in developing the fauna of Alabama. Besides going the whole length of the Coosa from Gadsden to Wetumpka by boat, he did the Black Warrior thoroughly before it was spoiled by the Government improvements (?) and spent a season on the Mussel Shoals of the Tennessee. Two or three summers were spent on the Connasauga and other head-waters of the Coosa, and in numerous side trips he had covered practically the whole state. Then, too, through local collectors, many of them trained by him, he had reached into many localities that he did not personally visit. By these means he collected an enormous amount of material, practically none of which has been worked up.

"While he worked for the 'Syndicate' he collected everything; but when that arrangement ceased, he specialized in the *Unionidæ* and *Pleuroceridæ*. I have not any very accurate figures on the number of specimens of *Unionidæ* that he collected, but I think that from 40,000 to 50,000 would not be an overestimate. His Black Warrior collection alone he reported as 10,000. No report on this material has ever been made, and a

very large proportion of it still remains to be worked over. This I shall do as rapidly as I have time. I also have on hand many thousands of specimens of *Amnicolidæ* that have not been sorted out. And the same is true of a very large amount of *Ancylidæ* from the Coosa and its tributaries.

“But it was especially in the *Pleuroceridæ* that he put in his best work. He became exceedingly interested in that family and the many perplexing problems that its protean species presented, and it was his expectation to work it up himself. The enormous collection, thousands upon thousands of specimens, and the familiarity that he had acquired in his many years of field work, especially fitted him for the work. But unfortunately the multitude of duties that pressed upon him, as Curator of the State Museum, prevented him from carrying his plan into execution. He had planned to publish a paper on the *Anculosæ* of the Coosa for some time, and expected to write it up this last spring. He had gone so far as to arrange a series of the species in the order that he intended to present them, but his untimely death prevented the completion of the work. Beyond this, and a somewhat similar arrangement of the *Gyrotomas*, nothing has been done and, except the manuscript names attached to many species that he believed to be new, and which he intended to describe, there is absolutely nothing left to show the vast knowledge that he had acquired of that marvelous fauna. He had it all in his brain, and it all perished with him. I do not suppose that any other man ever had such an intimate knowledge of the variation of that family, and to think that it is all gone, is truly pitiful.

“I do not believe that the fauna of any other State in the Union has ever been so thoroughly worked as was that of Alabama, by him.”

I do not know how many new species were collected by Mr. Smith in Brazil, the West Indies and Mexico, but the following is the list from Colombia and Alabama:

COLOMBIA.

Glandina callista Pilsbry and Clapp.	Aperostoma smithi Pilsbry and Clapp.
Circinaria ponsonbyi Pilsbry and Clapp.	Helicina sanctæmarthæ Pilsbry and Clapp.
Circinaria ponsonbyi var. clara Pilsbry and Clapp.	Helicina cacaguelita Pilsbry and Clapp.
Aperostoma sanctæmarthæ Pilsbry and Clapp.	

ALABAMA.

Musculium transversum de- cism Sterki.	Neoplanorbis umbilicatus Walker.
Pisidium compressum coosa- ense Sterki.	Clappia clappi Walker. Polygyra smithi Clapp.
Pisidium compressum con- trarium Sterki.	Polygyra inflecta approxi- mans Clapp.
Pisidium limatulum Sterki.	Polygyra decepta Clapp.
Pisidium noveboracense ala- bamense Sterki.	Polygyra barbata Clapp. Polygyra brevipila Clapp.
Pisidium atlanticum dispar Sterki.	Polygyra brevipila chero- keensis Clapp.
Pisidium atlanticum albidum Sterki.	Polygyra cohuttensis Clapp. Vertigo alabamensis Clapp.
Rhodacmea cahawbensis Walker.	Vertigo alabamensis conecu- hensis Clapp.
Rhodacmea gwatkiniana Walker.	Vertigo oscariana "Var." (not named.)
Somatogyrus decipiens Walker.	Omphalina pilsbryi Clapp. Vitrea lewisiana Clapp.
Somatogyrus hendersoni Walker.	Vitrea aldrichiana Clapp. Vitrea cumberlandiana Clapp.
Somatogyrus pygmaeus Walker.	Vitrea (Paravitrea) conecu- nensis Clapp.
Neoplanorbis carinatus Walker.	Vitrea (Paravitrea) pilsbry- ana Clapp.
Neoplanorbis smithii Walker.	Carychium nannodes Clapp.

Dr. W. J. Holland, Director of the Carnegie Museum, Pitts-
burgh, has written a very appreciative article on the life and
work of Mr. Smith, in *Science*, N. S. Vol. XLIV, No. 1273,
pages 481-483, May 23, 1919, where other fields of activity are
touched upon; but to cover the whole subject would demand a
volume. It is to be regretted that Mr. Smith was not able to
carry out a plan he long had in mind, of working up his ex-
tensive series of notebooks into a story of his life as a collector,
as it would have been an inspiration to future collectors, and
would, I feel sure, have been worthy to place alongside of the

classic works of Bates and Wallace. He was a remarkably keen observer, as shown by his letters, so his notebooks undoubtedly contained a vast amount of most valuable observations. Even when feeling "down in his luck," he always saw the funny side of life, and had a large stock of humorous stories, which he would frequently insert in his letters, for no other reason, apparently, than that he just happened to think of them.

NOTES.

VERTIGO OVATA AND V. HEBARDI IN FLORIDA.—Both *Vertigo ovata* and *V. hebaridi* appear to be rare in Florida, as you will see by the list below giving records from my collection. The number found is added for each locality.

Vertigo ovata Say.

Snapper Creek Hammock, south of Miami (2).

Madeira Hammock, southern Florida (1).

Lower Matecumbe Key (5).

Vertigo hebaridi Van.

Pumpkin Key (3+fragments).

Big Pine Key (1).

Elliotts Key (2).

Porgy Key (9+fragments).

Little Palo Alto Key (3).

No Name Key (1).

Lignum Vitae Key (1).—GEO. H. CLAPP.

In a most interesting article by W. J. Wintemberg, "Archaeology as an Aid to Zoology" (Canadian Field-Naturalist, Vol. 83, Oct., 1919, pp. 68-72), an error in the distribution of *Litorina irrorata* Say has crept into print, in quoting from G. G. MacCurdy, "The Passing of a Connecticut Rockshelter" (Amer. Jour. Sci., Vol. 38, p. 517, 1914). *L. irrorata* is not confined to Florida, but is found more or less common along the entire coast from New England southward. Vineyard Sound, "sparingly" (Verrill). New Haven, "not at all common" (Perkins). Stratford, Conn., "on high sedges" (Linsley).

Huntington, L. Isl. (*S. Smith*). It is locally common in the marshes along the New Jersey coast.—C. W. JOHNSON.

FASCIOLARIA PAPILLOSA SOWERBY. In regard to my reference to this species in the October NAUTILUS, p. 45, Mr. J. R. LeB. Tomlin says: "I have the Tankerville catalogue before me and on p. xvi of its Appendix I find: 1552, *Fasciolaria papillosa*. F. testa fusiformi, apice papillosa, anfractibus transverse striatis, mediane nodosis; aperturâ intus laevis; caudâ longâ, long. $3\frac{7}{10}$, lat. $1\frac{3}{10}$ unc.

"It is not figured nor is any locality given." It may possibly be a young *F. gigantea* but from the above description it seems unrecognizable.—C. W. JOHNSON.

PHYSA SMITHIANA new name for PHYSA SMITHII.—Dr. Bryant Walker has kindly called my attention to the fact that the name *Physa smithii* used in my paper "Fresh-water Mollusca from Colorado and Alberta" (Bull. Amer. Mus. Nat. Hist., XLI, p. 535) is preoccupied by Clessin (Conch. Cab., Planorbis, p. 294) for a *Physa smithii* from Australia. I therefore change the name to *Physa smithiana*.—FRANK C. BAKER, University of Illinois.

AN AMENDMENT.—In the January number of the NAUTILUS, on page 103, I inadvertently omitted from the list of Simpson's catch of Unionidæ at Lodgepole Creek, *Anodontoïdes ferussacianus* Lea. The omission makes the next sentence unintelligible or misleading, according to the interpretation placed upon it by the reader.—JUNIUS HENDERSON.

PUBLICATIONS RECEIVED.

EXPERIMENTS IN THE BREEDING OF CERIONS. By Paul Bartsch (Carnegie Institution of Washington, 1920). It is well known that in this genus each colony "presents certain slight characters by which we can distinguish its members from those of other colonies. The question arises, are the forms in the var-

ious colonies fixed forms; that is, will generation after generation yield the same mode in measurements, or will changes in the local environment from season to season affect the developing organisms to such an extent as to produce an unending series of slight variations? These were the problems that called for a solution. The hope of throwing some light upon these questions prompted the breeding experiments which were started in 1912."

Colonies of 200 each of two species from Andros, *Cerion casablancae* and *C. viaregis* Bartsch were originally introduced on certain of the Florida Keys. In 1915, 800 *C. crassilabris* from Porto Rico, and in 1916, 8,317 *C. uva* from Curaçao were planted on Loggerhead Key. The shells were marked by filing. Some of these colonies have now produced a second generation of Florida-grown offspring. The present paper contains records of the results. In the case of *C. viaregis* Dr. Bartsch finds that the variations in the first and second generations are entirely within the range of the species in its original locality; the changed environment "has not affected them in such a way as to produce such differences as one observes between the various colonies in the Bahamas." *C. casablancae* gives practically the same result. The same holds with the first Florida generation of *C. crassilabris*.

On Newfound Harbor Khy *C. viaregis* has hybridized with the native *C. incanum*. The offspring show a remarkable range of variation; forms near typical *C. incanum* and typical *viaregis*, all intermediates between these, but also forms closely resembling the mottled *C. martensi* group of the Bahamas. A state of flux has been produced by cross-breeding. The experiments indicate also an unusual fertility, and the suggestion is made that "crossing has an energizing effect which seems to enable the new product to surpass its associated congeneric forms in the production of offspring."

Dr. Bartsch suggests that during the glacial period, when the low state of water united the numerous Bahaman Keys, extensive crossing took place, this resulting in the efflorescence of new forms which we find to-day.

A valuable section treats of the soft anatomy, which shows

considerable divergence among the species. Other biologic notes and information on the ecologic relations of Cerions are given. 59 plates fully illustrate the material.

Dr. Bartsch's experiments clearly have important bearings upon systematic zoology as well as upon the doctrine of evolution generally.—H. A. P.

MOLLUSCA OF THE CROCKER LAND EXPEDITION TO NORTHWEST GREENLAND AND GRINNELL LAND. By Frank C. Baker (Bull. Amer. Mus. Nat. Hist., Vol. 41, pp. 479-517, pls. 25-27, Dec., 1919). An interesting review of some of the arctic mollusks, especially of the Buccinidae of which *Buccinum tanquaryi* and *B. ekblawi* are described as new.

FRESH-WATER MOLLUSCA FROM COLORADO AND ALBERTA. By Frank C. Baker (Bull. Amer. Mus. Nat. History, Vol. 41, pp. 527-539, Dec., 1919). *Planorbis similaris*, *Physa smithi* and *Galba alberta* are described and figured as new.

NEW SHELLS FROM THE NORTHWEST COAST. By William H. Dall (Proc. Biol. Soc. Wash., Vol. 32, pp. 239-252, Dec., 1919). Ten new species and varieties and a new genus *Pantel-laria* (type *Megerlia monstrosa* Scacchi) are described.

LOCOMOTION IN TWO SPECIES OF THE GASTROPOD GENUS ALEC-TRION WITH OBSERVATIONS ON THE BEHAVIOR OF PEDAL CILIA. By Manton Copeland (Biol. Bull., Vol. 37, pp. 126-138, 1919).

THE CENTRAL NERVOUS SYSTEM OF NUCULA AND MALLETTIA. By W. A. Hilton (Jour. Ent. and Zool., Vol. 11, pp. 75-78, 1919).

NEW SPECIES OF MOLLUSCA FROM VARIOUS DREDGINGS TAKEN OF THE COAST OF NEW ZEALAND, THE SNARES ISLANDS AND THE BOUNTY ISLANDS. By Miss M. K. Mestayer (Trans. and Proc. N. Zealand Inst., 1919, Vol. 51, pp. 130-135, pl. 8). *Liotia suturi*, *Orbestella hinemoa*, *Crossea cuvieriana*, *Leucosyrinx thomsoni*, *L. cuvierensis* and *Vepecula cooperi* are described as new.

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