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NAUTILUS

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DEVOTED TO THE INTERESTS OF
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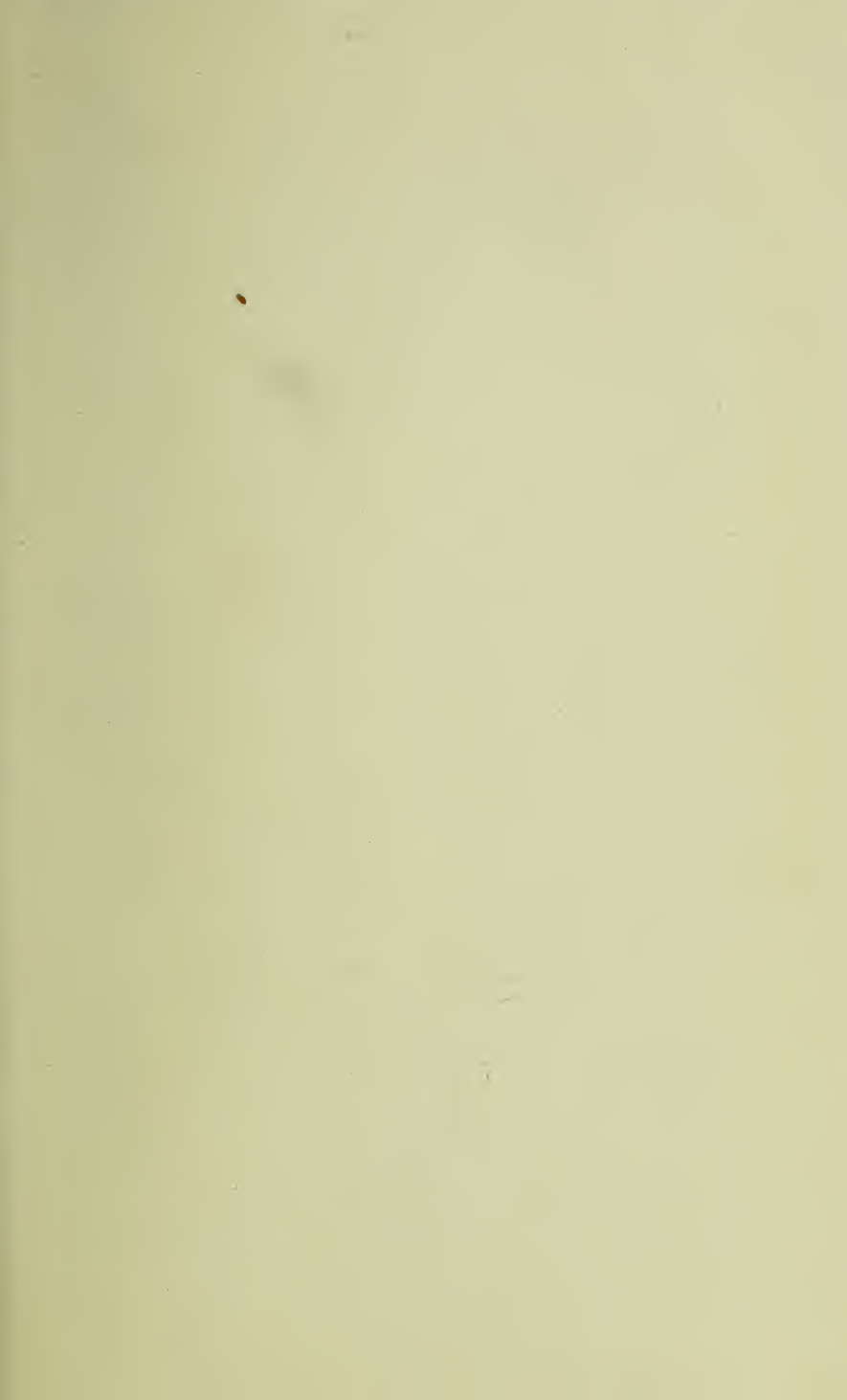
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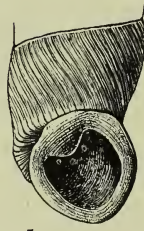
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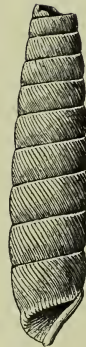
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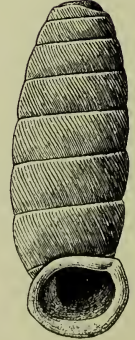
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THE NAUTILUS.

VOL. XV.

MAY, 1901.

No. 1.

NEW JAMAICAN UROCOPTIDÆ.

BY HENRY VENDRYES.

Cylindrella (Anoma) inusitata, Vendryes. Pl. I, figs. 1 and 2.

Shell much elongated, cylindrical, rimate, somewhat shining and transparent, color light brown; spire slightly tapering both above and below its greatest diameter, which is about the middle; truncate with the loss of 7 to 8 whorls, whorls remaining 11 to 12, planulate, shouldered by an early obsolete angle, the last detached and descending, strongly carinated at the base, the carina extending to the back of the aperture; striæ waved, strong and compact, crossing the whorls obliquely and continued up to and many crossing over the edge of the suture, which appears fringed here and there by their intrusion; aperture like that of *Dunkeriana*, but rather larger in proportion to the shell, and less oblique than in that species, well produced over the penult. whorl. Height 18 mm., greatest breadth above the middle of the spire, $3\frac{1}{2}$ mm.; aperture, 3 mm. high, $2\frac{1}{4}$ mm. wide.

This species is remarkable for its produced and detached aperture, placing it in the same group to which *princeps* belongs. Specimens were received from Mr. Bancroft, who collected them on the mountains at Upper Leighton, near Spring Garden estate in the parish of Saint George.

Cylindrella (Anoma) cognata, Vendryes. Pl. I, figs. 3, 4.

Shell rimate, cylindrical, elongated, color very light pale brown; spire tapering from the last whorl to the summit; apex truncate, with the loss of 7 to 8 whorls, whorls remaining 11 to 12, subplan-

ulate, slightly shouldered, the last detached and descending, strongly carinated at the base, carina continued to the back of the aperture; striæ very strong and compact, irregularly spaced and waved here and there, some crossing over the sutures from one whorl to the other; aperture as in *inusitata*, but less elliptical, well produced beyond the penult whorl. Height, 15 mm.; greatest breadth, 3 mm.; aperture, $2\frac{1}{2}$ mm. high, $2\frac{1}{4}$ mm. wide.

I am indebted for specimens of this shell to Mr. Hart, at one time Superintendent of Public Gardens and Plantations in Jamaica, and now occupying a similar position in Trinidad, by whom they were collected at the government cinchona plantations in the mountains of Saint Andrew, about 3,500 feet above sea level.

One of the specimens being alive, I obtained the radula, but failed in securing the buccal plate. The teeth are of the type common to MM. Crosse & Fischer's first group A. of *Cylindrellæ*. The animal is very small in proportion to the shell. It is spiral behind the mantle, short, of a pearly-white color, slightly mixed with green, and marked with close-waved, narrow, longitudinal brown lines, not extending to the lapping of the foot; head short, with a simple labial appendage, apparently incapable of much projection; eye peduncles short, slender, of a deep bistre color, except on the lips, where the color is like that of the body; eyes very black, placed on the bulb-shaped tips of the peduncles; tentacles short and very slender; foot broad and lance-shaped behind. The animal is very active for a *Cylindrella*. It progresses by extending forward the forepart of the foot and drawing the afterpart up to it in a sort of wave. Part of the shell drags lightly on the ground and is carried forward with each fresh advance of the foot.

Cylindrella (Anoma) propinqua Vendryes. Pl. 1, figs. 7, 8.

Shell rimate, cylindrical, nearly white, under a light brown epidermis, which becomes paler towards the apex; the spire widens very gently from the base of the penult whorl to about one-third above it, where the greatest diameter is reached, and thence it tapers to the truncate apex; apex truncate with the loss of 8 to 9 whorls, whorls remaining 10, less deep and less flattened than on *Dunkeriana*, the first two above the base subangular about the periphery, the last more strongly carinated than in *Dunkeriana*, with the carina continued down to the base of the aperture; striæ very strong, compact and

wavy, extending across the whorls to the very edge of the well-impressed suture; aperture oblique like that of *Dunkeriana*, but the peristome is thinner and is appressed above to the penult whorl. Height 13 mill., greatest breadth at the slender part of the spire 3 mill.

The shell comes near to *Dunkeriana*, but it has 10 whorls which are less planulate than on that species, and the striation is rather coarser and less regular; the color of *Dunkeriana* is also different. Gloyne, in Journ. de Conch., vol. —, reports it as *similis* from Bellevue. Bland had identified them with great doubt as *similis*. On closer examination they turned out to be unlike *similis* or any other Jamaican species of *Anoma*.

Hab.: Bellevue, near Stony Hill, in the parish of Saint Andrews, (!) Vendryes. (!) Gloyne.

Cylindrella (*Thaumasia*) *sanguinea* Pfeiffer, var. *perplexa* Vendryes. Pl. I, figs. 11, 12.

This variety was collected at (!) Water House, an abandoned sugar estate, now turned into a grazing pen and negro provision grounds, in the upper northern portion of the Liguinea plain, where the limestone hills of the Red Hills range begin to rise. The aperture is produced and the peristome is detached all round; whilst in the typical *sanguinea* the peristome above is closely soldered to the body-whorl, and often so much attenuated at the point of attachment as to form a thin film. The shell is of medium size and dark colored; there is a narrow line of a deeper tint than the ground color, but rather dingy, running next to the suture along the lower part of it and extending to within it. This form is very persistent in the locality mentioned.

Cylindrella (*Anoma*) *abnormis* Vendryes. Pl. I, figs. 5, 6.

Shell deeply rimate, cylindrically elongated, color brown with a very slight tint of yellowish-red, shining; spire broadly truncate with the loss of — whorls, whorls remaining 9, the last and the three following it are more drawn out and consequently deeper than the remaining ones, the last is slightly narrower in diameter than the second, the second than the third, and the third than the fourth, thence the remaining whorls become less deep and gradually diminish in diameter to the truncated apex, so that the outline of the shell presents the form of a long, narrow, drawn-out purse, somewhat

bulging about the middle, and thence tapering towards the bottom; whorls slightly convex, obtusely angulated at the periphery, sculptured with strong, thick lamella-like costulae crossing the whorls obliquely, generally curvilinear, irregular in some places and wavy here and there, extending to the very shoulder of the whorls, the last whorl with a prominent carina which extends to the back of the base of the aperture close to the peristome; suture well incised; aperture inclining to the right, the plane very oblique, peristome thick, nearly white, smooth and shining, reflected all around, with a very large, strong, elevated knob close over the spot where the columellar lip should merge into the columella, and apparently arched over the space of the entering rima beneath. Total length, 11 mm.; greatest breadth at middle of spire, 3 mm.; next above the aperture, 2 mm.; at the truncation, 2 mm.

This shell was collected by me among fine earth and vegetable debris taken from the roadsides near to Brown's Town, in the parish of Saint Ann. Unfortunately, as its presence was only revealed to me when searching this debris some time afterwards at home, no note was kept of the exact habitat and station. It is as yet unique in my collection. It is unlike any species of *Anoma* with which I am acquainted, and its peculiarities would seem to warrant the creation of a new subgenus, or at least of a special section to receive it. The reasons for this appear to me to be as cogent as were those which led to the creation of the subgenus *Chittya* for *Geomelania sinuosa*.

Cylindrella (Thaumasia) instabilis Vendryes. Pl. I, figs. 9, 10.

Shell ovate-cylindrical, solid, rimate; color dark-sanguineous, not unlike that of some specimens of *Cyl. sanguinea*, but the surface of *instabilis* exhibits in most specimens semi-hydrophanous, more or less wide, transverse patches sparsely and irregularly occurring, and apparently produced by some indistinct lesions of the very thin epidermis; spire describing a well-drawn-out ovate outline; apex broadly truncate with the loss of 6 to 7 of the earlier volutions, whorls remaining 7 to 8, almost entirely plane in some examples, or moderately convex in others, subarcuately, obliquely and closely costulate striae; the last whorl not detached in some examples, and detached and produced in others, and generally more strongly sculptured than the penult and other whorls, with a well-pro-

nounced carina at the base; suture lightly impressed and submarginated; aperture slightly oblique, circular in some examples or transversely narrowed in others; peristome slightly tinged with the prevailing ground color of the shell, well expanded all around and reflected, not continuous above, but attenuated or reduced to a mere film and appressed to the body whorl in some examples, or in others detached and continuous, and produced outward near the upper part of the right side of the aperture and with a sinus or notch on the produced part. Long., 24 to 25 mm.; diam. at middle of spire, 9 to 10 mm.; aperture with peristome appressed, 8 mm. high and wide; when produced and with peristome detached, 6 mm. high, and 6 to 7 mm. wide.

In several of its characters this species is rather inconsistent. In specimens found side by side and manifestly of the same brood, some examples show strong affinities with *Thaumasia sanguinea*, others with *Thaumasia cylindrus*, others again with *Gongylostoma lata* (? *Thaumasia lata*), in so far that it becomes often very difficult to locate them decisively.

In the two specimens figured, one has the lip appressed, as in *sanguinea*; in the other it is detached and expanded towards the right side of the aperture and bears a notch or sinus. In one the sculpture is decidedly like that of *sanguinea*, on the other it is like that of *cylindrus*, but stronger. In specimens with the aperture but slightly produced and the peristome *uninterrupted* by attenuation and adhesion to the body whorl, or produced and *not* bearing a sinus, the resemblance to *lata* is very great.

Habitat: (!) Phoenix Park, near the Monarque in the parish of Saint Ann; (!) environs of Brown's Town in the same parish.

NOTES ON MESECHIZA GROSVENORII LEA.

It is now over thirty-seven years since Mr. Lea described this species, and additional specimens have not been reported. In his Monograph of the family Strepomatidæ, Mr. Tryon says, in a foot-note page 350, "every specimen examined shows evidence of diseased growth." In the description, the location of notch is stated to be inconstant or wanting. Admitting then that the notch of this species is a deformity, where should the specimens described by Mr. Lea be placed? The notch being a deformity, the genus would not stand, because that

is the distinguishing point of the genera, like the fissure of *Schizostoma*. I am of the opinion that Mr. Lea's specimens are young *Angitrema armigera* Say, for the following reasons: The young of *armigera* is generally smooth, is fusiform, thin, obtusely conical and of various shades and markings, from a light straw-color to purple, occasionally seven banded while six is common; the aperture is large and rhomboidal, obtuse longitudinal thickenings are common on body whorl, a light line under the suture is also common in banded and purple specimens, base channel well defined. Polar point of the operculum well removed from the margin. There is no other species found in the Wabash that has so many points of resemblance; about the only point of difference is the number of whorls, five to six in the young *armigera* I have, while Mr. Lea's description says seven.

There are some other species I think must be referred to *Angitrema armigera*, but additional specimens from other localities are needed to fully determine the identity.—A. A. HINKLEY.

THE SUBSPECIES OF *PYRAMIDULA ALTERNATA*.

BY HENRY A. PILSBRY.

Pyramidula alternata knoxensis, n. v.

A more robust, larger shell than typical *P. alternata*, with more widely open umbilicus; dull rusty brown, with comparatively inconspicuous or much-reduced flame-markings. Whorls $5\frac{1}{2}$, not carinated. Sculpture of fine and even rib-striae, but little weaker on the base, the whole covered with a secondary sculpture of fine wrinkles, partially cuticular, and running a little more obliquely than the rib-striae. This minute wrinkling is barely visible to the naked eye, but is much stronger than in other forms of *P. alternata*, and gives the surface a peculiarly dull appearance.

Alt. 11, diam. 23, width of umbilicus $6\frac{1}{2}$ mm. (Knox Co., Tenn.).

Alt. 11, diam. 23, width of umbilicus 7 mm. (Laurel Creek Gap).

Alt. 13, diam. 25, width of umbilicus $7\frac{1}{2}$ mm. (Hazel Creek).

This remarkable race of *P. alternata* belongs, so far as we know, to the valleys of the western slope of the Great Smoky mountains, extending into the valley of East Tennessee. It was first found by Mrs. George Andrews, in Knox county, Tenn. During the past summer Mr. Jas. H. Ferriss found it in Cade's Cove, at Laurel Creek,

Gap and Hazel Creek. We saw nothing of it on higher elevations in the Great Smokies, the localities mentioned lying below 2000 ft. elevation. In the collection of Geo. H. Clapp there is a single shell from the Jas. Lewis coll. labeled "Philadelphia, Monroe Co., Tenn.," probably collected by Miss Law, and measuring: Alt. 13, diam. 24, umbilicus $7\frac{1}{2}$ mm.

No intergrades with typical *P. alternata*, *P. a. carinata* or *P. a. costata* have been observed. It is remarkable for the strong development of the secondary sculpture, with fine primary sculpture of ribstriæ, the unkeeled, capacious whorls, wide umbilicus, and dead, rusty surface. Messrs. Clapp and Ferriss agree with me in considering this a strongly differentiated subspecies.

The following subspecies of *P. alternata* are now recognized:

P. alternata (Say).

P. alternata fergusonii (Bld.). N. Y. to Md.

P. alternata rariorotata Pils. Texas.

P. alternata carinata Pils. Pa. to Tenn., in western division of the Appalachian Mt. system.

P. alternata knoxensis Pils. Knox, Blount and Monroe Cos., Tenn.

P. alternata costata 'Lewis' Clapp. Greaty Smoky Mts.

P. alternata mordax (Shuttl.). Great Smoky Mts. (?)

The last variety has not yet been rediscovered; the "*mordax*" in collections being referable, so far as I have seen, to a strongly-ribbed form of *P. alternata*, which has not been named; and not fulfilling the requirements of Shuttleworth's diagnosis. *P. alternata carinata* includes strongly angular or keeled, but finely striate shells of the mountainous region from western Pennsylvania to Tennessee. It was defined in my paper on Rhoads' Tennessee shells; and is not known to occur in the Tenn.-N. C. boundary ranges. I have never seen any true intergrades between *P. alternata* and *P. cumberlandiana*, and consider the latter a well-defined species.

There is also a color var. *alba* Tryon, of *P. alternata* (Amer. Journ. of Conch. ii, p. 261, and Monog. Terr. Moll. U. S., p. 49). This occurs abundantly in certain localities within the area of typical *alternata*. Thus in Philadelphia, *alba* is found along the Wissahickon Creek, while in other localities in this vicinity the ordinary *alternata* is found. This color-var. is not really white, but merely albinistic; it lacks the spots and flames of the typical form. It is also found in Michigan, etc.

GENERAL NEWS.

POLYGYRA THYROIDES SANCTISIMONIS n. var.—Spire more conic than in *thyroides*, composed of $5\frac{1}{2}$ whorls which are more closely coiled; body-whorl decidedly more depressed; umbilicus open. Aperture smaller than in *thyroides*, transversely elliptical, being much less rounded than in *thyroides*. Shell rather solid, with opaque cuticle, often more yellow than in *thyroides*. Alt. 15, diam. 23 mm. St. Simon's Island, Georgia.—H. A. PILSBRY.

HELICOSTYLA CARINATA Lea, and H. DACTYLUS Brod.—In the Manual of Conchology, viii, p. 22, I showed that Lea's *Bulimus carinatus* is identical with and was published prior to *Bulinus dactylus* Brod., and consequently should be accepted in place of the latter. This decision must now be reversed, on account of the earlier *Bulimus carinatus* Perry, 1811, which preoccupies Lea's name, and which I was not aware of when the ruling was made.—H. A. PILSBRY.

NOTE ON TWO SPECIES OF CANTHARIDUS.—It has not been noticed, I believe, that *Bulimus eximus* Perry, Conchology, pl. 30, f. 2 (1811), is identical with *Cantharidus badius* Wood (18—), and *Bulimus carinatus* Perry, f. 1, is *C. peronii* Phil. (1850). Perry's figures are very good, for him, and quite recognizable. He gives Van Diemen's Land as locality for the former, New Holland for the latter species. So far as I can see, his names will stand for these species.—H. A. PILSBRY.

AMPHIDROMUS LÆVUS (Müll.).—In my account of this species in the *Manual of Conchology* (1900) the "*Helix læva*" of Müller was called *Amphidromus lævis*. Mr. G. H. Chadwick has called my attention to the mistake, Müller's word being the adjective *lævus*, left, referring to the sinistral or "left-handed" coil of the shell.—H. A. P.

A NEW TRIASSIC CHITON.—Mr. Otto Jaekel describes (*Zeitschr. der Deutschen geologischen Gesellschaft*, vol. 52, 1900, p. 9) a new form from Rüdersdorf as *Trachypleura triadomarchica*. All of the

valves are preserved in place, with fragments of the girdle. The valves lack insertion-plates, and also otherwise have the general characters of the modern *Lepidopleurus*, while the girdle is armed with spines which are believed by Jaekel to have been calcareous. The length, without girdle, is about 16, breadth 9 mm. The genus is evidently extremely like *Lepidopleurus* in hard parts, and so far as the figures and description show, indistinguishable from the recent genus except in the character of the girdle armature. It is quite unlike any of the known Palæozoic genera.—*H. A. P.*

PUBLICATIONS RECEIVED.

SYNOPSIS OF THE FAMILY CARDIIDÆ AND OF THE NORTH AMERICAN SPECIES. BY WILLIAM HEALEY DALL. PROC. U. S. NAT. MUS. VOL. XXIII, PP. 381-392, 1900.—As Tryon and Pilsbry's "Manual of Conchology" does not yet include Pelecypoda, the necessity for monographs giving the latest investigations in systematic changes is apparent. Students are deeply indebted to Dr. Wm. H. Dall for his recent monographs on several families of bivalve mollusks, including the Maत्रacea, Diplodontidæ, Leptonacea, Psammodiidæ, Solenidæ, Tellinidæ and Cardiidæ.

In the bulletin on Cardiidæ there are no plates, but there is a bibliography followed by a synopsis of the family which includes a "subdivision of the family included as a whole." The "brackish water forms associated with *Adacna*" are no longer included in this family.

The principal changes in nomenclature of the East American species since Dr. Dall's "Marine Mollusks of the South Eastern Coast," are as follows:

Cardium magnum Born is included under the name of *C. (Dino-cardium) robustum* Solander, which is the older name; this does not include *C. magnum* Linnæus, which Dr. Dall thinks is probably *C. (Trachycardium) leucostoma* Born. In subgenus Papyridea, *spinosum* takes the place of *bullatum*, or *bullata*, of "many authors but not of Linnæus," and *P. petitianum* Orbigny is a synonym of *P. semisulcatum* Gray. *Liocardium lævigatum* is a synonym of *Cardium (Lævicardium) serratum* Linnæus.

The West American species include *Cardiums* found in the Gulf of California and ranging further south. This adds to the number of West Coast species.

Collectors who have readily detected a varietal difference in the lighter weight of shells sent out as *Cardium nuttallii* Conrad, may regret that these shells are not recognized even as a variety, but are included in the synonym of *Cardium* (*Cerastoderma*) *corbis* Martyn. *Cardium blandum* Gould is a synonym of *C.* (*Cerastoderma*) *californiensis* Deshayes. *Cardium* (*Cerastoderma*) *ciliatum* O. Fabricius (*C. islandicum* Chemnitz (a synonym) and *Serripes grönlandicus* Gmelin are Arctic sea species that are found on the Atlantic and Pacific shores. *Cardium aspersum* Sowerby is listed as a variety of the eastern coast *Cardium* (*Poppyridea*) *spinosum*.

Dr. Dall says *Cardium* (*Lavicardium*) *elatum* Sowerby "is the largest species of the genus." We have often noted the variation in shape of some of the large cardiums of the West Coast; he says of these oval and rotund forms that they may possibly be correlated with sex.—M. B. W.

DESCRIPTION OF A NEW SPECIES OF UNIO FROM THE CRETACEOUS ROCKS OF THE NANAIMO COAL FIELD. By J. F. Whiteaves (Ottawa Naturalist, XIV., Jan., 1901). *Unio nanaimoensis* n. sp. *Unio hubbardi* Gabb is stated to be from the Cowgitz coal mine, on Graham Island, one of the Queen Charlotte Is., and probably did not come from Vancouver Island, as originally reported.

NOTES ON SOME LAND AND FRESHWATER MOLLUSCA FROM FORT CHIMO, UNGAVA BAY. By J. F. Whiteaves (Ottawa Nat., XIV., March, 1901). The specimens were collected by Mr. W. Spreadborough in 1896, and comprise *Limnæa palustris* var. *vahlîi* *Planorbis arcticus* ("which may be only a synonym of *P. parvus*,") *Valvata sincera* and *Pisidium steenbuckii*. Notices of previous records of non-marine mollusks of Labrador are given.

ADDITIONS TO THE MARINE MOLLUSCA OF THE BERMUDAS. By A. E. Verrill and Katherine J. Bush. THE NUDIBRANCHS AND NAKED TECTIBRANCHS OF THE BERMUDAS. By A. E. Verrill. (Trans. Conn. Acad. of Sci., X., 1900). The additions to the fauna recorded in these articles are mostly from the collection made at the Bermudas in April and May, 1898, by the Yale scientific party under Professor Verrill. In the first paper about 80 species are recorded for the first time from the Bermudas, 25 of

them being described as new, among them a new *Siphonaria*, 6 *Eulima*, several *Odostomia* and *Cæcum*. In dealing with the *Terbonillidæ*, the groups *Mumiola* and *Mornula* (Adams, 1864) are subordinated to *Pyrgostelis* (Monterosato, 1884), though Adams' names have priority. The dentition of *Synaptocochlea picta* is figured, and its operculum said to have few whorls.

In the second paper, Prof. Verrill records *Aplysia dactylomela*, *A. Willcoxi* (?) and *A. megaptera* n. sp. The latter is a fine species a foot long. *Pleurobranchopsis* is a new genus for *P. aurantiaca* n. sp., a form with no shell, mantle-edge free throughout, gill sessile; the radula and jaws are not described. 6 species of *Dorididæ* are described.

TRANSACTIONS OF THE WAGNER FREE INSTITUTE OF SCIENCE, III, *Contributions to the Tertiary Fauna of Florida*.—We have more than once in these pages alluded to the importance of this publication to the general student of recent mollusks, no less than to the paleontologist. The production of such a work is evidence of an enlightened appreciation of the value of these investigations, on the part of the Trustees of the Wagner Institute, no less than a high ideal of scientific work on the part of the author, Professor Wm. H. Dall. The esteem in which the *Transactions* are held by foreign students is shown by a recent letter from the Australian conchologist, Charles Hedley, an extract from which we venture to print:

“I am most gratified at receiving the volume on the Tertiary Mollusca of Florida, but in thanking you for the copy I must also thank you for the labor you have placed at the disposal of every student. I cannot sufficiently express what a boon to me is the generic revision of the various groups. After struggling with the scanty and perplexing literature of bivalve hinge structure, I can greet your work as a ship-wrecked mariner might greet the shore. For instance, I have had a quiet little fight with *Mysella* and have drawn the hinges ready for publication. But I had laid aside the notes and sketches till I could better comprehend the matter. My unsuccessful struggles at least enabled me to appreciate the cost of labor and talent in producing the synonymy of *Rochefortia*. Those who have daily intercourse with fellow workers, who can consult great museums and splendid libraries, will thank you in their turn. But as a scientific exile, without these advantages, allow me to tell you how your Mollusca

of Florida smooths my path, so that I may do with accuracy and speed what I formerly did slowly and painfully.”

Apology is due to Mr. Hedley for this unauthorized use of a private letter, and also to Professor Dall.—EDS.

CORRESPONDENCE.

EDITORS NAUTILUS: In the remarks of our friend Hemphill, on pp. 139-140 of the April number, some of us are called to order for a phraseology which is not altogether agreeable to him and other workers on the Pacific coast, and may properly be modified in the interest of their feelings. I refer to expressions which refer to the habitual nomenclature of some shell under discussion, in the cabinets of collectors on the Pacific shores, as in error. I suppose I have been one of those whom he criticises; for being familiar with most of the West coast collections, lists and nomenclature, it has often seemed useful to refer to the name in common use on the other side of the continent, when in the course of monographic revision it has been found to be untenable.

But I should like to assure Mr. Hemphill and all others who have been displeased by such expressions that nothing was farther from my mind than to reflect on the care or desire for accuracy of West Coast workers. I have been of and among them so many years that I feel entitled to claim a place in their ranks, and a large part of the work I have done has been intended to assist them to the extent of my ability. No one is infallible, at least outside of the Vatican. No one can correct the errors of a nomenclature at one fell swoop, so to speak. I have named many thousands of shells for West Coast correspondents, and I have named many of them wrong. That is, I have given names which were at the time in current use, but which subsequent researches have shown to be untenable. If Methuselah was a conchologist, he probably did better toward the end of his career, and the heirs of his original correspondents profited thereby. But alas! these are degenerate days, and in forty years or so one does not ferret out all anterior mistakes. Therefore if one's gratuitous service does not prove infallible, and one's expressions not invariably happy, let our West coast friends hold fast to the theory of friendly intent, and believe we at the East mean to do our best by them every time.

—W. M. H. DALL.

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No. 2.

COLLECTING IN HAITI.

J. B. HENDERSON, JR.

On the 30th of November last, Mr. C. T. Simpson, of the Smithsonian Institution, Mr. Robert T. Hill, of the Geological Survey and myself, sailed from New York for Haiti with the intention of making as thorough conchological exploration of that island as a time limit of two months would permit. Although Haiti has been visited by Bland, Sallé, Rolle, Weinland and others, it may yet be considered almost a *terra incognita* to the collector of land shells. Many of its great mountain ranges and deep valleys have never been reached by naturalists; even its more accessible regions have been but superficially examined. Imagination gilds the unknown, and we debarked at Cap Hatien eager to get into the field without a moment's delay.

Cap Hatien is situated upon the coastal margin of an extensive plain; but just back of the town rises an isolated group of high hills which appear to have no connection with the northern main range of mountains. These hills are composed of hard, flinty rock, resembling the formation of the Blue Mountains of Eastern Jamaica. In the absence of limestone they support a scant molluscan fauna, and our first day's collecting proved a bitter disappointment. Not more than fifteen species rewarded our most diligent labors, but among these were some interesting finds—notably a *Lucidella* of decided Jamaican affinities.

Leaving Cap Haitien we made our first interior journey horseback to Milot, at the foot of the main range, where amid the ruins of the famous palace of Sans Souci and in the dungeons of the old

fortress of La Ferrière we hoped to discover the habitat of that prince of American Helices—*Pleurodonte gigantea*. At an elevation of about 3000 feet, we came upon the first evidences of our game in the numerous dead shells of that superb species. Scattered about the bases of huge limestone fragments which were heavily draped and festooned in richest tropic verdure were thousands of dead *P. gigantea*, but not a trace of a living animal. We remained several days at Milot, but captured only three living examples of *gigantea* and took not more than a dozen fairly good cabinet specimens. Although disappointed in this respect we were cheered by a splendid bag of *Cylindrellas*, *Helicinas*, smaller *Helices*, *Stenogyra* (s. s.) *Opeas*, *Subulina* and several *Tudora* and *Chondropoma*.

One of the finest *Helices* of the West Indies is the large and exceedingly handsome *P. undulata*. This species is abundant about the foot of the mountains near Milot. Swarms of half naked children followed us about, often annoying us to the point of desperation, but these bright little urchins proved to be clever collectors. Finding that we rejected all dead shells of *P. undulata*, they brought us worn and useless specimens into the apertures of which they had carefully inserted large slugs. As this method failed them they recovered some living but immature specimens which we had thrown away, and extracting the animals, they reset them in dead shells and solemnly offered them to us again. The most notable catch on the mountain of La Ferrière is a small operculate with free whorls all in the same plane, probably a new genus.

Returning to Cape Haitien we took a steamer for Port au Prince, where we remained a full week, collecting most industriously in the neighborhood. The excessive dryness of the season caused living land shells to be scarce, but we succeeded in making a remarkably good catch, notwithstanding adverse conditions. In this part of the island the larger *Helices* disappear; *P. undulata* is replaced by the smaller *P. crispata* and a larger proportion of operculates is apparent. *Macroceramus* is encountered and *Cylindrella* is more abundant.

The prevailing type of operculate in this part of the island is represented by the well-known *Chondropoma semilabre*, barrel-shaped, whitish in color and with a descending and slightly free last whorl. This last characteristic runs through nearly all the Cyclostomacea of the island. As a persistent feature it finds no counterpart elsewhere in the West Indies.

Perhaps the particular feature of our Haitian journeys was our trip to Lake Assuei, one of the two great interior lakes of Haiti and Santo Domingo. The fauna of this large body of water is wholly unknown and there can be no doubt that its clear depths would furnish many treasures to the zoölogist provided with a good dredge. But we had neither dredge nor boat. An examination of one-half mile of shore line revealed a Hydrobia and a Physa, but no trace of Naiades or Sphæria. Amid the grandest scenery, we collected over the mountains north of the lake with fairly good success. One Chondropoma (evidently new) should receive some name signifying "splendid."

In a grove of very large trees near the lake we experienced several hours of the keenest delight in gathering *Liguus virginea* and *Pleurodonte bizonalis*. The former is no doubt the most beautiful of all land shells; the latter is considered a rarity. I know of no more thrilling experience than our sudden discovery of a hundred of these exquisite *Liguus*.

At St. Mark, Jeremie and Jacmel we toiled like madmen to exhaust those regions of their special faunæ; our catch from the last two stations being principally in *Cylindrella*, *Helicina*, *Glandina*, *Eutrochatella* and the smaller helices of the *Cepolis* group. The collection about Jeremie is exceedingly rich, but the unfriendliness of the natives is more pronounced at that city than elsewhere in the island.

One can scarcely picture a more promising-looking region for snail life than the environs of Jacmel. There are mountains and deep valleys, shaded and cool, sparkling streams, moisture and limestone, everywhere. We were amazed, however, to find the region almost barren of mollusks, a fact that seems wholly unaccountable.

Fortunately time seems to magnify in the mind the pleasant features of rough travel, while disagreeable episodes gradually fade from the memory. The oppressive climate, the wretched food and accommodations, the unsanitary condition of the cities, the vermin and larger insect pests, the stupid ignorance and arrogance of the official classes, the difficulties of interior travel, render Haiti all but impossible. We left Jacmel for Kingston, Jamaica, rejoicing in our flight from that land of dark superstition and filth.

Our material has not yet been overhauled, but I may, with due caution, state that Haiti is not so rich conchologically as Jamaica or

parts of Cuba, though richer probably than is Porto Rico. The distribution of its shells is far more general than as recorded in Crosse's list, and the affinities between the faunas of North Haiti and Cuba and South Haiti and Jamaica are not so decidedly marked as heretofore supposed.

The presence of a large number of the *Thaumasia* group of *Urocoptidæ* in the Southern peninsula is significant, yet we encountered *Lucidella*, *Stoastoma* and a probable *Sagda* in the north.

ALASMIDONTA MARGINATA SAY.

In the April number of the *Nautilus* Professor Charles Le Roy Wheeler calls attention to the above species and is in doubt whether this name should be applied to the somewhat solid, inflated, rhomboid western shell, or the less inflated, thinner, triangular form from the Atlantic drainage. I am glad Professor Wheeler has called attention to this, because at the time I made up the account of Say's species for the *Synopsis* I overlooked the fact that it had just been published in the *Journal of the Academy of Natural Sciences*. In Dr. Dall's copy of the paper on *Conchology* by Say in the third edition of *Nicholson's Encyclopedia*, Say says: "Found in the river—" leaving it to be understood that he was not certain where it was found. Immediately after the dash there is written in ink "Delaware."

The description is not very clear, but I was inclined to believe that it applied better to the eastern than the western form. Say says that his shell is transversely oblong-suboval, and this outline applies best to the eastern shell, which is often irregularly obovate, while the western form is almost invariably rhomboid. He states that it is bluish-white within, with a white margin. The eastern form is sometimes colored within in this way; in the western specimens the border is generally darker than the rest of the interior. The length given, $2\frac{1}{2}$ inches, agrees better, I think, with the eastern shell than with the western one, which runs from 3 to $4\frac{1}{2}$ inches, though of course Say might have had a young specimen of the heavy rhomboid form before him.

He says that it was communicated to him by Mr. Lea, who found it in the Scioto River. I am doubtful whether Dr. Lea ever col-

lected in that river. Most of his shells from Ohio were collected by Mr. T. G. Lea or other resident collectors in the State.

It is probable that Say's type is lost. I could not find it when I went over the Academy's collection and made notes on his species, and since the publication of Professor Wheeler's note Mr. Vanatta has kindly made a search for it, and fails to find it.

I confess that I am in doubt as to what Mr. Say had before him when he described his *Alasmidonta marginata*, though I am inclined to think it was the eastern form. In case it should be shown that Say's name applies to the western shell, the name *Alasmidonta varicosa* Lamarck, could probably be used for the Atlantic drainage species.

NEW VARIETIES OF FRESH WATER SHELLS.

BY FRANK C. BAKER.

Limnæa reflexa jolietensis, n. var.

Limnæa reflexa attenuata, Baker (non Say), Trans. St. Louis Acad. Sci., Vol. IX, p. 20, pl. 1, fig. 4, 1901.

Shell with an attenuated spire, the whorls, seven in number, being very convex and the sutures very deeply impressed; aperture about a third the length of the entire shell, ovate, thickened on the inside by a heavy callus; peristome thin; columella covered by a heavy callus and with a prominent plait; color light horn, frequently blackened by the carbon dioxide in the water, aperture of same color, the internal callus edged with dark brown or red.

Length 24.00; width 8.00; aperture length 9.50; width 5.25 mill.

Length 23.00; width 7.75; aperture length 9.00; width 5.00 mill.

Length 22.00; width 7.00; aperture length 8.75; width 4.75 mill.

Length 29.00 mill. (Bryant Walker collection).

Distribution: Joliet, Illinois (J. H. Ferriss); Saginaw River, Michigan (Bryant Walker).

Remarks: In the publication mentioned above the writer was led into the error of identifying the Joliet specimens as *attenuata* Say. Mr. Bryant Walker, to whom specimens were sent, has called the writer's attention to the true characters of *attenuata* and to the fact that the Joliet specimens are a distinct and undescribed variety of *reflexa*. The peculiar loosely coiled whorls, attenuated spire and labiate lip will easily distinguish this variety.

In Bull. No. 3, Vol. II, of the Chicago Academy of Sciences, the writer published an account of the anatomy of *Limnæa emarginata* var. *Mighelsi* in which several errors appeared. The first was the position of the kidney and ureter as figured on plate VI. K. U. An examination of a larger and more perfect specimen shows the shape and position to be different, the ureter really proceeding from the anterior end and extending in a straight line to the edge of the mantle. It is needless to add that the renal organs, as figured on this plate, do not exist in the fresh water pulmonates.

On plate III of the same paper is given a figure of the genitalia in which a flagellum is described (E. F.). This is the vas deferens and the duct thought to be the vas deferens is the penis retractor muscle.

NEW LAND SHELLS FROM THE LOO CHOO ISLANDS AND JAPAN.

BY HENRY A. PILSBRY.

Mr. Hirase, continuing his researches, has recently taken steps to procure shells of the Loo Choo Islands; some of the first-fruits being noticed below. He writes: "I have sent two able collectors, in the hope that I may procure for study the land shells of Kiushiu and Loo Choo. They were sent at first, on February 23d last, to Yaeyama, in the Loo Choos, for a stay of two months; but because of malaria they were obliged to leave, and thus spent only twenty days there. They are now working in the neighboring island of Nawa, in the Loo Choo group."

Among the species sent from Yaeyama are *Clausilia hyperoptyx* Pils., *C. Stearnsii* Pils., *Bifidaria armigerella* Reinh., and *Georissa japonica* Pils. The last two species were originally described from the main island of Japan, Hondo; and their occurrence in the middle Loo Choo group extends their distribution notably. The specimens are, however, quite typical. The finding of a typical species of the Chinese group *Buliminopsis*, *B. meiacoshimensis* A. & R., which Mr. Hirase sends from Yaeyama Island, and a species of *Tornatellina*, is extremely interesting. The latter genus has not been reported nearer than Luzon, so far as I know. Of *Buliminopsis* two species have been described from the Loo Choo Is., *B. meiacoshimensis* Adams and Reeve, described as a *Bulimus*, and

hitherto referred to *Stenogyra*, and *B. turritus* Gude, described as *Ganesella*, though Mr. Gude suggests that it may be a *Buliminopsis*. Although I formerly thought *turrita* a *Ganesella*, the sculpture of fresh specimens is so similar to *Buliminopsis* that I have now little doubt that Gude's surmise was correct. It resembles the Chinese *B. buliminoides* Hde. in shape, but the latter, from a specimen received from Pere Heude, is narrower and less acutely keeled. Dr. Fritz Wiegmann has recently shown that *Buliminopsis* has essentially the organization of the genus *Eulota*, and therein is perhaps nearest to *Cathaica*. His investigations show that there are no important anatomical differences between the numerous subgenera which I have subordinated to *Eulota*. The characters intergrade by easy stages. Even *Buliminopsis* is anatomically an *Eulota*.

At Shunashiri, Loo Choo group, a form of *Eulota* (*Plectotropis*) *scepasma* Pfr. occurred, having $6\frac{1}{2}$ whorls and a more depressed contour, being thus more acutely carinate. It measures, alt. $10\frac{1}{2}$, diam. 21 mm., and is densely covered, like the typical form, with short, triangular, cuticular scales. *Plectotropis pachysoma* Ehrmann, is evidently a synonym of typical *E. scepasma*.

Trishoplita collinsoni var. *casta* nov. Shell rather openly umbilicate, depressed, with conic spire; white with a brown line at the periphery, showing above the suture on the spire. Surface shining, minutely striate, rather faintly decussate beneath, microscopically papillose. Whorls 6, slowly widening, the last very obsoletely angular at the periphery, becoming rounded towards the aperture, convex beneath. Aperture oblique, shortly oval, slightly lunate, the penultimate whorl excising a segment of about one-fourth the circumference of the peristome; lip white, narrowly expanded above, the outer and basal margins reflexed.

Alt. 8.6, diam. 12.5; length of aperture 5.5, width 6.3 mm.

Alt. 10, diam. 12; length of aperture 6, width 7 mm.

Obi, Prov. Hyuga, in eastern Kiushiu (Mr. Y. Hirase).

This species is somewhat more conical than *T. tosana* Gude,¹ with an umbilicus of about the same width or a little smaller. It has about the form but not the coloration of *T. cretacea* var. *bipartita*, and is apparently allied to *T. collinsoni* (A. Ad.) and *T. lischkeana* (Kob.), both of which have similar coloration. *T. collinsoni* was described from "Tago," which I take to be Tako, a place at the west-

¹ The name *tosana* Gude has three days priority over *suprazonata* Pilsbry.

ern end of Shikoku Island. It has not been figured, but is said to be "globoso-conica," "late perforata," with a wide peripheral band and lunate aperture. None of these terms would I apply to the shells before me, though it is by no means impossible that my species is a variety of that of Adams. *T. lischkeana* is from Hagi, on the north coast of western Hondo. It is a smaller shell than *T. casta*, with narrower umbilicus. When these forms of *Trishoplita* are better known, I believe they will be seen to fall under a few specific heads, like the *pelionophala* group of *Euhadra*. It is likely that *collinsoni*, *casta*, *lischkeana*, *bipartita* and *cretacea* are varying races of one species, and will be found to intergrade on the confines of their several areas. *T. collinsoni* is the senior name for the group, which has about the distribution of *Eulota callizona* var. *maritima* G. & P.—Shikoku, eastern Kiushiu and western Hondo.

Trishoplita hiugensis n. sp. Shell depressed, rather narrowly umbilicate, brownish yellow, the suture bordered below with a narrow white band; very glossy, finely striatulate. Spire low-conic, the apex obtuse. Whorls $4\frac{3}{4}$, convex, the last slightly deflexed in front, indistinctly angular at the periphery in front, becoming rounded on the latter portion. Convex beneath. Aperture shaped like that of *T. tosana*, the lip expanded, reflexed below. Alt. 6.4, diam. 9.4–9.8 mm.

Obi, Prov. Hyuga, Kiushiu (Mr. Y. Hirase).

A smaller, less conoidal form than *T. tosana* or *T. dacostæ*, with fewer whorls. It is No. 601 of Mr. Hirase's collection.

Kaliella Austeniana n. sp.

Shell distinctly perforate, turbinate-conic, thin, light reddish brown. Surface very minutely sculptured with densely crowded rib-striæ, which give it a silken luster, and give place on the more glossy base to slight growth-wrinkles and fine spiral striæ. Whorls nearly 6, very convex, the first one sculptured with much more spaced rib-striæ; last whorl obtusely subangular at the periphery, quite convex beneath. Aperture oblique, rather broadly crescent shaped; peristome simple and thin, the columellar margin dilated above. Alt. 2.7, diam. 5.2 mm.

Yaeyama Island (Mr. Y. Hirase, no. 627).

In this species the minute striæ continue below the periphery, and form a silken band around the base, the central two-thirds of which is more glabrous. This has been noticed in *Juconulus*, *Guppya*,

etc., also. The spaced costulation of the initial whorl is a characteristic though not invariable feature of *Kaliella*.

It is named in honor of Lieut.-Col. H. H. Godwin-Austen, whose work on the Indian *Zonitidæ* is destined to become a malacological classic.

Kaliella yaeyamensis n. sp.

Shell narrowly perforate, rather low conic, thin, reddish brown. Surface slightly shining above, glossy beneath, sculptured with rib-striæ comparatively coarse for a *Kaliella* (but still very fine), continuing on the first whorl, obsolete on the base, and excessively minute spiral striæ. Whorls $4\frac{3}{4}$, moderately convex, the last angular (but not acutely so) at the periphery, not very convex beneath. Aperture oblique, broadly crescentic, the lip thin and simple, dilated at the columellar insertion. Alt. 2, diam. 3 mm.

Yaeyama Island (Mr. Y. Hirase, no. 625).

With *K. nahaensis* Gude, this makes three species of *Kaliella* now known from the Loo Choo Islands. *K. nahaensis* has fine, almost subobsolete striæ, and a peripheral keel, thus differing decidedly from the two species described above.

Kaliella ruida n. sp.

Shell perforate, in shape resembling *Microcystina ceratodes* (Gude). Acutely keeled, thin, brown, somewhat translucent, sculptured above and in a band around the base, below the periphery, with sharp, close and regular rib-striæ; the rest of the base glossy, with very minute spirals only. Whorls $3\frac{1}{2}$, moderately convex above, the last quite convex beneath. Aperture wide-crescentic, peristome thin, fragile. Alt. 2, diam. 3.5 mm.

Gojo, Prov. Yamato, Japan (Mr. Y. Hirase, no. 607).

I am disposed to believe this shell, of which but two specimens were sent, is not full grown, and will be found to attain a larger size; but the sculpture is so conspicuous and so unlike any known species of similar shape, that its recognition will be easy.

Georissa luchuana n. sp.

Shell small, globose-turbinate, dull red, composed of nearly $3\frac{1}{2}$ very convex whorls, the first glossy and smooth, with rather large apex, the rest rapidly increasing, closely and regularly striated or lirulate spirally. Last whorl large and obese. Aperture oblique,

half-circular; outer lip simple; columella heavily calloused, wide and somewhat flattened. Length 2.1, diam. 1.85 m.

Yaeyama Island, Loo Choo group (Mr. Y. Hirase, no. 623).

A species relatively much shorter and wider than the related *G. japonica* Pils., which occurs also on Yaeyama.

Dr. v. Möllendorff has recently redescribed *G. japonica* as a new species, not knowing of my earlier description. He used the same specific name (Nachrbl. 1901, p. 45).

Diplommatina insularum n. sp.

Shell minute, imperforate, amber-colored or corneous, cylindrical-oblong, the penult whorl widest, those above forming a gradually tapering spire, sculptured with delicate, rather close rib-striæ. Whorls $6\frac{3}{4}$, convex, the last narrower than the preceding, ascending to the aperture, somewhat constricted in front. Aperture circular, the peristome continuous, outer lip doubled; columella acutely toothed; palatal fold short. Length 2.8, diam. 1.4, alt. of aperture with peristome 1 mm.

Yaeyama, Loo Choo Islands (Mr. Y. Hirase, no. 620).

This is a decidedly more tapering species than *D. cassa*. *D. nipponensis* is less slender and smoother, and *D. kobelti* is larger and more pyramidal. All of these are dextral forms. *Paxillus lyratus* Gld. may be closely allied, possibly identical; but the description is not sufficient for critical comparison.

Cyclotus Hirasei n. sp.

Shell broadly and openly umbilicate, subdiscoidal, yellowish-green in color, the first two whorls subtranslucent and deep amber colored; rather glossy, very irregularly and roughly wrinkled or even subpliate, in the direction of growth-lines. Whorls $3\frac{3}{4}$, the first $1\frac{1}{2}$ strongly projecting, teat-like, following whorls tubular, the last whorl slowly descending, barely in contact with, or slightly free from the preceding whorl, at the aperture. Aperture circular, slightly oblique. Peristome circular, unexpanded and acute, continuous. Operculum multispiral, with sunken central nucleus, the edges of the whorls projecting a little. Alt. 4.5, diam. 8.5, diam. of aperture 3.3 mm.

Loo Choo Is. (Mr. Y. Hirase, no 612).

Related to *C. swinhoei* and *C. minutus* H. Ad., of Formosa, but differing in sculpture, the present species being wrinkled but without spiral striation.

Diplommatina cassa n. sp.

Shell dextral, imperforate, oblong, rather thin, reddish-amber colored or whitish-corneous, composed of $6\frac{1}{2}$ very convex whorls, the last one narrower, strongly ascending. Surface densely and regularly costulate-striate. Aperture subcircular, the peristome continuous, thin, rather broadly and flatly reflexed, its face concave; there is a sharp, high and narrow crest close behind the outer and basal margins. Subcolumellar tooth strong; palatal fold short, situated to the left of the adjacent margin of the peristome. Length 3.1, diam. of penult. whorl 1.7, length of aperture 1.2 mm.

Kodakari, prov. Hida (no. 604), and Kyoto (no. 452), Y. Hirase.

This species is related to *D. nipponensis* Mlldff., *D. insularum* Pils., and *D. Kobelti* Ehrm. The conical part of the spire is much shorter than in the former of these, judging from specimens from the Hakone Mts., collected by Mr. B. Schmacker.

D. Kobelti is a species slightly longer than *D. cassa*, finely costulate-striate, composed of $7\frac{1}{2}$ whorls, of which only the last two are of equal diameter, those above tapering regularly, forming a *very long conic spire*. The aperture is about as described for *D. cassa*. Length 3.4, diam. 1.6, aperture 1.16 mm. It is thus slightly longer than either *nipponensis* or *cassa*, with one whorl more, and a longer more pyramidal spire. It is from Kashima, prov. Harima, where it occurs with *D. cassa* (no. 305 *b* of Mr. Hirase's collection).

These species are all distinctly smaller than *D. collarifera* S. & B. and *D. tenuiplica* Pils., and larger than *D. uzenensis* Pils.

D. minutissima Mlldff. 1901, is a synonym of *D. pusilla* var. *omiensis* Pils., published eight or nine months previously. Both were based on Mr. Hirase's no. 487.

Tornatellina inexpectata n. sp.

Shell umbilicate, pyramidal, thin, brown, glossy, smooth except for slight growth-lines. Spire straightly conic, the apex obtuse. Whorls $5\frac{3}{4}$, slightly convex, the last rounded at the periphery, convex below. Aperture subovate, armed within with a low entering lamella on the middle of the parietal wall. Peristome thin, the margins remote, columellar margin broadly dilated and reflexed. Length 3, diam. 1.7 mm.

Yaeyama Island (Mr. Y. Hirase, no. 626).

Carychium cymatoplax n. sp.

Shell minute, corneous-whitish, slender, cylindric-fusiform, almost

smooth. Whorls 5, moderately convex, the penult. and last of about equal diameter. Aperture small, somewhat oblique; peristome well expanded, much thickened within, the outer lip broad, with a blunt tooth above the middle, columella truncate at base; parietal lamella strong. Axial lamella becoming a very wide spiral plate within, bent into strong waves. Length 1.84, diam. .64 mm.

Yaeyama Island (Mr. Y. Hirase, no. 618).

This species is smaller and more cylindrical than *C. noduliferum*, is smooth, and the internal axial lamella is more strongly waved. *C. noduliferum* was described from Misaki, and has been sent by Mr. Hirase from Nishigo, Prov. Uzen. It is a strongly tapering shell, finely but sharply and regularly striate, and in most adults has a palatal nodule within the outer lip, though this is variable in development. It is larger than *C. cymatoplax*, length 2.2 mm.

NEW PUBLICATIONS.

DIGESTA MALACOLOGICA, No. 1. A Summary of the American Journal of Conchology. By E. R. Sykes.¹ Under the above caption Mr. Sykes proposes to issue a series of digests, prepared after the model of those in the Zoölogical Record. "It has been a constant source of difficulty for many years past to ascertain what work has been done by our predecessors, relating either to a special genus or to some faunal district. With the idea of rendering some assistance to students, the present work has been undertaken." The number before us deals with the *American Journal of Conchology*, and commences with a table of dates of publication, followed by a list of titles arranged by authors. The contents of the articles are then referred to under the heads of Anatomy, Distribution, both geographical and geological, etc. The systematic portion is arranged by families, every species described being referred to by volume and page. It is, therefore, easy to ascertain what the series contains relating to the mollusks of any given region, or of any special family or genus, whereas otherwise this information could be obtained only at the expense of much time and labor, or found only by accident. All who have occasion to use the *Journal* should possess themselves of this aid to its use. The Digest is well gotten up, and seems to contain but few mistakes or misprints.

¹ London, William Wesley & Son, 28 Essex St., Strand, 1901. (Price, \$1.50; to subscribers to the series, \$1.25.)

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THE AMERICA PHYSÆ.

BY O. A. CRANDALL, SEDALIA, MO.

The members of this genus are the most beautiful shells of all of our fresh-water snails, and, were they properly understood, would be the most sought for by collectors. It has been the custom of authors to attempt to establish species upon slight variations in form until the multiplicity of varieties and synonyms has caused such confusion that even our most experienced conchologists hesitate to venture an opinion as to many of the described species, while amateurs, being unable to obtain satisfactory information upon which to correctly label their "finds," have become so careless about collecting them that they are rarely offered for exchange.

To remedy this evil, and as far as possible to simplify the determination of species, I have given my spare time for several years past to the study of this genus, and now give to the public the result of my observations.

In determining the species of this genus it is not only necessary to observe the characteristic form of the shell, but something of its life-history must also be known. Some species grow to maturity in one season, while others require two or more seasons of growth to mature.

In central Missouri, *P. gyrina* Say is the first to appear in the spring and the last to disappear in the fall. I have seen them crawling on the ice in March and depositing the ova as late as the first of October. They begin depositing eggs early in May and continue throughout the season; and as the young are continually

hatching, all sizes may be found in the fall, none of which will be full grown. The members of this species require more than one year in which to mature, while other species deposit the ova early in May and the young attain full size the same season. Having a knowledge of which species mature—respectively in one, two and three seasons of growth—greatly simplifies the determination of species.

It is unnecessary to watch the growing snail, as I have done, to learn this fact, for every shell carries unmistakable evidence of the number of periods of growth it has required to attain its present size. This evidence is the white and brown lines upon the last, and next to the last whorl, called variceal lines, or bands. At the end of the season, or when the pond dries up, or when from any other cause the shell ceases to grow, the snail strengthens the shell by constructing a triangular-shaped rib within the sub-margin of the lip. In forming this rib the coloring matter which exudes from the mantle of the animal is withheld until the structure is complete, thus leaving a white or light-colored line on the outside of the shell immediately over the rib. Sometimes the line will be shaded with brown or some dark color on one side, rarely on both sides. As the ribs are never removed, the lines always remain visible on the outside of the shell, and mark the periods of growth.

For brevity in describing this feature I may be permitted to coin the word *annuan*. It is derived from the Latin word *annus*, year, and the suffix *an*, pertaining to, and signifies pertaining to one year, or period of growth.

In examining shells, first determine whether the example is an *annuan*, *bi-annuan* or *tri-annuan*; then examine the general form and appearance of the shell, the texture, sculpture, the form of the sutures, showing how the whorls are joined together, and the aperture. Color, height of spire, proportionate length of aperture and size of the shell are so variable that they have but little weight in determining species, except in a few cases.

The most reliable characteristics are, in the order here given, texture, structure and sculpture; in fact they are the only ones not changed by environment.

Texture relates to the weight and to the fineness and coarseness of the layers of which the shell is made. The viscid matter secreted by the mantle is deposited on the edge of the shell as the snail grows,

and hardens. In some species the exudation is continuous, or nearly so, while in others it seems to be deposited at intervals. When the deposit is frequent and small, or continuous, the lines of growth will be fine and the surface smooth and shining, as in *P. heterostropha* Say. When made at longer intervals, and large, the lines will be coarse, as in *P. gyrina* Say.

Structure refers to the general plan of the shell, but more particularly to the manner in which the whorls are joined together. In some forms, like *P. ancillaria* Say, the whorls lap over each other like shingles on a roof; in others, like *P. forsheyi* Lea, they rest against each other. This distinction is constant in all species, and to a great extent is carried through the varieties.

Sculpture is the markings on the surface of the shell, and consists of the lines of growth, striæ crossing the lines of growth, as in *P. oleacea* Tryon, ribs, as in *P. costata* Newcomb, and such other markings as may be found constant in a species.

It must be remembered that while these characters are always found in typical members of species having one or more of them, they become modified in the varieties and forms, and the greater the departure from the type the greater will be the modification.

Species are supposed to be founded upon permanent characteristics which are not influenced by change of location or environment. Varietal changes are many and frequent, and it is doubtful if a single variety described forty years ago can now be found living and identified, while species should be found in the habitat of the type with but slight variations in its characterization.

No member of the animal kingdom is so susceptible to local influences as fresh water snails. Every change of environment changes the Physa, and so long as environments continue to change new forms will continue to occur; but they will not necessarily be new species nor varieties, but new forms of the same species, having the same characteristics upon which it was founded, with some of them more or less modified.

Another cause for variations is the probably frequent occurrence of cross breeding, producing hybrids. It is often that forms are presented to conchologists for identification having some of the characteristics of two different species, neither of which is sufficiently strong to control, and the life history not being known, they are described as new species. The forms being hybrids, when the crop disappears

the species disappears with it, and so we have a large list of described species in our literature with but few living forms to represent them.

To simplify the study of the genus I discard all sub-genera and divide the genus into species, varieties and forms.

Species are forms having some characteristics which remain constant for ages.

Varieties are forms having the ruling characteristics of the species to which they belong, with modifications that remain constant for years.

Forms show temporary variations caused by environment or hybridization, and are transient. New forms are appearing every year. I would not attempt to refer all the living forms to their respective progenitors, but leave the collector to attach the label to suit his own taste.

Where a form can now be found that substantially bears the description given forty or fifty years ago, it should be considered a species, if originally founded on sufficient differences from other described species to entitle it to rank as such; but where no specimens of a species has been found since it was described many years ago, it is likely to have been only a local form, and to have become extinct.

Many of the early described species are found now bearing the same distinctive characters as when first described. It is these typical forms that must be our guide, and not the varieties.

The result of my examination of all the described species occurring east of the Rocky Mountains will be found in the following paper.

Physa heterostropha Say.

Synonyms: *P. Philippi* Küster, *P. plicata*, De Kay.

This species was described by Thomas Say in 1817 from forms taken in the Delaware River, and the same forms are found there yet. The water having become polluted, they are covered with a dark coating and many of them distorted. The type is not inflated nor elongated, yet the larger part of the specimens of the species now accepted by conchologists are more or less inflated. Some even go so far as to include under this head all the varieties of *P. ancillaria*, Say, *P. lordi* Baird, and *P. sayii* Tappan. While there are some good reasons for bunching all the American *Physæ* into one species with a vast number of varieties, I do not believe such a course would be conducive to the best interests of science. Species should be

founded on some distinct and constant characters, and reduced to the minimum.

The shell described by Say is symmetrical, of fine texture, smooth and shining surface, lines of growth scarcely visible even with a lens, whorls four, convex, sutures impressed, spire elevated and acute, and the inner wall of the aperture straight. It is an annuan, rarely taking a second growth, and when it does the growth appears to be an addition to a mature shell.

Distinguished by its symmetrical form, smooth and shining surface, convex whorls, impressed sutures, elevated and acute spire and straight or perpendicular axis, thus forming a straight inner wall to the aperture.

Physa philippi Küster, is an inflated variety bearing all the characteristics of the type, except that it is inflated and the columella is slightly curved. This is the first inflated variety described, and should cover all inflated forms.

Physa plicata DeKay. This form is admitted a species by Tryon, but Binney, Pilsbry, and others, place it amongst the synonyms of this species, where it evidently belongs, unless it is raised to a variety. It being the only elongated form of this species ever described, it may well be considered a variety to which all elongated forms should be referred.

Physa heterostropha alba, n. v. Shell ovate, symmetrical, not inflated, porcelain white, whorls four, convex, sutures impressed, spire elevated and acute, surface smooth and shining, columella slightly curved. Diameter $\frac{2}{3}$ the length. This beautiful little shell was sent to me by Mr. Albert Baily, of Capachet, N. Y., he having taken it from Cedar Lake near that place. It is distinguished by its color.

I have recently seen in Mr. Bryant Walker's collection some very fine forms of this species that seem to be of frequent occurrence in Northern Michigan. They are slightly more elongated than the type, and are marked with a dark-brown apex. This marking does not appear in any of the eastern forms, so far as I know, but it is not sufficient variation to found a variety upon.

Further forms are: *Physa striata* Menke, *P. charpentieri* Küster, *P. fragilis* Mighels, *P. lata* Tryon, *P. primeana* Tryon, and many other slight variations which have not been named.

This species extends from the Potomac and Ohio rivers north and

east over New England and Canada, and as far west as Indiana and Michigan. West of the Alleghanies it gradually gives way to *P. sayii* Tappan. I have never seen a well authenticated example west of the Mississippi or south of the Ohio.

(To be continued.)

THE SYNONYMY OF BYTHINELLA OBTUSA LEA.

BY BRYANT WALKER.

This well-known and characteristic little species, which has an extended range through the Northern States from New York to Iowa, if not further west, was first described by Lea, in 1841, as *Paludina obtusa*. Haldeman, in his "Monograph of the Fresh-water Univalve Mollusca" (1844?), although apparently unacquainted with the species, referred it to the genus *Ammicola*. Binney (1862), in his preliminary study of the fresh-water operculates, also placed it among the *Ammicolæ*. Stimpson (1865), in his "Researches upon the Hydrobiinæ," considered it "probably referable" to *Bythinella*. In this he was followed by Binney (1865) and Tryon (1870), and from that time the species has been uniformly known and cited as *Bythinella obtusa*.

Unfortunately, however, Lea had been anticipated in the use of the name, *Paludina obtusa*, by Troschel, who, in 1837, had described a species of *Vivipara* from Bengal under that name. It follows necessarily, therefore, that Lea's name will have to give way; and had not the species already been described by another author under a different name, a new one would have to be provided for it.

Were it not for the express statement that his species was imperforate, I should be inclined to refer this species to Green's *Paludina alleghaniensis* (see Binney, L. & F. W. Shells, III, p. 60), which has several years' priority. The differences relied upon by Lea in differentiating his "*obtusa*" would scarcely be sufficient in the absence of the other peculiarity. I know of no other species from Pennsylvania that would fill the description except *Ammicola decisa* Hald., which might well be called imperforate. On the other hand,

the "elevated and rather obtuse" spire would apply better to "*obtusa*." In view of this uncertainty, it would seem better to accept a later description, in regard to which there can be no question, rather than to attempt to rehabilitate a name which must always be the object of suspicion. There should be a statute of limitations in science as there is in law; and the use of a name, which has become established by tradition and long usage, should not be overturned, in the absence of the type specimens, excepting upon the most convincing proof.

In 1852 Küster, in his "Monograph of Paludina," in the *Conchylien Cabinet*, describes a small species from North America as *Paludina emarginata*, which he attributed to Say, on the authority of Brown. As Say never used the name "*emarginata*" in connection with any fresh-water operculate form, this species will have to stand as *Paludina emarginata* Küster.

Binney, in his "Land and Fresh-water Shells of North America" (1865), refers Küster's species to *Annicola cincinnatiensis* Anth. as a synonym. This was clearly erroneous, as a most casual inspection of Küster's description and figure quoted by Binney will show.

Tryon makes no mention whatever of Küster's "*emarginata*" in his continuation of Haldeman.

What Küster's species really was has been a matter of speculation with me for many years. Recently, however, in reading Frauenfeld's paper (1863) on the *Annicolæ*, in the Imperial [Vienna] and Cuming Collections, I found a statement that specimens clearly agreeing with Küster's figure were in the Cuming collection labeled "*obtusa* Whit." Now there was a well-known collector named Whittemore, who lived in Massachusetts in 1840-1860, and it seemed quite probable that he had supplied the Cumingian specimens under Lea's name, but without quoting his authority. Then, too, there was a very evident accord between Küster's figure and his description and those of Lea's species.

On applying to Mr. E. A. Smith, of the British Museum, for information in regard to the Cumingian specimens, I was favored with the following statement:

"The shells marked *Annicola* '*obtusa* Whit' in the Cuming collection certainly are not *cincinnatiensis* Anth., and I believe that you are right in considering them the same as *obtusa* Lea. They agree exactly with Binney's figure, Part III., p. 70, but are corneous

and not "dark green" as Lea describes it. May not the green tint have been due to *confervæ*? Accompanying the specimens of '*obtusa* Whit.,' is a ticket '*emarginata* Say,' in Frauenfeld's own handwriting. I do not see how they can be separated from the form described and figured by Küster as '*emarginata*' of Say, or in other words, I consider them the same species."

This would certainly seem to be conclusive as to the identity of Küster's "*emarginata*" with Lea's "*obtusa*." And, as for the reason above given, Lea's name cannot be used, it follows that the species must hereafter be known as "*emarginata* Küster." As to the proper generic designation, the investigation of the radula by Messrs. Pilsbry and Beecher shows the species to belong to the genus *Cincinnatia*, the dentition being like that of "*Amnicola*" *cincinnatiensis* Anth., and unlike all other known species of "*Bythinella*" or *Amnicola*.

The complete synonymy of our species will then stand as follows:

CINCINNATIA EMARGINATA (KÜST.).

1841. *Paludina obtusa* Lea, Proc. Am. Phil. Soc. II., p. 34, non Troschel (1837), Wieg., Archiv, I., p. 173.

1844. *Paludina obtusa* Lea, Trans. Am. Phil. Soc. IX., p. 13.

1848. *Paludina obtusa* Lea, Obs. Gen. Unio, IV., p. 13.

1844. *Amnicola obtusa* Lea, Hald. Mon. F. W. Univ. Moll., p. 24.

1862. *Amnicola obtusa* Binney Desc. Cat. Amnicola, &c., p. 10.

1865. *Bythinella obtusa* Stimp., Hydrobiinæ, p. 20.

1865. *Bythinella obtusa* Binney, L. & F. W. Shells, N. A. III., p. 69, fig. 138.

1870. *Bythinella obtusa* Tryon, Mon. F. W. Univ. Moll., p. 48, pl. 16, fig. 6.

1852. *Paludina emarginata* Küst., Paludina, Conch. Cab., p. 50, pl. 10, figs. 3 & 4.

1863. *Amnicola emarginata*, Frfld., Verh. Zool.-bot. Ges. Wien. XIII., p. 1030.

1865. *Amnicola cincinnatiensis* Binney L. & F. W. Shells, N. A., p. 85, fig. 169.

A NEW JAMAICAN LAND SHELL.

BY GEORGE H. CLAPP.

Pleurodonte Adamsiana, n. sp. Plate II, Figs. 1, 2.*

Shell imperforate, carinated, depressed, convex above, regularly and very convex below, solid, dark purplish-brown with a white up-turned carina; the whole surface, with the exception of the apex, densely, finely granulate; apex subplanulate, almost smooth, shining, yellowish-white; sutures impressed; whorls 5, convex, slowly widening and wavy; body-whorl acutely carinated at the periphery, concave above, convex below the carina, impressed in the umbilical region, very slightly descending anteriorly, with a slight furrow or groove, about 4 mm. long, just back of the aperture above the carina; carina white, translucent. Aperture oblique, subtriangular, shining brown, inside showing the light peripheral band; peristome white shaded with brown, bearing inside the lower margin four teeth; a very small one near the insertion, then a larger on the basal margin, then two near together on a common eminence toward the outer angle of the aperture; the last two teeth are united for over half their height, the outer one turning sharply toward the peristome. The base is deeply tri-scribulate behind the peristome, the outer two grooves being in a common pit. Margins of peristome joined by a thin transparent callus which sweeps around the umbilical region.

Greater diameter 32, lesser 28, altitude 14 mm.

“Whitney Estate,” Upper Clarendon, Jamaica. A single dead but perfectly fresh and unweathered specimen.

This species seems to unite two widely different groups, as it has the *aperture* and *teeth* of *P. peracutissima* and the granulated surface and supraperipheral furrow of *P. sinuata*. In general appearance it is, however, unlike either.

I take pleasure in naming this shell, one of the most beautiful of the Jamaican *Pleurodonte*s, after the late Prof. C. B. Adams who did so much in working out the wonderfully complex molluscan fauna of Jamaica.

* Plate II will accompany the next issue.

A NEW COLOMBIAN PLEURODONTE.

BY H. A. PILSBRY.

Pleurodonte (*Labyrinthus*) *Clappi*, n. sp. Pl. II, figs. 3, 4.

Shell imperforate, thick lens-shaped, carinated at the periphery, strong and solid, chocolate-brown, with a purplish cast; surface slightly striated obliquely, and showing a minute and dense but superficial spiral wrinkling or malleation over part of the base. Spire dome-shaped rather than conic; whorls $4\frac{3}{4}$ to 5, but slightly convex, slowly widening, the first $2\frac{3}{4}$ whorls punctate, the last angular at the periphery, the angle almost obsolete on the more swollen latter part of the whorl, which is very deeply deflexed in front, and strongly constricted behind the lip, the constriction showing two pits behind the basal lip and a linear scar at the periphery. Aperture extremely oblique, ear shaped, the peristome continuous, the lip broadly reflexed; parietal wall bearing a strong and long oblique lamina; outer lip with a compressed, fold-like tooth rising from a swollen base; basal lip three-toothed, the outer tooth high, oblique and compressed, the median stout and squarish, the inner smaller and bilobed; a small compressed fold stands on the axial reflection, exactly over the umbilicus.

Alt. 21, greater diam. 35, lesser 30 mm.

Alt. 19, greater diam. $32\frac{3}{4}$, lesser 28 mm.

Sierra de Santa Marta, Colombia, at "Alto de Cielo," at about 5,000 feet elevation, in forest among rotting leaves on the ground.

The first specimen taken was a dead shell, eroded and showing a dull red inner layer on the spire, eaten into many small pits on the body-whorl. A second perfect specimen, slightly larger, has been found this year. It is most nearly allied to *Helix sieversi* v. Martens (Conch. Mittheil. iii, p. 7, 1889; Man. Conch. viii, p. 263, ix, pl. 22, f. 7, 8), also from the Santa Marta mountains, resembling it in the arrangement of the teeth, but *P. Clappi* differs from that species in being much larger, with the periphery keeled, the spire lower and dome-shaped, the teeth more strongly developed, and the umbilicus wholly closed. *Pleurodonte sieversi* measures $12\frac{1}{2}$ by $19\frac{1}{2}$ mm., has 5 whorls, a wide-conoidal spire, rounded periphery and minute umbilical chink, and there are some differences in the teeth, the inner

basal one not being described as bifid, and being about equal to the next tooth in size, and no axial tooth is developed.

P. Clappi is a very interesting addition to the sub-genus *Labyrinthus*. It will be interesting to know what snail-eating mollusk or arthropod inhabits the northern part of South America, where this type of shell is developed, that is absent in southern Colombia and Ecuador, where the almost toothless group *Isomeria* occurs.

This species is one of the most interesting of Mr. Herbert H. Smith's finds in the Sierra de Santa Marta. It is named in honor of my friend Geo. H. Clapp.

GENERAL NOTES.

TRUNCATELLA TRUNCATULA (Drap.) IN THE UNITED STATES.—In preparing the Catalogue of North American Land Shells, this species was inadvertently overlooked. It has been recorded by Prof. Verrill, in the Proc. U. S. Nat. Mus., III, 376, and Trans. Conn. Acad. Arts & Sci., V, 525, fig. 8, as follows: "Living in considerable numbers, and of all ages, among the docks at Newport, R. I., July, 1880. It occurred among decaying sea-weed thrown up at high-water mark, both among the vegetable matter and on the under side of stones." "Common on the coast of Europe, and in similar localities. Perhaps introduced on this coast by shipping, but it may have been hitherto overlooked. It was associated with *Assiminea grayana* and *Alexia myosotis*."—C. W. J.

AN EVOLVING ASHMUNELLA.—*Ashmunella thomsoniana cooperæ*, n. var.—Shell with max. diam. from 13 to 15 millim., but usually of the smaller size; basal tooth single, occasionally slightly double; umbilicus narrower than in type or var. *porteræ*, exposing less of the penultimate whorl; genitalia as in *porteræ*, with the same long (22 mm.) spermatheca, and double insertion of the penis retractor. *Hab.*—Las Vegas Hot Springs, 1900, 1901. Discovered by Miss Mary Cooper; later taken in quantity by Miss Cooper and Miss Maud Ellis. The locality is in the Transition Zone, at about 7,000 ft. altitude; *porteræ* belongs to the Canadian Zone, about 1,000 ft. higher. This is not a very distinct form, conchologically; but is worth calling attention to as a species of *Ashmunella* in the making, probably derived from the *porteræ* form rather than from the true *thomsoniana*.—T. D. A. COCKERELL.

PUBLICATIONS RECEIVED.

MARYLAND GEOLOGICAL SURVEY: EOCENE. By Wm. B. Clark and Geo. C. Martin. It has afforded us a great deal of pleasure and instruction to peruse the carefully prepared and beautifully printed volumes of the Maryland Geological Survey. The State may justly feel proud that it is able to present to the world such admirable reports on its physical and geological features. The present volume on the Eocene fauna is especially interesting to conchologists, as by far the largest number of forms described are molluscan. The volume contains 331 pages and 64 plates, and includes a map and sections. Two formations are recognized, the Nanjemoy and Aquia, the former corresponding in many respects to the Lower Claibornian, and the latter to the Chickasawan of the Gulf States. There are described and well figured 135 species of mollusca; among which is a large new Nautiloid (*Hercoglossa tuomeyi*), while 19 Gastropoda, and 10 Pelecypoda are also described as new. Among the 135 species are 15 of which the genus only is given, the specimens being too imperfect for specific descriptions. We highly commend this step, for the description of indeterminate species is only a hindrance to the progress of paleontology. C. W. J.

CORRESPONDENCE.

EDITORS NAUTILUS: I have read with deep interest Mr. J. B. Henderson's article in the June NAUTILUS on the trip made by himself and companions, Messrs. C. T. Simpson and Robert T. Hill, to Haiti on a hunt for land shells, and was sorry to learn of their comparative failure to secure a greater number of specimens of that splendid species, *Pleurodonte gigantea*. I then recalled that when my friend, Mr. H. Rolle, of Berlin, returned from his Haitian trip, where he had spent three months or more collecting specimens, he called on me at my home (then) at Brooklyn, N. Y., and told me of his efforts to find this snail, and how very difficult it was to secure them, because it was a *night* shell, rarely ever being seen in daylight. He succeeded by doing his searching at night, with the aid of a lantern. He referred to the same spot—palace and fortress—mentioned by Mr. H., where they found the dead shells so numerous. If they had worked the grounds by *lamp light* I fancy they would have been rewarded with a larger catch. My collection contains but one of this species; it is a very large and excellent specimen, except for a somewhat marred epidermis. Mr. H. makes no mention of finding any *Cerion*. Did they not look or care for them? I think *Cerion* a very interesting and beautiful snail. They must be quite abundant, for the Rev. Mr. Smith, resident missionary at Cape Haitian, sent me a very large number of most perfect and beautiful specimens. I compliment the gentlemen on the final success of their efforts.

June 6th, 1901.

A. B. KENDIG, *Brookline, Mass.*



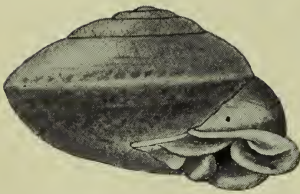
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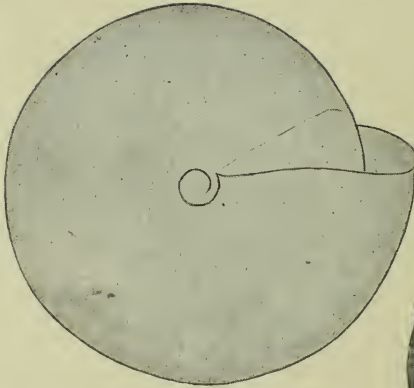
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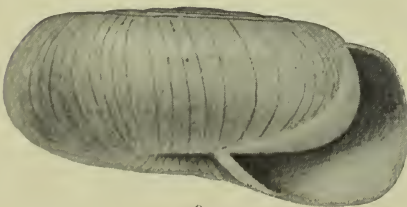
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THE NAUTILUS.

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PLATE II.

Figs. 1, 2. *Pleurodonte Adamsiana* Clapp. This Journal for July, p. 33.

Figs. 3, 4. *Pleurodonte Clappi* Pilsbry. This Journal for July, p. 34.

Fig. 5. *Physa Walkeri* Crandall. Petosky, Mich.

Figs. 6, 7. *Physa rhomboidea* Crandall. Muddy Creek, Sedalia, Mo.

Figs. 8, 9. *Gastrodonta Clappi* Pils. This Journal XII, p. 86; XIV, p. 58. Large depressed specimen from Clingman Dome, no. 2490, coll G. H. Clapp. Alt. 3, diam. 6.2 mm.

Figs. 10, 11, 12. *Nenia Smithiæ* Pilsbry. Page 39.

THE UNIONIDÆ OF NORTH AMERICA.

BY H. VON IHERING.

By the publication of his "*Synopsis of the Naiades*" Mr. Simpson has rendered an excellent service to students of Malacology and of the *Unionidæ* especially. It is for me the greatest satisfaction to felicitate Mr. Simpson upon having produced a work which will mark a new period in the study of fresh-water mussels.

It will be understood from this that the work of Mr. Simpson does not represent the conclusion of a series of successful studies, but a basis for the beginning of a new period of investigation. Doubtless this work will give an impulse to the study of the *Unionidæ*, and it is the purpose of these lines to point out what we may expect concerning the American *Unionidæ*.

The criticisms we have to make upon the *Synopsis* of Mr. Simpson refer principally to two points: The validity of the genera adopted by him, and the systematic arrangement of these groups to form greater sections. Concerning the specific limits and their sometimes enormous synonymy I am nearly always of the same opinion with him. Some observations about species concerning which I hold divergent views, will follow at more length below. I cannot say the same concerning the genera, as may easily be understood. Many of the distinctive characters are derived from anatomic structures, and therefore are unknown where the animal has not yet been observed. The association of a number of species in one genus is therefore in many cases but a provisional grouping; and specially is this the case with the Mexican and Central American species.

The systematic arrangement of the North American *Unionidæ*, as given by Simpson in his *Synopsis*, is based essentially upon the marsupia; that is to say the gills or parts of them functioning as ovisacs. This is a classification which we may not see employed without scruples, because it is based rather on physiologic than anatomical characters. Zoölogical classification is founded on morphological characters, and while physiologic or biological facts may give us important explanations, they cannot be employed directly for systematic purposes. This is generally acknowledged, since it became necessary to dismember the class of *Helminthes*, and it is likewise valid for the *Mollusca*, as proved by the example of the pelagic gastropods. Whether the eggs expelled out of the genital orifice pass into the inner gills (*Endobranchiæ*) or in the outer ones (*Exobranchiæ*) or if they fill on each side both the gills (*Amphibranchiæ*), is a fact of merely physiologic signification, and cannot be employed for systematic purposes. These differences are less than those which exist in many genera or species of gastropods, very closely allied, in reference to the deposition of eggs, some being oviparous, others ovoviviparous or viviparous. As it seems, there are in many species of the group *Lampsilis* and *Quadrula* structural modifications of the outer gills, which may be used for systematic purposes, but the few exact data thereon which may be found in the publications of Lea, Sterki and Simpson are throughout insufficient. What we need is a careful, histological study upon the gills, marsupia and ovisacs of the North American *Unionidæ*.

These facts, however, do not affect the general question. It is quite evident that a systematic arrangement of the marsupia does not coincide with a natural system of the family. The species of *Diplodon* of New Zealand, which I have examined, had filled only the inner gills with eggs; but Suter has observed that sometimes eggs are also found in the outer gills. Simpson says that in the species of *Quadrula*, both the gills are filled with eggs, but that sometimes the inner gill contains but few. We cannot doubt that in the most ancient *Unionidæ* the eggs were discharged only into the inner gills and that later all four gills were filled with eggs, representing the last stage, the exclusive employment of the outer gills. In the genus *Quadrula* all these successive stages are still represented; and it is not admissible to use such differences for the establishment of genera. It happens that in the same species are observed great differences in this respect. The specimen of *Quadrula heros* Say, examined by Lea, had filled with eggs all the four gills; while the specimen examined by Sterki had only the hinder part of the outer gills filled with eggs, as in many species of *Lampsilis*. According to the classification of Simpson, which in this respect is an artificial one, these specimens would fall in quite different genera. Differences of this nature have caused Simpson to separate from *Quadrula* various species and sub-genera. It is no natural disposition when we see *Pleurobema* allied with *Unio*, *Quadrula tuberculata* Bar. widely separated from the nearly related species *speciosa*, *forsheyi*, etc.; *Obliquaria reflexa* widely remote from *Quadrula metanевра*; *Quadrula æsopus* allied to *Pleurobema*. In the same manner is *Lampsilis phaseolus* separated from *L. iris*, etc., because the development of the marsupium is more extensive. Therefore it is necessary to associate these separated groups with their real relatives.

(To be concluded.)

A NEW COLOMBIAN CLAUSILIA.

BY HENRY A. PILSBRY.

Nenia Smithiæ, n. sp. Pl. **II**, figs. 10, 11, 12.

Shell cylindric-fusiform, rather thin, lusterless, nearly smooth, obsoletely marked with growth-wrinkles; of a rich purplish-brown color. Whorls $8\frac{1}{2}$, moderately convex, the penultimate widest, those

above gradually tapering to an obtuse apex; last whorl flattening at the sides, elongated, having a weak basal carina, the suture very obliquely descending, becoming shortly free in front. Aperture large, rotund-ovate, dark reddish-brown inside; peristome broadly flaring, white on both face and reverse. Superior lamella vertical, compressed and sharp, continuous with the spiral lamella. Spiral lamella short, penetrating merely to a dorsal position. Inferior lamella rather receding, not extended upon the peristome, strongly converging toward the superior lamella, ascending straightly inside, and penetrating to a ventral position. Subcolumellar lamella completely immersed, short. Principal plica situated high, short, extending from a latero-dorsal position nearly to the lip. Lunella united with the lower end of a short, curved upper palatal plica, together with it forming somewhat the shape of an inverted letter J. No lower palatal plica.

Length 24, diam. 4.2, longest axis of aperture 5.5 mm.

Sierra de Sta. Marta, U. S. of Colombia, at El Libana, at 6000 to 7000 ft. elevation, in moss on tree trunks. Collected by Mr. H. H. Smith, May, 1898.

This species belongs to a somewhat numerous group of plain species from Colombia and Ecuador. It resembles *N. femurina* Jous., of Ecuador, but has different sculpture and a longer "neck." In *N. crossei* Hid., the aperture is narrower and oblong, not rounded-ovate as in this species.

It is named in honor of Amelia W. Smith, the devoted and capable companion of her naturalist husband, on his collecting journeys through the tropics of two continents. Types in Coll. A. N. S. Phila. and of George H. Clapp.

A GIGANTIC FOSSIL LUCINA.

BY WM. H. DALL.

During the cruises of the U. S. Fish Commission steamer *Albatross* in the West Indies, some years ago, one of the party collected some fossils from various localities, and among others some large internal casts of bivalves from Clairemont, St. Ann's Parish, Jamaica. These, according to the investigations of Hill, must have come from the Montpelier white limestone, a widespread deposit of Upper Eocene or Oligocene age, but older than the Oligocene of the

Bowden horizon. The Montpelier limestone contains, as a rule, little that is recognizable in the way of fossils except foraminifera; hence any species which can be identified is of interest, and in the present case the interest is increased by the unparalleled size, for the genus, of the species concerned. The specimens referred to appear to belong to the sub-genus *Miltha* or *Pseudomiltha* of the *Lucinidæ*. It is absolutely certain that they belong to the genus *Lucina*, *sensu lato*, and probably to one or the other of the above-mentioned sub-genera. The species, which may be provisionally named *Lucina megameris*, is, so far as I am aware, the largest Lucinoid shell known. It is equivalve, very inequilateral, the beaks being near the anterior third, moderately convex, though somewhat flattened peripherally; the cavity of the beaks rather shallow, the internal margins of the valves smooth and entire, the lower posterior part of the valves produced, the anterior end rounded, short; posterior adductor scars small and high; anterior scar low, narrow and loriform, produced backward nearly to the vertical from the posterior scar. There are no traces of the cardinal teeth, if any, but there were two feeble, non-functional, posterior laterals, one on each valve. The disk is more or less radiately striated and profusely punctate, as in many other *Lucinas*. The greatest length of the cast, on a line drawn from the umbo tangent to the posterior end of the anterior scar, is 235 mm.; the shorter line at right angles to the last, 230 mm.; the diameter of the cast from side to side, 67 mm. The margins are defective to the extent of half an inch or more in front and behind; the valves appear to have been not quite closed when the matrix filled them, but the margin opposite the umbones appears to be complete. Allowing 15 mm. for the thickness of the shell at the umbones, which from the breadth of the impression of part of the hinge-plate preserved seems reasonable, and the total length of the valves would in that case have been 250 mm., or about ten inches. The largest Lucinoid shell heretofore recorded, *Lucina* (*Pseudomiltha*) *gigantea* Deshayes, from the Parisian Eocene, attains a length of 98 mm., slightly less than four inches; from which the overwhelming superiority in size of the Jamaican species is evident.

The cast, without extraneous matter, weighs seven pounds avoirdupois.

With the exception of *Hippopus* and *Tridacna*, the shells of very few, if any, of the teleodont bivalves equal or exceed the above

dimensions, though the mass of the animal in *Panopea* and *Tresus* is probably greater than in our species. On the other hand, among the Prionodonts, such as *Inoceramus*, etc., a number of fossil forms occur which were larger; and the spread of the valves of the recent pearl oyster, *Meleagrina*, sometimes exceeds a foot, when closed.

In a recent examination of all the generic forms supposed to belong to the family *Lucinidæ*, I have been led to the conclusion that there is no evidence that the Palæozoic fossils referred to *Paracyclas* Hall, should be placed in this group. They appear to be absolutely without any of the characters which are diagnostic of Pelecypods belonging to the *Lucinidæ*.

I may add that the Clairemont limestones contain two other species of this family, one a true *Lucina* of the type of *L. edentula* Reeve, and the other a species of *Phacoides* belonging to the subgenus *Lucinoma* Dall., typified by *L. filosa* Stimpson; a group which has a remarkably wide distribution in age, space and depth of water.

N
THE AMERICA^N PHYSÆ.
^

BY O. A. CRANDALL, SEDALIA, MO.

Physa ancillaria Say.

Including the subspecies *Physa vinosa* Gould, *magnalacustris* Walker, and *crassa* Walker.

This species was described in 1826 from forms taken from the Delaware river near Easton, Pa. Typical forms are still found in the same locality. It differs from *P. heterostropha* Say, in its larger size, more inflated form and by its coarser lines of growth. The greatest difference lies in the manner in which the whorls are put together, and the resulting change in the structure of the suture and form of the spire. In that species the whorls lie against each other, forming a more or less impressed suture, while in this form the whorls overlap in such a manner as to make the suture appear as a mere line. The type is shouldered, but in a majority of specimens the shoulder is not prominent. It has a little more than four whorls, the last very large, and the columella is always twisted. It is an annuan, but forms are found having two varicose lines on the last whorl near the margin.

Distinguished by its inflated form, shoulder, low spire, unimpressed sutures and twisted columella.

Physa vinosa Gould. This variety differs from the type only in having a more globose form, the spire a little more elevated, and impressed sutures.

Physa magnalacustris Walker. This form has been recently discovered by Mr. Bryan Walker in northern Michigan. As his description has been published in the NAUTILUS it is not necessary for me to give it here. It is a large, fine globose shell, remarkable for the broad, white longitudinal bands on the last whorl. If they are all like the specimens shown me, it should rank as a species.

Physa crassa Walker. This variety has also been recently described from forms found in Michigan. It is much heavier and somewhat narrower than the type. It has been well described by its author.

Physa ancillaria is distributed over the same territory as *P. heterostropha* Say, but is not so plentiful in the extreme east, and may extend a little further west, but does not cross the Mississippi river. *P. obesa*, De Kay, is a form of this species.

Physa sayi Tappan.

There has been a great deal of contention over this species. Some of our ablest conchologists contend that it should not rank as a species, while others equally as experienced accord it that rank. After having given it much investigation and study, I have decided to recognize it as a species. That it is an offshoot of *P. ancillaria* Say, as that shell is of *P. heterostropha* Say, I have no doubt; but has it not by its constant variation from its ancestor established the right to rank as a species? It is not only possible, but highly probable that all the American species of this genus sprung from one form. The evolution began away back in the dreamy past, and has continued in some degree to the present time. When in our investigations we find a form that has maintained distinctive characters for a long period of time—in fact so long that the knowledge of man runs not to the contrary—we must admit it to specific rank.

It was described sixty years ago from forms taken in Lake Pipin, Portage Co., Ohio, and typical forms are still found having the same inflated form, expanded lip, elevated spire with dark brown apex, five whorls, coarse lines of growth and two varicose bands.

It is distributed over the northern part of the United States, and

extends into Canada and as far west as the Rocky Mountains, but not south of the Ohio and Missouri rivers.

Physa warreniana Lea, is a less inflated form and may be ranked as a variety.

***Physa lordi* Baird.**

This species was described in 1863 from specimens taken in Osoyoos Lake, British Columbia. It is a northwestern species, and probably does not extend east much beyond the Rocky Mountains. It is the largest American species of the genus, and may be readily distinguished by its large size, inflated, gibbous form, and thin and fragile shell.

***Physa parkeri* Currier.**

The consensus of opinion places this shell with *P. lordi* Baird as a variety, but in this opinion I do not concur. I am unable to see any similarity in the two forms except in size, and the general outline of the form when *P. parkeri* is not shouldered. *P. lordi* is a large gibbous form, while *P. parkeri* is large and square shouldered. It is also a thick, heavy shell of a different color and structure. I leave the matter to be determined by those more familiar with these forms than I am.

Distribution, Northern Michigan.

***Physa rhomboidea*, n. sp. Pl. II, fig. 6, 7.**

Shell rhomboid-ovate, large, heavy, robust, yellowish horn-color to pale yellowish-brown, texture fine, surface undulating and shining when not covered with a dark coating, spire elevated, acute with dark brown tip, whorls five convex, sutures much impressed, aperture ovate, lip simple, not expanded, sometimes a little compressed, thickened on inner margin with reddish-brown callus, columella well covered with heavy deposit continuing and extending from the lip. On many of them the columella is folded so as to form a narrow umbilicus.

Length 16 mm. diameter 9 mm. Bi-annual.

This shell was collected by me in Cedar and Muddy creeks, near Sedalia, Mo. I have since found it at Dardanelles and Sulphur Springs, Ark., and at three localities near Las Vegas, New Mexico. I have sent to Prof. Pilsbry examples from Missouri and Las Vegas. In a reservoir on Romaro ranch I found some dead shells considerably larger than the one described.

It is distinguished by its robust appearance, deep sutures, con-

stricted aperture and umbilicus, which will be found in a large part of them. It is more like *P. solida* Philippi than any other species.

Physa gyrina Say.

Including the subspecies *Physa hildrethiana* Lea, *oleacea* Tryon, and *albofilata* Ancey.

This species was found in Bowyer Creek, near Council Bluffs, Iowa, in 1821. It is a large, coarse shell, sub-cylindrical in form; the largest sizes having six whorls. The lip joins the body whorl at an acute angle, forming a loop-shaped aperture; the penultimate whorl is enlarged, giving the spire a blunt appearance, lines of growth coarse, *crossed by microscopic striæ*, giving the surface a dull appearance.

Diameter $\frac{8}{15}$ the length. This species is a tri-annuan.

Distinguished by its form, coarse lines of growth, loop-shaped aperture, large penultimate whorl and obtuse spire.

Physa hildrethiana Lea, comprises nearly all the forms found east of the Mississippi river. It is distinguished from the type by being of a lighter texture, finer lines of growth, not so much covered with cross striæ, and having a darker color. Many of these forms are more slender.

Physa oleacea Tryon. This variety is more cylindrical than either of the other forms, has a very obtuse spire, lines of growth much finer and the cross striæ more thickly covering the surface, giving the shell a smooth, dull appearance. It is generally found with five whorls. The spire is very variable, but otherwise its markings are constant. Some forms are cylindrical with the spire smoothly rounded over, showing no raised apex. This form Prof. Tryon, in the "Monograph of the Fresh-water Univalve Mollusca," placed with the synonyms of *P. elliptica* Lea. It is sometimes so distinct from all other forms of this species that I should accord it the rank of a species but for the fact that my observations while collecting them have clearly disclosed so many proofs that it is only a peculiar and eccentric form of *P. gyrina*. I have found it inhabiting little ponds, with the typical form maintaining family relations, and of all sizes and forms from the cylindrical scarcely raised spire to the elongated and obtuse spire of the typical form. I am fortified in this position by Prof. Tryon, to whom I took some samples for identification about a year before his death, and he identified them as a variety of *P. gyrina*.

(To be concluded.)

GENERAL NOTES.

The following interesting notes are taken from the Journal of Conchology, Vol. x, no. 2, pp. 35-42, April, 1901, "Conchology at the Dawn and Close of the Nineteenth Century" (The Presidential Address delivered by Mr. E. R. Sykes, at the Annual Meeting of the Conchological Society of Great Britain and Ireland, Oct. 27, 1900).

* * * "The close of the Nineteenth Century is, to use a commercial expression, a time to 'take stock,' and consider what progress has been made. It is with one of these forms of estimating our present position that I propose for a few minutes to concern myself, and especially with an endeavor to arrive at some idea of the actual number of species of recent mollusca which are now known to science. Any such estimate can but be approximate, but a survey of the most recent monographs enables one to form a fairly accurate conception.

"The classic starting-point for such a calculation, as indeed for all other systematic molluscan work, is the tenth edition of Linnaeus." His works contain roughly speaking about 700 species. This number gradually increased nearly every year, until "Dillwyn, in 1817, was enabled to enumerate 2,244; which we may divide into: *Cephalopoda*, 45; *Gastropoda*, 1,510; *Scaphopoda*, 15; *Pelecypoda*, 638; *Polyplacophora*, 36.

In the classic work of the brothers Adams (1853-58) we find the following: *Cephalopoda*, 197; *Gastropoda*, 12,604; *Scaphopoda*, 46; *Pelecypoda*, 4,258; *Polyplacophora*, 216.

Treating Paetel's well-known work (1888-1890) in the same way we get: *Cephalopoda*, 305; *Gastropoda*, 35,134; *Scaphopoda*, 137; *Pelecypoda*, 8,467; *Polyplacophora*, 439; or a total of 44,482 species.

"Hoyle's catalogue of the recent *Cephalopoda* in 1886, with addenda in 1896, contains 469. From the Zoölogical Record of 1897-9, we add eleven, and on an average, we may include four for 1900, making a total of 484 species.

In the *Gastropoda* the recent catalogue of the *Cyclophoridæ*, *Cyclostomatidæ*, and allies, by Kobelt and Moellendorff, "yields about 2,444 species, and if we add 48 species from the Zoöl. Record of 1899, and estimate a similar number for the 1900, we get 2,541." Since Paetel's list in 1888 (omitting the *Cyclophoridæ*, etc.), basing 1900 on a three years' average (682), there have been recorded 7,396, a total estimate of 43,021.

As to the *Scaphopods*, the most recent monograph, by Pilsbry and Sharp, yields 238; if we add the single one in the record of 1899, and another for 1900, we have 240 species.

For the *Pelecypoda* we have since Paetel's list (1890), basing as before, 1900 on a three years' average (142), 1,056; a total of 9,523 species.

“Finally we turn to the *Amphineura*. Here from Dr. Pilsbry's work we get: *Polyplacophora*, 540; *Aplacophora*, 33. Adding from the Zoöl. Record in a precisely similar manner we have to include *Polyplacophora*, 59; *Aplacophora*, 4; and we get a final total of 636.

“The next question which arises is, how far are the above totals trustworthy? On the one hand they are inflated by a mass of synonyms which still masquerade as species, while on the other hand they are reduced by a certain number of omissions. The only omission of any importance, however, will, I think, be found in the *Nudibranchiata*, of which the true total is, owing to the nature of the works consulted, unduly curtailed.”

“Making a reduction therefore for synonyms and allowing for the above, I think a very fair approximation will be: *Cephalopoda*, 450; *Gastropoda*, 40,000; *Scaphopoda*, 220; *Pelecypoda*, 8,500; *Amphineura*, 600; or a grand total of 49,770—say 50,000 known species of recent mollusca.”

C. W. J.

THE LOCALITY OF SAY'S TYPE OF *ALASMODONTA MARGINATA*.—Bearing on the question whether the name *Alasmodonta marginata* of Say should be applied to an Eastern or a Western shell, and as it has been questioned that Lea ever collected in the Scioto River, the following quotation¹ will be found of interest: “Mr. Lea remembers that Mr. Say founded his genus *Alasmodonta* on a single valve which he himself had picked up on the river shore at Chillicothe, Ohio, and which he carried from that place to Philadelphia in his saddle-bags.”

From this it is clear that Say's name should be applied to the form known as *A. truncata* of the western states, as it corroborates Say's statement that the type was found in the Scioto River.

It may be well to point out that the *Journal of the Academy of Natural Sciences of Philadelphia*, containing the description of *Alasmodonta marginata*, although dated December, 1818, really did not appear until the year 1819, which is the same date as the separate of Say's paper from the 3d edition of *Nicholson's Encyclopedia*. From the fact that no locality for the species is given in the latter paper, it seems safe to say that *A. marginata* was first described therein, the locality being supplied in the later paper in the *Journal*, which was published prior to March 13th, 1819, as Say, in a letter of that date, speaks of having sent a copy of it to a correspondent.

In Say's *American Conchology* there is an article, or chapter perhaps, entitled: “An attempt to exhibit a synonymy of the Western North American species of the genera *Unio* and *Alasmodonta*,” in which will be found listed as a *western species*, “*Alasmodonta marginata* Say.”—WILLIAM J. FOX.

¹From *The Published Writings of Isaac Lea, LL. D.*, by Newton Pratt Scudder. (*Bull. No. 23, W. S. Nat. Mus.*)

CORRESPONDENCE.

We extract the following from a letter recently received from Rev. W. H. Fluck, Wounta Haulover. (Address care of Moravian Mission, Bluefields. Nicaragua):

“I believe I am the only conchologist in Nicaragua, and I suppose my collection is not only the largest but the finest. Caesar said, ‘Better be first in a little Iberian village than be second in Rome,’ but I don’t agree with him. I send you herewith a few shells.

Donax cayennensis Lam. Prinzapolka, Mosquito Coast, Nicaragua, C. A.

Donax denticulatus L. Wounta Haulover.

Nerita pelaronta L. Man of War Keys, Mosquito Coast, Nicaragua, C. A.

Dione dione Linné. Wounta Haulover.

Neritina reclivata Say, var. *reticulata* C. & J. In the Lagoon at Wounta Haulover.

Pachycheilus corvinus Morel. Quiquina, on the Toongla River.

Polymesoda inflata Hanley. Lagoon, Wounta Haulover.

I have eaten bushels of the Donaces. The Indian children collect them at low water.”

We would add that the specimens of *Donax* and *Dione* are the finest we have ever seen. The *Neritina* is exceptionally large. *Neritina reclivata* is now referred, correctly no doubt, to *N. lineolata* Lam.; and the netted Central American race will stand as *N. lineolata* var. *reticulata* C. & J. *Polymesoda* is what has usually been known as *Cyrena*; and is now accepted as the generic name for the American *Cyrenas*, which have a small pallial sinus, such as *carolinensis* and the tropical American species.

Working alone in a bookless land, we are sure that Mr. Fluck will be glad to receive papers on conchological topics, and exchanges for the shells of his region.

GEORGE W. DEAN.

We regret to learn of the death of our old friend Mr. Geo. W. Dean, which occurred on April 10th at his home in Kent, Ohio. Mr. Dean was born in Wayne township, Ashtabula Co., Ohio, August 20, 1820. In 1855 he took up the occupation of a nurseryman and florist, a business in which he was successfully engaged until the time of his death.

Mr. Dean was a great lover and student of nature, and well known to many of the readers of THE NAUTILUS, for notwithstanding his busy life as a horticulturist, he was an ardent and enthusiastic collector of shells.

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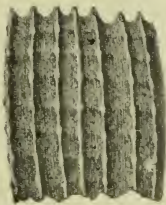
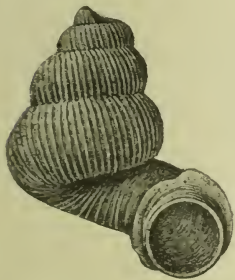
No. 5.

A NEW JAMAICAN ADAMSIELLA.

BY J. B. HENDERSON, JR.

Adamsiella jarvisi n. s.

Shell moderately elongate, pyramidal. Whorls four, well rounded, the last leaving the body of the shell and projecting one-half its own



length free in a slight curve. Apex truncate; sutures well impressed.

Sculpture consists of unevenly spaced, prominently-raised laminae circling all the whorls; these are crossed by obsolete spiral liræ which are only apparent at their

points of intersection with the transverse ridges. Umbilicus narrow and extending through the shell, forming a puncture at the apical truncation. Aperture exactly round; inner peritreme greatly extended; the outer peritreme corresponding to an exaggerated lamina, circles the whorl like a collar, the outer edge of which is irregular but not fluted. Color pale yellowish-gray.

Height 11; diam. above aperture 6.5; greatest diam. 9; diam. of aperture 3 mm.

This species resembles *A. pearmaniana* in general shape and sculpture, but is obviously distinct by reason of its coarser laminae and evidences of spiral striae, also by the striking projection of the last

whorl. The sculpture of this shell is somewhat suggestive of the rough burr-like appearance presented by some of the Jamaican *Choanopomas*. A series of chestnut-brown spots circling the outer expanded peritreme probably indicates in fresh specimens parallel rows of similar spots upon the whorls. Operculum unknown.

Collected by Mr. Jarvis near Ewarton, Jamaica.

THE UNIONIDÆ OF NORTH AMERICA.

BY H. VON IHERING.

Entering into consideration of particular species, I would make the following observations :

Quadrula spheniopsis Morel certainly does not belong to the genus *Quadrula*, because the female is inflated in the same manner on the base of the shell as *Lampsilis*. I have a good series of specimens, some of which were examined by the late Dr. Fischer. I subordinate this species to the genus *Nephronaias*, of which *Pachynaias* Crosse and Fischer is a synonym.

Quadrula pernodosa Lea. I consider that this is not a variety of *pustulosa*, because the form is quite different from that of the varieties of *pustulosa*, which is always more quadrate, while *pernodosa* is of an elongate, higher form, with more prominent beaks. The hinge-line is longer in *pustulosa*. The distance of the large pseudocardinal tooth from the end of the lateral is more than a half of the height in *pustulosa*, but is less in *pernodosa*.

Lampsilis occidens Lea, I consider as a good species, different from *L. ventricosus* by the more central position of the beaks and different shape of the anterior extremity. I have males and females of both *ventricosus* and *occidens*.

Lampsilis pictus Lea, is perhaps the male of *perdix* Lea.

Lampsilis sapperi sp. n. This is the shell mentioned by Simpson in his Catalogue, p. 571, n. 4, as a doubtful variety of *L. explicatus*. The shell is more elongate, with the ventral margins sinuate and the anterior extremity lower and somewhat obliquely truncate on the inferior part of the anterior margins. The pseudocardinals are very stout, one in the right, two in the left valve. This differs remarkably from *L. explicatus* as figured by Crosse and Fischer, pl. 61, fig. 1, of the Moll. Mex., having the pseudocardinals elevated, compressed,

lamelliform. I believe the *L. sapperi* more allied to *L. umbrosus* Lea than to *explicatus*, being, however, of a more elongate form with produced posterior extremity and larger size. The type example has a length of 64 mm., breadth of 114 mm., diam. of 38 mm. The epidermis is dark brown, blackish, the nacre white. The posterior slope has two obtuse, somewhat indistinct diverging lines. The species is from the Chixoy river in Guatemala, and dedicated to Dr. Carl Sapper, who has collected in scientific expeditions in Central America and Mexico many interesting *Unionidæ*, for which I am much indebted to him.

Nephronaias medellinus Lea seems to be the same as *Lampsilis aztecorum* Phil.

Nephronaias averyi Lea, I have from the Rio Tuca, in N.-W. Guatemala.

Nephronaias goascoranensis Lea (1858), I have received from Dr. Sapper from the Moramusko river, in Honduras, and from the Rio Coco in Nicaragua. The species varies, and I have specimens corresponding to the figure of Lea and others to that of Crosse and Fischer (Miss. Sci., Mexico, pt. 2, 1894, pl. 64, fig. 5 and 5 a), of *Unio calamitarum* Morelet (1849.) The name of this widely-distributed Central American species should, therefore, be *Nephronaias calamitarum* Morelet, if Morelet, as also Crosse and Fischer have not confounded two different species, and it is impossible to say what is the true *calamitarum*.

Nephronaias tabascoensis Küster (1856) is also a widely-distributed Central American species. This is my No. 60 from the Rio Copan, Guatemala, tributary of the Motagua river, and which Mr. Simpson believed be the *scamnatus* Morelet. Having both *N. scamnatus* Morel. and *gandlachi* Dunker from Cuba, I consider them different. The true *scamnatus* is a smaller and thinner shell, while to *tabascoensis* are synonymous *U. persulcatus* Lea, *rugulosus* Küst. and perhaps also *plicatulus* Küster. To this species belongs also *Unio calamitarum* Morelet, var. *prolongata* Crosse et Fischer l. c., p. 612, pl. 63, fig. 5 et 5 a. The supposed Central American examples of *N. scamnatus* may be identical with *N. dysoni* Lea. *N. tabascoensis* I have also from Nicaragua, Rio Telpanek, and (No. 61) from El Obrage, Guatemala.

Referring to the genera of North American *Unionidæ* admitted by Simpson, I would make the following observations :

Truncilla. This would be a quite natural genus, eliminating some heterogenous elements, that must be placed with *Quadrula*, as *T. personata* Say, allied to *Q. trigona*, and *T. perplexa* and *foliata* allied to *Q. metanevra*.

Lampsilis. A very natural genus, from which, however, *Proptera* should be separated as a genus.

Obovaria belongs in the vicinity of *Quadrula*, as do likewise *Trigonia*, *Cyrogenia*, *Obliquaria* and *Dromus*.

Ptychobranthus is a subgenus of *Lampsilis*.

Pleurobema will form a natural group after the removal of *P. æsopus* and probably some other species.

Unio. There are to be removed *U. spheniopsis*, a species allied to *Nephronaias cyrenoides*, and also the group of *U. semigranosus*, consisting of species of *Quadrula*. There are a number of species of *Quadrula* in Mexico distinguished by peculiar granular sculpture and thin reddish-gray epidermis, for which Crosse and Fischer created the sub-genus *Psoronaias*. I can find no reason for dividing them between two groups, as Simpson has done; and I unite *U. semigranosus* and allied species to *Quadrula*. In this way all sculptured forms are eliminated from the genus *Unio*.

Plagiola. Genus probably to be restricted to *P. elegans* and similar forms, while *P. cyrenoides*, etc., may be transferred to *Nephronaias*.

The family *Unionidæ*, as limited by Simpson, would contain, according to these views, two families: *Diplodontidæ* and *Unionidæ*, which are distinguished not only by the marsupia, but also by important conchological characters. The sexual differences, strongly pronounced in the *Lampsilis* group, are not entirely deficient in the other groups, as there are species with pronounced sexual differences in both the genera *Quadrula* and *Diplodon*. The sculpture of the beaks is concentric in the *Unionidæ*, radial in the *Diplodontidæ*. In some species of *Hyria* and *Tetraplodon* the radial sculpture is reduced or almost obsolete. Of two specimens of *Castaliella sulcata* Krauss in my collection, one shows the radial sculpture well developed; in the other it is nearly absent. The pseudo-cardinals are variant in both examples; the nacre is bluish-white. This mussel is doubtless identical with *Tetraplodon schombergianus* Sow., but I have received my specimens, collected by Kapler on the Marowini River, Surinam, from the Zoological Museum in Stuttgart as typical specimens of *Castalia*

sulcata Krauss. As Simpson believes also to be typical his specimen with purplish nacre, further investigations will be necessary, however, as it is probable that the species shows some variability, and that *Tetraplodon schombergianus* is a synonym.

Conformable with the conceptions here exposed, we may consider the super-family of Naiades as composed of two families: *Unionidæ* and *Diplodontidæ*. The former, the only one occurring in North America, may be divided into the following three sub-families:

UNIONIDÆ with the genera: *Anodonta*, *Lastena*, *Gonidea*, *Anodontoides*, *Pegias*, *Arcidens*, *Symphynota*, *Alasmidonta*, *Hemilastena*, *Margaritana*, *Unio*.

QUADRULINÆ with the genera: *Quadrula*, *Pleurobema*, *Obovaria*, *Cyprogenia*, *Obliquaria*, *Dromus*.

LAMPSILINÆ with the genera: *Lampsilis*, *Truncilla*, *Micromya*, *Medionidus*, *Nephronaias*, *Glebula*, *Plagiola*.

As shown by the arguments given, the opinions of Mr. Simpson, in many essential points, are in accordance with those of the writer, and I thought it useful to publish such of my ideas as do not accord with Mr. Simpson's, in order to submit them to examination in the discussion which a book of such great importance will naturally provoke.

S. Paulo (Brazil) 10 May, 1901.

AN ABNORMAL CHITON.

In September of last year Mr. Hemphill sent me a photograph of an abnormal specimen of the common Californian species *Ischnochiton (Maugerella) conspicuus* Cpr., the divergence from the ordinary form consisting in its having *only six valves*. The length of the specimen (photo) is about 70 and the breadth 38 millimeters. There is no indication of pathologic deformity; the proportionate size of the valves compared with the size of the shell as a whole, exhibits no eccentricity. Cooke, in the Mollusca volume of the Cambridge Natural History Series, remarks that "seven-valved monstrosities very rarely occur." Sykes has recently reported and figured a three-valved individual. In the hundreds of Chitons of various species that I have collected on the West Coast I have never detected an example with less than the usual number, though it is possible in handling a large number, especially of the smaller forms, to

overlook an individual varying in the above respect. It will be well for collectors to keep their eyes open for such abnormal individuals; it may be found that they occur oftener than is supposed.

R. E. C. STEARNS.

Los Angeles, May 2, 1901.

THE AMERICAN PHYSEÆ.

BY O. A. CRANDALL, SEDALIA, MO.

Physa gyrina var. *albofilata* Ancey. This variety is confined to southwest Missouri and northwestern Arkansas, extending into the Indian Territory and Kansas. It is distinguished by its lighter color, fine lines of growth, rarely showing cross striæ, generally malleated on some part of the surface, and large white varicose bands. It is generally found with five whorls.

Forms: *Physa hawni* Lea, *P. cylindrica* Newcomb, *Physa smithsoniana* Lea.

P. gyrina is the most widely distributed of all the American species. It extends over all the territory between the Alleghanies and Rocky Mountains, and from the Arctic region south into Alabama and Texas. I have examples from near Philadelphia, Pa., and from Routt county, Colorado, but I do not consider them permanent inhabitants of those localities. It is possible that they may yet be found to extend as far west as the Sierra Nevada Mountains, but I have been unable to obtain any evidence that they now inhabit the Great Basin. I account for their being found outside of the limits here given by the ova being carried on the feet of migratory birds, by means of which isolated colonies are planted, which survive for a time, but finally become absorbed by the more numerous inhabitants and disappear. They may be called sporadic colonies. This also in part accounts for the hybridization that has produced so many forms that have been described as new species, only to vanish in a season.

Physa elliptica Lea.

Includes the sub-species *Physa elliptica troostiana* Lea, *Physa elliptica minor* n. v.

There probably is not a more distinct species in the genus than this, yet Binney and Haldeman place it in the synonymy of *P. gyrina* Say. Tryon recognized it as a species, gave it a very large

synonymy, and substituted his description of *P. oleacea* for that of Lea. The species are widely different, and were so acknowledged by him in later years. The form which I refer to this species may be described as follows:

Shell elliptical, thin, pellucid, smooth and generally shining, lines of growth scarcely perceptible, spire rather short and obtuse, sutures impressed, aperture elliptical, axis straight, with varicose bands when mature, and diameter from two-fifths to one-half the length. The outline is almost exactly that of an elliptic spring. All the varieties are small, not exceeding a half inch in length.

Physa troostiana Lea is a more robust form, more obtuse, and the diameter a little greater in proportion to the length. Its habitat is along the Ohio valley.

Physa elliptica minor n. v. was sent to me from Grand Rapids, Mich., by Mr. Streng. It is very small, being only four to five mm. in length, rather cylindrical in form, whorls three, convex, sutures impressed, spire slightly elevated, surface highly polished, color deeper than the type. At first I thought they were immature, but the lip has a well defined rib on the submargin, and I now think they are a miniature form of this species.

Physa deformis Currier probably belongs here, and may be a variety, but for the present I prefer to consider it only a form. It may be a larger form of *P. elliptica minor*; if so it will take its place.

Forms: *P. aurea* Lea, *P. febigerii* Lea, *P. nicklinii* Lea.

This species is distributed sparingly over all the region east of the Mississippi and north of Tennessee.

Physa niagarensis Lea.

This species was described in 1864 from forms taken in Niagara river, N. Y., but has generally been considered a variety of *P. integer* Hald. In fact I have held the same opinion until quite recently. In the last few years I have had opportunity to examine examples of *P. integer* from over fifty localities, about one-fourth of which were properly referred to this species, and from these examinations and the places from which they were taken, I feel satisfied that this form is not a variety of *P. integer*. If it is not entitled to rank as a species, it should be referred to *P. heterostropha* as a variety.

They vary but little, but the largest part of those I have examined have the form of *P. heterostropha*, except that the spire is a little

more elevated and the acute apex is tipped with reddish-brown. Axis straight, aperture ovate, smooth and shining surface, rarely showing varicose bands. Color yellowish-white grading into a pale yellowish chestnut in some forms. It usually has four whorls. While white, it is not porcellaneous. Lea's description is correct.

P. saffordi Lea, is a form of this species.

Distribution: Along the Great Lakes.

Physa integer Haldeman.

Subspecies: *Physa integer billingsi* Heron.

This is a very distinct species, described in 1841 from shells found in Indiana. It is distinguished by its oval form, light color frequently banded with white, deeply impressed sutures, ear-shaped aperture and somewhat rough but shining surface. It is not closely allied to any other species. It requires two seasons to reach maturity. Diameter seven-tenths the length.

It is the only species that extends from the Lakes to the Gulf. It inhabits all the country bordering on the Lakes from Ontario west, and extends south and west as far as San Antonio, Texas. I have collected live forms in the latter place, and found it fossil in the post-pliocene at Belton, Texas.

Its distribution being different from that of any other species raises a doubt as to the identity of the species at the extreme ends of the territory covered. It has not been reported from south of the Ohio river, nor from eastern Arkansas, but seems to occupy a belt lying between central Arkansas and central Kansas, continuing about the same width to the Gulf.

Physa billingsi Heron. The type was taken in Rideau river, near Ottawa, Canada. The first examples sent me from that locality varied so much from any described form that I was inclined to accord it specific rank, but having received it from several localities in Michigan, I am now placing it here as a well-marked variety.

It is smaller than *P. integer*, of finer texture, and the sutures are much less impressed. None of them have the ear-shaped aperture. The lip is expanded and in many of them forms the arc of a circle. In some of them the diameter is nearly as great as the length. From this form they graduate into the usual form of *P. integer*.

Its distribution, so far as known, is confined to Canada and Michigan.

Physa anatina Lea.

This is the most striking and beautiful species of the genus. It was discovered in a northern tributary of the Arkansas river in Kansas, in 1864, and in that locality it has its greatest development. The extent of its distribution is unknown. It is plentiful around Wichita, Kansas, and has been reported from Missouri, Arkansas, Nebraska and Michigan. It probably inhabits all the intervening territory.

Distinguished by its sub-fusiform and symmetrical shape, smooth and shining surface, pale color, six oblique whorls, impressed sutures, and the malleations on the lower part of the last whorl of all adult forms. Bi-annuan.

Diameter $\frac{5}{9}$ the length.

Physa brevispira Lea.

Ottawa river, Canada West, furnished the type for this species in 1864. It is not numerous in any locality, and is seldom reported by collectors. I have examples agreeing with Lea's figure from Lake Nippising, Ont. and shells from five other localities which I believe belong here, although they differ in color and height of spire. Specimens from Detroit river, Reed's Lake and Pent Water, Mich., are good representatives of the species in size, color and all other characters except that the spire is somewhat exserted. The Isle of Mackinac furnishes a much larger white shell which I refer to the same species.

Distinguished by its globose form, opaque whitish color and dilated aperture. It has been sent to me as *P. ancillaria* and *vinosa*. Annuan.

Diameter $\frac{3}{4}$ the length. Aperture $\frac{7}{10}$ the length of shell.

Physa walkeri n. s. Pl. 2, fig. 5.

Shell elongate-ovate, ashy horn color, texture rather coarse, whorls four, very convex, sutures much impressed, spire much elevated and tapering to an acute apex, aperture ovate, not expanded, $\frac{6}{10}$ the length of the shell, lip tortuous and evenly curved, inner margin thickened with thin white deposit. Length 10 mm, width 6 mm.

This little shell was sent to me by Bryant Walker, Esq., of Detroit, Mich., having been collected by him at Petoskey, Mich., after whom I take pleasure in naming it. It has also been sent to me from three other localities in Michigan, and Rideau river, Ont. It is allied to *P. integer* Hald, and fills the place between that species and *P. anatina* Lea.

It differs from *P. integra* Hald. in having a more elevated, slender and acute spire, less deeply impressed sutures and much finer texture. The aperture is nearly ovate, not ear-shaped, the columella gracefully curved and covered with a thin lamina. It differs from *P. anatina* Lea in being much smaller, lighter colored, the whorls less oblique, lines of growth more visible and being of lighter texture. The shell as a whole, when seen with these species, impresses itself as distinct at a glance.

Physa cubensis Pfeiffer.

This is a Cuban species found in Florida. I have not seen Pfeiffer's description, but forms kindly sent to me by Prof. Pilsbry may be described as follows :

Mature shell sub-fusiform, light amber, smooth and shining surface, lines of growth scarcely perceptible, whorls five, convex, sutures impressed, spire rising like a cone to an acute apex, aperture elongate ovate, lip not expanded, columella twisted and covered with a callus. Bi-annuan I think.

A peculiarity of this species, as shown by the forms sent to me, is that the immature form is ovate, the last whorl in the adult being somewhat flattened and elongated, thus making the shell sub-fusiform when mature.

A NEW CALIFORNIAN BITTIUM.

BY W. H. DALL AND PAUL BARTSCH.

Bittium (*Elachista*) *californicum* spec. nov.

Shell white, broadly elongate-conic; whorls rounded, falling off more abruptly toward the suture than the summit. The earlier whorls increase less rapidly in diameter, and are more evenly rounded. Base short, well rounded; aperture suboval, effuse and subchannelled anteriorly, with the posterior angle rounded; columella somewhat twisted and slightly revolute.

The ornamentation consists of about 14-16 broad and low axial folds, which gradually become obsolete on the periphery and base,

and on the whorls three or four impressed spiral lines, which are equally apparent on the ribs and intercostal spaces.

This species occurs both recent and fossil in California. Recent shells appear more slender with fewer ribs, 12-14. The type is a fossil specimen from Dead Man's Id. off San Pedro, Cala., and has 8 whorls which measure: long 5.3 mm., diam. 2.2 mm. A recent shell of 10 whorls measured 6.0 mm., diam. 2.1 mm.

LIMNAEA AURICULARIA IN AMERICA.

BY FRANK COLLINS BAKER.

Some weeks ago Mr. Herbert E. Walter, instructor in Biology in the North Division High School, brought me several specimens of a *Limnaea* which was new to the fauna of the United States. Upon inquiry, the locality was given as the propagating green-house of Lincoln Park. A few years ago Miss Marie LaGrange, a pupil in the North Division High School, found a number of the same species in a lily pond in the park, the water of which was artificially heated to give the necessary warmth for certain tropical plants, the temperature being above 90° Fahr.

Comparison with the shells in the Academy's collection showed the species to be *Limnaea auricularia*, and an inquiry of the park gardener brought to light the fact that certain plants had been recently imported from Belgium. This information at once removed the mystery surrounding the sudden appearance of this shell in the park, and shows how easy it is at the present time to transport a species from one continent to another, especially if it be a pulmonate. The shells of *L. auricularia* are about an inch in length, of a deep corneous color, and are rather thin. When alive, the mantle of the animal is seen through the shell to be made up of dark and light spots arranged irregularly. The animal appeared rather active, moving about the aquarium with a steady, gliding motion. The heart pulsations were 34 per minute.

It may also be of interest to state that the following introduced species have been found in the greenhouse or in the lily ponds: *Testacella haliotoidea*, *Limax maximus* and *L. flavus*, *Vitrea draparnaldi* and *Limnaea auricularia*.

ORESTES A. CRANDALL.

It is with deep regret that we record the death of Colonel O. A. Crandall, of Sedalia, Missouri, which occurred at West Chester, Pennsylvania, July 6. He left home during the latter part of June on a business and pleasure trip East. After staying a few days at Bridgeport, Connecticut, he went to Philadelphia, where he was sick four days, when he went to the home of an old friend at West Chester, hoping that with complete rest he would soon recuperate; but the extreme heat combined with heart trouble caused his sudden death. Interment was at Sedalia.

“Orestes A. Crandall was born at Syracuse, N. Y., February 25, 1833. In 1835 his parents removed to McHenry county, Illinois, at that time known as the Crystal Lake country, a wilderness inhabited by Indians and wild animals. The nearest settlement was forty miles distant. Thrown upon his own resources at the age of thirteen, Mr. Crandall developed rapidly those sterling qualities which in later years made him prominent among men.

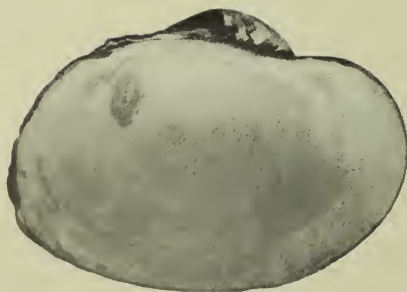
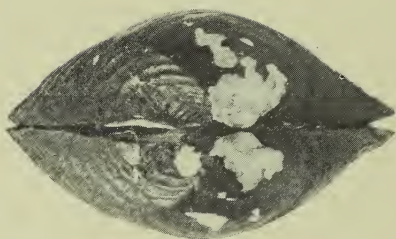
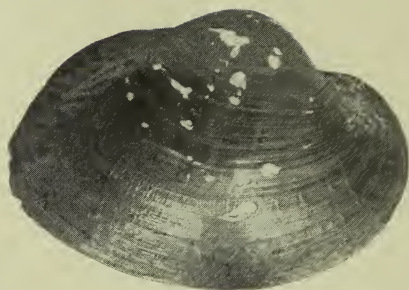
“In 1853 he went to California, walking 500 miles of the distance and carrying his bundle on his back. He worked eight years in the Golden State as miner and mineralogist, returning to “The States” in 1861 and locating in Saline county, Mo.

“At the outbreak of the war, soon after coming to Missouri, he aligned himself with the Union and went to the “wilderness” of Illinois, where he organized and put two regiments of soldiers in the field. He fought with honor during the war, his last battle being the battle of Sedalia, October 15, 1864, in which he was captured by the Confederate forces.

“He located permanently in Sedalia in 1864, and in that year was admitted to the bar and practiced his chosen profession until the beginning of the eighties. He married Miss Kate A. Kidd, of that city.

“In 1875 he organized the Pettis County Bank and was made its president. He was elected president of the Missouri Trust Company in 1880. Under his guidance the company became one of the foremost institutions of its kind in the country.”

Mr. Crandall was well known to many readers of *THE NAUTILUS*, especially those interested in fresh-water snails. For a number of years his spare time was spent in a study of the genus *Physa*, the results of which are still being published under the title “The American *Physa*.”



STROPHITUS WRIGHTIANUS WALKER.

THE NAUTILUS.

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LAND MOLLUSKS OF THE NORTHEASTERN GROUP OF THE LOO CHOO ISLANDS.

BY HENRY A. PILSBRY.

The exploration of Tane-ga-shima and Yaku-no-shima (Yaku-shima), effected under the direction of Mr. Y. Hirase, gives us absolutely the first information upon the land mollusca of the "north-eastern group" of the Loo Choo Islands.

Tane-ga-shima is a well-cultivated island, about 32 miles long and 5 wide. It is comparatively low, the highest point having an elevation of about 1200 feet. It is somewhat noted as being the first Japanese soil trod by an European. In 1542, Mendez Pinto, the Portugese adventurer, landed there, astonishing the natives with his firearms. I have named a diminutive *Clausilia* in memory of this circumstance.

Yaku-shima is a wilder, forested island, nearly circular, with a diameter of about 15 miles. It towers in a splendid mountain mass 6000 feet above the sea. The snail faunas of the two islands seem to be very similar, with a number of identical species. I do not know whether Mr. Hirase's collector ascended the peak of Yaku-shima; probably not. The heights would probably have different species from the shore zone.

A Helicid species, *Eulota* (*Euhadra*) *submandarina*, described by me many years ago from two bleached specimens, one said to be from the "Loo Choo Islands," the other labeled "China," proves to be a characteristic species of these islands. It is quite unlike other known Japanese forms, both in shell and soft anatomy. *Eulota sub-*

mandarina is quite variable. The figured type measures alt. 17, diam. 21 mm. Three specimens from Tane-ga-shima (from no. 660 of Mr. Hirase's collection) measure $16 \times 21\frac{1}{2}$, $18 \times 24\frac{1}{2}$ and 20×26 mm. They are reddish-brown, with a narrow dark band at the periphery. Two others from the same island are more elevated, measuring alt. 22, diam. 21, and alt. 21, diam. 25 mm.; the latter being of a rich dark chestnut color, the band black. These are Mr. Hirase's no. 659.

From Yaku-shima the shells sent out are larger, alt. 23, diam. 30; alt. 22, diam. 28 mm. They have $6\frac{1}{2}$ whorls, like the smaller shells of Tane-ga shima, and the color is rather light, the peripheral band reduced to an indistinct line. This form I have called var. *magna*. It is no. 672 of Mr. Hirase's collection.

Doubtless *E. submandarina* is peculiar to these and perhaps some neighboring islands.

The following species are not confined to the two islands: *Trochomorpha Gouldiana* Pils. occurs on Yaku-shima, indistinguishable from the types from Oshima. *Macrochlamys tanegashimæ* has recently been received from Kago-shima, Satsuma (Mr. Hirase's no. 701), quite like the types, but slightly larger. *Sitala circumcincta* var. *elata* (Gude) is a trifle more brown in color than the types from Hondo, the perforation is perceptibly wider, and the whorls possibly less convex; but specimens received from three localities in Kiusiu are partly similar, partly intermediate in characters, so that although it takes next to no difference to make a "species" in this group, I do not think the Kiusiu or Yaku-shima Sitalas deserve separation from the Nippon form.

Among the land operculates there is a new *Spiropoma* (*Cælopoma*) which has been called *S. Nakadai*, and a new *Pupinella*, *P. Funatoi*. These are named for Messrs. Nakada and Funato, two able and enthusiastic collectors of shells for Mr. Hirase.

The *Clausiliidæ* are represented by five species and several varieties, all peculiar to the islands, and remarkable for the excessive thickness of the shells. Their general relations are with species of Kiusiu and Nippon, not with those of the central group of the Loo Choo Is. The wonderful forms with plicate lips, found in Oshima and Great Luchu (Okinawa or Nawa Island) are apparently wanting in Tane-ga-shima and Yaku-shima, and their place is taken by species of the sections *Stereophædusa* and *Hemiphædusa*. All but *Clausilia stereoma* are rather small, and all of them are remarkably

unlike any Japanese species, though more nearly related to them than to those of the central Loo Choo Islands.

The general affinities of the faunas of the two islands are with that of southern Kiusiu, but there is remarkable specialization, vastly more than in Tsu-shima, for instance, although the latter is more distant from the west coast of Kiusiu than these islands from the south. Tsu-shima, so far as the specialization of the snail fauna is concerned, might be a part of Kiusiu. Its isolation must be of very recent date, but Tane-ga-shima and Yaku-shima are clearly much more ancient islands. The full list of species sent by Mr. Hirase is as follows :

Species from Tane-ga-shima.

Eulota submandarina (Pils.).	Clausilia Pinto Pils.
Ganesella tanegashimæ Pils.	Clausilia tanegashimæ Pils.
Macrochlamys tanegashimæ Pils.	Spiropoma Nakadai Pils.
Microcystina Hiraseana Pils.	Pupinella rufa var. tanegashimæ.
Clausilia stereoma var. cognata Pils.	Pils.
	Pupinella Funatoi Pils.
Clausilia ptychocyma Pils.	Diplommatina tanegashimæ Pils.
Clausilia entospira Pils.	

Species from Yaku-shima.

Eulota submandarina var. magna Pils.	Clausilia stereoma var. nugax Pils
	Clausilia ptychocyma var. yaku-shimæ Pils.
Trochomorpha Gouldiana Pils.	
Sitala circumcincta var. elata (Gude).	Ennea Iwakawa var. yakushimæ Pils.
Clausilia stereoma Pils.	Diplommatina yakushimæ Pils.

Yaku-shima is so for the northern limit for *Trochomorpha*.

There are in all 21 forms. One species is common to Yakushima and Oshima; four are varietal or subspecific modifications of, or identical with, Kiusiu and Nippon species, and twelve species with six varieties are confined, so far as we know, to the two islands.

Most of the species have been described in the Proceedings of the Academy of Natural Sciences, but the following remain to be characterized :

Ganesella tanegashimæ n. sp. Shell imperforate, depressed, with convexly-conoid spire, rather thin. Dead specimens, denuded of the cuticle are white, becoming red-brown above, the inner $3\frac{1}{2}$

whorls of that color; periphery encircled by a narrow red-brown band, the peristome pale red-brown. Whorls $5\frac{1}{2}$, very slowly increasing, moderately convex, the last rounded at the periphery, rather flattened beneath, hardly impressed around the axis, slowly descending in front. Aperture oblique, broadly lunate; peristome narrowly expanded, thickened within, reflexed and abruptly dilated over and closing the umbilicus; columella concave, bearing an inconspicuous, low, oblique, fold-like tooth. Alt. 21-22, diam. 28 mm.

Tane-ga-shima (Mr. Y. Hirase, no. 689).

Only dead and somewhat weathered specimens were found; but what remains of the cuticle on the parietal wall is a moderately bright yellow tint. The species is related to *G. myomphala*, and most resembles the variety *minor* of Gude, from which it differs in the smaller aperture, the columellar tooth, less impressed axial region and higher spire. In this connection I may mention that a species of *Ganesella*, *G. Adelinæ*, n. sp., has been sent from Oshima, Mr. Hirase's no. 352. It is the shape of *G. largillierti* or somewhat more pyramidal, but has a decidedly larger umbilicus than that species. On a pinkish or pale yellow ground there are three blackish bands, the peripheral united with that above, or with a reddish space between, basal band wide, interior of the umbilicus and the dilated columella very dark; peristome well expanded. Alt. $26\frac{1}{2}$, diam. 25, to alt. 24, diam. $22\frac{1}{2}$ mm.

Diplommattina yakushimæ n. sp. Shell similar to *D. cassa* but more acutely tapering above. Whorls $5\frac{3}{4}$, the last two of equal diameter, last half whorl reduced. Sculpture of even, fine, low, rather close, delicate striæ; no spiral striæ. Aperture subcircular, the lip expanded, duplicate; columellar tooth blunt and strong; palatal fold short, above the columella. Length 2.3, diam. 1.3 mm.

Yakushima (Mr. Y. Hirase, no. 679).

D. tanegashimæ is a large shell, conspicuously different in sculpture. *D. yakushimæ* is much smaller than any of the numerous Japanese species of the same group. It resembles *D. cassa* most. Besides its distribution in Hondo, *D. cassa* has now been sent from five localities in the provinces Bungo, Higo and Satsuma, in Kiusiu. It is evidently a species of wide distribution, though surpassed in this respect by the tiny *D. pusilla*, which has been found in Hokkaido, Hondo and Kiusiu, the latter island being represented by specimens of the variety *omiensis* in Mr. Hirase's last sending

Ennea Iwakawa var. *yakushimæ* nov. Similar to *E. Iwakawa* of Nippon and Kiusiu Islands in sculpture and aperture, but of a decidedly broader, more swollen shape. Yakushima (Mr. Y. Hirase, no. 680*b*, types; also 680*a*).

A NEW SPECIES OF STROPHITUS.

BY BRYANT WALKER.

Strophitus wrightianus, n. sp. Plate III.

Shell irregularly subrhomboidal, inflated, scarcely sub-solid, nearly equilateral; beaks very full and high, turned in over a slight lunule; their sculpture consisting of a few strong ridges that run nearly parallel with the growth lines; anterior end rounded, elevated above the line of the hinge superiorly and slightly cut away below; base line evenly curved; posterior ridge angled, ending in a blunt point below the median line of the shell; dorsal slope subtruncate, covered with strong, subconcentric, somewhat broken ridges extending from the posterior ridge to the margin; disk with light uneven growth lines; epidermis almost jet black, lighter on the beaks, shining, with occasional indications of very light transverse sculpture similar to that on the dorsal slope; left valve with an irregular tooth and a vestigial one in front of it; right valve with a roughened tooth in front of the beaks; laterals almost wanting; beak cavities deep; anterior muscle scars distinct; posterior scars faint; nacre bluish white, a little thicker in front.

Length 54 mm., height 38 mm., width 31½ mm.

A single specimen only of this fine species occurred in two barrels of *Unionidæ* received from Messrs B. F. and G. H. King, collected in the tributaries of the Flint river, Baker county, Ga. It differs from all other known species in the strong ridges which cover the dorsal slope. It seems to be most nearly related to *S. tombigbeensis* Lea, and has the "obtruded anterior margin" characteristic of that species.

Mr. C. T. Simpson, to whom the specimen was submitted for examination, and to whom I am indebted for assistance in preparing the foregoing description, writes in reference to it: "I know of nothing at all like it. In fact it is so different from anything that I have seen or read of that I am at a loss to know just where to place

it. Its general form, texture and color of epidermis inclines me to believe that it is a *Strophitus*, related to *S. tombigbeensis*. I find some vestiges of plication on one or two specimens of *Strophitus* in our collection. The teeth of this are stronger than in any specimen of that genus I have seen, but there is much variation in this matter."

I take great pleasure in naming this species after Mr. B. H. Wright, who has done so much in recent years in developing our knowledge of the *Unionidæ* of the southern states.

NEW PISIDIA.

BY DR. V. STERKI.

The following *Pisidia* have been known as distinct species for several years, and the names have been used in my own collection as well as in identifying specimens sent for examination by many conchologists. So they should have been published long ago.

Pisidium affine n. sp. Rather large, well-inflated, slightly oblique, beaks somewhat posterior, large and prominent in full-grown, broad and quite low in young specimens, rounded or slightly flattened on top; superior and inferior margins moderately curved, posterior subtruncate, with slightly marked angles above and below, supero-anterior forming one regular curve from the beaks to the anterior end, which is low-situated and well-rounded; surface distinctly and somewhat irregularly striated, with some coarser lines of growth, dull or somewhat shining; color lighter or darker grayish horn to plumbeous or brownish with a few irregular darker zones corresponding with the lines of growth, and often with fine darker mottlings, usually with a broad lighter zone along the margins; the young are pale horn or straw-colored; shell moderately thick, nacre whitish, muscle insertions little; hinge rather stout, plate rather broad; cardinal teeth long, not very strong, the right one curved, its free edge often indented in the middle, its posterior end somewhat thicker, with a fine groove, the left anterior tooth curved, the posterior slightly so, oblique, rather behind the anterior, each covering the other for half their lengths; lateral teeth stout, rather long, their cusps short and somewhat pointed, the outer ones in the right valve of good size; ligament rather long and stout.

Size: Long. 6, alt. 5, diam. 4 mill. (average).

Long. 7, alt. 6, diam. 4.7 mill.

Long. 4.6, alt. 3.8, diam. 2.8 mill. (small, northern form).

Habitat: Great Lake Region, Michigan to New York · also Minnesota, Illinois and Ohio (Ohio river drainage). It seems to prefer quiet water, small lakes and slow-running rivers.

Pisidium affine is related with *nov-eboracense* Pr. and with *sargenti* St. (See the following sp.) From the former, it differs by the following characters: it averages larger, its beaks are larger, broader, as especially noticeable in the young, the whole muscle is more full, the hinge margin is less curved, the supero-anterior, as mentioned, forms one long, unbroken curve, the anterior part is larger, the end situated nearer the "base" and more rounded. *P. nov-eboracense* retains its light, yellowish horn color, and the surface is rather shining, while older specimens of *affine* usually are light to dark grayish, and the surface is more dull.

Our species is somewhat variable. Specimens from Michigan, especially Perch Lake,¹ Reed Lake, some other small lakes, and from the Grand River at Grand Rapids are regarded as typical, and examples from the Little Lakes near Mohawk, N. Y., are rather the same. In northern Michigan, *e. g.*, in Mountain Lake, River Rouge, Carp Lake, there is a smaller form, of darker color but typical shape, collected by Mr. Bryant Walker, and the same was found in Clearwater Lake, Minnesota, by Mr. H. E. Sargent. A somewhat higher form, with a slightly marked angle at the scutellum, is known from Minnesota, Michigan, Buffalo, N. Y. (Miss E. J. Letson), and Meyer's Lake, near Canton, Ohio (the writer). The latter has a straighter striation and a somewhat waxy appearance of the surface.

Whoever has carefully studied and compared a few suites of specimens at all stages of growth, will always recognize the present species, as the young and half-grown are quite characteristic, while some full-grown examples may present similarities with *P. nov-eboracense* and *sargenti*. All these species are decidedly variable, in several directions, and so it takes a good deal of material and some experience in order to ascertain their claims for specific distinction, and to recognize aberrant and poorly developed forms. The present one being a "critical" species, I trust the somewhat lengthy expose on it will be excused.

Pisidium sargenti n. sp. Mussel of medium size, somewhat oblique,

¹ Collected in large numbers by Dr. Kirkland.

well inflated; beaks not much posterior, rounded or slightly flattened on top, well prominent over the hinge margin; the latter slightly curved in the adult, almost straight in the young and half-grown, with projecting, not or hardly rounded angles at the scutum and scutellum, which are slightly to well marked, narrow; posterior margin subtruncate above, passing into the well rounded inferior with an uninterrupted curve, or with a slightly marked, rounded angle, more so in the young; supero-anterior margin little to moderately curved, sloping from the projecting angle at the scutellum to the rounded anterior end; surface regularly and rather coarsely striated, dull, rarely somewhat shining in older specimens; epiconch thin and often worn off, pale horn-colored in the young, lighter to darker grayish to brownish in older specimens, usually with a lighter zone along the margins; shell moderately thick, nacre glassy, colorless to white or bluish, muscle insertions distinct; hinge stout, plate rather broad, cardinal teeth well formed, short, the right one rather strongly curved, its posterior end thickened and grooved, the left anterior angular, stout, the posterior small, oblique; lateral teeth rather short, stout, their cusps short, pointed, the outer ones in the right valve well formed; ligament short, strong.

Size: long. 5, alt. 4.4, diam. 3.4 mill.

Habitat: New York to Ohio, Michigan, Illinois and Minnesota, rather common in creeks, rivers and small lakes.

Well formed specimens are easily recognized by the oblique shape, the rather short, slightly curved hinge margin with the projecting angles at both ends, the regular striation and the dull, often roughish appearance of the surface; by the latter features it may be discerned from some forms of *P. scutellatum* which are of similar shape; but it is more nearly related to *P. nov-eboracense* and *affine*; and some full-grown, well-inflated specimens, in which the scutar and scutellar angles are sometimes less marked, might be mistaken for one or the other. But a lot of mussels at different stages of growth are always recognizable at once; the projecting angles, especially marked in half-grown specimens, in connection with the peculiarly dull surface (like in "typical" *P. compressum* and in *P. kirklandi*) are well marked characters, and so is the color, which turns to grayish while the mussels are much younger and smaller than in *P. affine*. In the latter species, the hinge-teeth, especially the cardinals, are longer and finer.

The present species is named after Mr. H. E. Sargent, who has assiduously collected small mollusca, and has secured some good lots of this *Pisidium*.

THE AMERICAN PHYSÆ.

BY O. A. CRANDALL, SEDALIA, MO.

Physa forsheyii Lea.

Sub-species *Physa forsheyii grosvenorii* Lea.

This species was discovered near Ruterville, Texas, in 1864. The description calls for six whorls, but I have examined cotypes in the Academy of Sciences in Philadelphia, and nearly a hundred examples from eight different localities, and have been unable to find a single one having more than five, so I concluded that five is the proper number.

This is a small shell, not exceeding $\frac{5}{8}$ inch in length, and distinguished by its sub-fusiform shape, exserted spire, deeply impressed sutures, smooth but not shining surface. Nearly all the adults are covered with microscopic transverse striæ, which give the surface a dull appearance. Bi-annual.

Physa grosvenorii Lea, also described in 1864, belongs here as a variety. I have collected it in many different places, and have no hesitancy in referring it to this species. The only difference I can discover between this and *P. forsheyii* is that it is smaller, shorter, a little more inflated, more robust, and of a darker color. Some of the young shells are highly polished, but the adults have the same dull appearance as the species form, and are dark yellowish horn-color. It is a very pretty shell, uniform in size, color and general outline.

In the middle of January I found some of these little shells under some leaves in a spring brook near Sedalia, Mo., where they hibernated for the winter. The aperture, instead of being closed by a film as in land shells, was filled with dirt and sand, mixed with the viscid exudations from the body, forming a cement one-eighth inch thick, which I found quite difficult to remove without injury to the shell.

The species form is distributed over Texas and Louisiana, but farther north, through Arkansas, Indian Territory, Southern Kansas and Missouri, as far north as the central part of the state, it takes the form of *P. grosvenorii*.

Forms: *Physa whitei*, Lea.

Physa pomilla Conrad.

This species was first described by Conrad in 1834 from forms taken from Random's Creek, Claiborne Co., Ala., and was again described in 1864 by Lea under the name of *P. showalteri*. They are both the same species, but Lea's description is the most correct, and was substituted by Tryon for that of Conrad. It is exclusively a southern species, its habitat being the country lying south of Kentucky and east of the Mississippi River. An annuan. Very similar forms have been sent to me from Grand Rapids, Mich., as *P. showalteri*, but I feel confident that they are a modified form of *P. anatina* Lea.

Physa microstoma Haldeman.

This species was described from a single specimen found in Kentucky in 1840, and has been reported by Rhodes from several places in that state. Its principal character is the two obtuse teeth on the columella, but the other characters are sufficient to found a species upon. Some time ago I received from Mrs. Geo. Andrews, of Knoxville, Tenn., several lots of shells collected in East Tennessee, a large part of which bear the description of this species except the teeth. It is a thick heavy elliptical shell with four to five whorls not convex, with a continuous peristome, and the labium much thickened anteriorly. The columella is thick and twisted so that it forms a single protuberance somewhat like the tooth-like callus on the columella of *Bulimulus alternatus* Say. The varicose bands are white on the outside and reddish-chestnut on the inside.

I do not hesitate to refer the shells sent to me from Tennessee to this species.

Physa crocata Lea. This is a closely allied form, described in 1864 from specimens taken in Walker Co., Georgia. It is a smaller and much lighter shell. In some specimens the spire is a little more exerted, and the twist in the columella not so marked. In form and color, which is light brownish-ochraceous, they are the same. Both are bi-annuan. Length not exceeding $\frac{1}{2}$ inch.

Habitat: Kentucky, Tennessee, northern Georgia and Alabama.

Physa distorta Haldeman.

Some time ago I received from Mr. H. E. Sargent twenty little shells collected near Woodville, Ala., which I refer to this species. The largest is ten mm. in length and six in diameter; the greatest diameter being near the shoulder. Its color is very light yellowish-gray, whorls three, very convex, sutures very deep. Spire elevated,

first and second whorls small and the last one very large, forming a rounded shoulder; so much larger, that in some of them the spire appears to rise like a cone from an expanded surface. Not umbilicated. Aperture oval, columella scarcely folded, outer lip thickened on sub-margin with a very pale yellowish-red callus. It corresponds with Haldeman's description except the umbilicus.

This species was described in 1842, and so far as I can learn, has not been reported since.

DOUBTFUL SPECIES.

Physa fontana Haldeman, 1841, = young *P. heterostropha* Say.

P. subarata Menke, not sufficiently described for recognition.

P. parva Lea, 1864, probably young *P. anatina* Lea.

P. altonensis Lea, 1864, an abnormal form of *P. gyrina* Say described from a single shell, and not heard of since.

P. inflata Lea described many years ago, and not reported since.

P. solida Philippi. This species was described many years ago from forms found at New Orleans, but I have been unable to procure any information regarding it. It is a very marked species, and it seems that it should have been reported many times. The name is pre-occupied, and should it ever be re-discovered, it will have to be given a new name.

P. tenuissima Lea, 1864. This is a very distinct species if it exists. It was described from a single dead shell found at Alexandria, La. I have been unable to get any information regarding it. I have in my collection a single shell sent to me from Hudson, Ohio, that bears this description, but until others are reported, it had better stand in the doubtful list.

P. globosa Haldeman, 1843. Like the two last, I have been unable to learn anything about this species, except the description given by Binney. It has been suggested that it is the same as *P. brevispira* Lea. I do not concur in this opinion. The form is very much the same, but this is a southern species, and these seldom get as far north as the Great Lakes without materially modifying the form. Besides if it was, it would be found in intervening territory, which does not seem to be the case.

 GENERAL NOTES.

LUCAPINA CRENULATA (SOWERBY).—On Aug. 3, at La Jolla, Cal., Miss Vashti Thomas was so fortunate as to find a living specimen of this gigantic keyhole limpet, which she brought to me for examination. As the published descriptions of the animal state it to

be "black," and lack detail, the following notes from life may be useful:

Mantle about 20 cm. long, rather light olive brown, minutely reticulated with black, and blotched in an irregular but radiate manner with dark brown, the blotches mostly around the shell aperture. Edge of mantle black. Shell aperture 43 mm. long, 26 broad. Under side of mantle yellowish-white; tentacles and adjacent parts black; mouth light orange. Foot 65 mm. broad, sole deep orange; sides of foot dark olive brown, edge black, the black grading into the brown. Epipodial ridge darkened, with round white spots, the lower edge crenulated. Upper surface of shell exposed by mantle aperture, flesh colored, with radiating riblets, 13 in 10 mm. measured transversely. Aperture in shell oval, 18 mm. long, 13 broad; portion of animal filling shell-aperture pitch-black.
—T. D. A. COCKERELL.

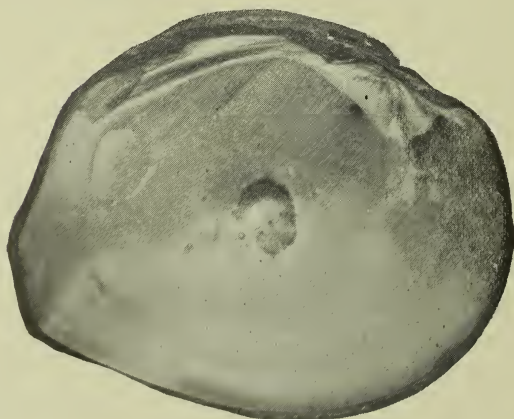
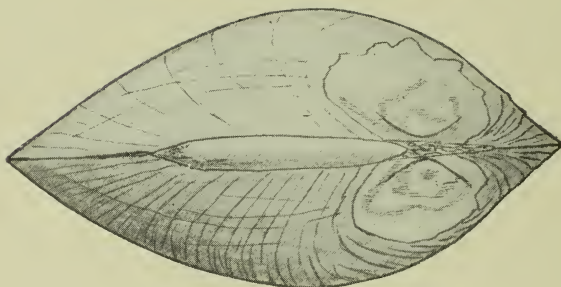
NAVANAX INERMIS (COOPER).—During July this interesting animal was not uncommon on mud flats in San Pedro harbor, California. As the published descriptions are somewhat inadequate, the following notes from life are offered:

Dark brown to black, minutely lineolate above with pale yellow lines; anterior margin of head-shield narrowly yellow or orange; in a young example a yellow line, on which are three blue spots, runs back from each lateral angle. Epipodial flaps narrowly margined with orange, next to which is a row of bright blue spots. Beneath the animal is marked with a number of orange streaks or elongated spots, giving way to light yellow lines on the sides. A pink copepod lives in numbers under the epipodial flaps.

The creature is quite variable, and at first I thought there were two species, but with sufficient material all are seen to be specifically identical.

I may as well record *Aglaja purpurea* (Bergh) from San Pedro. Dr. W. R. Coe gave me one which he found on July 20.—T. D. A. COCKERELL.

EPIPHRAGMOPHORA KELLETII, ON SANTA CATALINA ISLAND.—
"We found the first ones at the Canyon back of Avelon, where we found the *E. gabbi*. In this locality there are only scattering shells and we were greatly disappointed. But we made a trip to the Isthmus and there we found them in quantities. They live on and under the cactus, and I have found them nowhere else. This is their hibernating season of course, and they are all asleep. Sometimes a dozen on one leaf, old and young. I expected to find them on the fresh growing cactus leaves, but instead of that they are on the old dead leaves, and under piles of dead leaves. They do not seem to require moisture. I think we have found as fine specimens as are to be found anywhere.—MRS. E. M. GAYLORD, July 19, 1901.



QUADRULA LANANENSIS FRIERSON.

THE NAUTILUS.

VOL. XV.

NOVEMBER, 1901.

No. 7.

A NEW LAND OPERCULATE FROM HAITI.

C. T. SIMPSON AND J. B. HENDERSON, JR.

CERATODISCUS, nov. gen.

Shell almost strictly discoidal; spire very slightly raised; whorls few, nearly round, closely coiled except the last third of the outer one, which leaves the penultimate whorl at a tangent and has a groove on its inner side; aperture nearly circular, scarcely thickened or reflexed; surface with finely reticulated sculpture; epidermis corneous. Operculum unknown. Probably one of the Cyclotidæ.

CERATODISCUS SOLUTUS, n. sp. Pl. V, figs. 1, 2.

Shell small, planorboid, the large nucleus slightly raised, but not elevated to the level of the last whorl; whorls three, nearly round, being a little wider and flatter above than below, the first two and two-thirds in contact and having a deep suture above and below, the last third of the outer whorl solute, leaving the penultimate whorl at a tangent, the free part very slightly deflexed; on the inner side of the uncoiled part of the shell, close to the penultimate whorl, there is generally a well-marked groove; surface with close, delicate incremental striæ which are crossed by microscopic threads that run parallel with the direction of the whorls; aperture nearly circular, compressed a little on the inner side; peristome scarcely thickened or reflexed; epidermis greenish-yellow. Height 1.5, greatest diameter 5, diameter at the point where the last whorl becomes free 4 mm.

Seven dead specimens were found on the mountain of La Ferriere, in northern Haiti, at an elevation of perhaps two thousand feet, in a

talus of red clay by the road side. These were the result of an hour's search, and it is greatly to be regretted that no specimens were found with the operculum. When taken they were considerably incrustated with earthy matter.

A TEXAS OIL WELL FOSSIL.

BY T. H. ALDRICH.

Some months since, Dr. Wm. B. Phillips, Director of the Texas Mineral Survey, sent me a few fossils from Beaumont, Texas, obtained at a depth of 390 feet in an oil well on Spindle Top Hill. Among them was a new species of *Nassa*, which has been described in Bulletin No. 1 of the University of Texas, Mineral Survey, July, 1901. Description is herewith repeated, and a figure added.



NASSA BEAUMONTENSIS Aldr.

“Shell cancellated, whorls seven, the first two smooth, the others with two strongly nodular transverse lines, except the body whorl, which has six or seven. Aperture with both outer and inner lip dentate, canal short. Length 8 mm., breadth 4 mm. This species resembles *Nassa bidentata* Emmons, but is much more strongly nodular and has but two transverse or spiral ribs, and also possesses one more whorl. The shell resembles a species of *Phos*, externally.”

DESCRIPTION OF A NEW UNIO FROM MISSOURI.

BY WM. A. MARSH, ALEDO, MERCER CO., ILLINOIS.

Pleurobema missouriensis, new species.

Shell smooth, obliquely triangular, rounded before, subbiangular behind, moderately thick, very much thicker anteriorly, sides somewhat flattened, beaks wide, solid, incurved, ligament long, light brown, epidermis light brown, without rays, growth lines numerous, not raised, umbonal slope wide and rather flat, posterior slope wide,

flattened, with two dark inconspicuous lines running from beaks to posterior margin, beak sculpture unknown; cardinal teeth rather long and solid, depressed, disposed to be double in both valves, corrugate. Lateral teeth straight, oblique, corrugate. Anterior cicatrices distinct, deep. Posterior cicatrices distinct and well impressed, shell cavity wide and deep, nacre white.

Habitat, near Poplar Bluff, Black River, Butler Co., Missouri.

I know of no described species which this closely resembles; in outline it is perhaps nearest to *U. Bigbyensis*, Lea, but differs in every other respect. Specimens of *Bigbyensis* from Flint River, Ala., attain twice the size of this shell. *Bigbyensis* is nearly always covered with green rays. This shell is rayless. It also has higher and more massive beaks, is more equilateral and differs entirely in the color of epidermis, teeth, etc. The color of the epidermis and character of the beaks is more like *U. Hartmanianus*, Lea, but that shell has very much higher beaks, more swollen and pointed, and is in every respect a more solid shell.

Four specimens of this shell from quite young to adult have been in my collection for a number of years, having been collected by the late Ellwood Pleas, of Ind. I never could place them with any known species, but have kept them separate, hoping that sooner or later I might obtain others like them, but having failed to obtain others, I now describe them.

A NEW UNIO FROM TEXAS.

BY L. S. FRIERSON.

Quadrula lananensis, n. sp. Plate IV.

Shell quadrate to triangular, nearly equilateral, anterior margin rounded. Base round in front, nearly straight behind. Posterior oblique, biangular, slightly emarginate. Dorsum curved, smooth, nearly polished above, striate below and upon posterior slope. Lines of growth distinct and ill-defined. Dark reddish-brown, sometimes a little olive, obscurely radiate. Beaks eroded, umbos low, somewhat inflated. Anterior umbonal slope rounded. Lateral slope flattened. Posterior ridge angular near the beaks, becoming obsolete near the base. Ligament brown, smooth, medium-sized.

Length 3.2, height 2.3, diameter 1.5 inches.

Shell of medium thickness, thinner behind. Teeth double in left valve, single in right. Laterals rather thin, nearly straight. Cardinals stumpy. Muscle scars well marked; generally separate, sometimes confluent. Pallial line distinct in front, less so behind. Cavity of shell dish-like; of the beaks deep and full.

Sometimes the dorsal muscle scars are situated in the extreme end of the beak cavity, but generally upon the base of cardinal and dorsal plate. Nacre rose-color, with blotches of yellow surrounded by brown. Cavity nearly always studded with numerous pearly excrescences.

Flesh of animal whitish or salmon-colored exteriorly, but shows scarlet when cut. Eggs carried in all four gills, very red, and the gravid animal thus presents a striking appearance.

Habitat: Lanana and Banita Creeks, near Nacogdoches, Texas. About 200 specimens were taken on July 10, 1901, by Messrs. Askew, Strode and Frierson.

Examples may be seen in their cabinets, and in the U. S. National Museum and Academy of Natural Sciences, where the types are deposited.

Q. lananensis is closely allied to *Q. askewii* Marsh, both by its conchological and anatomical characteristics. It may be differentiated from that shell by being longer, more compressed, more oblique, and its shell is never so *inflated and thickened in front as Askewii*, and not so acutely angled on the posterior ridge.

Internally, *lananensis* is rose-colored nearly invariably, and the color is *uniformly spread over its surface*. *Askewii* is mostly white, and when colored (pink), the color is almost always confined *exterior to the pallial line*.

Finally, *Q. Askewii* never possesses those peculiar pearly excrescences which seem to belong to *lananensis*. This species was collected many years ago at the type locality by Mr. H. G. Askew. But that gentlemen's innate modesty forbade his describing the shell, and he generously gave to me this honor.

Lananensis is the shell quoted as having been found by Mr. Askew in the Lanana Creek, in the "Contributions to the Natural History of Texas" (page 321), by Mr. J. A. Singley, and called by him *U. cerinus* Conrad. Its relationship to this abundant Louisiana shell is so remote, however, that it is not worth while to point out their differences.

ON THE CLASSIFICATION OF THE UNIONIDÆ.

BY CHAS. T. SIMPSON.

In the August and September numbers of the *Nautilus*, Dr. von Ihering takes exception to the classification of the Unionidæ proposed by me in the Synopsis, claiming that it is based essentially on the marsupia.

He has apparently overlooked the fact that it is founded not merely on the characters of the marsupia, but on the more obvious anatomical characters, as well as those of the shell and the beaks. It agrees with what I believe to be the development of the family from the earliest and simplest forms to the latest and most highly organized.

So far as the classification of the Diplodontinæ is concerned we essentially agree. This I divided into two supergeneric groups founded on characters of the beak sculpture and shell, and *not* on those of the marsupia. Von Ihering agrees with me that the earliest uniones probably had radial beak sculpture. I have examined the animals of a large number of the South American and Australasian uniones and in all cases where they were gravid the embryos filled the inner gills alone, forming a smooth pad, the ovisacs not being separated by sulci. I have examined a few specimens of the forms with zigzag radial beak sculpture (*Rosanoramphus*), and found in the gravid ones that the marsupia filled the inner gills only. It may be, and probably is the case, that in rare instances among the Hyrianæ there are a few embryos in the outer gills. I know of no special characters employed in the classification of large groups which do not vary somewhat, but I believe it still to be a fact that in the Hyrianæ the embryos are almost invariably contained in the inner gills only, that in the Unioninæ they are found in the outer, or (in the Tetragenæ) all four of the gills.

In the South American and Australasian Uniones we have the radial beak sculpture with simple shells and the embryos contained within the inner gills, the ovisacs not being separated by any external markings. I believe that these are the simplest and lowest forms of *Unione* life, that they have descended almost unchanged from the earliest forms of the family. The fact that they occupy the Southern Hemisphere exclusively while the Unioninæ, containing

the more highly developed forms, belong entirely in the Northern Hemisphere, would indicate this. I consider the radial beak sculpture a character belonging to the older and simpler forms; the concentric beak sculpture belongs to the more recent and higher forms. The zigzag radial sculpture of the group *Rosanoramphus* is a move in the direction of concentric sculpture, hence of a higher order than that which is strictly radial.

The *Tetragenæ* is a transition group. *Its young are contained in all four of its gills, filling them throughout*, though they are more numerous as a rule in the outer than in the inner, and this fact together with the general character of the shells and the beak sculpture, which is generally more nearly concentric than radial, led me to place these forms in the *Unioninæ* rather than to make a separate sub-family for them. *In every case where I have placed a form in this group the shell has deep beak cavities.* In the genus *Pleurobema*, which seems to be the next step in the way of development, while the shells are generally rather short, solid and inflated as in *Quadrula*, *the beak cavities are invariably shallow*, and in all cases that I have examined *the outer gills only contain embryos.* Here we have characters of the marsupia agreeing with those of the shells. Care must be taken in the examination of the marsupia or appearances may lead to wrong conclusions. According to von Ihering, Sterki has found *Quadrula heros* with only the hinder part of the outer gills filled with embryos. I have seen the same thing in other *Quadrulas*. I have seen in some of the *Unionidæ* the front part of the gills filled with embryos while all the rest was empty, and in a number of cases a few ovisacs in the middle or in various parts of the gills entirely empty, while the rest were full, or a few filled while all the rest were empty. In such cases the empty ones had simply been discharged, the full ones had not. In all the forms which I have mentioned so far the marsupia fill the entire gills and are pad-like, that is, the ovisacs are not marked out separately by sulci.

Advancing a little in the development of the family we find a number of aberrant forms confined to the Mississippi and Gulf drainages of the United States. Each group has certain characters of the shells which we may call generic, though they are not striking. But they are all very wonderful in the character of their marsupia. In such groups as *Ptychobranclus*, *Cyprogenia* and *Strophitus*, the marsupia are astonishing, and in all of them the ovasacs are distinctly marked.

To this point, proceeding upward in the scale of development, the shells of males and females are essentially alike. It is true that there is some variation in their forms, but it is equally true that somewhat elongated specimens with no inflation at the post-basal part of the shell may be females, while shorter specimens that are full post-basally may be males. I do not think there is any strict dimorphism up to this point. In many cases among these lower forms I have assorted my material before opening it, placing in one lot those I would naturally suppose were males, and in another the presumed females, and on opening the shells and examining the animals I always found I was as likely to be wrong as right. In some groups, notably *Nodularia* and *Lamellidens*, all the shells of certain species are inflated at the post-basal region.

Above this point the shells begin to be regularly dimorphic. They are less regularly so in *Obovaria*, *Medionidus*, some forms of *Nephronaias* and *Plagiola*; they are nearly always dimorphic in *Lampsilis* and *Truncilla*. The shells of male and female are always so different that the merest tyro could without difficulty separate them.

Von Ihering believes that the *Unio tuberculatus* of Barnes is nearly related to the *U. forsheyi* and *U. speciosus* of Lea. I am surprised at such an opinion, because, while the shells of the two last-mentioned forms are alike in male and female, those of the former are strictly and remarkably dimorphic, that of the female being more compressed and ending posteriorly in a wide, rounded wing. That of the male is more inflated, is truncate behind, and has no wing at all. In the animal of the female there is a wide, rounded flap of the mantle which fills this peculiar extension of the shell, differing somewhat from that of any other that I know of.

Now among all these higher forms comprised in the group *Heterogena* there is a radical difference in the marsupia. Wherever I have been able to examine them, they occupy only the posterior portion of the outer gills in the form of distinctly-marked ovisacs. Each ovisac when filled is rounded below. The higher the form ranks, the more markedly is the marsupium swollen and separated from the rest of the gill, and the more distinctly is the female shell swollen in the post basal region to correspond with it. In some forms of *Plagiola* and *Medionidus* there is little difference between male and female shells. In such cases the marsupium, though having the characteristic ovisacs, is but

slightly fuller than the rest of the gill. In the more highly organized species of *Lampsilis*, both the shell of the female and the marsupia are decidedly produced behind. In *Truncilla*, which I regard as the highest manifestation of Unione life, the marsupium is almost absolutely separated from the rest of the gill, and when full, assumes the shape of a great kidney, projecting below the rest of the branchiæ. The great flap of the mantle of the female is very peculiar, being double or having a strong over-hanging ridge inside. In many of the shells of this genus the area corresponding with and covering the marsupium is greatly swollen, is thin, has a different texture from the remainder, is gaping and distinctly toothed.

I have never been able to examine a gravid female of the *Unio tuberculatus* of Barnes, hence I cannot give anything more than a guess as to the character of its marsupium, though from some material lately seen, in which the ovisacs appeared to have just been emptied, I am inclined to believe that the outer gills are filled throughout with embryos, forming well-marked ovisacs.

Now these remarkable characters of a distinctly separated marsupium occupying only the hinder part of the outer gills, and a corresponding swelling of the female shell to receive it, the fact that the more distinct and swollen the marsupium is the more pronounced is the swelling of the shell, may be merely the work of chance; they may stand for nothing whatever in the way of rank or development among our Uniones, but it does not seem so to me. All the changes of shell and marsupium which I have indicated seem to me to be steps in the development of the family from the lowest, simplest and oldest forms to the highest, most complex and most recent.

I need not occupy space with a discussion on the validity or proper determination of species. Such questions are after all largely matters of personal judgment, and in this branch of the work I have endeavored to do the best I possibly could with the material I have been permitted to examine.

Dr. von Ihering changes the subfamilies Unioninæ and Diplodontinæ into families, and divides the former into three sub-families, Unionidæ, Quadrulinæ and Lampsilinæ. He gives no characters for these sub-families, and I am totally at a loss to know on what he would found them. Certainly he cannot establish them on beak sculpture, for in nearly all the species this is more or less concentric, and it seems to me does not offer distinctions sufficiently important to be used as a basis for founding sub-families.

This classification is not founded on characters of the marsupia, for he has placed in *Quadrulinae* groups in which the embryos occupy all four of the gills, others in which they fill only the outer gills, and still others where they are confined to the hinder or the median part of the outer gills. Besides, he distinctly states on page 39 that a systematic arrangement of the marsupia does not coincide with a natural arrangement of the family.

Nor do I see how such an arrangement can be based on shell characters. *Obovaria*, which is placed with *Quadrula*, has more or less perfectly developed dimorphism in the shells. In *O. ellipsis* the female shells are almost always swollen at the posterior base, and the same is the case with *O. lens* and *O. circulus*, while in *O. castaneus* the male and female shells are as distinct as in any species of *Lampsilis*. *Ptychobranchus*, with its wonderfully folded marsupium occupying the entire outer gills, with the shells of male and female alike, he places in the genus *Lampsilis*. Why he does so I do not know, as the group differs most decidedly from *Lampsilis* in the characters of shell, marsupium and animal.

On the other hand, he places *Truncilla personata* Say, *T. perplexa* Lea, and *T. foliata* Hild., in the genus *Quadrula*! To me such an arrangement is absolutely astonishing! The male shell of the first-named species is somewhat triangular, and does resemble a *Quadrula* somewhat. The female shell is very different, being quadrate and having a decided, gaping, toothed post-basal swelling. In *T. perplexa* the female shell has a great rounded post-basal swelling, which differs in thickness, texture and color from the rest of the shell. I do not think there is a species known in which the differences between the male and female shells are so great as they are in *T. foliata*. In the male shell at the place where there is a compressed, radial, central area the outline of the female is carried down into an enormous and elongated, rounded wing. That these should belong in a genus in which the shells of male and female are alike and from which the animal and marsupium so widely differ, is beyond my comprehension! If such an arrangement is a natural one then I am sure that all the years I have spent in patiently and lovingly studying the Naiades have been absolutely wasted. It seems to me that we might just as well go back to the arrangement temporarily adopted by Dr. Lea, of grouping together in one lot those forms which have a wing, and in another those which have none, and subdividing these groups into small ones founded on form and sculpture of the shell.

I have no doubt that a careful histological study of the branchiæ and perhaps other parts of the animals of the Unionidæ will furnish additional characters for classification. But it will be many years before this can be done, and when it is, I feel sure that the results of such study will fully agree with the characters of the shells and marsupia.

HOW POTAMIDES (CERETHIDEA) CALIFORNICA HALD. TRAVELS.

BY MRS. M. BURTON WILLIAMSON.

In traveling over the mud-flats, *Cerethidea californica* Hald. leaves zigzag marks upon the sandy mud. These lines are made by the apical whorls of the shell as it is dragged forward, or sideways. How does the animal crawl? It *appears* to move forward by the contraction of the foot only, but my observations have led me to the conclusion that the foot movement is somewhat secondary. The movement of this tapering shell is one requiring considerable muscular strength. This is very apparent. In order to study the mode of travel of this species, a specimen was studied as it traveled up the sides of a glass jar of sea-water, and this and other specimens were studied for several hours. The conclusion reached was, that first there was a strong muscular movement forward, then the foot advanced. The *Cerethidea* pushes its head forward while the tentacles are expanded to their full extent, the body whorl is raised with an effort, then the shell is propelled *forward before the foot advances*. Immediately, no time is lost, the foot is spread out its full capacity and drawn forward. This is immediately followed by a contraction of the foot in the posterior part, then the head is again advanced. The strength of the animal seems to be concentrated in the movement of the body-whorl as it is raised up and forward. Of course all these movements are rapid, so that it requires close observation to see that all movements are not simultaneous, or at least which is secondary. A homely illustration may be used to make this movement plainer. When a man attempts to step upon a ladder with a hod full of bricks, or plaster, his first movement is apt to be a hunching of the shoulders—the weight being

here—then the step forward, or upward, follows. The movement of the body-whorl reminded me of this hunching of the shoulders of workmen when extra weight was to be borne by them.

GENERAL NOTES.

GONIOBASIS IN MASSACHUSETTS.—A few years ago the Rev. Geo. D. Reid found *Goniobasis virginica* at Deep River, Connecticut. That was, I think, the first instance of that species being found in New England. On October 1st, while riding the wheel from Springfield to Hartford, I examined the Connecticut River for a few minutes and found the same species in the town of Agawam, Mass., at a spot some three miles from Springfield. This establishes the species in Massachusetts, and no doubt it will be found farther north in the same river.—HENRY W. WINKLEY, Branford, Conn.

TRUNCATELLA ON GUADALUPE ISLAND.—Specimens of this genus were collected by Mr. R. E. Snodgrass, in November, 1899, for the first time on any of the islands off Lower California. They resemble *T. stimpsoni* Stearns, but differ in being stouter with less convex whorls, and of a pale red color. Length 6, diam. $2\frac{1}{2}$ mm. This form may be called *T. stimpsoni guadalupensis*.—H. A. PILSBRY.

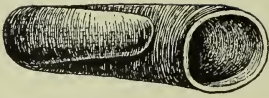
CYPRÆA CITRINA Gray.—Any one interested in the geographical distribution of Cypræidæ will be pleased to learn that the true *Cypræa citrina* Gray, has been rediscovered on the beach at Fort Dauphin, S. Madagascar. The old authors have recorded the species from Madagascar, but some more recent ones gave Australian localities as the habitat of this scarce cowry, and supposed there was some error about the existence of the species on the shores of Madagascar. As there may be no doubt whatever about this and about the identification of the specimens, *Cypræa citrina* must really belong to the fauna of Australia as well as to the fauna of Madagascar. It somewhat recalls the far more common *C. helvola*, but the teeth are totally different. The color itself, although similar, is not quite the same.—C. F. ANCEY.

PUBLICATIONS RECEIVED.

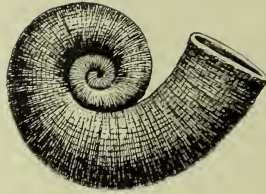
CATALOGUE OF THE MARINE INVERTEBRATES OF EASTERN CANADA. By J. F. WHITEAVES, Geol. Survey of Canada, 1901.— This is a very useful catalogue, and gives for the first time a concise record of our present knowledge of the Marine Invertebrates of Eastern Canada. The work contains 271 pages, of which 98 are devoted to the mollusca, 100 species of *Pelecypoda*, 5 *Scaphopoda*, 166 *Gasteropoda* (including 8 *Polyplacophora*), and 13 *Cephalopoda* are listed, with ample notes on their geographical and geological distribution and bathymetrical range.

GUIDE TO THE GEOLOGY AND PALEONTOLOGY OF NIAGARA FALLS AND VICINITY. By A. W. GRABAU (Bull. Buffalo Soc. Nat. Sci., VII., No. 1, 1901). The Buffalo Society of Natural Science has appropriately signalized the Exposition year by issuing a volume bearing the above title, containing a full and readable account of the local geology and paleontology. On account of its situation, the geology of Niagara is of course of far greater than local interest, since the intensely interesting and complex history of the Great Lakes is involved, so that the mass of data presented deals with subjects of wide interest. It is suitably illustrated with excellent maps and views. The paleontological part consists of an untechnical account of the fossils of the region, properly illustrated by good figures.

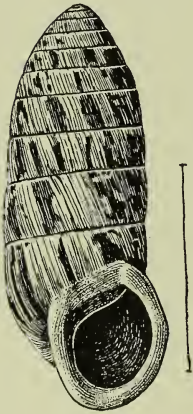
Chapter V., by Miss Elizabeth J. Letson, describes the post-pliocene fossils of the Niagara River gravels, and dealing with species still existing has special interest for conchologists. Some 17 species of Gastropoda and 14 Pelecypoda are discussed and illustrated. Among the more notable species may be mentioned the carimate form of *Goniobasis livescens* var. *niagarensis*, which reproduces the contour of *Anculosa carinata*; *Ammicola letsoni* Walker, an apparently extinct species; some peculiar forms of *Limnæa desidiosa* and *catascopium*, and a series of *Unionidæ*, very interesting to the student of geographic distribution:—*Lampsilis rectus*, *ellipsiformis*, *Uniogibbosus*, *Quadrula solida* and *coccinea*—forms speaking clearly of a former connection between the Great Lakes and Mississippi drainages. All of the species are illustrated with original figures. The work is well done, and cannot but prove useful for many years to come.



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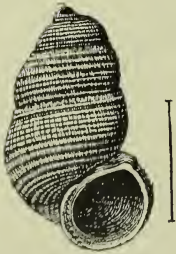
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1, 2. *Ceratodiscus solutus* H. & S. 5. *Ctenopoma hydii* Weind.
3, 4. *Cerion marmoratum* Pfr. 6. *Chondropoma hjalmarsoni* Pfr.

THE NAUTILUS.

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No. 8.

LAND SHELLS OF FORTUNE ISLAND, BAHAMAS.

BY J. B. HENDERSON, JR.

Fortune Island is one of the Bahamas belonging to the Crooked or Long Island group, and which is separated from the more westerly groups by a deep arm of the sea. Geologically it is in every respect similar to the other Bahamas. The little island is but four or five miles long and from one to one and one-half miles in width, with an elevation scarcely exceeding thirty feet. Its surface is rough with flat fragments of "eolian" limestone, and the entire island is covered by a dingy-colored scrub growth of trees and shrubs. A few clumps of graceful palms scattered here and there relieve somewhat the monotony of the dreary aspect. A wide beach of silvery coral sand encircles the island, glittering like a mirror by day and superbly bright in the moonlight. Singularly enough the only shells we found cast upon this beach were *Cerion*. Occasionally low cliffs of eolian rock extend down to the water's edge, and at such places, *Tectarius muricatus* L., *T. trochiformis* Dillw., and *Litorina lineata* Phil., were discovered.

The scrub vegetation affords but little shade, and the ground is baked by a powerful sun whose rays oppress the weary collector as they seem to enliven the swarms of sand-flies and mosquitoes. A diligent search from daylight to dark brought to our bag but four species of land shells; although individually these were quite abundant.

1. *Cerion marmoratum* Pfr. Generally dead specimens found under bushes. A considerable range of variation exists, the extremes of which are illustrated on Plate V, figures 3 and 4.

2. *Cepolis (Hemitrochus) milleri* Pfr. The color varieties of this really beautiful shell are infinite—indeed, no two specimens are entirely alike. They cling to the under side of leaves and to the stems of a certain species of shrub. Dead shells are scattered about in the debris of fallen leaves.

3. *Ctenopoma hydii* Weinl. Under slabs of eolian limestone; about the roots of trees; among fallen leaves. There is no actual difference between this species and *C. bryanti* of Great Inagua. I believe it is also reported from Long Island. (Plate V, figure 5.)

4. *Chondropoma hjalmarsoni* Pfr. Same station as the last. This shell has a decided Haitian appearance and has evidently been identified as *C. semilabre* Lam. It is doubtful if Lamarck's species ever occurs out of Haiti, indeed I am inclined to believe it is confined to the "cul de sac" region of that island. *C. hjalmarsoni* is more obese than *C. semilabre*, its decussated sculpture is not conspicuous, the revolving striæ are more pronounced and the longitudinal striæ less so than in the Haitian shell. (Plate V, figure 6.)

Fortune Island is easily accessible from New York, and offers an excellent base for exploring the neighboring islands of the group; however, it requires much patience to tarry in a desert of poor collecting when the larger Antillean islands with their magnificent mountains and forests and incomparable molluscan richness lie but a day beyond.

COLLECTING SHELLS IN MONTANA.

BY MORTON J. ELROD, UNIV. OF MONTANA.

The State of Montana is not very productive of conchological specimens. The conditions are all against shell growth. The rivers are rapid, the water quite soft, and food in the rivers scarce. The large lakes, as Flathead lake, contain clear, cold water. They are usually deep, with rocky bottoms, and surrounded by mountains with steep slopes. The marshy, stagnant parts of the lakes are usually small. The mountain sides in summer become dry and parched, except in protected portions and along the streams. Great stretches of plain are without moisture for a portion of the summer, drying up every living thing that cannot move to the water-courses. The days are hot, the nights cool. In this mountainous State, where very little

soil is lower than 3000 feet above the sea, the air is dry and evaporation rapid. A passing rain-cloud may leave considerable moisture, but it is soon taken up by the parched earth or evaporated if left on the surface. Stagnant ponds with decaying vegetation are few and confined to the vicinity of the few rivers. Even such ponds usually become dry each summer.

No doubt the western mountain region will produce some excellent material for study of variation through isolation, when collections have been made more extensively. Most of the valleys were former lake beds of greater or less extent. As these lakes have been drained, they left swamps in which rhinoceroses, camels, three-toed horses, elephants, titanotheriums, and other beasts have become mired, their remains being buried for long ages. These swamps have dried up, and the waters have become more widely separated, now occurring as deep mountainous lakes, or larger lakes, which are mere expansions of rivers. Such isolation must have caused the separation of shells of a species which naturally would take different lines of development. Accompanying this gradual separation of waters we might expect a region of moisture on the land adjacent to the lakes, giving suitable environment to the land snails.

As a result of the above conditions, we may expect great variations in adjacent regions, where the barriers may be sufficient to cut off all communication between the regions. Such variations have been illustrated in part by Hemphill's suite of *Patulas* (*Pyramidula*), in the Lichtenthaler collection at the Illinois Wesleyan University. This has also been shown by collections made in the Sandwich Islands. There is very little doubt but that the isolated lakes in Montana and the northwest will produce interesting variations. But the sparsely-settled country and the small number of collectors makes the work of collecting and studying very slow. This may be better understood by a practical application. The State of Montana has an area of 146,000 square miles. So far as the writer is able to discover, he is the only resident of the State who has collected fresh-water and land shells, and this has been done at odd moments while prosecuting other lines of work.

The accompanying list is not large. Five species is the maximum taken in one day. Those taken from mountain sides represent much toil for a few scattered specimens. The list, incomplete as it must be, represents the specimens collected at intervals during the past

three years, and is given as a basis for work, with the hope that others may add to it. The species are all from the western side of the range, or Pacific slope, with the exception of a few, which are properly indicated where they are discussed.

Missoula is located in a valley in which the Hell Gate and Bitter Root rivers unite to form the Missoula river. West of the Bitter Root river the Bitter Root range of mountains extend parallel with the river in a northerly and southerly direction. So far the writer has explored but a few spots in these mountains and along the rivers. But the results have been surprisingly good. North of the valley lies the Cabinet range, rugged and broken. Few spots in this have been examined. Across the Cabinet range lies the Flathead Indian Reservation. The crest of the Mission range marks the eastern border of the reserve. The Mission range extends almost due north and south for a distance of nearly a hundred miles. The southern end contains the highest peaks, reaching 10,000 feet, while the northern end slopes down to the Swan river, and has been ground smooth by glacial action.

Out of the Mission range four large creeks flow across the Mission valley, joining each other or the Pend d'Oreille river, which is the outlet of Flathead lake. The range makes the eastern bank of Flathead lake for its entire length. In the cañons of this range numerous small lakes lie nestled among the hills, invisible until one comes suddenly to the bank. Sin-yale-a-min lake is at the base of Sin-yale-a-min peak, at the southern end of the range. A ten days' camp at this lake brought to light probably all the shell fauna to be found. To the north the mountain produced the very interesting variety of *Pyramidula strigosa* described later.

McDonald lake is 15 miles north of Sin-yale-a-min lake, 500 feet lower in altitude, at the base of McDonald peak. Ten days at this spot produced several quarts of *P. elrodi* Pils., besides the first living shells. Another camp at Crow creek produced several valley shells. Several camps at different points on Flathead lake produced other species from the sands and from the water. Swan lake is on the eastern side of the Mission range. A camp on this lake added one to the list in the western part of the State, not found elsewhere.

While the collecting represented by these notes has extended through four summers, the results will probably be modified when a further study of the extensive country has been made.

The identifications have been made for the greater part by H. A. Pilsbry and W. H. Dall, and for this and other courtesies thanks are hereby extended.

Margaritana margaritifera L.

This is the only species of bivalve mollusk of the family *Unionidæ* taken. It has been found at several places in the Bitter Root river above the junction of this river with the Missoula. At one place a colony was found on a sand bar, when about a peck of live specimens were taken. At another they were found, in March, clinging to the rocks where the water was swift. They were captured by inserting the tip of a switch from a tree between the valves. The shell was closed on the limb, and the specimen pulled from the water. In this way a dozen or so were secured. Pieces of shells have been seen around Flathead lake, but no living specimens taken. In 1900, several dozen were taken in Crow creek, Flathead Indian Reservation. The species is found in all the western mountain streams. At no place is it abundant, and many people who have lived in this country all their lives express surprise at seeing these shells and hearing they are from waters in the State.

A NEW SPECIES OF LIOMESUS.

BY W. H. DALL.

Liomesus nassula n. sp.

Shell solid, white, covered with a pale olive, slightly-hispid periostracum, with a rather elevated, subacute spire of seven whorls; suture distinct, not channelled; apex somewhat eroded with a small blunt top; surface of the whorls delicately sculptured with fine revolving threads, four or five to a millimeter, of which about every fourth thread is perceptibly stronger than the other three; these are crossed by still finer, sharp, elevated, arcuate, incremental lines, along which the hispidity of the periostracum is arranged; pillar white, solid, twisted, funicular distally; canal very short, wide; outer lip thin, simple, with a concave flexuosity behind the periphery; body with a thin white callus. Alt. 42, max. diam. 22, lon. aperture 17 mm.

Dredged in 121 fathoms, sand, near the Pribiloff Islands, Bering Sea, by the U. S. S. Albatross.

This interesting addition to the genus has a sharper spire than any other species and a different sculpture. It is perhaps nearest *L. canaliculatus* Dall, which has coarser sculpture and a channeled suture.

A NEW TETHYS FROM CALIFORNIA.

BY T. D. A. COCKERELL.

Tethys (Neaplysia) ritteri, n. sp.

Length 21 cm., breadth about 8 cm. Dark grayish-olivaceous; sides with oblique, flame-like, blood-red markings, especially about the middle of the body; upper surface of the head and outer surface of epipodial lobes mottled with brown, but without any conspicuous blotches; inner surface of epipodial lobes and mantle covering shell pale sea-green, wholly without markings; lobe overlapping branchiæ deep rich purple; when the shell is removed, the area beneath it is seen to be strongly suffused with dark purple; branchiæ purplish-grey; sole 45 mm., broad, transversely grooved and corrugated, greyish-brown, inclining to coffee-color; epipodial lobes about 80 mm. long and 28 broad, from base within ends of lobes to nearest part of sole about 67 mm.; anterior tentacles 11 mm. from inner base to tip; posterior tentacles 14 mm. long.

Shell very thin, flexible, corneous, 58 mm. long, 42 broad; accessory plate well-developed.

The animal produces an abundance of a reddish-brown fluid. The muscular stomach or gizzard contains eleven pentagonal corneous bodies, which fit raised areas on its wall. The largest of these bodies was $14 \times 10\frac{1}{2} \times 10\frac{1}{2}$ mm. The alimentary canal contained seaweed.

Hab.: San Pedro, California. The specimen described was found cast up on the shore of the bay, just in front of the University of California Marine Laboratory, July 23, 1901. Others were obtained by workers at the laboratory; one of these, which I saw, had been in formalin, and the red, flame-like markings had wholly disappeared.

This animal has the structure of *T. californicus* (Cooper), which was also described from San Pedro, but the color-scheme is so entirely different that it must be assumed that the species are distinct. Should any reason hereafter appear to the contrary, *T. ritteri* will at least be a very distinct variety. It is named after Prof. Wm. E. Ritter,

director of the Marine Laboratory at San Pedro, in recognition of his important services to marine zoölogy.

JAPANESE VIVIPARA IN CALIFORNIA.

BY ROBERT E. C. STEARNS.

In the NAUTILUS for February, 1892, Mr. Williard M. Wood mentions the presence of "Paludina Japonica" (as determined by Mr. W. J. Raymond), in the Chinese market in San Francisco, where he saw a bucket-full of living specimens, being part of the first lot brought alive from Japan, where they are collected in the rice-fields near Yokohama, and are sold for a few cents a quart. They are called by the Chinese "Tsen law." Subsequently Mr. Wood (NAUTILUS, September, 1892), mentions seeing the same species and certain forms of *Anodonta* in an aquarium in a shop in the Chinese quarter of San Francisco.

A year or more ago, Mrs. A. E. Bush, of San José, sent me a few examples of a *Vivipara*, a quite familiar Japanese form. One living specimen sent to Dr. Pilsbry, he kindly determined for me as *V. stelmaphora* Bgt. (= *V. malleata* Rve.), "it is a female and gives us plenty of young," etc. From Mrs. Bush's note it appears that the species may now be collected, or might have been at the time she sent the specimens, in San José, and also in a little valley at the foot of Mount Hamilton. The examples received from her were collected at the former place. The first specimens from the several regions were detected by a boy, at a point seven or eight miles from San José. In wheeling over the floor of a little lake that was dry at the time, he picked up the shells and gave them to a friend who was interested in conchology.

From the above it is quite evident that somebody planted this Asiatic form thereabout, presumably some of the Japanese or Chinese living in the neighborhood. It may be remembered that the European *Helix aspersa* was planted in San José forty years ago; in course of time the mollusca of the region may exhibit quite a cosmopolitan aspect.

Los Angeles, Cal., Oct. 22, 1901.

THE SHELL-BEARING MOLLUSCA OF RHODE ISLAND.

BY HORACE F. CARPENTER.

The earlier portion of this paper appeared in Volumes III. and IV. of this Journal.]

199. *Yoldia sapotilla* Gould.

Nucula sapotilla Gld., DeKay, Sby., Hanley; *Leda sapotilla* Stimp., S. I. Smith, Reeve; *Yoldia sapotilla*, of modern authors.

Shell elongated ovate, thin, fragile, translucent; beaks nearly central, a little nearer the anterior end, not elevated; anterior portion of the shell semi-oval, regularly rounded, posterior narrowed and compressed but not so much so as in *Y. limatula*; surface with very minute concentric lines; epidermis thin, glossy, bright yellowish-green with one or two narrow zones of a darker shade; interior white and pearly; hinge with sixteen long and pointed teeth on each side of the beaks, those near the center small and close together. Length $\frac{9}{10}$, height $\frac{4}{5}$, breadth $\frac{3}{10}$ inch.

This species is comparatively rare and local, but inhabits soft mud in deep water from Long Island to the Arctic Ocean. It has been dredged in Provincetown Harbor by Col. Joseph G. Totten, and in Long Island Sound by Mr. S. Smith. Prof. A. E. Verrill has dredged it off Gay Head, 19 fathoms; Buzzard's Bay, 25 fathoms; east of Block Island, 29 fathoms; and in Casco Bay and Bay of Fundy, 4 to 100 fathoms. Quoted from Mass. Bay (Gould), Nova Scotia (Willis), Labrador (Packard), Greenland (Mörch).

Gould says, "In its shape and the perfect polish of its surface, this shell resembles the seed of the Sapotilla (*Achras sapota*), a tropical fruit," and for this reason he gave it its specific name.

Yoldia obesa Stimp. and *Yoldia thraciformis* Stimp. have been quoted from Long Island to Greenland, but have not as yet been found in Rhode Island.

Family ARCIDÆ.

The Arks are boat-shaped shells, having a straight hinge with numerous short comb-like teeth; the umbos separated from each other by a flat, lozenge-shaped ligamental area, and on the interior of the valves are two distinct muscular impressions. The animals have two hearts, each with an auricle; they spin a byssus not like the mussels, but a horny substance composed of numerous thin calcareous plates

which can be cast off and renewed whenever occasion requires. There are a large number of genera and species; they are distributed world-wide, in all seas and at all depths from low water to 240 fathoms. Fossil arks are abundant in all ages. There are several groups of this family, one of which is sedentary in its habits, adhering to crevices in rocks; another group *Scaphula* Benson, an East Indian genus, lives in fresh water, a thousand miles from the ocean; others live in sand or mud and move about freely. We have two species in New England, although a third, *Arca ponderosa* Say, is occasionally washed up on the beach at Edgartown, Martha's Vineyard.

200. *Arca (Argina) pexata* Say, 1822.

Shell oblong, thick and solid, very inequipartite; beaks prominent, ventricose, pointing obliquely forwards, terminating in points which are nearly in contact, surface with 32 to 36 broad radiating ribs, crossed by minute lines of growth, the whole covered with a very coarse, brown hairy epidermis; interior white, the margin polished and deeply crenulated by the alternate termination of the ribs and grooves; hinge with a series of small teeth. Length $2\frac{1}{2}$ inches, height 2 inches, breadth $1\frac{1}{2}$.

This species is very abundant in Narragansett Bay and has been quoted from Cape Cod to Gulf of Mexico. I think it must be very rare and local south of Long Island Sound, as collectors south of New York seem to consider it a rare species. It is distinguished from all others of our marine shells by its rough, dirty epidermis, which is thick and hairy, generally detached in places and can be torn off in long strings. The fishermen call it the hairy clam. It is not an attractive looking object when found alive, and is still more repulsive if we open the valves, for the animal then exudes a reddish, bloody-looking liquid, from which circumstance it is often called the bloody clam.

201. *Arca (Scapharca) transversa* Say, 1822.

Shell transversely oblong, rhomboidal; beaks prominent, separated from each other by a long, narrow space; surface with 32 or more radiating ribs, the ribs and intervening spaces of about equal breadth. Length and breadth about $1\frac{1}{2}$ inches each, height 1 inch. This species is of southern distribution and is not at all common as far north as Rhode Island. It has been found from Florida to Cape Cod.

Several specimens have been collected at Nantucket and Martha's Vineyard; it is not very rare at New Haven, but I have never found anything in our bay excepting single valves. Mr. John Ford, of Philadelphia, while on a visit to Providence, a few years ago, obtained several live specimens among the oysters dredged off Bullock's Point.

Family MYTILIDÆ.

The mussels inhabit all shores in great numbers. Some species inhabit deep water and others frequent near high water mark, being uncovered nearly all the time and moistened by the salt water only once every twelve hours. Woodward says, "The members of this family exhibit a propensity for concealment, frequently spinning a nest of sand and shell fragments, burrowing in soft substances or secreting themselves in the burrows of other shells." In speaking of the animals, he says, "Animals marine or fluviatile attached by a byssus." There are no fluviatile members of this family, although one species, which will be spoken of hereafter, seems to live equally well in either fresh or salt water.

Genus *Mytilus* Linné, 1758.

The mussels are easily recognized by their triangular or wedge-shaped shells, which are pointed at the anterior end and broad and rounded at the posterior; the hinge is either toothless or in some species with very minute teeth. There are sixty-five species distributed world-wide, one of which inhabits Rhode Island.

202. *Mytilus edulis* Linné.

Mytilus vulgaris Da Costa; *Mytilus borealis* Lam., De Kay, Midd.; *Mytilus pellucidus* De Kay; *Mytilus notatus* De Kay (young).

Shell ovate-triangular, solid; beaks pointed, situated at the anterior end; hinge margin rising in a straight line at an angle of forty-five degrees from the basal margin, which is also straight; posterior widened and rounded, the broadest part of the shell being directly opposite the centre of the basal margin; surface covered by a dark, shining, bluish-black epidermis, under which the shell is violet; interior silvery in the centre, with dark violet margins. Length of large specimens two and a half inches, height one and three-tenths, breadth one inch.

This species, the common edible mussel, inhabits the whole of the ocean shores of the northern hemisphere, being extremely abundant

all over the northern portions of Europe, Asia and America. They are used in Rhode Island for food to a very limited extent, probably on account of the vast quantities of clams, quohogs, oysters and scallops which abound here, any of which form a much better quality of food than the mussels; but they are consumed in large numbers in Europe. The annual consumption in the city of Edinburgh is estimated at four hundred bushels, averaging one thousand to the bushel; the amount collected for bait in various kinds of fishing is enormous. In France, Norway and Russia immense quantities are gathered and used, animal, shell and seaweed together, as a fertilizer for the land. They are found in Rhode Island attached to each other by their strong byssus in great numbers. They are not buried in mud, but cluster together on rocks between tides and form beds in the banks. The young are found in deeper water and attain their growth in one year.

Mytilus pellucidus, Penn., Mont., Turt., Don., De Kay and others, considered by many as a separate species, I think is only a variety of *Mytilus edulis*. The shell is thin and transparent, beautifully radiated with blue, yellow and green zones. These marks are generally seen in specimens about one inch to an inch and a half in length and they gradually disappear as the shell gets larger; still these zones are sometimes seen in old and solid specimens, while others, one half an inch or less in length, are of a uniform shining black appearance, so that it does not seem to depend at all upon the age or size of the individuals. In every cluster of *Mytilus edulis* we find from one to a dozen or more of these pellucid, radiating ones, which if they do belong to a separate and distinct species, present an anomaly seldom seen, *i. e.*, a colony of different species of animals living together and firmly bound together by such strong bonds of friendship (or something else) as these mollusca are.

Genus *Modiolus* Lam., 1799.

The horse-mussels differ from the edible mussels in having a shell swollen at the umbos, and in having three pedal impressions in each valve, whereas there are but two in *Mytilus*. The animal burrows in mud, or clusters together under banks of grass or peat in salt marshes in some species, while others live in deep water. There are three species living in Rhode Island, one of which, however, is not a native, but has become domesticated here within about twenty years.

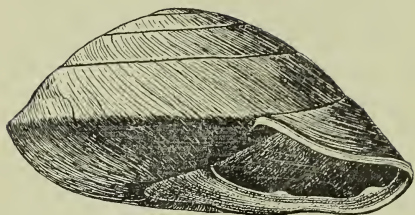
204. *Modiolus* (*Brachydontes*) *hamatus* Say, 1812.

Mytilus hamatus Say, De Kay; *Mytilus serratus* Barnes, 1823; *Modiola hamatus* H. F. Carpenter, 1865, A. E. Verrill, 1872; *Brachydontes hamatus* Perkins, 1869.

Thomas Say describes this species in the Jour. Acad. Nat. Sci., ii, p. 257, 1822, under the name of *Mytilus hamatus*, giving for its locality the Gulf of Mexico; the specimens he described were obtained from the markets of New Orleans, adhering to the shells of the southern oyster, *Ostrea virginica*. Since his time it has been found on oysters along the coasts of all the southern Atlantic States. Shell very much contracted and incurved at the beaks, which are acute; surface covered all over with elevated radiating lines, which near the umbos are divided into two and sometimes three; color black or very dark brown; interior purple with white margins. Length two and one-half inches, breadth one and a half, but sometimes as broad as long; very variable.

Gould's Invertebrata of Massachusetts, 1840, does not mention this species at all; even Binney's Gould, second edition, 1870, supposed to contain descriptions of all the marine species inhabiting the coast of Massachusetts, has not a word to say about it. It is, however, getting to be quite common in Rhode Island waters, but the collector will obtain more specimens in five minutes in the oyster markets of Providence, than he could collect at the shore in a week. The first specimens I ever saw were given me by Mr. E. H. Jenks, who obtained them in a fish market in Pawtucket; neither of us knew what they were at the time, but I pronounced them to be *Modiolus* at once. After carrying them home I referred to a volume of Say in my possession and saw by the figure and description given in it that they were *Mytilus hamatus* Say. They were attached to oyster shells. On seeing Mr. Jenks a few days after, I told him what they were, but added, "they are not *Mytilus* if Say does say so, they are *Modiolus* just the same." Since then the species has become domesticated in our bay, having been brought here alive on the southern oysters and transplanted in these waters. I have found a few specimens in our bay not attached to oysters, stones or anything else, but its proper habitat is on valves of *Ostrea virginica*, adhering by a short, stout byssus.

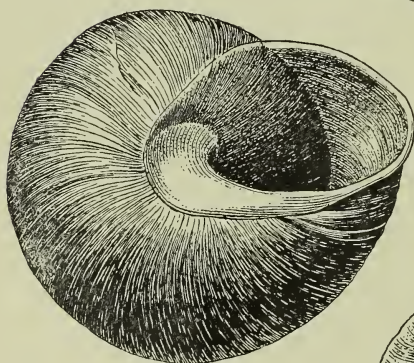
In November, 1870, Mr. Geo. H. Perkins published the "Molluscan Fauna of New Haven," in which, speaking of this species, he says, "An examination of the *animal* has led me to consider it a *Modiola* rather than a *Mytilus*." He described it as a *Modiola* under the sub-generic name of *Brachydontes* Sw., 1840. In 1872, Prof. A. E. Verrill, in the March number of Silliman's Journal, p. 211, says, *Modiola hamatus* = *Mytilus hamatus* Say. New Haven harbor and vicinity, usually attached to oysters.



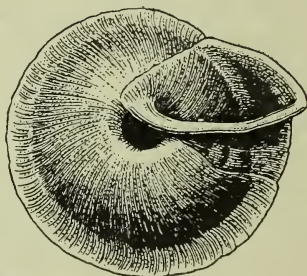
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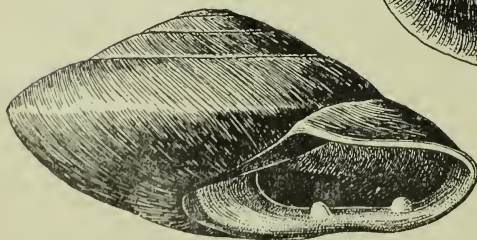
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VENDRYES: NEW SPECIES OF PLEURODONTE.

THE NAUTILUS.

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JANUARY, 1902.

No. 9.

A DAY ON THE GREAT BARRIER REEF

BY CHARLES HEDLEY.

“All hands on deck!” Ugh! “The billy’s boiled!” Groan. “The tide is falling fast!” That fetched your conchologist. Sleepily he crawled out and reached for his mug of hot tea. Balancing himself on the combings he looked abroad.

Far in the west the jungle-clad mountains of tropical Queensland loomed soft and blue. Between lay a purple sea which in the near distance suddenly changed to the vivid green of shoal water. To windward a beach of coral sand showed white and bright under the dense foliage which smothered a long, low island. Beyond it a line of foaming breakers stretched to the sky-line. Back against the white surf there rose the bristling fangs of the reef, rank after rank passing in long perspective out of sight. Below in the clear water, the links of the cable lay as sharp on the sand as if the cutter had floated in the air. Down overboard a blue starfish (*Linckia*) slept, here a prickly urchin, there a madrepora.

Regardless of scenery the party munched their damper, and asked what was the scarlet tree ashore, and should the cook be keel-hauled for opening plum jam instead of marmalade.

“Get the dingy up and look alive!” quoth the captain. Into her tumbled all hands, Mr. Conglomerate, the captain, the cook, the jib-sheet hand, and Mr. Conchologist. Safe in the locker are stowed all the nice town clothes. A soft-felt hat, flannel shirt, tweed pants, belt and sheath-knife, and big laborer’s boots with thick socks rig out a man for the reef. Mem. tie your boots with string instead of

laces for wading. Our tools are a geological hammer, a four pound sledge, a crowbar, all the cans and buckets available, a pocket-full of corked tubes and a pocket lens fastened to the waist with a key-chain, such as bank clerks use. A big shooting bag is a handy thing to sling over the shoulder. A design for reef collecting which we never put in practice was a belt like a soldier's cartridge belt to hold tubes instead of cartridges. Not only could molluscs, worms, etc., be packed apart, but such useful things as alcohol, formal, or picric acid would be at hand in small quantities. In practice we filled, say the left trouser pocket, with empty tubes. When a specimen is found it is important not to lose sight of it, and one hand may be engaged holding the rock. With the free hand a tube is taken, the cork pulled out with the teeth, the specimen bottled, the tube filled with sea water and stowed in the right hand pocket.

Now we pull in among the corals and jump overboard. "But what is the thing like a barrel stranded yonder?" "That, Mr. Conglomerate, is a *Tridacna gigas*." A real, live, giant clam, with jaws gaping like a crocodile, lying high and dry and loose upon the reef. Between the jaws are living jewels of green and gold, thick strewn on living velvet. With a convulsive jerk the shell half closes and gaps again. "I've seen plenty bigger nor this; do you want him, Mr. Conchologist?" asked the jib-sheet hand. "Yes, take that." So he drove the end of a board hard down in the centre of the gape. That disabled the monster. The cook plunged in a butcher's knife, dexterously peeled back the gorgeous mantle, slipped off the huge adductor muscle and unceremoniously threw out the carcass, bigger than a leg of mutton, on the sand.

The conchologist who ordered the execution feels, well, just a qualm of remorse, as the men hoist the shell to the boat. Anyhow he never collected a bigger shell. And then for an instant, the sunshine and the sea were swept away and the magic of memory flashed out a picture of distant lands and days; faint incense, cold and gloom, past rows of marble pillars and stained glass windows, to a small conchologist gaping with amazement at his first *Tridacna*, the the holy-water basins in St. Sulpice.

Again the ripple on the water, the sunshine and the sea. All about the giant lay lesser clams, *Hippopus*. "How do you tell one from the other, captain?" "Why, look at the meat," says he. And sure enough, we saw that *Hippopus* lacked the jewelled eyes of

his great brother. Queer topsy turvy molluscs these, lying hinge down, gape up. And yet they have turned round in the shell and live heart up, foot down, like other bivalves.

"Here's something for you!" Wading across, the conchologist found four men standing at a respectful distance round one small *Octopus*. Boldly he grappled with the fearsome beast, twining and untwining the long sticky tendrils. The jib-sheet hand muttered something to the cook, and both exploded with laughter. I fear that irreverent young rascal had remarked how like the *Octopus*, all legs and arms, was to Mr. Conchologist himself. Now the slippery thing is gathered up and slid into the bucket. When packing time came, however, no *Octopus* could be found; evidently it climbed out when the gaoler's back was turned.

Another big coral block, over with it. A scuttle of little crabs, as they clatter down small holes, a shrinking of things soft, a twisting and a writhing of things neither hard nor soft; among them is a particularly energetic bunch. Left alone it unwinds into a huge Brittle star; casting a couple of cables into the water beneath, the Brittle star lowers itself along itself to the sea, pulls after itself the cords which are itself, and tucks itself, body and ropes and running rigging, comfortably into a crack in the coral.

This is a land of big things. Here is a huge sea anemone, bigger than a dinner plate, *Discosoma*, with all its tentacles spread abroad. A gorgeous little fish, crimson with a white bar, has made friends with the anemone and at the least fright swims to its capacious bosom and nestles safe among the poisonous tentacles.

And here is the Chinese dainty, the *bêche de mer*, a dozen different kinds of them. The commonest *Holothurian* is a long, black, snake-like species. When feeding they sweep all around with their branching tentacles, grasping a miscellaneous catch of foraminifera, shells and sea-weed, and thrust the mass down their throats. Another *bêche de mer* has earned the name of cotton fish, because when handled it voids a mass of white glutinous threads, troublesome to clean from hands and clothes.

"Pass the crow-bar and up-end this block. A heave, my hearties, and up she goes!" "A mutton-fish," says the jib-sheet hand, and grabs it. *Haliotis asinina*; now we always did think that narrow shell could not contain the body, and here it is like *Scutus* or *Umbrella* or *Lucapina*, only a shield upon the back. "And those, toe-

nails you call them, not a bad name either. I call this *Acanthochites* and that *Cryptoplax*." As the conchologist crooks his finger round a live *Stomatella mariei*, the creature falls asunder. Like a Gecko, he would ransom his body with his tail. *Gena* does the same in Sydney harbor; *Harpa* is said to know the trick.

"What are you doing?" asks Mr. Conglomerate, strolling up. "Smashing up *Heliopora*? What a shame!" And so it is, to wreck the beautiful blue branches, but we seek all manner of queer things hidden in corners, and *Gephyrean* worms and *Lithophaga* burrowing inside. A few odd urchins and star-fish are overhauled for *Stylifer* without success.

And see under the water what looks to the eye like a mass of white down, but to the finger feels hard. We read the riddle with a chop of the crow-bar; the fragment shows tiny crimson rods packed together, and partitioned off into floors and ceilings. It is a lump of *Tubipora musica* in full bloom.

Out in the broad daylight lie the Strombs, they love the little sandy pools among the rocks. The sociable big *Pterocera* lie around in scores, not too proud to foregather with their humble cousin *S. luhuanus*. There is nothing shy about a Stromb, it vigorously resents being picked up, and kicks like a *Nassa*, lashing out water with its operculum, and thrusting out its beautiful big, green eyes, on their long stalks, it stares boldly at its captor.

But now the tide is rising fast. Soaked and tired and hungry we must leave our hunting ground. Though bags and buckets and tubes are crammed, yet we have scarcely tasted of the riches of the reef. All to-morrow, next week, and next month we might collect without exhausting it.

Back to the cutter we row over fields of deeper corals, scarlet gorgonias, parrot fish glancing blue and gold and green, *Monacanthus* in armour of black and red, over madrepores ten feet across, like tables spread with dainty lace and edged with violets.

Then we climb aboard and snatching a hasty meal as we work, face the only tiresome labor of the day, the labelling, sorting and packing of our catch.

At last the jars and kegs are screwed down. Let us pass the pannikin along for rum, light a pipe, stretch luxuriously on the hatch and lazily watch the ghostly gleam of the zodiacal light fading in the west.

A NEW SPECIES AND SUB-SPECIES OF JAMAICAN PLEURODONTE.

BY HENRY VENDRYES.

PLEURODONTE (Pleurodonte) VACILLANS, n. sp. Pl. VI, figs. 1, 2, 3.

Shell rather solid, very slightly dilated transversely, depressed turbinate above, depressed convex below; color brown all over, deepening slightly in tint and simulating an indistinct band running along the centre surface of the spire whorls (except the apical) with a dark brown band below the periphery of the last whorl encircling the base of the shell and fading off to very light about and around the umbilical region; whorls a little more than five, apical obtuse, the rest subplanulate except the last which is impressed above the periphery and somewhat inflated above the impression; the periphery subacute and descending slightly near its extremity; suture linear, impressed. Sculpture on part of the antepenult whorl apparently the same as in *P. carmelita*, in the rest for the main part, of irregularly raised, drawn out growth lines, coarse in some places and very fine in others; aperture peroblique, sublunate, livid shining within in fresh specimens; peristome not so stout as in *P. carmelita*; the extremities joined by a callus spreading across the parietal wall, upper margin simple, somewhat sinuously depressed above near its commencement, basal margin reflexed, widening, and adnate for some distance to the base of the last whorl which is inflated, but less so than in *subacuta*. There are two small distant teeth within, like those of *P. subacuta*, but of a brown color, as is also the peristome. The umbilicus is covered in some specimens but not completely so in others; in the first case the basi-columellar part of the peristome which forms the covering shows a shallow depression over the perforation beneath. Alt. 23, diam. 48 mm.

Habitat: Silver Hill in the Parish of St. George, situated at an elevation of about 4000 feet on the northeastern slope of the chain of mountains in St. Andrew; St. Catherine Park, in the neighborhood of the habitat of *C. carmelita*, and in exactly similar stations to those which the latter frequents.

This shell so much resembles *P. carmelita* in some respects, and *P. subacuta* in others, that one may be led at first sight to confound it with one or the other of those species to which the particular specimen under examination may show a preponderance of resem-

blances. Its principal differences from *P. carmelita* are the possession of the two teeth (*carmelita* never exhibits a vestige of teeth) and the adrate peristome. These two features, however, bring it nearer to *P. subacuta*, but the sculpture, the deflection of the last whorl (or rather the descending), the color of the peristome and teeth, and the generally less inflated appearance of the shell remove it also from that species. It appears as if thrown in between *carmelita*, *subacuta* and *acuta* to exemplify the sportive tendencies of the very variable group to which they all belong.

Figures 1 and 2 are from the type. Figure 3 represents a specimen approaching *subacuta*.

PLEURODONTE (Pl.) SOROR Fér. var. PERACUTA, n. var. Pl. VI, figs. 4, 5.

Same in size as the type, but the shell is more depressed, the base less regularly convex and the outline of the spire is more conoidal. The periphery of the last whorl is much pinched and spread out into a wide, flat, knife-like carina. The base is somewhat convex below the periphery, then compressed laterally inward from it and inflated. The umbilicus is uncovered; the aperture subtriangular, narrowed transversely and forming an acute angle at the right side. A few examples are unicolored brown with the epidermis dull and flaky as in some specimens of *P. cara*, but by far the greater number of specimens are banded with dark and white, as in the type of *soror*, on the spire, and the periphery of the last whorl is white. The bands do not stop, as in the type, half way up the spire, but extend to the very suture line of the first apical whorl. The color of the shell (or of the bands) is not so intense, or pure or lustrous white as in the type. The shells somewhat resemble small banded forms of *P. peracutissima*, but they have the teeth of *soror*. A specimen received from Clitty is marked "*soror*?" From Lower Maysfield in the Parish of St. Elizabeth.

A NEW SPECIES OF VOLUTOMITRA.

BY W. H. DALL.

This genus has long rested on its typical species, the *Mitra grønlandica* (Beck) Möller of the Arctic Atlantic Seas. The discovery of another species, therefore, possesses somewhat more than the ordinary interest.

Volutomitra alaskana n. sp.

Shell fusiform, with about six moderately convex whorls; suture distinct, surface wholly minutely spirally striated, covered with an olivaceous periostracum over a white or yellowish shell; aperture longer than half the total length, with a rather wide canal, callous pillar and body in the adult, and simple outer lip; the canal has a well marked siphonal fasciole, and is slightly flexuous; plaits normally four, rarely three or five, strong and rather distant; nucleus almost always eroded; lon. 44, diam. 17.5; lon. of aperture, 26 mm.

Habitat in the southern and eastern parts of Bering Sea and the Aleutians, in 60 to 85 fathoms, muddy bottom, and southward in constantly deeper water, following the temperature of 39° Fahr. to a point off San Diego, California, in 822 fathoms.

This species differs from *V. grönlandica* in its much greater size, less rufous color, and pervasive fine spiral sculpture, but otherwise is very similar. It was first dredged by the writer in the eastern Aleutians, and has since been obtained by the U. S. Fish Commission. The Atlantic species is usually about 18, but reaches 27 mm. in length, and is smooth above, with a few coarse spiral striæ on the base.

 COLLECTING SHELLS IN MONTANA.

BY MORTON J. ELROP, UNIV. OF MONTANA.

[Continued from page 89.]

Sphærium partumeium Say.

This beautiful shell is common in the ponds near Flathead Lake and around Missoula. They live in the dense vegetation, in company with *Planorbis trivolvis*, larvæ of Odonata, Cyclops, Daphnia, and numerous water insects. They are gathered by pulling out a mass of the vegetation, picking it to pieces, and here and there finding the delicate shells. A single dead shell was found on the beach of Swan lake. None have been discovered in the small cold water lakes in the Mission mountains.

Planorbis trivolvis Say.

This cosmopolitan species is the most abundant thus far found, and has been taken in most of the ponds where shells are found. It has been taken around Missoula in the streams, in the lakes of the

Mission Mountains as high as 3800 ft., in the ponds bordering Flathead Lake, and in Swan Lake.

Estey's pond covers some 10 or 15 acres, three miles from the Biological Station, and a mile from Flathead Lake. In August, 1900, the shores of this pond were literally covered with dead shells, and great quantities of live ones in the water.

It was here that a very interesting experiment was performed with these shells and a large frog. A dead shell was tossed in front of the frog, close to his nose. The shell was immediately seized, and an unsuccessful attempt made to swallow it. It was disgorged by the aid of the fore feet. A second attempt gave the same result. This was continued until the frog had seized the eighteenth dead shell, when he seemed to weary of the sport, and took a rest. After this he would seize only now and then, and only those in easy reach. After the 23d shell had been seized he no longer made any effort, and a good sized pile of shells was made with no result. Other attempts on other frogs gave practically the same result, with a slight variation in the number.

Planorbis parvus Say.

In August, 1897, while camped on the bank of the Pend d' Oreille river a couple of miles below the outlet at Flathead Lake, some sand siftings produced a dozen or more of these small shells.

(*To be continued.*)

THE SHELL-BEARING MOLLUSCA OF RHODE ISLAND.

BY HORACE F. CARPENTER.

[*Continued from page 96.*]

203. *Modiolus modiolus* Linné.

Mytilus modiolus Linn., Wood, Don. Chem., DeKay. *Modiola modiolus* Turt., Gld., Perkins, Dall.

Shell large, thick and solid, oblong-ovate; beaks at the anterior end which is narrow; posterior broad, rounded; hinge margin straight, ascending from the beaks at an angle of forty-five degrees to the centre, then curving downward to the posterior end; basal margin arched a little upwards near the centre, gaping at this point for the passage of a byssus; epidermis dark brown, thick, folding

over the margin; interior pearly, of a livid color. Length four and a half inches; height two and a quarter; breadth two inches.

It inhabits the ocean in deep water, attached to the larger seaweeds, and is thrown up on ocean shores in storms, the seaweeds being torn from the rocks by the action of the waves and dashed upon the beach. Sometimes these shells attain a length of six inches and are subject to great variety of form, being almost always distorted in some manner. In young specimens, the epidermis at the lines of growth is prolonged into filaments.

205. *Modiolus plicatulus* Lam.

Shell transversely oblong-ovate, elongated, narrowed at the anterior and broadened at the posterior; beaks at the anterior end; hinge margin straight, ascending for two-thirds the length of the shell, then curving downward and rounding at the posterior to meet the basal margin; surface ornamented with numerous radiating, sometimes undulating, prominent ribs; a broad elevated ridge runs from the beaks to the posterior end of the basal margin, dividing the shell into two nearly equal parts; on the upper half of the shell thus divided, the ribs are large and coarse, but on the lower half they are very fine, merely lines on a smooth surface; exterior silvery white, covered by a thin varnish epidermis of a brown color, rayed with zones of yellow, green and black; interior silver white; margins crenulated. Length three inches, height one and a quarter, breadth nine-tenths.

This species, with the exception of *Mya arenaria* and perhaps *Ilyanassa obsoleta*, is the most abundant mollusk in R. I. It inhabits everywhere in mud, peat bogs, salt marshes and in the banks of rivers. It is found up the Blackstone nearly to Pawtucket, where the fresh water is continually pouring over the falls, as well on the shores of the bay and ocean. Its station is everywhere above low water, and they cluster so thickly together as to frequently form banks a foot or two in depth imbedded near high water, forming beds sometimes hundreds of feet in length by ten to twenty in width. When found completely buried in mud, they are generally preserved in good condition, but if taken under any other circumstances, the epidermis is found to be badly eroded, not only at the umboes, where shells usually exhibit this peculiarity if at all, but all over the surface. They may be gathered in any quantity in Providence, in the banks of the river road, above Red Bridge.

Genus *Crenella* Brown, 1827.

There are five species, one of which inhabits New England.

206. *Crenella grandula*, Totten.

Syn : *Modiola glandula* Tott. Gld.; *Mytilus decussatus* Stimp.; *Crenella decussatus* Forbes & Hanley, DeKay.

Shell small, thin, rounded oval; beaks small, separated at the anterior end, and at one half the height of the shell; surface with minute lines of growth, crossed by numerous fine radiating ribs which increase in number as they recede from the beaks; epidermis brownish-yellow; interior pearly; margins sharp and crenulated. Length one quarter of an inch, height nine-twentieths, breadth three-tenths.

This species was discovered by Col. Joseph G. Totten in Provincetown Harbor, and described in Silliman's Journal, Vol. xxvi, p. 367, 1834. It inhabits sandy and soft mud in water from 3 to 60 fathoms, from Sandy Hook to the Gulf of St. Lawrence, and is often found in the stomachs of fishes. It has been dredged in various places between these points, such as Buzzard's Bay, Vineyard Sound, off Block Island, in Massachusetts Bay, Casco Bay and Bay of Fundy. It is found fossil at Montreal.

Genus *Modiolaria* Gray, 1872.

The shells of this genus are small, rhomboidal in shape, and are sculptured by two series of radiating lines, one at each end, leaving a smooth space between.

207. *Modiolaria discors* Linné.

Syn : *Mytilus discors* Linn., Loven, Stimp., Hanley, etc.; *Mytilus discrepans* Mont., Dill., Turt., Flem.; *Modiola discrepans* Lam., Forbes, Gld., Migh., DeKay.; *Crenella discors* Gray, Adams, Forbes and Hanley; *Modiolaria discors* Loven, Binney, Dall, etc.

Shell obliquely-oval, beaks near the anterior end; surface coarsely marked by lines of growth and divided into three fan-shaped spaces, the anterior portion with eight fine lines radiating from the beaks to the basal margin, the middle portion smooth and the posterior with numerous lines radiating in an opposite direction from those on the anterior end of the shell; interior silvery. Length one inch, height thirteen-twentieths, breadth two-fifths.

Circumpolar: from Greenland to Long Island; from Finmark to Great Britain; Bering's Straits to Puget Sound. Inhabits from

low water mark to 100 fathoms, also found in the maws of fishes. Common everywhere north of Cape Cod, rare and local to the south of it. Two other species, also circumpolar in range, the *Modiolaria nigra* and *M. corrugata*, are said to have been found as far south as Buzzard's Bay, but as I have no idea they will ever be found in R. I., I do not include them in these papers.

(*To be continued.*)

GEORGE B. SIMPSON.

George Bancroft Simpson was born in 1841 at Boston, Mass., removed to Waterbury, Conn. at an early age, and in 1861 enlisted in the army for the Civil War. At the close of his service he entered Yale College, but was unable to complete his course for lack of money. In 1868 he came to Albany and began work with his uncle, the late Prof. James Hall, State Paleontologist, as a collector of fossils. Subsequently he took up the drawing of fossils and became highly skilled in this work. Thousands of the fine drawings which have illustrated the *Paleontology of New York* being his handiwork.

He was a devoted lover of nature, and was the author of a useful work on the anatomy of the fresh water clam (*Anodonta fluviatilis*), and had just completed an elaborate treatise on the anatomy, physiology and embryology of *Polygyra albolabris* and *Limax maximus*, at the time of his death, which occurred October 15, 1901.—J. M. C.

PUBLICATIONS RECEIVED.

THE MOLLUSCA OF PORTO RICO. By William H. Dall and Charles T. Simpson. (Extract from U. S. Fish Commission Bulletin for 1900, Vol. I, pages 351-524.)

This work really constitutes a hand-book of the mollusca of the island, as it contains brief descriptions of the genera and species with references to the original descriptions and principal synonymy, illustrated by 6 plates containing 102 figures. The total number of species recorded is 653, of which 42 are new. Excluding the land and fresh water shells and nudibranchs the number of species and well-marked varieties is 530, and an estimate is made of 600 species. "It has been one of the surprises that a number of species originally described from deep water in the Blake report, turned up in less than 100 fathoms in Mayaguez harbor or other localities."

Some important changes in nomenclature are noticeable: The genus *Pyrena* Bolten, 1798 (*Conidea* Swain), is adopted for *Columbella ovulata*, and *Nitidella* Swains., is given generic standing. *Ultimus* Bolten is used generically for *Ovula gibbosa*. We can hardly agree with the authors in some of the names they still retain in the old family *Tritonidæ*, for which they use a new term *Septidæ*. If one name of an author having priority is used, why not use others that can be as readily identified? If *Septa* Perry, 1811, can by elimination be used for *Triton* Montf., why not use *Monoplex* Perry, instead of *Ranularia* Schumacher 1817, and *Aquillus* Montf., 1810, for *Lampusia* Schum.? *L. cynocephala* Lam., certainly belongs to *Ranularia* rather than *Lampusia*. The family name *Septidæ* probably deserves adoption, as the genus *Septa* contains one of the largest and most beautiful shells in the world (*Septa tritonis*), although it is not perhaps the most typical, nor the oldest genus of the family.

THE MOLLUSCA OF THE PERSIAN GULF, GULF OF OMAN AND ARABIAN SEA, as evidenced mainly through the collections of Mr. F. W. Townsend, 1893-1900; with descriptions of new species. By James Cosmo Melvill and Robert Standen (Proc. Zool. Soc. of London, 1901, pp. 327-460). Part I.—Cephalopoda, Gastropoda and Scaphopoda.

This valuable and interesting paper adds greatly to our knowledge of the oriental species and their geographical distribution. Upwards of 935 species are recorded, including 77 new species and one new genus (*Argyropeza*) in the family of *Litiopidæ*. Some families are unusually well represented; of the genus *Conus* 41 species are recorded, while those usually restricted to the *Pleurotomidæ* number 100 species, 20 of which are new; of the 54 species of *Nassidæ*, 5 are new, and there are also 5 new *Mitra* out of a total of 43 species.

As the authors have "endeavored in every case to give the name sanctioned by the laws of priority," we note several changes, although many genera having priority, and now in common use still bear later names: *Glyphis* Cpr., 1856 = *Fissuridea* Swains, 1840; *Mitularia* Schum., 1817 = *Cheilea* Modcer, 1793; it does not belong to the *Hipponycidæ*; *Vertagus* Schum., 1817 = *Clava* Martyn, 1789. In adopting *Lotorium* Montf., for *Triton* (preoccupied), why retain the family name *Tritonidæ*? For *Cypræa turdus* Lam., 1822, the name *C. ovata* Perry, 1811, is adopted, and for *Fusus turricula* Kiener, *F. forceps* Perry. *Latrunculus* Gray, is used instead of *Aburna* Lam., 1822 not 1801. The work is illustrated by four very finely executed plates containing 87 figures, and is by all odds the most important paper yet published on the faunæ of which it treats.

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NOTES ON ASHMUNELLA.

BY T. D. A. COCKERELL AND MARY COOPER.

A large series of specimens from Manzanares Valley and Cañon Diablo, near Rowe, N. M., shows that the *A. thomsoniana* type is well divided into two races, to which the names *thomsoniana* and *porterae* are applicable. The Manzanares Valley specimens are to be designated *porterae*, although the basal tooth is in most cases scarcely double, the inner denticle being reduced to a slight callosity. The Cañon Diablo form, coming from a somewhat higher altitude, is referred to *thomsoniana*, although the basal tooth is often double as in *porterae*. The fact is, that the character of the basal tooth, whether double or single, is highly variable, and not to be relied on to separate races. On the other hand, the size is much more distinctive. The following measurements of the greatest diameter of the shell are worth giving:

(1) *A. thomsoniana* from Cañon Diablo. 9 are between 11 and 12 mm., 49 are 12, 52 are 12+, 53 are 13, 9 are 13+, 1 is 14, and 1 is 14½ mm.

(2) *A. porterae* from Manzanares Valley. 1 is 13+, 3 are 14, 13 are 14+, 16 are 15, 10 are 15+, 5 are 16, 6 are 16+, 1 is 18 mm.

(3) *A. porterae* from Beulah. 2 are 14, 12 are 14+, 17 are 15, 6 are 15+, 3 are 16 mm.

If any one will take the trouble to plot out the curves from these statistics, they will find that two and three are the same, with the mode at 15, and the skew towards the smaller size. On the other hand, one will be found to have an utterly different curve, with the

mode at 13, the skew strongly towards the smaller size, and the extreme of large size barely overlapping the minimum size of *porteræ*.*

A few of the Cañon Diablo *thomsoniana* have the mouth of the shell very strongly contracted, so as to look like a distinct species, but they are connected by intermediates with the ordinary form.

Albinos have been found of both forms :

A. thomsoniana mut. *alba*, nov. Cañon Diablo, N. M.; one.

A. porteræ mut. *alba*, nov. Manzanares Valley, N. M., a few.

At the monthly meeting of the Las Vegas Science Club, held November 12, reported in *Science* December 27, 1901, p. 1009, the authors exhibited a series of a supposed new species of *Ashmunella*, "proposed to be called *Ashmuella antiqua*, found fossil in the Pleistocene beds of Las Vegas, N. M. It resembled in most respects *A. thomsoniana*, but wholly lacked the parietal tooth." Upon further examination it appears that the parietal callus has scaled off in the specimens described, and it is likely that the shells are identical with the living *A. porteræ*.†

COLLECTING SHELLS IN MONTANA.

BY MORTON J. ELROD, UNIV. OF MONTANA.

[Continued from page 104.]

Limnæa stagnalis L., var. *appressa* Say.

The first shells of this species were taken early in the year 1900 in a small pool along the Bitter Root river. A large spring supplies the pool with clear, fresh water. In this pond a good series of both living and dead shells was secured. A couple of dead shells were found in Swan Lake in August, 1900. This is over a hundred miles to the north of the Bitter Root locality, while water connection between the two places would be much more than double the distance.

* *A. porteræ* was taken the past summer at the head of Dailey Cañon, in the uppermost part of the Canadian Zone. The specimen is quite like the Beulah ones.

† A co-type of *A. antiqua*, received from Mr. Cockerell, bears out this conclusion. It is without doubt *A. t. porteræ*. The passage quoted above from *Science* is the complete original account of *antiqua*.—Ed.

Limnæa palustris Müll.

Taken from a pond near Bitter Root river. Quite abundant, several hundred specimens taken. Also taken in abundance in standing and quiet waters in the creeks on Flathead Indian reservation. At the upper end of Flathead Lake there is a great deal of marshy country tributary to the lake and to Flathead river. In the lowland bordering on the lake, which had been overflowed and later dried off, large quantities of dead shells were observed. Indeed the shells were so abundant one could not walk without mashing large numbers. In still other places the shells were yet alive in the sloughs, in great abundance. Along the Bitter Root river the shells were living in the same waters with *Aplexa hypnorum*. Mr. Earl Douglass collected a large series in the Madison lakes, southern part of the State, in summer of 1900.

Limnæa nuttalliana Lea.

Abundant in the region with *L. stagnalis* L. var. *appressa* Say, *L. palustris* Müll., and *P. trivolvis* Say. A hundred or more specimens secured.

Limnæa emarginata Say, var. *montana* Elrod.

Shell large, globose, thin and fragile; of a light horn color, in many cases tending to light pearl gray; in many instances there is an abrupt line between the lighter portion and the horn colored portion, the lighter portion being next the aperture; the last whorl constituting about three-fourths the length of the shell; malleations obscure or absent, distinguishable in occasional specimens; lines of growth fine, and quite regular; spire short, consisting of three obliquely twisted whorls and the nucleus; suture well impressed; aperture about two-thirds as long as wide; outer lip thin, acute, inner lip reflexed near its junction with the columella.

Length 27 mm. Greatest width 13.25 mm. Width of aperture 10.25 mm. Length of aperture 14.70 mm. Whorls, 5.

The species is found sparingly in Sin-yale-a-min lake in the Mission range of western Montana, and abundantly in McDonald lake, some 15 miles north of the former. A few were taken in Swan lake, on the opposite side of the range. At Sin-yale-a-min lake an entire afternoon was spent in securing a couple of dozen specimens. The method was to row over to the lake outlet in the canvas boat,

secure location where the water was not too deep, and fish with a silk butterfly net attached to a long handle. When a shell was sighted the boat was brought to a standstill so the surface would become quiet, and the net was lowered with the edge of the wire beneath the shell. As soon as the shell was touched the animal let go all hold, and if it did not roll into the folds of the net would settle among the large pebbles. To secure it then in three or four feet of water was impossible. Naturally, the failures were as frequent as the successes. As stated, the afternoon produced a couple of dozen shells, two dripping individuals, each with aching backs and weary eyes, and a torn net and wet boat.

Aplexa hypnorum L., var. *tryoni* Currier.

The Bitter Root river valley flows to the north along the flank of the Bitter Root mountains, which are on the western bank. From these mountains numerous creeks enter the river, and many ponds have been made by these creeks and by the changing river. The river is about 100 miles long, and flows through one of the finest and most fertile valleys in the State. In one of these ponds, near the juncture of the Bitter Root and Missoula, this species was found rather abundantly.

Physa heterostropha Say (?).

Specimens referred by Dall to this species were collected at Missoula in June, 1898, September 17, 1897, and April 8, 1900, on which latter date they were depositing eggs. In working over the *Physa* collected in Western Montana, I have read with much interest the complaint of O. A. Crandall in THE NAUTILUS for June, 1892, in which he raises the question, "Is there such a species as that described by Say? If so, what is it?"

Physa ampullacea Gld.

The species seems widely distributed in Western Montana. It has been taken in Bitter Root river, in Lakes Sin-yale-a-min and McDonald in the Mission mountains, and sparingly in Flathead lake.

Physa gyrina Say.

A few of this species taken with *P. heterostropha* and *P. ampullacea*. Finding these three species together leads to suspicion that the species may not be distinct. A single shell from the Flathead Indian reserve (Crow creek) seems to belong to this species.

THE SHELL-BEARING MOLLUSCA OF RHODE ISLAND.

BY HORACE F. CARPENTER.

[Continued.]

Genus PECTEN Brug. 1789.

The pectens, fan-shells or scallops have on each side of the beaks a broad expansion of shell called ears; beaks touching; hinge toothless, with a triangular pit for the cartilage. The animal has no syphons; the mantle is free, its margins double, the inner one fringed and hanging down like a curtain, and the outer one with a row of dots shown to be eyes. They move about very rapidly by suddenly opening and shutting their valves, and can jump two or three feet; they seem to have the power of choosing the direction, for they can, by a sudden jerk, jump backwards or to either side, skip along the surface of the water or sink to the bottom. I never saw one jump forwards. We have in New England three species, two of which inhabit Rhode Island.

208. *Pecten irradians* Lam.Syn.: *Pecten concentricus* Say, Con., DeKay, Gld.

Shell nearly round; valves convex, with about twenty elevated, rounded ribs radiating from the beaks, the ribs and spaces between of nearly equal breadth; ears nearly equal; interior shining; on the exterior the ribs and spaces are both rounded while on the interior the corresponding spaces are flat. Length three inches, height two and a half, breadth one. The so-called eyes in this species, of which there are from forty to sixty, situated along the edges of the mantle in both valves, are of a beautiful bright-blue color. This is the common scallop and is a very abundant shell in Rhode Island, but owing to the great demand for this luscious bivalve in the market, the State of Rhode Island has passed laws prohibiting their being taken through the summer months of each year. The "scallop law" is off on the first day of September, and on the morning of that day hundreds of boats may be seen in our waters at sunrise eager to be first on the grounds where the scallop beds are. Thousands upon thousands of bushels of pectens are dredged during the following three or four months, and if it were not for the law allowing the young a chance to get their growth, one season would completely exhaust the supply. The entire animal is not used for food, like the

other edible species of mollusca, such as clams, quohogs, mussels and oysters, but only the large muscle in the centre which holds the valves together; this muscle in adult *pectens* is about an inch in diameter and the same in length. The shells are subject to great variety in color, sometimes having one valve pure white and the other yellow, red, purple, or mottled and banded with several colors, when young; the adult shells generally lose their brilliant shades and become of a uniform slate tint, with one valve, however, always lighter than the other. The young shells frequent the shore and are very active; I have often put out my hand to take one, when just as I almost had it, it would suddenly shut its valves and skip away out of reach. At times I have seen them at Apponang so abundant that they were piled up in layers six or eight inches deep, and at other times not one could be seen. The adults inhabit deeper waters and are dredged from the bottom from boats.

209. *Pecten tenuicostatus* Migh. and Ad.

Syn.: *Pecten magellanicus* Con., Gld., Stimp, DeKay.

Shell large, round, inequivalve, lower one nearly flat, upper one convex, ears nearly equal; surface with fine radiating, punctured lines; lower valve white; upper valve brownish-red, dingy; interior white, glossy and smooth, with a different set of radiating lines from those on the exterior. Length five inches, height five and a half, breadth one and a half.

This is a northern species, found of large size on the coast of Maine and everywhere north of Cape Cod; smaller ones are obtained from the stomachs of fishes. It inhabits deep water off Block Island, and in southerly storms is driven up in large numbers on the shore at Point Judith.

Family Anomiidæ.

Shells thin, pearly, with a notch or hole through the right or lower valve near the beaks, to which is attached a plug, closing the orifice and also serves to attach the shell to other objects. There are two genera, *Placunanomia* and *Anomia*, divided into several subgenera.

Genus ANOMIA, Linné., 1767.

The animal of *Anomia* differs from *Ostrea* in having a small foot, one of the peculiar characteristics of oysters being the entire absence of any foot.

The shells of *Anomia* have one valve convex and the other flat or a little concave ; the flat valve is perforated and the plug which fills the hole and partly attached to the valve. The shells are seldom found free but generally attached to oysters or other shells or stones. There are twenty species, two of which inhabit New England.

(*To be continued.*)

DESCRIPTION OF A NEW UNIO FROM TENNESSEE.

BY WM. A. MARSH, ALEDO, ILLINOIS.

QUADRULA ANDREWSII, n. sp. Shell smooth, triangular, solid, beaks swollen, incurved, shell very inequilateral, compressed and striate at the base, obliquely rounded before, obtusely biangular behind, ligament rather short, light brown, epidermis reddish brown, maculate, growth lines numerous, rather rough, umbonal slope slightly rounded, posterior slope flat, cordate, with very indistinct lines from beaks to basal margin, beak sculpture unknown, cardinal teeth thick, very much sulcate, single in right, double in left valve, lateral teeth thick, short, and slightly curved, anterior cicatrices small and deep, posterior cicatrices distinct, small and deep, shell cavity rather deep, cavity of the beaks deep and angular, nacre silver white and iridescent.

Diameter 1.1 ; length 1.6 ; breadth 2.

Habitat : Holston river, Tenn., Mrs. Geo. Andrews.

Remarks : Several years ago Mrs. Geo. Andrews, of Knoxville, Tennessee, sent me a number of these shells. I never knew where to place them, but recently, on sending some of them to Mr. Simpson for examination, I was satisfied they were distinct. They belong to the group of which *trigonus*, Lea, is the type, but in no way do they resemble that species. There is no species which they closely resemble, except *globatus*, Lea, but it is a very much less inflated shell than that species, having a different colored epidermis, rougher and coarser growth lines, at least one-half of the disk is covered with wide, dark green spots ; between these rows of maculations are very narrow, dark green interrupted rays.

The outline of *globatus* is rounded, while my shell is triangular.

I name this very interesting species in honor of Mrs. Geo. Andrews, a lady who has sent me very many interesting shells from Holston river, Tennessee.

NOTICES OF NEW JAPANESE LAND SHELLS.

BY H. A. PILSBRY.

Chloritis perpunctatus n. sp. Shell resembling *C. fragilis* in shape and general appearance, but differing in the very narrow umbilicus, half covered by the dilated columellar margin of the otherwise simple peristome, and by the extremely dense covering of exceedingly short hairs, almost exactly as in *C. pumila* Gude, which differs from *C. perpunctatus* in being imperforate, with a higher spire. Whorls 4, the inner ones flatly coiled, the last slightly and slowly descending. Aperture slightly oblique, broadly lunate. Alt. 8, diam. 13.7 mm. Totsugawa, Yamato, with *C. fragilis* (Mr. Y. Hirase, no. 843).

Ganesella sororcula n. sp. Shell narrowly umbilicate, globose-conic; white (fossil), encircled with scarlet bands above and below the periphery, with others variable in occurrence at the suture and within the umbilicus. Smoothish, lightly marked with irregular growth-wrinkles and densely, minutely engraved with spiral striæ. Spire conic, with slightly convex outlines, the apex very obtuse. Whorls $5\frac{1}{2}$, quite convex, the last more or less angular at the periphery, hardly descending in front, moderately convex beneath. Aperture oblique, the outer lip expanded, basal lip narrowly reflexed, columella subvertical, nearly straight, with reflexed, dilated margin. Alt. 19.5, diam. 20.5 mm. Alt. 17.5, diam. 19 mm.

Kikai-ga-shima, Osumi (Mr. Y. Hirase, no. 834).

This species is closely allied to *G. Largillierti*, of Great Riukiu, and *G. Adelinæ*, of Oshima. It is smaller and less conic than either. *G. Adelinæ* has a larger umbilicus, a peripheral band and more whorls. *G. Largillierti*, besides being larger and more conic, wants the crowded spiral lines. It is found fossil with various other land shells, some of which I have already noticed elsewhere.

Ganesella optima n. sp. Shell obliquely perforate, elevated, pyramidal, thin, pale-yellow corneous, whitish above, glossy; lightly marked with oblique growth-wrinkles; faintly, almost imperceptibly striate spirally, but marked with minute whitish lines giving the appearance of spiral striation. Spire straightly pyramidal. Whorls

$7\frac{1}{2}$, slightly convex, the last slightly angular at the periphery in front, a little descending to the aperture, convex beneath, Aperture oblique, the peristome thin, everywhere arcuate, narrowly expanded and reflexed, triangularly dilated at the columellar insertion. Alt. $14\frac{1}{2}$ to $15\frac{1}{2}$, diam. $10\frac{1}{2}$ mm.

Suimura, Prov. Awa, Shikoku Island (Mr. Y. Hirase, no. 824.)

A charming species, unlike any other Japanese *Ganesella* in its elevated shape.

Macrochlamys cerasina n. sp. Shell perforate, depressed, with low-conic spire, dark-reddish amber colored, brilliantly glossy, with faint growth-lines, no spiral striæ. Whorls $5\frac{1}{2}$, convex, slowly increasing, separated by impressed sutures, the last whorl perceptibly angular at the periphery in front, convex beneath. Aperture slightly oblique, lunate, the lip simple and thin, abruptly dilated and reflexed in a minute triangle at the columellar insertion. Alt. 5.7, diam. 8.6 mm.

Tobishima, Prov. Ugo (Mr. Y. Hirase, no. 838).

M. cerasina var. *awaensis* n. v. Shell paler, with lower spire and 6 more closely coiled whorls. Alt. 4.2, diam. 7.8 mm.

Tairiuji, Awa, Shikoku Island. Although remote from the preceding geographically, this form seems to me to be too similar for specific separation.

Eulota (Cælorus) caviconus n. sp. Shell small, thin, with a large, deep umbilicus, conic above, flattened beneath, reddish-brown, lustreless, the surface roughened by short cuticular processes like adnate hairs, usually in part worn off. Outlines of spire a little convex, the apex obtuse. Whorls about $7\frac{1}{2}$, the earlier a little convex, the later ones flattened; the last whorl acutely carinate at the periphery, abruptly and deeply descending in front, contracted behind the lip. Aperture small, subhorizontal, oblong, the peristome expanded above, reflexed below, the ends approaching. Alt. 4, diam. $6\frac{1}{2}$ mm.

Goto, Uzen (Mr. Y. Hirase, no. 815).

This peculiar species is related to *E. cavicollis* Pils, differing in the flattened whorls and carinate periphery.

Mandarina exoptata n. sp. Shell narrowly umbilicate, depressed, biconvex, solid, light brown, the early whorls darker. Surface beautifully sculptured with crowded, spirally engraved, crimped lines, cutting irregular growth-wrinkles, the spirals obsolete immediately around the umbilicus. Spire low conic. Whorls $4\frac{1}{2}$, the first $1\frac{3}{4}$ or

2 forming the large nepionic shell. Last whorl wide, strongly carinate, a little sunken above and below the median keel, scarcely descending in front, convex beneath. Aperture oblique, wide, the lip obtuse, expanded above and outwardly, reflexed and thickened below. Alt. 14 to 15½, diam. 23 mm.

Hahajima, Ogasawara (Mr. Y. Hirase, no. 805).

An exceedingly distinct species, like a thick *Plectotropis*. It is quite unlike the larger carinate species *Mandarina Pallasiana*.

Microcystina hahajimana n. sp. Shell very minutely perforate or closed, depressed subglobose. Amber colored, translucent, brilliantly glossy, smooth except for some very slight growth-wrinkles. Spire quite convex. Whorls 5, nearly flat, the sutures but lightly impressed, narrowly margined. Last whorl faintly angular in front, convex beneath, impressed in the center. Aperture lunate, the peristome simple and acute; columella thickened above and bluntly toothed. Alt. 4, diam. 6½ mm.

Hahajima, Ogasawara (Bonin Islands). No. 803 of Mr. Hirase's collection.

GENUS *HIRASEA* nov.

Small disc-shaped or biconvex, perforate shells, pale and of nearly uniform tint, finely rib-striate, the aperture crescentic, the peristome contracted, thickened with a very heavy callus rib within. Type *Hirasea sinuosa*.

This genus belongs apparently to the *Zonitidæ*, or possibly to the *Endodontidæ*. It has some resemblance in the thick lip-rib to *Brazieria* or *Microphyura*, but there is no parietal barrier. The Philippine groups *Pliotropis* and *Glyptoconus* have some similar characters, but they are thin shells with no lip-rib. The species now known may be distinguished as follows:

- a. Upper margin of the lip drawn back, the basal margin projecting beyond it. Spire low, composed of 5¼ very narrow and convex whorls, the last angular at the shoulder, very convex beneath, perforate; aperture narrowly crescentic; lip expanded and arched forward in the middle below, retracted at the upper termination. Alt. 2.1, diam. 4.3 mm. Hahajima, Ogasawara (Hirase, no. 802). *H. sinuosa*, n. sp.

- a¹. Aperture normally oblique, the upper margin projecting forward; form biconvex. Whorls 4¾, with an acute, com-

pressed keel along sutures and at the periphery; subperforate; aperture lunar, oblique, a little contracted; finely rib-striate above and below. Alt. 2, diam. 4 mm. Hahajima (Hirase, no. 801). *H. nesiotica*, n. sp.

A third form was sent from Chichijima, Ogasawara (no. 800), similar to *H. nesiotica*, but much smaller, diam. 3.2 mm., with barely 4 whorls. This may be called *H. chichijimana*. Subsequently some five additional new species from Hahajima have been received.

GENERAL NOTES.

HELIX ASPERSA INCREASING IN CALIFORNIA.—Complaints are being made that the spotted snail, *Helix aspersa*, is becoming too common in the gardens of San José, Oakland and Los Angeles, California, and that it is injuring many flowers and vegetables. This species was introduced into California from Europe many years ago, presumably by a Frenchman who considered it a choice delicacy for his table. For a long time the snails were confined to a small plot of ground in the city of San José, but of late they have evidently resolved upon a "policy of expansion," and are spreading rapidly and are liable to cause serious mischief. It is to be hoped that Californians will cultivate the French taste and thus turn the tables on the molluscan invaders.—JOSIAH KEEP.

TRUNCATELLA SUBCYLINDRICA Linnæus.

This species has been credited to the West Indies by various writers, even to the present time, although Linnæus and all the early English authors gave it as a species of Europe. Dall and Simpson, in their Mollusca of Porto Rico, 1901, Bull. Fish Commission, p. 436, give its range as "Porto Rico; adventitious in England; common in Florida and many localities in the West Indies."

The Linnæan species is in fact a common European shell, occurring as far north as England; thinner, more transparent, and typically smoother, than any Antillean *Truncatella*. It is commonly found in older collections under the name *T. montagui*, and is probably not specifically distinct from *T. truncatula* Drap. The "*T. subcylindrica* Gray" of Binney's Terr. Moll. iv, and Land and F. W.

Shells of N. A., pt. iii, p. 100, is a totally different thing, and as the name is preoccupied, it must be dropped for the ribbed species there defined. If *T. subcylindrica* L. occurs at all in the West Indian area or Florida, which I strongly doubt, its presence there is "adventitious." All of which may be readily verified by a reference to the works of Linnæus, Hanley, Thorpe, and a collection containing a series of European *Truncatellidæ*.—H. A. Pilsbry.

The collection of the late Dr. Wm. D. Hartman has been purchased by the Carnegie Museum, Pittsburgh. It is especially rich in the genera *Partula* and *Helicina*, the Melanians, both American and exotic, *Unionidæ*, and Polynesian marine shells. It contains most of the types of new species described by Dr. Hartman, others being in the collection of the Academy of Natural Sciences. The *Achatinellidæ* were purchased some years ago by the Hamburg Museum. In acquiring this collection the trustees of the Carnegie Institute have made an extremely important addition to their museum, as the formation and study of this collection was the life-long work of Dr. Hartman. The specimens are well identified, as we know by frequent use of them, and afford a solid basis for conchologic work to students in Pittsburgh and the adjacent cities of Pennsylvania and Ohio.

TAMIOSOMA CONRAD, A SESSILE CIRRIPEDE.—Prof. W. H. Dall has recently examined specimens of this problematic fossil, formerly supposed to be molluscan, and finds that the supposed tubes are the vesicular, elongated bases of a *Balanus*-like cirripepe.—*Science*, Jan. 3, 1902.

PLANORBIS BICARINATUS STRIATUS n. var.—Shell similar to that of typical *bicarinatus*, but with a deeper, narrower umbilicus, and with the spiral lines raised, very numerous and distinct, and with the longitudinal sculpture almost obsolete. Diameter 10, altitude of aperture 6 mill.

From sewer excavation, eight feet below the surface of the ground, Cold Spring Park, Milwaukee, Wisconsin, collected by Charles E. Brown.

This pleistocene fossil, of which no living examples have yet been seen, seems to differ from the typical *bicarinatus* sufficiently for varietal distinction. Twelve specimens have been examined, which are all uniform with the above description, and which are readily distinguishable from typical *bicarinatus*.—FRANK COLLINS BAKER.

THE NAUTILUS.

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No. 11.

A REVISION OF THE CARINATE VALVATAS OF THE UNITED STATES.

BY BRYANT WALKER.

Valvata tricarinata was originally described by Say in 1817 as *Cyclostoma tricarinata*. It is one of the most abundant of the smaller operculates of the Northern States and Canada, ranging from the Atlantic coast westwardly at least as far as Manitoba and Iowa, and south to Virginia and the Ohio river. It has three well-marked varieties, which differ from the typical form only in the smaller number or entire absence of the revolving carinæ.

In 1841 Dr. Isaac Lea described a *Valvata* from the Schuylkill river, Pa., as *V. bicarinata*.

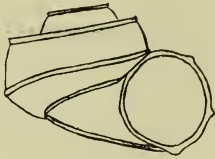
Haldeman in his "Monograph" (145) doubtfully refers Lea's species to *V. tricarinata* as a bicarinate variety. W. G. Binney, in 1865 (L. & F. W. Shells III, p. 9), states that from an examination of both Say's and Lea's types he is "convinced of the identity of the two." Tryon in his Continuation of Haldeman (1870) does not mention the subject, and evidently acquiesced in Binney's decision.

In this he has been followed by all subsequent writers so far as I have been able to ascertain, with one exception. Mr. W. A. Marsh in his "Brief Notes on the Land and Fresh Water Shells of Mercer Co., Ill." (Conchologists' Exchange II, p. 80, 1887), separated the two forms and recognized the validity of Lea's species.*

From a careful examination of the material in my possession I am

*The validity of *V. bicarinata* has been recognized by all recent Philadelphian conchologists. See NAUTILUS, VIII, p. 138.—ED.

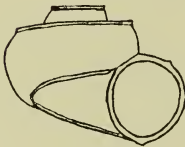
convinced that Lea's *bicarinata* is not the bicarinate form of Say's *tricarinata*, but is a distinct species, which also has a tricarinate form. I have the typical form of *V. bicarinata* from Columbia and Philadelphia, Pa., and Port Oram, N. J., and the tricarinate form from Muscatine, Ia., and Utica, Ill. Within the last few weeks I have had occasion to examine critically hundreds of specimens of *V.*



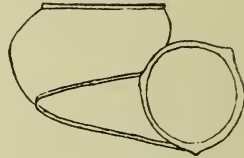
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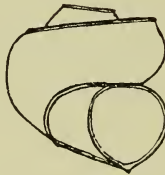
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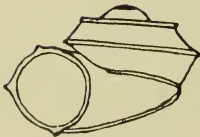
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6.



3.



4.



7.

tricarinata in its various aspects from Michigan, and a considerable number from at least ten different states and Canada, and I have yet to see the first specimen that in any way seems to connect the two.

In comparison with *V. tricarinata*, Lea's species is larger, discoidal; the upper surface of the whorls slopes downwards from the carina to the suture, giving a concave appearance to the upper surface

as a whole; the spire is depressed, not appearing above the superior carina of the body whorl, the umbilicus is very wide and more shallow, exhibiting all the whorls. In *tricarinata*, on the other hand, the whorls are more closely coiled, making a round, deep, funnel-shaped umbilicus; the penultimate whorl is elevated and only the apex of the spire is depressed.

The relation between the two species is very similar to that between *Pyramidula perspectiva* Say, and *striatella* Anth.

The recognition of the specific distinctness of these forms not only involves some changes in nomenclature, but also renders necessary a re-description of the various recognized forms.

The following re-arrangement of the group is offered as an attempt to satisfactorily differentiate the different forms.

I. *Valvata tricarinata* Say (fig. 1).

Shell turbinate, thin, translucent, shining; horn-color or pale green; whorls about $3\frac{1}{2}$; flattened between the carinæ; shouldered; the upper surface sloping upwards from the carina to the suture; spire elevated, depressed at the apex; lines of growth faintly marked; suture distinct; body whorl tricarinate, superior carina revolving nearly to the apex, the peripheral carina on the whorls of the spire being usually covered by the lower whorl; carinæ sharp, elevated and lighter in color than the body of the shell; aperture circular, slightly modified, however, by the carinæ; lip simple, sharp, continuous, slightly appressed to the body whorl; umbilicus round, deep, funnel-shaped, bordered by the inferior carina. Height $3\frac{1}{2}$, width $5\frac{1}{2}$ mm.

Cyclostoma tricarinata Say, Jour. Phil. Acad. Nat. Sci., I, 13 (1817).

Canada and eastern United States to, at least, as far west as Manitoba and Iowa, and south to Virginia and the Ohio River. (Utah, Ingersoll.) As all gradations between the typical form and the different varieties can be found in any considerable suite of specimens; it is deemed best to draw the lines between the recognized varieties upon the presence or absence of well-developed carinæ. Angulations of the body whorl, however acute, should not be considered in determining the position of any particular specimen.

This species is one of the most abundant forms in the Post-Pleistocene deposits of Michigan, and apparently was then more

subject to variation than at the present time. In the NAUTILUS, XI, p. 121, will be found an account of several specimens in which an additional carina was developed. In a large amount of material from the marl deposits of the State recently examined, two examples were found in which the superior and peripheral carinæ are present, but the basal one is obsolete, while in a deformed specimen from the deposits at White Pond, N. J., only the basal one is present. Two specimens from Michigan marl deposits have the last whorl near the aperture, entirely separated from the body whorl. None of these variations have been noticed so far as I am aware in recent specimens. In the collection of the late Dr. Jas. Lewis, now in my possession, is a sinistral specimen (fig. 4).

As these variations occur only in very few instances, they are to be classed as individual variations or "sports," rather than as distinct forms worthy of varietal names.

Var. *confusa* n. v. (fig. 2). Body whorl bicarinate, peripheral carina obsolete; periphery rounded or angulate. *Valvata tricarinata* var. *bicarinata*, authors generally, not of Lea. A curious scalariform specimen is in the collection of Mr. J. H. Ferriss, of Joliet, Ill. (fig. 3).

Var. *unicarinata* DeKay. Unicarinate, peripheral and basal carinæ obsolete, periphery rounded, base rounded or angulate. *Valvata unicarinata* DeKay. N. Y. Moll., p. 118, pl. VI, f. 129 (1843).

Var. *simplex* Gld. Ecarinate, whorls usually more or less flattened above. *Valvata tricarinata* var. *simplex*, Gld., Invert Mass., p. 226, f. 126 (pars.), (1841).

The citations of *Valvata humeralis* Say from Michigan by Miles (Geo. Sur. Mich., p. 237, 1860) and from Canada by Bell, Whiteaves, etc., referred to by Binney (L. & F. W. Shells, III, p. 14), are in all probability based upon this form.

II. *Valvata bicarinata* Lea (fig. 6).

Shell discoidal, flattened above, rather thick, shining; horn-colored or tinged with green; whorls $3\frac{1}{2}$, shouldered, upper surface sloping downward from the carina to the suture, which is deeply impressed; spire greatly depressed, not rising above the carina of the body whorl when viewed from in front; lines of growth faintly marked; body whorl bicarinate, superior carina revolving nearly to the apex, periphery rounded or bluntly angulate; carinæ sharp,

elevated; aperture nearly circular, slightly flattened above and modified by the carinæ; lip simple, sharp, appressed to the lower half of the body whorl; umbilicus wide, exhibiting all the whorls. Height $3\frac{1}{2}$, width $6\frac{1}{2}$ mm.

Valvata bicarinata Lea, P. A. P. S. II. 81, 83 (1841). Schuylkill river, Pa. (Lea), Columbia, Pa., Philadelphia, Pa., and Port Oram, N. J. (Walker), and Mercer Co., Ill. (Marsh).

The distinguishing characteristics of this species as compared with *V. tricarinata* have already been stated. The localities above mentioned are the only ones brought to my notice, but it will probably be found in the intermediate region.

Var. *normalis*, n. v. (fig. 5). Body whorl tricarinate, otherwise like the type. Muscatine, Ia. and Utica, Ill.

As in the case of *Polygyra andrewsæ* W. G. Binn., the typical form of this species is really only a variety of the real specific type. In a single specimen from Utica, Ill., collected by J. H. Ferriss, a fourth carina is developed on the upper surface of the last whorl at about its first third, and revolves parallel with the suture to the aperture, the space between forming a deep groove.

III. *Valvata utahensis* Call. (fig. 7).

Shell turbinate, thin, translucent, shining; yellowish horn color at the apex, white or greenish white below; whorls 4, convex, regularly increasing, minutely striate, the uppermost shouldered, with a single, well marked carina which becomes obsolete on the body whorl; spire obtusely elevated, apex depressed; suture well impressed; aperture circular, slightly angled posteriorly; lip simple, nearly continuous, appressed to the body whorl; umbilicus small, round, defined by a more or less obvious angle around the base of the shell. Height $4\frac{1}{2}$, width $4\frac{1}{2}$ mm. Utah Lake and Bear Lake, Utah.

Valvata sincera v. *utahensis* Call, Bull. U. S. Geol. Sur., No. 11, p. 44, Pl. VI., f. 1-3 (1884). *Valvata utahensis* Call, Proc. Dav. Acad. Nat. Sci. V, p. 4, Pl. I, fig. 1-3 (1886).

This species, which is more nearly related to *V. tricarinata* var. *unicarinata* than to any other of the eastern forms of *Valvata*, is well characterized by its more elevated spire, more globose form, the obsolescence of the carinæ on the body whorl and the much smaller umbilicus.

PISIDIUM STRENGII, N. SP.

BY DR. V. STERKI.

Mussel of moderate size, regularly inflated, rather short; beaks slightly posterior, small, narrow, approximate, somewhat projecting over the hinge margin; superior and inferior margins well curved, the supero-anterior slightly so and forming a steep slope to the somewhat angled anterior end; the posterior end subtruncate; scutum and scutellum indistinct; angles in front of and behind the beaks slight, rounded; shell rather thin, translucent; surface very finely striate, appearing smooth, with a few fine, irregular lines of growth, and with a slight, dull gloss; color of epiconch pale horn shading into grayish, whitish or yellowish; nacre almost glassy, muscle scars very slight; hinge fine, plate narrow; cardinal teeth small, thin; the right one curved, its posterior end deeply cleft, the left anterior curved or almost straight, the posterior short, oblique; lateral teeth small, somewhat pointed, the outer ones of the right valve quite small but distinct; ligament small. Long. 4, alt. 3.7, diam. 2.6 mill. (average).

Hab.: Michigan to New York, Ohio and Indiana. It seems to be a form mainly inhabiting smaller lakes. Perch lake, Mich., collected by Mr. L. H. Streng (in whose honor the species is named) and Dr. Kirkland; Reed lake and Little Bostwick lake, Mich.; Bass lake, Ind. (among shells taken from the stomach of catfish), by Mr. L. E. Daniels; Meyer's lake, Ohio (Sterki); Little Lakes, N. Y., found among materials in the collection of the late Dr. Jas. Lewis, now in possession of Mr. Bryant Walker.

Pisidium strengii has a resemblance to some smaller forms of *P. abditum* Hald., *nov-eboracense* Pr., and with *politum* Sterki, but can be recognized by its high form, the small, approximate beaks, especially noticeable in front (or rear) aspect, the peculiar, dull gloss of the surface, and the strongly cleft posterior end of the right cardinal tooth. The latter feature was found constant in normal specimens from widely distant places; but it may be added that the species appears to be particularly inclined to abnormal, and even monstrous formation of the cardinal teeth. As to size, shape and general appearance, the mussel does not vary greatly, so far as seen.

This species was first noticed as different from others, and named, in 1895. Yet, considering the great variability of our *Pisidia* as well as the fact that it does not show a striking variance from others, in general appearance, it was thought best to wait until sufficient evidence was gained of its being really distinct.

NOTE ON THE NAMES ELACHISTA AND PLEUROTOMARIA.

BY W. H. DALL.

My attention has been called by Mr. Cockerell to the fact that the name *Elachista* Dall and Simpson, in the Porto Rico Report, Mollusca, p. 427, 1901, is preoccupied in Lepidoptera by Treitschke, since 1833. For this peculiar group of *Bittium*, typified by *B. cerithioides* Dall, and which extends in time as far back as the Eocene in both Europe and America, I would substitute the name *Alabina*, in reference to its resemblance to *Alaba*, a name which, so far as I am able to discover, has not hitherto been used.

I have frequently called attention to the ill-effects of the absurd European proposition that names such as *Cyprinus* and *Cyprina* should not be allowed to exist in nomenclature simultaneously. Very few of those who support this view have any idea of the havoc in nomenclature which the rigid enforcement of such a rule would produce, with no benefit, but a very serious detriment to science. Finding the name *Nassaria* challenged on this ground, I hunted up the earlier use (1806) in Duméril's *Zoologie Analytique* and took the occasion to make a full list of Duméril's names, which all end in *arius* and are all synonyms. Some appear in the text and others in the Latin index only, with references to the pages where the French equivalent is to be found. Among the latter I discovered *Pleurotomarius*, Duméril's name for *Pleurotoma*. If the idiotic rule above-mentioned was put in force, this superfluous synonym would deprive us of the right to use *Pleurotomaria* J. Sowerby, which dates only from 1821, and perhaps also *Pleurotomarium* Blainville, another rendering of DeFrance's French name, which dates from 1825. I may add that any rule admitting anonymous names, taken into consideration with the above-mentioned one, would upset about half of the best-known names in Molluscan Zoology, including such as *Oliva*, *Cypræa*, etc. Can any one mention any good results to be obtained from such a course?

THE ORIGINAL LOCALITY OF LIMNÆA AMPLA MIGHELS.

BY OLOF O. NYLANDER.

In 1842 Mr. Alexander W. Longfellow discovered in Second Eagle Lake *Limnæa ampla*. Prof. Edward L. Morse visited the same lake in 1851 and called it Mud Lake. On the maps of Maine it is generally called Second Lake, but Mud Lake is the only name

used among the people. It is located on the east branch of Fish river, between Long and Cross lakes, in Township XVII, Range 4, Aroostook county, Maine. Some parts of Fish river have been visited every summer since 1897, and the shells collected published at various times in the NAUTILUS. Mud Lake (Second Lake) being of special interest to conchologists, as *Limnæa ampla* was described from specimens found in this lake, I examined it for the first time in August and September of last year (1901).

The name *Limnæa ampla* is in use from Maine to Alaska by different collectors. The question arose at an early date if *L. ampla* really could be a distinct species or only a variety of some previously described form. The best authors agree it is only a variety of Say's *L. emarginata* (also described from Maine in 1821) and my observations go to confirm the same.

Mud Lake is about $2\frac{1}{2}$ miles long and one wide, shallow, with mud, gravelly and rocky bottom, the forest growing all around it down to the water's edge. There are no settlements upon the lake, and in all probability it looks just the same as when Mr. Longfellow first collected his shells in 1842. A paper privately published, 4 pp., 4 plates and 85 figs., illustrating the variation of *Limnæa emarginata* of Fish river, was prepared in Oct., 1901, and a more elaborate one will appear when all the lakes on Fish river have been examined and a map prepared.

A careful survey was made in every part of Mud Lake and collections made in all parts of it from the shore to 15 feet in depth, and the following species were obtained:

Physa ancillaria Say. A few thin, fragile shells, nearly as clear as glass, were dredged in 3 to 6 feet of water at the upper end of the lake on muddy bottom.

Limnæa emarginata Say. Very abundant at the inlet in all stages of growth. (The original locality of *Limnæa ampla* Mighels.) Smaller colonies were found in the upper part of the lake and on the left side of lake near the outlet.

Planorbis companulatus Say. Dredged.

Planorbis bicarinatus Say. Dredged.

Planorbis hirsutus Gld. Dredged in the lake and the thoroughfares above and below the lake; very variable.

Planorbis parvus Say.

Ancylus parallelus Hald. One specimen in thoroughfare below the lake.

Valvata tricarinata Say. One specimen.

Valvata sincera Say. One specimen in the lake and a few in the thoroughfare below the lake.

Amnicola limosa Say. Common.

Unio complanatus Sol. Common.

Margaritana undulata Say. Few dead shells at the inlet, and the thoroughfare between Long and Mud Lakes.

Anodonta fragilis Lam. Common (small forms).

Sphærium striatinum Lam. Living and dead shells abundant on rocky bottom in the thoroughfare between Mud and Cross Lakes.

Calyculina securis Prime. At the inlet not many found.

Pisidium pauperculum nylanderii Sterki. Few specimens.

Pisidium ferrugineum Prime. Few very fine specimens at the inlet.

Caribou, Maine, Feb., 1902.

COLLECTING SHELLS IN MONTANA.

BY MORTON J. ELROD, UNIV. OF MONTANA.

[Continued from page 112.]

Limax montanus Ingersoll. One specimen taken at Missoula, June 29, '97. Slugs are rarely seen in this region.

Eucomulus fulvus Drap. A few specimens taken near Missoula, June 5, '97.

Succinea nuttalliana Lea. At the upper end of Flathead lake, in a swampy bog, quantities of *Limnaea palustris* Müll. with dark shells, were discovered. Among these was an occasional *Planorbis trivolvris* Say. Four specimens of *S. nuttalliana* Lea, were all that could be found, though diligent search was made. These delicate shells appear to be very scarce, since they have been taken no place else.

Polygyra devia Gld. var. *hemphilli* W. G. B. On May 8, 1900, Arbor Day, we took to the woods along the beautiful Lo Lo creek, south of Missoula, and extending up into the Bitter Root mountains a distance of some 75 miles. Lunch was eaten some four miles from the mouth of the creek, when we sought for specimens along the banks of the stream in overflowed pools. Among and in the abundant fresh deer-tracks were found scattered specimens of this species and *P. townsendiana* Lea, var. *ptychophora* A. D. Br. The species was not abundant, only about 15 being taken. They were much scattered, in holes, under decaying vegetation, difficult to discover.

Polygyra townsendiana Lea, var. *ptychophora* A. D. Br. These were taken rather abundantly, some 60 being the result of a two hours' search along the Lo Lo creek on May 8, 1900, in connection with *P. devia* Gld., var. *hemphilli* W. G. B. For details see under the latter species for information. Also found in small numbers at other places near Missoula. The species was also taken at both McDonald lake and Sin-yale-a-min lake in the Mission mountains, a couple of dozen being taken at the former place and but a few at the latter.

Zonitoides arboreus Say. A half dozen of these little shells taken at Missoula June 5, 1897.

Pyramidula striatella Anth. Only a very few of this species taken near Missoula in June, 1897.

Pyramidula elrodi Pils. This beautiful shell has been termed by an admiring friend "the queen of the Pyramidulas." It has thus far been found only along the banks of McDonald lake in the Mission mountains of Montana, living on the crags and among the loose talus. The first collecting produced some forty specimens, all dead. During the summer of 1900 about three quarts were secured. It will be interesting to the reader to give some of the opinions regarding this shell. For beauty the quotation above is certainly very flattering. W. G. Binney writes, Oct. 12, 1900, "I call it a depressed form of Hemphill's *Wasatchensis*. You might make a dozen species out of my series, and feel like tearing your hair afterwards in despair!" Dr. W. H. Dall says "the shell is larger than any *strigosa* I ever saw, and differs in sculpture from any in our collection. *Strigosa*, var. *Hemphilli* has the same form, but its sculpture is predominantly spiral and the shell the usual size. Conchologically speaking, it is a coarsely sculptured form of Stearns' shell (*circumcarinata*)." Dr. H. A. Pilsbry considers it sufficiently different from any existing species to be described as a distinct species.

THE SHELL-BEARING MOLLUSCA OF RHODE ISLAND.

BY HORACE F. CARPENTER.

[Conclusion.]

210. *Anomia aculeata*, Gmel.

Shell small, round; beaks obtuse, terminal; surface covered with fine hairy, radiating lines on the upper or convex valve; lower valve thin, smooth and flat, color yellowish white or gray; interior shining; aperture circular. Length and height about one-half inch each.

Habitat from Long Island to Greenland and northern coasts of Europe, rare south of Cape Cod. It has been found at Greenport and Montauk, L. I. (S. Smith); Stonington, Conn., 4 to 5 fathoms; Off Gay Head, 10 fathoms, but as yet no specimens have been obtained in R. I. waters. Its station is among roots of fuci, attached to stones and shells.

211. *Anomia glabra*, Verrill, 1872.

Syn: *Anomia ephippium*, Gld. and American authors, non Linné. *Anomia electrica*, Gld. (Binney's), non Linné. *Anomia squamula*, Gld. (young), non Linné.

Shell rounded, oval or irregular in form; beaks small, pointed, not quite reaching the margin; substance of the shell scaly, consisting of numerous overlapping layers of pearly material resembling talc, of a greenish tinge in living specimens—this substance in dead

shells is rubbed off, showing the golden and silvery hues of the real surface; upper valve convex, lower valve flat, with an ovate aperture which reaches the margin by a fissure. Diameter about one inch.

Habitat from Maine to Florida, but rare and local north of Cape Cod. It is sometimes very abundant in R. I. and at other times quite rare. Generally in the fall months it is seen adhering to small stones between tides at Opponang in Greenwich Bay, but during the rest of the year it is rare to find one near the shore, its station being among oyster beds. When growing upon the valves of *Pecten irradians*, as it does sometimes, the *Anomia* conforms to the shape of the *Pecten* and is ribbed like that species.

The *Anomia ehippium* of Linnæus is a very common European shell, and the great naturalist was deceived in our American shell, supposing it to be the same species, and called it by the same name, giving as its habitat, Pennsylvania. All authors since have known it under that name, even down to Dall's revision of the Mollusca of Mass., Mar. 16, 1870, but Prof. A. E. Verrill has shown it to be a distinct species and named it *Anomia glabra*, V., Am. Jour. Sci., iii, 213, 1872.

The shell described in Binney's Gould, second edition, under the name of *Anomia electrica*, Linné, is found among oysters and is distinguished from *A. glabra* by its sulphur yellow color, its defined edge and its very convex upper valve. It is generally distorted, semi-transparent and not so scaly as the preceding species. I think it is merely a variety, and the variety is much more common with us than the type.

Family *Ostreidæ*.

The oysters commenced in the Carboniferous and are found in every age since to the present time. Some of the fossil oysters are two feet in length. Of the living species, the most peculiar in its habitat is the tree oyster, which grows upon the roots of the mangrove. There is but one genus in this family and about 70 species.

212. *Ostrea borealis*, Lam.

Syn.: *Ostrea Canadensis*, Brug, Lam, Hanley.

213. *Ostrea Virginica*, Lam.

Syn.; *Ostrea Virginiana*, Lister, Sby, Gld.; *O. rostrata maxima*, Chem.; *O. elongata*, Solander.

These two species are so variable in shape that it is impossible to give an accurate description of them. They are very irregular and inequivalve, the larger valve generally attached to some object and the smaller one moving forward as the shell grows. *O. borealis* is obliquely rounded ovate, with short curved beaks, while *O. Virginica* is long and narrow, with long and pointed beaks. In both species the large valve is the lower one and the upper valve is the smallest, flatter and smoother; surface of *borealis* flaky, greenish, that of

Virginica somewhat lead color. Interior chalky or greenish white, with a dark violet muscular impression in the centre.

A. Virginica sometimes attains a length of twelve to fifteen inches, but seldom over three inches in breadth, while in *borealis* the breadth is about one-half the length; specimens six inches in length are about three in breadth.

Oysters have many enemies, among which are sponges, star-fish, drills and man. The drills or borers, *Urosalpinx cinerea*, are extremely abundant in our bay, and can destroy a great many oysters in a short time.

Ostrea edulis of Europe is considered by some authors to be identical with our northern oysters. I cannot see enough resemblance in either shell or animal to agree with them. Experienced oyster-eaters can tell the difference between *borealis* and *Virginica* instantly by the taste, having no knowledge whatever of the shells. Having tried to eat English, Scotch, French and Dutch oysters, judging from that standpoint I could never believe they were the same species as the *Ostrea borealis*, the finest eating oyster in the world.

[The following species were omitted in their proper place:]

175. *Pisidium variable* Prime.

Shell heavy, oblique inequilateral, inflated, anterior longer, narrower and angulated at the end; beaks full, prominent, not approximating at the apex; valves solid, interior light blue; epidermis glossy, color variable, straw or greenish-brown, with a yellow zone on the basal margin; cardinal teeth united; lateral teeth short and strong. Length $\frac{21}{100}$, height $\frac{18}{100}$, breadth $\frac{17}{100}$ inch.

Described by Temple Prime in Proc. Bost. Soc. Nat. Hist., IV, 163, 1851. Inhabits the Eastern and Middle States. A very common species found in nearly all small streams.

176. *Pisidium Virginicum* Gmelin.

Shell thick, oblique, very inequilateral, coarse and robust in appearance; anterior rounded, posterior broader, subtruncated at the extremity, beaks large; valves solid, interior light-blue; epidermis greenish-brown to chestnut, with zones of a darker shade; hinge margin curved; cardinal teeth two, shaped like the letter V reversed; lateral teeth short and strong. Length $\frac{35}{100}$, height $\frac{29}{100}$, breadth $\frac{21}{100}$ inch.

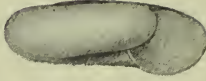
This is one of the largest species of *Pisidium* in America. It inhabits running streams in New England and Canada, and throughout the Middle States, and in a few of the Western States. Say, in 1819, described this shell under the name of *Cyclas dubia*, and it is generally known to collectors under this name, but Mr. Prime has shown it to be identical with one described by Gmelin, in 1788, as *Tellina Virginica*; he, therefore, changes the name to its present one as adopted above.



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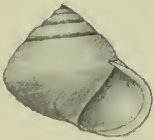
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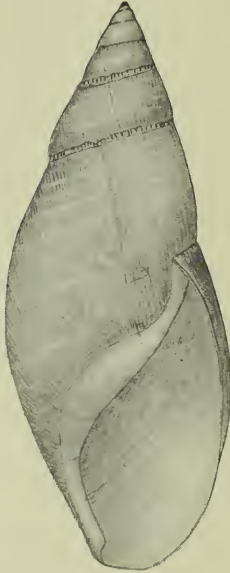
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E. G. Yanatta, del.

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NEW LAND SHELLS FROM THE SANTA MARTA MOUNTAINS, COLOMBIA.

BY H. A. PILSBRY AND G. H. CLAPP.

The species described below were collected by Mr. and Mrs. Herbert H. Smith, in the course of their recent collecting tour in the Santa Marta region.* The country explored proved to be singularly unproductive in land mollusks, both species and individuals being, with the exception of a few forms, very scarce. However, the proportion of new forms was high, and indicates considerable local specialization, as would be expected from the topography of that portion of Colombia.

Glandina callista n. sp. Pl. vii, fig. 7.

Shell fusiform, very thin, pale brownish-yellow with a few indistinct darker streaks, more numerous on the spire, and encircled by numerous narrow, inconspicuous buff spiral lines between the periphery and suture and on the spire. Surface but slightly glossy, sculptured with fine, somewhat irregular striæ, and weakly scored by fine, close spiral striæ, better developed below. Suture distinctly margined with a row of small bead-like folds, each formed usually by the coalescence of two, or the knob-like enlargement of one of the striæ. Spire acuminate. Whorls nearly 7, but slightly convex, the last more inflated, tapering below. Aperture slightly oblique, four-

*The *Bulimulidæ* collected have been noticed in the current volume of the *Manual of Conchology*, two being there described as new. Two other species, *Pleurodonte clappi* and *Nenia smithæ*, have already been described and figured in this journal.

sevenths the length of the shell; outer lip evenly arcuate; columella very concave, truncate as usual below. Parietal wall covered with a very thin wash of callus, which swells broadly out upon the whorl in the middle, and is abruptly retracted above. Length 68.5, diam. 26 mm.; length of aperture 38, greatest width 15.5 mm.

Santa Marta Mts. at Valparaiso, in forest at 4500 ft. elevation.

A charming species, remarkable for its acuminate spire, fusiform contour and thin texture. It differs from *G. striata* by its sculpture and the absence of distinct dark varices. *G. plicatula* is a smoother, more obese shell, with shorter aperture. No other South American species is nearly related.

Circinaria ponsonbyi n. sp. Plate vii, figs. 1, 2, 3.

Shell much depressed, flat above, broadly and openly umbilicate, thin, slightly greenish yellow-corneous, with a few faint darker streaks; subtransparent. Surface glossy, irregularly sculptured with wrinkles of growth. Spire almost perfectly flat, the inner whorls hardly perceptibly raised. Whorls a trifle over 5, convex, separated by a deeply impressed, narrowly margined suture, the last whorl wide, evenly rounded at the periphery, convex beneath. Umbilicus about one-fourth the shell's diameter, regularly narrowing, all the whorls being plainly visible. Aperture somewhat oblique, lunate-oval. Peristome simple and thin, the upper termination inserted far above the periphery of the preceding whorl. Alt. 4.9, diam. 13 mm.

Santa Marta Mts. at Cacaguelito, 1500 ft. elevation, under dead leaves.

It is named for our valued friend and correspondent John Ponsonby, of London.

A paler and slightly less depressed form, which may be called *C. ponsonbyi clara*, was taken at El Libano, at 6000 ft. elevation. It is pellucid, faintly greenish-corneous—the largest specimen measuring, alt. 5, diam. 12 mm., whorls $4\frac{1}{2}$. The whorls are somewhat more convex beneath, and the apex is larger.

Aperostoma sanctamarthæ n. sp. Plate vii, figs. 9, 10.

Shell openly umbilicate, depressed, rich chestnut colored with some yellowish streaks and darker lines at irregular intervals; moderately solid. Surface glossy, sculptured throughout with close, fine, rib-striae, which are distinctly wavy or crimped, and occasion-

ally anastomosing or splitting. Whorls $4\frac{1}{3}$, convex, tubular, rapidly enlarging, the last becoming almost free from the preceding near its termination. Aperture but slightly oblique, subcircular, a little angular above. Peristome obtuse, continuous, a trifle excised and retracted on the parietal margin. Umbilicus ample, showing all the whorls, its width contained $4\frac{1}{2}$ times in that of the shell. Alt. 20, diam. 31.5 mm. Length of aperture with peristome 14.5, width 14.3 mm.

Operculum solid, perfectly flat, dull and white externally, composed of about 7 whorls, which are raised in a low ridge or welt on the inner edge, and very obliquely striated, the nucleus a little sunken, and not raised inside. Diam. 12 mm.

Las Nubes estate, Santa Marta Mts., Colombia, at 4000 ft. elev. A single specimen.

Related to *A. popayanum*, but the umbilicus is wider, the striæ stronger, and with another color-pattern. A close examination shows some very faint traces of spiral bands.

Aperostoma smithi n. sp. Pl. vii, figs. 5, 8.

Shell rather narrowly, deeply umbilicate, low-turbinate, very dark chestnut with indistinct wide, black streaks, the eroded inner whorls dull red; moderately solid. Surface glossy, with sculpture of close rib-striæ, which are a little waved or crimped. Whorls fully 4, convex, rapidly widening. Aperture large, moderately oblique, circular, a trifle angular above. Peristome blunt, continuous, in contact with the preceding whorl for a short distance only. Umbilicus deep, its diameter contained 9 or 10 times in that of the shell.

Alt. 14, diam. 20 mm.; length of aperture 10.5, width 10 mm.

Alt. 14.5, diam. 19.5 mm.; length of aperture 10.8, width 10 mm. Operculum whitish externally, composed of about 6 flat whorls around a sunken, corneous nucleus about 1 mm. diam. Internally there is a slight central mucro, which lies just within the edge of the dull scar of attachment. Diam. 9 mm.

Santa Marta Mts. at El Libano, at 6500 ft. elevation, under decaying leaves in forest.

It is about the size of *A. dysoni*, but with stronger, straighter rib-striæ and slightly more oblique aperture. *A. pazi* Crosse is somewhat similar, but has a wider umbilicus, smaller aperture and is more depressed. *A. smithi* has a much smaller umbilicus than *A. sanctæ*

marthæ at any stage of growth; the aperture is larger and more oblique, the color is darker, and the operculum differs. This species is respectfully dedicated to Mr. H. H. Smith.

Helicina sanctæmarthæ n. sp. Pl. vii, fig. 4.

Shell globose-conic, rather thin; variously colored, yellow, corneous-yellow or light red above, paler beneath, variegated with more opaque white or whitish in spiral lines and bands, continuous or interrupted; the suture generally having a dark red border above, apex white or tinted. Surface somewhat glossy, nearly smooth to the eye, but sculptured with fine growth-lines and sparse, unequal and irregularly spaced spiral lines of punctures. Spire straightly conic, rather acute. Whorls $4\frac{3}{4}$ to 5, somewhat convex, the last rounded at the periphery. Aperture oblique, semicircular; lip thin, expanded and reflexed, pale yellow. Basal callus spreading far forward, whitish in the middle, elsewhere transparent.

Alt. 11.5, diam. 13 mm.

Alt. 11, diam. 13.5 mm.

Operculum bluish-white with some darker concentric lines, concave and minutely papillose outside, the papillæ not crowded. Interior glossy blackish, shading to red and then yellowish towards the nucleus, a reddish border at the semicircular periphery. Straight margin yellow-bordered, strengthened by a moderate ridge, which is bent inward near the nucleus.

Santa Marta Mts., Colombia, at El Libano, 6000 ft. elevation, on trees, especially palm leaves.

This species closely resembles *H. columbiana* Phil. at first sight, but it has a more straightly conic spire and entirely different minute sculpture, *H. columbiana* being decussated with crowded spiral lines crossing the growth striæ. The operculum in *H. sanctæmarthæ* is thicker than in *H. columbiana*, and of a different color outside, but the internal structure and color are about the same.

Helicina cacaguelita n. sp. Pl. vii, fig. 6.

Shell globose-conic, thin, pale yellow or reddish-corneous, with the spire pale red, the suture margined with red above, last whorl encircled with several opaque whitish bands or lines. Surface nearly smooth, showing faint growth-lines and almost obsolete spirals under a lens. Spire straightly conic, rather acute. Whorls $4\frac{1}{2}$, somewhat convex, the last rounded peripherally. Aperture oblique and semi-

circular. Outer lip very narrowly reflexed, whitish, a little thickened within. Basal callus moderately spreading, whitish in the middle, elsewhere transparent.

Alt. 7.8, diam. 9.5 mm.

Alt. 7.2, diam. 8.3 mm.

Operculum thin, externally whitish at the nucleus and along the straight margin, a red area around the nucleus, outside of which it becomes pale blue, with a reddish bordering line; nearly smooth. Inside deep reddish, almost black, fading to whitish along the straight margin and near the nucleus. The straight edge is thickened outside and within.

Santa Marta Mts., Colombia, at Cacaguelito, at 1500 ft. elevation, on the ground in forest under decaying leaves.

A small edition of *H. sanctæmarthæ*, but differing in the less extensive basal callus, the minute sculpture, narrow lip, thinner shell and operculum. It is more globose than *H. tamsiana*. The coloring is similar in some specimens of *H. nemoralina* of Trinidad, but that shell has a more globular last whorl.

NOTES ON THE DISTRIBUTION OF THE PLEURODONTE ACUTA GROUP.

BY P. W. JARVIS.

As most of the Jamaican land shells in museums and private collections, are usually labelled "Jamaica," a very vague locality, a few notes giving the areas in which some of the species live may not be out of place.

Belonging to the group of which *H. acuta* is type, seven species are recognizable:

1. *Pleurodonte ingens* (Adams).
2. *Pleurodonte chemnitziana* (Pfr.).
3. *Pleurodonte carmelita* (Fér.).
4. *Pleurodonte subacuta* (Pfr.).
5. *Pleurodonte patina* (Ads.).
6. *Pleurodonte oxytenes* (A. D. Brown).
7. *Pleurodonte acuta* (Lam.).

and three to the group of which *H. bainbridgei* is type.

8. *Pleurodonte bainbridgei* (Pfr.).
9. *Pleurodonte pretiosa* (Ads.).
10. *Pleurodonte spengleriana* (Pfr.).



1. *Pleurodonte ingens* (C. B. Ad.) is limited to the John Crow Mountains in Portland (No. 1 in map). It is a mountain species. The largest and most typical specimens come from Moore Town and its immediate neighborhood, but living or dead specimens are to be found scattered in all parts of this area amongst the limestone rocks.

The varieties described by Prof. C. B. Adams, viz., *indigna* and *imperfurata*, are not local forms, but simply individual variations, all three forms being occasionally found together.

2. *Pleurodonte chemnitziana* (Pfr.) has a much wider range than *P. ingens*, being scattered sparsely on the spurs of the Blue Mountain range, and found more plentifully towards the eastern limits of this area (No. 2). A small pale variety (which is otherwise typical), occurs at Bath, in St. Thomas parish.

3. *Pleurodonte carmelita* (Fer.) is limited to the higher regions of the Blue Mountain range. This species seems to thrive on the shaly soil, while all the other species are most plentiful in the limestone regions.

4. *Pleurodonte subacuta* (Pfr.) apparently has two habitats, the first on the southern slopes of the Blue Mountain range (No. 4 in map), where it is sometimes found in company with both *P. carmelita* and *P. chemnitziana*. The second habitat (No. 4 A) commences about thirty miles west, at Mount Diablo. Thence it occurs plentifully on the mountains running due west to Ulster Spring, where a few stragglers have been found. At present it has not been found in the intermediate space (which is very poor in land shells), but further search may possibly connect these two areas, or it may be found that the form of each area constitutes a distinct species.

5. *Pleurodonte patina* (C. B. Ad.) occupies a very large area. In the extreme east of it the variety *nobilis* of C. B. Adams is found on the slopes of Mount Diablo. A few miles west, at Cave Valley and Aenon Town, the largest and most typical form of *P. patina* crops up, and is undoubtedly the locality where Prof. Adams obtained his types. It spreads west through the higher parts of St. Ann's and Trelawny to Moore Town in St. James, gradually losing its most distinctive characteristics, such as the concavity of the shell above and below the periphery; though retaining both the smooth surface and the single small tooth.

6. *Pleurodonte oxytenes* (A. D. Brown) is limited to Hanover. It is a very clearly marked species, yet subject to considerable individual variation.

7. *Pleurodonte acuta* (Lam.) is found throughout the southern Parishes of St. Elizabeth, Manchester, Clarendon and St. Catherine; though in some localities slightly specialized forms occur, I have not yet been able to arrange them satisfactorily. As a rule the specimens from the higher lands are larger and with small teeth, sometimes only one tooth, whilst the coast and lowland forms are very small, and have large teeth.¹ The variety *acutissima* is not a local race, for in almost every locality of say three or four miles in extent it usually turns up as an acutely carinated form of the local variety.

7 A. *Pleurodonte acuta* (Lam.). The variety *julia* occurs on the hills near the sea on the northern coast. Acutely carinated shells with depressed spire are frequently found amongst the common and typical forms. This variety *julia* may ultimately prove to be the lowland variety of *P. patina*—not of *P. acuta*.

7 B. *Pleurodonte acuta*, var. *lucerna* (Müll.).² The most pronounced forms are found on the coast hills of Westmoreland. Further inland occur larger specimens with smaller teeth, and the aperture of the shell much wider. Prof. C. B. Adams' *fuscolabris* is a color variety.

7 C. *Pleurodonte acuta* var. *sublucerna* (Pilsbry) occurs in the lowlands of St. Catherine and along the coast hills of St. Andrew. Near Yallahs there is a very small depressed shell with very large teeth and the umbilicus uncovered. Prof. C. B. Adams mistook this shell for *P. lucerna* of Müller, and so named it in his collection at Amherst College; so when he had the Westmoreland specimens brought to him he described them as new under the name of *fuscolabris*. On the northeast slopes of the John Crow Hills, especially at Quaw Hill, a very large form of this umbilicated shell is found.

8. *Pleurodonte bainbridgei* (Pfr.) (No. 8 in map), occurs only in the neighborhood of Ulster Spring in Trelawny. It is distinguished by having the spire very much depressed.

9. *Pleurodonte pretiosa* (C. B. Ad.) is very widely distributed, being abundant in Manchester (No. 9 on map), and spreading eastward. It is difficult to give any eastern boundaries of this shell, as

¹Specimens of *P. acuta* were taken near Hope Bay, on the north coast in Portland parish, by C. W. Johnson and W. J. Fox, in 1891.—Eds.

²If *P. acuta* and *lucerna* are to be united, the latter will be the species, the former the variety, as *H. acuta* was described nearly fifty years later than *H. lucerna*.—Eds.

weathered specimens are occasionally found in Clarendon, and St. Catherine. Prof. C. B. Adams, who was unacquainted with *bainbridgei* of Pfeiffer, mistook the nearly allied Manchester species for it, and coming across the albino form, described it as the var. *pretiosa* of *bainbridgei*; consequently, his varietal name must be used to designate this species, which is usually of a rich chocolate color.

10. *Pleurodonte spengleriana* (No. 10 in map) is the St. Elizabeth species, and is readily distinguished by its smooth surface.

Before closing these notes I must acknowledge the kindly aid my Master in Conchology, Mr. Henry Vendryes, has always so generously given me. Had it not been for his help I should never have been able to send these communications. I must also acknowledge the aid my friend, Mr. Geo. Nutt, has given in helping me to map out most of the groups of Jamaican land shells.

NOTICES OF NEW LAND SHELLS OF THE JAPANESE EMPIRE.

BY H. A. PILSBRY.

Mandarina hirasei n. sp. Shell umbilicate, depressed-globose, solid and strong, smoothish, slightly marked with growth-striæ, and under a lens seen to be densely striate spirally. Spire low-conoidal, the apex obtuse. Whorls $4\frac{1}{2}$, the last rounded peripherally and beneath, slightly descending in front. Aperture quite oblique, rounded-truncate; peristome thick, expanded, narrowly reflexed below, a little dilated at the columellar insertion, partially covering the umbilicus. Alt. 13, diam. 21 mm.

Chichijima, Ogasawara (Mr. Y. Hirase, No. 860).

Quite unlike any of the known species. The specimens are dead, without cuticle, and white. Like *M. ruschenbergeriana* and *M. palasiana*, the species is probably extinct.

Hirasea diplomphalus n. sp. Shell very small, shaped like an Ammonite or like *Diplomphalus*, the base perforate, spire rather narrow and deeply sunken, periphery broadly rounded. Whorls $4\frac{1}{2}$, the last sub-angular above. Aperture vertical, narrowly crescentic, the outer lip thickened with a white rib within except near the upper termination. Alt. 3.2, diam. nearly 2 mm.

Chichijima, Ogasawara (Mr. Hirase, No. 863).

Hirasea goniobasis n. sp. Shell sub-perforate, dull brown, acutely

carinate at the periphery, low-conic, striate and terraced above, sub-angular at base. Whorls $5\frac{1}{2}$, slowly widening. Aperture vertical, narrow, trilobed, the outer lip thickened and sub-dentate within, columellar margin thickened. Alt. 2.2, diam. 3.8 mm.

Chichijima, Ogasawara (Mr. Y. Hirase, No. 864).

HIRASIELLA, gen. nov. Shell small, bullet-shaped, like *Euconulus* or *Kaliella*, polished, sub-perforate, the lip contracted and thickened within. The type of this group would be considered a *Kaliella* were it not for the characters of the peristome, which shows it to be allied to *Hirasea*. The young have a thin lip, like *Kaliella*.

Hirasiella clara n. sp. Shell sub-perforate, glossy and smooth, yellowish, elevated with convex outlines, bullet-shaped, the periphery rounded, base very convex. Whorls $6\frac{3}{4}$, convex. Aperture shortly lunate, contracted, the lip thickened within. Alt. 3, diam. 3 mm.

Chichijima, Ogasawara (Mr. Hirase, No. 867).

Diplommatina dormitor n. sp. Shell similar to *D. cassa* in shape, but a little larger; evenly sculptured with delicate, spaced rib-striae. Whorls 7, the last narrower and ascending as usual. Aperture sub-circular, the peristome continuous across the parietal wall. Columella toothed below, the tooth or fold moderate, ascending, not enlarged within the last whorl. Palatal fold short. Length 3, diam. 1.5 mm.

Kikaiga-shima, Osumi. Mr. Y. Hirase, no. 870.

This form has been found fossil in a (post-pliocene?) deposit containing many land shells. It differs from *D. cassa* in the much shorter palatal fold, and far less developed columellar lamella within the last whorl. Modern species of the same region, such as *D. saginata* of Oshima, are much smaller. This is the first *Diplommatina* known from Kikaiga-shima.

ALPHEUS HYATT.¹

Alpheus Hyatt died suddenly of heart disease at Cambridge, Mass., Jan. 15, 1902. He was born at Washington, D. C., April 5, 1838; prepared for college at the Maryland Military Academy and passed a single year at Yale. After a year's travel in Europe he

¹ Taken in part from the excellent memoir by Mr. Samuel Henshaw. *Science*, Vol. XV., p. 300, Feb. 21, 1902.

entered the Lawrence Scientific School at Harvard in 1858, graduating with the degree of Bachelor of Science in 1862.

He enlisted in the volunteer militia in 1862 and at the close of the Civil War was mustered out as Captain of the 47th Massachusetts Infantry. Returning to Cambridge, he resumed his studies under the guidance of Prof. Louis Agassiz, the greater part of his time being directed to work upon the fossil Cephalopoda. In 1867, Mr. Hyatt went to Salem, Mass., and was associated with Messrs. Putnam, Packard, and Morse in the care of the natural history collections of the Essex Institute and the Peabody Academy of Science, and in the editorial management of the *American Naturalist*. He remained in Salem until 1870, when, on May 4, he was elected custodian of the Boston Society of Natural History. By yearly choice Mr. Hyatt remained the scientific head of the Society until his untimely death.

For the head of a museum of Natural History, Prof. Hyatt had many marked qualifications; his knowledge of zoölogy, of paleozoölogy and geology was extensive; he was skilful in manipulation, suggestive in council, enthusiastic and approachable. His plan that a natural history museum should be arranged so that a visitor on entering should pass from the simpler groups to those more specialized, and that the specimens in each case should be similarly classified, though opposed as impractical, is both sound and feasible.

Prof. Hyatt's reputation as a teacher will rest largely on the work he did for the Teacher's School of Science. His management of this school was very skilful, and his lectures, of which he gave many courses, were uniformly successful.

In the pursuit of his investigations, Prof. Hyatt not only studied the accumulations preserved in museums in this country and abroad, but he partook in active field work; he dredged off the east coast at various points from Labrador to Noank, Conn., and explored many geological horizons in Canada, New England, New York and the far west.

The following are some of his more important papers on mollusca: On the parallelism between the different stages of life in the individual and those of the entire group of the molluscous order Tetrabranchiata. Fossil Cephalopods of the Museum of Comparative Zoölogy. The genesis of the Tertiary species of *Planorbis* at Steinheim. Genera of fossil Cephalopods. Genesis of the Arietidæ.

From the beginning Prof. Hyatt's researches were very largely devoted to evolutionary questions, and to the special study of fossil Cephalopods; at the time of his death he was one of the foremost authorities upon the fossil Cephalopoda. The true value of his work upon this group must be left for the future; memoirs such as the Genera of fossil Cephalopods, and the chapter on the Cephalopoda contributed to the English issue of Zittel's Palæontology cannot be properly estimated by the present generation; they require prolonged and detailed study founded upon large series of specimens. His theory of parallelism based on acceleration and retardation, and his discoveries concerning the laws of development, growth and decline were advocated with persistence and vigor; and while his treatment is not always lucid, he is to be credited as the originator of a distinct school, a school devoted to exact methods of research. The growth of this so-called Hyatt school, never of greater importance than at the time of his death, was a source of sincere gratification to him.

Prof. Hyatt possessed traits of character the worth of which cannot be exaggerated; his private life, though uneventful, was attended with many blessings; he had vigorous health, congenial work and many friends. He enjoyed scientific meetings and general society; his welcome to his own home, where he was the most charming of hosts, can never be forgotten.—C. W. J.

We record with great regret the death of Prof. A. G. Wetherby, which occurred Feb. 15. Further notice will appear next month.

GENERAL NOTES.

SERRIDENS OBLONGUS Cpr.—During one of my recent collecting trips to Pt. Loma and Pacific Beach, I found a number of these interesting little bivalves nestling under the mantle or clinging to the outside of the shell of *Ischnochiton conspicuus*. Their minute size seems to make it especially appropriate for them to depend on their big neighbors for protection and support. The specimens were identified by Dr. Dall, who tells me that *Pristophora* being pre-occupied, the genus has been named *Serridens*. He states that up to the date of my finding them here, only the single valve, found by Dr. Carpenter at San Diego, in 1866, was on record.—F. W. KELSEY, SAN DIEGO, CAL.

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ALBERT G. WETHERBY.

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No. 1.

NOTES ON THE DISTRIBUTION OF THE PLEURODONTE SINUATA GROUP

BY P. W. JARVIS.

Jamaican Pleurodontæ fall into two distinct groups: those that have two teeth on the peristome, with *P. acuta* as type (see last article), and the four-toothed species, with *P. sinuata* and *peracutissima* as types.

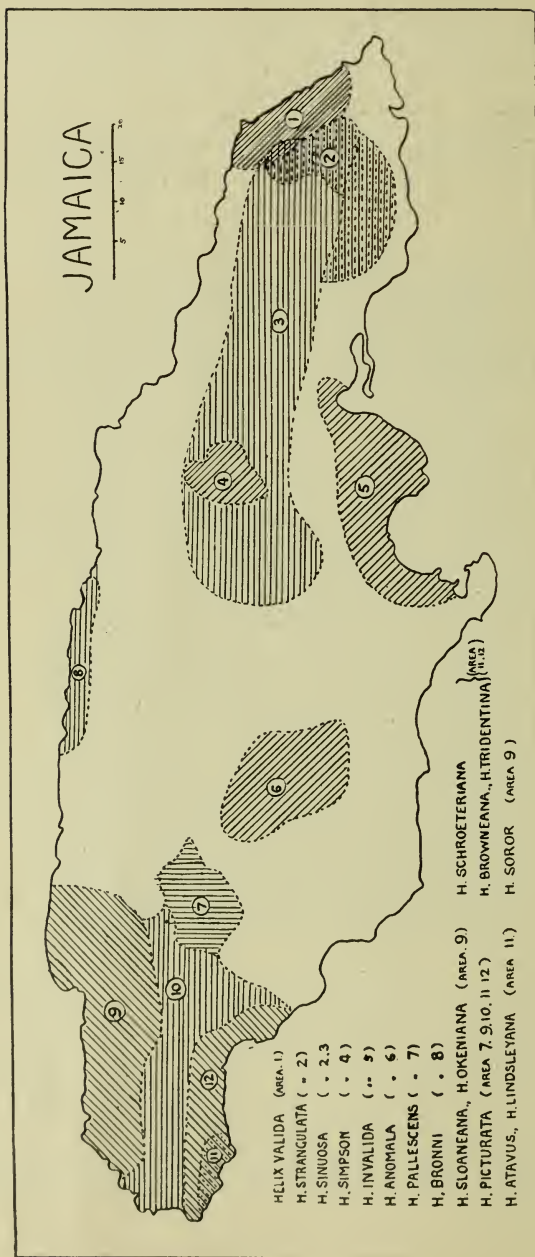
The species of this second group are :

- | | |
|----------------------------------|-------------------------------------|
| 1. <i>P. valida</i> (Ads.). | 11. <i>P. picturata</i> (Ads.). |
| 2. <i>P. strangulata</i> (Ads.). | 12. <i>P. atavus</i> (Sh.). |
| 3. <i>P. sinuosa</i> (Fer.). | 13. <i>P. lindsleyana</i> (Chitty). |
| 4. <i>P. simpson</i> (Pfr.). | 14. <i>P. schroeteriana</i> (Pfr.). |
| 5. <i>P. invalida</i> (Ads.). | 15. <i>P. tridentina</i> (Fer.). |
| 6. <i>P. anomala</i> (Pfr.). | 16. <i>P. browneana</i> (Pfr.). |
| 7. <i>P. pallescens</i> (Sh.). | 17. <i>P. sinuata</i> (Müll.). |
| 8. <i>P. bronni</i> (Pfr.). | 18. <i>P. soror</i> (Fer.). |
| 9. <i>P. sloaneana</i> (Sh.). | 19. <i>P. peracutissima</i> (Ads.). |
| 10. <i>P. okeneana</i> (Pfr.). | 20. <i>P. cara</i> (Ads.). |

Pleurodonte valida (Ads.) (No. 1 in map), John Crow Mountains, in the extreme east of the island. This common woodland species is very abundant in the north and eastern parts of this area.¹

Pleurodonte strangulata (Ads.) (Area No. 2), not a common shell, though rather widely distributed. The remarkable shape of the aperture at once distinguishes it from its allies.

¹ Specimens of *P. valida* were taken near Hope Bay by C. W. Johnson and W. J. Fox, in 1891.



Pleurodonte sinuosa (Fer.) (Area No. 3). Common on the mountains in the eastern half of the island; often found from 2,000 to 3,000 feet above sea level.

Pleurodonte simpson (Pfr.) (Area No. 4). If this is not a good species, it is the small globose local form of *H. sinuata* found in the Richmond Valley district, where it abounds to the exclusion of the other forms of *sinuata*.

Pleurodonte invalida (Ads.) (Area No. 5) is limited to the lowlands of St. Catherine and common all over this district, even in the wooded swamps near the sea. It is found in company with the var. *sublucerna* of *acuta*, and possibly is a diminutive or lowland variety of *H. sinuata*.

Pleurodonte anomala (Pfr.) (Area No. 6) is a very remarkable and readily distinguished species, limited to the Manchester district. The var. *convexa* of Adams occurs at Balaclava.

Pleurodonte pallescens (Sh.) (Area 7) is limited to the cock-pit country, and very common in the "sink-holes" at Mulgrave, in St. Elizabeth.

Pleurodonte bronni (Pfr.) (Area 8) is not a common shell, being limited to a few miles of the coast hills on the north side of the island, near Rio Bueno and St. Ann's Bay.

Pleurodonte sloaneana (Sh.) and *P. okeniana* (Pfr.) (Area 9) are both distributed throughout this area. *P. sloaneana* is very common and found living everywhere, whilst *P. okeniana* (the larger of the two species) is represented by dead shells alone in the southern and eastern parts of this area, and at present only found living at Hanover.

Pleurodonte picturata (Ads.) (Areas 7, 9, 10, 11, 12). This extremely pretty shell spreads from the cock-pit country through St. James, Hanover, Westmoreland and the western parts of St. Elizabeth. The var. A. of Adams with the more elevated spire and closed umbilicus, occurs in the western parts of Westmoreland and common near Negril.

Pleurodonte atavus (Sh.) (Area 11) is very local, limited to low coast hills lying west of Little London in Westmoreland, where it is far from abundant. The arrangement of the teeth on the peristome and general build of the shell at once distinguish it.

Pleurodonte lindsleyana (Chitty) (Area 11). A few poor specimens of this shell come from the same locality as *P. atavus*. This

is also Chitty's type locality where he obtained a few good specimens.

Pleurodonte schroeteriana (Pfr.) (Area 12). This species abounds in the wood of the western part of Westmoreland, it occurs much less commonly in the other parts of this area.

Pleurodonte tridentina (Fer.) and *P. browneana* (Area 12) are found in the woods on the northern parts of this area, at a higher elevation than *P. schroeteriana*. These two species are allied to *P. schroeteriana*, and if not good species, the types are very highly differentiated varieties. These shells are also subject to considerable individual variation.

Pleurodonte sinuata (Müll.) is the only species of this group which is found almost all over the island. Slightly specialized local forms do occur, but it is remarkable that a shell so widely distributed and so abundant should be so constant.

Pleurodonte soror (Fer.) (Area 9). This shell occurs in the Parish of Hanover and the bordering mountains of Westmoreland.

Pleurodonte peracutissima (Ads.). This shell is generally distributed over the higher regions of Manchester, Clarendon, St. Ann, Trelawny and St. Elizabeth. In spite of this species being so widely distributed and varying very much in size, and other minor characters, there is little doubt as to the extreme varieties belonging to the same species. Several localities have their typical varieties of this species.

Pleurodonte cara (Ads.) inhabits the western part of the Island (the part shaded on the map), and a few stragglers have been found in the mountains on the north of Manchester and St. Elizabeth. There are two very distinct varieties of this shell, the type with the "very thick, strong lip" from St. James and Hanover, and the common and more widely distributed variety which is of a much lighter build and with thinner lip.

NOTICES OF NEW LAND SHELLS OF THE JAPANESE EMPIRE.

BY H. A. PILSBRY.

Eulota despecta var. *kikaiensis* n. var.

Smaller and more solid than *despecta*, pink-tinted, at least near the aperture; the cuticle thin or wanting, hardly yellowish. Inner

border of the lip more or less thickened, pink or lilac colored, the throat paler. Whorls 5 to $5\frac{1}{3}$.

Alt. 17, diam. 19 mm.

Alt. 15 to $15\frac{1}{2}$, diam. 17 mm.

Kikaiga-shima, Oshima group, Osumi.

The fossil specimens from Kikaiga-shima belong to the larger typical form, which also still exists in the living fauna of the island, practically indistinguishable from the Okinawa shells, and showing the same color variations, from brownish-pink to a whitish straw tint.

Punctum morseanum n. sp.

Shell umbilicate, depressed, convex, low conic above, convex beneath, thin, brownish-corneous. Surface slightly shining, nearly smooth, but there are a few irregular and low thread-like striæ of growth. Whorls $3\frac{1}{2}$, convex, separated by a well-impressed suture, the last whorl rounded at the periphery, convex beneath. Aperture oblique, rounded, somewhat less than one-fourth of the circle excised at the parietal wall. Peristome simple and thin, the columellar margin dilated. Width of the umbilicus one-sixth the diameter of the shell. Alt. 0.73, diam. 1.9 mm.

Hirado, Hizen, in western Kyūshū. Types no. 83024 A. N. S. P., from no. 553*b* of Mr. Hirase's collection.

This species is much larger than *P. japonicum* Pils. It differs from *P. amblygona* (Reinh.) and its variety *pretiosum* (Gude) in the rounded periphery and smoother surface. *P. leptum* (Westerl.), described from Nagasaki, which is not known to me by specimens, is apparently different in its sculpture of delicate, crowded, cuticular lamellæ, and in the obtuse angulation of the last whorl.

Prof. E. S. Morse informs me that he has demonstrated the existence of the genus *Punctum* in Japan by examination of the jaw. The species he worked on has not been determined, but it may not unlikely prove to be *amblygona* Reinh., as that occurs in the region of Tokyo. The described Japanese species mentioned above I have referred to *Punctum* from their shell-characters only. All of them are extremely small.

Hirasea acuta n. sp. Shell solid, biconvex, acutely carinate at the periphery, densely and finely striate above, and decussated with fine spirals below; brown, paler or whitish around the perforation; whorls slightly over 4, flat, the last deflexed in front, contracted at

the mouth. Aperture small, acutely angular at the position of the keel; basal lip strengthened within by a strong, white, callous rib. Alt. $1\frac{1}{2}$, diam. $3\frac{1}{2}$ mm.

Imotoshima, Ogasawara (Mr. Y. Hirase).

Not quite so depressed as the slightly larger *H. acutissima*, and beautifully decussated beneath.

Mandarina mandarina var. *conus* n. var. Shell much elevated, the spire pyramidal, with obtuse apex. Nearly black brown, 2 or 3 early whorls reddish; sometimes with a pale patch at the middle of the base. Alt. 21, diam. 22 mm.

Imotoshima, Ogasawara (Mr. Hirase, no. 896).

Clausilia japonica var. *okinoshimana*, n. var. Larger than *japonica*, coarsely fold-striate, with fine spiral striæ visible in most of the interstices; whorls $11\frac{1}{2}$. Dark purplish-brown, with a yellowish border under the sutures on the middle whorls. Aperture, lamellæ and plicæ as in *C. japonica*. Length 31-34, diam. 7-8 mm.

Okinoshima, Tosa. Types no. 80846 coll. A. N. S. P., from no. 585 of Mr. Hirase's collection.

Distinguished by its large size, dark color and strongly developed sculpture. It is not, however, different from *japonica* in any important structural feature.

Microcystina yakuensis n. sp.

Shell imperforate, depressed, biconvex, thin, somewhat translucent, pale yellow, glossy and smooth. Spire low conoidal, composed of $4\frac{1}{2}$ convex, slowly increasing whorls separated by a well impressed suture. Last whorl rounded peripherally, convex beneath, impressed at the axis. Aperture lunate; peristome thin and fragile; columellar margin reflexed, somewhat thickened. Alt. 1.2, diam. 2.3 mm.

Yaku-shima. Types no. 83035, A. N. S. P., from no. 900 of Mr. Hirase's collection.

This species is a miniature of "*Macrochlamys*" *tanegashimæ*, of Tanega-shima and Satsuma.

Kaliella Okiana n. sp.

Shell subperforate, conic-depressed, thin, brownish, somewhat glossy, the upper surface slightly striatulate, base whorl glossy. Spirally striate. Spire conic, composed of 5 convex whorls, the last slightly angular in front, becoming rounded. Aperture lunate,

the lip single and thin, columellar margin suddenly dilated and reflexed at the axial insertion, a little thickened. Alt. 2.1, diam. 2.7 mm.

Hirado, Hizen. Types no. 82969 A. N. S. P., from no. 891 of Mr. Hirase's collection. Named for Mr. Oki, Mr. Hirase's correspondent in Hirado.

Kaliella hizenensis n. sp.

Shell minute, imperforate, depressed-conic, thin, yellowish, somewhat transparent. Surface sculptured with excessively minute, densely crowded radial striæ above, nearly smooth beneath. Spire low-conic, composed of slightly more than 4 very convex, slowly increasing whorls, the last rounded at the periphery, convex beneath, impressed at the axis. Aperture oblique, rounded-lunate, the peristome thin and simple, dilated and reflexed at the columellar insertion. Alt. 1.4, diam. 1.9 mm.

Hirado, Hizen. Types no. 82970. A. N. S. P., from no. 892 of Mr. Hirase's collection.

This very small species, of which 10 specimens were sent, is somewhat like *K. pagoduloides*, but more depressed and not so large.

6x
DESCRIPTION OF A NEW UNIO FROM TENNESSEE.

BY WM. A. MARSH, ALEDO, MERCER CO., ILLINOIS.

Quadrula Beauchampii n. sp. Pl. I, lower two figs.

Shell subtriangular, inflated over the umbones and beaks; shell very thick and solid, thicker before, beaks solid, raised and *incurved*, inequilateral, rounded before, obtusely angular behind, ligament short, thick, light brown, epidermis yellowish-brown, growth lines close and very prominent, almost sulcate. Shell compressed at the base, slightly flattened on the sides, umbonial slope rounded, posterior slope rather wide, with a dark impressed line from beaks to basal margin. Beak sculpture unknown. Cardinal teeth heavy and solid, rather compressed, corrugate and sulcate, lateral teeth short, thick and slightly curved. Anterior cicatrices small and deep, posterior cicatrices distinct and well impressed, shell cavity wide, cavity of beaks deep and obtusely angular, nacre white. Dimensions of an adult specimen: diam. 1.4, length 2.2, breadth 2.3 inches.

Hab.: Little Tennessee River, Tenn., Wm. U. Beauchamp, and Holston River, Tenn., Mrs. Geo. Andrews.

Remarks: I obtained three specimens from Wm. U. Beauchamp a number of years ago; afterwards Mrs. Geo. Andrews sent me several of them from Holston river, Tennessee.

They are near *globatus* Lea, but were too different to place with that species. In outline they are subtriangular, not spherical, and rounded like that species. They are more solid and heavy, and a larger species than *globatus*. They have a lighter colored epidermis, with closer growth lines, and the surface of the shell is rougher.

They need not be confounded with my *Andrewsii*, as they differ in outline, teeth and character of the rays, and are a very much larger species, and more solid and heavy.

They vary greatly in character of the rays; some are rayless, two have obscure maculations, while some have very obscure, indistinct rays. I name this shell after Wm. U. Beauchamp, who first sent me these shells, and who formerly was greatly interested in this family of shells.

Quadrula Andrewsæ Marsh. Pl. I, upper two figs. NAUTILUS XV, p. 115.

St.
PHOLAS TRUNCATA IN SALEM HARBOR.

BY EDWARD S. MORSE.

Pholas truncata, first described by Say in the Journal of the Academy of Natural Sciences, in 1822, with distribution indicated as southern, has been reported by others in Connecticut, Vineyard Sound and New Bedford Harbor. It has never to my knowledge been found north of Cape Cod. Lately Mr. J. J. Connor, connected with the Peabody Academy of Science, in digging for *Pholas crispata*, in Salem Harbor, Mass., found large numbers of another species, which proved to be *P. truncata*. They were found at extreme low-water mark in very hard, fine clay, in company with very small specimens of *P. crispata* and large specimens of *Petricola pholadiformis*. Many young of *P. truncata* were also found. The burrows of this species were very large, in some cases exceeding an inch in diameter. Prof. Verrill states that in Vineyard Sound they are found at all elevations between tides. In Salem harbor they appear only at low tide.

A NEW RISSOINA FROM CALIFORNIA.

BY PAUL BARTSCH.

Rissoina bakeri spec. nov.

Shell small, sub-diaphanous to milky white. Nuclear whorls two, quite large, with beveled shoulder, smooth. Later whorls well rounded, somewhat angulated about one-fourth below the summit, ornamented by about twelve to fourteen quite well developed axial ribs and a series of prominent axial striations, between them in the intercostal spaces, which are about four times as wide as the ribs; both ribs and striations extend from the summit of the whorls to the umbilical region, which is bordered by a basal fasciole. Sutures simple, well marked. Aperture large, very oblique, sub-oval, slightly notched at the posterior angle. Outer lip varicose.

The type, No. 130562, U. S. Natl. Museum collection, is from San Pedro, California. It has seven whorls (nucleus included), which measure: Long, 2.7 mm.; diam., 1.0 mm.

Other specimens examined were collected at White's Point and Pacific Beach, Cal., and San Martin Island, Lower Cal. One of these has as many as sixteen axial ribs. On some specimens these are quite prominent, while in a few individuals they are but feebly expressed.

This species is nearest related to *R. newcombei* Dall, differing from it in having the whorls more inflated, slightly angulated with much less conspicuous axial intercostal sculpture, and in having the base rather prolonged and provided with a much stronger fasciole.

The species is named after Dr. Fred. Baker, of San Diego, California, whose collecting at San Martin Island has largely increased the number of species known from that locality.

GENERAL NOTES.

At the March meeting of the Section on Conchology of the Brooklyn Institute of Arts and Sciences, two topics were discussed; *The Preparation and Care of Cabinet Specimens* and the genus *Nassa*. Under the first topic several very practical suggestions were made by Prof. R. Ellsworth Call, President of the Section, based upon his long experience in that work. The discussion of *Nassa* was illustrated by many specimens from the rich collection of Mr.

Charles A. Dayton, and also by the specimens in the Children's Museum, in which building the meetings are held.—FRANK H. AMES, *Secretary*.

ALBERT G. WETHERBY.¹

Professor Albert G. Wetherby was born in Pittsburg, Pa., in 1833. While yet a boy his parents removed to the vicinity of Cleveland. Here he obtained a rudimentary education, and afterwards went to college. After his graduation his time for several years was spent in farming in the summer and teaching a country school in winter. In 1861 he removed to Cincinnati, where he was appointed principal of the Woodburn public school. He filled this position with great acceptability during nine years; but his friends, recognizing his broad scholarship and his special fitness to teach the natural sciences, urged his appointment to a professorship in the Cincinnati University, and in 1870 he was elected to the chair of natural history. But as the University was new, and spending its money in new buildings and equipment, the chairs of geology and botany were added to his duties. Professor Wetherby was young, full of energy and enthusiasm, and during these six years of his university work accomplished more than mortal man should have attempted. But even if he had nerves of steel, he saw that he would soon break down under this overwork, and so he resigned to accept a more lucrative position in the business world.

Professor Wetherby was a born teacher, and some of his friends thought he made the mistake of his life in resigning his chair in the University to accept a business position. But the trustees had placed upon him burdens too heavy for one man to bear, and he was too conscientious a teacher to slight his work.

His enthusiasm for his favorite studies was contagious. No one could be in his society long without feeling the wonderful magnetic power of this man. On one of his excursions with his class in geology he penetrated the wild mountain region of South Carolina. Little did he then think that this region would be his future home; that he would spend his last years among these strange people, the

¹ The portrait is reproduced from the last photograph which he had taken and represents Prof. Wetherby at about fifty years of age.—EDITORS.

followers of Cromwell, who sought to hide from the wrath of Charles II. in these mountain fastnesses.

He resigned his position in the Cincinnati University to become the general manager of the American and European Investment Company, which position he held for two years.

In 1886 he was made manager of a large tract of timber and mineral lands belonging to the Roan Mt. Steel and Iron Co. This appointment compelled him to remove with his family to North Carolina. Here his home was located in one of the most beautiful valleys in the world, about 3000 feet above the sea level and surrounded with towering mountains. To one who was such a lover of nature this was an ideal place. Here surrounded by his interesting family he varied his other duties, which were many, by communion with nature.

His hospitality was unbounded, and his home was always open to friend or stranger and especially to any strolling naturalist, who was always sure of a hearty welcome from the professor and his estimable wife.

Professor Wetherby, while connected with the Cincinnati University, organized five expeditions for field work and study, in all of which the writer had the pleasure of being one of the party. As an organizer of a camping party he had no superior. He was a very companionable man, could tell a story, sing a song or play on his violin to drive away the blues, when the weather was unpropitious, and could cook a meal under the most unfavorable circumstances that would satisfy the most fastidious epicure.

The naturalist's best hunting grounds are generally far from the lines of civilization. No mountain roads, however impassable, or swollen streams, could turn him from his course. Difficulties which would appall ordinary men only seemed to stimulate his indomitable will power, which always carried him safely through.

Among his numerous friends in Cincinnati, perhaps none mourned his death more than those who shared with him the joys and hardships of camp life.

Professor Wetherby was taken sick Jan. 1st, with congestion of the lungs, at his home in Magnetic City, N. C. He seemed to slowly improve, when on Feb. 10 he was taken with sinking spells due to heart failure. He died Feb. 15, and was buried at Magnetic City, N. C., Feb. 18, 1902.

The following papers by Prof. Wetherby appeared in the Journal of Cincinnati Natural History Society, Vols. II to VI, and Vols. XVI and XVII: Descriptions of new fossils from the Cincinnati group; also from the Subcarboniferous. Descriptions of new species of crinoids from the Kaskaskia Group; also from the Subcarboniferous. Remarks on the genus *Pterocrinus*. Some notes on American land shells. Trenton rocks at High Bridge, Kentucky. Remarks on the Trenton limestone of Kentucky, with descriptions of new fossils. Geographical distribution of some fresh-water mollusks of North America. Descriptions of Crinoids from the subcarboniferous of Pulaski county Kentucky. Descriptions of new fossils from Lower Silurian and Subcarboniferous of Ohio and Kentucky. Notes on Trenton fossils of Mercer Co., Ky. Descriptions of new fossils from the Lower Silurian and Subcarboniferous rocks of Kentucky. Directions for collecting and preparing land and fresh-water shells. Relation of mollusks to shells. Natural history notes from North Carolina.

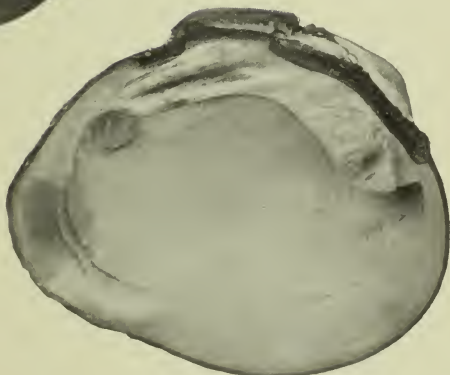
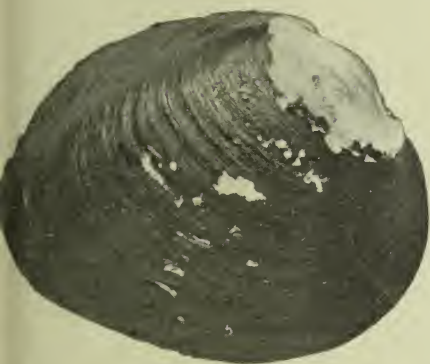
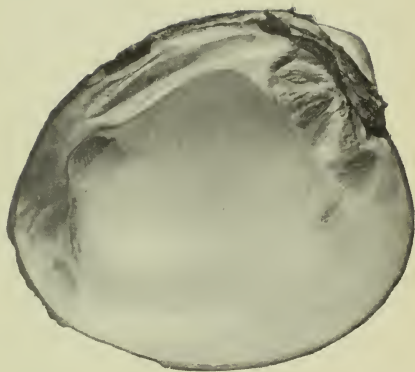
Journal of Science, Vol. I. Description of Lepidopterous Larvæ.

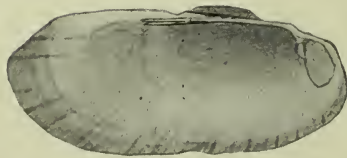
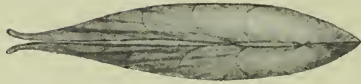
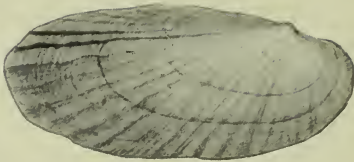
The following articles were published in the NAUTILUS, Vols. VIII and IX: A few notes on *Helix appressa*. A few notes on *Helix tridentata*. New records of Reversed American Helices. Remarks on the Variation in Form of the Family Strepomatidæ, with descriptions of New Species; read before the Cincinnati Natural Historical Society, December 7, 1875.

Quarterly Journal of Conchology, No. 11, May, 1877. "Review of the Genus *Tulotoma*, with remarks on the geographical distribution of the North American Viviparidæ."

The above list of papers published by Professor Wetherby, though not complete, gives some idea of the versatility of his mind and his great capacity for work. His last years were spent in a careful study of the mosses and grasses of the Roan Mt. region, which work, had he lived to complete it, would have been a valuable contribution to the botany of North Carolina. He made a fine collection of the smaller mammals peculiar to the Roan Mt. region, which he presented to the Smithsonian Institution. His large and valuable collection of minerals he presented to the Cincinnati University. His collections of plants, of fossils, of land and fresh-water shells, are very valuable, as they contain many unique specimens and all the types of the species described by him.

GEO. W. HARPER.





DANIELS: LAMPSILIS BLATCHLEYI.

THE NAUTILUS.

VOL. XVI.

JUNE, 1902.

No. 2.

C^v A NEW SPECIES OF LAMPSILIS.

BY L. E. DANIELS.

Lampsilis blatchleyi n. sp. Plate II.

Shell long, elliptical or obovate, compressed, thin, inequilateral, slightly gaping behind; beaks low, but little inflated, pointed, with minute nodulous sculpture; dorsal and basal outlines lightly curved; anterior end somewhat narrowed, rounded; posterior end rounded and lightly and obliquely subtruncate above; surface with singular growth lines; epidermis somewhat concentrically wrinkled, projecting beyond the border of the shell, yellow green with faint green rays; pseudocardinals rudimentary, smooth, subcompressed; laterals straight, single in the right valve, partly double in the left; nacre brilliant, iridescent, having a somewhat coppery luster in the cavities, becoming very thin and greenish at the edges.

Length 45, height 21, diameter 10 mm.

Length 40, height 17, diameter $8\frac{1}{2}$ mm.

Soft parts: Marsupium very large, occupying the posterior two-thirds of the outer gills, each lobe containing apparently about forty narrow ovisacs, the whole rounded and projecting well below the inner gills; inner gills united to the abdominal sac throughout their length; palpi large, elliptical, projecting backward but little; mantle much thickened on the border, its edges being decidedly double wavy and dark-colored; branchial opening rather large, with stout papillæ; anal opening small, crenulate; super-anal opening long, closed below; foot rather large.

Habitat: Wabash River, Section 32, Linn Township, Posey

County, Indiana. Found only on gravel bars in swiftly running water.

Fourteen specimens were collected by the author in August, 1901, while working for the Indiana State Geological Survey.

The smaller of the two type specimens (figured a little enlarged on pl. II) is in the Indiana State Museum, the other in the author's cabinet. Soft parts in the U. S. National Museum.

I am under obligations to Mr. C. T. Simpson for assistance in preparing the description of the soft parts.

The species is closely allied to *L. leptodon* Raf., particularly in its anatomical characteristics; the shell differs from that species by not having the wing and by the posterior end being rounded and in the full-grown shell being not more than one-half the size.

The two small shells found at Hardy, Ark., by Mr. J. H. Ferriss, by him referred to *L. simpsoni* (NAUTILUS, Aug., 1900, page 39), are without doubt this species.

Mr. C. T. Simpson informs me that Mr. Paul Bartsch of the National Museum believes he has found the same species in the Iowa River at Iowa City, Iowa.

I take pleasure in naming this species in honor of Prof. W. S. Blatchley, State Geologist of Indiana.

Cont.

NEW ENGLAND MARINE COLLECTING.

BY REV. HENRY W. WINKLEY.

Occasional letters ask the following questions: "Can I stock up duplicates by a week or two in New England? Where is the best place to collect?" An answer to all may be made by narrating my own experience. During fifteen years I have devoted much time to collecting. Considerable dredging has been done, but not below 25 fathoms. The most careful searching has been done at Eastport, Wiscasset, Casco Bay and Old Orchard, Maine, and Wood's Holl, Mass. Other places have had some visits. This area contains perhaps 250 shell-bearing mollusca; of these I have 200 and lack 50. Of the 200 found by me, 113 species I have only for my own cabinet, 12 more I have spared for exchange perhaps once, and 20 more have yielded a few exchanges. This leaves 55 species that I have had in quantity.

Let me add notes on the fifty-five: *Litorina*, *Nassa*, *Ilyanassa*, *Mytilus*, *Mya*, *Tottenia*, and a few others are general in distribution. Many others are limited, as follows: *Ostrea*, *Venus*, *Urosalpinx*, *Bittium*, *Sycotypus*, etc., common south of Cape Cod, but rare or wanting to the north. Again, *Buccinum*, *Lunatia*, *Cyprina*, and others should be sought in Maine. Many shells are found abundantly in limited portions of the coast. *Acmaea testudinalis*, common at Eastport, is scarce even in other parts of Maine. *Chiton albus* and *marmoreus*, with *Margarita groenlandica*, must be gathered at extreme tides in the Bay of Fundy. To be sure they occur elsewhere, but they are small and not abundant. The harvest season for *Lunatia* and *Cyprina* is after certain storms at Old Orchard. Sometimes these occur once or twice in a winter, or a year or more may pass without the harvest, but when they roll in they are very abundant. Dredging has an element of luck. One haul in the Penobscot Bay gave *Nucula proxima* enough for some years of exchanging. *Pecten magellanicus* is abundant in small areas, but it is easy to miss the spot. Another fact is the best region. *Buccinum* is common at Eastport, but small. The finest specimens are from Casco Bay. Yet other things, like Limpets and Chitons are at their best in Fundy waters.

The New England shells are very much in demand, but the lack of stock compels one to send frequent regrets. There is an amusing side to the work. One well-disposed friend asked for a dozen *Pecten islandicus*; I never saw a dozen. Prof. Verrill tells me that the government dredgings only yielded three or four in a summer.

It must be understood by the readers of this article that I speak of my own experience. Some forms that have not been found abundantly by me may be found in quantities at times, yet I think one may form an estimate of the difficulties we meet in New England.

^{Car}
NOTES ON THE GIANT LIMAS.

BY WILLIAM HEALEY DALL.

The reception of a specimen of *Lima goliath* Sowerby (1883) the other day led to comparisons of and annotations on the great deep-water species. The dean of this assembly is the well-known *Lima*

excavata Fabricius (1779) from Norway (150–300 fms.). Next comes *L. goliath* from Japan (775 fms.), which reaches about the same size as *excavata*. A third form is recorded from the West coast of Patagonia (245–481 fms.), which I shall call *L. patagonica*, and a fourth *L. agassizii* n. sp., from the Gulf of Panama in 322 fathoms. A section, *Acesta*, has been proposed to include these species by H. and A. Adams.

All of them have fine microscopic radial striæ and coarser radial sculpture, which is more pronounced toward the ends of the shell. In all there is a concentric grooving in the channels between the ribs, which, when the channels are narrow, takes on the appearance of punctation. All have a very narrow gape for the byssus and a flattened or impressed lunular area. All have a very general similarity externally. The Patagonian species has an astonishing likeness to *L. excavata*. It may be useful to record the distinctive characters.

L. excavata. Convex; the whole disk radially grooved, the grooving feebler mesially; the most impressed part of the lunule close to the hinge line, the shell moderately arcuate, the posterior outline roundly convex; color grayish white; resilium broad, somewhat oblique. Alt. 140; lat. 106; diam. 55 mm.

L. goliath. Flatter, broader, the middle of the disk smooth, posterior radials fine and close-set; most impressed part of the lunule lower down, the lunule itself longer, the shell more arcuate; color milk white, sometimes with a yellow flush inside, hinge line longer and resilium slightly more central. Alt. 140; lat. 106; diam. 36 mm.

L. patagonica. Narrower and less convex, the whole shell straighter vertically, the lunule narrower and less impressed, a slight tendency to divarication in the obsolete radials of the middle of the disk, otherwise like *L. excavata*. Alt. 100; lat. 72; diam. 31 mm.

L. agassizii. Moderately convex; the radial grooving quite uniformly distributed distally, feebler mesially near the beaks, the interspaces smoothly convex, and not sharp and corrugated anteriorly; lunule short, deep and narrow, anterior end of the hinge-line very short; area of the hinge narrow, and the resilium and pit very narrow and oblique; color chalky white, with a yellow periostracum. Alt. 97; lat. 78; diam. 30 mm.

L. goliath and *L. patagonica* show distinctly obsolete lateral teeth

near the angles of the hinge-line, but in *L. excavata* there is no trace of them, and the hinge of *L. agassizii* is too chalky to be certain about their presence or absence. They are most distinct and prominent in the young shell. *L. agassizii* was dredged by the U. S. Fish Commission steamer *Albatross*, as were our specimens of *L. patagonica*.

cont.
THE SHELL-BEARING MOLLUSCA OF RHODE ISLAND.

BY H. F. CARPENTER.

The following species are additional to those hitherto described in this series, and complete the list of known species from Rhode Island:

214. *Lucina filosa* Stimpson.

Lucina radula Gould, Inv. Mass., 1st ed., p. 69, 1840; Mighels, Bost. Jour. Nat. Hist., iv, 318.

Lucina contracta De Kay, Nat. Hist. N. Y., 1843.

Lucina filosa Stimp., Shells of New Eng., 17, 1851.

Shell white, thick, orbicular, moderately convex; hinge margin straight; beaks small, pointed, projected over a small, indented, smooth, lanceolate lunule. Exterior covered with remote, concentric lamellar ridges, between which are round, thread-like striae. Interior chalky-white, polished around the margins. Hinge straight, with one cardinal tooth in the left valve and two small, diverging teeth in the right valve. Length and height 2 inches; breadth, 1 inch.

This is a rare, deep water shell and was not published in the description of the "Shell-Bearing Mollusca" of R. I. because it had never been found and was not likely to be found in our waters; but several specimens were dredged in Narragansett Bay, about two years ago, by Prof. Herman C. Bumpus, then of Brown University, in Providence, to whom I am indebted for the specimens now in my collection.

215. *Physa gyrina* Say.

Shell heterostrophe, oblong; whorls 5 to 6, terminating in an acute apex; suture slightly impressed; aperture a little more than half the length of the shell; labium a little thickened on the inner

margin. This species was found in Stafford's Pond, Tiverton, R. I., by Mr. John Ford and the writer while on a trip to the southeastern part of R. I. in search of some of the rare land shells described by Mr. John H. Thompson, of New Bedford, Mass. I am sorry to state that our search for these rare shells was not rewarded by a single specimen.

216. *Sphaerium deformis* H. F. Carpenter.

Shell transversely oblong, elongated, both sides of nearly the same length; anterior margin curved; posterior margin abrupt, forming an angle with the hinge margin; basal margin having a twist to one side, as though some one had given it a pinch in the middle, squeezing it together and at the same time twisting it downwards; beaks large, inclined towards the anterior; valves thin, smooth, of a dirty brown color.

This species was found in Tiogue Reservoir, in the town of Coventry, R. I., by Mr. Richard Allen, who presented them to the writer. This species, with the somewhat doubtful *Cyprina islandica*, which (it is claimed) has been found in Rhode Island, brings up the number of species to 217, as per catalogue published by me in 1889, copies of which may be had free by addressing H. F. Carpenter, 58 Page St., Providence, R. I.

C. C.
A NEW GENUS OF EOCENE EULIMIDAE.

BY THOS. L. CASEY.

As far as available literature discloses, the following genus seems to represent a new and very interesting type of Eulimidae, which may be outlined by the following characters:

Ptereulima n. gen.

Conical, devoid of sculpture, finely attenuate, with simple direct nucleus, umbilicated, the columella as usual without folds; anterior whorls having a large flattened process or wing at each side.

This genus appears to be more closely allied to the Chinese *Hoplopteron* of Fischer than any other known at present, but the latter is imperforate and has the apex obtuse.

Ptereulima elegans n. sp.—Almost evenly conical, the surface

shining, the more recent whorls perhaps a little more rapidly increasing in size than the first three or four, the apex acute with the embryonic whorls two in number and very minute, the next three small and simple, the five succeeding similar to the preceding three except in possessing, at each side, a large obtuse aliform process as shown in the figure. Umbilicus rimate. Inner lip defined throughout by callus, which is slightly reflected along the umbilicus. Surface of all the whorls feebly and evenly convex, the suture fine and simple but distinct. Length 3.5 mm.



Lower Claiborne Eocene (St. Maurice, La.)

The outer lip is broken away in the unique type, but undoubtedly possessed an aliform projection similar to that immediately above it. The processes are of the nature of thin varices which served to protect the animal, and the growth of the shell between these temporary arrests was probably very rapid.

cat.

THREE NEW SPECIES OF CHROMODORIS.

BY T. D. A. COCKERELL.

The species here described are obviously different from *C. californiensis*, Bergh, and *C. agassizii*, Bergh, and I do not find any descriptions applicable to them.

CHROMODORIS UNIVERSITATIS, n. sp. Length about 67 mm., rather narrow, mantle less ample than in *C. mcfarlandi*, not expanded at the sides; rhinophores and branchiæ wholly retractile; rhinophores stout, with numerous transverse lamellæ; branchiæ of about 12 large simply pinnate plumes, several more or less branched, and so bipinnate at the ends; oral tentacles just concealed by mantle; hind end of mantle gibbous; foot projecting 20 mm. behind end of mantle; breadth of sole when crawling $8\frac{1}{2}$ mm.

Color rich dark ultramarine blue, the edge of the mantle and the edge of the foot bright cobalt blue; rhinophores very dark blue; mantle with two longitudinal series of oblong very bright orange spots, about seven in a series; five round orange spots on the anterior part of the mantle, in front of the rhinophores; under surface of posterior lobe of mantle with a series of eight round white spots, the

hindmost four large, the others smaller and rather faint; sides of foot with a series of over ten round or oval orange spots; branchiæ very dark blue, speckled with orange within; sole deep blue.

The splendid blue pigment of this animal is dissolved out after death, even in sea-water; but very fast in formalin, producing a blue liquid which is turned pink by hydrochloric acid, but is not affected by alkalies, except that strong alkalies rapidly bleach it. Curiously, the orange spots of the animal seen through the blue solution, appear red, though in reality their color is not altered.

Hab.—In rocky pools between tides, San Pedro, Calif., July 28th, and La Jolla, Cal., early in August, all collected by Wilmatte P. Cockerell. The name of the species was suggested by the fact that it carries the colors (blue and gold) of the University of California. It was also collected at San Pedro by the naturalists of the University of California Marine Laboratory.

CHROMODORIS PORTERÆ, n. sp. Length about 11 mm., form of *C. universitatis*, but uniformly much smaller, and quite different in markings. Deep ultramarine blue, including the whole of the foot; mantle with two rather broad longitudinal stripes of bright orange, not united posteriorly, and ending anteriorly at the rhinophores, but anterior to the rhinophores is a transverse orange stripe; median stripe of *C. mcfarlandi* represented by an inconspicuous lighter blue line; margins of mantle very narrowly pure white; foot wholly without marks, except that the hind end has a suffused whitish stripe. Rhinophores and branchiæ entirely retractile. Branchial plumes eleven, in a circle, simply pinnate, entirely of the blue color of the mantle. After death, a number of conical white papillæ (about 9 on each side) appear beneath the hind part of mantle. After death, the blue dissolves out, and the body becomes a sort of pale greenish-blue, with the dorsal stripe very white; and the orange bands as in life.

Hab.—In rocky pools at low tide, La Jolla, Cal., early in August, rather common. (Wilmatte Porter Cockerell.)

CHROMODORIS MCFARLANDI, n. sp. Length about 35 mm.; mantle ample, covering head, but pointed end of foot projecting far beyond mantle posteriorly; rhinophores short and stout, lamellate, with over twenty transverse lamellæ; branchiæ entirely retractile, arranged in the shape of a horseshoe, not entirely surrounding the anus, which is produced into a truncate cone; branchial plumes

twelve, simply pinnate, some of the posterior plumes bifid; oral tentacles short, wholly concealed under mantle; eyes apparently absent. Mantle brilliant purple with a yellow margin (continuous in front and behind), and three longitudinal yellow stripes; the yellow of the margin is really bright orange, bordered with white; the median yellow stripe begins a short distance before the rhinophores, and runs between them; rhinophores dark purple; foot white with a purple tint, or quite purple when contracted after death; the end of the foot is purple with a dorsal longitudinal orange stripe. The purple color does not dissolve out in formalin.

Hab.—In rocky pools at low tide, La Jolla, Cal., beginning of August; San Pedro, Cal., July 27th. All collected by Wilmatte P. Cockerell. Quite common at La Jolla. Named after Prof. F. M. McFarland of Stanford University, who has done some excellent work on the nudibranchs of Pacific Grove, Calif.

Calif.
NEW LAND SHELLS OF THE JAPANESE EMPIRE.

BY HENRY A. PILSBRY.

Chloritis bracteatus n. sp.

Shell depressed-globose, almost imperforate, very thin and fragile, brown. Surface dull to the eye, under a strong lens seen to be very densely covered with very small crescentic scale-like cuticular processes, densely crowded, and arranged in nearly regular descending rows. Spire convex. Whorls $4\frac{1}{2}$, the inner slowly, the last rapidly widening; separated by a deep suture. Aperture rounded, lunate, the peristome simple and thin, at the columellar insertion abruptly dilated, almost closing the umbilicus. Alt. $13\frac{1}{2}$, diam. 18 mm.

Nishigo, Uzen. Types no. —. A. N. S. P., from no. 904 of Mr. Hirase's collection.

This most northern of all its genus is strongly distinct by its excessively minute, curved cuticular appendages, unlike the hairs of all other species of *Chloritis*.

Pupisoma japonicum n. sp.

Shell globose-turbinata, umbilicate, light brown, very delicate and fragile. Surface delicately striatulate. Spire conic, the apex obtuse. Whorls $3\frac{1}{2}$, strongly convex. Aperture very obliquely ovate,

the peristome thin, fragile, unexpanded, the columellar margin broadly dilated and reflexed. Alt. about 1.6, diam. about 1.5 mm.

Hirado, Hizen. Types no. 82974 A. N. S. P., from no. 890 of Mr. Hirase's collection.

This is, I have not much doubt, the species collected by Hilgendorf at Yedo and in Idsumo, recorded by Prof. von Martens as "eine der *H. orcula* Bens. höchst ähnliche Art;"¹ but it differs from that Bengalese species in the much larger umbilicus and smoother surface, as well as in the noticeably smaller size.

Some immature specimens from Kashima, Harima (Mr. Hirase's no. 901) are probably the same species. With the two localities given by Prof. von Martens, this gives *Pupisoma* a wide range in central and southwestern Nippon. Until mature shells can be examined, the identity of the Nippon shells with the types from western Kiushu cannot safely be assumed, although it is likely.

PUBLICATIONS RECEIVED.

Catalogue of the Binney and Bland collection of the Terrestrial Air-breathing Mollusks of the United States and Territories, in the American Museum of Natural History, with enumeration of types and figured specimens, and supplementary notes. By L. P. Gratacap (Extr. from Bull. Amer. Mus. N. H. xiv, article xxiii, pp. 335-403. Dec. 3, 1901).

The "Binney and Bland collection" was formed by Mr. Binney, consisting in part of specimens from the collection of Dr. Amos Binney. It was given by him to Thomas Bland, from whom the Museum acquired it in 1882. The collection derives its importance from containing many of the shells illustrated in *Terrestrial Mollusks* Vol. III (the plates of which were reprinted in T. M. vol. V), besides many of Mr. Binney's types. The present list, of which the scope is stated in the title, is therefore important for reference to those who have occasion to study critically the land shells of the U. S. Mr. Gratacap has added notes upon many of the species. In some cases these record varietal names found upon the original labels, but elsewhere unpublished.

Five interesting plates showing generic distribution, and the relative

¹Sitzungsberichte der Gesellschaft naturforschender Freunde in Berlin, 1877, p. 101 (Sitzung vom 17, April).

numbers of species in different parts of the areas covered by the genera have been added by Mr. Gratacap. To some extent these charts indicate, incidentally, areas in which but little collecting has been done. This is especially the case with plate xlii, representing the distribution of typical *Polygyra*.

The following names seem to be new to us:

Glandina truncata var. *minor* Binney MS. (p. 338, Cat. no. 16). Based upon "*Variety of Glandina Texasiana Pfr.?*" Terr. Moll. iv, pp. 141, 205, pl. 77, f. 21. Seems to be a very slender specimen of *G. truncata minor* Pils., NAUTILUS xiii, p. 46; Proc. A. N. S., Phila., 1899, p. 404.

Macrocyclus vancouverensis var. *semi-decussata* Binney on label (p. 340). Astoria, Oregon. This is doubtless identical with *Circinaria spartella hybrida* Anc., which we have from Astoria.

M. concava var. *minor* (p. 341). No locality or definition.

Zonites (Gastrodonta) ligerus var. *sagdinoides* Gratacap (p. 344). "A very high 'bee-hive' form from Indiana."

Zonites (Hyalina) placentula Shuttl. (p. 350), Catal. no. 294 was Binney's earlier identification of *placentula*, subsequently becoming the type of *Z. lawi*. The specimens from Monroe Co., Tenn., and St. Giles Co., Va., are true *placentula*, as afterward identified by Binney. Through the kindness of Mr. Gratacap, I have been able to examine this series.

Helix (Patula) alternata var. *costigera* Bld. MS. (p. 357).

Helix (Patula) perspectiva "var. *carinata* (p. 358) from Union Co., Tenn., is almost planate, and below the periphery the striæ approach extinction." Under *H. (P.) bryanti*, Mr. Gratacap writes, "Certainly interchangeable with var. *carinata* of *perspectiva*."

Triodopsis mullani (Bland), Cat. no. 1275 (p. 383), can hardly be that species.

Macroceramus (p. 397). The specimens recorded under *M. pontificus* as from Texas are probably *M. texanus*. That from Central America is no doubt *kieneri*, as recorded by Mr. Gratacap (see Man. Amer. Land Shells, p. 416, fig. 457).—H. A. P.

SOME UNDESCRIBED VARIETIES OF CYPRÆA.—By Mrs. Agnes Kenyon (Jour. of Conchology, Vol. X, p. 6, April, 1902).—In this paper the following varieties are described as new:

Cypræa tigris var. *lineata*. From Fiji. Differs from the type in possessing a number of longitudinal hair-like lines.

Cypræa mappa var. *viridis*. New Caledonia. Both back and base colored green or with only the dorsal surface suffused with a greenish tint.

Cypræa bregeriana var. *barbara*. New Caledonia. "Shell differing from *C. bregeriana* in the fineness of the dentition and without the violet coloring interstices, interior lined with white, not violet-purple as in *C. bregeriana*."

Cypræa helvola var. *borneensis*. Borneo. Shell smaller, with narrower sides, not incrassated or angulated, dorsal surface reddish-pink sprinkled with white, sparsely overlaid with brown spotting, base and extremities white.

Cypræa helvola var. *timorensis*. Timor Island. Differing from *C. helvola* in having white, not lilac, extremities, which are calloused, twin callosities at the posterior extremity.

Cypræa poraria var. *vibex*. New Caledonia and New Hebrides. Considerably larger than normal examples, and distinguished by a white porcellanous band or stripe, extending from one extremity to the other, thus dividing the dorsal surface into two equal parts.

Cypræa miliaris var. *diversa*. Shark's Bay, West Australia. "Specimens very light in color, almost white, but showing spotting perfectly: they are quite distinct from *C. eburnea*, the teeth are not so coarse, the enamel of the dorsal surface is not so shining, the interior is colored pink or pale violet, while the interior of *C. eburnea* is either white or orange; specimens are comparatively small."

Cypræa carneola var. *rubicola*. Hawaiian Islands. The color of the teeth is a "bright rose-pink, in contradistinction to the purple-hued dentition of *C. carneola* or the colorless base and dentition of *C. læbbeckiana*."—C. W. J.

THE MARINE WOOD-BORERS OF AUSTRALASIA AND THEIR WORK. A paper read before the Australasian Association for the Advancement of Science. By Chas. Hedley. An exceedingly interesting paper, giving an account of their method of propagation and boring; their ravages, remedies, natural enemies and classification. The ship-worms of Australasia belong to two genera, *Uperotis* and *Nausitoria*. The genus *Teredo* is at present unknown in that region, although "*Teredo navalis*" is indiscriminately applied by engineers to all ship-worms. The paper is illustrated by four plates.—C. W. J.

THE NAUTILUS.

VOL. XVI.

JULY, 1902.

NO. 3.

^{Coast} CRUISING AND COLLECTING OFF THE COAST OF LOWER CALIFORNIA.

BY FRED. BAKER, M. D., SAN DIEGO, CAL.

Cruising on our southern Pacific coast is less indulged in than along the Atlantic seaboard, because there is a marked dearth of the land-locked harbors into which our eastern yachtsmen can run almost every night, or in case of a threatened storm. Nevertheless, two years ago, tempted by our summer promise of continued good weather, a party of seven, including my wife and two children, started from San Diego harbor for a run down the coast of Lower California in the staunch little schooner "Lura."

A late start made it advisable to anchor over night at the mouth of the harbor, but this gave a chance to get under way at daylight for a beautiful run of seventy miles to "Todos Santos" bay, on the sloping shores of which lies "Ensenada," the capital of the northern department of the Mexican territory of "Baja California."

As we ran we left broad to the starboard the Coronados, a group of seven small islands belonging to Mexico, but lying only twenty miles off San Diego, and a common terminus of our short cruises. They, like most of the off-shore islands, are bold volcanic masses, the largest, though less than three miles long, rising 880 feet above the sea, in many places sheer for hundreds of feet. This is a type of all the coast line for several hundred miles south. Bluffs and headlands, with here and there a narrow or broad valley sweeping down to the sea, but above all and crowning all, the foot-hills and the great mountains of the Coast Range.

It was just turning dusk as we rounded Ensenada Point into Todos Santos Bay, which is little better than an open roadstead, except for the protection offered by the chain of Todos Santos islands a dozen miles to sea, and the shelter of the Point from north-west winds. Immediately on dropping anchor we were boarded by the Comandante of the port, Don Luis Fernandez, and the quarantine officer, our old friend, Dr. Peterson, who courteously waived all examination, allowing us to go ashore at will. The two nights spent here with a nearly full moon shining down on us, just enough ground swell to keep in mind that we were cruising, and the balmy breeze of semi-tropical summer blowing over us, make a memory picture as near perfection as this world gives.

The day was busy. First we had the usual difficulties with the Mexican officials. In the absence of specific instructions, they were unable to determine whether we should register our craft as a private yacht or a passenger vessel. In either case they notified us that we must bear the expense and delay of telegraphing to the City of Mexico for instructions and license. Fortunately our schooner had on a former occasion been used in fishing down the coast, and after much argument Señor Victorio decided to grant us a three months' fishing license, at the same time clearing us with a clean bill of health for the return trip to San Diego. Under this very satisfactory arrangement we could run down the coast as far as the jurisdiction of the northern department reaches—something like 300 miles—land where we chose, collect what we liked, and when we were ready, sail away home without touching again at "Ensenada."

While our sailing master was arranging all this, the rest of us passed the day in seeing the few sights of the town, observing Mexican life, and visiting a few old friends. Among these Mrs. Gastelum holds first place, not for her society alone, though she is a woman of wide experience and much knowledge, but because in a former phase of her existence she was married to a Mexican customs official, who, during his sojourn at various ports on the Pacific Coast, had collected many bushels of shells which she has stored away in many boxes and barrels. This was the second time I had overhauled the lot, and as before I was astonished at the low price placed on my pickings, after a long conference between herself and her husband—a later acquisition. As I paid the bill I reflected that while I should undoubtedly have enjoyed the society of the former husband with

his evident love of shells, the later acquisition was probably more in harmony with the size of my pocket-book.

Away at daybreak Sunday morning, looking our last on "Ensenada," one of the goodliest sights to look upon it has been my fortune to see in a fair amount of knocking about. A great sweep of unbroken sand beach from "Ensenada Point" to "Punta Banda," a distance of eighteen miles, the high range of Punta Banda breaking off abruptly into the sea to the south, the horseshoe being completed by the low mesa-crowned Todos Santos islands. The town of Ensenada nestles on the low beach under the high ridge which forms Ensenada Point to the northwest, the broad valley reaching back with few breaks for twenty miles—then the foothills, and back of all, as always, the great mountains! It is our dry season and everything is parched and brown, and the near-by ridges show great outcroppings of black volcanic rock, but the blending of color under our brilliant California sun, and the foreshortening of great distances giving the effect of haze and softness, make a scene of marvelous beauty.

A glorious sail—free with the prevalent northwest wind—out through the narrow gate between Punta Banda and the easterly island of the Todos Santos group, which was alive with seal and waterfowl, and down a bold coast for twelve miles to cast anchor under the lee of the "Santo Tomas" headland noted all along the coast for its frequent storms. Here we divided up, one to sleep, two to fish, two to hunt deer, and two to collect shells and algae. All were successful but the deer-hunters. Unfortunately I did not keep my Santo Tomas collections apart from others, so I can give no fair idea of my catch, but a single *Haliotis rufescens*, Swainson, represents the only species not appearing in the list which closes this article.

Away again at sunrise for our final southward stretch. All day we ran almost before the wind, the coast growing generally more bold and culminating in Cape "Colnet," a great promontory presenting an almost unbroken face to the northwest, a cliff many miles long and many hundred feet high. We round the Cape with a half gale, and bear away southeasterly to our final destination, the little island of San Martin, lying five miles off the coast and ten miles from San Quintin, the first land-locked harbor in 200 miles from San Diego. We cast anchor at 3 a. m., and all hands slept late.

Of San Martin a few words' description must suffice. Roughly it is a round conical island, three miles in diameter, with two peaks, the higher a typical extinct volcano rising 471 ft., with an almost perfectly regular crater about 250 ft. in diameter, and between 75 and 100 ft. deep. The island is a solid mass of very hard volcanic rock with frequent small caves—evidently blow-holes—covered imperfectly where reasonably level by a thin soil which supports a moderately abundant vegetation in which various species of cactus are very plentiful. Up the slopes are great slides of loose rock, and owing to the cacti and the roughness of the way, the climb of a little over a mile to the top proved a very serious undertaking.

On the north side of the island a moderately level space, covering between 500 and 1,000 acres, is occupied by rookeries, mostly of pelicans and cormorants. The birds were most of them just beginning to fly, and a rough estimate convinced us that there were certainly some millions of them. We spent the greater part of one day watching them. The young cormorants waddled to the bluffs, spread their wings evidently for their first trial, and sailed or flew awkwardly into the ocean. There they were perfectly at home and could not be distinguished from the old birds, swimming and diving with perfect ease. But the pelicans had a harder time. They could fly very well indeed, but like the Irishman "had a divil of a toime loighting." Starting from some slight elevation they would sail away majestically, managing their great wings and bodies remarkably well. After a turn of one or two hundred yards they would light without slowing up perceptibly, come down with a thud that we could hear a hundred yards away; turn two or three somersaults, and straighten up with the same appearance of surprise and offended dignity which we have all seen drunken men assume when suffering from similar mishaps. We actually laughed till we cried, and it was hours past our dinner time before we could agree unanimously to start for the boat.

Running easterly at a tangent from the southerly edge of the island for nearly 1000 yards is the so-called breakwater, a nearly straight line of enormous beach-worn boulders arranged like some huge artificial jetty. The acute angle has filled in with sand over a space of about fifty acres. In the bight there is safe anchorage except in a northeast storm. At two places dips in the breakwater bring it below high tide level, one opposite the little harbor, and the

other opposite the sand bar, and here the constant tidal current has excavated a little circular bay, covering two or three acres. This bay and the breakwater, with another little bight not much over thirty feet across, furnished nearly the only good collecting ground on the island. Otherwhere I found only a few of those hardy shells capable of standing any amount of buffeting by the waves, Chitons and Limpets, an occasional Chlorostoma, and the *Monoceros lugubre* Sby., which is in evidence along the whole coast from Ensenada south.

Dredging at moderate depths gave little results, but some of my fishermen friends who spend much time about this island, which furnishes some of the great fishing of the coast, make a practice of bringing up to me rocks which they haul up on their lines from considerable depths, attached to kelp roots. I am, therefore, able to list a considerable number of deep-water species. It has seemed to me advisable to publish the following list of shells secured from this small island and its immediate vicinity as a contribution to our knowledge of geographical distribution. I have to thank Dr. Wm. H. Dall of the National Museum, and Mr. Henry Hemphill of San Diego, Cal., for determining a very large share of the species about which I was in doubt.

After commenting on the fact that many of the specimens which I sent to him were too young or too worn to be identified specifically, Dr. Dall writes, "There was a small *Rissoina* among the shells which we have had for some years from San Pedro, but had not named, and with your permission we propose to call it *R. Bakeri*, Dall and Bartsch. There are also some of the new *Pyramidellidæ* described in the paper on *W. Am. Pyramidellidæ* which Mr. Bartsch and I have in preparation."

Our return trip was made much more slowly than the outward one, as the prevalent wind made it a long tack to windward. The only break was a night run against a sharp storm to make the doubtful shelter of Santo Tomas, where we lay for twenty-four hours with two anchors out, estimating the chances of a shift of the wind driving us to sea again. Our cruise lasted seventeen days, and was unanimously voted a success.

 A NEW NAIAD FROM NEW ZEALAND.

BY CHARLES T. SIMPSON.

Diplodon websteri Simpson.

Shell long, rhomboid, compressed or subcompressed, inequilateral; beaks subcompressed, pointed, their sculpture apparently a few irregular lachrymose nodules arranged in a somewhat radial pattern; surface with uneven growth lines and impressed rest marks, sculptured throughout with lachrymose nodules which are often V-shaped, those along the upper part of the low posterior ridge slightly knobbed; epidermis dark olive green, clouded with lighter green, rather dull; pseudo-cardinals small, subcompressed, granulose, two in each valve; laterals straight, two in the left valve, one in the right; muscle scars small, shallow and irregular; nacre bluish, lurid purple near and in the beak cavities, thicker in front.

Length 67, height 32, diam 14 mm.

Length 62, height 32, diam. 17 mm.

New Zealand.

Specimens of the above were sent by Rev. William H. Webster, of Wauiku, New Zealand, to the U. S. National Museum. They proved to be a new species, apparently allied to the *Diplodon novæ-hollandiæ* Gray of Australia, but smaller, less inflated and less solid than that species. In *D. novæ-hollandiæ* the anterior third of the shell is almost destitute of nodules; in the present species the whole surface is covered with them. These resemble somewhat those found on the *Unio tuberculatus* of Barnes, but are less elevated. The exact locality was not given.

 NEW AMERICAN LAND SHELLS.

BY HENRY A. PILSBRY.

Most of the following species were discovered by Mr. Jas. H. Ferriss during a recent flying visit to the Southwest. I am indebted to Mr. G. H. Clapp for various suggestions regarding them; both Mr. Clapp and Mr. Ferriss agreeing with me that they are new.

Polygyra alabamensis n. sp.

Shell depressed, about like *P. vannostrandi* in general contour,

yellowish brown, glossy, finely rib-striate above and below; umbilicate. Spire low dome-shaped. Whorls about 6, *very closely coiled*, the last having the periphery situated high; a trifle deflexed in front. Aperture oblique, lunate; peristome white, narrowly reflexed, thickened within, the outer lip bearing a small, squarish tubercle, bent inward; basal lip bearing a marginal tubercle, abrupt on its outer, sloping or buttressed on its inner side. Parietal lamella short, erect, a trifle curved. Alt. 6, diam. $11\frac{1}{2}$ mm.

Auburn, Alabama. Types no. 82556 A. N. S. P., collected by Carl F. Baker.

The aperture is exceedingly similar to that of *P. inflecta*, from which this species differs in the sculpture, closely coiled whorls and open umbilicus. *P. cragini* is more depressed, with fewer whorls. *P. vannostrandi* has differently proportioned teeth and less closely coiled whorls.

Polygyra texasensis n. sp.

Shell narrowly umbilicate, but the umbilicus rapidly enlarging at the last whorl, where it becomes more than one-fourth the diameter of the shell; depressed, light brown, glossy, lightly and rather distantly striate, usually with several coarse, strong wrinkles behind the lip. Spire low, convex. Whorls $5\frac{1}{4}$, slightly convex, slowly widening, the last abruptly descending in front, deeply and narrowly constricted behind the lip, convex beneath. Aperture small, oblique; peristome reflexed, thickened. the outer and basal lips each bearing a compressed tooth, parietal wall with a strong, erect V-shaped tooth which connects the ends of the lip, the upper branch of the V slender and low.

Alt. 5, diam. 13.5 mm.

Alt. 5, diam. 12.3 mm.

Colorado City, Mitchell Co., Texas. Types no. 83258, A. N. S. P., collected by J. H. Ferriss, 1902.

This species is clearly related to *P. texasiana* (Moricand), which occurs at the same locality, as well as throughout the greater part of Texas. It differs from *texasiana* in the larger size, with about the same number of whorls, the more regular increase of the whorls in width, and the proportionally wider umbilicus. In the great number of *P. texasiana* I have seen from many localities, none approach *P. texasensis*.

Sonorella granulatissima n. sp.

Shell depressed, in general shape much like *S. hachitana* and *S. rowelli*; narrowly umbilicate, the umbilicus between one-eighth and one-ninth the diameter of the shell; pale corneous-brown, becoming somewhat whitish around the umbilicus, with a conspicuous red-brown band above the periphery, and an inconspicuous, ill-defined, faint and wide one below the suture on the last whorl. Surface lustrous to the naked eye, but not glossy, under a strong lens seen to be *very densely and evenly granulose*, the granulation extending to the apex, but becoming more effaced on the base, subobsolete around the umbilicus, where some specimens show faint spiral lines. Spire very low. Whorls hardly $4\frac{1}{2}$, rather slowly widening at first, the last whorl very much wider, gradually and rather deeply descending in front, far below the periphery of the shell. Aperture very oblique, very shortly elliptical, almost circular, the peristome thin, narrowly expanded, the columellar margin dilated, ends approaching.

Alt. 10, diam. 19 mm.; oblique alt. apert. 9.7, width 11 mm.

Alt. 9.8, diam. 18 mm.; oblique alt. apert. 8.5, width 9.8 mm.

Huachuca Mts., Arizona; collected by Mr. Jas. H. Ferriss.

The umbilicus is narrower than in *S. hachitana* and *S. rowelli*, and it differs from both in the dense granulation. It is a species of delicate beauty, evidently distinct from any form collected by Ashmun and others in the same region.

Sonorella rowelli Newc., originally described from Arizona, was taken by Mr. Ferriss at Sanford, and in the Patagonia Mts. Mr. Ashmun also brought the species from the latter locality, and Dr. Geo. H. Horn collected a specimen at Fort Grant, Arizona. It is much like *S. hachitana* in miniature.

Mr. Binney rejected *rowelli* from the U. S. list because he considered it identical with *Helix lohrii* of Gabb from near Moleje, Lower California; but the two species are clearly distinct, and there seems to be no sufficient reason to doubt the truth of the original statement that the type of *rowelli* was taken by Frick in Arizona.

Bulimulus dealbatus pasonis n. subsp.

Much more slender and smaller than any described form of *dealbatus*, *schiedeanus* or *mooreanus*, but larger and stouter than *B. durangoanus* v. Mart. Reddish-corneous, with opaque white streaks and mottling; smoothish. Whorls nearly 6, quite convex. Aper-

ture small, ovate, less than half the length of the shell, the ends of the lip approaching. Length 15, diam. 7.3, longest axis of aperture 6.5 mm.

El Paso, Texas. Types no. 83259, A. N. S. P., collected by Jas. H. Ferriss, 1902.

PUBLICATIONS RECEIVED.

THE MOLLUSCA OF THE CHICAGO AREA: Part II., The Gastropoda. By Frank Collins Baker, Chicago Academy of Sciences. Bull. No. III, pt. II.

This handsome volume of 288 pages and 9 plates, which completes Mr. Baker's work on the Mollusca of the Chicago Area, will be a most welcome addition to the library of every American conchologist.

It has been for years a source of regret to all students of the American mollusca that so little attention has been given by our leading conchologists to the study of our fresh-water species. For more than thirty years practically nothing, except here and there a description of some supposed new form, has been published on this subject. The invaluable monographs published by the Smithsonian Institute have not only been out of print and scarcely attainable for years, but are quite out of date from a scientific standpoint. There is at present no work which gives the results of the material which has been accumulated in the public and private collections of this county, since the publication of those monographs, or embodies the modern ideas of classification. The land mollusks have apparently absorbed the attention of our working conchologists and the fluviatile forms have been almost totally ignored. The recent synopsis of the Naiades by Mr. Simpson has filled a long felt want, and placed that group in an enviable condition. The studies of Dr. Sterki are rapidly bringing the species of *Sphærium* and *Pisidium* out of their chaotic condition. Similar work upon the fresh-water univalves is one of the greatest needs of American Conchology to-day. Mr. Baker's book is an important advance in the right direction, and should be an incentive for others to undertake similar work in other states. It is the first publication in this county, which attempts to treat the fluviatile forms with the same detail and thoroughness, which has been given to the terrestrial species. Both the author and the

Academy are to be congratulated upon the success with which the undertaking has been carried out.

Beginning with the *Pulmonata*, the land species, 51 in number, are first described, a sufficiently full synonymy of each is given with figures of the shell, and in nearly all cases of the jaw and radula. Full details of local distribution and of the habits and characteristic peculiarities of the different forms are also given. Pilsbry's classification is of course followed, and the whole treatment of the subject is in accordance with the latest scientific methods.

The most striking innovation in this portion of the work is the adoption of Say's name of *ovalis* for the species commonly known as *Succinea obliqua*. This is, however, in accordance with the recognized rules of nomenclature, and it is surprising that it has not been done before. The Succineas need a thorough revision. The specific characters exhibited by the shells are slight, and most of the described species seem to be exceedingly variable. It is possible that dissection will show reliable characters in the soft parts that can be relied on for specific determination. This work has yet to be done and would be a very valuable contribution to science. The jaws and radulæ if examined in sufficient quantities to determine the amount of variability in each species, might furnish a sufficiently reliable basis for classification. The difference shown between the author's figure of *S. ovalis* and Binney's figure of that of *S. totteniana* and that between his figure of the radula of *ovalis* and Binney's figure of the same, and the remarks on the same subject with reference to the published figures, the jaw of *S. retusa* is very suggestive, and shows the necessity for additional work in that line. It is unfortunate that the author did not make an original figure of the jaw of *S. avara*, as there is reason to believe that Morse's figure, adopted by Binney, is not correct.

The treatment of the fluviatile univalves is a welcome addition to the scanty literature on the subject. The only regret is that the fauna of the Area is comparatively small and that so many of our common species are not represented in it.

The keys supplied under the different genera serve to bring out the differential specific characters, and will be of great assistance to the student in identifying his specimens. The jaws and radulæ of many of the species are figured for the first time and many anatomical details of value are given. This branch of the subject is practi-

cally the first effort in a new field and forms the most valuable portion of the entire work. The synonymy is practically that of Binney with the addition of more recently described forms. Until a thorough revision of the subject can be made, based on abundant material from all parts of the country, and the study of the original types, this is no doubt the wisest course to pursue. The advisability of printing the MSS. names of Calkins, all of which seem to be synonyms, may be perhaps questioned.

The treatment of the *Limnæidæ* will in the main commend itself to the student. The author declines to follow Crandall in separating *Physa elliptica* Lea from *P. gyrina oleacea* Tryon. Judging from the figures given, it seems possible that *elliptica* as differentiated by Crandall does not occur in the Chicago Area. Certainly as species go in *Physa*, there is room for a difference of opinion on this subject. The elaborate descriptions of the *Pleuroceridæ* are worthy of notice, and are a refreshing improvement upon the descriptions that do not describe, of the older authors in treating of this most difficult family. The union of *Goniobasis depygis* to *G. livescens* seems a rather radical innovation and will likely provoke dissent. If it serves to incite discussion and careful study, it will have accomplished a useful purpose.

The author's figure of the radula of *Cincinnatia cincinnatiensis* is the first that has been published of that species. It is remarkable in not showing the "tongue shaped process from the middle of the anterior surface, reaching beyond the base," which is given by Stimpson as a generic characteristic of *Amnicola*. If the figure is correct, *Cincinnatia* must be removed from under that genus and placed elsewhere. We do not understand the statement on p. 335 that figures 4 and 11 on Plate I. of Haldeman's Monograph are misnamed. In the copy before us, both the description and plate give the proper references. The author also seems in error in his remarks on page 336 in regard to Binney's figure 162 as copied from Troschel. Neither Binney nor Troschel refer the radula there figured to *Amnicola cincinnatiensis* Anth. Both refer it, and probably correctly, to *A. sayana* Anth., which is a synonym of *Pomatiopsis cincinnatiensis* Lea, an entirely different thing. The synonymy of the *Campelomas* is that established by Call and, barring the reference of Lea's *milesii* to *subsolidum*, is entirely acceptable. There is reason to believe that Lea's species should rather be referred to *decisum*. The large specimen figured as *decisum* on plate 36, fig. 5,

looks very much like *C. integrum*. Possibly that species should have been included in the Chicago fauna.

The paper concludes with a full bibliography of the literature of the Area, and a list of all the works referred to, which in itself will be of valuable assistance to the student who desires to familiarize himself with the literature, especially that published since Binney's Bibliography was issued.

BRYANT WALKER.

ENTEROXENOS OSTERGRENI, A NEW ENDO-PARASITIC GASTROPOD.—In the current number of the Zoologische Jahrbücher (xv, pl. 4, p. 731) a new parasitic gastropod of unusual interest is described by Kristine Bonnevie. It lives in the body-cavity of the N. European holothurian *Stichopus tremulus*, usually near the anterior end of the intestine, to which it is attached. The adult animal is vermiform, 6–15 cm. long, 4–5 mm. in diameter, without visible external opening, suddenly contracted anteriorly, into a slender style which is run into, and attaches it to the intestine of the host. The largest individuals sometimes lie free in the body-cavity. The integument is smooth, white and opaque. Under the epithelium there are circular and longitudinal layers of muscle. The internal anatomy is very simple. There is a narrow, long, central cavity, running backward from the end of the peduncle of attachment, the large ovary opening into it distally, while the testis lies anterior. The eggs are fertilized in the central cavity of the animal, and undergo development there. No trace of an alimentary canal is present. The gastropodous nature of the parasite is shown by the development and embryo.

The relationships of *Enteroxenos* are apparently with *Entocolax* and *Entoconcha*, but it is a more advanced evolution-product. The author gives provisional and guarded adherence to Schmiemenz's theory of the mode of derivation of *Entoconcha* from *Stylifer*-like ectoparasites, but wisely abstains from homologizing the parts of the endoparasitic forms with those of normal mollusks, preferring to leave open the questions of the homologies of the body-wall, style of attachment and central cavity.—H. A. P.

A REVISED CENSUS OF THE MARINE MOLLUSCA OF TASMANIA. By Prof. Ralph Tate and W. L. May. (Proc. Linnean Soc., New South Wales, pp. 344–471. Issued Dec. 19, 1901.)

This valuable contribution consists of an introduction to and history of marine conchology in Tasmania; a systematic list of species; a catalogue of synonyms with the corresponding names adopted; critical remarks on some species, and descriptions of two new species and one new genus—(*Legrandina*). The work is illustrated by five plates, containing 107 figures and 14 figures in text. A summary of admitted species shows: 10 Cephalopoda, 504 Gastropoda, 4 Scaphopoda and 157 Pelecypoda, a total of 653 species. It is a truly up-to-date catalogue, very few of the more recent improvements in nomenclature being overlooked.—C. W. J.

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Col. COLLECTING UNIONIDÆ IN TEXAS AND LOUISIANA.

BY L. S. FRIERSON, FRIERSON, LA.

In July, 1901, Dr. W. S. Strode, Mr. H. G. Askew, and the writer, took a trip through eastern Texas, collecting Unionidæ. Dr. Strode first took a "still hunt" on the Sabine river, at Loganport, where he duplicated the experience of the writer, the results of which have already been given the readers of NAUTILUS (xiii. 79). We met Mr. Askew at Sheperd, a small town northeast of Houston, and in close proximity to "Big creek," and Trinity river.

From Big creek we obtained a few *Lampsilis lienosus*. This shell had never before been obtained so far west, nor had it been listed as a Texas species by Mr. Singley. The Trinity river, though shallow at this time and place, was swift, with a sandy bottom, a combination not favorable to unio life, and we had therefore poor luck. We obtained some magnificent *Quadrula pauciplicata*; big, glossy, black and nearly devoid of plications. They were otherwise interesting on account of the females being gravid, an unusual condition in this group. It is a true *Quadrula* in this respect. Some very fine *Q. trapezoides* were also taken. They were remarkably compressed, and some of them were likewise gravid. They bore their young (or eggs) in all four gills. This we believe has never before been noted, and effectually places this species in the genus *Quadrula*, as defined by Mr. C. T. Simpson, who placed it here without having the advantage of seeing a gravid female. We captured a trio of *L. amphichænus*, which extends both the habitat and size of this remarkable species, one of them being $5\frac{1}{4}$ inches in length. (The writer has since obtained a dead shell from the upper Brazos river.) A fine

series of shells were found which are in my cabinet as yet unnamed. They seem to be a perfect connecting link between *Q. aurea*, *houstonensis*, and *pustulata*. We were fortunate enough to find a couple of *Q. chunii*, Lea. This is the river in which the types were obtained and the specimens were typical in every respect. This shell is a very rare species, and one sadly abused. Whenever a uniologist gets a shell belonging to the group headed by *Q. trigona*, and about whose name he is in doubt, he at once dubs it *Q. chunii*. I may be rather harsh on my brother uniologists, but these two shells are my only *chunii* to date.

The next day we were at Nacogdoches, Texas. Here we saw the celebrated "Stone Fort," an ancient structure over whose walls the flags of *seven* governments have floated. How many of my readers must plead guilty, as I did, of never having heard of the Republic of Fredonia? ¹ The full history of this structure was given us by Mr.

¹In April, 1825, Hayden Edwards made a contract with the government of Mexico for the introduction of 800 families into Texas. They were to settle in the neighborhood of Nacogdoches, and be provided with lands under the general colonization law. The location proved unfortunate. Nacogdoches had been settled many years, partly by Mexicans and partly by a roving class of people who had a prejudice against the Anglo-Americans. When the colonists selected their lands and commenced improving, some older claimant would appear. The courts were appealed to, but would invariably decide in favor of the Mexican constituents. These conditions continued until finally (1826) the Mexican governor of the province decreed the annulment of the contract and the expulsion of Edwards and his brother from the territory. But Edwards had expended several thousand dollars in this enterprise, and his colonists too had expended considerable in building their homes. The Indians (principally Cherokees) also had settled near-by under the provisions of the colonization laws, and being greatly dissatisfied, allied themselves with the Edwards colonists, who, assuming the name of Fredonians, declared their independence of Mexico. They proceeded at once to organize a legislative committee composed of eight Americans and five Indians. Learning that Col. Bean was preparing to resist their movements, they took possession of the old stone fort. Norris, the deposed Mexican Alcalde, collected some friends and on Jan. 4, 1827, entered the town; they were attacked by the Americans and Indians and driven off with a loss of one killed and several wounded. The Fredonians were sadly disappointed in not receiving the co-operation of the Austin colonists, who joined the 200 soldiers sent from San Antonio to suppress the infant republic. Seeing the hopelessness of maintaining the Republic of Fredonia, Major Edwards and his forces retired across the Sabine into the United States and disbanded.

We are indebted to Mr. Askew for the above notes from Thrall's History of Texas.—EDITORS.

Askew, who is as loyal a son of Texas as ever drew breath. It is a shame to the town that this fort has been recently torn down and replaced by a sordid brick store. As soon as we had breakfasted, we went to the La Nana creek, where we obtained the new species, *Q. lananensis* recently described. We also obtained a number of the most deeply corrugated *Q. laticostata* we have yet seen. A solitary *Obovaria castanea* was taken. Numbers of *Tritogonia tuberculata* were found, but much to our disappointment, not a single gravid female was noted. (This species has not as yet been observed in that condition.) In this creek we obtained some *L. nigerrimus* and *Strophitus edentulus*, neither of which was listed by Mr. Singley. While cleaning up our catch in the hotel yard, we were joined by an intelligent-looking party who gravely asked if the "fossils" we were cleaning belonged to the Devonian formation! I shall never forget the guileless look of the doctor, as he gravely replied that they *did*.

By high noon next day we were at Rockland on the Neches river; we had taken our dinner, and by 5 p. m. were loaded with all the unios we wanted. This place is the metropolis of *Q. askewii*, of which some examples require a "Philadelphia lawyer" to differentiate from *Q. beadleanus*. The unios of this river are precisely the same as in the Sabine river. We obtained some *bona-fide* *Q. nodifera*, a species of the validity of which we had had doubts, but these are now forever laid aside. From Rockland we then took flight towards Lake Charles (Louisiana). En route we were compelled to stop over at Beaumont, Texas; while there we were fortunate enough to witness the striking of oil by one of the wonderful "gushers" of that place. It was a grand sight, the memory of which will never leave us. Lake Charles we found to be a shallow expansion of the Calcasieu river, about two miles wide, with sandy bottom, and covered by floating masses of the "Water Hyacinth," acres and acres of them. Calcasieu river is an extraordinary stream; for fifty miles it is sixty feet deep and a quarter of a mile wide, with no current excepting after rains, and not a shoal or sand-bar. The salt water comes up 40 or 50 miles during storms, and kills most of the fresh-water shells.

Those left alive were the following: *Q. apiculata* (typical), *Q. mortoni*, *L. texasensis*, *L. hydiana*, *L. anodontooides*, *Q. trapezoides*, variety *pentagonoides* (new var.), and finally *Glebulia rotundata*. I have in my cabinet two specimens of fresh water mussels (*Unio*)

having growing on them a shell of the salt water mussel (*Mytilus*); both host and mess-mate were alive when taken.

The *G. rotundata* were unusually fine, the shades of color exhibited by them I have never seen excelled. These were otherwise interesting as a number of them were gravid, and we felt all the importance of being true discoverers, as no student had ever before noted them in this condition. As regards this part of their physiology they are a true *Lampsilis*. The possession however of several unique characteristics will probably keep them in a separate genus.

Mention was made above of a new variety of *Q. trapezoides*. This shell differs from the type in having its dorsum very much *arched* or *bent* midway. The posterior is *widely* biangulated. The anterior is singularly truncated like *W. coruscus*, *Gld.* The effect being that the outline forms nearly an *equilateral pentagon*, hence the name. Aside from its form, it differs in being much smaller, and frequently entirely devoid of plication on either its sides or posterior slope. A striking peculiarity is that the posterior end of the ligament is perpendicularly over the centre of the base, whereas in the ordinary *trapezoides* the end is situated about three-fourths of the distance from the anterior to the posterior.

^{See} LIST OF SHELLS COLLECTED ON SAN MARTIN ISLAND, LOWER CALIFORNIA, MEXICO.

BY FRED. BAKER, M. D.

Loligo sp? Giant squid.	Monoceros lugubre Sby.
Cavolina tridentata Gmel.	Marginella regularis Cpr. 30
Cerostoma nuttalli Conr.	fathoms.
Ocenebra circumtexta Stearns.	Marginella jewettii Cpr. Drift.
Ocenebra gracillima Stearns.	Marginella pyriformis Cpr.
Ranella californica Hds. 30	Volvarina varia Sby. Drift.
fathoms.	Olivella biplicata Sby.
Fusus luteopictus Dall. On	Astyris gouldi Cpr. 30 fathoms.
breakwater at low tide.	Astyris aurantia Dall.
Macron kellestii A. Ad.	Astyris gausapata Gld.
Macron lividus A. Ad.	Astyris carinata, var. hindsii Rve.
Nassa fossata Gld.	Astyris tuberosa Cpr.
Nassa perpinguis Hds.	Anachis penicillata Cpr.

- Engina carbonaria* Rve. 30 fathoms.
Amphissa versicolor Dall.
Surcula carpenteriana, var. *tryoniana* Gabb.
Clathurella affinis Dall.
Mitromorpha filosa Cpr.
Mangelia interlirata Stearns.
Mangelia variegata Cpr.
Conus californicus Hds.
Cypræa spadicea Gray.
Polinices uber Val.
Crepidula aculeata Gmel.
Crepidula aculeata, var. *californica* Nutt.
Crepidula dorsata, var. *ligulata* Gld.
Crepidula rugosa Nutt.
Capulus sp?
Hipponyx antiquatus Linn.
Hipponyx tumens Cpr. In drift.
Scala hindsii Cpr.
Scala tineta Cpr.
Turritella goniostoma Val.?
Mesalia tenuisculpta Cpr.
Vermetus fewkesii Yates.
Cæcum californicum Dall.
Cæcum crebricinctum Cpr.
Cæcum læve C. B. Ad.
Cæcum oreuttii Dall.
Eulima compacta Cpr.
Turbonilla similis C. B. Ad.
Turbonilla tenuicula Gld.
Turbonilla torquata Gld.
Dunkeria gracilentia Cpr.
Dunkeria laminata Cpr.
Odostomia nuciformis, var. *avellama* Cpr.
Odostomia americana Dall & Bartsch.
- Odostomia (Ivara) turricula* Dall & Bartsch.
Miralda californica Dall & Bartsch.
Ividia armata Cpr.
Mumiola amiantis Dall.
Chrysallida aequisculpta Cpr.
Chrysallida cincta Cpr.
Oscilla aequisculpta Cpr.
Littorina planaxis Nutt.
Littorina pulchra.
Littorina scutulata Gld.
Lacuna unifasciata Cpr.
Diala marmorea Cpr.
Bittium armillatum Cpr.
Bittium attenuatum Cpr.
Bittium esuriens Cpr.
Bittium quadrifilatum Cpr.
Cerithiopsis columna Cpr.
Cerithiopsis metaxæ D. C.
Cerithiopsis munita Cpr.?
Cerithiopsis tuberculata Mont.
Triforis adversa Mont.
Cerithidea californica Hds.
Rissoina aequisculpta Cpr.
Rissoina bakeri Dall & Bartsch.
Rissoina infrequens C. B. Ad.
Rissoina interfossa Cpr.
Barleeia acuta Cpr., banded var. 30 fathoms.
Barleeia haliotiphila Cpr.
Barleeia subtenuis Cpr.
Rissoa acutilirata Cpr.
Rissoa aequisculpta Cpr.
Alvania aequisculpta Cpr.
Alvania carpenteri Weink.
Alvania notabilis Cpr.
Alvania purpurea Dall.
Amphithalamus inclusus Cpr.
Truncatella californica Pfr.

- Truncatella stimpsoni* Stearns.¹ *Ischnochiton magdalenensis* Rve.
Liotia acuticostata Cpr. Rather common, but no large
Liotia fenestrata Cpr. ones found.
Ethalia supravallata Cpr. *Ischnochiton mertensii* Midd.
Phasianella compta Gld. *Ischnochiton sarcosus* Dall.
Phasianella compta, var. *Callistochiton crassicosatus* Pils.
pulloides. 30 fathoms. *Callistochiton infortunatus* Pils.
Eulithidium substriatum Cpr. *Mopalia muscosa* Gld.
Pomaulax undosus Wood. *Lepidopleurus* (Oldroydia) per-
Chlorostoma funebre A. Ad. crassus Dall. "Not in Pils-
Chlorostoma gallina Fbs. bry's Monograph."
Gibbula succincta Cpr. *Chaetopleura hartwegii*, var.
Leptothyra bacula Cpr. *nuttalli* Cpr.
Leptothyra carpenteri Pils. *Tornatina inculta* Gld.
Leptothyra paucicostata Dall. *Tornatina harpa* Dall.
Calliostoma splendens Cpr. *Tornatina recta* d'Orb.
Trochiscus norrissii Sby. *Gadinia reticulata* Sby.
Margarita acuticostata Cpr. 30 *Helix stearnsiana* Gabb.
fathoms, *Saxicava arctica* Linn.
Scissurella rimuloides Cpr. *Semele decisa* Cour.
Haliotis cracherodii Leach. *Cumingia californica* Conr.
Haliotis fulgens Phil. *Tellina bodegensis* Hds.
Fissurella volcans Rve. *Macoma secta* Cour.
Clypide'la calliomarginata Cpr. *Petricola carditoides* Cour.
Megatebennus bimaculatus Dall. *Venus fordi* Yates.? *V. toreuma*
Acmæa persona Esch. Gld.
Acmæa scabra Nutt. *Psephis salmonea* Cpr.
Acmæa rosacea. 4 fathoms. *Psephis tantilla* Gld.
Acmæa spectrum Nutt. *Tivela crassatelloides* Cour.
Nacella inessa Hds. *Saxidomax nuttalli* Cour.
Nacella paleacea Gld. *Tapes staminea* Cour.
Williamia peltoides Cpr. *Chama exogyra* Cour.
Lottia gigantea Gray. *Chama pellucida* Sby.
Ischnochiton conspicuus Cpr. *Chama spinosa* Sby.

¹ In "NAUTILUS," Nov., 1901, Dr. Pilsbry describes *T. stimpsoni guadalupensis*, found by Mr. R. E. Snodgrass in Nov., 1899, as the first specimens of this genus found on any of the islands off Lower California. The above two species were collected in August, 1899.

Lucina californica Cour.	Modiola (Gregariella) opifex Say.
Lucina nuttalli Cour.	Septifer bifurcatus Rve.
Lucina tenuisculpta Cpr.	Philobrya setosa Cpr. 30 fathoms.
Diplodonta orbella Gld.	Lima orientalis Ad. & Rve. Young, dead. 30 fathoms.
Lasea rubra Mont. 30 fathoms.	Pecten latiauritus Conr. 30 fathoms.
Lasea rubra Mont., var. subviridis Cpr. 30 fathoms.	Hinnites giganteus Gray. 30 fathoms.
Kellia laperousii Desh.	Monia foliata Brod. In Hinnites, 30 fathoms.
Kellia suborbicularis Mont. 30 fathoms.	
Milneria minima Dall.	
Lazaria subquadrata Cpr.	
Arca gradata Brod.	
Mytilus californica Cour.	

NEW SPECIES OF PACIFIC COAST SHELLS.

BY WILLIAM HEALEY DALL.

Trivia atomaria n. sp. Shell minute, of a livid pink, with a substratum of olivaceous cast, the whole giving a pinkish brown effect; form subglobular, with a feeble dorsal sulcus, across which the ribs usually pass without interruption; in all there are about 18 ribs, with about equal interspaces, which are slightly sagriate or minutely irregularly rugose, though the ribs are smooth; these ribs form an equal number of fine denticulations on the inside of the outer lip and over the pillar-lip and internal lobe; the extremities are very slightly or not at all produced; the spire is completely obscured. Length 3.2, breadth 2.6, height 2.2 mm.

Half a dozen specimens of uniform size were dredged in 18 fathoms, Panama Bay, by the U. S. Str. Albatross. This is the smallest species I have seen; even the dwarfs of the allied *T. subrostrata* Gray of the West Indian fauna are larger.

Trivia panamensis n. sp. Shell small, strongly sculptured, subovate, inflated, with its posterior extremity slightly produced; sculptured with about 15 rather sharp-edged strong ribs, of which about 4 are intercalary and the others continuous over the shell; in the middle line of the back they dip slightly but are not interrupted or attenuated; aperture narrow, strongly and nearly equally toothed on

each lip; the spire wholly concealed; the interspaces are smooth and somewhat wider than the ribs. Length 4.2, breadth 3.0, height 2.5 mm.

Two specimens were obtained with the preceding. Both forms have been submitted to Mr. J. Cosmo Melvill, of Manchester, England, who now possesses the types of Gaskoin's species, and has given especial attention to the group. He regards both as new.

Erato oligostata n. sp. Shell small, very nearly the shape of *Trivia atomaria*, but not ribbed, of a pale olive green, with the extremity of the canal deep rose pink; spire entirely concealed by a microscopically pustulate layer of greenish white callus; aperture narrow, very slightly shorter than the spire and not angulate externally behind; pillar lip with two anterior pliciform and half a dozen small pustular more posterior deposits of callus, the outer lip minutely dentate, the teeth smaller in front; the canal very short. Length 3.2, breadth 2.25 mm.

Found with the preceding. This is perhaps the smallest known *Erato*, and while, perhaps, nearest to dwarf specimens of the West Indian *E. maugeriæ* Gray, it differs from them in its more rounded form and less trigonal outline, as well as by the pustulated surface.

The European genus *Mysia* (Leach) Lamarek, of which the type is *Lucinopsis undata* Forbes and Hanley, has two right and three left cardinal teeth. A very similar type is found in American waters, represented in the Antilles by *Artemis tenuis* Recluz, and on the Pacific coast by *Dosinia subquadrata* Hanley. These forms however differ from *Mysia* by having three cardinal teeth in each valve. For this American type I propose the name of *Cyclinella*, and add the following new species to the fauna of the Pacific coast.

Cyclinella singleyi Dall. Shell solid, nearly orbicular, yellowish white, with an extremely thin periostracum, moderately inflated; surface with very fine close concentric sulci, giving a silky texture to it; an obscure depression radiates from the beaks near the posterior margin; lunule lanceolate, defined by an impressed line; pallial sinus narrow, high, rather blunt, pointing at the umbo; internal margins plain, the middle cardinals strong, the posterior, right cardinal bifid. Length 40, height 39, diameter 22 mm.

Gulf of California in the Yaqui delta; Singley. It is smaller, more convex and solid, with vastly larger muscular scars than *C. subquadrata* Hanley.

Cop.
NEW LAND MOLLUSKS OF THE JAPANESE EMPIRE.

BY HENRY A. PILSBRY.

Eulota (Aegista) minima n. sp.

Shell openly umbilicate, depressed, convex above and below, broadly rounded at the periphery, light yellowish-brown. Surface densely covered with fine, short cuticular scales, readily rubbed off. Whorls about 5, convex, separated by an impressed suture, slowly increasing, the last wider, convex beneath, not noticeably descending in front. Aperture broadly crescentic, oblique; peristome slightly thickened, very narrowly expanded and subreflexed. Alt. 3, diam. 6.3 mm.

Ōshima, Ōsumi. Types no. 83,369 A. N. S. P. from no. 929 of Mr. Hirase's collection.

Much smaller than any other Japanese species of the group, but a true *Aegista* in form and sculpture.

Eulota (Plectotropis) hachijoensis n. sp.

Shell narrowly umbilicate, biconvex, acutely carinate, pale brown or whitish-corneous. Surface glossy, finely and faintly striate, and under a lens seem to be *very closely and distinctly engraved with spiral striæ beneath*, more obsoletely so above. Whorls $4\frac{1}{2}$, moderately convex, the last descending below the keel in front, slightly concave above and below the peripheral keel. Aperture oblique, irregularly oval; peristome slightly expanded above, reflexed below, scarcely thickened, the ends somewhat approaching. Alt. 5.4, diam. 10 mm.

Hachijo-jima, Izu. Types no. 83,368 A. N. S. P., from no. 943 of Mr. Hirase's collection.

The pale color of the somewhat translucent, acutely carinate shell, and its beautiful sculpture of spiral striæ beneath are the more prominent features of this species. It has the shape, but not the surface, of *Plectotropis*, and does not seem closely related to any of the known species from the adjacent islands of Japan, but resembles closely the Riukiu species *E. inornata* Pils., differing chiefly in the smaller number of whorls.

Eulota (Aegista) aperta var. *mikuriyensis* nov.

Similar to var. *trachyderma* Pils. & Gude, but more elevated and covered with very much coarser, less crowded, ragged cuticular

scales, or where they are rubbed off the surface is roughened with comparatively coarse, short striæ. Whorls $5\frac{3}{4}$; periphery subangular at the beginning of the last whorl. Peristome thin, narrowly expanded and subreflexed. Alt. 7.5, diam. 12.5 to 13 mm.

Mikuriya, Suruga. Types no. 83317 A. N. S. P., from no. 937 of Mr. Hirase's collection.

The peristome of this species is of the same character of that of *trachyderma*. Mr. Gude dissents from the course I took in subordinating *trachyderma* to *aperta*. He writes: "I decidedly consider *trachyderma* as more nearly related to *mimula* than to *aperta*. Only look at the peristome, which is so decidedly thickened in *aperta* (and you must remember that your types of *aperta* were immature shells). If you will examine them again I think you will agree with me, and if *trachyderma* must be degraded to varietal rank, by all means place it under *mimula*" (G. K. G. *in litt.* Jan. 7, 1902).

I am now much disposed to adopt this view; but pending a thorough study of the group, I allow the published status of the form to remain.

Eulota (Plectotropis) mackensii var. *formosa*, nov.

Shell similar to *E. mackensii* and *vulgivaga* except that the umbilicus is less widely open and the lower margin of the lip is less deeply curved. Alt. $10\frac{1}{2}$, diam. $23\frac{1}{2}$ mm., whorls $6\frac{1}{2}$.

Taihoku, Formosa. Types no. 83332 A. N. S. P., from no. 429 of Mr. Hirase's collection.

Schmacker & Böttger have already commented upon this Formosan form of *mackensii*, which they had from Tamsui (Nbl. D. Mal. Ges. 1890, 136).

Eulota (Caelorus) caviconus Pils.

NAUTILUS XV, p. 117 (February, 1902). The locality should be Goto, Hizen, in Kyūshū. Mr. Hirase has sent specimens from Ojika-jima, Hizen (no. 928), which are a little larger than the type lot, diam. 7.6 mm.

Eulota submandarina var. *compacta* nov. Differs from the typical form by the larger umbilicus, more elevated spire of $6\frac{1}{2}$ very convex whorls; very solid, light chestnut colored, without a peripheral band. Lip expanded and strongly thickened within. Specimens measure: Alt. 19.5 to 20, diam. 21.5 mm., and alt. 19, diam. 22.5 mm.

Yakushima. Types no. 82498 coll. A. N. S. P., from no. 777 of Mr. Hirase's collection.

Hirasea major n. sp. Shell depressed, lens-shaped, brown, dull and densely, finely obliquely striate above, paler, somewhat glossy and more faintly striate beneath. Spire convex; whorls 5, but slightly convex, the suture superficial, filled by the peripheral keel; last whorl very acutely carinate, the keel narrowly projecting, base convex, deeply impressed in the middle. Aperture oblique, obscurely trapezoidal-lunate, the peristome thin in the specimens seen. Alt. 3.3, diam. 6.7 mm. Chichijima, Ogasawara (Mr. Y. Hirase, no. 865). Much larger than the related *H. hypolia*, less polished below, and with a more acute peripheral keel. The specimens may not be fully mature.

Hirasea diplomphalus var. *latispira* n. var.

Similar to the typical form except that the spire is wider and less sunken. Chichijima.

Hirasea profundispira n. sp.

A species similar to *H. diplomphalus*, but differing in the much narrower spire, not one-third the diameter of the shell, and quite deeply sunken. Alt. 2.3, diam. 3.3 mm. Chichijima.



TWO NEW BULIMINI FROM CENTRAL ASIA.

BY C. F. ANCEY.

1. *Buliminus larvatus*, Anc.

Shell rather solid, cylindrical, attenuated and conic towards the apex, with an oblique and compressed umbilical fissure, somewhat shining, whitish flesh-colored, with irregular and oblique rather straight stripes of a darker hue. Apex brownish or horn-colored. Spire produced, obtuse. Whorls $7\frac{1}{2}$ -8. slowly increasing, not much convex, suture simple, not deeply impressed; the first 4 or 5 whorls gradually becoming broader, the following of nearly the same diameter, the last one cylindrical, compressed near the chink and obscurely and obtusely angular at the base, not ascending in front. Aperture oval, angulated superiorly, a little oblique. Peristome thickened and labiated internally, but slightly expanded, more broadly so at the columella. Margins distant, the columellar one simple and arched. Parietal callosity more or less conspicuous, sometimes thickened on each side.

Length $14\frac{1}{2}$ - $15\frac{1}{2}$, diam. $5\frac{1}{2}$, length of apert. 5 mm.

Loc.: Valley of Urmara, Talas-Alatan, Turkestan. Alt. 8500 feet (O. Rosen).

A distinct form, recalling in shape *Bul. Kuschakewitzi*, Anc., of Namangan, Khanat of Khokand, but very distinct and with the peristome less developed.

Some of the *Bulimini* that I have described from the same countries bearing only the very vague locality, Turkestan, I now avail myself of the opportunity of mentioning the precise localities of:

Bul. Ujfalvianus, Anc., Usgent.

Bul. Turanicus, Anc., Usgent.

Bul. trigonochilus, Anc., Samarkand.

Bul. Annenkowi, Anc., Margelan.

Bul. Kuschakewitzi, Anc., Namangan.

Bul. Bomalotianus, Anc. (emend.), Alai. A smaller, highly colored variety which I propose to call var. *colorata*.

Bul. intumescens is also found at Osch, Eastern Turkestan, with *Bul. albiplicatus*, von Mart. The former appears to be a widely spread species.

2. *Buliminus albocostatus*, n. sp.

Shell small, rather thick, slender, cylindrical, turreted, rimate, shining, brownish horn-color or brownish, sculptured with strong, numerous, rather regular, white folds. Apex obtuse, smooth, horn-colored. Spire long, regularly attenuated, subcylindrical below. Whorls 8-9, somewhat convex, slowly increasing, suture simple, moderately impressed; the last whorl not much broader than the preceding one, barely attenuated or narrowed towards the base, minutely ascending in front. Aperture nearly vertical, ovate, sometimes produced externally, angulated superiorly. Peristome white, thickened, superiorly straightened, flatly expanded, margins not distant, joined by a heavy callosity. Columella simple, internally simple, not folded, externally broad.

Length $8\frac{1}{2}$ -10, diam. 3, length of apert. $2\frac{1}{2}$ mill.

Loc.: Valley of Karagoin, Turkestan (O. Rosen).

A charming and sharply defined, graceful species which I received at first labeled as "*Bul. albiplicatus*, von Mart., variety," and subsequently as "*Bul. albiplicatus*, West." I am not aware it was ever published by Westerlund. From *B. albiplicatus* it differs in being smaller, more slender and the characters of aperture, as well as the relative proportions, are altogether dissimilar.

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NOTES ON TASMANIAN AND WEST INDIAN CONCHOLOGY.*

BY C. HEDLEY, F. L. S.

The study of Tasmanian conchology has been facilitated by an excellent catalogue published last year by the late Prof. Tate and Mr. W. L. May in the Proceedings of the Linnean Society of New South Wales. Therein certain species ascribed to Tasmania by the Rev. J. E. Tenison Woods were rejected from the fauna chiefly because no later observer had taken them. Though apparently of foreign origin, their exclusion could not be wholly justified until that origin was ascertained. At the invitation of Messrs. A. Morton and W. L. May I undertook their examination. From the result it appears that five West Indian species were supplied to Tenison Woods, which he erroneously described as Tasmanian, and as new to science. They are :

Pleurotoma weldiana, T. Woods, Proc. Roy. Soc. Tas., 1876 (1877), p. 137, identical with *Drillia fucata*, Reeve, Conch. Icon., pl. xx, f. 169.

Ethalia tasmanica, T. Woods, Proc. Roy. Soc. Tas., 1876 (1877), p. 146, is the common West Indian *Modulus modulus*, Linne.

Adeorbis picta, T. Woods, Proc. Roy. Soc. Tas., 1876 (1877), p. 146, is *Chlorostoma fasciatum* Born. Wood's type answers well to fig. 2a of pl. 63 of Fischer's Monograph in the "Coquilles Vivantes."

Astele turbinata, T. Woods, Proc. Roy. Soc. Tas., 1876 (1877), p. 145, is *Chlorostoma scalare*, Anton, another well-known West Indian shell.

Semele werburtoni, T. Woods, Proc. Roy. Soc. Tas., 1876 (1877), p. 158, is *Codakia orbicularis*, Linne, a common Antillean species.

* From the Proceedings Royal Society of Tasmania for 1902.

FOSSIL LAND SHELLS OF THE OLD FOREST BED OF THE OHIO RIVER.

BY A. C. BILLUPS, LAWRENCEBURG, IND.

During the spring of 1902, owing to the unusually heavy rains which caused much cutting to be done on the banks of the Ohio and Great Miami rivers, near Lawrenceburg, Indiana, I had a fine opportunity to examine this interesting formation, the Old Forest bed, from a conchological point of view.

I had many years previously found large numbers of broken and bleached shells of species which are foreign to this locality in drift piles of the Great Miami and Ohio rivers, which I had always put down as dead specimens which had floated from some point far above where they were found. I found that this conclusion was erroneous and that these shells were washed from the deposit which contained them, and floated to the various drift piles where they first attracted my attention.

The Old Forest bed is a stratum of several feet in depth, six to eight feet below the present surface of the bottom lands of the Ohio, and contains in many places the well-preserved remains of mammoth trees; these are covered with a thick layer of yellow clay of an exceedingly hard and solid texture, which renders very difficult the extraction of fossils so delicate in structure as the land shells. About the only satisfactory way to obtain good specimens is to wash out with water until the clay is softened and then, if good luck follows you, you may obtain a respectable specimen. The use of a knife or chisel is absolutely useless, as in nearly every case the fossil extracted by these means is cracked or broken.

The comparison between these fossil forms and the species now found in this section is extremely interesting and worthy of study. To give a general idea of the species and to illustrate the difference between the fossil and recent faunas, I give the following list with notes on each species, which will show clearly what time has done to modify the molluscan fauna to the changed conditions of the present time.

It is remarkable how well the red coloring matter of all species is preserved, particularly in the case of *P. alternata* Say.

Vallonia pulchella Mull. Traces only of this minute shell.

Polygyra tridentata Say. Not many found, and these much more elevated and more deeply striated than the local living specimens.

Polygyra tridentata Say. Variety, region of the mouth much compressed and very deeply striated.

Polygyra inflecta Say. A few broken specimens.

Polygyra profunda Say. Very large well-preserved shells, heavy, and bands very plainly marked.

Polygyra albolabris Say. Very scarce.

Polygyra exoleta Binn. Common and of usual form.

Polygyra multilineata Say. Perhaps about the most plentiful of all the species found. This shell has never been found alive within twenty miles of this deposit.

Polygyra palliata Say.

Polygyra appressa Say. Several broken specimens.

Polygyra elevata Say. Fairly common and well preserved.

Polygyra pennsylvanica Green. Quite common in the deposit, but rare in this vicinity alive, only ten or twelve specimens having been found in the last six years after careful search.

Polygyra thyroides Say. Good specimens and fairly common.

Polygyra mitchelliana Lea. Common in the deposit, but rare and very local alive, only one locality known near Lawrenceburg.

Polygyra stenotrema Fer.

Polygyra monodon Rack. Very rare.

Pupoides marginatus Say.

Bifidaria contracta Say.

Bifidaria armifera Say. Common.

Cochlicopa lubrica Mull. A few broken specimens.

Circinaria concava Say. Quite common.

Vitrea hammonis Strom. Several broken shells.

Gastrodonta ligera Say. Common and in good condition.

Pyramidula alternata Say. Very large forms with distinct and beautiful color markings.

Pyramidula solitaria Say. Plentiful, large, heavy shells.

Pyramidula perspectiva Say. Rare.

Pyramidula striatella Anth. Rare.

Helicodiscus lineatus Say. Rare and broken.

Succinea sp. Very large, quite common, and in fine condition, nothing nearly as large found here alive.

Pomatiopsis lapidaria. Common. I have never taken this shell alive in the vicinity of Lawrenceburg.

Subsequent search will no doubt increase the numbers of this list,

as only those shells are mentioned which are perfect enough to render identification complete.

Poly-multilineata Say, which occurs plentifully in the middle portions of the State, seems at Lawrenceburg to be conspicuous by its absence, but is represented in the fossil state in large numbers, and is an exceedingly well-developed form for this species. In fact all these fossils are much larger and better developed than the species which are found alive here at the present time, with the exception of *Pol. albolabris* Say., which is in the deposits a very rare shell, but most abundant in the surrounding woods. This may be due to the fact that *albolabris* is a thin and fragile shell, and has not been able to withstand the pressure of the surrounding soil so well as *elevata* and its more solidly-built brethren. However, this theory would not seem to hold good, as *Succinea*, one of the most fragile land shells, occurs in numbers, of large size, and in a splendid state of preservation.

A NEW HELIX FROM CALIFORNIA.

BY J. ROWELL.

Epiphragmophora exarata var. *rubicunda* Rowell.

Shell umbilicate, conic, less depressed than *exarata*, rather thin, sculpture somewhat malleated, the malleation lying in ridges parallel with lines of growth, color dark chestnut-brown, with one black band, summits of ridges and malleation dark orange-red, interior ruby-red; whorls seven, rounded, suture impressed, the upper whorls much less wrinkled than in *exarata*.

Alt. 21, diam. 27-30 mm. (Occidental.)

Alt. 25, diam. 31½ mm. (Freestone.)

Habitat, Sonoma Co., on a high, dry ridge, in the town "Occidental," on our "Cal. North Western R. R." I have visited the place three times, hoping to get other mature shells besides my original pair, but have searched in vain. All around are *exarata* proper and a few *infumata*, in the redwoods. But on my last trip, I stopped over at the town "Freestone," six miles this side of Occidental; I chose the place because there the redwoods and the open country meet, and I thought that for this reason it would be the right place for my shell, and a dense fog helping me, I was delighted to find quite a number of fine specimens.

v.
A NEW FLORIDIAN HELICINA.

BY H. A. PILSBRY.

Helicina tantilla n. sp.

Shell very small, much depressed, finely and weakly striate. Spire low, convex, with rather straight outlines. Whorls $3\frac{1}{2}$, rather slowly widening, the last much wider, rounded at the periphery, convex beneath, impressed around the central callus. Aperture quite oblique, semi-circular, the lip obtuse, not noticeably expanded. Umbilical callus but slightly convex, not filling the cavity to the level of the surrounding convexity of the base. Alt. 1.3, diam. 2.5 mm.

Palm Beach, Florida. Type no. 77349 A. N. S. P., coll. by H. A. Pilsbry.

This tiny *Helicina* is quite distinct from all the Antillean species I have been able to compare. A single bleached specimen was gathered in June, 1899, with other small land shells, in the woods about a quarter of a mile from the Atlantic beach. I did not notice it at the time, or I would have made search for more; it was only detected when the material was being sorted at home. No further specimens have turned up in the three years since this one was taken, and it is now published in the hope that some reader of the NAUTILUS who may visit that most beautiful of the winter resorts of east Florida, may search for the species, and complete the description by finding living specimens. It has no resemblance to the young of *H. orbiculata*.

v.
NEW LAND MOLLUSKS FROM THE JAPANESE EMPIRE.

BY H. A. PILSBRY.

Alycaeus vinctus n. sp. Moderately umbilicate with conic spire and the general aspect of other described Japanese species of *Alycaeus*. Whorls $3\frac{2}{3}$, the first $1\frac{1}{2}$ smooth, corneous-brown, following whorls dull, whitish, sculptured with lamellar rib-striae and finer spiral threads, the riblets as usual much more crowded on the back of the last whorl. Constriction of neck rather strongly marked, and with the portion following it, *smooth*, free from riblets, or with weak striae only. "Tube" long, reflexed, lying in the suture.

Aperture oblique, circular, the peristome blunt, continuous, strengthened by a *very strong external rib* which is beveled to the lip-edge. Operculum yellow, thin. Alt. 2.7; diam. 3.6 to 4 mm. Tanegashima, Osumi. (Mr. Hirase, no. 916.)

Readily distinguished by the excessively heavy collar behind the lip and the comparatively conspicuous spiral threads. (*Vinctus*, bound, in allusion to the heavy, hoop-like lip-rib.)

Macrochlamys semisericata n. sp. Shell perforate, moderately depressed, dark reddish-brown, thin and somewhat translucent; the surface polished below, dull with a silken sheen at the periphery and above. Sculpture of excessively fine, close, slightly waved, parallel, slightly oblique rib-striæ above, extending from the apex to below the periphery, the base smooth. Whorls $4\frac{1}{2}$, slowly increasing, convex, separated by an impressed suture, the last much wider, rounded at the periphery. Aperture oblique, lunate; peristome thin and simple, dilated at the columellar insertion. Alt. 3, diam. 5.2 mm.

Kurozu, Kii, Types no. 83374, A. N. S. P., from no. 935*a* of Mr. Hirase's collection. Slightly smaller specimens were found at Nachi, Kii, Mr. Hirase's no. 955.

Distinguished from *M. cerasina* v. *awaensis* and *M. tanegashimæ* by the silken lustre of the upper surface, produced by fine parallel striæ. It is much smaller than *awaensis*. (*Semisericatus*, clothed half in silk.)

Zonitoides subarboreus n. sp.

Shell extremely similar to *Z. arboreus* (Say), from which it differs in the wider, less deeply lunate aperture, and the slightly wider umbilicus. The shell is brownish yellow. Surface glossy, irregularly striate, smoother below, without spiral striæ. Whorls $4\frac{1}{2}$, convex, separated by an impressed suture. Alt. 2.7, diam. 6 mm., or slightly smaller.

Hachijo-jima, Izu. Types no. 83375, A. N. S. P., from no. 951 of Mr. Hirase's collection; collected by Mr. Nakada, 1902.

This species is more depressed than *Z. nitidus*, and the base is less convex. If found in the United States, the differences from *Z. arboreus* would hardly be noticed; but its location on an island over one hundred miles off middle Japan, together with the slight divergence noted above, seem to indicate a distinct species. (*Subarboreus*

might mean under trees, but here it refers to the resemblance to *Zonitoides arboreus*, one of the commonest snails of North America.)

Microcystina circumdata n. sp. Shell perforate, depressed, with low, conic spire, glossy, light yellowish-brown, somewhat translucent. Sculpture of slight growth-lines, and under a strong lens there are seen to be excessively minute, close, engraved spiral lines above, and shallow, weak, and much coarser spiral sulci beneath. Whorls $4\frac{1}{2}$, convex, slowly increasing, joined by an impressed suture, the last whorl rounded peripherally, impressed around the perforation. Aperture lunate, oblique; outer margin of the peristome thin and simple, the columellar margin thickened within, narrowly dilated at the insertion. Alt. 2, diam. 3.4 mm.

Hachijo-jima, Izu. Types no. 83376, A. N. S. P., from no. 949 of Mr. Hirase's collection.

This species is larger and less depressed than *M. yakuensis*, which resembles it more than any other species which I have compared. (*Circumdatus*, surrounded, *i. e.*, by the sea.)

Kaliella hachijoensis n. sp. Shell imperforate, globose-conic, smooth except for faint growth-striae, yellowish-brown. Spire conic with slightly convex lateral outlines, the apex obtuse. Whorls $5\frac{1}{2}$, convex, separated by an impressed suture, the last inconspicuously and bluntly angular at the periphery, convex beneath. Aperture lunate, but slightly oblique; peristome thin and simple, the columellar end reflexed, whitish. Alt. 2.7, diam. 3.4 mm.

Hachijo-jima, Izu. Types no. 83377, A. N. S. P., from no. 941 of Mr. Hirase's collection, collected by Mr. Nakada, 1902.

Kaliella pallida n. sp. Shell minutely perforate, depressed conic, glossy and smooth except for faint growth-lines, translucent, pale yellowish-corneous, becoming whitish towards the apex. Spire conoidal, the apex obtuse. Whorls $4\frac{1}{2}$, convex, the suture impressed. Last whorl rounded at the periphery, a little angular in front of the aperture, convex beneath. Aperture broadly lunate, the peristome thin and simple, triangularly dilated at the columellar insertion. Alt. 2.5, diam. 3 mm.

Hachijo-jima, Izu. Types no. 83378, A. N. S. P., from no. 952 of Mr. Hirase's collection.

These species are somewhat similar in contour to *K. nanodes* (Gude) and *K. reinhardti* (Pils.), but are apparently different from any of the described Japanese species. (*Pallidus*, pale.)

Sitala latissima n. sp. Shell minutely perforate, low trochiform, dull brown. Surface nearly lustreless, showing two or three spiral cuticular threads on the upper surface of the last and next earlier whorls. Spire conic. Whorls $4\frac{1}{3}$, convex, separated by a deep suture, the last whorl angular at the periphery, flattened, only weakly convex beneath. Aperture oblique, somewhat square, the periphery thin and simple, dilated at the columellar insertion. Alt. 1.5, diam. 2.3 mm.

Yayeyama, Riukiu group. Types no. 83379, A. N. S. P., from no. 953 of Mr. Hirase's collection.

Distinct by its very broadly conic shape. (*Latissimus*, widest).

Pyramidula pauper var. *hachijoensis* n. var.

Shell low-conic above, convex beneath, higher than *P. pauper*, angular at the periphery; regularly rib-striate, dark brown. Whorls $4\frac{1}{4}$; umbilicus about one-fourth the diameter of the shell, being much narrower than in *pauper* or *depressa*. Alt. 3.7, diam. 6.5 mm.

Hachijo-jima, Izu. Types no. 83324, A. N. S. P., from no. 950 of Mr. Hirase's collection.

Although there is now a tendency to regard island races, where intergradation with the stem-form can not occur, as of specific rank, yet it seems to me that the relationships of such forms as this are best indicated by the use of a trinomial. The elevation of the spire and the narrower umbilicus readily distinguish this sub-species.

Buliminus luchuanus var. *oshimanus* nov. Shell similar to *B. luchuanus*, but differing in being thinner, with more conic spire, far less copious dark variegation, 7 to $7\frac{1}{2}$ whorls, and a thinner lip.

Length 18.3, diam. 7 mm.

Length 16.3, diam. 6.3 mm.

Oshima, Osumi. Types no. 83381 A. N. S. P., from no. 930 of Mr. Hirase's collection.

Buliminus hiraseanus n. sp. Shell rimate, egg-shaped, being short, broad and compact, the spire short, conic with convex outlines, apex obtuse; yellow or brown; surface minutely decussate. Whorls about 6, hardly convex. Aperture oblique, ovate; peristome white, expanded and somewhat reflexed, thickened within, a small nodule on the parietal wall defining a narrow channel at the upper angle. Length 8.5-9, diam. 5 mm. Mukojima, an islet southwest of Hahajima, Ogasawara. (Mr. Y. Hirase, no. 919.)

Diplommatina kobelti var. *ampla* Pils.

Proc. Acad. Nat. Sci. Phila., 1902, p. 28. The locality is Gotō, Hizen, not Uzen as given in the original description.

Carychium hachijoensis n. sp. Shell ovate-conic, whitish, slightly translucent, nearly smooth, the growth-lines being very faint. Spire conic, the apex obtuse. Whorls $4\frac{1}{2}$, convex, separated by a deep suture. Aperture ovate, a little less than half the length of the shell; the peristome reflexed, much thickened throughout, white; Outer lip bearing a strong tubercle on its inner margin above the middle; columella conspicuously truncate, ending below in a strong tooth-like fold, and bearing a stout, projecting lamella above. Length 1.5, diam. 0.8 mm.

Hachijo-jima, Izu. Types no. 83,382 A. N. S. P., from no. 946 of Mr. Hirase's collection.

This species differs from *C. noduliferum* Reinh. in its shorter spire of fewer whorls, the absence of striation, and the smaller size.

Tornatellina biplicata n. sp.

Shell imperforate, pyramidal, thin, brown, nearly smooth; spire straightly conic, the apex obtuse. Whorls $5\frac{1}{2}$, convex, separated by a well impressed suture. Aperture oblique, rather narrow, sometimes showing a strong narrow, white rib within; peristome simple; columella spiral, forming a strong callous fold; parietal lamella thin but high. Length 3, diam. 1.7 mm.

Hachijojima, Izu. Types no. 83,380 A. N. S. P., from no. 948 of Mr. Hirase's collection.

This species is more lengthened than *T. ogasawarana*, or *T. varicifera*, but less so than *T. nakadai* (*biplicatus*, two-folded).

Cochlicopa lubrica var. *hachijoensis* nov. Shell short and wide, with very obtuse apex; whorls $5\frac{1}{2}$. Length 6, diam. 2.7, length of aperture 2.4 mm.

Hachijo-jima, Izu. Types no. 83,383 A. N. S. P., from no. 940 of Mr. Hirase's collection.

LIST OF LAND SHELLS COLLECTED IN THE SACRAMENTO MTS., NEW MEXICO.

BY E. G. VANATTA.

During April and May of the present year Messrs. J. A. G. Rehn and H. L. Viereck collected natural history specimens in the Sacramento Mts., Otero Co., New Mexico, for the Academy of Natural

Science of Philadelphia. Collecting was done at Cloudercroft, in James Cañon, elevation 9500 feet, in the Canadian zone, where the following species were taken :

Ashmunella rhyssa hyporhyssa Ckll.	Vitrina pfeifferi Newc.
Vallonia cyclophorella Anc.	Euconulus fulvus Müll.
Thysanophora ingersolli Bld.	Zonitoides arboreus Say.
Pupa sonorana Sterki.	Zonitoides milium Mse.
Bifidaria pilsbryana Sterki.	Punctum pygmaeum Drap.
Vertigo concinnula Ckll.	Succinea avara Say.

Ashmunella rhyssa hyporhyssa Ckll. was found in great abundance under logs and branches at Cloudercroft, the type locality.

At Highrolls, Otero Co., New Mexico, elevation 7000 feet, in the Upper Sonoran zone, the following species were collected :

Ashmunella rhyssa hyporhyssa Ckll.	Bifidaria armifera Say.
Vallonia cyclophorella Anc.	Zonitoides arboreus Say.
	Succinea avara Say.

Holospira roemeri Pfr. and *Vitrea indentata umbilicata* "Singl." Ckll. were taken at 4600 feet elevation in the Middle Sonoran zone, in the Alamo Cañon near Alamogorda, Otero Co., New Mexico.

GENERAL NOTES.

LIMNÆA AURICULARIA IN AMERICA.—In *Science*, July 11, 1902, p. 65, Dr. R. E. Call records the occurrence of a well-established colony of this species in Flatbush, Brooklyn, N. Y. They were probably introduced on plants.

PLANORBIS PARVUS WALKERI n. var.

This variety is similar to *P. parvus*, but distinguished by having the lip internally thickened.

Types in coll. of Academy of Natural Sciences, no. 81143 from Hartland, Vt., gift of Mr. Bryant Walker; cotypes in coll. Walker.

It also occurs at the following Michigan localities: Oakland Co.; Detroit; Cambridge, Sewell Co.; Antrim Co.; Fenton, Genesee Co.; Lake near Charlevoix; and Grand Rapids, all communicated by Mr. Bryant Walker.—E. G. VANATTA.

VERTIGO COLORADENSIS AND *V. INGERSOLLI*.—In our Revision of Pupæ, 1900, pp. 599, 603, Mr. Vanatta and I stated that we had not seen the descriptions by Mr. Cockerell published in the *British Naturalist*, 1891. The missing number of that journal has now been

received, and as there are probably but few copies accessible to American conchologists, we reprint below the passages relating to American *Pupidæ*.

"In the 'Journ. of Conch.,' 1889, p. 63, a small species of *Pupa* from Colorado was named *P. coloradensis*, but not described. It is a distinct species allied to *corpulenta*, but decidedly smaller (length $1\frac{1}{2}$ mill.), more striate and slightly narrower. There are four apertural lamellæ, [p. 101] one on the parietal wall, one on the columella, and two—the lower one the largest—on the outer wall.

"*Pupa ingersolli* Ancey MS., mentioned on p. 64 of the same volume, has also never been described. It is allied to *coloradensis*, but 2 mill. long, cylindrical, dull brown, with half a whorl more,¹ and a double lamella² on the parietal wall. *P. montanella*, indicated on the same page as *P. coloradensis*, proves to be a form of *P. pentodon*—T. D. A. C." (The British Naturalist, 1891, part v. pp. 100, 101.)

The description of *P. ingersolli* is so abbreviated that in a critical group like the *modesta* group of *Vertigo* it may be doubted whether it is sufficiently diagnostic. Prof. Cockerell, who has affirmed the identity of *ingersolli* with his *concinnula*, seems to have held a different view when describing the latter. As the original description of *ingersolli* is only about two lines long, and quite inexact for *concinnula*, it may fairly be held, I think, that it was not recognizably defiled, and the name *concinnula* should not be displaced.—H. A. PILSBRY.

ASHMUNELLA LEVETTEI (Bld.). Specimens of this species (formerly referred to *Polygyra*) were taken alive in the Huachuca Mts., Arizona, by Mr. J. H. Ferriss, and have been dissected by Mr. E. G. Vanatta. It proves to be a typical *Ashmunella* anatomically. Since this is the case, it is altogether likely that the related *Polygyra mearnsi* Dall will follow suit; so that *Ashmunella* will include numbers 84 to 89 of the check-list of 1897. It should be mentioned that Mr. C. F. Ancey had already, on conchologic or distributional grounds, referred *levettei* to *Ashmunella*, but Mr.

¹ It will be noticed in this connection that the number of whorls is not stated in the description of *P. coloradensis*. H. A. P.

² The term "a double lamella" may be applied to the parietal process of *Bifidaria procera*, *armifera*, *contracta*, etc., but it is conspicuously inexact when used for a species with two separate and distinct lamellæ upon the parietal wall, as in *Vertigo*. H. A. P.

Vanatta's investigation places the generic position of the species on an indisputable basis.—H. A. PILSBRY.

A LARGE PEARL.—A short time ago, one of the students of the Southern Collegiate Institute, of Albion, Ill., had occasion to use a live *Unio* in illustrating some point in zoölogy. When the shell was opened there was found in the mantle quite a large, regularly-formed pearl, 12 mm. wide, and 7 mm. high. The pearl was found in the anterior side of left valve. There is quite a depression in the valve where the pearl was found, although it was not connected with the shell. The *Unio* from which the pearl was taken is *U. multiplicatus* Lea, and is a mature shell. It was found in the Bonpas Creek, not far from where it empties in the Big Wabash River.—C. S. HODGSON.

MR. SLOMON ROUS, whose stock of Cape shells is well known to many of our conchologists, has removed to 929 DeKalb Ave., Brooklyn, N. Y. He reports the receipt of large consignments of South African shells, including most of the recently described species.

NEW PUBLICATIONS RECEIVED.

CHECK LIST OF NORTH AMERICAN NAIADES, by B. H. Wright and Bryant Walker. 8vo, pp. 19, Detroit, 1902. An alphabetically arranged list of species with the genera and groups indicated, and the distribution briefly stated. It will prove useful for checking collections, as well as for determining the modern genera of collections labeled by Lea's system. It is based upon Simpson's Synopsis.

NECROLOGY.

A veteran conchologist, WILLIAM LEGRAND, of Tasmania, has just died, aged 82. He was a book-seller in Hobart, and printed (with his own hands) a little book, Collections for a Monograph of Tasmanian Land Shells (1871), which Tryon noticed in Volume III. of the Manual of Conchology. Much of the Tasmanian material described by Hanley was, I believe, obtained by him, and Tenison-Woods described many shells from his collection. Tate and May named a genus *Legrandina* after him. *Turris legrandi* Ten.-Wood; *Columbella legrandi* T.-W.; *Calliostoma legrandi* T.-W.; *Gibbula legrandi* Petterd; *Zidora legrandi* Tate, perpetuate his memory. His collection was purchased by C. E. Beddome.—C. HEDLEY, Sydney, N. S. Wales, July 9, 1902.

We regret to record the death of DR. J. G. COOPER, at Haywards, California, on July 19, at the age of 72 years. Extended notice will follow.

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Col.
HELIX VAR. CIRCUMCARINATA AND PYRAMIDULA ELRODI.

BY ROBT. E. C. STEARNS.

I have to thank Mrs. M. Burton Williamson of this city for the opportunity to examine a specimen of *Pyramidula elrodi* described by Dr. Pilsbry on pages 40-41 of THE NAUTILUS for August, 1900. As the example was sent to Mrs. Williamson by Professor Elrod there is no doubt as to its authenticity. The form is unquestionably the same as that described by me in the Annals of the N. Y. Acad. of Sciences, Volume I, November, 1879, as *Helix var. circumcarinata*,¹ Mrs. Williamson's specimen differing only in size, being .85 as compared with .92 and 1.01 of an inch, greater diameter, of my examples.

Several specimens of *circumcarinata* were given to me by the late A. W. Crawford, of Oakland, some before and some after my description was written. He had numerous examples, received from an acquaintance or friend, who gave "Turloch, in Stanislaus county, Cal.," as the locality where he had found them. Subsequently Mr. Crawford discovered he had been deceived and stated the true locality as being "near Columbia, in Tuolumne county." His friend may have been guilty of a second fib. As I noticed certain characters suggestive of possible relationship to the well-known *Epiphragmophora mormonum*, which occurs in the Tuolumne region, I have regarded the later habitat given by Mr. Crawford as quite probable.

¹ See Binney's Manual of Am. Land-Shells, 1885, p. 141; also, Pilsbry's Catalogue, Phila., 1898, p. 4.

The general region in which Columbia is situated remains to be explored; it has been barely glanced at. Though the occurrence of *circumcarinata* thereabouts has not been verified by subsequent collectors, its non-occurrence there cannot safely be assumed upon the ground of extreme remoteness from the Montana region explored by Professor Elrod, when we have the more extraordinary fact in the matter of distribution, exhibited by the occurrence of *Pyramidula hemphilli* Newc. (heretofore credited to Arizona, Nevada, Idaho, Utah and Colorado), on Catalina Island, twenty-five miles distant from the mainland of southern California, where Mr. Hemphill, some months ago, collected numerous living examples, fifty or more, which he kindly showed me.

Here is a conundrum in geographical distribution, of great interest and certainly "a hard nut to crack."

Hemphill's original find of this peculiar form was in the White Pine mining district, extreme eastern Nevada.

A few years ago the distribution of *Vallonia pulchella*¹ was given as "Montana eastward, from Canada to, or nearly to the Gulf of Mexico. Europe." In September, 1900, it appeared suddenly upon my grounds in Los Angeles and continued to be abundant for some months; it is now scarce. Whence it came and whither it is going, who can tell?

Los Angeles, Cal., August 26, 1902.

Sp. "PYRAMIDULA" ELRODI AND EPIPHRAGMOPHORA
CIRCUMCARINATA.

BY H. A. PILSBRY.

Dr. Stearns, having expressed the opinion that the two *Helices* named above are specifically identical, I have again compared them, and find my previous idea of their distinctness confirmed. My material consists of the types and numerous other specimens of *P. elrodi* and two specimens of *E. circumcarinata*, an adult and a young one, received from Dr. Stearns years ago, about the time the species was described. The difference between Dr. Stearns' views and my own, of the affinities of the two *Helices*, may be due to his

¹ See THE NAUTILUS for October, 1900.

having, perhaps, no examples of *circumcarinata* at hand for direct comparison with *elrodi*.

The following differences appear on comparing the shells: With the same general figure and size, *P. elrodi* has a wider umbilicus, and viewed from above, the last whorl is wider; the base is more convex, being swollen and almost subangular around the umbilicus; the rib sculpture is coarser; the finer spiral sculpture is much developed in *P. elrodi*, especially beneath, while *E. circumcarinata* shows no spirals there, but only minute papillæ scattered between the ribs. The shape of the apertures differs: In *P. elrodi* the transverse axis does not much exceed the longitudinal, while in *circumcarinata* it is conspicuously greater. In Dr. Stearns' species, the basal lip is narrowly reflexed, while in *P. elrodi* it is at most merely expanded a little. Finally, the apices show important differences.

In *E. circumcarinata* the first $1\frac{1}{2}$ whorls appear smooth, a high power showing a minute, even, criss-cross pebbly sculpture, like that of *E. mormonum*, and the next whorl shows only very weak riblets, with papillæ between them; while in *P. elrodi* the strong riblets begin earlier, and there is no trace of the *mormonum* type of sculpture, even in young removed from the uterus of the mother.

These facts indicate, in my opinion, that the great general similarity between the two species in question is merely superficial, and probably the result of similar conditions acting upon organisms originally diverse, and indeed not closely related. *P. elrodi* belongs undoubtedly to the *P. strigosa* group; while, although its soft anatomy is unknown, *circumcarinata* will probably prove to belong where Dr. Stearns placed it, near *mormonum*, although with present knowledge it is in all probability distinct from that specifically. In other words, I think the two species belong to different genera.

It might be as well to say here that the *strigosa* group of snails is not correctly placed in *Pyramidula*. They do not belong in the *Endodontidæ* at all, but are *Helicidæ*, nearer *Sonorella* than any other group, but constituting a new genus which will be suitably defined in the near future.

In South Australia there is a group of snails called *Glyptorhagada*, some species of which resemble *P. elrodi* remarkably in form, sculpture and color. They belong, however, to a different sub-family of *Helicidæ*, and the resemblance, as in the case of *E. circumcarinata*, is a case of convergent evolution.

CONTRIBUTIONS TOWARDS THE KNOWLEDGE OF THE MOLLUSCA OF
MADAGASCAR.

BY C. F. ANCEY.

Helicarion (?) *Dautzenbergianum* Anc.

Testa imperforata, convexo-depressa, angulata, tenuis, pellucida, nitens, corneo-virens, supra angulum medianum fascia rubrofusca sat angusta circumdata, indistincte et obsolete lineis radiantibus subplicosa. Spira depresso-conoidea, subobtusa, convexa. Anfractus $4\frac{1}{2}$ celeriter crescentes, subconvexi, sutura distincta sed haud profunda; ultimus magnus, dilatatus, utrinque convexus, medio angulatus, basi subtumidus. Apertura ampla, distincte obliqua, extus angulata, lunato-oblonga, leviter supra convexo-producta, basi regulariter usque ad columellam arcuata, marginibus remotis.

Diam. maj. 18, min. $15\frac{1}{2}$, alt. $9\frac{1}{2}$, alt. apert. (oblique) 9 mill.

Hab.: "Montagne d' Ambre," N. Madagascar.

A very remarkable species on account of the keel and its very peculiar shape and coloration. It may, perhaps, be referable to *Euplecta* or *Hemiplecta*.

Euplecta oxyacme Anc.

Testa fragillima, subimperforata, conico-trochiformis, parum nitens, opacula, corneo-lutescens, concolor, sub valida lente lineis confertissimis incrementi notata et striis argutis permultis spiralibus decussata, subtus paulo nitidior. Spira elevata, perfecte conica, rectilinearis, acuta. Anfractus 6 regulariter crescentes, priores convexiusculi, inferi applanati, sutura lineari, appressa; ultimus acute et compresse in medio carinatus, infra convexus, supra carinam planodeclivis, antice haud deflexus. Apertura lunata, extus angulata, subobliqua, marginibus distantibus, supero recto-declivi, basali regulariter arcuato, columellari leviter supra perforationem parvulam expansiusculo, eam fere prorsus occultante.

Diam. maj. $13\frac{1}{4}$, min. $11\frac{3}{4}$, alt. apert. oblique $5\frac{3}{4}$, alt. $9\frac{1}{2}$ mill.

Hab.: Antankaratra Country (Humboldt).

Of the same shape and size as *Rotula argentea*, Reeve, but of thinner texture and different color. It may belong to the same genus, but is perhaps related to *Euplecta* (?) *fenneriffensis*, Angas. The generic reference, therefore, is doubtful.

Hemiplecta oleata Anc.

Testa globoso-depressa, tenuis, anguste perforata, oleoso-nitens, supra tenuissime et irregulariter granulata; subtus magis nitida, lineis radiantibus incrementi notata et sub valida lente striolis spiralibus undulatis valde confertis cincta, superne fusca, ad peripheriam zonula pallida cingulata, infra peripheriam intense castanea, denique basi pallidior. Spira convexa, obtusa. Anfractus 5 convexiusculi, regulariter crescentes, sutura appressa nec profunda divisi, ultimus amplus, vix rotundato-angulatus, basi convexus. Apertura subobliqua, lunata, marginibus distantibus, callo nitido tenuique junctis, supero convexo-declivi, basali regulariter arcuato, columellari anguste in trianguli forma expanso, subincrassato. Peristoma acutum, rectum.

Diam. maj. 37, min. $30\frac{1}{2}$, alt. 23, alt. apert. oblique $17\frac{1}{2}$ mill.

Hab.: Antsianaka Country (E. Perrot).

Very distinct from *Hemiplecta Balstoni*, Angas, *H. Cleamesi*, E. A. Smith, and *H. formosa*, Anc., all also from Madagascar.

Hemiplecta profuga Anc.

Testa depressa vel subgloboso-depressa, tenuis, perforata, nitida, supra subsericea, luteo-cornea, infra angulum medianum zona fusca angustaque cingulata. Spira plus minusve convexa, conoideo-depressa, obtusa. Anfractus 5- $5\frac{1}{4}$ convexiusculi, regulariter crescentes, oblique obsoleteque lineis incrementi confertis vix sculpti, supra passim et inconspicue subgranulati, sutura parum profunda discreti, ultimus ante medium angulo ad aperturam paulatim evanescente aut subrotundata cinctus, basi convexior. Apertura subobliqua, lunata, transverse irregulariter oblonga, extus subangulata, marginibus remotis, basali antice subsinuato, columellari in trianguli forma supra perforationem circularem et minutam anguste dilatato.

Diam. maj. 22, min. $18\frac{1}{2}$, alt. apert. oblique 8 mill.

Hab.: Antankaratra, N. Madagascar (Humblot).

This is allied to *H. oleata*, but is much smaller, more depressed and of lighter color. The sculpture also is more obsolete.

Macrochlamys granosculpta Anc.

Testa perforata (perforatio parva, sed aperta, circularis), tenuis depressa, oleoso-micans, sordide luteo-cornea, vix lineis incrementi notata, striis confertissimis spiralibus passim, sed ad suturam præsertim, granulosis decussata, apice lævi. Spira depresso-sub-

conoidea, obtusa. Anfractus $4\frac{1}{2}$ convexiusculi, regulariter crescentes, sutura appressa, superficiali; ultimus suprà convexiusculus, infrà convexior. Apertura subobliqua, lunata, sat ampla, transverse oblonga. Peristoma acutum, marginibus distantibus, columellari in trianguli forma everso.

Diam. maj. 15, min. 13, alt. $8\frac{1}{4}$, alt. apert. oblique $7\frac{1}{2}$ mill.

Hab.: Antankaratra Country, N. E. Madagascar (Humblot).

The two specimens I have seen of this species probably are young ones, altogether the species is quite distinct from any other from Madagascar on account of its peculiar sculpture.

Macrochlamys Humbloti Anc.

Testa anguste perforata, conoideo subdepressa, tenuis, nitidissima, fusco vel purpureo-cornea, zona pallida, albescente, dilutaque infra suturam ornata, sublœvigata, infrà lineis incrementi radiantibus obsolete notata et sub valida lente exiliter striis spiralibus incisula. Spira conoidea, subobtusa. Anfractus $5\frac{1}{2}$ regulariter et sat lente accrescentes, convexiusculi, sutura levi, appressa; ultimus suprà convexo-declivis, infrà convexus, subdepressus. Apertura parum obliqua, lunata, truncato-oblonga. Peristoma simplex, marginibus distantibus, columellari minute in trianguli forma expanso.

Diam. maj. $12\frac{1}{2}$, min. 12, alt. 8, alt. apert. oblique 6 mill.

Hab.: Antankaratra Country (Humblot).

Quite unlike the other species hitherto recorded from the island, the sutural white band being an unusual feature in the genus.

Helicophanta Alayeriana Anc.

Testa imperforata aut vix subrimata, depressa ovato-globosa, solidula, primum læte fulva et inconspicue griseo multifasciata, deinde in ultimo intense brunnea et paulatim nigricans, ac præter zonam pallideorem initio ultimi anfractus suprà peripheriam concolor, epidermide nigra glutinosa decidua induta. Spira brevissima, convexa, obtusa, apice subplanata. Anfractus 4, celerrime accrescentes, convexiusculi, sutura impressa in ultimo sublacerata divisi; embryonales tenuiter oblique striati, penultimus granulis parvis et elongatis irregulariter asperatus, ultimus ab initio granulis destitutus, irregulariter plicatulus, maximus, inflato-depressus, ad aperturam superficialiter atque spiraliter submalleatus, basi convexus. Apertura perobliqua, diagonalis, late ovalis, sublunata, intus atro-cyanea, margaritacea, nitida. Peristoma incrassatum, expansum, basi breviter

reflexum, hepaticum, margine columellari crasso, albo, nitido, dilatato, medio late et indistincte subtuberculato, parietali albescente, callo nitido crassiusculo oblecto.

Diam. maj. $69\frac{1}{2}$, min. 52, alt. 41 mill.

Hab.: Bora County, S. Madagascar (Sikora).

This is a beautiful species, between *H. gloriosa* Pfeiffer and *H. Ibaraoensis* Angas, but nearer to the latter one. It is however smaller, more globose, the aperture is larger, of a more oblique shape and the columellar margin is thicker.

Ampelita Robillardii Angas.

This does not appear to be a very variable species. The shell is more or less depressed and the upper line is sometimes wanting.

Hab.: Fort-Dauphin, S. Madagascar (F. Sikora).

Ampelita Madagascariensis Lam.

Hab.: Fort Dauphin, S. Madagascar.

Ampelita gonostyla Anc., f. major.

Hab.: Bora Country, Madagascar (F. Sikora).

The specimen is larger and has a bluish lip, thicker than in the typical form.

Leucotænius ellipticus Anc.

Testa elliptico ovalis, glandiniformis, solida, alba, strigis subrectis fuscis nonnullis angustisque passim picta, subobliqua confertim costulata, costulis infra medium ultimi anfractus evanidis. Spira satis producta, regulariter conoideo-attenuata, obtusa. Anfractus $8\frac{1}{4}$ subplani, regulariter crescentes, sutura subirregulari propter costulas; ultimus oblongus, dorso convexo-attenuatus. Apertura subrecta, pyriformi-ovalis, superne angulata, lactea. Peristoma vix incrassatum, obtusiusculum, basi leviter effusum, ad columellam late dilatatum ac supra perforationum angustam reflexum, marginibus remotis, callo nitido junctis.

Long. 54, lat. $23\frac{1}{2}$, alt. apert. 25 mill.

Hab.: Andrahomana, S. Madagascar (Sikora).

I at first supposed this species might be *L. Favanni* Lam., var. β elongatula, of Crosse (Journ. de Conch., 1868, p. 185), also found in southern Madagascar, but the present form is quite different in shape, number of whorls and sculpture from the true *L. Favanni* Lam., the latter being similar in sculpture to the *Bulimulus dealba-*

tus var. *Ragsdalei* Pilsbry. It is the fourth species recorded of the genus, the others being:

L. Favanni Lam.

L. crassilabris Gray.

L. Procteri G. B. Sowerby.

The latter is much like a dwarfed example of *Favanni*, but is shorter and more conic.

Clavator Balstoni Angas.

Hab.: Imerina (F. Sikora); also Antankaratra Country (Humblot).

The specimen of Imerina is shorter and more ventricose than others I have seen.

Clavator Balstoni Angas, var.? *herculea* Anc.

Testa *eximix* magnitudinis; differt a *Cl. Balstoni* Angas, non solum statura insigni sed etiam spira magis producta, anfractibus 9 (nec 8), testa magis elongata, paulo solidiore, apertura magis incrassata, margine columellari longiore, crasso, summo subacuto.

Long. 144, diam. $45\frac{1}{2}$, alt. apert. 48 mill.

Hab.: N. W. Madagascar (Humblot).

Owing to the variability of the species, I dare not separate this very large and remarkable specimen from *Cl. Balstoni*, which is looked upon by some conchologists as a synonym of *Cl. eximius* Shutt., but considered as distinct by Crosse & Fischer; altogether it might prove to be a different species.

(*To be concluded*).

**LIST OF LAND MOLLUSCA FROM THE NEIGHBORHOOD OF
SAPPORO, YESSO.**

BY HENRY A. PILSBRY AND ADDISON GULICK.

A number of land shells collected by Mr. Paul Rowland at and near Sapporo, in Ishikari province, Yesso, and submitted to us for study, adds to our scanty knowledge of the Hokkaido species.

Eulota (Euhadra) peliomphala var. *septentrionalis* (Ehrm.). Mt. Moiwa, two miles from Sapporo, and Maruyama, $1\frac{1}{2}$ miles from the same place. Specimens from the former place are typical in color, having two broad dark bands and an umbilical patch. At the second locality two of three shells have a narrow band above the upper wide one, and the third has opaque creamy streaks, interrupting the

bands, as in ordinary *peplomphala*. All have the characteristic dark apex.

Eulota (Euhadra) blakeana (Newc.). Mt. Moiwa.

Eulota (Mastigeulota) gainesi Pils. Maruyama.

Eulota (Mastigeulota) gainesi var. *gudeana* Pils. Sapporo Park.

Clausilia micropeas var. *hokkaidoensis* Pils. Mt. Moiwa.

Clausilia rowlandi n. sp. Garukawa, 10 miles from Sapporo.

This is a very distinct new species of *Euphædusa*, named in honor of Mr. Paul Rowland.

Cochlicopa lubrica (Müll.). Garukawa.

Pyramidula pauper (Gld.) Yubari, 50 miles from Sapporo.

Kaliella sp. Mt. Moiwa. A large species, identical with Mr. Hirase's no. 678.

Succinea lauta Gld. Maruyama.

Helicina hakodadiensis Hartm. Mt. Moiwa.

The *Kaliella* is one which has been the subject of some correspondence between one of us and Mr. G. K. Gude, and there seems to be no doubt that it is an undescribed form. The new *Clausilia* will be described and illustrated in "Additions to the Japanese Land-snail Fauna," No. 7. The range of *Helicina*, *Eulota pel-septentrionalis* and *Clausilia* is extended some distance northward by Mr. Rowland's collection.

UNIO POPEII, LEA, IN NEW MEXICO.

BY T. D. A. COCKERELL.

In the list of New Mexico mollusca the genus *Unio* has not appeared, but I always hoped that some species would turn up in the eastern portion of the Territory. When recently at Roswell, in the Pecos Valley, Miss Bessie Peacock, of that town, brought me some single valves of a *Unio* which she had found in North Spring river, Roswell. I was, of course, greatly interested; and next day, guided by Miss Peacock, visited the place and had the good fortune to find a complete specimen. The shells are fresh and the species is evidently still living in the river.

I sent the specimen I had found to Mr. C. T. Simpson, who kindly reports as follows: "This is *Unio popeii*, Lea, and it is quite a long way out of its known range. The type came from the Rio Salado, a tributary of the Rio Grande, and since that was found other speci-

mens have been taken in Southwestern Texas. A few years ago Dr. Edgar A. Mearns collected it abundantly near Ft. Clark, Southwestern Texas, and obtained a number of living specimens, which he sent to me. Some of these were gravid and showed it to be a true *Unio*."

G. W. A NEW VARIETY OF GLYPTOSTOMA NEWBERRYANUM.

BY F. W. BRYANT.

G. newberryanum var. *depressum*.

This variety differs from typical *Glyptostoma newberryanum* (W. G. Binney) in being very much depressed, the altitude of shells with an equal number of whorls being less than two-thirds that of Binney's species. The diameter is correspondingly reduced. The aperture is also less round than in *G. newberryanum*. A specimen measures, alt. 11, diam. 27 mm.

Dead shells of this variety are found in abundance on the bluffs north of Ensenada, Lower California.

It has also been collected by Mr. Henry Hemphill near Wilmington, Los Angeles Co., California.

G. THE MANUFACTURE OF PEARL BUTTONS FROM FRESH-WATER MUSSELS.

In the manufacture of pearl buttons the centre of activity has shifted from the China Sea to the river towns of the Mississippi. Altogether unknown in this region a dozen years ago, this industry has grown to such proportions that it now employs the services of thousands of people, and the output has become so great that it materially affects the button market of the world.

About twelve years ago a German buttonmaker named Boeple wandered into Muscatine from the old country. He saw for the first time the mussel shells of the Mississippi river. He examined them closely and expressed the opinion that they were good material for buttons. Up to this time fresh-water shells were considered unsuitable for any such use, and authorities on the subject were naturally skeptical in regard to Boeple's opinion of their usefulness. He persisted in claiming that the "niggerhead" mussel from the waters of the Mississippi river would make, if properly handled and finished, the finest pearl buttons yet produced. He took some

specimens to the factories at Waterbury, Conn., and after considerable experimenting one concern there determined that with some changes in their machinery the shell of the strange mussel from the "Father of Waters" would make a button to compete with the best of those from other parts of the world.

First one concern and then another began to use the Mississippi shell, until the foreign one was almost abandoned. In the beginning the shells were shipped east in the rough and prepared for use after their arrival there, but the freight rates were so high that one enterprising firm soon shipped that part of its machinery which makes the "blanks" out to Muscatine, and, what generally results when some pioneer leads the way to a good thing, others soon profited by the example and came also. The industry has spread both up and down the river, until almost every town of any importance, from St. Paul, Minn., to Alton, Ill., is now engaged in some form of the industry.

The manner of catching the mussels is interesting. A fisherman equips himself with what is known to the clan as a "John boat." This is a flatboat on the order of a scow, about 20 feet long and $3\frac{1}{2}$ feet wide. Upon the inside of the boat are placed eight uprights, which are between three and four feet high and have crotched tops. Four of the uprights are placed on each side of the boat, at just enough distance apart to accommodate the four 10-foot pieces of inch gaspipe that rest upon them. To each of the gaspipes are attached 20 four-foot stagons, similar to those used on an ordinary trout line, and each stagon has four hooks, with four prongs.

The fisherman goes out in his "John boat" with as much confidence as if it were the finest craft afloat. Once in the stream, he casts his gas-pipes, one by one. As the hooks drag along the bottom of the river they come in contact with the open shells of the mussels, which immediately close up on them. Thus attached, they are brought to the surface and taken off. The distance the hooks are dragged each time depends altogether on the thickness of the bed, and varies from three boat-lengths to an eighth of a mile.

The rivers of Arkansas are said to be so thick with mussel beds that they crop out of the water when it is low. The men put on rubber boots and shovel the shells into the boats. In the Upper Mississippi district, shells are quoted in car-lots, ranging from 15 to 30 tons in weight, but the Arkansas dealers have astounded everybody in the business by sending out quotations on 500-ton lots and

promptly filling all orders sent them. The men sell the mussels to the button factory operators at so much per 100 pounds. The wages they make depend upon their diligence and the luck they meet with in getting in a thick bed, but range from \$1.50 to \$5 per day. There is one big mussel bed near Canton, Mo., about eight miles in length.

The process of making the shells into buttons is interesting. The shells are first cut up into blanks the exact size the buttons are to be; then they go to the grinder, a machine which grinds the black back off of them; after that to the facing machine, which cuts the face on them; next to the backer, which bevels the back; then the drill, which puts in the eye-holes; from here they go to the polishing room, where the glossy finish is put upon them; after that they are sorted, put on cards and boxed up.

There are about 40 factories in Muscatine, and the amount paid out weekly in wages is \$10,000. There are factories in Davenport, Fort Madison, Burlington, Quincy, LaGrange, Canton and many other points.

There is an added interest in the business of mussel fishing on account of the likelihood of finding pearls. It is not an uncommon thing for a fisherman to find a pearl valued at \$100, and one lucky fellow found a beauty which sold for \$5,000. Every follower of the business has a little bottle filled with specimens, which eventually find their way to the market.—*Phila. Record.*

GENERAL NOTES.

CANTHARIDUS PERONII Phil. In this journal for May, 1901 (xv, p. 8), I noted that it was Perry who first gave a name to this species, *Bulimus carinatus*. I find that this name cannot stand on account of the earlier *Bulimus carinatus* of Bruguiere, and the name given by Philippi will be retained. In the same note, the second *i* was omitted from the name *Bulimus eximius* Perry, by typographical error.—*H. A. Pilsbry.*

ANGITREMA VERRUCOSA AT LAWRENCEBURG, INDIANA.—I am able to list an entire new shell to this locality, *Angitrema verrucosa* Raf. This shell had so far never been found in the upper Ohio, the mouth of the Wabash, 275 miles below this point, being its locality according to Say. I was fortunate enough to obtain 60 specimens of this shell, and send you a set for the collection.—*A. C. Billups.*



DR. JAMES G. COOPER.

THE NAUTILUS.

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No. 7.

DR. JAMES G. COOPER.

On the nineteenth of July, Dr. Cooper, a man prominent in the scientific history of Western America, died at his home in Haywards, California. For nearly fifty years he labored with zeal and earnestness for the advancement of zoölogical knowledge. Trained as a physician and for years engaged in the practice of his profession, he yet found time for work of lasting value in the domain of nature-study. He suffered from ill health for many years, yet as one of the pioneers in the western field, his name will be held in grateful remembrance for what he has done in zoölogical science.

His father, William Cooper, one of the founders of the Lyceum of Natural History, now the New York Academy of Sciences, was eminent as a naturalist. From him Dr. Cooper received the early training which in large measure prepared him for his later career. Born in New York, June 19, 1830, James commenced his school life at the age of ten years, while living with his family on a farm near Hoboken, N. J. On his way to school it was his delight to collect birds or shells or anything else in animate nature which he might find, thus showing those traits which were afterward a dominating factor in his life work. Later he studied medicine, and received his degree from the College of Physicians and Surgeons of New York in 1851. After two years spent in the city hospitals, he was appointed physician on a government survey for a railroad between St. Paul and Puget Sound. A part of his duty was to make zoölogical and botanical collections, and in this way he began the observations and discoveries for which the scientific world is permanently indebted to him. During the succeeding years he spent most of his time in col-

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lecting on the Pacific coast. In 1855, after the abandonment of the survey, he was at Gray's Harbor, then at Whitby's Island, then for six weeks in the Santa Clara Valley, in California, after which he went to Panama to collect shells for his father, who wrote the article on West Coast Shells for the Pacific R. R. Reports. Until 1860, Dr. Cooper continued his field work on the Pacific coast, much of the time at his own expense. In that year he was appointed Zoölogist of the California State Geological Survey under Whitney. While engaged in this work, he collected along the coast from San Diego to Bolinas, as well as inland. His observations on the land birds were embodied in the report on Ornithology, edited by Professor Baird and justly regarded as "by far the most valuable contribution to the biography of American birds that has appeared since the time of Audubon." (Baird.) Dr. Cooper's report on Conchology still remains in manuscript form in the library of the University of California. This report contains information of the highest value, especially in its voluminous notes on geographical distribution.

Through the latter part of the Civil War, Dr. Cooper served as surgeon in the Second Cavalry, California Volunteers. In 1866, at Oakland, California, he married Miss Rosa M. Wells. His later life was spent in the practice of his profession, until, with failing health, he retired to Ventura county, then in 1875 to Haywards. Although no longer as active in collecting as in earlier years, his scientific work was continued with the ripe experience and knowledge of zoölogy which the years had brought him. Some of his later work was done for the State Mining Bureau in the identification of fossils, in the description of new species, and in the publication of a Catalogue of Californian Fossils. For the Academy of Sciences also, of which he was an early member and at one time vice-president, he performed valuable service, both in conchology and in palæontology. Some of his latest papers were based on material collected by members of the Academy.

Dr. Cooper published more than forty papers on conchology between 1859 and 1896. His discoveries of new species and varieties of mollusks were numerous. Of the 116 new forms credited to him, 65 were described by Dr. Philip P. Carpenter, 16 by W. M. Gabb, 17 by Dr. Cooper himself, and the remainder by William Cooper, Gould, Bland, Newcomb and Tryon. It is noticeable that so few were described by Dr. Cooper. Owing to a lack of scientific books

and authenticated collections in California, he sent most of his new species to more favored workers for description. Dr. Carpenter says of the species collected by Dr. Cooper: "The diagnoses . . . published in the Proc. Cal. Ac. N. S. . . . should be credited to the zealous zoölogist of the survey, rather than to the mere artist-in-words who endeavors to represent their forms to the reader." Dr. Cooper described a few species collected by other workers in the field, but of these there is no enumeration at hand.

Dr. Cooper was a man of noble character and kindly disposition. He was tall and slender, not very fluent in conversation unless the topic under discussion was one of special interest to him. Many of the younger students of zoölogy in California remember with gratitude his aid so freely given them in their studies. Since his death, besides extended notices in the daily papers, there have appeared a memorial by Wm. H. Dall in Science for August 15, and one by W. O. Emerson, together with a list of ornithological papers, in the current number of the Condor. The last is the Bulletin of the Cooper Ornithological Club and contained in its first issue, 1899, a much longer account of Dr. Cooper's life work. A partial list of his conchological papers will be found in Bulletin 4, California State Mining Bureau. The present portrait is from a photograph taken in 1865, and was sent to the writer by Mrs. Cooper, who still lives in Haywards.

WILLIAM J. RAYMOND.

University of California, Oct. 15, 1902.

NOTICES OF NEW JAPANESE LAND SNAILS.

BY H. A. PILSBRY AND Y. HIRASE.

Mr. Nakada, who collected so successfully in the Bonin Is. (Ogasawara-jima), has now gone into western Hondo, through the provinces Echizen and Kaga, and continuing northward will collect in Noto and Sado Island. Among many other interesting discoveries, he has found *Sphyradium edentulum* Drap. (new to eastern Asia), *Bifidaria plicidens* Bs. (described from India), magnificent specimens of *Eulota (Euhadra) senckenbergiana*, one of the finest helices in the world, and many other beautiful shells.

Chloritis albolabris Pilsbry & Hirase, n. sp.

Shell depressed, the alt. about half the diameter, but slightly convex above, several earlier whorls being coiled in a plane, the tip of the apex turning down; umbilicate, the width of umbilicus about one-fifth that of the shell, thin but moderately strong, greenish, somewhat russet tinted above. Surface dull, marked with low growth-wrinkles, and set with *rigid, short, black-brown, tapering bristles*, arranged in oblique lines as usual, but in part irregularly placed. On the latter part of the last whorl the bristles stand nearly a half mm. apart. Whorls $4\frac{3}{4}$, convex, slowly widening to the last, which is fully double the width of the preceding whorl, is well rounded at the periphery and beneath, and descends slowly in front. Suture deeply impressed. Aperture quite oblique, widely lunate, the peristome white, narrowly reflexed, thickened with a narrow rim within, the ends approaching.

Alt. 9.6, diam. 20 mm.

Alt. 9, diam. 18 mm.

Yaku-shima, Osumi. Types no. 83883 A. N. S. P., from no. 958 of Mr. Hirase's collection.

This fine *Chloritis* needs comparison with no other Japanese species. The wide umbilicus, stiff, dark-colored bristles, and thick white lip, are conspicuous features differentiating it from other forms. (*Albolabris*, white-lipped.)

Eulota (Aegista) kobensis var. *gotoensis* P. & H., n. var.

Much smaller than *kobensis*, with narrower umbilicus; whorls $5\frac{1}{2}$; sculpture and color as in *kobensis*. Aperture more nearly circular, the lip thick and white, as in *kobensis*. Alt. 6.5, diam. 12 mm.

Goto, Hizen. Type no. 83877 A. N. S. P., from no. 969 of Mr. Hirase's collection.

E. kobensis (Schm. & Bttg.) has hitherto been known from Awaji, Setsu and Yamashiro, adjacent provinces, though the former is insular. The occurrence of a race far to the southwest is therefore interesting.

Eulota (Plectotropis) omiensis var. *echizenensis* P. & H., n. var.

Shell depressed, conic or low-conic above, convex beneath, umbilicate, the width of the umbilicus one-third the diameter of the shell; brown; surface nearly lusterless, sculptured with slight and

irregular growth-lines and bearing sparse triangular cuticular processes, nearly wanting in some individuals. Whorls 5 to $5\frac{1}{3}$, convex, the last angular at the periphery, the angle disappearing behind the outer lip, slowly descending below the angle of the preceding whorl. Aperture very oblique, rounded, about one-fourth of the circle excised by the preceding whorl. Peristome thin, expanded.

Alt. 4.5, diam. 7.3 mm.

Alt. 5, diam. 7 mm.

Arato, Echizen. Types no. 83879 A. N. S. P., from no. 752a of Mr. Hirase's collection.

This western race is distinguished from *omiensis* by its more conic, elevated spire, and sparser cuticular shreds.

Eulota (Aegista?) intonsa Pils. & Hirase, n. sp.

Shell depressed, somewhat lens-shaped, umbilicate, the umbilicus less than one-fourth the diam. of the shell; thin; light brown with some indistinct corneous streaks, and corneous around the umbilicus. Surface somewhat shining, rather roughly papillose-striate, the last whorl densely set with short, hair-like cuticular processes, in part rubbed off. Whorls 5 to $5\frac{1}{2}$, slowly widening, somewhat convex, the last whorl strongly angular at the periphery, much more convex below the angle than above, shortly descending in front. Aperture oblique, oval; peristome thin, the upper margin slightly expanded, outer and lower margins expanded and narrowly reflexed, the terminations converging, parietal wall covered with a thin varnish.

Alt. 6, diam. 12 mm.

Alt. 5.3, diam. 11.5 mm.

Suimura, Awa (Shikoku). Types no. 83378 A. N. S. P., from no. 960 of Mr. Hirase's collection.

A species with much the contour of *Plectotropis*, but more like *Aegista* in sculpture and texture, so that both of us are disposed to refer it to the latter group. It is quite unlike any Japanese species yet described. The aperture reminds one somewhat of *Trachia*. (*Intonsus*, unshaven).

Pyramidula conica Pils. & Hir., n. sp.

Shell umbilicate, conic, rather thin, dark purplish-brown, closely, finely and rather irregularly striate. Whorls $4\frac{1}{2}$, very convex, separated by a deep suture, the last rounded at the periphery and beneath.

Aperture oblique, rounded, about one-fourth of the circumference excised at the parietal wall by the preceding whorl; peristome simple and thin, the columellar margin a little dilated. Alt. 1.5, diam. 2.7 mm.

Suimura, Awa, Shikoku. Types no. 83884 A. N. S. P., from no. 961 of Mr. Hirase's collection.

This species is excessively similar to the common European *P. rupestris*, type of the genus *Pyramidula*. In fact, if found in the western Palæarctic area, it probably would not be separated more than as a subspecies. However, the whorls are more tubular, especially the last one. The Chinese *Pyr. orphana* (Heude) is also closely related, but comparison with a specimen received from Père Heude shows it to be perceptibly rougher and with the last whorl more depressed.

The species of the typical group of *Pyramidula* differ from those of the more widely distributed section *Gonyodiscus* in wanting regular rib-striæ. This is more constant than the degree of elevation, which varies widely in both groups. Some large forms, such as *Pyr. solitaria*, also want the ribbed sculpture. It has elsewhere been shown that the teeth and jaw of *P. rupestris* are like those of the ordinary discoidal species; so that Dr. von Moellendorff's hope that it will prove generically distinct does not seem likely to be realized.

Macrochlamys kagaensis Pils. & Hir., n. sp.

Shell very narrowly umbilicate, globose-depressed, thin, greenish-yellow. Surface very glossy and smooth, marked with faint growth-wrinkles, the inner whorl densely and finely engraved with spiral striæ, which are obsolete or nearly so on the last whorl. Whorls $4\frac{1}{2}$, rather rapidly increasing, the last about double the width of the preceding, rounded peripherally, convex beneath, impressed at the axis. Suture shallow, edged by a fine white line. Aperture slightly oblique, wide lunate, the peristome thin and simple, slightly dilated at the axial insertion. Alt. 9.5, diam. 15 mm.

Hakusan, Kaga. Types no. 83881 A. N. S. P., from no. 974 of Mr. Hirase's collection.

A fine large species, allied to *M. dulcis* Pils., but much more globose. *M. perfragilis* Pils., from Oshima, is very similar in form, but has an even smaller umbilicus and more oblique aperture, besides wanting the incised, clear-cut spirals on the inner whorls.

Microcystina nuda P. & H., n. sp.

Shell minute, imperforate or nearly so, depressed, yellowish, glossy and smooth. Whorls 4, slowly increasing, the last indistinctly and obtusely subangular at the periphery, above the middle; impressed around the axis. Aperture lunate, subvertical, the lip simple, acute, dilated at the axis, the columellar margin a little thickened. Alt. 1.2, diam. 2.6 mm.

Hakusan, Kaga. Types no. 83880 A. N. S. P., from no. 973 of Mr. Hirase's collection.

Apparently related to the smaller *M. sinapidium*, both belonging to Reinhardt's group *Discoconulus*. (*nudus*, naked).

Kaliella kagaensis Pils. & Hir., n. sp.

Shell subperforate, low-trochiform, yellowish and glossy. Surface marked with faint growth-lines, the second whorl delicately and very minutely costellate; base showing some faint spirals. Whorls 5, somewhat convex, slowly increasing, the last angular at the periphery, convex below. Aperture lunate, oblique, the peristome simple and thin, columellar margin subvertical, narrowly expanded. Alt. 2.4, diam. 3.2 mm.

Hakusan, Kaga. Types no. 83882 A. N. S. P., from no. 971 of Mr. Hirase's collection.

A shell almost identical in contour with *K. okiana*, but smooth and glossy, and a little larger.

Kaliella gudei Pils. & Hir., n. sp.

Shell large for the genus, perforate, conic, thin, pale yellowish, somewhat translucent, smooth except for slight, irregular growth-lines. The outlines of the spire are slightly convex, nearly straight, last whorl with a narrow, thread-like peripheral keel, which ascends the spire and is visible as a narrow border above the suture. Whorls 6 to $6\frac{1}{2}$, quite convex, the last convex above and below the keel, slightly impressed around the perforation. Aperture truncate-lunar, the lip simple, columellar margin dilated, reflexed. Alt. 5, diam. 6.2 mm.

Kayabe, Ojima. Types no. 81922 A. N. S. P., from no. 678 of Mr. Hirase's collection. Also Hakodate, Ojima. Mt. Moiwa, two miles from Sapporo, Ishikari (Paul Rowland); all in Yesso.

This is the largest Japanese species, and one of the largest of the

genus. It is related to *K. (?) ceratodes* Gude, but that is a much smaller and smoother shell. *K. gudei* was at one time identified with *H. labilis* and with *H. pupula* of Gould, both described from Hakodate, but Mr. G. K. Gude directed attention to its distinctness from these species.

cont.

CONTRIBUTIONS TOWARDS THE KNOWLEDGE OF THE MOLLUSCA OF
MADAGASCAR.

BY C. F. ANCEY.

Clavator Johnsoni E. A. Smith.

Hab.: Central Madagascar (Humblot).

Clavator obtusatus Gmelin.

Hab.: Fort Dauphin, S. Madagascar (F. Sikora). Also found at the northern end of the island (Alluaud).

Clavator Humbloti Anc.

Testa magna, imperforata, elongato-attenuata, solidula, epidermide fusco lutescente infrà transverse et exiliter fusco multifasciata induta, sub epidermide alba, nitidula. Spira regulariter usque ad apicem attenuata, elongata, obtusa. Anfractus 9? (supremi fracti), regulariter crescentes, convexiusculi, sutura mediocri in ultimis minute et leviter subcrenulata discreti, longitudinaliter striis confertis incrementi exarati, in 5 inferis lineis spiralibus impressis magis distantibus decussati; ultimus elongatus, inferne attenuatus. Apertura subobliqua, basi leviter recedens, irregulariter oblongo-attenuata, superne angulata, basi ampliata, intùs cœrulescens. Columella antice angulatum producta, intùs contorto-subplicata, crassiuscula. Peristoma obtusum, suprà columellam dilatatum et adnatum, marginibus distantibus, callo nitido basi præcipue conspicuo junctis.

Long. 95, diam. $27\frac{1}{2}$, alt. apert. 31 mill.

Hab.: Antankaratra Country (Humblot).

This fine species appears to be allied to *Cl. Moreleti* Desh., but is much larger and is very distinct.

Pachnodus rufoniger Reeve.

Hab.: "Montagne d'Ambre," Diego Suarez; Antankaratra (Humblot).

Planorbis Madagascariensis E. A. Smith.

Hab.: Vinaninony and Fenoarivo.

Planorbis trivialis Morelet.

Hab.: Same localities.

Acroptychia æquivoca Pfeiffer.

Hab.: Antankaratra (Humblot).

I think that *A. manicata*, Cr. and F. is the same as this.

Hainesia crocea Sowerby.

Hab.: Andrahomana, S. Madagascar (Sikora).

I do not see that any precise locality was ever given for this species, erroneously ascribed to Mauritius by Benson.

Cyclostoma carnicolor Anc.

Testa pro genere mediocriter sed profunde umbilicata, globosconica, solida, suprâ parùm, inferne magis nitida, superne spiraliter multisulcata, præterea lineis incrementi sub lente decussata, carnea vel rubella, ad apicem luteola, fascia fuseo-cærulea infrâ peripheriam cincta. Spira conoidea, apice sat minuto, obtuso. Anfractus $5\frac{1}{2}$ convexo-rotundati, ultimus bene rotundatus, subtùs fasciam lævigatus, dein iterùm circà umbilicum et in umbilico ipso confertim concentricè liratus, antice breviter ascendens. Apertura albida, intùs candida vel luteola, fascia transmeante. Peristoma expansum, marginibus approximatis, callo submarginato junctis, columellari dilatato-reflexo. Operculum testaceum, sordide album, anfractibus 4, nucleo subcentrali.

Diam. maj. $23\frac{1}{2}$ – $26\frac{1}{2}$, min. 18–20, alt. 21–26 mill.

Hab.: Andrahomana (Sikora).

Nearly related to *C. asperum*, Pot. and Mich., but much less rugose and of different color. It may be the southern analogue of *asperum*, which lives in the northern end of Madagascar.

Cyclostoma Alayerianum Anc.

Testa globoso-turbinata, pro genere anguste umbilicata, parùm crassa, spiraliter confertim acutique lirata, liris in ipso umbilico conspicuis, infrâ peripheriam ultimi anfractus lævioribus, ochraceo-fulvescem, fasciis angustis 2 fuscis, quarum una angulo superiore aperturæ incipit, altera minus conspicua suprâ peripheriam ultimi cingulata. Spira turbinata, apice lævi, obtusulo. Anfractus 5 valde convexi, sutura profunda, inferne minute plicatula, ultimus

rotundatus, ad finem brevissime et leviter subascendens. Apertura parùm obliqua, subcircularis, intùs luteola. Peristoma subinterruptum, anguste, ad columellam paulo magis expansiusculum.

Diam. $9\frac{1}{4}$, alt. $9\frac{1}{2}$, alt. apert. vix 5 mill.

Hab.: Region of Fort Dauphin, S. Madagascar (F. Sikora).

Although this small species bears some resemblance with others, like *C. undatoliratum* Boettg., etc., still I cannot identify it with any of them.

Cyclostoma obsoletum Lam.

Hab.: Province of Boeni.

Cyclostoma filostriatum Sowerby.

Hab.: Fort Dauphin (F. Sikora).

About the geographical distribution, it may be of interest to note that *Helicophanta magnifica* has been found in Imerina, where it is said to be very scarce (Sikora), and *Heliophanta cornu-giganteum*, Chemnitz, in southern Madagascar, near Fort Dauphin (Sikora).

Corb.

NOTE ON NEOCORBICULA FISCHER.

BY W. H. DALL.

In a small collection of freshwater shells from Uruguay, recently received, are specimens of *Corbicula obsoleta* Deshayes and *C. limosa* Maton. The latter is the *C. variegata* Orbigny, and the type of Fischer's section *Neocorbicula*, proposed for the American Corbiculas, which have separate siphons and a small pallial sinus, while the European types of the genus *Corbicula* have an unsinuated pallial line.

Several of the specimens above mentioned had the animal matter dried up within the shell, and in removing this it was discovered that the shells contained a large number of nepionic young of varied size, some nearly two millimeters in length and already showing radiating lines of color. There were 15 to 20 of the young fry in each individual, and while the dried matter gave no distinct indication of the original arrangement, the fry in each case were in the umbonal cavities.

I have run over the literature and manuals and have not found any reference to viviparity in *Corbicula* or *Cyrena*, though of course it is well known in the allied *Sphærium* and *Pisidium*. If it is a characteristic of the Old World *Corbiculas*, it is singular that it has not been hitherto noted.

The prodissoconch in these young shells is rounded, polished and translucent, and presents no remarkable peculiarities.

If the brooding of the nepionic young in a marsupial sac is a further point of distinction between the New and Old World forms, it is probable that it may be regarded as raising the value of the subdivision to higher than sectional rank.

"PYRAMIDULA" ELRODI AND EPIPHRAGMOPHORA CIRCUMCARINATA.

BY ROBERT E. C. STEARNS.

In connection with my remarks upon the above-named forms in the October number of THE NAUTILUS, and Dr. Pilsbry's comments that follow, he says: "The difference between Dr. Stearns' views and my own, of the affinities of the two *Helices*, may be due to his having, perhaps, no examples of *circumcarinata* at hand for direct comparison with *elrodi*." This suggestion is correct. I have not seen an example of *circumcarinata* for ten years, and only a single specimen of *Elrodi*, that heretofore referred to by me.

The dominant features of these shells are surprisingly alike. The many though less conspicuous characters indicated by Dr. Pilsbry in their bearing on the distinctive point, must therefore be accepted. The remarkable similarity exhibited between the forms in question are presumptively, as Dr. Pilsbry observes, the result of similar environmental conditions "acting upon organisms originally diverse, and indeed not closely related."

Closeness of relationship or otherwise, among land-snails inhabiting the same geographic or physiographic area, though the area may include a broad extent of territory, is another and very interesting question.

Regarding the relations of the *strigosa* group of snails, I have for a long time held the opinion that it was decidedly out of place in

Pyramidula, and am pleased to learn on the authority of Dr. Pilsbry that the proper position of this large and varied group will soon be made known.

Los Angeles, Cal., October 12, 1902.

GENERAL NOTES.

“SLUGS” AS MEDICINE.—While in Port Antonio, Jamaica, last March, I collected some *Veronicella sloanei* Cuv., and having nothing to put them in, wrapped them in paper and left them on a table in my room at the hotel. During my absence they escaped and began crawling around, much to the disgust of the colored chambermaid who happened in about that time. On my return she filed a vigorous protest against the “nawsty things,” and wanted to know what I intended to do with them. She then informed me that they were good for all forms of lung trouble and asthma. They are used as follows: Take a green cocoanut, cut off the end, and drop a good sized “slug” into the milk, in which it will dissolve. The milk is then drunk and is a “sure cure for asthma.”

It would be interesting to know whether this is a survival of the old European belief in the efficacy of the slime of “slugs” in pulmonary troubles, carried to the island by the early English settlers, or whether it is a part of the African pharmacopœia introduced with the slaves.—GEO. H. CLAPP.

NOTES ON *HALIOTIS RUFESCENS* SW.—For several months a company of Japanese fishermen has been engaged in collecting abalones on San Clemente Island, and drying the animals for the Japanese and Chinese markets.

Among the shells sent from this island to San Pedro for shipment I recognize quite a large number of fine *Haliotis rufescens* Sw., which is not, or is only very rarely found along the shore of the mainland of southern California at the present time.

Last year I collected an interesting series of this beautiful shell in the shell-mounds on San Nicolas Island, but most specimens of the shell in those mounds are broken or in an advanced stage of disintegration.

Recent collectors of abalones report living specimens of the red abalone very rare on San Nicolas Island.—HENRY HEMPHILL.

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SURFACE SCULPTURE IN ANCYLUS.

BY BRYANT WALKER.

Owing to the simple character of the shell, which presents but few of the salient specific features which enable the more specialized groups to be readily determined, the North American *Ancylis*, like the Succineas, have received but scant attention from our collectors, and great confusion exists in regard to the identification of nearly all the described species.

The species of the earlier authors were based almost wholly upon the shape, contour of the slopes and position of the apex. The surface sculpture was as a rule overlooked. With the exception of the few species characterized by radial ribs or incised lines, in only four of the eastern American forms is the character of the surface mentioned at all in the original descriptions, and then only with reference to the growth lines.

Bourguignat, in 1853 (*Journal de Conchyliologie*, IV, p. 63), was the first to point out the apical scar as a peculiarity of the genus, and Pilsbry (NAUTILUS, IX, p. 139) is the only American author who has noticed its presence in any American species. It is present in all of them, but is much less conspicuous in those species which group around *A. fuscus* than in those of which *A. rivularis* is the leading form.

Pilsbry also was the first (*loc. cit.*) to call attention to the fact "that nearly all specimens are more or less coated with foreign matter, sometimes calcareous, but generally ferruginous (which) must be removed before the color and finer sculpture can be observed," and to give a practical method for cleaning the shells.

A recent study of the eastern North American species has developed some unexpected peculiarities in regard to their surface sculpture, which are of value in determining many of the species and which may prove to be of importance in reference to their phylogeny and classification.

In studying the *Ancylis*, it is necessary to have the shells thoroughly cleaned with dilute oxalic acid and to use a compound microscope of at least 50 diameters; not unfrequently a power of 100 diameters is required, especially with the smaller species, to reveal the characteristic sculpture. Under a simple lens of 10 diameters the shell, when cleaned, appears to be smooth and shining, but under a higher power a more or less developed system of sculpturing is visible in nearly every species. This consists of two elements: first the concentric lines of growth, and second, a radial sculpture more or less evident, which in its fullest development, as in *A. peninsulae* and *eugraptus*, presents a series of fine, conspicuous, radial riblets extending from the apex to the peritreme.

The concentric sculpture formed by the growth lines is not usually very strongly developed. It never presents the regular clear-cut striation such, for instance, as is presented by *Planorbis trivolvis*, but is irregular and more or less indented, varying in the different species.

The radial sculpture in all the species examined, when present, consists of fine transverse elevations varying from very fine, irregular, discontinuous ripples to continuous riblets covering the entire surface. When present at all, their position is radial.

The only species in which any other kind of radial sculpture has been noticed is the *A. borealis* Morse, in which the surface is marked "with fine, regularly interrupted radiating lines." It is not expressly stated that these are incised, but such would seem to be the inference. Unfortunately no authentic specimens have been accessible for examination.

There is a large degree of individual variation in the development of the radial sculpture, even in those species which have been established upon its presence and in which it is best developed. *A. peninsulae* is the only one in which it seems to be uniformly present. *A. filosus* is frequently nearly smooth and, judging from specimens from both the Coosa and the Cahawba, the radiating sculpture is decidedly irregular. The same holds true in regard to *A. eugraptus*. *A. ovalis* has not been examined.

On the other hand, in nearly all the so-called smooth species there is a distinct tendency toward the formation of a minute, transverse, irregular and discontinuous rippling of the surface, which, especially on the lateral slopes, tends to form irregular riblets extending anteriorly. The median portion of the anterior slope is less apt to be affected in this way.

While it is, as yet, too soon to speak positively, it seems possible that an examination of a large amount of material may lead to discarding the presence of a well-developed radial sculpture, unaccompanied by other peculiarities of size and shape, as a ground for specific distinction. The *A. excentricus* Morelet may be cited as an example of this kind. It is described as smooth or with very fine concentric lines only, and apparently on this ground alone is distinguished from the *A. radiatus* Guilding. Bourguignat (J. de C., iv, p. 155), on other grounds, only allows it varietal rank; but Crosse & Fischer (Moll. Mex., ii, p. 37) hesitate to follow him on account of the absence of the radiating striæ, which are so prominent in *radiatus*. An examination of specimens of *A. excentricus* from Texas, collected by Singley, shows that in all of them the radiating sculpture is incipiently present and that in some there are well-developed riblets present on the antero-lateral slopes, the median portion of the anterior slope being practically smooth. (See also Pilsbry, NAUT., iii, p. 64.) A larger series would probably necessitate the uniting of the two forms.

The most striking feature, however, in the radial sculpture of the *Ancylis* is the presence, in many of the species, of a circle of fine riblets or striæ on the apex, radiating from the apical scar. These apparently have not been noticed before. When present in a species, they are invariably to be found, and that quite independent of the presence or absence of a radial sculpture over the entire surface, and they may be entirely wanting in species with a well-developed ribbed surface, as in *A. eugraptus*. When the radial sculpture is persistent over the whole surface, the riblets originate from these apical striæ, but when that sculpture is not present, they cease a very short distance from the apex. This apical sculpture is characteristic of the more elevated species with an acute apex, of which *A. rivularis* is the leading form. The scar in these species is situated on the tip of a sharp, prominent apex and, with its circle of radiating ribs, is very conspicuous and easily observed.

In a large number of species, however, the apex is smooth and the radial riblets when present originate below the apex. These are the wide, ovate or subcircular species, usually more or less depressed, of which *A. fuscus* may be considered the type. In these the apex is blunt and smooth and the apical scar is not conspicuous. In *A. peninsulæ*, however, the riblets in some specimens seem to extend clear up to the scar, but not into it. While in this respect this species seems an exception to the rule, that the depressed species have the apical region smooth, nevertheless its affinities are all with that group, and in spite of the apparently intermediate character of its apical sculpture, it seems better to class it with them. A similar tendency, though much more feeble, has been observed in one set of *A. diaphanus*.

The eastern American species, so far as examined, fall into two natural groups characterized by their shape and contour as well as this difference in apical sculpture. Pilsbry has already indicated them (loc. cit.) on other grounds, and it is interesting to find that the distinction apparently also holds good on structural grounds of some importance.

The following list of eastern American species is arranged with reference to their apical character:

Apex striate.	Apex smooth.	Not examined.
<i>rivularis</i> .	<i>fuscus</i> .	<i>obscurus</i> .
<i>tardus</i> .	<i>diaphanus</i> .	<i>elatior</i> .
<i>parallelus</i> .	<i>excentricus</i> .	<i>calcarius</i> .
<i>shimekii</i> .	<i>holdemani</i> .	<i>borealis</i> .
<i>flosus</i> .	<i>eugraptus</i> .	<i>ovalis</i> .
	<i>peninsulæ</i> .	

Any collector, who has any of the unexamined species as here listed, will confer a favor by communicating with the writer.

A NEW HAITIEN CHONDROPOMA.

BY JOHN B. HENDERSON, JR., AND CHAS. T. SIMPSON.

Chondropoma superbum.

Shell having a small umbilicus, usually truncated, subsolid, somewhat shining; whorls 7, the two nuclear ones smooth and waxy; those remaining in the truncated shell 4; sculpture consisting of

rather fine axial threads, becoming finer behind the aperture; suture narrowly canaliculate, its lower edge finely denticulate; last whorl decidedly solute, free about one-fifth of its length; aperture almost regularly oval, vertical when viewed from its outer edge, oblique when viewed from the front; outer lip heavy, rounded and well reflexed; inner lip narrower, scarcely reflexed above; base within the umbilical region with faint spiral liræ; color brownish white, marked with brown spots arranged in longitudinal and revolving series.

Operculum paucispiral, finely ridged, calcareous without, horny within; nucleus excentric.

Length 25, greatest diameter 14, least diameter 11 mm. Length of aperture 10, diameter 7 mm.

Another shell. Length 21, greatest diameter 13, least diameter 7 mm. Length of aperture 9, diameter 6 mm.

Found on a high limestone hill back of Thomazeau, Haiti, many specimens, living and dead.

This species is somewhat closely related to *Chondropoma weinlandi* Pfeiffer, which is found on the plain about Thomazeau, but it is larger, solidier, more finely developed and painted, and has the last whorl much more solute and the outer lip more solid and reflexed. It varies a good deal in size and color pattern. There are occasionally faint longitudinal brown bands, and the darker spots which are usually longest in a spiral direction may become angular, rounded or almost blunted into axial rows.

It is a magnificent species, often quite as beautiful as *C. magnificentum*.



cat.

SOME NOTES ON THE NORTH AMERICAN CALYCULINÆ, WITH NEW SPECIES.

BY DR. V. STERKI.

The genus Calyculina has been pointed out by T. Prime¹ without a name, and named by Clessin.² It seems well-defined, since no species have been seen which were in doubt whether to be ranged under Sphærium or Calyculina.

¹ Mon. Corbiculidæ, 1865, p. iv.

² Mal. Bl. xix., 1870, p. 150, and used in "Cycladeen," p. 253.

One of the features, however, considered characteristic, and from which the generic name was derived, is not constant. The beaks are not always capped, or calyculate, and in *C. transversa*, e. g., they are simply rounded, as a rule, while in all other species, examples with rounded, not calyculate, beaks, are occasionally found, and sometimes at a large percentage. As stated elsewhere, it seems that this is caused, at least partly, by the seasons during which propagation is effected.

It has been asserted, and repeated, that the Calyculinæ have a cyclical period of life, within one year, depositing their young in spring. This seems not to hold good. Of *Cal. transversa* Say, e. g., I have collected specimens at all stages of growth, and also gravid animals in all seasons, also in midwinter, and nearly the same can be said of *C. partumeia*, *truncata* and *securis*. And among materials sent for examination from different places and collected at various seasons, the mussels were found of different ages and sizes.

Since the publications of T. Prime and Clessin, little has been said about our Calyculinæ. During the last eight years I had chances to examine many thousands of specimens, owing to the efforts and the kindness of a number of conchologists. Yet the materials extant are still insufficient, especially from the Southern and Western States. Most of the species seem to be rather variable, and some considerably so, in regard to size, shape, surface appearance and color, and some forms could be referred to certain species only after careful examination and often repeated comparison, and even then doubtfully in some instances. More materials from many localities are very desirable.

They preferably inhabit quiet waters, to which they are best adapted, with their thin and fragile shells. Pools, ponds, ditches, slow rivers and creeks often abound with them, where they are crawling among plants and dead leaves. In fast running streams, with coarse bottoms, they are scarce, and so along the shores of larger lakes.

So far as I know them now, the species are the following :

1. *C. elevata* Hald. A southern species, with comparatively strong shells. The specimens are not always so high and of such circular outlines as in T. Prime's figure. A rather small, but well inflated form from Kansas seems to range under this species.

2. *C. contracta* Pr. Seems to be a good species. Seen from

Alabama and Louisiana. Specimens from Kentucky (Bowling Green, collected by Miss Price) are slightly different in shape, being more rhomboid, but probably range with *contracta*.

3. *C. hodgsonii* n. Somewhat like *contracta*, but rather larger, somewhat more elongated; the shell is thicker, the nacre whitish, the hinge stronger; the posterior end is not so markedly or so obliquely truncated. The surface is rather dull, the color a vivid yellow, to plumbeous around the umbones, in older specimens. It has some resemblance with *C. transversa*, but is less elongated, more equipartite, the shell and hinge are stouter, the superior margin and the hinge more curved, especially so the posterior lateral teeth.

Size: long. 14, alt. 11, diam. 6.5 mill.

From a mill pond at Albion, Ill., collected years ago by Mr. C. S. Hodgson. It is in many collections under various names, *e. g.*, *Sphaerium aureum* Pr., from which it is very different. So well marked a form must be described and named, even if known from only one place, so far, and even if it should ultimately prove to be a variety, *e. g.*, of *C. contracta*, which, however, is not probable. I take pleasure in naming it after its discoverer, Mr. Hodgson.

4. *C. transversa* Say. Widely distributed and common in all kinds of waters. Fairly constant in shape, but rather variable as to size and color.

5. *C. ferrissii* n. sp. Shell elongated, equipartite, rather well inflated, beaks in the middle, narrow, moderately prominent, somewhat inclined forward, slightly or not calyculate; superior margin curved, sloping from the beaks anteriorly and posteriorly; scutum and scutellum slight but distinct, long and narrow; inferior margin well and regularly curved; anterior and posterior part rounded, without any angles, the former somewhat less high; surface with some irregular, not sharp, but partly rather deep striæ, more or less arranged in zones, polished; color plumbeous around the beaks, with broad light yellow zones along the margins; shell thin, hinge fine, plate quite narrow, teeth thin and slight, the laterals placed at angles with the longitudinal axis, rather long; ligament fine and very long.

Size: long. 13, alt. 10, diam. 7 mill.

Hab.: Oklahoma City, Oklahoma, Arkansas, Frierson, Louisiana; in the former States collected by Mr. Jas. H. Ferriss, in whose honor the species is named, in the latter by Mr. L. S. Frierson.

So far as known, the present Calyculina is decidedly distinct, and

moreover, was found in company with *C. transversa*, which it resembles in being so elongated. But its beaks are not anterior, narrower and less full, the hinge margin is not so straight, and the anterior and posterior ends are rounded, not truncate.

6. *C. partumeia* Say. Widely distributed and decidedly variable, some forms being hardly recognizable. At Garrettsville, Ohio, Mr. Streator has found a form with exceptionally broad, full, rounded beaks, quite unlike those of a Calyculina.

7. *C. jayensis* Pr. (*Sphaerium jayanum*, in Mon. Corb.). One of the rarer species, and known from Indiana and Michigan to Wisconsin and Iowa. Seems to be valid.

8. *C. truncata* Linsley. Rather common, and somewhat variable. In regard to shape and surface appearance, it usually resembles more *C. partumeia* than *securis*. Yet in some forms the posterior end is rather obliquely truncated, and the beaks are rather strongly inclined towards the anterior. The mussel is more inflated, as a rule, than the dimensions given in Prime's description.

Clessin (*Cycladeen*, p. 246) says: "It appears to me somewhat doubtful whether *C. truncata* can be regarded as a good species. Around the type of *Cal. securis* are grouped several species (*Sph. contractum*, *rosaceum*, *sphaericum*, *truncatum*, *lenticula*), which, according to European principles, would unhesitatingly be regarded as varieties." In all probability, Clessin had insufficient materials on hand.¹ *C. truncata* has been collected in many places over a wide territory, and has been found distinct. Quite commonly, I have found *C. securis* and *truncata* associated, and the two often also with *C. partumeia*. *C. contracta* is evidently of another type. As to *rosacea* and *sphaerica* we refer to the following.

9. *C. rosacea* Pr. There is a small Calyculina with a thin, transparent, horn-colored, or almost colorless shell, narrow, moderately high beaks, which is evidently distinct from the other species. It is known from different places in Michigan, Illinois, New York and Virginia. For years it has been a stumbling block, since most forms did not agree exactly with Prime's description of *rosacea*, and yet they could not well be ranged under any other species. After all, it seems that they are *rosacea*.

¹ As directly evident from some of his descriptions and notes. *E. g.*, he says in the description of *C. securis*: "shell shining," which is rather an exception than the rule. Some of his descriptions were made from single specimens, as he states.

10. *C. securis* Pr. Widely distributed, common, and quite variable in size, shape, surface sculpture and color. The shell is more or less inflated; the beaks are more or less prominent, broader or narrower, often not calyculate, but simply rounded; the posterior end is more or less truncate, the disproportion between the anterior and posterior parts various; the surface of the shell is usually dull or even rough from fine scales of the epiconch, but sometimes smooth or even glassy. The color varies from brown to a vivid yellow or orange (*crocea* Lewis).

11. *C. sphaerica* Anth. I have seen no authentic specimens and no Calyculinæ from the original place, and consequently am unable to judge about it. It appears to be very near *securis*, also from some Michigan specimens received as *sphaerica*.

12. *C. rykolti* Normand. From Traverse City and from Straits Lake, Michigan, Mr. Bryant Walker has sent specimens of a Calyculina, which so closely resemble *C. rykolti* from Germany and Sweden that they can hardly be regarded as distinct. More materials may bring additional evidence.

Larger specimens (of the size given as typical by Clessin) from Saguache, Colorado, were in the collection of the late Dr. James Lewis, now in possession of Mr. Bryant Walker. They agree with *C. rykolti*, but must also be compared with the following:

13. *C. raymondi* Cooper. The specimens I have from Washington (Spokane, Mrs. Olney, and Seattle, Mr. Randolph), are evidently not mature. They have much resemblance with *C. rykolti*, and it would be of special interest to know whether such forms also inhabit eastern Asia.

14. *C. deformis* Carpenter. My specimens are from Rhode Island and New Jersey, not authentic but probably true. Whether this Calyculina is a good species, or a form of *securis*, as has been asserted, I am unable to decide, for the present. At any rate, it is a remarkable form, seems to be distinct.

15. *C. lacustris* Mull. (?). To Mrs. M. Olney I am indebted for a few specimens from the Spokane river, Washington, which can in no way be distinguished from *C. lacustris*, from several European countries. They appear absolutely identical. More specimens from other places would be very welcome.

Of *C. subtransversa* Pr., *lenticula* Gld., and *tenue* Pr., I have no materials. Under the first name, *C. transversa* from Texas have been sent out.

cat.
A NEW *RISOOA* FROM CALIFORNIA

BY W. H. DALL AND PAUL BARTSCH.

Rissoa kelseyi Dall and Bartsch.

Shell of medium size, elongate-conic, white, variously banded, or uniformly chocolate brown. Nuclear whorls mammillate, smooth. Post-nuclear whorls slightly rounded, ornamented axially by a few broad, depressed, almost obsolete ribs which are best seen near the summit of the whorls, and many irregular, more or less deeply impressed striations, which extended almost undiminished to the umbilical region. The spiral sculpture however is more conspicuous than the axial, and consists of deeply impressed lines which are more closely placed and less strongly developed near the summit of the whorls than at the periphery, grading gradually in this respect between these two regions. Sutures simple, well marked. Periphery and base of the last whorl well rounded, the latter ornamented by spiral sculpture similar to that between the sutures, but a little more distantly spaced and more strongly impressed. Eighteen of the spiral lines appear between the sutures upon the penult whorl and ten upon the base. Aperture large, oblique, decidedly effuse anteriorly; posterior angle acute, peristome continuous; columella strong, short, somewhat twisted and slightly revolute.

The type has seven post-nuclear whorls and measures: long. 6.3 mm., diam. 2.5 mm.

Seven specimens were sent to the National Museum by Mr. F. W. Kelsey, who collected them at Pacific Beach, California. The type and two specimens now form no. 168605 of the U. S. N. M. collection, the remaining four being in Mr. Kelsey's collection.

This species appears to be nearest related to *Rissoa albolirata* Carpenter, but is larger in every way than that form; there are also minor differences in sculpture.

cat.
VITREA DRAPARNALDI, BECK., IN WASHINGTON, D. C.

BY GEORGE W. H. SOELNER.

On the 22d of May, 1901, I visited a greenhouse in this city for the purpose of investigating its snail life, and was rewarded by finding a colony of what I at that time firmly believed to be finely de-

veloped specimens of *Vitrea cellaria*. A number of specimens were collected and labeled accordingly, and as many have since passed into the hands of friends, it may be well to state, in the interest of those who may not be familiar with the specific characters which differentiate this species from *V. draparnaldi*, that my identification of these shells was erroneous.

A recent search among the disintegrating ruins of an old mill in Georgetown, one of the oldest sections of the city, very unexpectedly brought to light specimens of a *Vitrea* which, notwithstanding its quite close resemblance to *draparnaldi*, is undoubtedly, I think, *cellaria*, although the shells obtained are unusually small and fragile, which is probably due to their out-of-door life. The largest measured only 8.75 mm. greater diameter. Owing to their smaller size and the different color of the animal and shell, I was at once impressed with the belief that I had found two species. A re-examination of specimens was, therefore, necessary, and after carefully comparing my first lot with Mr. Frank C. Baker's description and remarks on *V. draparnaldi*,¹ I was delighted to find that I had discovered this species; the specimens agreeing exceedingly well with his description in every detail. Dr. Pilsbry and Mr. Geo. H. Clapp, of Pittsburg, Pa., to whom I have sent examples, have kindly verified the identification.

Being anxious to know if the colony was flourishing, I again visited the nursery on November 3, 1902, and again secured a number of fine specimens, the largest measuring 16 mm. greater diameter.

This interesting find not only adds another species to the list of the mollusks of the District of Columbia, but another locality, and that a remote one, to the geographical distribution of this handsome introduced species, which seems to be gradually spreading over the United States. As far as I know, this is the first record for this shell east or southeast of Chicago, Illinois.

Washington, D. C., November 15, 1902.

NOTES AND NEWS.

NOTES ON LIMNÆA.—The receipt of Mr. F. C. Baker's very excellent work on the Mollusca of the Chicago Area suggests a few remarks on *Limnæa*. It seems unfortunate that American workers

¹ Mollusca of the Chicago Area, Part II; Chicago Academy of Sciences, April 25, 1902.

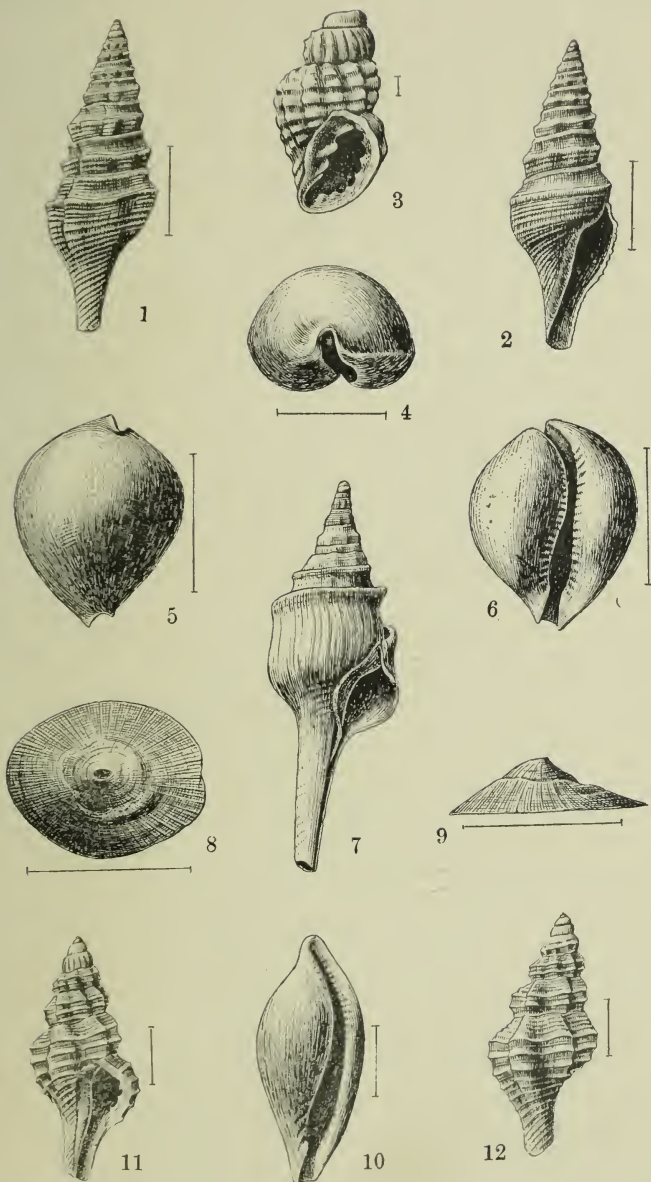
do not pay more attention to the European forms of the circumpolar types. Judging from the names, one would suppose that the American variations of *L. palustris*, etc., were quite different from those found in Europe. If this is the case, it is a fact of much interest; but it has never been demonstrated by comparisons, nor is it suggested by the figures in Mr. Baker's work. The variety *expansa* Hald., of *L. palustris*, is to be compared with the European var. *coniformis* Bourg., which on the face of things appears to be the same; while other American *palustris* seem referable to varieties *elongata* Moquin (Baker, Pl. xxxii, first three shells of fig. 1), and perhaps *conica* Jeffreys. In fact, it is not yet clear that there is any American variation of *L. palustris* which cannot be duplicated in Europe. With regard to *L. stagnalis*, it is well said that the typical European form is not that found in America, but it is apparently not true that the American form (*appressa* Say) is absent from Europe. I have seen plenty of European specimens which could not, I think, be distinguished from the American ones; such appear to pertain to the variety *fragilis* (Linné) and its allies. Some one should minutely examine the anatomy of these forms, to see whether it is not possible that there are two species, viz.: (1) *L. stagnalis* (L.), Europe; (2) *L. fragilis* (L.), Europe and America, including *appressa* Say, *raphidia* Bourgt., *vulgaris* Westerlund, etc.

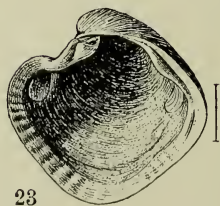
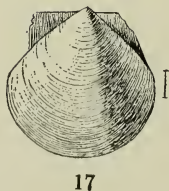
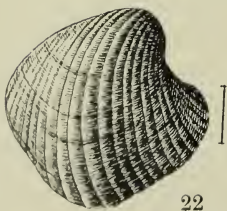
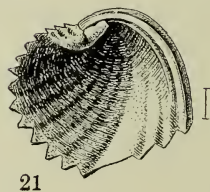
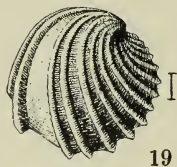
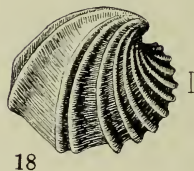
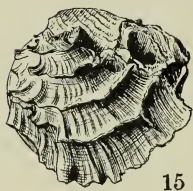
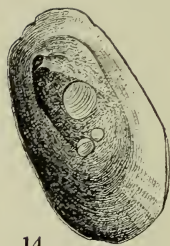
Linnæa Woodruffi Baker, appears from the figures to be the European *L. peregra*, in which case it must have been introduced.—T. D. A. COCKERELL.

THE death is announced of the Jesuit Father Prof. P. HEUDE, on January 3d, at Zikavei, near Shanghai, at the age of 66 years.

At the NOVEMBER MEETING of the SECTION ON CONCHOLOGY, Brooklyn Institute of Arts and Sciences, Mr. S. C. Wheat exhibited two specimens of fresh-water mollusca taken from a stream in New Jersey, which, upon careful inspection by Dr. R. Ellsworth Call, were pronounced to be hybrids between *Margaritana marginata* and *Anodonta undulata*. The specimens aroused much interest, as such hybrids are very rare. A specimen of *Anodonta implicata* seven inches in length taken from Prospect Park Lake was also shown. These specimens were added to the collection in the Children's Museum.—F. H. AMES, Sec.

Description de mollusques nouveaux provenant de l'île Obi (Moluques). In *Le Naturaliste*, Nov., 1902, p. 247, Mr. Dantzénberg has described and figured a series of Helices and two Leptopomas. Of the former *H. (Albersia) omissa* seems to be identical with *H. (Albersia) obiensis* Mart. (*Archiv f. Naturg.* 1899, pl. 3). *H. (Papuina) obiensis* Dantz. is apparently *H. (P.) piliscus* Mts. *H. (Papuina) groulti* is a fine, pyramidal, carinate species of the *pileolus* group, somewhat similar to *P. rynchostoma* Pfr.—H. A. P.





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No. 9.

NEW SPECIES OF TERTIARY FOSSILS FROM ALABAMA, MISSISSIPPI AND FLORIDA.

BY T. H. ALDRICH.

The following species are principally Eocene; descriptions of two species have already appeared in THE NAUTILUS and they are now figured for the first time. One new species from the Oligocene of Oak Grove, Fla., has been added. The Oligocene deposit of Oak Grove has been pierced by a deep well near Mobile, Ala., and no doubt it will be found still further to the westward. I am indebted to C. W. Johnson, of the Wagner Free Institute of Science, Philadelphia. All the drawings have been executed by Dr. J. C. McConnell, of the Army Medical Museum, Washington, D. C.

PLEUROTOMA (DRILLIA) CASEYI n. sp. Pl. III, fig. 1, 2.

Shell fusiform, whorls ten to eleven, first four smooth, apex pointed, the balance of the whorls nodular with a connecting line situated at the periphery. About nine nodes on each whorl. The balance of the spiral sculpture consisting of close-set, rounded lines, which are stronger on the lower part of each whorl; suture nearly concealed by a strongly raised and rounded band which is wavy and closely appressed. On the humeral area the spiral lines are cut by fine curved lines formed by the former retral sinus, sinus nearly semi-circular. Canal open and slightly spatulate.

Length 11 mm., width 3 mm.

Localities: Red Bluff, Miss., Byrams Ferry, Pearl Rv., Miss., and Vicksburg, Miss.

Resembles *Drillia texanopsis* Harris, but is carinated at the periph-

ery, more strongly striated and with a deeper retral sinus. Maj. Thos. L. Casey, U. S. Engineers, has sent me examples from the upper part of the bluff at Vicksburg. The shell is named in his honor.

CANCELLARIA ANNOSA Aldr. Pl. III, fig. 3.

This species was described in THE NAUTILUS, Vol. XI, p. 97, January, 1898.

CYPRÆA NUCULOIDES n. sp. Pl. III, figs. 4, 5 and 6.

Shell broadly ovate, rounded, globose, extremities slightly produced, surface smooth, basal callus heavy and extending upwards about one-third on each side, base flattened, rounded into the aperture, resembling in this respect *C. pinguis* Con., but broader. Aperture rather narrow, denticulated.

Length 17 mm., greatest breadth 14 mm.

Localities: From the Claibornian at De Soto, Miss., McLeod's Mill, Miss., and Dubose's Mill, in West Alabama.

This species has a more flattened base than *C. spheroides* Con. and has a much heavier basal callus. The inner lip is smooth below the denticulations.

CLAVILITHES COLUMBARIS n. sp. Pl. III, fig. 7.

Shell fusiform, whorls ten, apex bulbiform, consisting of three whorls, the third constricted; the next four spirally striated and tuberculated, the last two strongly turreted and excavated below the sutural shoulder. Aperture small, constricted at posterior. Canal long, narrow.

Length of figured specimen 52 mm.

Localities: Claibornian of De Soto and McLeod's Mill, Miss., also in West Alabama, same horizon. This species approaches the form described by Harris as *Clavilithes humerosus* Con., var. *texanus*, but the size and extremely prominent shouldered whorls and the constriction below are peculiar. The figured example is the most perfect one obtained, but the shoulder is even more prominent in other specimens. On comparing this species with *C. longævus* Lamarck, I find it has one less embryonic whorl and a higher spire.

FISSURIDEA INFREQUENS, n. sp. Pl. III, figs. 8, 9.

Shell medium size, with broadly ovate periphery at base, rather depressed; substance of shell thin, foramen in anterior half, small and narrowly ovate.

Greatest breadth at base 22 mm., height 6 mm.

Locality : On the Chickasawhay River, three and one-half miles below Quitman, Miss., below the *O. sellæformis* bed, Claibornian.

This species differs from any Tertiary species known by the very thin shell in comparison with its size, and its very fine cancellation. The interior is filled with matrix.

OVULA SYMMETRICA n. sp. Pl. III, fig. 10.

Shell smooth exteriorly, spire produced, pointed and slightly spatulate, outer lip reflected, margined on the interior with numerous crenulations, and curved from spire to base. Aperture narrow, the inner margin of same denticulated near the spire and with three or four folds at base.

Length of figured example 9 mm.

Localities : McLeod's Mill and on the banks of the Chickasawhay River, three and a half miles below Quitman, Miss.; close to the Wautubbee beds of the Claibornian. This species differs from both *O. subtruncata* and *O. texana* of Johnson, and it has been kindly compared with the types by C. W. Johnson.

The specimen from the bluff below Quitman is broken, but if perfect would be about 13 mm. in length.

LATIRUS ELABORATUS n. sp. Pl. III, figs. 11, 12.

Shell small, whorls nine, the first three smooth, the fourth partly so, the balance nodular and crossed by spiral lines, the lines faint on the upper part of each whorl, becoming coarser below and developing plaits at the top of the transverse nodes; the younger whorls have two coarse spiral lines about their centre.

Suture irregular, closely appressed. Outer lip nodular within, the pillar lip smooth with the exception of two slight raised plaits about the centre of the aperture within; canal produced and but slightly curved.

Length of the largest specimen 11 mm., breadth $4\frac{1}{2}$ mm.

Localities : Matthew's Landing bed, at C. Jones, Wilcox Co., Ala., and in the Black Bluff clays near Grave Yard hill, Ala. The figures are of a small specimen and do not show the two plaits on the pillar lip because they are too far within the aperture.

ANOMIA NAVICELLOIDES Aldr. Pl. IV, figs. 13, 14.

For description see THE NAUTILUS, Vol. XI, p. 97, January, 1898.

CHAMA MONROENSIS n. sp. Pl. IV, fig. 15.

Shell of medium size, strongly rugosely plicated, lamellar. Upper valve with 6-8 leaves turned up to nearly a vertical at their ventral edges, each leaf covered with radial raised lines running in couples. Upper valve slightly convex, lower valve convex and inequilateral.

Resembles somewhat *C. corticosa* Con., but is smaller and more profusely ornamented. One lower valve has twelve leaves or corrugations. The upper valve is shown in the figure natural size.

Locality: The *O. sellæformis* bed, at White's Marl bed, Monroe Co., Alabama.

PECTEN (PSEUDAMUSIUM) SUBMINUTUS n. sp. Pl. IV, figs. 16, 17.

Shell minute, thin, surface smooth, not polished, valves rather flat, ears small, subequal in the right valve and unequal in the left. Fine rugose striæ on the ears of the right valve, vertical to the hinge line but not reaching it, but they run down over the submargin. One ear in the left valve with five or six radiating ribs, the other smooth; interior smooth, the cardinal margin cross striated.

Alt. 3 mm., lat. 3 mm. of the largest specimen.

Localities: Red Bluff, Miss., Jackson, Miss.

This little shell is evidently adult. It is probably found at Vicksburg also. It is not rare, closely resembles *Pecten Guppyi* Dall in form, but is smaller.

VERTICORDIA DALLIANA n. sp. Pl. IV, fig. 18.

Shell small, rather flat, surface ornamented with sharp curved ribs, in the present specimen thirteen in number, nine on the anterior, then a concave space as if one rib was missing, then two more ribs about the middle of the shell, then a wide concave space and then two more ribs, the last one almost at the margin. Ribs serrating the ventral margin. Cardinal tooth strong, erect; lateral tooth long and curved.

Breadth $2\frac{1}{2}$ mm., height from beak to base 2 mm.

Only one valve found; it is about the same size as *V. eocense* Langdon. The muscular scars are slightly impressed. Pallial line not perceptible.

VERTICORDIA SOTOENSIS n. sp. Pl. IV, figs. 19-21.

Shell small, strongly ribbed with twelve ribs, then a blank space, then two ribs near the margin, beaks blunt and rounded, ventral

margin serrated; lateral tooth long and curved. Interior very porcellaneous; muscular scars slightly impressed.

Localities: Claibornian of De Soto and McLeod's Mill, Miss., and also in West Alabama, same horizon.

This species closely resembles *V. dalliana* Nobis, but differs in the number of ribs and the absence of one space which appears on the other. It is also more rounded.

VERTICORDIA QUADRANGULARIS n. sp. Pl. IV, figs. 22, 23.

Shell stout, valves nearly quadrangular, rather thick and globose. Surface with numerous coarse, rounded ribs. Entirely covered with granulations; deeply excavated behind the beaks; possesses both cardinal and lateral teeth. Muscular scars are deeply impressed. Pallial line strongly marked. Internal basal margin showing the ribs.

Height and breadth equal, 7 mm.

Several valves were found. This species belongs to the Section *Haliris* Dall. The laterals are more strongly developed than in most forms of this section. It is distinct from *V. mississippiensis* Dall in having fewer and more rounded ribs and a more depressed lunular area.

CANCELLARIA BIFOLIATA n. sp. Pl. IV, fig. 24.

Shell small, whorls six, first two smooth, the third partially so, and the last three strongly cancellated. The ribs prominent, spiral lines alternately coarse and fine. Umbilicus open, pillar lip with two plaits. Shell appears to be turreted from the strong ribbing.

Length 7 mm., breadth 4 mm.

Locality: Oak Grove, Florida, Oligocene of Dall.

This little species differs from *C. mississippiensis* Con. in its less number of plaits on the pillar, its higher spire and open umbilicus.

cat.
A NEW CRASSATELLITES FROM BRAZIL.

BY WM. H. DALL.

Among some dead shells dredged by the U. S. Fish Commission in fifty-nine fathoms mud, east of Rio Janeiro, Brazil, were a number of valves which were inadvertently put away among a lot of *Astartes*. On overhauling the latter, lately, these valves were found

and re-examined, proving to be an undescribed species of *Crassatellites* from a region where none had been reported hitherto.

CRASSATELLITES BRASILIENSIS n. sp.

Shell solid, small for the genus, yellowish-white, covered with a thin brownish periostracum; valves ovate, slightly squarish behind, rapidly descending and rounded in front, with pointed, slightly flattened beaks, sculptured with a few (5 to 10) low concentric waves beyond which the disk is smooth, or concentrically striated with some very obscure, fine, radial lines near the anterior base; lunule narrow, elongate, bounded by an obscure sulcus inside of which the area is excavated; escutcheon similar but much larger; basal margin minutely crenulate within, hinge normal, the resilium immersed but rather short and wide; muscular impressions well defined. Height 27.5: length 36; diameter 15 mm., some specimens being proportionately a little shorter.

The posterior end is obscurely truncate, but in some specimens slightly rostrate. On the whole, the species has much the aspect externally of a smoothish *Astarte*. The bottom temperature where dredged was 57° Fahr. The beaks are usually a little behind the anterior third of the valves.

♪ SHELL COLLECTING ON THE MISSISSIPPI.

BY FRANK C. BAKER.

For a number of years it has been the custom of the Chicago Academy of Sciences to have a Field-day some time during the month of July and to spend the day investigating some notable or particularly interesting locality, from a zoölogical, botanical or geological standpoint. These excursions are not only attended by members of the Academy, but by the faculties and students of the Chicago University, the Northwestern University and kindred scholastic bodies.

Saturday, July 12th, was chosen as the field-day for 1902, which dawned bright and pleasant. About one hundred and fifty people, including many of the charming "co-eds" from the Zoölogical Department of the Chicago University, met at the Chicago, Milwaukee and St. Paul depot, from which the special train left at eight o'clock

for Savanna, Illinois, our objective point. The ride consumed several hours and we arrived in sight of the Mississippi about noon.

Our first thought was for the "inner man," and we hastened in a body to the river bank, where we bargained with the boat renters and secured row-boats. No sooner were our bargains completed than we scrambled into our boats and rowed across the river toward a group of islands, where we ate our lunches.

The pull across the river was very interesting, especially to several of the "co-eds," who bravely volunteered to row one or two of the boats, for there was a seven-mile current which made this a matter of great exertion. The writer had never before seen the "Father of Waters," and he must confess that a peculiar feeling came over him as he rowed across the swiftly-flowing stream and thought of the many historic scenes which had taken place on or near this mighty river since De Soto first saw it. But the most interesting fact *to him* in connection with this river was that it afforded a home for more Unios than any other stream in the world.

As soon as lunch was out of the way we began a hunt for clams, and before the time arrived for the departure of our train we had accumulated several bushels, beside numerous examples of fresh-water gastropods, such as *Campeloma* and *Vivipara*.

About a mile above Savanna we found several men engaged in "fishing" for clams, which they sold to the button-factories at Muscatine and other places in Iowa and Illinois. Their method of fishing was ingenious. A bar of iron (frequently a gas pipe) six or seven feet long is strung with four-pronged hooks, made of bent and twisted telegraph wire. The strings are about five inches apart and two or three hooks are attached to each string, making two or three rows of hooks attached to the bar. As many as forty hooks are frequently strung on one bar, the whole appliance being locally known as a "crowfoot" dredge or grapple. A piece of rope is tied near each end of the bar, forming a sort of bridle, and to this is fastened another rope, twenty-five or more feet in length, by which the dredge is pulled over the bottom of the river.

At first sight one would hardly suppose that with such an instrument a person would be able to gather very many clams, but the fishermen told us that several tons could be obtained with this apparatus in a comparatively short time. The clams are caught in this way: in many parts of the river the Unios lie packed by thousands,

their shells half protruding from the mud and slightly gaping, as is natural with all these mollusks when at rest. As the fisherman pulls the dredge along the bottom over these *Unio* beds the prongs of the hooks become caught between the open valves of the shell, which immediately close and fasten themselves to the prong. A single haul may yield over one hundred shells caught in this way.

The inordinate collecting of shells for the button industry bids fair to exhaust the supply before many years have passed unless wise laws are enacted and enforced. Not only are many tons of these shells taken every year, but a large number are wilfully wasted by the fishermen. An example of this waste came under the notice of the writer on this occasion. Having failed to secure as many specimens as were wanted, a fisherman was asked if he knew a good place to gather clams. He replied that just above a large grain elevator some fishermen had dumped a boat-load on the shore. Not realizing fully what he meant, we walked to the spot indicated and there beheld a sight which made at least one of the party both glad and sad. Piled on the shore for a distance of a quarter of a mile were thousands upon thousands of clams, some alive, others with gaping shells and a few entirely devoid of the animal. Not less than twenty-five species were represented, many of them useless for the manufacture of buttons, but of great value to the conchologist of the future who may wish to study these species. The fishermen were either too lazy to throw them back into the water or else thought that if they threw them on the shore they would avoid catching them again on their hooks. Such wanton destruction as this, if not stopped, will soon exterminate many of the species. Those which were thus destroyed were comparatively thin shelled, such as *Anodonta*, *Alasmidonta* and *Symphynota*.

The species collected by the different parties were as follows :

<i>Lampsilis ventricosa</i> Barnes.	<i>Plagiola securis</i> Lea.
<i>ligamentina</i> Lamarck.	<i>elegans</i> Lea.
<i>anodontoides</i> Lea.	<i>Obliquaria reflexa</i> Rafinesque.
<i>fallaciosa</i> (Smith) Simpson.	<i>Strophitus edentulus</i> Say.
<i>recta</i> Lamarck.	<i>Anodonta corpulenta</i> Cooper.
<i>parva</i> Barnes.	<i>Arcidens confragosus</i> Say.
<i>alata</i> Say. ¹	<i>Symphynota costata</i> Rafinesque.
<i>gracilis</i> Barnes.	<i>complanata</i> Barnes.
<i>leptodon</i> Rafinesque.	<i>Unio gibbosus</i> Barnes.

¹ One specimen of *alata* was curiously deformed, one valve being perfectly flat while the other was very convex.

Unio crassidens Lamarck.	obliqua Lamarck.
Pleurobema æsopus Green.	ebena Lea. ¹
Quadrula plicata Say.	tuberculata Rafinesque.
undulata Barnes.	metanevra Rafinesque.
heros Say.	Vivipara intertexta Say.
lachrymosa Lea.	Campeloma integrum DeKay.
pustulosa Lea.	subsolidum Anthony.
pustulata Lea.	Polygyra multilineata Say.
trigona Lea.	

The last was found to be a common inhabitant of the islands in the river and in the woods bordering the Iowa side of the river.

At Carroll Creek, ten miles from Savanna, Mr. C. C. Adams, of the University of Chicago, collected the following species, all being very common :

Amnicola limosa Say.	Physa integra Haldeman.
Physa gyrina Say.	Succinea ovalis Say.

A NEW FOSSIL ASHMUNELLA.

BY T. D. A. COCKERELL.

ASHMUNELLA THOMPSONIANA PECOSENSIS subsp. nov.

Small (diam. max. 12, min. 10.5 mm.); last half of last whorl very distinctly transversely ribbed, recalling *A. altissima*; lip and teeth strongly developed, basal tooth single.

Hab.: Vallé Ranch, Pecos, New Mexico, in a light reddish deposit of uncertain age, Nov. 30, 1902. (T. D. A. and W. P. Cockerell.) The commonest shell in the deposit is *Pyramidula strigosa cooperi*. *Vallonia cyclophorella* is also abundant.

Last year my wife collected a dead shell of a recent *Ashmunella* at the old Pecos Pueblo, which is only a few miles from the Vallé Ranch. It is *A. thomsoniana*, with max. diam. 13.5 mm., basal tooth single. There is no sign of the ribbing of the fossil form.

¹ This species is called "nigger-head" by the fishermen, and is considered the most desirable shell for the cutting of pearl buttons.

cut.
 NOTES ON SOME SHELLS FROM NORTH CAROLINA.

BY E. G. VANATTA.

OMPHALINA RUGELI OXYCOCCUS n. var.

This variety is distinguished from the typical *O. rugeli* Binn. by being densely microscopically granulate above and having the base nearly smooth.

The type is in the collection of the Academy of Natural Sciences of Philadelphia, No. 68743, collected by Mr. H. W. Wenzel, June, 1896, at Cranberry, N. C.

Locality: Cranberry, N. C., collected by Mr. H. W. Wenzel, Dr. Henry Skinner and Mrs. Geo. Andrews; also at Banners Elk, Watauga Co., N. C., by Mrs. Geo. Andrews.

The following species were collected by Mr. Joseph Willcox during July, 1902.

At Blowing Rock, Watauga Co., N. C., the following were taken:
 Goniobasis proxima Say (3500 feet elevation). Polygyra andrewsæ normalis Pils.
 Polygyra albolabris Say. Circinaria concava Say.
 Philomycus carolinensis Bosc.

And at Cranberry, Mitchell Co., N. C., the following species:
 Polygyra andrewsæ normalis Pils. Polygyra tridentata Say.
 monodon fraterna Say. Vitrinizonites latissimus Lewis.
 stenotrema Fér. Circinaria concava Say.
 thyroides Say. Pyramidula perspectiva Say.
 subpalliata Pils.

NOTES.

HAWAIIAN PHYSIDÆ.—It has been held by Pease and others that the reversed fresh-water shells resembling *Physa*, found in the Hawaiian Islands, are all Limnæids belonging to *Ameria* or some related group. Part of them certainly are, but a species, believed to be *Physa compacta* Pease, received from Mr. H. W. Henshaw, of Hilo, Hawaii, proves, on anatomical examination, to be a *Physa*, though whether referable to *Physa* s.s. or to *Aplexa* cannot be determined, owing to the contraction of the mantle edge which, in spirits, appears not to be digitate.—W. H. DALL.

“PYRAMIDULA” STRIGOSA CONCENTRATA.—I have lately re-

ceived a couple of specimens of this form (max. diam. barely over 12 mm.), collected by Mr. C. S. Onderdonk, at Alpine, Chaffee county, Colorado, at between 10,000 and 12,000 ft. This is a long way from the original locality, but I sent one to Dr. Dall, who certified that it is the genuine *concentrata*. There are two dark bands, both narrow but strongly developed. This var. *concentrata* is extremely close to my var. *minor* (max. diam. 14 mm.), described in Journ. of Conchology, 1890, p, 175. The latter, however, is not alpine.

No doubt the Colorado *concentrata* have evolved independently from the New Mexico and Arizona ones, and, therefore, might perhaps be considered entitled to a different name.—T. D. A. COCKERELL.

ERRATUM.

NAUTILUS, p. 96, line 8 from top: For *coniformis* read *corviformis*.—T. D. A. COCKERELL.

PUBLICATIONS RECEIVED.

THE MOLLUSCA OF THE MT. MITCHELL REGION, NORTH CAROLINA.—By Bryant Walker and H. A. Pilsbry. Proc. Acad. Nat. Sci., Phila., 1902, pp. 413-442, Pls. xxiv, xxv.—In vol. xiv, p. 45, we noticed Professor Pilsbry's account of the Mollusca of the Great Smoky Mountains. The present paper sets forth the results of the exploration of the French Broad river region by Messrs. Ferriss and Walker "and two ladies" in 1901. The Roan Mountain fauna being pretty well known from the investigations of Wetherby, Walker and others, it now becomes possible to determine with some degree of accuracy the range of the different species in this part of North Carolina and adjacent Tennessee. It had previously been made clear that the Roan Mountains and Great Smoky regions, though only about seventy-five miles apart, possessed molluscan faunæ which were by no means identical; the expedition of 1901 sought to determine whether the valley of the French Broad river might be the dividing line between the Roan and Great Smoky faunæ, and whether Mt. Mitchell, with an altitude of 6,711 ft., might not produce something peculiar to itself. With the results of the expedition before them, the authors conclude that the French Broad river is not the dividing line between the two faunæ just mentioned, and, in fact,

that there is probably no sharp line of demarcation anywhere. It is found, however, that the French Broad river region has itself some of the characteristics of a distinct faunula, although Mt. Mitchell, the centre of the explorer's hopes, proved disappointing. A comparative list, showing the distribution of the species, is presented on pp. 420, 421. To the Roan Mountains list should be added *Philomyces secretus*, described from thence, and *Vitrea carolinensis wetherbyi*,¹ sent to the present writer from Roan Mountain by Wetherby. The true *V. carolinensis* probably does not occur at Roan Mountain, as I gathered from Wetherby's letter when sending the *wetherbyi*, that he knew only the latter.

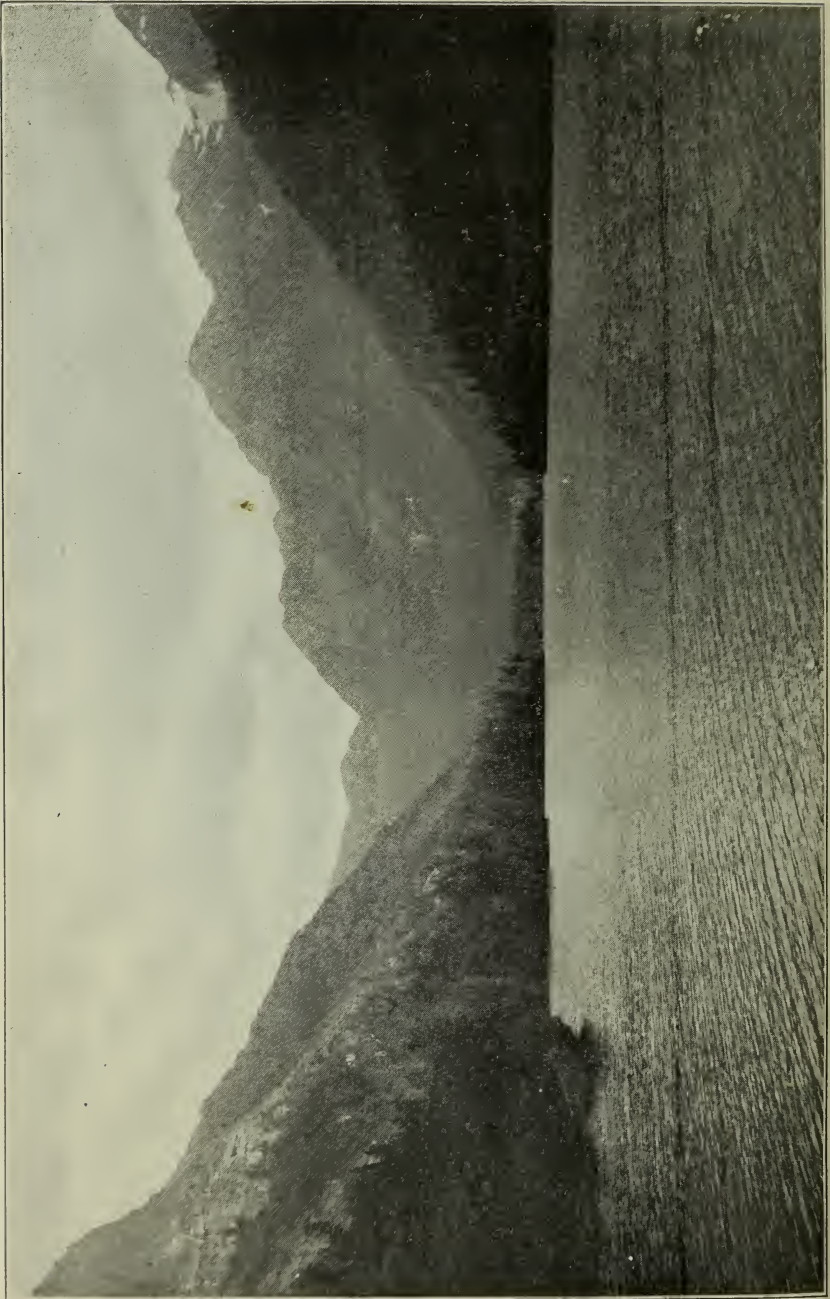
Leaving out a few probably erroneous records, we find 105 species and races of land mollusca recorded from the whole region discussed. Of these, only 33 are recorded as common to all three faunulæ, *i. e.*, the Roan, French Broad and Great Smoky. Three are common to the Roan and Great Smoky regions, and have very likely been overlooked in the French Broad. 25 are from the Roan alone, 10 from the Roan and French Broad, 8 from the French Broad alone, 7 from the French Broad and Great Smoky and 19 from the Great Smoky alone.

The same peculiar features of the fauna as were observed in the Great Smokies are seen in the Mt. Mitchell region. The Pupidæ are represented by a single example of *Strobilops*, and this a southern form. Not a single Limnæid was found anywhere; not even *Physa*.

The new forms described in the paper are: *Polygyra tridentata tennesseensis* W. & P., *P. andrewsæ intermedia* W. & P., *Vitrea approxima* W. & P., *V. vanattai* P. & W., *Gastrodonta gularis theloides* A. D. Brown MS., and *G. gularis decussata* Pils. & Van.; while *Polygyra hirsuta* vars. *altispira* and *pilula* are raised to specific rank. *Pyramidula alternata mordax* was rediscovered by the expedition, and is fully discussed and figured.

Altogether, the paper is certainly a most satisfactory one, and we can only hope that it will be followed by a long series of similar ones. It will be some time before Messrs. Pilsbry, Walker, Ferriss and their friends exhaust the possibilities of the Appalachian Mountains, which seem to contain an extraordinarily varied and interesting molluscan fauna.—T. D. A. COCKERELL.

¹ On page 430, the date of publication of *wetherbyi* is said to be 1901. It should be 1900.



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No. 10.

^{Col.}
NOTES ON PYRAMIDULA ELRODI PILS.

BY MORTON J. ELROD.

This shell was first collected on the sides of the Mission Mountains, above Post Lake, in the summer of 1899. About forty were taken, all dead. Specimens were sent to Dr. Pilsbry, of the Philadelphia Academy of Sciences, who described the species in NAUTILUS, Vol. XIV, 40, naming the shell after the collector.

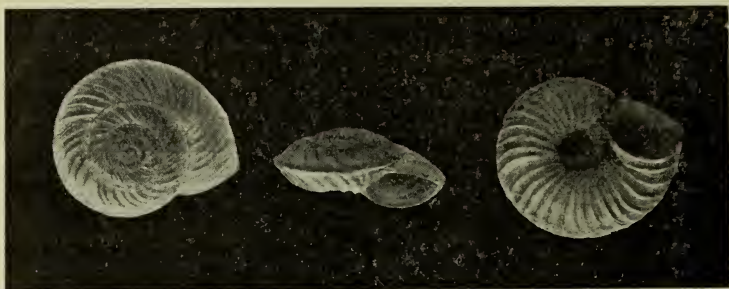
During the collecting expedition of the University of Montana Biological Station, in July, 1900, a stay of ten days was made at McDonald Lake for the express purpose of making further investigations of this species. During this time some three quarts of specimens were collected, of all sizes and varying colors, from the dark brown of the living shells to the bleached white of the dead ones. Also some three dozen living snails were secured, which were drowned, and in a number of cases, beautifully expanded.

The distribution of the species, so far as known, appears to be quite local, and is deserving of further study. At present it seems confined to the mountain slopes forming the amphitheatre around and to the east of Post Lake. On the south side of the lake, owing to the dryness of the rocks and soil, it appears very scarce, one living and several dead shells being the result of an afternoon's search. A search on the north bank during the same time on the same day resulted in a quart of shells, a dozen living. While no search has been made in the mountain slopes east of the lake, there can be little doubt of its presence, since the shell is found on both sides of the lake.

On the north slope of the lake four small streams tumble over the

rocky wall of the mountains, making beautiful little cascades. The first of these, beginning next the plain, appears to come out of the rocks high up, flows through a small canon between the cliffs, and shortly afterward disappears in the loose talus below. Earlier in the year these loose, talus rocks are wet with melted snow, but at the time of collecting, in July, they were hot and dry.

On the talus below the first fall, shells were found abundantly. On the talus of the ravine, a few feet to the west, only a few were found, while still further west none whatever could be found anywhere. This little stream from the mountain, therefore, seems to mark its distribution on the mountain towards the west. Acting on this basis, the rocks were followed upward along the sides of the



mountain, following the little gully of the stream mentioned. Shells were found as high as we went, a distance of 1,500 feet, or up to a total elevation of 5,000 feet above the sea. Time did not permit a search higher.

The limit of distribution of the shells, as mentioned, ends abruptly. A search eastward from the mountain stream caused the discovery of shells in abundance for a mile; beyond this we did not go. There is a great deal of difficult mountain climbing necessary to explore these regions, and a half day does not permit one to go far. But from the fact that they have been found on the slopes of Mt. McDonald, across the lake to the south, it would appear evident that the unexplored canons and mountain sides forming the large amphitheater supplying the lake's waters, support the *Pyramidulas*.

The writer has been in different places in the Mission range, from one end to the other, on the western slopes, and nowhere else have

the shells been found. Whether or not they are on the eastern slopes, on the Swan river side, is yet to be determined.

The habits of the shells are very peculiar. Shells are rarely found among the bushes or where there is much vegetation. They are found on the surface among the loose rocks of medium size, but not among the large boulders or the finer talus. When bleached, they are a beautiful white, their color against the dark brown or lichen-colored sandstone making them very conspicuous objects. The corrugations show plainly from a distance, and there is no difficulty whatever in seeing the dead shells when in the region where they are to be found.

The living ones are not so easily discovered. They are dark brown, almost identical in color with the rocks among which they live, and very easily overlooked. When the animal dies the color changes to a delicate pink, and later the shell becomes a beautiful clear and pearly-white.

A search was begun for living shells by following up the talus where the shells were found most abundantly. After descending over a thousand feet, we came to a small ledge of rock forming a sharp promontory with a cliff below, on which we stopped to take a photograph of McDonald Peak, which showed up beautifully from this point. This ledge forms the western wall for the small canon through which the aforementioned stream comes. The loose rocks on the top of the cliff were overturned. It was with much surprise that shells were picked up, and among them one apparently alive. Diligent search revealed the fact that this small ledge, not more than thirty feet in extent, was the home of a colony of these interesting creatures. A quart of shells was secured, among them a dozen live ones, the first ever found. This ledge is shown on the left of the picture.

This home of the shell is very interesting and romantic. Living on the cliffs of one of the most rugged ranges in the State, with scant vegetation, it has a life common to few shells. It prefers the crannies among the loose rocks, hiding there from enemies.

After finding this first colony, a second trip was made over the same route, only farther up the mountain. Other colonies were found, with occasionally a live one. Search was then made lower down, among the rocks near the lake, resulting in finding live ones at different places, though to do so required considerable digging in

the rocks, in order to get down below the hot, dry rocks to where there was a little moisture.

It seems apparent that the living shells live among the loose stones, in the early spring crawling around over the damp rocks. As the warm spring and summer days approach, the rocks become dry. The snails previously crawling over them cease activity, and instead of all of them crawling for protection under the loose rock, some throw their protective film across the opening of the shell while yet on the rocks; the sun kills the animal, which dies, leaving the dead shell to bleach and become a conspicuous feature on the rocks. Here the shells remain, very few of them washing any distance.

All of the living shells taken appeared dead except a few. Invariably, however, when a shell sank in water the snail within was alive. It is probable that the species is continued by the hibernation of some of the more fortunate individuals which are deeper in the rocks, where there is more moisture.

ADAPTATION OF MOLLUSKS TO CHANGED CONDITIONS.

BY A. C. BILLUPS, LAWRENCEBURG, INDIANA.

Many years ago the Ohio river at and below Cincinnati, Ohio, was one of the most prolific hunting grounds of the collector of the fresh-water species of mollusks. At that time abounded in immense numbers (as is shown by the large quantities of duplicates in the collections of all the old collectors) *Anculosa praerosa* Say. About twelve years ago this shell disappeared almost entirely and for many years not a single specimen was found; this year, however, a few adults and large numbers of young shells have been found in localities where it is certain that no shells have existed for many years. The explanation of this occurrence is as follows; *A. praerosa* Say was a long time ago one of the most common of the river snails; the growth of the city of Cincinnati and the numerous factories along the banks of the river, each and every one adding to the filth of the water, pouring in sewage and acids, have rendered the water so foul that the *Anculosa* of the old day have been exterminated, all but a few of the most hardy of the species, which probably crawled to the lowest and most inaccessible parts of the river, where they managed to exist and to produce young: the young shells have become more used to the changed conditions, which worked such havoc with their ancestors,

and their descendants are so little affected by the foul water that they are now thoroughly acclimated and are producing young in large numbers used to the surrounding conditions. As this is the case, we may now look for *Anculosa praerosa* Say in nearly all its old haunts, where it will thrive under conditions which would have proved fatal to its ancestors. Many of our forest snails have been forced, by the clearing of the timber and tilling of the soil, to more or less adapt themselves to conditions not slightly, but very materially changed from those to which they were originally used. One of the most ready to take to the new mode of life was perhaps *Pyramidula alternata* Say, which is now one of the most sociable snails that exists in North America; this snail can be found in all our cities and doing well surrounded by conditions which are, without the slightest doubt, entirely strange to its nature—the rubbish heaps in every back yard harboring hundreds of fine and well-developed specimens in every stage of growth. Another forest snail which has taken kindly to open country life is *Polygyra appressa* Say. By setting a trap (a board greased with lard, placed about one inch above the ground) in a dark and damp alley between two houses in a low part of the town, I captured in ten nights the following number of snails: 9, 12, 10, 13, 26, 23, 18, 21, 12, 11—in all 155 adult specimens; young and immature specimens were not counted. This trap cleaned up all the snails in the immediate vicinity, as after that date the captures began to drop off and at the end of three weeks no more were taken. *P. monodon* Rack. and *inflecta* Say have in a smaller degree taken to open country life and are now common on nearly every railroad cut or fill under old cross-ties, but in nearly every instance deprived of the shade of the trees which seemed to be so necessary to their original abode. With *Pol. albolabris* Say and *exoleta* Binn., however, the change from woodland to open country does not agree. I have for years tried the experiment of transporting these eminently forest snails to places which, while being favorable for their maintenance, were still very different from their native haunts, and the result has been with both species a signal failure, and of three thousand that I transported three years ago, a very few only have managed to survive. They laid many eggs but very few of them ever hatched, and at the present time I doubt if there are twenty living snails to be found. *Pol. thyroides* Say is perhaps of the larger snails the most hardy, and the least affected by changed conditions. Mr Geo. H.

Clapp, of Pittsburg, Pa., informs me that *Vallonia* has adapted itself to open life and can now be collected in immense numbers in places very different from its original haunts. The question of the adaptation of mollusks to changed conditions is one of great interest, and in no country can the subject be so well studied as in America, where man and man's inventions change the whole face of an immense tract of country in a very short time. We know that the object of molluscan life (and in fact all life) is to preserve its own existence and to reproduce its own species. With rapidly-changing conditions, the snail must either adapt itself to these conditions or cease to exist, and it will be most interesting for many years to come to watch the struggle and to record the cases of success or failure. Complete local lists of species carefully made up, collections of large series of species from every possible locality and a knowledge of that locality and its conditions, will enable all students in this branch of molluscan evolution to arrive at a convincing and satisfactory conclusion. While in the older countries of Europe the forest snail has become now adapted to open country life, we have no records to bear upon the time when this change was taking place, and in all probability it was much more gradual than will be the case in this country of rapid and great changes.

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NEW LAND SHELLS OF THE JAPANESE EMPIRE.

BY H. A. PILSBRY AND Y. HIRASE.

As already stated in a former number of the NAUTILUS, Mr. Nakada spent the autumn in exploration in the Hokuriku region, which includes provinces along the west coast of middle Hondo. The material examined shows that area to have but few endemic species, most of those collected being widely-distributed forms, already well known from other places. He reached Sado Island, where he found numerous species, the more interesting being a handsome new *Euhadra*, a sharply-carinate new *Helicina*, and specimens of *Blanfordia japonica* A. Adams. This last is perfectly distinct from the mainland form I called *B. jap.* var. *simplex*, which will now be raised to specific rank. *B. japonica* has a strong rounded ridge or varix behind the lip, such as is seen in many *Truncatellas*. Mr. Nakada returned to Kyoto, and started, November 5th, for Tosa province, in

Shikoku, with Mr. Adzama. We hope to have still more good things from this prolific province.

Mr. Hatai, who assisted Mr. Nakada in Ogasawara (Bonin Islands), continued to collect there after Mr. Nakada's return. On September 25th he started from Chichijima to go to Yuo-jima, small islands southward from the Ogasawara group. He reached Kita-Yuō-jima safely, but owing to stormy weather, a landing on Naka-Yuō-jima could not be made. The vessel stayed at sea, but the storm increased, and the ship was lost. After more than eighty days, no tidings of him have come. Mr. Hatai was faithful to the work, and his untimely loss through his efforts to increase our knowledge of these island faunas is deeply felt.

Eulota (Euhadra) sadoensis P. & H., n. sp.

Shell rather narrowly umbilicate, somewhat trochoidal, buff-whitish, with a sharply-defined dark chestnut band just above the periphery, a wider one, fading at the edges, on the upper surface, and a very broad band extending over most of the base, the interior of the umbilicus also dark; these bands leave the pale ground-color in narrow belts below the suture, above and below the periphery, and around the umbilicus. Surface glossy, irregularly obliquely striate, and showing the usual very fine spiral lines. Spire elevated, conic, the apex obtuse. Whorls $5\frac{1}{2}$, moderately convex, the last depressed but not angular, very slightly descending in front. Aperture very oblique, somewhat lunate; peristome expanded and reflexed, dilated half over the umbilicus, white, except where colored by the bands. Alt. 17, diam. 24 mm.

Sotokaifu-mura, Sado. Type no. 83909 A. N. S. P., from no. 994 of Mr. Hirase's collection.

This seems quite distinct from other members of the *peplomphala* group of Helices. The coloration reminds one of *Epiphragmophora mormonum* var. *cala*.

Eulota (Plectotropis) kiusiuensis var. *oshimana* n. var.

Similar to *E. kiusiuensis* in texture, sculpture, umbilicus and peripheral keel; but the spire is higher, and the color chestnut-brown instead of yellowish.

Oshima, Osumi. Types no. 83891 A. N. S. P., from no. 914 of Mr. Hirase's collection.

Ganesella notoensis Pils. & Hir., n. sp.

Shell imperforate, resembling *G. stearnsi* and *G. papilliformis* in general shape; pale greenish-buff, thin, dull with the luster of silk, but the early whorls are glossy, and there are some narrow, oblique, glossy streaks. Smooth to the eye, but under a lens showing slight growth-lines and almost obsolete spiral striation. Spire high, with slightly convex outlines. Whorls $6\frac{1}{2}$, moderately convex, the last slowly descending in front, convex beneath. Aperture very oblique, round-lunate, the peristome narrowly expanded, subreflexed; columella vertical, narrow, dilated over the umbilicus and appressed. Alt. 23, diam. 19 mm.

Kitanoshō, Noto. Type no. 83892 A. N. S. P., from no. 289 c of Mr. Hirase's collection.

This is a pale species, differing from *G. stearnsi* in color and the less convex whorls, which in *stearnsi* are swollen just below the suture. In *G. pagodula* and *G. papilliformis* the columella is different in shape.

Ganesella cardiostoma var. *kagaensis* Pils. & Hir., n. var.

Shell imperforate, somewhat globosely conic, light chestnut-colored, with an indistinct, pale, peripheral band; thin, somewhat transparent, smooth and glossy, slightly wrinkled by growth-lines, and very densely, minute striate spirally. Spire conic, with convex outlines. Whorls $5\frac{1}{2}$, convex, the last rounded peripherally, very convex beneath, especially at the last half; slightly descending in front, and contracted behind the lip. Aperture oblique, lunate-triangular, the lip thin, brownish, expanded, reflexed below, the steeply-sloping baso-columellar margin straightened, dilated over the umbilicus, where the base is deeply impressed. Alt. 13, diam. 14 mm.

Hakusan, Kaga. Type no. 84321 A. N. S. P., from no. 975 of Mr. Hirase's collection.

This form differs from *G. cardiostoma* Kob. (described from Kyoto, but not yet found there by Mr. Hirase), in the darker color (*cardiostoma* being yellowish-corneous, like *japonica*), and the very convex base, while *cardiostoma* is said to be flattened there.

Chloritis echizenensis Pils. & Hir., n. sp.

Shell shaped almost exactly like *C. bracteatus*, but glossy, the raised dots (not bairs) far less crowded, though still close; the apex

more obtuse, earlier $2\frac{1}{2}$ whorls coiled about in a plane. The sculpture is about as close as in *C. pumila*, but the processes are shorter, the shell larger, more elevated and glossy. *C. perpunctatus* is more depressed, smaller and narrowly umbilicate, while in *echizenensis* the perforation is almost closed by the reflection of the lip at its axial insertion. Alt. 13, diam. 19 mm., whorls $4\frac{1}{2}$.

Omiishi, Echizen. Type no. 84256 A. N. S. P., from no. 981 of Mr. Hirase's collection.

Related to the several species mentioned above, and best described by a comparison with them.

NOTE ON TRITONIA PALMERI COOPER, 1882.

BY T. D. A. COCKERELL.

The type locality of this species is San Diego, California, where it is said to be common. Cooper's description would hardly distinguish it from allied species, but as I know of only one species from southern California according with the description of *T. palmeri*, I assume that it is in fact the animal Cooper had in hand. The following notes, based on a specimen collected by Dr. W. R. Coe at Deadman's Island, San Pedro, California, July 18, 1901, may serve to facilitate the recognition of the species. The description is from life.

Length about 17 mm.; white, suffused with yellow dorsally; tentacles pale yellowish-brown; ends of lamellæ yellowish; dorsum rugose with small warts. Close to *T. lineata* A. & H., but differs by its strong yellow suffusion above and absence of opaque white dorsal lines. Ramose branchial lamellæ irregularly bipinnate, five on each side. Veil bilobed, each lobe produced into five or six finger-like filaments (two in *T. lineata*). Tentacles almost as in *T. lineata*; with the principal axis cylindrical and truncate, and numerous lateral branched processes, not so long as central axis. No eyes visible.

The species of *Tritonia* seem to be most easily distinguished by the character of the veil. *T. palmeri* has more processes on the veil than *T. lineata*, but very much fewer than in *T. holmbergii*, in which, however, they are very short.

c)
SOME HOMONYMOUS GENERIC NAMES

BY T. D. A. COCKERELL.

In the course of some recent investigations, I found that certain names proposed by Mr. C. T. Simpson (Proc. U. S. Natl. Museum, 1900) for groups of Naiades were homonyms. I wrote to Mr. Simpson, asking him to propose substitutes, but he has preferred to leave this in my hands. The names are:

Dalliella Simpson, t. c., p. 832 (not *Dalliella* Cossmann, 1895). This may be called *Simpsonella*; type *Simpsonella purpurea* (*Anodonta purpurea* Val.).

Aurora Simpson, t. c., p. 849 (not *Aurora* Rag., 1888, nor *Aurora* Sollas, 1888). This may be called *Diaurora*.

Anodontoides Simpson, is later than *Anodontodes* Hamps., but the difference of a letter is sufficient to prevent homonymy.

The name *Carinella* Mabile, pertaining to a tolerably distinct section of *Arion*, is a homonym of *Carinella* Sowerby, 1839. If it is thought worth while for the section mentioned to have a name, a new one must be found.

Geyeria Buckman, 1899, for a genus of Ammonites, is a homonym of *Geyeria* Buchecker, 1880.

Paratropis Boettger, 1891 (sect. of *Omphalotropis*), is a homonym of *Paratropis* Simon, 1889.

In 1890, Brauer and Bergenstamm gave the name *Paramenia* to a genus of Diptera from New Zealand. In 1891, Pruvot applied the same name to a genus of Aplacophora (Arch. Zool. Expér., ix). Under these circumstances, *Pararrhopalia* Simroth, 1893, regarded as a subgenus of *Paramenia* Pruvot, may stand as a genus; type *Pararrhopalia pruvoti* (*Paramenia pruvoti* Sims.). Typical *Paramenia* Pruvot may be called *Pruvotina*.

Ridleya Ancey, 1901, is later than *Ridleia* Dendy, 1888, but I think both may stand, by the difference of a letter.

Ischnodactylus Cossmann, 1890, is a homonym of *Ischnodactylus* Pels., 1886. *Pasithea* Hartman, 1881, invalidates *Pasithea* Meyrick, 1883, the first being a genus of Mollusca, the second of insects.

Zygænosis Felder, 1874, prevents the use of *Zygænosis* Rochebrune, 1884, proposed for a genus of Mollusca.

GENERAL NOTES.

ZONITOIDES ARBOREUS (Say) IN JAPAN.—In a recent lot of shells sent by Mr. Hirase, there are specimens of this common North American species, from Tokyo. The shells are quite indistinguishable from American specimens. One with the soft parts dried in enabled me to compare the dentition, which proves to be substantially that of the American species, the formula being 20.6.1.6.20. In a Philadelphia *arboreus* examined there are 19.6.1.6.19 teeth, the shapes of the individual teeth being the same in both. A slender, nearly straight dart, in a club-shaped sack, was found in the Tokyo specimen.

The form described by me as *Z. subarboreus*, from Hachijo island, Izu, is distinguishable chiefly by the somewhat larger size, and the same seems to be true of *H. yessoensis* Reinh., described from Hakodate, which is probably also a *Zonitoides*, but I have not yet seen specimens.—H. A. PILSBRY.

I have recently found a very fine reversed specimen of *Polygyra profunda* Say in Hamilton Co., Ohio, not far from Laurenceburg.—A. C. BILLUPS.

At the December meeting of the Section on Conchology of the Brooklyn Institute, the president of the Section, Dr. R. Ellsworth Call, exhibited a reversed specimen of *Mesodon exoleta*, which is very rare in that form.

Mr. Wm. H. Weeks, Jr., reported on a collecting trip on the coast of Maine, as follows:

“*Shell Collecting on Cliff Island, Casco Bay, Maine.*—So much has been said regarding the conchologist at Casco Bay that little can be added. The writer spent a most delightful ten days at Cliff Island during last August and much of that time was spent in hunting mollusks. Shore collecting gave fine suites of *Purpura lapillus*, *Littorina palliata*, *Littorina littorea*, *Littorea rudis*, *Acmæa testudinalis* and *Macoma fusca*. A diligent search on shore for the famous *Buccinum undatum* revealed only dead specimens, but fishermen brought in fine suites found in lobster traps, also fine specimens of *Neptunea decemcostata* and *Sipho islandicus* found well out to sea. Dredging gave sparingly such forms as *Astarte sulcata*, *Nucula proxima*, *Lyonsia hyalina*, *Nassa trivittata*, *Pecten magellanicus*, *Modiola modiolus*, etc. *Polinices heros* was obtained at low tide well off shore

and *Helix hortensis* was in abundance on the island. A few *Helix albolabris* were also captured."—F. H. AMES.

PUBLICATIONS RECEIVED.

AN ANNOTATED CATALOGUE OF SHELLS OF THE GENUS PARTULA in the Hartman collection belonging to the Carnegie Museum. By Herbert H. Smith (Ann. Carnegie Mus. I, no. 3). The rich series of Partulæ brought together by Dr. W. D. Hartman, having passed with his collection into the possession of the Carnegie Museum, has now been catalogued, with full details concerning each of the 240 suites contained therein. The total number of species is 83, besides many named forms which Dr. Hartman regarded as varieties; in all 1,647 specimens. We feel rather skeptical about the specimens considered hybrids by Hartman (Catal., pp. 471-473). There is not much evidence of hybridism between really distinct species of Gastropods. The notes comprise the data accompanying each lot and more or less descriptive commentary on the shells themselves, but consist largely of extracts from the letters of Mr. Andrew Garrett, who collected the major part of the specimens. Within his province, Garrett was one of the best conchologists of his time, and his experience in the field gives his opinions on these shells great weight. The catalogue is arranged according to Dr. Hartman's latest MS.; and embodying as it does the results of both Hartman's and Garrett's mature thought on this difficult genus, it must be regarded as one of the most important papers on South Pacific land snails. Although Mr. Smith has modestly "abstained from expressing opinions and made only a few suggestions," his judicious notes earn for him the thanks of conchologists.

PRELIMINARY CATALOGUE of [Japanese] Marine Shells in the collection of the Natural History Department, Tokyo Imperial Household Museum. By T. Iwakawa. Part I, consisting of Cephalopoda, Pteropoda and Pectinibranchiata forms a book of 84 pp., recording 893 suites. Localities are carefully noted, both in English and Japanese, and the list will be chiefly useful to students of the Pacific fauna for the numerous definite Japanese localities. The known faunas of the Riukiu and Ogasawara groups, hitherto but little known, are largely increased by these records.



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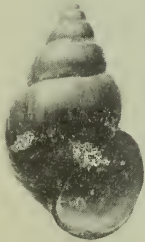
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12.

THE NAUTILUS.

VOL. XVI.

MARCH, 1903.

No. 11.

C. L.
ON THE SPECIFIC VALIDITY OF *CAMPELOMA MILESII* LEA.

BY BRYANT WALKER.

There has been considerable difference of opinion expressed, both in regard to the specific validity of this form and in regard to its relations to the other recognized species of the genus.

The types were collected by the late Manly Miles, formerly State Geologist of Michigan, in Branch Lake, Antrim county, in the extreme northwestern part of the State, and were described by Dr. Lea, in 1863.¹ Binney, in 1865,² included it in the aggregation which he assembled around *Campeloma decisa*. Dr. James Lewis, in his review of Binney's work in the Am. Jour. of Conchology,³ declared that it "has claims to the rank of a species that must be recognized." And later, in the same Journal,⁴ associated it with *decisa* in the group characterized by "shells of thin texture, whorls usually regularly rounded, suture well impressed, spire regular in proportion and, when perfect, acute."

Tryon, in his continuation of Haldeman,⁵ concludes that "it does not exceed the usual variation of *decisa*," and does not allow it even varietal rank. Call, in his elaborate paper "On the Genus *Campeloma*,"⁶ refers it to *C. subsolida* Anth. And in this he is followed

¹ Proc. Phil. Acad. Nat. Sci., 1863, p. 156.

² L. & F. W. Shells, Pt. III, p. 42 (1865).

³ A. J. of C., IV, p. 60 (1868).

⁴ A. J. of C., V, p. 33 (1869).

⁵ Mon. F. W. Univalve Moll., p. 28 (1870).

⁶ Bull. Wash. Coll. Lab. N. H. I., p. 155 (1886).

by Baker,¹ in his recent work on the "Mollusca of the Chicago Area." Lea's figure,² which is copied by Tryon, is either very poor or else represents an abnormal specimen. Binney's figure, which is stated to be from one of the types, is more accurate and represents the species as usually found at the present time.

Campeloma milesii has not as yet been recorded from outside the state of Michigan. In that State it has a well-defined and somewhat peculiar distribution and, wherever found, seems to preserve its essential characteristics as fully as any of the other recognized species of the genus (figs. 1, 2, 3, 4, 7, 8 and 9). It is an interesting coincidence, if nothing more, that its range is substantially the same as that of *Limnæa catascopium* and *Physa ancillaria magnalacustris*, which are the characteristic univalves of the shores of the Great Lakes and of the rivers and lakes in close proximity to them. The localities thus far recorded for *milesii* are the Detroit River, Saginaw Bay, Carp Lake and Crooked Lake Emmet county, Branch Lake Antrim county, North Lake on Beaver Island in Lake Michigan and the Pine River Marquette county. In most of these localities it is associated with *C. decisa* and in some with *C. rufa*. On the other hand, the range of *C. subsolida* in Michigan is quite different. This species on the eastern side of the State has not been found north of the Clinton River. On the western side it is abundant in the St. Joseph and Grand Rivers and apparently ranges as far north as Charlevoix, which is the only place where it has been found associated with *milesii*. Neither form has been reported from the interior of the State, and *subsolida* does not seem to be found in waters of any of the Great Lakes. From this, it is evident that the ranges of the two forms are quite different and only impinge in the extreme northwestern part of the lower peninsula.

Compared with *C. subsolida*, as found in the southern part of the State (fig. 11), and which is quite typical, it differs both in form and texture. *Subsolida* is a large, thick, heavy shell, with a blunt apex, sinuous lip and with a heavy white deposit on the parietal wall. It is practically free from erosion. On the other hand, *milesii* has a thin shell, a regularly-tapering, acute spire, a thin, transparent parietal callus, a much less sinuous lip, and is usually only about half the

¹ Moll. of Chi. Area, p. 361 (1902).

² Observations, XI, pl. 24, fig. 114.

size. It is extremely subject to erosion, and mature specimens with a perfect apex are comparatively rare. If, as has been stated, *milesii*, like *exilis*, is a sexual variation of *subsolida*, it is remarkable that it has not been found associated with that species in localities where that species is abundant, and it is still more remarkable that where it is found, its slender form is persistent and equally characteristic of both sexes. The only form of *subsolida* with which *milesii* can at all be compared, is the slender form from the Mississippi Valley known as *C. exilis* Anth. (fig. 10). Just what the relations of this form with the typical *subsolida* are, have never been satisfactorily explained. If, as generally considered, it is merely a sexual variation, it is a curious fact that it has never been found in any of the Michigan rivers where the typical form is abundant. But however that may be, while superficially resembling *milesii* in its slender elongated form, it differs, like the typical *subsolida*, in the shape of the spire, the less rounded whorls, and consequently less impressed suture, shape of the lip and texture. It seems clear, therefore, that *milesii* cannot be referred to *subsolida* even as a varietal form.

There yet remains to be considered its relation to the congeneric forms, with which it is frequently found associated. The characteristic color and texture of *C. rufa* are always sufficient to distinguish it, even when the erosion of the upper whorls has destroyed the outline of the more elongated *milesii*.

Lewis was quite right when he grouped *decisa* and *milesii* together, and it must be confessed that the exact relation of the two forms is not free from doubt. *Milesii* is more closely related to *decisa* than to any other species, and it is possible that when a greater abundance of material can be had, it may be relegated to varietal rank. But from our present knowledge, the forms seem quite as distinct as any of the more closely-related species of *Campeloma*, which are recognized, and it would seem better to keep them separate until their specific identity can be unquestionably established. Compared with *decisa* as it is commonly found, *milesii* is a thinner, more elongated shell, with a more acute apex; the upper whorls are more convex and the suture rather more deeply impressed; the aperture is smaller and narrower. This difference is well shown in the two forms as found together in the Pine River, Marquette county (figs. 9 and 12).

Then, too, there is a marked difference in the shape of the young when ready for extrusion. It will be remembered that Dr. Lewis

laid great stress on such differences in his study of this group, relying on the well-recognized principal that "marked differences in the embryos and young of a class of beings are specific." The young *milesii* when ready for extrusion is uniformly larger than the young of *decisa* (*milesii* 4.75 x 3.50, *decisa* 4.25 x 3.50 mill., specimens figured). The shell is more slender and noticeably more elongated, the apex being well elevated above the next whorl, while in *decisa* the apex is depressed, giving a planorboid shape to the apex, and rises scarcely if at all above the second whorl. This difference, shown by figs. 5 and 6 from the two species as found together in the Detroit River, is characteristic and persistent. There is no substantial variation in the young of the Detroit River *milesii*, and none in fourteen different lots of *decisa*, from localities as widely separated as Port Cram, N. J., Detroit River, Grand Rapids and Marquette county, Michigan. The color in both forms is the same, a pale green, and both have raised revolving lines of epidermal tissue.

It is unfortunate that no detailed anatomical examination of either species has ever been published. It is quite possible that when that is done, other differences will be found which will confirm the view herein expressed. In the meantime, it certainly seems advisable to recognize the specific validity of this interesting form.

EXPLANATION OF PLATE V.

1. *Campeloma milesii* Lea. Detroit River, Michigan.
2. *Campeloma milesii* Lea. Detroit River, Michigan.
3. *Campeloma milesii* Lea. Detroit River, Michigan.
4. *Campeloma milesii* Lea. Saginaw Bay, Michigan.
5. *Campeloma milesii* Lea. (Young.) Detroit River, Michigan.
6. *Campeloma decisa* Say. (Young.) Detroit River, Michigan.
7. *Campeloma milesii* Lea. Charlevoix, Michigan.
8. *Campeloma milesii* Lea. Carp L., Emmett Co., Michigan.
9. *Campeloma milesii* Lea. Pine River, Marquette Co., Mich.
10. *Campeloma exilis* Anth. Illinois River, Illinois.
11. *Campeloma subsolida* Anth. Clinton River, Macomb Co., Mich.
12. *Campeloma decisa* Say. Pine River, Marquette Co., Mich.

Cal.
THE LAND SHELLS OF CALHOUN FALLS, S. C.

BY A. C. BILLUPS, LAWRENCEBURG, IND.

Local lists of shells, no matter how incomplete they may be, are always useful to those interested in the study of geographical distribution, and without them no work could be done in that branch to any degree of satisfaction.

Many collectors fail to make these lists because they deem them of little special interest, and because they feel they can give no account of any new thing. These lists of themselves form no article of great interest when taken singly, but when a large number of them, covering a large area of country, are brought together, they form a most valuable source of information to the specialist. It should be the aim of every naturalist to add his share to the sum of general knowledge, no matter how small that share may be, and for these reasons I feel it not wasted time to give the result of one day's hunt, in what most likely is an unworked locality.

This day's work took place at a bad time of year, on a cold, bright morning on the 9th of December, 1900, at a place known on the map as Calhoun Falls. I say on the map, as the Falls proper are a long three miles from the hotel, general store and saw mill bearing that name. They treated me well, however, at the hotel, as some sportsmen had spent the day there and had added a quantity of delicious game to the usual southern country fare of "hog and hominy." Between the combined resources of hotel and sportsmen, I put away one of the best dinners I ever sat down to, and one which I shall long remember.

Calhoun Falls, S. C., is in Abbeyville county, on the Sea Board Air Line, about twenty-five miles southwest of Greenwood, South Carolina, and fifty miles east of Athens, Georgia.

The country two miles back from the river is of a very sandy soil, interspersed with red clay, and the timber principally pine. The creeks are all small, sandy and swift, running over a bottom composed only of sand, and occasionally a few yards of bare rock buried in sand; they contain no molluscan life whatever, and time spent in their investigation is wasted.

The Savannah River, at a point about half a mile below the railroad bridge, breaks into a series of falls, or rather rapids, full of small

islands and rocks, and two miles below attains a width of nearly three-fourths of a mile. A few of these islands are of fairly large extent and heavily wooded with pine and oak.

The rapids extend for a distance of five miles and bear the same character throughout, the rocks all rest upon a clean, sandy bed, and over the entire length of the rapids I could find no trace of water shells of any description. The streams in this section of the country all seem to be alike in this respect, with the exception, perhaps, of Clear Creek, a stream about three miles from this point, which is said to contain large quantities of *Unio* of which, however, I have had none other than oral evidence.

The banks of the river on the South Carolina side are in many places very steep and covered with hard-wood timber. I may here state that it is only wasted time to attempt to find shells under pine logs. I have tried it often and always with the same results, namely, a tired back, torn hands, a considerable gain in bodily temperature, and few if any specimens to add to the bottle. As an athletic exercise it is without an equal, but from a collector's point of view, a decided failure.

Beginning at the railroad bridge and working down stream, comes a stretch of bottom land covered by one of the most dense cane brakes I ever saw, extending to the water edge, and which gives evidence of being submerged at high water. I turned many logs at this point but they were in too close contact with the clear sand and produced nothing.

Beyond and below this cane brake the banks of the river rise at a distance of fifty yards from the water to quite steep hills, thickly timbered with oak and maple, and the soil of a much more solid consistency. Here, under logs on the hill side, I found *Polygyra appressa* Say, *Polygyra stenotrema* Fer. and several *Zonitoides*, together with a few specimens of *Polygyra tridentata* Say. Under one log I found a colony of *Polygyra barbiger* Redf., but a most careful search under many other similar logs near by failed to discover any more. On the bottom land several water-soaked and spongy logs produced *Gastrodonta interna* Say and *Zonitoides elliotti* Say in great numbers, they were all obtained by picking the wood apart with a knife and shaking out the shells into a handkerchief. The contrast between the light delicate pink of the former and the pale green of the latter was very marked and beautiful.

After leaving this part of the bank I traversed two miles of red clay soil, covered with pine and shrub, which, though most carefully searched, produced nothing whatever. Below this, several streams were crossed, containing nothing but the usual sand and water.

The banks now become very steep and in many places the bare rocks are exposed, badly cracked and weather-worn. Here in the crevices of the limestone, so far back as to require the aid of a stick to reach them, I found some beautiful specimens of *Polygyra obstricta* Say, a few alive and many dead, at the base of the cliff.

Numerous specimens of *Polygyra* and *Pyramidula* were found among the loose and broken fragments of stone, which were here piled in great profusion, between the cliff and the river, but which were all above high-water mark.

Beyond this place, where the rocks are less numerous and covered by a rich, black soil, I took a few fine specimens of *Polygyra albolarbris major* Binn. alive and also found many dead and broken shells.

From this point I left for the hotel, by what I took to be a short cut through the woods but which proved to be very far from an air line. I reached home, however, after about a two hours' tramp, having spent one of the most enjoyable days I can remember, and well satisfied with the results of my trip. It must be remembered that this tramp was made at a very bad time of year and when all shells were in their winter quarters.

The following is a complete list of all the material taken :

SHELLS TAKEN AT CALHOUN FALLS, SOUTH CAROLINA.

Polygyra tridentata Say. A large, dark-colored shell, found quite plentifully among the loose rocks and broken fragments.

Polygyra tridentata var. A much smaller shell than the preceding, showing a pinkish shade about the lip. Scarce, and in company with the above.

Polygyra rugeli Shutt. Quite common under logs.

Polygyra inflecta Say. Under logs and among loose stones.

Polygyra albolabris major Binn. Under logs and chips in the black soil.

Polygyra palliata Say. Eight specimens from the heavily-timbered hill side.

Polygyra obstricta Say. From the cracks in the limestone cliffs.

Polygyra appressa Say. Among the loose stones with *tridentata*.

Polygyra elevata Say. Four dead shells only, in drift near the river.

Polygyra thyroides Say. Two dead and one living, on the hill side.

Polygyra barbiger Redf. A numerous colony under one log only, evidently in their winter quarters.

Polygyra stenotrema Fer. A small number, not common and generally distributed.

Polygyra stenotrema exodon Pils. Very common under the logs and loose stones. (Determined by Bryant Walker.)

Polygyra hirsuta Say. One or two specimens only.

Circinaria concava Say. Five adult and several partly-grown shells found, under leaves, logs and stones on the hill side.

Omphalina fuliginosa Griff. Several specimens, deep in thick beds of leaves.

Gastrodonta intertexta Binn. A few fine shells, in the earth under the logs.

Gastrodonta interna Say. Large numbers, in water-soaked logs near the river.

Zonitoides arboreus Say. Quite common, under the bark and in rotten wood.

Zonitoides elliotti Redf. Large numbers, in water-soaked logs.

Pyramidula alternata Say. A strongly-ribbed variety. Quite plentiful, under the large loose rocks.

Pyramidula perspectiva Say. Quite common, in decayed logs on the hill side.

Pyramidula striatella Anth. Scarce, in company with *P. striatella*.

Helicodiscus lineatus Say. Ten specimens, under bark of dead wood.

NEW LAND SHELLS OF THE JAPANESE EMPIRE.

BY H. A. PILSBRY AND Y. HIRASE.

Helicina sadoensis Pils. & Hir., n. sp.

Shell depressed and acutely carinate, about equally convex above and below, dull red or reddish-yellow, sculptured with fine, irregular wrinkle-striæ and very fine, crowded spirals above and below. Spire low-conic with somewhat convex outlines. Whorls about 4, the last convex below, not descending in front. Aperture oblique, of the

usual shape; lip well expanded and thickened; a noticeable angle at the base of the columella. Umbilical callus small but rather thick, pox-marked. Operculum is sparsely granulose and retracts barely within the lip. Alt. 2.5, diam. 4.5 mm., to alt. 3, diam. 5 mm.

Sotokaifu, Sado. Types no. 84380, A. N. S. P., from no. 991 of Mr. Hirase's collection.

Related to *H. hakodadiensis* Hartm., but quite distinct by its acute peripheral keel.

Alycæus harimensis var. *sadoensis* n. v.

Similar to *A. harimensis* in size, form and striation, but the strongly constricted neck is quite smooth, the umbilicus is noticeably wider, the reflexed sutural process is more prominent, and the peristome is much thickened outside and beveled towards the edge.

Aikawa, Sado. Types no. 83895 A. N. S. P., from no. 996 of Mr. Hirase's collection.

Macrochlamys perfragilis var. *shikokuensis* Pils. & Hir., n. v.

Shell depressed, yellow, subtransparent, with the form of *M. perfragilis* Pils., of Oshima, Osumi, but with the same number of whorls it is much smaller. It is also very similar to *M. dulcis* Pils. in shape, but the umbilicus is narrower and almost closed by the triangular reflection of the columellar lip, and the very glossy surface is smooth, without the spiral lines of *M. dulcis*. Whorls $4\frac{1}{2}$, alt. 6.5, diam. 13 mm.

Kotsuzan, Awa (Shikoku). Type no 84259 A. N. S. P., from no. 1000 of Mr. Hirase's collection.

Microcystina higashiyamana Pils. & Hir., n. sp.

Shell minutely perforate, conic, brown, somewhat transparent, glossy, and marked with fine, indistinct growth-lines. Spire conic, the apex obtuse. $5\frac{1}{2}$ convex whorls, very slowly widening, the last distinctly angular at the periphery, convex beneath, a little impressed in the middle of the base. Aperture oblique, somewhat lunate, the outer lip simple, columellar lip turned back, strengthened by a nearly vertical white callus a little way within. Alt. 2.2, diam. 3 mm.

Higashiyama-mura, Awa, Shikoku Island. Type no. 84379, A. N. S. P., from no. 1002 of Mr. Hirase's collection.

Distinguished by the conic, *Kaliella*-like shape and the white callus within the columellar margin.

Buliminus andersonianus var. *echigoensis* P. & H., n. var.

Shell similar to *B. andersonianus* Mlldff. except that the spire is a little wider, not quite so straightly conic, and the size is much greater. Dark vinous-brown with a green-buff border below the suture, the mouth purple-bordered inside.

Length $29\frac{1}{2}$ to $30\frac{1}{2}$, diam. 11 to $11\frac{1}{2}$ mm.; whorls fully 8.

Myokōzan, Echigo. Types no. 83896 A. N. S. P., from no. 750a of Mr. Hirase's collection.

B. andersonianus was originally described from Yesso; but Mr. Hirase has found it not only in Ojima, the southern province of that island, but also in the province Uzen, in Nippon (Hondo); the specimens being typical. This large race is from still farther south.

HELICINA JAPONICA AND RELATED FORMS.

BY H. A. PILSBRY.

Helicina japonica was described from "Tabu-Sima," that is, Tobishima, an islet of the Province Ugo, on the west coast of Nippon. Adams gave no dimensions; but the figures in Sowerby's *Thesaurus Conchylorum*, which were evidently drawn from his specimens, measure alt. 8, diam. 9.6 mm. However, even where no size-mark is given in the *Thesaurus*, the figures of many small species are slightly enlarged. Thus, on the same plate with *H. japonica*, the figures of *H. convexa*, *concinna*, etc., are enlarged, while those of some other species are not so. Therefore the dimensions of these figures cannot be relied upon as showing the true size of *H. japonica*. The specimens before me from Tobishima, the type locality, measure alt. 6, diam. 8 mm., or are a little smaller, alt. 5, diam. 7.2 mm. The surface is glossy or dulled by slight erosion, and is rather *finely but deeply striate*. The lip is expanded and in fully adult shells is duplicate, and very much thickened on the face. The moderately thick basal callus is densely, conspicuously roughened. The specimens from Sado are like those of Tobishima, but of a dull red-brown color. A larger race, diam. 9.5 to 10.5 mm., red, or sulphur-yellow, glossy and handsome, occurs at Kashima, Harima. It has the fine sculpture of typical *japonica*.

H. reinii Kobelt, described as a variety of *H. japonica*, is much larger, alt. 10, diam. 14 mm. The type locality is unknown, but

specimens exactly typical occur at Ibuki, Omi. It is much less striate than *japonica*. In the specimens I have seen the surface is dull from loss of the cuticle, which is evidently deciduous and very thin. It varies in color from white or sulphur-yellow to deep crimson. Some shells from Kotsuzan, Awa (Shikoku) having all other characters of *reinii*, have the last whorl covered with glossy cuticle like the small form *expolita*. *Reinii* may prove to be specifically distinct from *H. japonica*, and for the time being may be so considered.

The various forms may be tabulated thus:

- I. Shell distinctly striate or costulate (*H. japonica*).
 1. Striation close and fine.
 - a. Diam. 7 to 8 mm., typical *H. japonica*.
 - b. Diam. 9 to 11 mm., *H. japonica*, var. from Harima.
 - c. Diam. 15 to 16 mm., *H. japonica* var. *uzenensis*.
 2. Very coarsely ribbed; diam. 10-11 mm., *H. japonica* var. *echigoensis*.
- II. Surface not distinctly striate (*H. reinii*).
 1. Surface dull, denuded of cuticle; diameter 12 to 15 mm., typical *H. reinii*.
 2. Surface covered with a smooth, polished cuticle; diam. 10 to 13 mm., *H. reinii* var. *expolita*.

H. j. echigoensis is a new variety from Omimura, Echigo, types no. 84384, A. N. S. P., from no. 575a of Mr. Hirase's collection. It is strongly and coarsely ribbed.

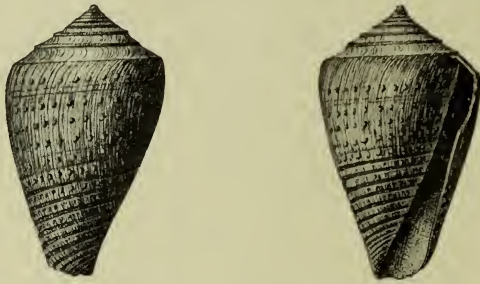
♣ A NEW CONUS FROM THE TERTIARY OF FLORIDA.

BY T. H. ALDRICH.

Conus waltonensis n. sp.

Shell medium in size, substance rather thin; spire elevated, with nine whorls, including the apex, which is rather sharp, profile of spire slightly broken by a shoulder just above the suture on each whorl, the suture impressed, each whorl of the spire concave, and marked by numerous curved lines; periphery sharp; body whorl below the keel in some specimens over one-half smooth, then below this bearing two or three spirals of evenly-spaced nodules without any grooves between, gradually changing to rows of nodules on bands

between grooves, which are eight or ten in number, the nodules fading away as the canal is reached, but in the type specimen the nodules are present over the whole of the smooth part without, however, any grooves between. Anal notch rather deep, and marking the spire



with its former positions; outer lip thin, pillar lip straight with a very slight twist; aperture straight above, widening near the base.

Length 20 mm., max. diameter 12 mm.

Locality: Shoal Creek, Walton county, Florida.

Remarks: This shell bears a close resemblance to *Conus puncticulatus* Hwass, and is doubtless an ancestral form, thus adding another link to the chain of evidence of a connection between the Atlantic and Pacific Oceans during Tertiary times.

This species has been in my possession for many years and until lately was not known to me from any other locality, but on looking over some specimens of fossils from the Number 2 well of the Mobile Oil Co., bored near Mobile, Alabama, I found two or three specimens of it, and from its position over three hundred feet above the Oak Grove (Fla.) horizon in this well, it would seem to indicate that this deposit on Shoal Creek is much younger than the Oak Grove beds. The assignment of these beds to the Oligocene must, in the writer's opinion, be better substantiated than at present. There are so few species common to the "Chipola" of Dall and the Vicksburg formation, it would seem better to confine the use of the term "Oligocene" to the latter, which is in accordance with Conrad's original diagnosis, and put the Chipola, Shoal Creek and Chattahoochie beds into one formation, calling them all Miocene, and if this should eventually be done, then this formation should bear the name its discoverer, D. W. Langdon, Jr., gave it of "Chattahoochie."

D. G. Harris figures a *Conus puncticulatus* Hwass from the Galveston deep well. It is probably the same species as the one herein described. The pustules on the living shell appear to be in the grooves while on the fossil form they are between them.

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No. 12.

♂¹
MOLLUSKS OCCURRING IN SOUTHERN CALIFORNIA.

The following species, not heretofore made known as occurring in Southern California, have been detected in Los Angeles and elsewhere in this part of the State within the past two years. The large slug *Limax maximus* first observed in the southeasterly part of Los Angeles, has been quite numerous. It is found in considerable abundance in many localities in the Walnut Grove Tract, including my own grounds. Its color caused me to doubt its identity, so I sent specimens to Dr. Pilsbry. He referred them to the foregoing species with the comment, "that it was not the common form, but a melanistic variety which I have never seen from the East." Another slug determined by Dr. Pilsbry for Mr. Williamson is *Limax flavus*, occurring in Los Angeles, apparently rare as yet. In March, last year, I detected a few examples of *Punctum conspectum* Bland, on my lawn near the water faucet; some 9 or 10 specimens; these were named by Professor Dall. I have failed to find further examples after careful search. *Vallonia pulchella*, so exceedingly abundant on my grounds in August, 1900 (see the NAUTILUS, Vol. XIV, pp. 65-67) is now quite scarce.

Mr. Hemphill reports *Limax maximus* as occurring in San Diego in the nursery of the well known florist, Miss Kate O. Sessions of that city.

The appearance and disappearance of forms like *V. pulchella* and *P. conspectum* is not easily explained.

Helix aspersa became exceedingly abundant on my premises, so numerous as to be a pest; by persistent search it is now nearly ex-

terminated. The hunt will have to be kept up, else it will soon become as abundant as ever.

ROBT. E. C. STEARNS.

Los Angeles, Feb'y 24, 1903.

DESCRIPTIONS OF NEW JAPANESE LAND SHELLS.

BY H. A. PILSBRY AND Y. HIRASE.

Chloritis tosanus n. sp.

Shell umbilicate, depressed, the spire but slightly convex, very thin, uniform brown. Surface slightly glossy, closely set with short hairs arranged in regular oblique rows. Whorls $4\frac{3}{4}$, very convex, separated by a deeply excavated suture, the last whorl rounded peripherally and beneath. Aperture slightly oblique, rounded-lunate; peristome thin, acute and not expanded except at the columellar insertion, where it is widely dilated, partly covering the umbilicus. Alt. 10, diam. 17.5 mm.

Shinjo-mura, Tosa. Type no. 84415. A. N. S. P., from no. 1015 of Mr. Hirase's collection.

This species is the first *Chloritis* found in Shikoku. It is very like *C. per punctatus*, but about twice the size. In *C. fragilis* the hairs are much more widely spaced. *C. hirasei* is far more widely umbilicate.

Eulota (Cælorus) cavitectum n. sp.

The shell resembles *E. caviconus*, but is larger, not quite so high, the umbilicus contracting more rapidly within. Brown; covered with oblique cuticular threads and small scales, the scales predominating on the last whorl and base. Whorls $6\frac{1}{3}$, slightly convex, the last strongly carinate at the periphery, a little convex beneath, descending rather deeply below the keel in front. The aperture is nearly horizontal, transversely oval. The peristome is brown, thin, the upper margin not expanded, lower margin reflexed, bearing a white tubercle on the inner margin. Alt. 5, diam. 10 mm.

Kochi, Tosa. Type no. 84416. A. N. S. P., from no. 1033 of Mr. Hirase's collection.

E. caviconus of western Kyushu is smaller, has more whorls, a well-like umbilicus, and finer sculpture, the cuticle of *E. cavitectum*

being roughened like that of a *Plectotropis*. It is the first *Cælorus* found in Shikoku Island.

Trishoplita lischkeana var. *hizenensis* n. var.

The shell is transparent-whitish, with a red-brown band at the periphery, which is angular in front, becoming rounded on the latter part. The band ascends above the suture. The surface is glossy, and under the lens is seen to be very finely striate, and decussate by very close, fine, shallow spiral striæ. Whorls $4\frac{1}{2}$. The umbilicus is about one-eighth the diameter of the shell. Peristome thin, expanded below, hardly so above.

Alt. 5.8, diam. 9 mm.

Alt. 5.3, diam. 8.8 mm.

Ukujima, Hizen. Types no. 84414. A. N. S. P., from no. 1019 of Mr. Hirase's collection.

This little shell has the red-brown band and decussate surface of the much larger shell I described as *T. collinsoni* var. *okinoshimæ* (Proc. Acad. Nat. Sci., Phila., 1901, p. 547. It is also related to *T. c.* var. *casta* (NAUTILUS XV, 'p. 19), also a larger shell, from the province Hiuga, in eastern Kyushu; and to *T. lischkeana* (Kobelt), from Hagi, Nagato, on the northwestern coast of southwestern Hondo (Nippon). *T. lischkeana* is more elevated than *hizenensis*, and though compressed, the last whorl is not angular. Otherwise the two forms seem to be alike, so far as we can tell from the published description and figures of *lischkeana*.

One of the present authors, in referring these forms to A. Adams *collinsoni* some years ago (NAUT. XV, 19), was influenced by the belief that the locality "Tago" given for that species was situated in western Shikoku but this was an error, Tago being a seaport of the province Izu, on Suruga Gulf; and as *collinsoni* is described as a decidedly more globose shell than *casta*, etc., though similarly colored, it will probably prove to be specifically distinct from the forms *casta* and *okinoshimæ*.

Trishoplita mesogonia var. *shikokuensis* n. var.

The shell is similar in form to *T. mesogonia* (Pils.), but differs in sculpture, being very closely and finely striate spirally. The types are red-brown, fading towards the suture and base, with a pale line at the angular periphery, and more or less streaked with whitish-corneous. Whorls $5\frac{1}{2}$. Alt. 7.3, diam. 11 mm.

Sodayama, Tosa. Types no. 84412. A. N. S. P., from no. 1016 of Mr. Hirase's collection.

T. mesogonia is from the province Tango in western Hondo, Hilizan on the western side of Lake Biwa, etc. It varies from reddish-brown to nearly as pale as *T. goodwini*. The variety from Shikoku is similar in shape, but constantly different in sculpture. The types are variegated as described above. A series from Kochi, Tosa (Mr. Hirase's no. 580), has neither the pale peripheral band nor the streaks of the shells from Sodayama, and varies from pale brown to nearly as light a tint as *T. goodwini*. Specimens of this lot were compared by Mr. Gude with his *T. goodwini* var. *carinata*, and said to "differ in the body-whorl, and the aperture is smaller and more rounded." Others were found at Suimura, Awa (Shikoku), Mr. Hirase's no. 823, like the Kochi lot.

Arinia japonica n. sp.

The shell is very minute, gray, cylindric, terminating above in an *extremely short, low brownish cone* of hardly two whorls. Surface lusterless, sculptured with narrow ribs, like a *Diplommatina*. These ribs are fine and rather close, but on the last whorl they become *very widely spaced*. Whorls $5\frac{1}{3}$, convex, the last whorl distorted, being smaller than the preceding whorl, and strongly ascending in front. It is very shortly and inconspicuously rimate. The aperture is vertical and circular. The peristome is continuous, very narrowly expanded, and thickened outside behind the edge. The columella is simply concave. Length 2, diam. 1.2 mm.

Goto, Hizen. Types no. 84413. A. N. S. P., from no. 1018 of Mr. Hirase's collection.

This tiny snail is the first *Arinia* from Japan, and by far the most northern of its kind. It is remarkable for the very obtuse summit.

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ILLUSTRATIONS OF SOME JAPANESE LAND SHELLS.

Several of the Japanese snails described in the NAUTILUS during the past year or two are illustrated on the plate accompanying Mr. Hirase's catalogue of Japanese shells inserted in our advertising pages this month. As some of them have not before been figured, it seems proper briefly to refer to them.

The *Euhadra* section of *Eulota* is represented by two fine species. Fig. 3 is *E. callizona* var. *dixoni* Pils. (NAUTILUS XIV, p. 60). This elegant shell is from the province Idzumo. It is named for the President of the Academy of Natural Sciences. Fig. 4, *E. senckenbergiana* var. *awaensis* Pils., is a race from Sbukaku of the species from western Japan, the largest Japanese Helix. Figs. 5, 6, *Plectotropis elegantissima* var. *cara* Pils. (NAUTILUS for Jan., 1901, p. 107) is from Great Riukiu Islands.

Ganesella Pargillierti Phil., from the same island (fig. 13), is a very characteristic Riukiuan snail; and fig. 1, *G. myomphala* Mart., is the largest Japanese member of the same genus, and to my eye, one of the most beautiful Helices. It is rather widely distributed in southern Japan.

Clausilia martensi var. *reiniana* Kob., is the largest living *Clausilia*. It is not an uncommon species in central Japan.

Cyclophorus hirasei Pils. and *Pupinella oshimæ* Pils. are two operculate forms from the island of Oshima, in the "Riukiu Curve."

Figs. 7-10 belong to the wonderful fauna of the Bonin Islands (Ogasawara-jima). These mere dots on the great Pacific have a varied snail population of about 50 species, all but half a dozen discovered by Mr. Hirase's collectors, chiefly by Mr. Nakada, whose work is deserving of high praise. Fig. 7 is the var. *trifasciata* of *mandarina mandarina* Gray, from Nakanojima, a little islet not shown on ordinary maps. The genus *Mandarina* comprises a half dozen species, the largest, *M. ruschenbergeriana* Pils., NAUTILUS IV, p. 64, figs. in text, exceeding our big *Polygyra chilhoweensis* in size. It was supposed before Mr. Hirase's explorations, to be from the Riukiu Is. The species of *Mandarina* are all from the Bonin Is., and are strong, solid shells, related to a Chinese group of which the common *Camæna cicatricosa* is a well-known member. Fig. 8 is *Fametesta mirabilis* Pils., from Hahajima, the southern large island of the Ogasawara group. The name "wonderful starved shell" is from its lank, emaciated appearance. *Hirasea profundispira* Pils., fig. 9 (NAUTILUS XVI, p. 47), is one of the numerous genus *Hirasea* (NAUTILUS XV, p. 118), consisting of small shells very peculiar in shape. *Hirasiella clara* Pils., fig. 10 (NAUTILUS XV, April, 1902), is the sole representative of a related genus. These genera are all confined to the Ogasawara-jima.

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HABITS OF ACANTHOPLEURA GRANULATA.

BY S. H. HAMILTON.

The south coast of Cuba west of Santiago de Cuba is a sharp, dock-like escarpment bounded by very deep water. In the cavities of the coralline rock, from ebb water to that just wetted by each wave, are the homes of this chiton. The impact of the waters of the Caribbean against this coast, not being broken by any beach or shallow water, is often very powerful and destructive. I observed that with each successive wave the chitons brought their girdles flush and tight with the rocks, while during slack water they raised, so as to let the receding fluid circulate freely around their gills. At the time of my visit to Cuba I was unacquainted with the visual organs of the tegmentum, and supposed that *Acanthopleura granulata* had acquired a rhythmic movement by experience and was so enabled to live in a more exposed situation than other mollusks. It now seems evident to me that the megalapores are so well developed in this species that it can perceive the oncoming wave before it strikes.

TEMPLE PRIME.

In the death of Temple Prime, which occurred on the 25th of February last, another of the old-time Conchologists has passed away. Mr. Prime was born in New York City seventy years ago, and after graduating at Harvard, studied law but never practised. He was greatly interested in science, particularly Conchology, and studied with Professors Agassiz and Silliman. In the early sixties he published numerous papers, mostly in the Proceedings of the Acad. Nat. Sciences, Philada., upon the *Cyclades*, in which he was especially interested and an authority. His exhaustive Monograph of the Corbiculidæ was published under the auspices of the Smithsonian Institute, Washington.

Mr. Prime was also a student of Genealogy and History, and at the time of his death was at work on a French history. He was actively interested in political affairs, being what is called an Independent, and in 1860 was secretary of legation at The Hague, Holland. As president of the Citizens' League for good government in Huntington, he took a lively interest in local affairs and was a large con-

tributor towards its educational and other interests, notably the Soldiers and Sailors Memorial Association, the indebtedness of which he greatly reduced and finally cancelled.

Personally Mr. Prime was a generous friend, ever ready to help any worthy cause with purse or counsel, and he will be greatly missed in the community in which he spent so many years of his life.

S. RAYMOND ROBERTS.

PUBLICATIONS RECEIVED.

SYNOPSIS OF THE FAMILY VENERIDÆ AND OF THE NORTH AMERICAN RECENT SPECIES. By Wm. H. Dall (Proc. U. S. Natl. Mus. xxvi, 335-412, plates xii-xvi, 1902).

This synopsis gives in condensed form the results of another of Dr. Dall's elaborate studies on the Pelicy pods. The revision of the nomenclature involved a great amount of work, necessitating many generic and specific changes. A complete bibliography is given, followed by the synopsis of classification of the genera and subgenera, and a revision of the species with descriptions of twenty new species.

Dr. Dall divides the *Veneridæ* into four sub-families: *Dosiniinæ*, *Meretricinæ*, *Venerinæ*, *Gemminæ*; represented on the Atlantic coast by 59 species, and on the Pacific by 80 species, two being natives of both oceans.

From the Atlantic and Gulf coasts of the United States the following species are recorded: *Dosinia concentrica* Born.; *D. elegans* Con.; *D. discus* Rve.; *Transennella cubaniana* Orb.; *T. stimpsoni* Dall; *T. conradiana* Dall; *Gouldia cerina* C. B. Ads. is now placed in the genus *Gafrarium* Bolten 1798, and *Macrocallista nimbosea* Solander 1786, is adopted in place of *Callista gigantea* Gmel. 1792; *M. maculata* L.; *Callocardia* (*Agriopoma*) *morrhuanua* Linsley, replaces *Cytherea convexa* Say (not Brong.), and *C. sayana* Con., the two latter names were applied to the Miocene form which is considered distinct from the recent. *Callocardia texasiana*, Dall; *C. zonata* Dall; *Pitaria albida* Gmel.; *P. fulminata* Mke. (*Cytherea varians* Hanley); *P. simpsoni* Dall; *P. eucymata* Dall, and *P. (Hysteroconcha) dione* L. The latter is more familiarly known as *Dione dione* or *D. veneris* Desh. By elimination the genus *Cytherea* Bolton 1798 should be restricted to form like *C. listeri* Gray (*Venus*

crispata Desh.), *C. rigida* Dillw. 1817 (*V. rugosa* Gmel. 1772, not Linn. 1771), *C. rugatina* Heilp. and *C. strigillina* Dall. *Cyclinella tenuis* Recl. (*Lucinopsis tenuis*); *Chione cancellata* L. (*Venus cancellata*), *C. subrostrata* Lam. (*V. beauri* Recl.), *C. mazyckii* Dall; *C. intapurpurea* Con.; *C. grus* Holmes; *C. pygmaea* Lam.; *C. paphia* L.; *C. latilirata* Conr. (*V. varicosa* Sowb.); *Anomalocardia brasiliiana* Gmel. (*Venus flexuosa* Born, not Linn., and *V. macrodon* Hanley are syn.) *A. cuneimeris* Con. (*V. rostrata* Sowb.); *Venus mercenaria* L.; *V. campechiensis* Gmel. (*V. mortoni* Con.), *Liocyma fluctuosa* Gould; *Gemma gemma* Tott.; *G. purpurea* H. C. Lea (*G. concentrica* Dall.), and *Parastarte triquetra* Con.

From the Pacific coast north of Mexico the following are received: *Dosinia ponderosa* Gray (Pleistocene only, on the California coast), *Transennella tantilla* Gld.; *Tivela* (*Pachydesma*) *stultorum* Mawe. (more familiarly known as *Pachydesma crassatelloides* Conr.), *Amiantis callosa* Con.; *Pitaria newcombiana* Gabb.; *Cytherea fordii* Yates; *Saxidomus nuttallii* Conr.; *S. gigantea* Desh.; *Chione fluctifraga* Sowb.; *C. undatella* Sowb. (*V. simillima* Sowb.); *C. succincta* Val.; *Venus kennicottii* Dall; *Marcia kenneleyi* Rve.; *M. subdiaphana* Cpr.; *Paphia* (*Protothaca*) *staminea* Conr. The genus *Paphia* Bolton 1798, replaces *Tapes* Megerle 1811, the latter is however used as a sub-genus. Five varieties of *P. staminea* are recognized *Petiti* Desh. (*rigida* Gould); *laciniata* Cpr.; *runderata* Desh.; *orbella* Cpr., and *sulculosa* Dall. *P. tenerrima* Cpr.; *Liocyma beckii* Dall; *L. viridis* Dall; *L. scammoni* Dall; *Venerupis lamellifera*, *Psephidia lordi* Baird (*Psephis lordi*), *P. ovalis* Dall, and *Gemma gemma* Ton., the latter introduced into San Francisco Bay on "seed" oysters.

A number of forms on the Pacific coast are closely related to species of the Atlantic fauna, and probably had a common ancestry when the two oceans were connected at the isthmus. *Dosinia ponderosa* "recalls somewhat the Atlantic *D. contentrica*;" *Tivela byronensis* Gray (*T. radiata* Sowb.), is "the analogue of *T. macroides* Born of the Antilles;" *Macrocallista squallida* Sowb., is the analogue of *M. maculata* of the Atlantic fauna, and *Callocardia catharina* Dall, is represented in West Indies by *C. aresta* Dall and Simpson; *Pitaria tomeana* Dall is "the apparent analogue of *P. fulminata* of the Atlantic fauna." *P. (Hysteroconcha) lupanaria* Less. is "a larger but less elegant analogue of the Antillean *P. dione* L., easily recognized by the violet spots at the base of the spines;"

P. (Lamelliconcha) circinata of the Atlantic can hardly be separated from *P. alternata* of the Pacific; *Cytherea magdalenæ* Dall is the analogue of *C. strigellina* Dall, of the Atlantic fauna; *C. rigida* Dillw. is found on both shores; *C. multicostata* Sowb. is allied to *C. listeri*; *Chione subrostrata* lives on both coasts; forms of *C. undatella* often resemble *C. cancellata*; *C. purpurissata* Dall is closely related to *C. puber* Val.; *C. pulicaria* is the analogue of *C. intapurpurea* of the Atlantic fauna; while *C. obliterated* Dall "is the analogue of *C. latilirata* Conr., and *C. mariæ* Orb. of *C. paphia* L."—
C. W. J.

REVISION DES CYPRÆIDÆ DE LA NOUVELLE-CALÉDONIE, par Ph. Dautzenberg, Journal de Conchyliologie, Vol. L, pp. 291–384, 1902. In this interesting paper the author records about 70 species, and a number of varieties including several which are described as new. The following is a brief review of the new forms:

CYPRAEA ARGUS var. MINOR, applied to specimens under 55 mm. in length.

C. ARGUS var. CONCATENATA, shells with numerous small ocellated spots disposed in small chains, which cross each other more or less regularly; at the points of intersection the remarkably large rings sometimes transform into brown spots.

C. CARNEOLA var. PROPINQUA Garrett (Cat'l *Cypræidæ*), very short, reflected, approaching in form *C. arenosa*, dorsal region with a violet ring more or less apparent.

C. TALPA var. SATURATA. In this variety the three dorsal bands are less clearly defined, the entire shell being tinted with a deep brown.

C. TABESCENS. *C. rashleighana*, *C. alveolus*, and *C. elaiodes* are all considered varieties of *C. tabescens*.

C. CAURICA var. PALLIDA. This has the form of var. *obscura* Rossiter, but tending to albinism, while var. *obscura* tends to melanism.

C. ARABICA var. ATRA. Tinted with black over the entire dorsal surface. This var. corresponds to the var. *nigricans* of *C. eglatina*.

C. EGLATINA var. PALLIDA. Based on two shells with very marked tendencies to albinism.

C. HISTRIO var. LUCTUOSA. This presents exactly the same ex-

tent of melanism as the var. *nigricans* of *C. eglatina*, but without a tendency to rostration.

C. TIGRIS var. *ROSSITERI*. Is characterized by the dorsal surface being a beautiful orange, the scattered brown spots being few in numbers.

C. VITELLUS var. *SUBROSTRATA*. Based on a specimen showing a tendency to rostration.

C. ERRONES L. Under this species three varieties are recognized, var. *ovum* Gmel. = *sophixæ* Brazier, a color var. *albida*, entirely white except for light spots of brown on each side of the extremities, var. *pallidior*, with dorsum very pale, base recurved, callus very thick, white, without spots at the extremities.

C. WALKERI var. *ROSSITERI* is based on *Luponia bregeriana* Rossiter (1882) not Crosse (1868).

C. ZICZAC var. *DECOLORATA*. Specimens tending to albinism. *C. miliaris* Gmel. and *C. eburna* Barnes are both considered varieties of *C. lamarcki*; but in uniting these forms why make *C. lamarcki* Gray 1824 the species and *C. miliaris* Gmel. 1790 a variety?

C. PORARIA var. *INSIGNIS* is unusually shining or seemingly translucent, dorsal region orange, without spots, base beautifully tinged with violet.—C. W. J.

BIOMETRIKA, a new journal for the statistical study of biological problems (Cambridge, England) contains several papers on mollusks. In vol. 2, part 1 (Nov., 1902), Miss Abigail C. Dimon has studied at length the variation and correlation of *Nassa trivittata* and *obsoleta* from Cold Spring Harbor, Long Island. She discusses the influence of density and stillness of water on depauperization. Both species were found at that locality to be smaller than normal type, this being attributed to lack of density of the waters of Long Island Sound as compared with the open ocean. While this explanation may apply to *N. trivittata* which is a snail inhabiting open beaches, it is certain that the small size of *N. obsoleta* is not thus to be explained, because this is a species of the salt meadows and inlets, and the largest individuals we have ever collected were taken in a stream in a mud-flat, which ran fresh at low tide, and being far from the open ocean, could not have been very dense when submerged at high tide. There is great need for improved mechanical devices for rapidly determining quantitatively the various characters both of form and

color in shells. We do not see much use in carrying the decimals of mm. to two or more places in measuring the length of shells of the size of these, but then it does no great harm if the measurer has plenty of time. There is a wide field for this kind of work among our mollusks, and the data to be obtained are of great value.—H. A. P.

Part 4 of Vol. I of the same journal contains a valuable statistical investigation by C. Hensgen on the band variations of *Helix nemoralis*, at several places in Strasburg. The paper is too extensive for abstract, but it may be mentioned that the curve for number of bands has its major mode at 0 with a well-marked minor mode at 3 bands.—H. A. P.

GENERAL NOTES.

CONUS PROMETHEUS Hwass.—A synonym of this species which I have not seen noticed in the monographs is *Conus nicholii* Wilson, 1831; figured in James Wilson's "Illustrations of Zoölogy," pl. 36. The specimen described measured $8\frac{1}{2}$ inches long.

In the revision of the CARDITACEA, lately printed by the Academy of Natural Sciences, I preserved the name *Miodon* for a form of *Venericardia* found on the Pacific coast and applied by Carpenter in 1864. For *Miodon* Sandberger, 1870, given to a fossil form of *Cyrena* the name *Miodontopsis* was proposed. In Sharp's Index Zoologicus just received, I find *Miodon* however was used for an ophidian in 1859 by Duméril, and therefore Carpenter's shell will have to have a new name also. In this case I would propose *Miodontiscus* for the Venericardian.—W. H. DALL.

Mr. Jas. H. Ferriss and the senior Editor of the NAUTILUS are collecting mollusks and ferns in the Southwest.

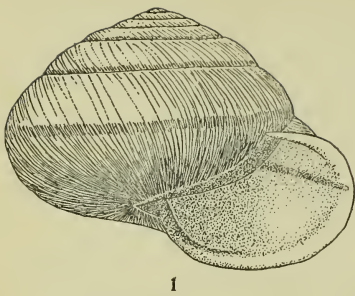
So many years have elapsed since a general work covering the entire mollusca has appeared, that it is of interest to many readers of THE NAUTILUS who have not access to the larger libraries to know what are the general views of leading biologists regarding the relative

position of the larger groups. This feature is very clearly shown in an excellent "Manual of Zoölogy," by Richard Hertwig, recently translated by Prof. J. S. Kingsley. "This American edition is not an exact translation. With the consent of the author, the whole text has been edited and modified in places to accord with American usage."

The Mollusca (Phylum VI) are divided into five classes, of which the *Amphineura*, including two subclasses, *Placophora* (Chitons) and *Aplacophora* are considered the most primitive. Class II comprises *Acephala* or *Pelecypoda*, in which the views of Pelseneer are closely followed. The order *Protoconchiæ* includes most of the families grouped by Dr. Dall under *Prionodesmacea*, except the *Naiadæ*, which, with the remainder of the families, are placed in the order *Heteroconchiæ*. The *Nuculidæ* are considered the most primitive, while the more highly specialized families, like the *Teredidæ* and *Gastrochænidæ*, are placed at the other extreme. *Scaphopoda* (Class III) are placed between the *Pelecypoda* and *Gasteropoda*; the latter being divided into three orders: *Prosobranchia*, *Opisthobranchia* and *Pulmonata*. The *Prosobranchs* are divided into two suborders: *Aspidobranchia*—of which the *Docoglossa* (Limpets) are the most primitive—and the *Pectinibranchia*. *Heteropoda* "in all details of gills, genitalia, heart and nervous system are true *Pectinibranchi*, but from an exclusively pelagic life have acquired peculiar modifications." The *Opisthobranchia* consists of three suborders: *Tectibranchia*, *Pteropoda*—"pelagic forms which in most points of structure agree with the *Tectibranchi*"—and *Nudibranchia*. Class V comprises the *Cephalopoda*.—C. W. J.

The junior editor of the NAUTILUS has been appointed Curator of the Boston Society of Natural History, Boston, Mass. This will be his future address.

ERRATA.—In the article "Notes on *Pyramidula elrodi* Pils." in the February NAUTILUS, McDonald Lake of the Mission Mountains should be read instead of Post Lake. There are two McDonald Lakes in Montana, and the authorities seem to think the same name for two lakes within a hundred miles of each other must stand.—M. J. ELROD.



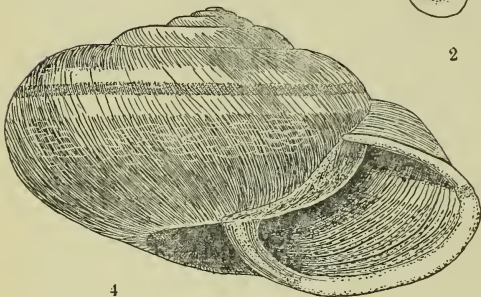
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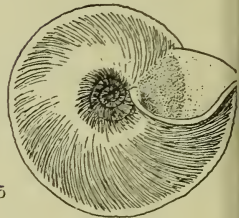
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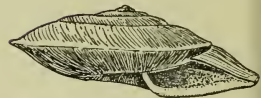
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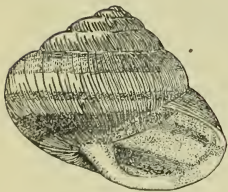
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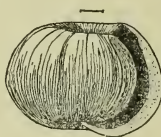
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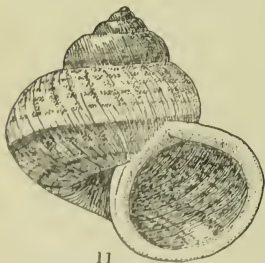
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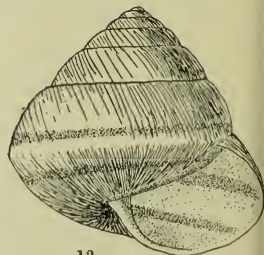
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JAPANESE LAND SHELLS.

CATALOGUE

OF

LAND SHELLS OF JAPAN

TO BE HAD OF

Y. HIRASE

SHIMOCHOJA-MACHI,
KARASUMARU, KYOTO, JAPAN.

1903.

HAVING collected Japanese land, fresh-water and marine shells for many years, the number of species in my possession has now reached several thousand. Among these are many new species, found by myself and my assistants. In the land shells especially, the new species outnumber those known before my researches began.

With the aid of numerous assistants I have been able to explore many parts of Japan, including the Riukiu (Loo-choo) Islands, and the Ogasawara (or Bonin) group, where a rich fauna of new and strange land shells was found. I hope in future to extend the work, and send collectors to China, Corea and Formosa.

All the species are sent to Dr. Pilsbry, of Philadelphia, U. S. A., who kindly determines them, so that I believe that those receiving specimens from me may place confidence in the names, and will find them an important and useful addition to their collections.

Attention is called to the importance of securing *authentic specimens from the original localities* of the many new species in my collections.

Catalogues of marine and fresh-water shells are in preparation.

Specimens will be sent on approval to purchasers known to me or giving satisfactory reference.

Y. HIRASE.

CATALOGUE
OF
LAND SHELLS,

TO BE HAD OF

Y. HIRASE,

SHIMOCHOJA-MACHI, KARASUMARU, KYOTO, JAPAN.

NOTE.—Species and varieties marked thus * are new forms, described from specimens from my collection. Where no prices are given, specimens are not always in stock.

ACMELLA.

- | | | | |
|------|---------------|----------------------|------------|
| *853 | vagans, Pils. | Hahajima, Ogasawara, | \$0.08-.12 |
| *856 | minima, Pils. | Hahajima, Ogasawara, | .07-.10 |

ALYCAEUS.

- | | | | |
|-------|--------------------|--------------------------|---------|
| *831b | biexcisus, Pils. | Suimura, Awa. (Shikoku), | .05-.08 |
| *298 | harimensis, Pils. | Kashima, Harima, | .05-.08 |
| *996 | harimensis, var. | | |
| | sadoensis, P. & H. | Aikawa, Sado, | |
| *476 | hirasei, Pils. | Kyoto, Yamashiro, | .04-.07 |
| *499 | melanopoma, Pils. | Mikuriya, Suruga, | .04-.07 |
| *298b | reinhardti, Pils. | Kashima, Harima, | .05-.08 |
| *704 | satsumanus, Pils. | Kagoshima, Satsuma. | |
| *723 | tanegashimæ, Pils. | Tanegashima, Osumi. | |
| *916 | vinctus, Pils. | Tanegashima, Osumi. | |

AURICULA.

- | | | | |
|-----|----------------|----------------|---------|
| 442 | reiniana, Kob. | Hirado, Hizen, | .07-.12 |
|-----|----------------|----------------|---------|

BIFIDARIA.

619	armigerella, Reinh.	Yaeyama, Loochoo,	.05-.08
*798	ogasawarana, Pils.	Chichijima, Ogasawara.	
*797	chichijimana, Pils.	Chichijima, Ogasawara.	
757	plicidens, Benson.	Riozen, Omi.	

BLANFORDIA.

412	bensoni, A. Ad.	Shikunobe, Ojima,	.03-.05
*406	simplex, Pils.	Nishigo, Uzen,	.03-.05
990	japonica, A. Ad.	Sotokaifu, Sado.	

BULIMINOPSIS.

621	meiacoshimensis, A. Ad. & Rve.	Yaeyama, Loochoo,	.07-.12
*455	turrita, Gude.	Loochoo,	.05-.08

BULIMINUS.

311	andersonianus, Mlldff.	Shikunobe, Ojima,	.06-.10
*750a	andersonianus, var. echigoensis, P. & H.	Myokozan, Echigo.	
*468	callistoderma, Pils.	Hahajima, Ogasawara,	.05-.08
*758	callistoderma, var. hachijoensis, Pils.	Hachijo, Izu.	
*602	callistoderma, var. ogasawarae, Pils.	Hahajima, Ogasawara,	.08-.15
*597	eucharistus, Pils.	Yaeyama, Loochoo.	
*478	hirasei, Pils.	Kikai, Osumi,	.08-.12
919	hiraseanus, Pils.	Hahajima, Ogasawara.	
*598	luchuanus, Pils.	Yaeyama, Loochoo.	
*930	luchuanus, var. oshimanus, Pils.	Oshima, Osumi.	
509	reinianus, Kob. v.	Shirakata, Sanuki.	
582	reinianus, Kob.	Arakura, Tosa,	.08-.12
587	reinianus, Kob. (small var.)	Okinoshima, Tosa.	
549	reinianus, var. extorris, Branc.	Kyoto, Yamashiro,	.06-.10

- *411 *reinianus*, var.
 hokkaidoensis, Pils. Shikunobe, Ojima, .12-.20
 *484 *reinianus*, var.
 omiensis, Pils. Ibuki, Omi, .08-.12

CARYCHIUM.

- *618 *cymatoplax*, Pils. Yaeyama, Loochoo, .05-.08
 *946 *hachijoensis*, Pils. Hachijojhma, Iza.
 555 *noduliferum*, Reinh. Nishigo, Uzen, .04-.07
 *729 *pessimum*, Pils. Tanegashima, Osumi, .06-.10

CASSIDULA.

- 445 *labrella*, Desh. Hirado, Hizen, .03-.05

CHLORITIS.

- *958 *albolabris*,
 Pils. & Hir. Yakushima, Osumi.
 *354 *eucharistus*, Pils. Oshima, Osumi, .25-.40
 *981 *echizenensis*,
 Pils. & Hir. Omushi, Echizen.
 *13 *fragilis*, Gude. Kyoto, Yamashiro.
 *786 *hirasei*, Pils. Kurozu, Kii.
 *843b *perpunctatus*, Pils. Totsugawa, Yamato.
 *735 *pumila*, Gude. Mikuriya, Suruga.

CLAUSILIA.

- 424 *addisoni*, Pils. Kagoshima, Satsuma, .05-.08
 *663c *agna*, Pils. Yakushima, Osumi.
 *1014 *aenea*, Pils. Tosa.
 501 *attrita*, Bttg. Ibuki, Omi, .05-.08
 *764b *attrita*, var. in-
 fausta, Pils. Tomisato, Kii, .07-.10
 *1013 *aratorum*, Pils. Tosa.
 *450b *aulacophora*, Pils. Fukura, Awaji, .05-.08
 *733b *aulacopoma*, Pils. Hirado, Hizen, .06-.10
 503 *aurantiaca*, Bttg. Nohara, Yamato, .05-.08
 738 *aurantiaca*, var.
 erberi, Bttg. Gojo, Yamato, .05-.08
 782 *aurantiaca*, var.
 plicidens, A. Ad. Kashima, Kii, .05-.08

*450a	<i>awajiensis</i> , Pils.	Fukura, Awaji,	.05-.08
*818	<i>bigeneris</i> , Pils.	Goto, Hizen.	
254	<i>bilabrata</i> , Smith.	Senzan, Awaji.	
*1002	<i>bilabrata</i> , var.		
	<i>tosaensis</i> , Pils.	Shiujomura, Tosa.	
593	<i>brevior</i> , Mart.	Oshima, Izu,	.05-.08
*634	<i>callistochila</i> , Pils.	Kunchan, Loochoo.	
*894	<i>caloptyx</i> , Pils.	Yakushima, Osumi.	
*770c	<i>caryostoma</i> , var.		
	<i>jayi</i> , Pils.	Jomura, Kii.	
434c	<i>caryostoma</i> , Mlldff.	Banzai, Awa.	
*306b	<i>comes</i> , Pils.	Kashima, Harima,	.06-.10
*632a	<i>crenilabium</i> , Pils.	Kunchan, Loochoo,	.08-.12
*632b	<i>crenilabium</i> , Pils.		
	(var.)	Kunchan, Loochoo.	
*874	<i>dæmonorum</i> , Pils.	Kikai, Osumi.	
*819	<i>dalli</i> , Pils.	Tairiuji, Awa (Shikoku),	.07-.10
410a	<i>digonoptyx</i> , Bttg.	Nishigo, Uzen,	.05-.08
739a	<i>ducalis</i> , Kob.	Miyamura, Hida,	.10-.15
*913a	<i>ducalis</i> , var.		
	<i>decapitata</i> , Pils.	Kashima, Harima.	
740	<i>ducalis</i> , var.		
	<i>dorcas</i> , Pils.	Miyamura, Hida,	.10-.15
*765b	<i>ducalis</i> , var.		
	<i>mediocris</i> , Pils.	Tomisato, Kii.	
*986	<i>echigoensis</i> , Pils.	Myokoan, Echigo.	
*663a	<i>entospira</i> , Pils.	Tanegashima, Osumi.	
*563	<i>euholostoma</i> , Pils.	Mikuriya, Suruga,	.07-.10
687	<i>fultoni</i> , Sykes.	Ushirogawa, Tosa.	
*794	<i>graciæ</i> , Pils.	Nachi, Kii,	.07-.10
592	<i>hakonensis</i> , Pils.	Oshima, Izu.	
*306a	<i>harimensis</i> , Pils.	Kashima, Harima,	.06-.10
*764a	<i>heteroptyx</i> , Pils.	Tomisato, Kii.	
*423	<i>hirasei</i> , Pils.	Kagoshima, Satsuma,	.04-.07
*586	<i>hiraseana</i> , Pils.	Okinoshima, Tosa,	.06-.10
*546b	<i>hokkaidoensis</i> , Pils.	Kayabe, Ojima.	
*789	<i>holotrema</i> , Pils.	Nachi, Kii.	
686	<i>hyperolia</i> , Mart.	Oshima, Izu,	.06-.10

*457	hyperptyx, Pils.	Loochoo;	.05-.07
*733	subignobilis, Pils.	Hirado, Hizen,	.05-.07
*486b	iotaptyx, Pils.	Ibuki, Omi,	.08-.12
*292	iotaptyx, var. clava, Pils.	Senzan, Awaji,	.05-.08
*657a	ischna, Pils.	Kioragi, Higo,	.06-.10
*754	jacobiana, Pils.	Tanegashima, Osumi,	.05-.08
56a	japonica, Crosse.	Senzan, Awaji,	.04-.06
198	japonica, Crosse. (large var.)	Takeya, Izumo,	.04-.06
*403	japonica, var. inter- plicata, Pils.	Nishigo, Uzen,	.05-.07
11	japonica, var. nipponensis, Kob.	Kyoto, Yamashiro,	.03-.05
*56e	japonica, var. per- obscura, Pils.	Shirono, Buzen,	.08-.12
*657b	kochiensis, Pils.	Kioragi, Higo,	.08-.12
*934	kurozuensis, Pils.	Kurozu, Kii.	
564	martensi, Herklots.	Mikuriya, Suruga,	.07-.10
500	martensi, var. reiniana, Kob.	Ibuki, Omi,	.07-.10
*768	martensi, var. tinctilabris, Pils.	Nachi, Kii.	.08-.12
737	micropeas, Mlldff. (var.)	Mikuriya, Suruga,	.05-.08
*486a	mikado, Pils.	Ibuki, Omi,	.05-.08
*654	mima, Pils.	Oshima, Osumi.	
*762	mitsukurii, Pils.	Tomisato, Kii,	.10-.15
*546a	monelasmus, Pils.	Kayabe, Ojima,	.05-.08
*646	munus, Pils.	Oshima, Osumi,	.06-.10
*932	neniopsis, Pils.	Oshima, Osumi.	
*652	nesiothauma, Pils.	Oshima, Osumi,	.10-.15
*434	nolani, Pils.	Fukura, Awaji,	.07-.12
463	oostoma, Mlldff.	Mikuriya, Suruga,	.04-.06
*926	oostoma, var. goniopoma, Pils.	Wakayama, Kii.	
*696	oostoma, var. dactylopoma, Pils.	Kashio, Awaji.	

*748	<i>orthatracta</i> , Pils.	Akasaka, Mino.	
*674	<i>oscariana</i> , Pils.	Fukuregi, Higo,	.08-.15
*653a	<i>oshimæ</i> , Pils.	Oshima, Osumi.	
*695	<i>oxycyma</i> , Pils.	Kagoshima, Satsuma.	
*954	<i>pachyspira</i> , Pils.	Miyai, Kii.	
*584	<i>perignobilis</i> , Pils.	Okinoshima, Tosa,	.06-.10
*410b	<i>perpallida</i> , Pils.	Nishigo, Uzen,	.02-.12
*306c	<i>pigra</i> , Pils.	Kashima, Harima,	.06-.10
*663b	<i>pinto</i> , Pils.	Tanegashima, Osumi,	.06-.10
*817	<i>plagiptyx</i> , Pils.	Goto, Hizen.	
473	<i>platyauchen</i> , Mart. (var.)	Nishigo, Uzen,	.05-.08
669	<i>platyauchen</i> , Mart. (small var.)	Mikuriya, Suruga,	.04-.07
502	<i>platydera</i> , var. λ , Bttg.	Nohara, Yamato,	.05-.08
*763	<i>platydera</i> , var. <i>kiiensis</i> , Pils.	Tomisato, Kii,	.06-.10
*434d	<i>platyderula</i> , Pils.	Aki, Awa.	
*653b	<i>pseudoshimæ</i> , Pils.	Oshima, Osumi.	
*664a	<i>ptychocyma</i> , Pils.	Tanegashima, Osumi,	.08-.12
*664b	<i>ptychocyma</i> , var. <i>yakushimæ</i> , Pils.	Yakushima, Osumi,	.07-.10
*993	<i>sadoensis</i> , Pils.	Misakimura, Sado.	
656	<i>schmackeri</i> , Sykes.	Kochi, Tosa,	.07-.10
987	<i>sericina</i> , Mldff.	Omimura, Echigo.	
*736b	<i>sericina</i> , var. <i>rhopalia</i> , Pils.	Mikuriya, Suruga,	.08-.15
*506	<i>shikokuensis</i> , Pils.	Ushirogawa, Tosa,	.07-.10
*820	<i>shikokuensis</i> , Pils. (small var.)	Tairiuji, Awa (Shikoku),	.05-.07
*506c	<i>shikokuensis</i> , var. <i>inokuchiensis</i> , Pils.	Inokuchimura, Tosa.	
*345	<i>sieboldi</i> , var. <i>diptyx</i> , Pils.	Hirado, Hizen,	.04-.06
622	<i>stearnsii</i> , Pils.	Yaeyama, Loochoo,	.08-.12
*594	<i>stearnsii</i> , Pils. (small var.)	Loochoo.	

*670	stereoma, Pils.	Yakushima, Osumi,	.08-.12
*661	stereoma, var. cognata, Pils.	Tanegashima, Osumi,	.06-.10
*670a	stereoma, var. hexaptyx, Pils.	Yakushima, Osumi.	
*671	stereoma, var. nugax.	Yakushima, Osumi.	
*505	subaurantiaca, Pils.	Toyonishikami, Nagato,	.06-.10
*488	subjaponica, Pils.	Ibuki, Omi,	.05-.08
*766	subulina, var. leucopeas, Pils.	Tomisato, Kii.	
*688	surugensis, Pils.	Mikuriya, Suruga,	.06-.10
*1007	sus, Pils.	Muya, Awa.	
*662	tanegashimæ, Pils.	Tanegashima, Osumi,	.08-.12
*813	tantilla, Pils. 8 tau, Bttg.	Goto, Hizen, Kyoto, Yamashiro,	.08-.12 .01-.02
*550	tosana, Pils.	Ushirogawa, Tosa,	.07-.12
*638b	tryoni, Pils.	Hachijo, Izu,	.08-.12
*816	una, Pils. 462 valida, var.	Goto, Hizen.	
	fasciata, Sykes.	Miyako, Loochoo,	.04-.06
*633	valida, var. perfasciata, Pils.	Kunchan, Loochoo,	.05-.08
732	(Reinia) variegata, A. Ad.	Hirado, Hizen,	.04-.07
*942	(Reinia) variegata, var. nakadai, Pils.	Hachijojima, Izu.	
675	vasta, Bttg.	Fukuregi, Higo.	

"CRYSTALLUS."

* . . .	velatus, Gude.	Kyoto, Yamashiro.	
* . . .	sulcatus, Gude.	Kyoto, Yamashiro.	

COCHLICOPA.

362	lubrica, Müll.	Shikunobe, Ojima,	.05-.07
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CYCLOPHORUS.

2	herklotsi, Mart.	Kyoto, Yamashiro,	.02-.04
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*421	herklotsi, var.		
	expallesens, Ehrm.	Kagoshima, Satsuma,	.05-.07
*644	hirasei, Pils.	Oshima, Osumi.	
*574	kikaiensis, Pils.	Kikai, Osumi,	.06-.10
*684b	kikaiensis, Pils.	Kikai, Osumi, (fossil.)	.10-.15
372	turgidus, Pfr.	Loochoo,	.03-.05
684a	turgidus, Pfr.		
	(fossil, large var.)	Kikai, Osumi,	.10-.15
*713	turgidus, var.		
	angulatus, Pils.	Loochoo,	.12-.20

CYCLOTUS.

54	campanulatus, Mart.	Senzan, Awaji,	.04-.06
*612	hirasei, Pils.	Loochoo,	.06-.10
*307	micron, Pils.	Kashima, Harima,	.03-.05

DIPLOMMATINA.

*604	cassa, Pils.	Kodakari, Hida,	.04-.07
512	collarifera, S. & B.	Ibuki, Omi,	.04-.07
*870	dormitor, Pils.	Kikaigashima, Osumi.	
*620	insularum, Pils.	Yaeyama, Loochoo,	.05-.08
*822	kiiensis, Pils.	Tairiuji, Awa (Shikoku),	.05-.08
*305b	kobelti, Ehrm.	Kashima, Harima,	.04-.06
*812	kobelti, var.		
	ampla, Pils.	Goto, Hizen,	.05-.08
*629	luchuana, Pils.	Kunchan, Loochoo.	
305a	nipponensis, Mldff.	Kashima, Harima,	.04-.06
*647	oshimæ, Pils.	Oshima, Osumi.	
*836a	pudica, Pils.	Nachi, Kii,	.06-.08
521	pusilla, Mart.	Kashima, Harima,	.04-.07
*487	pusilla, var.		
	omiensis, Pils.	Ibuki, Omi,	.04-.07
*649	saginata, Pils.	Oshima, Osumi,	.06-.10
*639	septentrionalis, Pils.	Kayabe, Ojima,	.05-.08
*668	tanegashimæ, Pils.	Tanegashima, Osumi,	.06-.10
*296	tenuiplica, Pils.	Kashima, Harima,	.04-.06
*648	turris, Pils.	Oshima, Osumi,	.06-.10
*510	uzenensis, Pils.	Nishigo, Uzen,	.05-.08
*679	yakushimæ, Pils.	Yakushima, Osumi,	.06-.10

ENNEA.

- *295 iwakawa, Pils. Kashima, Harima, .04-.06
 *680 iwakawa, var.
 yakushimæ, Pils. Yakushima, Osumi, .05-.08

EULOTA (AEGISTA).

- *451 aperta, Pils. Fukura, Awaji, .07-.12
 *761 aperta, var.
 cavata, Pils. Tomisato, Kii, .08-.12
 *787 aperta, var.
 trachyderma, Pils. Ikoma, Kii.
 *937 aperta, var.
 mikuriyensis, Pils. Mikuriya, Suruga.
 343 friedeliana, Mart. Hirado, Hizen, .04-.07
 *960 intonsa, Pils. & Hir. Suimura, Awa.
 288 kobensis, S. & B. Kyoto, Yamashiro, .10-.15
 *969 kobensis, var.
 gotoensis, P. & H. Goto, Hizen.
 *353 martensiana, Pils. Sedake, Osumi, .15-.25
 *929 minima, Pils. Oshima, Osumi.
 *590 mimula, Pils. Kayabe, Ojima, .08-.12
 *753 mimuloides, Gude. Itanami, Omi.
 475 oculus, Pfr. Loochoo, .08-.12
 998 subchinensis, Nev. Loochoo.
 272 vermis, Rve. Loochoo, .20-.30

EULOTA (COELORUS).

- *9 cavicollis, Pils. Kyoto, Yamashiro, .06-.10
 *815 caviconus, Pils. Goto, Hizen.

EULOTA (EUHADRA).

- 359 blakeana, Newc.
 var. blakei, Kob. Shikunobe, Ojima, .10-.15
 528 blakeana, var.
 sericea, Gude. Nobusayama, Teshiwo.
 271 caliginosa, Ad. & R. Yaeyama, Loochoo, .08-.12
 224 callizona, var.
 amaliae, Kob. Tadachi, Shinano, .05-.08

82	<i>callizona</i> , var.		
	<i>congenita</i> , Smith.	Kobe, Settsu.	.
*87	<i>callizona</i> , var.		
	<i>dixoni</i> , Pils.	Inga, Hoki,	.12-.20
399	<i>callizona</i> , var.		
	<i>maritima</i> , P. & G.	Hagi, Nagato,	.05-.08
*239	<i>callizona</i> , var.		
	<i>minor</i> , Gude.	Hagi, Nagato,	.06-.10
393	<i>connivens</i> , Pfr.	Itoman, Loochoo,	.04-.06
472	<i>connivens</i> , var.		
	<i>phaeogramma</i> , Anc.	Kikai, Osumi,	.05-.08
*556	<i>grata</i> , Gude.	Nishigo, Uzen,	.30-.50
73	<i>luhuana</i> , Sowb.	Hirado, Hizen,	.04-.07
*547	<i>luhuana</i> , var.		
	<i>aomoriensis</i> , G., P.	Chojamura, Mutsu,	.08-.15
*186b	<i>luhuana</i> , var.		
	<i>arimensis</i> , G., P.	Tadachi, Shinano.	
248	<i>luhuana</i> , var.		
	<i>eo</i> a, Crosse.	Mikuriya, Suruga,	.10-.15
199	<i>luhuana</i> , var.		
	<i>idzumonis</i> , P. & G.	Takeya, Idzumo.	
*73b	<i>luhuana</i> , var.		
	<i>nesiotica</i> , Pils.	Tanegashima, Osumi.	
*682	<i>luhuana</i> , var.		
	<i>pachya</i> , Pils.	Kikai, Osumi, (fossil)	.15-.20
19	<i>luhuana</i> , var.		
	<i>tsushimana</i> , Mlldff.	Izuhara, Tsushima,	.04-.07
*116	<i>luna</i> , Pils.	Iwamizawa, Ishikari.	
371	<i>mercatoria</i> , Gray.	Loochoo,	.05-.08
496	<i>mercatoria</i> , var.		
	<i>atrata</i> , Pils.	Kunchan, Loochoo,	.10-.30
*683	<i>mercatoria</i> , var.		
	<i>dæmonorum</i> , Pils.	Kikai, Osumi, (fossil.)	.15-.20
*357	<i>oshimæ</i> , Pils.	Oshima, Osumi,	.15-.30
231	<i>pelionphala</i> , Pfr.	Gomei, Kai,	.05-.08
319	<i>pelionphala</i> , Pfr.		
	(large var.)	Kyoto, Yamashiro,	.08-.15
560	<i>pelionphala</i> , var.		
	<i>brandtii</i> , Kob.	Manabe, Hitachi,	.07-.10

90	<i>pelionphala</i> , var. <i>herklotsi</i> , Mart.	Kyoto, Yamashiro,	.04-.06
139	<i>pelionphala</i> , var. <i>nimbosa</i> , Crosse.	Toyado, Shimotsuke.	
*358	<i>pelionphala</i> , var. <i>septentrionalis</i> , Ehrm.	Shikunobe, Ojima,	.06-.10
402	<i>quaesita</i> , Desh.	Nishigo, Uzen,	.05-.08
*994	<i>sadoensis</i> , Pils. & Hir.	Sotokaifumura, Sado.	
225	<i>scaevola</i> , Mart.	Ibuki, Omi,	.20-.30
186a	<i>senckenbergiana</i> , K.	Kokubu, Hida,	.15-.25
199	<i>senckenbergiana</i> , Kob. (var.)	Takeya, Izumo,	.08-.15
*828	<i>senckenbergiana</i> , var. <i>awaensis</i> , Pils.	Suimura, Awa (Shikoku),	.20-.30
*660	<i>submandarina</i> , Pils.	Tanegashima, Osumi,	.12-.20
*835a	<i>submandarina</i> , Pils.	Kikai, Osumi, (fossil.)	.15-.25
*777	<i>submandarina</i> , var. <i>compacta</i> , Pils.	Yakushima, Osumi,	.25-.35
*672	<i>submandarina</i> , var. <i>magna</i> , Pils.	Yakushima, Osumi.	
291	<i>yaeyamensis</i> , Pils.	Loochoo,	.40-.60

EULOTA (EULOTELLA).

4	<i>similaris</i> , Fer.	Kyoto, Yamashiro,	.02-.04
545	<i>commoda</i> , A. Ad.	Kayabe, Ojima,	.06-.10

EULOTA (PLECTOTROPIS).

*431	<i>aemula</i> , Gude.	Takeya, Izumo,	.06-.10
*774	<i>deflexa</i> , Pils.	Tobishima, Ugo,	.12-.20
396	<i>elegantissima</i> , Pfr.	Naha, Loochoo,	.05-.08
*536	<i>elegantissima</i> , var. <i>cara</i> , Pils.	Kunchan, Loochoo,	.07-.12
*943	<i>hachijoensis</i> , Pils.	Hachijo-jima, Izu.	
*407	<i>horrida</i> , Pils.	Nishigo, Uzen,	.12-.20
*596	<i>inornata</i> , Pils.	Yaeyama, Loochoo,	.15-.35
*479	<i>kiusiuensis</i> , Pils.	Kikai, Osumi,	.15-.25
*914	<i>kiusiuensis</i> , var. oshimana, P. & H.	Oshima, Osumi.	

*464	lepidophora, Gude.	Loochoo,	.04-.07
273	mackensii,		
	A. Ad. & Rve.	Yaeyama, Loochoo,	.10-.15
*752	omiensis, Pils.	Itanami, Omi,	.15-.25
*752a	omiensis, var.		
	echizenensis, Pils.	Arato, Echizen.	
*773	pannosa, Pils.	Atsumi, Uzen,	.12-.20
461	scepasma, Pfr.	Loochoo,	.06-.10
*694	shikokuensis, Pils.	Yoshida, Iyo.	
110	trochula, A. Ad.	Izuhara, Tsushima,	.05-.08
10a	vulgivaga, S. & B.	Kyoto, Yamashiro,	.05-.08
10b	vulgivaga, S. & B. var.	Ibuki, Omi,	.05-.08
*825	vulgivaga, var.		
	lanx, Pils.	Suimura, Awa (Shikoku),	.10-.15

EULOTA (ACUSTA).

394	despecta, Gray.	Naha, Loochoo,	.04-.07
459	despecta, Gray.		
	(large var.)	Loochoo.	
685	despecta, Gray.		
	(large var., fossil.)	Kikai, Osumi.	
*474a	despecta, var.		
	kikaiensis, Pils.	Kikai, Osumi.	
*249	ganesi, Pils.	Ushika, Teshiwo,	.10-.15
216	ganesi, var.		
	gudeana, Pils.	Kiyokawa, Ojima,	.06-.10
409	sieboldiana, Pfr.	Nishigo, Uzen,	.03-.05
*14	sieboldiana, var.		
	minor, Gude.	Kyoto, Yamashiro.	

GANESSELLA.

*352	adelinae, Pils.	Oshima, Osumi,	.25-.40
*783b	cristata, Pils.	Nachi, Kii.	
*975	cardiostoma, var.		
	kagaensis, P. & H.	Hakusan, Kaga.	
*734	fausta, Pils.	Mikuriya, Suruga.	
*508	ferruginea, Pils.	Ushirogawa, Tosa,	.10-.15
*309	jacobii, Pils.	Ibuki, Omi,	.15-.25
12	japonica, Pfr.	Kyoto, Yamashiro,	.07-.12

*513a	<i>japonica</i> , var. <i>carinata</i> , Pils. & Gul.	Ibuki, Omi,	.10-.15
*548a	<i>japonica</i> , var. <i>granulosa</i> , Pils.	Kyoto, Yamashiro,	.07-.12
*252	<i>japonica</i> , var. <i>heteroglypta</i> , Pils.	Fukura, Awaji,	.10-.15
106	<i>japonica</i> , var. <i>satsuma</i> , Pils.	Kamo, Shima.	
460	<i>largillierti</i> , var. <i>cincta</i> , Pils.	Loochoo,	.08-.12
535	<i>largillierti</i> , var. <i>cosmia</i> , Pils.	Shimaziri, Loochoo,	.08-.12
74	<i>myomphala</i> , Mart.	Hirado, Hizen,	.15-.25
328	<i>myomphala</i> , var. <i>fusca</i> , Gude.	Kokubu, Hida,	.15-.25
96	<i>myomphala</i> , var. <i>minor</i> , Gude.	Toyonishikami, Nagato,	.10-.15
*260	<i>myomphala</i> , var. <i>omphalodes</i> , Pils.	Omikado, Inaba.	
*289c	<i>notoensis</i> , Pils. & Hir.	Kitanoshō, Noto.	
*824	<i>optima</i> , Pils.	Suimura, Awa (Shikoku).	
*61	<i>pagodula</i> , Ehrm.	Nohara, Yamato,	.12-.20
*788	<i>selasia</i> , Pils.	Nachi, Kii.	
*834	<i>sororcula</i> , Pils.	Kikai, Osumi (fossil).	
289	<i>stearnsii</i> , Pils.	Kyoto, Yamashiro,	.30-.40
*689a	<i>tanegashimæ</i> , Pils.	Tanegashima, Osumi.	
*689b	<i>tanegashimæ</i> , var. <i>dulcis</i> , Pils.	Tanegashima, Osumi.	
*577	<i>wiegmanniana</i> , Pils.	Kochi, Tosa.	.10-.15

GEORISSA.

*471	<i>japonica</i> , Pils.	Kashima, Harima,	.04-.07
*623b	<i>luchuana</i> , Pils.	Yaeyama, Loochoo.	

HIRASEA.

*897	<i>acuta</i> , Pils.	Imotoshima, Ogasawara.	
*848	<i>acutissima</i> , Pils.	Hahajima, Ogasawara.	
*849	<i>biconcava</i> , Pils.	Hahajima, Ogasawara.	.10-.15

*800	chichijimana, Pils.	Chichijima, Ogasawara.	
*863	diplomphalus, Pils.	Chichijima, Ogasawara.	
*847	eutheca, Pils.	Hahajima, Ogasawara.	
*864	goniobasis, Pils.	Chichijima, Ogasawara.	
*850	hypolia, Pils.	Hahajima, Ogasawara,	.08-.15
*865	major, Pils.	Chichijima, Ogasawara.	
*854	(Fametesta)mirabilis, Pils.	Hahajima, Ogasawara.	
*801	nesiotica, Pils.	Hahajima, Ogasawara,	.10-.15
*863c	profundispira, Pils.	Chichijima, Ogasawara.	
*802	sinuosa, Pils.	Hahajima, Ogasawara,	.10-.15

HIRASIELLA.

*867	clara, Pils.	Chichijima, Ogasawara.	
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HELICINA.

*806	capsula, Pils.	Hahajima, Ogasawara.	
595	hakodadiensis, Hartm.	Kayabe, Ojima,	.05-.08
*852	hirasei, Pils.	Hahajima, Ogasawara,	.10-.15
759	japonica, A. Ad.	Tobishima, Ugo (type loc.),	.08-.12
*575	japonica, var. uzenensis, Pils.	Nishigo, Uzen,	.06-.10
*808	ogasawarana, Pils.	Hahajima, Ogasawara,	.10-.15
*809	ogasawarana, var. discrepans, Pils.	Chichijima, Ogasawara.	
*862	ogasawarana, var. optima, Pils.	Chichijima, Ogasawara.	
*558	osumiensis, Pils.	Kikai, Osumi,	.05-.08
308	reinii, Kob.	Ibuki, Omi,	.04-.06
*55	reinii, var. expolita, Pils.	Senzan, Awaji,	.03-.05
*991	sadoensis, Pils. & Hir.	Sotokajifa, Sado.	
470	verecunda, Gld.	Loochoo,	.04-.07
*624	yaeyamensis, Pils.	Yaeyama, Loochoo,	.04-.07
*807b	yoshiwarana, Pils.	Hahajima, Ogasawara.	
*807a	yoshiwarana, var. arata, Pils.	Hahajima, Ogasawara.	

- *857 *yoshiwarana*, var.
microtheca, Pils. Hahajima, Ogasawara, .08-.12

KALIELLA.

- 448 *acutangula*, A. Ad. Kyoto, Yamashiro, .05-.08
*627 *austeniana*, Pils. Yaeyama, Loochoo.
*641 *borealis*, Pils. Kayabe, Ojima.
*482 *ceratodes*, Gude. Kashima, Harima.
*518 *circumcincta*, Reinh.,
var. *elata*, Gude. Kashima, Harima.
*609 *crenulata*, Gude. Kochi, Tosa.
*519 *fraterna*, Pils. Kashima, Harima.
*678 *gudei*, Pils. & Hir. Kayabe, Ojima.
*655 *harimensis*, Pils. Kashima, Ojima, .06-.10
*971 *kagaensis*,
Pils. & Hir. Hakusan, Kaga.
*697 *kyotoensis*, Pils. Kyoto, Yamashiro, .05-.08
*678 *gudei*, Pils. & Hir. Kayabe, Ojima, .08-.12
* . . . *lioderma*, Pils. Kashima, Harima.
*941 *hachijoensis*, Pils. Hachijo-jima, Izu.
*892 *hizenensis*, Pils. Hirado, Hizen.
*720 *modesta*, Pils; Oshima, Higo.
*300 *multivolvis*, Pils. Kashima, Harima, .05-.08
*466 *nahaensis*, Gude. Loochoo, .04-.07
*625b *nahaensis*, var.
kunchana, Pils. Kunchan, Loochoo.
*490 *nanodes*, Gude. Kyoto, Yamashiro.
*846 *ogasawarana*, Pils. Hahajima, Ogasawara; .10-.15
*891 *okiana*, Pils. Hirado, Hizen.
*514 *pagoduloides*, Gude. Kashima, Harima.
*952 *pallida*, Pils. Hachijo-jima, Izu.
*743 *præalta*, Pils. Ryozen, Omi.
*302 *reinhardti*, Pils. Kashima, Harima, .05-.07
*607 *ruida*, Pils. Gojo, Yamato.
* . . . *subcrenulata*, Pils. Kochi, Tosa.
*625a *yaeyamensis*, Pils. Yaeyama, Loochoo, .06-.10
*606a *yamatoensis*, Pils. Gojo, Yamato, .06-.10

LEPTOPOMA.

275 vitreum, Less. Yaeyama, Loochoo, .05-.08

MACROCHLAMYS.

*838 cerasina, Pils. Tobishima, Ugo, .08-.15
 *821 cerasina, var.
 awaensis, Pils. Tairiuji, Awa (Shikoku), .08-.12
 495 doenitzi, Reinh. Kyoto, Yamashiro, .06-.08
 *785 dulcis, Pils. Nachi, Kii.
 *465 fulgens, Gude. Loochoo, .05-.08
 *635 gudei, Pils. Kunchan, Loochoo.
 *974 kagaensis, Pils. Hakusan, Kaga.
 *282 micrograpta, Pils. Kashima, Harima.
 *637 perfragilis, Pils. Kunchan, Loochoo.
 *1000 perfragilis, var.
 shikokuensis, Pils. Kotsuzan, Awa.
 935a semisericata, Pils. Kurozu, Kii.
 *666 tanegashimæ, Pils. Tanegashima, Osumi, .06-.12

MANDARINA.

*805 exoptata, Pils. Hahajima, Ogasawara, .25-.40
 *845 exoptata, var.
 obtusa, Pils. Hahajima, Ogasawara.
 *860 hirasei, Pils. Chichijima, Ogasawara.
 467a mandarina, Gray. Hahajima, Ogasawara, .10-.15
 *858 mandarina, var.
 hahajimana, Pils. Hahajima, Ogasawara, .25-.40
 *467b mandarina, var.
 ponderosa, Pils. Hahajima, Ogasawara, .15-.25
 *896 mandarina, var.
 conus, Pils. Imotoshima, Ogasawara.
 906 ruschenbergeriana,
 Pils. Chichijima, Ogasawara.
 859 pallasiana, Pfr. Chichijima, Ogasawara.

MELAMPUS.

446 caffer, Krauss. Hirado, Hizen, .03-.05

MICROCYSTINA.

*949	circumdata, Pils.	Hachijojima, Izu.	
*482	ceratodes, Gude.	Kashima, Harima.	
*667	hiraseana, Pils.	Tanegashima, Osumi.	.06-.12
*803	hahajimana, Pils.	Hahajima, Ogasawara,	.08-.12
*973	nuda, Pils.	Hakusan, Kaga.	
483	sinapidium, Reinh.	Kashima, Harima,	.06-.10
*900	yakuensis, Pils.	Yakushima, Osumi.	
*1002	higashiyamana, Pils. & Hir.,	Higashiyama, Awa.	

NESOPUPA.

*855	dedecora, Pils.	Hahajima, Ogasawara,	.08-.12
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OMPHALOTROPIS.

*588	japonica, Pils.	Kashiwashima, Tosa.	.05-.08
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OPEAS.

*286a	brevispira, Pils.	Kashima, Harima,	.08-.12
456a	gracilis, Hutt.	Loochoo,	.05-.07
*286b	kashimæ, Pils.	Kashima, Harima,	.04-.07
*313b	kyotoensis, Pils.	Kyoto, Yamashiro,	.04-.07
*456b	obesispira, Pils.	Loochoo,	.05-.07
313a	pyrgula, A. Ad.	Kyoto, Yamashiro,	.04-.07

OTESIA.

673	japonica, Mlldff.	Kagoshima, Satsuma.	
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PUNCTUM.

*553	amblygonum, var. pretiosum, Gude.	Fukura, Awaji,	.04-.07
*517	japonicum, Pils.	Kashima, Harima.	
*553b	morseanum, Pils.	Hirado, Hizen.	

PUPINELLA.

*665a	funatoi, Pils.	Tanegashima, Osumi,	.06-.10
*645	oshimæ, Pils.	Oshima, Osumi,	.06-.10
51	rufa, Sowb.	Senzan, Awaji,	.03-.05
*731b	rufa, var. alba, Pils.	Hirado, Hizen,	.06-.10

- *665b rufa, var. tanegashimæ, Pils. Tanegashima, Osumi, .04-.07

PUPISOMA.

- *972 edentulum, Drap. Hakusan, Kaga.

PYRAMIDULA.

- *961 conica, Pils. Suimura, Awa.
 405 pauper, Gld. Nishigo, Uzen, .02-.03
 529 pauper, var.
 depressa, A. Ad. Nobusayama, Teshiwo, .05-.07
 *950 pauper, var.
 hachijoensis, Pils. Hachijo-jima, Izu.

PYTHIA.

- *710b aegialites, Pils. Loochoo.
 444 cecillei, Phil. Hirado, Hizen, .05-.08
 *709 pachyodon, Pils. Loochoo.
 453 Pythia sp. Loochoo, .04-.06

SITALA.

- *717 circumcincta, var.
 elata, Gude. Takayama, Iyo, .05-.08
 *953 latissima, Pils. Yaeyama.

SPIROPOMA (FORMERLY COELOPOMA).

- 53 japonicum, A. Ad. Senzan, Awaji, .03-.05
 *658 nakadai, Pils. Tanegashima, Osumi, .06-.10

SPHYRADIUM.

- 972 edentulum, Drap. Hakusan, Kaga; Kiyotaki, Omi.

SUCCINEA.

- *642 hirasei, Pils. Tsuchiura, Hitachi, .05-.08
 312 horticola, Reinh. Kyoto, Yamashiro, .04-.07
 408 lauta, Gld. Nishigo, Uzen, .03-.05
 *617a ogasawarae Pils. Hahajima, Ogasawara, .06-.08
 *617b punctulispira, Pils. Hahajima, Ogasawara.

TORNATELLINA.

*948	<i>biplicata</i> , Pils.	Hachijojima, Izu.	
*626	<i>inexpectata</i> , Pils.	Yaeyama, Loochoo,	.05-.08
*799	<i>ogasawara</i> , Pils.	Chichijima, Ogasawara.	
*851	<i>tryoni</i> , Pils.	Hahajima, Ogasawara.	

TRISHOPLITA.

*600	<i>collinsoni</i> , var. <i>casta</i> , Pils.	Obi, Hiuga.	
*691	<i>collinsoni</i> , var. <i>okinoshimæ</i> , Pils.	Okinoshima, Tosa.	
*565	<i>cretacea</i> , Gude.	Ushirogawa, Tosa,	.12-.20
*566	<i>cretacea</i> , var. <i>bipartita</i> , Pils.	Toyonishikami, Nagato,	.10-.15
*507	<i>dacostæ</i> , Gude.	Kagoshima, Satsuma.	
*344	<i>dacostæ</i> , var. <i>strigata</i> , Pils.	Hirado, Hizen,	.06-.10
*643	<i>dacostæ</i> , var. <i>awajensis</i> , Pils.	Anaga, Awaji,	.06-.10
7	<i>goodwini</i> , Smith.	Kyoto, Yamashiro,	.05-.08
*5	<i>goodwini</i> , var. <i>kyotoensis</i> , Pils.	Kyoto, Yamashiro,	.06-.10
310	<i>hilgendorffii</i> , Kob.	Ibuki, Omi,	.05-.08
*746	<i>hilgendorffii</i> , var. <i>chikubushimæ</i> , Pils.	Chikubushima, Omi.	
*751a	<i>hilgendorffii</i> , var. <i>tenuis</i> , Pils.	Ibuki, Omi,	.06-.10
*303	<i>hilgendorffii</i> , var. <i>rufa</i> , Pils.	Kashima, Harima.	
*601	<i>hiugensis</i> , Pils.	Obi, Hinga.	
580	<i>mesogonia</i> , Pils. (var.)	Kochi, Tosa,	.06-.10
581a	<i>pallens</i> , Ehrm.	Arakura, Tosa,	.10-.15
*387	<i>pura</i> , Ehrm.	Inga, Hoki.	
*581b	<i>smithiana</i> , Pils.	Arakura, Tosa,	.10-.15
*389	<i>tosana</i> , Gude.	Ushirogawa, Tosa,	.10-.15
*751b	<i>tosana</i> , var. <i>anozona</i> , Pils.	Akasaka, Mino.	

TROCHOMORPHA.

- *650 *gouldiana*, Pils. Oshima, Osumi, .06-.10
 631 *horiomphala*, Pfr.
 (*fritzei*, Bttg.) Kunchan, Loochoo.

TRUNCATELLA.

- *811c *kiusiuensis*, Pils. Tanegashima, Osumi, .05-.08

VERTIGO.

- *570 *hirasei*, Pils. Yanagawa, Chikugo.

VALLONIA.

- 281 *tenera*, Reinh. Osaka, Settsu.

ZONITOIDES.

- 1005 *arboreus*, Say. Tokyo.
 554 *minusculus*, Binn. Fukura, Awaji, .04-.07
 *951 *subarboreus*, Pils. Hachijojima, Izu.

EXPLANATION OF PLATE.

- Fig. 1. *Ganesella myomphala* Martens. Hirado, Hizen.
 Fig. 2. *Clausilia martensi* var. *reiniana* Kob. Ibuki, Omi.
 Fig. 3. *Eulota callizona* var. *dixoni* Pils. Takeya, Idzumo.
 Fig. 4. *Eulota senckenbergiana* var. *awaensis* Pils. Suimura,
 Awa.
 Figs. 5, 6. *Eulota elegantissima* var. *cara* Pils. Riukiu.
 Fig. 7. *Mandarina mandarina* var. *trifasciata* Pils. Nakano-
 shima, Ogasawara.
 Fig. 8. *Fametesta mirabilis* Pils. Hahajima, Ogasawara.
 Fig. 9. *Hirasea profundispira* Pils. Chichijima, Ogasawara.
 Fig. 10. *Hirasiella clara* Pils. Chichijima, Ogasawara.
 Fig. 11. *Cyclophorus hirasei* Pils. Oshima, Osumi.
 Fig. 12. *Pupinella oshimæ* Pils. Oshima, Osumi.
 Fig. 13. *Ganesella largillierti* Phil. Riukiu.
 Figures 8, 9, 10, 12 are enlarged, the others are natural size.

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