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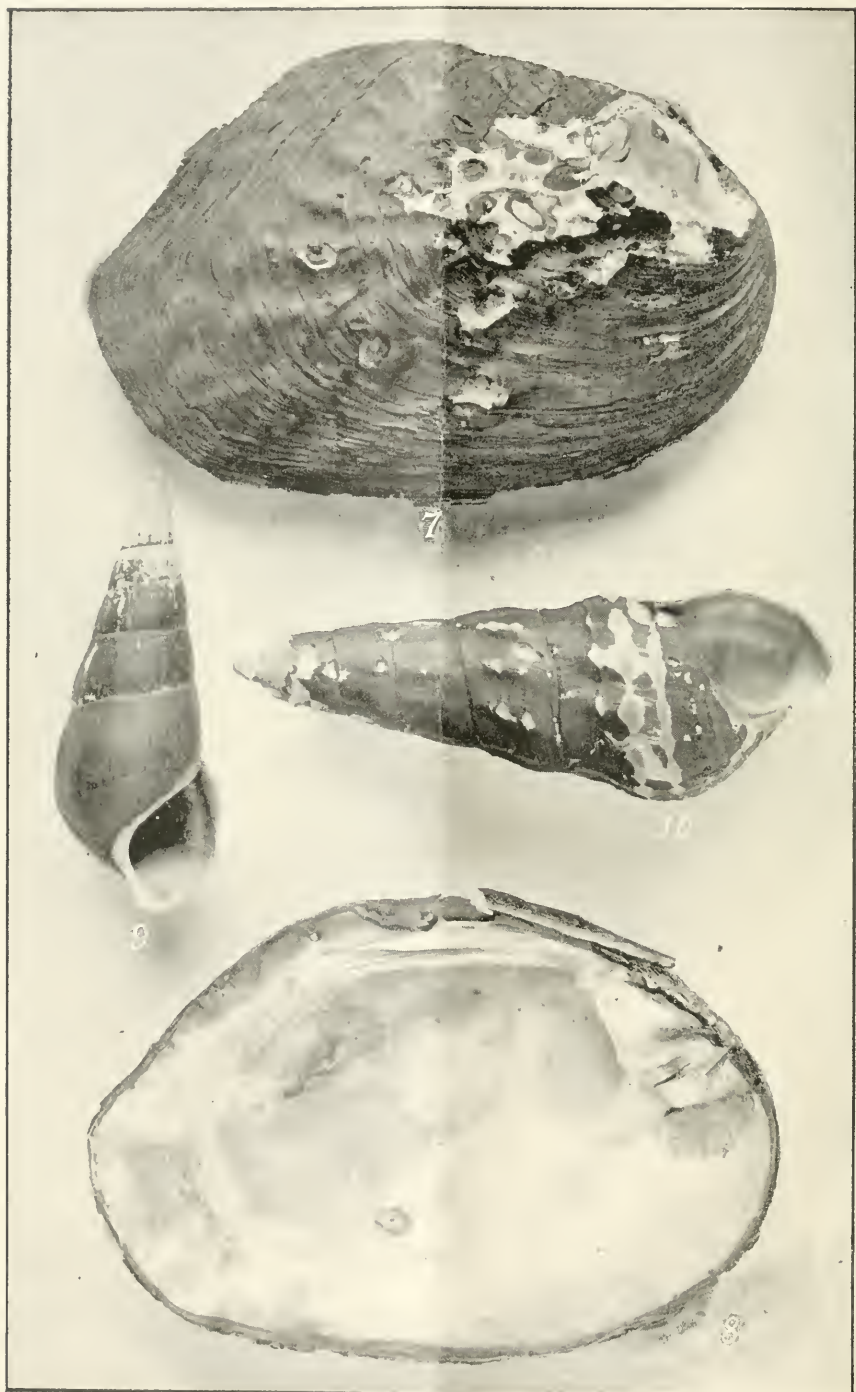
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PILSBRY.—NEW UNIO AND PACHYCHILUS.

THE NAUTILUS.

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No. 1

ILLUSTRATIONS OF NEW SHELLS.¹

Unio Pilsbryi Marsh, Plate I, figs. 7, 8.

This species is a member of the plicate group of Uniones. It is a decidedly compressed, oblong shell, black in color, having very distinctly marked lines of growth, which are spaced over the greater part of the disk, but become crowded on the lower margin. It has numerous oblique waves, which generally bifurcate indistinctly toward the posterior-lower end. The waves are more or less cut by short impressed furrows, as in *U. undulatus*, etc. The nacre is white and very thick anteriorly, but in the cavity of the valves and posteriorly it is thin and stained with blue and olive-green. The lateral teeth are also olive-green.

It was collected by Mr. Elwood Pleas in the Little Red River, Arkansas, and the original description, by Mr. Wm. A. Marsh, will be found in the NAUTILUS, V, p. 1.

Unio Pilsbryi is not closely allied to any other American species. It has a striking resemblance to *Unio Leai* Gray of China.

Specimens, including the individual figured, are in the special exhibit of United States shells, formed by the American Association of Conchologists, in the Museum of the Academy of Natural Sciences of Philadelphia.

¹The accompanying plate is reprinted by permission from the Proc. Acad. Nat. Sci. of Philadelphia.

The Melanian illustrated (figs. 9, 10) will be noticed in a later article.

SOUTH AMERICAN NOTES.¹

BY DR. WM. H. RUSH, U. S. N.

I have been adding lately to my collections many specimens, nearly all the work having been done near Maldonado, but few species being added, and they include the *Unio* *Rhuacoica* and *Charmana*, a fine, large *Anodonta*, *Azara labiata*, *Solecurtus Platensis*; and some fine, large, clean specimens of *Mytilus Platensis*, taken from the flukes and shank of an old anchor grappled here. This old anchor proved to be quite a blessing in disguise, for on it were some fine specimens of *Chiton Tehuelchus* and *C. Isabellei*, and a few large *Ostrea Puelchana*. In my dredgings since, I have found a few more *Chitons*, but always on rocky bottoms and attached to stones, so that while adding only a few of these, I have been adding nothing to my stock of the mud-lovers, such as *Corbula*, etc.

Mr. Burnett, the British Vice-Consul here, while visiting the ship, told me that he had occasionally found in his garden a large black slug. The day following proving pleasant found me on my way to hunt the monster, but anxious as I was for the little game of hide and seek, I found time on the way to loiter in a small patch of native trees to hunt for my old friends, the *Helix costellata* d'Orb., to add to the number of my accumulating exchanges. Finally I found Mr. Burnett and we started for the old ruins of a house. I did not anticipate much success when we entered the enclosure, for the ruins were in the center of the town of Maldonado, whose population is about twelve hundred, and the surroundings were extremely dry, there having been no rain for months. However, with willing hands we started in and after turning over many large masses of brick, my companion said, after the exertion of moving an extra heavy one allowed him to recover enough breath to speak, "There is one of those large mail-coated insects I was speaking of," I promptly said, "Hold on!" and proceeded to turn out with my

¹The following extracts are from a letter received from our esteemed correspondent, Dr. Wm. H. Rush, dated U. S. S. Yantic, Maldonado Bay, Uruguay, March 7th, 1893.

forceps what seemed to be the veritable monster in all his glory of aestivation, the *Vaginulus solea* d'Orbigny, or more correctly according to Tryon, *Veronicella*. One more specimen was found with its egg-nest. Both specimens were curled, and the tentacles were not visible, in fact, it looked like a lifeless mass of very dark grayish-brown opaque glue, with lighter gray spots: about the size of that warred-upon Bland dollar, with a notch in one side and a crack extending nearly to the center. Turning it over it presented the well known under surface as shown in d'Orbigny's figure. Soon two tentacles came forth, which stuck up in the air, and each had a bright black eye visible in the exact center of its free end; then two more were observed, which projected downward and were broader and stouter than the others, and appeared bifurcated; these latter were constantly in motion, apparently acting as feelers, and later when the animal was moving along on a glass plate seemed to act as suckers. Finally he slowly straightened out until he was ten centimeters long and a little over two wide. I next took a look at the nest, of which I had found several in the woods, only never very large, usually containing about ten or fifteen eggs, but in this one I counted seventy-five, although, much to my discouragement as an amateur artist, in my sketch of it I can only account for forty-five—it was about the size of a silver half dollar and hemispherical, the eggs being regularly arranged around the circumference and held together by a heavy mucous-like rope. The eggs were oval in shape, some perfectly clear and transparent, others yellowish and more or less opaque, and all were covered by the stercoraceous deposit of some insect, I judged. Unfortunately, it broke to pieces before I reached the ship on account of the rough handling of curiosity. One specimen of the solea was much darker in color than the other, and the lighter seemed to fade before I had my water color sketch finished; subsequent finds may show considerable variation in coloration. I killed the first specimen in a solution of bichloride of mercury, 1 to 500, and then dropped it into glycerin hoping thus to preserve its colors, but it has contracted and become very dark: the second I killed in the same solution, in which it still remains. In dying it threw out much mucus, most rapidly and in greatest quantity from the extreme end so that I suspect there may be a mucous pore there; it also seemed to come from its whole surface enveloping it quickly in a cloud, completely hiding it, and in sufficient quantity to render the fluid as nearly opaque as milk.

The mantle retracted from the head, which thus exposed is one cm. long—the jaw was easily seen, by the unaided eye, as a brown crescentic band in the superior lip, and with an ordinary magnifying glass the ridges were easily seen. The whole animal is faded and contracted, but still pliable. The next I obtain will be killed in accordance with your directions in water, and will be kept for you.

Associated with the solea, and in damp places, I found some numbers of the slug which is given in d'Orbigny as *Limax unguis* Fer., but they are not as large as represented in the plate. I found this latter species very plentiful in the Prado at Montevideo and always several individuals together. This latter is in contrast with *Veronicella*, which were alone and widely separated.

I had a few Chitons of both species mentioned in the first part of this letter, alive in my aquarium bottle, for a few days in my room, with a long strip of glass upon which I coaxed them to crawl for the purpose of sketching for water-color work, and was surprised at the rapidity with which they travel, and it was rendered all the more decided when I compared it with the movements of the *Veronicella* which I had in another bottle alongside.

CONULUS FULVUS MULL.¹ VAR. DENTATUS, N. V.

BY DR. V. STERKI.

Among a number of *Con. fulvus* from Jackson Co., Alabama, kindly sent by Mr. H. E. Sargent, last year, there were a few specimens with distinct "teeth" in the base of the last whorl. Since then, Mr. Sargent has paid attention to the matter, and a few days ago sent me some more specimens in two lots, one from the valley and another from the hills. The latter were most small, young and half grown, and most of them showed 1-2-3 small, white, testaceous deposits in the base of the last whorl, at somewhat irregular intervals, roundish or elongate in a radial direction. They are not high, tooth-like, but quite distinct, whether seen through the shell, or if near enough, from the aperture inside, and recall the same feature

¹The species was first described by Müller, not by Draparnand. It may be said again, that *Conulus* is a genus founded on anatomic characters.

in the smaller *Gastrodontas*, although I have never seen more than one tooth on the same radius. But, as said, in some they are in the form of radial bars, and when two or three are present they are always of the same character, either round or transverse. Two examples, mature or nearly so, but weathered and opaque, have at least one distinct round deposit each, about $\frac{1}{2}$ volution above the aperture. In the specimens from the valley, about a dozen in number, varying from young to large, and by the way a few of them with very high spire, there is not a trace of teeth to be seen.

This is certainly a very interesting fact, and the character described could mean a different species, and for the *Nouvelle Ecole* would be sufficient to establish a new genus. But as the shell is, in all other regards, formed like that of typical *C. fulvus*, we have to regard it as a variety of that species, the more so since in the lot there are a few examples without teeth and differing in no way from the type. This, and the variation in number, shape and size, show it to be a newly acquired character, which some time may be that of a distinct species.

It remains to know whether the form be found also in other places of our country—which is quite probable—and to ascertain also the nature of the localities where it lives. Another question is whether it also inhabits the Old Continent.

It may be mentioned here also that there are two different forms of the common *C. fulvus*, one more pale horn, the other deep wine or amber colored, and there are also differences in surface sculpture. It would be of interest to know how far these forms are constant and in correspondence with the nature of their habitats. I have seen them in both Europe and North America.

New Philadelphia, O., March 21, '93.

POLYGYRA SUBPALLIATA, N. SP.

BY H. A. PILSBRY.

Some time ago the writer received from Prof. A. G. Wetherby, a suite of the land-snails found at his home, "Roandale Farm," Magnetic City, North Carolina; and with them a letter giving the collector's impressions and conclusions in regard to some, and queries

respecting other forms. A number of "*Zonites*" were included, among them specimens of *Z. carolinensis* Ckll., and of two new species, one of about the same size as *suppressus*, the other larger. Of these an account will be given later. Among the Helices, one of the most interesting forms was labelled "*H. wetherbyi* Bld. var. *Don't believe it!*" Upon glancing at the specimens I was compelled to join Wetherby in his scepticism, for the shells are certainly unlike *H. wetherbyi*, and belong to quite a different group of species. The first notice of these so-called *wetherbyi* appeared in a paper written by Mr. Wetherby on the shells of Roan Mountain, and published in the Journal of the Cincinnati Society of Natural History, vol. iv, as long ago as 1881. The paragraph is as follows:

"*Mesodon wetherbyi* Bland.—Shells which have been referred to this species occur somewhat sparingly at this locality. Like the specimens from the original station, the shells are covered with a thick coating of dirt, imbedded in the hirsute covering of the epidermis, which being carefully washed away leaves the shell of a pale greenish white color. These shells have a lamellar projection on the inferior surface of the peristome much like that of some varieties of *T. appressa*, and which is a character very distinct from that of the same region in the type. A very careful examination of the genitalia shows them to be much more like those of *Triodopsis*. Indeed, looking over the whole field, it seems not improbable that here we have another case of the union of characters of *Mesodon* with other groups, like that of *Stenotrema*, mentioned in my notes, No. 1. Mr. Binney says, *Terr. Moll.*, vol. v, p. 301, "*Triodopsis* does not differ from *Mesodon* or *Polygyra* in the character of its jaw." Again, p. 306, he says that the genitalia of *T. appressa*, resemble, in certain features, those of *Mesodon sayii*=*M. diodonta*. This shell certainly presents as many features that would ally it to *Triodopsis* through *appressa*, as to *Mesodon* through *dentifera*. In fact, I am inclined to the belief that the shell is not *Mesodon wetherbyi* at all, but a distinct species, probably a *Triodopsis*, and having the closest analogy to *M. dentifera* Binney, which certainly has some very strong claims to relationship to *Triodopsis* through *T. appressa*. The station of this species is always in the dirt under and beside rotting logs. It is very sluggish and timid, and very rare."

It will be seen that Wetherby recognized the Triodopsoid affinities of the snail; but in the writer's opinion it is more nearly allied

to the *palliata* than the *appressa*. The species may be diagnosed as follows:

Polygyra (Triodopsis) subpalliata n. sp. Shell depressed, thin, pale green or buff-green, somewhat translucent. Surface shining, minutely roughened by narrow granules elongated in the direction of growth-lines. Spire convex, composed of slightly over 5 convex whorls, the last rounded at the periphery, deflexed in front, and very deeply constricted behind the lip. Aperture oblique; outer lip flatly reflexed, white, wide, the arcuate basal lip bearing a long plate-like callus, as in *H. palliata*; parietal wall bearing a large, high, curved tooth, like that of *H. palliata*. Alt. $9\frac{1}{2}$, diam. 15 mill. (largest specimen). Alt. 7, diam. 13 mill. (smallest specimen).

DALL'S TERTIARY MOLLUSKS OF FLORIDA.¹

This second volume of Dr. W. H. Dall's great work upon the Tertiary Mollusks of Florida is much wider in scope than the previous part, including much matter upon other East American faunas of the same epoch, notably the Pliocene of the Carolinas. The introductory chapter graphically describes the series of changes of shore line and elevation of our southeast coast, from the close of the Eocene to the present time; and this has been noticed and quoted from in a previous number of the NAUTILUS.

The systematic enumeration and description of species occupies the greater portion of the work, the subject being completed down to the Pelecypods, which will form the third part of the work.

The new genera and subgenera proposed are as follows: *Glyptostyla* (type *G. panamensis* Dall), a peculiar form like *Pyrula* outside but ponderous and with the plaits of *Latirus*. *Trachyodon*, new subgenus of *Chiton* for *C. eocenensis* Conr.

The generic synonymy of *Vivipara* is worked out in full, the author concluding that *Vivipara* (Martini) Lamarck, has priority over the very bad masculine form, *Viviparus* Montf., which has lately been adopted by English authorities. Incidentally the history of the name *Bulimus* is discussed, and shown to be totally inapplicable to the genus of land snails generally known by that name. *Clava*, of Martyn, is used as a generic name to supercede

¹Transactions of the Wagner Free Institute of Science of Philadelphia, vol. 3, pt. ii. Issued January, 1893.

Vertagus. The genus *Natica* as used by most writers is definitely divided into two genera, *Natica*, in which the operculum is shelly, and *Polynices* Montfort (1810), in which the operculum is thin, flexible, corneous. The last group contains, of course, the familiar *duplicata* and *heros* of our east coast, and the similar western species. This is a division heartily to be commended, and it is surprising that it has not been placed upon a firm basis long ago.

A very large number of new species are described. The illustrations are excellent, having the merit of great clearness of detail. The appearance of the volume is highly creditable to the Wagner Institute, the officers of which have, with an enlightened appreciation of the importance of the work, spared no pains or expense in its production. Especially are the thanks of both Palæontologist and Conchologist due to Messrs Joseph Willcox and Charles W. Johnson, who collected much of the material, as well as to Dr. Dall who has so ably worked it up.

CESARE MARIA TAPPARONE CANEFRI.

On the 6th of August, 1891, CESARE TAPPARONE CANEFRI expired after a long illness. Professor CESARE TAPPARONE CANEFRI was born at Alexandria on the 5th of February, 1838, being descended from a noble Piedmontese family. His father was for many years Mayor, and destined his son for an official career. Tapparone, therefore, at the age of 20, entered the University of Turin as a law student; but he had already become interested in the natural sciences, especially botany. At Turin he formed a friendship with LUIGI BELLARDI and VITTORE GHILIANI; and in the elevating atmosphere of that fellowship he developed the enthusiasm and love for science which pervaded his whole after life.

A few years after his graduation, Tapparone was employed in the civil service of Spezzia; and there he was attracted by the rich shell fauna of the Gulf, which had already been studied by JEFFREYS and CAPELLINI. Many species not known to these students were found by the young enthusiast, who, in 1865, embodied the results of his research in a "Catalogue of the Mollusca of Spezzia," his first conchological paper. Henceforth, the greater part of his time was given to the study of mollusks. He shortly became an assistant to Professor LESSONA, in the Chair of Zoology and Com-

parative Anatomy, in the Royal University of Turin; while here he worked up the mollusks collected by DE FILIPPE during the circumnavigation of the Royal Frigate, 'Magenta.' In 1873, Tapparone began the series of articles upon Oriental land mollusks collected by O. BECCARI and L. M. D'ALBERTIS in New Guinea and adjacent regions; and it is to this series of papers that his reputation is chiefly due.

After a residence of eight years in Turin, Prof. Tapparone went abroad for the purpose of studying the mollusks of foreign museums. He visited the British Museum, the Zoological Museum of Berlin, etc., and finally spent some time in study under SEMPER at Würzburg. Returning to Italy, he went to Genoa, where he devoted himself to the mollusk collection of the Civic Museum. Shortly after, a disease of the circulation and nerves manifested itself, and despite the tenderest care of wife and friends, it proved fatal.

His collection and library have been given to the Civic Museum of Genoa, by his wife.

All students of land shells will regret the death of so conscientious and able a malacologist; and particularly will his loss be felt by those who have profited by his "*Fauna Malacologica della Nuova Guinea*," and the other essays upon allied faunas.

A bibliography and full biographical sketch by ISSEL, with portrait will be found in the *Annali del Museo Civico di Storia Naturale di Genova*, 1892.

THE UNIO MUDDLE.

BY PROF. CHAS. LE ROY WHEELER.

Under the above heading appears an article in the February NAUTILUS from the pen of Mr. Berlin H. Wright. In a recent number, also, appeared an article from Mr. John H. Campbell suggesting that the Uniologists connected with the American Association of Conchologists meet at Chicago this summer and settle disputed points as to priority of description, nomenclature, and synonymy. Certainly it would be "just too nice for anything" if the aforesaid Uniologists could have a little pic-nic at Chicago, pass a few resolutions forever settling all disputed points, pat each other

on the back, shake hands, adjourn, go home, and sleep more soundly than ever before; but, unfortunately, the ghosts of Dr. Lea, Mr. Conrad, Mr. Say, and others might appear upon the scene, and Mr. Ego might appear in the flesh, armed with carpet-bag, microscope, and manuscript; in which case the big show would not last half long enough to enable the quarrelsome scientists to finish throwing mussel shells at one another.

Seriously, however, this "muddle" ought to be unuddled; but how is it to be done? Who is there upon whom all concerned will be willing to rest the responsibility of deciding contested points? Can three or five men be found upon whose judgment all will consent to rest? If so, who shall they be?

By the time the "Unio Muddle" shall have been fairly settled the indications are that there will be three or four other first class muddles ripe. Would it not be well for the American Association of Conchologists to do in regard to American mollusks as the American Ornithological Union has done in regard to the American Birds, and settle not only the "Unio Muddle," but all contested points in American Conchology?

Why is it that the reputation of a conchologist should rest upon the naming of new species rather than upon a knowledge of Conchology? and, honestly, may not the making of new species sometimes be attributed more to conceited self-assertion than to a desire to help the science? Suppose we have a committee of the American Association whose duty it shall be to decide upon the merits of so-called new species, and that a name be regarded as only provisional until it be accepted or rejected by such committee. So mote it be.

DESCRIPTION OF A NEW SPECIES OF *NASSA* FROM THE GULF OF CALIFORNIA.

BY ROBT. E. C. STEARNS, U. S. NATIONAL MUSEUM.

Shell small, elongated, ovate, of seven to eight whorls, with an acutely elevated spire, ornamented with generally three spiral series of granules; occasionally four series are exhibited on the penultimate whorl, and six to seven on the basal. These granules also correspond to a longitudinal arrangement. In some examples the sutural series is a little more prominent and followed by a slight

parallel sulcation. Otherwise sculptured with revolving liræ on the lower half of the basal whorl. Suture more or less distinct, aperture small, ovate, about one-third the length of the shell. Outer lip externally rimmed and internally thickened, crenulated and denticulate on the inner side; pillar and face of basal whorl heavily caloused, with a single plication or fold on the base and four or five obtuse wrinkles above. Aperture notched above with the usual attendant callosity; pillar roundly arcuated, and the whole surface of the parietal region and edge of the lip showing a warm shining brown glaze, light in some examples and quite dark in others; some specimens are much more robust than others and vary also in the elevation of the spire.

Dimensions of largest, altitude 16 mm., breadth 9 mm.

An intermediate example measures, altitude 15 mm., breadth 8 mm.

The majority of the specimens are much smaller than the least of the above.

The nearest ally of *N. brunneostoma* is *Nassa complanata* Powis, and these two species, together with *N. tegula* of Reeve, form a little group possessing similar general characters.

N. brunneostoma is readily separated from its congeners by the highly glazed and solid brown callus that surrounds the aperture.

Habitat.—Gulf of California, near the mouth of the Colorado River; also at Guaymas, on the easterly shore, where numerous examples were collected by Dr. Edward Palmer (Mus. Nos. 23721, 37239, 55951).

Washington, D. C., May 2, 1893.

NOTES AND NEWS.

THE MALACOLOGICAL SOCIETY OF LONDON.—At a meeting held on the 27th February, at 67 Chancery Lane, London, England, W. H. Hudleston, F. R. S., in the chair, the following resolutions were passed:

1. That a Society be formed in London for the purpose of furthering the study of the Mollusca and Brachiopoda in all their branches.

2. That the Society be called the "MALACOLOGICAL SOCIETY OF LONDON," and that the Annual Subscription be 10s. 6d.

3. That those who have signified to Mr. Sykes their willingness to join the Society shall constitute the original members: to wit (list of 70 names).

4. That the original Members, and those who join the Society during the year 1893, be exempt from entrance fee.

5. That the election of Members, subsequent to this the inaugural meeting, be by ballot, under regulations to be drawn up by the Council.

6. That there be an Entrance Fee, and that it be 10s. 6d.

7. That the following constitute the first Council:

President: Dr. H. Woodward, F. R. S.

Vice-Presidents: Lt.-Col. H. H. Godwin-Austen, F. R. S., etc.; W. H. Hudleston, F. R. S., etc.; J. Cosmo Melvill, F. L. S.; E. A. Smith, F. Z. S.

Treasurer: G. F. Harris, F. G. S.

Secretary: E. R. Sykes, F. Z. S.

Other Members of Council: H. W. Burrows; G. C. Crick, F. G. S.; W. Crouch, F. Z. S.; Rev. Canon Norman, D. C. L., F. R. S.; J. H. Ponsonby, F. Z. S.; G. B. Sowerby, F. L. S.; B. B. Woodward, F. G. S.

8. That the Council be instructed to draw up the rules, and submit them at the next Meeting of the Society.

9. That the Meetings be held on the second Friday in each month, commencing in April, 1893.

10. That the Resolutions passed at this Meeting be printed and circulated amongst the Members.

Votes of thanks were passed to the Chairman for presiding, and to Mr. G. F. Harris for the use of the room.

The next meeting will therefore take place on Friday, April 14th, at 8.00 p. m., and succeeding Meetings on the second Fridays in May and June, after which there will be no Meeting till November. Until further notice, the Meetings will be held, by the kind permission of Mr. Harris, at 67 Chancery Lane (second floor).

MR. CHARLES W. JOHNSON is spending a few weeks in Washington, D. C.

The death of the veteran botanist, ALPHONSE DE CANDOLLE, April 9, 1893, is announced.

MR. JOHN RITCHIE, JR., of Boston, paid a flying visit to his Philadelphia and Washington friends recently, being in the latter city attending the meeting of the National Academy of Sciences.

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No. 2

SOME NOTES ON ZONITIDAE.

BY DR. V. STERKI.

1. The generic name *Zonites* Montf., has, by European malacologists, long ago been restricted to a group of circum-Mediterranean forms, such as *algirus*, *verticillus*, *gemonensis*, etc., none of them being represented in the recent North American fauna; and as it seems to be a well-defined genus, we will do well to recognize this restriction of the group. The old genus *Zonites*, or *Hyalinia*, is being disintegrated, just as the old genus *Helix* has been. For *nitidus* Müller, the genus *Zonitoides* has been established on characters chiefly anatomic, the presence of a dart sac and dart, and, as it seems, peculiarities of the radula. As the same dart sac and dart is present in a number of North American species, such as *elliotti*, *ligerus*, *demissus*, *intertextus*, *gularis*, *suppressus*, *internus*, etc., and, as has been supposed, and I can positively confirm, *arboreus*—they would range under *Zonitoides*, especially if their anatomy prove to agree with *nitida*, also otherwise. Dr. v. Ihering makes the proposition to unite all Vitri-no-zonitidae having a dart¹ in a family, as xiphogone forms—“Zon.” (or Hyal.) *fulvus* Müll., *gundlachi* Pfr., *sterkii* Dall., belong to the genus *Conulus* Fitz., well characterized anatomically. *Hy. crystallina* Müll., *diaphana* Studer., etc., of the old continent, have their peculiar anatomy also, and range under

¹ Which, however, is not homologous with the dart of the Helicidae, and therefore named *pugio*, by v. Ihering.

the genus *Vitrea* Fitz. On the other hand, as well known, our *Mesomphir* (s. str.) are hardly to be separated generically from *Hyalinia* (*Euhyalinia*), as *glabra*, *draparnaldi*, *cellaria*, etc., and forms like our *wheatleyi*, *petrophila* from *pura*, etc., not to speak of *radiatula* which is equally distributed on the old and new continents. We may, for all these, use the generic name *Hyalinia*, the more since such authorities as W. G. Binney, Tryon and others have done so before, and no embarrassing of the synonymy will result. Yet all these forms still need careful examination as to their anatomy.

2. Some *Zon. suppressus* Say, show not a trace of internal teeth or rather lamellæ, when adult; W. G. Binney (l. c. p. 226) also says that the tooth is sometimes "so little prominent as to be hardly visible." I have in possession specimens from Ohio and Virginia (Petersburgh, collected by myself)* of 7-8 mill. diam. and 7-7½ whorls, with the last whorl and aperture well-rounded, without any "teeth," and only a thin callus inside. As to size and shape, they differ essentially from W. G. Binney's description and figure.² With these, there were examples of all ages and sizes, inseparately connected with the former, having two strong lamellæ upon a heavy callus. Also in *gularis* and other forms of the group, the lamellæ considerably decrease in size and number with advancing age, and at maturity sometimes are quite short and thin.

3. Mrs. Geo. Andrews, to whom we owe so many valuable finds among land mollusca, sent me, in 1891, a number of "*Zonites gularis* small var." Then I was satisfied that they were not *gularis*; and now, after repeated comparison and examination also of the soft parts on specimens recently obtained, this is beyond a doubt, and as well, that it is a distinct species, not yet described. Here only so much of the description will be given as to serve our purpose. The shell is of the general appearance of a small *Z. ligerus*, of only 9 mill. greater diameter, finely perforated, with a high spire, well-rounded at the apex. Inside there is a rather long fold corresponding to the same (outer) in *Z. gularis*, etc., and a lower one near the columella. In a part of the specimens there is another (outer) long fold, about ½-¾ volution above the aperture, sometimes connected by a fine marking with the one in front; evidently this is the one previously formed and not resorbed, the same thing as in *Z. internus*, etc.

4. A few examples of *Zonites*, I think a form of *demissus*, from

² Manual, p. 225; fig. 241, looks like drawn from an immature specimen.

Nashville, Tennessee, and Jackson Co., Alabama, the latter collected by Mr. Sargent, have a strong, thick, white, testaceous deposit inside the base of the last whorl, with some nodules, apparently irregular, but equal in the specimens from either locality, which correspond to teeth or folds. These testaceous deposits in different species are often smaller and thinner in mature shells than in adolescent, and sometimes entirely resorbed; they evidently are the same morphological element as the deposits and folds in *Gastrodonta*.

5. I believe the fact must impress itself upon anyone that *Zon. suppressus*, especially the form noted above; *gularis*, also more in some forms, much resemble *Z. ligerus*, *demissus*, etc., and are nearly related to them, much more so than the latter are to the *Mesomphix* between which they are inserted in systematic works. This feeling found its expression also in W. G. Binney's "L. & F. W. Shells," where *ligerus*, *demissa*, *intertexta* are ranged under the genus *Hyalinia*, the *Mesomphix* under *Zonites*. To this now comes the species announced under 3 above, resembling *ligerus* as to the general configuration of the shell, and "*Gastrodonta*" in the lamellæ, which are of a somewhat peculiar type at that, approaching it to *significans* Bld. Some light on the significance of presence or absence of internal teeth is given also by *Conulus fulvus*, in which, as we have seen, such may be found or wanting in the same form from the same locality. And a character common to the two groups, valuable even of higher order, seems to be the presence of a dart, in the genital organs, which would range them together in the genus *Zonitoides*. It may be communicated here, previously, that I have found, in the upper part of the penis in *Z. ligerus*, *suppressus*, the forms mentioned under 3 above, and in *arboreus* a peculiar papilla (Reizkörper of German authors) in which a part is hard, sharp, projecting and (in the 3 former species) impregnated with carbonate of lime.

6. Quite lately, Mrs. Andrews has sent me specimens of a *Zonites*, collected at Cranberry, Mitchell Co., North Carolina. They can be referred to none of the described species, and may prove to be a new one.³ The shell, of about 7 m. in diam., has two very small lamellæ or teeth near the aperture, corresponding to the same *Z.*

³ The n. sp., however, may be "hanged in the smoke till cured," or left in suspense till fully confirmed; it is, *as such*, of little consequence, but of great importance as a form.

gularis, and thus proves to be a Gastrodonta. The shell is thin, transparent, somewhat greenish deep horn colored, of the same appearance as *Z. nitidus* Müll., which species it surprisingly resembles below, while above it appears different by the greater number of whorls. It seems that here we have a "missing" or connecting link between the so-called type of *Zonitoides*, and its more characteristic North American members.

7. Mrs. Andrews has, of late, again sent me numerous small *Zonitidae*, collected in the mountains of Tennessee and North Carolina. From these I learned, beside other things, that *Zon. andrewsi* W. G. B., when adult, has very often (or always?) no internal teeth at all. Moreover, the shell attains quite a different configuration: the last whorl is placed considerably deeper on the penultimate, or gradually descends, thus causing the spire to be much more elevated; it becomes also deeper and at last somewhat truncate in the periphery (perpendicular section) and subangular below, comparatively large, just as we find it in some *ligerus*, *gularis*, *suppressus*. At the same time, the base is no more equally rounded, but becomes sloping inward, somewhat infundibuliform, the umbilicus is rather large, and the striation becomes more crowded and coarse, even so that the striae appear to be raised (*i. e.* the intervals) in place of impressed, as they are on the inner whorls. The whole shell then has quite a different appearance from that commonly known as *Z. andrewsi*, much resembling the description and figure of *Zon. placentulus* Shuttl. (in W. G. Binney's Manual, p. 222). The whorls are fully 9 or more, the diameter 7-7.5 mill. It was somewhat difficult to state these relations, as I had, though, a good number of specimens, no complete series from one locality at disposition. There is no doubt, to say no more, that many such examples have been taken for *Zon. placentulus*. And, as a striking proof of this, I have in my collection four specimens from the mountains of North Carolina received as *Zon. placentulus*, years ago, from a conchologist who studied those land shells; they show more or less the characteristic features noted above, and one of them has a distinct row of denticles denoting it unmistakably as *Zon. andrewsi*.

8. As with the preceding, it is with *Zon. significans* Bld. Only the younger examples, *i. e.*, those commonly found in collections under this name, have the teeth, two series of two, as a rule. In older specimens, of 5-6 mill. diam., they are no more formed, or only occasionally one or another, and then the shells have the characters

of *capsella* Gld., and doubtless have been and will be taken for such. A lot of fine examples, received from the same author, collected in eastern Tennessee, and named *capsella*, are, to all probability, nothing else but adult significans, in which the last whorl becomes comparatively more voluminous and commonly more descending. The spire is variable from almost flat to rather elevated, and also the umbilicus shows some differences. Among lots, which to all appearance, were *Zon. capsellus*, there were examples with a single, sometimes barely perceptible, tooth.

9. With all this, I do not feel positive, at present, that *Zon. andrewsi* W. G. B., and *significans* Bld., are only the juvenile forms of *Zon. placentulus* Shuttl. and *capsellus* Gld. But so much is sure, that they must be desperately similar, respectively, and that they need careful revision, also as to anatomy. The words of W. G. Binney that the latter form "a puzzling group," become of an increased meaning now.

10. For faunistics, it may be of interest that there were a few specimens of *Hyal. ferrea* Mse., from eastern North Carolina, among the materials sent by Mrs. Andrews. In my collection there is one from Randolph Co., West Virginia. Also from different places in eastern Ohio it is known.

New Philadelphia, Ohio, May, 1893.

A REVIEW OF VON IHERING'S CLASSIFICATION OF THE UNIONIDÆ AND MUTEIIDÆ.

BY CHAS. T. SIMPSON.

Since the theory of evolution has been generally accepted, a complete revolution has taken place in the methods of study and classification among biologists. All artificial systems, or those based upon a single character, have either been relegated to the past or are hopelessly doomed. Students who are progressive and keep abreast of the times, realize that in the study of organic life it is necessary to seize on to every fact which can possibly aid them in classifying: embryology, anatomy, the study of its development in the past as taught by palaeontology, geographical distribution and habits.

Dr. H. von Ihering, of Rio Grande do Sul, Brazil, has recently

published in *Archiv für Naturgeschichte*,¹ a lengthy article on the *Naiidae* of San Paulo, Brazil, and a proposed system of classification in which some startling discoveries are brought to light, and which ranks as one of the ablest papers ever written on the subject. This classification, while working a complete revolution in our preconceived ideas of the relationships of the different members of this group, is so clear and philosophical, it so thoroughly takes cognizance of all the known facts, that it is certainly worthy of the most thoughtful consideration. In a brief review like this I can only allude to the more prominent points, and those who are interested should read the paper itself.

H. and A. Adams, in the *Genera of Recent Mollusca*, divide the *Naiades* into two families, *Unionidae* and *Mutelidae*,² separated by certain minor characters of the shells and animals. Ihering uses the same family names in a somewhat different sense from the Messrs Adams, and unites the whole into a larger group or super-family, which he calls the *Naiidae*. He finds in all the genera which he places in the *Unionidae*, the larval state is a *glochidium*, that is, a stage or condition in which the animal is completely enclosed in a porous bivalve shell.

On the other hand, the species which he places in *Mutelidae*, pass through a state after hatching which he calls a *lasidium*, in which the animal is divided into three parts, of which only the middle bears the small, single shell. He finds, on examination, that those South American forms that have hitherto been placed with *Anodon*, pass through the *lasidium* stage, hence they must be separated from that genus whose larval state is a *glochidium*, and he retains for this group the name suggested by Gray—*Glabaris*. He believes that *Aplodon*, having a few South American species, hitherto placed in *Monocondylaea*, and the so-called African *Anodons* belong to the same family, and that the latter should be placed in *Glabaris*.

D'Orbigny established the genus *Monocondylaea* for certain species of South American *Naiadae* whose shells possess a single cardinal, and no lateral teeth. Several of these will fall into other natural groups. Ihering does not mention the Asiatic species which Lea

¹ *Najaden von S. Paulo und die geographische Verbreitung der Süßwasser Faunen von Südamerika*, von H. von Ihering. Jahrg 59. 1 Bd.. 1 Heft.

² Fischer. *Manuel de Conchyliologie*, p. 997, divides *Unionidae* into two sub-families; *Unioninae* including *Unio*, *Monocondylaea*, *Pseudodon*, *Anodonta*, *Solenia* and *Mycelopus*; 2d *Mutelinae*, with *Mutela*, *Hyria*, *Castalia* and *Leila*.

and others have placed in this genus, but I believe they have no close relationship to these South American forms, and that they are merely depauperate Unios, which have a close affinity to species of that genus found with them.

The *Unionidæ* of Europe, North and Central America, and probably of the whole Northern Hemisphere, develop eggs in the outer gills alone as far as is known, with the exception of *Unio multiplicatus* and one or two others, which contain embryos in all four leaves of the branchiæ. Ihering states that in all the *Najidæ* hitherto examined from South America, the eggs are borne in the inner gills. I may remark in passing that the shells of the Australian, New Zealand, and many South African Unios bear an astonishing resemblance to those of South America in form, texture, smooth epidermis and concentric, sometimes slightly granulated sculpture, and especially in the peculiarly compressed, parallel cardinal teeth, and Suter states³ that the embryos of *N. menziezi* are borne in the inner gills. Ihering calls attention to the fact that all South American *Unionidæ* have a radial beak sculpture, and suggests that probably the same character may be found in the New Zealand species.

I have carefully examined extensive series of *Unio menziezi* and *lutulentus*, and on the latter find that the umbos are radiately ribbed where the shells are not too badly eroded, and there are traces of such ridges on the former and on some Australian species. He believes that we shall find the beak sculpture one of the best characters for determining the minor divisions of the *Unionidæ*. Notwithstanding the opinion of this eminent conchologist, and the fact that Mr. Wm. A. Marshall, of the New York State Museum, who has also given this subject some very careful study, believes that the beak sculpture is quite constant and may be used in determining species, my own experience in handling great quantities of material from all over the world leads me to consider this a somewhat variable character, and although it will no doubt prove very useful in studying species and the smaller groups, yet I am sure it cannot by any means be always relied on.

It is only in Europe that the post-embryonic larvæ of the *Unionidæ* have been observed actually attached to fishes, though the North American species are known to possess hooks and bristles during this stage, and they no doubt make use of the same means to assist in their distribution, as do their Old World relations.

³ N. Z. Jl. of Science, No. 6, Vol. I (new issue), p. 250.

Ihering fails to find them on any of the South American *Unionide* he has examined, but he has probably overlooked the statement of Lea¹ that the glochidium of *Unio firmus* of Brazil is provided with both of these appendages.

Castalia was placed in the *Mutelidæ* by the Messrs Adams, but Ihering shows that it is very closely and curiously related to *Unio*. In the latter the short branchial siphon is open; in the former it is closed; in *Unio* the lateral teeth are either smooth or obliquely striated;² in *Castalia* they are vertically ridged. He has applied the name *Castalina* to a few species which stand between the two genera, and has given it generic rank. But he shows that there is a complete intergradation and connection from one end of the chain to the other. In certain *Castalias* there is a typical animal, in others it is that of *Unio*, and in *Castalina* there is an almost complete blending and crossing of characters. I have noticed on examining large series of these shells that in some *Castalias* the peculiar tooth sculpture is nearly wanting.

Von Ihering finds that *Unio multistriatus* of Brazil is very closely related to *N. senegalensis* of Africa, and to certain Indian forms. He has, in his collection, a specimen of *Unio radula* of India that is identical with *N. coriaceus* from Rio Janeiro, and believes this fact to be a proof of the long duration of the species of this family and probably evidence in favor of the existence of the lost Atlantis.

His arrangement of the families and genera stands as follows:

<i>Mutelidæ</i> v. Ih. (nec Adams).	<i>Unionidæ</i> v. Ih. (nec Ad.).
<i>Leila</i> Gray.	<i>Hyria</i> Lam.
<i>Glabaris</i> (Gray) v. Ihering.	<i>Castalia</i> Lam.
<i>Aplodon</i> Spix.	<i>Castalina</i> v. Ih.
<i>Plagiodon</i> Lea.	<i>Unio</i> Retz.
<i>Fossula</i> Lea.	<i>Margaritana</i> Schum.
<i>Mycetopus</i> Orb.	<i>Cristaria</i> Gld.
<i>Solenaia</i> Con.	<i>Anodonta</i> Lam.
<i>Mutela</i> Scop.	
<i>Iridina</i> Lam.	
<i>Pleiodon</i> Con.	
<i>Spatha</i> Lea.	

¹ Observations on the Genus *Unio*.

² In *Unio tortuosus* Lea, a remarkable inequivalve species from China, the laterals have perpendicular striæ, and Lea remarks that if this is found in all the individuals of the species, it would have to be placed in *Castalia*. It has much the appearance of *Unio ellipsis* Lea.

This classification is, to a certain extent, provisional; and may have to be somewhat modified when we have a fuller knowledge of the anatomy. Whatever else may be said of it, the principle adopted is the right one, and the only one which modern science can recognize. The arrangement of the Adams brothers is largely artificial, both as to genera and subgenera, as well as the system adopted by Lea, as they bring together side by side, species and groups from every country which have no close relationship whatever, and by such methods anatomical and conchological characters, the facts of geographical distribution, habits and palæontology, are ignored.

THE SMALL GREY SLUG IN JAMAICA.

BY T. D. A. COCKERELL.

Some days ago Mr. W. Harris sent me from Cinchona some strawberry plants, together with a beetle larva which was injuring them. Of this larva there will be more to say hereafter, but the object of the present note is to record that among the plants I found three specimens of the small, grey slug of Europe, *Agriolimax agrestis*. This slug, well-known as a garden pest in England, has never before been noticed in the West Indies, and there can be no doubt that it has been introduced with plants. It is, I suppose, almost impossible to import living plants without sooner or later introducing foreign slugs. They and their eggs come in the earth about the roots, and, in many cases, it must be practically impossible to detect them on arrival. It might be advisable in some cases to isolate newly-arrived plants by water, and search for slugs on them at intervals; or we might import the carnivorous slug, *Testacella*; or introduce some of our native carnivorous snails, *Oleacina*, into the locality where the plants were being propagated. It has been recorded that in twenty-four hours, 25 specimens of *Testacella* devoured 25 earthworms and 25 *Agriolimax agrestis*.

The small, grey slug, although now first detected here, has spread to many distant localities by human means. I have seen specimens from various parts of the United States, west to the Pacific coast and east to New Jersey, from St. Helena, the Canary Islands, Tristan d'Acunha, New Zealand, etc., and no doubt in time it will inhabit every part of the earth in which the climate is suit-

able to it. In Jamaica it will probably remain confined to the higher altitudes.

Institute of Jamaica, April 13, 1893.

A REPLY TO PROFESSOR WHEELER.

I think that quite enough has been said on the subject of the *Unio* muddle in the columns of the *NAUTILUS*, and I do not want to revive the subject. But there are one or two suggestive points in Professor Wheeler's note in the May number that I want to call attention to.

While a Congress of American conchologists might be able to settle certain contested points in nomenclature, if their work did not come into too glaring opposition to certain established laws recognized by scientific societies in general, yet I believe it is impossible for any such body to straighten out the muddle of specific limits, or perhaps, in all cases, the relations of one species to another. I believe that an expert, a specialist who has devoted years to the loving study of a family or genus, is better qualified to judge on these points than any body of students, no matter how capable they may be otherwise, but who probably have only a mere smattering of the matter in question.

C. B. Adams and Dr. Gould ranked easily among the ablest conchologists in the world, but who can doubt that Mr. Lea, or James Lewis were better qualified to judge on the nice distinctions of the *Unionidae*, or that Dr. Newcomb was more competent to arrange the *Achatinellas*, or that Dr. Dall has a better knowledge of deep sea Mollusks than did either of these? Because these men have made life studies of these subjects, while the others were not specially interested in them.

A specialist who works on a difficult or puzzling group, goes over his work again and again, putting it aside when he tires of it, and taking it up when the mind is rested. He patiently and lovingly labors over the most minute and obscure points that to most students would be of little or no interest, because his heart is in the work and he is thoroughly determined to master the whole subject. As a rule, his collecting is largely done in the direction of his hobby, and he therefore has more material to work on than one slightly interested. He eagerly reads all literature relating to his work, and in time, if his judgment is well balanced, he becomes an authority.

Now I do not pretend to say that any such person can ever arrive at a point where he never makes mistakes, or where his authority should be taken as absolute, but I do say that he knows at sight and has constantly on his tongue's end much that the ordinary student cannot possibly know or have.

And even when such a specialist publishes the results of his studies they must stand the test of criticism, merciless and searching; they must be subject to all the modifications that will be caused by future discoveries and enlarged knowledge, for it is the naked truth alone that will stand, and not the assertions of any specialist or body of scientists. But I believe that the man who spends years of loving, conscientious labor and study on a subject is better qualified to act as an authority than any body of outsiders.

CHAS. T. SIMPSON.

AMERICAN ASSOCIATION OF CONCHOLOGISTS.

Since the article in the October NAUTILUS, the following have been admitted as members of the Association:

T. S. Oldroyd, 142 N. Los Angeles St., Los Angeles, Cal. Subject—(not chosen yet).

Wm. H. Myles, 53 Arkledun Ave., Hamilton, Ontario, Canada. Subject—Helicidae and Pupidae of Ontario.

A. H. Gardner, P. O. Box 84, Fort Hamilton, Long Island, N. Y. Subject—Land Shells and Fresh-water Univalves of the United States.

Miss S. P. Monks, 305 Bunkerhill Ave., Los Angeles, Cal. Subject—(not chosen yet).

A. G. Wetherby, Magnetic City, Mitchell Co., N. C. Subject—(not chosen yet).

Chas. S. Hodgson, Albion, Ill. Subject—Helicidae.

W. H. Conrad, 11 Bank St., Philadelphia, Pa. Subject—Tertiary Shells.

M. J. Elrod, Wesleyan University, Bloomington, Ill. Subject—(not chosen yet).

Geo. H. Clapp, 116 Water St., Pittsburgh, Pa. Subject—Helicidae.

Members will please note the following changes of addresses since the publication of the list of members:

- John Ford, Holmes Station (B. & O. R. R.), Delaware Co., Pa.
 Mrs. E. P. Gaylord, 167 E. Congress St., Detroit, Mich.
 L'abbé P. A. Begin, Seminare St., Charles Borromee, Sherbrooke,
 Quebec, Canada.
 Frank J. Ford, 314 Wabash Ave., Wichita, Kan.
 R. T. Shepherd, 110 N. Market St., Troy, Ohio.
 Dr. W. S. Strobe, Lewiston, Ill.
 T. Wayland Vaughan, 6 Brewster St., Cambridge, Mass.
 John Watson, 6 Garson St., Rochester, N. Y.
 Jas. H. Lemon, Avonmore P. O., Ontario, Canada.
 Mrs. S. H. Young, 423 Second St., Cedar Falls, Iowa.
 Chas. Le Roy Wheeler, Damascus, Wayne Co., Pa.
 Robt. Walton, Houghton St., Lower Roxborough, Phila., Pa.
 E. H. White, 1202 Thomas St., Rockford Ill.
 Dr. C. F. Newcombe, 70 Dallas Road, Victoria, B. C.
 Rev. A. Dean, Fort Lee, N. J.
 R. C. Barnard, 21 Park Row, New York City.
 Berlin H. Wright, Penn Yan, N. Y.
 A. Schlehenried, 16 N. William St., New York City.
 John H. Campbell, 1009 Walnut St., Phila., Pa.
 Robt. T. Jackson, 33 Gloucester St., Boston, Mass.

NOTES AND NEWS.

MR. HUGH FULTON, of London, passed through Philadelphia, recently, en route for Chicago. His stay, though short, was most enjoyable.

NOTE.—Owing to the expected absence from Philadelphia of the Editors and Manager, the July issue of the NAUTILUS will probably be delayed beyond the usual time.

Last week a coyote was found at Punta Banda, San Diego county, trapped by an abalone shell [*Haliotis cracherodii*]. The coyote had evidently been hunting for a fish breakfast, and finding the abalone only partially clinging to the rock had inserted his muzzle underneath to detach him, but the abalone closed down on him and kept him a prisoner.—*Weekly Bulletin*, San Francisco, May 17.

THE NAUTILUS.

VOL. VII.

JULY, 1893.

No. 3

TO CONCHOLOGISTS.

The Editors of the NAUTILUS would like to impress upon American Conchologists that they are not conducting this paper for their personal aggrandizement, as some persons seem to believe. The work done has been purely a labor of love, for the promotion of interest in conchology; and the Editors have not only put much work into the enterprise, but, from first to last, a considerable number of large and shining Dollars, and this without expectation of pecuniary return.

We have looked forward to the unanimous support and encouragement of American Conchologists, for it is only by such support that a paper of this character can be sustained. We know that there are enough persons in the States interested in Conchology to give this support, and to enable us to increase the size, the number of illustrations and the interest of the articles as well.

We depend upon you to aid us in bearing the expenses of publication. We depend upon you to send us notes and matter to increase the interest and usefulness of the numbers from month to month. The time we put on this work is time stolen from scientific work of vastly greater magnitude, and it is only by the liberality of the Academy of Natural Sciences and the Wagner Institute that we are enabled to give the attention necessary to conduct a monthly journal.

We write thus because we know that we are not having the sup-

port we deserve from American Conchologists. Scores of subscriptions remain unpaid, and requests by letter to "square up" are calmly ignored.

We would ask our subscribers in all seriousness. Do you need this paper? If so, why not support it. We depend upon the Conchologists of America to help and encourage us in making our NAUTILUS a journal worthy of American Science.

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

BULIMULUS PROTEUS Broderip AND ITS DISTRIBUTION.

BY W. H. DALL.

Bulinus proteus was described by Broderip from Peru in 1832. It was referred by Deshayes to *B. sordidus* of Lesson, an opinion not generally adopted, and which he afterward relinquished. In 1860, Mr. J. Xantus, collecting for the Smithsonian Institution at Cape St. Lucas, obtained one adult and two young specimens of a large *Bulimulus*, which were referred to Broderip's species by Binney; an opinion which was justified by the close resemblance and small amount of material for comparison. The singularity of distribution has been commented on by every one from Binney to Crosse and Fischer in their magnificent work on the Mexican land shells, and Dr. Cooper in recent papers on Lower Californian land shells. By a recent expedition of the California Academy of Sciences to Lower California, nearly 100 specimens of the shell in question were obtained, which I examined while in California in 1892, and which are described by Dr. Cooper (Proc. Cal. Acad., 2d Ser. III, p. 211, 1892), thus for the first time giving an opportunity for careful comparison of our Californian species with that from Peru. A series kindly sent by Dr. Cooper on behalf of the Academy, together with the original specimens of Xantus and a series of fourteen specimens of the Peruvian *B. proteus*, have been critically compared, leaving no doubt, in spite of the close similarity, that the Mexican shell is distinct and must receive a name, as the synonyms are all strictly referable to the Peruvian form.

Bulimulus (*Scutalus*) *montezuma* Dall.

B. (S.) proteus Binney, L. & F. W. Shells N. Am., 1, p. 207, fig. 358, 1869; not of Broderip, P. Z. S., 1832, p. 107.

Habitat, Lower California, mostly from the mountainous region (3500 ft. alt.), Eisen, Belding and Xantus.

As Dr. Cooper observed, this species is not as "protean" as some others. It exhibits no such variations in form or color as *B. proteus*; the latter assumes almost every mutation of form, but taken on the average is less acute and has the last whorl less patulously drawn out, axially, than the *B. montezuma*. The color of *B. proteus* is variably distributed, but tends in the most strongly colored examples to be laid on in 4-6 broad, spiral bands of brown, with indistinct boundaries, separated by paler zones. In *B. montezuma* the color is seldom present, but, when it is, it is laid on in narrow, obscure zones, parallel with the incremental lines and never spirally disposed. The granulation in the Californian shell is less coarse and intense than in the Peruvian species when most developed, and the umbilicus averages much smaller in the former. All these characters are of degree rather than kind, but two features may be mentioned which appear constant and specific. In the Mexican shell the angle which the outer lip makes with the body whorl, or axial perpendicular, at its junction is invariably more acute than in *B. proteus*, which latter has the lip bent suddenly down at this point. Secondly, the larval shell or nucleus of *B. proteus* is beautifully shagreened with minute punctations or short, almost vermicular, indentations, visible plainly under a glass, and only absent when worn off by abrasion. Traces of this sculpture may always be found. In *B. montezuma* the nucleus is delicately ribbed in harmony with the incremental lines, and does not show the peculiar shagreening alluded to, a character which alone is sufficient to establish its distinctness, but the constancy of which could not be predicated from the three specimens examined by Mr. Binney.

The distribution of the species now determined by Messrs Eisen and Belding is sufficient to disprove the hypothesis of introduction by artificial means, and it is satisfactory to have our largest North American species placed upon a permanent footing.

EDIBLE MOLLUSKS OF SOUTHERN CALIFORNIA.

BY MRS. M. BURTON WILLIAMSON, UNIVERSITY, LOS ANGELES CO.,
CAL.

In an interesting article upon the "Edible Mollusks of Rhode Island," by Mr. Horace F. Carpenter, published in the NAUTILUS some time ago, he compares the number of marine edible mollusks of Rhode Island with those reported from San Francisco by Professor Keep.

Without wishing to leave the impression that California can compete with Rhode Island in the number of species found in the "fish markets," yet the number recently reported from this State can be greatly increased. The number of shells offered for sale here is always limited, and the famous "clam-bake" of the eastern shore is never duplicated. In the Los Angeles fish markets, *Donax* and *Chione* are the most abundant.

Donax californicus Conr. is the favorite clam for soup. This tiny bivalve might seem to an observer "all shell," yet it proves a very good substitute for the oyster in soup. The shells are carefully washed, allowed to remain in fresh water some hours, boiled, then drained. The liquid drained off is, with plenty of milk added, converted into a very palatable soup, especially when one is on the beach, and has just returned to the tent after a good bath in the ocean.

Chione simillima Sby. is often offered for sale at five cents a pound. *Chione fluctifraga* Sby. and *Chione succincta* Val. are occasionally found with the former, as they are collected from the same mud flats. Soup made from this shell-fish is not finely flavored and the meat is tough.

Tivela crassatelloides Conr., large shells are sometimes sold in the markets, usually at five cents each. *Tapes staminea* Com., *Ostrea lurida* Cpr., *Ostrea virginica* Gmel. (the latter brought here from San Francisco), *Mytilus californianus* Conr., *Mytilus edulis* Linn., and *Pecten aequisulcatus* Cpr., are also occasionally offered for sale, but in limited quantities. *Haliotis cracherodii* Leach may sometimes be seen in the market, although I have not seen one this winter. Occasionally a small *Haliotis fulgens* Phil. has been seen with the former species. The Mexicans seem to be fond of this shell-fish, as I have seen three and four dozen Halioti dried and strung on a cord, the same as they string red-peppers. When dried, the Abalones, as they are named by the Mexicans, look like oblong pieces of very thick leather, more than anything else that I can describe.

The number of species found in Los Angeles city markets, and not reported from San Francisco, would, I believe, add six more to the Californian region. Professor Keep says the *Mytilus californianus* is found outside of San Francisco Bay, but does not mention it as sold in the city. *Amiantis callosa* Conr. is occasionally eaten when collected in San Pedro Bay, although I have been told it was "not a very tempting dish." As it does not live near the shore,

collectors do not often find more than single valves on the beach.

In the "Catalogue of Economic Mollusks," written by Lieutenant Francis Winslow, upon the exhibition of the U. S. Nat. Museum, at the "International Fisheries Exhibition," at London, in 1883, he says of *Macoma nasuta* Conr., "It is abundant in San Francisco Bay, and it was evidently eaten largely by aborigines, as the shell-mounds in the vicinity of the bay are largely composed of shells of this species." I have not heard of this shell-fish being eaten here, nor the much larger *Macoma secta* Conr., but Lieutenant Winslow says the former is "eaten on the Pacific coast by all classes." The same writer mentions *Platyodon cancellatus* Conr. as existing in "great abundance in Bolinas Bay and Santa Barbara. Its habits are essentially those of the 'soft clam,' and it forms one of the staple food shell-fish of the Pacific coast," although Mr. C. R. Orcutt, in his "Notes on the Mollusks of San Diego," says this shell has been collected for food at La Playa, "but the animal is bitter." I fear I am digressing, as Professor Keep's article was intended by him as the first of a series of articles reporting "food mollusks which may be bought in the markets of our country," each writer "reporting for his (or her?) own locality."

Notwithstanding the number of species we can report from California, I am compelled to admit that, in quality and number of individuals, California cannot boast of her edible mollusks.

ON A NEW SPECIES OF *YOLDIA* FROM CALIFORNIA.

BY W. H. DALL.

Yoldia montereyensis n. s.

Shell large, stout, inflated, with a polished, dark greenish olive epidermis; beaks eroded in all the specimens, situated in the anterior part of the middle third of the shell, not prominent; valves full and rounded, anterior end evenly rounded into the upper and basal margins; posterior end narrower, rounded, the extreme end nearer the cardinal margin with which it almost forms an angle, below sloping obliquely toward the basal margin, with a very obscure broad ray impressed in a radiating manner from the beaks toward the oblique slope, the profile of which it does not perceptibly indent; surface sculptured only by feeble incremental lines; epidermis polished with one or two darker concentric color zones and a microscopic, irregular, radially disposed wrinkling, most con-

spicuous at the margins of the impressed ray; posterior cardinal margin nearly straight, anterior ditto evenly rounded; interior porcellanous white, the pallial sinus not reaching the middle vertical line of the shell, broad and rather rounded; ligamental fosset large, cuplike; anterior teeth V-shaped, about 22 in number, strong and prominent; posterior teeth similar, and forming an equally long line but only 18 in number, the posterior cardinal margin showing a long narrow impressed area very feebly marked; length of shell 32; beak from anterior end 12; vertical from beak to base 17; max. diameter 13 mm.

Habitat U. S. Fish Com. Station, 3202, in 382 fathoms green mud, Monterey Bay, California, bottom temperature, 41° Fahrenheit.

This fine shell recalls *Y. thraciaformis*, but is smaller, without the angularity of that species and proportionately more solid. It was dredged by the U. S. Steamer Albatross, several years ago. It is probably a deep water species exclusively at least in the latitude of California. The types are in the U. S. Nat. Museum, 106,972.

NOTES ON THE GENERA OF UNIONIDÆ AND MUTELIDÆ.

BY H. A. PILSBRY.

In the June number, p. 20, a list of the genera of *Unionidæ* and *Mutelidæ* recognized by Dr. v. Ihering is given. It should be noted that by inadvertence *Pleiodon* Conr. is given as a genus, but Ihering considers it a synonym of *Iridina*. The genus *Pseudodon* Gld. was omitted after *Cristaria* Schum.¹

Attention should also be directed to the fact that the name *Castalia* Lam., 1819, is preoccupied in Vermes by Savigny, 1817 (Système des Annelides). Probably TETRAPLONDON Spix, 1827 can be used in this case as a substitute.

For *Aplodon* Spix (preoc. by Rafinesque in Pulmonata), may be substituted SPIXOCONCHA.

Lea's name *Plagiodon* (1856) seems also to be preoccupied (by Dumeril in Reptilia, 1853), and the group may therefore be called IHERINGELLA, Lea's species *isocardioides* being the type.

¹ The Editor fears that these errors may have been due to his own hasty proof-reading, rather than to defects in the original MS.

NOTES ON THE ACANTHOCHITIDÆ WITH DESCRIPTIONS OF NEW
AMERICAN SPECIES.

BY HENRY A. PILSBRY.

The family Acanthochitidæ includes Chitons having the exposed surface of the valves, when present, divided into a narrow dorsal smooth or striated band, sometimes obsolete, with a granular area on each side, formed by the union of the lateral areas and the plural tracts of the central areas. The *Cryptoplacidæ* also share this peculiar plan of valve-sculpture, but they are vermiform in shape and not nearly covered above by the valves, whilst the *Acanthochitidæ* have well-developed valves covering the upper surface, even in those genera like *Amicula* and *Cryptochiton* which have the girdle-skin extending over the larger part or the whole of the dorsal armor. There are many other differences, but still the *Cryptoplacidæ* give unmistakable evidence of their descent from *Acanthochitidæ*. On the other hand, all other Chitons differ in having the valves divided into triangular lateral, and wide central areas, and in other equally important if less obvious features.

The following genera belong to Acanthochitidæ: *Spongiochiton*, *Leptoplax*, *Acanthochites*, *Katharina*, *Amicula*, *Cryptochiton*. All but the first two are found upon the United States coasts. It will be noticed that the association of *Acanthochites* with *Mopalia*, instituted by Dr. Philip Carpenter, is not retained.

Some naturalists may find it difficult to believe that complex structures so very similar to each other as are the posterior valves in *Mopalia* and *Acanthochites* could have arisen independently; but that this is the fact I feel entirely assured. In the two cases, this peculiar form of two-slit and sinused posterior insertion-plate, arose from a perfectly regular, even, and many-slit plate; the two phyla travelling along parallel roads. The Mopaloids reach their culmination in *Plaxiphora*, which has lost its two posterior slits, and is in this respect quite analogous to an old individual of *Cryptochiton stelleri*.

The genus *Acanthochites*, which has given its name to the family, is readily recognized by the series of tufts of fine bristles, like spunglass, along each side. These tufts may be accounted for by the theory that they are the result of over-nutrition caused by the frequent flexure of the girdle at the sutures; this flexure naturally bringing a greater share of nutriment to the stimulated point than

to the comparatively motionless portion at the sides of each valve, resulting in a more exuberant growth of girdle spicules there.

Within the *Acanthochites* stock the progressive diminution of the tegmentum or outer layer of shell, has proceeded along two lines: in one series of forms the girdle has encroached at the sutures, producing a heart-shaped exposed area, seen in such species as the *Notoplax*, and this system has also produced the *Amiculas*. In the others, the tendency has been to encroach along the sides of the valves, leaving a narrow or linear tract, resulting in forms like *Acanthochites exquisitus*, and culminating in *Cryptoconchus* (*C. monticularis* Q., and *floridanus* Dall.)

Acanthochites is divisible into four sections: *Acanthochites* typical, having a wide caudal sinus and two slits in the tail valve, and well-developed sutural tufts; *Notoplax*, having several slits in the tail-valve behind, and the girdle encroaching at the sutures; *Cryptoconchus*, having a similar tail-valve, but the girdle encroaches at the sides, leaving only a linear dorsal area exposed; and finally, *Loboplax* (sect. nov.), with a many-slit tail-valve, the head valve strongly 5-lobed and ribbed, girdle nearly naked—type *A. violaceus* Quoy. The following two species belong to the typical section:

A. exquisitus n. sp. Visible portions of the valves extremely narrow, generally less than one-fourth the entire width of the dried animal. Valves dark olive, interior blue; the girdle light green, tufts very large, either green, pink or bronze; fleshy covered with a green pubescence. Length 30, breadth 18 mill. La Paz (Lockington).

The valves are more covered than in any other form, the tegmentum being far less in area than one of the sutural laminae.

A. rhodeus n. sp. Exposed portion of valves subtriangular, about one-third the entire width, the valves depressed, obtusely carinated, brown, almost separated by the encroachment of the girdle at the sutures. Median area smooth, not striated. Interior deep rose colored. Length 28, breadth 15 mill. Panama (MacNeil).

A. (Notoplax) hemphilli n. sp. Valves heart-shaped, about one-third the total width; red, more or less maculated with white; girdle rust-brown; dorsal area having some longitudinal striae. Interior light green at the sides, deep rose-red in the middle. Girdle wide, sparsely clothed with microscopic hyaline spicules, having a marginal row of longer spicules and 18 small white tufts. Length 24, breadth 11 mill. Key West, Florida (Hemphill).

MOLLUSCA OF ARKANSAS.

BY F. A. SAMPSON, SEDALIA, MO.

A report on the shells of Arkansas, made to the State Geologist of that State, will soon be published, and in this paper I will give the list of species, not including the Unionidæ. I have collected in twenty-five counties, but not equally in all—in some having made search in many different places and at different times, and in others in only one place or at one time.

The type specimens of those species marked * were from Arkansas.

<i>Selenites concava</i> Say.	<i>M. divestus</i> Gld.
<i>Limax campestris</i> Binn.	<i>M. elevatus</i> Say.
<i>Zonites friabilis</i> W. G. B.	<i>M. exoletus</i> Binn.
<i>Z. lævigatus</i> Pfeif. (Binney's Manual).	<i>M. exoletus minor</i> .
<i>Z. demissus</i> Binn.	<i>M. thyroides</i> Say.
<i>Z. brittsi</i> Pils.*	<i>M. thyroides bucculentus</i> Gld.
<i>Z. ligerus</i> Say.	<i>M. clausus</i> Say.
<i>Z. arboreus</i> Say.	<i>M. kiowaensis arkansensis</i> Pils.*
<i>Z. viridulus</i> Mke.	<i>Dorcasia berlandieriana</i> Mor.
<i>Z. indentatus</i> Say.	(Binney's Manual).
<i>Z. minusculus</i> Binn.	<i>Bulimulus dealbatus</i> Say.
<i>Z. placentulus</i> Shuttl. (Binney's Manual).	<i>Pupa fallax</i> Say.
<i>Z. fulvus</i> Drap.	<i>P. armifera</i> Say.
<i>Z. undetermined.</i>	<i>P. contracta</i> Say.
<i>Z. undetermined.</i>	<i>P. procera</i> Gld.
<i>Z. gularis</i> Say.	<i>Succinea ovalis</i> Gld.
<i>Tebennophorus carolinensis</i> Bosc.	<i>S. ovata</i> Say.
<i>Patula solitaria</i> Say.	<i>S. obliqua</i> Say (Binney's Manual).
<i>P. alternata</i> Say.	<i>Helicina orbiculata</i> Say.
<i>P. perspectiva</i> Say.	<i>Limnæa humilis</i> Say.
<i>Helicodiscus lineatus</i> Say.	<i>L. columella</i> Say.
<i>Strobila labyrinthica</i> Say.	<i>L. catascopium</i> Say.
<i>Polygyra texasiana</i> Mor.	<i>Physa gyrina</i> Say.
<i>P. triodontoides</i> Bland.	<i>P. heterostrophe</i> Say.
<i>P. jacksoni</i> Bland.	<i>Planorbis trivolvus</i> Say.
<i>P. dorfeuilliana</i> Lea.	<i>P. bicarinatus</i> Say.
<i>P. dorfeuilliana sampsoni</i> Weth.*	<i>Ancylus tardus</i> Say.
	<i>Vivipara contectoides</i> W. G. B.

<i>P. leporina</i> Gld.	<i>V. subpurpurea</i> Say.
<i>Stenotrema labrosum</i> Bland.	<i>Campeloma subsolidum</i> Anth.
<i>S. edgarianum</i> Lea (Binney's Manual.)	<i>C. ponderosum</i> Say.
<i>S. stenotremum</i> Fer.	<i>Pomatiopsis lapidaria</i> Say.
<i>S. monodon fraterna</i> Say.	<i>Pleurocera subulare</i> Lea.
<i>S. leaii</i> Ward.	<i>P. canaliculatum</i> Say.
<i>Triodopsis obstricta</i> Say.	<i>Goniobasis lawrencei</i> Lea.*
<i>T. appressa</i> Say.	<i>G. plebeius</i> Anth.
<i>T. inflecta</i> Say.	<i>G. cubicoides</i> Anth.
<i>T. edentata</i> Sampson.*	<i>G. crandalli</i> Pils.
<i>T. fallax minor</i> Weth.*	<i>Sphaerium sulcatum</i> Lam.
<i>T. vultuosa</i> Gld.	<i>S. striatinum</i> Lam.
<i>Mesodon albolabris</i> Say.	<i>S. stamineum</i> Conr. (Prime).
<i>M. albolabris minor</i> .	<i>S. transversum</i> Say (Prime).
<i>M. albolabris alleni</i> Weth.*	<i>Pisidium abditum</i> Hald.
	<i>P. virginicum</i> Bourg.

One unnamed *Zonites* bears considerable resemblance to *Z. limatulus*, but is of only three mm. diameter, more depressed, sutures less impressed and outer whorl more rounded, and having four whorls.

The other unnamed one has the general size and appearance of *Z. arboreus*, but has six whorls. These were both found on the Boston Mountains. *Zonites brittsi* was described in the NAUTILUS of last January. The type specimens were collected by Mr. R. A. Blair, of Sedalia, in Garland County near Hot Springs. They are very close to *Z. demissus*.

Patula solitaria has not before been recorded from as far south. Very few specimens of *Polygyra texasiana* were found in the State, but they were very abundant in the Indian Territory across the river from Fort Smith. In no county except Garland were both *dorfeuilliana* and its variety *sampsoni* found. The latter was most abundant in Carroll County, fifteen or twenty being frequently under one stone. *P. jacksoni* was much larger than typical size on the bluffs at Van Buren. But one *T. obstricta* was found, and that a dead one, near Batesville. *T. edentata* were collected on the Boston Mountains in Franklin County. They are larger than *inflecta* and almost or entirely without teeth on the peristome. *T. fallax*, from the northwest corner of the State, were quite small, and many of them albinos.

The *Mesodon albolabris*, from Eureka Springs, are pronounced by Wetherby to be a very distinct variety. He has also described the two other varieties from the same place, and the *exoletus minor* from there are said by Mr. Binney to be "very curious."

The *kiowaensis* variety, *arkansensis*, lately described in the NAUTILUS, were collected by Mr. R. A. Blair, near Hot Springs.

The *Goniobases* were generally very plenty where found at all, and in other streams near by there were none. I have them from many streams. The *G. crandalli* was collected at Mammoth Spring, and described in the Proceedings of the Philadelphia Academy of Sciences.

NOTE ON ENDODONTA (*Flammulina*) INFUNDIBULUM Hombr. & Jacq.

BY CHARLES HEDLEY, AUSTRALIAN MUSEUM, SIDNEY, N. S. WALES.

In the "Reference List of the Land and Fresh-water Mollusca of New Zealand" by Mr. H. Suter and myself, the species named above was placed under *Flammulina crebriflammis* Pfr. as a synonym. Tryon and Pfeiffer, whom we followed in this course, were certainly wrong in connecting *infundibulum* with *crebriflammis* (Mon. Hel. Viv. iii, p. 148, etc.). *H. infundibulum* was described from Vavas, Tonga Is., and appears to be a small variety of *Gradata* Gould. It was omitted from Mousson's Tongan list.

NOTES AND NEWS.

REV. DR. A. DEAN has removed from Muncy, Pa., to Fort Lee, N. J., on the Hudson, above New York City. The best wishes of many brother Conchologists go with him to his new home on the Palisades.

AN interesting paper on the shells collected by the Death Valley Expedition, by Dr. R. E. C. Stearns, has appeared in the "North American Fauna" series, published by the U. S. Dept. of Agriculture. Some pages are given to the discussion of the Tryonias, which were collected alive by Dr. Merriam in a hot spring in Pahrana-gat Valley, Nevada. The "*Tryonia*" *protea* is shown to intergrade perfectly with the smooth form which Frauenfeld called *Hydrobia seemani*. It is a species of *Bythinella*. Stearns retains *Tryonia clathrata* distinct, as he has seen no examples connecting with *protea*. Several species of Amnicolidæ are described and figured, and valu-

able data on the south-eastward distribution of *Arionta* are presented.

DR. H. VON IHERING has been appointed Director of the Zoological Department of the Museum at San Paulo, Brazil.

IN electing officers of the American Association of Conchologists for the ensuing year, John H. Campbell was elected President; John Ford, Vice-President; Chas. W. Johnson, Secretary.

THE death of the well-known Zoologist, CARL SEMPER, of Würtzburg, Germany, on the 29th of May, has been announced.

WILLARD M. WOOD, of San Francisco, intends very soon to make an eastern trip, visiting Chicago, New York, Philadelphia and Washington.

MR. H. E. SARGENT, formerly of Woodville, Alabama, is in Philadelphia, where he proposes to spend some time in biological work.

A "REFERENCE LIST of the Land and Fresh Water Mollusca of New Zealand" has been published by Messrs Chas. Hedley of Sydney, N. S. Wales, and H. Suter of Christchurch, New Zealand. It forms an extremely useful index to that fauna, and is indispensable to those who desire to understand the peculiar genera of Australasia.

EXCHANGES.

WANTED, about 25 specimens of any one species of *Dentalium*; also live specimen of *Zonites elliotti*, *demissus*, *intertextus*, *gularis*, *internus* and *nitidus*. Offered, British L. and Fr. W. and North American L. and Fr. W. shells, also dart of *Zonites ligerus* Say.—Robert Walton, Houghton street, Lower Roxborough, Philadelphia, Pa.

M. M. SCHEPMAN, Rhoon, near Rotterdam, Holland, has, to exchange, many East Indian sea shells. Send list and receive mine.

FOR EXCHANGE, 200 species of land and fresh water shells, from British India, Burmah and Ceylon; also large collection of marine shells from various parts. Offers solicited in land and fresh water shells.—Miss J. E. Linter, Arragon Close, Twickenham, England.

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No. 4

NOTICE OF NEW CRETACEOUS FOSSILS FROM THE LOWER GREEN
MARLS OF NEW JERSEY.¹

BY R. P. WHITFIELD, AMERICAN MUSEUM OF NATURAL
HISTORY, NEW YORK CITY.

Mr. Pilsbry recently sent me a few New Jersey fossils for identification; among them were the following new species which he wished me to describe for the NAUTILUS.

Volutoderma Woolmani n. sp.

Shell, as shown by the internal cast, somewhat more than an inch in length, and having a diameter of the body volution of seven-sixteenth of an inch in the cast, being more slender than any species yet described. Volutions largest just below the suture and attenuate below, forming a moderately long beak; marked in the upper part by eight comparatively strong vertical plications, which are obsolete below. Columella marked by three very distinct folds or ridges, the lowest of which is the strongest. These are well marked on the inside of the upper volutions.

This species like most of those from the New Jersey Green Marls is known only from an internal cast. It retains only two volutions and is imperfect at the base of the beak. It is very distinct, how-

¹ Illustrations of the following species will be given next month.

ever from any species previously noticed, being much smaller and of more slender habit. The external markings are unknown. The specimen is from the Lower Green Marls at Lenola Station on the Long Branch Division, Pennsylvania Railroad in Burlington Co., New Jersey. The type is in the collection of the Academy of Natural Sciences of Philadelphia. Collected by Mr. Lewis Woolman of Philadelphia for whom it is named.

Cerithium Pilsbryi n. sp.

Shell elongated and slender; volutions numerous, number not determined, very gradually expanding with additional growth; apex and aperture unknown. Volutions slightly convex between sutures, and ornamented by a band of small oblique nodes immediately below the suture; also by a series of larger vertical folds which extend across the exposed part of the volution, below the upper band of nodes, and numbering something more than one half as many to the volution as the nodes above. There are also very fine spiral striae almost too fine to be seen without magnifying. The lines of growth are fine but distinct, and take a broad sweeping backward curve between sutures. Apical angle fifteen to eighteen degrees.

This species is a new type for the New Jersey cretaceous, and I know of none of the same type in the rocks of this age in North America; while in the Cretaceous of Palestine there are several species already described. The one most nearly like this being that described in the Bulletin Am. Mus. Nat. Hist. for December, 1891, figured on Pl. IX of Vol. III, figs. 11 and 12, under the name *Cerithium Conradi*; the point of difference between them being the exact reversal of the lines of nodes, the upper one here being small while on that one it is the largest. These specimens consist of concretionary matrices, in what appear to have been Coprolitic bodies, in one of which there are fragments of several species of molluscs represented. They are also from the Lower Green Marls at Lenola, N. J. Collected by Mr. Lewis Woolman, and are deposited in the collection of the Academy of Natural Sciences, Philadelphia.

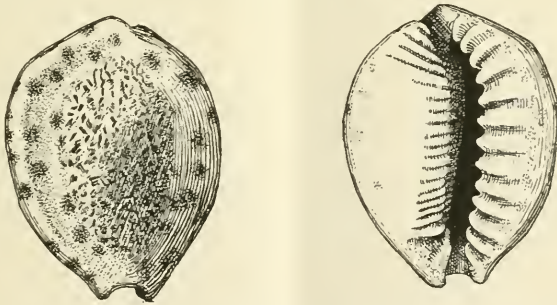
Another *Cerithium*-like shell occurs with the above, but is too imperfect for specific description. It presents characters which would most likely ally it to *Cerithiopsis*. There are imprints of portions of six volutions remaining in the matrix showing three lines of nodes on each volution, increasing in size from above downward. This also is an undescribed species. There is also an internal cast of a species of *Anchura* or *Rostellaria*, which differs from any

described form, but too imperfect for characterization. Mr. Woolman writes me that the locality from which these specimens were obtained has yielded upward of sixty species of Molluscan remains, which is rather more than that obtained from any one locality within the State, from this bed, so far as I know.

DESCRIPTION OF A NEW SPECIES OF CYPRÆA.

BY JOHN FORD.

In the description of *Cypræa cruenta* Gmel. var. *Greegori* Ford, published in the NAUTILUS for Feb., 1893, it was suggested that most conchological students would probably have made *Greegori* a species instead of a variety. It may at once be said that the writer of that description is now fully convinced of the specific distinction of the latter, and has therefore decided to alter the name from *C. cruenta Greegori* Ford to *C. Greegori* Ford. Under the circumstances such a



change will doubtless meet with some opposition. Nevertheless, I have no hesitation in making it, inasmuch as my conclusions are chiefly based upon the careful study of some fifty specimens secured by me since the description referred to was written.

These are of various sizes and stages of growth, yet all of them can be readily separated from any other species belonging to the genus, though in exceptional instances the heavy callus on the sides and ends is creamy white and the typical blotches scarcely discernible. The larger portion of my former description may be profitably retained, but as it is desirable to make a few additions it is reproduced here with these included.

Cypræa Gregori Ford, n. sp.

Shell depressed, orbicular oval in form, callus on the sides and ends remarkably thickened. That on the sides light salmon in color, with irregular purple-brown spots, having a blotchy appearance. Dorsal surface similar to that of *cruenta*, but lacking the whitish spots typically present in that species. Base semi-translucent, spotless, dark buff or salmon colored, darkest in the interstices. Teeth on outer lip very strong, long and whitish; on inner lip finer, with exception of the anterior fold and one or two adjacent teeth, the first of these latter being very prominent and notably transverse. Space between the anterior fold and the following tooth wide and brightened; posterior teeth of inner lip prolonged outward upon the base. Dimensions of average specimen: length $1\frac{1}{4}$, breadth $\frac{5}{8}$ inch.

That *C. Gregori* is more nearly related to *C. cruenta* than to any other species, I have no doubt. But it is equally true that the former possesses several characters altogether distinct from those belonging to the latter. For instance, *C. gregori* is more translucent, more rugged, much smaller and rounder in form, different in general color, and in the peculiar variations of the teeth, also in the remarkable thickness and brilliancy of the callus with which it is rimmed.

With the probable exception of one poor specimen, this shell was unknown to the late Mr. Tryon, and for the same reason, perhaps, it was not noticed in Mr. Robert's catalogue of the species. Nevertheless, an excellent figure of it was published by Kiener¹ who merely referred to it as a variety of *C. cruenta* (*variolaria*). A figure, possibly intended for the same shell, was also published by Sowerby² who seems to have considered it a variety of *C. caurica*. More recently, Sowerby's figures were alluded to by Mr. J. C. Melvill³, as the var. *coloba*, but whether this variety was referable to *C. cruenta* or *C. caurica*, seems to have been a question that he was either unable or unwilling to decide. At least, in one sentence he apparently makes *C. cruenta* responsible for its parentage, while in another sentence the same honor is given to *C. caurica*. Verily it seems that even the babes in "Pinafore" could not have been more hopelessly mixed than were these poor little waifs.

¹ Iconographie Coquilles Vivantes, Page 57, pl. 27, fig. 3.

² Thesaurus Conchyliorum. Plate 23, fig. 190.

³ 1st Vol. 4th series of Memoirs and Proc. of the Manchester, (Engd.) Lit. and Phil. Society, 1887--8.

So far as I am aware, no description of the shell, previous to my own, has been published; and unless proof of such publication is shown I shall claim priority both for the name and description. This claim has especial reference to a criticism of the name applied to the shell in my former article.

It might be well to add that the incipient tooth in the interstice next to the anterior fold, as shown in the figure published in THE NAUTILUS for April, 1893—is not typical, since it is discernable in less than five per cent of the specimens, and very slightly in them. In a hurried selection of the specimen for drawing purposes, this very minute protuberance was unobserved by me. Otherwise it would not have been drawn. This error has been corrected in the figure accompanying this article.

BEACH SHELL COLLECTING IN CONNECTION WITH A STUDY OF
OCEANIC PHENOMENA.

BY MRS. M. BURTON WILLIAMSON.

It has often occurred to me that a shell collector who is something of a physicist, having a love for historical facts, could furnish interesting data in regard to shore collecting under certain physical conditions of the ocean. Few amateur collectors note the historical, or rather chronological appearance of genera and species collected by them, they are usually satisfied with obtaining a "good find," but time and seasons are hardly observed, certainly not studied as furnishing data for future reference. A storm is hailed as a precursor of "rare finds," but a study of the storm with notes in regard to it, accompanied with a list of shells found after such a storm are too frequently neglected by collectors. Mollusks are collected too often as a miser collects his money, *as a mania*, not as a medium for an intelligent study of Nature. It seems to me, that a study of mollusks thrown upon the shore from other areas, in connection with a study of the physical condition of the ocean at such times, would be very helpful to the collector, although of no value to science. It may be urged that shells cast up by the sea are merely "happen-

ings" and no data can be gathered in reference to what seems a work of chance. When a heavy gale ploughs up the home of mollusks and huge breakers land them, by the incoming tide, on the shore, no collector can fore-tell when such a phenomenon may occur, nor what conchological rarities may follow in the wake of such a storm. Rare shells are sometimes washed ashore, then years may elapse before they again make their appearance. Sometimes shells considered as belonging to the fauna of a different latitude are found among the drift in such small numbers as to raise a question as to their introduction by artificial means. During a violent storm mollusks travel great distances before they are cast upon the shore. This is especially noticeable in pelagic organisms which are often cast upon the beach when some ocean current buoys them inward toward the shore. All these facts combine to make it impossible to collect *working* data, but one cannot doubt that a study of collections as the result of unusual conditions of Neptune might be conducted with some satisfactory results. A diary of the atmosphere, tides, daily physical conditions of the ocean with lists of shells found during the same period, if followed any length of time, might be resultant in adding a few facts that would be interesting, even though not very valuable. High and low tides would influence "finds" at any time, but some "low tides" are much richer in molluscan forms than others.

As a rule each region has its own fauna; when this fauna is disturbed and carried outside the range of its own normal environment it must be due to unusual conditions in the surrounding water; shells from the laminarian and inner corallines zones found strewn upon the beach are the *effect* of some *cause*. To a physicist, a study of the storm that stranded rare forms upon the beach, would surely be as interesting and important as the shells found in the drift! The study of oceanic phenomena in connection with conchological acquisitions might be valuable to the collector in many ways; although of no value to the scientific world in these days of applied science, with hydrographers collecting data, and with all the modern appliances furnished to ships sent out on scientific explorations.

We narrow our horizon by failing to observe and study that which is near at hand. There are environments that afford more than ordinary facilities for study, but only a few are so favored, and only a small proportion of these utilize their opportunities.

NOTES ON THE NORTH AMERICAN SPECIES OF SUCCINEA.

BY T. D. A. COCKERELL.

[Concluded from Vol. VI, p. 31.]

(18.) *S. luteola* Gould. Mr. Singley sent me this from Manatee Co., Florida, and at the same time specimens marked *texasiana* Pfr., from Derby, Frio Co., Texas. I made notes on these shells as follows:

- (a.) *S. texasiana*. Belongs perhaps to *putris* group, but very different from it, and forming a new subsection. Shell shaped, but for mouth, like some varieties of *Limnea palustris*. Length $16\frac{1}{2}$ mill. Transversely irregularly striate-ribbed. Young example semitransparent pale horn, adults opaque yellowish-white.
- (b.) *S. luteola*. No doubt the same species as *texasiana*, but the specimens are horn-color and smaller; some little ones are more like *putris*— $7\frac{1}{2}$ mill. long, shiny, striate, horn-color, more globose, spire short.

Sect. III. *Lucena*.=*Lucena* Oken.

(19.) *S. avara* Say. This species varies in color a good deal, and also in shape. The following are the varieties described or known to me.

- (a.) forma *alba* nov. Shell greenish-white. Horseshoe Bend Gulch, Custer Co., Colorado, at about 10,000 ft. alt. Mr. H. Prime has an albino of *S. avara* from Arizona, and there is a specimen in the Binney and Bland collection from New York State (Dr. Lewis.)
- (b.) forma *wardiana* Lea. Shell yellow.
- (c.) var. *vermeta* Say. Yellowish, thin, suture deep. I have seen a clear red-brown form of this from Toronto, Canada (D. B. Cockerell). An amber-colored form was sent to me by Mr. Binney, collected by Mr. W. S. Teator at Barrytown, Dutchess Co., N. Y.—this may also fall under *vermeta*.

- (d.) var. *compacta* Ckll. J. of Conch., 1892, p. 39. Colorado.
- (e.) forma *major* W. G. Binney, Ac. Nat. Sci. Phila., Nov., 1858, sine descr. A large variety, about $13\frac{1}{2}$ mill. long, in the Binney and Bland collection, is from Utica, N. Y. It is marked var. *major*, apparently in Mr. Binney's handwriting.
- (20.) *S. aurea* Lea. I formerly supposed this might be closely allied to *pfeifferi*; having received a close relative or variety of that species from St. Thomas, Ontario, Canada (D. B. Cockerell), which seemed to agree with *aurea*. This view, however, was probably erroneous, as a specimen marked *aurea* in the Binney and Bland collection seems to belong to the *avara* section.
- (21.) *S. mooresiana* Lea. I have found shells in a dry locality on Round Mountain, Custer Co., Colo., which, although no doubt referable to a variety of *avara*, appear to be Lea's *mooresiana*. •A specimen of *mooresiana* in the Binney and Bland collection, from the Platte River, also seems to belong to *S. avara*.
- (22.) *S. oregonensis* Lea. Mr. Singley sent me this from Dalles, Oregon, (E. H. White). I noted that they were of the *avara* group, but in shape approaching the *pfeifferi* group, pale reddish-horn, striate, dull. One in the Binney and Bland collection looks like a member of the *pfeifferi* group, but another, marked with a query, is larger and seems to belong to the *avara* section.
- (23.) *S. rusticana* Gould. Mr. Singley sent me some shells labelled *oregonensis* from Plumas Co., California (G. W. Michael), of which I noted: *avara* group, larger than *oregonensis* from The Dalles, greenish-horn, more shiny, whorls more convex. These specimens seemed to agree better with *rusticana* than *oregonensis*. Later, Mr. Binney has sent me a shell, apparently *rusticana*, found by Mr. Hemphill at Julian City, San Diego Co., California. This shell is $10\frac{3}{4}$ mill. long, form of *rusticana*, but aperture more oblique, color reddish-horn, rather shiny; soft parts (in alcohol) black. It is impossible to tell whether

these shells should be separated from *rusticana* without examining a larger series showing the variation.

- (24.) *S. verrilli* Bld. Apparently belongs to sect. *Lucena*, but I have not seen specimens.
- (25.) *S. grænlandica* Beck. Specimens in the Binney and Bland collection from Kuksuk, Greenland, almost certainly belong to this group; although the species seems to have leaning toward the *Campestris*, with which it allies itself through *S. chrysis* and *S. annexa*.

Section IV. *Campestris*.

- (26.) *S. campestris* Say. Mr. Singley sent me specimens of this from Long Key, Florida; they seemed to me nearly identical with *S. lineata* from Kremmling, Colo. A variety of *campestris* was named *inflata* by Lea.
- (27.) *S. lineata* W. G. Binney. Found in rejectamenta at Kremmling, Colo., together with a form *elongata*, Ckll., J. of Conch., 1892, p. 39.
- (28.) *S. greerii* Tryon. This is considered a synonym of *S. obliqua*, but a dead shell in the Binney and Bland collection from Vicksburg, Miss. (Tryon), appeared to resemble *campestris*.
- (29.) *S. chrysis* Westerl.
- (30.) *S. annexa* Westerl. This and the last appear to belong here, but are probably related somewhat to *grænlandica*. The presence of whitish streaks on the arctic species is noteworthy. Dr. von Martens (Conch. Mittheilungen, 1885) has described a var. *aurelia* of *S. chrysis* from Alaska.
- (31.) *S. unicolor* Tryon. A specimen so named is in the Binney and Bland collection from New Orleans, La. It is a peculiar shell, apparently of sect. *Campestris*, very globose, spire short and blunt.
- (32.) *S. turgida* Westerl. This species is unknown to me; it is recorded in Land- och Sötv. Moll. Vega-Exped. 1885.
- (33.) *S. decampii* Tyron. Belongs to *Amphibina*, and was accidentally omitted in the proper place. It is considered a form of *ovalis*, but a specimen from Michigan (Tryon), in the

Binney and Bland collection seemed hardly quite like *ovalis*; small, shiny, thin, rather greenish.

Of these 33 nominal species of *Succinea*, possibly not more than about half will prove valid, but it is impossible to arrive at any exact results without further research into the variation, anatomy and distribution of the several forms.

The distribution, so far as known, present some features of interest. The species of the eastern and northern states are more like those of Europe than the southern or western. The southern and northwestern distribution of the *campestris* is noteworthy. It appears that in glacial times, owing to a warm current, the coast of Alaska was free from ice, while that of British Columbia was glaciated down to the sea¹; hence a contingent of the *campestris* may have survived to the north, while their representatives in some of the middle regions were exterminated.

While on the subject of *Succinea*, it may be worth while to call attention to fig. 13 of pl. II, Bull. U. S. Geol. Survey, No. 34, (1886). The fossil there figured is referred by Dr. C. A. White with doubt to *Limnæa*, but is it not a *Succinea* of the section *Lucence*?

Regarding the Calif. *Succ. stretchiana* (Naut. VI, p. 72), I fear the specimens were in a box which unfortunately got lost in the post on its way back to Mr. Singley. They *seemed* to represent a distinct form, but it is possible that they were not true *stretchiana*. Bland's type was from Washoe Co., Nevada; and no doubt the specimen from that locality in the Binney and Bland collection belonged to the original lot, the actual type being in U. S. N. M. (see Man. Amer. Land Shells, p. 497). The Washoe Co. specimen examined by me was in some respects like *avara*, and by no means altogether like the Californian examples; but considering the variation seen in species of *Succinea*, I did not feel able to decide without better material, whether they should be held distinct, and so accepted the indication of the labels. There is a Colorado *Succinea* which was formerly thought to be *stretchiana*, but it is certainly either a var. of *avara* or a species very closely allied. Is anyone prepared to say exactly what distinguishes *stretchiana* from other species? If the San Francisco specimens were not *stretchiana*, I am rather puzzled to know what are the true characters of the species. Perhaps the anatomy would settle the question.

¹See Prestwich, Geology (1888) Vol. II, p. 464.

GENERAL NOTES.

VITRINA LIMPIDA IN PENNSYLVANIA.—In April of this year I found about a dozen dead shells of *Vitrina limpida* Gould on the bank of the Ohio River about 14 miles below Pittsburg, I have since visited the place and found about 20 additional shells all dead and most of them broken. There were many more too badly broken to be worth taking. A careful search both times failed to bring any live shells to light, and as many of the shells found were young I think the colony must have become extinct last year. They were found among "drift," so *may have come* from the head-waters of the Allegheny River in New York State.

I intend visiting the place again soon and will report results.—
Geo. H. Clapp, Pittsburg, Pa.

ARGONAUTA FOUND ALIVE.—A living specimen of the Paper Nautilus, *Argonauta argo*, was found at Palm Beach, Dade Co., Fla., in April by Mrs. C. Rowland of Philadelphia. This handsome shell is over six inches in diameter. It is rare that living examples of this are found on our coast.

The *West American Scientist* for July contains a biographical sketch of the late Henry Chandler Orcutt, of San Diego, Cal.

A RARE OLD BOOK.—An auction sale of old and rare books took place here a few days ago. This collection was consigned to a prominent auctioneer direct from Great Britain (around the Horn). I was lucky enough to have a catalogue sent me. In looking same over, I found only one book on Conchology. It was numbered 324 and described as "Collection de differentes especes de Coquillage, par George Wolfgang Knorr. Both parts, plates giving hundreds of beautifully colored figures of rare shells, 4to"

I attended the sale and when no. 324 was put up the bid started at 50 cents; I went one better, 55, then two prominent bookdealers began bidding with me, until one of them struck the dollar limit and ceased. I went one better, bidding \$1.10; and as they saw that I was determined to get it, they stopped; and the book was knocked down to me for the above ridiculously small amount.

Upon reaching home I found it to be published in French, and during the *reign of King Louis XV—1765*, although George

Wolfgang Knorr, the author, states he wrote it during *Nov.* 1756 at Nuremberg. The print is in the old style; very large.

The book contains 100 pages, has 47 plates containing 248 exquisitely water-colored (by hand) figures of shells.

Think of the time it must have taken to color these! How I would like to have a glimpse of the person who colored them, 129 years ago! Some of the tints, especially the pearly ones used in *Haliotis striata*, *Haliotis marmorata* and *Trochus niloticus*, are something wonderfully clever.

On the inside of the cover, was a piece of paper glued. On it was engraved a crest of some person, with the words "Navitir et Solerter," and underneath it was engraved the following:—"Daniel Cresswell, S. T. P. Coll: S. S. Trin: apud Cant: Soc." The crest was composed of a large ostrich with a nail in its mouth. Beneath this was a shield, within same were three squirrels sitting on their hind legs, eating acorns or something of that sort. Upon close investigation, I discovered this crest was pasted over another. With a great deal of trouble I succeeded in separating the two. The lower one was an egg-shaped circle, within was a shield with three holes in the upper portion. On top of the shield rested some kind of a royal head-gear. Upon this head-gear lay a mummy and upon the mummy an eagle had just alighted, and was in the act of tearing out the eyes of the mummy. Under the crest was the signature of "JOHN LATHAM, M. D., Winchester."

Who can tell me anything about the persons above named? Also if there are many of these books in existence. I should judge they were quite rare. How I do wish that many other British collections of old books might be brought here and sold at public auction. Many rare books published during 1567-1656-1780 and 1800 were sold at the above sale, all the way from 25 cents to \$5.00—*Williard M. Wood, San Francisco, Cal., March 15, 1893.*

EXCHANGES.

LAND AND FR.-WATER SHELLS of Eastern Pennsylvania to exchange for Land, Fresh-water or Marine shells from other localities.—*Walter Black, 541 James Ave., Roxborough, Phila., Pa.*



1.



2.



3.



4.



5.

THE NAUTILUS.

VOL. VII.

SEPTEMBER, 1893.

No. 5

ILLUSTRATIONS OF NEW CRETACEOUS SHELLS.

Volutoderma Woolmani Whitf. Plate II, figs. 4, 5.

Described in the *Nautilus* (August) Vol. VII, p. 37. Lenola, Burlington Co., N. J.

Cerithium Pilsbryi Whitf. Plate II, fig. 3.

Described in the *Nautilus* (August) Vol. VII, p. 38. Lenola, Burlington Co., N. J. Drawn from a guttapercha squeeze of the natural cast.

Since the publication of Mr. Woolman's article on the cretaceous fossils found at Lenola, near Moorestown, Burlington Co., N. J., in the *Proc. of the Acad. Nat. Sci. of Phila.*, 1893, page 219, the following additional species have been found by Messrs Morris Schick, Robt. Hancock, John G. Johnson and Chas. L. Thackeray.

LAMELLIBRANCHIATA.¹

Cyprimeria densata Conr. Vol. I, p. 157, pl. XXII, figs. 19-21.

Lucina Smockana Whitf. Vol. I, p. 130, pl. XVIII, figs. 21, 22.

Arca quindecimradiata Gabb. Vol. I, p. 208, pl. XXVII, figs. 10-13.

Crassatella conradi Whitf. Vol. I, p. 209, pl. XXVIII, figs. 1-5.

¹ The references after specific names are to Whitfield's *Paleontology of N. J.*

Modiolu (Lithodomus?) inflata Whitf. Vol. I, p. 197, pl. XXVI, figs. 13, 14.

Inoceramus sagensis Owen. Vol. I, p. 76, pls. XIV, XV, figs. 15, 1, 2.

Inoceramus sagensis var. *quadrans* Whitf. Vol. I, p. 79, pl. XV, fig. 16.

Cardium sp.

DESCRIPTION OF A NEW FOSSIL CYPRÆA.

BY JOHN H. CAMPBELL.

Cypræa Squyeri n. s. Plate II, figs. 1, 2.

Shell ovate-oblong, attenuated at the extremities. Spire prominent, showing four whorls; outer lip thickened and having on the inner edge thirteen or fourteen teeth. Anterior half of the aperture wide, but contracted at the extremity, posterior end contracted and projecting slightly beyond the spire. Under the magnifying glass the shell shows strong revolving raised lines and striæ. Length 20 mm., width 11 mm., height 9 mm.

A notice of the finding of this shell by Mr. Homer Squyer of Mingusville, Mont., in the cretaceous formation (Fox Hills Group) of eastern Montana, and the above proposed name, were published in the NAUTILUS Vol. VI, p. 50. This shell resembles in outline the recent *Cypræa stolidæ*, but its very prominent spire would separate it from this group. Shell structure is wanting on most of its dorsal surface and the inner lip obscured by the hard matrix, which it would be inadvisable to remove. In a recent letter from Mr. Squyer he says "This summer while looking for fossils I found the outer lip of the imperfect specimen, found at the time I obtained the type. This specimen I have sent to the U. S. National Museum." The type has been placed in the collection of the American Association of Conchologists.

PRELIMINARY NOTICE OF NEW SPECIES OF LAND-SHELLS FROM THE GALAPAGOS ISLANDS, COLLECTED BY DR. G. BAUR.

BY WM. H. DALL.

Bulimulus (Næsiotus) duncanus n. s.

Shell short, stout, inflated, thin, with wrinkled and slightly gran-

ulose surface and six and a half whorls; apex rather pointed, whorls rapidly enlarging, the suture behind the last whorl deeper than the rest, aperture relatively small, rather oblique; the lip simple, not reflected, a single tubercle on the body whorl well within the aperture and about equidistant from either lip; umbilicus perforate, narrow. Alt. of shell 18; of last whorl 12·5; diam. of shell 11 mm.

Duncan Island, Baur; no living ones seen.

Bulimulus (Næsiotus) amastroides Ancy var. **Ancyi** Dall.

Shell resembling *B. amastroides* Ancy but with more plicate surface, ruder aspect, smaller mouth and more angular periphery. Lon. 9, lat. 4·5 mm.

Chatham Island, 1600 feet; Baur.

This may prove merely a depauperate variety of *B. amastroides*, but at first sight it looks very different.

Bulimulus jacobi var. **vermiculatus** Dall.

Shell with five and a half sharply granulated, wrinkled whorls; suture deep, aperture small, simple, thin-edged; umbilicus perforate, rather large but not funicular. Lon. 8, lat 5·5, alt. of last whorl 6·0 mm.

James Island at James Bay, Baur.

Resembles a dwarf *B. jacobi* with very sharp, beaded, alternate granulations in spiral rows; transverse wrinkles small but distinct; the spire pointed but the apex rather blunt.

Bulimulus olla Dall. (**B. jacobi** Reeve, Icon., not of Sby., Conch. Illustr.)

Duncan, Indefatigable, and Barrington Islands, Dr. Baur.

This shell is closely related to *B. jacobi* and was figured by Reeve under the name of *jacobi*. The original *jacobi* was sent by Cuming to Dr. Lea and subsequently a specimen of Reeve's form was added by Mr. Cuming. These are now in the Nat. Museum.

The true *jacobi* is smaller, and is sharply spirally sculptured with fine lines of beaded granules alternating in size, every fifth or sixth row being larger. It has six inflated whorls and a pale peripheral band. *B. olla* has a nearly smooth almost polished surface, only marked with incremental faint lines, seven whorls and a very bulbous pillar. It is a larger shell than the original *jacobi*. The latter comes from James, Albemarle, Charles and Chatham Islands, in the wooded zone, while *B. olla* inhabits the grassy upper zone.

Bulimulus (Næsiotus) tortuganus n. s.

Shell small, solid, moderately elongated with six and a half whorls; the earlier whorls subtranslucent madder brown with a pale peripheral stripe, more or less silky and sculptured with very fine spiral lines; sutures very distinct; later whorls malleated, wrinkled or pecked; rude, fleshy white, with a variably large perforate umbilicus; aperture small, with a lump on the pillar and another within the middle of the outer lip; lips thickened, white, slightly reflected, the throat brownish, body with a thin, transparent callus. Lon. of shell 12, of aperture 5·5; max. diam. of shell 7 mm.

La Tortuga, grassy zone, South Albermale, Baur.

This shell which is very characteristic seems to be abundant where found by Dr. Baur. It seems nearest to *B. simrothi* Reibisch. of the described species. It is remarkable for the illustrations it gives of the varied influence of the environment on different individuals. The sculpture of the last whorl recalls that of *B. rugiferus*. The young is hispid and colored like that of *unifasciatus*, but is narrower; the pale peripheral band is almost wholly obscured in the adult and the hairs are soon lost.

Bulimulus (Næsiotus) Bauri n. s.

Shell small, short, stout, with a dark rapidly attenuated spire, distinct suture, and opaque yellow-brown last whorl; whorls about seven, the earlier ones dark livid purple with straw colored streaks, paler at the suture, rude and malleated; last whorl inflated, more or less transversely wrinkled, somewhat polished; umbilicus closed or a mere chink; aperture subquadrate, angulated behind and at the base of the pillar; pillar short, oblique; lips simple, thick, especially across the body where the callus has a raised edge; throat white. Lon. of shell 10, of aperture 4·5; max. lat. of shell 6·5 mm.

Hibernating on the under side of leaves of plants at the Southwest end of Chatham Island, 1600 ft. above the sea, Dr. Baur.

This is one of the most distinctive species of the whole group.

Hyalinia chathamensis n. s.

Shell small, thin, straw colored, depressed, with four rounded polished whorls; suture distinct; sculpture of numerous radiating, slightly flexuous, indented lines; umbilicus deep, exhibiting all the volutions, but rather narrow. Max. diam. 3, min. diam. 2·25 mm.

Alt. of shell 1·30 mm.

Chatham Island, 1600 feet, 1 specimen, Dr. Baur.

This shell recalls *H. arborea* Say, but is much smaller and has a different umbilicus. In the characters of the aperture, etc., not mentioned above, it duplicates *arborea*.

Conulus galapaganus n. s.

Shell close to *C. fulvus*, but has five whorls to four in a specimen of *fulvus* of the same diameter; it has a very well marked suture and the whorls between the sutures are more rounded than in *fulvus*. The height of *C. galapaganus* is greater in proportion to the number of whorls. Alt. of shell 3.25; max. diam. of shell 2.5 mm.

Chatham Island, 1600 ft., Dr. Baur.

This shell appears to differ from all the forms like *fulvus*, *selenkai*, *cœcocides*, etc., by its smaller size, very brilliant surface, inflated whorls and number of turns. It wants entirely the spiral striation of *Zonites bauri* which is a much larger and more depressed shell. In fact it seems like an elevated, dwarfed and inflated *C. fulvus*.

There are probably other Helices on the islands which have not yet been collected.

Succinea corbis n. s.

Shell small, of two and a half whorls, to which a black mould adheres with tenacity. The first whorl and a half are salmon pink in the adult but the young of the same size are pale amber. In the adult the last whorl is of a pale straw color. The shell resembles *S. wolfi* in form but is smaller and has a more contracted aperture; it is instantly recognized, when examined with a good lens, by its surface which is minutely shagreened all over with an excessively fine network of closely reticulated incised lines. Alt. of shell 4, max. diam. 4; extreme length of aperture 4 mm.

S. Albemarle Island on dry bones of turtles, Dr. Baur.

The remarkable sculpture is not visible to the naked eye except as a sort of hoary bloom on the surface. Under a compound microscope it looks like closely woven basket work. I have examined a great many Succineas without finding any other species possessing this character. The sparse dichotomous impressed sculpture which appears on Succineas from Samoa and other oceanic islands and is occasionally visible on *S. bettii* is an entirely different thing.

I may add that the *S. bettii* var. *brevior* of Smith, is in my opinion distinct from *S. bettii* and should be raised as *S. brevoir* to specific rank. I have examined a large number of both forms. *S. bettii* is a species of the wooded zone, *S. breviar* of the dry zone. It is probable that *S. wolfi* Reibisch may be only a variety of *S. bettii*.

The final report on Dr. Baur's collections will not long be delayed. The species will be figured and their anatomical characters discussed. The most important fact thus far determined is the close alliance of all the *Nesiotes*, *Rhaphiellus* and *Pleuropyrgus* to the American *Bulimuli* of the type of *B. serperastrus*. The different forms of the shell are dynamic not genetic differences, and there is no doubt as to the exclusively American type of the whole fauna, when the groups represented are not of world wide distribution.

PRELIMINARY NOTE ON THE SPECIES OF STROBILOPS.¹

BY H. A. PILSBRY.

The United States species of this genus have generally been believed to be but two in number, the "*Helix*" *labyrinthica* of Say, and *Hubbardi* of A. D. Brown; the types of both being in the museum of the Academy of Natural Sciences of Philadelphia.

The writer some months ago, gave the varietal name *virgo* to specimens sent him for determination by Rev. H. W. Winkley,² and later the name *affinis*³ to another form.

Recently, with the assistance of Mr. H. E. Sargent, the various species and varieties have been re-examined and compared, with the result of finding that, in what has hitherto passed as "*H. labyrinthica*," there seem to be at least three well marked species. These species agree in general form and sculpturing, but differ in size, color, degree of depression, and especially in *the internal lamellæ* of

¹*Strobilops* Pilsbry, Proc. Acad. Nat. Sci. Phila., 1892, p. 403, *Strobila* Morse 1866, not *Strobila* Sars, 1833, nor *Strobilus* Anton, 1839.

²*Nautilus*.

³Proc. Acad. N. S. Phila., 1892, p. 404, (no description).

basal and outer walls of the body whorl. In this they are comparable to the *Clausilias*, *Endodontas*, etc.

The species may be tabulated thus :

- a.* Internal lamellæ on floor of body whorl 2 or 3, short ; color dark brown ; one parietal fold conspicuously emerging from aperture.
 - b.* Form elevated conoidal . . . *S. labyrinthica* Say.
 - bb.* Form much depressed . . . *S. labyrinthica strebeli* Pfr.
- aa.* Internal lamellæ on floor and adjacent side wall of body whorl 6 or more.
 - b.* 6 long lamellæ ; 2 parietal folds emerging ; color white or pale brownish ; form elevated, . . . *S. virgo* Pils.
 - bb.* About 8 short lamellæ arranged in a curved radial series ; color dark brown ; form elevated *S. affinis* Pils.

The figures of Morse and Binney represent *S. labyrinthica* Say.

The *S. labyrinthica strebeli* Pfr. was described from Mirador, Mexico, the specimens before me being from that locality. It was well figured by Pfeiffer in the *Malakozoologischer Blätter* viii, pl. 1, figs. 5-8 ; but Crosse and Fischer's figures (*Moll. Mex.*) do not represent it. They were probably drawn from a specimen of *S. virgo*, but certainly not from *strebeli*. Mr. Sargent has found a form closely resembling the Mexican *strebeli*, at Woodville, Ala.

The original examples of *S. virgo* are greenish-white in color. They were collected by Rev. H. W. Winkley near Sebec Lake, Piscataquis Co., Maine. Mr. Sargent has found a form of the same species at Woodville, Ala., where they are of a light brownish tint.

S. affinis is a large form, very abundant at many localities in New York, Ohio, etc. Its prominent feature is the armature of numerous short lamella, extending in a forwardly curved series from the axis across the base and up the side wall.

The writer wishes to prepare an illustrated paper upon these forms, and will be glad to receive specimens from as many localities as possible, and especially western and southern localities. Anyone sending specimens will receive in return (if they wish it) a copy of the pamphlet "Preliminary Classification of the Helices," and, when it is issued, a copy of the projected paper on *Strobilops*.

CHARLES B. FULLER.

BY REV. HENRY W. WINKLEY.

The death of Mr. Charles B. Fuller, which occurred in April last, removes from our midst a man who had been a most enthusiastic worker in the Natural History of the State of Maine. Since 1858 he had been Curator of the museum of the Natural History Society of Portland, and the results of his labor have greatly enriched that museum. His interest in Conchology was great, and though he never published his results, the rooms of the society show what his labor was. I had several times suggested that he allow me to send his name for membership in the Association but his reply was "I am too old now and cannot help them." He has however helped many, and some of our younger members will recall him as ever ready to assist. Though quiet and retiring, he soon became a warm friend to one who loved Nature. His work and influence must live for a long time, though he is no longer present.

THE NEW POSTAL RULING.

It has always been recognized that scientific research is greatly furthered by the exchange of the various objects with which that research is concerned. For the transmission of objects of natural history from one country to another, the mails have offered a cheap and speedy means. Heretofore, through the laxity with which the regulations have been enforced, it has been possible to enter such objects in the mails of the Universal Postal Union as "samples of merchandise," and under the rates of postage therefor. From official information lately received from the United States Post Office Department, it appears that such a rating is entirely unauthorized by existing provisions, and that objects of natural history may only be mailed by the rates required for letters. The United States Post Office Department also stated that it had recently submitted a proposition to the countries comprised in the Postal Union,

to modify the regulations so that such specimens may be entered in the mails as "samples of merchandise;" but that a sufficient number of countries had voted against the proposition to defeat it. Those countries voting negatively were Austria, Bolivia, British India, Canada, Germany, Great Britain, Guatemala, Hungary, Japan, Norway, Portugal, Russia, Spain, Sweden, Tunis, Uruguay and Venezuela.

The Academy of Natural Sciences of Philadelphia has appointed, through its President, a Committee (Chairman, Mr. P. P. Calvert) to address the various scientific bodies with which it is in communication in those countries, and to request them to memorialize their respective Governments in favor of the proposed modification. The letter rate for postage in the Postal Union is ten times that required for samples of merchandise, so that the former is virtually prohibitive.

In view of the fact that the subject is one which concerns all Zoologists, the NAUTILUS would urge its readers to use such influence as they may be able in favor of the proposed change. Foreign Conchologists living in the countries named above, will, it is hoped, exert their influence toward the modification desired.

NOTES AND NEWS.

MR. E. W. ROPER of Revere, Mass., returning from Chicago, visited the Conchological fraternity of Washington and Philadelphia recently.

DR. B. SHARP of the Academy of Natural Sciences of Philadelphia has departed on a scientific mission to the Sandwich Islands. He expects to return in December.

A VALUABLE MONOGRAPH upon the "Pleistocene History of Northeastern Iowa," by W. J. M'Gee appears in the Eleventh Annual Report of the U. S. Geological Survey, just issued.

The senior Editor of the NAUTILUS is engaged upon a guide of the Heliciform land snails. All of the genera and subgenera will be thoroughly defined, both as to shells and anatomy; a number of species of every subdivision will be figured, the anatomy will be figured, and the species of each group will be enumerated. An

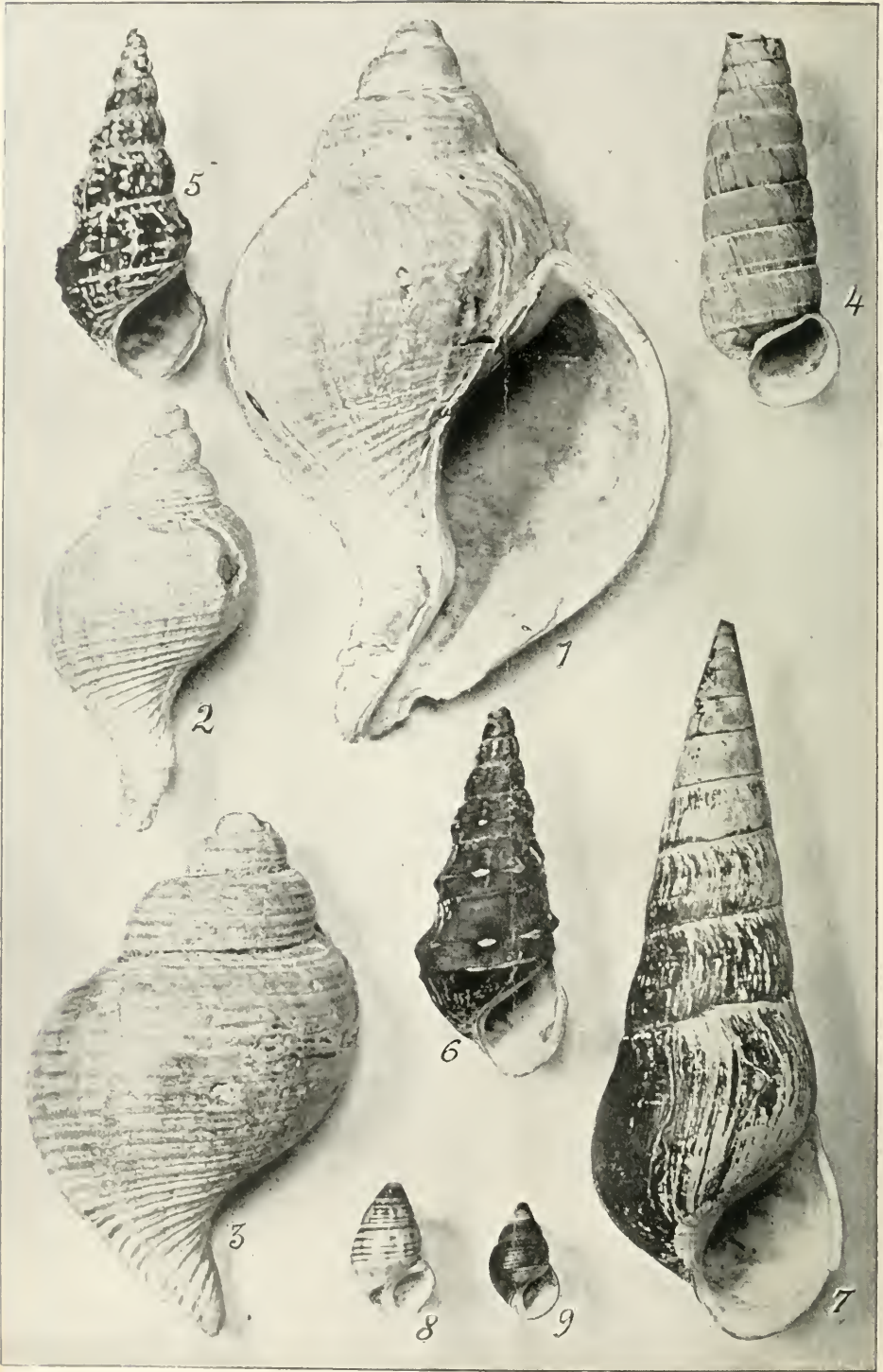
immense amount of new information, not to be found in any of the conchological manuals, will be offered. The work, it is believed, will form a complete text book of the subject, and will be indispensable to the student of land snails.

PROF. RALPH TATE describes a number of interesting new Australian gastropoda in the Tr. Roy. Soc. S. Austr. June, 1893. Among them are the following *Turbinida* and *Trochida*; *Astralium rutidoloma*, *Clanculus consobrinus*, *euchelioides*, *Thalotia neglecta*, *Calliostoma spinulosum*, *Euchelus fenestratus*, *pumilio*, *vixumblicatus*, *annectans*, and *E. (Hybochelus) ampullus*. He states that *Euchelus tasmanicus* Tenison-Woods is the same as *E. scabriusculus* (Angas) Fischer, the type of Pilsbry's subgenus *Herpetopoma*. A supplemental list of S. Australian mollusca is also given.

OLFACTORY ORGANS OF HELIX. Dr. A. B. Griffiths (Proc. Roy. Soc. Edinb. 1892,) contends that Sochaczewer's experiments, by which he showed that the tentacula of *Helix pomatia* are not olfactory organs, were untrustworthy from his use of turpentine, which gives off a vapor that is irritating to the sensitive tissues generally. If snails are placed on flat slabs, the edges of which have been smeared with eau de cologne, methyl or ethyl acetate, liquids the vapors of which are not irritants, such as have the tentacula removed gradually approach the edges of the slabs, while those whose tentacles are uninjured turn away from the edges. He concludes, therefore, that the tentacles are the seat of the olfactory organs in *Helix*.

The Mid-August number of the *Zoologischer Anzeiger* contains an excellent portrait of J. Victor Carus, in commemoration of his seventieth birthday.

Mr. A. Belt, in writing of the mollusks of Dorset, (England) gives the following interesting notes. It is well known that thrushes in seasons of scarcity hunt for snails, and to extract the animal break the shell by beating it against a stone. Stones that have been used for this purpose, with the broken shells lying around them are frequently noticed but I had never before found them in such profusion as on the present occasion. A very large proportion of the 576 specimens of *Helix nemoralis* and *H. hortensis* found consist of these fragments. In fact, the birds had so thoroughly worked the district that until a heavy fall of rain induced the snails to come forth from inmost hiding-places, I did not find more than a dozen live shells of these species. On one occasion I found 42 *H. aspersa*, *H. hortensis* and *H. nemoralis* round one stone.



PILSBRY.—NEW N. JERSEY AND MEXICAN SHELLS.

THE NAUTILUS.

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No. 6

ILLUSTRATIONS OF MEXICAN MELANIANS.¹

BY H. A. PILSBRY.

The distribution of the Melanians and of land operculates in the Americas forms a most interesting chapter in zoogeography. As is well known, the family *Pleuroceride* comprises all of the Melanians found living in North America above the Rio Grande; and moreover no members of this family or subfamily are known to exist outside of this area. South of the Texas boundary there are few melanians or none throughout northern Mexico; but as we approach the isthmus of Tehauntepec the characteristic neotropical genera *Pachychilus* and *Hemisinus* appear, and are represented by a considerable number of species and innumerable local races. The richness of this fauna in varietal forms rivals the prolific streams of Tennessee and northern Alabama. Every spring and stream has its peculiar variations, often so distinct typically, that the naturalist is tempted into extravagance in naming them as species. The illustrations here with given represent some of the forms of *Pachychilus glaphyrus* from the State of Tabasco, sent to the Academy of Sciences by Professor ROVIROSA, a zealous and enlightened naturalist of that State.

¹ Reprinted by permission from the Proc. Acad. Nat. Sci., Phila.

Pachychilus glaphyrus Morelet.

This species is an exceedingly variable one, more so perhaps than any other Mexican Melanian. The American student, however, will readily call to mind cases of equal variability among the species of our Southern States. The material sent by Prof. Rovirosa comprises a number of varietal forms not before made known.

P. glaphyrus Rovirosai Pils. (Pl. I, figs. 9, 10.)

Shell large and heavy, elevated conical, the lateral outlines straight above, modified by the slight convexity of the whorls below. Spire more or less truncated at tip, half-grown specimens, (Pl. I, fig. 9,) possessing 8 remaining whorls; adults, (Pl. I, fig. 10,) having one or two whorls less.

Surface most minutely spirally striated the striæ visible only under a lens. Young and half-grown specimens are otherwise smooth, except for very slight spiral liræ toward the base. When a little more than half-grown, there appear coarse, oblique, curved wave-like folds on the body-whorl, extending to the periphery but not below it. Simultaneously with these undulations, begin spiral spaced liræ crossing them, which are slightly more prominent on the crests of the waves. This sculpture continues upon all subsequent volutions. The last volution of an adult specimen is slightly compressed below the suture, then quite convex. It has ten waves, and about nine spiral liræ, but the number of these last is quite variable on different specimens.

The color is olive in young, blackish in old examples: interior of the mouth white, maculated with brown at the position of the periphery and folds. This marking is also seen on the eroded spire in some specimens.

Aperture ovate, acute above, slightly exceeding one-third the total length of the shell. Columella white, regularly arcuate, spreading in a brown-tinted callus.

Dimensions. An adult specimen measures: Alt. 78, diam. 28 mm. Aperture, alt. 25, width 18 mm. A younger specimen measures: Alt. 56, diam. 20 mm. Aperture, alt. 20, diam. 12½ mm.

Collected from a spring which gushes from the western brow of the little ridge of the Limon, State of Tabasco, Mexico.

This form is allied to *P. glaphyrus* typical, and to the var. *scam-nata*, but it is distinct from both. The form is notable for its stout, straight-sided spire, non-impressed sutures, and the unsculptured young.

P. glaphyrus var. between *polygonatus* and *immanis*. (Pl. III, figs. 5, 6.)

The two specimens figured are of the same size but differ in sculpture. One (fig. 6) is smooth above and below, having a strong sub-spinous keel at the periphery, and a smooth, acute keel below it. Upon the earlier whorls of the spire there are longitudinal waves, and two spiral cords above the peripheral keel, which diminishes in size. The base has no spirals. The other specimen has the entire body-whorl spirally lirate (liræ on body-whorl 9, on penultimate whorl 3) and strongly plicate.

P. glaphyrus potamarchus. (Pl. III, fig. 7.)

This is one of the largest forms of *Pachychilus* known, and it is the most aberrant of the *glaphyrus* stock. The shell is rather slender and acutely conical, the outline of the spire being straight. The aperture is ovate, narrowed above, and one-third the length of the shell. Whorls 10-11 remaining, several of the earlier being lost by erosion. The microscopic sculpture is the same as in var. *Rovirosai*. There are no traces whatever of the waves or folds so prominently shown by the other varieties of *glaphyrus*, and the spiral cords are also completely obsolete, or indicated by the faintest traces on the base. The color is olive-green or olive-brown.

Alt. 99, diam. 33 mill.

Alt. 87, diam. 29 mill.

Tabasco, Mexico.

This variety differs from the *pyramidalis* of Morelet in being larger and smoother, lacking altogether the chestnut colored spirals of that form.

Potamanax subgen. nov.

Shell solid, oval with short conic spire, spirally sculptured or banded. Aperture ovate, acute above, broadly rounded below; outer lip not sinuous; inner lip more or less heavily calloused, not notched at the base. Operculum few-whorled, with basal nucleus. Type *P. Rovirosai* Pils.

This group has the sculpture of *Hemisinus* but differs from that genus in the entire, un-notched basal lip. The columella callus is much like some species of *Pachychilus* but the operculum is very different from that genus. From both of these groups it differs in the short, ovate contour of the shell. The description of the operculum is taken from *Melania brevis* d'Orbigny of Cuba, which I consider congeneric.

The relationship of *Potamanax* to *Hemisinus* in sculpture and operculum is obvious, and has caused me to regard it as a subgenus

rather than a distinct genus; but the total lack of a basal notch or truncation is a character usually considered of generic importance.

P. Rovirosai n. sp. (Pl. III, figs. 8, 9.)

Shell oblong-conic, very solid, whitish, encircled by numerous narrow smooth spiral liræ of a dark brown color, and somewhat alternating in size. Spire conical, apical whorl eroded; whorls 5 remaining, slightly convex, the last whorl large, regularly convex. Aperture a little less than half the length of the shell, ovate, angular above; outer lip regularly acute; inner lip strongly calloused.

Alt. 20, diam. 12 mill. (old specimen.)

Alt. 16½, diam. 9¾ mill. (young specimen.)

Two specimens are before me, collected by Prof. Rovirosa at the mountains of Poana, State of Tabasco. The older individual (Pl. III, fig. 8) is considerably worn; the other is perfect but not wholly adult, and neither contains the operculum. The species is allied, apparently, to the Cuban *Melania brevis* Orb., but is decidedly longer, and the liræ are much stronger.

EXPLANATION OF PLATE III.

Figs. 1, 2, 3, *Chrysodomus (Sipho) Stonei* Pils.

Fig. 4, *Eucalodium compactum* Pils.

Fig. 5, 6, *Pachychilus glaphyrus* var.

Fig. 7, *P. glaphyrus* var. *potamarchus* Pils.

Figs. 8, 9, *Potamanax Rovirosai* Pils.

NOTE ON CYPRÆA GREGGORI FORD.

BY EDGAR A. SMITH.

I sincerely trust that Mr. Ford¹ wrongly estimates the critical acumen of modern conchological students. He says that most of them would probably have made *C. Greggori* a species instead of a variety.

There is no doubt that the new French School of Conchologists would agree with Mr. Ford in considering the shell in question specifically distinct from *C. cruenta*, but I am glad to say that in England (and I hope in America also) the ideas are not so advanced (?). Although examples of this shell have been in the National collection for more than 50 years, no British author has ever suggested that they belonged to a distinct species.

¹ NAUTILUS, Vol. vi, p. 112, Vol. vii, p. 39.

I fully admit that the differences pointed out by the author are fairly constant, and that examples are pretty easily separable from the typical form of *eruenta*. But admitting this does not prove that they ought to be held specifically distinct, and I venture to suggest that they only constitute a recognisable race or variety of an already known species.

The chief object of this note, however, is to make complaint respecting the name which Mr. Ford has imposed upon his so-called species.

When he published *Greegori* as a varietal name, it was already five years previously preceded by Mr. Melvill's varietal name *coloba*,¹ and therefore there is no question I think, which name should be employed if this variety be regarded as a distinct species. Right and justice (*and even courtesy*) at once direct us in the present case.

Mr. Ford is under the impression that Mr. Melvill was in a state of uncertainty whether the form in question was a variety of *eruenta* or *caurica*. I find no such impression conveyed by Mr. Melvill's sentences which are criticised by Mr. Ford. Moreover, in the catalogue of species (l. c., p. 243), Mr. Melvill ranges the var. *coloba* under *eruenta* and in addition gives a representation of the ventral side of the shell (Pl. I, fig. 7).

LAND MOLLUSCA OBSERVED IN THE GASPE REGION.

A. W. HANHAM, QUEBEC.

About the middle of May last I left Quebec for Gaspé Basin, by the way of Port Dalhousie, N. B. and the steamer "Admiral." It was my intention to spend a week or more in this district collecting shells and insects.

Unfortunately I found the season very backward up there, the weather too was wet or cold during my stay; owing to this but little collecting could be done, and I was more than disgusted having journeyed so far for so little purpose.

The following specimens were taken or seen at Barachois, near Mal Baie; this village is at the inner end of a deep bay, and is distant from Gaspé Basin some 25 miles, and from Percé about 10 miles.

With a few exceptions the land shells collected were found living in the grass on a sandy hillside close to the beach. The open coun-

¹ Mem. and Proc. Manchester Lit. and Philos. Soc., 1887-8. Ser. 4. Vol. I, pp. 218 and 243.

try was too wet and the woods were too full of snow to be worked at all, in fact it was only in places on the hill side that the snow had melted.

A broad sandy bar, some 5 or 6 miles long, cuts off the ends of the bay at Barachois, leaving a narrow channel at one end: on this bar I was surprised to find *Pupa muscorum* and *Vallonia costata* in the sand under pieces of wood. *Z. radiatulus*, *P. striatella*, *A. harpa* and *F. subcylindrica* occurred here rarely, as well as a *Vertigo*, of which two specimens only were taken.

Helix hortensis was very common on the hillside, generally buried in the sand; several varieties were taken; the plain form seemed to be the least abundant. At the entrance to some burrows I found quite an accumulation of empty shells, and nearly all being entire, many were in very fair condition.

A little collecting under more favorable circumstances would no doubt materially increase this list, from which several of the Northern or universally distributed species are absent.

At Gaspé Basin, *Limnea palustris*, *catascopium*, *desidiosa*, and one *Physa*, most likely *heterostropha*, were found in drift. Some marine species were also taken, but are not yet identified.

Linax campestris Binn. A few.

Vitrina limpida Gld. Frequent. All dead.

Zonites arboreus Say. A few.

“ *radiatulus* Alder. Common.

“ *fulvus* Drap. Two specimens.

Patula alternata Say. Frequent.

“ *striatella* Anth. Common.

Helicodiscus lineatus Say. Rare.

Acanthinula harpa Say. Common.

Tachea hortensis Müll. Abundant.

Vallonia costata Müll. ? A few. Mostly dead.

Pupa muscorum Linn. Frequent.

Vertigo. Two specimens (perhaps two species).

Ferussacia subcylindrica Linn. Common.

Succinea obliqua Say. “

“ *avara* Say. A few.

Carychium exiguum Say. Rare.

¹ Reprinted by permission from the Proceedings of the Academy of Natural Sciences of Philadelphia, 1892, p. 328.

A NEW GASTROPOD FROM NEW JERSEY.¹

BY H. A. PILSBRY.

At the regular weekly meeting of the Academy of Natural Sciences of Philadelphia, October 18, 1892, Mr. H. A. Pilsbry exhibited a series of specimens of a large species of *Chrysodomus*, belonging to the subgenus *Sipho*, which he had received from Messrs Witmer Stone, Chas. LeRoy Wheeler and John Ford. He stated that the specimens were cast upon the shore during severe gales from the south east, and were evidently derived from a submarine stratum which was disturbed and broken up at those times. Associated with the *Chrysodomus* were examples of *Buccinum undatum*, *Urosalpinx cinereus* of extraordinary dimensions, and *Chrysodomus* (*Sipho*) *Stimpsonii*, the latter being well developed and typical in sculpture. The age of the deposit cannot be definitely settled at present, but the evidence at hand indicates that it is post-pliocene.

The following description of the new species was offered :

CHRYSODOMUS (SIPHO) STONEI (Pl. III, figs. 1, 2, 3.). Shell obese-fusiform, rather thick and solid, with strongly convex whorls separated by deep sutures. Sculpture consisting of strong spiral cords, equal on young specimens and on the spires of adults, but which alternate with smaller intermediate cords on the body-whorl in full grown specimens. A young shell therefore has about 20, an adult 40 spirals upon the body-whorl. The aperture is oval: the canal is strongly curved to the left and backward.

Length 72, greatest diam. 45 mm.; length of aperture and canal 51 mm. The largest individual measures, length 100, breadth 64, length of aperture 73 mm. Both of these, as well as all specimens seen, have lost several of the earlier whorls; so the length of a perfect individual would be proportionately greater.

The more prominent features of this species are the swollen form, deep sutures, the strong spiral sculpture, and the strongly recurved canal.

The localities whence specimens have been obtained are as follows: Point Pleasant, N. J. (Witmer Stone); Sea Isle City, N. J. (John Ford, Oct., 1892); Cape May, N. J. (C. LeRoy Wheeler, 1891.)

Prof. A. E. Verrill of Yale College very kindly compared specimens of this species with the collection under his charge (a collection vastly richer than any other in mollusks of the north-west Atlantic.) He writes as follows:

"I have made a careful comparison of the *Sipho* sent by you with our series.

"It differs notably from any thing we have, and is probably, as you suppose, an undescribed species, unless described as a fossil. We have specimens of the ventricose varieties of *S. Stimpsoni*, which equal this in stoutness, and nearly equal it in curvature of the columella, but the whorls are less ventricose, the shoulder less swollen, the sutural region less deep, and the sculpture is very much finer."

Comparisons have also been made by myself with the Atlantic Siphos in the U. S. National Museum, and of course with the recent and fossil series in the collection of the Academy.

SHELLS OF HENRY CO., INDIANA.

BY E. PLEAS.

To judge from such works on the Mollusca as I have had access to, Indiana has not been regarded as having a Molluscan fauna worthy of the attention of the Conchologist. It is not often mentioned in giving localities. W. G. Binney in his very valuable Manual of Am. Land Shells, prints a list of his large collection as presented to the Smithsonian Institute; some 312 species and varieties, only mentions a beggarly 4: *Zonites fuliginosus*, *Patula solitaria*, *Triodopsis appressa* and *T. inflecta* as hailing from the Hoosier State.

I have been a student and collector of Mollusca for several years and have made it a point to secure our home shells first, and am able to present the following list collected within 5 miles of my residence near Dunreith, Indiana.

Mesodon albolabris Say.	striatella Anth.
elevatus Say.	Polygyra leporina, Gould.
thyroides Say.	Stenotrema stenotremum Fer.
" var bucculenta.	monodon Rack.
Mesoden exoletus Binn.	" var. leaii.
profundus Say.	" var. fraternum.
multilineatus Say.	hirsutum Say.
Sayii Binn.	maxillata? Gould.
clausus Say.	Triodopsis fallax Say.
pennsylvanicus Green.	tridentata "
Patula alternata Say.	palliata "
" var. carinata.	inflecta "
perspectiva Say.	appressa "
solitaria "	Zonites ligerus Say.

- fuliginosus Griff.
 intertextus Binn.
 exiguus Stimp.
 arboreus Say.
 indentatus Say.
 limatulus Ward.
 nitidus Müll.
 viridulus Say.
 fulvus Drap.
 minusculus Binn.
 petrophilus Bland?
 Strobila labyrinthica Say.
 Helicodiscus lineatus "
 Vallonia pulchella Müll.
 Punctum pygmaeum Drap.
 Pupa contracta Say.
 pentodon "
 corticaria "
 fallax "
 armifera "
 curvidens Gld.
 Vertigo ovata Say.
 miliun Gld.
 tridentata Wolf.
 bollesiana Morse.
 gouldii Binn.
 Carychium exiguum Say.
 Valvata sincera Say.
 tricarinata "
 Amnicola porata Say.
 cincinnatiensis Anth.
 Sayana "
 Pomatiopsis lapidaria Say.
 Bythinella attenuata Hald.
 Melantheo integra Say.
 Bulimus dealbatus Say.
 Ancyclus rivularis Say.
 Limnaea reflexa Say.
 palustris Mull.
 desidiosa Say.
 humilis "
 catascopium Say.
 caperata "
 Physa gyrina Say.
 heterostropha Say.
 Bulinus hypnorum L.
 Planorbis trivolvis Say.
 " var. fallax.
 bicarinatus Say.
 companulatus Say.
 parvus "
 Segmentina armigera Say.
 Succinea obliqua Say.
 ovalis Gould.
 avara Say.
 " var. vermeta.
 Sphaerium sulcatum Lam.
 solidulum Prime.
 occidentale "
 striatinum Lam.
 truncatum Lins.
 Pisidium abditum Hald.
 Unio rubiginosus Lea.
 occidens "
 luteolus Lam.
 sub-ovatus Lea.
 gibbosus Bar.
 pressus Lea.
 gracillis Barr.
 phaseolus Hild.
 glans Lea.
 radiatus Lam.
 cocineus Hild.
 spatulatus Lea.
 nigerrimus "
 ligamentinus Lam.
 plicatus Les.
 undulatus Bar.
 nov-eboraci Lea.
 Margaritana marginata Say.
 calceola Lea.
 deltoidea "

<i>M. rugosa</i> Bar.	<i>shaefferiana</i> ? Lea.
<i>Anodonta grandis</i> Say.	<i>salmonea</i> “
<i>plana</i> Lea.	<i>ferusacciana</i> “
<i>decora</i> “	<i>ferruginea</i> Lea.
<i>imbecillis</i> Say.	<i>stewartiana</i> Lea.
<i>ovata</i> Lea.	<i>subeylindrica</i> Lea.
<i>edentula</i> Say.	

ON A COLLECTING TRIP TO MONTEREY BAY.

BY WILLIARD M. WOOD.

The editors of the NAUTILUS have asked me to write a short article for the NAUTILUS, while I am here, on my trip to this once famous collecting ground.

Now that I am about to leave for San Francisco, I feel sorry to think that I have not devoted more time to the collection of specimens. Of course, there have been many long drives to be taken, a dip in the surf once in a day, huckle-berry expeditions with friends, and a thousand and one things to be done, while stopping at a summer watering place.

Between these “sports,” if I may be permitted to call them such, I have managed to find time to do some collecting.

The hotel at which I am stopping is situated within five hundred yards of the beach. To the north, runs a very smooth beach, devoid of rocks of any character for some fourteen miles. To the south, and extending for many miles, is a very rocky stretch. To this rocky portion, almost all of my collecting trips were confined.

Monterey is no longer the famous collecting ground it used to be. The increasing population at and around Pacific Grove is driving away all the land shells. The deadly sewerage flowing from the various towns into Monterey Bay is killing the marine shells. However, new and very interesting species are occasionally brought up from deep water by the dredge.

Early in the morning, on the 28th of June, I started by steamer from San Francisco with my shell collecting outfit, consisting of glass pill bottles for small shells, paper boxes, cigar boxes, cloth bags, long, thin pieces of wood with rubber bands attached for the Chitons, alcohol stove and pan for the killing of bodies of the shells,

cotton batting, long rubber boots, an immense sun hat, a chisel to detach *Haliotis* shells from the rocks, etc.

I arrived here at seven in the evening and although the trip down was rough, and our little "tub" rocked dreadfully, causing me to be sea-sick, it nevertheless did not prevent me from starting right in and collecting as soon as my feet rested on terra firma. On that evening, I began collecting at seven o'clock and as it was very light at that hour, I continued to collect along the beach until eight. I am very glad I did so, as it netted me some beach-washed species which I have not come across since.

I selected a week when the early morning small low tides occurred. Thus, one morning I devoted to the collection of *Haliotis cracherodii*, another morning I went in search of *Littorina planaxis*, another for *Chlorostoma costatum*, *Acmæa scabra*, *Nassa mendica*, etc.

During this second week, when no morning low tides have occurred, I have gone among the rocks, gathering any and every species which was so unfortunate, nay, I should say, fortunate, as to be placed within my reach.

Priene Oregonensis Redf. will be noted as having been collected here. I do not as yet understand how this large and beautiful northern shell should be found so far south. It could not have drifted into the bay, as it was a fresh, perfect-lipped specimen.

I may also mention that in a letter recently received from Mrs. M. Burton Williamson, of University P. O., Cal., that lady informed me that *Psammobia rubro-radiata* Nutt., is not found north of San Pedro Bay. As will be noted, I found one specimen, alive and perfect. It is truly a beautiful shell. The inside of both valves resembling delicate porcelain.

I am exceedingly sorry to think that I have no dredge here with me, as I feel positive I could gather at least five times as many specimens as I have already collected.

In the following list, the number of specimens taken is given after each name, and will serve to show the relative abundance of the species.

Arionta californiensis Lea, 51; *dupetithouarsi*, Desh., 4; *nickliniana*, Lea, 1. *Acmæa asmi* Midd., 33; *mitra* Esch., 11; *patina* Esch., 5; *pelta* Esch., 2; *persona* Esch., 2; *scabra* Nutt., 2; *spectrum* Nutt., 6. *Amphissa corrugata* Rve., 64. *Astyris gausipata* Gld., 12. *Bittium filosum* Gld., 24; *filosum* Gld. var. *esuriens*

Cpr., 2. *Calliostoma annulatum* Mart., 17; *canaliculatum* Mart., 32; *costatum* Mart., 80. *Chlorostoma brunneum* Phil., 23; *pulligo* Mart., 3; *funerale* A. Ad., 2. *Cerostoma foliatum* Gmel., 1. *Crucibulum spinosum* Sby., 9. *Crepidula edunca* Sby., 21; *rugosa* Nutt., 2; *navicelloides* Nutt., 12. *Conus californicus* Hds., 4. *Cryptomya californica* Conr., 1. *Chaetopleura hartwegii* Cpr., 11. *Chama spinosum* Sby. (?), valves only, 4. *Columbella carinata* Hds., 24. *Drillia torosa* Cpr., 5. *Erato columbella* Mke., 6; *vitellina* Hds., 6. *Fusus luteopictus* Dall, 1. *Fissurella volcano* Rve., 47. *Gadinia reticulata* Sby., 8. *Glyphis aspera* Esch., 3. *Haliotis cracherodii* Leach, 72; *fulgens* Phil., 1; *rufescens* Swains., 2. *Hipponyx tumens* Cpr., 57. *Lyonsia californica* Conr., valves only, 1. *Lottia gigantea* Gray, 44. *Lucina californica* Conr., valves only, 11. *Lucapina crenulata* Sby., 4. *Lunatia lewisii* Gld., 2. *Lamellaria stearnsiana* Dall, 1. *Leptothyra carpenteri* Pilsbry, 28. *Litorina planaxis* Gray, 83; *scutulata* Gld., 2. *Lazaria subquadrata* Cpr., 5. *Mitromorpha aspera* Cpr., 2. *Modiola fornicata* Cpr., 2. *Mangilia variegata* Cpr., 3. *Mitra maura* Swains., 1. *Marginella jewettii* Cpr., 25. *Monoceros engonatum* Conr., 2; *lapilloides* Conr., 75. *Mopalia lignosa* Gld., 3; *ciliata* Sby., 2. *Macoma inquinata* Desh., 1; *secta* Conr., valves, 2. *Mytilus californicus* Conr., 2. *Nassa californiana* Conr., 1; *fossata* Gld., 13; *mendica* Gld., 58. *Nacella inessa* Hds., 19; sp. undet., 2. *Nuttallina scabra* Rve., 29. *Olivella biplicata* Sby., 14. *Ocinebra circumtexta* Stearns, 7; *interfossa* Cpr., 7. *Priene oregonensis* Redf., 1. *Psanmobia rubra-radiata* Nutt., 1. *Pedicularia californica* Newc., 12. *Purpura saxicola* Val., very large, 16; *saxicola* Val., var. *emarginata* Desh., 80. *Pachypoma inæqualis* Chem., 1. *Phasianella compta* Gld., 9. *Pecten hastatus* Sby., valves only, 4. *Pholadidea penita* Conr., 1. *Placunanomia macrochisma*, Desh. (valves), 2. *Petricola carditoides* Conr., 2. *Rupellaria lamellifera* Conr., 3. *Saxicava arctica* Linn. (valve only), 1. *Scala indianorum* Cpr., var. *tincta* Cpr., 10. *Surcula carpenteriana* Gabb., 3. *Septifer bifurcatus* Rve., 11. *Standella falcata* Gmel. (?) (valves only), 2. *Schizothærus nuttallii* Conr. (valves), 2. *Tapes staminea* Conr. (?), 3. *Trivia californica* Gray, 20. *Tellina bodogensis* Hds. (valves only), 2.

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NOTES ON PAPUINA.

BY CHARLES HEDLEY, AUSTRALIAN MUSEUM, SYDNEY, N. S. W.

All *Papuina*¹ are arboreal; this habit is as "good" a generic character as any anatomical feature could be. Parenthetically, I may remark, that my friend Mr. Brazier, who has probably gathered more living *Papuina* than any other naturalist, agrees with me that the account (Ann. Mag. N. H., (4) xx, p. 242) of a *Papuina* clinging half way up a reed in a brackish swamp is quite incredible. The usual position of *Papuina* is upon the trunks or limbs of trees where an unpracticed eye might take it for a rough bit of bark. In southern Europe the *Macularia* perch just so on precipitous rocks; indeed, I recollect there capturing an *H. nicensis* on an olive tree in exactly the manner affected by the *Papuina* in New Guinea.

A small group of Queensland snails, viz, *conscendens* Cox, *fuscata* Pfeiffer, and *bidwilli* Cox, seem to differ from the main body of the genus in their habits. Not the stem or branches, but the leaves of trees are chosen by these for their favorite abode. To suit the situation the shell has been modified until the contour would suggest *Partula* rather than *Papuina*. The more conical shape has proba-

¹This name is now generally used for the conical *Helices* characteristic of the Papuan and Solomon Island faunas, formerly called *Geotrochus*.

bly been adopted for greater safety in the exposed tree tops; to the same end every superfluous atom of weight has been abandoned, the shell reduced to the thinnest, and the reflected lip dispensed with. Under the lens the apex is seen to be of one and a half whorls, black or darker than the adult shell, smooth and subglobose. Oblique growth lines are the predominant features of the adult sculpture; by flashing the shell in the sunshine under a lens, an extremely minutely shagreen surface is perceptible in the gleam, and here and there broken lengths are decipherable of engraved spiral lines. Viewing the shells of these three species by transmitted light the color markings are seen as translucent spaces in the opaque shell. I should interpret these signs as indicating a descent from an ancestor like *naso* and *macgillivrayi* through a form very close to *bidwilli* Pfeiffer.

The minute almost imperceptible shagreen surface may represent the coarse sculpture of *naso*; the evanescent spiral lines are traceable from the clear cut lines of *macgillivrayi* through the fainter sculpture of *bidwilli* Pfr., to their vanishing representative in *bidwilli* Cox. But the minute subglobose apex and especially the translucent spiral color bands ally this group unmistakably with *Papuina*. Admitting this, in default of anatomical examination, it will be necessary to rename the shell hitherto known as *Bulimus bidwilli* Cox, lest it should clash with that other *Papuina* described by Pfeiffer as *Helix bidwilli*. I therefore propose that in allusion to its peculiar habits, it be henceforth called *Papuina folicola*.

Between these leaf-dwelling *Papuina* of Queensland and *Bulimus mageni* Gassies, of New Caledonia, I note a strong resemblance in color, form and sculpture, but especially in their translucent color bands. Until further research settles authoritively the position of this species I would provisionally class it with the foregoing.

SAN PEDRO AS A COLLECTING GROUND.

San Pedro, California, is remarkable for the number and variety of recent and fossil mollusks.

New forms and an unusual abundance of known species are constantly being found.

This is due in a great measure to the extension of the Government breakwater, which has made changes in the sea currents near the

shore, and caused the tide water of the harbor to scour out the channel and drift large quantities of sand over the shallows.

By this means new homes are made for wanderers, and old inhabitants are washed from their moorings and swept by the tide within reach of eager Conchologists.

It is surprising, however, how seldom the year's abundance of any species repeat themselves.

At one time *Nassa fossata* Gld., at another *Periploma discus* Stearns; at another *Lima orientalis* Cpr.; or *Scalatella striata* Cpr., are found by the dozen, or score, or hundred in San Pedro Bay or vicinity, and then for years after only a few are found at a time.

The sea conditions are unsettled. This keeps local collectors alert.

Within a few months I have found a specimen of *Tritonium gibbosum* which is new to California, and one of *Cylichna cylindracea* var. *attonsa* Cpr., which is new to San Pedro. Both shells are beach worn.

This summer I spent July at San Pedro and added a number of new specimens to my collection besides learning many interesting facts about habits and habitat of molluscs.

A student only gets a half knowledge who cannot collect specimens and study the living animals in their native haunts.

July seems to be a favorite month for many species to lay their eggs.

Mitra maura (Idæ), fastens her capsules to the underside of stones; the Naticidæ place their "sand collars" in the damp sand; *Bulla nebulosa* Gld. coils up her yellow strings on the grassy flats, and *Haminea virescens* Sby. chooses the same place and time, but has a different shade of yellow for her egg-strings.

I was much interested in the eggs of *Actæon* (*Rictaxis*) *puncto-celatus* Cpr.

This mollusk has been rare, and I am inclined to think it only comes inshore in numbers during the breeding season and after that burrows in sand in deeper water for the rest of the year. In July we found them by the hundred.

The eggs are laid in a white string three or four inches long that coils so as to form a loose spiral.

The spirals are anchored, by some means, so firmly that the washing of rough surf does not sweep them away.

They so closely resemble the spiral pattern on the adult shell that the collector, looking down through the water, not unfrequently stoops to pick up what he thinks is one of these little gasteropods and finds a string of eggs in his fingers.

I visited Portuguese Bend and learned that *Purpura emarginata* Desh., which I found in quantity more than a year ago, is a resident or a comer and a goer, for more than a dozen were collected this summer. Its habitat is limited to a small mussel bed.

Other localities so much like this mussel bed, that one would consider them suitable dwelling places do not boast of a single *Purpura*; so that something besides collectors must disturb this usually common species.

I collected at San Pedro an abundance of *Acmæa paleacea* Gld. on the eel grass.

These close clingers love the grass on the outside of the island that is swept by heavy swells and where the water scarcely leaves them even in very low tides.

Their more peaceful cousins *Acmæa depicta* Gld. will probably be found swaying with the grass in the stiller waters of the bay, for dead shells have been frequently found in the drift.

In the quiet bay quantities of drift material are washed up with algæ and eel grass during medium tides.

This is rich in minute forms. It consists largely of broken shells of molluscs and crustaceans, but there is a sufficient quantity of *Pedipes*, *Siphodontalium*, *Tornatina*, *Cæcum*, *Truncatella*, *Mitromorpha*, *Turbonilla*, *Cerithiopsis*, *Triforis*, *Diala*, *Muniola* and other wee bodies to amply repay any one for carrying away a few pounds of the drift to be dried and sorted at home.

The sifting and the sorting with a microscope takes so much time and patience, that the new and rare species hidden in my bags of drift must wait a more convenient season.

The yearly extension of sand flats at San Pedro, must make happy all sand loving species such as *Bulla*, *Sigaretus*, *Natica*, *Olivella* and scores of bivalves.

Besides these sandy stretches there are mud flats, rocky points, brackish water, fresh water, smooth or rocky beaches enough to make San Pedro an ideal collecting ground.

Although nearly all the localities are easy of access for the Conchologist, or the collector who "makes shell flowers," there are changes enough taking place to insure a good supply of shells.

A storm that stirs up the depths makes a grand holiday, but nearly every visit, in storm or calm, repays the student by some glimpse of the life history of some soft—hard dweller of the sea.

Sarah P. Monks.

PRELIMINARY NOTES ON TASMANIAN LAND SHELLS.

BY HENRY SUTER.

Since I became acquainted with the New Zealand and Tasmanian land and fresh water molluscan fauna, some four to five years ago. I came to the conclusion that both are very nearly related, though this opinion is not shared by Conchologists generally. On several occasions I expressed my views, especially when describing *Charopa subantialla* and *Ch. mutabilis*. It is well known that no attempt has been made to classify the Tasmanian land shells; all the Helicidæ have been simply placed in that "olla potida" genus *Helix*, Mr. Charles Hedley of Sydney, was first to publish structural details of the animals of some Tasmanian land shells (Proc. Linn. Soc., N. S. W. (2) VI, p. 19). Descriptions and very good figures of the animals and the dentition were there given of *Bulimus dufresni*, *B. tasmanicus*, *Anoglypta launcestonensis*, *Rhytida lampra*, *Helicarion verreauxi* and *Cystopelta petterdi*.

I have not been successful in procuring land shells with their animals from Tasmania, and I therefore decided to sacrifice part of my collection. There were some specimens with the animal dried in them and these I used for preparing the jaws and radulae. I have just finished the microscopic slides and have not yet had time to study them carefully. However, I ascertained a few facts, which, I feel sure, may prove of great interest to Conchologists, though my communication is only provisional.

Conchologists of course know that the genera *Endodonta*, *Charopa* and *Rhytida* are common to New Zealand and Tasmania. The new facts I ascertained of genera or sections of genera found in New Zealand as well as in Tasmania, and part of Australia in some cases, are the following :

Genus **Gerontia**.

Section Flammulina, thought to be confined to New Zealand only. I think that *H. Jungermannie* Petterd, belongs to this section, though I am not yet quite positive.

Section *Thalassohelix*, hitherto not recorded from beyond New Zealand. There is no doubt that *H. fordei* Brazier, (= *petterdi* Cox = *positura* Cox) must be classed under this section, and very likely also *H. austrinus* Cox, *H. allporti* Cox, *H. helice* Cox, *H. medianus* Cox, *H. mixta* Cox, *H. tabescens* Cox, *H. tranquilla* Cox, *H. trajectory* Cox, which are said to be varieties of *H. fordei*. This species is found also in Australia.

Genus **Laoma.**

Section *Phrixgnathus*, a genus which was thought to be peculiar to New Zealand "par excellence." Now I am quite sure that the following Tasmanian mollusks belong to this section:

H. cæsus Cox (and var. *occultus* Cox?) *H. henryana* Petterd, and *H. pictilis* Tate; the latter being found also in Australia.

Genus **Rhenea.**¹

This genus of which two species are known from New Zealand, is in Tasmania represented by *Hyalina nelsonensis* Brazier (= *fulgetrum* Cox, and very likely *H. dyeri* Petterd, though the dentition of the latter is unknown to me).

I am confident that on examining my slides there will be some other sections of *Gerontia* to be placed on record in my next communication on Tasmanian snails.

In future we may no doubt be able to distinguish in New Zealand and Tasmania two different immigrations of land mollusca, one having spread from north southward, and another, the *antarctic*, migrating from south to north.

Springfield Road, Christ Church, New Zealand, Sept. 6, 1893.

SOME (RESPONSIVE) REMARKS RELATIVE TO *CYPRÆA GREGGRI*
FORD.

BY JOHN FORD.

In the note on *Cypræa Greggri* Ford, published in the October number of the NAUTILUS, the writer, Mr. Edgar A. Smith, of London, rather forcibly remarks that "the new French School of Conchologists would probably agree with Mr. Ford in considering the shell in question specifically distinct from *C. cruenta*," but, "he

¹A genus of carnivorous, jawless snails allied to *Rhytida* and *Paryphanta*, formerly called *Elæa* Hutt. (preoc.)—Ed.

was glad to say that in England (and, he hoped, in America also), the ideas were not so far advanced (?).” In support of the last proposition, he says: “Although examples of this shell have been in the National (British) collection for more than fifty years, no British author has ever suggested that they belonged to a distinct species.” This statement is apparently correct, but he might have added quite as truly, that nearly all of these years were required for “British authors” to find them worthy even of varietal distinction.

In view of this “state of things,” it is not at all surprising that Mr. Smith should consider it a “bit of presumption” for an American student, having less than one year’s knowledge of the shells, to attempt to lift them above the plane of varietal controversy.

It matters not that this student has examined hundreds of specimens, all showing the same distinctive specific characters. His “ideas” do not agree with English formulas, therefore they must necessarily be too far advanced.

Nevertheless, the new species, *C. Gregori*, has doubtless come to stay, since it has been endorsed already by quite a number of eminent (American) Conchologists, whose opinions, were it necessary to mention names, would at once be accepted as weighty. In regard to Mr. Smith’s admission, “that *examples* are pretty easily separated from the *typical* form of *cruenta*,” it may be said that I have seen no specimens whatever that could not be separated on sight from *any* form of *C. cruenta*. Just here, it may also be said, that I do not hesitate to claim (as in my former article) priority both for the name and description of the shell; and this claim is made in face of the fact that British authors, as a rule, command my highest respect and esteem. But while according this, I do not expect them to throttle, without ample reason, even the humblest seeker after knowledge.

It is only just to myself to say that not until my first description was in type, did I learn that Mr. Melvill had ever referred to the shells, nor, so far as I could ascertain, was this reference known to any of my Conchological friends. Indeed, the gentleman who finally gave me the information has, from the first, regarded them as *C. caurica* var. As Mr. Smith suggests, I was then, and still am, under the impression that Mr. Melvill’s sentences left the reader in a state of uncertainty as to whether he considered the shells a

variety of *cruenta* or of *caurica*. That his purpose is more plainly shown in the list of figures given is apparent, but as the volume examined by me was an uncut one, this list was not at the time discovered.

Since many readers of the NAUTILUS may lack the opportunity of seeing Mr. Melvill's statement, and judging for themselves as to its clearness, it is given here *verbatim*, as follows: "*C. cruenta* (Gmel.) is very nearly allied to the preceding," [i. e. *caurica*] "and the variety *coloba* (fig. 7), so-called from the stunted appearance, is also figured in Sowb. Thes. f. 190, as *caurica* var.; it would appear nearer this species: the base is always brighter coloured, and teeth interstices bright red. I possess stunted *caurica* with which this var. cannot be mistaken."

Now if any reader of the NAUTILUS can show by these sentences to which of the two species Mr. Melvill assigned the variety, it will be a pleasure for me to acknowledge my error in questioning his meaning. But whether the language refers to one variety or another is really of very little moment at this time, since it can in no way affect the present status of the shells. Be it agreeable to Mr. Smith or not, the fact remains that Mr. Melvill's so-called description is simply meaningless and void, embracing as it does, just three words, viz, "base brighter colored," meaning, of course, brighter colored than the type shells he had in mind.

But how brighter or how colored? They are certainly *not brighter* than both *cruenta* and *caurica* usually are; and there is not a hint as to whether the *color* is green, blue, yellow or any one of a dozen hues, yet with such a description at hand, the student was expected to distinguish the shells from all others. It is true that there are other words besides the three quoted, viz, "teeth interstices bright red." Unfortunately, however, the same sentence is used in the description of the type *C. cruenta*, (to which species Mr. Smith assures us the variety *coloba* relates) and is therefore entirely worthless as a distinctive *varietal* character.

For these reasons, I claim that the name *coloba* is absolutely devoid of collateral support, since nothing can be plainer than the fact that without an accompanying description intelligible enough for comprehension, the suggested name or title of a shell is of no scientific value whatever.

But then, as Mr. Smith intimates, there is the figure! and surely that counts for *something*.

Perhaps it does. But not for anything of special importance in this connection, for Kiener, many years before, gave us a *pair* of figures quite as good; not to mention that made by Sowerby some years later.

It should be understood that these references are not made in defence of the present specific standing of the shells, but mainly in deference to those readers who may have missed seeing my former articles relating to them. The species, i. e., *C. Gregori*, is doubtless already sufficiently fortified to prevent successful assaults from any quarter.

In conclusion, it might be well to add, that Mr. Smith's rather emphatic "reminder" of my lack of courtesy, is wholly gratuitous, and therefore does not call for comment.

In the interest of peace, however, it is accepted "with thanks," and filed for future courteous consideration.

Philadelphia, October, 1893.

THE SHEEPSCOTE RIVER.

BY REV. HENRY W. WINKLEY.

The fauna of the eastern coast of New England, aside from the species which characterize it as a whole, has a number of small areas where the oyster, quahog and other southern forms exist. The most conspicuous of these areas is Northumberland Straits, where the oyster is abundant enough to be of commercial value. Other points, where the Virginian fauna occurs, are a few sheltered spots on the east coast of Nova Scotia, in Minas Basin, Casco Bay and Massachusetts Bay, with a few outliers of less importance.

These spots on the coast are widely separated from each other, and have in the near neighborhood animals which are adapted to the colder waters. Some few years ago the present writer published a list of thirty species found in Northumberland Straits.¹ The present summer was spent in Wiscasset, Maine; this and a visit to that place three years ago enabled me to dredge in many places in the Sheepscote River.

Wiscasset is ten or twelve miles from the sea and the river is practically a salt water bay or fjord. Its depth is ten fathoms in

¹ Bulletin VII—Nat. Hist. Soc. of New Brunswick.

places, and at no point is it shallow. The width, on the other hand, is but a few hundred yards except at Wiscasset, where it is three quarters of a mile wide. The river is famous for its scallops, *Pecten magellanicus* Gmelin, these occur for the most part in the lower part of the river.

It was frequently reported to me that oysters were to be found "up river" four or five miles. I am sorry to say I had but one day "up river;" that trip, however, revealed the fact that a very narrow spot known as the Falls, separated an upper basin from the main part of the river. Here in the warmer waters oysters do occur, but very few and far between. With the oysters I found a few of the old companions noticed in Northumberland Straits, and abounding south of Cape Cod.

As a whole this river is rich in specimens, and the cold and warm water species are by no means distant neighbors. Some forms are dwarfed, some like *Bullinella alba*, are colored probably by iron to a darker shade than the normal. I believe that more species may be added to the list by a more careful search above the place dredged. I give the list of those found by me in the area extending four or five miles each way from Wiscasset.

<i>Mya arenaria</i> Linn.	<i>Pecten magellanicus</i> Gmelin.
<i>Pandora gouldiana</i> Dall.	<i>Ostrea virginiana</i> Gmel.
<i>Lyonsia hyalina</i> Conrad.	<i>Anomia simplex</i> Orbigny?
<i>Saxicava rugosa</i> Lam.	" <i>aculeata</i> Gmel.
<i>Macoma baltica</i> var. <i>fusca</i> Say.	<i>Diaphana debilis</i> Gld.
<i>Cryptodon gouldii</i> Stimp.	<i>Utriculus gouldii</i> Stimp.
<i>Astarte undata</i> Gld.	<i>Bullinella alba</i> Brown.
<i>Gemma gemma</i> var. <i>totteni</i> Stm.	<i>Chiton marmoreus</i> O. Fab.
<i>Cardium pinnulatum</i> Conrad.	<i>Chiton albus</i> Mont.
<i>Venericardia borealis</i> Conrad.	<i>Acmæa testudinalis</i> Mull.
<i>Nucula proxima</i> Say.	<i>Puncturella noachina</i> Linn.
<i>Nucula dolphnodonta</i> Migh.	<i>Skenea planorbis</i> Fabr.
<i>Yoldia sapotilla</i> Gld.	<i>Cingula minuta</i> Totten.
<i>Mytilus edulis</i> Linn.	<i>Onoba aculeus</i> Gld.
<i>Modiola modiolus</i> Linn.	<i>Lacuna vineta</i> Mont.
<i>Modiola plicatula</i> Lam.	<i>Litorina tenebrosa</i> Mont.
<i>Modiolaria nigra</i> Gray.	" <i>litorea</i> Linn.
" <i>discors</i> Linn.	" <i>palliata</i> Say.
<i>Crenella glandula</i> Stimp.	<i>Odontostomia bisuturalis</i> Say.
	<i>Odontostomia trifida</i> Totten.

Velutina haliotoidea Stimp.	Purpura lapillus Linn.
“ zonata Gld.	Ilyanassa obsoleta Say.
Polynices heros Say.	Nassa trivittata Say.
“ triseriata Say.	Buccinum undatum Linn.
Bela incisula Verr.	Chrysodomus stimpsoni Mörch.
“ harpularia Couth.	Chrysodomus pygmæus Gld.
“ cancellata Migh. & Ad.	Trichotropis borealis Sby.
“ decussata Couth.	

[COMMUNICATED.]

AMERICAN ASSOCIATION OF CONCHOLOGISTS.

The President of the Association regrets that he has been compelled through stress of business engagements and other matters, to temporarily suspend his correspondence upon Conchological matters, but would be glad now to hear from any of the members, especially those whose letters have not been attended to promptly.

The Association has recently not been so active as formerly, but everything looks fair for a go-ahead, prosperous season. Nearly 200 members are enrolled in the Association, and any proposals of new members will be acted upon promptly by the officers. Such proposals should be made to the Secretary, Mr. Chas. W. Johnson, Wagner Institute, Philadelphia.

Members desiring to forward fine specimens of shells to the "American Collection," will kindly communicate with the President, Mr. John H. Campbell, 1009 Walnut Street, Philadelphia, sending him lists of such species as they wish to forward. Due acknowledgment of shells received will be made in the pages of the "NAUTILUS."

The most recent addition to the collection has been a fine series of fossil species from the Miocene and Pliocene of Maryland, Virginia, North Carolina and Florida by Mr. Joseph Willcox of Philadelphia. The collection, already, is one of the finest "special collections" in America, and bids fair to surpass all others. Each species is carefully examined, named, mounted and placed in the cases set apart by the Academy of Natural Sciences and the collection as a whole, is kept separate from the general collection of that

institution. The *name* and *address* of each donor with date of reception, are neatly written on the cards, upon which the shells are mounted and the officers of the Association give the collection their personal supervision.

Changes of address of members should be promptly noted to the Secretary.

NOTES AND NOTICES.

Mr. F. H. Lattin, whose Natural History establishment at Albion, N. Y., has long been well known to many of us, has recently founded a "branch" in Chicago, where we lately had the pleasure of looking through his large mass of material. Mr. Lattin has now a considerable stock of shells in addition to his departments of ornithology and oology, and it is with pleasure that we announce this first commercial enterprise in the Conchological line in the West. F. H. Lattin & Co. now occupy a handsome and well filled building at 3571 Cottage Grove Avenue.

A VIGOROUS EDITORIAL from the pen of Mr. J. Ritchie, Jr., dealing with the recent postal ruling against natural history specimens, appeared in the *Commonwealth* (Boston), Saturday, September 23.

VARIATIONS OF *STROBILOPS HUBBARDI*.—In looking over our collection of this species I find that over half of them have three teeth, but about a third have four, and I found one with five. We have collected them from several different localities, but all in Florida, and nearly all in this county, some near the coast and some 16 to 18 miles inland.—*G. W. Webster, Lake Helen, Florida.*

A SYNONYM OF *LEPTOTHYRA*.—It seems to have escaped notice hitherto that Gabb's genus *Petropoma* (*Journ. Acad. Nat. Sci., Phila.* viii, p. 281) is founded upon a species exhibiting all the essential features of *Leptothyra*. The operculum and shell are very like in structure to the granulose species of the central Pacific. Gabb, in his description, mistakes the inside for the outside of the operculum. Being later in date than *Leptothyra*, the name *Petropoma* becomes a synonym.—*H. A. P.*

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No. 8

LAND AND FRESH WATER SHELLS IN THE ROCKY MOUNTAINS.

BY GEO. W. TAYLOR, VICTORIA, B. C.

In the October NAUTILUS there is a short paper by my friend Mr. Hanham upon the shells found by himself during a trip in that rather out of the way Canadian locality, the Gaspé region.

It may be interesting to have a record of a small collection made by me a few weeks ago in another little-known locality at the opposite end of the Dominion viz.: Laggan near the summit of the Rocky Mountains.

I had received earlier in the year from Mr. T. R. Bean of Laggan, a nice little collection of shells which included specimens of what Dr. Sterki considers to be the true *Pupa hoppii* of Möller, and this tempted me to stay over for a couple of days when passing through Laggan last September on my way to Toronto.

Dr. Bean most kindly showed me all the best localities known to him, and our united exertions were rewarded by the discovery of several species that he had not previously recognized, including one which I believe had not before been found in Canada.

In the rivers, the Bow and the Pipestone, we could not find any shells at all, the waters being cold and the stream rapid in each case, but in all the little creeks and swamps *Limnaea palustris* abounded and *Planorbis parvus* occurred in less numbers. In a small lake not more than a mile from Laggan we found, in addition to the

species above named, 3 others—*Planorbis trivolvis* Say, common, *Pisidium abditum* Hald., rare, and a *Valvata*, which I suppose to be *virens* Tryon, 6 specimens only.

No *Physa* of any kind were observed, nor has Dr. Bean as yet found any species of *Unio*, *Anodonta*, or *Sphærium*.

The land shells enumerated below were all found under logs or under pieces of board in the neighborhood of the settlement and along the banks of the rivers. *Vitrina limpida* Gould, *Hyalina arborea* Say, *Hyalina radiatula* Alder, *Conulus julvus* Drap., *Patula striatella* Anth., *Vallonia costata* Müll. (form *gracilicosta* Reinh., teste Sterki), *Ferussacia subcylindrica* Linn., *Succinea avara* Say, and a species of *Vertigo* closely resembling *gouldii*, were all common.

Pupa hoppii Möller, was not very common in the spots I searched and I only secured 8 specimens. Still less frequent was *Pupa alticola* Ingersoll, which I had here the pleasure of finding for the first time.

Dr. Bean has in his collection, besides the above, specimens of *Pupa pentodon* Say, which he took a few miles to the west of Laggan; and a second species of *Succinea* perhaps *S. ovalis* Gould. Lastly some slugs which were probably *Limax hyperboreus* West., were observed by us but not collected.

The altitude of Laggan is about 5,200 feet above sea level and the locality is interesting, as being nearly at the summit of the Rocky Mountain range, which seems to form, in Canada, a hard and fast line of demarcation between the eastern and western species of Mollusca.

HÆCKEL'S PLANKTONIC STUDIES.

All interested in the life of the open and deep sea, the so-called pelagic or Plankton fauna, will be interested to read the translation of Prof. E. Hæckel's paper of 1890, which is printed in the Report of the U. S. Fish Commission for 1889-91, pp. 565-641.

Some of the German polemics are omitted, though a sufficient amount remains to spice the article in a lively manner. There is much reason to believe that Hæckel, who has had no experience in deep sea work, has overestimated the evidence in favor of zonary distribution of life in the deep sea. Certainly the observations of

Agassiz and Tanner are superior by reason of their better apparatus to any heretofore made, and they seem to show that with the exception of a superficial zone of a few hundred fathoms and a thin zone immediately over the bottom, the animal kingdom is represented in the intervening region by the dead bodies of sinking animals only, and has no peculiar fauna of its own and but little life. There is no obvious reason why this must be so, but the most carefully checked observations yet made indicate that it is so. Apart from this one point, the paper of Hæckel gives a most interesting, accurate and vivid idea of the pelagic life of the sea, and one which every one may read with profit. The vast experience in surface and coast collecting which the Jena Professor has had, enables him to speak from experience in this direction, and the material obtained by others, on the Challenger and elsewhere, which he has worked up, has given him great familiarity with the Plankton fauna.

W. H. D.

CONTRIBUTIONS TOWARD A REVISION OF THE TASMANIAN LAND
MOLLUSCA.

BY H. SUTER.

Since I wrote the "Preliminary Notes on Tasmanian Land Shells," I have sacrificed many more specimens of my collection for the study of the dentition, and, as I have just finished the work, I wish to give here the result of my investigations.

Before giving the results of my study, it will be necessary to say a few words on the classification of the New Zealand Helicidæ. Mr. H. A. Pilsbry proposed (NAUTILUS, VI, 1892, No. 5, pp. 54-57) a new classification of N. Z. Helicidæ, the main feature of it being the forming of one genus, *Gerontia*, of these former genera constituting my family *Phenacohelicidæ*. Later on he published (Proc. Acad. Nat. Sci. Philada., 1892, pp. 387, etc.) a "Preliminary Outline of a New Classification of the Helices," in which he included under the one genus *Endodonta*, the following groups: *Endodonta* s. str., *Ptychodon* (= *Maoriana*), *Charopa*, and his genus *Gerontia*. I can not agree with this latter classification, as the author was under the impression that *Endodonta*, *Charopa*, etc., possess a muc-

ous tail gland, which is not the case. Moreover, the jaw in *Endodonta* and *Charopa* is only striated, whilst stegognath in *Gerontia*, and the radula in the latter is more or less distinctly pseudozonitoid. I am of opinion that the separation of *Gerontia* from *Endodonta* is fully justified; the patuloid shells being included in *Endodonta*, whilst the more zonitoid forms are embraced in *Gerontia*.

Mr. Charles Hedley and the writer substituted von Martens' *Flammulina* for *Amphidoxa* of N. Z. authors, and as the genus of von Martens dates from 1873, it must be used as the generic name instead of *Gerontia* (1883).

The classification of the New Zealand Helicidæ I propose, following chiefly Mr. H. A. Pilsbry, is the following:

Group HAPLOGONA Pilsbry.

1. Genus *Flammulina* (von Martens) Suter.

Sections: (1) *Flammulina* v. Mart. s. str.; (2) *Gerontia* Hutt.; (3) *Phacussa* Hutt.; (4) *Therasia* Hutt.; (5) *Pyrrha* Hutt.; (6) *Phenacohelix* Sut.; (7) *Allodiscus* Pils.; (8) *Suteria* Pils.; (9) *Thalassohelix* Pils.

2. Genus *Endodonta* (Albers) Pilsbry.

Sections: (1) *Endodonta* Albers, s. str.; subsect. *Ptychodon* Ancey; (2) *Charopa* Albers; subsections, a. *Tesseraria* Bottger; b. *Aerschrodomus* Pils.

Group POLYPLACOGNATHIA Pilsbry.

Genus *Luoma* (Gray) Pilsbry.

Sections: (1) *Luoma* Gray, s. str.; (2) *Phrixgnathus* Hutton.

Giving now the classification of the Tasmanian land shells examined, I wish to point out that it is based on the dentition as well as on the shell characters; their number is thirty-two.

Genus *Flammulina* (von Mart.) Suter.

Sect. *Flammulina* von Martens, s. str.

- (1) *F. juergermanniae* Petterd. (3) *F. luckmani* Brazier.
 (2) *F. sitiens* Cox.

Sect. *Gerontia* Hutton.

- | | |
|-------------------------------------|------------------------------------|
| (1) <i>G. albanensis</i> Cox. | (7) <i>G. tasmaniae</i> Cox. |
| (2) <i>G. stanleyensis</i> Petterd. | (8) <i>G. subrugosa</i> Brazier. |
| (3) <i>G. legrandi</i> Cox. | (9) <i>G. mathiunæ</i> Petterd. |
| (4) <i>G. marchiannæ</i> Cox. | (10) <i>G. macdonaldi</i> Cox. |
| (5) <i>G. diemenensis</i> Cox. | (11) <i>G. bassi</i> Brazier. |
| (6) <i>G. gadensis</i> Cox. | (12) <i>G. tamarensis</i> Petterd. |

Sect. *Phacussa* Hutton.

- | | |
|--------------------------------|-------------------------------|
| (1) <i>Ph. savesi</i> Petterd. | (3) <i>Ph. Hamiltoni</i> Cox. |
| (2) <i>Ph. stephensi</i> Cox. | |

Sect. *Allodiscus* Pilsbry.

- (1) *A. limula* Cox.

Sect. *Thalassohelix* Pilsbry.

- (1) *Th. fordeii* Brazier.

Genus *Endodonta* (Albers) Pilsbry.Sect. *Charopa* Albers.

- (1) *Ch. antialba* Beddome.

Genus *Laoma* (Gray) Pilsbry.Sect. *Phrixgnathus* Hutton.

- | | |
|---------------------------------------|----------------------------------|
| (1) <i>Ph. weldii</i> Tenison-Wood. | (5) <i>Ph. pictilis</i> Tate. |
| (2) <i>Ph. caesus</i> Cox. | (6) <i>Ph. pipænsis</i> Petterd. |
| (3) <i>Ph. henryana</i> Petterd. | (7) <i>Ph. halli</i> Cox. |
| (4) <i>Ph. furneauxensis</i> Petterd. | (8) <i>Ph. hobarti</i> Cox. |

Genus *Rhytida* Albers.

- | | |
|-----------------------------------|-------------------------|
| (1) <i>R. sinclairi</i> Pfeiffer. | (2) <i>R. ruga</i> Cox. |
|-----------------------------------|-------------------------|

Genus *Rhenea* Hutton.

- (1) *R. nelsonensis* Brazier.

It is a most astonishing fact how close the relation between the Tasmanian and New Zealand molluscan fauna really is, more so than I ever expected it to be. Of nine sections of the genus *Flam-*

mulina occurring in New Zealand, five are represented in Tasmania. Most remarkable is the preponderance of *Gerontia*, a section represented in New Zealand by two species only, and of *Phrixgnathus*, which is also well represented in New Zealand. A very striking feature is the almost total absence of *Endodonta*, there being one species of *Endodonta* s. str. (*E. dispar* Braz.) and one of *Charopa* known from Tasmania. *Rhytida* is more abundant in Tasmania, whilst *Rhenea* is represented by two species in each country.

There can be no doubt about the great antiquity of these forms, as they must date at least from the Cretaceous period.

New Zealand. Christchurch, October 4, 1893.

IN MEMORIAM—ROBERT WALTON.

■■■■■

It is with sad hearts that we record the death of our young friend Robert Walton. While out collecting on Saturday, November 11, along the steep bank at West Conshohocken, he slipped and fell as a freight train was passing below, receiving a terrible gash on the head and having one of his legs crushed beneath the wheels, from which he died at 8 p. m., the accident occurring about noon. He was born in Halifax, England, July 17, 1875, and came to this country in the summer of 1889. He was a collector from boyhood, studying nature with that enthusiasm which only a born naturalist can. He was not content with a collection of shells alone; his was a collection of the mollusca. He studied their anatomy, working out their jaws and dentition, the darts from the *Zonites*, and the testaceous shell-plates, from the *Limaces*. He was a close observer, and by his zealous collecting he found many forms not before recorded from this section. Among his rarities were reversed specimens of *Zonites cellarius* and *Zonites ligerus*, and I remember his saying, when we met only a few days before his sad accident, that he found the reversed *Zonites cellarius* at West Conshohocken. He was to be appointed as a Jessup student at the Academy of Natural Sciences, and was looking forward, as only a young heart can, to the day when he would be studying and working there among the objects he so dearly loved. Mr. Pilsbry was looking forward with a great deal of pleasure to the time when he would have such a valuable

assistant. We shall miss him with his bright and happy face and his pocket full of shells, and all tender our heartfelt sympathy to his parents and brothers.

The appended lines are by his friend, Mr. John Ford.

C. W. J.

Toll, toll the bell! his young heart beats no more;
 His eyes are dimmed, his life's short cycle run.
 No more may Science yield him, as before,
 The charming favors he so fairly won.

Alas, that in the East his sun should set,
 And 'neath the shadows hide the hopes he knew!
 Bright hopes, recalled to mind with keen regret
 By all who felt his power to will and do.

Though now in sorrow we must say "Farewell!"
 Sweet memories of him our hearts will hold;
 While through the years that Time for us may tell
 His friendship shall be cherished as of old.

A NEW HAND-BOOK OF THE HELICES.¹

This new work, of which the first one of the four parts has now appeared, aims to present a complete introduction, key and index to the genera, subgenera and species, of the Helices of the world. Each group, whether generic, subgeneric or sectional, is defined, and its species enumerated; the type and usually a number of prominent species of each is figured, and the anatomy is described and figured.

The first genus included in the "part" just issued, is *Trochomorpha*, an important Asiatic and Polynesian group, many specimens of which are in most collections. Although it has generally been associated with the Helicidæ, *Trochomorpha* really belongs to the Zonitidæ; and it is admitted to this work only because the species have been generally known as "*Helix*."

¹ By H. A. Pilsbry; being Vol. IX of the Manual of Conchology. Published by the Conchological Section of the Academy of Natural Sciences of Philadelphia. 8 vo. Issued in parts, price \$3.00 per part, plain edition; or \$5.00 per part colored edition. Any volume complete in itself, and sold separately.

The following genera belong to the Helicoid group *Haplogona*.² They have a shell with simple, non-reflexed lip, more or less similar to our "*Patula*" *alternata*, etc. The genital system lacks all appendages. *The foot has on each side a border above the margin bounded by a groove* (easily seen in *alternata*, *solitaria*, etc.). This last character is shared with the family *Zonitidae*. The jaw exhibits considerable variety in the several genera. It is either (1) composed of separate squarish plates, overlapping or imbricating, and only connected by a common membrane (*Punctum*, *Laoma*), or (2) the plates are soldered together, the outer edge of each being free (*Flammulina*, *Charopa*), or (3) the plates are completely soldered together, their edges appearing only as vertical striae (*Pyramidula*—"*Patula*"). The first type has been called *Goniognathous*, but falsely, as it has no near relationship to the jaw of *Orthalius*, etc.; the second type has been called *Stegognathous* or "plaited"; and the third *Mulucognathous* or "striated." The three are really only stages of development, and between the last two all intermediate forms occur.

The principal peculiarity of the generative system, besides its simplicity, is the very low insertion of the spermatheca duct. The teeth show no very characteristic features, except that in many cases the inner cusp is retained on the laterals, as in the *Pupidae*.

The genera of *Haplogona* may be briefly tabulated thus:

- | | |
|---|---------------------------------|
| a. Jaw composed of separate plates, | <i>Punctum</i> , <i>Laoma</i> . |
| aa. Plates of jaw more or less soldered together, | |
| b. Tail having a mucous pore, | <i>Flammulina</i> . |
| bb. No mucous pore | |
| c. Australo-Polynesian forms, | <i>Endodonta</i> . |
| cc. S. American forms, | <i>Amphidoxa</i> . |
| ccc. S. African forms, | <i>Phasis</i> . |
| cccc. North temperate forms, | <i>Pyramidula</i> . |

The five last named genera include a great number of subgenera and "sections," all of which are defined and fully illustrated both as to shells and anatomy, with lists of the species of each.

The group *Haplogona* as a whole may be regarded as an ancient and unspecialized type, formerly world wide in distribution. At present a vast majority of the species retain their footing only on the southern extremes of the three great land masses of the globe, and

² The genus *Polygyra*, formerly included in the *Haplogona*, does not belong there. It has a solid, ribbed jaw and no grooves above the foot margin.

on the Pacific Islands, where they are free from the competition of highly organized types of *Helix*, which have driven them from the Tropics and North Temperate regions. In the north the species are comparatively few in numbers, and live mainly in the colder latitudes, where more recent types of *Helix* do not flourish, or in some cases they have become reduced in size as in the sections *Helicodiscus*, *Pyramidula* s. str., *Planogyra*, *Patulastra*, etc., acquiring the habits of the *Pupæ* with which they compete, and in many cases the *Pupæ* type of dentition also.

The name *Pyramidula* Fitz. 1833, has been preferred to that of *Patula* Held. 1837, for the Eur-American group to which *H. rotundata* and *alternata* belong, on the ground of prior publication, and because two other names for the group were proposed in 1837, either of which has as much claim to be accepted as *Patula*. There are moreover, still two more names antedating *Patula*, besides the earliest name, *Pyramidula*. This change is therefore inevitable.

The figures were mostly drawn by the author. They illustrate prominent typical species of all the subgenera and sections; so that it is comparatively easy for a person unacquainted with the intricacies of *Helix* classification to refer any specimen to its appropriate group, whether it be a living or fossil form.

NOTES AND NEWS.

IN a recent letter from Miss Ida M. Shepard, she says: "We have formed what we call the LOS ANGELES CONCHOLOGICAL CLUB, for the study of our local shells, and hope to take up the west coast species generally later. We have eleven members, and meet once or twice a month." We heartily endorse this new organization for the study of the mollusca, and wish the club a successful future.—C. W. J.

SPECIES DETERMINED.—FROM M. M. Schepman, Rhon near Rotterdam, Holland, 1. *Sistrum nodulosum* C. B. Ads.; 2. *Bittium* sp.; 3. *Carditamera gracilis* Shuttl.; 4, 5. *Acmaea cubensis* Reeve; 6. *Acmaea leucopleura* Gmel.; 7. *Donax fossor* Say; 8. *Heterodonax bimaculatus*, L.; 9. *Litiopa bombyx* Kien.; 10, 11. *Mytilus crustus* Linn.—C. W. J.

VALLONIA AMERICANA Ancey *ms.*—The description of this has been published by Dr. Sterki in Proc. Acad. Nat. Sci. Phila., 1893, p. 266. The locality of Ancey's types, however, is not stated, so it seems desirable to record that they were from Davenport, Iowa, collected by Professor D. S. Sheldon. *V. parvula*, it will be noticed, is recorded by Sterki from the same locality. It may be added that I saw Ancey's MS. description in May, 1890.—*T. D. A. Cockerell.*

STROBILA HUBBARDI.—Noting your comments on *S. labyrinthica* and vars., suggested to me the idea of comparing them with *S. hubbardi*.

There is evidently a close affinity between the two species, and the same tendency to variation in the number of teeth. I find in the *Hubbardi* three constant teeth, but in nearly one-half of our collection of several hundred there is an extra tooth between the second and third tooth counting from the umbilicus, and in some cases a fifth tooth beyond the third. The variety *S. strebeli* found here in our locality is also an approach to *S. hubbardi* in its depressed spire and dark color. They are also found in similar stations often together under the bark of old logs or on palmetto trees, hidden in dirt or old rubbish. *Hubbardi* is a very shy snail, and I have spent many days looking for them. At first I thought three or four a good day's find.—*G. W. Webster.*

VITRINA LIMPIDA IN PENNSYLVANIA.—In my note on *Vitrina limpida* Gld. in Pennsylvania which you published in the August NAUTILUS, I promised to report the results of future visits to the place where the shells were found. I went down yesterday afternoon and found 24 *living shells*, and as I could only go over a very small portion of the hollow, owing to a *very heavy* growth of nettles, brambles and other noxious weeds, I think the shells must be very plenty—in fact, I do not think I “worked” over two or three square yards at the most. * * * *

In continuation of my letter of October 2: On the 8th inst. I again visited the place where I found the *Vitrina limpida* Gld., and got 38 living specimens in about one and one-half hours, and went over exactly the *same ground* as in my former visit, though this time the space worked over was less than on October 1. The colony appears to be in a very flourishing condition, although dead shells are very plenty. * * * *

Since writing you last, I have collected 208 living *Vitrina lim-pida* Gld. The last time I was out, a friend and myself collected 70 *in an hour*, and only took the *largest* specimens.

—Geo. H. Clapp, Pittsburg, Pa.

ON LAND AND FRESH WATER MOLLUSCA OF LOWER CALIFORNIA, by Dr. J. G. Cooper (Calif'a Acad. Sci. III). In this paper several very interesting species are described and figured. Among them are two species referred to *Columna*, a *Melaniella*, two *Planorbis* allied to *P. cultratus* Orb., and a sub-species of *Helicodiscus lineatus*.

THE ISAAC LEA CHAPTER of the Agassiz Association is becoming an important factor in the revival of interest in American conchology. The President is now Prof. Josiah Keep; the General Secretary Mrs. M. Burton Williamson (University, Los Angeles Co., Cal.). Interesting reports of their work are published by the Secretary in *Popular Science News* from month to month.

A valuable paper on the anatomy of *Bulimus acutus*, by Messrs. W. Moss and F. Paulden, appears in the Trans. Manchester Micros. Soc. for 1892.

THE FIRST MEETING of the Winter Session of the Perthshire (Scotland) Society of Natural Science was held at Perth, Nov. 9, Mr. Henry Coates, President, in the chair. In his opening address the President gave his impressions of the principal Scientific Museums of America, which he had visited during the Summer. The criticisms seem for the most part appreciative and just, and are of interest to us as showing how our work appears in the eyes of a cultured observer familiar with English museum methods.

Dr. WM. H. DALL has left Washington to investigate geological problems in South Georgia and Florida.

MESSRS. HENDERSON AND SIMPSON, of Washington, have departed on a winter tour in the West Indies, especially Jamaica. They will no doubt return with a rich store of conchological plunder from this paradise of mollusks.

ACANTHOCHITES EXQUISITUS Pilsbry.—The locality given in a former number of the NAUTILUS for this species is incorrect. I am informed by Dr. R. E. C. Stearns that Mr. Lockington procured his

specimens of this and other Lower California mollusks from Dr. W. J. Fisher, who fitted out a vessel at his own expense. He collected this species at Los Animas Bay.—*H. A. P.*

NEW PUBLICATIONS.

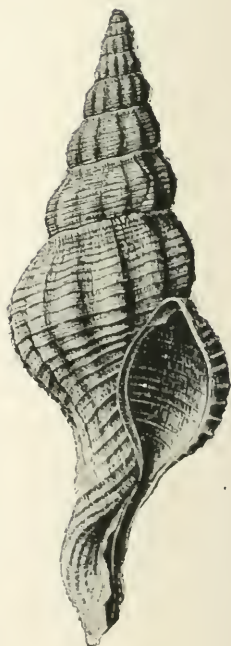
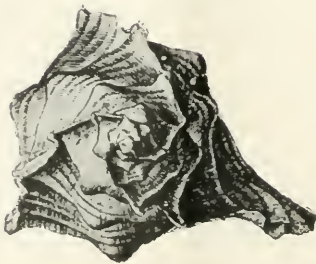
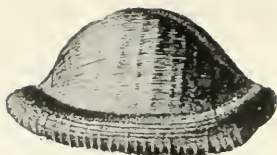
NATURAL HISTORY NOTES FROM NORTH CAROLINA, by A. G. Wetherby. From the Jour. Cincinnati Soc. Nat. Hist. An interesting article strongly criticizing the present mania for species-making with notes on the *Mesodon* of Roan Mountain and vicinity.

—*C. W. J.*

REPORT ON THE MOLLUSK-FAUNA OF THE GALAPAGOS ISLANDS, by R. E. C. Stearns, Ph. D., from the Proc. U. S. Nat. Mus., Vol. XVI. The geographical and physical characteristics of the Islands are thoroughly discussed, and with the amount of material at his command, Dr. Stearns finds that the many so-called species of *Bulimulus* are only forms of *B. nux* "for this is one of those protean forms, like, for instance, *Patula strigosa*, *cooperi*, etc., that can not be properly exemplified or understood by a few examples, nor even by a hundred specimens."—*C. W. J.*

An able article by Mr. Chas. T. Simpson, ON SOME FOSSIL UNIOS AND OTHER FRESHWATER SHELLS from the drift at Toronto, Canada, with a review of the distribution of the *Unionida* of north-eastern North America, appears in the Proc. U. S. Nat. Mus., Vol. XVI.—*C. W. J.*

OBSERVATIONS ON VALLONIA, by Dr. V. Sterki from the Proc. Acad. Nat. Sci., Phila., 1893. In this article Dr. Sterki has, with his accustomed acumen, revised the species and varieties of this genus of minute Helices, illustrating the shells, dentition and jaws of the species. The group has been much neglected heretofore; and while some Conchologists may not be prepared to accept so many species as Dr. Sterki distinguishes, it must be everywhere admitted that in pointing out the distinctive features of the forms, a very valuable service has been rendered, and a substantial addition made to conchological literature.—*H. P.*



SWORD, PHILA., ENGR

1. M. LINTOIDEA.

2. C. DALLI.

3. P. CLARKEANA.

2. C. DALLI.

4. M. BURNSII.

6. L. INDISTINCTUS.

5. C. SERRATOIDES.

4. M. BURNSII.

THE NAUTILUS.

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No. 9.

NEW TERTIARY FOSSILS FROM RED BLUFF, MISSISSIPPI.

BY T. H. ALDRICH.

The fossil-bearing stratum designated by Dr. E. W. Hilgard as the "Red Bluff group," occurs in Wayne County, Mississippi, near Red Bluff station, and is exposed on the banks of the Chickasawharg River. The fossiliferous stratum is four feet thick and contains beautifully preserved specimens imbedded in a greenish clay. Through the kindness of Prof. W. H. Dall I have had an opportunity to examine the collections of the National Museum, which were obtained here by Mr. F. Burns and others and with a series in my own cabinet have been enabled to list 135 species from this bed. Of these 26 are peculiar; 25 are found also in the beds at Jackson, Miss.; 54 occur also at Vicksburg, and 30 are also common to Jackson and Vicksburg. This bed, therefore, should be classed with the Vicksburg series. The following are described as new:

Mitra lintoidea n. sp. Pl. 4, fig. 1.

Shell fusiform, whorls nine, somewhat turrated, densely but coarsely longitudinally ribbed, a transverse impressed line behind the suture gives the upper whorls the appearance of being beaded; aperture narrow, elongate; outer lip sharp, slightly incurved, striated within, labium four plaited; canal open, rather short, curved, a number of impressed lines showing upon the lower part of body whorl. Alt. 27 mm.; diam. 8 mm.

This species differs from *Fusimitra cellulifera* Con. by its lack of

impressed revolving punctures and by being broader and much heavier.

The ribs are almost obsolete in young specimens. Type is in my collection. Examples in National Museum.

Cypræa Dalli n. sp. Pl. 4, fig. 2, 2 a.

Shell ovate, moderately elevated, surface highly polished, crossed above by a number of lines not closely set, dividing the surface into a series of facets, base ventricose; labrum very much thickened, profoundly striated but the striations do not extend up over the whole surface. Teeth on outer lip alternate. The smaller ones half the length of the others; aperture narrowed in some specimens in the centre, in others regular and strongly denticulated. Length 15 mm.; width 12 mm.; alt. 9 mm.

This shell is also found at Jackson, Miss. It resembles *C. linteæ* Con., and has been considered as that species. It is however larger, with a more thickened labrum on which the striations do not reach the body of the shell as in Conrad's species, but stop half way; the surface of this shell is very different. In *C. linteæ* the surface is completely covered with close-set, very fine lines, while this species has but few, and they are not impressed, some specimens being smooth. The type retains some color, showing the shell to be chocolate brown above with the lip white; *C. linteæ* Con. is figured in my *Preliminary Report*, Pl. V, fig. 2, p. 32, 1886.

Conrad's original description contains a misprint which seems to have been perpetuated in later publications. It should read "with *fine* approximate equal impressed lines," instead of "four . . lines." Type in National Museum; examples in my collection.

Pleurotoma Clarkeana n. sp. Pl. 4, fig. 3.

Shell rather solid, fusiform, whorls about nine, spire smooth (?), whorls with about eleven strongly raised and rounded ribs crossed by coarse revolving lines; somewhat alternate. The finer lines between often being double, especially upon the body whorl. Suture appressed, bordered by a corded thread, and this in turn by a concave space. Aperture oblong-oval. Canal short. Sinus semi-circular, and well up in the aperture. Length 31 mm.; breadth 11 mm.

Murex (Pteronotus) Burnsii n. sp. Pl. 4, fig. 4, 4a.

Shell large, with three foliated varices, whorls nine. Nucleus pointed, smooth; whorls convex, appressed at suture, whorls fol-

lowing the nucleus have two ribs on centre, each rib bearing a node which is equidistant from the foliations; three continuous fin-like varices continued from apex, which revolve in descending, edges of varices dentate. Body whorl with about thirteen distant spiral raised ribs, the two on the periphery bearing a node each between the foliations. Aperture elongate-oval. Outer lip having internally seven plications, inner lip smooth; canal rather long, almost closed posteriorly, widening anteriorly, and bent upwards. Canal of preceding aperture persistent. Alt. 65 mm.; diam. 33 mm.

This elegant *Pteronotus* is described from the unique example belonging to the National Museum. Named in honor of its discoverer, Mr. F. Burns, of the U. S. National Museum.

Cerithium serratoides n. sp. Pl. 4, fig. 5.

Shell elongate; suture linear; whorls ornamented with transverse ribs, which are moderate near the suture, but suddenly become enlarged and spinous at the intersection of a spiral near the middle of each whorl; a couple of fine spiral lines occur between the spines and preceding whorl; also a single spiral line just below the suture. Whorls slightly shouldered.

Specimen figured has lost its apex and aperture, but is so evidently a serrate *Cerithium* that I have concluded to describe it.

Length of part figured is 36 mm.

Type in National Museum. Example in my cabinet.

Latirus indistinctus n. sp. Pl. 4, fig. 6.

Shell fusiform, whorls nine, rounded; apical whorl smooth, the remaining ones transversely ribbed, crossed by raised lines that on the body whorl are alternately coarse and fine; suture distinct, whorls appressed to it anteriorly. Canal long, twisted strongly to the right and then to the left. Striations continue to the end of canal. Aperture oblong-oval, toothed posteriorly and shouldered anteriorly. Outer lip striated internally; inner lip covered with a thin callus, definitely delineated and running to end of canal. No teeth on the inner lip, but some of the striations show through the callus. Alt. 42 mm.; diam. 14 mm.

This handsome species is strongly Fusoid in appearance, and does not possess plications on the inner lip like most of the genus, but it evidently belongs there from its other characters.

Type in the National Museum. One example in my collection.

NOTES OF A COLLECTING TRIP TO DEPARTURE BAY, VANCOUVER ISLAND.

BY GEORGE W. TAYLOR.

The account given by Mr. Wood in the October number of *THE NAUTILUS* of his collecting trip to Monterey Bay tempts me to put on record an experience of my own which goes to prove that our Northern waters are quite as rich in molluscan life as those of the sunnier South.

Departure Bay is a small bay on the east coast of Vancouver Island, about 75 miles north of Victoria. It is shut in by its own shores on the north, west, and south, and is protected from the open sea on the east by a series of small islands. Consequently, the water, at most seasons of the year, is smooth, and as the depth ranges from 10 to 50 fathoms, and the bottom is varied, being sandy in some places and rocky in others, the bay is a capital place for a dredging expedition.

In August, 1888, through the kindness of Mr. S. M. Robins, the managing director of the New Vancouver Coal Company, I was able to spend four days in dredging from a small steam launch belonging to the Colliery Company. Much time was wasted on this occasion in searching for suitable ground, but the result of the four days' work was by no means disappointing, as I took home with me more than five thousand (5,000) specimens of one hundred and ten different species. One of them, since named in manuscript by Mr. Whiteaves as *Pecten Vancouverensis*, was new to science, and several others were additions to our Vancouver lists.

In July of the present year, I spent three and one-half days in the same locality in company with Professor Macown, the well-known Canadian botanist and naturalist. We were determined, if possible, to beat the previous record, and therefore worked very industriously. We spent two and one-half days collecting on shore between tide marks, and one day was devoted to dredging over the ground prospected in 1888.

In the shore collecting my own captures amounted to nearly 2,500 shells of 61 species. In the dredging expedition our joint bag reached the grand total of over seven thousand (7,000) specimens of 88 species. This very satisfactory result was obtained from an ordi-

nary open sailing boat, with a crew of three men and a single home-made dredge. I should mention that 13 species were taken both between tides and by dredging, so that the actual number of different species taken in the three and one-half days was 136.

In shore collecting, no attempt was made to collect the very common shells in quantity, or the numbers might have been swelled indefinitely. In fact, I was looking more especially for Chitons, of which I took seven species (183 specimens), and the smaller shells, such as *Volutella pyriiformis* Cpr. (40 specimens), and species of *Odostomia*, which occurs commonly under rocks at low water. I took also on this occasion a very fine series of *Terebratella transversa* Sby., which was found literally in thousands attached to the rocks on the south side of the bay.

Fine series of several *Macomas* were dug in the sand, and a few specimens of the curious *Lepton rude* Whiteaves were found attached (as is their habit) to the central segments of specimens of *Gebia pugetensis*, which we dug out of the muddy shores.

When dredging, everything that came up was preserved, and the finer sand and mud boxed, and afterward dried and examined at home.

Of the Pelecypoda dredged, by far the commonest specimen was *Acila Lyalli*, of which at least a couple of thousand specimens were taken. Another common bivalve was *Cryptodon sericeatus* Cpr., about 300 specimens. *Venericardia borealis* Conrad, *Nucula tenuis* Mont., and *Lucina tenuisculpta* Cpr., came next in order, about 100 of each being taken.

Of rarer shells may be mentioned, *Pecten Vancouverensis* Whiteaves and *hastatus* Sby., *Amusium caurinum* Gould, *Modioluria lavigata* Gray and *nigra* Gray, *Crenella decussata* Mont., *Cardium blandum* Gould, *Fulvia modesta* Ad. and Rue., *Cryptodon flexuosus* Mont., *Astarte Esquimalti* Baird, and *undata* Gould, *Psephis Lordi* Baird, *Clementia subdiaphana* Cpr., *Venus Kennerleyi* Reeve, *Macoma yoldiformis* Cpr., *Cuspidaria pectinata* Cpr., *Kennerlia filosa* Cpr., etc.

Of the Gasteropoda the most abundant were, *Nassa mendica* Gould, *Nitidella Gouldii* Cpr., *Olivella baetica* Cpr., *Mesalia reticulata* Mighels, and the deep-water variety of *Margarita pupilla* Gould, of each of which more than one hundred specimens were obtained.

Of rarer shells the following is a partial list: *Drillia incisae* Cpr., and *cancellata* Cpr.; *Mangilia sculpturata* Dall, *Cancellaria circumcincta* Dall, *Velutina laevigata* Linn., *Turbonilla torquata* Gould,

chocolata Cpr., and *Lordi* Smith, *Scala indianorum* Cpr., *Solariella peramabilis* Cpr., and *varicosa* Mighels, *Puncturella guleata* Gould, *evullata* Gould, and *Cooperi* Cpr. (all living), *Cryptobranchia concentrica* Midd., *Ischnochiton interstinctus* Gould, and *cancellatus* Sby., *Pluciphorella sinuata* Cpr., *Utriculus incultus* Gould, and *Rictaxis punctocalata* Cpr., this last being new to our Vancouver list.

I have not attempted to give a complete list, as such would take up too much of THE NAUTILUS'S valuable space, and would, moreover, be of little interest; but I think I have written enough to show how very abundant the Mollusca are in our seas, and how much may be accomplished in even a single day's collecting if one knows exactly how and where to look.

A REPLY TO "SOME (RESPONSIVE) REMARKS RELATIVE TO CYPRÆA GREGGORI, FORD."

BY EDGAR A. SMITH.

It is flattering to see that my remarks on Mr. Ford's so-called species of *Cypræa* have been deemed worthy of such lengthy consideration. It were easy to take Mr. Ford's paragraphs *seriatim*, to make sharp replies, and to confute them, but I value the pages of THE NAUTILUS too highly to occupy them with matter of that description. I will merely observe, then, that I have carefully reconsidered the subject, and I still am of opinion that Mr. Melvill's meaning is quite evident. It is to be regretted that Mr. Ford did not cut the leaves of the work he was consulting and carefully examine it, for, had he done so, he could not possibly have failed to see to which species Mr. Melvill assigned the var. *coloba*, and possibly he would have adopted that name. When I suggested that *even courtesy* directed us to employ Mr. Melvill's name, it occurred to me that possibly some persons might be ignorant of or disregard the friendly custom of adopting as a *specific* name one already used in a *varietal* sense by another, and the readers of THE NAUTILUS are now in a position to judge whether my supposition was well-founded.

In conclusion I would point out that it is hardly fair for a writer who is criticising the work of another, unnecessarily to put in inverted commas phrases and words which the general reader might estimate as quotations. The words "state of things," "reminded," "with thanks," do not occur among my observations, and the "bit of presumption" also emanates from Mr. Ford.

A LIST OF THE BRACHIOPODA, PELECYPODA, PTEROPODA, AND NUDI-BRANCHIATA OF JAMAICA, LIVING AND FOSSIL.

COMPILED BY T. D. A. COCKERELL.

No list of the bivalve Mollusca of Jamaica has ever been published, and many of the commonest species are unrecorded from the island. The present compilation was prepared during the time I was Curator of the Jamaica Museum, and is, I think, almost as complete as the present state of knowledge will permit. But for the kindness of Mr. H. Vendryes in permitting me the free use of his collections and MSS. the list could never have been prepared, and it is, in the main, a monument of his industry, extending over a great number of years. Mr. Vendryes informed me that the specimens recorded by him might be regarded as correctly identified, as not only has he given them careful study himself, but they were submitted to and verified by Messrs. Swift and Carpenter.

All records are given as I found them, in alphabetical order under each group; synonymy being indicated by cross references.

The solitary nudibranch at the end may serve to remind students that there is a rich but *unknown* nudibranch fauna in the seas around Jamaica.

[Since writing the above, I have submitted the list to Mr. E. A. Smith, who has most kindly indicated some rectifications in the generic nomenclature, and searched some works inaccessible to me, with the result of discovering several additional records. Mr. Smith thinks that a thorough search through the different monographic works, and the older books, would reveal many other records. I regret I have neither time nor opportunity to make this search, but I do not think many *reliable* records would be found. Mr. Smith has discovered seven records (indicated in the list within brackets) which are certainly erroneous, and in the case of easily-recognized species attributed by older authors to Jamaica, but not found there since, I think we may well express some doubt. Specimens of various kinds were frequently brought to me at the Jamaica Museum, which I might easily have supposed Jamaican, without careful inquiry; such specimens would be from Colon principally, but in former days, when Jamaica was on the highway to the Pacific and antipodes, they might have come from more distant

points. Undoubtedly, the marine shells of Jamaica are imperfectly known, but the additions will be made by dredging and such means, and will not be found in such collections as were probably examined by the earlier writers.]

I. BRACHIOPODA.

- Cistella barrettiana*, Dav.: Davidson, Zool. Challenger, 1, p. 22;
Zool. Rec., 1866, p. 212.
woodwardiana, Dav.: Davidson, Zool. Challenger, 1, p. 22;
Zool. Rec. 1866, p. 212.
Discina striata, Lam.: Vendryes Coll., =? *antillarum*, d'Orb., teste
E. A. Smith.
Terebratula sp. undet.: Barrett, Proc., Geol. Soc., 1866, p. 282.
(foss.).
Terebratulina caputserpentis, L.: Davidson, Zool. Challenger, 1, p.
13.
Thecidium barretti, Woodw.: Davidson, Zool. Challenger, 1, p. 23
(foss. and viv.).
mediterraneum, Risso: Davidson, Zool. Challenger, 1, p. 23.

II. PELECYPODA.

- Anomia ephippium?* L.: Bowden, Vendryes MS. (foss.)=simplex?
simplex, d'Orb.: Vendryes Coll.
Area adamsi, Shuttl.: E. A. Smith, Jr. Linn. Soc., 1890, p. 499.
[*antiquata*, L.: Dillw. Cat. Rec. Shells, but not truly Jamaican, teste E. A. Smith.]
candida, Chem.: Vendryes Coll.
carinifera, Adams: Jay, Cat. Shells, Ed. 1850, teste E. A. Smith.
chemnitzii, Phil.: Vendryes Coll.=? *inæquivalvis*.
consobrina, Shy.: Guppy, Geol. Mag., 1874; Ether. in Sawkins, p. 336 (foss.).
deshayesi, Hanley: Vendryes Coll.
domingensis, Lam.: Vendryes Coll.
d'orbigny, Reeve: Vendryes Coll.
imbricata, Brug.: Dillw. Cat. Rec. Shells; Jay Cat. Shells, Ed. 1850, teste E. A. Smith.
inequilateralis, Guppy: Guppy, Geol. Mag., 1874 (foss.).
jamaicensis, Gm.: Turt. Linn., iv, p. 555. =*candida*.

- listeri*, Phil.: Vendryes Coll (viv.), Bowden, id. (foss.).
noae, L.: Ether. in Sawk., p. 336 (foss.); Vendryes Coll. (viv).
occidentalis, Phil.: Guppy, Geol. Mag., 1874 (foss.); Vendryes Coll. (viv.).
perata, Say: Vendryes Coll.
rhombca, Born: Hunt's Bay, Vendryes Coll.
[*senilis*, Dillw.: Dillw. Cat. Rec. Shells, but recorded in error, teste E. A. Smith.]
tenera, C. B. Ad.: Vendryes MS. Cat.
umbonata, Lam.: Lamk., vi, p. 38.
Asaphis coccinea, Mart.: Vendryes Coll.
Aricula jamaicensis, Dunker: Dunker's orig. descr., teste E. A. Smith (viv. and foss.).
macroptera, Lam.: Vendryes Coll.
radiata, Leach: Vendryes Coll.
Barrettia monilifera, S. P. Woodw.: Ether. in Sawkins, p. 308-310 (foss.)=Hippurites.
Caprina sp. Ether. in Sawkins, p. 308 (foss.).
Caprinella sp. Ether. in Sawkins, p. 308 (foss.).
Cardita ovata, C. B. Ad.: Vendryes MS. Cat.
scabricostata, Guppy: Guppy, Geol. Mag., 1874 (foss.).
Cardium antillarum, d'Orb.: d'Orbigny's orig. descr., teste E. A. Smith.
[*apertum*, Chem.: Jay. Cat. Shells, Ed. 1850, but record erroneous, teste E. A. Smith.]
(*Fulvia*) *bullatum*, L.: Vendryes Coll.
? *citrinum*, Chem.: Bowden, Vendryes MS.=*serratum* (foss.).
domingensis, d'Orb.: Vendryes Coll.
? *dominicensis*, Gabb: Bowden, Vendryes MS. (foss.).
elongatum, Brug.: Vendryes Coll.
graniferum, Brod. and Sow.: Vendryes Coll.
haitense, Sby.: Guppy, Geol. Mag., 1874 (foss.).
inconspicuum, Guppy: Guppy, Geol. Mag., 1874 (foss.).
(*Trachicardium*) *isocardia*, L.: North Side, Vendryes Coll.
(*Laeicardium*) *lorigatum*, L.: Kingston Harbor, Morant Bay, Vendryes Coll.
lingua-leonis, Guppy: Guppy Geol. Mag., 1874 (foss.)=sub-
elongatum.
medium, L.: Vendryes Coll.

- muricatum*, L.: Kingston Harbor, Vendryes Coll. (viv.),
Bowden, id. (fo-s.).
- rusticum*, L.: (Lister) Lamk., vi, p. 12.
- serratum* L.: Vendryes Coll.=*lavicardium*, teste E. A. Smith.
- spinosum*, Meuschen.: Vendryes Coll.
- subelongatum*, Sby.: Vendryes Coll.
- Chama arcinella*, Linn.: Guppy, Geol. Mag., 1874 (foss.); Vendryes Coll. (viv.).
- gryphoides*, Linn.: (see Turt. Linn., iv, p. 247).
- involuta*, Guppy: Guppy, Geol. Mag., 1874 (foss.).
- [*lazarus*, L.: Dillw. Cat. Rec. Shells, but record erroneous, teste E. A. Smith.]
- lobata*, Brod.: Vendryes Coll.
- macrophylla*, Chem.: Möreb. Mal. Blätt., 1877, p. 119.
- ruderalis*, Lam.: Bowden, Vendryes MS. (foss.).
- Circe minima*, : Bowden, Vendryes MS. (foss.)? Kingston Harbor, id. (viv.).
- cerina*, C. B. Ads.: Kingston Harbor, Vendryes Coll.
- ? *Coralliophaga* sp. Ether. in Sawkins, p. 323 (foss.).
- Corbula barrattiana*, C. B. Ad.: Contr. Conch., p. 237.
- blandiana*, C. B. Ad.: Contr. Conch., p. 234.
- chittyana*, C. B. Ad.: Contr. Conch., p. 238.
- contracta*, Say: Dall., Bull. 37, U. S. N. M., p. 70.
- cubaniana*, d'Orb.: Dall., Bull. 37, U. S. N. M., p. 70 (viv.; and ? foss.).
- dietziana*, C. B. Ad.: Contr. Conch., p. 235=*tahitensis*.
- disparilis*, d'Orb.: Kingston Harbor, Vendryes Coll.
- kjeriana*, C. B. Ad.: Contr. Conch., p. 237=*caribea*, d'Orb.
- knoriana*, C. B. Ad.: Contr. Conch., p. 238=*cubaniana*.
- krebsiana*, C. B. Ad.: Contr. Conch., p. 234.
- lavalleana*, d'Orb.: Kingston Harbor, Vendryes Coll.
- operculata*, Phil.: Kingston Harbor, Vendryes Coll.
- swijtiana*, C. B. Ad.: Contr. Conch., p. 236=*caribea*.
- tahitensis*, Lam.: Kingston Harbor, Vendryes Coll.
- rieta*, Guppy: Guppy, Geol. Mag., 1874 (foss.)=*disparilis*.
- riminea*, Guppy: Guppy, Geol. Mag., 1874 (foss.)=*Bothrocorbula*.
- Crassatella Marylandica*? Conrad: Vendryes MS. (foss.).
- Crassinella*? *martinicensis*, d'Orb.: Bowden, Vendryes MS.=*Gouldia* (foss.).

- Cuspidaria cleryana*, d'Orb. (Sphena): orig. descr., teste E. A. Smith.
costellata, Desh.: Guppy, Proc. Geol. Soc., 1866, p. 575 (foss.)
 =? *ornatissima* d'Orb.
- Cytherea carbacea*, Guppy: Guppy, Geol. Mag., 1874 (foss.).
planivieta, Guppy: Guppy, Geol. Mag., 1874 (foss.).
trigonella, Lam.: Vendryes MS. Cat.
affinis, Gmel.: Vendryes Coll.
- Dione*, Gray=Cytherea, subg.
albida, Gmel.: Desh., Cat. Conch. B. Mus., 1 (1853), p. 69.
convexa, Say: Bowden, Vendryes MS. (foss.).
maculata, L.: Vendryes Coll.
- Diplodonta caudeana*? d'Orb: Bowden, Vendryes MS. (foss.).
janeirensis, Rve.: Hunt's Bay, Vendryes Coll.
soror, C. B. Ad.: Dall., Bull. 37, U. S. N. Mus., p. 52.

[To be concluded in next number.]

NOTICES OF NEW CHITONS, I.

BY H. A. PILSBRY.

Meturoplax n. subg. of *Acanthochites*.

Subg. char.:—valves i to vii as in *Acanthochites*, but dorsal (jugular) areas indistinctly differentiated; *valve viii* having the *muero posterior*, the *insertion plate* strongly directed forward, with one slit on each side, and no sinus behind. Girdle as in *Acanthochites*. Type, *A. retrojectus*.

This group holds the same relation to *Acanthochites* that *Pallochiton* holds to *Chatopleura*. It is a variation distinctly in the direction of the *Cryptoplacide*, recalling *Choneplax*, and clearly showing the *Acanthochitoid* genesis of that family.

A. retrojectus n. sp.

Shell small, narrow and elongated, convex, not carinated; black or black-brown, with a whitish "v" or three white stripes on each valve, sometimes broadly maculated with whitish at the sides.

Intermediate valves moderately beaked (except valve ii, the posterior margin of which is straight), sculptured with comparatively coarse, rounded, scattered pustules, which become smaller and more crowded toward the middle, and are lower and less distinct on the ridge, no areas being distinctly differentiated on the valves. End

valves similarly sculptured. Posterior valve small, having the mucro obtuse and posterior, the posterior slope short, vertical.

Interior green, marked with black in the cavity. Head valve having the insertion plate about one-third as long as the front slope of the tegmentum, with 5 small slits. Intermediate valves having very oblique plates with 1-1 minute posterior slits. Posterior valve having the insertion plate short and strongly directed forward, with a small slit on each side. Sutural laminae rather long and narrow, projecting far forward. Sinus wide, deep, and square.

Girdle microscopically chaffy, with a series of hyaline spicules at the edge, and 18 small and compact silvery tufts.

Length $9\frac{1}{2}$; width $3\frac{1}{2}$ mill. (dry specimen).

Port Jackson, near Sydney. Abundant. Collected by Dr. J. C. Cox.

GENERAL NOTES.

ALCYNA.—Specimens of the rare *Aleya ocellata* A. Ad. are included in Mr. F. Stearns' last collection of Japanese mollusks. It proves to have a corneous operculum, and therefore belongs to the *Trochida* instead of the *Phasianellida*, where it has hitherto been placed.—*H. A. P.*

S. AUSTRALIAN MOLLUSCA.—“A Hand List of the Aquatic Mollusca Inhabiting S. Australia” has been issued by D. J. Adcock, Adelaide, S. Australia. It will prove very useful to those interested in this fauna.

CONTRIBUTIONS TO THE NATURAL HISTORY OF TEXAS.—I. TEXAS MOLLUSCA.—By J. A. Singley (Geol. Survey of Texas). A complete list of species known from the State, with useful notes. Mr. Singley's personal researches have covered a large part of the State, but he has supplemented them with citations of Texan localities by other authors, especially Binney and Dall. The paper forms a very useful basis for further operations in the field of Texas conchology.

REPORT ON THE ARTESIAN WELLS OF THE GULF COASTAL REGION (of Texas). By J. A. Singley (Geol. Survey of Texas, 4th Annual Report). This paper is evidently the result of much careful investigation, and will be especially valuable to those interested in Tertiary and Quaternary Geology of the Gulf region.

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A NEW SPECIES OF PATELLA.

BY H. A. PILSBRY.

Patella kermadecensis n. sp.

Shell large and massive, conical, the apex subcentral; slopes of cone nearly straight; outline short ovate, slightly narrower in front. Exterior whitish, apparently strongly ribbed when perfect, but the specimens described are everywhere deeply eroded. Border lightly scalloped by the ribbing, and finely puckered at the edge. Musclescar roughened, strongly marked, and either white or bright orange; rest of the interior white, stained in places with livid-brown or purplish.

Length 135, breadth 115, alt. 48 mm.

Length 111, breadth 102, alt. 45 mm.

Habitat, Kermadec Is.

The two specimens above described, of this large species of the subgenus *Scutellastra*, were sent to me by Mr. E. W. ROPER, of Revere, Mass., who obtained them from the original collector. The species can be compared only with *P. patriarcha* Pils. from the Cape of Good Hope, and *P. mexicana* Brod. & Sowb. from West Mexico. The former of these is a wider, more angular species; the latter is more oblong, and has more obvious primary ribs. Figures will be published later.

NOTES ON COLLECTING SHELLS IN JAMAICA.

BY CHAS. T. SIMPSON.

About the first of December, Mr. John B. Henderson, Jr., of Washington, and the writer visited the island of Jamaica for the purpose, principally, of collecting land, fresh-water and marine mollusks. We called on Mr. Henry Vindryes, a veteran collector and conchologist in Kingston, inspecting his magnificent set of Jamaica Shells, and receiving from him every possible courtesy and many useful notes as to localities.

As our stay was to be limited to some three weeks, we were anxious to begin work at once, to actually put our hands on some of the land snails in their homes. We hired a cab with a good natured darkey for a driver, and a miserable, little, bony horse, of uncertain color, and started for the suburbs, in the direction of Rockport with our eyes strained to catch sight of the splendid *Orthalicus undatus*, which we were told we might find on our way. The poor little horse, which wobbled about first from one side of the road to the other as if in search of snails, but probably from sheer exhaustion, was suddenly brought to a standstill without much exertion by the driver, who exclaimed as he pointed his whip to some low trees on the south of the road "Da de snail you want massa." I think we had all observed them at the same moment, and with a shout like boys we were out of the cab and racing across the road, through a terrible hedge of wild pinguin in less time than it takes to write it. There they were, great beautiful fellows, variegated with ash color and glossy black, one, a half dozen, fifty, a hundred, in fact without limit! They clung to all kinds of trees and shrubs in the low tangled scrub, and in great numbers to the tall cylindrical Spring Cereus; in almost every case glued by an epiphragm so solid that it was well nigh impossible to dislodge them, and invariably with the spire pointing downward.

When we came out of the woods an hour afterward we were as wet with perspiration as though we had been dipped in water, and covered with every description of sticking burrs; our flesh was lacerated, and our hands dirty and bleeding, for everything in the scrub bears villainous thorns. On the debtor side we had ruined two suits of clothes, and to our credit could be placed over five hundred superb living *Orthalicus*. We had learned a lesson, too,

worth remembering, viz, never wear anything decent when collecting in the tropics.

During our stay we drove around the entire island, visiting every parish. Owing to the worthlessness of our team, the illness of the driver, and the almost incessant rains we encountered on the north side, our opportunities for collecting were greatly diminished.

It was only when we stopped over a day or so at the towns that we were able to get any great amount of material. Strangely enough we found almost no marine species whatever. Occasionally on the rocky beaches we obtained *Neritina virginea*, a few *Littorinas*, *Tectarius* and *Neritinas*, but for miles, in fact along whole parishes, though the road ran near to the sea, and we watched closely, not even a valve was seen.

The lack of marine forms was made up in the abundance of the land snails, and in some cases the fresh water species. In a branch of the delta of Roaring River, under a great breadfruit tree, H. picked up a dead *Hemisimus lineolatus*. Then I looked on the rocky and sandy bottom and found it alive by handfulls, and we met with it in quantities elsewhere.

We kept an eager watch for the great white *Helix aspera*. My friend picked up a single dead specimen on the road near Falmouth, and this fairly turned our heads. We inquired of every darkey from that on, hearing of it often like the *Ignis fatuus*, just a little way out of reach. Near Montego Bay we got a few more dead ones, and again as it was growing dark we discovered a dozen or so on the bushes and vines when we were nearing Savanna la Mar. The next day I started out early for a walk, resolved to find this snail if thorough search would do it. I tramped the whole forenoon and got only a few *Ampullarias*, and two o'clock found me tired, hungry, and thoroughly disgusted, seven miles from our hotel, and uncertain whether to push on to some low hills a mile ahead, or to give it up and go back. My resolve determined me and I went on. The first rounded knoll looked well at a little distance—one learns in a short time to distinguish good from poor localities a long way off. The elevation did not occupy more than half an acre; red clay with decomposed limestone. It was originally a dwarf scrub which had been partly cleaved a couple of weeks before. The first thing I saw was a fine dead *Helix aspera* on the ground, then others, there they lay thickly all around me, bright and fresh, with the animals nicely cleared out by tropic showers, the sun, and swarming insects.

I hardly dared move for fear of stepping on them, and to calm my excitement, and assure myself that it was not all a wild conchologist's dream, I stood still and tried to count a hundred, but when I had got to twenty I saw half a dozen live ones clinging like a string of enormous white beads to a little shrub right beside me, and I quit counting and gathered them in. Then I sat down and without moving I picked up thirty fresh, cabinet specimens. About that time it just began to dawn on me that the great *Lucerna acuta* was as abundant as the *aspera*, and in no time I had my hands full of the fine, big, brown fellows. Afterward I got me eyes focussed down to seeing *Sagdas*, *Helix sinuata*, three or four *Cylindrellas* and as many *Tudoras*, and that under the leaves, and among rubbish there were quantities of small *Glandinas*, *Zonites* and *Microphysas*, that the ground when closely examined was literally bespangled with lovely little *Proserpinas*, that shone in the sun like polished opals.

To my dying day I never expect again to see such collecting unless I revisit Jamaica. Hunger, fatigue, headache, the flight of time were forgotten, and I was only warned that I must return by the fact that the sun was nearly down before I knew it, and that I had an eight mile walk and darkness before me. On a little spot no larger than a city lot, I had taken in a few hours over thirty species of land shells. As I reluctantly tore myself away I took fifteen *asperas* from a small Mango, and on the border of the clearing where some one had bent together a couple of young logwood trees, not as large as my wrist, I picked twenty-five more fully adult and one young one.

Shall I tell how in a narrow limestone gorge of the Rio Cobre near Bogwalk in the talus under a ledge some two rods long we found no less than forty-five species, all living, and nearly every specimen in perfect condition; or how at Mandeville the honey-combed rocks were crowded with lovely *Chounopomas*, rough as chestnut burrs, now H. wild with excitement and regardless of bats, centipedes, scorpions, and poisonous vines wedged himself into a dark cave whose mouth was at least two sizes too small for his body; how he stuck fast, and alone and far from help, could neither get forward or backward for awhile, how he pushed on to be rewarded by finding quantities of *Helix peracutissima* and the great purple *H. jamaicensis*, the latter clinging to each other on the roof like so many stalactites, a snail which, by the way, we had repeatedly been told was extinct! I fear it may be now.

It is enough to say that for the brief time and limited opportunities we had, our trip was a success, and we left with many regrets that we could not spend the rest of the winter on the island, and thoroughly explore it, and collect its inexhaustible treasures.

A LIST OF THE BRACHIOPODA, PELECYPODA, PTEROPODA, AND NUDI-BRANCHIATA OF JAMAICA, LIVING AND FOSSIL.

COMPILED BY T. D. A. COCKERELL.

[Continued from p. 107.]

- Donax denticulata*, L.: Milk River Beach, Pt. Morant, Vendryes Coll. (viv. and foss.).
 [rostratus, Adams: Jay, Cat. Shells, Ed. 1850, but record erroneous, teste E. A. Smith.]
- Dosinia concentrica*, Lam.: Vendryes Coll. (viv. and foss.).
incerta, Verkruzen (MS.?): Paetel, Cat. Conch. Samml., 1890, teste E. A. Smith.
- Ervilia nitens*, Montagu: Vendryes Coll.
- Erycina* sp. Bowden, Vendryes MS. (foss.).
- Gastrochaena chemnitziana*, d'Orb.: Vendryes Coll. (viv. and foss.).
cuneiformis, Spengler: Vendryes Coll.
- Eriophyla lunulata*, Conr.: Kingston Harbor, Vendryes Coll.
 var. *parva* C. B. Ads. Vendryes MS. Cat.
- Inoceramus* sp. Ether. in Sawkins, p. 308 (foss.).
- Leda acuta*, Conr.: Bowden, Vendryes MS. (foss.).
bisulcata, Guppy: Guppy, Geol. Mag., 1874 (foss.).
clara, Guppy: Guppy, Geol. Mag., 1874 (foss.).
corpulenta, Dall: Dall, Bull. 37, U. S. Nat. Mus., p. 44.
illecta, Guppy: Bowden, Vendryes MS. (foss.).
jamaicensis, d'Orb.: Vendryes Coll.
vitrea, d'Orb.: orig. descr., teste E. A. Smith.
- Lima carribea*, D'Orb.: Vendryes Coll. = ? squamosa.
scabra, Born: Vendryes Coll.
- Limopsis aurita*, Brocchi, var. *paucidentata*, Dall: Dall, Bull. 37, U. S. Nat. Mus., p. 42.
- Lithophagus bisulcatus*, D'Orb.: teste E. A. Smith.
caudiger, Lamk.: Rockfort, Vendryes Coll. (as Modiola).

- Lithophagus cinnamomeus*, Chemn.: teste E. A. Smith.
gossei, Rve.: orig. descr., teste E. A. Smith.
 [*lithophagus*, L.: Dillw. Cat. Rec. Shells, but record erroneous, teste E. A. Smith.]
caudigera, Lam.: Rockfort, Kingston, Vendryes Coll.
forficatus, Ravenel: Dall, Bull. 37, U. S. Nat. Mus., p. 38.
- Loripes anatelloides*, Rve.: Paetel, Cat. Conch. Samml. 1890, teste E. A. Smith.
- Lucina americana*, C. B. Ad.: Ad., Contr. Conch., p. 243=*quadrisulcata* d'Orb., teste E. A. Smith.
antillarum, Reeve: Ad., Contr. Conch., p. 243. (= *ornata*, C. B. Ad. non Rve.) (viv. and foss.).
candeana, d'Orb.: Vendryes Coll.
costata, d'Orb.: orig. descr., teste E. A. Smith.
crenulata, Say: Bowden, Vendryes Coll.
dentata, Wood: Vendryes Coll. (Subgen. *Divaricella*).
 [*digitalis*, Lam.: Jay, Cat. Shells, Ed. 1850, but the record erroneous, teste E. A. Smith.]
divaricata, L.: Bowden, Vendryes MS. = *dentata*, Wood. (viv. and foss.).
edentula, L.: Lam., V, p. 540. (C. B. Ad. also). = *Loripes granulosa*, C. B. Ad.: Ad., Contr. Conch., p. 245.
imbricata, C. B. Ad.: Ad., Contr. Conch., p. 245. (= *pecten* Rve.).
imbricatula, C. B. Ad.: Vendryes Coll.
jamaicensis, Chem.: Ad., Contr. Conch., p. 245.
janeirensis, Reeve: Ad., Contr. Conch., p. 245. (= *subglobosa*, C. B. Ad.).
muricata, Chem.: fide d'Orb., teste E. A. Smith.
nasuta? Conr.: Bowden, Vendryes MS. (foss.).
occidentalis, Reeve: Kingston Harbor, Vendryes Coll. = *imbricata*, Ad.
pecten, Reeve (? Lam.): Bowden, Vendryes MS. = *imbricata?* (foss.).
pectinata, C. B. Ad.: Ad., Contr. Conch., p. 245-6. (viv. and foss.).
pectirella, C. B. Ad.: Ad., Contr. Conch., p. 246.
pennsylvanica, L.: Ad., Contr. Conch., p. 246 (viv.); Guppy Geol. Mag., 1874 (foss.).

- Lucina pulchella*, C. B. Ad.: Vendryes MS. Cat.
scabra, Reeve (? Lam.): Ad., Contr. Conch., p. 247.
soror, C. B. Ad.: Ad., Contr. Conch., p. 247.
subglobosa, Adams (MS.?): Jay, Cat. Shells, Ed. 1850, teste
 E. A. Smith.
 (*Codakia tigerina*, L.: Ad., Contr. Conch., p. 247.
virgo? Reeve: Ad., Contr. Conch., p. 247.)
- Macoma cerina*, C. B. Ad.: Dall, Bull. 37, U. S. N. M., p. 60.
- Mactra alata*, Spg.: Morant Bay, Vendryes Coll. = *carinata*, Lam.
 (viv. et foss.).
 (*Spisula bilineata*, C. B. Ad.: Vendryes MS. Cat.
braziliana, Lam.: Vendryes Coll.
 (*Spisula subimbricata*? Mont.: Vendryes MS. Cat.
elegans, Sowb.: Vendryes Coll.)
- Modiola americana*, Leach: Vendryes Coll. (Mr. Smith adds a?)
barbata, C. B. Ad.: orig. descr., teste E. A. Smith.
demissa, Dillw.: Vendryes Coll. (= *plicatula*, Lamk.,) teste
 E. A. Smith.
- Myonera lamellifera*, Dall: Dall, Bull. 37, U. S. N. M., p. 68.
- Mytilus canalis*, Lam.: Lam., VI, p. 123. (Mr. Smith adds a?)
exustus, L.: Bowden (foss.), Dry Harbor (viv.), Vendryes
 Coll. (viv. et foss.).
- Nuculocardia diraricata*, d'Orb.: orig. descr., teste E. A. Smith.
- Ostrea carinata*, : Cat. Sawkins Coll., No. 133. (foss.).
folium. L.: Dillw. Cat. Rec. Shells, teste E. A. Smith.
parasitica, Gmel.: Bluefield Point, Vendryes Coll.
plicatula, Gmel.: Vendryes Coll.)
- Pecten exasperatus*, Sow.: Port Antonio, Vendryes Coll.
exasperatus (nec Sow.): Guppy, Geol. Mag., 1894. (foss.). =
oxygonus.
inacqualis, Sow.: Guppy, Geol. Mag., 1874. (foss.).
nucleus, Born: Vendryes Coll. (viv. et foss.)
ornatus, Lam.: Port Antonio, Vendryes Coll.
oxygonus, Sow.: Bowden, Vendryes MS. (foss.)
thetidis, Sow. (var.): Bowden, Vendryes Coll. (foss.).
zigzag, Chem.: Vendryes Coll. (viv. et foss.).
 var. *alba*, : shell white, Vendryes Coll.
gibba, L. (Turt, Lim. IV, p. 267).
- Pectunculus acuticostatus*, Sow.: Guppy, Geol. Mag., 1874. (foss.).
angulatus, Lam.: Vendryes Coll.

Pectunculus angulosus, Gmel. : Dillw., Cat. Rec. Shells, teste E. A. Smith.

castaneus, Lam. : Port Antonio, Vendryes Coll.

decussatus, L. : Guppy, Geol. Mag., 1874. (foss.).

pectinatus, Gmelin : Vendryes Coll.

pennaceus, Lam. : Ether. in Sawkins, p. 337. (foss.). = *decussatus*.

undatus, L. : Dillw., Cat. Rec. Shells, teste E. A. Smith.

Perna bicolor, C. B. Ad. : Kingston Harbor, Vendryes Coll.

ephippium, Linn. : Dall, Bull. 37, U. S. N. Mus., p. 36.

obliqua, Lam. : Vendryes Coll.

rigida, Dillw. : Vendryes MS. Cat.

Pholas clavata, Lam. : (see Lam., V, p. 446). = *pusillus*, L.

corticaria, Sow. : C. B. Ad., Contr. Conch., p. 75. (= *Martesia*) teste E. A. Smith.

pusillus, L. : (see Turt. Linn., IV, p. 173). = *striata*.

striata, L. : Rockfort, Vendryes Coll. (= *Martesia*) teste E. A. Smith.

Pinna muricata, L. : Vendryes Coll.

Placuna sinuosa, : Ether. in Sawkins, p. 336. (foss.).

Placunanomia echinata, Brod. : Kingston Harbor, Vendryes Coll.

Plicatula cristata, Lam. : Paetel, Cat. Conch. Samml., 1890, teste E. A. Smith.

plicata, Chem. : Kingston Harbor, Vendryes Coll.

reniformis, Lam. : Lam., VI, p. 185. = *barbadensis*, Petiver.

vexillata, Guppy : Guppy, Geol. Mag., 1874.

Psammobia affinis, C. B. Ad. : Vendryes MS. Cat.

biradiata, C. B. Ad. : Vendryes MS. Cat.

cerina, C. B. Ad. : Vendryes MS. Cat.

purpureo-maculata, C. B. Ad. : Vendryes MS. Cat.

Radiolites, sp. Ether. in Sawkins, p. 308. (foss.).

Sanguinolaria rosea, Chem. : Lam., V, p. 511. = *sanguinolentus*, Gm., Vendryes Coll.

Semele jayantum, C. B. Ad. : Vendryes Coll. = *cordiformis*, Chem.

proxima, C. B. Ad. : Vendryes Coll. = ? *elliptica*, Sby.

reticularis, L. : Vendryes Coll.

variegata, Lam. : Vendryes Coll.

Tagelus bidens, Chem. : Kingston Harbor, Vendryes Coll.

caribæus, Lam. : fide d'Orb., teste E. A. Smith. = *gibbus*, Speng.

- Solen ambiguus*, Lam. : Vendryes Coll. (viv. et foss.).
- Spondylus bostrychites*, Guppy : Guppy, Geol. Mag., 1874. (foss.).
- Strigilla carnaria*, L. : Morant Bay ; Port Antonio, Vendryes Coll.
carnaria, var. *miocenica*, : Bowden, Vendryes MS.
 (foss.).
flexuosa, Say : Bowden, Vendryes MS. (foss.). Morant Bay,
 Port Antonio, Vendryes Coll.
producta, Tryon : Zool. Rec., 1870, p. 172. Morant Bay,
 Vendryes Coll.
pisiformis, L. : Morant Bay, Vendryes Coll.
- Tellina antonii*, Phil. : Kingston Harbor, Vendryes Coll.
arcuata, Sow. : Vendryes MS. Cat.
 (*Arcopagia*) *bimaculata*, L. : Kingston Harbor, Vendryes
 Coll.
 (*Peronæoderma*) *biradiata*, Schum. : Vendryes Coll.
carribæa, d'Orb. : Vendryes Coll.
 (*Angulus*) *constricta*, Phil. : Vendryes Coll.
 (*Angulus*) *cuneatus*, d'Orb. : Hunt's Bay, Kingston Harbor,
 Vendryes Coll.
decussatula, C. B. Ad. : Vendryes MS. Cat.
 (*Arcopagia*) *fausta*, Sol. - Vendryes Coll.
 (*Angulus*) *guadaloupensis*: D'Orb. : Kingston Harbor, Ven-
 dryes Coll.
jamaicensis, : Turt. Linn., IV, p. 193.
lineata, Turton : Vendryes Coll.
lincea, Conrad : Dall, Bull. 37, U. S. Nat. Mus., p. 60.
 (*Angulus*) *martinicensis*, d'Orb. : Hunt's Bay, Kingston
 Harbor, Vendryes Coll.
nitens, Adams : orig. descr., teste E. A. Smith.
punicea, Born : Vendryes Coll.
radiata, L. : Vendryes Coll. (viv.) Bowden, Vendryes MS.
 (foss.) (viv. et foss.).
 var. *unimaculata*, Lam. : Vendryes Coll.
striata, Chem. : Vendryes Coll.
subradiata, Schum. : Hunt's Bay, Vendryes Coll.
tumida, Sow. : Vendryes MS. Cat.
- Teredo fistula*, Lea : Bowden, Vendryes MS. (foss.).
navalis, L. : Vendryes Coll.
- Trigonulina ornata*, d'Orb. : Vendryes MS. Cat. (ex Chenu.)
- Venus antillarum*, d'Orb., orig. descr., teste E. A. Smith.

- Venus blandiana*, Guppy : Guppy, Geol. Mag., 1874. (foss.).
braziliana, Gm. : Plumb Point L. Ho., Milk River Mouth,
 Vendryes Coll.
cancellata, L. : Pt. Morant, Vendryes Coll. (viv.), Bowden,
 id. (foss.).
cardioides, Lam. : Lam., V, p. 590.
flexuosa, Lam. : Port Antonio, Vendryes Coll.
granulosa, Gmel. : Pt. Morant, Kingston Harbor, Vendryes
 Coll.
listeri, Hanley : Port Antonio, Vendryes Coll.
maculata, L. : orig. descr., teste E. A. Smith.
macrodon, Lam. : Vendryes Coll.
paphia, L. : Guppy, Geol. Mag., 1874 (foss.); Vendryes
 Coll. (viv.).
reticulata, Lam. : Vendryes Coll.
rubra, Gm. : Turt. Linn., IV, p. 236. =? *Cytherea circinata*.
rugosa, Gm., Chem. : Guppy, Geol. Mag., 1874. (foss.), Ven-
 dryes Coll. (viv.).
subrostrata, Lam. : Vendryes Coll.
subrugosa, Sowb. : Port Antonio, Vendryes Coll.
walli, Guppy : Bowden, Vendryes MS. (foss.).
woodwardi, Guppy : Guppy, Geol. Mag., 1874. (foss.).
zigzag, L. : Pt. Morant, Vendryes Coll.
- Pisidium pygmaum*, C. B. Ad. : (Cyclas) Contr. Conch., Vendryes
 List, p. 487. (= *jamaicense*, Prime) = *adamsi*, Desh. :
 Desh., 11, p. 184.
- Sphærium veatleyi*, C. B. Ad. : (Cyclas) Contr. Conch., Vendryes
 List, p. 487. Desh., 11, p. 283.

PTEROPODA.

- Cleodora* sp. Ether. in Sawkins, p. 319. (foss.).
pyramidata, L. : (See Turt. Linn., IV, p. 17).
retusa, . (see Turt. Linn., IV, p. 117)
- Creseis* sp. Ether. in Sawkins, p. 319. (foss.).
Cuvieria sp. Ether. in Sawkins, p. 319. (foss.).
Hyalea (Diacria) vendryesiana, Guppy : Guppy, Geol. Mag., 1874.
 (foss.).

NUDIBRANCHIATA.

- Glaucus atlanticus*, Foster : R. Bergh, Chall. Rep., Zool., X, p. 11.

NOTICES OF NEW CHITONS, II.

BY H. A. PILSBRY.

Chiton Coxi, n. sp.

Shell oblong, much elevated, carinated; delicate bluish mottled or blotched with olive-brown, yellow and white; girdle delicate blue-green, with narrow white bars. Sculpture as in *Ch. jugosus* Gld., but grooves of the pleura shorter, straighter, narrower, and more spaced. Girdle-scales convex, shining, microscopically and superficially striated, each measuring about .30 mm. wide. Length 13, breadth $7\frac{1}{2}$ mm.; divergence, 90 to 110°.

Port Jackson (Dr. J. C. Cox!)

This is probably the *Lophyrus jugosus* of Angas' Port Jackson Catalogue, P. Z. S. 1867. It differs from Goulds' species in the totally diverse color-pattern, etc.

Acanthochites granostriatus n. sp.

Elongated, the tegmentum occupying about one third the total width in dry specimens. Valves obtusely keeled, the dorsal ridge indistinctly clouded with whitish, orange and blackish; side mottled in varied patterns with olive and white. Girdle olive, the 18 tufts silvery stained with blue or dirty olive.

Valves distinctly imbricating; the dorsal areas rather wide, convex, distinct but not raised at the edges, having numerous rather weak longitudinal striæ. Side areas having elevated pustules arranged radially and connected by opaque lines giving the aspect of radial striæ. Tegmentum of post. v. subcircular, the mucro rather acute and elevated, at the posterior third. Length 9, breadth $3\frac{1}{2}$ mm. Port Jackson and Port Hacking, N. S. Wales (Dr. J. C. Cox!)

Acanthochites Coxi, n. sp.

Valves grayish, somewhat mottled with olive and fleshy, the dorsal areas dark red or marked with olivaceous. Girdle olivaceous. Valves nearly disconnected by spiculose bridges of girdle tissue at the sutures. Dorsal areas longitudinally striate; sides sculptured with convex pustules elongated radially. Tegmentum of posterior valve subcircular, slightly wider than long, the rather elevated, acute mucro slightly behind the middle. Interior rose colored.

Girdle densely clothed with short, hyaline spicules, the tufts represented by inconspicuous clumps of slightly longer spines. Length 23, breadth 13 mm.

Port Jackson, N. S. Wales, (Dr. J. C. Cox !)

Acanthochites Matthewsii Bednall & Pilsbry.

Much elongated, keeled, flesh-tinted with several olivaceous forward-converging zigzag bands on each valve. Posterior margins of valves i-vii concave, beaks small. Dorsal areas narrow, rounded, with very fine, indistinct striæ; side areas having an indistinct diagonal riblet; *pleura longitudinally ribbed*, lateral areas obliquely ribbed, the ribs more or less cut into granules. Tegmentum of post. v. short-ovate, slightly longer than wide, its front half ribbed, posterior half granulated. *Mucro* between the posterior third and fourth of the length of tegmentum, *strongly hooked backward, the slope behind it very concave*. Girdle narrow, tufts inconspicuous. Length, 26, breadth, 8 mm.

South Australia. Collected by Mr. E. H. Matthews. The sculpture is totally unlike that of any other known *Acanthochites*.

Illustrations of the above species will be given later.

GENERAL NOTES.

The death of DR. PAUL FISCHER of Paris has been announced.

MR. C. W. JOHNSON will spend the latter part of January in Cambridge, studying types of Diptera and Mollusca in the Museum of Comparative Zoology.

MR. E. W. ROPER of Revere, Mass., has sailed for Jamaica where he purposes spending some time.

MR. A. W. HANHAM, formerly of Quebec, is now permanently located at Winnipeg. His address is "The Bank of British North America, Winnipeg, Manitoba, Canada."

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No. 11

SHELL COLLECTING IN NORTHERN ALABAMA.

BY H. E. SARGENT, WOODVILLE, ALA.

Huntsville, Alabama, the county seat of Madison County, is a somewhat exceptional southern city in that it has an abundant supply of pure spring water bursting forth from its very foundations. This spring of sparkling lime water, beside supplying the city mains, affords a constant stream several feet in width and several inches in depth to go to waste. In this stream and also in the reservoir I have, upon several occasions, taken large numbers of *Gonio-basis nassula* Con., var. *perstriata* Lea. A recent visit, however, disclosed the fact that although still plentiful in the reservoir, this interesting species has almost disappeared from the stream. A flock of geese near by offered a possible solution of the mystery.

Upon this occasion, a more careful search was made than upon former visits, with very satisfactory results. The upper surfaces of the rocks were found to be covered with a species of *Ammicola* which the Editor refers to a form previously had from Florida, and for which he proposes the name of *Ammicola olivacea* Pils. In more secluded spots, several specimens of *Pleurocera brunbyi* Lea were also taken. These specimens were much larger than those found in other streams in this vicinity. A hand-dredge brought from the oozy bottom numerous beautiful clear specimens of *Pisidium* sp. *Physa halei* Lea and *Limnæa desidiosa* Say were found in considerable numbers. A single young specimen of *Planorbis trivolvis* Say, and a single valve of *Sphaerium* indicated their presence, although no good specimens were taken. Several dead specimens of *Campeloma coarctatum* Lea also came to light.

* * * * *

A two-hour hunt for *Helix carolinensis*, made December 1, upon the timbered flats of the Paint Rock River, resulted as follows: *Helix obstricta* Say, var. 4. Binn = *H. carolinensis* Lea, 59. *H. inflecta* Say, 22. *H. thyroides* Say, 13. *H. stenotrema* Fér., 3. *Zonites laevigatus* Pfr., 1, *Z. acerrus* Lewis 2. *Patula alternata* Say., var. *mordax* Shutt, 4. *Selenites concava* Say, 1. *Limacidae*, 8. A little later in the season, these flats will be inundated most of the time for several months. A visit to the same station a little earlier than this last year, yielded about the same results.

NOTES ON SOME NEW ZEALAND LAND AND FRESH WATER MOLLUSKS.

BY HENRY SUTER.

1. *Ancylus woodsi* Johnston. About one year ago, I discovered a small *Ancylus* in the River Avon, near Christchurch, which I recognized as being identical with *A. woodsi* from Tasmania. This was, to my knowledge, the first *Ancylus* ever found in New Zealand, and I mentioned the fact in Crosse's Journ. de Conch., vol. 32, p. 248. I can not recognize *Ancylus dohrnianus* Clessin as a New Zealand species, as long as Clessin can not give the exact locality where his species has been found, and thus enable us to verify its occurrence in this colony. There is no such *Ancylus* known to New Zealand conchologists, and it therefore will only help to swell the already large list of shells erroneously ascribed to New Zealand.

Only a few weeks ago, I collected a good number of *A. woodsi*, and this time alive. To my great astonishment I found several specimens with a septum more or less in process of formation, so that there could be no doubt but that this mollusk is not an *Ancylus* at all, but a *Gundlachia*. This was further confirmed by examining the radula, which perfectly corresponds with the radula of a *Gundlachia* collected and kindly sent to me by my friend, Dr. V. Sterki, of New Philadelphia, Ohio. Having come into possession of some literature on Tasmanian mollusks, I now find that Johnston, in his description of *A. woodsi* (Proc. Roy. Soc. Tasm., 1878, page 25) says: "Animal and teeth almost similar to *Gundlachia petterdi*." And in the description of (*G. petterdi* (l. c. page 23) he writes: "In the young state the shell is simple, and resembles the common *Ancylus*." I really do not understand why Johnston established the n. sp. *A. woodsi*, when he must have been fully aware of the fact that it

was a young *Gundlachia*! In his list of Tasmanian mollusca, 1890, he simply drops his *A. woodsi* without mentioning that it is a young *Gundlachia*. I have not yet found full-grown specimens of our *Gundlachia*, but I hope to succeed later on, and it is to be expected to be a similar form to *G. petterdi* Johnston.

Prof. Hutton suggested to me that this *Gundlachia* might, perhaps, have been introduced from Tasmania on aquatic plants, which were used in packing trout ova, and as our fish-hatching ponds are in communication with the river Avon, there is all possibility of this being really the case. However, there is one objection. Up to the present day I found our *Gundlachia* only on aquatic plants in the lower parts of the river, from the outflow of Horseshoe Lake to New Brighton, but not upward between this outflow and the fish-hatching ponds. This makes it very likely that *Gundlachia* occurs in the swampy Horseshoe Lake, difficult of access, and was washed down in the river Avon when the canal was cleared from *Anacharis* weeds. If this mollusk is really indigenous, it will, no doubt, be found in localities where the introduction from Tasmania is out of question, but as long as this is not the case, we must remain doubtful on this point.

In the "Reference List" I published with my friend Mr. Ch. Hedley, of Sydney (Proc. Linn. Soc. N. S. W., vol. VII (2) p. 624), he put down *Ancylus tasmanicus* Tenison-Woods, as being synonymous with *A. woodsi*. This is wrong, as the former is quite different, and I believe it to be really an *Ancylus*. *A. australicus* Tate and *A. smithi* Cox are very likely also young forms of *Gundlachia*. *A. assimilis* Pett. and *A. oblonga* Pett. I have not seen. It would be of highest interest to examine the dentition of the Caledonian *A. reticulatus* Gassies and *A. noumeensis* Crosse, which Mr. Hedley thinks to be nearly allied to the so-called *A. woodsi*.

2. *Rhytida meesoni* Suter (Reference List, l. c. page 631) is no *Rhytida*, but a *Paryphanta*, as the animal lays calcareous eggs, whilst the genus *Rhytida* is considered to be viviparous. The genera *Paryphanta* and *Rhytida* are in the shells, the exterior of the animals and the radula so nearly allied, that it is not always easy to separate them. Very likely the genital organs will show generic differences, and it is my intention to study the anatomy of these genera as soon as opportunity offers and time permits.

3. *Thalassohelix ziczac* Gould. There was always some doubt whether this shell was really a New Zealand species or not, and at

the request of Mr. Hedley, when we worked out our "Reference List," I tried to solve the question. I came to the conclusion that *Th. portia* Gray must be the same species, and therefore they appear as synonyms in our list. I then selected two perfectly similar specimens, and sent one to Mr. Edg. A. Smith of the Brit. Museum for comparing it with Gray's type of *H. portia*, the other to Dr. Dall, Washington, to compare it with Gould's type of *H. ziczac*. Both gentlemen very kindly acceded to my request, and I herewith wish to express my gratitude to them.

Mr. Edg. A. Smith writes: "*Helix portia* Gray. Right, but I doubt if Gould's *ziczac* is the same species." And Dr. Dall reports: "There is no doubt whatever of the identity of your shell with Gould's type. He, in his preliminary report (*Otia Conch.*, p. 17), refers it to New South Wales, but in his final report (*Moll. U. S. Expl. Exp.*, p. 41), he says that it was collected by Dr. Pickering in a crater at Taiaamea, New Zealand. His type was a little faded, hence the prominence of the dark variable lines and the straw color of the shell." These reports set all doubts at rest.

4. *Thalassohelix zelandiæ* Gray. In a letter to me, Mr. H. A. Pilsbry expressed his opinion that the shell Prof. Hutton and I considered to be Gray's *Hel. zelandiæ* might, perhaps, be another species. I therefore forwarded a specimen to Mr. Edg. A. Smith, and he kindly compared it with Gray's types. His opinion is as follows: "The shell under this name is, I think, a form of that species. It is larger than any of our typical examples and more brightly variegated, and the whorls are perhaps, a trifle flatter, still I think it is only a variety." To this I would remark that most species of *Thalassohelix* are subject to great variation, and I am confident that we identify the right shell as *Th. zelandiæ* Gray.

5. *Endodonta varicosa* Pfeiffer, I considered to be synonymous with *E. timandra* Hutton (*Reference List*, l. c., p. 651). Mr. H. A. Pilsbry, however, denies their identity (*Man. Conch.* (2) VIII, p. 84), and I therefore also sent specimens of *E. timandra* to Mr. Edg. A. Smith for comparing them with *varicosa* Pfr. He kindly sent me the following information: "*E. timandra* Hutt. This is *distinct* from *varicosa* Pf. It is smaller, more openly umbilicated, has more riblets, and the armature of the mouth is different. There are three teeth in *timandra* and *one* (overlooked by Pfeiffer and Reeve) in *varicosa*, situated on the body-whorl. It is a very slender lamella, and might easily be overlooked." After receiving this report, I

looked all specimens of *E. timandra* in my collection carefully through, and had the great satisfaction to find a few specimens of *E. varicosa* Pf. The two species differ in the characters mentioned by Edg. A. Smith; however, I have one specimen of *E. varicosa* with two lamellae in the body-whorl. If not very carefully examined, the two species may very easily be confounded. It seems that *E. timandra* occurs only on the North Island, while *E. varicosa* seems to be limited to South Island.

6. *Charopa sylvia* Hutton. I thought this species to be identical with *Ch. tau* Pfeiffer (Ref. List., l. c., p. 657), but felt always more or less doubtful. I therefore sent specimens with the others to Mr. Edg. A. Smith, and he very kindly wrote to me: "*Ch. sylvia* Hutt. You question this being the same as *Hel. tau* Pfr. We have not yet the latter in the Museum, but Pfeiffer's description of the sculpture '*subdistantum costato-plicata*' scarcely applies to your specimens. They are undoubtedly identical with Pfeiffer's *Hel. gamma*. I have compared them with the types, and they agree in every respect, excepting that yours are fresher." Therefore:

Charopa buccinella Reeve, sp., 1852 (= *gamma* Pfeiffer, 1852 (? 1853)) = *sylvia* Hutton, 1883).

Now it remains to identify *Ch. tau* Pfr. It may be that my *Charopa mutabilis* is this species; I have sent a specimen to Vienna to have it compared with Pfeiffer's type, and am awaiting a report.

New Zealand, Christchurch, Sept. 6, 1893.

SHELLS OF THE SAGINAW VALLEY, MICHIGAN.

BY BRYANT WALKER, DETROIT, MICHIGAN.

Some twenty-five years ago the late Dr. George A. Lathrop, while residing at East Saginaw in this State, made a considerable collection of the shells, which he found in that vicinity.

After lying packed away for many years, the collection has recently come into my possession, and as it contains some material of considerable interest, and no local catalogue from that part of the State has ever been published, the following list of the species represented has been deemed worthy of a permanent record.

I am indebted to Dr. V. Sterki for the determination of the Pupidae and to Mr. A. A. Hinkley for the identification of *Goniobasis*

semicarinata Say and *depygis* Say. Unless otherwise specified the locality is in all cases East Saginaw.

Selenites concavus Say.

Zonites nitidus Mull.

Zonites indentatus Say.

Zonites arboreus Say.

Zonites minusculus Binn.

Zonites radiatulus Alder.

Zonites fulvus Dr.

Zonites multidentatus Say. Heretofore cited only from the western part of the State.

Patula alternata Say.

Patula perspectiva Say.

Patula striatella Anth.

Patula lineata Say.

Punctum pygmæum minutissimum Lea.

Helix multilineata Say.

Helix thyroides Say.

Helix albolabris Say. Above the average in size and one example an almost perfect albino.

Helix albolabris dentata.

Helix exoleta Binn.

Helix sayii Binu. Port Austin. A new locality for this (in Michigan) rare species.

Helix mondoni fraterna Say.

Helix leaii Ward.

Helix tridentata Say.

Helix patliata Say.

Helix virgata Da Costa. A single well marked example of this species, apparently of the variety called "*alba*" by Taylor, occurs in the collection with the following label: "From Dr. Clark of Flint, Michigan, where he says it was found." Dr. Clark was a well known physician of Flint in times past; but as both he and Dr. Lathrop are dead, it is not probable that any further information in regard to the circumstances under which this shell was found can be had. The specimen though mature, is not quite fresh, and as the body whorl was filled with hard packed fine sand it seems very probable that it was imported in the earth about some foreign plants.

Vallonia pulchella Mull. Determined by Dr Sterki.

Strobilops labyrinthica Say.

Pupa corticaria Say. These are the first specimens seen from the eastern part of the State.

Pupa armifera Say.

Pupa contracta Say.

Vertigo ovata Say.

Vertigo gouldii Binn. Quite abundant apparently, and exhibiting some considerable variation in size. A single albino example is included, of which Dr. Sterki writes "This is a very interesting and valuable specimen; the only true albino among many thousand specimens of our *Vertigos* I have seen."

Vertigo ventricosa elatior Sterki. Not heretofore known from Michigan.

Vertigo pentodon Say.

Vertigo curvidens Gld.

Ferussacia subcylindrica L.

Succinea oblivua Say.

Succinea peoriensis Wolf.

Succinea avara Say.

Succinea sp.

Succinea ovalis Gld.

Succinea sp.

There are four forms of *Succinea* in the collection, which group around *S. ovalis* Gld. as a type. The first is the form usually called *ovalis* characterized by the short; rather blunt spire, elongated body whorl and effuse aperture. The second is the *peoriensis* of Wolf, a very widely extended form in Michigan and easily separated from the "*ovalis*" by reason of the shorter body whorl and more nearly oval aperture, which though somewhat narrowed posteriorly lacks the patulous expansion anteriorly so characteristic of the former. The third resembles *ovalis* in the shape of the aperture, but is a more slender shell and has the spire more elongated than either the preceding forms. It appears to range generally over the State and is the same form noticed as "*S. higginsi* Bld." in my catalogue of Michigan shells (NAUT. VI, p. 19).

The fourth form is quite remarkable. Having the general shape, characteristic of the group, it far exceeds them all in dimensions, equalling in length a good sized *S. obliqua* Say. These shells were labeled by Dr. Lathrop as "*S. sillimani* Bld.?" They agree substantially in form and size with figures of that species given by Binney. Some individuals, however, have the spire more produced, resembling in that respect the figures of *S. hawkinsi* Bd.; but the suture is not impressed to the extent represented in that species. None of them have the blunt apex, which seems to be characteristic of *S. haydeni* W. G. Binn., though fully equalling that species in size. Cockerell (NAUT. VI, pp. 23 and 29) refers all these forms to the *S. elegans* Risso of Europe. It is possible that these specimens

are similar to the Canadian examples, which he refers to that species.

Carychium exiguum Say.

Limnæa stagnalis L.

Limnæa catascopium Say.

Two forms of this species are represented in the collection. One from the Saginaw River is of the usual form, but of unusual size, one example being nearly one and one-fourth inches in length.

The other form from Saginaw Bay is characterized by its greatly inflated body whorl and very short, rapidly acuminate spire. A single specimen from Lake Huron represents the form usually found in the Great Lakes.

Limnæa reflexa Say. Bayou, East Saginaw and Saginaw Bay. The latter somewhat smaller and more slender than the former.

Limnæa reflexa scalaris. Intermediate between the type and the variety.

Limnæa palustris Mull. Larger than the average in size. The striped variety corresponding to form of *L. reflexa* known as *zebra* Tryon, is also represented.

Limnæa cubensis Pfr.

Physa ancillaria Say. Saginaw Bay.

Physa sayii Tapp.

Physa gyrina hildrethiana Lea.

Aplexa hypnorum L.

Planorbis trivolvis Say.

Planorbis bicarinatus Say.

Planorbis campanulatus Say.

Planorbis albus Mull.

Planorbis exacutus Say.

Planorbis parvus Say. Among a number of the usual form of this species occurs one of the curiously distorted examples, in which the whorls almost from the apex are entirely detached from each other and coiled obliquely like a ram's horn.

Segmentina armigera Say.

Ancylus fuscus Ad. Saginaw River.

Ancylus parallelus Hald. Saginaw River. Much narrower and with the sides more flattened and hence more nearly parallel than in specimens from other localities.

Lyogyrus pupoidea Gld. Heretofore this species has been cited only from the western part of the State.

Campeloma decisa Say. Cass River.

Amnicola porata Say.

Bythinella obtusa Lea.

Goniobasis livescens Mke. Saginaw Bay.

Goniobasis semicarinata Say. Saginaw River.

This is the first time this species has been cited from this State.

Goniobasis depygis Say. Saginaw River.

This species, although cited in the earlier lists of Sager and Miles, has not been found by any of the more recent collectors.

Goniobasis milesii Lea. Cass River.

Two specimens "from Dr. Miles," which seem to justify Tryon's doubt as to whether the species is more than a globose form of *G. livescens* Mke.

Unio alatus Say. Saginaw River.

Unio asperimus Lea. Saginaw River. This is the first recorded occurrence of this species in the eastern part of the State. It may be of interest to add that Dr. W. H. DeCamp of Grand Rapids informs us that the species has also been recently found in the Grand River, so that the doubt formerly cast upon its occurrence in Michigan must be considered as entirely removed.

Unio cornutus Bar. Another addition to the fauna of the eastern part of the State. One example, probably a female, is unusually elongated.

Unio ellipsis Lea. This and all the following species are from Saginaw River.

Unio gibbosus Bar.

gracilis Bar.

ligamentinus Lam.

luteolus Lam.

nasutus Say.

novi-eboraci Lea.

phaseolus Hild.

rectus Lam.

rubiginosus Lea.

schoolcraftii Lea.

ventricosus Bar.

Margaritina deltoidea Lea.

Anodonta benedictii Lea.

footiana Lea.

imbecilis Say.

Sphærium striatinum Lam.

rhomboideum Say.

occidentale Pme.

partumeium Say.

truncatum Lam.

Pisidium virginicum Lam.

abditum Hald.

compressum Pme.

variabile Pme.

NOTES AND NEWS.

MR. JOHN RITCHIE, JR. of Boston paid a short visit to his conchological friends in Philadelphia Feb. 3d and 4th, being the guest of Mr. Ford.

TULOTOMA IN THE TENNESSEE DRAINAGE.—As the Paint Rock River is a tributary of the Tennessee and hence in the Ohio drainage, it may be of interest to note that a fossil specimen of *Tulotoma magnifica* Con. was recently found about 20 miles from its mouth. *T. magnifica* is a living species of the lower Coosa.—*H. E. Sargent, Woodville, Ala.*

REV. SAMUEL LOCKWOOD, PH. D., well known in New Jersey as an enthusiastic student of the Natural History of the State, died at his residence in Freehold, N. J., on Jan. 10th.

SOME FINAL REMARKS RELATIVE TO CYPREA GREGORI, FORD.—Since Mr. Smith has, in the January number of the NAUTILUS, deemed it expedient to make a purely scientific subject, the vehicle of remarks chiefly personal in character, it is just possible that comment is uncalled for from me. It might be prudent, however, to notice one or two of the gentleman's statements, especially that touching the ease with which he could take Mr. Ford's paragraphs *seriatim*, and confute them, etc. In respect to this show of confidence, I have nothing to suggest beyond referring him to the following not very classic, but rather trite saying, viz.: "The man who is always sure that he could have managed things better had he been there, is usually the one who never gets there."

Regarding the quoted phrases so pathetically alluded to by the gentleman, I cannot believe that any reader save himself ever supposed they were presented as parts of his communication.

Certainly such a thought never occurred to me. The "inverted commas" were added to them simply as evidence of their general use. Was this fact apparent to Mr. Smith? Perhaps not, and yet—Perhaps.

As my reasons for claiming priority for the name *C. Gregori* were fully explained in the NAUTILUS for Nov., 1893—and as the justice of this claim has been heartily conceded by very many of our ablest conchologists, I do not propose inflicting the reader with any further

remarks on the subject, now or hereafter.—*John Ford, Philadelphia, Jan., 1894.*

The collection of DR. WM. D. HARTMAN of West Chester, Pa., is offered for sale. It is one of the richest in America in Melanians, *Partula*, *Achatinella*, *Bulimus*, etc., and comprises the types of Dr. Hartman's new species, as well as duplicate types from Lea, Anthony, Wheatley, and many other conchologists. It will prove a very valuable collection to whoever may purchase it.

NOTES ON NEW PUBLICATIONS.

PRELIMINARY REPORT ON THE MOLLUSCAN SPECIES collected by the U. S. Scientific Expedition to West Africa in 1889-90, pp. 32.

ON RARE OR LITTLE KNOWN MOLLUSKS from the west coast of North and South America with descriptions of new species, pp. 11 and plate.

REPORT ON THE MOLLUSK-FAUNA OF THE GALAPAGOS ISLANDS, with descriptions of new species etc., 97 pp., plate and map.

The foregoing are the titles of recent papers on Mollusca by Dr. Stearns published in the proceedings of the U. S. National Museum, in Volume XVI, which includes the various articles for the year 1893. The first of the above, is an annotated catalogue of the shells collected by the Eclipse Expedition so-called, that went to the west coast of Africa for the purpose of observing the total eclipse of the sun, that occurred on the 22nd of December 1889. The Natural History work was of course incidental; it includes also the forms collected at the Azores, where the *Pensacola* touched on her way. The total number of molluscan species collected foots up 120, the greater portion, over one hundred, at various African points, Ascension Island and Cape de Verde, etc. Several of the species are shown to have a wide distribution, from the Gulf of Mexico and the Caribbean waters to the African region; and *Trochatella radians* "not before reported outside of Peru and Chili," was detected, a single example, at Cape de Verde; many other forms have nearly as wide a range.

The second paper embraces several forms, some of which were preliminarily described in "The NAUTILUS" in May, 1893. Many

species of a decided Polynesian aspect are reported from the Gulf of California region; among these are *Chicoreus palmarosa mexicana*, *Ranella cruentata*, *Purpura hippocastanum*, *Casmaria vibex* and *Luponia isabella mexicana*. This paper includes also revised descriptions of species previously described by the author, notably, *Dolabella californica*, *Onchilella binneyi*=*O. carpenteri* Stearns not Binney, etc. A new species of *Tectarius*, *T. atyphus*, the first of this group detected on the West Coast is described; it occurs at Manta on the coast of Ecuador. Other species are referred to and commented upon.

The last of the foregoing titles relates to a paper hitherto briefly noticed in "The NAUTILUS," (December, 1893). This includes a list of Galapagos shells, compiled from the collections made by the *Albatross*, Dr. Habel, Dr. Wolf, the *Petrel*, Dr. W. H. Jones and the papers and publications of Carpenter, Albers, E. A. Smith, Wimmer, Aucey, Reibisch, Dall, etc., etc. The *Albatross* collectors obtained 109 species and several varieties; of these 59 were not before reported as occurring at the Galapagos. A few new species were detected and are described by the author. The total as shown in the summarized list is 288 species and 30 varieties.

The land shells are of a distinctly West American type, comparable with Chilean and Peruvian forms, and with the exception of half a dozen local species, the marine forms are West American—with a slight color of Caribbean or Antillean types.

NOTES ON RECENT COLLECTIONS OF N. A. MOLLUSKS, ETC., by R. E. C. Stearns (Proc. U. S. Nat. Mus. 1893). Dr. Stearns records numerous new localities for various land and fresh-water shells, discussing particularly the range of *Patula strigosa Hemphilli*, and its occurrence in Arizona at Coon Mountain, that problematic crater. *Triodopsis Levettei* is reported from Fort Huachuca and Tucson Arizona (a large form). Ft. Huachuca is so near the Mexican boundary that Stearns believes both *P. hemphilli* and *T. Levettei* will eventually be found in the Mexican state Sonora. *Helicina orbiculata* was collected by Mr. V. Bailey near Marble Cave, Stone Co., Mo., probably near its northern limit. Attention is called to the discontinuous distribution of the section *Mesodon*, which is represented by several western species, among them *townsendiana* and *ptychophora*; records of North Dakota and eastern Montana localities for *Mesodon* are still lacking. In this tract *multilineata* and *thyroides* are to be expected, we think, but suitable stations are not very numerous west of Minnesota and Iowa.

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THE CALIFORNIAN SPECIES OF THE GENUS *NUTTALLINA*.

BY W. J. RAYMOND, OAKLAND, CALIFORNIA.

In the Manual of Conchology, Vol. 14, p. 280, after directing attention to the differences existing between *Nuttallina californica* Nutt. and *N. scabra* Rve., Mr. Pilsbry remarks that data are desirable concerning the areas of distribution of the two species along the Californian coast, especially between San Diego and Point Piedras Blancas, near San Simeon. Having collected numerous specimens of this genus at various points between Bolinas and Santa Barbara, I can offer the following notes.

A glance at a map of the West Coast will recall certain geographical features bearing upon the distribution of marine life. Going southward from San Francisco, the coast line which has followed a general southeasterly direction, bends abruptly to the east at Point Concepcion. As a result of this, the great ocean current from the north which has held to a course near the coast and parallel with it, all the way from Alaska, leaves it for the first time and flowing southward, is still further deflexed by the chain of the Santa Barbara islands. From Point Concepcion eastward, the ocean is warmer and the other conditions surrounding marine life are such as to warrant the expectation of an assemblage of species, different from those found north of the cape. While many species of mollusks are common to our whole Californian coast, *Terebra simplex*, *Drillia hemphilli*, *Marginella varia*, *Cypraea spadicea*, *Trivia solandri*, *Turritella cooperi*, *Norrisia norrisii*, *Trophon belcheri*, *T. triangulatus*, *Periploma planiuscula* and *Barbatia gradata* are species of a more southern fauna, found in Santa Barbara county, which do not as far

as we know pass Point Concepcion. Many other examples might be noted.

This is not the place to enter into a discussion of the West Coast marine faunal provinces. But it is interesting to note that as far as the material at hand gives evidence, the two West Coast species of *Nuttallina* are sharply divided by this natural boundary. At Carpinteria, ten miles east of Santa Barbara and at points west of that town, to Santa Anita, within ten miles of Point Concepcion, the specimens are uniformly *N. scabra*, as are also the more southern examples of the genus. Specimens collected at Point Sal, thirty-five miles northward from Point Concepcion, together with those collected at San Simeon, at Monterey, at Purissima and at points near San Francisco are uniformly *N. californica*. No intergrading forms were observed. While the external appearance is not always a sure guide to specific position, disarticulation of the plates has, in all cases examined, revealed the species with certainty.

A study of numerous specimens from the localities mentioned, shows the following differential characteristics, in addition to those cited by Mr. Pilsbry. Whether they would hold good in specimens from other localities or not, I do not know. In color *N. scabra* is externally more varied than *N. californica*. Specimens of the former from Santa Barbara are clouded and mottled with greenish upon a buff ground-tint, on the second, third, fifth and sixth valves. The remaining valves are much darker and less variegated. In single valves of *scabra*, viewed from above, the broad curving outline of the tegmentum on each side is bordered by a small spot of brown, placed centrally on the light blue surface of the sutural plates. This feature is constant in all of the specimens examined. In *N. californica* the spots are wholly absent, or in some cases replaced by indistinct clouds of a color darker than the surface of the sutural plates. Of course no one would separate the species because of these slight color differences, but taken in conjunction with the weightier points of difference furnished by the shape of the plates, sculpture and character of the girdle, they are interesting as showing how far these geographical races have become differentiated from the parent stock.

LAND AND FRESH-WATER SHELLS OF ALLEGHENY COUNTY, PA.

COLLECTED BY S. H. STUPAKOFF OF PITTSBURGH, PA.,
FROM JAN., 1890 TO DEC., 1893.¹

Mesodon albolabris Say.	Hyalina wheatleyi Bld.
Mesodon var. dentata Binn.	Conulus fulvus Drap.
Mesodon dentifera Binn.	Gastrodonta multidentata Binn.
Mesodon profunda Say.	Ferussacia subcylindrica Linn.
Mesodon pennsylvanica Green.	Leucocheila contracta Say.
Mesodon thyroides Say.	Leucocheila armifera Say.
Mesodon exoleta Binn.	Vertigo ovata Say.
Triodopsis tridentata Say.	Vertigo pentodon Say.
Triodopsis palliata Say.	Vertigo milium Gld.
Triodopsis fallax Say.	Succinea avara Say.
Stenotrema monodon Rack.	Limnæa columella Say.
Stenotrema var. fraterna Say.	Limnæa humilis Say.
Stenotrema hirsuta Say.	Limnæa palustris Müll.
Helicodiscus lineata Say.	Limnæa desidiosa Say.
Vallonia pulchella Mull.	Planorbis bicarinatus Say.
Vallonia excentrica Sterki.	Carychium exile Lea.
Patula alternata Say.	Carychium exiguum Say.
Patula solitaria Say.	Helicina occulta Say.
Patula perspectiva Say.	Physa heterostropha Say.
Patula striatella Anthony.	Ancylus fuscus Adams.
Punctum pygmæum minutissimum Lea.	Sphærium striatinum Lam.
Selenites concavus Say.	Pisidium ?
Mesomphix fulginosus Griff.	Goniobasis ?
Mesomphix ligerus Say.	Margaritana rugosa Barnes.
Mesomphix intertextus Binn.	Unio ligamentinus Lam.
Mesomphix inornatus Say.	Unio gibbosus Barnes.
Hyalina arborea Say.	Unio ellipsis Lea.
Hyalina indentata Say.	Unio cariosus Say.
Hyalina minuscula Binn.	Unio pyramidatus Lea.
Hyalina milium Morse.	Unio trigonus Lea.
Hyalina radiatula Alder.	Unio alatus Lea.

¹ The present list is the first essay toward a knowledge of the snail fauna of western Pennsylvania. The region is an interesting one, combining the features of the Atlantic slope and the Ohio valley; and it is desirable to have a complete and accurate catalogue of the fauna. The fresh-water fauna will prove especially interesting, as we know little of the range of the Ohio River types of Unionidæ and Strepomatidæ in the headwaters of that river system.—ED. NAUTILUS.

In addition to the above the following species were collected by Mr. Geo. H. Clapp; these complete to the present date all the species found in Allegheny County, Pennsylvania.

Strobila labyrinthica Say.

Mesodon clausa Say.

Mesomphix levigatus Pfr.

Gastrodonta suppressa Say.

Vitrina limpida Gld.

Vertigo bollesiana Mse.

Pupa corticaria Say.

A NEW PAPUINA.

BY CHARLES HEDLEY, SYDNEY, AUSTRALIA.

Papuina cerea Hedley.

Shell thin, translucent; contour trochoidal, color waxen white, becoming yellowish on the 3rd and 4th whorls, encircled below the suture by an opaque white thread, *nowhere are translucent lines or spaces visible*. Sculpture: surface of a waxen polish; transverse growth lines can be detected by the unaided eye, and spiral grooves, almost effaced above but plainer on the base, may be



deciphered with a lens. Whorls $5\frac{1}{2}$, flattened, regularly increasing, the last constituting five-eighths of the shell's height, angled at the periphery, descending considerably and abruptly at the aperture, gibbous at the point of flexure. Suture impressed. Aperture very oblique, anterior margin waved; *columella* oblique, wide, *extending nearly to the angle of the aperture, subtruncate below*. A thin, translucent, shining callus extends over the imperforate axis to the insertion of the anterior margin of the lip.

Height $13\frac{1}{2}$, major. diam. 16, min. diam. 14 mm.

Hab. Bloomfield River, North Queensland.

ON THE SPECIES OF MACTRA FROM CALIFORNIA.

BY WM. H. DALL.

In revising the Tertiary *Maत्रacea* of the southeastern United States, it became necessary to examine the recent species and work

up their synonymy. The species of the Pacific coast especially have long been known to be in a very bad state as regards nomenclature, etc. Several long known forms appear, on investigation, to be really nameless, the titles belonging to other less conspicuous species having been applied to them, while some of the earliest named forms have been lost sight of. I hope to furnish the NAUTILUS, shortly, with synonymic lists of the east and west coast *Mastras*, pending the completion of which the following descriptions are offered.

Mastra catilliformis Conrad. Pl. V, fig. 3.

Shell large, thin, whitish or straw color, irregularly concentrically striated, with a gray, wrinkled epidermis, inflated short-oval subequilateral valves and closely adjacent inconspicuous beaks; anterior end of shell evenly rounded in front, a little shorter than the posterior end; lunule narrow, impressed, escutcheon narrow, longer, rather obscure; posterior end of valves rounded, slightly compressed and with a narrow gape when closed; hinge resembling that of *M. polynyma* Stm., but more concentrated, cartilage pit large, rather produced; posterior muscular impression larger, pallial sinus rather large, rounded in front. There is a faint posterior flexure of the valves and a feebly marked area above it, on which the epidermis is more conspicuous. Lon. 108·0, alt. 87·0, diameter 45·0 mm., in a moderately sized pair, but the adult reaches 140·0 mm. in length.

Distribution: Neeah Bay to San Diego, Cala.

This is *Standella californica* Carpenter, but not of Conrad or Deshayes. It was imperfectly described without a figure by Conrad in the Am. Journ. Conch. vol. iii, p. 193, 1867, and erroneously stated to come from Panama. *M. lenticularis*, Gabb, 1866, from the Miocene of California is closely related.

Mastra Hemphillii n. s. Pl. V, fig. 2.

Shell large, thin, inflated, subequilateral, creamy white with a yellow thin epidermis, which over the body of the shell in young shells is beautifully evenly concentrically striated and on the posterior dorsal area is irregularly wrinkled, with an elevated raphe of epidermis at the margin of the area; beaks rather prominent, the anterior end of the valves longer than the posterior; posterior dorsal slope excavated; lunule obscure, escutcheon marked by prominent elevated radial lines of epidermis; the dorsal margin pouting in front of the ligament, the posterior slope convex, the posterior flexure

faint, but marked by a recession of the ventral border of the valves, which gape but very little and not at all in front; anterior end rounded, but smaller than the posterior; ventral border arcuate; hinge and pallial sinus much as in the last species, except that the sinus is somewhat smaller and less depressed. Lon. 120, alt. 93, diam. 50 mm.

Distribution: San Diego, Hemphill and Cooper.

This fine and perfectly distinct species appears rare and I have seen but two specimens, both from San Diego.

The preceding species belong to the subgenus *Standella* as adopted by H. and A. Adams, but the following is a true *Mactra*, with the ligament separated from the cartilage pit by a shelly plate.

Mactra dolabriformis Conrad, 1867. Pl. V. fig. 1.

Shell much compressed, polished white under a dull brown epidermis, subequilateral with inconspicuous beaks. It closely resembles *M. falcata* Gould (from type) but has higher beaks more centrally set, the anterior end more attenuated and less truncate, the left anterior lateral tooth single and distally more prominent; the left cardinal larger and wider; the posterior adductor scar horizontally elongate and smaller. Lon. 90, alt. 63, diam. 26 mm.

Distribution: San Diego, Cala. to Guaymas, Mexico; "Panama" Conrad.

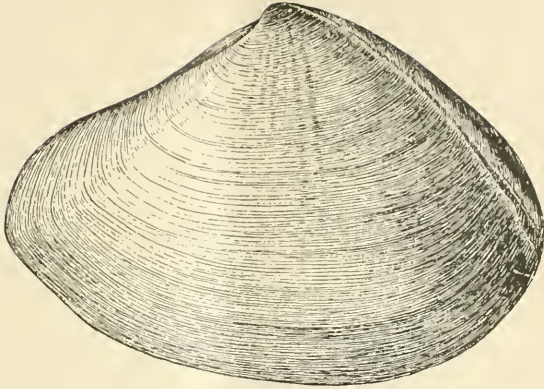
This remarkably handsome shell has not unnaturally long been confounded with *M. falcata*, from which the hinge separates it subgenerically.

The true *M. californica* of Conrad is a *Mactrinula* and can at once be recognized by its sulcate beaks. It reaches 36 mm. in length. The *M. plumulata* is also a small species, resembling *M. polyuyma* in miniature. The northern form generally referred to *M. falcata* is a barely separable variety of *M. polyuyma* which may take the name of *Aluskana*.

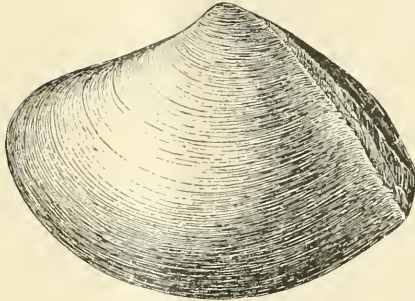
NOTICES OF NEW CHITONS, III.

BY H. A. PILSBRY.

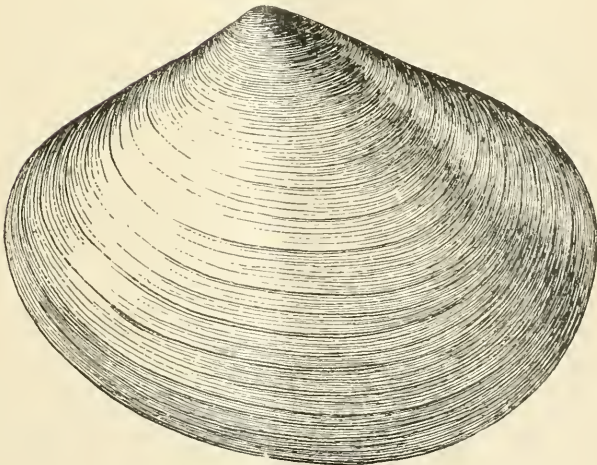
Certain rectifications of the previously accepted nomenclature have become necessary, and may be made here.



No. 1.



No. 2



No. 3.

Genus *Phacellozona* Pilsbry (new name).

Synonymy: *Angasia* CPR., Table Reg. Chitons, 1873. DALL, Proc. U. S. Nat. Mus., 1881, pp, 283, 286, 289, 290. PILSBRY, Manual of Conchology, XIV, p. 286.

Not *Angasia* White, Proc. Zool. Soc. Lond., 1863, p. 498 (Crustacea).

The type of the genus will, of course, remain *Angasia tetrica* Cpr.

Genus *Choriplx* Pilsbry (new name).

Synonymy: *Microplx* AD. & ANG., Proc. Zool. Soc. Lond., 1864, p. 194. PILSBRY, Manual of Conch., XIV, p. 21.

Not *Microplx* Fieber, Europ. Hem., p. 53, 1861 (Hemiptera).

Type *Microplx grayi* AD. & ANG. This is an extremely peculiar and isolated genus, and forms, I am disposed to believe, a distinct family of the *Eoplacophora* or slitless Chitons—that is, if the slits really prove to be completely absent, for the unique type has not been disarticulated. In some features it recalls the *Acanthochitidae*. The single species was described and illustrated from the unique type in the British Museum, in the Manual of Conchology, vol. XIV.

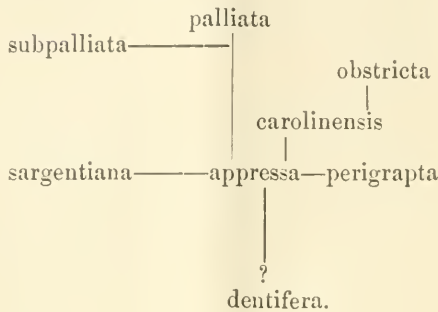
 DESCRIPTIVE NOTES ON CERTAIN FORMS OF POLYGYRA.

BY H. A. PILSBRY.

The genus *Polygyra* is one of the most numerous and characteristic groups of North American land snails. It ranges over the whole of the Eastern United States, from Canada to Florida, and from Manitoba to Yucatan, with species in Idaho and on the Pacific slope. A few stragglers have reached Cuba, the Bahamas and Bermuda.

Many of the species exhibit a great amount of variation, and in some cases the variations of several allied species form chains of mutations almost or quite connecting very unlike species. This is the case in the group of *Polygyra appressa*. Typical *P. appressa* is a snail having the aperture three-toothed, but the upper lip tooth is often small or wanting. It varies toward *P. obstricta* var. *carolinensis*, which is close to *P. obstricta*, and less so to *P. palliata*. In another direction *P. appressa* is allied to *P. sargentiana*. In fact, *appressa* is not far from the ancestral form from which all the spe-

cies mentioned above have been differentiated. This diagram expresses roughly the relationships of the species and varieties:



Polygyra appressa Say.

Surface striate, but having no spiral incised microscopic lines; outer lip frequently having an upper tooth, or the indication of it; parietal tooth generally long, curving downward and nearly joining the columellar lip.

This species was collected by Say on Long's Expedition. It is abundant in Illinois, Arkansas, Missouri, etc. Say's types are lost, but his description unmistakably indicates this form.

Polygyra appressa perigrapta Pils.

Surface striate and having crowded microscopic spiral incised lines, especially beneath; outer lip with no upper tooth; parietal tooth short, not connecting with columella.

Distribution mainly southern; Woodville, Ala.; Cherokee Co., N. C.; Columbus, Ga.; etc. The types are Woodville specimens.

Polygyra fallax Say.

This is, as the writer has elsewhere shown, the *H. introferens* of Bland. It is not the *fallax* of all modern writers and collectors.

Polygyra fallax obsoleta Pils.

General features as in the type, but all teeth of the aperture much reduced in size, the upper lip tooth nearly or wholly obsolete. Newbern, N. C.

Polygyra tridentata edentilabris Pils.

General characters as in the type, but lip teeth wanting in perfectly mature examples.

***Polygyra hirsuta altispira* Pils.**

Size large; spire high and conical; notch of the basal lip very large. Alt. 7, diam. 9 mm.

Specimens are before me from near Magnetic City (Wetherby) and from the Black Mountains, N. C. (Hemphill).

REMARKS ON *ASTYRIS GOULDIANA*.

BY A. H. GARDNER, FORT HAMILTON, N. Y.

In a careful examination of the Columbelloidæ dredged by me last summer in Long Island Sound, I find amongst specimens of *Astyris lunata*, taken from a muddy bottom with eel grass, in 2 to 3 fathoms of water in Lloyd's Harbor, 3 shells which are typical examples of *Astyris gouldiana* Agassiz *in litt.* (*vide* Stimpson) and again recorded from this same locality by Mr. Sanderson Smith in "The Mollusca of Long Island and its dependencies," Smith & Prime. The species seems to have been considered as of doubtful validity by Prof. Verrill, as in "The Invertebrate of Vineyard Sound," he includes it in the synonymy of *Astyris lunata*, referring to it as a color variety identical with the *Wheatleyi* of Dekay, but I think the characteristics of the shell entitle it to rank as a good species.

The shells measure in length 4 to $4\frac{1}{2}$ mill., and have 8 whorls. *A. lunata* rarely exceeds 3 mill. and has from 6 to $6\frac{1}{2}$ whorls; in *Astyris gouldiana* these whorls are more convex and inflated.

The apical termination of the shell resembles that of *Belemnitella americana*, whilst in the general outline of its whorls it is very much like the well known land mollusk, *Ferussacia subcylindrica*. The rostrum is not only much produced but is curved to such an extent in two of the specimens as to give the aperture a decidedly auriform appearance. The thick loosely appressed callus on the pillar lip of *A. lunata* is represented in this shell only by a very fine glaze. The specimens all exhibit clear zigzag markings of a brownish red, which are more pronounced than those found on any examples of *A. lunata* in my collection.

The division line between the two species seems to me to be quite sharp, both as regards size and form. I have seen no shells which

might be classed as intermediate, which would seem to confirm my conclusions.

NOTE ON *PATELLA KERMADECENSIS*, PILSBRY.¹

BY GEO. W. TAYLOR.

More than a year ago a little parcel of limpets from Kermadec Islands was sent to me by a correspondent in New Zealand. They were sent by way of England and were there delayed so that they did not reach me until about a month ago.

I at once perceived that they belonged to an unknown species and I promptly sat down and wrote a note, with a diagnosis of the species for the NAUTILUS, but on a second thought decided not to be too hasty, and so instead of sending my note, I sent a specimen (a young one) of the shell itself to the Associate Editor asking him kindly to compare it with the series in the Philadelphia Museum and let me have his opinion.

I did this because I thought and still think it possible that the young shell may have been already described.

This morning I received the February NAUTILUS, and I find that some one else has a correspondent in Kermadec Island and that Mr. Pilsbry has been beforehand with me and named the new shell most appropriately, *Patella kermadecensis*.

However, as Dr. Pilsbry has only 2 specimens and I have 14, I venture to write a line or two to supplement his description.

I may say that in my opinion, the shell is very nearly related to *pica* Reeve which by the way is a South Pacific species according to the original descriptions, although Mr. Pilsbry in his "Manual" has transferred it to the Mauritius.

My suite of *kermadecensis* consists of 2 full grown shells and a series of 12 others ranging from 75 mm. down to 6 mm. in length. The large ones are respectively 130 mm. x 109 mm. x 41 mm. and

¹ This remarkable limpet seems to have been received by Mr. Taylor and Dr. W. H. Dall at about the same time. Dr. Dall sent to the NAUTILUS a description of the species under the name *P. Kermadecensis*, but after the Editors' description was already in print. Dall's description of the young and adult shells, with figures, will shortly be published in the Proc. Acad. N. S. Phila.—ED.

130x109x34 mm., being both considerably flatter than the specimens described by Mr. Pilsbry.

All my specimens are distinctly narrowed in front, and in this particular the species differs essentially from *P. patriarcha*, which is very round in outline. I have a specimen of *patriarcha* exactly the same *width* as the two shells above mentioned, namely, 109 mm., but its *length* is only 119 mm. Our species is further distinguished by its sculpture from both *patriarcha* and *mexicana*—the ribs being narrower and much more numerous than in *patriarcha* and decidedly heavier than in *mexicana*. Every 5th or 6th rib in the adult shell seems to be more prominent.

Although my shells are not badly eroded there is but little color observable outside, except in spots where smaller limpets have had their stations. In such places the peculiar burnt red color so characteristic of *P. argenvillei* is seen, and the same color, with an occasional spot of black, edges the interior of the shell and in a paler and browner shade blotches the spatula, which in the young shells is sometimes entirely brown. It would seem that the color of the interior becomes lighter with age, as is the case in many other species.

The muscle scar is, as Mr. Pilsbry remarks, strongly marked and callous in the adult shell, but in the young, it is not at all noticeable. This is the case also with the 2 species with which *kermadecensis* is compared.

On the whole this is the very finest of the many fine species of limpets that Mr. Pilsbry has made known to science during the last few years. It has no rival in size save *P. mexicana*, except it be the at present unrecognized *P. gigantea* of Lesson from the Society Islands, which may be found to be nearly allied or perhaps identical with the present shell.

NOTICES OF NEW JAPANESE MOLLUSKS, I.

BY H. A. PILSBRY.

The species described below were collected by Mr. Frederick Stearns of Detroit, Michigan, during his second visit to Japan, in 1892. They will be illustrated in his Catalogue of Japanese shells, now in preparation.

Sepia Hercules n. sp.

Shell having the general form of that of *S. esculenta* Hoyle but more convex ventrally; chitinous margin narrow; dorsal surface tuberculate-rugose as in *esculenta*, but more coarsely so, the posterior part having the tubercles very deeply separated, flat-topped, and leaning posteriorly; dorsal surface evenly rounded, with no trace of a median longitudinal rib. Ventral surface as in *esculenta*, but the striation is much closer although the shell is triple the size. Last loculus has an index of 22. Inner cone well developed, its limbs arising about one-third the length of the shell from the posterior end, gradually rising along the sides, posteriorly reflexed and appressed on the outer cone, leaving below a narrow small cavity. The anterior edge of the inner cone does not form a shelf across the posterior end of the outer cone as is the case in *esculenta*, and the cavity is much smaller, shallower and narrower than in a specimen of *esculenta* 155 mill. in length. Spine very stout, conical, its root excavated ventrally.

Length 425 mill.; greatest breadth 160 mill.; length of spine 19 mill.

This species is the giant of the genus, the shell being about $16\frac{7}{8}$ inches long. It is allied to *S. esculenta* Hoyle, but differs as above indicated. The dorsal slope does not descend abruptly to the spine as in that species. Of *S. esculenta* a good many specimens are before me collected by Mr. Stearns. They agree well with the "Challenger" specimens. The size of *esculenta* is moderately constant, those seen by Hoyle, Appellöf and myself being from 155 to 163 mill. long (about $6\frac{1}{4}$ inches). In color, *S. Hercules* is white in the middle, faint pink at the sides; whitish beneath.

A second specimen from the Loo Choo Is. exhibits the same characters throughout.

NOTES AND NEWS.

The Rev. Geo. W. Taylor reports the appearance of *Paludina Japonica* Mart. in the Chinese Market at Victoria, B. C. These Mollusks are accounted dainties by the Chinese and are retailed to them at 25 cents a pound. The occurrence of this species in the San Francisco markets was noted by Mr. W. M. Wood in the NAUTILUS, Vol. V, p. 114.

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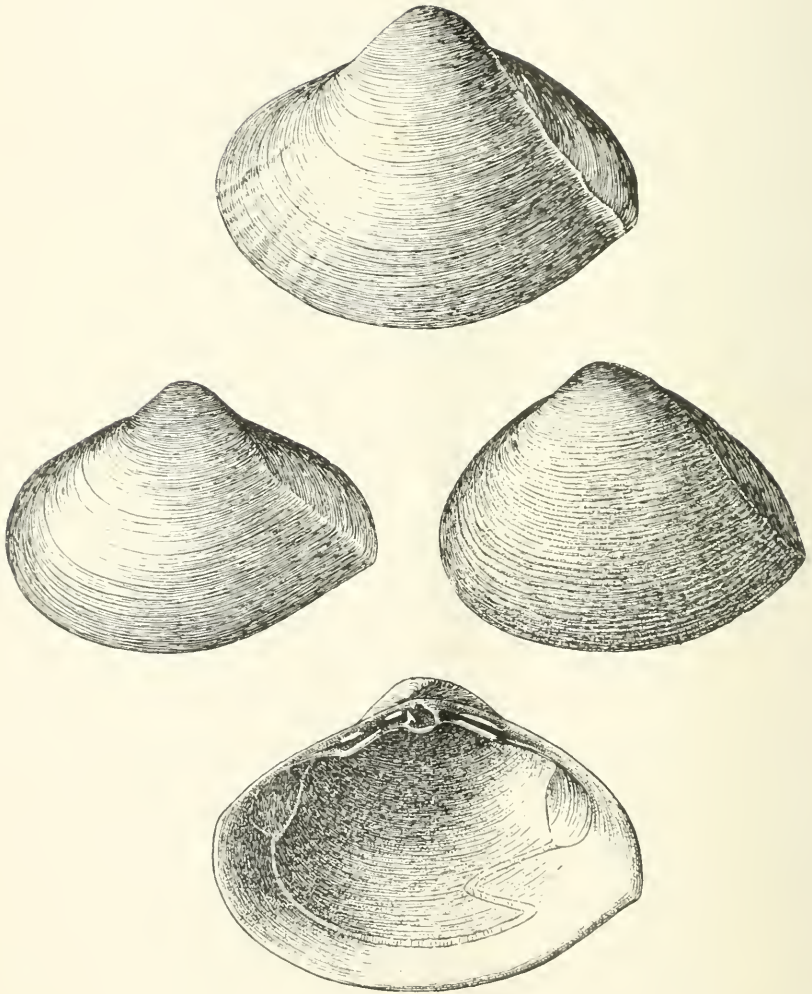
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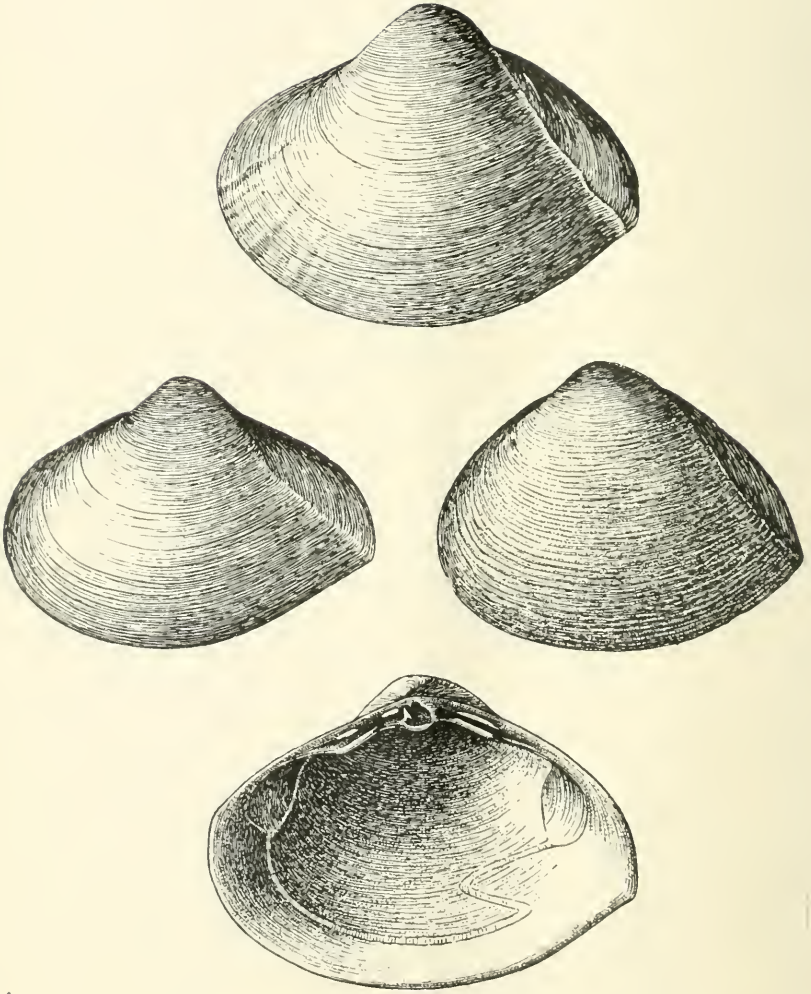
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DALL — West American Mactridæ.



DALL — West American Mactridæ.

THE NAUTILUS.

VOL. VIII.

MAY, 1894.

No. 1

LIST OF SHELLS COLLECTED IN JAMAICA.

BY J. B. HENDERSON, JR.

First paper: Glandinidae, Zonitidae, Helicidae.

The following is a list of a collection made by Mr. Charles T. Simpson and myself in Jamaica, during the months of December and January (in part) last. We were upon the island about one month and although we devoted ourselves assiduously to hunting snails, yet so much time was spent in getting about from place to place, and otherwise lost, that our collecting appears, after all, to have been very superficial—a mere hasty gathering of what presented itself along the roadside.

I have attempted, as far as possible, to be “up to date” in the nomenclature. Mr. Simpson cheerfully assumed the heavy task of identifying the material, for which I am very much indebted to him. To Mr. Vendryes I wish to extend my thanks for courtesies shown us by him in Kingston.

1. *Glandina nitidiuscula* C. B. A. Bog Walk.
2. *Glandina unicolor* C. B. A. Montego Bay; Bog Walk.
3. *Glandina propinqua* C. B. A. W. of Ocho Rios; Mandeville; Spurtree Hill; Port Antonio.
4. *Glandina perplexa* C. B. A. Montego Bay; St. Anns; Stony Hill.
5. *Glandina griffithi* C. B. A. Bog Walk.
6. *Glandina similis* C. B. A. Gallina Point; Bog Walk; Port Antonio; Mt. Pleasant; Hope River; Ocho Rios; Mandeville.
7. *Glandina ligata* C. B. A. Mandeville.
8. *Glandina venusta* Pfr. Hope River.

9. *Glandina nemorensis* C. B. A. Hope Bay.
 10. *Glandina elegans* C. B. A. (Bought).
 11. *Glandina philippiana* Pfr. Bog Walk.
 12. *Glandina arcuata* Pfr. Montego Bay.
 13. *Glandina costulata* C. B. A. West of Port Antonio.
 14. *Glandina proxima* C. B. A. Bog Walk.
 15. *Glandina gracilior* C. B. A. Mandeville; Bog Walk.
 16. *Guppya epistylum* C. B. A. Mandeville.
 17. *Zonites* (*Stenopus*?) *simulans* C. B. A. West of Port Antonio.
(This seems, from the characters of the shell, to be a *Stenopus*).
 18. *Sagda foremaniana* C. B. A. Bought.
 19. *Sagda cookiana* C. B. A. Bog Walk; Stony Hill; Mandeville.
 20. *Sagda spiculosa* Shuttl. St. Anns Bay; Ocho Rios; Gallina Point; Bluefields; Buff Bay; Sav. la Mar.
 21. *Sagda connectens* C. B. A. Near Bluefields.
 22. *Sagda epistylum* Müll. Mandeville; Montego Bay; Sav. la Mar.
 23. *Sagda alveare* Pfr. Bog Walk; Stony Hill.
 24. *Sagda maxima* n. s. Eight miles north of Sav. la Mar.
 25. *Sagda jayana* C. B. A. Bog Walk.
 26. *Sagda alligans* C. B. A. Near Sav. la Mar.
 27. *Sagda epistyloides* Fér. Mandeville.
 28. *Sagda* (*Hyalosagda*) *osculans* C. B. A. Montego Bay.
 29. *Sagda* (*Hyalosagda*) *osculans* var. *delaminata* C. B. A. (?) Hope River.
 30. *Sagda* (*Hyalosagda*) *arboreoides* C. B. A. Bog Walk; Buff Bay; Pt. Maria; Hope River; Stony Hill; Petersfield; Spurtree Hill; Mandeville; Pt. Morant; Bowden; St. Anns; Port Antonio.
 31. *Sagda* (*Hyalosagda*) *hollandi* C. B. A. St. Anns; Port Antonio; Ocho Rios; Bowden; Buff Bay; Montego Bay; Mandeville; Gallina Point.
- The *Sagdas* are very variable in size, form and development of internal laminae, and appear often to blend one into another.
32. *Thysanophora spreta* C. B. A. Pt. Antonio. (*Microphysa* [preoccupied] = *Thysanophora*).
 33. *Thysanophora brevior* C. B. A. Gallina Pt.; W. of Pt. Antonio.
 34. *Thysanophora apex* C. B. A. Montego Bay.
 35. *Thysanophora fuscula* C. B. A. Bog Walk.

36. *Thysanophora diminuata* C. B. A. Montego Bay; Mandeville; Long Mt.; Little River; Falmouth; Ramble (Hanover); Pt. Antonio; Bowden; Cave and ledge near St. Anns; Gallina Point; Pt. Antonio.

37. *Thysanophora boothiana* Pfr. Bluefields; Petersfield; Mandeville; Black River; St. Anns; Mt. Pleasant. (*T. athoniana* C. B. A. seems to be only a slightly larger and solider form of this).

38. *Thysanophora sincera* C. B. A. Port Antonio; St. Anns Bay; Ramble; Gallina Point; Montego Bay; W. of Pt. Antonio. (Seems only to be a less strongly ribbed var. of *T. diminuata*).

39. *Thysanophora peraffinis* C. B. A. Cave St. Anns; Duncan; Rio Novo; Petersfield; Buff Bay; Hope River; Pt. Antonio; Ramble; Bog Walk; Falmouth; Montego Bay; Bluefields; Bowden; Little River; Gallina Point; Ocho Rios; Spurtree Hill; Mt. Pleasant.

40. *Thysanophora perdepressa* C. B. A. Long Mt.; West of Pt. Antonio.

41. *Thysanophora turbiniformis* Pfr. Hope Bay; Gallina Point; Bog Walk; Bowden; Mandeville; Mt. Pleasant; Pt. Antonio; Duncans; Rio Novo; Spurtree Hill; Buff Bay; St. Anns; Ocho Rios; Falmouth. (Quite variable. The var. from Spurtree Hill much elevated. Those from Falmouth, Ocho Rios, St. Anns, and Rio Novo greatly depressed).

42. *Thysanophora ptychodes* Pfr. Mandeville; Bog Walk.

43. *Thysanophora immunda* C. B. A. Bluefields; Stony Hill; Bog Walk. (*T. ptychodes*, according to Adam's shells in the Natl. Museum, is considerably more depressed and sharper keeled than this species. All our material, however, of both forms is intermediate in form and it is probable that the two run together).

44. *Zaphysema macmurrayi* C. B. A. Mandeville; Petersfield (dead).

45. *Zaphysema tunicata* C. B. A. Bought.

46. *Zaphysema tenerrima* C. B. A. Bog Walk.

47. *Zaphysema columellata* C. B. A. Beach, Morant Bay; S. of Montego Bay. (*Zaphysema* is a generic name applied by Pilsbry to the Jamaican forms hitherto included in *Cysticopsis*).

48. *Helix* (*Pleurodonte*) *bainbridgei* Pfr. Bought. (*Lucerna* is now included in de Waldheim's *Pleurodonte*. See Man. Conch., (2), Vol. IX, p. 80).

49. *Helix* (*Pleurodonte*) *lucerna* Müll. St. Anns; Morant Bay; Yallaho R.

50. *Helix* (Pleurodonte) *lucerna* v. *julia* Fér. Cave, St. Anns.
51. *Helix* (Pleurodonte) *lucerna* v. *fuscolabris* C. B. A. Little River.
52. *Helix* (Pleurodonte) *acuta* Lam. (small var.). Mandeville; Bog Walk.
54. *Helix* (Pleurodonte) *acuta* v. *nobilis* C. B. A. Stony Hill.
54. *Helix* (Pleurodonte) *acuta* v. *nannodonta* Brown. Mt. Pleasant.
- 54a. *Helix* (Pleurodonte) *acuta* v. *albino*. Sav. la Mar.
55. *Helix* (Pleurodonte) *acuta* v. *lamareki* Fér. Bluefields; Bog Walk.
56. *Helix* (Pleurodonte) *peracutissima* C. B. A. Mandeville (fine living spec.); Petersfield; Spurtree Hill (dead).
57. *Helix* (Pleurodonte) *sloaneana* Shuttl. Montego Bay. (*Helix vendryesiana* of Cockerell, specimens of which were sent to the Natl. Museum by the author from this locality, seems to be identical with this).
58. *Helix* (Pleurodonte) *schroeteriana* Pfr. Petersfield; Mt. Pleasant.
59. *Helix* (Pleurodonte) *tridentina* Fér. Sav. la Mar. (Seems to connect with last).
60. *Helix* (Pleurodonte) *invalida* C. B. A. Stony Hill.
61. *Helix* (Pleurodonte) *bronni* Pfr. St. Anns Bay.
62. *Helix* (Pleurodonte) *sinuata* Müll. Mandeville.
63. *Helix* (Pleurodonta) *consanguinea* C. B. A. Bog Walk.
64. *Helix* (Pleurodonte) *sinuosa* Fér. Bog Walk.
65. *Helix* (Pleurodonte) *picturata* C. B. A. Sav. la Mar.
66. *Helix* (Pleurodonte) *anomala* Pfr. Bought.
67. *Helix* (Thelidomus) *aspera* Fér. Mandeville; Rio Bueno; Spurtree Hill; Mt. Pleasant; Petersfield; Bog Walk; Montego Bay.
68. *Helix* (Eurycratera) *jamaicensis* Gmel. Cave St. Anns; Bluefields; Bog Walk; Mandeville.
69. *Helix* (Thelidomus) *jamaicensis* v. *cornea* Simpson. Mandeville. (A var. without any coloring whatever, and with a corneous epidermis).
70. *Helix* (Hemitrochus) *graminicola* C. B. A. Bog Walk; Spurtree Hill; Long Mt.; Stony Hill; Mandeville.
71. *Helix* (Dialeuca) *conspersula* Pfr. Sav. la Mar, on logwood trees.

The *Dialeucas* are very variable and puzzling and none of the specimens collected exactly agree with any figures or descriptions known to the writer.

72. *Helix* (*Dialeuca*) *conspersula* v. *platystyla* Pfr. Sav. la Mar (on trees).

73. *Helix* (*Dialeuca*) *conspersula* v. *virginea* C. B. A. Mt. Pleasant (on trees).

74. *Helix* (*Dialeuca*) *subconica* C. B. A. Mandeville; Stony Hill.

75. *Helix* (*Dialeuca*) *fuscocincta* C. B. A. Bought.

76. *Helix* (*Dialeuca*) *nemoraloides*. C. B. A. (?) Bog Walk.

77. *Helix* (*Dialeuca*) *blandiana* C. B. A. Buff Bay; Pt. Antonio.

78. *Helix* (*Dialeuca*) *gossei* Pfr. Hope River. (Pilsbry and others unite this with *H. subconica* C. B. A. There is a shell of the above and specimens of Adam's species in the Natl. Museum which were labelled and sent by Adams to Dr. Lea. *H. conica* is a thin shell, much more depressed and with straighter spire than this species; the last whorl is scarcely descending anteriorly, while in this species it is abrupt and strongly deflected. In *H. gossei* the outer lip is thickened and reflected, the columella is quite strong and broad. If it were found in Cuba it would be called a *Coryda*, and is suggestive of an elevated *Helix alauda*).

(To be concluded in June number.)

ON SOME SPECIES OF MULINIA FROM THE PACIFIC COAST.

BY W. H. DALL.

Mulinia modesta, n. s. (Plate I, lower fig.).

Shell rather small, ovate-triangular, thick, equilateral, covered with a lineated straw colored thin epidermis, ivory white with a few rusty flecks toward the umbones; surface smooth except for incremental lines; anterior dorsal area obscure, posterior larger, bordered by a hardly angulated ridge on which the epidermis forms a raised line, but without any marginal flexure behind the basal termination of this ridge; anterior end evenly rounded, beaks prominent, pointed rather distant, pallial sinus well marked. Lon. 42.0 alt. 31.0, diam. 24.0 mm.

Habitat, Guaymas, Sloat, in U. S. Nat. Mus.

This differs in its proportions from *M. carinulata* Desh. to which Carpenter referred it. The latter is with little doubt merely a young specimen of *M. pallida* Sby. the *M. donaciformis* of Gray, better known as *angulata* Gray. It is a thinner shell with a sharp keel terminating in a somewhat recurved acute point, and having the beaks more anterior than *M. modesta*. The beaks are decidedly more distant in the latter.

Mulinia coloradoensis, n. s. (Plate I, upper fig.).

Shell larger, solid, rude, equilateral, resembling *M. modesta*, but having the posterior dorsal margin more arched, the base behind the posterior dorsal angle, somewhat concavely flexuous, and the surface anteriorly and on the dorsal area marked with obsolete, little elevated radii. Lon. of a medium sized specimen 49, alt. 36.5, diam. 32 mm.

Habitat, Head of the Gulf of California in the estuary of the Colorado River, abundant; Dr. E. Palmer.

M. coloradoensis var. *acuta*, n. s. (Plate I, left fig.).

Shell thinner, longer, and more flexuous posteriorly. Lon. 40, alt. 29 mm.

Habitat, with the typical form, common.

Mulinia Bradleyi, n. s. (Plate I, right fig.).

Shell resembling a miniature *M. donaciformis* but more compressed, shorter, the beaks smaller and less prominent, the posterior dorsal margin much more arched, no basal flexuosity, the pallial sinus longer and more rounded internally, and the epidermis elevated into narrow fringes, more or less regularly spaced. Lon. 32, alt. 26, diam. 15 mm.

Habitat, Panama; Bradley, in U. S. Nat. Museum.

TRIODOPSIS + MESODON.—DISTRIBUTION, ETC.

BY ROBERT E. C. STEARNS.

In the last number of the Manual (Pulmonata Series), Mr. Pilsbry very properly unites *Triodopsis* and *Mesodon*; both of these are Rafinesque's names; in order of date, the former has priority, therefore *Mesodon* must take a back seat. As to the propriety of these names, neither is satisfactory. *Triodopsis* the name that must stand for the reason above given, priority, conveys a false idea, for as Mr. Pilsbry says, in the remarks¹ that precede his list:

¹Manual of Conchology, pt. 34, pp. 74-76.

"The species enumerated below have been divided by authors into two sections, *Triodopsis* and *Mesodon*, but such division seems to be artificial. Some species of *Triodopsis* are known to have varieties lacking lip teeth, and these would technically fall into *Mesodon*.

"In other cases, such as the group of Idaho and Washington species, all the transitions from tridentate to toothless apertures occur. The group of *P. appressa* is also a transition group. Tryon has resuscitated the section names *Xolotrema* and *Ulostoma*. The first of these is a Rafinesquian name totally unidentifiable; the second was proposed by Albers for species of *Polygyra* ss. and *Triodopsis* ss., and did not include either of the forms Tryon uses the name for! *Aplodon* Raf. has also been used in this connection; it is positively unidentifiable." Whoever has had occasion to review the points referred to by Mr. Pilsbry, cannot fail to indorse his conclusions.

Triodopsis as a name is as unsatisfactory as *Mesodon*; but there it is, and it will have to stick. *Xolotrema* and *Ulostoma* must be consigned to the waste basket; fortunately they are book names rather than names in practical use.

Touching the matter of distribution in connection with the foregoing, the farthest outpost of *Triodopsis*+*Mesodon* in the Southwest is that occupied by *T. levettei* at Fort Huachuca and Tucson, Arizona, about on the line 32° N. latitude and 111° longitude W. While Santa Fè, New Mexico, where the type described by Bland was collected, is considerably further to the north and east. At the first named place the three genera, *Arionta*, *Patula* and *Triodopsis* occur in close geographical proximity, but there are wide gaps between these localities and the west coast, and between the same localities and the nearest eastern localities of *Triodopsis*+*Mesodon*. So the more northerly line of distribution of *Triodopsis*+*Mesodon* is interrupted or discontinuous as I have pointed out elsewhere,² along the line as we proceed eastward from the Pacific Coast through the states adjoining the southerly boundary line of the Dominion of Canada, i. e. Washington, northern Idaho and Montana (according to Binney); then comes the gap between western Montana and the eastward.

Within the States above named we find *Triodopsis*+*Mesodon*, *Patula* and *Arionta* in geographical proximity as in the southerly region previously named. We find the *Triodopsis*+*Mesodon*

²Proc. U. S. Nat. Mus., Vol. XVI, pp. 749—50.

characters shading into each other in both regions though perhaps less frequently in the Atlantic Appalachian region, so that they appear to be in no way related to geographical or environmental differences or influences. Size, elevation or depression, color, sculpture, etc., are exhibited as might be supposed, in many and various facies, but the denticulation of the marginal lip of the aperture, or the presence of a tubercular callus or tooth on the parietal wall, or a tuberculoid lump or thickening at the base of the pillar, all of these last characters are inconstant and variable and are often present or absent in examples that are found in the same colony, at many if not all places, within the territory inhabited by the species of *Triodopsis*+*Mesodon* group.

In *Triodopsis levettei* from Arizona and New Mexico, as well as in *T. devia*+*Mullani* from the northerly region before indicated, "we find all the transitions from tridentate to toothless apertures occur." A comparison between 40 and 50 examples from Cœur d'Alene, Idaho, in addition to those previously contained in the National collection, indicate that *Mullani* is but a variety of *devia* as Mr. Binney has placed it³; and to quote Mr. Binney's remarks: "The variations of this species show very markedly the unsatisfactory character of our so-called genera. Here we have the typical *devia* as a *Mesodon*, though the variety is a true *Triodopsis*."

DESCRIPTIVE NOTICES OF NEW CHITONS—IV.

BY H. A. PILSBRY.

Plaxiphora Suteri, n. sp.

Shell resembling *P. biramosa* Q. and *P. superba* Cpr.; but girdle all over sparsely hairy, *without the least indication of pores or sutural bristles*. Valves smooth, with slight growth-wrinkles, the diagonal rib but slightly indicated. Ridge with a chestnut band with a stripe of green on each side of it, the pleura and lateral areas uniform blackish olive. Girdle blackish with chestnut hairs. Interior blue, fading to white on the sutural-plates. Length about 45, breadth about 25 mm.; (specimens all curled and contracted).

Tinaru, Sumner and Port Lyttelton, S. Island, N. Z.; (H. Suter).

A young specimen has the earlier formed portion of each valve light brown, spotted with white. This is probably the normal coloring of the young shells.

³Manual Am. Land Shells, p. 119.

Ischnochiton elizabethensis, n. sp.

Shell small, elliptical-oblong, elevated at an angle of about 105° ; carinated, the side-slopes somewhat convex. Color whitish or buffish-olive, finely and closely mottled all over with light olive-green, or having angular patches of olive at the sides of each valve; sometimes with black-green triangles on the ridge of some valves (valves ii, iv, vii, viii); the posterior margins of valves more or less tessellated light and dark. Girdle indistinctly tessellated with numerous small green bars or patches.

Intermediate valves not beaked. Valves finely granulated throughout, *the sculpture closely resembling that of Trachydermon cinereus* L. Lateral areas slightly raised. Posterior valve having the central mucro somewhat prominent, posterior slope concave.

Interior bluish, with a pair of darker green rays in each intermediate valve; the inflected posterior margin tessellated. Sutural plates small, separated by a very wide, straight, smooth sinus. Anterior valve having 10, intermediate valves 1-1, posterior valve 11 slits; teeth smooth and sharp; slit-rays showing as whitish lines; posterior tooth in intermediate valves short, removed from the posterior margin of valve by about its own length. Eaves narrow.

Girdle densely clothed with smooth, flattened imbricating scales.

Length $10\frac{1}{2}$, breadth 7 mm.

Habitat: Port Elizabeth, S. Africa.

This little species closely resembles *Trachydermon cinereus* L. (*marginatus* auct.), or *dentiens* Gld., in sculpture and coloration, but differs from them in the totally diverse girdle-covering. I am indebted to Mr. G. B. Sowerby for specimens. It is the *Ch. marginatus* of his useful "Marine Shells of S. Africa," p. 50.

NOTICES OF NEW JAPANESE MOLLUSKS, II.

BY H. A. PILSBRY.

Siphonaria sirius n. sp.

Shell oblong, polygonal, low-conical with subcentral, erect, apex; *primary ribs all single, generally 7, strongly elevated and white; interspaces wide, dark brown, radially finely ribbed. Interior brown-black, the larger ribs indicated by white rays; Siphon occupying a single rib, never a double one. Cavity with a white callus (rarely*

chestnut colored), the region of the muscle-impression bordered with chestnut stains. Length 22, breadth 17-19, alt. 5 mm.

Sagami, and Kashiurazaki, Boshu, Japan (Frederick Stearns!)

This species differs from *S. atra* Q. & G., *corensis* A. & R., and their allies in having the siphonal rib single and simple. It is probably the species identified as *S. atra* by Dunker and other writers on Japanese shells. Several hundred specimens collected by Mr. Stearns agree in the characters above given. Not one shows any tendency to double the siphonal rib.

Helix (*Euhadra*) *yaeyamensis* n. sp.

Shell sinistral, perspectivevely umbilicated, depressed, thin but rather solid, light brown with a supra-peripheral brown line. Surface irregularly wrinkle-striate and in places showing an excessively fine, superficial spiral striation. Spire low conoidal, composed of 6 convex, slowly widening whorls, the last nearly twice as wide as the preceding, a trifle descending in front, rounded at the periphery and beneath. Aperture oblique, wide lunate; peristome flesh-tinted, narrowly expanded and subreflexed, and slightly thickened within, dilated at the columellar insertion. Alt. 17, greater diam. 27½, lesser 23 mm.

Yaeyama (Okinawa) Island, Loo Choo group. (Frederick Stearns).

This species is apparently most nearly allied to the Chinese *H. latilabris* Mlldff., but the umbilicus is more open, the lip narrower, aperture more oblique, etc. The umbilicus is wider and more open than in *H. quesita*.

ISAAC LEA CHAPTER, AGASSIZ ASSOCIATION.

BY DR. M. L. LEACH, WEXFORD, MICH.

A vigorous chapter of the Agassiz Association has been in existence for several years and is known as the "Isaac Lea Conchological Chapter." Its members are scattered over this country from Maine to California, and some of them reside in Canada. The Chapter is divided into sections, each having a secretary, who has special knowledge of his department. A juvenile section has recently been added, and a goodly number of boys and girls are learning about shells. As the members are so widely separated, most of the com-

munications must be in writing. The most valuable papers consist of annual reports, which are sent to the members in turn, and are finally preserved by the general secretary. During the past years excellent work has been done by members of this Chapter, and an invitation is extended to working conchologists to apply to the secretary for membership.

The President of the Chapter is Prof. Josiah Keep, of Mills College, Cal., and the Secretary is Mrs. M. Burton Williamson, University P. O., Los Angeles Co., California.

MELONGENA CORONA Gmel.

BY FRANK A. WHITE, GEORGIANA, FLORIDA.

For many years I have seen these shells and have been sure that they were from a living mollusk, but until March 20, 1894 had never seen one alive.

On that day I went from Georgiana to Oceanus and as the river was very boisterous I went by way of the Thousand Islands. When about half a mile from my destination we all went ashore for a few minutes and there in the shoal, still water, were several pairs of *Melongena corona* apparently in the act of copulation. I very much desire to visit the station again when I have more time at my command and secure more of the shells and observe more closely their actions.

Structural and Systematic Conchology in the description says "operculum solid" but does not give material. It is horny and not very thick.

There is some variation in the living shells some having varices near anterior end of aperture, others smooth. Some time ago I found a broken shell much larger than any recent shell I have seen. The spire and part of the body whorl were gone but the aperture was intact and measured 3 inches in length including the callus of posterior canal. This seems to indicate that in "prehistoric times" these mollusks attained a much greater size than at the present time.

I neglected to say in the proper place that the living shells were in the Banana river in brackish water.

NOTES AND NEWS.

MR. EDWARD W. ROPER has returned from a two months trip to Jamaica. He reports a good time and considerable collecting.

PURPURA SAXICOLA VAL.—A large suite of this species recently presented to the collection of the American Association of Conchologists by MR. WILLIARD M. WOOD, shows an extraordinary amount of variation. Some very large examples are represented, the largest measuring 34 mm. alt. Others show variations from smooth to strongly corded. In color they vary from livid-white or gray; white to bright orange and to black, some being spirally banded with brown in the intervals between the white spiral riblets. The entire lot was collected in San Francisco County, Cal.

MR. FREDERICK STEARNS of Detroit, is in Philadelphia, working upon the literature of Japanese mollusks.

A. B. KENDIG, D. D., has removed from East Orange, N. J., to 2190 Seventh Ave., New York City.

OBITUARY.

MRS. D. L. GARLICK expired suddenly March 16, 1894, in San Francisco. She was spending the winter in Alameda, as the guest of her sister, Mrs. Gaylord, 2116 Central Avenue, and the two ladies went out to the Cliff House and vicinity yesterday to spend the day collecting shells.

They climbed a precipitous height near Land's End station on the line of the Ferries and Cliff House Railroad, and when she reached a little station on the road, they sat down for a rest. Suddenly Mrs. Garlick fell forward and dropped on the floor. Upon trying to raise her up, Mrs. Gaylord was horrified to see that her sister was dead.

Weakness of the heart, aggravated by over exertion, is attributed as the cause of death.

The home of the deceased was at St. Paul, Minn., and she made it a practice for many years to spend the winters in California, either in Alameda or San Diego. She had been interested in the collection of shells for some years.

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No. 2

UROSALPINX CINEREUS IN SAN FRANCISCO BAY.

ROBT. E. C. STEARNS.

The Report of the U. S. Commissioner of Fish and Fisheries 1889-91 just published (March, 1893), contains an interesting and valuable paper by Mr. Charles H. Townsend of the *Albatross* on "The Oyster Resources and Oyster Fishery of the Pacific Coast," etc., etc., in which he mentions the occurrence of *Urosalpinx cinereus* (= *Fusus cinereus* Say) on the beds of transplanted Eastern oysters near Belmont. It appears that this species, the "drill" of the oystermen, "has not become troublesome until very recently, and even now is abundant only in the southern part of the Bay.

* * * * *

"At the Belmont beds I had no difficulty in gathering a quart of these mollusks, in less than ten minutes, by merely turning over the large oysters when the water had receded from the beds.

* * * * *

"This destructive animal may have been introduced much earlier than the oyster-men suppose, as a few individuals accidentally imported among the original oysters would require several years to increase to the present numbers." They had not at the time of Mr. Townsend's investigation, been detected on the oyster beds at Millbrae, which are much nearer the sea.

This is the second form that has incidentally been introduced with the oysters from the Atlantic seaboard, *Mya arenaria* being the first; the latter has already become abundant, and therefore a val-

uable addition to the food supply of the West Coast. It seems strange that some of the conchologists or collectors should not have detected the *Urosalpinx* before; for while, no doubt it multiplies rapidly under favorable conditions, still the abundance of this form as shown by Mr. Townsend's investigation, indicates that it must have been on the Belmont beds for several years. The common *Purpura* of the coast, *P. crispata* has heretofore been found in considerable numbers on some of the oyster beds in San Francisco Bay. How it compares with the *drill*, as an oyster borer and pest to the oyster men, I have not learned.

We may reasonably look forward to the finding of a third eastern species, as an accidental or incidental transplantation; it may be already established there, in some of the beds of eastern oysters. I refer to the ribbed *Mytilus*, *M. hamatus* Say, which is so frequently met with here, attached to *Ostrea virginica*. Mr. Townsend or some of the local naturalists, should look after it—if not there now, it will be sooner or later.

Washington, D. C., March, 1894.

A FEW NOTES ON HELIX APPRESSA.

BY A. G. WETHERLY.

In the April NAUTILUS, Mr. Pilsbry has given us his description of *Triodopsis appressa*, and named a variety thereof, *perigrapta*. As I am at war in a good humored way, with the modern habit of designating the hundreds of varieties of our land shells by latin names, I hope to make my reasons plain in the following brief note. Referring to, but not copying Pilsbry's description of *perigrapta*, I will say that I have shells in my collection exhibiting every gradation of the sculpture in question, from a few "spiral incised lines" in specimens from Cherokee Co., N. C., to those in which these lines are not only crowded, but much more pronounced individually; and as these specimens are heavily ribbed, they aid in giving some parts of the surface of the shell a beaded appearance.

Every gradation may be traced in the specimens which I have, from the smooth albino form found at Cincinnati, Ohio, to those rough mountaineers from Morrowville, Tenn. Where then, does

perigrapta begin and where does it stop? Any of these varieties is just as much entitled to name as is the one selected for this honor. Among the rest is a large var., 23 mm., from Lookout Mt., Tenn. This variety is almost smooth or very sparingly costate. It is slightly wrinkled like *Z. inornatus*. But it is crowded with these incised lines *above* and *below*!

Another form that I collected at Gasper, Picking Co., Ga., in August, '83, is very costate, and has the incised lines very much crowded and developed. The Lookout shells have the parietal tooth long, curving, and joining the columellar callus in the umbilical region. The Gasper specimens have this tooth short and very erect. They also have the lip very much widened, and the spire elevated. I have, in my suite of this species, four shells, taken at random from a lot collected at Murphy, Cherokee Co., N. C., *in every one of which the upper tooth is well indicated*, the parietal tooth is short and erect, the spire elevated, the body whorl obtusely carinate and the whole surface above and below is crowded with "microscopic spiral incised lines." Now which is *perigrapta*? The deep costæ and the multitude of spiral incised lines roughen the epidermis of the Morrowville examples and begin to introduce the conditions attaining in *subpalliata*. These shells, in consequence, have a somewhat dull appearance, while the Lookout Mt. and Cherokee Co. specimens are highly polished.

A variety from Braden Mt., Tenn., is heavily costate, and has the spiral lines (as has every shell of *appressa*) but not "incised." These shells range from 12 mm. to 25 mm. (my largest specimen of *sargentiana*). This last form is costate, has the erect tooth, the carinate body whorl, and the spiral lines, not "incised," and is in fact nearer to the typical *appressa*, in every aspect, than the highly polished and shining specimens from N. C.

Now what is the philosophic method in treating such a problem? Is it to give all these varieties names, loading up our literature and check lists with trinominal designation for varieties that differ in the same County of the same State? Or shall we write our labels *appressa* var. with *locus* and so on to the end? There is at least one collection in the U. S. where the latter method prevails and will to the end. I am tempted, in this place, to prune and reset Mr. Pilsbry's phylogenic tree according to my ideas, but I will not take space for so doing now. I do not, however, believe that *dentifera* is the root or that the branches *sargentiana*, *appressa* and *perigrapta*

are of equal specific rank, or that two of them are of any specific rank whatever; and I base my statement not only upon the varieties of this species here briefly mentioned, but upon many others in my collection, from many States and mostly collected by myself.¹

Why do we not take to our heart of hearts the great truth that there are no hard and fast lines in Nature's record either present or past, and hold close the splendid proof given by this shell?

The foreign student who has not seen all our shells can tell nothing by these names, but if he knows *appressa* he will have the truth suggested by *appressa*, etc. So, too, our catalogues will be something besides names and *nobis!* They will be expressive of facts in the life history of this humble race.

This is the method that appeals to me as the scientific, the truthful, the suggestive method; and I shall never cease to believe in it and to work for it.

NOTICES OF NEW JAPANESE MOLLUSKS, III.

BY H. A. PILSBRY.

Siphonaria acmæoides n. sp.

Shell oblong, nearly equilateral, but with excentric apex like *S. radiata* A. & R. (Zool. Samarang pl. 13, fig. 2). The even surface hardly modified by the 9-16 low, wide ribs, between which it is very finely radially striated. Siphonal rib wide but low and inconspicuous. Apex spiral, bent down and appressed. Interior blackish or chestnut within the muscle impression, outside of which it is radially striped black and white, the siphonal channel extremely shallow and inconspicuous. Color outside whitish-buff, speckled and maculated with brown, or whitish on the principal ribs, the intervals black-brown. Length $12\frac{3}{4}$, breadth $9\frac{1}{2}$, alt. $3\frac{1}{2}$ mm.

Prov. Boshu, Japan (Frederick Stearns).

This little species very closely resembles *Acmæa Heroldi* in the general form and the coloration of the interior.

¹ Mr. Pilsbry intended *appressa*, not *dentifera* for the root, in his diagram. The "tree" is seen from above, not from the side.—ED.

PEROSTYLUS, A NEW GENUS OF FUSOID GASTROPOD.

BY H. A. PILSBRY.

In volume IX of the Manual of Conchology, Mr. Tryon described and figured a shell from Port Darwin, N. Australia, as *Cerithium* (*Colina*) *Brazieri*. Having occasion recently to study a large number of *C. macrostoma* Hinds, the type of the subgenus *Colina*, I was at once struck by the notable difference between this species and *C. Brazieri*. The latter does not seem to belong to the *Cerithiidae* at all, much less to the group *Colina*. I am more inclined to view it as an aberrant type of the *Fusidae*, although only a knowledge of the operculum and dentition can decide the question. The new group may be thus diagnosed :

PEROSTYLUS n. g. *Gen. Char.*: Shell cylindrical or pillar-shaped, thin, with decollated apex like that of a *Rumina* or *Cylindrella*; last whorl but little wider than the spire; aperture small, shaped like that of *Fusus* or *Chrysodomus* (*Sipho*), produced in an open canal below; columella straight or sinuous, without folds; outer lip thin and fragile. Type *Cerithium* (*Colina*) *Brazieri* Tryon.

The decollation of the spire is not the result of erosion, as in the species of *Potamides* and *Melaniidae*, nor is the apex filled with a thick solid mass of shell-tissue as in those groups. In *Perostylus* the structure is like that of *Rumina decollata* or the West Indian *Cylindrellas*.

The genus will consist for the present of two species.

P. Brazieri Tryon.

Shell cylindrical, white, fragile, hardly tapering, consisting of $6\frac{1}{2}$ remaining whorls, each carinated and obtusely nodulous in the middle, and obsoletely spirally lirate. Last whorl with one or two spiral cords below the peripheral keel, and more distinctly spirally lirate, the base nearly smooth. Aperture one-third the length of the shell; outer lip thin and fragile, columellar lip distinctly sigmoid, smooth. Alt 21, diam.



6 mm.

Habitat, Port Darwin, N. Australia (John Brazier).

If this shell could be reproduced in the form it would have were the earlier whorls not decollated, it would be by all odds the most attenuated Gastropod known, surpassing even the *Terebras* in the number of its slowly increasing whorls. The numerous young shells

before me fully support this opinion. Unfortunately none of them are young enough to show the apex. The youngest of them, although not half the diameter of the adult, show the same almost imperceptible degree of tapering.

P. Fordianus Pilsbry.



Shell cylindrical, white, thin; spire hardly tapering, but last whorl notably wider. Remaining whorls $4\frac{1}{2}$, sculptured as in the last species, but the next-to-the-last whorl is distinctly narrower than the preceding whorl. Aperture nearly one-half the length of the shell; outer lip thin, simple; columella straight, a trifle deflected toward the left below. Alt. 19, diam. $7\frac{1}{2}$ mm.

Habitat unknown. The specimens were presented to the Academy by Mr. John Ford.

This species is distinguished from the preceding by its straight, not sigmoid columella, and by the fewer remaining whorls. As the last character might possibly be the result of greater age, I do not now attach much importance to it, although it will probably prove to be a constant specific feature.

SOUTHERN SHELLS IN MISSOURI.

BY F. A. SAMPSON, SEDALIA, MO.

In the March *Nautilus* there is a reference to *Helicina orbiculata* having been collected in Stone county, Missouri, "probably near its northern limits." I have it in my collection from three other counties in Missouri: Jasper, Barry, and Macdonald, all of them being near the southern line of the state.

Of some other southern species I have specimens from places further north, a list of which is here given:

Bulimulus dealbatus Say, from the counties of Macdonald, Barry, Douglas, Camden and Cooper, the two latter being in the central part of the state.

Polygyra triodontoides Bland, from Barry.

P. jacksoni Bland, from Jasper, Barry, Macdonald, Dade and Camden.

P. dorfeuilliana Lea, from Howell and Douglas.

P. sampsoni Weth., from Macdonald, Jasper, Barry, Camden and Benton the latter being in Central Missouri.

P. leporina Gld., from Barry, Butler and Cape Girardeau.

Stenotrema labrosum Bland, from Macdonald, Barry, Jasper, Dade and Greene.

Triodopsis vultuosa Gould, from Macdonald, Dade and Pettis, the latter being in Central Missouri.

Mesodon divestus Gould, from Barry, Jasper and Dade.

M. andrewsi W. G. B., from St. Francois.

LIST OF SHELLS COLLECTED IN JAMAICA.

BY J. B. HENDERSON, JR.

Second paper: Orthalicidæ, Cyliindrellidæ, Pupidæ, Operculata.

78. *Bulimulus immaculatus* Rve. Long Mt.; S. of Pt. Maria.

79. *Orthalicus undatus* Brug. E. of Kingston, on trees. Hope River (dark var.).

80. *Cylindrella montana* C. B. A. Bought.

81. *Cylindrella columna* C. B. A. Bog Walk (?).

82. *Cylindrella striata* Chitty (?). St. Anns.

83. *Cylindrella ovata* Desh. (?). St. Anns.

84. *Cylindrella cylindra* Chem. Stony Hill.

85. *Cylindrella sanguinea* Pfr. Bog Walk.

86. *Cylindrella brevis* Pfr. Long Mt.; Ocho Rios; Hope River Rockfort.

87. *Cylindrella brevis* v. *intermedia* C. B. A. Hope River.

88. *Cylindrella obesa* C. B. A. Falmouth.

89. *Cylindrella columna* C. B. A. Rockfort.

90. *Cylindrella gravesi* C. B. A. Montego Bay; Little River; Bluefields.

91. *Cylindrella bacquieana* Chitty (?). Cave, Pt. Antonio.

92. *Cylindrella nobilior* C. B. A. Bog Walk.

93. *Cylindrella aspera* C. B. A. Yallahs River.

94. *Cylindrella rosea* Pfr. Mandeville.

95. *Cylindrella rosea* v. *fortis* C. B. A. Spurtree Hill.

96. *Cylindrella rubra* C. B. A. Bog Walk.

97. *Cylindrella tenella* C. B. A. Falmouth; Little River; Ocho Rios; Bog Walk; St. Anns; Gallina Point; Montego Bay.

98. *Cylindrella alba* C. B. A. N. of St. la Mar.
99. *Cylindrella inornata* C. B. A. Mandeville (dead).
100. *Cylindrella seminuda* C. B. A. Bog Walk ; Long Mt.
101. *Cylindrella robertsi* C. B. Ad. Ocho Rios ; Montego Bay ; Stony Hill.
102. *Cylindrella elongata* Chem. Bog Walk ; Stony Hill.
103. *Cylindrella gracilis* Wood. Mandeville.
104. *Lia maugeri* Wood. Bog Walk. Bought.
105. *Macroceramus gossei* Pfr. Spurtree Hill.
106. *Pupa servilis* Gould. Hope River ; W. of Pt. Antonio.
107. *Pupa tenuidens* C. B. A. W. of Pt. Antonio.
108. *Pupa jamaicensis* C. B. A. Falmouth ; Rockfort.
109. *Pupa grevillea* Chitty. W. of Pt. Antonio.
110. *Pupa jardineana* Chitty. W. of Pt. Antonio.
111. *Pupa lata* C. B. A. W. of Pt. Antonio.
112. *Stenogyra (Opeas) pauperculus* C. B. A. W. of Pt. Antonio ; Mt. Pleasant.
113. *Stenogyra (Opeas) terebella* C. B. A. St. Anns ; Long Mt. ; Falmouth ; Black River ; Bog Walk ; Gallina Point ; Montego Bay.
114. *Stenogyra (Opeas) striosa* C. B. A. Rockfort ; Montego Bay ; Black River ; Bog Walk ; Duncans ; Pt. Antonio ; Mt. Pleasant ; Bowden ; Bluefields ; Long Mt. ; Ocho Rios ; St Anns ; Gallina Point ; Hope River.
115. *Stenogyra (Subulina) octona* Chem. St. Anns ; Pt. Maria ; Pt. Antonio ; Kingston ; Hope Bay ; Gallina Point ; Buff Bay ; Bowden ; Mandeville ; Mt. Pleasant ; Bluefields ; Remble ; Petersfield ; Bog Walk ; Stony Hill ; Long Mt. ; Annotha Bay ; Ocho Rios.
116. *Stenogyra (Subulina) octonoides* Chem. Pt. Antonio ; Bog Walk ; Black River ; Mandeville ; Gallina Point ; Montego Bay.
117. *Stenogyra (Spiraxis) solitaria* C. B. A. Long Mt. ; Montego Bay.
118. *Stenogyra (Spiraxis) pellucens* C. B. A. Bog Walk ; Ocho Rios ; Rio Novo ; Hope River ; Annotha Bay.
119. *Stenogyra (Spiraxis) aberrans* Pfr. Cave, St. Anns.
120. *Stenogyra (Spiraxis) subula* Pfr. Spurtree Hill ; Mandeville ; Bog Walk ; Stony Hill.
121. *Stenogyra (Leptinaria) pallida* C. B. A. Bog Walk ; Montego Bay ; Pt. Antonio ; Mandeville ; Ocho Rios.

122. *Geostilbia iota* C. B. A. W. of Pt. Antonio.
123. *Succinea sagra d'Orb.* Montego Bay; Pt. Antonio; Bog Walk; Bowden; Rio Novo; Buff Bay; Gallina Point; Pt. Maria; Petersfield; Mandeville; Bluefields.
124. *Succinea contorta* C. B. A. Bowden; Bluefields.
125. *Succinea angustior* C. B. A. Montego Bay; St. Anns; Petersfield.
126. *Succinea latior* C. B. A. Pt. Antonio; Montego Bay; Mt. Pleasant; Gallina Point; Bowden; Mandeville; Rio Novo; Pt. Maria; St. Anns; Bog Walk; Black River.
- (I believe all these *Succineas* to be one species).
127. *Veronicella occidentalis* Gldg. Pt. Antonio.
128. *Veronicella sloanei* Cuvier. Mandeville.
129. *Carychium exilis* C. B. A. Petersfield; St. Anns; Pt. Antonio.
130. *Geomelania beardsleyana* C. B. A. Bog Walk.
131. *Geomelania minor* C. B. A. Mandeville.
132. *Geomelania fortis* C. B. A. Mandeville.
133. *Geomelania procera* C. B. A. Pt. Antonio; Bowden.
134. *Geomelania jamaicensis* Pfr. Petersfield.
135. *Geomelania pygmaea* C. B. A. Rio Novo.
136. *Geomelania vicina* C. B. A. Black River.
137. *Geomelania pauperata* C. B. A. Montego Bay.
138. *Geomelania affinis* C. B. A. (?). Kingston.
139. *Truncatella pulchella* Pfr. Rockfort.
- (In fresh water pool with *Planorbis decipiens*! This pool is by the roadside, the water slowly oozing out of a cut in the hill. A few above and a short distance from Kingston Harbor).
140. *Truncatella scalerina* Mich. Little River, on stones at low tide.
141. *Truncatella succinea* C. B. A. St. Anns; Petersfield, on mountain with hermit crabs, 9 miles from the sea; Ocho Rios.
142. *Neocyclotus dubiosum* C. B. A. Montego Bay; Falmouth.
- (“*Neocyclotus*” has been applied by Crosse and Fischer to the American forms of *Cyclotus*. The group of species with corrugated shells peculiar to Jamaica is placed by them in the subgenus *Platystoma*).
143. *Neocyclotus (Platystoma) portlandiensis* Chitty. Pt. Antonio.
144. *Neocyclotus (Platystoma) semi-nudus* C. B. A. Bog Walk.

145. *Neocyclotus* (*Platystoma*) *varians* C. B. A. Mandeville; Petersfield.
146. *Neocyclotus* (*Platystoma*) *varians* v. "a" Chitty. Bog Walk.
147. *Neocyclotus* (*Platystoma*) *jamaicensis* Chem. Petersfield; Mt. Pleasant; Mandeville; Bog Walk.
148. *Neocyclotus* (*Platystoma*) *subrugosus* Sby. Mandeville; St. Anns: Hope River; Sat. la Mar.
149. *Neocyclotus* (*Platystoma*) *rupis-fontis* Chitty. Mandeville.
150. *Neocyclotus* (*Platystoma*) *corrugatus* Pfr. Mandeville; Spurtree Hill.
151. *Neocyclotus* (*Platystoma*) *crassus* C. B. A. Black River; Mandeville; Montego Bay: Sat. la Mar; Mt. Pleasant.
152. *Neocyclotus* (*Platystoma*) *pretiosus* Chitty. Bog Walk; Rio Novo.
153. *Neocyclotus* (*Platystoma*) *ruber* Chitty. St. Anns Bay.
154. *Neocyclotus* (*Platystoma*) *jugosus* C. B. A. Sat. la Mar.
155. *Neocyclotus* (*Platystoma*) *jugosus* v. *rufilabris* C. B. A. Bought.
156. *Neocyclotus* (*Platystoma*) *corrugatissimus* Chitty. Ocho Rios.
157. *Neocyclotus* (*Platystoma*) *biswichi* Chitty. Bluefields.
158. *Neocyclotus* (*Platystoma*) *corrugator* Chitty. Gallina Pt.; Duncans.
159. *Neocyclotus* (*Platystoma*) *gemma* Chitty. Petersfield; Montego Bay.
160. *Neocyclotus* (*Platystoma*) *granulatus* Chitty (MS). Gallina Point.
161. *Neocyclotus* (*Platystoma*) *nova-spei* Chitty. Rio Novo.
162. *Neocyclotus* (*Platystoma*) *zig-zag* Chitty. Montego Bay.
163. *Neocyclotus* (*Platystoma*) *annotator* Chitty. Gallina Pt.
164. *Neocyclotus* (*Platystoma*) *sp.* Bluefields.
- (There is a remarkable resemblance between the shells of this group, but a great diversity in the sculpture of the opercula which furnishes good specific characters).
165. *Choanopoma* *fimbriatulum* Sby. Mandeville.
166. *Choanopoma* *lencina* L. Bog Walk.
167. *Choanopoma* *interruptum* Lam. Mona House, Long Mt.
168. *Adamsiella* *variabilis* C. B. A. Bluefields.
169. *Adamsiella* *mirabilis* Wood. Montego Bay.

170. *Adamsiella pulchra* C. B. A. Gallina Point; Rio Novo.
171. *Adamsiella grayana* Pfr. Stony Hill; Bog Walk.
172. *Adamsiella grayana* v. *aureo-labris* Simpson. Rio Novo.
 (These differ from the type in being less elevated, smoother and somewhat shining, in having a larger umbilicus; and in the aperture, which has the inner lip slightly or often not at all developed, and the outer smooth and reflexed, the whole a bright reddish orange. The outer lip of the type is little reflexed and generally lamellar, the border is usually straight at its upper part; in the var. it is invariably bent back. Were this not such a variable species, Mr. Simpson thinks it should receive a specific name).
173. *Tudora columna* Wood. Bog Walk.
 =*quinquefasciatum* C. B. A.
174. *Tudora armata* C. B. A. Rochfort.
175. *Tudora fecunda* C. B. A. Hope River; Long Mt.; Stony Hill.
176. *Tudora proxima* C. B. A. Bog Walk; Mandeville; Pt. Maria.
177. *Tudora angustae* C. B. A. Bowden; Hope River; St. Anns; Ocho Rios.
178. *Tudora angustae* v. *rufilabre* C. B. A. Near Ocho Rios.
179. *Tudora fascia* Wood. Gallina Point; Buff Bay; Pt. Antonio; Hope Bay; Little River.
180. *Tudora crenulosum* C. B. A. Spurtree Hill; Bluefields.
181. *Tudora aurora* C. B. A. Gallina Point; St. Anns.
 =*maritima*?
182. *Tudora maritima* C. B. A. Rio Novo; Ocho Rios; Cave, St. Anns.
183. *Tudora adamsi* Pfr. St. Anns; Gallina Point; Falmouth, near Long Bay.
184. *Tudora wilkinsoni* C. B. A. Bluefields.
185. *Tudora shepardiana* C. B. A. Mt. Pleasant.
186. *Colobostylus jayanus* C. B. A. Mandeville; Bog Walk.
187. *Colobostylus jayanus* var. Bought.
188. *Colobostylus albus* Lam. Gallina Point; Rio Novo; St. Anns; Buff Bay.
189. *Colobostylus albus* v. *fuscus* C. B. A. Rio Novo.
190. *Colobostylus tectilabris* C. B. A. Spurtree Hill; Mandeville.
191. *Colobostylus redfieldianus* C. B. A. Bog Walk; Bluefields; Kings; Mt. Pleasant; Montego Bay; Black River.

192. *Colobostylus bauhsianus* Sby. Mandeville.
=hyacinthimum C. B. A.
193. *Colobostylus chevalieri* C. B. A. Little River.
194. *Colobostylus chevalieri v. albus* C. B. A. Montego Bay.
195. *Colobostylus chevalieri virgatus* C. B. A. Little River.
196. *Colobostylus lamellosus* C. B. A. Near Little River.
197. *Colobostylus bronni* C. B. A. E. of St. Anns; Falmouth; Little River; Ocho Rios; on stone walls in the sunshine at Montego Bay.

(One specimen from Mt. Pleasant that differs slightly from the others, but hardly specifically).

198. *Colobostylus yallahensis* C. B. A. (?). Duncans (in Portland): E. of St. Anns.

(Agrees with Reeves figure in Conc. Icon., Vol. XIII, pl. 13, but hardly with Adams' description. If it is not this it must be a new species).

199. *Helicina neritella* Gray. Montego Bay; Bluefields; Mt. Pleasant; Petersfield; Pt. Maria; Annotta Bay; Mandeville; Pt. Antonio; Stony Hill; Buff Bay; Bog Walk; Sav. la Mar.

200. *Helicina neritella* var. (banded) (new?) Bog Walk.

201. *Helicina jamaicensis* Sby. Mandeville.

202. *Helicina aurantia* Gray. St. Anns; Montego Bay.

(To be Continued.)

NOTES AND NEWS.

VARIATIONS DUE TO STATION IN POLYGYRA (STENOTREMA) HIR-SUTA Say.—Having read your "Descriptive Notes on Certain Forms of Polygyra" in the April "NAUTILUS," I take the liberty of sending you two forms of *P. hirsuta* Say that I have found in this County. The first measures 8 mm. in diameter, is very common on *low ground*, in some places being the most plentiful species of *Helix* found, while the second form, 6 mm. diam., I have only found on *one high, and dry hill*, clear up at the top, among moss and stones, where the Trailing Arbutus (*Epigæa repens*) and Wintergreen grow. I think you will find No. 2 alive, as I only collected them last Sunday. Under the microscope you will see that while No. 1 has "sharp, rigid hairs" those of No. 2 are curved or hooked. It also seems to me that there is a noticeable difference in the "notch."—*Geo. H. Clapp, Pittsburgh, Pa., April 3, 1894.*

THE NAUTILUS.

VOL. VIII.

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No. 3

SYNOPSIS OF THE MACTRIDÆ OF NORTH AMERICA.

BY WM. H. DALL.

In revising the group of *Maत्रracea* with the intention of working up the Tertiary species of North America it became necessary to go over the whole of the recent species and enquire into their synonymy. The following lists of east and west American species seem likely to be useful to students, as the synonymy of the group has been in a confused state hitherto. The distinctions between the different types of *Maत्रridæ* have hitherto largely been lost sight of, owing to the practice of confounding all together under one or two generic names; and while, to those habituated to previous methods, the present arrangement may at first sight seem excessively subdivided, I have found, in going over the whole group of *Maत्रracea* in the National Collection, that features of geographical distribution and characters of importance in the development of the family in time, are brought out by it in a way which was wholly impossible by earlier methods. The present subdivision compared with that of most other groups of mollusks at the present time is not excessive, and by those who may be led to a close and accurate study of the mollusks in question hereafter I believe it will be found to be useful and convenient.

I. Synopsis of the *Maत्रridæ* of the Eastern coast of the United States.

Subfamily MACTRINÆ.

Genus **MACTRA** (L.) Lam., 1799.(+ *Crassatella [cygnea]* Lam., 1799); Type *M. stultorum* L.**Mactra Richmondi** Dall. Greytown, Nicaragua.Subgenus **MACTRELLA** Gray, 1853.(+ *Papyrina* Mörch, 1853); Type :**Mactra (Mactrella) alata** Spengler, 1802. Porto Rico to Brazil.=*M. carinata* Lam., 1818; +*M. striatula* Auct. non L.Subgenus **MACTROTOMA** Dall.(=*Standella* Cpr. ex parte, non Gray; *Spissula* Mörch non Gray).

Anterior left lateral tooth bidentate, right ventral tooth tridentate. Type :

Mactra (Mactrotoma) fragilis Gmelin, 1792. Hatteras to Rio Janeiro.=*M. dealbata* Pult. 1803; +*M. brasiliiana* Lam., 1818; +*M. oblonga* Say, 1822; +*M. ovalina* (Lam.?) Auct.; +*M. oblongata* Ravenel, 1834; +*M. bilineata* (C. B. Ads.) Reeve, 1854; +*M. silicula* Reeve non Desh. (?) 1854; +*M. ambigua* Weink. (?); +*M. anserina* Guppy, 1875. Not *Spissula fragilis* Gray, 1838.Genus **SPISULA** Gray, 1838.(=*Spissula* Phil., 1847, not Mörch, 1853; +*Spizula* Conr., 1868; +*Spisulina* Fischer, 1887). Type *Mactra solida* L., Gray, 1847.Subgenus **HEMIMACTRA** Swainson, 1840.**Spisula (Hemimactra) solidissima** Dillwyn., 1817. Labrador to Virginia.=*M. gigantea* Lam., 1818; +*M. procera* Sol., mss.; +*M. Sayi* Gray, 1838.**S. (Hemimactra) solidissima** var. *similis* Say, 1822. Rhode Id. to St. Thomas, W. Indies.=*M. Raveneli* Conr., 1831; not *M. similis* Gray, 1828.Section *Mactromeris* Conrad, 1868.**Spisula (Hemimactra) polynyma** Stimpson, 1860. Hudson Bay to Cape Ann, Mass=*M. ovalis* Gld., 1840, not J. Sowerby, 1817; +*M. ponderosa* Phil., 1844, not Eichw. nor Conr., 1830; +*M. grandis* Desh., 1830, not Gmel., 1788; +*M. similis* Gray, 1828, not Say, 1822; +*M. Grayana* Schrenck, 1867.

Genus **MULINIA** Gray, 1838.

Type *M. typica* Gray (= *M. edulis* King).

(= *Moulinea* Phil., 1853, + *Mulineia* Conr., 1867.)

Mulinia lateralis Say, 1822. New Brunswick to the West Indies.

= *Mactra subtruncata* Greene, 1833; not Da Costa, 1788.

Mulinia lateralis var. *corbuloides* Deshayes, 1854. Mostly southern.

= *Mactra rostrata* Phil., 1848, not Spengler, 1802.

Mulinia guadelupensis Recluz, 1852. West Indies.

= *Mactra cantrainei* Reeve, 1854; + *M. portoricensis* Shuttlew., 1856; + *M. donaciformis* Auct. non Gray; + *M. tumida* and *turgida* Guppy, non Gmelin.

Genus **GNATHODON** Gray, 1831.

Type *G. cuneatus* Gray, 1831.

(= *Rangia* Desm., 1832, + *Clathrodon* Conrad, 1833; + *Perisodon* Conrad, 1863; + *Columbia* Blainville, mss., 1834.)

Gnathodon cuneatus Gray, 1831. Gulf of Mexico.

= *Rangia cyrenoides* Desm., 1832.

Gnathodon cuneatus var. *nasutus* Dall, 1894. Texas.

Subgenus **RANGIANELLA** Conrad, 1863.

Gnathodon flexuosus Conrad, 1839. Gulf of Mexico.

= *G. rostratus* Petit, 1853.

Gnathodon flexuosus var. *Petitianus* Dall, 1894. Mexico.

Genus **LABIOSA** (Schmidt) Möller, 1832.

Type *Mactra anatina* Spengler, 1802.

(= *Anatina* Schumacher, 1817, non Lamarck, 1809, + *Cypricia* Gray, 1840; + *Leucoparia* Mayer, 1867.)

Labiosa lineata Say, 1822. New Jersey to San Paulo, Brazil.

= *Mactra nuttallii* Reeve, 1854, non Conrad; + *M. recurva* Gray, 1828; + *M. papyracea* Auct. non Lamarck.

Subgenus **RAETA** Gray, 1853.

Type *L. canaliculata* Say, 1822.

(= *Cryptodon* H. & A. Adams, not of Turton or Conrad, + *Lovel-
lia* Mayer, 1867.)

Labiosa (*Raeta*) *canaliculata* Say, 1822. New Jersey to southern Brazil.

= *Mactra campechensis* Gray, 1828.

Doubtful or spurious East American species.

Mactra nucleus Conr., 1831, from "New Jersey" is exotic, and stated by Tryon in the Am. Marine Conchology to be a native of Manila.

Mactrella (*Harvella*) *elegans* Sowerby, has been reported from "Florida" where it is unknown, and "Jamaica" probably by a misidentification. There is no specific difference between Panama and alleged Antillean specimens and the name cannot be admitted to the East American list without further evidence.

Spisula subtruncata Da Costa. What appears to be a somewhat deformed subfossil valve of this species was sent from Lawlor's Lake, New Brunswick, to Dr. Stimpson by Matthews, many years ago. It is in the National Collection but no other specimen seems to have been collected on this side of the Atlantic and it is probably a ballast shell.

Spisula solidissima var. *Acadica* Matthews; Can. Nat. viii, no. 2, p. 111, 1877, from the higher clays beds at St. Johns, N. B. See also Ann. Soc. Mal. de Belgique ix, 1874. This may be founded on the specimen of *S. subtruncata* above mentioned, though Mr. Matthews' paper is not sufficiently explicit to determine. It is probably an exotic as he suggests.

Spisula "*subimbricata* Mont." Cockerell, in list of Jamaica shells, Nautilus, vii, p. 115, 1894. Montagu described no *Mactra* of this name. What the shell intended may be, is of course impossible to say, but possibly the following:

Mactra Richmondi n. s. Shell thin, small, white, inequilateral, with the posterior end shorter and its dorsal aspect obtusely keeled; surface nearly smooth, except the dorsal areas, which have short deep concentric grooves; beaks moderate, adjacent; lateral teeth rather short and small, smooth; pallial sinus small, rounded, extending forward to the vertical of the beaks; posterior end obtusely pointed. Longitude 21; alt. 14; semi-diameter 4.5 mm.

One valve on the beach at Greytown, Nicaragua; Chas. Richmond. It is the only American species belonging to typical *Mactra* with grooved dorsal areas.

Mactra Cumingiana "Bush," Zool. Rec., 1885, from Cape Hatteras, is a *lapsus* of the Recorder for *Mactra Cumingiana*.

HELIX (ARIONTA) COLORADOENSIS:—A NEW LOCALITY.

ROBT. E. C. STEARNS.

This form first detected by Dr. C. H. Merriam¹ in the Grand Cañon of the Colorado, opposite the Kabab plateau, at an elevation of 3500 feet, in 1890, and subsequently near Resting Springs² in the southeastern part of Inyo County, California, at an elevation of 900 feet above the Springs, in February, 1891 by Mr. Vernon Bailey has recently (March of the present year) been obtained by Mr. C. R. Orcutt of San Diego, at Mountain Springs, Colorado desert, San Diego County. Mr. Bailey found his specimens among rocks on a dry hill: Orcutt found but one example a bleached shell with the band barely discernable. With these three points in mind it will be seen, that a wide range of distribution is already indicated for this species.

NOTICES OF NEW JAPANESE MOLLUSKS, IV.

BY H. A. PILSBRY.

Macroschisma Lischkei n. sp.

Nemoto, Boshu (Stearns).

Shell oblong, *the length less than twice the breadth*; lateral margins convex, anterior margin well rounded, posterior margin bluntly rounded, subtruncate. Anterior slope straight, *decidedly less than half the length of the shell*; side slopes straight.

Surface sculptured with fine radial striæ, alternately larger and smaller, finer on the forward half of the side slopes; slightly decusated by growth lines. Color either (1) uniform black, or (2) closely speckled with black on a buff ground, or (3) crimson with or without dusky rays. *Posterior slope long* for the genus, about one-fifth the length of the entire shell; flattened or subconcave behind the hole, but not guttered. Perforation large, oblong, slightly narrower in front, and wider behind, with a *very narrow*

¹ Described by me in the Proc. U. S. National Museum, Vol. XIII, 1890.

² Mollusks of the Death Valley Expedition, U. S. Dept. Agriculture, (N. A. Fauna, No. 7), 1893.

eroded tract behind it. Length of hole contained two and one-half, times in length of shell. Interior bluish-white, the hole callus darker at the sides. When resting upon a plane surface, the peristome of the shell is seen to be *very much elevated behind, and but little less so in front*; the latero-basal margins strongly curved throughout.

Length $17\frac{2}{3}$, breadth 9, alt. 5 mm.

Length 16, breadth $9\frac{1}{4}$, alt. 5 mm.

Twenty-two specimens collected. This seems a very distinct species; the position and proportions of hole, the long posterior and short anterior slope, and the strongly curved basal margins being especially characteristic, and unlike other described forms.

Cyrena luchuana n. sp.

Shell large, inequilateral, oblong, the anterior end short, broadly rounded, posterior end long, produced, and squarely truncated; basal margin gently arcuate, dorsal margin narrowly rounded at the beaks, the anterior slope short and nearly straight, posterior slope long, rectilinear. Valves strong, convex, the posterior dorsal area flat or concave, bounded by a blunt angle, another obtuse angle extending from beaks to lower posterior extremity. Interior white, stained with buff-olive on the hinge. Cardinal teeth bifid; anterior lateral very short and strong; posterior lateral long, remote from cardinals. Cuticle dull brown, with a yellow under color, irregularly wrinkle-striate, lamellose behind, and less so over the whole disk. Length 94, breadth 72, diam. 47 mm.

Yaeyama Island, Loo Choo group (Fr. Stearns).

Cyrena (papua var. ?) *yaeyamensis*.

Shell shorter than the preceding, being less produced posteriorly, the posterior surface not so distinctly angular, posterior truncation less marked; anterior lateral tooth not so short. Anterior dorsal slope of hinge line straight, posterior dorsal slope slightly convex. Color and sculpture as in *luchuana*, except that there is usually some oblique corrugation of the posterior slope. Length 75, breadth 63, diam. 36 mm.

Yaeyama I., Loo Choo group (Frederick Stearns).

This may prove to be a form of *Cyrena papua*, or of *C. buschii* Phil. of China, but it is more triangular, with the posterior margin more produced.

Cyrena fissidens n. sp.

Shell resembling *C. sinuosa* as figured by Clessin (Conch. Cab., pl. 45, f. 1), but the posterior lateral tooth and corresponding pit

much slenderer and somewhat longer, the posterior cardinal tooth in right valve split by a sulcus much broader than the space between the posterior and the next adjacent cardinal tooth. Valves orbicular, very convex, lightly wrinkle-striate, and covered with a black cuticle. Posterior slope depressed, with a radiating wide and shallow furrow, rendering the margin slightly emarginate. Dorsal, anterior and basal margins well rounded; posterior margin obliquely subtruncate. Length 86, breadth 77, diam. 49 mm.

Yaeyama I., Loo Choo group. A single specimen (Frederick Stearns).

Siphonalia Stearnsii n. sp.

Shell fusiform, solid, brownish; spire conical, shorter than the aperture, consisting of 8 convex whorls, which are finely spirally lirata, and *closely* and strongly plicate; plicæ becoming partly or wholly obsolete on the body-whorl, which is very indistinctly or not at all shouldered, and runs upward somewhat toward the aperture, causing a narrow, small posterior channel. Aperture shaped as in *S. fusolineata* Pse. but wider, the inner lip smooth, its edge raised and free; outer lip with a wide yellow internal border, inside of which it is thick, lirata and white. Anterior canal strongly recurved, short. Alt. 46, diam. 25 mm. Oblique alt. of aperture 29 mm.

Allied to *S. longirostris* Dkr., but less elongated, with more strongly plicate spire and different aperture, I cannot see that any of A. Adams' unfigured species agree with the specimens before me. The spire is longer and more plicated than in *S. fusoides* Reeve, and the canal more recurved.

LIST OF SHELLS COLLECTED IN JAMAICA.

BY J. B. HENDERSON, JR.

Third Paper: Operculata, Aquatic Pulmonata.

203. *Alcaldia hollandi* C. B. A. Duncans; W. of St. Anns.

204. *Alcaldia adamsiana* Pfr. Mandeville.

205. *Alcaldia solitaria* C. B. A. Black River; Bluefields; Mt. Pleasant; Bog Walk.

206. *Alcaldia depressa* Gray. Bluefields; Ora Cabessa; Bog Walk.

207. *Alcadia browni* Gray. Montego Bay; Bog Walk.
208. *Alcadia palliata* C. B. A. Mandeville; Bog Walk; Sav. la Mar; Stony Hill; Ora Cabessa; Mt. Pleasant; Gallina Point.
209. *Alcadia palliata* v. *labiosa* C. B. A. Montego Bay.
210. *Alcadia maxima* C. B. A. Petersfield.
- Alcadia*, as typified in *Alcadia palliata* (with slit in the base of the aperture) gradually blends into *Helicina*.
211. *Eutrochatella tankervillea* Gray. Bought.
 ("Trochatella" being preoccupied, "*Eutrochatella*" of Fischer is taken).
212. *Eutrochatella pulchella* Gray. Bog Walk; Ora Cabessa; Mandeville; Gallina Point; Stony Hill; St. Anns; Pt. Antonio; Montego Bay; Ocho Rios.
213. *Eutrochatella costata* Sby. St. Anns; Falmouth; Gallina Point; Little River; Rio Bueno.
214. *Lucidella nana* Pfr.
 = *Helicina lineata* Ads. Mona House; Mandeville; St. Anns; Petersfield; Pt. Antonio; Bog Walk.
215. *Lucidella inaequalis* Pfr. Black River; Mt. Pleasant.
 (Probably only a var. of *L. aureola*).
216. *Lucidella aureola* Fér. Everywhere.
217. *Lucidella aureola* v. *granulosa* C. B. A. Mandeville.
218. *Lucidella aureola* v. *interrupta* Simpson. St. Anns; Duncans.
219. *Stoastoma jayanum* C. B. A. Pt. Antonio; Petersfield; St. Anns; Bog Walk.
220. *Stoastoma gouldianum* C. B. A. Buff Bay.
221. *Stoastoma pisum* C. B. A. Mandeville.
222. *Stoastoma* sp. Mandeville.
223. *Stoastoma* sp. Petersfield.
224. *Proserpina bilentata* C. B. A. Mt. Pleasant.
225. *Proserpina nitida* Sby. Mandeville; Petersfield.
226. *Proserpina discoidea* C. B. A. Bluefields; Petersfield; Mt. Pleasant; Black River; Kings.
227. *Proserpina opalina* C. B. A. Montego Bay; Ocho Rios; Mandeville; Bog Walk.
228. *Proserpina pulchra* C. B. A. Mt. Pleasant; Bluefields; Bh. River; Kings.
229. *Amnicola* (?) *rivularis* C. B. A. Sweet River.
230. *Amnicola jamaicensis* C. B. A. Rockfort.

231. *Potamopyrgus caudeana* Orb. Sweet River.
 232. *Neritina jamaicensis* C. B. A. Great River.
 var. of *N. tristis* Orb.?
 233. *Neritina punctulata* Lam. Buff Bay.
 234. *Neritina tristis* Orb. Sweet River.
 235. *Neritina tenebricosa* C. B. A. Buff Bay; Sweet River.
 236. *Limnea umbilicata* C. B. A. Bluefields; Sweet River.
 237. *Physa jamaicensis* C. B. A. Ramble; Sweet River.
 238. *Planorbis affinis* C. B. A. Kingston.
 239. *Planorbis dentiferus* C. B. A.
 239a. *Planorbis dentiferus* var. *edentata* C. B. A. Bluefields;
 Black River; Sweet River.
 240. *Planorbis redfieldi* C. B. A. Bluefields.
 241. *Planorbis decipiens* C. B. A. Bluefields.
 242. *Planorbis pallidus* C. B. A. Rockfort.
 243. *Ampullaria fasciata* Lam. Savannah la Mar.
 244. *Hemisinus lineolatus* Wood. Sweet River; Great River;
 Rio Cobre; Mt. Pleasant; Sav. la Mar; Roaring River.
 245. *Melampus flavus* Gmel. Little River.
 246. *Melampus caffeus* L. Little River.
 247. *Melampus* (*Tralia*) *pusilla* Gmel. Little River.
 248. *Pelipes naticoides* Stearns. Little River.
 = *ovalis* C. B. A.

MY DAILY WALK.

WILLIARD M. WOOD.

What student of conchology does not take a daily walk, whether it be to one's business house, a stroll after luncheon or a walk home. And while thus taking the outdoor exercise, does one "keep an eye open" for specimens? If not, do you imagine how many specimens are passed by?

My exercise consists of a daily walk of sixty blocks; thirty of which, I walk to my office, starting at 8.30 o'clock in the morning, and the balance, coming home at 5 o'clock in the afternoon.

Every day I carry with me, a small tin box, one which I can very conveniently carry in my pocket, in which my "finds" are contained; and when a morning is very damp, the result of a rain the day before, or when a heavy fog settles over the city, then I take with me a much larger box, inasmuch as I find that I can collect two or three times the amount of specimens that I would when the ground is not very moist.

Some mornings I gather great quantities of *Zonites lucidus* Drap. (sent to Mr. Pilsbry to be identified) while other mornings, *Agriolimax agrestis* Linn. may be found very numerous. However, the following list may be called a fair sample of the specimens I collect, while on my daily walk.

<i>Specimens gathered on Nov. 11, 1893.</i>	<i>No. collected.</i>
<i>Helix (Lysinoc) nickliniana</i> Lea var. <i>reticulata</i> Pfr.	48
<i>Zonites cellarius</i> Mull.	3
<i>Zonites lucidus</i> Drap.	32
<i>Ariolimax columbianus</i> Gld.	5
<i>Amalia hewstoni</i> Cooper	13
<i>Agriolimax agrestis</i> Linn.	27
<i>Limax maximus</i> Linn.	30
<i>Prophysaon andersoni</i> Cooper	21
	<hr/>
	Total 179

I may add, that of the above species, although *Limax maximus* Linn., has only been an inhabitant of this country for a period of about two years, it has multiplied so greatly, that it has become a nuisance to people who have flower gardens.

The slugs I find, generally crawl across the cement sidewalks and walls surrounding residences, while the *Zonites* apparently delight in crawling over the wooden door steps, and the *Helix reticulata* prefer secluded spots in vacant lots, among the grass or under boards. Of the last named species, I have at present, almost a thousand specimens and of the *Zonites lucidus* Drap. over three hundred specimens.

Is it not worth while then, to be "on the lookout" for specimens when out walking? One can thus see how I profit by my daily walk.

San Francisco, Cal., March 31, 1894.

NOTES AND NEWS.

REVERSAL OF CLEAVAGE IN *Physa*.—Mr. Henry E. Crampton, Jr., has recently studied the early stages of *Physa* and *Limnæa*. In the former the cleavage is according to the typically spiral type, but *totally reversed* in direction. It will be interesting to learn whether this is directly correlated with the sinistral form of the adult.

On the 28th of January last, A. TH. VON MIDDENDORFF, the celebrated traveller and zoologist died at his home near Dorpat. Middendorff is especially known to American conchologists as a writer on shells of the northwest coast.

BULIMUS OBLONGUS has recently been found by Mr. H. G. Hubbard, of the U. S. Agricultural Department, flourishing in St. Kitts, where it has been introduced from Antigua by a resident conchologist. This is perhaps, worth making a note of, since it has not been found so far north, and some one hereafter may suppose it native. Mr. Hubbard finds that a species of *Tillandsia* holds large quantities of water in the axils of the leaves; a good sized one he says will hold a barrel of water, and this water in the mountainous forests of Montserrat has a fauna of its own. He brought an *Amphibulima* (possibly *A. patula*) and *Pellicula* (? *depressa*) which he found in these moist retreats.—W. H. DALL, *in letter*.

PUPA SYNGENES Pils., has recently been received by the National Museum from Beaver Creek, Montana, (a tributary of the Little Missouri) in the river drift. This is a new locality, I believe, and interesting on account of its distance from the original place (Arizona).—W. H. DALL.

NOTE ON *LIPARUS*.—When studying the apices of the Australian land shells *Panda* and *Caryodes*, the writer had occasion to examine those of the Australian *Bulimuli* belonging to the subgenus *Liparus* of Albers. In this group the earlier whorls are very closely *pitted*, somewhat like a thimble, while in *Panda* they are decussated, and in *Caryodes* spirally *lirulate*. The characters of the earlier whorls seem to be of much greater importance than has generally been supposed. *Placostylus* agrees with *Liparus* in the peculiar pitting. *Bul.* (*Leucotænius*) *favannii* has a closely costulate apex, like our *B. schiedeanus*. The name *Liparus* in mollusca is preoccupied by *Liparus* Olivier, Entomologie, ou Hist. Nat. des Insectes, Vol.

V, pp. 73, 283 (1807), for a genus of Rynchophorous Coleoptera. I therefore suggest as a new name for the Australian group BOTHRIEMBRYON, the type being *Bul. melo*:—PILSBRY.

SPIRULA PERONII in Jamaica.—Mr. Edw. W. Roper reports finding a specimen of this cephalopod containing the animal, during his recent visit to Jamaica.

MR. F. C. BAKER has been appointed Curator of the zoological department of the Field Columbian Museum at Chicago.

The collection of shells of the late DR. PHILIP P. CARPENTER is offered for sale. This is an excellent opportunity to obtain a valuable and authoritatively named collection. Address Mrs. Minna M. Carpenter, 241 University St., Montreal, Canada.

SOME ARKANSAS SNAILS.—On my trip here (Fort Smith, Ark.,) I did what I did some years ago—walked from Winslow, on the top of the Boston Mountains, to Porter, six miles this side. I collected quite a number of shells, and will send you some living *Triodopsis edentata*, *Stenotrema labrosum*, *Polygra Sampsoni* and *P. Jacksoni*. I got the *edentata* from the top of the mountain to Rudy, a vertical distance of 1500 feet. At the latter place they are found with the ordinary *Triodopsis inflecta*. I hope you will have time to examine the internal parts. I find that where I got the type specimens was in Washington County, instead of Crawford; but on this trip I gathered them in both counties.—F. A. SAMPSON, *in letter*.

THE MICHIGAN FISH COMMISSION has commenced an investigation of biological conditions of the Great Lakes, with especial reference to the life history of the white fish. The work will include a determination of the fauna and flora of Lake Michigan at Ann Arbor, and of their vertical and horizontal distribution. This determination will be both qualitative and quantitative, and will be particularly directed towards a study of the life history of the white fish and lake trout. Since the life of the water constitutes first or last the food of the fish in it, this determination will afford some idea of the value of this locality as a breeding ground for fish and of its adaptability as a planting ground for the fry. The party at work in the laboratory will consist of various specialists, Mr. Bryant Walker, Detroit, Mich., taking charge of the mollusca.

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ON THE ORTHALICUS OF FLORIDA.

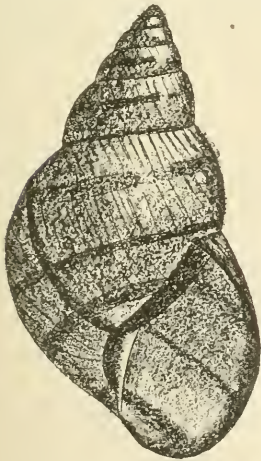
BY H. A. PILSBRY.

Thanks to the BINNEYS, father and son, we American malacologists rarely have anything but comparatively fair sailing when we have occasion to work with the land mollusks of our own Country. Only those who have spent days and months striving to unravel the tangled threads of synonymy, striving to see a little way into the

mysteries of structure, of phylogeny or origin, and of geographic distribution, can rightly appreciate the debt we owe to two men who have given the best energy and scholarship of their lives to the study of American land shells.

These reflections come to me as I think on the question of the number of species of *Orthalicus* found in Florida—a matter in which it seems to me that Mr. Binney's books have not been clear.

The species of this genus (or perhaps better, *subgenus*, for structurally it differs from *Liguus* only in trifling points) are not, for the most part, at



Orthalicus melanocheilus var.
Foridensis.

all well defined. The older authors mixed them sadly; and we moderns are in some danger of drawing over-fine distinctions. Still, the systematic zoologist who makes any voyages at all, must perforce sail between Scylla and Charybdis. The great art is to steer a middle course.

Returning to our *Orthalicus*, we notice that the older collectors found only the zebra-striped forms in Florida, these being identical with the species so common in Jamaica, and known for many years under the names *zebra* Müller and *undatus* Brugnière.

Some authors have attempted to establish *undatus* and *zebra* as distinct species, but the last name was proposed for a medley of *Achatinas* and *Orthalicus*, not including the form now known as *undatus*; so it will be dropped from the lists entirely. The well-known Florida and West Indian species is *O. undatus* Brug., (see W. G. Binney's works). It is not known from Mexico.

Besides this form, we find in a number of localities in Southwest Florida, an *Orthalicus* with nearly white shell, spiral brown bands and occasional oblique stripes, but none of the zig-zag flames so characteristic of *O. undatus*. This form was described by the writer in 1891, as follows:

Orthalicus melanocheilus Val. (1833).

One of the most distinct species of the genus, described originally from "New Spain" (*i. e.*, the Middle American mainland). The Florida specimens differ from the Mexican and Central American in a number of characters and seem to me perfectly distinct as a geographic variety.

O. melanocheilus var. *floridensis* Pilsbry.

Shell white or slightly stained with brown, having no longitudinal zig-zag flames. The body whorl has three narrow brown bands, the upper one often broken into spots. There is a black varix on the penultimate whorl, and one or two on the body whorl. The varices are generally *not visible within the aperture, but the three spiral bands are conspicuous there*. Lip bordered with blackish-brown; columella white edged, but parietal callus deep brown.

The types of this variety are from near Cape Sable, Florida.

The synonymy of my variety includes:

Bulimus zebra W. G. Binney, Terr. Moll. U. S. Vol. IV, Pl. lxxviii, fig. 12.

O. zebra W. G. B. & T. Bld., Land and Fresh-water Shells of N. A., Vol. I, p. 216, figs. 370, 371.

O. undatus W. G. B., Manual of N. A. Land Shells, p. 440, fig. 483.

Von Martens has recently expressed the opinion that "Pilsbry's *O. melanocheilus* var. *floridensis* is probably a dark-mouthed variety of *O. undatus*;" but he had not seen a Florida specimen. The fact is that this is one of the most distinct forms of the typical group of *Orthalius*, and if it be a variety of *undatus*, then *undatus* will cover all of the typical group of so-called species admitted by Crosse and Fischer, v. Martens, *et. al.*

II. SYNOPSIS OF THE MACTRIDÆ OF NORTHWEST AMERICA, SOUTH TO PANAMA.

BY WM. H. DALL.

Subfamily MACTRINÆ.

Genus **MACTRA** (Linné) Lam., 1799.

Subgenus MACTRODERMA Dall, 1894.

Shell as in *Mactra* but rude, inequilateral, with a coarse epidermis, pronounced pedal gape, the ligament set off from the cartilage but mostly sunken, concentrated dental armature, and the anterior arm of the right cardinal in the plane of the adjacent ventral lamina. Type:

Mactra (**Mactroderma**) *velata* Phil., 1848. Panama to the Gulf of California.

Subgenus MACTROTOMA Dall, 1894.

Section Mactrotoma ss.

Accessory lamellæ coalescent with laterals and cardinals.

Mactra (**Mactrotoma**) *nasuta* Gould, 1851. West Columbia to Lower California.

= *M. californica* Desh., 1854, not Conr., 1837; + *M. hiantina* Desh., 1854; + *M. ovalina* Auct. not Lam.; + *M. falcata* Weinkauff not Gould; + *M. fragilis* Cpr., 1858, not Gmel.; + *M. Deshayesii* Conr., 1868; + *Merope* sp. Weinkauff and *Spisula* sp. Conrad.

Section *Micromactra* Dall.

Hinge like the typical section, beaks sulcate, shell small.

Mactra (*Mactrotoma*) *californica* Conrad, 1837. Fuca Strait to Central America.

= *M. augusta* Desh., 1854; + *M. nasuta* Auct. not Gould; not *M. californica* Desh.

Section *Simomactra* Dall.

Accessory lamellæ free of the laterals.

Mactra (*Mactrotoma*) *dolabriformis* Conrad, 1837. San Diego, Cal., to Guaymas, Mexico.

Subgenus **MACTRELLA** Gray, 1853.Section *Mactrella* ss.

Surface of the valves smooth.

Mactra (*Mactrella*) *exoleta* Gray, 1837. Gulf of Cal. to Guayaquil.

+ *Lutraria ventricosa* Gould, 1851.

Section *Harvella* Gray, 1853.

Surface of the valves plicate.

Mactra (*Mactrella*) *elegans* Sby., 1825. Panama to Gulf of Cal.

+ *M. pacifica* Conr., 1868.

Genus **SPISULA** Gray, 1837.

Type *M. solida* L. Gray, 1847.

Subgenus **HEMIMACTRA** Swainson, 1840.Section *Mactromeris* Conrad, 1868.

Spisula (*Hemimactra*) *polymyma* Stm., 1860, var. *alaskana* Dall, 1894. Icy Cape to Neeah Bay. (See eastern list for synonymy).

Spisula (*Hemimactra*) *catilliformis* Conr., 1867. Neeah Bay to San Diego.

+ *Standella californica* Cpr., Auct., non Conr.

Spisula (*Hemimactra*) *Hemphillii* Dall, 1894. San Diego.

Spisula (*Hemimactra*) *planulata* Conrad, 1837. Monterey to San Diego. Not *planulata* of Cala. authors.

Subgenus *Symmorphomaetra* Dall, 1894.Teeth of *Mactrotoma*, ss.; hinge of *Spisula*.**Spisula** (*Symmorphomaetra*) *falcata* Gld., 1850. Comox, Br. Col. to San Pedro, Cala.Genus **MULINIA** Gray, 1837.**Mulinia pallida** Brod. & Sby., 1829. Panama to C. St. Lucas.+ *M. donaciformis* Gray, 1839, not of Reeve, 1854; + *M. angulata* (Gray) Reeve, 1854; + *M. carinulata* (Desh.) Reeve, 1854, (young shells); ?=*M. goniata* Desh., 1854, (unfigured and insufficiently described); + *M. bistrigata* Mörch, 1862.**Mulinia modesta** Dall, 1894. Guaymas, Mexico.+ *M. carinulata* Cpr. non Deshayes.**Mulinia Gabbi** Tryon, 1869. Lower California.**Mulinia coloradoensis** Dall, 1894. Gulf of California, at Guaymas and thence to the Colorado-mouth.**Mulinia coloradoensis** var. *acuta* Dall, 1894. Colorado river-mouth, Gulf of California.**Mulinia Bradleyi** Dall, 1894. Panama, Bradley.Genus **GNATHODON** Gray, 1831.Subgenus **RANGIANELLA** Conrad, 1863.**Gnathodon** (*Rangianella*) *mendicus* Gould, 1851. Estuaries, Gulf of Cal.+ *G. trigonus* Petit, 1853; + *G. truncatum* Petit, 1853.Subfamily **PTEROPSINÆ**.Genus **LABIOSA** (Schmidt) Moller, 1832.**Labiosa anatina** Spengler, 1802. West Mexico.+ *L. pellucida* Schum., 1817; + *M. cyprinus* Gray, 1828; + *L. papyracea* (Lam.) Sby., 1824.Subgenus *Raeta* Gray, 1853.**Labiosa** (*Raeta*) *undulata* Gould, 1851. San Pedro, Cala., to Panama.+ *R. californica* Melvill, as of Sowerby.

Subfamily LUTRARIINÆ.

Genus **TRESUS** Gray, 1853.

+ *Cryptodon* Conrad, 1837, not Turton; + *Schizothærus* Conrad, 1853, (about three weeks after Gray); type:

Tresus nuttallii Conrad, 1837. Sitka to San Diego, Cal.

+ *Lutraria maxima* Midd., 1849, non Jonas, 1844; + *L. capax* Gould, 1850; + *L. inflata* Dunker, 1853.

Genus **DARINA** Gray, 1853.

Darina declivis Cpr., 1865. "Vancouver;" "Forbes;" fide Cpr.

DOUBTFUL OR SPURIOUS WEST AMERICAN SPECIES OF MACTRIDÆ.

There is no typical *Maetra* or *Spisula* known from the Pacific Coast.

Maetra angusta Desh., 1854, from the Gulf of California as figured by Reeve, resembles a refined *M. californica* Conr. Wein-kauff's figure is undoubtedly *californica* Conr. not Desh. I have not seen authentic specimens.

Mulinia bistrigata Möreh, 1861, appears to be a mere color variety of *M. pallida*.

Mulinia Gabbi Tryon, is stated to have come from Lower California, but has not since been reported from there. It is very close to the South American *M. exalbida* Gray, and as *M. exalbida* is found near Panama it may reach California.

Mactrella subalata Möreh, 1861, was described from a single worn valve obtained at Realejo, Costa Rica. This was probably a ballast shell or one in some way transported from the Atlantic Coast. Caribbean shells are taken to Panama and other Pacific ports for sale to visitors, as I have personally experienced. *Mactrella alata*, of which *subalata* is a pure synonym, has not been authenticated from the Pacific where it is replaced by *M. exoleta* Gray.

M. (Mactrella) lucinata Cpr., 1856; Panama, Bridges; is probably a *Mulinia*, notwithstanding its reference to *Mactrella*. Its small size (0.7 in.) points toward immaturity. It has not been

figured or sufficiently described to enable it to be referred to its proper place in the family.

Lutraria Sieboldii Desh., 1854; "Vancouver Id., Kellett"; is a Japanese species, with which *L. lucida* Gld., 1861, (a young shell) is probably synonymous.

Darina declivis Cpr., 1865, has not been found by any collector on the N. W. coast since reported from a collection alleged to have been made by Dr. Forbes, R. N., but which had passed through the hands of a dealer. The same lot contained a shell described by Dr. Carpenter under the name of *Saxidomus brevisiphonatus*, which also has not subsequently been discovered in the region.

[Errata. July NAUTILUS at foot of p. 28, should read: *Mactra Cumingiana* "Bush," Zool. Rec., 1885, from Cape Hatteras, is a lapsus of the Recorder for *Macha Cumingiana*.]

April 15, 1894.

A FEW NOTES ON HELIX TRIDENTATA.

BY A. G. WETHERBY.

I have recently received from Mr. Pilsbry his Critical List of Mollusks collected in the Potomac Valley. Proc. Acad. Sci., Phila., 1894, pp. 11 to 31, with plate.

This is a valuable and interesting contribution from this indefatigable worker. But he has again dropped into the business of adding latin names to varieties of our common shells, so that we now have from Say's species no less than three trinominal relations, viz., *H. tridentata edentilabris*; *H. tridentata juxtidentens* and *H. tridentata fraudulenta*. I propose, in this note, to briefly review this case, as Mr. Pilsbry, having the spirit of the true naturalist, has kindly opened his pages for that purpose.

This species, though exhibiting so many variations, due to differences of station, or to inherited race proclivities, has always a general facies that marks it well. No student of our land shells need ever or does ever, mistake it for anything else. It cannot be confounded with *H. fallax* Say, though Dr. Binney believed them to be identical; nor is there any other North American species, worth anything as such, that need be taken for it. Now with this fact well

before us, I wish to use this criticism of these unnecessary names to illustrate the suggestions as to labeling such shells, made in my notes on *H. appressa* in the JUNE NAUTILUS. The chief forms of *H. tridentata* in my collection are the following:

The type, from many localities in many States; I need not cite them here.

A variety found under the shingle and waste of the limestone cliffs about Cincinnati. This shell is characterized by its very light color, horny texture, polished appearance, comparatively few and little impressed striae, and the aperture of Pilsbry's *juxtidentis*.

A variety found on Braden Mt. in Campbell Co., Tenn., of very large size, very much depressed, deeply sculptured and with the denticles little developed and remote.

A smooth variety from Whitley Co., Ky., with polished surface, striae very little impressed, aperture nearly circular, almost without denticles.

A variety from Putnam Co., W. Va., very small, with all the mouth parts approximated, but not like Pilsbry's *fraudentata*. This is a most interesting form, and as widely separated from the last as it well could be.

A variety from Cherokee Co., N. C., with all the characters of *juxtidentis* but with the mouth parts cupped like *H. fallax*.

Now I do not hesitate to affirm that in these lots are every gradation necessary to unite them with the type. This is a matter of the eye simply. Now what shall we do? Shall we label the first form *H. tridentata polita*, the second *H. tridentata edentilubris* or what not, and so on to the end, or shall we say for the first *H. tridentata* Say, var. Cincinnati, O., and for the second *H. tridentata* Say, var. Campbell Co., Tenn.? and so on to the end. The first method loads up our literature with trinominal designations of varieties that fix a limit just as rigid as a specific name. The second method is in accordance with nature and the facts in the case. They are varieties, uniting each other, through the gradations in each, with the type. What is a "subspecies"? I undertake to say that there is no such thing in nature whatever. We may have species; we certainly have no "subspecies." The moment the specific line is passed, if any exists, that instant we are in the realm of variations, inhabited only by varieties. To name these varieties is to make types of them as rigid as the specific type itself. If not, why name them? If so, why

call them varieties or "*subspecies*," endeavoring in this way to dodge a dangerous breaker?

As the humblest student of these beautiful and variable forms of molluscan life, I shall not cease, upon every opportunity, to enter vigorous protest against these inversions of the natural order in development.

As there are no such things in nature as subspecific or varietal barriers, so there should be none in the literature devoted to her record.

Here may the educated finer sense, the critical insight, the intense love of truth, the most unbounded capacity for labor, the acumen derived from the union and cultivation of all these, find wholesome employment and scope for all legitimate ambitions.

This is better than erecting obstructions in this highway of the omnipotent, that must crumble of their own inherent falsity.

Magnetic City, N. C.

ON CHITON HARTWEGII CPR. AND ITS ALLIES.

BY H. A. PILSBRY.

In the "Proceedings of the Zoological Society of London" for 1855, Dr. P. P. Carpenter described a number of West American Chitons, now mostly well-known to western naturalists, among them *C. Hartwegii* and *C. Nuttalli*. The descriptions though concise are excellently worded, leaving no doubt of the exact forms intended; for Carpenter was an adept in the art of writing diagnoses. In his later publications on the shells of this fauna, the systematic position of these species caused Carpenter some trouble; for he refers them to both *Trachydermon* and *Chatopleura*; and the difficulty of placing them in either of these genera caused the present writer to make a new group, CYANOPLAX (in allusion to the color of the interior), to contain them. There cannot be much doubt that *Cyanoplax* is a subgenus of the Carpenterian genus TRACHYDERMON. The species *Hartwegii* was founded upon specimens collected at Monterey by Hartweg (whom Carpenter is pleased to call "*diligentissimus*"). The type measured about 31x19 mm. (1.26x.76

inch), and agreed in its rather long and narrow form and impressed sutures with fig. 85 of plate 14 of the Manual of Conchology.

The *Nuttalli* (named in honor of the naturalist whose name is so familiar to botanist, conchologist and ornithologist alike) was collected at the same locality, and was stated to differ in being wider, depressed, the valves squared where they join the girdle, the latter not projecting between them to form deep sutures. The type measured about $26\frac{1}{2} \times 20$ mm. This is the form figured by me on pl. 14, fig. 84 of the Manual.

It is not at all difficult to pick out specimens of this short, broad form, or of the longer, narrower form, even more pronounced in character than Carpenter's types; but trouble begins when we come to the intermediate examples. In one lot of 18 specimens recently received from Miss Shepard, 6 are typical *Nuttalli*; 8 are more or less typical *Hartwegii*; but it would puzzle a Philadelphia lawyer (or conchologist either) to tell what the other specimens are. The same extremes and intermediates occur in many other trays of specimens I have seen from various localities; so that one cannot doubt that the two forms named by Carpenter are merely the variations of one species, and are not correlated with differences of station or geographic range.

All of the specimens are dull greenish, gray or even black, the lighter forms generally having a row of dark blotches on each side of the dorsal ridge; and seen under a lens, all are minutely but sharply granulated, with coarser granules scattered irregularly over and among the smaller ones, especially on the lateral areas; and they are all rather deep colored inside, varying from "Robin-egg" to "Catbird-egg" blue.

Some months ago, the writer received from Mr. W. J. Raymond, fourteen specimens of *Cyanoplax*, which differ so markedly from the species discussed above that they must form a distinct species. After reaching this conclusion the shells were put aside, for one is slow to describe new littoral shells from so well worked a locality as middle California; but renewed study of them convinces me of the necessity of the step.

Trachydermon (Cyanoplax) Raymondi n. sp.

Shell longer and narrower than *T. Hartwegii*. Back somewhat keeled, varying in elevation. Color (1) olivaceous green mottled with white, sometimes with dark lateral streaks as in *Hartwegii*,

sometimes ruddy at the ridge, or (2) uniform blackish, or (3) dark brown, uniform or with whitish flecks.

Valves rather strong, slightly beaked when unworn, the posterior (sutural) margins straight or slightly concave. Intermediate valves rather rounded where they join the girdle, scalloping the inner border of the latter; not distinctly divided into areas. Lateral areas hardly or not raised (the diagonal being indistinct) *evenly sculptured with minute, equal granules*. Central areas also evenly sculptured throughout with similar granules, slightly finer on the ridge. End valves with the same equal sculpture, the tail valve with the mucro central and a little projecting.

Interior light blue, with darker stains at bases of the sutural laminae and behind the rather strong blue-white valve callus. Sinus and sutural laminae as in *Hartwegii*. Slits in valve i, 8; valves ii-vii, 1-1; valve viii, 11; teeth of end valves blunt, thick, but not distinctly bilobed. All teeth longer than the narrow, porous eaves.

Girdle narrow, black or with small whitish spots, leathery, very minutely papillose.

Length 23, breadth 11 mm. (type; San Francisco).

Length 12½, breadth 7 mm. (Bolinás specimen).

Habitat, San Francisco, Bolinas, Purissima, San Mateo Co., Monterey, with typical *Hartwegii*.

Specimens from the first three localities were collected by Mr. W. J. Raymond, who has seen them from Monterey also.

This is a longer species than *T. dentiens* Gld., with heavier valves, less apparent diagonal, and much longer, thicker teeth. It differs from *T. Hartwegii* (to use Mr. Raymond's words) in being (a) "narrower and smaller than southern *Hartwegii* (Monterey to San Diego) with which alone I have been able to compare them from the material at hand; (b) the color of the inside is lighter blue than in *Hartwegii*; (c) I cannot make out the warty sculpture, which you emphasize in the description of *Hartwegii*." Moreover, *the teeth are much longer than in Hartwegii*, from which the finer, even granulation well distinguishes *T. Raymondi*.

NOTICES OF NEW JAPANESE MOLLUSKS.

BY H. A. PILSBRY.

Clausilia (*Stereophædusa*) *Stearnsii* n. sp.

Shell elongated, regularly tapering, the next to the last and the

last whorl widest, the latter hardly contracted below; moderately solid, closely, lightly striated, the striae wanting on the earlier whorls, more distinct and spaced on the latter part of the last whorl. Color opaque purplish-brown. Whorls 12-13, but slightly convex, separated by a shallow, simple suture. Aperture contained $4\frac{1}{2}$ to $4\frac{5}{8}$ times in length of shell; peristome reflexed, whitish, slightly thickened, not adnate; superior lamella strong, extending to the lip-edge; inferior lamella deep-seated, parallel to the superior, invisible from the front; subcolumellar lamella extending to lip-edge, bounded by grooves; palatal plicæ two, the upper one long, second rather short, with a thin white subvertical callus below it, which is strengthened below into a low bar.

Alt. 31, greatest diameter of last whorl above aperture 5 mill.

Alt. 26, greatest diameter of last whorl above aperture 5 mill.

Yaeyama (Okinawa), Loo Choo Is. (Fr. Stearns).

Believing this species to be new, I sent examples to Prof. Dr. O. Boettger, the great authority on these shells, and received the following emphatic confirmation of my opinion: "Die *Clausilia* von Okinawa ist ohne jeden Zweifel n. sp. Es ist eine *Stereophadusa* und steht in der Mitte zwischen *japonica* Crosse und *brevior* v. Mts."

No similar form has hitherto been reported from the Liu Kiu group, the nearest allies of the species being Japanese. It is named in honor of my friend FREDERICK STEARNS of Detroit, who has contributed so largely to our knowledge of the Japanese fauna. The specimens vary considerable in length, but not in other characters.

GENERAL NOTES.

MR. WM. B. MARSHALL, who has been doing good work in the department of Zoology of the New York State Museum (Albany), has accepted the chair of Biology in Lafayette College, Easton, Penna.

The peculiar shell described in the JUNE NAUTILUS as *Perostylus*, proves to be the larval form of *Fusus proboscoidiferus*. A paper on the subject will appear in the September number.

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No. 5

REMARKS ON THE STATUS OF SPECIES AND SUBSPECIES.

BY H. A. PILSBRY.

In several articles published in recent issues of this journal, a conchologist as well known for his wide experience in the field as for the vigor and point of his fluent pen, has been at some pains to criticise certain work by the writer, on American land shells. Several newly named varieties of well known shells are particularly obnoxious to my good friend; and in another place¹ he attacks the recent systems of classification of land shells, darkly hinting at certain tabulated results which he fancies would astonish systematists. Now in view of the amount of ink wasted over the questions of SPECIES, VARIETIES and CLASSIFICATION, it may be worth while to point out a few of the facts in the case; to show the futility of arguing on the abstract question of species, and incidentally to call attention to some of Mr. Wetherby's mistakes in dealing with certain varieties described by myself.

Mr. Wetherby says: "we may have species; we certainly have no subspecies." Now the truth is that *Nature* knows nothing of "species" or "subspecies," but only *individuals*. All *groups* of individuals are conventional and artificial. Were the record of paleontology complete, almost the entire mass of living individuals would be found to be connected throughout by intermediate forms. Not only would most of the *species* intergrade, but the genera, families

¹Land Shells of Roan Mt. and Vicinity, Journal Cin. Soc. N. H.

and orders likewise. I say "most" because some would not intergrade; for contrary to the old adage, nature *does* sometimes jump. The theory of descent, and the connection of distinct, recent species by their extinct ancestors being admitted, we may next inquire what convenient artificial limits may be erected to define the "species;" for all scientific investigation would be at a stand still if we have no names whereby to designate the various organisms about us. Probably the only definition of any use is that a species is any assemblage of similar individuals of presumably common ancestry, which cannot be connected by living intermediate specimens with other groups of individuals. It is the break in the chain which allows us to constitute the species; and whether this break be wide or narrow is of little importance so long as no recent organisms intermediate in characters are known.² However this idea may be worded, there is no possible foundation for species on any other basis. Now, many species, especially those having a wide range of distribution, show in some parts of their range considerable modifications usually correlated with peculiarities of climate, soil, or other factors known or unknown of their environment. These modifications are often sufficient for specific separation were it not for the fact that in some localities the links connecting the extreme forms occur. We have here species in process of making, waiting only for the extinction of the intermediate individuals or for the further intensification of the differential characters, to become full-fledged specific types. It is obvious that science must take cognizance of these incipient species, if it is to be a true record of nature; and for this reason "subspecies" or "varieties" are recognized. Of course they "run into" each other in some part of their range, otherwise they would be *species*. To ignore these varietal forms would be not removing obstructions from "the high-way of the Omnipotent" as Mr. Wetherby says, but a piece of the most pedantic falsity. The far-reaching importance of these local or geographic "subspecies" will be recognized when we understand that in them we have the material of future species in the making. We have moved away from the Darwinian conception that species have arisen from favorable variations of occasional individuals, preserved by the action of natural selection or "survival of the fittest"; and now we see much reason to believe that the whole mass of individuals over a given area of changed or changing conditions, is simultaneously remoulded, not

²The question of hybrids need not be considered here for obvious reasons.

by *individual variations* (which must usually be quickly effaced by interbreeding with normal or differently modified individuals), but by the steady action on the entire mass of the factors of climate, elevation, food-plants, currents and other quantities of the complex equation unknown to us.³

Mr. Wetherby proposes to avoid the use of subspecific or varietal names by the circuitous method of writing the *locality* after the specific name. He would say "*H. tridentata* Say, var. Campbell Co., Tenn." "*H. tridentata* var. Cincinnati, O." "*H. cereolus* var. Sanford, Fla." etc. Now the disadvantage of this system is that it tells absolutely nothing to the man who has no specimens from those exact localities, without a detailed description of the shells in each case. Moreover, Mr. Wetherby would write "*H. appressa* var. Woodville, Ala." for both *H. appressa perigrapta* and *H. sargentiana*, two very dissimilar forms. Who would know which one he meant to indicate? The trinomial system on the other hand offers a convenient, concise, readily understood index to geographic and local races. When one says "*P. cereolus septenvolva*" the idea is conveyed as exactly and much more concisely than by saying "*P. cereolus* large var. St. Augustine," for unless one has specimens from this locality he would not then know just what was meant. Again, were one to say "*P. cereolus* small var. Sanford, Fla." nobody could tell whether the variety found there was that with an internal lamina (*P. cereolus carpenteriana*) or without a lamina (*P. cereolus volvoxis*). Now what is the use in all this circumlocution when we have so convenient a system of nomenclature as the trinomial system, already in practical use in other departments of zoology.

Having discussed the abstract questions at issue at such length, we can devote but little space to the particular cases cited by Mr. Wetherby; but this is the less needful because what we wish to establish is the great importance of subspecies in general, not of any particular one of our own naming. We may, however, re-affirm the

³One of the most potent causes of specific or varietal differentiation has been the glacial epoch, which undoubtedly caused a southward movement of the entire northern fauna. Upon the recession of the ice sheet the species thus driven south found themselves exposed to changing climate and food-plants in their new home. Those following the retreat of the ice found the topography, soil and drainage systems of their former area in the north vastly changed. What wonder that we find many geographic subspecies! And shall we shut our eyes to the results upon our snails of the action of these cosmic forces, these manifestations of the Omnipotent?

reality of the distinction between the mass of southern, and the northern specimens of *P. appressa*. The northern shells described by Say have no incised spirals whatever, and the upper lip-tooth is frequently developed. The southern specimens (which we have called *P. appressa perigrapta*), have spiral incised lines more or less developed, and the upper tooth is wanting in the vast majority of cases. When it is present, as in the Cherokee Co., N. C. examples mentioned by Mr. Wetherby, I would regard it as an interesting case of reversion.

As to *Polygyra tridentata*, Mr. Wetherby has not read my paper with sufficient care to see my meaning. He attacks my *P. fraudulentata*, but says in the next sentence that *P. fallax* is perfectly distinct from *tridentata*. The truth is that *Helix fallax* of Wetherby and other modern authors and collectors is identical with my *fraudentata*! The true *H. fallax* of Say is identical with *H. introferens* Bland, as I have already stated in this journal and elsewhere. So my critic discredits and affirms the validity of this form in one article! As to *P. tridentata edentilabris*, Mr. Wetherby has evidently never seen it. The var. *juxtidentata* is a well-known form. I believe it to be a distinct line of differentiation, well worth attention and recognition by name.

I have not referred in this article to the large class of individual variations such as is shown in the banding of many Helices. This mode of variation is often repeated, different species having parallel modifications. The mutations are frequently not inherited, any of the forms giving birth to numerous others, as is the case with the band-varieties of *Helix nemoralis*. This tendency to "sport" in all directions is a totally different thing from the moulding of an entire race explained above; and its products cannot usefully be given varietal names. They are best expressed by formulæ devised to cover entire classes of such variations.

TYPES OF ANODONTA DEJECTA REDISCOVERED.

BY CHAS. T. SIMPSON.

In making a final arrangement of the general collection of *Unionidae* of the National Museum I found the other day among some

Unios, Lewis' types of *Anodonta dejecta*. The species was furnished by Dr. H. C. Yarrow, Surgeon and Naturalist of the Wheeler Expedition, and was said to have come from the Arkansas or its tributaries, west of the 100th meridian. The lot consists of three broken valves, two of them forming a normal pair but very much distorted.

I saw in a moment that the shell I named *Anodonta mearnsiana* in the NAUTILUS, Vol. VI, no. 12, p. 134 was the same, and my name will therefore have to be relegated to the synonymy.

Lewis described his species in Field and Forest, Vol. 1, nos. 3 and 4, page 26, and in Wheeler's Report upon Geographical and Geological Explorations and Surveys West of the One Hundredth Meridian, vol. V, Zoology, p. 952, 1875, but did not figure it.

I am almost certain that the locality given by Dr. Yarrow is wrong, as the specimens collected by Dr. Mearns were from San Bernardino Ranch, Arizona, out of waters that drain into the Colorado River of the West. A very large number of specimens were sent, and there can be no doubt as to where they were found.

It would indeed be a strange thing if this species was obtained from two places seven or eight hundred miles apart, in two distinct drainage areas. As the locality given for Lewis' species is rather vague, and a large amount of the collections of the Wheeler Expedition were made on the Pacific slope it is quite probable that the types of *A. dejecta* came from the Colorado drainage basin.

Washington, D. C., Aug. 1st, 1894.

DESCRIPTIVE NOTICES OF NEW CHITONS, V.

BY H. A. PILSBRY.

Ischnochiton ptychius n. sp.

Shell small, oval, moderately elevated, with fine and distinct though rather obtuse dorsal keel and slightly convex side-slopes; bright *flesh-pink*, with a few white dots along the sutures, and creamy angular patches on the outer portions of the pleura of some valves, the girdle dull flesh-colored with indistinct whitish mottling in some places.

Median valves short, the posterior outlines slightly concave, with the beaks but slightly indicated. Lateral areas slightly raised, each

divided by one curved radial groove in front of the middle of the area, with one or several shorter, less distinct grooves in front of it; *concentrically sculptured with coarse, low, irregular wrinkles*, which make the sutural margin feebly dentate. Central areas finely and minutely sculptured with *irregularly zigzag transverse, vermiculate subgranose wrinkles*, which are broken into granules on the ridge, and are punctulate, the outer portions of the pleura more coarsely wrinkled. Valve i having weak radial grooves and concentric wrinkles. Valve viii with central, low, mucro, the posterior slope somewhat concave; sculptured like the head-valve but more obsoletely.

Interior rose-pink, fading to white on the sutural laminae. Sinus wide, notched at the bases of the sutural laminae; eaves narrow and *distinctly porous*. Median valves with 1-1, tail valve 16 slits; teeth sharp, very *distinctly crenulated at the inner edge*.

Girdle wide, densely clothed with scales which are weakly striated, and measure about one-seventh of a millim. in width, and *imbricate inward and backward*.

Length 11, breadth 8 mm.

Hab. St. Vincent Gulf (Bednall).

A peculiar little species, shorter than most Australian *Isechnochitons*, and wrinkled much as in *I. striolatus* Gray. In the individual before me there are creamy patches at the outer ends of valves iv, v, vii and viii; on the last valve there is some olive-green variegation of the cream color.

Chiton (*canaliculatus* var. ?) *tricostalis*, n.

Allied to *C. canaliculatus* Q. & G. (+*insculptus* Ad. and *stangeri* Rv.) and *C. discolor* Souv. (+*miniuceus* Cpr.), but having fewer radial riblets on end valves and lateral areas than the first, and more elevated than *discolor*, with projecting, more backward-hooked mucro on the tail valve.

Shell oblong, elevated, acutely keeled with nearly straight side slopes. Color variable, either (1) uniform chrome yellow, or (2) olivaceous mottled finely with white, with some white patches on the lateral areas, the outer halves of the pleura blackish, girdle olivaceous with cream-white bars opposite the sutures.

Median valves a trifle beaked, the posterior (sutural) margins nearly straight. Lateral areas well raised, having three radial tuberculate riblets, the middle one shortest; tubercles rounded and spaced on front two ribs, closer and compressed on the posterior rib,

where they denticulate the sutures. Rarely a fourth very short rib is indicated on some valves. Central areas having a smooth dorsal band of about the same width in front and behind, or somewhat wider in front. Pleura having 14-15 longitudinal riblets, narrower than their intervals, the inner 1 to 3 on each side not reaching to the anterior margin of the valve. Head valve with 17-19 radiating tuberculate ribs. Posterior valve elevated, the mucro projecting, posterior slope concave. Interior milky bluish, the sutural laminæ white.

Girdle densely clothed with imbricating finely striated scales, shaped like those of *Chiton sinclairi* and measuring about one-third of a millim. in width.

Length 17, breadth 9 mill.; an olivaceous, variegated specimen is somewhat larger.

Hab. St. Vincent Gulf, S. Australia (W. T. Bednull).

This form differs from *C. muricatus* in the shape of the girdle scales. It is more roughly sculptured than *C. canaliculatus*, with the girdle-scales different in form, although they are about the same width; and with a different pattern of coloring, although in this respect all the allied forms of the *canaliculatus* group vary a good deal. The smooth dorsal band is wider than in *canaliculatus*.

It is somewhat doubtful whether this should be considered a geographic variety of the New Zealand species or an independent species. It is at all events closely allied to the *C. canaliculatus*, although actual connecting links between the two are unknown to me. The detail figures given in volume xiv of the Manual of Conchology (pl. 36, f. 4, 6) excellently represent the sculpture of *C. canaliculatus*, being drawn from a specimen furnished by Professor Hutton.

Chiton æreus var. *calliozona* n. var.

Shell oblong, elevated, the dorsal ridge acutely keeled, side-slopes straight; light olive-green, with a few concentric lighter streaks upon each valve, and obscure dusky-green longitudinal streaks on each side of valves ii and vi, less conspicuous on iii and v. Posterior (sutural) margin of valves i to vii articulated or tessellated, being painted with alternate white and brown oblique spots. Girdle buff, paler on the outer half of its width, variegated with *transverse bars of crimson and black scales* mingled with the buff ones; about 10 bars on each side.

Median valves scarcely beaked, the posterior outline of each concave. Lateral areas raised, sculptured with two or three radial grooves, becoming more numerous toward the bases, and inconspicuous growth-striae. Central areas having a wide smooth triangle in the middle: *sculptured in front of each diagonal slope with narrow, spaced impressed longitudinal grooves*, not half as wide as the intervals, and which form a sculptured band, increasing but little in width outwards. *Toward the beaks of each valve these grooves disappear entirely, but are replaced by distinctly painted green lines*, very curiously simulating the grooves. Anterior valve with about 28 convex radial riblets, some split at base. Posterior valve with subcentral subprominent mucro, and slightly concave posterior slope, weakly radiated. Interior pale blue, the sutural laminae white. Sinus very narrow.

Girdle densely clothed with very convex, shining, polished solid scales, those in the middle of its breadth largest, measuring, six-tenths mill. in width.

Length 38, breadth 18 mill. (exclusive of girdle).

Hub. St. Vincent Gulf (W. T. Bednall).

I have not much doubt that this shell is a form of Reeve's *areus*, but the coloration is different, the number of riblets on the pleura is not nearly so great. Mr. E. A. Smith has united *areus* to the Mediterranean *C. siculus* (= *olivaceus*), but I can hardly endorse such a lumping of forms from totally different areas.

ISAIAH GREGOR.

We have heard with deep regret of the death of Mr. Isaiah Gregor, which occurred on the 26th of July at his home, Cuyahoga Falls, Ohio.

Mr. Gregor was not only an extensive dealer in shells, but also an ardent and earnest Conchological student. Though for many years engaged in a business requiring strict attention and skilful management, he never allowed this to interfere with the promptings of his generous heart; a fact which was constantly exemplified by his timely suggestions and gifts of specimens to friends and others engaged in Conchological pursuits. He also took much interest in the completion of the American Association's collection. His last

gift to this,—some two months ago, was a number of Florida species; among them a suite of *Strombus alatus* Gmel., remarkable for their very large size and brilliant coloring; the latter ranging from the brightest crimson to the deepest purple. The presentation of this suite gave him a great deal of pleasure, and we shall never forget his gratified expression when he saw them safely placed.

How little did he then think that his eyes rested upon them for the last time!

“We mourn him dead, yet is he living.”

[COMMUNICATED.]

NOTES AND NEWS.

TRACHYDERMON RAYMONDI IN BRITISH COLUMBIA.—Mr. C. F. Newcombe has found this species abundant at Victoria, on exposed headlands, its stations being similar to those of the Nuttallinas. It was formerly confused by collectors of that district with *Tr. dentiens*, young *Mopalia lignosa*, and young *Nuttallina scabra*. The occurrence of the latter species in British Columbia is extremely doubtful. *Trachydermon raymondi* will probably prove to have the distribution of *Nuttallina californica*, *Ischnochiton mertensii* and *Tonicella lineata*.

NOTE ON ORTHALICUS MELANOCEILUS FLORIDENSIS.—In the reference to Land and F. W. Shells, N. A. (foot of p. 38) “fig. 371” should be omitted. That figure represents a shell from the Sierra Madra, and shows the conspicuous dark oblique stripe in the aperture characteristic of typical *melanocheilus*, and the spirals are very faint there. A good figure of the Florida shell has been given by Mr. Binney in “Fourth Supplement T. M. V.,” pl. 2, f. 4.

AGRIOLIMAX CAMPESTRIS IN NEW MEXICO.—Mr. A. Boyle has given me a specimen of *Agriolimax campestris* which he found in his garden at Santa Fé, about 7100 ft. above sea level. The specimen is pale brown, with a pale grey unicolorous sole. So far as I know, this is the first slug recorded from New Mexico.—*T. D. A. Cockerell*. July, 1894.

NEW METHOD OF PREVENTING CRACKING OF ANODONS.—
EDS. NAUTILUS: All collectors are aware of the trouble we have

in preserving Anodons. No matter how good they may be, they won't stay so if they can only get to split up in pieces. Last spring a fish pond here was drained and I obtained a good lot of very fine large *Anodonta fluvialtilis*. I washed them clean on Saturday and put them aside to dry, and when I came back Monday morning they were having a regular "pic-nic" splitting and popping. So I just gave them a bath of thin white shellac and alcohol and they have been behaving well ever since. I send you some specimens that you may see the effect it has on them.

Frank Burns, Washington, D. C.

[The specimens are still in good condition, and the plan is worth a further trial. The principle is that the shellac forms an impervious layer over the epidermis, preventing that evaporation of water from the latter which causes it to contract and break the thin calcareous layer. The shellac should therefore be applied as soon as the surface of the mussel is dry. Its main disadvantage is in the artificial gloss which it gives the shell, which would prevent its use on lusterless specimens. If the shellac is very thin it does not effect the appearance of glossy shells like *A. fluvialtilis*.—ED.]

ERRATA.—A typographical error occurred in the July number of the NAUTILUS and I desire to correct same. In the article "My Daily Walk" on page 34, the *second line under the list of species collected*, I notice the *ninth word* should have read as "county" and not "country."—*Williard M. Wood.*

NOTICES OF PUBLICATIONS RECEIVED.

NATURAL HISTORY NOTES FROM NORTH CAROLINA (Papers nos. 2 and 3) by A. G. Wetherby (from the Jour. Cincinnati Soc. Nat. Hist.). In these papers on "The Land Shells of Roan Mountain and Vicinity" the author enumerates fifty-four species with interesting notes on each. A parasitic species of Diptera is here recorded infesting *Zonites clliotti* and *Polygyra fustigans*.—*C. W. J.*

GEOGRAPHIC AND HYSOMETRIC DISTRIBUTION OF NORTH AMERICAN VIVIPARIDÆ by Prof. R. Ellsworth Call (from the American Jour. of Science for August). This interesting article is accompanied by a map showing the distribution of each species. The

author recognizes two species of *Tulotoma* (*magnifica* and *coosaensis*), four of *Vivipara* (*contectoides*, *intertexta*, *subpurpurea*, *troostiana*), two *Lioplaces*, and nine species of *Campeloma*. The main facts of the distribution and station of each species are stated, largely from the authors own wide experience in the field. It would be unreasonable to expect any discussion of synonymy in a paper of the scope of this one, but even if Prof. Call could prove the specific identity of *Vivipara contectoides* with *georgiana*, *wareana*, etc., why should he use the *latest* instead of the *earliest* name for the species? —J. & P.

Dr. WM. H. DALL has recently issued a "MONOGRAPH OF THE GENUS GNATHODON, GRAY (RANGIA DESM.)." In this essay the priority of the name *Gnathodon* for the group is demonstrated; the anatomy of both soft and hard parts is described, and the species are discussed and figured. Dall concludes that *Gnathodon* does not constitute a distinct family near *Cyrenidae*, as Fischer has it, but that it belongs without doubt to *Maetridae* and is probably an off-shoot from the *Mulinia* stock. The range of the genus is "Subtropical America, the Gulfs of California and Mexico, in shoal quiet water, varying from salt to fresh, but preferably somewhat brackish; range in time from the newer Miocene to recent seas." Three sections are adopted, *Gnathodon* typical, *Miorangia* Dall and *Rangianella* Conr. *G. cuneatus* Gray is the commonest species in collections (often under the name *Rangia cyrenoides*).

THE MOLLUSCA OF THE PARIS MAINS.—M. Locard has been making some very interesting studies of the mollusks of the water-mains of Paris, from which he has collected forty-four species belonging to thirteen genera, among which several species are described as new to science. These are, however, only slight varieties of well known species. Among other peculiarities of this strange fauna he notes four marked modifications, due to their environment, in which they differ from the types in the waters from which these mains are supplied. These are: [1] A diminution of size, due to the absence of light; [2] a decrease of marked coloration, due to the same cause; [3] decided modifications of form, generally producing a lengthened shell, due to the mechanical action of a steady and rapid current; [4] difference of general appearance, the polished, brilliant shell being developed with regularity in a constant medium. The last two peculiarities may be noticed in the shell life of those streams in tropical countries which in the shaded mountains are constant; as

differentiated from the formation and appearance of members of the same species found in the periodic streams of the open plains, which disappear with each recurrence of the dry season.

ON THE JAMAICAN SPECIES OF VERONICELLA, by Prof. T. D. A. Cockerell and R. R. Larkin. (Journ. of Malac. III, pt. 2, 1894). The material discussed in this paper consists of 18 specimens, all referred to *V. sloanii*, from Jamaica. These were dissected and their characters carefully noted. The conclusions reached are of much value to investigators of this difficult genus. "The results obtained are quite remarkable and tend to throw doubt on the validity of several characters hitherto used for the separation of species in the genus * * * The specimens show great differences from one another, so that by selecting a few of the most distinct forms, several apparently good species might be described. Yet we believe that the whole series represents the variations of but one species, *V. sloanii*, and that *V. virgata* Ckll. must be reduced to *V. sloanii* var. *virgata*. * * notwithstanding so much variability, the species as now defined should be easy of recognition. The following characters appear to be quite constant and of specific value in *V. sloanii*. (1) The under-side is always free from spots or markings of any kind, whereas *occidentalis* Gldg. from the Lesser Antilles, has some spots below. (2) The sole never projects from behind the body, as it does in one or two of the continental species. (3) The filiform glands are less than 10 mill. long, whereas in *dissimilis* and *floridanus* they are considerable longer. (4) The penis is always long, cylindrical, with the end slightly bulbous and the orifice terminal. It thus entirely differs from that of such species as *V. portoricensis*. (5) The filiform glands are always more than 10 in number thus differing from *V. morehii* and *V. dubia*. (6) The female orifice is always post median, thus differing from the continental *V. nigra*, etc."

The characters of size and shape, distance of female orifice from head and sole, size of penis and splitting of its retractor, number and length of filiform glands etc., were found to vary within wide limits, and their several variations were not correlated in the different organs, so that no dependence could be placed upon the various combinations presented for specific distinctions. Color, contrary to the opinion of some authors, seems useful in some cases. The whole series examined is systematically tabulated; and the only thing lacking in this admirable paper is *illustration*. Still, this is a lazy complaint when all is so clearly described.

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No. 6

THE AMERICAN SPECIES OF CARYCHIUM.

BY HENRY A. PILSBRY.

The genus *Carychium* contains some of the smallest land mollusks known. The shell is cylindrical or high conical like that of *Pupa*, but the lack of eye-stalks and the form of the lingual teeth show the genus to belong to the family *Auriculidae*, a group best known in America by the salt-marsh inhabiting *Melampus*. The species of *Carychium*, like other *Auriculidae*, are terrestrial in habit, living among damp leaves or wood. The genus contains about 15 recent species, distributed over nearly the whole northern hemisphere.

In THE NAUTILUS for 1891, vol. iv, p. 109, the writer gave a brief notice of the United States forms of the genus. Subsequent study resulted in a synopsis of the group, which was published in Proc. Acad. Nat. Sci., Phila., 1891, p. 318, with plate xiv. With a view of enlisting the services of conchologists in the needed examination of more material from various parts of the country, this synopsis is here reprinted. Information is needed to establish the range of the various forms, particularly in the West and South, and also the variations of the several forms. Only the collection of specimens from points geographically intermediate between the extremes of the range of this genus, and the examination of such material by a competent person, can finally decide the question of the number of naturally defined species, and which, if any of them, must be considered geographic races or sub-species.



Carychium exiguum Say. Figs. 1, 2, 3.

Shell *cylindrical*, the last two whorls of about equal diameter. Whorls $4\frac{1}{2}$. Aperture decidedly over one-third the total altitude. Outer lip sinuous, moderately thickened, very strongly arcuate at its upper outer portion.

This is the common East American form, ranging from Maine southward and westward, the limits of its range not exactly determined as yet.

Carychium exiguum var. *Mexicanum* Pilsbry. Figs. 7, 8, 9.

Shell cylindrical. Whorls $4\frac{1}{2}$. Aperture equal to, or a trifle exceeding one-third the total altitude of shell. *Outer lip thickened at and below the middle by a very heavy deposit of callus upon its face.* Lower fold of the columella sub-obsolete. Surface delicately striated.

Orizaba, Mexico.

Carychium occidentale Pilsbry. Figs. 4, 5, 6.

Shell *distinctly conical*, tapering. Whorls 5. Aperture very oblique, larger than in *C. exiguum*, the outer lip flatly expanded, thin, *not at all thickened on its face.*

Portland, Oregon, is the only locality from which I have seen this species.

Carychium exile H. C. Lea. Figs. 10, 11, 12, 13, 14.

Shell *elongated*. Whorls $5-5\frac{1}{2}$. Aperture small, very oblique, about *one-third the length of the shell.* Outer lip more or less thickened. *Surface closely, regularly and very distinctly striated.*

Eastern Pennsylvania (H. C. Lea); Kent, Ohio (Geo. W. Dean).

Lea found this form on the Wissahickon Creek, near Philadelphia, but I have not been able to rediscover it there.

Carychium exile var. *Jamaicensis* Pilsbry. Figs. 15, 16.

Much elongated, similar to *C. exile*, but the surface smooth, not perceptibly striated.

Jamaica.

LIST OF SHELLS FROM THE VICINITY OF MINGUSVILLE, MONTANA.

BY HOMER SQUYER.

Many of the smaller forms were picked out of fine river drift found along the banks of Beaver Creek, a tributary of the Little Missouri, after the subsidence of the freshets.

The occurrence of *Pupa syngenes* Pils., previously known only from Arizona, and of *Planorbis umbilicatellus* Ckll., described and reported only from Manitoba, are especially interesting. Many of the forms were identified at the National Museum by Messrs. Dall and Simpson, while Dr. Sterki has kindly named the *Pupide* and *Vallonias*. Mingusville is two thousand six hundred and forty-five feet above sea level.

HELICACEA.

Family ZONITIDÆ.

Vitrea arborea Say; worn var., approaching *V. breweri* Newc.

Vitrea radiatula Alder, rare.

Conulus fulvus Drap., one specimen.

Pseudohyalina minuscula Binn.

Pseudohyalina leviuscula? Sterki. Close to vars. of *minuscula*.

Pseudohyalina conspecta Bland.

Family ENDODONTIDÆ.

Pyramidula striatella Anth.

Family HELICIDÆ.

Vallonia gracilicosta Reinh.

V. gracilicosta var. close to *costata* Say.

Vallonia perspectiva Sterki.

Vallonia pulchella Mull.

Family PUPIDÆ.

Pupa muscorum L.

Pupa blandi Morse.

Pupa blandi var. *edentata*; one specimen.

Pupa syngenes Pilsbry. Eight more or less perfect specimens.

Pupa holzingeri Sterki.

Pupa armifera Say.

Pupa pentodon Say.

Pupa decora Gould.

Vertigo ovata Say.

Vertigo binneyana Sterki.

SUCCINEACEA,

Family SUCCINEIDÆ.

Succinea avara Say.

Succinea obliqua Say.

Succinea grosvenori Lea.

Succinea lineata Binn.

LIMNÆACEA.

Family LIMNÆIDÆ.

Limnæa palustris Mull.

Limnæa bulimoides Lea.

Limnæa humilis Say.

Limnæa caperata Say.

Planorbis bicarinatus Say.

Planorbis lentus? Say; young shells only.

Planorbis parvus Say.

Planorbis umbilicatellus Cockerell; (*P. umbilicatus* Taylor, Leeds Journ. Conch. IV, p. 351, 1885, not of Müller, 1774). Described from Manitoba.

Family ANCYLIDÆ.

Ancylus ricularis Say, one specimen.

Family PHYSIDÆ.

Physa gyrina Say, young only.

Physa ancillaria Say.

Physa heterostropha Say.

Physa lordi Baird.

PELECYPODA.

Family CORBICULIDÆ.

Sphærium sulcatum Lam.

Pisidium compressum Prime.

Family UNIONIDÆ.

Anodonta plana Lea, young.

Anodonta ovata Lea, young.

Only one perfect and adult specimen of *Planorbis umbilicatellus* was obtained in the river drift. It is readily distinguished from *P. parvus* Say by its narrow funnel-shaped umbilicus and higher, somewhat beveled whorls. It was first collected in Manitoba by R. M. Christy, Esq., and described by Taylor under a name already widely known in the literature though generally regarded as a synonym of one or another Linnean species. It was re-named by Cockerell, in the Conchologist's Exchange, November, 1887, p. 68. (W. H. D.).

NOTE ON HELCIONISCUS NIGRISQUAMATUS REEVE, SP.

 BY GEO. W. TAYLOR.

I have recently received from Mr. Frederick Stearns of Detroit a number of shells collected by himself and labelled as follows :

" *Patella boninensis*, Bonin Is."

" *Patella stearnsii*."

" *Patella* near *stearnsii*, Japan, 1892, only 8 found."

" *Patella nigrisquamata* (?), Loo Choo Is., Yacyama Is."

" *Patella nigrisquamata* (?), a var., Japan, 1892."

All the specimens sent are, in my opinion, referable to a single species which has long had a place in my cabinet as *H. nigrisquamatus* Reeve.

Reeve's locality for this species was "Australia," but this has never been confirmed and is doubtless an error. The same I think must be said of the additional locality, "Concepcion Chili," given by Mr. Pilsbry (in the Manual, XIII, 126), on the authority of Dr. W. S. W. Ruschenberger, for we cannot concede to any limpet a range so extensive as from Japan to Chili, and Japanese shells of which I am now writing are certainly true *nigrisquamatus* if figures and descriptions count for anything. I may add as negative evidence of a certain value that of several thousands of limpets from Chilian and Australian localities that have passed through my hands, I have never seen a specimen, young or old, approaching this species.

With regard to *P. boninensis*, the differences on which Mr. Pilsbry relies are 3 in number (see Man. Conch. XIII, 132). The first *geographical*; but as *nigrisquamatus* has not been found in the same habitat as the original specimens of *boninensis* this distinction no longer holds. Secondly, the *size of the central callus*; but such a difference would hardly be specific, taken by itself, I should think, and moreover, it is not apparent in the series before me. Lastly, Mr. Pilsbry notes the *brown streaks* diverging from the head segment of the central callus. These marks, however, are present in some of the specimens sent as *nigrisquamata* and absent in others sent as *boninensis*, showing either that the original collector was unable to separate his shells accurately or else that the distinction is not a constant one.

As to *P. stearnsii*, if the shells sent to me by Mr. Stearns are conspecific with the type specimens named and figured (from his collection) by Mr. Pilsbry, then in my opinion *stearnsii* is only a young form of *nigrisquamata* and I suspect (from the description) that *Patella grata* of Gould is the same shell. I am, therefore, inclined to write:

Helcioniscus nigrisquamatus Reeve (*Patella*), 1854.

= ? *P. mazatlandica* Sowb., 1831.

= *P. grata* Gould, 1859.

= *P. boninensis*+*P. Stearnsii* Pilsbry, 1891.

Habitat: Japanese Seas, Stearns; "Australia," Reeve, error; "Chili," Ruschenberger, ? error.¹

PEROSTYLUS, THE EMBRYO OF MEGALTRACTUS.

BY H. A. PILSBRY.

In a former number of this journal (June, 1894) the writer proposed a new genus, *Perostylus*, for the *Cerithium* (*Colina*) *brazieri* Tryon and another supposed new species. Upon the appearance of the paper describing these forms, I was informed by my encyclopedic friend, Professor Theodore Gill that the type of the new group had been shown by Professor R. Tate to be the embryonic portion of "*Fusus*" *probosciferus*. Some time after, the article by Tate, published in the Proc. Linnæan Society of New South Wales (Australia), Second Series, Vol. VIII, pt. 2,² p. 244, came to hand.

In reference to *Cerithium* (*Colina*) *Brazieri*, Professor Tate writes: "The above named gastropodous shell is described in Tryon's Manual of Conchology, Vol. IX, p. 142, and illustrated t. 26, fig. 16. The occurrence of *Colina* in the Eocene beds of Victoria has led me to a study of the recent species, and in doing so I was arrested by the unlike-

¹ Mr. Taylor is unquestionably right in considering *Helcioniscus boninensis* a synonym of *nigrisquamatus* Rv. I had satisfied myself of this by the examination of the National Museum collection some years ago. He errs, however, in placing *H. stearnsii* in the same category as it is a totally distinct thing. Mr. Taylor probably had the young *H. nigrisquamata* before him, as so acute an observer could hardly confuse *stearnsii* with the other species.—ED.

² Issued March 12, 1894.

ness of Tryon's figure, as above quoted, to other members of the genus; moreover, the shell seemed familiar to me, and if I am right in my identification it is nothing more than the embryo of *Fusus proboscidiferus*, of which I have examples from Port Essington. The apical whorls of that shell are often decollated, but in some specimens there remains sufficient of the apex to permit one to arrive at the opinion just stated."

If any further evidence is needed to demonstrate the true nature of *Perostylus*, it is supplied by Mr. Edgar A. Smith of the British Museum (Natural History), who writes to me as follows:

"The presence of a fine series of *Fusus proboscidiferus* Lamarck in the British Museum Collection, ranging from the very young state up to the adult form, enables me to show that *Perostylus* is merely the apical portion of the spire of that immense West and North Australian shell.

"The late Capt. Beckett brought from the Dampier Archipelago a number of specimens of this species besides a fine mass of the egg-capsules containing the young shells in large numbers. These agree exactly with the description and figure of *P. brazieri* (Tryon) and *P. fordianus* Pilsbry, as given by the latter author. The number of whorls in specimens from the same compartment of the mass of capsules is variable from four to six, and the length of the rostrum and canal is also subject to slight variation. Some specimens are also considerably broader than others. We have in the museum collection a specimen corresponding in size with Swainson's figure¹ of *Fusus aruanus* (= *proboscidiferus*) with the apical whorls still remaining intact. Another example is nine inches in length and still retains the nucleus, but in all the larger shells this part is broken off.²

"The apical portion of *Turbinella pyrum* is also very similar, but a close examination reveals the incipient characteristic columellar folds.

"In the description of *Perostylus* the apex is said to be decollated like that of *Rumina* or *Cylindrella*. Whether this is really the case has yet to be proved by further observation. There certainly is every appearance of there having been an embryonic shell which has become detached, but it is also certain that this takes

¹ Exotic Conchology.

² It is broken off in all the specimens in the Philadelphia collection.—P.

place within the egg-capsule, at an early stage of the creature's existence, for no such nucleus is attached to any of the specimens in the egg-capsules at hand which are of the same size as the shells figured by Mr. Pilsbry."

In conclusion it should be stated that *Fusus proboscidiiferus* has been made the type of *Megalatractus*, a subgenus of *Hemifusus* (*Semifusus* Fischer!), by Fischer. There are good reasons for giving the group generic rank. It certainly does not belong to *Fusus*, the embryonic whorls being very different from those of the typical species of that genus. Neither can it be referred to *Hemifusus* as Fischer has done.¹ *Perostylus* will, of course, become a synonym of Fischer's group.

CATALOGUE OF LAND SHELLS OF LONG ISLAND, N. Y.

BY HENRY PRIME.

The time in making this collection embraces a number of years and I think it to be rather complete, having left no stone (or log) unturned in searching for the species. *Mesodon albolabris* and *thyroides* are dwarfed, and *Tachea nemoralis* does not compare as to size with those from Europe. The sea air may have something to do with this. The soil is of a sandy nature, as a rule, not adapted to the growth of sand snails.

Hyalinia arborea Say. Coldspring; Greenport; East Hampton; Huntington; Prospect Park, Brooklyn; Astoria; Myrtle Ave. Park, Brooklyn; Lloyd's Neck; Centerport.

Hyalinia binneyana Morse. Huntington.

Hyalinia cellaria Müll. Astoria.

Hyalinia indentata Say. Huntington.

Hyalinia milium Morse. Huntington.

Hyalinia nitida Müll. New Lots.

Limax agrestis Müll. Jamaica; Brooklyn; Huntington; Centerport.

Limax campestris Binn. Lloyd's Neck; Whitestone; Centerport.

¹ Manuel de Conch. p. 623.

Limax flavus Linn. Huntington. Was introduced in egg state among mushroom spawn. Brooklyn.

Limax maximus Linn. Brooklyn.

Patula alternata Say. Richmond Hill; Lloyd's Neck.

Tebennophorus carolinensis, Bosc. Lloyd's Neck.

Pallifera dorsalis Binn. Lloyd's Neck.

Helicodiscus lineatus Say. Brooklyn; Huntington; Lloyd's Neck; Centerport.

Pupa contracta Say. Huntington; Lloyd's Neck.

Pupa corticaria, Say. Huntington.

Pupa fallax Say. East Marion; Coldspring. At Coldspring this species was at one time quite abundant among the brick (of what was left of a house cellar); these being removed the colony was broken up!

Pupa pentodon Say. Huntington.

Vertigo milium Gld. Coldspring.

Vertigo ovata Say. Shelter Island; Greenport; Coldspring; Huntington; East Marion; Myrtle Ave., Prospect Park, Brooklyn; Centerport.

Strobila labyrinthica Say. Huntington; Lloyd's Neck; Centerport.

Triodopsis introferens Bld. New Lotts. *Two* specimens were found *without the animal*, might they have been the playthings of some children?

Mesodon albolabris Say. New Lotts; Huntington; Oyster Bay; Prospect Park, Brooklyn.

Mesodon thyroides Say. Lloyd's Neck; Prospect Park, Brooklyn; Astoria; Huntington; New Lotts; Richmond Hill.

Vallonia pulchella Müll. Huntington; Centerport; Coldspring; Prospect Park, Brooklyn.

Tachea nemoralis. Yellow, plain, Flushing; yellow, 2 bands, Astoria; yellow, 4 bands, Flushing. A colony existed sometime since on Lloyd's Neck, but that locality being used as a public picnic ground, they in time *removed*.

Punctum minutissimum Lea. Coldspring.

Succinea avara Say. Coldspring.

Succinea aurea? Lea. Peconic.

Carychium exiguum Say. Huntington; Centerport.

Melampus bidentatus Say. Lloyd's Neck; Huntington; White-stone; Coney Island; Eaton's Neck.

GENERAL NOTES.

WITH the cooler weather of autumn conchologists will find indoor operations once more agreeable, and all who have availed themselves of the past season for adding to their knowledge of mollusk life or to their cabinets of specimens should try to share their harvests with others by telling of the interesting experiences in the field, of the occurrence of uncommon species or varieties, or the turning up of well known ones in new localities. Frequently random observations on the life habits of one or a few species are valuable. Who knows where most of our marine or land snails lay their eggs, how many there are, their form and size? And yet this is a vital point in the life of the species; and there are hundreds of others, some of which are sure to come to the knowledge of every collector. The difficulty is that such facts are too often esteemed of less worth than a fine lot of shells, and so are forgotten and left half seen or unrecorded. A collector's note-book should be as valuable as his cabinet, especially if the knack of sketching living animals, etc., is cultivated.

We hope that each of our readers will give us some fact or observation which has been made his or her own, during the past summer. Short notes dealing with single topics are always welcome, and have the advantage of being published promptly. Such a magazine as this one is always co-operative, and the more each gives, the more each receives. If anything you have seen interests *you* it is likely to be of value to others: but being interested one's self is a good test of what makes good reading. Meantime the editors will try to do their part. In future, more attention will be given to notices of current literature of conchology than has been our custom in the past; and it is of course understood that our pages are freely open to all opinions, entirely regardless of those held by ourselves.

THE JUNIOR EDITOR of the NAUTILUS will be away from Philadelphia for some time after the middle of October, as he contemplates a paleontological trip to Alabama.

NOTE ON *HELIX* GOSSEL.—As the identity of this species is somewhat obscure, it may be well to clear it up in this place. *Helix gosseli* was first described by Pfeiffer in the Proc. Zool. Soc. Lond., for 1846, p. 37, the description being repeated in Monographia, I, p. 30. In the later Conchylien Cabinet, *Helix*, p. 219, Pfeiffer de-

clared it to be a mere color variety of *H. subconica* C. B. Ad., described in 1845, and the figure he gives of his type amply confirms this opinion. In the Conchylien Cabinet, a few pages further on, Pfeiffer describes and figures a "*Helix gossei* C. B. Adams MSS." This name, of course, cannot stand, being preoccupied by that prior *H. gossei* of Pfeiffer himself, and this decision is not affected by the fact that Pfeiffer's first *gossei* is a synonym. This *gossei* of (C. B. Ad.) Pfr., I consider a race or variety of *H. nemoraloides* C. B. Ad., 1845, and it is practically covered by C. B. Adams' *H. pulchrior*, 1851. It is this form which caused Messrs. Simpson and Henderson some trouble in NAUTILUS for May, 1894, p. 5. The conclusion is that neither of the "gosseis" can stand, the first *gossei* of Pfr. being a synonym of *subconica*, and *gossei* C. B. Ad. MS. of Pfr. (later) becoming a synonym of *H. nemoraloides* var. *pulchrior*.—*Pilsbry*.

HELICES CARRIED BY BIRDS.—"From the throat of *Rallus pectoralis* Mr. J. A. Thorpe of the Australian Museum extracted the snail I now exhibit. This is a specimen of *Chloritis jervisensis* Quoy and Gaimard, a species common in this neighborhood, whose almost adult and uninjured shell measures 18 mm. in diameter, and which weighed, shell and animal together, 1.26 grammes. When found by Mr. Thorpe, to whom I am indebted for both facts and specimen, the snail was quite dead; as a test I immersed the animal in strong spirits without inducing contraction; since, however, its consumer had been killed forty hours earlier, the suffocation of the mollusc was to be expected. The bird was shot at Randwick, near Sydney, on the 19th May, 1894, by Mr. Newcombe, Deputy Registrar-General. In enumerating "Means of Dispersal," Darwin observes (*Origin of Species*, 6th ed. p. 372): 'A bird in this interval [eighteen hours] might easily be blown to the distance of 500 miles, and hawks are known to look out for tired birds, and the contents of their torn crops might thus readily get scattered.' In view of the above incident, this suggests a means whereby the geographical range of *jervisensis* might be considerably extended."—*Charles Hedley*, in *Abstr. Proc. Linn. Soc. N. S. Wales*, May 30, 1894.

PROF. H. E. SARGENT who has been pursuing biological studies at the Chicago University, has returned to Woodville, Ala.

THE NAUTILUS.

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NOVEMBER, 1894.

No. 7

DESCRIPTION OF A NEW SPECIES OF DORIDIUM FROM
PUGET SOUND.

BY W. H. DALL.

Among specimens of mollusks collected in Puget Sound by the Young Naturalists' Association of Seattle, Wash., and forwarded for identification by Prof. O. B. Johnson, was a species of *Doridium*, a genus new to the region, and detected by Miss Adella M. Parker, in whose honor, at the request of the society, it has been named. The specimens were dredged in 30 fathoms at Eagle Harbor, Puget Sound.

Doridium adellæ n. sp.

Animal naked, about 16 mm. long, of a dark plum color, mottled with fine vermiculate spots of golden yellow; general form that of *D. carnosum* Cuvier, but with a shorter velum, half as long as the body and transversely truncate behind; the posterior free portion of the mantle short, obscurely bilobed, and without a flagellum; front edge of the velum slightly excavated; parapodia wide, the sole slightly longer than the body; shell internal, subconical, white covered with a brownish epidermis; pillar strong, reflected with a deep groove outside of it, the basal end projecting spur-like; nucleus small, depressed.

The shell is more conical and the cycloid wall of it narrower than in *D. carnosum*, and the excavated pillar much more prominent.

See Ann. Mus. de Marseilles, Zool. t. II, p. 45, pl. 2, figs. 42-44, 1885.

EDITORIAL CORRESPONDENCE FROM ALABAMA.

The following paragraphs from a letter received from the junior Editor of the NAUTILUS, written from Claiborne, Alabama, under date of Oct. 18th, will be of interest to our readers :

"* * * I arrived here [Claiborne] last evening, seven days out from Selma. While waiting for a train at Selma, I took a stroll along the river. The steep bank of bluish gray clay, probably forty or fifty feet in height, tempted me to look for fossils. A small *Ostrea*, or *Gryphæa*, a *Pecten* resembling *Camptonectes burlingtonensis*, and several parts of a large *Inoceramus* told me it was cretaceous. But the specimens were too scarce and poor to warrant the expenditure of much time. From Selma I went by train to Catharine, and thence to Prairie Bluff.

"It is at the latter place that the collector of cretaceous fossils is in his element. The bluff is over one hundred feet high, and in one place slopes gradually, giving one a good opportunity to collect. Fine large specimens of *Exogyra costata* and *Gryphæa vesicularis* were abundant. The shells of the latter were unusually thick and the lower valve very convex. Perfect specimens of *Plicatula urtica* were also common. Finely preserved casts and, in many cases, the shells of numerous species of *Gastropods*, were abundant. Exceptionally numerous were: *Anechura spirata*, *Turritella encrinoides*, *Rostellites texturatus*, *Pyropsis* sp., *Natica abyssina* and *Lunatia Halli*. Of the Cephalopods, I found *Nautilus DeKayi*, *Baculites ovatus* and *Ammonites* sp., in fair numbers.

"At Matthew's Landing, ten miles below Prairie Bluff, is the first good exposure of strata containing Eocene fossils. They are well preserved and very interesting, many that I found being new to the Philadelphia collection, *Cardita*, *Area*, *Volutilithes*, *Pleurotoma*, being some of the principal genera. I found the spire of a large and handsome conch, reminding one of *Melongenæ corona*, except that the projections on the angles of the whorls are nodulose instead of spinose, but I looked in vain for a perfect specimen.

On the west bank of the river, a short distance below Clifton, are high bluffs of indurated blue clay, and I found the first (and

last, so far) *Strepomatidae* of the trip, *Goniobasis solidula* Lea. The bank below the water-line was covered with them. In many places little springs trickled down the bank, and in these they were to be found to a height of twelve feet above the river level. Notwithstanding the very low stage of the river, I have seen no living *Unionidae*, and only a few worn and faded valves on Burford's Bar.

"In the the bluff at Peach Tree there is a narrow stratum of ferruginous sand containing a few Eocene fossils. Monday, the 15th, was spent at Gregg's Landing, four miles below Peach Tree. As there were no accommodations there for staying over night, we made every minute tell. It is a fascinating spot; great masses of a hard fossiliferous sandstone in which *Turritella mortoni* and *Ostrea compressirostris* predominate, and which has come from an upper stratum seventy or eighty feet above the present water-line, lay strewn along the base of the cliff, reminding one of Potomac Creek, Va. In the lower fossiliferous stratum, of a dark, indurate, sandy clay, *Cardita planicosta*, *Cucullaea* sp., *Turritella humerosa*, *Turritella* sp. and *Calyptrophora trinodosa*, were the conspicuous forms.

"Bell's Landing, five miles below Gregg's, was next visited. The fossils were similar to those found at Gregg's, but among them were many rare species—rare in collections and rare at Bell's Landing.

"It was indeed singular how many uniques of some very interesting forms I found here. The stratum referred to above was also present here, but the upper one was for the most part a soft sand, and contained a greater number of species. As it was impossible to work the upper stratum in place, and as both were mixed together in the talus at the base of the cliff, I found it impracticable to keep the fossils of the two separate. I have not had time to hunt for land shells, but from appearances it seems somewhat unfavorable. On the bluffs it is extremely dry, while the lowlands are subject to overflow. To-morrow I go to work at the Claiborne fossils.

Yours sincerely,

"CHAS. W. JOHNSON."

POLYGYRA (STENOTREMA) HIRSUTA ON LONG ISLAND.

BY A. H. GARDNER, FORT HAMILTON, L. I., N. Y.

In the October number of the NAUTILUS I noted a catalogue of the land shells of Long Island, N. Y., by Mr. Henry Prime, which

seems, from my own investigations, to be very accurate. I venture, however, to supplement the same with a species hitherto unrecorded amongst the annals of the mollusk fauna of Long Island, and existing in what I believe to be a very circumscribed area. Most of the species Mr. Prime records I have found in localities other than those he names, and from his more extended investigations and those of his predecessors, Messrs. Temple Prime and Sanderson Smith—ranging over nearly the entire island—I am inclined to believe that the species of which I am about to write is to be found in but one locality, the one in which it was first discovered.

During the early spring of 1891 a colony of *Stenotrema hirsuta* was accidentally discovered by my friend, the late Mr. James Armstrong, a naturalist residing in Bay Ridge, L. I.; they were found in a small patch of woods, or rather, a small thicket, laying at right angles to a good-sized wood, at what is now 13th Ave. and 74th St., Brooklyn. The situation was a good one, being shady, and the ground covered with small fragments of boulders cast there at some past time from the surrounding fields. It had been undisturbed for years, as the position of the stones testified to; the leaves of many summers had fallen, decayed, and left their remains amongst the interstices in the form of a rich, dark mould.

The surrounding woods, for there are (or were) several in this immediate vicinity, had been thoroughly searched, both by myself and Mr. Armstrong, for many previous years, with a view of collecting specimens of the land mollusca, and had yielded to active and close search examples of *Helix* (*Mesodon*) *albolabris* and *thyroides*, *Zonites arboreas* and *indentatus*, *Helicodiscus lineatus*, *Strobila labyrinthica*, *Vertigo Bollesiana* and *milium*, but never a trace of the *Triodopsis* or *Stenotrema* groups, which, moreover, had never been noticed before by either of us in Long Island. *Stenotrema hirsuta* is at all times a rare shell in this part of the country. I know but of one specimen, collected at Highbridge, N. Y. City, and have heard of a few specimens being found on Staten Island by the late Dr. Hibbard, on the palisades of New Jersey. I have found them, but even there they are exceedingly scarce.

Now in this particular locality they abounded, and a very large quantity of specimens was procured.

The question arises how or by what means were they introduced. Evidently they were not the survivors of a species that had once flourished there, as in that case at least dead shells would have

been found elsewhere near the locality. The large quantities found would point to their having been native to the place for a long period of time. Why they had not spread is not strange when their habits are considered: they are slow in movement and retiring, loving to adhere to the under side of a stone, where moisture can be procured in the hot days of summer. Surrounded by conditions favorable to their existence, they neither seek nor require change of locality.

It is easy to account for the introduction in any place of a new plant or insect. The influence of the wind will scatter spores or seed vessels over a vast area; whilst when the locomotive powers of insects are considered, both aerial and terrestrial, it needs but a new condition, generally the scarcity of food, to cause an immediate migration, bounded only by arrival at the nearest spot indicated by instinct as the place where more suitable conditions exist, necessary to the preserval of life and development. But in the case of a snail, and especially such a slow moving one as *S. hirsuta*, it is different; to such an organism transition over an extended distance would be an impossibility, that is to say, by its own natural powers.

The only theory possible to solve this question is that they were carried there either as snails or the spawn of snails by some outside influence which we can only attribute to a winged animal capable of covering an extended distance continuously; for example, a hawk or other bird of strong flight may have left the Palisades of the Hudson river with dirt adhering to its claws containing the embryo "*hirsuta*," and winging its way across river and land, alighted on a tree at this spot, and in the process of perching, seraped off dirt and snail spawn, which dropped amongst the stones below. And again, the bird may have swallowed the *S. hirsuta*, and as it is a globular shell and of very hard substance, it may have escaped the grinding of the stones in the œsophagus, passed through the digestive organs, and been ejected at the locality with other excrement, and there perpetuated the species.

At any rate, this appears the only agency by which the species can have been introduced, and unless the same can be distinctly refuted, it forms a theory illustrated by the present example of the diffusion of certain forms of molluscan life over a continent—an agency probably uncommon and rarely put in force by the strange workings of Mother Nature.

N. B.—This locality has been recently invaded by civilization in the form of an electric road passing near it, bringing its attendant blessings (?), houses and their inhabitants. But as yet the colony exists; I collected specimens there as lately as last September.

EASTPORT NOTES.

BY REV. HENRY W. WINKLEY.

Chiton marmoreus Fab.

A variety differing from the type in size and color occurs at Eastport. The type occurs in size as long as $1\frac{1}{4}$ inches, and even a trifle more than that. The blue variety is not over an inch, the average being about $\frac{3}{4}$ of an inch. The type has the color of the interior white at the edges of the valves, deepening to rose color. In the variety, which may be called var. *cæruleus*, the rose color gives place to a delicate light blue. The outside is robin's egg blue. Though not common, this variety seems to be established. I have found it twice, and in small numbers.

Bucinum undatum Linn.

The type is abundant at Eastport. Largest specimen, $2\frac{1}{8}$ inches. (I have a specimen from near Old Orchard 4 inches long.) A variety (v. *plana*) occurs at Eastport and Grand Manan; size of largest specimen, $1\frac{7}{8}$ inches, resembling the type except in size and loss of waves. In some cases the waves remain in faint form; in some cases they are absent altogether. The type form at Eastport has the waves very heavy.

Margarita undulata Say.

Type is abundant; an albino form occurs rarely; it is about one-half the size of the type.

Terebratulina septentrionalis (young), *Menestho albula* and a few of the deep water starfishes were found at low tide in small numbers.

Astarte crebricostata—formerly common in 10 fathoms, could not be found.

The season has been a good one for collecting at Eastport. Some of the rare forms, like *Lunatia grœnlandica* and *Bela Pingelii*, were found at 15 fathoms, and on the whole, there was a tendency among the deep water forms to the shallower water.

THE HABITS OF FLORIDA LITTORAL MOLLUSKS.

BY JOSEPH WILLCOX.

Although the following facts may be well known to some Conchologists, there are many undoubtedly who have not had the opportunity of observing the habits of southern shells. It is a very interesting scene to witness the actions of many mollusks in the shoal waters in the bays of Florida, and on the sand flats that are exposed to the air at low tide. Below is a list of some of the shells that are found above the water level at low tide on the southwest coast of Florida:

Fulgur perversum,	Aplysia,
F. pyrum,	Sigaretus perspectivus,
Oysters,	Callista gigantea,
Oliva literata,	Nassa vibex,
Fasciolaria gigantea,	Marginella apicina,
F. tulipa,	Melongena corona,
F. distans,	Conus proteus,
Cerithium atratum,	C. Floridanus,
C. nigricans,	Cardium isocardia,
C. muscarum,	Cardium magnum,
Cerithidea scalariformis,	C. muricatum,
Lucina Florida.	

Aplysias do not remain voluntarily out of water at low tide, as they then become dry on the surface and appear to suffer for want of water, often emitting in such cases a large amount of purple fluid. They possess no power of locomotion on land.

The *Cerithium* usually crawl about on the sand soon after the water has receded, and remain above the surface until the return of

the tide. Their tracks may often be traced more than twenty feet.

Cerithidea scalariformis habitually crawls up the stems of grass, and lives the greater portion of the time out of water.

The *Cerithium nigricans* live in large colonies between high and low water marks.

Cardium isocardia crawls out of the sand soon after the water disappears: but they do not travel far. When put in a basin of salt water, they often close their shells with a lively snap.

Fasciolaria distans is the only shell, observed by the writer, which feeds upon the *Vermetus nigricans* colonies, into the tubes of which it inserts a long proboscis.

Fasciolaria tulipa is the only shell, in the knowledge of the writer, which makes an effort for freedom when held in the hand. It projects its body out of the shell and "slashes" about its long and sharp operculum with sufficient force to occasionally bring into view some of the blood of its captors.

The *Oliva literata* often lives in colonies. It emerges from the sand soon after the disappearance of the water, and crawls for a considerable distance.

Sigaretus lives usually under the sand, but at low tide it often comes to the surface; but it does not proceed far. It is a favorite morsel for the "littoral pigs," who root it out of the sand with avidity.

Lucina jamaicensis affects the muddy sand. They lie deeply buried under the surface, and seldom are seen on top of the mud. The *Lucina tigrina* probably possesses the same habit, as many dead shells are found in places where few are seen living.

The *Pholus costata*, I presume, lives below low water mark, as their shells are washed ashore in some places in great quantities. They also live in colonies in the muddy sand flats that are dry at low tide.

The shell reposes about 10 to 12 inches below the surface, but the animal can project its long siphon to the surface, through a hole permanently kept open.

In a future article we propose giving the results of observations upon the feeding habits of some Florida mollusks.

NEW FORMS OF WESTERN HELICES.

BY HENRY A. PILSBRY.

The Pacific Slope has been proven by the researches of many collectors to be richer in varietal forms of Helices than any other part of the United States; but although there are a large number of well-marked local varieties, there has been a tendency to oversplit them on differences of no racial value. The following forms are believed to be sufficiently individualised to require names.

Although superficially some species such as *arrosa*, *tudiculata* etc. are very much like the European group *Arionta*, others like *Campylæa*, and still others from Lower California are like *Euparypha*, it is the writers belief that the American forms are not closely allied to these European groups, but rather to the forms found in Japan, China and the Philippines, the resemblance to European types being a case of "convergence" of one character, the shell, and not extending to the less readily modified viscera. Other allies of the Californian group are the *Hemitrochus* of Florida and the greater Antilles. In Mexico another allied group, *Lysinœ*, is found; but the genuine Californian type extends southward along the mountain axis as far as the Argentine Republic. All these American, and the East Asiatic groups are more nearly allied to each other than any of them are to the European Helices.

The earliest name for this group of forms is the rather cumbersome term *Epiphragmophora* of Döring; and it is proposed to use this in a generic sense, to supercede *Arionta*, *Aglaia* and *Euparypha* of American writers. The history of all these snails and their names, with a discussion of their probable ancestry and migrations, will be found in the writer's Guide to Helices, now in press.

Epiphragmophora ellipsostoma n. sp.

Shell globose-depressed, with low-convex spire, round periphery and almost covered umbilicus; thin; color a greenish straw tint, with one supra-peripheral brown band, surface shining, showing irregular growth wrinkles, and closely, somewhat spirally wrinkle-malleate all over, much as in the thin forms of *E. tudiculata*; the spiral tendency of the wrinkles more marked below. Whorls 4, the apical $1\frac{1}{2}$ forming a rather large nuclear shell; last whorl deeply descending in front, a little constricted behind the basal lip. Aperture very oblique, short-elliptical, obliquely truncated by the penultimate whorl; peristome rather narrowly but evenly and well reflexed

throughout, dilated at the columella insertion and almost covering the umbilicus. Alt. 12·5, greater diam. 20, lesser 16·2 mm.

Belongs to the *E. rowelli* group, but differs from other species in its malleation. From *tudiculata* and its allies, it differs widely in the elliptical mouth, coarse apex and fewer whorls. The same characters and its sculpture remove this shell from *E. traskii* and its several varieties described by Hemphill.

Locality, "San Juan del Norte" (Gabb). Probably on the east coast of Lower California.

NOTES AND NEWS.

VARIATIONS OF PLEUROCERA ALVEARE Conrad.—In L. and F.-W. Shells, part 4, (*Strepomatidae*), page 50, Mr. Tryon says: "The species is very variable in length," leading one to infer that the other features were more constant. Such is not the case.

Specimens from Cypress and Shoal creeks, Ala., present such a difference that on first sight the mature shells of one stream would not be taken for the same species as those from the other.

From Cypress creek they have the folds or tubercles on each whorl and the striæ on the base well defined. From Shoal creek they are eroded on the spire, giving the shell a cylindrical appearance; body whorl smooth and the striæ of the base faint or wanting; a number from both streams are two-banded; the upper band causes the dark spots Mr. Lea mentions in his description of *pernodosa*. In both streams they were found on rocks in the current.—A. A. Hinkley, Dubois, Ill.

NEW LOCALITY FOR UNIO ELLIPSIS LEA.—While collecting in the vicinity of Florence, Alabama, the past summer, eight specimens of this species were found in the Tennessee river.—A. A. Hinkley.

MR. EDW. W. ROPER, of Revere, Mass., gave his friends in Philadelphia and Washington a short but pleasant call recently.

Z. CELLARIUS IN WESTERN PENNSYLVANIA.—I found 3 specimens of *Zonites cellarius* Müll., 2 living and 1 dead, from the Phipps Conservatory in Allegheny City, and as the 3 specimens came from 3 different greenhouses, they must have obtained a pretty good foothold. None of the shells were fully mature, the dead one being the largest.—Geo. H. Clapp.

THE RATE OF GROWTH OF HELICES.—I have placed mature *Helix appressa* in a box the middle of May. They have laid eggs,

the eggs have hatched, and the animal has grown to maturity by the first of November. With *Helix alternata* the growth was much less, hardly making more than one-half that of *H. appressa*.—Chas. S. Hodgson, *Albion, Ill.*

ARGONAUTA ARGO on the East Florida coast.—A specimen of this species measuring $7\frac{2}{3}$ inches diameter, and perfect in every respect, has been obtained by Mr. Wm. P. Stanley. It was found about 10 miles below Palm Beach, and contained the animal when cast ashore.

RECENT PUBLICATIONS.

OBRAS MALACOLOGICAS DE J. G. HIDALGO. Madrid, 1894. The name of JOAQUIN GONZALEZ HIDALGO has long been a familiar one to conchologists acquainted with recent French and Spanish literature of mollusca; and whoever has used the more extended works "*Moluscos Marinos de Espana, Portugal y las Baleares*" and the "*Moluscos Terrestres*,"—works indispensable in the study of the shells of Southwestern Europe—will hear with pleasure of the publication of the "*Obras Malucologicas*." This *magnum opus*, of which several parts lie before us, will consist of three portions: works relating to the fauna of Spain, works upon the South American fauna and publications on the land shells of the Philippine Islands. Of the former two we may judge in advance by the magnificently illustrated volumes named above, and the "*Moluscos del Viaje al Pacifico*."

That upon the Philippine fauna, now in course of publication, aims to present a summary of the literature of each species, with valuable critical notes on the variations, distribution, etc.; and it is illustrated on a scale which leaves little to be desired. The land snails of the Philippines are among the most beautiful of any region, and it is only fair to say that for the first time justice is done them in the splendid plates of Hidalgo's *Obras*. The *Helices* and *Cochlostylas* are illustrated in the parts already issued, and we hope to have the *Bulimi* and *operculates* before long. The text is characterized by its moderate and conservative spirit, refreshingly free from "nouvelle ecole" vagaries, but well abreast of the times.

The work will doubtless be of the greatest assistance to all students of this rich fauna, and we hope that its talented and industrious author may succeed in bringing it to a good completion.

LIST OF TEXAS MOLLUSCA collected by J. D. Mitchell. This catalogue embraces both marine and fresh-water forms, and adds many localities to the published records of Texas shells.

NOTES ON SOME MARINE INVERTEBRATA FROM THE COAST OF BRITISH COLUMBIA, by J. F. Whiteaves. A new *Pecten*, *P. (Pseudomusium) vancouverensis* is described and figured, and an adult specimen of *Turricula cidaris* is for the first time illustrated.

A CONTRIBUTION TO A KNOWLEDGE OF INDIANA MOLLUSCA, by R. Ellsworth Call (from Proc. Ind. Acad. Sci., III). The present paper is a preliminary list of the Indiana mollusk fauna, showing what has already been done toward an exact knowledge of the conchology of that State. Only authentic locality references are given, and nothing is admitted to the list on the strength of its occurrence in neighboring States. Of land shells, 58 species are enumerated; fresh-water univalves, 47 species; bivalves, 102 species. No less than 53 species were originally described from Indiana localities. A bibliography is given, both of special and general works bearing on Indiana shells. The "Contribution" is a step in the right direction, and will be welcomed by both Indiana collectors and those interested in the distribution of United States shells generally.

NOTES ON THE MIOCENE AND PLIOCENE OF GAY HEAD, MARTHA'S VINEYARD, MASS., ETC., by W. H. Dall (Amer. Jour. Sci., Oct., 1894). The result of Dall's visit to this locality, examined by Lyell 50 years ago, and by numerous other geologists later, are important, verifying its reference to Miocene, in which it corresponds to the Chesapeake, "in all probability to the upper part of the Chesapeake, certainly not lower than the St. Mary's fauna, and probably between that and the Yorktown beds." At about 80 feet above sea level a small patch of shell fragments was found, in a stratum of sand, which is considered Pliocene. *Nucula shaleri* and *Macoma lyelli* are described as new from the Miocene; and *Chrysoodomus stonei* Pilsbry, originally described from stray specimens washed ashore on the New Jersey coast, was found, thus fixing its position, hitherto unknown, in the Miocene.

THE NAUTILUS.

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DECEMBER, 1894.

No. 8

A SHELL HUNT FORTY FEET UNDER THE SEA.

BY C. HEDLEY, SYDNEY, AUSTRALIA.

To widen the fairway of Port Jackson (Australia), a submarine reef is being removed. An opportunity of going down with the divers employed thereon was kindly offered to myself and a scientific friend by the officer in charge of the operations. So tempting an invitation was, of course, accepted with delight. Often in imagination had we wandered on the ocean floor, peering into ghastly wrecks of ships sunk long ago, fighting with some huge shark or monstrous octopus, and gathering treasures of science or heaps of gold. Now our dreams were to come true and we were indeed to tread that fairy-land. We might not have the luck of the mariner in the song who

“ Fell overboard in a gale,
And found down below where the seaweeds grow,
Such a lovely maid with a tail,”

but we should certainly pluck strange growths at the bottom of the sea as one might pick flowers in a meadow.

A trim launch sped with us from Circular Quay down the famous Sydney Harbor, past bay after bay, some lined with wharves and shipping and some with trees growing to the water's edge, by rocks and white sandy beaches, past point and headland gay with villas and gardens, or sombre with eucalypt forest. So familiar was the

scene to us, that we smoked and chatted, unmindful of its beauties, till we reached a flotilla of punts and barges moored near the Heads.

After a cup of tea with the overseer, we prepared for our descent by divesting ourselves of boots, coat, vest and collar. A couple of laborers officiated as my *valets de chambre*, wrapping me first in thick flannel socks, trousers and jacket, and then in a canvas overall garment which left only the head and hands uncovered. The hands being left bare, the sleeves were secured at the wrists by rubber cuffs and bracelets. My feet were thrust into a pair of enormous boots, each sole of which was weighted with 25 pounds of lead. Bending my head, two men placed over it a huge diver's helmet and screwed it into a brass collar of the canvas dress. My costume completed by slinging on chest and back two large metal weights, I was told to rise. Thus encumbered, it was no slight exertion to get up, take three steps to the ladder, and descend into the water knee-deep. There I halted while my signal cord was belted round my waist; my air-tube, which reminded me of a garden hose, was screwed to my helmet and the pump commenced to force air through it. Finally an attendant screwed a plate-glass front, the size of a saucer, into my helmet; from the inside, this last operation resembled the closing of a coffin-lid. Some one tapped my helmet twice, the submarine signal for "all's well," and I started.

Stepping off the bottom rung of the short ladder, down I went, till the keel of the barge loomed up, rose and passed me—down, down into the green sea water, watching the silvery bubbles stream upward—down, down, down, as the water darkened. That sensation of gliding down into an emerald abyss, was the weirdest, dreamiest thing I ever felt. Then so gently did I alight, that I merely noticed that I had ceased to fall. At my feet I saw rock and sand and seaweed; looking up, I saw a monster in a helmet with two ropes leading away up to where the sky ought to be. The monster's face showed through his little window as a big, fair moustache and a pair of kindly blue eyes. Fetching out of a capacious trouser pocket a small school slate, he wrote, "How do you feel? Shall we go on?" and held it up. Taking his slate, I wrote, First rate; go on." He read the message, gravely rubbed the slate clean with his finger, pocketed it, and held out his hand. I grasped it and we started for a walk at the bottom of the sea.

Then I noticed a pain in my ears; the compressed air was hurting me. To cure it, I went through the motion of swallowing once

or twice. Feeling more comfortable, I "began to take notice," as they say of the babies. The light was bright enough to see small things plainly twenty feet away, but the water strangely magnified familiar objects. A shoal of little fish passed us, swimming under our arms and between our legs in the most ridiculous way. I tried to take one with my hand, but it deftly turned and avoided my grasp. The guide, seeing my attempt, pinned one to the ground with an iron rod he carried, and handed it to me; another he stabbed and caught as it swam by. Before we had gone far I had lost all sense of time, space or direction, and became too confused to know whether I had travelled east or west, ten yards or a hundred, in ten minutes or half an hour. A queer sensation was that of having escaped from the law of gravity; it seemed just as easy to walk up as down a cliff—we usually walked on our toes, sloping from the ground at an angle of forty to sixty degrees. When too much air is pumped down, the submarine pedestrian is unduly buoyant, and his aims to clutch a shell from the ground must be conically like the dodging and staggering of a drunken man.

A little dell lay before us choked with rank seaweed, through which we strode waist-deep like plunging into a tangle of fern in some damp valley on the land. My guide reached out, picked something off a broad frond, and handed it to me. It was a *Doris*, a lovely creature, whose like I never saw in books, striped with purple on a milk-white ground. It began to crawl over my fingers quite unconcernedly. I clapped my hands and tried dumbly to express my delight by patting my companion's big fist. He replied by offering me the slate, on which I wrote, "Very good; put him in the bottle." Rubbing out my words, he wrote, "Send down the bottle," tied the slate to the rope and jerked the latter four times. Away went rope and slate to the regions above. In response to an answering signal, the slack was hauled in and my collecting-jar descended tied to the rope. In turn, we tried in vain to open it. Although our correspondent above had filled the bottle with water, the pressure at our depth so sealed it that we could not raise the stopper. With a message on the slate, "Open this bottle and send it down open," we sent the jar aloft. When it was lowered to us the second time, I found that my *Doris* had slipped unobserved through my fingers, and so I lost a possible new species, the rarest treasure I was to see that day.

Continuing our travels in the dim water-world, we passed through a field of sponges. Not the brown, round masses of the bath-room, but radiant growths of scarlet (*Raphyrus hixonii* and *Halicondria rubra*) and purple, here and there great open oscula, tempting one to poke in a mischievous finger. Some grew in tufts like moss, some expanded like a dainty vase (*Phyllosiphonia caliciformis*), some forked like branches of trees and some spread like a lady's fan. One abundant species, about the size and shape of an orange, was pure ice-white, studded with golden dots that almost glittered (*Leucondra* sp.). Of all these we gathered what we could, pricking our hands sore with sponge spicules as we worked. When, on the morrow, our ravished beauties lay dead on a table in the museum, they had faded sadly from their pristine splendor. Among the sponges grew purple *Boltenia pachydermatina*, a pear-shaped head upon a slender stalk, like tulips in an earthly garden.

For a surprise, the diver held up before my face and pressed an *Aplysia*. From it flowed a violet stream which stained the water for two feet around, hiding hand and mollusk in the cloud. One of my last captures was an exquisite nudibranch, which swarmed on the broad fucus blades. In hue it was the blue of a summer sky, flecked with blood-red dots and stripes. I had now grown weary; not of searching for wonders, but of supporting the heavy diving armor, and was content to be drawn up again to the world of air and sunshine, which I had quitted three-quarters of an hour before.

On reflection, I found the reward of my under-water foray to be, not a hoard of specimens, but a better appreciation of the circumstances under which marine life exists. Our party of four had only observed, dead or alive, *Chamostrea albida*, *Vola fumata*, *Trigonia lamarecki*, *Struthiolaria scutulata*, *Drillia oweni*, *Cassis pyrum*, *Cypræa xanthodon*, *Astraliu tentoriforme*, *Ranella leucostoma*, *Aplysia kerou-dreni*, *Chromodoris bennetti*, and two undetermined *Doris*. Molluscan life seemed, on the spot I explored, to be less plentiful than at low-tide mark. Perhaps, however, the difficulties under which I labored as a beginner in the art of diving, impeded me from finding what was really there. After seeing the rough sea floor, one wonders that a dredge should capture as much as it does. A rich harvest probably awaits a conchologist who should seriously practice diving as a means of collecting.

VERTIGO MORSEI, n. sp.

BY DR. V. STERKI.

Shell large (for the group), cylindrical-turriculate, with a rather acute apex, imperforate rimate, with few obsolete striae of growth, shining, translucent; whorls six, rather slowly and regularly increasing, the last scarcely higher than the penultimate and rather narrower, somewhat sloping towards the base, slightly ascending at the aperture; suture deep; aperture lateral, scarcely oblique, comparatively small, inferior and palatal part well-rounded, the latter with an angular impression and slightly protracted in about its middle, the upper half more strongly curved, peristome everted; on the palatal wall, at some distance from and parallel with the margin, a moderate crest, behind it a deep and large impression over the palatal folds, and in front of it a groove corresponding with the impression at the auricle; inside the crest there is a distinct callus of the same color as the shell; apertural lamellae and folds typically nine: three on the parietal wall (the same as in *V. ovata*), the largest whitish; two on the columella, the superior strong, vertical above, then in an angle turning horizontally, the inferior horizontal, lamelliform, thin, high and directed obliquely upward; basal small, sometimes double, rarely 0; palatals high, and rather long, curved and directed upward; suprapalatal small, nodule-like.

Size: alt. 2.7, diam. 1.3; apert. alt. 0.9, lat 0.8 mill.

Soft parts not examined.

Habitat: Kent County, Michigan.

This magnificent *Vertigo* has been collected by Dr. DeCamp and kindly sent for examination by Mr. Bryant Walker. There were seven specimens, all fully mature, well-formed and almost exactly alike. Yet there are some slight differences, as they may be found in all forms of this group: in one example the inferior parietal tooth is wanting, in another the basal only trace-like, and in a third the same is double, as frequently found in *V. ovata*. With the latter species, *V. morsei* has much resemblance, especially in the aperture: the configuration and the "teeth" are the same, but the inferior columellar, and the two principal parietals, are rather larger, and markedly directed upward. The main difference is in the number and relative size of the whorls: while in *V. ovata* they are five, and rapidly increasing, the last predominating; in our species there are six, slowly increasing, the last, and consequently the aperture, com-

paratively small. This is a radical difference, and gives the shell quite another aspect, so that there can be no question about its being distinct. But *V. morsei* is also decidedly larger, *V. ovata* not, or little, exceeding two millimeters of altitude.

The species is named in honor of Mr. E. S. Morse, who has so considerably promoted our knowledge of the Pupidae.

New Philadelphia, Ohio, Nov., 1894.

A NEW CHITON FROM CALIFORNIA.

BY W. H. DALL.

Genus *LEPIDOPLEURUS* Risso.

Section *Lepidopleurus* ss. Valves adjacent, jugal area obscure, not separated from the pleural tracts; lateral areas distinct, or feeble, when all the sculpture is feeble. Type *L. cajetanus* Poli. Mediterranean.

Section *Oldhoydia*. Valves separated by narrow extensions of the girdle, reaching to the jugum; jugal area prominent, sculptured differently from the pleural tracts and extending in front of them between the sutural laminae; lateral areas not differentiated; valves heavy, strongly sculptured. Type *L. (O.) percrassus* n. sp.

Lepidopleurus percrassus n. sp.

Shell solid, strong, small, of a pale pinkish-brown with a darker brownish girdle which appears rather narrow in the dry state; scales very minute, partly dehiscent, chaffy, with occasional slender spinules resembling hairs; scales on the base crowded, minute, sandy; an extension of the girdle is prolonged between the valves on each side as far the jugum, the surface of these sinuses is also minutely scaly with occasional spinules; valves thick, white below, moderately arched with the prominent jugum forming a sort of keel; near the points of insertion the valves are heavily callous below; the sutural laminae are short, smooth and separated at the median sinus by a prolongation of the jugum in advance of the anterior margins of the pleurae; sculpture of the jugum consisting of punctate fore-and-aft parallel grooves with some small elevated transverse ridges anteriorly; the rest of the valve has, on each side, six or eight vermicular ridges divaricating toward the posterior edge of the valve and irregularly corrugated with sharp, fine, elevated

lamellæ crossing the interspaces transversely but fading out on the ridges; head-valve with minutely nodulous concentric ridges; tail-valve highest at the subcentral, not very prominent mucro, in front sculptured like the intermediate valves, behind the mucro like the head-valve. Length about 14, width 5.75, height 2.5 mm., in the dry state. The dry girdle about half a millimeter wide.

Specimens obtained by Mr. T. S. Oldroyd from a stone pulled up from about 75 fathoms in the Santa Barbara Channel off San Pedro, California.

This species, for which a section named in honor of Mr. Oldroyd is proposed, is very remarkable. The girdle recalls that of *Deshayesiella* Carpenter, but is extended in such a manner as to partly separate the shelly portions of the valves. The very callous surfaces of the interior, according to Mr. Pilsbry, are unique in the group. Most of the species of *Lepidopleurus* are comparatively thin, and though *L. cajetanus* is a solid shell, none of the species are as heavy as the present one in proportion to their size. The conspicuous and forwardly produced jugum is unique in the family. The type is in the National Museum, and will be figured later.

PATELLA (HELICIONISCUS) NIGRISQUAMATA REEVE.

BY CHAS. T. SIMPSON.

In the collection of the National Museum are twenty specimens of *Patella* bearing the above name received from Frederick Stearns, the U. S. Exploring Expedition, W. K. Fischer, and the Lea-Chamberlain Collection—the latter credited to "Dr. R." by Mr. Lea, and probably from Ruschenberger. One other specimen of the same name is in the museum from the Rich Collection without locality.

These vary from young shells less than an inch in diameter to those which are more than 3½ inches in length. There can be no doubt that the above name is correct, as all the specimens agree fairly well with Reeves' description and excellent figures in the *Cochologia Iconica* (Vol. VIII, *Patella*, species 3, plate II, figs. 3^a and 3^b).

The species described as *P. boninensis* in the NAUTILUS (Nov., 1891, p. 79), was characterized by its author as having a large central muscular callus, and two diverging dark bands from the anterior head segment.

Our large series shows every possible variation in the development of these characters, from young specimens in which no scar or tails (for they look very much like squirrel tails) are visible, to old, solid shells with a heavy, snowy, swollen callus, and having these brown wings very strongly developed.

The same characters are seen in *Patella (Helcioniscus) argentata* Sowb., better known as *P. talcosa* Gld. *H. clypeator*, which Mr. Pilsbry places with *Nucella*, on account of slight differences in anatomical characters, but which, conchologically, seems closely allied to *P. argentata*, and in other species.

In short, there can be no doubt that this scar and the curious radiating brown lines are merely adult characters which are developed in quite a number of species. I quite agree with Mr. Geo. W. Taylor in believing that this species does not come from the west coast of South America, but is probably confined to the north-western part of the Indo-Pacific region.

THE VIRGINIA COLONY OF *HELIX NEMORALIS*.

BY T. D. A. COCKERELL, N. M. AGR. EXP. STA.

There appeared in the NAUTILUS, of Nov., 1889, a paper under the above title, setting forth some very interesting facts regarding the variations exhibited by a colony of *H. nemoralis* at Lexington, Va. Prof. J. H. Morrison, who collected the shells studied, took considerable interest in the matter at that time, and had gathered together a good deal of information additional to that given in the above-cited paper. I have, therefore, been quite disappointed not to see any publication by him on this subject, or any evidence that the colony has received further attention.

It is scarcely necessary to dwell on the extreme interest attaching to the history of this colony. Here we have a variable species introduced into a new country, and varying in a most extraordinary manner under the influence of the new environment. The peculiar variations are very numerous, though, in the main, tending entirely in one direction—to the splitting of the normal bands. Although the number of individuals thus varying is considerable, very few of such have exactly the same formula, whereas, several of the old European variations occur in numerous specimens.

It appears, in the highest degree, probable that these peculiar variations are congenital and not acquired during the lifetime of

the individual,¹ in which case we have an example of environment modifying the germ-plasm—the odds against the variation being only accidentally coincident with the changed environment being enormous.

In 1889, the above-mentioned changes had taken place in the colony, but time was needed to show whether they would increase in number and degree; or whether, as seemed more probable, the old European varieties would eventually assert themselves, and swamp the rest. In either case, the result would be very interesting, and now that five years have elapsed, it is extremely desirable that some one should make a new investigation and report in detail. It is really astonishing that no one has yet done so. The colony was, in 1889, so evidently in a condition of unstable equilibrium, that it seems certain that changes must have occurred in the interval, tending to the predominance either of the old or the new (split-band) type.

Believing that Prof. Morrison would publish, I did not follow my paper of 1889 with further observations, but it will be as well now to put the following on record:

(1) Lexington, Va., received from Morrison one of each of the following, Oct. 26, 1889:

Helix nemoralis mut. *guettardia* Moq.

Helix nemoralis mut. *arcelinia* Loc.

Helix nemoralis mut. *petiveria* 10345 = *requienia* Moq.

Helix nemoralis mut. *libellula* 1(234)5 Kregl.

Helix nemoralis mut. *libellula* 123(4)5 nov.

Helix nemoralis mut. *libellula* 0030₅ Ckll. (juv.).

Helix nemoralis mut. *libellula* 12₃45 Ckll.

Helix nemoralis mut. *libellula* 1₂2₃x(45) nov. (juv.).

Helix nemoralis mut. *libellula* 12₃3(45) nov. (juv.).

(Morrison had another example.)

Helix nemoralis mut. *libellula* 12₃3(44)5 nov.

(Morrison had another example.)

Helix nemoralis mut. *libellula* 1₀345 nov. (juv.).

Helix nemoralis mut. *libellula* 12_x3_x45 nov. (juv.).

Helix nemoralis mut. *libellula* 1₂34(5₅) nov. (juv.).

Helix nemoralis mut. *libellula* 123₃45 nov.

Helix nemoralis mut. *libellula* 12_{xx}2_{xx}45 nov.

Helix nemoralis mut. *libellula* 003₅ Ckll.

¹ If so acquired, it must be in very early life, as, in many instances, the variations were recorded from immature examples.

Helix nemoralis mut. *libellula* 12₃(45) Ckll.

Mr. Morrison also sent me word of the occurrence of mut. *libellula* 0030₅ Ckll.

(2) Lexington, Va., received from Morrison in November, 1889.

H. nemoralis mut. *libellula bimarginata* 12₃345 nov.

(the bands tend to coalesce.)

H. nemoralis mut. *libellula* 12345 Moq.

H. nemoralis mut. *libellula bimarginata major* 00000 Moq.

(thin. max. diam. 28½ mm.)

H. nemoralis mut. *libellula major* 12345 Moq.

(max. diam. 26¾ mm.)

H. nemoralis mut. *petiveria* (12345) = *richardia* Moq.

H. nemoralis mut. *petiveria umbilicata* 123_x45 Ckll.

(nov. mut. *umbilicata*, shell more globose, umbilicus open.)

H. nemoralis mut. *libellula* 1234445, nov. = *morrisonia* nov.

(extra bands 44, much thinner than 4.)

H. nemoralis mut. *albescens* 00000 Moq.

(pale yellow, like mut. *subalbida* of *hortensis*.)

(3) Lexington, Va., not seen, recorded by Morrison in litt., Nov. 16, 1889.

H. nemoralis mut. *libellula* (12)(345) Kregl. (one).

H. nemoralis mut. *libellula* 120(45) Kregl. (one).

H. nemoralis mut. *libellula* 1₂045 nov. Morr. (two).

H. nemoralis mut. *libellula* (123)45 = *nilssonina* Moq. (one).

H. nemoralis mut. *libellula* 1234455 nov. Morr. (one).

H. nemoralis mut. *rubella* 123(45) Moq. (four).

H. nemoralis mut. *rubella* 10345 Moq. (three).

H. nemoralis mut. *rubella* 123X45 Ckll. (one).

(4) Lexington, Va., not seen, recorded by Morrison in litt. Jan. 2, 1890. This is the most extraordinary series of all; about all the band-variations are new.

Mut. *petiveria* 12_{3xx}45.

Mut. *libellula* 1(22)045.

Mut. *petiveria* (12)3(45) Moq.

Mut. *libellula* 1234(55).

Mut. *libellula* 1₂₃45.

Mut. *libellula* 12(33)45.

Mut. *libellula* 12_{x3xx}45.

Mut. *libellula* 1_{23x}4(55).

Mut. *libellula* 12(3₃)_x(45).

Mut. *libellula* 12₂₃3₄(55).

Mut. *libellula* 123(45) *bimarginata*.

Mut. *libellula* 1(22)3(45).

Mut. *libellula* 123(4445).

Mut. *libellula* 123_x45 Ckll.

Mut. *libellula* 1(2₂)345.

Mut. *libellula* 123_{xx}45.

Mut. *libellula* (1₁2₂3₃₄4₅₅₅).

Mut. *libellula* 123_{xx}(45).

Mut. *libellula* 123₄5.

- Mut. libellula roseolabiata bimar-* *Mut. libellula* 123(44)5.
ginata 12345. *Mut. libellula* 1234₄5.
Mut. libellula 123(4₄)5. *Mut. libellula* 1(22)345.
Mut. libellula 123(4₄)5. *Mut. libellula* 1_x03_x45.
Mut. libellula 12_x345 Ckll., *bi-* *Mut. libellula roseolabiata bimar-*
marginata. *ginata* (1₂345).
Mut. libellula 12_x345 Ckll. *Mut. libellula* 1₂3₄45.
Mut. libellula 12₃₃(4445). *Mut. libellula* (12₃₃₃45).
Mut. libellula (1_{2xx}3₃)(45). *Mut. libellula* (12₂₃₃45).
Mut. libellula 103(44)5.

It should be explained that a split-band bracketed, as (44), means that it is split, but joins near the mouth of the shell.

NOTES AND NEWS.

MR. T. WAYLAND VAUGHAN is now engaged in geological work on the scientific corps of the U. S. Geological Survey.

MR. GILBERT D. HARRIS, formerly of the U. S. Geological Survey, has, after spending the summer abroad, taken up the work of his new appointment at Cornell University, where the valuable collection of mollusks, of which Dr. Newcomb was so long curator, is under his charge, as well as the Paleontological Department.

THE LONG BEACH (CALIFORNIA) CONCHOLOGICAL CLUB elected the following officers for the next year: Miss I. M. Shepard, President; Mrs. M. Darling, Vice-President; Mrs. Terry, Treasurer and Secretary, with Miss E. Lowe her assistant.

The Club is to hold its meetings twice a month. The following are the charter members: Miss E. Lowe, Mrs. M. Darling, Mrs. E. Cushman, Mrs. R. Preston, Mrs. Terry, Mrs. Craig, Miss I. M. Shepard and Mrs. Dial. At the next meeting, to be held December 1, new members will be received. The Club has been studying and collecting for a year, but had not before formally organized.

They held their first Annual Meeting and Reception at the home of Miss E. Lowe, on the evening of October 6. A short program was given and letters of greeting read from Dr. W. H. Dall, Mr. H. Hemphill and Prof. Josiah Keep. Ice cream and cake were served in shells, and the rooms handsomely decorated with palms, shells, kelp, and smilax.

The Club would be glad to hear from any and all interested in the same study, and will make a special study and collection of our local shells or shells of Los Angeles Co.

AMNICOLA OLIVACEA PILS.—In April, I visited the original lo-

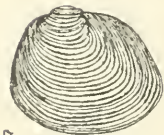
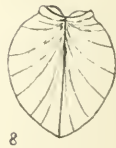
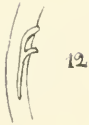
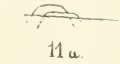
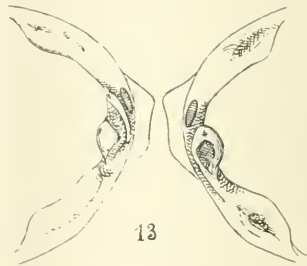
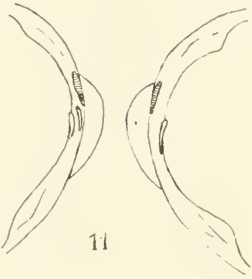
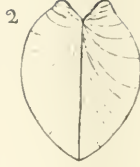
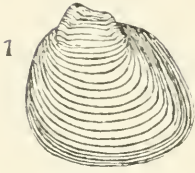
cality (Huntsville, Ala.) and was surprised to find this species in vast numbers. The stream has a mud bottom which is much indented with cow tracks. In these the *Ammicola* had congregated—not as a layer on the surface, but as a solid mass. To get an idea of how many there were I scooped up the contents of three holes, and after washing them thoroughly, found I had a full quart of the living animals. There must have been bushels of them in the few rods of stream which I inspected. The stream receives some of the city sewerage, so it is probably a good feeding-ground.

The geese which infest the neighborhood do not seem to care for this species.—H. E. SARGENT, *in lit.*

NEW PUBLICATIONS.

THE LIFE AND WRITINGS OF CONSTANTINE SAMUEL RAFINESQUE, by Richard Ellsworth Call, is announced to be published in January next. The volume will be in quarto form, and issued in paper only. It will contain several full-page illustrations, one of which will be a portrait of its subject. A complete bibliography of the writings of Rafinesque, on every subject, comprising over four hundred titles, will be included, together with a certified copy of his will, one of the most remarkable testamentary documents ever probated. It will prove of exceptional value to those interested in botanical, conchological, or ichthyological matters.

A MONOGRAPH OF THE LAND AND FRESHWATER MOLLUSCA OF THE BRITISH ISLES, by J. W. Taylor, F. L. S., is announced as in press. The object in issuing this work is to bring together, as far as practicable, all reliable information bearing upon the study of the British Land and Freshwater Mollusca. It will aim to combine the information upon all aspects of the study, and thus form a standard work of reference as well as a reliable text-book upon British Land and Freshwater shells. The first volume will be devoted to general characters of the shell, the morphology of the animal, geological and geographical distribution, habits, parasites, etc. The second volume will be devoted to the treatment of species individually, and will aim to give accurate descriptions and faithfully colored figures of the typical shell and the chief varieties of every species; the various organs of the animal will be described and illustrated in the text, and full lists of localities, with a full synonymy will also be given, as well as observations upon the habits and peculiarities of each species. Mr. Taylor's work promises to be a timely and useful one. Fuller notice will be given upon the appearance of the first volume.



1-6, 13, 13a, *Pisidium cruciatum* Sterki. 7-12, *P. punctatum* Sterki. 14, *Olivella gracilis* v. *Gaylordi* Ford. 15, *Haminea virescens* Sowb.

THE NAUTILUS.

VOL. VIII.

JANUARY, 1895.

No. 9

TWO NEW PISIDIA.

BY DR. V. STERKI.

Pl. II, Figs. 1-13.

Pisidium cruciatum, n. sp. Figs. 1-6, 13, 13a.

Shell minute, inequipartite, oblique, subtriangular in outline, high, ventricose, regularly and comparatively coarsely striated, straw colored; anterior part moderately long with an oblique, nearly straight edge above and the end rounded; posterior part short, the end somewhat obliquely truncate, superior margin rather strongly curved, scutum scarcely, scutellum little marked, the latter forming a rather distinct angle; inferior part moderately curved; beaks prominent, each with two ridges diverging at nearly right angles, together forming a cross on the upper aspect of the shell, each of the ridges ending in a nodule of which the posterior is larger and more prominent; nave rather thick, whitish; hinge very stout, list strong; cardinal teeth rather large, and strongly projecting inward from the hinge list; in the right valve one, strongly curved, posterior part thick, anterior thin, lamellar, the ends united by a lamella so as to form a deep groove into which the posterior tooth of the left valve articulates; in the left valve two, the posterior (inferior) stout, massive, the other, superior and a little anterior, rather short, fine, lamellar, oblique, little curved; lateral teeth large, high and pointed in the left, strongly projecting inward in

the right valve, the latter with no (or only traces of) outer teeth, and a deep groove; between the cardinal and the lateral teeth the hingelist is rather deeply excavated, so that all teeth are markedly isolated: muscle insertions visible; ligament, short, strong.

Size; long 1.9, alt. 1.9, diam. 1.4 mill.

Soft parts slightly yellowish.

Habitat: Tuscarawas River, at New Philadelphia, Ohio.

Figure 1 represents an adult specimen, 2 the posterior, 3 the dorsal aspect, 4-6 a young example, 0.8 mill. long; fig. 13 the hinge; 13a the dorsal aspect of the right cardinal tooth with an indentation; figs. 1-6: scale 15×1 .

The singular shape of the umbones is so characteristic that this species will be recognized at once, and cannot be mistaken for any other. And also in the formation of the hinge it is quite unlike any other *Pisidium*, so that it holds a peculiar position in the genus. In the hinge structure it is very illustrative and instructive for the understanding of the different forms of cardinal teeth; yet this is not the place to discuss the subject at length.

Our species is rather variable, even so that all specimens from one place in the river are different in size and shape from those of another place scarcely half a mile distant. It measures from 1.6 to 2.1 mill. (One specimen 2.1:2.1:1.6, another 1.7:1.7:1.3 mill.), 1.9 being about the average; the margins may be rather obtuse or somewhat acute, the beaks more or less prominent, and the anterior nodule more or less marked. As a rule there are no outer lateral teeth in the right valve, yet traces of them may be seen in some specimens. Also in the formation of the cardinal teeth there is some variation, as the one in the right valve may be indented in its middle, at the angle, and so there are apparently two teeth (fig. 13a).

Pis. cruciatum is not rare in the Tuscarawas River, where, so far, it has only been found, but probably it has a wider distribution, and may even have been collected and taken for the young of some other species, owing to its minute size. In October and November, 1891, it was first found, and some specimens were sent to several conchologists, so to Mr. E. W. Roper, who also recognized it as a new species. In 1893 and 1894 about a hundred were collected, in all stages of growth. Only few of them are quite mature, and almost globular, most adolescent, and, though apparently old, much less inflated. They live in mud among aquatic plants and dead leaves,

and, as a rule, are covered with a black or brown coat, sometimes so thick that they appear to be globules of dirt, and only a sharp eye may recognize them from the hair-like free line along the edge. Some old specimens are badly eroded.

Pisidium punctatum, n. sp. Figs. 7-12.

Shell minute, inequiptite, high, oblique, strongly ventricose, almost globular, regularly and sharply striated, microscopically rugulose, whitish; anterior part moderately long, the edge above oblique, almost straight, end slightly angled, rather inferior; anterior part short, truncate, slightly angular above, rounded below; superior and inferior margins moderately curved, the former rather short, the latter long; scutum little, scutellum moderately marked, both forming slight angles; vertical section heart-shaped, horizontal, short, lanceolate-rhombic; margins very slightly acute; beaks moderately full and prominent, with a longitudinal, slightly oblique ridge (sometimes obsolete) below the culmination; nave moderately thick, whitish, with crowded, small pits, from which it appears as if dotted; hinge moderately strong; cardinal teeth fine, in the left valve two, lamellar, longitudinal, about equally long, a little curved, almost parallel, the upper little anterior; in the right valve one, longitudinal, little curved, lamellar, the posterior end slightly thickened; lateral teeth rather small and thin, in the left valve one, pointed, in the right valve two, the outer quite small; hinge-list fine, rather regularly formed; ligament rather long and fine.

Size; long 1·8, alt. 1·6, diam. 1·3 mill.

Soft parts colorless, rest whitish.

Habitat: Ohio; Tuscarawas River, Bear Run, tributary to the Mahoning River, Portage Co., a spring brook at Rootstown Station, Portage Co., emptying into the Cuyahoga River (Lake Erie and St. Lawrence drainage); in all places collected by the writer.

Figures 7-9 represent an adult, 10 a young specimen, scale 15×1 ; fig. 11 the hinge, 11a the dorsal aspect of the cardinal teeth in the left valve; fig. 12 shows a remarkable abnormality of the cardinal tooth in the right valve.

This species resembles somewhat *Pis. compressum* Prime, in having a ridge or appendage, but not in the same place, as it stands on the outside, below the culmination of the beaks, while in the mature *P. compressum* it has its place rather on top. The shape of the shell is different, and the size is very much smaller, its bulk being only about one-tenth of that shell. And while the upper part of

the posterior margin in *P. compressum* is rounded or flattened, it is sharp, somewhat "pinched" in *P. punctatum*. In this the shell is purely whitish, or light straw colored, the latter more so when dry, while the mature *P. compressum* is always more or less grayish. A marked feature is the finely and densely pitted interior surface of the shell, the dots being distinctly perceptible through the shell from the outside. Yet this is not unique, as I have also seen it in other *Pisidia*. Some specimens show not a trace of the appendages on the beaks, yet they are evidently identical.

In the Tuscarawas River this *Pisidium* appears to be rare, as only thirty were taken, twelve of them in one place, in company of about five hundred *P. compressum*, most of the latter quite young to half grown, *P. cruciatum* and a few *P. abditum*, which is common in pools and ditches. More frequent it is in the Bear Run, where about 120 were collected, but only one-fourth of them adult. Those from the spring brook mentioned above, are somewhat larger, averaging 2.0 millimeters long.

These two well characterized and very small *Pisidia* are a valuable addition to our molluscan fauna. Besides them there are several other undescribed species from our country at hand. These small mussels have been somewhat neglected and a more assiduous collecting and closer study will doubtless bring to light not only more unknown forms, but also interesting geographical relations.

New Philadelphia, Ohio, Nov., 1894.

HAMINEA VIRESCENS. (Pl. II, fig. 15).

BY MRS. M. F. BRADSHAW.

One afternoon in August, when the low tide of the month occurred, we went to our favorite reef of rocks to see what of interest new or old we could find.

There were acres of mussels with *Purpura saricolu* in great numbers and various colors wedged in between them. These *Purpuras* are graceful in form and often beautifully colored and striped, and I never tire of them. There were several species of *Acmæa* and *Fissurella volcano* plentiful enough, and as we reached the outside of the reef where the waves dashed at us threateningly, we found a few small *Haliotis cracherodii*, some sea urchins and starfish. These

last we left to the enjoyment of their home in the deep pools among the rocks.

But I wanted to tell you of the real "find" of my summer. On the flat surface of the rocks, and nearest the shore, were small indentations and shallow crevices. While looking into these in search of a possible new Chiton, I saw a gray object which I picked up with the remark that here was some sort of key-hole limpet.

My little companion says: "What is a key-hole limpet?" and so I took out my knife and was about to dissect it to give her a lesson in conchology, but to my surprise I found I had something quite new to myself.

I had very rarely picked up on the beach a small, pale yellow bubble shell never more than $\frac{3}{8}$ inch in length, but had no idea whereabouts this little mollusc had lived. But here in my hand was a real live Haminea, the pale greenish shell so nearly transparent, that it was excusable to at first think it was internal instead of on the creature's back.

The shell was about $\frac{5}{8}$ inch in length, and as we found none larger, was probably an adult, and it covered less than one-third of the mollusk.

The animal itself was a slimy gray globule, not pleasant to touch, and one could not help wondering what possible use or protection was this fragile, inconspicuous, insufficient shell.

Further search revealed several dozen, but they were hard to find even after we knew exactly what to look for, so nearly were they like their surroundings.

After that we searched for Haminea in all similar places for several miles of our coast, but never again found them; so I am still of the opinion that they are rare in this locality.

Monoceros engonatum is not rare on this coast I believe, but I never found them until that day, I got two, one a fourth of a mile from the other. Careful search failed to reveal more, though these individuals could not be living alone, and I have no doubt had only taken a short excursion, leaving the rest of their families safely at home.

The field of my observations has been but limited; situated about midway between Los Angeles and San Diego, but I think it is a locality rich in the number of its species.

NEW FORMS OF AMERICAN SHELLS.

 BY H. A. PILSBRY.

Gastrodonta (*Pseudohyalina*) *lateumbilicata* n. sp.

Shell resembling *Ps. limatula* in color, texture and sculpture, but much depressed, the upper surface almost flat, last whorl of much smaller calibre, the umbilicus very much wider, shallow, its cavity widely open and saucer-shaped, much as in *Helicodiscus lineatus*. Alt. 1.4, diam. 4.3 mm.

Hab., near Woodville, Alabama. Coll. by H. E. Sargent, whose labors in northern Alabama have been remarkably fruitful in increasing our knowledge of the conchology and mammalogy of Alabama, as well as in his chosen work as an educator.

Somatogyrus *Sargenti* n. sp.

About the size of *S. aureus* Tryon, but shouldered as in *S. subglobosus* Say, and imperforate. Shell globose-turbinata, light olive-green, smooth except for fine growth lines. Whorls about $4\frac{1}{4}$, those of the spire very convex and separated by deep sutures; last whorl shouldered above, flattened toward the suture, large and convex. Aperture large, ovate, a little flattened on the parietal side, broadly rounded below, narrowly rounded above, and angular at the upper insertion of the lip. Columella concave, moderately heavy, the callus becoming wider at the umbilical region; parietal wall with a transparent callus layer. Alt. 6, diam. 5 mm. Mud Creek, a tributary of the Tennessee R., Ala.; coll. by Prof. H. E. Sargent.

This species differs from *S. integer* and the closely allied species or varieties *depressus*, *aureus* and *parvulus* in its shouldered whorls, planulate below the suture. It has no such heavy columellar callus as *S. currierianus*; and it is a smaller species than *S. subglobosus* (*isogonus*) of Say, with wholly closed umbilicus and differently formed columella.

RANGIA THE PROPER NAME OF THE MACTROID GENUS GNATHODON.

 BY THEODORE GILL.

Mr. Dall, in the NAUTILUS (VIII, 27) and Proc. U. S. Nat. Mus., (XVII, 91), has shown that the generic name *Gnathodon* was

introduced before *Rangia* for the same genus of Mactroid bivalves. Nevertheless, the former name must give place to the latter, because it had been previously used in zoology for a different genus. Ever since Mr. Dall communicated to me the results of his investigations, I had a dim recollection of having seen the name used in another sense, and that *Rangia* would have to stand, but could not recall any circumstances connected with it. Having had occasion recently to refer to the Plectognath fishes, I recalled that the name *Gnathodon* had been given to a combination of the genera *Tetrodon* and *Diodon*, because neither of the latter was applicable to all the forms of the composite genus. It was Goldfuss in 1820 who thus used the name in his "Handbuch der Zoologie." I have not access at present to a copy of Goldfuss' work,¹ but have verified my recollection by reference to Cuvier and Valenciennes' "Histoire Naturelle des Poissons," (I, 226), where, in a summary of the work, the name is thus mentioned "*Gnathodon (Diodon Tetrodon.)*". Of course, the name is not active in ichthyology, and, also of course, it is not recorded in any of the Nomenclators of zoology, but, in accordance with the law "once a synonym always a synonym," the previous application of the name in ichthyology precludes its use in conchology.

A NEW VARIETY OF OLIVELLA.

BY JOHN FORD.

Some months ago, I received from my friend, Mrs. E. M. Gaylord, of Alameda, Cal., a suite of Olivella which had been found by her in a box of shells that apparently came direct from the Gulf of California.

All of the associated species were well known Gulf shells, and as the Olivella were in the same fresh condition as the rest, there was no reason to doubt that the entire lot had been secured simultan-

¹Handbuch der Zoologie, von Georg August Goldfuss, Nuernberg, 1820, being the Zweite Abtheilung of the Dritter Theil of Dr. G. H. Schubert's Handbuch der Naturgeschichte. *Gnathodon* appears on page 100, is suitably diagnosed, and includes as sections *Orthragoriscus* Schn., *Diodon* L. and *Tetrodon* L.—ED.

ously, and, probably, at the same locality. In view of this conclusion, also of the fact that the specimens are in some respects distinct from any heretofore known to me, or, so far as I can learn, to any writer on conchological matters, I assume the responsibility of naming and describing them as follows :

Olivella gracilis Gray. Var. *Gaylordi* Ford. Pl. II, fig. 14.

Shell similar in outline to *O. gracilis*, but much smaller, general color bluish-grey, with a well defined interrupted band of a lead-black hue bordering the upper part of the final or body whorl.

Smaller spots of a like hue also appear at the upper edge of the fasciole. Circling the middle portion of the whorl is a number of irregular brownish lines, which also occur less prominently on the fasciole. In some specimens a splotch or two of the same color as the interrupted band referred to, appears on the upper part of the preceding whorl. Apex very acute and free from spots. Length of aperture rather more than one-half that of the shell ; dorsal portion of the extreme base creamy white. Average length of specimens 9 to 10 mm., width 3.2 to 4 mm. Hab., Gulf of California.

Mrs. Gaylord, for whom the variety has been named, is not only a practical collector, but an unusually earnest and capable conchological student also. It gives me great pleasure, therefore, to associate her name with the beautiful specimens referred to.

FERUSSACIA SUBCYLINDRICA AND TWO NEW SPECIES IN JACKSON CO., ALABAMA.

II. E. SARGENT, WOODVILLE, ALA.

The pleasure which thrills the field naturalist upon locating with in his range, a species previously unknown to the region, must be experienced to be appreciated. It is my privilege at this writing to report three such finds.

Late last November, at the end of a shell hunt of two hours, which had among other things brought to light several fine specimens of *H. obstricta* Say var. *y*, I chanced to detect for the first time a specimen of *F. subcylindrica* L.

Its station was a flat surface rock about thirty feet square, at an angle of 30°, with a north exposure. Having a sack with us, my

assistant and I proceeded to "bag" the leaf mould. While doing so another new thing attracted my attention. Upon comparing it with a single specimen of *Z. limatulus* Ward in my collection, I pronounced it the same with a question and sent it to the Editor for verification. He writes "Your *limatulus* I find, on comparing with typical specimens, are much flatter and have wider umbilicus. I therefore, call them *Gastrodonta (Pseudohyalina) lateumbilicata* n. sp."

Daylight failing and being a mile from home in a ravine 500 feet below home level, and only the bed of a mountain torrent for foot-path, we could only carelessly collect the bushel of mould which we brought away, doubtless leaving many specimens. Upon assorting the material the following was the result:

Ferussacia subcylindrica L., 245. *Pomatiopsis lapidaria* 48.

Gastrodonta lateumbilicata Pils., 200.

G. capsella Gld., 25.

Z. indentatus Say, 18.

G. interna Say, 18.

Helicodiscus lineatus Say, 5.

Patula perspectiva Say, 51.

Helix spinosa Lea, 1.

H. stenotrema Fer., 3.

H. inflecta Say, 4.

A subsequent visit to another part of the same ravine resulted in the finding of 50 more specimens of *G. lateumbilicata*, but none of *F. subcylindrica*. I have since received two specimens of the latter from another locality not far distant.

This trip also resulted in the finding of two living specimens of *Gastrodonta acerra* Lewis, the gem of our American *Zonites*. A number were also found which had been broken into and eaten. Query; may not the rarity of this species be due to its delicate shell and habit of remaining among the loose leaves rather than burying itself in the mould as does its more thrifty neighbor *Omphalina laevigata* Pfr.?

This is thus far the only station at which I have found *G. acerra*.

A new species of *Somatogyrus* for which the name *Somatogyrus sargenti* Pils. is proposed, is found in considerable numbers, twenty miles northeast of here in a spring, tributary to Mud Creek, which is in turn tributary to the Tennessee River. It is found attached to the dead leaves in company with one species each of *Physa*, *Planorbis*, *Limnaea* and *Goniobasis*.

NOTES AND NEWS.

The Conchologists Exchange was started so oddly (on a postal card) and ended so abruptly—and without an index to either volume, that we are constantly receiving letters of inquiry regarding its contents, numbers, etc. We once proposed to make a reprint, but could not obtain sufficient subscribers to warrant it. We now propose to print an index of both volumes, if enough of our subscribers want it to pay for the cost of printing. The index will contain a list of contributors with the titles of their articles, and a list of the species mentioned. Those wishing an Index will please send twenty-five cents to the Editors. It will be printed as soon as sufficient money is received.—H. A. P. and C. W. J.

There is being built at FINDERNE, N. J., a large Casino Building, one room of which is to be devoted to Natural History. Mr. Thomas Morgan, of Somerville, N. J., has been appointed Curator. He intends placing there his entire collection. Any donation of specimens will be thankfully received.

DEAD SNAILS.—On the 14th of last April, (1894), I turned over a log in the woods in Miami Co., Ohio, and found, all in a heap, the following shells: 74 adult *Helix elevarata*, 38 young of same, 1 *H. profunda*, 9 *H. alternata*, 1 *H. albolabris* and 2 *H. hirsuta*, making in all 125 individuals. They were all dead but well preserved, and many were clean inside so that they would make good cabinet specimens. Besides these perfect shells there were many so broken that they could not be readily identified.

How can we explain this? Did these mollusks seek the warmth to be derived from a number huddling together, or were they acted upon by the common impulse of protection? Were they destroyed by insects, or did they perish by the cold? The preceding winter was an unusually mild one, and the size of the log and quantity of leaves which surrounded them would preclude the latter theory. The fact that so many were so thoroughly cleaned inside would seem to show that some insects as ants had made an attack upon them and eaten them. What are the enemies of our common snails? I have often found perfectly clean dead shells under logs.—G. D. Lind, Lebanon, Ohio.

An interesting study of *Scissurella*, illustrated with figures of the living animal and dentition, by A. Vayssière, of Marseilles, is pub-

lished in the current number of the Journal de Conchyliologie. The external features as well as the dentition differ very widely from *Pleurotomaria*, the teeth being as in *Trochidæ*.

In Abstr. Proc. Linn. Soc. N. S. Wales, meeting of Sept. 26, 1894, Mr. John Brazier retracts his former opinion that *Patella kermadecensis* is not from the Kermadec group, and quotes from a pamphlet published in 1887, stating that on Macauley Island there occur "large limpets (as big as small saucers and good eating)."

The last number of the Journal de Conchyliologie contains a portrait and biographical sketch of Dr. Paul Fischer.

PUBLICATIONS RECEIVED.

ON A MOLLUSCAN GENUS NEW TO, AND ANOTHER FORGOTTEN FROM AUSTRALIA, By Charles Hedley (Proc. Roy. Soc. Vict., 1894).—*Lucapinella* is identified from Australia with two species, *nigrita* Sowb. and *pritchardi* Hedley. *Scyllæa pelagica*, recorded by Cuvier from W. Australia years ago, has lately been collected at Port Philip by Mr. J. B. Wilson.

DESCRIPTION d'un Hélicéen nouveau provenant de la cote occidentale du Maroc, par Ph. Dautzenberg (Bull. Soc. Zool. de Fr. 1894, p. 17).—*Helix (Jacosta) Renuti* is described and figured. We cannot distinguish it from *H. argonautula* Webb & Berth., a species referred by European authors to *Ochthephila* or *Discula*, but really belonging to *Jacosta*.

THE LAND AND FRESHWATER MOLL., NEW PHILADELPHIA, O., by Dr. V. Sterki.—A list freely annotated with Dr. Sterki's habitual critical acumen recording 151 species. The new forms described are *Pupa curvidens* var. *gracilis*, "intermediate in shape between the type and *P. holzingeri*;" *P. pentodon* f. *curta*; *Vertigo ventricosu* c. *elator*; *Planorbis exacutus* var. *rubellus*. *Gundlachia* is reported, and two *Pisidia* described in the preceding pages are noticed.

UEBER BINNEN-CONCHYL. der Küstenzone von Rio Grande do Sul, von Dr. H. von Ihering.—From the study of land snails found in Quaternary deposits the conclusion is reached that formerly the region in question was wooded, and more favorable to snail life than the present sandy expanse with sparing grass growth. In the living fauna a remarkable new genus of *Succinidae* occurs, like a *Hyalimax* with completely internal, spireless shell.

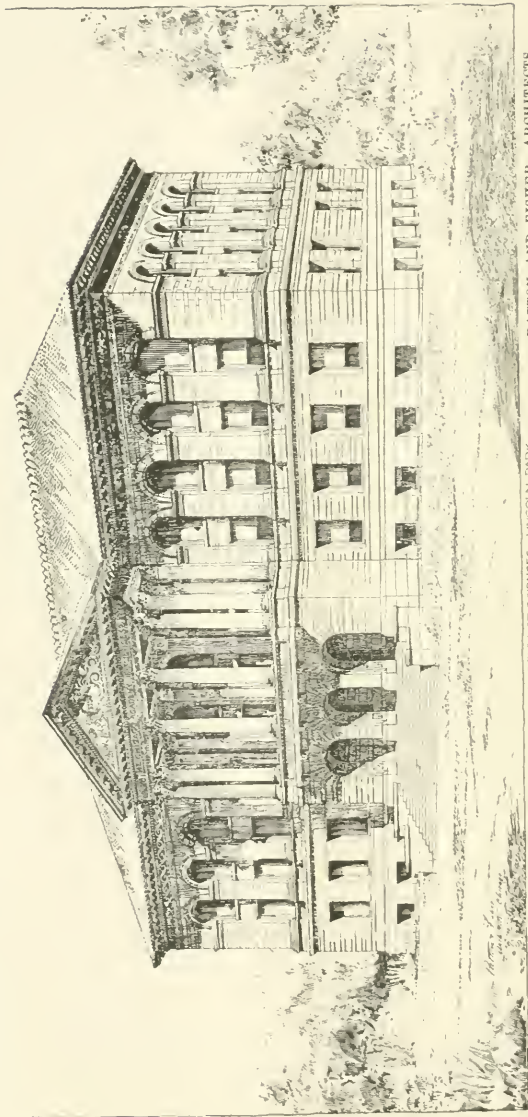
DIE SUSSWASSER-BIVALVEN JAPANS, von H. von Ihering (Abh. Senck. naturforsch. Gesellsch.).—In the discussion of the species, this work supplements Kobelt's Fauna Japonica, describing several new specific forms. In the Japanese bivalve fauna, v. Ihering finds only East Asiatic types, and those occupying the entire Holarctic tract (such as *Margaritana margaritifera*). There are no peculiar forms of more than specific value, the fauna being merely a part of that of the adjacent Siberian and Chinese countries, unspecialized except in the specific characters, and many of the species are very near those of the mainland. It is interesting to find that these results coincide with the facts known in regard to the freshwater gastropods and the land shells. Except that the mollusk fauna of Japan has a more southern aspect than that of the adjacent mainland (due to the warm ocean current, the "Gulf stream of Japan"), there is no difference of any importance in zoogeography.

PRELIMINARY LIST OF THE MOLLUSCA OF ARKANSAS, by F. A. Sampson (Ann. Rep. Geol. Surv. Ark., Vol. II).—81 species are the result of several years work by Mr. Sampson, not including *Unionidae*, which will be treated separately. The State has been little known to conchologists hitherto, and the present catalogue supplies data for the southwestern range of a considerable number of species. It is judiciously annotated, and illustrated with woodcuts of *Triodopsis edentata* Sampson.

A BIOLOGICAL EXAMINATION OF LAKE ST. CLAIR (Bull. Michigan Fish Commission, No. 4).—The present preliminary account details the methods adopted by the Michigan Fish Commission, with brief lists of the various forms of life, a map of the lake, etc. The mollusks were studied by Mr. Bryant Walker and listed on pp. 43, 44. More elaborate reports on the principal groups are in preparation.

PL. III.

THE NAUTILUS, VIII.



PATTON AND FISHER, ARCHITECTS.

THE CHICAGO ACADEMY OF SCIENCES LINCOLN PARK

THE NAUTILUS.

VOL. VIII.

FEBRUARY, 1895.

No. 10

A GLANCE AT THE CHICAGO ACADEMY OF SCIENCES.

BY FRANK C. BAKER, SECRETARY.

In 1857, a society for the promotion of science, was formed in Chicago, taking the name of "The Chicago Academy of Natural Sciences." About \$1,500 was subscribed, a room taken in the Saloon Building, corner of Clark and Lake Streets, a few cases were made, and a museum was begun. In 1859, the society was incorporated by the name of "The Chicago Academy of Sciences."

In the winter of 1863-4, several prominent citizens of Chicago resolved to found a Scientific Museum in the Metropolis of the Northwest. A large sum of money was accordingly subscribed, an Act of Incorporation, (1865) as now published, was obtained and the Academy was placed upon a solid foundation. Mr. Robert Kennicott was appointed first Director of the Museum. Collections rapidly rolled in and rooms were taken at the Metropolitan Building, corner of Randolph and La Salle Streets. In 1865 Mr. Kennicott, with a party of young naturalists went to Alaska to survey a route for a telegraph line, then proposed to connect North America with Russia. From this expedition Mr. Kennicott never returned. He died suddenly of heart failure on the banks of the Yukon River. After the death of Mr. Kennicott, Dr. William Stimpson was appointed Director of the Museum.

June 7, 1866, the building in which the Museum was placed was partially destroyed by fire. The collections were much damaged,

and parts were wholly destroyed. This calamity brought the question of a permanent building to head, and a lot on Wabash Avenue, north of Van Buren Street was purchased and a fire-proof building erected. The first meeting was held January 28, 1868. The building was of brick 55 feet by 50 in area, and 50 feet high; the floors were of brick and iron the stairways and principal doors of iron, and the windows were covered with iron shutters. The basement was used for laboratory and storeroom; the first floor for library and offices, while the whole upper part, surrounded by two wide galleries, was occupied by Museum. From this time until the great fire the growth of the Academy, under the skillful management of Dr. Stimpson was rapid, and much valuable original work was done.

On the 9th of October, 1871, this building, in spite of the fire-proof qualities which it was supposed to possess, was totally destroyed in the great conflagration which laid Chicago in ashes,—specimens, library, manuscripts, and apparatus—all that was left of the once invaluable collections was a sheet of printed paper and a few pieces of broken pottery. Within twelve days after the fire, however, a meeting was held and steps taken towards a restoration of the Academy. A circular was issued inviting the sympathy and help of corresponding societies, which elicited many immediate and liberal responses. The loss of his priceless manuscripts so prostrated Dr. Stimpson that he died on the 26th of May, 1872.

It was soon determined to rebuild upon the old site, and upon the same plan modified by such improvements as experience could suggest. Upon the front of the same lot a business block of the first class, four stories in height was erected. The restored building was occupied in the fall of 1873. The funds at the disposal of the Academy being insufficient for their needs, they borrowed such additional sums as were necessary, securing the lender by a mortgage upon the whole property. They estimated that the income from the property would provide a sinking fund by which the original indebtedness would be paid when it became due. The scheme, however, proved disastrous. The new building did not pay the interest on the indebtedness, and after a term of years, in process of law, the whole property was lost to the Academy.

When, in 1886, the Academy was finally driven from its home on Wabash Avenue, the Exposition Company received the collections within its building upon the lake front and paid the expense of their

maintenance. But in its turn, the exposition company was ousted and its building destroyed. The property of the Academy was sent to storage where it remained for several years. In 1891 when the affairs of the Academy seemed to have reached their lowest ebb, a proposition was made to unite its fortunes with the University of Chicago, then just organizing. This the Academy was not willing to do, feeling that in time the identity of the organization would become lost in that of the University. In 1892 a generous citizen of Chicago Mr. Matthew Laflin, seconded and aided by his son George K. Laflin promised to give a sum adequate for the purpose of erecting a building which should stand for all time as the home of the Academy. In addition to this, it was ascertained that it was possible for the commissioners of Lincoln Park to aid in the prosecution of such an enterprise by offering a site and additional endowment. The result is one of the most perfect museum buildings situated in one of the most beautiful parks in the world. In June, 1893, the corner stone was laid and Nov. 1, 1894, the building was formally thrown open to the public.

The new building is a plain rectangular structure measuring 150 by 50 feet. The material of the building is Bedford stone and the architecture is Romanesque. Over the central doorway is the inscription MATTHEW LAFLIN MEMORIAL. The interior is decorated in old gold and ivory giving a soft tone to the light. There is electricity, running water, electric bells, elevator, and all the modern improvements which go to make up a perfect museum.

The library contains 5000 scientific works. It communicates with the museum by two stairways. The museum hall is 150x50x30 feet, with one wide gallery. Upon the main floor there are 24 large cases, in the gallery the same number with the addition of a large rail case. Unlike most museums *there is not a dark corner in the building*, from cellar to garret.

The collections consist for the most part, of North American productions, and are most complete so far as the valley of the Mississippi is concerned. In Mollusca, the collection is rich in North American forms.

With a new building and the best of facilities, it is believed that the Academy will again occupy a prominent place among Scientific bodies, and regain the prestige and fulfil the promise of its earlier days.

ON A NEW SPECIES OF HOLOSPIRA FROM TEXAS.

BY WM. H. DALL.

Holospira pasonis n. sp.

Shell white, mostly smooth but hardly glossy, of eleven and a half whorls; two and a half smooth, inflated, nepionic whorls, the apex flattish, followed by several whorls which are minutely ribbed in harmony with the incremental lines, the ribbing gradually becoming obsolete over most of the shell but reappearing on the last whorl, especially the basal part, sharper and somewhat crowded just behind the reflected lip; umbilicus closed or reduced to a minute chink; suture distinct, sutural edge continuing as a keel to the reflected margin of the aperture; aperture very short necked, almost circular broadly reflected; the pillar, as usual in the genus, tubular above the last whorl, the axis externally simple but somewhat flexuous. Lon. 22.5, max. diam. 6.5 mm. El Paso County, Texas, from Mule cañon at an elevation of 4000 feet. This species is nearest to *H. coahuilensis* W. G. Binney, which has one or two more whorls, the last two proportionately more attenuated with more extended, sharper and more distant sculpture, and obtusely keeled or compressed base resulting in a much more triangular and narrower aperture. It is not particularly close to any of the other species hitherto described, the *H. semistriata* Stearns being quite distinct. A marked character is the evenly rounded basal part of the whorl just behind the lip.

The specimens were procured by a correspondent of Mr. J. A. Singley.

MEGATEBENNUS BIMACULATUS.

BY MRS. M. F. BRADSHAW.

One day last September I found a curious and interesting mollusk. On a ledge of rocks, so high as only to be reached by the waves at the highest tides, there was a hollow containing a barrel or more of water.

Poking around in this I saw what appeared to be a bit of flesh. I took it out, thinking I had found a small *Lucapina crenulata*,

whose shell is—or appears to be—internal. But this one wore his shell upon his back for what purpose I do not know, for it was too small for protection, and the creature himself was so unpleasant to look at, no beauty of shell could redeem his ugliness.

Red-brown in color, warty, even the inadequate shell was a dull greenish-grey; not a single pretty feature!

Only an enthusiast could have taken him up with a thrill of pleasure, instead of a qualm of disgust.

Upon examination at home, it was determined to be *Fissurellidæa bimaculata*; yet the shell does not quite tally with the description in West Coast Shells. Internally it is white, outside gray-green with fine sculpturing; the rays running from the aperture to the edge are strong, the circular ribs faint, and the margin is not crenulated. *F. bimaculata* is said to be $\frac{1}{4}$ in. in length; this one is more than double that size. And the dark spots on the sides are not visible. If the green stain could be removed perhaps they would appear; but as the size is too great for *bimaculata*, perhaps I have a *Fissurella* not credited to this coast.

ON COLLECTING PISIDIA.

BY DR. V. STERKI.

Pisidia, and for a good part Sphaeria, are by far not sufficiently known, systematically as well as geographically. Requested to do so, and encouraged by prominent conchologists, the writer is going to work them up. Already some valuable materials are at hand; thus the entire Pisidium-collection of Mr. E. W. Roper, numerous lots, most from Lake Michigan, sent by Mr. Bryant Walker, others from Mr. H. Prime and other conchologists, besides my own collection; and some good results have so far been attained. Yet these materials are absolutely insufficient for a thorough study and knowledge of these small mussels which, with all their minute size, are a very conspicuous and interesting part of our molluscan fauna. They should be studied in their different forms, considerably variable according to their habitats, and all kinds of waters should be searched for them all over the continent.

Whoever has collected Corbiculidæ assiduously will know that they are, as a rule, present in large numbers, wherever found. The

best means for collecting them is a rather long (8-12 inches) net of strong canvas, such as used for embroidery work, fastened to a ring of strong wire¹, five to eight inches diameter, with a handle, to be used either directly, or fastened to a stick, or pole up to ten or twelve feet long. For deep waters a dredge should be used. The "stuff" gathered is shaken and washed until the remains are free of fine mud, then in a basket, sack, or some other suitable receptacle brought home, where the mollusks, Corbiculidae and others, may be picked out at leisure. If they are not to be kept alive, it is best to spread the materials on large pieces of paper, or cloth (bed sheet e. g.) and let them become dry. In this way, especially if one or several fine sieves are used, they are most easily found; and none of them should be overlooked, as some forms are very minute, and the young of all are of interest, while fully grown specimens are comparatively scarce, and so are certain species in some places. If sent for examination, all from a locality are best left mixed up, and not separated, but with notes on the nature of their habitat.

Hundreds, and thousands of specimens may be secured in a short time, not to speak of other mollusks, among which, last not least, very young Unionidæ. The best places are, as a rule, among aquatic plants, and also in deep places, or holes, where the mussels are washed together. But it must also be said, that they are found most actively propagating in late fall and early winter.

New Philadelphia, Ohio, Jan., 1895.

NOTE. In Dr. Sterki's article in the January NAUTILUS, the word *naere* should be read instead of "nave" on page 97, 9th line from foot of page, and also on page 99, 16th line from top.

Pisidium punctatum has also been found in Lake Michigan and in Herkimer Co., N. Y.

NEW AMERICAN FRESH-WATER MOLLUSKS.

BY H. A. PILSBRY.

Planorbis alabamensis n. sp.

Shell small, whitish corneous, solid, lens-shaped; intermediate in form between *P. excavatus* and *P. dilatatus*. Upper surface convex.

¹ Where fastened to the wire, the net should be enveloped with strong cloth, or leather, lest it will wear off; and the seams should be securely sewed.

but the apex is slightly sunken; whorls nearly three, slightly convex, rapidly widening, acutely keeled at the periphery, the keel projecting above the suture on the penultimate whorl in most adult specimens. On the last whorl the keel is about median in position, is acute, as if pinched out, and extends to the aperture. Base of shell convex, rising toward the umbilicus, which is moderately large and funnel-shaped, with very obtusely angled margin. Aperture small, oblique, sub-rhombic; the lip strongly thickened within. Alt. 1.8, diam. 3.4 mm.; width of aperture 1.6 mm.

Woodville, Alabama (Prof. H. E. Sargent). This is a smaller species than *P. exacutus*, with much smaller less oblique aperture, thick lip, and not so flattened. It differs from *P. dilatatus* in the acute peripheral keel, etc.

***Amnicola olivacea* n. sp.**

Shell olive colored, somewhat intermediate in form between an ordinary *Amnicola* and *Pomatiopsis lapidaria*. Spire elevated, the apex rather acute. Whorls 5, very convex. Aperture ovate, less than half the length of the shell, angular above; peristome free except for a very short distance on the parietal wall; umbilicus rather large. Surface smooth; coated with iron oxide in the adult specimens seen.

Alt. 4.2, diam. 2.5 mm. (Male?).

Alt. 4.2, diam. 3 mm. (Female?).

Huntsville, Ala. (coll. by Prof. H. E. Sargent; see NAUTILUS for December, 1894, p. 95).

This form is quite distinct from other *Amnicola*, being of more elongated contour than any other Northern forms except *A. lustrica*. Its nearest allies are some of the smaller slender Floridian forms, but none of these have such convex whorls. As I have seen dry specimens only, I have not verified the reference of the stouter individuals to the female sex, but from analogy with other species this is probable. The supposed males have much the general appearance of *Pomatiopsis cincinnatiensis*.

***Planorbis bicarinatus* arcostookensis n. var.**

Shell having the spire and umbilicus very deep, the latter funnel-shaped as in typical *bicarinatus*, but both upper and lower keels entirely obsolete or rounded off on last whorl, which has the aspect of that of *P. trivolvis*. Surface minutely striated spirally as in *P. bicarinatus*. Aperture less angular and less produced below than in *bicarinatus*, in consequence of the rounding of the whorls. Diam.

15, alt. at aperture $7\frac{1}{2}$ mm. Specimens from East branch of Salmon brook, Woodland, Aroostook Co., Me., coll. by O. A. Nylander, Caribou, Maine.

Vivipara georgiana limnothauma n. var.

Whorls much swollen around the upper part, sloping below, giving a shouldered appearance. This is one of the most remarkable forms of *Vivipara* yet made known. Types are from an aboriginal shell-field on Hitchen's Creek, but it also occurs living in Lake George, 2 fms., off Drayton's Island (Pilsbry and Johnson coll.).

MOLLUSKS OF ALLEGHENY CO., PENNSYLVANIA.

BY GEO. H. CLAPP, PITTSBURGH, PA.

Below is given a list of additional species of land and fresh-water shells collected in Allegheny Co., Pa., to be added to the list published by Mr. S. H. Stupakoff in the NAUTILUS, April, 1894.

<i>Hyalina cellarius</i> Müll.	<i>Unio crassidens</i> Lam.
<i>Hyalina nitidus</i> Müll.	<i>Unio luteolus</i> Lam.
<i>Mesodon mitchelliana</i> Lea.	<i>Unio gracilis</i> Lam.
<i>Pupa curvidens</i> Gld.	<i>Unio rubiginosus</i> Lea.
<i>Succinea aurea</i> Lea.	<i>Unio orbiculatus</i> Hild.
<i>Succinea obliqua</i> Say.	<i>Unio securis</i> Lea.
<i>Limnæa parva</i> Lea.	<i>Unio cornutus</i> Bar.
<i>Gyraulus dilatatus</i> Gld.	<i>Unio undulatus</i> Bar. (?) dead
<i>Pleurocera canaliculatum</i> Say.	[broken shell.
<i>Goniobasis</i> ? (Young).	<i>Unio obliquus</i> Lam.
<i>Unio ovatus</i> Say.	<i>Ancylus tardus</i> Say.
<i>Unio rectus</i> Lam.	<i>Ancylus rivularis</i> Say.
<i>Unio pilaris</i> Lea.	

From the previous list, *Mesomphic levigatus* Pfr. should be dropped. I have found *Mesodon sayii* Binn. in Beaver Co., but have not, so far, found it in this county.

NOTE ON UNIO OREGONENSES LEA.

For years I have been puzzled over a shell in the Lea collection of Naiads which Lea received from Wheatley as coming from the

Columbia river, Oregon and which the former named *U. oregonensis*, describing and figuring it in Trans. Am. Phil. Soc. X, p. 275, pl. 22, fig. 33. The specimen is in bad condition, being somewhat broken and considerably eroded. In a paper on the Relationships and Distribution of the North American *Unionidae*, with notes on the West Coast Species, which I published in American Naturalist, Vol. XXVII, No. 316, I stated that I had come to the conclusion that the specimen in question was a form of the widespread and variable *Unio luteolus* Lam, there being examples in the National Museum from Canada very much like it. I believed that if it really came from the Columbia river it was just possible the young might have been carried in mud on the feet of aquatic birds, from waters near by which drain into the Missouri, in which stream *U. luteolus* is found. But I have never been quite satisfied with my determination of the shell, since it always seemed to resemble to some extent a group of the Mexican species. To-day, in carefully going over all the Mexican and Central American Naiad material in our own and the Lea collections I suddenly discovered a surprising resemblance between the Lea specimen and some others of *U. rowelli* Lea, and on careful comparison I found it to be undoubtedly an old, solid, and inflated female of that species.

Unio rowelli is a remarkably variable form which I cannot for a moment doubt is exactly synonymous with *U. macneilli* Lea, the types of both species being in the Lea collection. Lea calls attention in his description to its resemblance to *U. sapatensis*, to which it is closely related, and it may be remarked in passing that in this group the females and males are separate, the former being inflated in the posterior ventral region like those in the *Luteolus* Group. Some specimens of this protean species are much inflated, others are compressed; some are somewhat triangular and pointed at the base of the posterior slope, without a trace of biangulation, others are nearly rhomboid and distinctly biangulate; there is considerable variation in the degree of sulcation, and in the coloring of the epidermis. They may be either uniform greenish-yellow, brownish, or marked with distinct and delicate radiating stripes as in the type of *U. oregonensis*. And all these variations may occur in a lot from a single locality.

The cardinals are rather compressed, double in the left and single in the right valve, and have a peculiarly rough, torn appearance; while the laterals are somewhat striated longitudinally.

As *Unio oregonensis* was described probably about the year 1852, *rowelli* in 1859, and *Macneilii* in 1874, the former should have precedence. But it may be set down as an absolute certainty that no member of the group to which this species belongs was ever found nearer than 1500 miles from the Columbia river, and the locality is undoubtedly an error. As the name *oregonensis* is, therefore, misleading, I think we are justified in applying to the species the next oldest name, *Unio rowelli* of Lea. As I have shown in the article referred to in American Naturalist that *Unio famelicus* Gld. of the Columbia region is only a young *Unio multistriatus* Lea, of Brazil, I think I am safe in saying that no Unios are known to inhabit North America west of the great Rocky Mountain chain; this being the largest area destitute of *Unio* life in the temperate or tropical regions of the globe.

NOTES AND NEWS.

MR. A. A. HINKLEY has removed from Du Bois, Ill., to Rockford, Illinois, which will be his address in future.

MR. EDW. W. ROPER and Mrs. Roper sailed for Jamaica on Dec. 19, to spend the winter collecting shells and ferns.

A TRAIN STOPPED BY SNAILS.—Mr. Laille, an engineer in the employ of the Tunisian Railway, writes in the *Dipeche Tunisienne*: "The train coming east from Suk-el-Arba last Thursday was two hours late for a very singular reason. The road was literally covered with snails, the wheels of the locomotive crushing these mollusks into a pulp, which destroyed all adherence and caused the locomotive wheels to skate, so to speak, in their places. We have seen flocks of locusts stop trains, but I think the fact that snails can stop a train is without a precedent. These snails are very general all through Tunis, especially during the rainy season; the smallest remainders of green on field or tree are covered with them, so much so that they appear like a bunch of grapes hung up, only that their white shells produce a curious effect."—*Phila. Record*.

MR. JOHN B. HENDERSON of Washington, D. C., has sailed for Japan, with Mr. John W. Foster, to be absent about three months.

HELCONISCUS NIGRISQUAMATUS.—By error, the word "not" was printed for *now*, in line 11 from bottom of Mr. Taylor's article on this species, October number, p. 66. As it completely changes the meaning of the sentence, this correction should be made.

FULGUR PERVERSUM is a rare shell on the coast north of Delaware Bay, if, indeed, it occurs at all living. Mr. Curtis Smith has recently found dead and blackened (fossil?) specimens at Wildwood, N. J.

PROF. H. E. SARGENT of Woodville, Ala., called upon his friends in Philadelphia on the 26-28th inst. He purposes to be in New England for the next month or more.

NEW PUBLICATIONS.

THE LIFE AND WRITINGS OF RAFINESQUE, By Richard Ellsworth Call.¹ (Filson Club Publications, No. 10).—To most naturalists, a peculiar charm attaches to the personalities of their predecessors in the same field of endeavor. And we of to-day, who may fairly be reckoned as the third generation of nature students in America, have a natural curiosity to know something of the men of that first generation, to whom the "New World" was indeed new—who enjoyed in such generous measure that intense delight which can only be felt or appreciated by the field naturalist in the presence of forms of life new to him. Rafinesque, the subject of Mr. Call's present work, has been much less familiarly known to us than any of the other pioneers in American zoology; he was misunderstood by most when living, and scoffed at dead. It is, therefore, with unusual interest that we follow the tale of his eventful life as it is here related. Mr. Call, after telling of his early training, or rather lack of training, follows his hero to France and then to Sicily, where Rafinesque's life work was begun, and his peculiar characteristics as a naturalist were developed. When he finally left that sunny island for America, he was already the author of many works and papers on numerous branches of zoology and botany, though only thirty-two years of age. His career of misfortune in America—relieved only by the intense pleasure of his work—is graphically described, the period covered by his life in Kentucky being given most space, this time covering Rafinesque's most important contributions to American science. Two portraits of Rafinesque are reproduced, as well as an autograph letter and sample pages of some of his works, all by good photo process engravings. The volume concludes with a bibliography, which seems to be complete.

The character of Rafinesque is appreciatively interpreted by Mr. Call, and his shortcomings are as leniently mentioned as strict re-

¹ Louisville, Kentucky, 1895, 4to. pp. xii, 227.

gard for right will admit. Acknowledging frankly the great defects of the eccentric naturalist's work, its value and genius are still considered by Call to be very considerable. There can be no doubt that in the appreciation of *natural groups*, Rafinesque had great insight, as his biographer claims; but still we can hardly endorse the statement: "considered as a whole, the conchologic work of Rafinesque was remarkably well done." From some acquaintance with that work, we would rather call it remarkably *badly* done, and only saved from worthlessness by certain glimmers of genius, in the ability to grasp natural groups. Some facts of value could have been obtained had Mr. Call corresponded more freely with Philadelphians, as here Rafinesque spent many years. Among other things, the statement in regard to the Poulson collection of Rafinesque's *Unionida* on p. 109, would not have been made. This collection was collected and labelled by Rafinesque, was procured by Tryon from Poulson's estate and is now preserved in the collection of the Academy of Natural Sciences of Philadelphia.

As a whole the volume seems remarkably free from mistakes of any kind, considering the difficulty of the subject. The typography is superb. The proof-reading is almost perfect, though we note a very few slips, such as "profligate" for prodigal, on p. 75. It is printed on fine paper, with wide margins, and is altogether a beautiful piece of book-making. We trust it will find a place on the shelves of conchologists and naturalists generally, and lead to a more just appreciation of this great though erratic genius.

THE MECHANICAL CAUSE OF FOLDS IN THE APERTURE OF THE SHELL OF GASTROPODA, By Wm. H. Dall (Amer. Nat., Nov., 1894).—The plicæ and folds found in the aperture and throat of gastropod shells are explained by the wrinkling of the mantle when retracted into the gradually narrowing caliber of the shell, and pressed between the solid foot and the shell wall. The semi-fluid secretion of which the shell-lining is built up is exuded from the whole surface of the mantle, but becomes rubbed off where the summits of mantle-folds press against the shell, gradually accumulating in the interstices between these folds. It is found that in shells having the ridges extending far inward, the adductor muscle is attached far within; in those having no folds, or only at the margin of the aperture, the adductor is attached to columella lower down. The deeper this attachment, the greater the distance over which the mantle is drawn, and consequently the greater its folding by compression, and the more emphatic the shell-ridges deposited by it.

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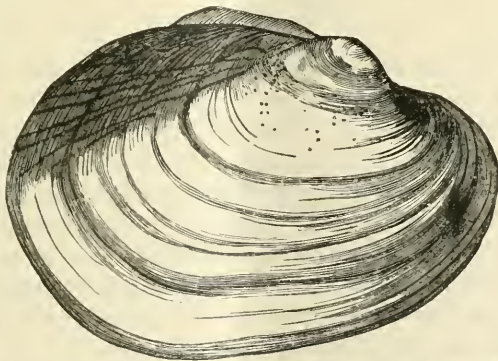
MARCH, 1895.

No. 11

UNIO OCHRACEUS AND CARIOSUS.

BY CHARLES TORREY SIMPSON.

The senior editor of the NAUTILUS has asked me to point out in a clear concise way the specific differences between *Unio ochraceus* Say, and *Unio cariosus* Say. They were both described in Nicholson's Encyclopedia, in an article on conchology, by Say; and the work, which is now long out of print, is exceedingly rare, and out of the reach of the ordinary student.

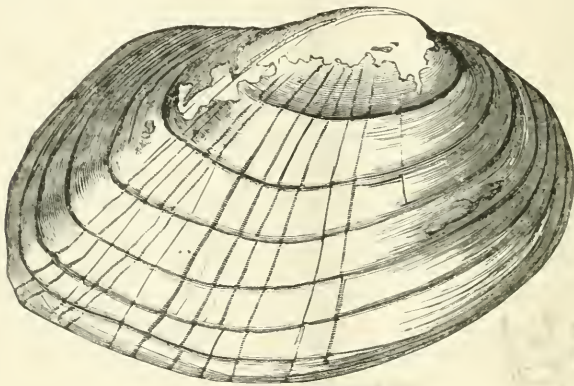


Unio ochraceus Say. *Unio cariosus* Say.

Both belong to a great assembly of North American forms fairly typified by the well known *Unio occidentalis*, it being one of the few groups that are well represented both in the Mississippi Valley and

Atlantic drainage areas, which in the main are peopled by very different *Unio* faunas.

The species which are the subject of this note, though closely related and having about the same geographical distribution, are no doubt distinct, and when one has learned to separate them he rarely has any difficulty in distinguishing them at sight. As a rule, *Unio ochraceus* is the more inflated and thinner shell of the two; it is almost invariably dull-colored, and the epidermis, especially at the posterior end is generally raised into slight irregular folds, which follow the growth lines. The rays, which are dirty green and ill-defined, usually cover the posterior part of the shell, and sometimes extend over the whole disc, becoming fainter towards the anterior



Unio cariosus Say.

end. The interior is dull-colored, often lurid, and quite frequently tinted with reddish salmon or purple.

On the other hand, *Unio cariosus* is generally the more compressed of the two; often showing a fairly well-defined angle on the posterior slope; it is almost invariably smooth and shining; the epidermis being yellowish or a dirty straw color, sometimes tinted with brown. Usually above the posterior slope there are a few wavy, very distinct, dark green rays, and sometimes, though rarely, this radiation extends over the shell. The interior is usually white or silvery, and more or less iridescent posteriorly.

In a very large series any of these characters may fail. Specimens of *U. cariosus* may be inflated, or very rarely slightly roughened; there may be individuals of either species that are uniform in color, or rayed throughout, but in an extensive set they will, for

the most part, hold good ; and the roughened, dull exterior, feeble rays, and lurid interior of *U. ochraceus*, and the shining epidermis and well defined posterior rays of *U. cariosus* are very constant. *Unio cariosus*, on the whole, approaches much closer to forms of *U. occidentens* than it does to *U. ochraceus*.

The latter ranges from the Connecticut River and the state of New York, south in the waters of the Atlantic drainage to Savannah, Ga. Two specimens from the latter locality have remarkably red interiors, and are a little peculiar, but are undoubtedly the species in question. *Unio cariosus* is found in the vicinity of Quebec, Canada, according to Latchford, and it has been reported from western New York. A doubtful specimen is in the Lea collection from Talledega, Ala. It is in the same collection from Edgefield, S. C., Ogeechee River, Ga., and Columbus, Ga., and these are no doubt correctly named. Other shells in the Lea collection from Neshotch, Wis., and Ontonagon, Mich., are very probably forms of *Unio occidentens*.

NOTES ON THE REPORTED EXTINCTION OF THE GENUS ACHATINELLA
AND MARVELOUS DEVELOPMENT OF A FLORIDA FASCIOLARIA.

BY JOHN FORD.

A most extraordinary account of a collection of shells, located somewhere in the interior of New York State, was handed me by a friend a few days ago.

This purports to have been written by a correspondent of a Rochester newspaper, in the columns of which the article probably first saw the light. The writer, it appears, does not claim any scientific knowledge of shells, nor can it positively be said that his bump of imagination is abnormally developed. Nevertheless, he has given to the paper alluded to, and consequently to the world, some very remarkable bits of information. Information, indeed, which, if true, shows how puny are the geographical and scientific acquirements of the general run of conchological students. Of course, for lack of space in your columns, reference can only be made to one or two of the marvelous statements embraced in the article. One of these refers to the genus *Achatinella*, of which the writer says, "This shell is confined to the Sandwich Islands and its tenant feeds on the

herbage of these islands. Since the islands have been pastured, the 'variety' has almost entirely disappeared, and probably not more than a half dozen specimens could be found there to-day." What a dire calamity! and how remarkable that these pretty little creatures should have "shuffled off their mortal coils" in the very season that less regal robes slipped from the shoulders of their Island Queen.

A few flippant students may question this tale of *starvation* in the midst of *green pastures*, but it will perhaps be well for them to pickle their opinions, since the positive assertions of "correspondents" are not to be trifled with. The shell expert who can doubt this starvation story would quite as likely question the following narrative said to have been written by the "experienced collector" who forwarded the shell referred to, to the aforesaid unparalleled New York aggregation, viz.; "The large Florida *Fasciolaria* father found one day by accident.

"While drifting about in Florida waters his boat suddenly touched what seemed to be a rock but it proved to be an immense specimen of the *Fasciolaria* (sic), alive and travelling." "This specimen weighs several hundred pounds."

A brief statement to be sure, but a graphic one, as the reader will admit. There is not a word, however, as to whether the boat was wrecked in its "sudden" contact with the limy mass "weighing several hundred pounds."

Nor is there any reference to the final disposition of that part of "the *Fasciolaria*" which, when struck, was "alive and travelling." But this fact matters little, perhaps, since we are assured that the "several hundred pounds" were gotten safely to the shore, and finally into that collection of shells which (I quote again) "is expected to be in a short time the most complete and valuable one, from a scientific standpoint, in the world."

Presumably this monster of "Florida Waters" is known to Science as *Fasciolaria gigantea*, but alas! how pitiable has been the ignorance of the scores of so-called conchological experts who have hitherto believed that this, the largest species of the genus, did not exceed a paltry ten pounds in weight. Think of it, ye academic plodders who for years have been gazing with wonder upon a petty *eight* pounder, imagining the while that Florida had utterly failed to produce anything larger in the same line. O, the pity of it! You that have given years of study and thought to the molluscan world,

how could you so mistake a pigmy for a giant, a veritable baby for a grandfather? Far better would it have been had you made a Mecca of the Empire State and sat at the feet of its astute correspondent, whose present throne is, doubtless, ye same old Fasciolaria, "alive and travelling" and "weighing several hundred pounds."

NOTE ON HELIX SAULIE PFR (non REEVE)=PALUMBA SOUVERBIE.

BY HUGH FULTON, LONDON.

Owing to an error in Reeve's Monograph some confusion has been caused as to the identity of the above species; both Pilsbry and Hidalgo have taken Reeve's description and figure (Conch. Icon., fig. 393) as being that of the type of *saulie*, consequently, and with reason, they have considered the *palumba* of *Souverbie* to be distinct from the former species. The fact is, that when Reeve described and figured his *saulie*, he had not the type of that species before him; the type specimen of Pfeiffer's *saulie* in the Cumingian collection, is identical with the *palumba* of *Souverbie*, Journ. de Conchyl., 1858, p. 369; 1862, t. 10, f. 5.

I have not been able to find in the Cumingian collection the shell figured by *Reeve*.

SHELLS OF AROOSTOOK CO., MAINE.

COLLECTED BY OLOF O. NYLANDER.

The species listed below were collected in the vicinity of Caribou, Maine. Aroostook County is the northern county in Maine, and very few species have hitherto been reported from there. The specimens of *Limnæa* and *Planorbis* show great variation, the forms of *L. emarginata* are especially interesting.

Vitrina limpida Gld. Caribou.

Vitræa arborea Say.

Conulus fulvus Mull.

Pyramidula alternata Say. Woodland.

Pyramidula striatella Anth.

Pyramidula lineata Say.

Polygyra albolabris Say. Woodland.

Polygyra dentifera Binn. Woodland.

- Polygyra sayi* Binn. Woodland.
Polygyra monodon Say. Woodland.
Strobilops labyrinthica Say.
Pupa pentodon Say. Woodland.
Vertigo gouldi Binn. Woodland.
Ferussacia lubrica Mull.
Succinea obliqua Say. Woodland.
Succinea ovalis Gld. Aroostook Co., Me.
Carychium exiguum Say. Generally diffused.
Limnæa humilis Say.
Limnæa desidiosa Say.
Limnæa emarginata Say.
Limnæa emarginata mighelsi W. G. B.
Planorbis trivolvus Say.
Planorbis bicarinatus Say.
Planorbis bicarinatus aroostookensis Pils.
Planorbis campanulatus Say.
Planorbis deflectus Say. Streams generally. Very large specimens in inlet of Cross Lake.
Physa ancillaria Say. Square Lake.
Physa heterostropha Say. Generally abundant.
Campeloma decisum Say. Lakes and Streams.
Pomatiopsis cincinnatiensis Lea. Caribou Lake.
Unio complanatus Sol. Lakes generally. Some are very large.
Margaritana margaritifera L. Aroostook R. (rocky bottom).
Margaritana undulata Say. Square Lake.
Anodonta fragilis Lam. Caribou L. (mud bottom).
Sphærium sulcatum Lam. Salmon Brook Lake.
Sphærium striatum Lam. Square Lake.
Pisidium variabile Prime. Caribou Lake.
Pisidium abditum Hald. Caribou Lake.

NEW SPECIES OF LAND-SHELLS FROM THE GALAPAGOS ISLANDS.

BY WILLIAM H. DALL.

Bulimulus (*Næsiotus*) *Reibischii* n. s.

Shell elevated, slender, of a pale ferruginous tint, rather solid, with nine whorls; apex funiculate as in other Nesiotes, the first two (nepionic) whorls finely ribbed and polished, the remainder with numerous oblique or irregular transverse ribs crossed by nu-

merous sharp spiral threads, with wider interspaces; suture distinct, somewhat appressed; base of last whorl somewhat attenuated; whorls little inflated, but not flattened; umbilicus a mere chink; aperture oval, higher than wide, rounded in front, the pillar simple, the margins thickened but not reflected. Lon. 11·0; max. diam. 2·5 mm.

This shell has the sculpture of *B. rugiferus* Sby., and somewhat the form of *B. chemnitzoides* Fbs., though shorter and with fewer whorls. It is fairly intermediate between *Næsiotus* and *Pleuropyr-gus*. Two specimens were collected by the U. S. S. Albatross at Indefatigable Island. The species is named in honor of Herr Paul Reibisch who has recently worked up the Wolf collection from these islands.

Bulimulus (Næsiotus) Fanneri n. s.

Shell short, stout, pointed, with six whorls of which two are nepi-onic with the usual sculpture, while the others are marked only by lines of growth and microscopic, inconstant spiral striation, of which the most prominent lines are regularly spaced and microscopically beaded, when present; color pinkish or slightly brownish white, no peripheral pale band visible on the specimens which, however, are not perfectly fresh; whorls well rounded, umbilicus large and deeply pervious; aperture large, with a widely reflected lip, the outer lip much bent over on the body, closely approaching the pillar and united to it by a distinct callus. Lon. 11·0; max. diam. 7·0 mm.

This belongs to the *B. jacobi* group, and is about the size of small varieties of *jacobi*, but is more conical and stouter, and has an aperture very differently shaped and with a more broadly reflected lip than any other species from these islands. It was found with the preceding and is named in honor of Capt. L. L. Fanner, commander of the Albatross. The pillar is perfectly plain and with no sulcus or fold at the base.

NOTE ON TASMANIAN *ACMÆA* AND *ISCHNOCHITON*.

BY H. A. PILSBRY.

Acmaea cantharus Reeve.

The habitat of this species was said, by Reeve, to be New Zealand; but Prof. Hutton, some years ago, corrected this error, stating that

it is Tasmanian. Numerous specimens received from Mr. H. Suter, collected by Mr. W. L. May, at Frederick Henry Bay, Tasmania, show a considerable range in pattern of coloring. The interior is very much like that of *Lottia gigantea*, and the anterior, marginal position of the apex also forcibly recalls that West American species.

Acmaea parva Angas, var. *tasmanica* n. v.

Shell smaller, wider and higher than "*Nacella*" *parva* Ang. (P. Z. S., 1878, pl. 54, f. 12), opaque white, with radial irregular rays of bluish or subtranslucent white at the sides and short, transverse bars of the same on the back. Length 8, breadth 2.2, alt. 1.5 mm. Estuary of Derwent R., Tasmania, 10 fms. Collected by Mr. W. L. May.

Ischnochiton (*Haploplax*) *Mayi* n. sp.

Shell short-oval, moderately elevated, carinated, the side-slopes slightly convex. Surface smooth to the naked eye, but finely granular. (*Color of valves and girdle uniform black* above, or slightly brownish at the beaks when eroded.

The intermediate valves have almost straight sutures, even a trifle concave in old specimens, the beaks projecting a trifle in young ones. *Lateral areas distinctly raised (the diagonal distinct and rather wide)*, sculptured with several arcuate, indistinct growth-marks, sometimes showing very slight traces of coarse, low pustules, but these are hardly mentionable; all over minutely granulose in diamond pattern. Central areas with faint growth-striae anteriorly, distinctly granulose at the sides, the granules arranged to form forward-converging riblets, which, though slight, are apparent on the outer half of each valve; central portion of central areas smoothish, with faint granulation only, beaks smooth. End valves sculptured like lateral areas. Valve viii with mucro projecting, at about the anterior third; the posterior slope concave below the mucro and then straight.

Interior dull blue-green, greener behind the rather heavy valve-callus, the depth of the cavity rather lead-color. Sutural laminae small, projecting less than half the length of a valve; sinus wide. Slits in valve i, 11; valves ii to vii, 1-1; valve viii, 12-13. Teeth sharp, smooth and short.

Girdle black, clothed with densely imbricating, coarse, convex, smooth scales.

Length 8, breadth 6 mm.; larger, "curled" examples would measure at least 10 mm. long. Divergence the same as in *I. smaragdinus*.

Eagle Hawk Neck, east coast of Tasmania. Collected by Mr. W. L. May, and communicated to me by Henry Suter.

This species belongs to the group of smoothish Australian species, such as *lentiginosus* Sowb., *smaragdinus* Angas and *virgatus* Reeve. It has more distinctly differentiated lateral areas and better developed pleural sculpture than any of them, and is, moreover, of a uniform black color. Types in coll. Acad. Nat. Sci., Phila.

In this connection it may not be out of place to direct attention to certain errors in the volume on Chitons in the Manual of Conchology. By the study of many specimens received from Messrs BEDNALL and COX, I find that two species were "lumped" under the name *Ischnochiton contractus*. (1) *I. decussatus* Reeve, of which *castus* Rve. and *speciosus* Ad. and Ang. are synonyms, and (2) *contractus* Reeve, of which Mr. Sykes considers *pallidus* Reeve a synonym. On account of the inadequate illustration and description of Reeve's *C. crispus*, I did not recognize it in my *Isch. haddoni*; but upon sending specimens of the latter to Mr. E. R. Sykes for comparison with Reeve's type, he informs me that they are the same. While something might be said in favor of ignoring Reeve's name on the score of insufficient definition, it may, in the long run, be better to receive it and make my own *I. haddoni* a synonym of *I. crispus*. I regret the change, because my intention was to honor Prof. HADDON, whose work on Chitons, as well as in other departments of Zoology, is of great merit; and a synonym is rather a doubtful honor.

NEW SPECIES OF LAND SHELLS FROM PUGET SOUND.

BY WM. H. DALL.

In some minute shells sent for examination by Mr. P. B. Randolph, of Seattle, after eliminating species already known, two forms appeared to be inedited. Having sent them to Mr. Pilsbry for criticism, he agrees that they are new, and the following descriptions are submitted.

Patulastra? (*Punctum?*) *pugetensis* n. s.

Shell minute, pale greenish yellow, nearly smooth, the first whorl and a half smooth, the others with fine, silky, close-set, hardly elevated lines or minute regular riblets, somewhat flexuous and in harmony with the incremental lines; form moderately elevated, the whorls inflated with a deep suture, and, in the adult, rapidly enlarging near the aperture in the latter part of the last whorl; aperture large, quite oblique, almost circular, the segment of the body between the two lips about one-sixth of the whole; umbilicus ample, scalar, exhibiting part of all the whorls which make, in adults, from three to three and a quarter volutions.

Alt. 0.5; max. diam. 1.5, min. diam. 1.2 mm. Habitat, Seattle, Wash., under leaves.

Pyramidula? *Randolphii* n. s.

Shell minute, reddish brown, with dull silky lustre, elevated, with three and a half rather inflated whorls; sculpture only of fine incremental lines, barely perceptible under an ordinary triplet lens; suture deep, periphery rounded, slightly less so in the immature shell but seemingly never angular; aperture obovate, somewhat oblique, wider than high, the body segment about one third of the whole; top dome-like, base full, umbilicus small, subcylindric, deep.

Alt. 0.75, max. diam. 1.4, min. diam. 1.25 mm. Habitat, with the last.

This little shell recalls *Conulus fulvus* in form, but wants the polish and imperforate base, and is more elevated and inflated than *C. fulvus* of the same number of whorls. It is not unlike the little *Helix granum* Strebel on a smaller scale. It is named in honor of the gentleman who collected it, who is deeply interested in the mollusk fauna of the Sound region.

NOTES AND NEWS.

PORTRAIT OF RAFINESQUE.—We are informed that portraits, suitable for framing (12 x 14 inches), may be had for a nominal sum to cover postage and packing, by addressing *Prof. R. Ellsworth Call, Manual Training High School, Louisville, Ky.*

By error, the name of the author was omitted from the paper "Note on *Unio oregonensis* Lea," in the last number of the NAUTILUS. It should have been signed *Charles T. Simpson.*

NAVARCHUS.—In working upon the Tectibranchs for Vol. XVI of the *Manual of Conchology*, I find that the name *Navarchus*, applied to a group of *Doridiidae*, is preoccupied. I propose, therefore, to substitute *Navanax*, the type being *N. inermis* Cooper.

PLEUROTOMARIA BEYRICHII.—A specimen of this rare species has lately been added to the National Museum Collection, which now possesses three of the four recent forms of the genus.

NOTE ON POTAMANAX.—The name given to this group of tropical American Melanians has been used again for a genus of *Lepidoptera* (Watson, *Hesperidae*, P. Z. S., 1893, p. 55). As the signature of the Proc. Acad. Nat. Sci. Phila. containing the description of the mollusk genus was actually distributed on Jan. 24, 1893, and the paper containing the Lepidopterous genus was printed under the proceedings for Jan. 17, 1893, the latter has apparent priority. However, the proceedings of that meeting could hardly have been actually printed until some weeks after the meeting, so that it is extremely probable that the name of the Lepidopter is later in date of actual publication, and must, therefore, be changed.

We are indebted to Dr. W. D. Hartman of West Chester, Pa. for the illustrations of *Unio ochraceus* and *U. cariousus* in this number. They are from his *Conchologia Cestrica*, an excellent work describing and figuring the shells of Chester Co., Pa., and incidentally the majority of those of the Middle States.

ANATOMY OF HEMICYCLA.—Dr. A. Krause (Nachbl. D. M. Ges. Jan.-Feb. 1895, pl. 1) has recently dissected several species of this Canary Island group of *Helices*, and finds their anatomy to be practically identical with that of *Tachea*. The rank and position assigned the group in Pilsbry's "Guide to the Study of *Helices*" is therefore fully confirmed. Its relationships are not with the Madeira and Azores *Helices* of the genus *Leptaxis*, but with the forms of true *Helix* of the European and N. African mainland.

NEW PUBLICATIONS.

THE ZOOLOGICAL RECORD for 1893 has appeared, containing the records of Mollusca, Brachiopoda and Bryozoa, by Mr. B. B. Woodward. These digests of the literature of zoology are of such great utility, when well done, that we cannot refrain from congratulating the Zoological Society upon the admirable manner in which the present Recorder has performed his difficult task. Mr. Woodward should have the hearty coöperation of all the conchologists. His

labor would be materially lessened if authors would send him "separates" of their publications, as soon as issued, addressed to *The Editor of the Zoological Record, Zoological Society, 3 Hanover Square, London W., England.*

DESCRIPTION D'UN PERIDERIS NOUVEAU [*P. lechatelieri*] provenant du Dahomey, par Ph. Dautzenberg (Journ. de Conch., 1893, pl. I).

DESC. D'UNE NOUVELLE espèce du genre *Littorina* provenant des côtes de la Tunisie, par Ph. Dautzenberg (J. C., '93, pl. I). *L. nervillei*.

DESC. D'UNE ESPECE NOUV. du genre *Chama* prov. des côtes océaniques de France, par Ph. Dautzenberg (Bull. Soc. Sc. Nat. de l'ouest de la France, 1892, p. 133, figs.). *Chama nicolloni*.

CONTRIB. A LA FAUNE MALACOLOGIQUE DES ILES SEHELLES, par Ph. Dautzenberg (Bull. Soc. Zool. France, 1893, p. 78). Contains important additions to the records in Martens' work in Möbius' Reise nach Mauritius, etc. No new species.

CRUISE OF THE STEAM YACHT "WILD DUCK" IN THE BAHAMAS, etc., NOTES ON THE SHELLS COLLECTED, by Wm. H. Dall. (Bull. Mus. Comp. Zool. xxv, No. 9.) It appears that the lagoons of the Bahama Is. are peopled by a peculiar mollusk fauna, evidently derived from species living normally in the sea outside. The number of lagoon species is small, and they are all marked by (1) thinness of shell; (2) diminutive size; and (3) when colored at all, by brilliancy of color, as compared with their nearest relatives in the adjacent sea. Among others enumerated by Dall which are common to the sea and the lagoons, are the following which occur only in and are characteristic of the latter: *Cyrena colorata* Prime, *Venus (Anomalocardia) leplalea* Dall, *Tornatina parviplica* Dall, *Cerithium (Pyrazus) 7-striatum* var *degeneratum* Dall, *Cerithium tenue* Pfr.

A considerable list of land species is given, among them *Chondropoma watlingense* and *Cerion Agassizi* are new, the latter fossil. Dall calls attention to the fact that the name *Strophia* is preoccupied, and proposes to substitute *Cerion* Bolten, 1799, as Mörch had already done in 1850. He gives names to the subdivisions of the genus indicated by Maynard, as follows:

CERION *s. s.* Parietal lamina short, situated in the angle between pillar and body-whorl; short internal sets of laminae persistent; type, *uva*.

STROPHIOPS Dall. Parietal lamina penetrating body-whorl to $\frac{1}{2}$, $\frac{1}{2}$ or more its length, central, etc. Type *decumana* [not Fér.!=*regia* Bens.!=Ed.]

MAYNARDIA Dall. Like Strophops, but parietal tooth short; type *neglecta* Mayn.

DIACERION Dall. Parietal lamina double within, and penetrating one or two whorls; type *dalli* Mayn.

EOSTROPHIA Dall, 1890. No teeth or laminae. Type *E. anodonta* Dall, fossil in lower Miocene, Tampa Siliceous beds.

THE NAUTILUS.

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APRIL, 1895.

No. 12

MOLLUSK FAUNA OF PHILADELPHIA AND ENVIRONS.

BY MORRIS SCHICK.

In the Proceedings of the Academy of Natural Sciences of Philadelphia for 1861, page 306, Mr. W. M. Gabb has given a list of Philadelphia mollusks, enumerating 62 species, seven of which are, however, synonyms or doubtful inhabitants of this region. Having collected a number of species in this vicinity which are not on Gabb's list, the writer thought it well to make a new one, giving exact localities where the various species have been found during the last two or three years in the neighborhood of Philadelphia, and including not only those forms personally collected, but also the species and localities discovered by other local naturalists—Messrs. Walton, Vanatta, Stone, Pilsbry, McGinty, Johnson, Ford, Fox and Eisenhardt, all of whom have contributed materially to the list.

The importance of the Philadelphia fauna, as being the type locality of many of Thomas Say's species, will always render it of interest to those who study geographic variation; and moreover, an accurate local list is of value to conchologists in the future, in determining the ever fluctuating geographic limits of species and varieties. While many of the special localities herein recorded will be destroyed by the growth of the city, others situated in Fairmount Park, especially along the Wissahickon, will doubtless perpetuate within the city limits most of the species indefinitely; and the aquatic forms will survive at least as long as the Schuylkill furnishes the water supply of the city.

The west bank of the Schuylkill above Girard Avenue was a very good collecting ground, where one could find in good numbers *Polygyra hirsuta*, *P. thyroides*, *P. tridentata justidens*, *Pyramidula alternata*, *Gastrodonta ligera*, *G. suppressa*, *G. nitida*, *Vitræa arborea*, and *Selenites concava*. with a few others not so common; but this place has been destroyed this year by the laying out of a drive. On the land shells of the park, see Ford, *Conchologists' Exchange*, II, p. 7.

In his list Mr. Gabb refers to *Helix labyrinthica* as common near Germantown; I have been able to find but three specimens of this species, after a dilligent search of three seasons. He also mentions *H. hirsuta* as one of our commonest species, but this is now also uncommon; while others are becoming rare, there are some species now quite common that are not mentioned in Mr. Gabb's list, such as *Limax maximus*, *Pyramidula striatella*, *Vallonia costata*, *Pupa contracta*, *Succinea obliqua*, *Sphærium striatinum*, *S. transversum*, etc. *Helix egena* Say, a depressed form of *Conulus fulvus*, was described from ten miles above Philadelphia; and *C. chersina=fulvus* is reported in Gabb's list as found near Germantown by Tryon. It has not occurred to recent collectors.

Helix appressa, admitted by Gabb, on the evidence of one specimen found on E. K. Tryon's estate near Germantown, was evidently a lost cabinet specimen. *Annicola lustrica* Say of Gabb's list is the half grown *Pomatiopsis lapidaria*. "*Margaritana rugosa* Say," is an evident pen error for *M. marginata* Say, which Gabb omits. *Unio fisherianus* reported from the Schuylkill above Girard Avenue bridge, one specimen, may have been an incorrect identification.

TESTACELLIDÆ.

[*Testacella maugei* Fér. Green house on School Lane. Germantown.]

SELENITIDÆ.

Selenites concava Say. Both banks of Schuylkill at Falls, and below; everywhere rare.

LIMACIDÆ.

[*Limax maximus* L. West Philadelphia and Darby, plentiful in cellars and green houses (Pilsbry); Wissahickon, uncommon; Laurel Hill Cemetery, common; Germantown (Vanatta)].

NOTE.—Introduced species are enclosed in brackets. The authority cited for each special locality refers to that immediately preceding only, but many of the places have been visited by several collectors.

[*Limax agrestis* Müll. Abundant in and around the city, and varying much in coloration.]

Limax campestris Binn. Common in most suitable localities around the city.

ZONITIDÆ.

Gastrodonta suppressa Say. Belmont glen, common (H. E. Eisenhardt); Tulpohocken Valley, Germantown, uncommon; Perkiomen; Glenside (Johnson); Fisher's Station, Germantown (Stone).

"I found a few specimens of this shell on the farm of my friend Mr. Reuben Haines at Germantown." (Say.)

Gastrodonta ligera Say. Wissahickon, common; also near Strawberry Mansion and West Falls of Schuylkill.

Gastrodonta ligera Stonei Pils. Westville, N. J., common; Hollyoak, Delaware (Stone, TYPE locality).

Gastrodonta (Zonitoides) nitida Müll. Wissahickon; West Park; and Westville, N. J., common. In Nov., 1893, they were found near Strawberry Mansion, East Park, congregated in immense numbers under logs (Vanatta).

Gastrodonta (Pseudohyalina) minuscula Binn. Wissahickon, rare; West Falls of Schuylkill (Vanatta); Westville, N. J. (Fox).

[*Vitreæ (Polita) cellaria* Müll. Wissahickon, uncommon; Conshohocken (R. Walton); found also in cellars of dwellings.] This is the *Helix glaphyra* Say, described in Nicholson's Encyl., Amer. Ed., 1818. "Taken by Mr. G. Ord in his garden in Philadelphia." (Say.)

Vitræa arborea Say. Same locality as *G. nitida*; Fisher's Station, Germantown, common (Stone); Westville, N. J. (Fox).

Vitræa indentata Say. Wissahickon, uncommon; Westville, N. J., common; Fisher's Station, Germantown (Stone).

Vitræa radiatula Alder (*viridula* Mke.; *electrina* Gld.). Lansdowne Valley, a few specimens; Wissahickon, rare; near Falls of Schuylkill (E. G. Vanatta); Westville, N. J. (Fox).

ENDODONTIDÆ.

Punctum pygmaeum minutissimum Lea. Gloucester Co., N. J. (Wm. J. Fox, NAUTILUS, IV, 113).

Pyramidula alternata Say. Wissahickon and Germantown, common; near Falls of Schuylkill (Vanatta); West Park (Ford); Perkiomen (Johnson); a pallid, spotless variety is found along the Wissahickon.

Pyramidula striatella Anth. West Park, common; Wissahickon, common; Westville, N. J., one specimen; near Strawberry Mansion, where, in Nov., 1893, they were found congregated in immense numbers (Vanatta).

Pyramidula (Helicodiscus) lineata Say. Lansdowne Valley, uncommon; Wissahickon, a few specimens; near Strawberry Mansion (E. G. Vanatta); Germantown (R. Walton; Stone); near 58th St. Station, P. W. & B. R. R. (Pilsbry); "Found by Robert E. Griffith, near Philadelphia." (Say.); Westville, N. J. (Fox).

HELICIDÆ.

Polygyra (Triodopsis) thyroides Say. West Park, common; Wissahickon, common; Westville, N. J., common; Monument Cemetery (E. G. Vanatta); Fisher's Station, Germantown, and Fern Rock (Stone).

Polygyra (Triodopsis) albolabris Say. Wissahickon; Laurel Hill Cemetery; Perkiomen (Johnson); Fern Rock, rare (Stone); Westville, N. J. (Fox).

Polygyra (Triodopsis) tridentata Say. Wissahickon, moderately common.

Polygyra (Triodopsis) tridentata juxtidentis Pils. West Park, and Laurel Hill Cemetery, common.

Polygyra (Triodopsis) fallax Say [*H. introferens* Bld.]. Flat Rock Dam, rare (R. Walton); Monument Cemetery, rare (E. G. Vanatta); Atco, N. J. (Fox); "Presented to the Academy by Messrs. Hyde and Mason who found it in the vicinity of Philadelphia where it is not uncommon." (Say.)

Polygyra (Stenotrema) hirsuta Say. West Park, uncommon; near Strawberry Mansion (E. G. Vanatta); Perkiomen (Johnson). *Polygyra (Stenotrema) monodon* Rack. Strawberry Mansion (Ford); Perkiomen (C. W. Johnson).

Vallonia pulchella excentrica Sterki. Ruins near School Lane, common; Falls of Schuylkill (E. G. Vanatta); Fisher's Station, Germantown, common (Stone).

Vallonia costata Müll. East bank of Schuylkill, at Flat Rock Dam, very common; Falls of Schuylkill (E. G. Vanatta).

PUPIDÆ.

Pupa armifera Say. Ruins near School Lane, common; Falls of Schuylkill (E. G. Vanatta).

Pupa contracta Say. Ruins near School Lane, common; east bank of Schuylkill, at Flat Rock Dam, uncommon; near Falls of Schuylkill (E. G. Vanatta); Fisher's Station, Germantown, common (Stone); Westville, N. J. (Fox).

Pupa pentodon Say. Near 58th St. Station, P. W. & B. R. R. (Pilsbry); Falls of Schuylkill (E. G. Vanatta).

Pupa corticaria Say. On walnut trees, School Lane, Germantown, rare.

Pupa fallax Say. Tulpohocken Valley, Germantown (John Ford).

Vertigo ovata Say. Tulpohocken Valley, Germantown (John Ford); "Numerous specimens were discovered by Mr. Wm. Hyde, in the vicinity of this city." (Say.)

Strobilops labyrinthica Say. Tulpohocken Valley, Germantown, rare.

ACHATINIDÆ.

Ferussacia lubrica Müll. (*subcylindrica* Auct., not Linné). Ruins near School Lane, common; Falls of Schuylkill (Vanatta).

[*Opeas octona* Linné. Introduced in green houses; Horticultural Hall (Robt. Walton)].

SUCCINEIDÆ.

Succinea avara Say. Conshohocken, common (R. Walton); Westville, N. J., one specimen; Tabor (Stone).

Succinea ovalis Gould. Wissahickon, uncommon; Westville, common; near Strawberry Mansion (Vanatta).

Succinea obliqua Say. Wissahickon, very common; Westville, N. J., common. Typical locality.

PHILOMYCIDÆ.

Philomycus carolinensis Bosc. Wissahickon, common; West Park, uncommon; South of Darby; Glenolden, Delaware Co. (Vanatta); Fisher's Station, Germantown (Stone).

AURICULIDÆ.

Carychium exile H. C. Lea. Wissahickon, rare (type locality).

Carychium exiguum Say. Wissahickon; Westville, N. J. (Fox).

LIMNÆIDÆ.

Limnæa catascopium Say. Delaware and Schuylkill Rivers, and Canal at Manayunk, common.

Limnæa columella Say. Ruins near School Lane, common; lakes near Memorial Hall, common; Perkiomen Creek (Johnson);

Tabor (Stone); Ponds along the Darby Creek Branch of the Reading R. R.

Limnæa humilis Say. Common in most localities.

Limnæa desidiosa Say. Schuylkill River, common.

Planorbis bicarinatus Say. Delaware and Schuylkill Rivers; Canal at Manayunk, common.

Planorbis trivolvis Say. Same localities as *P. bicarinatus*.

Planorbis deflectus Say. Canal at Manayunk, moderately common; Kaighn's Point, N. J., two specimens.

Planorbis exacutus Say. Ditch, South Broad Street, uncommon.

Planorbis dilatatus Gld. Near School Lane, rare; Ponds, South Broad Street; Fisher's Station, Germantown (Stone).

Planorbis parvus Say. Ditch at Kaighn's Point, N. J., common; near Strawberry Mansion (Vanatta); Fisher's Station, Germantown (Stone); Westville, N. J. (Fox).

Segmentina armigera Say. Westville, N. J., common; ditch at Kaighn's Point, N. J., common; ponds at Point Breeze (H. A. Pilsbry).

ANCYLIDÆ.

Ancylus rivularis Say. Rancocas Creek, N. J., and Schuylkill R., near Columbia Avenue Bridge (E. G. Vanatta); Perkiomen Creek (Johnson); Westville, N. J. (Fox).

PHYSIDÆ.

Physa heterostropha Say. This is the most abundant species, being found in almost all streams, ditches and ponds of this vicinity.

Physa heterostropha ancillaria Say. Delaware and Schuylkill Rivers. The specimens found show all the stages between *heterostropha* and *ancillaria*; Westville, N. J. (Fox).

Aplexa hypnorum L. Glen Riddle, Del. Co.; ditch at Kaighn's Point, N. J., uncommon. This is probably the extreme southern limit of this species.

VALVATIDÆ.

Valvata tricarinata Say. Schuylkill River, uncommon; canal at Manayunk, common. (Typical locality.)

Valvata bicarinata Lea. Same locality as the preceding; Westville, N. J. (Fox).

AMNICOLIDÆ.

Amnicola limosa Say. Canal at Manayunk, common; Westville, N. J.; Delaware River, below Gloucester. Typical locality.

Amnicola limosa porata Say. Canal at Manayunk, uncommon; lakes near Memorial Hall, Fairmount Park, common; Perkiomen Creek (Johnson).

Amnicola granum Say. Ditch at Kaighn's Point, N. J., rare; Corinthian Basin (John Ford).

*Gillia*¹ *atilis* Lea. Common in Delaware and Schuylkill Rivers; also canal at Manayunk; Westville, N. J.

Pomatiopsis lapidaria Say. Delaware River near Westville, N. J., common; near Strawberry Mansion (Vanatta).

VIVIPARIDÆ.

Lioplax subcarinata Say. Schuylkill River and Canal at Manayunk, common; Delaware River, very abundant.

Campeloma decisum Say. Schuylkill River, and Canal at Manayunk, common; Delaware River, uncommon; Ponds near Point Breeze (Pilsbry).

PLEUROCIDÆ.

Goniobasis virginica Gmel. Common in Delaware and Schuylkill Rivers; fine specimens at the mouth of Wissahickon Creek. Like many Goniobases, this species is dimorphic, the form with raised spirals (*multilineata* Say), occurring with the smooth specimens.

CYRENIDÆ.

Sphærium striatinum Lam. Delaware and Schuylkill Rivers; canal at Manayunk, common.

Sphærium sulcatum Lam. Cobb's Creek (John Ford).

Sphærium fabale Prime. Canal at Manayunk, uncommon.

Sphærium partumeium Say. Greenwich Point, S. Philadelphia (McGinty).

Sphærium transversum Say. Mouth of Wissahickon Creek; Dam in Tulphocken Valley, Germantown, abundant; stream flowing from Lily pond near Memorial Hall (Vanatta); Westville, N. J. (Fox).

Pisidium virginicum Gmel. Delaware River; canal at Manayunk, uncommon; Rancocas Creek, N. J. (Vanatta).

Pisidium abditum Hald. Rock Run, uncommon; ditch at Kaighn's Point, N. J.; stream flowing from Lily pond near Memorial Hall (V.).

¹*Gillia* in Mollusca has several months priority over the same name in Pisces.

Pisidium variabile Pme. Ditch at Kaighn's Point.

Pisidium compressum Pme. Canal at Manayunk.

UNIONIDÆ.

Unio complanatus Solander. Delaware and Schuylkill Rivers, very common; canal at Manayunk, very fine specimens; Muckinipallus Creek, Glenolden, Delaware Co. (Vanatta); Corinthian Reservoir (Ford).

Unio nasutus Say. Delaware and Schuylkill Rivers, common. Typical locality.

Unio radiatus Lam. Canal at Manayunk, abundant; Delaware River, not common.

Unio heterodon Lea, Canal at Manayunk, uncommon; canal in 27th Ward (John Ford); Neshaminy Creek (C. W. Johnson).

Unio ochraceus Say. Delaware River, common. (Type locality).

Unio cariosus Say. Delaware River, rare. (Type locality.)

Margaritana undulata Lea. Raccoon Creek, N. J.; Canal at Manayunk; Muckinipallus Creek, Glenolden, Delaware Co. (Vanatta); Neshaminy Creek (Johnson); "Delaware and Schuylkill Rivers" (Say).

Margaritana marginata Say. Tohickon Creek, Bucks Co.; Neshaminy Creek (C. W. Johnson); Muckinipallus Creek, Glenolden, Delaware Co. (Vanatta).

Anodonta fluviatilis Lea. Delaware and Schuylkill Rivers; canal, Manayunk, moderately common; Muckinipallus Creek, Glenolden, Delaware Co. (Vanatta); Wister's Dam, Germantown (Stone); Lily Pond near Memorial Hall (V.).

Anodonta fluviatilis Tryoni Lea. Typical localities, Schuylkill River above Phila., and Delaware River at League Island; Westville, N. J. (Fox).

Anodonta undulata Say. Canal, 27th Ward (J. Ford).

NOTE ON THE SPECIES OF VERONICELLA FOUND IN CENTRAL AMERICA.

BY T. D. A. COCKERELL, N. M. AGR. EXP. STA.

It must be confessed that our knowledge of the Central American forms of *Veronicella* is singularly inadequate, and the purpose of this note is mainly to draw attention to the matter, in the hope that those who have the opportunity will add to our information.

It may be as well to say at once, that for satisfactory work in this genus it is desirable to have at least a dozen mature examples of each species. Working with few examples, there is danger of taking varietal characters for specific ones, if the species is little known. Once the true specific characters have been ascertained from a good series, any single example, if mature, can be determined; but it is quite otherwise when the form is new, or belongs to a species which has been described from only one or two examples.

From necessity, species in this genus have, in the past, usually been described from one or two specimens. The descriptions, if prepared with reasonable care, even without anatomical details, will, I believe, be easily recognizable hereafter. But at present we do not know, in very many cases, *which* of the characters mentioned in the descriptions are really specific, and consequently whether the assumed species are valid.

I do not wish to suggest that species of *Veronicella* ought not to be described without numerous examples. If naturalists were to wait in every case until the material was as abundant as they could desire, our knowledge of tropical species of many groups would hardly advance at all. When a student introduces a presumed new species of *Veronicella*, having carefully ascertained that it *differs* from all previously described forms, and in his description sets forth that difference, he undoubtedly does good service. We are not to be prevented from interesting ourselves in the forms of *Veronicella* because we do not always know whether we are dealing with species, races, or varieties. But we *should like* to know the real status of each form, and must consequently urge those who have the chance to collect material to do their best to obtain sufficient.

The first Central American *Veronicella* to be named was *V. olivacea* Stearns, 1871. It was found in Nicaragua and has been supposed to inhabit California also. Although it is practically certain that it is not a native of California, it has been described in works on North American mollusca on the supposition that it belonged to that fauna. I have seen a specimen from Nicaragua, and have given a few descriptive notes in *Ann. Mag. Nat. Hist.*, Nov., 1890, p. 389. Mr. W. G. Binney has published a figure of this same specimen.

The next species was made known in the year following, 1872. This was *V. moreleti* Crosse and Fischer, from Mexico; fulvous with two blackish bands, whereas *olivacea* has no dark bands.

In 1873 a second Mexican species was announced, *V. mexicana* Pfeffer, in Strebel's work on the fauna of Mexico, p. 130. It was 47 mm. long, red-brown to grey-brown and black-brown.

For many years no more additions were made; until in 1885 (or Jan. 1886?) Dr. Semper's elaborate work on the genus appeared. In this, on p. 293, we find *V. mexicanus* n. sp., from Mexico; but the author having discovered, too late to change the text, that there was already a species of that name, takes the opportunity of writing *V. strebelii* instead on the explanation to the plate. This *mexicanus* = *strebelii* is 51 mm. long, $15\frac{1}{2}$ broad, with the female orifice $1\frac{1}{2}$ mm. from sole and almost exactly equidistant from each end. On p. 316 of the same work, Semper describes a true *mexicanus* Pfeff., which he had from Strebel. It was found in Vera Cruz, and was whitish-flesh, only 20 mm. long, with the ♀ orifice a little hind of the middle. If this specimen was really of the same species as originally described in 1873, it must have been somewhat immature.

In the same work of Semper, p. 295, appears a Chilian species, *V. decipiens* Semper. This is supposed to be also a native of Mexico, but I think the latter habitat must be accepted with some reservation; unless perchance, it has reached there accidentally through human agency. It is dark yellowish-brown, with the mantle black-spotted, 42 mm. long, $16\frac{1}{2}$ broad, ♀ orifice 1 mm. from sole, and somewhat *anterior to the middle*. This *V. decipiens* is very much like the Chilian *V. adspersa* Heynemann; so much so that one strongly suspects that they are forms of one species. They were published nearly at the same time, but I think *adspersa* has priority. Since Semper's work no further additions have been made.

In the British Museum are two other forms, which are the more interesting in that they represent new localities. They do not seem to be precisely identical with any of the described species, but all things considered, it seems preferable to leave them unnamed for the present. Descriptive notes are appended:

(1.) *Veronicella* sp. nov., vel *mexicana* var.

Long. (in alch.) $42\frac{1}{2}$, lat. $20\frac{1}{2}$, sole lat. 10 mm. ♀ orifice from head 22 (almost median), from sole 2 mm. Sole rather rounded posteriorly, not projecting beyond mantle, finely and closely transversely striate. Mantle above rugose-granulose, not at all papillate; color pale grayish-ochreous, above obscurely gray mottled, with the slightest indication of a dorsal and lateral dark band, only noticeable when looked for. Back arched, rounded. Upper tentacles grayish, lower pale ochery.

Honduras. Collector unknown. Heynemann had seen it when he visited the museum, and had written "nov. sp.?"

(2.) *Veronicella* sp. nov., vel *punctatissima* subsp.

Long. (in alch.) $41\frac{1}{2}$, lat. 12, sole lat. 4 mm. ♀ orifice from head 21 (almost median), from sole $2\frac{1}{2}$ mm. Sole very narrow, rounded behind, not projecting posteriorly, regularly and strongly transversely striate its edge longitudinally grooved. Mantle above thickly but rather irregularly impressed punctate, not papillate. Superior tentacles gray, lower pale ochrey.

Jaw brown, not very dark, with 36 very strong ribs. Penis tapering. Color variable, as follows:

- (a) Pale ochreous, above brown from thick brown mottling, with a slightly indicated but quite observable pale dorsal line. *Below with sparse black mottling.* Six examples.
- (b) Similar, but with more or less black spotting also above, though sparse. Four examples.
- (c) Similar, but dark brown above, no pale dorsal line.

Panama, Volcan de Chiriqui. Collector unknown.

The interesting point may here be noted, that whereas the Nicaraguan *olivacea* and the Honduras species are typically Central American forms, and show a good deal of resemblance to the species of the greater Antilles, the Panama species is quite different, and belongs with the series of the lesser Antilles, Trinidad, etc.

NOTES AND NEWS.

UNIO CARIOSUS and OCHRACEUS.—By an unfortunate oversight, the wood-cuts of these two species in the March number were transposed. The figure on page 121 is *U. cariosus*; that on page 122 is *U. ochraceus*.

BYTHINIA TENTACULATA.—A new locality for this species is Black Lake, Holland, Michigan, Mr. L. H. Streng having collected adult and young in all stages of growth there.

MR. H. E. SARGENT, having spent some weeks in New England, has returned to his home at Woodville, Ala.

MR. JAMES M. DE LANEY has removed from Rochester to South Livonia, Livingston Co., N. Y.

NEW PUBLICATIONS.

DISTRIBUTION OF THE LAND AND FRESH-WATER MOLLUSKS OF THE WEST INDIAN REGION, and their Evidence with Regard to Past Changes of Land and Sea. By Charles Torrey Simpson (Proc. U. S. Nat. Mus., XVII, 1894).—After a statement of the geographic facts in regard to the region, and the depths of sea between and around the main islands, Mr. Simpson considers the means of distribution of the land and fresh-water mollusks from island to island, concluding that while some forms have been transported by drifting trees, etc., the main means of transport has been by means of former direct land connection of islands now separated. "There appears to be good evidence of a general elevation of the Greater Antillean region, probably some time during the Eocene, after most of the important groups of snails had come into existence, at which times the larger islands were united, and there was land connection with Central America by way of Jamaica. * * * At some time during this elevation, there was probably a landway from Cuba across the Bahama plateau to Florida, over which certain groups of Antillean land mollusks crossed. * * * There followed a period of general subsidence. During this the island of * * Jamaica was first isolated, then Cuba, and afterwards Haiti and Puerto Rico were separated. The subsidence continuing until only the summits of the mountains of the four Greater Antilles remained above water; then followed another period of elevation which has lasted until the present time. * * The Bahamas have appeared above the surface of the sea, either by elevation or growth, and have been peopled by forms drifted from Cuba and Haiti. The lesser Antilles have been peopled, for the most part, from S. America." These conclusions are based upon tables showing the distribution of species and genera on the various islands, and the later movements are supported by well-known geological facts. The evidence for the earlier elevation should be compared with Spencer's "Reconstruction of the Antillean Continent" (Bull. Geol. Soc. Amer., VI, Jan., 1895), founded upon a study of the supposed sunken river-valleys, and altogether supporting Mr. Simpson's conclusions. That the West Indian region actually stood *two miles* above its present level, as claimed by Spencer, is a proposition requiring much more proof than has been offered, to bring it out of the realm of mere suggestion or hypothesis; and we are certainly not prepared to endorse it; but the orogenic movements required to fulfill the conditions asked by Mr. Simpson are far more moderate, and, it seems to us, by all odds the most reasonable explanation of the facts of distribution. Mr. Simpson's paper concludes with the descriptions of *Sagda maxima*, *Neocyclotus bakeri*, *Lucidella costata* and *Pleurodonte bowdeniana* n. spp., from Jamaica, the latter three from the Miocene beds at Bowden.

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DEVOTED TO THE INTERESTS OF
CONCINOLOGISTS.



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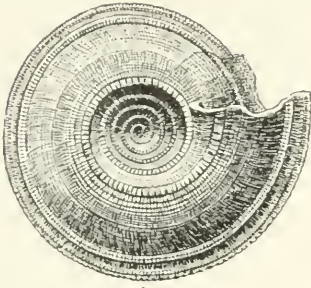
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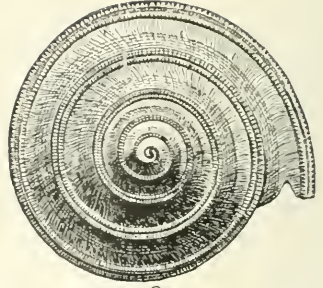
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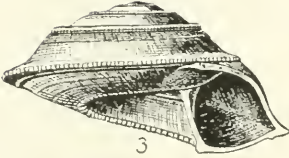
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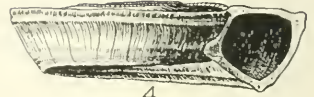
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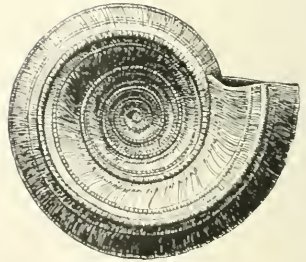
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ALDRICH—New Eocene Solaridiæ.

THE NAUTILUS.

VOL. IX.

MAY, 1895.

No. 1

DESCRIPTIONS OF TWO NEW EOCENE SOLARIIDÆ FROM ALABAMA.

BY T. H. ALDRICH.

Solarium elaboratum Conrad vir bimixta. Plate I, figs. 1, 2, 3.

Shell elevated, peripheral margins minutely beaded, flattened, acute; umbilical rib very small and placed close to suture, umbilical carina prominent and beaded. Base very finely striated with a strong beaded rib close to the periphery. Spiral ornamentation approaching *Solarium cupola* Heilpr. Max. diam. 15 mm., alt. 7 mm.

Locality: Matthews' Landing beds near Rosebud, Wilcox Co., Ala.

This variety, while belonging to the acutum-elaboratum section, has a combination of characters approaching other sections. The drawings executed by Dr. McConnell, of Washington, show this form so beautifully it is scarcely necessary to describe it.

Prof. W. H. Dall, in Trans. Wagner Free Inst. Science, Vol. 3, part 2, p. 323, Dec. 1892, has divided the Eocene *Solariums* into four sections, and, by letter to me, has lately added a fifth, viz.: Section DINAXIS Dall. "Spire flattened, with the circumference of shell forming the periphery; the umbilicus wide, nearly funicular, with thread-like spiral ribbing or none, the umbilical carina simple or finely granular, forming the base of the shell." This new section includes *S. alabamense* Dall, and the following new species.

Solarium planiforme n. sp. pl. I, figs. 4, 5, 6.

Shell flat, whorls six, apical one smooth, the balance with a beaded spiral boundary followed closely by a smaller spiral likewise beaded, two faint spirals near suture; lines of growth fine, coarser nearer aperture, the side of the body-whorl forming an acute angle with the top and nearly a right angle with the base; the side is slightly convex, with a granular raised line immediately below the periphery and two fainter ones near the base; the basal keel beaded; umbilicus wide, marked with two or three beaded lines. Aperture wedge-shaped, narrower at junction with body-whorl. Max. diameter 19 mm., elevation 6 mm.

Locality: near Rosebud P. O., Wilcox Co., Ala., in Matthews' Landing beds.

A MONTH WITH THE MICHIGAN FISH COMMISSION.

BY BRYANT WALKER, DETROIT, MICH.

In 1893, the Michigan Fish Commission, in co-operation with the University of Michigan, inaugurated a systematic biological examination of the Great Lakes, with special reference to the work of the Commission in replenishing the rapidly decreasing fisheries of the State. The headquarters of the field-party for 1894 was established at Charlevoix, the well-known summer resort, on the east coast of Lake Michigan, and formerly a fishing station of considerable magnitude. Through the kindness of Prof. Henry B. Ward, the Director-in-charge, the writer was invited to spend his vacation with the party as conchologist. In addition to the usual methods of collecting along the shore and from small boats, considerable dredging was done in the deeper waters of both Lake Michigan and Pine Lake. A three days' trip to the Beaver Islands at the northern end of Lake Michigan, was one of the most interesting episodes of the summer, and one most fruitful in its results, as it was, undoubtedly, the first time the islands had been visited for scientific purposes. The unusual facilities enjoyed by the expedition in the line of deep water dredging, have afforded many noteworthy additions to the fauna of the State in all classes of the invertebrata and especially in the mollusca; and, at the suggestion of the editors of THE NAUTILUS, the following summary of the results obtained has

been prepared in advance of the formal report of the summer's work.

Owing to the sandy nature of the soil, so characteristic of that portion of the State, and the long-continued drought which prevailed during last summer, terrestrial mollusks were not so numerous, either in species or individuals, as might naturally have been expected. The characteristic feature was the occurrence of many species, especially of the *Zonitidae*, peculiar to the northern region. Thus *Zonites ferreus* Mse., *binneyanus* Mse., and *exiguus* Stimp., *Vitrina limpida* Ged., and *Helix harpa* Say, are not found in the southern part of the State. *Patula asteriscus* Mse. and *Strobilops virgo* Pils., also northern forms, were interesting additions to our fauna. The local and rare (in this State) *Helix sayii* Binn., an essentially northern form, also occurred, indicating its probable range across the northern part of the State, as all the examples heretofore known to the writer have been from the counties bordering on Lake Huron. A few specimens of the albino variety of *Patula alternata* Say, were found associating with the typical form. Two forms of *Helix albolabris* Say were noted, occurring side by side, the one quite typical in shape and color, but rather below the average size and with a very thick and broadly-reflected lip; the other larger and much inflated, with a thin, dark purplish brown shell, having the narrowly reflected lip more or less deeply tinged with purple; a very beautiful form, not seen elsewhere. The only Pupa found was *P. contracta* Say, while *Vertigo* was represented by four forms, *V. ovata* Say, *bollesiana* Mse., *ventricosa elatior* Sterki, and *pentodon* Say. In addition to the universally-distributed *Succinea obliqua* Say and, *avava* Say, was found the elongated form of *S. ovalis* Gld., common in the northern part of the State, which has been doubtfully referred to the *S. higginsi* Bld. (see NAUTILUS, VII, p. 127). In all, thirty-one species of land-snails were found, of which two were new to the fauna of the State.

Among the fresh-water pulmonates, many interested forms occurred. The most noteworthy of them was a single example of a deep water form of *Limnæa stagnalis* L., dredged from ten metres depth in Lake Michigan, at High Island Harbor in the Beaver Islands. It is about 23 mm. in length, exceedingly fragile, of a pure translucent white, and, though somewhat larger and differently proportioned, appears to be analogous to the var. *Bottnica* of Clessin from Sweden. At the same locality occurred a small globose form

of the same genus which may be new. Also a small white *Physa* which is provisionally referred to *P. gyrina* Say. A small elongated *Limnæa* of the *reflexa* group from the same locality, seems to be the *L. lanceata* Gld. No less than seven different species of *Limnæidae*, six of operculates, and many *Pisidia* were brought up by one haul of the trawl from this prolific locality. In a small lake near the south end of Beaver Island, which was simply swarming with animal life, were found the finest specimens of *Limnæa ampla* Migh. yet seen from Michigan. The largest example collected measured $28\frac{1}{2}$ mm. in length and 19 mm. in breadth, the aperture being $19\frac{3}{4}$ mm. long and 13 mm. broad.

The *Limnæidae* of Pine Lake, which empties into Lake Michigan at Charlevoix, were also extremely interesting. The bottom of the lake is composed almost wholly of marl, except where it has been covered by a thin coating of sand washed in from the shores, and, as a consequence, both plant and animal life exist under very unfavorable circumstances. The level of the lake seems to have been lowered by the canal made by the U. S. Government to connect it with Lake Michigan, and the former lake terrace is now largely exposed, and, in many places, quite dry. In the numerous pools, however, which are left along the shore, the *Limnæa catascopium* Say is found in great abundance and almost infinite variety. It varies in shape from the comparatively slender form usually found in the Great Lakes to the globose form described as *L. pinguis* by Say, and seems, in many cases, to run very close to that of *L. ample* Migh. The Pine Lake examples have usually a very thick, solid opaque shell, and a large proportion are more or less distorted, the most common effect of their unfavorable environment being apparently to induce a very abrupt and rapid expansion of the outer lip, which, in most cases, is accompanied by a heavy callous deposit all round the aperture. The dredge also brought up from the marl of the bottom some other curiously distorted forms of *Limnæa*, whose specific position has not yet been satisfactorily determined. The curious *Planorbis multivolvis* Case also occurred here, rarely alive, but in great abundance among the dead shells along the shore. There is reason to suppose that these shells came largely from the marl deposits under the lake. It also seems probable that this species will prove to be only a form of *P. campanulatus* Say, peculiar to localities where the marl is found. At any rate, all the localities in this State, from which it is now known, are alike in this

respect, and specimens were found in places where the marl was less abundant, which seem to connect the two forms.

Along the Lake Michigan shore, among the stones, *Physa ancillaria* Say occurred, exhibiting a very heavy, solid, opaque shell. The same form is found plentifully at Mackinac Island, and seems to be one of the most characteristic forms of the region. A heavy malleated form of *Limnæa emarginata* Say is associated with it in both localities. *Limnæa desidiosa* Say and *Physa integra* Hald. were found plentifully in similar localities.

In one of the smaller inland lakes near Charlevoix, the dark red form of *Planorbis exacutus* Say, recently distinguished as var. *rubellus* by Sterki, was found. The typical form of the same species, as well as *P. bicarinatus* Say and *parvus* Say, occurred abundantly in the deep-water dredging at High Island. The great similarity of the Linnæid fauna of northern Michigan to that of Maine was again manifested in the discovery, in a small mill-pond near Charlevoix, of the ecarinate form of *P. bicarinatus* recently distinguished by Mr. Pilsbry as var. *arostookensis*. The only species of *Ancylus* met with was the *A. parallelus* Hald., which was common among the lily-pads in all the smaller lakes. Among the operculates there was little of special interest. *Goniobasis livescens* Mke., as usual in the lake region, was abundant everywhere, and in Lake Michigan was found in thirty feet of water. *Valvata tricarinata* Say and *sincera* Say were also abundant in deep water, and the latter species from High Island was unusually large and fine, and might be referred to the form described as *V. striata* by Lewis. The *Campolomæ* were also abundant. The slender northern form described by Lea as *C. milesii*, however, was found only in one lake on Beaver Island. The Lake Michigan form was *C. decisa* Say. The Amnicolæ were exceedingly abundant, the two larger forms *A. limosa* Say and *lustrica* Pils. occurring everywhere. *A. grana* Say was found at High Island only, as was also a single specimen of *Bythinella obtusa* Lea. One of the few disappointments met with was the failure to find the deep water form, *A. sheldoni* Pils., originally found in the deep water of Lake Michigan, at Racine, Wis. The only novelty among the *Unionidae* was the occurrence of *Unio borealis* Gray, in a small lake on Beaver Island. This is another addition to our fauna, and, I believe, the most western locality yet cited for the species, which, as Mr. C. T. Simpson, to whom I am indebted for the identification, suggests, is apparently only a form of *Unio luteolus* Lam. The

Anodonta occurred with their usual abundance and perplexing variety so characteristic of the inland lakes of Michigan. Possibly, owing to the unprotected character of the shore near Charlevoix, but few were found in Lake Michigan. *A. footiana* Lea, however, was found at Fisherman's Island near Charlevoix and also at St. James' Harbor, Beaver Island, where *A. subcylindracea* Lea and *ferussaciana* Lea also occurred. But it was among the *Corbiculidae* that the most interesting finds of the expedition were made. Both species and individuals were exceedingly abundant. Indeed, there can be no doubt that the smaller *Pisidia* form one of the most important portions of the food of the whitefish. The *Sphaeria* were most abundant in the inland waters where *S. simile* Say and *striatum* Lam. were found in profusion nearly everywhere. *S. rhomboideum* Say and the beautiful little *S. rosaceum* Pme. also occurred in one of the smaller lakes. A fine, new species, about the size of *S. occidentale* Pme. was dredged from 25 metres off Grand Traverse Bay. A larger form not yet satisfactorily determined was brought up from a lesser depth off the south end of Beaver Island. The *Pisidia* are now in the hands of Dr. V. Sterki, who has kindly consented to examine and determine them, so that the entire list cannot be yet given. But I am enabled to state that there are, at least, twelve species represented, of which seven are new to the State, including four species new to science. At High Island *Pisidia* were particularly abundant. A fine triangular form, as large as *P. virginicum* Bgt., proves to be the *P. idahoense* Roper. At the same place, Dr. Sterki's recently-described species, *P. punctatum*, also occurred. A most interesting find was that of a form which Dr. Sterki informs me cannot be distinguished from the *P. milium* Held., of Europe. This, I believe, is the first instance in which a species of this family has been proved to be an inhabitant of both continents. The other species found were *P. variabile* Pme., *abditum* Hald., *compressum* Pme., *rotundatum* Pme. and *ventricosum* Pme. In all, ninety-three species of mollusca were obtained, of which eleven species and three varieties were new to the fauna of the State, one species new to this country, and five species new to science.

ISAAC LEA DEPARTMENT.

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

The Isaac Lea Conchological Chapter of the Agassiz Association is

a corresponding chapter. It is composed of men and women interested in the study of shells. It also has a juvenile section composed of boys and girls. It is a working chapter, or society, as every member is expected to send an annual report of work done by him. These reports and such papers as the members may furnish are known as the transactions of the society. Each year the volume of transactions, in manuscript, is forwarded from one member to another until each member has read the book, but as some time must necessarily elapse before all the members of the chapter can receive it, the editor of THE NAUTILUS has kindly consented to allow space for extracts from the transactions in THE NAUTILUS each month. Each member in this way can have a copy of the annual reports to himself.

The Chapter is officered as follows:

President, Prof. Josiah Keep, Mills College, Cal.

General Secretary, Mrs. M. Burton, Williamson University, Los Angeles County, Cal.

SECRETARIES OF SECTIONS:

Section A.—Marine shells of the West Coast, Prof. Keep, Mills College, Cal.

Section B.—Marine shells of the East Coast, Mr. A. H. Gardner, Box 84, Fort Hamilton, N. Y.

Section C.—Land shells east of the Rocky Mountains (Sec. not yet chosen).

Section D.—Fresh water shells east of Rocky Mountains, Dr. W. S. Strode, Lewiston, Ill.

Section E.—Land and fresh water shells west of Rocky Mountains (Secretary not yet chosen).

Section F.—Fossil shells, Hon. Delos Arnold, Pasadena, Cal.

Section G.—Juvenile Section, Mrs. Mary P. Olney, Spokane, Wash.

Section H.—Microscopic shells (Secretary not yet chosen).

A STUDY OF FOSSIL SHELLS.

Report of Josiah Keep. From the Transactions of the Isaac Lea Conchological Chapter of the Agassiz Association for 1894.

Two years ago last summer, as I was returning to California from the Atlantic Coast, I had occasion to stop for a number of hours in the city of Cincinnati. By far the cheapest and most satisfactory

way to explore a city is to get on a street car and ride until you are told to get off, and then try another line in like manner.

Acting on this principle I hailed an electric car and was soon hurrying along the streets, up one hill and down another, and then over level stretches till I arrived at the "Burnett Woods" park. I did not need to be told to get off here, for the condition of things was evident, and this was, without doubt, the best place to spend the hot hours of mid-day. I was delighted with the place at once. What grand old trees were there, beeches and oaks and walnuts, majestic specimens with huge trunks and great spreading limbs.

Strolling across the little hills and valleys which make up the park, I came at last to a huge excavation where a new street was being cut out and an old one widened. A gang of prisoners, under the eye of armed guards, were working there in the hot sun. Some were shoveling away the loose soil, others were breaking up hard strata with their picks and bars, while still others were down to bed-rock, and were drilling holes for blasting.

The rock looked interesting, and I drew near to a cliff which had been partly carried away, and was delighted to find that the rock was full of fossils. In some places it was literally made up of shells and corals, and, so perfectly were they preserved, that you might trace every mark of sculpture on the shell, and observe its outline as perfectly as if it had just been brought up alive from the ocean.

Most of the shells were those of brachiopods, a class of mollusks that now exist but sparingly, though in ancient times they must have been as thick as the leaves of a forest.

How I longed for increased facilities for transportation on that July day. I wanted to take away at least a barrel of the fine specimens! They lay all around me, and it almost broke my heart to leave some fine pieces of stone studded over with those choice relics. But when I lifted one of those pieces and found that it weighed many pounds, I was reluctantly compelled to carefully put it down and content myself with a few fragments that were not too large for my coat pockets. One of these fragments is before me as I write.

What a story these old relics tell to one who is able to interpret their language. How many ages have passed away since each pair of these shells contained a living occupant, a creature without gills, indeed, but supplied with a pair of feathery arms which it stretched out and waved in the warm waters of the Silurian sea. When its little life was over, the shell sank down in the mud and was quickly filled and covered with the soft ooze.

All this took place when the ocean rolled over what is now the State of Ohio; before there was any coal, long before there were any Appalachian Mountains, and so long before the creation of Adam, that the time since the first man seems but a little while in comparison.

Century after century went slowly by, the land gradually rose, and the ocean slunk away.

Then came a time when uncouth monsters ranged over the soil; then a period of ice and desolation; then the age of man. But through all these uncounted millions of years, one little shell was quietly waiting—waiting a thousand thousand years, until the blast of the convict gang threw it up to the surface, and the sun shone down upon it, and a human being rejoiced to find it there. Could it speak, how it would inquire what had become of the ocean. Simple little shell, you have had a long sleep, but the world has been awake and astir all the time.

Perhaps this paper seems little like a conchological report, but, during the past year, most of my work with shells has been, not with modern species, but with fossils. I have been arranging a geological cabinet, and have been putting into their places molluscan species, from the little *Lingula cuneata* of the Lower Silurian rocks, down to those species which are now living along the coast.

How important it is for any one who desires to understand the noble science of geology, to first learn as much as possible of its handmaid, conchology. The shells of mollusks are the most enduring of fossils. They are the seals impressed upon the stony documents of the distant past, by which the scholar can tell you, often in a moment, the age in which those documents were written, and what of value you will be likely to find therein.

It may not be scientific, but I love to imagine that the mollusks which secreted these shells are alive once more. I question them concerning the past, concerning their contemporaries and their surroundings. I open the Devonian drawer of fossils and ask those revived mollusks to tell me concerning the "Age of Fishes." The little *Pupa vetusta* of the Carboniferous Age tells me a story of its life in the "dim watery woodlands" of the Coal Period.

Ammonite and Hippurite discourse concerning the "Age of Chalk;" the giant *Ostrea* details the quiet story of Tertiary times, and, finally, a little *Olivella*, such as now sports in the sands of the beach, tells me how it came to be buried in a little hill that has evidently been raised from the ocean in comparatively recent times.

And so the great story of life is narrated; a story so wonderful, so interesting, so full of suggestion of a great and wise Creator, that I take up the burden of life once more, encouraged, instructed, broadened, helped!

THE ANNUAL REPORTS PRESENT A VARIETY.—As the members of the Isaac Lea Chapter are found from Maine to San Diego, Cal., and while some live on the sea coast, others dwell near lakes and rivers, while others again reside far from any body of water, the annual report of work done by each member is varied. Some members have had years of experience, while others, perhaps, give us their first years' experience in collecting and studying molluscan forms of life; but each report is interesting, and, from month to month, we hope to give one or two reports of the members of our Chapter. This month our members will be interested in Professor Keep's paper on fossil shells. After reading it, our juvenile members will be glad to learn that Professor Agassiz, in his "Geological Sketches," tells about the Silurian fossils of Cincinnati, Ohio, and what he says about the fossil beds adds new interest to the report of our President.

University P. O., Los Angeles Co., Cal.

AN UNDESCRIBED MERETRIX FROM FLORIDA.

BY WM. H. DALL.

Meretrix simpsoni n. s.

Shell small, plump, concentrically grooved, but somewhat irregular in sculpture, smoother toward the beaks; varying in color externally from pure white to livid bluish overlaid with streaks or zig-zag brown lines, the interior from pure white to deep bluish purple; the most common color variety much resembles Sowerby's figure of *C. hebræa* Lam. (Thesaurus, pl. 134, figs. 143-4), but with the posterior end more rounded, the hinge teeth more compressed and smaller, and with a well-developed pallial sinus reaching to the vertical of the beaks; the lunule is smooth, long-ovate, marked off by an incised line, but not differentiated by color or otherwise from the adjacent parts of the shell; the escutcheon is obscure.

Alt. 15·0; lon. 18·0; long. of post-umbonal part 11·0; diam. 8·0 mm. Habitat from Curaçao and St. Thomas, West Indies, to Cedar Keys, Florida, from low water to 26 fathoms; Chas. T. Simpson and other collectors, in the U. S. Nat. Museum.

This is probably the species which has been identified by Antillean collectors with *Circe (Lioconcha) hebræa* (Lam.) Sowerby, but it is a smaller shell and a true *Meretrix*, represented by specimens from seven localities in the Museum collection and noted in Bull. 37, U. S. N. M., p. 56, No. 285 in 1889.

NOTES AND NEWS.

UNIO ELLIPSIS AND U. TENUISSIMUS.—I have never seen *Unio ellipsis* Lea and *tenuissimus* Lea noted from Grand Rapids, Mich. I wish to report the finding of 23 specimens of *ellipsis* and 24 of *tenuissimus* in Grand River, about two miles south of the city; they were taken by me last summer.—W. MILLER, Grand Rapids, Mich.

MR. WM. B. MARSHALL, formerly on the zoological staff of the N. Y. State Museum, at Albany, is now in Washington as an assistant in the Dept. of Mollusks.

DR. WM. H. DALL leaves Washington on the 16th of May to spend the summer in Alaska in field work.

MESSRS. USELMA C. SMITH AND ROBERTS LEBOUTILLIER, of Philadelphia, have returned from a naturalizing trip to Jamaica.

GONIOBASIS VIRGINICA Gmel. occurred in considerable numbers in the stomach of a specimen of the American Golden Eye (*Clauionetta clangula americana*) from a Philadelphia market, which I examined March 28.—H. W. FOWLER, Phila.

MR. EDW. W. ROPER, of Revere, Mass., has returned from Jamaica, where he has spent the winter. Good success in collecting shells and ferns is reported.

NEW PUBLICATIONS.

MISSION SCIENTIFIQUE AU MEXIQUE, etc., *Etudes sur les Mollusques Terrestres et Fluviatiles*, par MM. P. Fischer and H. Crosse (Vol. II, pt. 7). The present part contains the remainder of the *Unionidæ*

and the *Cyrenidæ* (*Corbiculidæ*). Like those which have preceded, the execution of the plates is superb, and the text is prepared with the attention to detail and accuracy characteristic of its authors. Many species of *Unionidæ* described by Morelet are herein for the first time illustrated, as well as those of Crosse and Fischer. This part completes the work, but one more will be issued containing additions to the fauna, being supplementary to the entire work.

IN the *Proc. Linn. Soc. N. S. Wales*, VIII, Mr. Charles Hedley describes a new species of *Cæcum* (*C. amputatum*) from Sydney Harbor, Australia, and gives an interesting paper on *Gundlachia*. The latter we will reprint in a future number.

LISTE SYNONYMIQUE ET BIBLIOGRAPHIQUE DES MOLLUSQUES *Terrestres et Fluviales de la Nouvelle-Zélande*. By Henry Suter, with preliminary note on the affinities of the New Zealand mollusk fauna by H. Crosse. The land mollusk fauna of New Zealand has received much careful study during the past few years, and this catalogue of 86 pages, embodying the results of the studies of HUTTON, SUTER, HEDLEY, PILSBRY and others, is a complete epitome of progress to this time. It is prefaced by a note from the experienced pen of CROSSE, contains copious references, and a plate illustrating some interesting forms. The work is well-done and of great utility.

MONOGRAPH OF THE GENUS *STROPHIA*, by C. J. Maynard (Contrib. to Science II, Nos. 3 and 4). Mr. Maynard prefaces his descriptions by some interesting observations, *inter alia*, that *Strophia* is found in the Bahamas only on islands and keys where palms grow, and does not occur on any that are not, or have not been inhabited by man. The descriptions of many new species follow. The careful and exact record of localities for each species and subspecies, is a most commendable feature of the work. There can be no doubt that the forms are in many instances extremely local in distribution, a fact which we owe to Maynard's researches. The localities given in former works on the genus are in a large number of cases wholly untrustworthy. Maynard proposes a new subgenus *Multostrophia*, type *S. eximea* n. sp., for shells with small *Maynardia*-like tooth and very fine striations. Among the figures we notice that that of *S. cinerea* (p. 119) has the axial lamella on the outer lip, doubtless an error of the engraver.

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No. 2

PLEURODONTE BAINBRIDGEI AND OTHER JAMAICA SHELLS.

BY EDWARD W. ROPER.

It was the writer's good fortune, during a recent trip to Jamaica, to stumble on the metropolis of the large and interesting land shell, *Pleurodonte bainbridgei* Pfr., at Mandeville. The locality, a heavily wooded hill near the hotel, had been neglected until many hills more remote were searched, without revealing more than an occasional dead shell. The numerous low piles of limestone fragments upon the summit were turned over with great success, the prizes including several white specimens. The common run included black with splendid purple lip, dark brown with purple or brown lip, and light brown with lip of the same color. The largest specimen was 56 and the smallest only 42 millimetres long. Only two or three specimens were over 50 millimetres long, and the lot averaged smaller than those in other collections examined by the writer. There was no variation in shape, all being low depressed conical, with finely granulated surface, and all were banded, even the white shells being encircled with a very fine semi-transparent line. This does not correspond with the typical white form, var. *pretiosa*, which is proportionately much more elevated. The Mandeville white shells differ only in color from their black and brown fellows. All variations of color are liable to be found under the same rock heap, so that environment is not responsible for the col-

oration. Indeed, it is uncertain which is the type color. The veteran Jamaica conchologist, Mr. Henry Vendryes, believes, with Bland and others, that *pretiosa* is the type and the dark shells varieties. The genuine *Bainbridgei* is said to have come from Demerara, but this question of disputed nomenclature the writer will not attempt to solve. Associated with *Pleurodonte bainbridgei* at Mandeville were other interesting shells, including *Pleurodonte peracutissima*, *P. anomala*, *Stoastoma pisum*, the giant of the genus and the little *Guppya epistyliulum*.

At Port Antonio, *Pleurodonte acuta*, in shape near the type, *acutissima* Lam., but very black even to the lip, was found associated with *P. valida*. A form almost equally black, but with light lip, was found at Manchioneal. These shells were strikingly different from the varieties of *P. acuta* found in other parts of the island.

Bulimus exilis, a very common West Indian shell, but not previously reported from Jamaica, was found abundantly at Castleton not far from the botanical gardens. It was probably imported on plants.

On the hills at Mandeville, a dagger-leaved plant, which retained a considerable quantity of rain water in the axils of its large leaves, was much frequented by *Thelidomus aspera*. The mollusk was often found with its body touching the water.

NEW FORMS OF AMERICAN ZONITIDÆ AND HELICIDÆ.

BY HENRY A. PILSBRY.

Omphalina Andrewsæ n. sp.

Shell allied to *O. inornata* Say in general characters and size. Rich chestnut colored above, opaque buff below; the surface brilliant, polished. Whorls $4\frac{1}{2}$, slightly convex, slowly widening, separated by moderately impressed, margined suture; spire small, very low-convex, its width less than half that of the shell; last whorl very wide, depressed, rounded at periphery, evenly flattened-convex beneath; convex around the deeply indented umbilical perforation. Aperture slightly oblique, elliptical-lunate; interior lined with a heavy white callus which thins out and disappears a few millimetres from the lip-edge; the latter thin, sharp; columellar margin concave, expanded in a minute triangle slightly impinging on umbilicus. Alt. 8, greater diameter 16, lesser 13.2 mm.; width of spire 7 mm.

Under plants on the summit of Thunderhead Mountain. (Mrs. Geo. Andrews, June, 1894.)

With the general aspect of *O. inornata*, this species is even more polished, with somewhat rounder aperture and notably narrower spire. This last difference is very perceptible on comparing the upper surfaces of the two species. *O. andrewsæ* is also in the Academy collection from Macon Co., Georgia, collector unknown. The name must not be confused with *Zonites andrewsi*, which is a species of *Gastrodonta*, a genus belonging to quite a different division of the *Zonitidæ*. *O. rugeli* is a more capacious shell with wider spire than *andrewsæ*.

O. Andrewsæ montivaga n. v.

Like the type in the shining surface, etc., but with five whorls, chestnut above, slightly paler and subtranslucent below; last whorl more widened toward the aperture, more sloping. Aperture quite oblique, wider and shorter than in *andrewsæ*, the upper and basal margins sub-parallel; *baso-columellar lip very gently curved*, not deeply rounded as in *andrewsæ*. Interior without white lining, having only a narrow white rib within the lip. Alt. 8.7; diam., greater, 17; lesser, 13.5 mm.; width of spire 8.5 mm.

Same locality and collector. The very much straighter basal lip and lack of white lining differentiate this from preceding species.

Gastrodonta (Pseudohyalina) patuloides n. sp.

Shell about the size and form of *Pyramidula striatella* Anth.; light green, hardly transparent; irregularly but closely rib-striate above, below and in the umbilicus, the first $1\frac{1}{2}$ whorls smooth. Whorls $4\frac{1}{2}$, slowly increasing, convex, with impressed sutures; last whorl rather tubular, rounded at periphery and below; aperture about the size of umbilicus, round-lunate, flattened above, lip simple, the *upper margin flattened down and arched forward*, as in *Selemites* or *Gastrodonta elliotti*; retracted at insertion. Umbilicus large, showing all the whorls very plainly. Alt. 2.5, diam. 5.1 mm.; aperture, alt. and width about 1.8 mm.

Thunderhead Mountain, under bark of a rotten log with *P. alternata* (ribbed), *P. perspectiva*, *Gastrodonta elliotti*, etc. (Mrs. George Andrews, June, 1894).

Two adult specimens collected. It is much smaller than *G. elliotti* Redf., with far larger, open umbilicus and heavier sculpture, recalling a *Pyramidula*.

Polygyra (*Stenotrema*) *stenotrema depilata* n. v.

Globose-conic, the spire much elevated; surface completely lacking hairs or their scars, showing sparse oblique short wrinkles above (hardly seen without a high power lens), the base with the luster of silk, or like the bloom on a grape, and showing indistinct spiral sculpture. Parietal tooth smaller than in the type, further from the basal lip, and not connected by a raised callus with the upper termination of the lip. Notch of basal lip rather shallow and wide. Alt. 8, diam. 10 mm.

Thunderhead Mountain (Mrs. Andrews), with typical *P. stenotrema* of the usual depressed-globose and hirsute form.

A NEW VARIETY OF *OCINEBRA CIRCUMTEXTA* STEARNS.

BY R. E. C. STEARNS.

A very pretty variety of *Ocinebra circumtexta* has recently been detected on the coast of Los Angeles County, by some of the local collectors. It is of a pale orange color; the bands, which in the typical form are dark, sometimes almost black, in the variety herein described are of a deeper orange. I have named it var. *aurantia*.

It is noteworthy, the prevalence of the orange hue, pale or dark, in many of the species of *Ocinebra* of the west coast.

This color is frequently met with in various shades in *Purpura crispata* of the Puget Sound and Alaska region.

Los Angeles, Cal., May 10, 1895.

NORTH AMERICAN SPECIES OF *VALLONIA*.¹

BY DR. V. STERKI.

Private inquiries and publications appear to make it desirable to give a few notes on our *Vallonia*, in this place. As far as known, at present, there are the following species in North America:

Group of *V. pulchella*. Not ribbed; peristome with strong lip.

1. *V. pulchella* Mull. (= *V. minuta* Say), North America, east of the Rocky Mountains; west of them at least scarce. All Europe, and adjoining parts of Asia and Africa.

2. *V. excentrica* Sterki. Northeastern North America from Maine and Quebec to Washington, D. C. All Europe. It is constantly distinct from *V. pulchella*, and, when once known, can not

¹ Conf. Observations on *Vallonia*, in Proc. Ac. Nat. Sc., Phila., 1893, p. 234.

be mistaken. Generally smaller; somewhat elongate in outline, and so is the umbilicus; the spire is smaller, lower, and the suture less deep; the peristome is not everted, as in *pulchella*, but only slightly expanded.

Group of *V. costata*. Ribbed; peristome with strong lip.

3. *V. costata* Mull. Eastern North America to the Mississippi Valley, but less common than *pulchella*, though numerous in some localities.

4. *V. albula* Sterki. Quebec, Manitoba to British Columbia. Larger than *costata* (2.7-2.8 mill.), whitish, with fine, crowded, membranous ribs; quite unlike any *costata* from Europe or North America. Also jaw and radula show differences, and so it was to be regarded as distinct, the more so as it has been found in company with *costata* at Quebec.

5. *V. gracilicosta* Reinh. Utah to Dakota. Differs from *costata* by the stronger and more oblique ribs on the shell, and small or no membranous appendages on them; the last whorl and the aperture are more angular at the periphery, and more flattened above; the color is grayish, and the lip porcelain white, while in *costata* it is somewhat glassy transparent.

6. *V. parvula* Sterki. Illinois to Nebraska and Indian Territory. Smaller than *costata* (diam. 2 mill.), the spire flat, the last whorl not descending.

Group of *V. cyclophorella*. Peristome without a lip.

7. *V. cyclophorella* Ancy. Rocky Mountains. Ribs very fine and crowded; shell thin, grayish or whitish; last whorl ascending and descending; aperture transversely elongate; peristome thin, without a lip; diam. 2.7 mill.

8. *V. perspectiva* Sterki. Appalachian Mountains, in Tennessee and Alabama; also in Iowa. Membranous ribs rather fine and crowded; spire low; last whorl descending; peristome continuous without a lip; shell thin, pale horn to colorless; diam. 2.0 mill.

ON THE GENERIC POSITION OF *PATULASTRA*? [PUNCTUM?] *PUGETENSIS* AND *PYRAMIDULA*? *RANDOLPHII*, WITH SUGGESTIONS FOR A CLASSIFICATION OF AMERICAN ZONITIDÆ.

BY HENRY A. PILSBRY.¹

Specimens of the two species named above preserved in alcohol by Mr. Randolph, of Seattle, Washington, and kindly forwarded

¹ These species were described in *NAUTILUS* for March, 1895, p. 130.

to the writer by Dr. Wm. H. Dall, have furnished preparations of the teeth enabling us to fix the generic positions of these interesting little species. *P. pugetensis* proves to be a Zonitid, with the dentition much like that of *Pseudohyalina minuscula* and *milium*, perfect laterals 4, as in *minuscula*, while *milium* has 2 or 3. The jaw, imperfect in my preparation, looks like that of *minuscula*.

P. randolphii has the characteristic dentition of *Punctum*, and with *pygmæum* (v. *minutissimum*) and *conspicuum* it makes three species of this genus for America. There are two in Europe, *pygmæum* Drap. and *massoti* Bgt., and one in Africa, *eryophilum* Martens. Some other minute Patuloids will doubtless prove to belong to *Punctum* when their dentition is examined. *P. randolphii* has a narrower umbilicus than our other species.

So ambiguous are the shell characters of these genera of small *Zonitidae* and *Endodontidae* that, as the event has proved, Dall was fully justified in the liberal use of question-marks in his provisional generic references. The moment their soft parts come under the microscope, broad distinctions between the groups appear, leaving no uncertainty as to the limits of the genera and families. The difficulty is to get the animals of these liliputian races alive or suitably preserved for dissection.

The classification of the numerous groups and genera of *Zonitidae* is still in an embryo condition. The forms with well-developed spiral shell inhabiting North America fall into groups as follows:

- a. ♀ System bearing a long dart-sack surmounted by one or more coronal glands, and usually containing a slender, curved dart. Subfamily ARIOPHANTINÆ Pils.
- b. Caudal mucus pore present; shell without opaque color-markings, Genus GASTRODONTA.
- c. Shell with internal teeth or a layer of callus on the floor of last whorl, s.-g. *Gastrodonta*.
- cc. No internal teeth or callus.
 - d. Surface polished, s.-g. *Zonitoides*.
 - dd. Surface conspicuously striate or costulate, s.-g. *Pseudohyalina*.
- bb. No caudal pore; shell with streak, band or flame markings, Genus PECILOZONITES.
- aa. ♀ System lacking dart-sack, etc.

Subfamily ZONITINÆ Pils.

- b. No noticeable shell-lobes developed; mucus pore present.
 c. Shell small, depressed and glassy; lower part of vas deferens not enlarged, Genus VITREA.
 cc. Shell larger, smoky; lower part of vas deferens greatly enlarged, Genus OMPHALINA.
 ccc. Shell smoky, *Vitrina*-like; vas deferens not enlarged, Genus VITRINIZONITES.
 bb. Right shell-lobe developed; no caudal pore, Genus VITRINA.

The positions of the genera *Pristiloma* and *Conulus* cannot be decided until their genitalia are investigated. The latter may prove to belong with *Microcystis* and *Guppya* in a sub-family *Microcystinae*, characterized by obsolescence of the sessile spermatheca. The *Ariophantinae* are well represented in the Orient by *Ariophanta*, *Nesta* and other genera. The *Zonitinae* by *Zonites* (restricted), *Rhysota*, *Trochomorpha*, etc. Although the grooves above the foot-edges are present in all *Zonitidae*, the tail pore is absent in various members of each prime division, such as the genera *Pacilozonites*, *Trochomorpha*, etc. The greatest defect in our knowledge of American forms is in respect to the *Zonitoides* and *Vitrea* groups, the shells of which offer no diagnostic genera features; and the nomenclature cannot be settled until the presence or absence of a dart-sack is ascertained in all the small species. The animals should be drowned, as ordinary alcoholic specimens of these minute forms are almost impossible to manipulate.

ISAAC LEA DEPARTMENT.

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

The outlook for the Isaac Lea Chapter for this year is very encouraging; new members are coming in, and all our members are enthusiastic in regard to the possibilities of the Chapter. With THE NAUTILUS as our official organ, we hope for a brilliant future for the Chapter. This little corner of THE NAUTILUS will always contain articles from the pen of beginners, as well as from those of more advanced students of conchology.

A DAY ON THE SPOON RIVER IN ILLINOIS.

Report of Dr. W. S. Strode, Lewistown, Ill. From the Transactions of the Isaac Lea Conchological Chapter of the Agassiz Association for 1894.

Owing to sciatic rheumatism, the writer, during the past summer and fall, has been unable to do much active work in the collecting

field. But one trip was made to the Illinois River, and, unfortunately, the stream was on a "high," and the conditions unfavorable for collecting. Excepting the dredging up of some fine *Pleurocera lewisi* Lea, nothing of interest was obtained.

However, a trip was made to Spoon River at Bernadotte, twelve miles from Lewistown, on October 20, which was more fortunate. The river was at a low stage, and everything favorable for collecting. My partner was Dr. J. M. Maguire, whose hobby was not shells, but birds. Yet, as is the case with all lovers of nature, when once within the pale of her magic influence, all her animate creatures met a responsive thrill in the kindly heart of the good doctor, and I found in him an enthusiastic and efficient helper in my search for molluscan treasures.

Procuring a boat we pulled up the river to Island No. 1, five miles from the village. There at the limit of back water from the mill-dam, we expected to find some shells; nor were we disappointed, for in the shallow water above and below this island, and on the banks under clumps of willows where they were carried by the minks and muskrats, we obtained quite a number of the following *Unios*: *capax* Green, *coccineus* Hild., *cornutus* Bar., *ebenus* Lea, *elegans* Lea, *lachrymosus* Lea, *luteolus* Lam., *levissimus* Lea, *occidens* Lea, *parrus* Bar., *pustulatus* Lea, *pustulosus* Lea, *rubiginosus* Lea, *trigonus* Lea, *Margaritana complanata* Barnes, *Anodonta inbecilis* Say, *decora* Lea, *edentula* Say.

Landing on this little island, which covers only about one acre of ground, we ate our lunch, and the doctor collected two or three each ruby-crowned and golden-crowned kinglets, that were busily seeking a dinner in the willows, and we then turned our boat's head down stream on our return voyage to the village. Every half mile or so we would come upon a flock of the beautiful moon ducks or dab-chicks, and, in the trees along the banks, were many red squirrels, and when one was particularly saucy, the crack of the doctor's gun would fetch him tumbling into the river. When the village was reached, we determined to try our luck in the shallow water along the rocky banks a half mile or so below the mill-dam.

The water-gates of the mills had just been shut down, and this would give us six inches less water to work in than when they were open. We soon desried an unexpected advantage from this fact. A half mile down the river, just above a place called the "deep hole," we found a large number of *Unio donaciformis* Lea and *Pleurocera elevatum* Say. In thirty minutes we picked up 200 of

the little *Unios*, and over a pint of the univalves. They were evidently making their way up stream, excited to do so by the strong millrace current. Many of them were busily working their shells out of sight in the coarse sand, and if we had been an hour or so later, perhaps none would have been visible.

Having collected all we desired of these two species, we went below the deep hole, and, in water from one to two feet deep, collected all we cared to haul home of the following species :

Unio alatus Say. A few.

Unio anodontoides Lea. Very plentiful and fine, ranging in size from full grown ones seven inches long to the very small young ones an inch in length ; and both varieties, the plain brown colored and the beautifully rayed ones.

Unio occidentalis Lea. Some very good ones.

Unio gibbosus Barnes. Only a few found, along with its cousin, the *anodontoides*, and *U. rectus* Lamarck, a half-dozen.

U. gracilis Barnes. Quite plentiful.

U. lachrymosus Lea. Some nicely marked ones.

U. ligamentinus Lam. More numerous than any other mussel in this locality. Specimens 5 to 7 inches long, were nicely rayed and but little eroded on the beaks.

Unio multiplicatus Lea. Four or five of the gigantic ones, 7 to 8½ inches long and a foot in circumference.

U. plicatus Lesueur. Plentiful, and all sizes.

U. tuberculatus Barnes. Plentiful, and all sizes, from 7 inches down.

Margaritana rugosa Barnes. A few adults found.

M. complanata Bar. Very plentiful and very fine, all sizes, from the beautifully-rayed young specimens, to the full sized adults peculiar to this river. One lying before me as I write, is 8½ inches long and thirteen inches in circumference.

This water was too swift and the bed of the river too rocky for the *Anodons*, and only a few *edentula* Say and *grandis* Say were found. Having loaded our boat with only the finest ones, and as many as we could get in our buggy, we pulled back up to the town, loaded up and departed for home, well satisfied with our day's outing.

A VISIT TO A VESSEL THAT WAS LOADED WITH SHELLS.—This winter I was much interested in a vessel which came into the port of Boston loaded with nothing but shells. I obtained a beautiful specimen of *Spondylus*, pink with white spines, and I can find noth-

ing like it in the museums here nor near Boston. Also a specimen of *Oliva*, beautifully marked. I visited the vessel three or four times, and was kindly allowed to visit the hold of the vessel, which had to be entered on hands and knees. *Tellinas*, *Conus*, *Myas* and other shells by heaps and bushels was a sight to behold and never forget.

I have taken great interest in the Isaac Lea Conchological Chapter, and have obtained much assistance in my work through it, and by coming in communication with the other members of it.—*Extract from the Transactions of the I. L. C. C., for 1894, by Mrs. T. E. Ruggles, Milton, Mass.*

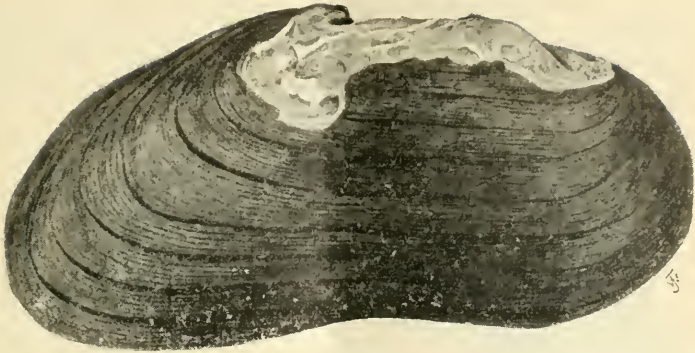
NEW PUBLICATIONS.

A MONOGRAPH OF THE LAND AND FRESHWATER MOLLUSCA OF THE BRITISH ISLES. By John W. Taylor, F. L. S.—We have indicated the scope of this long-expected work in a former issue (Dec, 1894, p. 96). The first part is now before us, and well sustains the expectations excited by the prospectus, the fact that Mr. Taylor has been devoting the study of years to the subject, and by the knowledge that a number of excellent observers were co-operating with the work, and most of the members of the Conchological Society of Great Britain have contributed data for its pages.



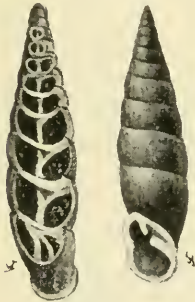
An Anisopleurous Pulmonate Gastropod, *Helix aspersa* v. *zonata* Moq.

The present fascicle of 64 pages treats of necessary elementary facts of the science of conchology; the broader principles of classification; primary divisions of *Mollusca*; of nomenclature, synonyms, etc. The *shell*, its composition, structure and forms are then considered, and here are defined the terms used in technical descriptions of mollusks, "turreted," "fusiform," "depressed," "turbinate" and so on, each explained briefly and illustrated by a figure in the text. This is an extremely valuable feature, for it makes perfectly clear to the beginner in conchology the whole jargon of descriptive terms, and, by a well-chosen illustration, fixes it in the mind.



A reniform Bivalve, *Unio margaritifer* v. *sinuata* Lam.

The parts of the shell and their names are similarly depicted.



Section through the shell of *Clausilia laminata* (Mont.) x 2, showing the nearly straight columella.

Pyriform univalve, *Clausilia laminata* (Mont.).

The questions of *species* and varieties are then discussed at length. The definition of "species" is good; but that of "variety" seems to us to beg the question entirely. Thus, in one paragraph, a variety is said to be an incipient species; in another, "varieties may be individual, that is, occurring only in a more or less isolated and sporadic way, or they may be a sexual character," etc. American naturalists, at least, do not regard such deviations as this as "varieties,"

but use that term for what Mr. Taylor calls "a sub-species, geographic variety or race." We believe that sexual and "random" variations should have no place in specific nomenclature. It is also unfortunate that

Mr. Taylor (in common with Mme. Paulucci and others) uses the term "mutation" to express a slighter modification than "variety," as it has a very different significance in palæontology, expressing the successive stages of a specific form, or genetically related series of specific forms, in successive formations.

In treating of the causes of form-modification in shells, Mr. Taylor states that fluvial species tend to develop a lengthened shell under the influence of a steady and rapid current, and short forms of otherwise elongated species in lakes and other large bodies of water.

Excellent illustrations are scattered freely throughout the text, illustrating at every point the statements made or the peculiarity mentioned; and this is a new departure in conchological treatises



An Equivalve, Inequilateral Pelecypod *Unio pictorum* (L.). a. s. anal or excurrent siphon; br. s. branchial or incurrent siphon; f. foot.

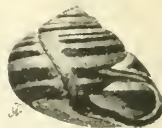
which can hardly be too warmly commended. The illustrations herewith shown are examples, and in beauty and fidelity to nature they speak for themselves. One would be critical indeed to ask for anything better than the figure of *Unio margaritifera* or *Planorbis corneus*. The species will be illustrated with colored plates, of which one accompanies this part. It is a really superb piece of color-printing.



Vertigo antivertigo
(Drap.).



Planorbis corneus v. *albina*
Moq.



Helix nemoralis
L.

Malacologists will look with interest for the succeeding parts; for that before us leads us to hope that Mr. Taylor will break with the time-honored but woefully antiquated system of generic and family classification of former English manuals of land and fresh-water mollusks, and adopt a nomenclature and classification abreast of the science. The work will doubtless prove of great utility to those interested in British malacology, especially on account of the exhaustive treatment of variation and distribution contemplated; and the features noted above will, moreover, render it useful to conchologists generally.

THE NAUTILUS.

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No. 3

A REMARKABLE MONSTROSITY OF *FULGUR CANALICULATUM*.

Fulgur canaliculatum is one of the most conspicuous Gastropods of our coasts from Long Island to the Chesapeake. It occurs less abundantly as far south as Florida (east coast) and northward to Cape Cod.



FIG. 1. *F. canaliculatum*, deformed.

In the Tertiary series, *F. canaliculatum* appears in the Pliocene of North and South Carolina (Wacamaw and Croatan beds); and pass-

ing downward, we find in *Fulgur coronatum* var. *rugosum* Conrad, from the Miocene of St. Mary's, Md., its probable ancestor.

F. canaliculatum exhibits but little variation in the recent fauna, except in point of size, southern specimens becoming much smaller. Thus, at St. Augustine, Florida, the largest shells found are not over half the dimensions of the largest from the New Jersey coast.

The typical form of this species is shown in fig. 2. Mr. James A.

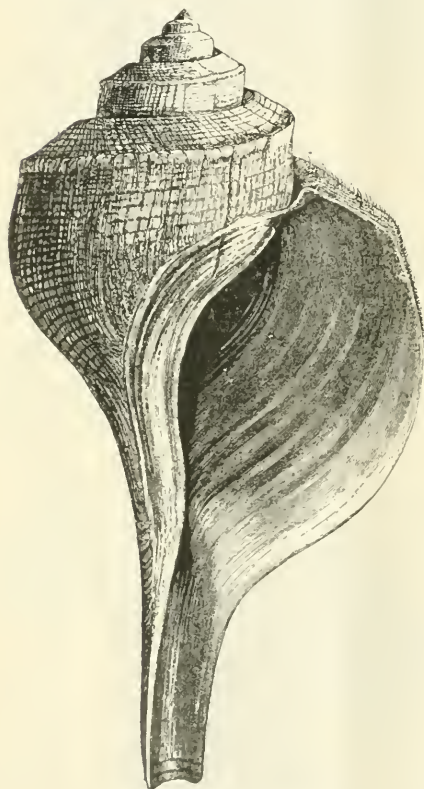


FIG. 2. *Fulgur canaliculatum*, Say.

Harkins, of Atlantic City, has called our attention to a remarkable deformed specimen, which he found at that locality, illustrated in fig. 1. It is an adult of average size, in which the basal canal is twisted to the left at a right angle to the axis of the shell. The growth-lines are everywhere unbroken, no evidence of an early fracture being visible, either outside or within the aperture. There is an abnormal lump or callus upon the upper part of the columella, probably deposited to fill some space left by the altered position of the soft parts in the cavity.

It is difficult to say how a monster of this sort was produced. The unbroken sweep of the growth-striae from body-whorl upon the canal indicates that the present canal was formed entirely after the abnormal condition set in, and is not a case of shell fracture and subsequent "patching" of the pieces, such as is often found. It is probable that the columellar side of the canal in the half-grown individual was injured, both soft and hard parts being affected; the mantle lining of the outer lip and base of canal being unhurt.

It is difficult to say how a monster of this sort was produced. The unbroken sweep of the growth-striae from body-whorl upon the

The specimen has been presented by Mr. Harkins to the collection of the American Association of Conchologists.

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

DESCRIPTION OF A NEW VITREA FROM PUGET SOUND.

BY W. H. DALL.

Vitrea Johnsoni n. s.

Shell small, pale waxen-white or translucent, of three and a half whorls, rather rapidly enlarging, smooth except for delicate radial lines of growth which are occasionally visible; suture distinct, slightly impressed; spire hardly elevated but not flattened; periphery rounded, base convex, imperforate, the pillar lip strongly reflected close to the axis; aperture semilunar, sharp edged, the peristome hardly flexuous, the upper edge a little in advance of the lower; resting stages indicated internally by one or two narrow whitish streaks where the shell is slightly thickened, but which do not project internally. Height of shell 1, major diam. 2, minor diam. 1.5 mm.

This differs from *V. indentata* by the absence of the impressed radial grooves and by its much smaller size for the same number of whorls; from *V. subrupicola* Dall by its more rapidly enlarging last whorl and more ample aperture in specimens of the same size. The latter species has one whorl less in the same diameter, and attains, when fully developed, a much larger size, besides having a peculiarly flattened appearance both above and below.

V. Johnsoni was named in honor of Prof. O. B. Johnson who has done so much to promote interest in the mollusk fauna of the Puget Sound region. It was collected under chips with *Vitreu pugetensis* near Seattle by Mr. P. B. Randolph.

It may be mentioned that the original types of *V. subrupicola* were collected at Clinton's Cave, Utah, by Dr. Packard; while much larger specimens, though with the same number of whorls, were collected later at Cave City, Calaveras Co., California, by Hemphill. After careful study I have found no characters except size to separate these from the Utah specimens, but in view of this difference the former may take the varietal name of *spelæa*. Neither form can be confounded with *V. indentata* by any one who critically compares good specimens. A specimen of *V. subrupicola* with four

whorls has a major diameter of 2.7 mm.; one of the variety, with exactly the same number of whorls, measures 4.0 mm., and my largest specimen 5.5 mm.

HELICES IN ILLINOIS.

BY W. S. STRODE.

In the Spoon river region of central Illinois, *Polygyra multilineata* is probably the most numerous of all the Helices. In the heavily wooded districts bordering the banks of the stream, where rotten logs, decaying leaves and vegetation are in the greatest abundance, they attain the largest size. Further back near the bluffs they are much smaller, not being more than one-half the size of those found near the river's bank. This difference which is due probably to environment, has given rise to the so-called *multilineata major* and *minor*. Not long since while driving across the bottom a mile from the river, I noticed many snails in the wagon track and crawling across the road. Just on my left was a tract of swamp prairie land containing several acres. The previous season this had grown up with tall prairie grass two or three feet in height, but a day or two before it had burned over. Going over to it I found the ground thickly strewn with *multilineata* which the fire had killed. Wherever a bit of grass, log or rail had escaped the fire, live ones could be picked up by the handful. It was the most extensive snailery I had ever seen. Thousands of them dead and alive, but not an *albolabris* nor a *profunda* nor a *Helix* of any kind except the *multilineata*; and in coloration from those that were almost albinos to the *rubra* with scores of lines, and all were the *minor* variety. *Pyramidula alternata* is the next species in relative abundance. Taking both upland and lowland it probably will outrank the *multilineata*. Then comes the *appressa*, which in some localities is quite abundant. *P. hirsuta*, *profunda*, *mitchelliana* and *albolabris* will rank in the order in which I have placed them. On the overflow land of the Illinois River a snail is rarely to be found. Further back near the foot-hills and on the margins of creeks tributary to this stream, they are quite common and fine. In these localities are to be found a few *Polygyra elevata* Say, quite rare in the Spoon River region.

DR. JOHN A. RYDER.

Dr. John Adam Ryder, Professor of Comparative Embryology at the University of Pennsylvania, and one of the most eminent embryologists and histologists in the world, died at his residence in Philadelphia, March 26, after a short illness, at the age of 43 years. The immediate cause of his demise was a complication of nervous troubles, which brought on gastric symptoms. Dr. Ryder was a very hard student, and his death was doubtless caused largely by over study.



JOHN A. RYDER, PH. D.

Dr. Ryder was born near Loudon, Franklin County, Pennsylvania, in 1852. He received a common school education and entered an academy, where his educational course was interrupted by financial reverses to his father. He then adopted his life work

teaching, and entered as a Jessup scholar, under an endowment held by the Academy of Natural Sciences of this city. He speedily showed great interest in scientific study and pursuit, and immediately began original research which has made him prominent in scientific circles. His mind was stored with a vast accumulation of facts which he so aptly used afterwards in illustrating his lectures. Early in life he began the publication of those original investigations that soon stamped him as one of America's foremost biologists. Later he was called, by the late Professor Spencer F. Baird, to the position of Embryologist to the United States Fish Commission.

The succeeding years, up till 1886, were spent in investigating the development, habits and breeding grounds of the oyster, sturgeon and other fishes, and in elaborate investigations bearing on these. His published papers on the oyster number about fifteen, and contain suggestions whose economic value is only now beginning to be recognized. His works and papers on the sturgeons and on propagation of the salmon are the most exhaustive upon these particular lines of study extant. These have been published in the bulletins of the United States Fish Commission, and have attracted the attention of American and European scientists. By means of Professor Ryder's method, the great fresh water lakes are now annually stocked with many thousand young sturgeon.

Dr. Ryder, four years ago, made an extended investigation of oyster culture at Sea Isle City, and the results of these studies are expected to revolutionize oyster culture.

He proved that oysters could be cultivated by artificial methods by starting with the egg, and, under conditions which can be controlled, and within a prescribed area and cost, that oysters could be raised by persons possessing the proper knowledge. He also wrote extensively upon the development of cetaceans and other mammals, and the thoughts and ideas advanced by him and the line of investigation opened up have been seized with avidity by scientists.

In 1886, he was invited to take the Professorship of Comparative Embryology at the University of Pennsylvania, and thereafter, although actively engaged in undergraduate and graduate teaching, he still was busy with his pen. The Proceedings of the Academy of Natural Sciences, of the American Philosophical Society, the *American Naturalist*, as well as the most prominent of European journals, were enriched by his contributions. Dr. Ryder was a strenuous opponent of the Weissmanian school of biological thought, believing,

as he did, that all phenomena of living organisms could be explained by the laws of mechanics. He was one of the foremost of mechanical evolutionists.

His chief writings and papers embrace "The Inheritance of Modifications Due to Disturbances of the Early Stages of Development, Especially to the Japanese Domesticated Races of Golden Carp;" "Dynamics in Evolution;" "The Mechanical Genesis of the Form of the Fowl's Egg;" "A Physiological Hypothesis of Heredity and Variation;" "The Origin of Sex Through Cumulative Integration, and the Relation of Sexuality to the Genesis of Species;" "On the Mechanical Genesis of the Scales of Fishes;" "The Sturgeons and Sturgeon Industries of the Eastern Coast of the United States, etc.;" "The Development of the Common Sturgeon;" "Evolution of the Specialized Vertebral Axes of the Higher Types;" "A Physiological Theory of the Calcification of the Skeleton," and "The Origin and Meaning of Sex."

Dr. McFarlane, speaking of Dr. Ryder, said: "He was, undoubtedly, one of the three greatest embryologists. His true worth was not known by the public, but the scientists with whom he was associated readily appreciated his great genius. His relations with his friends, colleagues and students were marked by a simplicity, earnestness and straightforwardness of purpose that endeared him to all. He enjoyed a profound reputation in Europe, and the news of his death will call forth the deepest sympathy from friends of science everywhere."

DR. W. S. W. RUSCHENBERGER.

Dr. William S. W. Ruschenberger, the eminent naval surgeon and scientist, died March 29, at his home, 1932 Chestnut Street, Philadelphia, in his 88th year.

Dr. Ruschenberger was one of the most widely known members of his profession in this country. He was born in Cumberland County, New Jersey, September 4, 1807. After receiving an academic education in Philadelphia and New York schools, he entered the medical service of the United States Navy as a surgeon's mate, August 10, 1826.

He was commissioned a surgeon in the navy April 4, 1831, and from 1835 to 1837 was Fleet Surgeon to the East India Squadron, with which he circumnavigated the globe. In 1840-42, Dr. Rusch-

enberger was attached to the naval rendezvous in Philadelphia. From 1843, he was Superintendent of the United States Naval Hospital at Brooklyn, and, during his term of service there, organized the Naval Laboratory, for supplying the service with pure drugs. He was again Fleet Surgeon of the East India Squadron from 1847 to 1850; Fleet Surgeon of the Pacific Squadron from 1854 to 1857, and of the Mediterranean Squadron from August, 1860, to July, 1861, having served in the intervals between cruises at Philadelphia.

In 1871, he was commissioned Medical Director on the retired list, with the relative rank of Commodore.

Dr. Ruschenberger has been best known in Philadelphia, perhaps, for his scientific labors, and particularly for his efforts in behalf of the Academy of Natural Sciences, which bestowed on him the highest honors within its gift.

He was elected Vice-President of the Academy in January, 1869, and President in December of the same year, serving in the latter office until 1881, when he was succeeded by Dr. Joseph Leidy. At the time of his death he was one of the curators, and Director of the Conchological Section.

Dr. Ruschenberger won considerable reputation by the results of his scientific observations during his various cruises, which he published at different times. Some of his works were: "Three Years in the Pacific," "A Voyage Round the World," "Elements of Natural History," "Lexicon of Terms Used in Natural History," "Notes and Commentaries During a Voyage to Brazil and China." Besides these, he wrote "A Notice of the Origin, Progress and Present Condition (1852) of the Academy of Natural Sciences of Philadelphia," and various other pamphlets.

Dr. Ruschenberger's works on Natural History were among the first American treatises on this subject, and were largely instrumental in creating an interest in zoology in this country. One of the most eminent entomologists in America, in speaking of Dr. Ruschenberger, said that he had first learned the orders of insects from Ruschenberger's Natural History.

THREE NEW SPECIES OF MACOMA FROM THE GULF OF MEXICO.

BY WILLIAM H. DALL.

Macoma limula, n. s.

Shell small, long and narrow, moderately inflated, anterior end rounded, longer; the posterior end substrate, bent to the right;

the pallial sinus deep, reaching more than half way from the vertical of the beaks to the anterior adductor; one bifid cardinal tooth in the left and two in the right valve, without laterals; ligament short, strong; exterior with nearly smooth beaks and no radiating lines, but most of the valve covered with low elevated concentric irregularly broken lines, which are irregularly swollen or granulose minutely in a longitudinal sense; color of the shell pale lemon-yellow or white, without distinct epidermis. Alt. 6·0, lon. 13·0, posterior end 6·0, diam. 3·5 mm.

Gulf of Mexico west of Florida in 26 fathoms; off Cape Lookout, N. Carolina, in 22 fathoms; Barbados in 100 fathoms.

This curious shell is distinguishable from any other American species by its peculiar surface. It grows twice as large as the measurements given above.

Macoma Mitchelli, n. s.

Shell small, thin, polished, pinkish-white, moderately inflated; teeth as in *M. limula* but more feeble; valves closely resembling *Tellina versicolor* Cozzens, but without the lateral teeth, less solid, the pallial sinus more distant from the anterior adductor, the posterior dorsal slope less arched and not quite so long, the muscular impressions less impressed and the anterior end somewhat broader; in *M. mitchelli* the surface is mostly smooth, but near the ventral margin, especially in front, there are impressed, somewhat distant and inconstant, concentric lines in harmony with the lines of growth or nearly so. Alt. 8·25, long. 15·0, post. end 6·0, diam. 4·0 mm. Habitat, Matagorda Bay, Texas, (I. D. Mitchell).

Macoma leptonoidea, n. s.

Shell very thin, high, short, polished, smooth or with fine silky concentric striulæ under a thin iridescent epidermis; hinge very feeble, teeth as in *M. limula*; pallial sinus irregular, reaching about two-thirds the whole length, backward from the front edge of the valves; outline of valves leptonoid, the anterior slope longer and more rounded, the posterior shorter and more direct but not rostrate, though there are two obscure ridges radiant backward from the beaks but not modifying the posterior margin; the shell is somewhat compressed but not flattened. Alt. 13·0, lon. 16, lon. of post. end 6·0 diam. 6·0 mm. Matagorda Bay, Texas, (Lloyd.).

This little shell looks curiously like a *Lepton*. Its outline, though larger, differs little from that of *Lepton longipes* Stm. The types of

the above mentioned species are in the National Museum, being respectively Nos. 95,619, 124,686 and 125,532.

ISAAC LEA DEPARTMENT.

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

MARINE SHELLS ON THE COAST OF MAINE.

Report of Mrs. E. P. Wentworth. From the Transactions of the Isaac Lea Conchological Chapter of the Agassiz Association for 1893.

During the past two years I have been much interested in conchology and have devoted my spare hours to collecting and studying mollusks.

I have collected marine shells from the Damariscotta River, Long Creek, near Portland, Peak's Island in Casco Bay, and Old Orchard and Higgin's Beaches, all these localities being in Maine. At Peak's Island the following shells were found in great abundance: *Mytilus edulis*, *Modiola modiolus*, *Macoma baltica*, *Mya arenaria*, *Saxicava arctica*, *Buccinum undatum*, *Nassa obsoleta*, *Nassa trivittata*, *Purpura lapillus*, *Littorina rudis*, *L. litorea*, *L. palliata*, *Lacuna vineta*, *Natica heros*, *Acmea testudinalis*. Occasionally there would be found hidden in the crevices of the rocks or thrown upon the beaches, *Crepidula fornicata* and *Anomia aculeata*.

The Damariscotta River, some forty or fifty miles east of Portland, is somewhat sheltered; and it contains mollusks which might once have been plentiful all along the coast of Maine, but which are now not often found so far north. Among these shells are the *Odostomia bisuturalis* Say (if I have made no mistake in the identification), of which the extreme northern limit is Massachusetts Bay, according to Bulletin No. 37, U. S. National Museum. *Urosalpinx cinerea* is very common in Damariscotta River, and the following shells are also found there: *Rissoa minuta*, *Mya arenaria*, *Modiola plicatula*, *Crepidula convexa*, *Alexia myosotis*, *Purpura lapillus*, *Littorina palliata*, etc. There are many old shells of *Ostrea virginica* and *Venus mercenaria* buried along the banks of the river and some of the people who live near by say that within their remembrance there were many oysters and quahogs in the river and

that they have been killed out by the sawdust from the mills above. On this river are the celebrated Damariscotta shell heaps composed almost wholly of oyster shells, and varying in depth from a few feet to more than sixty feet. Some of the oyster shells from these heaps are more than a foot in length.

At Old Orchard and Higgin's Beaches the shells are very different from those found on Peak's Island or in the Damariscotta River. Here are found, on the sand, between high and low water mark, *Cyprina islandica*, *Tellina tenera*, *Ensis Americanus*, *Siliqua costata*, *Mactra solidissima*, *Nassa trivittata* (very fine specimens), *Lynonsia hyalina*, *Scala greenlandica*, *Bela harpularia*, *Periploma* (*Coelodesma*) *leanum*, *Modiola modiolus*, *Mya arenaria*, etc. Clinging to the seaweeds thrown up by the surf, I found *Trachydermon ruber*, *Anomia glabra*, *Anomia aculeata*. Also found at Higgin's Beach, a very fine *Petricola photadiformis*.

GENERAL NOTES.

THE collection of Dr. P. P. Carpenter, the well-known authority on West Coast shells, has been purchased by the Field Columbian Museum of Chicago.

DISPERSAL OF SHELLS.—In his book on the "Dispersal of Shells," Mr. Kew mentions floating pumice-stone as a possible means of dispersal as pointed out by Mr. Bates and Sir C. Lyell. As a slight contribution to dispersal, or possible dispersal, by this means, I may say that on November 18th last I picked up a piece of porous blast-furnace slag, about 8x6x2 inches, that contained 17 individuals of *Zonites nitidus* Müll., *radiatulus* Alder and *arboreus* Say, all hibernating. This slag was lying among drift on the bank of the Ohio River and the nearest point from which it could have come is at least 10 miles above the point where it was found. As the slag is very light and floats *high* in the water, it would probably travel a considerable distance before the shells were all drowned and thus a colony of *Z. nitidus*, a *northern* shell, might be started a considerable distance down the Ohio.—GEO. H. CLAPP, *Pittsburgh, Pa.*

PROF. H. E. SARGENT has left Woodville, Ala., to spend the summer in Clearwater, Minnesota.

PROFESSOR THOMAS H. HUXLEY, the most famous of English biologists, died at 3.35 P. M., June 29, at the age of seventy years.

DR. W. D. HARTMAN, of West Chester, is publishing an Illustrated Catalogue of the Mollusks of Chester Co., Pa., in *The Village Record*, West Chester.

PLANORBIS SAMPSONI *Ancey*, described from Sedalia, Mo., and hitherto recorded from no other locality, is in the collection of the Acad. Nat. Sci., Phila., from Athens, Illinois, collected by E. Hall.

PLANORBIS CENTERVILLENSIS *Tryon*.—This very distinct species seems to be quite widely diffused on the Pacific slope, but most western collectors call it *vermicularis* Gld., judging from the labels of numerous lots before us. It is a small, brown shell, with high whorls, flat top, concave in the middle, and narrow umbilicus, while the true *vermicularis* is a flat, corneous shell, very similar to *parvus* or small *deflectus*, and doubtfully distinct from eastern forms.

MR. S. N. RHOADS has returned from a collecting trip through Tennessee, from the Mississippi to Roan Mountain. Land shells, *Unionidæ* and *Pleuroceratidæ* were found abundant. *Io spinosa* was rather scarce in the Tennessee, Nolachucky and Holston Rivers under boulders in swift water. *Vitrinizonites* was taken at Roan Mountain, as well as *Polygyra andrewsæ* and *major*, with other fine and local species. *Helicina occulta* Say also turned up in east Tennessee. Mammals were scarce throughout the State, except at Roan Mountain.

MOLLUSKS AS PURIFIERS OF WATER.—Charles Hedley, in the *Journal of Malacology*, says: "A use, novel to me, of pond snails by the Chinese silk-growers, is described in an official work which caught my eye by chance. This waif of malacological information is so certain to escape recorders that I transcribe the passage: 'The water used for reeling silk is taken from mountain streams, as being the cleanest; the water from wells is never used, and if mountain water cannot be had, river water is taken, which is cleaned by putting a pint of live shell-fish to one jar of water. There is a special kind of shell-fish, called the pure-water shell-fish (probably *Vivipara chinensis* Gray), found everywhere in ponds, wells and creeks. They first of all sink to the bottom of the jar, and then by degrees make their way up its sides, consuming gradually all impurities in the water within half a day or so. After the clean water has been drawn from the jar, the shell-fish are cleansed and put to the same duty again.'"

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PLEUROCERA SUBULARE IN WATER-MAINS.

BY CHAS. T. SIMPSON.

The U. S. National Museum has recently received from the Hannibal Water Co., of Hannibal, Mo. (through Mr. Chas. T. Lewis), a number of dead shells of *Pleurocera subulare* Lea, taken from the mains and pipes of the company in that city.

Mr. Lewis states that they accumulate at the cocks and faucets, and seriously retard the flow of the water, putting the company to considerable expense to remove them; also, that none have been found in their reservoirs or settling-wells, and they have never seen them in the Mississippi River.

The specimens taken in the company's pipes are always dead, and are only found in a space of perhaps 12 to 15 blocks, and not all the pipes in this area are infested.

This species has been found as far west as the White River, Carroll Co., Arkansas, and in the Mississippi River at Davenport, from which localities specimens were obtained that are now in the National Museum Collection, though the range of this form is mostly to the eastward of these localities. It is probable that the eggs or very young entered the mains through the strainers and took up their abode in certain favorable localities in the pipes, where food was brought to them by the currents, or existed in abundance, and that a more careful search would disclose them in a living state in the service pipes.

The existence of mollusks in water pipes is no new thing, though it is always interesting, and this is the first instance I have heard of in which any of the *Pleuroceridæ* have such a habitat. M. Locard found 44 species belonging to 13 genera in the water-mains of Paris,¹ and that they possessed certain peculiarities, no doubt the result of their environment. These were a diminution in size and decrease of coloration on account, perhaps, of the want of light; a more slender form, as this would make the least resistance to currents and enable the mollusks to cling more securely to the pipes. The specimens of *Pleurocera* sent by Mr. Lewis did not specially differ from those in the Museum Collection from Davenport, but, as the species had only been noticed at Hannibal a few years, it is probable that there has not sufficient time elapsed in its new environment to produce any important changes.

Many other cases of mollusks living in water pipes are known, notably that of *Dreissensia polymorpha*, introduced into England from the Aralo-Caspian region, and it has proven a serious nuisance in the mains of London, Birmingham and Manchester.

MARINE SHELLS OF PUGET SOUND.

By Mrs. Marie Drake. From the Transactions of Isaac Lea Conchological Chapter of the Agassiz Association for 1894.

I have a *Glycimeris generosa* Gld. which I got from Dr. Pomeroy of Vashon Is. It weighed $7\frac{1}{2}$ lbs. when alive, and was dug from a depth of three feet. Its length is $7\frac{1}{2}$ inches, width $4\frac{1}{4}$ inches. Its longest circumference is $13\frac{1}{4}$ inches. It gapes widely at both ends; rarely meets when alive. Its edges are covered with a yellowish-brown epidermis. The pallial sinus, though not very deep, is from $\frac{1}{4}$ inch to $\frac{1}{2}$ inch wide. Its distinct concentric grooves or lines are slightly irregular. The valves of this shell are strongly bulging. This shell is commonly called "Goe-duck," because it is so deep a burrower. The Indians esteem this shell-fish a great delicacy, and ornament their houses and yards with the shells. It is highly esteemed as an article of food, though quite difficult to obtain; one is said to furnish food for a whole family. Star-fish are also found by the hundreds at low tide on the mud flats, and of every hue—bright scarlet, peacock-blue, sea-green and paler tints.

¹ See NAUTILUS, Sept., 1894, p. 59.

I have found three species of *Purpura* here and many varieties, but the handsomest one is *Purpura crispata* Chemn. In my mind, the finest shell belonging to Puget Sound is this *Purpura* when banded orange and white. This shell usually does not see the light of day. Some persons prefer the deep orange variety. Both live under the water on the under side of stones or in rocky places, and are either obtained by dredging or at very low tide. *Purpura lactuca* Esch. is not found in so deep water, hence its white color; it is exposed to the rays of the sun sometimes. About September 1st, you can notice a great many purpuras closely packed together, clinging to rocks laying their eggs, which are in little capsules and resemble yellow oats stuck on end thickly over parts of the rock. Each capsule contains three or four dozen eggs, which require about four months to hatch, if they are not doomed before by some starfish hungry for an egg dinner. You can find a few egg cases almost any time of the year, but most of the eggs are laid during the months of August and September. *Purpura* lives on mussels, limpets and barnacles, or, if food gets scarce, it will eat dead fish. But the *Purpura* are not always victorious, for, when a crab wants a "purple tea," he shows no mercy to the destroyer of other homes, but inserts his strong claws under the operculum of the *Purpura* and digs him out and devours him.

One June morning, at Point Defiance, I saw three *Calliostoma costatum* eating a sea-weed breakfast. They looked so dainty and seemed to enjoy the bright sunshine so thoroughly, that it was with some regret that I placed them in my basket.

One of my friends dug up a fine *Priene oregonensis* Redf. It was five inches long and covered with a heavy dark brown epidermis. When the epidermis is removed, the shell is white. It has a strong epidermis. I have found a few specimens of *Bittium filosum* Gld., under stones at low tide, and several *Margarita pupilla*. *Crepidula dorsata* Brod. I have found by the hundreds growing on the shells, especially upon *Placunanomiu macroschisma* Desh. The *Littorina* are very plentiful and are large. I have searched for *Chrysodomus dirus* Rve., but have seen no traces of it. Perhaps it is found only on the ocean beach, and does not care for the Sound.

Modiola modiolus L. (*Modiolus capax* Conr.?) grows to an enormous size in the vicinity of Puget Sound. My husband brought me several from Henderson Bay; the smallest measured 7 inches in length, the largest 9 inches, and was 4 inches in diameter. These

he found growing in the mud, standing perpendicular, only about an inch being visible at very low tide. They are heavily bearded near the edge, partially covered with a light brown epidermis (which is several shades lighter than the epidermis of this same species which grows in the south), and considerably eroded near the unbones. All the shells living in the mud here are somewhat eroded. These monsters have an uncanny look; they are hermits when they grow old, do not live in clumps or groups as they do when young, or as *Mytilus edulis* does. Often I have seen a solitary *M. modiolus* upon a pile or log, which was entirely covered with *M. edulis*. They grow from $\frac{1}{16}$ inch to 8 inches in a single year. It takes muscle to remove one of the huge creatures from a rock or pile when it has fastened itself with brown byssal threads, which it spins with its huge tongue-like foot, from a sticky secretion formed at the base of the foot. They are said to live six hundred feet deep down in the ocean. Pupuras are death on mussels.

Placunamomia macroschisma Desh. is found here in great numbers. They live upon the under side of rocks which lie wholly in or part in water. A chisel is necessary to separate them from the rock, and even with this the pear-shaped byssal plug is rarely obtained entire. The interior of the upper valve is of a lovely sea-green and nacreous. The edges of the valves are thin and crumble at the least touch, which renders them difficult to clean and send away. If they grow upon other shells they are not so easily broken, but are much stronger. I have a fine specimen which I found growing in an old shell of *Cardium corbis* Mart. I obtained the byssal plug and both valves entire. The shells sometimes grow upon each other; when thus found, a perfect specimen is more readily obtained than from a rock. These shells are often mistaken for an oyster, especially by those unlearned in shell lore; they do resemble the variety known as *O. expansa*, though they are much larger and have the byssal opening and plug, which the oyster does not have. These bivalves are much handsomer than their southern cousins *Anomia lampe*. The animal is a bright orange, and is quite beautiful. To be prepared for the cabinet they are dipped in very hot water and the animal removed with a tiny steel chisel prepared for the purpose, then gently closed. This shell requires careful handling.

I saw a *Lunatin lewisii* Gld. eating a *Cardium corbis* very much larger than itself. I stopped this predatory proceeding, took both

home in my basket, and, after cremating the bodies, placed both shells in my cabinet. Both these shells are abundant on the Sound, and are easily obtained by digging in the sand and mud. The *Macoma* family thrives here. I have not found *M. secta*, but *M. nasuta* and *M. inquinata* are prized by the Indians as food, and *M. inconspicua* is found by the hundred, the exterior slightly eroded by the mud in which it dwells, but the inside of the shell is of a bright, rich, shiny pink; pale yellow and pure white are also found. The shell is about the size of a finger-nail.

I was surprised to find upon the rocky beach at Brown's Point a living specimen of *Lyonsia californica* Conr. It was moving about in a pool of water among pebbles and rocks. It seems marvelous that its thin, delicate little shell could remain uncrushed an instant; but it seemed to enjoy life as well here in the rugged, stormy north as it does in the warmer waters of the "land of sunshine and blue skies."

Cardium corbis is more hardy, though, unlike most of our northern shells, it is smaller than its southern cousins *C. quadragerium* and *Liocardium elatum*, but it is much more numerous than either of these species.²

Pecten hastatus Sby. is called by many our "prettiest shell," and with the thousands of little spears (*hastatus*), toothed edges and delicate coloring, it is indeed a lovely shell. I saw one for the first time (living) at Point Defiance during the month of April. It was caught on the top of a rock by becoming entangled by a piece of sea-weed; it opened and closed its shell rapidly, making a curious sound. The orange color of the animal shone and glittered in the sun. The circulation could be seen and the working of the heart and other organs. This *Pecten* is a deep-water species, swims about freely in the water and moves about at the same angle as a kite does in the air. It lives among sea-weeds and is found in great abundance at Fox Island in the spring of the year. The lower valve is bleached by the sand. It lives in the water and is never exposed to the rays of the sun, hence the delicacy of the color. This shell-fish has black eyes, and can tell when a hand or a bird comes to grasp it. I have seen *Amusium caurinum* in deep water, but have never succeeded in capturing one, as it is obtained only by dredging in very deep water. It is brown outside, white within, and has 20 ribs, and is not so handsome as *P. hastatus*.

² And is also a much heavier shell than the southern *Cardium*. M. B. W.

Mya arenaria L. is highly prized here as food, and grows six inches long. *Machæra patula* Dixon is sold in our markets. *Psammobia rubroradiata* Nutt. is more abundant and larger than in the south. It is found 5 inches long, here, partially covered with dark brown epidermis. Tapes and Saxidomus are well represented, and, though not so prettily marked, are very much larger and stronger (coarser) than those growing in the warmer waters of the south. They are almost always to be found in the markets.

Zirphæa crispata L. was recently described in one of our Tacoma daily papers by one of our Government surveyors as "a new clam."

"We have found a new shell unknown to science," etc. We were greatly amused, and sent an article to the paper the next day saying *Zirphæa crispata* ("a new clam") is found in abundance on both sides of the Atlantic, and was named by Linnæus long ago.

Limpets I have found in great abundance and of great size. I have several specimens of *Acmœa patina* Esch. found here in the "Narrows," measuring $2\frac{1}{4}$ inches in length and $1\frac{3}{4}$ inches across. Many of this species have bands of translucent tints on their interior, and are beautifully marked outside.

A. pelta is regularly marked with stripes from the apex, which is often corroded, in adult specimens, to the base. This is a most pleasing shell; is a sort of hermit, lives alone, often easily obtained; strong, not easily broken; often pure white inside, sometimes banded. I have one with a bright yellow band inside, embossed. Large specimens measure $1\frac{1}{2}$ inches in length, $1\frac{1}{4}$ inches wide, $1\frac{1}{8}$ inches high. I have not found *A. spectrum* Nutt. nor *Lottia gigantea* Gray, here. Fine specimens and many variations of *A. scabra* Nutt. are abundant. I have found more of *A. persona* than of any other species. At Brown's point, we find at one spot a variety having a gray interior with beautiful translucent bands. This is a new variation to me. *A. asmi* Midd. is found here, and many I have not been able to classify.

I have one specimen of *Fissuridea aspera* Esch. $2\frac{1}{4}$ inches long, $1\frac{1}{2}$ inches wide and nearly $1\frac{1}{4}$ inches high.

Limpets are sometimes used for picture frames by setting them deep in wood and fastening with glue. I saw one valued at fifty dollars here.

INDEX TO CONCHOLOGISTS' EXCHANGE.

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AN INDEX TO THE "CONCHOLOGISTS' EXCHANGE."

The publication of this magazine was commenced by Mr. Wm. D. Averill, of Chestnut Hill, Philadelphia, in July, 1886. The first number was printed on a postal card. The August number (No. 2) consists of four pages, without pagination, size $5\frac{1}{2} \times 6\frac{1}{2}$ inches. The September number contains six pages, without pagination. October number contains eight pages, which are numbered, the first being page 11; the last page (18) is blank. November number contains six pages. December number, eight pages and the last page is blank. January and February numbers (1887) each contain eight pages. March and April (Nos. 9 and 10) were printed together as a "double number," which consists of twelve pages. The May and June numbers each contain twelve pages and are a little larger, $5\frac{1}{2} \times 7$ inches. Vol. I, complete, contains 84 pages.

Vol. II, Nos. 1 and 2 (July and August, 1887) each contain 16 pages. September number contains 12 pages, and with this number there was another increase in size to $5\frac{3}{4} \times 7\frac{1}{2}$. October and November numbers each contain 16 pages. December number, 12 pages. January (1888) number, 12 pages, *plus* a cover (pp. i-iv) of the same kind of paper. February number contains 8 pages and a cover (pp. i-iv). March and April were printed together, but as one number (No. 9); this contains 12 pages and a cover (pp. i-iv), and this was the last number published. Vol. II, complete, contains 120 pages, exclusive of cover pages. No index to either volume was issued. The "*Exchange*" contains many new generic or subgeneric names, with other important changes in nomenclature, and some new species. The Index herewith given has been arranged to aid conchologists who have not access to a complete copy of the original publication. It has been cut into short pages in order that those who have the *Conchologist's Exchange* may bind this Index with it.—H. A. P. & C. W. J.

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No. 5

A SORA CAUGHT BY A MUSSEL.¹

When hunting in the marshes in this vicinity, September 3, 1894, Mr. Joseph D. Clark noticed a Sora (*Porzana carolina*) hopping along and trying hard to fly. His dog finally captured the bird. It had a "fresh-water clam" attached to one toe, being firmly caught by the bivalve. The poor bird, in its efforts to release itself, had



broken the bone of the toe and nearly severed it from the foot. Mr. Clark kindly presented me with his rare find, and a photograph, from which the accompanying cut was made, was taken at once. The mussel was 2.92 inches long and 1.61 wide.—JNO. H. SAGE, Portland, Conn., in *The Auk*, July, 1895.

¹We are indebted to the editor of *The Auk* for the illustration of this article. This mussel is evidently *Unio complanatus* Sol.

SYNOPSIS OF THE SUBDIVISIONS OF HOLOSPIRA AND SOME RELATED
 GENERA.

BY W. H. DALL.

Genus HOLOSPIRA Martens; type *H. pilocerei* Pfr.

Subgenus *Holospira* s. s.

Axis large, with an internal fold in the penultimate whorl and with a parietal, basal and peripheral lamina projecting into the lumen of that whorl. Besides the type, this includes *H. goldfussi* Menke and *H. gonistoma* Pfr.

Section *Bostrichocentrum* Strebel & Pfeffer, 1880.

Axis moderate, with a continuous plait, except in the last part of the last whorl; no laminae. Type *H. tryoni* Pfr. *H. veraeruzianus* Dall belongs here.

Section *Haplostemma* Dall, 1895.

Axis moderate, with, in the penultimate whorl only, a short, stout axial lamina extending about half a gyration, but no other laminae. Type *H. mearnsii* Dall, New Mexico.

Section *Eudistemma* Dall, 1895.

Penultimate whorl with a parietal and a short axial lamina only, axis moderate. Type *H. arizonensis* Stearns.

Section *Distomospira* Dall, 1895.

Penultimate whorl with a basal and a short, strong axial lamina only, axis moderate. Type *H. bilamellata* Dall, New Mexico.

Subgenus *Metastoma* Strebel & Pfeffer, 1880.

Axis smooth, without plaits, penultimate whorl without internal laminae. Type *H. raemeri* Pfr. This includes also *H. pasonis* Dall, *H. coahuilensis* Binn., *H. semisculpta* Stearns, *H. pfeifferi* Menke, *H. remondii* Gabb., *H. crossei* Dall, *H. pilsbryi* Dall.

Subgenus *Celostemma* Dall, 1895.

Axis vertically ribbed as in *Celocentrum*, shell otherwise as in *Metastoma*. Type *H. elizabethae* Pilsbry.

The internal characters of the following species are unknown: *H. gealei* A. Ads., *H. imbricata* Martens, *H. cretacea* Pfr., *H. microstoma* Pfr. and *H. teres* Menke.

Genus *Cœlocentrum* Crosse & Fischer, 1872.

Shell decollate, axis pervious.

Subgenus *Cœlocentrum* s. s.

Axis vertically ribbed internally. Type *C. turris* Pfr. This includes nearly all the known species.

Subgenus *Spartocentrum* Dall, 1895.

Axis as in *Bostrichocentrum*, not ribbed. Type *C. irregulare* Gabb., Lower California.

Genus *EUCALODIUM* Crosse & Fischer.

Shell resembling *Cœlocentrum*, but large, with a solid axis.

Section *Eucalodium* s. s. Type *E. ghiesbrechti* Pfr.

Axis sinuous and folded its whole length, except close to the aperture; transverse series of teeth on the radula long (65·1·65 in the type).

Section *Oligostylus* Pilsbry, 1895.

Axis straight and smooth; radula narrower (36·1·36 in the type). Type *E. blandianum* Crosse and Fischer.

Columna ramentosa J. G. Cooper, which might, from the shell, be assimilated either to *Berendtia*, *Rhodea*, or some of the above-mentioned groups, proves, from the anatomy, to be merely a section of *Bulimulus* closely related to *Leptobyrsus*. The genuine *Rhodea* very probably bears an analogous relation to *Otostomus*. It is viviparous, but the Lower Californian species is not. If the latter be deemed worthy of a sectional name, *Pseudorhodea* might be used for it. The new species of *Holospira* mentioned above are described in a report on the mollusks of the late Mexican Boundary Survey (1892-4), by the writer, which will appear, properly illustrated, in the report of the Commissioners of the Survey.

My special thanks are due Mr. H. A. Pilsbry for kind assistance rendered during the preparation of the report.

The anatomy of a curious cylindrical Austrian land snail, *Pupa obtusa* Drap., has recently been investigated by Mr. A. Protz and Professor von Martens. It proves to be no *Pupa*, but a member of the *Helicidae*, closely allied to the chalky *Helices* of Europe known as *Helicella* or *Xerophila*.

A NEW TEINOSTOMA.

BY HENRY A. PILSBRY.

Teinostoma Hidalgoana n. sp.

Shell orbicular, depressed, solid, bright, bluish-white. Spire very low, wide-conic, the apex acute. Whorls $2\frac{1}{2}$, hardly convex, the last large, rounded at periphery, depressed beneath; on its latter third the periphery descends toward the base, and immediately behind the lip is decidedly pinched into a short rounded keel. Surface closely engraved throughout with spiral lines of close, fine stippling or punctation. Aperture oblique, rounded, except for the straight parietal wall; peristome continuous, the outer lip thick, blunt, strengthened outside by a heavy rib or collar a short distance behind the edge; parietal wall bearing a low nodule or tooth near its upper termination. Parieto-umbilical callus heavy, deeply and coarsely pitted all over, forming a rounded lobe over the umbilical tract and a band in front of the parietal edge of peristome proper. Alt. 2, diam. 3.2 mm.

Singapore (Dr. S. Archer!). This exquisite species is respectfully dedicated to Dr. J. G. Hidalgo, of Madrid, author of numerous valuable contributions to malacological science.

One specimen of the type lot is much smaller than the others (diam. 2 mm.), but in all other respects exactly resembles them, and has the lip of a fully mature shell.

NOTES ON THE SMALLER AMERICAN PLANORBES.

BY E. G. VANATTA.

Including the species put in the sub-genera *Menetus* and *Gyraulus* by Binney in "Land and Fresh-water Shells of the United States."

The smaller species of Planorbis are, as a general rule, found on leaves and sticks in small ponds and springs.

The Western Slope species are *centervillensis*, *opercularis*, *opercularis* var. *oregonensis* and *callioglyptus*.

P. alabamensis Pils. has so far been found only in Woodville, Alabama, and Grove, Cooper River, S. C.

P. sampsoni has been found hitherto only in Pettis and Henry Co., Mo., and Athens, Ill.

P. umbilicatellus occurs in Manitoba and Montana.

The other species mentioned below are more or less widely distributed over the United States, except *hirsutus*, which is restricted to the northern tier of States.

I think any normal specimen can be identified by the following key:

I. PERIPHERY ACUTELY KEELED.

- a. Shell bi-convex.
 - b. umbilicus broad, shallow, *deflectus* Say.
 - bb. umbilicus small, deep.
 - c. lip simple, aperture extremely oblique, *exacutus* Say.
 - cc. lip thickened within, aperture less oblique, *alabamensis* Pils.
- aa. Upper surface flat, lower convex.
 - b. lip thickened within, spiral sculpture distinct, *oregonensis* n. v.
 - bb. lip thin, spiral sculpture absent, or very indistinct.
 - c. umbilicus broad, shallow, *exacutus* Say.
 - cc. umbilicus small, deep.
 - d. shell very small, radially ribbed below, *cristatus* Drap.
 - dd. shell rather large, smoothish, *opercularis* Gld.

II. PERIPHERAL KEEL BLUNT OR ABSENT.

- a. Radially ribbed below, *cristatus* Drap.
- aa. spiral sculpture distinct.
 - b. umbilicus broad, shallow; surface with spiral rows of hairs, *hirsutus* Gld.
 - bb. umbilicus small and deep.
 - c. shell rather large; aperture oblique, broader than high, keel indistinct, *calliogyptus*.
 - cc. aperture small, nearly vertical, of equal width and height, periphery more angular, *sampsoni* Ancey.
- aaa. Surface smooth or nearly so.
 - b. umbilicus broad and shallow
 - c. aperture oval, whorls rounded, *parvus* Say.
 - cc. aperture broader than high, whorls angular, *deflectus* Say.

- bb.* umbilicus small, deep.
c. lip thickened within, *centervillensis* Tryon.
cc. lip simple, thin.
d. whorls angular above the middle, *dilatatus* Gld.
dd. whorls rounded or angular below the middle.
e. spire sunken in center, *deflectus* Say.
ee. spire level, apex not sunken.

umbilicatellus Ckll.

Planorbis callioglyptus n. sp.

~~*Muretus opercularis planulatus*~~ *Planulatus* Gould
 Shell thin, yellowish corneous. Upper side flat, only a trifle concave in the middle; lower side convex; periphery very bluntly indistinctly angular, and midway between periphery and suture there is a slight angle; but both angles are obsolete at aperture; base often spirally malleated. Surface with a beautiful sculpture of fine spiral incised lines, crenulated by fine growth-lines. Whorls nearly 4. Umbilicus nearly a third the shell's diameter, deep and funnel-shaped, its edge bluntly angular. Aperture ovate truncate, moderately oblique. Lip not thickened inside. Alt. 3, diam. 8 mm.

Freeport, Washington, collected by H. Hemphill.

Planorbis opercularis var. *oregonensis* n. v.

~~*M. opercularis planulatus form*~~ *Planulatus* *oregonensis* var.
 Shell light yellowish, opaque. Upper surface flattened, slightly convex, the apex sunken; periphery keeled with a slight groove above the keel. Surface finely spirally striated. Umbilicus rather small and deep, its edge slightly angular. Aperture approaching vertical, *lip thickened within*. Alt. 2, diam. 6 mm.

Salem and Portland, Oregon. This looks very much like typical *opercularis*, but may be distinguished by the beautiful spiral sculpture and thickening within the lip. It differs from *callioglyptus* in having a decided keel around the nearly flat upper surface and a distinct thickening within the aperture. I have not seen any typical *P. opercularis* from Oregon. There are none in the collection of the Academy of Natural Sciences.

SYNONYMS.

- P. billingsii* Lea = *parvus* Say.
P. brogniartiana Lea = *exacutus* Say.
P. b Buchananensis Lea = *exacutus* Say (fide Simpson).
P. circumstriatus Tryon = *parvus* Say.
P. concavus Anth., M. S. = *parvus* Say.
P. costatus DeTarr & Beecher = *P. nautilus* var. *crispatus* Drap.

P. dilatus Hald. = *dilatatus* Gld.

P. elevatus Adams = *dilatatus* Gld.

Paludina hyalina Lea = *exacutus* Say.

P. lens Lea = *exacutus* Say.

P. lenticularis Lea = *exacutus* Say.

P. obliquus DeKay = *deflectus* Say.

P. planulatus Cooper = *opercularis* Gld.

P. umbilicatus Taylor (not Müll.) = *umbilicatellus* Cockerell.

P. vermicularis Gld. = *pavvus* Say.

P. virens Adams = *dilatatus* Gld.

P. hirsutus Gld. differs from the European *albus* Müll. in having the hairs longer and in fewer rows.

P. costatus DeTarr & Beecher, never having been reported from any locality but Michigan, is very likely introduced specimens of *P. nautilus* var. *cristatus* Drap., with which it seems identical.

P. alabamensis Pilsbry shows light spiral striations under a lens.

In *P. sampsoni* Ancey, the spiral striation is quite distinct.

GENERAL NOTES.

WE have taken advantage of the mid-summer number when Conchologists, like everybody else, avoid all the desk-work they can, to insert an Index to the *Conchologist's Exchange*. This will afford malacologists an opportunity of ascertaining the contents of that periodical, now rare and out of print. We had hoped to reprint the *Exchange* in full, but a sufficient number of subscriptions has not been received to justify us in the outlay.

SEVERAL years ago I collected two young specimens of a delicate bivalve in a mud bank at Revere, Mass., and put them away labeled *Zirphæa crispata*. I lately discovered that they are *Pholas truncata*, which shell has not, to my knowledge, been previously reported from north of Cape Cod.—EDWARD W. ROPER.

MR. A. A. HINKLEY, who has been for some time in Rockford, Ill., has returned to DuBois, Ill.

THE Chicago Academy of Sciences has recently purchased of Mr. John Walton, of Rochester, his collection of *Cypræidæ*. It has also purchased one of the collections of California and Mazatlan shells, prepared by Dr. P. P. Carpenter, and numbering some 3000 species.

CURIOUS CHINESE USE OF SHELL-FISH.—The Chinese have been students of the habits of animals for many thousand of years, and the influences of this study have manifested themselves in their art and their architecture, so much so, that one can readily recognize the common form of their animal life through its resemblances to the objects and pictures with which we are familiar.

One of the most interesting is what is known as the "joss-shell." Every one has noticed the pearly luster of the bivalves of our rivers and ponds, fresh-water mussels, they are called. These mussels are lined throughout with the same kind of material as the pearl-oyster, and, indeed, pearls of value are often to be found in them. In China and Japan, these mussels grow to great size, in the latter country being oftentimes seven to ten inches in length, and in China, fully as large as a small saucer. The shrewd Chinese are aware that the pearly nacre is a protection of the animal, which has thus the smoothest of substances against its sensitive skin, and they know also that any grain of dirt or roughness will be quickly coated with pearl if it should lie under the mantle. They therefore catch the animal, and oblige it to make such designs as they desire. These are usually little josses, images of some one of the Chinese Gods, which are formed in clay and slipped between the mantle and the shell of the mollusk. The latter, as soon as it is put into the water again, begins to cover the model with a coat of pearl, and at some time, when the process has been carried far enough, the animal is killed and the shells preserved with their pearly josses and sold as curiosities. They are, however, very rare in this country, being on exhibition only in a few of the larger museums. It is said that upwards of one thousand of the Chinese made their living by this industry, and that they will, on order, insert in the shells models of the initials of any one's name, which, after a wait of a year and a half, will be ready for delivery.—*The Happy Thought*, July 15, 1895.

PROF. GILBERT D. HARRIS, of Cornell University, has returned from a geological trip through Mississippi and Alabama, and is now spending two weeks at the Academy of Natural Sciences, studying the "Lea Collection" of Eocene fossils.

POLYGYRA CEREOLOUS SANCTIJOHANNIS n. var. Shell having the characters given in Man. Conch. IX, p. 73 for *P. cereolus septemvolva*, but periphery pinched out into an excessively acute keel. It is extremely abundant along the middle St. Johns River, Fla., from the Lake George region to L. Monroe at Sanford. I have seen nothing like it from other parts of the State. The shell is very thin, having very little lime in its composition, never enough to give a whitish color.—*Pilsbry*.

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No. 6

ON THE AUSTRALASIAN GUNDLACHIA.¹

BY C. HEDLEY, F.L.S.,
With note on American forms
BY H. A. PILSBRY.

The eccentric shell of *Gundlachia*, one part shaped like a knife-sheath, or rather a spectacle-case, plastered askew upon another part like the shell of an ordinary fresh-water limpet, the creature's external likeness and internal unlikeness to *Ancylus*, and the remarkable, discontinuous, geographical distribution of the genus, combine to tempt a naturalist's curiosity. For a chance to satisfy such curiosity I am indebted to several friends who have liberally assisted me with all the material and information at their command, and without whose kindly aid I should have had to relinquish, unprofited, the study of the subject. Prof. Tate has kindly loaned me the actual types of *G. petterdi*, and given me examples of that species collected by himself at Mt. Lofty near Adelaide, S. Australia. Mr. W. F. Petterd has liberally communicated a large series of *Gundlachia*, including the actual type of his species *G. beddomei*. Mr. C. E. Beddome has supplied me with a collection of *Gundlachia* from various localities. Mr. H. Suter has convinced

¹ From Vol. VIII (Series 2nd) of the "Proceedings of the Linnean Society of New South Wales" (November 29th, 1893). We have omitted Mr. Hedley's descriptions of the Australian species of *Gundlachia* and his plate illustrating them.—ED.

me of the method by which the primary shell is transformed into the adult by presenting me with a series showing the passage from stage to stage collected by him in New Zealand. To Mr. R. H. Pulleine, of the Adelaide University, who guided me to the spot and procured me several specimens, I am particularly obliged for the pleasure of viewing *Gundlachia* alive at Henley Beach near Adelaide.

The genus *Gundlachia* was instituted by Pfeiffer in the Zeits. Malak., vii, 1849, p. 98, for the reception of immature specimens of *G. ancyliformis* Pfr., sent to him by his correspondent, Dr. J. Gundlach, from Cardenas in Cuba. Troschel supplemented his friend's description by an account of an animal which had dried in the shell. From the dentition he classed the puzzle, not, as Pfeiffer was inclined to do, with *Navicella* and *Neritina*, but with its real kin the Linnæidæ. Though not recognizing it as such, he distinguished the jaw as a brown, semitransparent arch, convex in front and extending from eye to eye. Further remittances from Gundlach enabled Pfeiffer to describe and figure (*op. cit.* 1852, p. 180, pl. I, ff. 1-16) the adult and immature shells and to add some information from the collector of its habits and appearance when alive. From this species Bourguignat carved (*Spicil. Malac.*, 1862, pp. 82-87) a new genus, *Poeyia*, type *P. gundlachioides*, and two other species, *G. adelosia* and *G. poeyi*; all of which, so Crosse tells us (*Journ. de Conch.*, xxx, 1890, p. 262), are but stages in the development of *G. ancyliformis*.

In Trinidad the genus occurred to Guppy in the form described by him (*Proc. Sci. Assoc. Trinidad*, Dec., 1872) as *G. crepidulina*, and figured *Am. Journ. Conch.*, vi, 1870, pl. xvii, ff. 10 and 11.

From Mexico the genus is doubtfully indicated by Gibbons (*Journ. of Conch.*, iii, p. 267).

An undetermined species was recorded (*Am. Journ. Sci.* (3), xxiii, p. 248) by Cook from the State of New York.

On the banks of the Potomac River Stimpson discovered *G. meekiana*, which he figured and described (*Proc. Boston Soc. Nat. Hist.*, 1863, p. 249). This account, the best of the genus that has appeared, was transferred by W. G. Binney to the pages of "The Land and Freshwater Shells of North America," Pt. ii.

In California the genus is represented by *G. californica* Rowell, whose description is also reprinted, with additional figures, by Binney, from the *Proc. Cal. Acad. Nat. Sci.*, 1863, iii, p. 21.

As a fossil, *Gundlachia* occurs in S. Carolina in a quarternary marl containing mastodon bones (Cook, *l. c.*).

[In addition to the records of *Gundlachia* in North America, compiled by Mr. Hedley, we may instance the finding of numerous specimens in ponds near Greenport, Long Island, N. Y., by Mr. Sanderson Smith, recorded in the Annals of the Lyceum of Nat. Hist. of N. Y., ix, 1870, fig. 6. The specimens differ sufficiently from *G. meekiana* to be considered by Smith a distinct species, which he names *G. stimpsoniana*.

A *Gundlachia*, closely allied to, if not identical with, *G. meekiana*,



Fig. 1.

Fig. 2.

Gundlachia from Rock Island.

occurs abundantly in a lily-covered pond near Rock Island, Illinois. Specimens are drawn in the illustrations here given (figs. 1, 2), fig. 1 representing a shell with small accessory cap, the other figure showing one with it large. All intermediate sizes occur. With these, are found numerous specimens of like asymmetrical contour, but lacking the accessory shell! These are, as far as the shells are concerned, merely *Ancylus*. They live with the true *Gundlachias* on the lower surfaces of the lily-pads, grazing on their watery pasture like little sheep dotting a hillside. Professor B. Shimek has found something very similar to these near Lincoln, Nebraska (see NAUTILUS, August, 1890, p. 48).

Still another record of *Gundlachia* is given by Dr. Victor Sterki, who found it at New Philadelphia, Ohio (see NAUTILUS, Jan., 1895, p. 107).—*Pilsbry*].

Boettger has ventured to name an immature fossil from the Mayence Basin—*G. francofurtana* (Fischer's Manuel, p. 505).

A defective monograph of the genus, by Clessin, appeared in 1882 in the Conchylien Cabinet, Bd. i, Abth., 6, pp. 1-5.

The existence of this genus in Australasia was first announced by R. M. Johnston, who, in March, 1877, laid before the Royal Society of Tasmania an account of *G. petterdi*, from the vicinity of Launces-

ton in North Tasmania. In the first of two plates attached to "Critical Observations on Recent Contributions to our Knowledge of the Fresh-Water Shells of Tasmania," Pt. i, Proc. Roy. Soc. Tasmania, 1888, p. 84, but which Mr. Johnston, perhaps critically omitted to number or explain, are drawings 2a, 2b, 2c, presumably of this species. Appended to this paper is a table in which, under "General Remarks," a *Gundlachia beddomei* is mentioned as described "since 1881" by Petterd, which form is asserted to be "undistinguishable from *Gundlachia petterdi*." I believe that I am correct in stating that no species has ever been described under this title. The Quarterly Journal of Conchology contains, in Vol. iv, p. 150, a notice of a new and nameless mollusc by W. F. Petterd, dated Nov., 1883, and evidently relating to the form written of by Johnston.

Prof. Tate recorded (Proc. Roy. Soc. Tasmania, 1884, p. 216) *G. petterdi* from the hill streams of the Mount Lofty Ranges near Adelaide.

Finally, in a paper I have had the honor of communicating to you this evening, Suter declares the existence of an undetermined and probably new species from New Zealand.

The broken range of *Gundlachia* has attracted the attention of several conchologists: Petterd (Journ. of Conch., i, p. 399), Fischer (Manuel, p. 251), Tate (Rep. Austr. Assoc. Adv. Sci., 1887, p. 325), Spencer (*op. cit.* 1892, p. 96), and Suter (N. Z. Journ. Sci. iii, p. 252) have each commented thereon. The fluviatile mollusca of Southern Australia have, strange to say, a stronger likeness to those of New Zealand than to those of the northern part of this continent. *Amphipeplea*, *Potamopyrgus* and *Gundlachia* are confined to Tasmania and to the south-east fringe of Australia; they all reappear in New Zealand, but the *Vivipara* and *Melania* characteristic of tropical and subtropical Australia have failed to accompany them there. The extension of *Potamopyrgus*, *Gundlachia*, and, according to Tate, perhaps *Annicola*, with another Australian genus, *Mycetopus*, to America is even more remarkable.

To explain similar instances, Mr. H. O. Forbes (to whose courtesy I am indebted for a copy of this very interesting paper) has lately revived the theory of an Antarctic continent, and supports it by several weighty arguments, notably the presence in the Patagonian Eocene of marsupial remains nearest allied to those now existing in Australia. A strip of land, with a mild climate, extending across the Pole from Tasmania to Tierra del Fuego, would have afforded a

possible route² for the migration from America to Australia of these Tertiary marsupials. But such a land could not have been connected with New Zealand, or the marsupials would have wandered there also. A great southward extension of Tertiary New Zealand, considered probable by Sir J. Hector,³ would, however, have availed to people the latter with much of the fauna and flora of the supposititious Antarctic land, in the way that European plants are believed to have reached the Azores.

This theory of the origin of Australian marsupials would also account for the discontinuous distribution of *Gundlachia*.

The Australasian members of the genus known are *G. petterdi* Johnston, *G. beddomei* Petterd, MS., and *G.* sp. undetermined, and probably new, from New Zealand.

At present *G. petterdi* appears to be known, as adult, from only three localities: a small, shallow, stagnant pool near the First Basin, South Esk River, Launceston, Tasmania (Johnston and Petterd); a hill stream at Mt. Lofty, S. A. (Tate), and a chain of shallow, stagnant ponds behind the sandhills at Henley Beach, near Adelaide, S. A. (Adcock, Pulleine and Hedley). In this latter locality they were associated with *Planorbis*, *Bulinus* and *Ancylus*, the latter only determined by the shell. Their habit was to cling to drowned leaves and sticks, or to the submerged leaves and stems of water plants. So closely do they resemble *Ancylus* that a careful observer may, in the field, easily mistake one for another.

The precise mode of the growth of the shell does not seem to have been related by any writer. Johnston says (Proc. Roy. Soc. Tas-

² Had the alternative route advocated ("Island Life," 2nd ed. p. 497) by Wallace, "over what is now the Java Sea," been used by the marsupials, then Timor and the South-Eastern Austro-Malayan Islands should, as Forbes logically remarks, have preserved some remnants of the migrants amid surroundings so like Australia (Vol. iii, p. 22, Supplementary Papers, Royal Geographical Society, 1893). Spencer has demonstrated (Rep. Aust. Assoc. Adv. Sci., 1892, p. 118) "that the diprotodonts had their origin in the Euronotian region," which also seems to me, though not to him, to indicate the south rather than the north-west as the point of marsupial ingress into Australia. In his latest paper Prof. Zittel says (Geol. Mag., Nov., 1893, Vol. x, p. 512): "For its [*i. e.*, Australia's] connection at one time with South America, the abundant occurrence of fossil marsupials in the Santa-Cruz beds of Patagonia is valid evidence." See also Lydekker, "Nature," May 5, 1892, Vol. xlvi, pp. 11-12.

³ Address to the Geological Section of the Aust. Assoc. Adv. Sci., Adelaide, 1893.

mania, 1878, p. 24): "In the young state the shell is simple and resembles the common *Ancylus* in the same neighborhood."

From the fact that *Ancylus woodsii* (*op. cit.* p. 23) is omitted by its author from his last catalogue (*op. cit.* 1890, p. 145) I infer that he now considers that name to be a synonym, and further that he considers it a synonym of *G. petterdi*. If so, it is a matter for regret that Mr. Johnston has withdrawn his species in a manner to confuse a student of his writings.

The published figures of the juvenile shell only represent the stage at which the septum is completed and the secondary growth is about to occur. Thanks to a series of specimens collected by Mr. Suter in New Zealand, which probably represent the fry of an undescribed species, I am enabled to detail the process. My friend supposes that in unfavorable circumstances a septum is never formed, a view which his American experience had already suggested to Gibbons. If this be the case, and *Gundlachia* sometimes continues to regularly enlarge the ancyliform shell, then only an anatomical examination could distinguish between the genera; and, although several supposed species have been named, and more or less adequately described as Australian, yet this hypothesis would require proof of the existence of *Ancylus* in Australia.

The first deviation shown by young *Gundlachia* from *Ancylus* consists of a fold appearing at the posterior end of the aperture. No increase occurs round the rim of the ancyliform shell until the fold is built into a septum flooring half or two-thirds of the original shell. This septum is flat and grows asymmetrically, the right margin advancing before the left. At this stage the shell has much resemblance to a spectacle-case, and has been well figured by Pfeiffer. Vigorous growth now occurs; in front, but in an altered plane, the margin of the ancyliform shell is continued outwards, behind, the shell is spread beneath the septum floor to form the roof of the secondary shell, then leaving the septum it is abruptly bent downwards. A slight inclination to spiral growth is shown by the increase on the right exceeding that on the left.

Stimpson suggests "that the *Gundlachia* commences its life as an *Ancylus*, . . . it passes the first summer and autumn of its existence in this smaller shell, and that the septum, which afterwards partially closes its aperture, is formed during the period of inaction which ensues during the winter. This septum would, in some degree, serve as a protection to the mollusc during this period, in the

same way as the epiphragm of the *Helices*. In the following spring—the period of greatest activity in growth with all the fresh-water Pulmonates—the animal throws forth its newer and larger shell, retaining the older one on its back for the protection of its more tender viscera.”

I regret that I can give but a meagre account of the soft parts. My only material was some specimens procured at Adelaide, which died on the voyage to Sydney, and were hastily and badly preserved on board the steamer. * * * Part of the liver and the hermaphrodite gland are pinched off into a sort of tail, which occupies the primary shell. With this exception, as Gundlach and other observers have remarked, there is no difference from *Ancylus*. The form and disposal of the stomach and intestines seemed, as well as I could ascertain, to agree with those of *Ancylus* figured by Moquin-Tandon.

Jaw extremely minute and frail, about $\frac{3}{4}$ the length of the radula, very narrow, composed of a great number of separate imbricating plates, which appear to be arranged two deep, in contact but unattached; each is oblong in shape and serrate at one end, resembling somewhat the scales on some butterflies' wings.

The difficulty of observing this tender and incoherent organ will account for the uncertainty that prevails regarding it. Troschel saw it, described it, and then unfortunately concluded that it was a piece of hardened skin. Stimpson failed to find it. Johnston noticed it in *G. petterdi*. In *Latia* Hutton asserts (Trans. N. Z. Inst., XIV, p. 156) that no jaw exists; it has more probably been overlooked.

Radula a narrow parallelogram, very small, measuring about 3×1 hundredths of an inch. Formula, 70 rows of 8:12:1:12:8. Each half row straight, meeting at a low angle in the centre. Rachidian with a long, slender basal plate, rounded and slightly expanded posteriorly; reflection about a fifth of total length, bicuspid. Laterals with broad basal plates, emarginate at the proximal posterior corner, sloping away from the rachidian, reflection somewhat pyriform, the wide end proximal, set aslant on the basal plate and armed with a large proximal and two minor distal cups. Marginals more upright, with reflection of same pattern, but extending almost the length of the basal plate.

CONCLUSION.—The genus *Gundlachia* contains four American—*G. ancyliformis*, *meekiana*, *californica*, *crepidulina*—and two Aus-

tralian species—*G. petterdi* and *beddomei*. It is nearly allied to *Ancylus*, from which it differs anatomically by a distinct pattern of radula, and conchologically by its compound shell. The existence, variously affirmed and denied, of a jaw, is now demonstrated by figures. It has been suggested, but not proved, that in unfavorable circumstances the shell never attains its compound development, but remains simple. From an *Ancylus* of the same size the subcentral nucleus and regular elliptical outline distinguish young *Gundlachia*.

A fuller knowledge of the development and structure of the genus is very desirable.

The nearest, in phylogenetic array, to *Gundlachia* are probably the New Zealand *Latia* and the Tasmanian *Ancylastrum*. Should Hutton's *Latiide* win acceptance, which seems doubtful, it might include these.

The distribution of *Gundlachia* agrees in part with that of the recent marsupials, and the theory of a Mesozoic or older Tertiary migration to or from Australia across the south pole, when a lost land with a mild climate united Tierra del Fuego to Tasmania, would explain its present position.

A NEW MEXICAN BYTHINELLA.

BY HENRY A. PILSBRY.

Bythinella palomasensis.

Shell small, ovate, rapidly tapering above from the periphery of body-whorl to a blunt apex; composed of four very convex whorls, the last about five-sixths the entire length of the shell, well rounded out. Surface showing faint growth-wrinkles only. Aperture ovate, subangular above, its longest axis about half the length of the shell; peristome thin, continuous across the parietal wall and nearly straight there, although not appressed to the body-whorl. Umbilicus minutely perforated. Color whitish corneous and somewhat translucent.

Alt. 2.75, max. diam. 1.80 mm. Longer axis of aperture 1.36 mm.

Two specimens from Lake Palomas, northeastern Mexico, collected by Dr. E. A. Mearns, U. S. A., of the International Boundary Commission. One of the two specimens has the latter third of a

whorl free from the body, as in *Lyogyrus*, a somewhat common pathologic condition in species of this and allied genera; but in the other and evidently normal specimen the peristome is quite free from the adjacent body-whorl, not appressed thereto. Neither example retains the operculum or dried soft parts, and therefore the generic reference cannot be verified by examination of the dentition, but the figure of the shell is that of a *Bythinella* rather than of an *Ammicola*.

It is a stumpier species than *B. binneyi* Tryon, and has far less inflated whorls than *B. brevissima* Pils., but these two species are conchologically its nearest allies among United States species. Of the short-spined Mexican forms, *Ammicola orizabensis* C. & F. is totally diverse, although the figures in Crosse & Fischer's work (pl. 50, fig. 4, *a, b*) look somewhat like this species. *A. guatemalensis* C. & F. is larger, with relatively smaller aperture.

ISAAC LEA DEPARTMENT.

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

Every week the General Secretary receives letters from the members of the Chapter telling of the benefits of Chapter membership.

A good rule to follow in exchanging specimens is this: "Give a little more than you receive." The one who exchanges merely to add to the number of shells in his own cabinet, loses one of the great pleasures in life—the blessedness of giving pleasure to others.

NOTES ON SHELLS.

[Report of Mrs. E. C. Soper. From the Transactions of the Isaac Lea Conchological Chapter of the Agassiz Association for 1894.]

My enjoyment in studying shells is greatly lessened by the fact that to obtain good specimens I must collect those that are "alive," and then go through the intensely disagreeable operation of killing the helpless animals. Though, as we are told, they are not so sensitive to pain as the higher organisms, yet the poor, writhing, quivering creatures appeal to my pity in a very great degree.

However, men's cruelty, perhaps, does not surpass or equal that of the winds and the waves, and of the stronger animals that prey upon

the weaker; but, until I overcome my repugnance to the killing and dissecting of molluscs, I shall take more enjoyment in studying their homes than in getting acquainted with the inmates themselves.

Being a new member of this Society, and also a novice in conchological lore, I can hardly hope to write anything of much interest to the older members, but, perhaps, the younger ones may care to hear about some of my most interesting (to me) "finds." * * * * I shall never forget an expedition, taken in the early part of this year ('94), to Long Beach, in company with a friend, when our enthusiasm for collecting had just begun. Leaving Long Beach a short time before noon, we started to walk to Alamitos Bay, neither of us knowing the distance. We picked up so many shells that, before we were half way there, we were very tired; but determined to reach our destination, we pressed on, were caught in a shower, and finally reached the bay more dead than alive, judging from our feelings. We found nothing very valuable, but we fairly staggered under the load of shells we carried home, which place we did not reach until after dark. We were told the distance was five miles each way, and we believed it.

Last summer, during a trip taken with the Chatauqua Assembly School in Conchology, I picked up a shell near a fisherman's cottage on Tim Point, which proved to be a small specimen of *Siphonalia kelletti* Fbs. While cleaning it, I noticed, about two inches from the lip, on the inside, a rusty looking spot, through which the water trickled. After using quite a quantity of acid to take off the accumulation of foreign matter on the outside which nearly hid the form of the shell, I discovered opposite the rusty spot, and imbedded in the hard shell, a tiny mussel, half an inch long. I thought I had made a discovery; but, alas! on turning to "West Coast Shells," I found that these little mussels grow sometimes in large shells. I think it is *Adula stylina* Cpr., but so small and delicate! How did it carve a home to fit it so perfectly?

I have taken a good deal of pleasure in rude attempts to draw and paint some of the more simply formed shells, but I find it is difficult to reproduce them faithfully.

When in San Francisco, I had the privilege of a day in the Academy of Sciences, of looking at Tryon's magnificent work, which was beautifully illustrated in colors. I also had the pleasure of visiting Mill's College and the University at Berkeley, and of seeing the collections of shells at both these institutions, and I shall

always remember the courtesy shown to me, and the kindly interest taken in my growing desire to know something about conchology by those who have long made it a study.

MRS. MARY P. DARLING has collected, at the various beaches in Los Angeles County, and reports "one hundred and eighty-three species; among them are a live *Calliostoma splendens* and a dead *Nassa insculpta*."

WITH A DREDGE.

[Report of Miss Ida M. Shepard. From the Transactions of the Isaac Lea Conchological Chapter of the Agassiz Association for 1894.]

I have added a number of specimens to my collection during the year, and had the pleasure of dredging in the bay, with very good results. It is with impatience we wait the dredge to fill, after dropping it over the stern of the boat; and when it comes up filled with mud how we watch and exclaim over some treasure we see as the mud is being washed out. But often we find nothing, and often many good and rare specimens. I will tell you of what a few dredges contained. After the dredge is pulled up and the mud washed out, the contents, if any, are dumped into the tub, and we look it over, and find nothing but a stone or two and a few *Olivella boetica*, *Tornatina culcitello*, and young *Rictaxis punctocaelatus*. After the dredge was dropped over again, I picked up a small stone and looked it over, and soon gave an exclamation of delight, for, on one side, snugly in its nest, was a fine, large *Lima orientalis* Ad. & Rve. It did not take long to cut the nest from the stone and put it into a jar of sea-water, and before we reached the shore the Lima came out of the nest and swam around the jar. I wish I could give a good description of what a beauty it was swimming. Will do the best I can. About $\frac{2}{3}$ of the length of the shell the tentacles are of a bright rose color, the rest pure white, and, as it swam around, its beauty can be imagined. The tentacles are about $\frac{1}{4}$ inch in length. It would put out its foot at times to help it along.

Another dredge brought up a fine, large *Clidiophora punctata* Cpr., and it gave an exhibition after being put into a cup of sea-water and sand. Other dredges gave live *Dentalium hexagonum* Sby., *Scala hindsii* Cpr., *Eulima micans* Cpr., *Mangilia variegata* Turbonilla tridentata, *Macoma yoldiformis*, and the pretty *Tellina variegata* Cpr.

Besides dredging comes the collecting of fine *Lunatia lewisii*, *Fissuridea aspersa*, *Acmæa pelta* var. *hybrida*, *Acmæa pelta* var. *naceloides*, *Diplodonta orbella* and nests; *Lacuna carinata* and two finds of over 150 *Terebratella transversa*. Then dead specimens, in good condition, of *Cadulus fusiformis*, *Parthenia armata*, *Rissoina infrequens*, *Felania sericata*, with quantities of rich drift, not yet sorted, which doubtless contains many rare specimens new to my cabinet.

GENERAL NOTES.

MR. CHARLES W. JOHNSTON left Philadelphia, September 24, for an extended geological trip in the Eocene regions of Louisiana and Texas.

DR. WM. H. DALL has published a resumé of the results of his systematic studies on *Mastridae* and *Mesodesmatidae* in the last number of the Proc. Malacological Society of London.

PROF. GILBERT D. HARRIS has been spending some time in Philadelphia studying and remounting Lea's type collection of Claiborne Eocene fossils.

ACANTHOCHITES MATTHEWSI *Bednall & Pilsbry*, described in THE NAUTILUS for February, 1894, from "South Australia," was found by me in St. Vincent's Gulf at Giles' Point, south Yorke's Peninsula, at an unusually low tide.—*E. H. Matthews*.

EPIPHRAGMOPHORA CALIFORNIENSIS VAR. CONTRACOSTÆ.—Smaller than var. *diabloensis*, but of the same depressed form; light yellowish straw-colored, with or without a dark band; surface rudely striate and cut by irregular spirals into small granules; not malleated or slightly so. Whorls $5\frac{1}{2}$; outer lip *thickened*, hardly expanded, white, basal lip expanded and a trifle impinging on umbilicus, which is deep and rather widely open, somewhat as in *Polygyra kiawaensis*. Locality, Byron Hot Springs, Contra Costa Co., California.—*Pilsbry*.

EPIPHRAGMOPHORA REMONDI Tryon.—This species is, as Cooper and von Martens have lately recognized, quite distinct from *carpenteri*. Ancey's *H. verrilli* (Conch. Exch.) is a synonym of Tryon's species, Ancey having been misled by the misidentification of *Rémondi*, which has prevailed since the publication by Gabb of his Lower California finds.—*Pilsbry*.

THE NAUTILUS.

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No. 7

ON *DOLABELLA CALIFORNICA* STEARNS.

BY HENRY A. PILSBRY.

The genus *Dolabella* has long been known as an inhabitant of the Indian Ocean and Polynesia, but it had not been reported from American waters until Sowerby described the shell of *D. guayaquilensis*, from Guayaquil, in 1868.

In 1879 Dr. R. E. C. STEARNS described a *D. californica* from Mulege Bay, Gulf of California, but unfortunately the shells only were available for his study. They were found by Mr. W. J. Fisher "in pools left by the tide" at the locality named.

Part of the specimens collected by Fisher were secured by Mr. W. N. Lockington, and presented to the Academy, in alcohol; so I am enabled to give below a description of the animal of this interesting addition to the West Coast fauna, which proves to be nearest allied to *A. tongana* and *ecaudata*, Polynesian species.

The dentition of *Dolabella* is excessively peculiar, and together with the unusual position of the genital orifice, necessitates the formation of a new subfamily, *Dolabellinae*, for this genus.

D. californica Stearns.

Description of alcoholic specimens:—Length 12 to 14 cm. Oblong-ovate, broadly rounded behind, Aplysia-like in front. Buccal tentacles ear-like, short and folded about at the middle, not produced toward the mouth; tentacles conic and slit; the very minute

eyes in front of them and more separated. Mouth a vertical slit in a papillose disk. Swimming lobes arising at or behind the middle of the animal's length, contiguous. Posterior subcircular area defined by a groove with smooth, raised anterior edge, and enclosing a cord. Mantle having a large shell-foramen and a long posterior siphonal fold. Genital orifice under the back part of the gill.

Color (in alcohol) dark olive, or dull brown with more or less black maculation. In life it is said to be "a dark brown and the surface covered with warty papillæ."

Shell solid, with a brown cuticle. Apex with a roughened reflexed callus, continuing along the dorsal margins as a reflexed border over the cuticle.

In external appearance, this species seems nearest to *D. ecaudata* and *tongana*, but the posterior area is defined by a far less conspicuous frill, which does not extend to the edges of the dorsal slit. *Dolabella guayaquilensis*, a species known by the shell only, is stated to have the margins "scarcely reflected, callus small, narrow, not continued upon the margins," while in the present species the margins are bounded by unusually broad reflexed callous bands. Traces of sparsely scattered wart-like papillæ are visible on some specimens, mainly posteriorly, but these are not very distinct in the alcoholic examples. Two of the original lot collected by Fisher are before me, the smaller one being drawn in my figure, and another specimen of a dark olive color collected by Dr. W. H. Jones on the "West coast of Mexico," has also been examined.

DESCRIPTIONS OF NEW PISIDIA.

BY DR. V. STERKI.

In looking over more than 20,000 specimens of *Pisidium*, during the last twelve months, the writer came across numerous new forms, and many of them will prove to be new species. But, as some of those already published are not fixed beyond a doubt, owing to insufficient descriptions and figures, and lack of reliable originals, and as new forms are constantly coming in, it will be advisable not to hurry with publications. Yet a few of these new species were seen from so many different places, and come to hand again and again that it is too unsatisfactory to return them without or only with MS.

names. Besides, they are not doubtful species, being well defined and distributed over wide areas. Mr. E. W. Roper having examined specimens wished the writer to publish these species.

The descriptions will not be exhaustive, especially as to the hinges, leaving that, as well as figures, for a monograph, but they will be sufficient for recognition of the species.

P. WALKERI n. sp. Mussel of medium size, elongated, rather inflated, resembling *P. abditum*, but is smaller than good sized examples of that species; it is also more elongated, and the smaller and moderately prominent beaks are more posterior; thus the anterior part is comparatively very long, with the end rounded, the posterior quite short, truncated at the end; scutum and scutellum well marked. The shell is very thin, translucent, the surface very finely, and sharply striated, often somewhat scaly, dullish, or with a silky gloss; color grayish, along the margin more or less yellowish horn. Hinge moderately strong, of the same type as in *Pis. abditum*; cardinal tooth of the right valve moderately curved, its posterior part thickened and with a deep furrow; below this tooth, there is a deep groove formed by the inferior edge of the hinge list raised; and the same formation is in the left valve below the deep groove between the two cardinal teeth; ligament comparatively strong.

Long. 4.5, alt. 3.7, diam. 2.8 mill.

In outline, our species has some resemblance with *P. virginicum*, by its elongate shape, the beaks situated posteriorly, the long and below somewhat sacciform anterior part. But it is much smaller, its shell quite thin, the hinge finer, the striation finer and the beaks are much smaller.

P. walkeri is quite a characteristic and beautiful species which cannot be mistaken for any other. It has a wide geographical distribution but seems to live not in great numbers together, as e. g. *P. abditum*, *compressum* and others do. For the first time I found it in a lot of *Pisidia* from Kent County, Michigan, in the collection of Mr. Byrant Walker—in whose honor it has been named—, and in another from Utica, Mich. Later it was seen from Grand Rapids, Mich. (L. H. Streng), Columbia, Pa. (Bryant Walker), Mohawk, N. Y. (in E. W. Roper's collection, from E. R. Mayo); Clearwater and Mississippi rivers, Minn. (H. E. Sargent).

P. POLITUM n. sp. Mussel of medium size, well inflated, rather high, beaks slightly posterior, rather high and prominent, not full but well rounded; scutum and scutellum slightly marked. Supe-

rior margin rather short, rather strongly curved; inferior well curved, more so in front than behind; posterior margin distinctly truncated, with a well marked angle where joining the superior, and a less marked, rounded angle where joining the inferior margin; anterior end forming a slight but distinct angle situated rather high up. Surface very finely, irregularly striated, polished; whitish or straw colored, often leaden-grayish on the beaks, or even all over. Shell moderately thick, nacre whitish; muscular insertions not very distinct; hinge of essentially the same type as that in *Pis. abditum*.

Long. 4.0, alt. 3.4, diam. 2.4 mill.; 4.7 : 4.0 : 2.9 mill. from another place.

Pis. politum is rather variable in size, and more so in color as noted above, but so markedly constant in its several habitats that a number of different local forms, or varieties could be described. It has some resemblance with *Pis. abditum* Hald. and *Pis. variabile* Pr.; from the former it is different by its being somewhat smaller, comparatively shorter and higher, the beaks being less full, the surface finer striated and more polished; from the latter it is distinguished by its smaller size, the beaks being less full, the antero-superior margin less straight, and the angle at the anterior end being situated higher up; the shell is thinner and the hinge less strong, the coloration different. With all these differences appearing only gradual, our *Pisidium* is a good species beyond a doubt and will always be recognized.

It was found, in May a. c., in the outlet of a small peaty swamp near New Philadelphia, Ohio, about 200 specimens, in company with *Pis. abditum*, *varibile* and *compressum*, all, when fresh, being of a remarkably uniform color and appearance; Philadelphia, Pa. (Morris Schick); Grand Rapids, Mich. (L. H. Streng); Joliet, Ill. (Jas. H. Ferriss); Clearwater River, and Dallas Lake, Minn. (H. E. Sargent).

P. MILIUM Held. This is not a new species, but new to our country. A number of specimens from East Twin Lake, at Charlevoix, Michigan, dead shells but in perfect condition, in the collection of Mr. Bryant Walker, were, after careful comparison, found to be congruent, in shape and appearance, as well as in the hinge characters, with one of the larger forms of *Pis. milium* from England, so that there can be no doubt in their identity.

New Philadelphia, Ohio, Oct., 1895.

EDITORIAL CORRESPONDENCE.

Natchitoches, Louisiana.

October 6, 1895.

My first work was two miles below Mabelvale (12 miles southwest of Little Rock, Arkansas) along Fourche creek; an outcrop of Eocene limestone of the Midway or Clayton stage occurs here, containing *Enclimatoceras ulrichi*, *Ostrea pulaskensis*, *Cucullea microdonta*, *Cytherea* sp., *Venericardia planicosta*, etc., etc. Most of the fossils consist of casts only, and are difficult to obtain from the hard limestone. The situation was very favorable for land shells, however, and the heavy rain of the day before had caused the snails to start from their hiding places and I found them very abundant, crawling over the rocks and leaves. *Helicina orbiculata*, *Polygyra thyroides* var. *bucculenta*, *Polygyra inflecta* and large fine specimens of *Zonites friabilis* were particularly common, while a search brought to light *Polygyra stenotrema*, *Polygyra divesta*, *Selenites concava*, and *Pyramidula alternata* var. *mordax*. The whole bluff was strewn with dead shells, and in turning over a log one of the enemies of the Helices was found, a large beetle of the genus *Cychrus*.

At White Bluff on the Arkansas River, in Jefferson Co., Arkansas, is a bed of Upper Claiborne. The principal fossils collected were *Venericardia planicosta*, *Nucula ovula*, *Cytherea discoidalis*, *Corbula nasuta*, *C. oniscus*, *Turritella arenicola* var. *branneri*, *Turritella clevelandia*, *Pseudoliva vetusta*, *Lævifusus branneri*, *Volutilithes petrosus*, *Solarium bellastriatum*, a fine series of *Mazzalina inaurata*, and many others, altogether probably 25 or 30 species.

At Vince Bluff on the Saline River in Cleveland Co., Arkansas, is a small exposure of the Jackson bed from which about thirty species were obtained. The river was very low and in many places paved with Unios. As it was getting late, and a drive of eleven miles was before me I had very little time to collect; but upon cleaning the "catch" next morning, found I had the following species: *Unio pyramidatus*, *U. crassidens* (?), *U. trigonus*, *U. camelus*, *U. turgidus*, *U. pustulosus*, *U. near castaneus*, *U. plicatus*, *U. cornutus*, *U. metanever*, *U. trapezoides*, *U. securis*, *U. hydeanus*, *U. aberti*, *U. tuberculatus* *U. near satur*, *U. gracilis*, *U. purpuratus*. The first five species were abundant and many of the others would prove equally so with more thorough collecting. It is an ideal spot for a "Uniologist." *Campeloma subsolidum* Anth. and *Fleurocera elevatum* were also abundant, and among the former I find one specimen of *Vivipara subpurpurea* Say.

My next collecting was done at Mt. Lebanon, Bienville Parish, Louisiana. This is the locality discovered by Mr. T. Wayland Vaughan, and through his kindness in giving me the exact position of the bed, I was able to find it, after considerable digging, as the banks had caved down. I succeeded in getting a very interesting lot of fossils, including fine specimens of *Anomia ephippoides*.

While waiting for a train as Shreveport I took a stroll along the Red River and a small tributary ("Lake") to the north of the city. Nothing was to be found along the river except quantities of dead Helices, etc. among the flood-debris, but which have practically no value, as their habitat may have been Arkansas, Texas, or Indian Territory. Along the shores of the "Lake" I found some beautiful specimens of *Unio alatus* and *U. anodontoides*; and *Campeloma sub-solidum* and *Vivipara subpurpurea* were quite plentiful. Although the Red River was extremely low, the ever-changing bars and the freshet-swept shores are unfavorable situations for mollusca; while in the smaller rivers and tributaries they are abundant.

CHARLES W. JOHNSON.

NOTE ON THE GENUS JOANNISIA.

BY W. H. DALL.

In the Transactions of the Wagner Free Institute of Science vol. III, p. 545, April, 1895, I proposed the name of *Joannisia* for *Cyrenella oblonga* Sowerby and another Philippine island species which had been referred to *Cyrenella* (or *Cyrenoida* Joannis) as the hinge of these species is quite different from that of the original type of *Cyrenella* (or *Cyrenoida*). The Marquis de Monterosato kindly calls my attention to the fact that in 1888 he had used the name *Joannisia* for a genus typified by *Tylodina citrina* Joannis (Nom. Gen. Con. Medit., p. 149).

I would therefore modify the name as applied to the Philippine bivalve to *Joannisiella*.

ISAAC LEA DEPARTMENT.

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

Before the November issue of THE NAUTILUS each member of Chapter will have received a copy of our new printed list of members. A number of new names appear upon the list.

Please bear in mind that our Chapter reports are due next month (December). It is expected that our volume of Transactions will be very large this year. Write only on one side of paper eight by ten inches in size. Leave a margin of one and one-half inches at the left. Every member is expected to send in a report. A short one will be better than none.

The election of officers for the Chapter also occurs in December. The President and General Secretary, who also acts as Treasurer, are the officers to be elected. Those who have not paid dues in advance will please bear them in mind.

RAISING BABY SNAILS.

[From the Transactions of the Isaac Lea Conchological Chapter.]

Prof. Keep once inquired, in the *Popular Science News*, "Did any one ever raise baby snails?" I copy from an old note book:

"May 24, 1886, *Mesodon thyroides* deposited forty-three eggs. All hatched between 4 P. M., June 8 and noon June 9. June 23 found fifty-seven eggs." They were in two nests, and I probably removed the mother before her day's work was done, as I found fourteen more immediately after, making seventy-one. "July 11, sixty-nine. July 20, forty-seven." Whole number deposited in four days less than two months by one snail, 230.

Those hatched June 8 show, on July 1, small umbilicus, $2\frac{1}{2}$ whorls, and on July 8, three full whorls. July 23, four whorls, umbilicus partly covered. Shell so thin it is almost impossible to handle.

The following January, nearly five whorls, lip thickening and slightly everted. Callous on the body-whorl, but no tooth.

If any one interested in the study of mollusca could raise young, from any or all species in their vicinity, it would not only be instructive, but would save time and patience, when an undeveloped shell is found, in trying to find out what it is. The tiny youngsters have sometimes very little resemblance to an old one. I am rarely without one or two colonies.

MY FIRST YEAR COLLECTING AND STUDYING SHELLS.

[Report of H. Lowe. From the Transactions of the Isaac Lea Conchological Chapter of the Agassiz Association for 1894.]

My knowledge of collecting shells is quite limited as I have only studied conchology for about a year. I have collected chiefly at Long Beach and San Pedro, but prefer the latter place for collecting as it offers a great variety of beach, rocks, sand and mud flats. At Dead Man's Id. are to be found rock shells in abundance, the *Chlorostoma*, *Monoceros*, and *Littorina* clinging in dark patches on the rocks of the breakwater, while among them are bright red starfish and Chitons.

The *Pomaulax undosus* are also plentiful, for at one time I picked up thirty-five living specimens in one place. On the great pieces of kelp which are seen floating in the tide pools, are often found colonies of the beautiful *Norrisia norrisii* with their strawberry colored bodies extended from the shell.

I have found beautiful live specimens of *Semele decisa* in sand between the rocks on the Bay side of Dead Man's Id. and good specimens of the *Cordium quadragenarium* in the mud flats. *Olivella biplicata* may be found at low tide between Rattlesnake Id. and Terminal Id.

Most of the shells of Alamitos Bay are bivalve, while those of San Pedro and Dead Man's Id. are mostly Gastropods.

This Summer *Neverita reclusiana* has been quite plentiful for I found one hundred and twenty-five in one morning at the Donax beds at Long Beach, and I found it quite true as Prof. Keep says, that the Natica eat clams for I caught them while boring into Donaces. * * * * * Among other interesting relics which I found this Summer was the house which the *Oedalina subdiaphana* Desh., builds. It is made of sand and some substance which holds the sand together and covers the shell completely except for two tiny holes left for the siphons. It is about an inch long, and may sometimes be seen lying on the mud flats at Alamitos Bay, and resembles lumps of sand. The shell of the little mollusk which lives inside is pure white and very delicate, the lines of growth are distinct and the ligament is internal.

You may have wondered in walking along the beach, what the curious formation of sand, looking like a horse's hoof was. By some

people they are called "sand dollars." I was greatly puzzled over them till this summer when I learned, at the Conchology Class of the Chautanqua Assembly what they were. They are the egg cases of the *Natica* and are full of microscopic eggs mixed with the sand. Sometimes on top of the egg cases are found the eggs of the *Nassa* lying in long rows.

NOTICES OF NEW PUBLICATIONS.

ON THE STRUCTURE AND AFFINITIES OF SOME NEW SPECIES OF MOLLUSCS FROM BORNEO.—By W. E. Collinge and H. H. Godwin-Austen, P. Z. S., 1895.—This interesting paper gives descriptions and many figures of three new slugs collected by Mr. Everett in Borneo. The fact is brought out, that the slugs of Borneo resemble in their anatomy some of the shell-bearing forms of that island, rather than the Indian slugs to which they show more outward similarity. The first species is placed in *Damayantia* Issel, for all that it has a shell. The suggestion that Issel was mistaken in supposing that his genus was shell-less is probably correct; the present writer had in Ann. Mag. N. H., Jan., 1891, p. 100, suggested a doubt as to the validity of this character by quoting it within inverted commas. Some remarks are given as to *Tennentia*, which is said to be "probably synonymous with Issel's genus," but immediately below is correctly shown to be equivalent to *Mariaella*. It is probable that the authors meant to say that the so-called *Tennentia philippinensis* is a *Damayantia*, but not that *Tennentia*=*Mariaella* is *Damayantia*! If the latter synonymy held, *Mariaella* would of course be the name of the genus, having long priority. The statement that *Dekhanian* G.-A. is the same as *Mariaella* and "must be suppressed" comes rather late in the day, since the present writer had suppressed it, with all due pomp and solemnity, in 1891 (t. c., p. 103-104), and again in the check-list of 1893. The other two species are placed in *Microparmarion*, a genus or subgenus lately instituted by Simroth for a species from Java. Curiously, in making comparisons, *Africarion pallens* is said to be from South India, whereas it was really from Abyssinia, vide Godwin-Austen, Moll. of India, 1883.

Simroth's division of the Javan slugs into *Parmarion* and *Microparmarion* may be justified, but a new name is apparently required

for what he calls *Parmarion*. If we admit that the Javan slugs are not *Girasia* nor *Ibycus*, then they are assuredly not *Parmarion*; for that genus was founded by Fischer on four slugs, one of which is a *Mariella* one a *Girasia* (Indian), one an *Ibycus* (Indian), and the other a *Hyalimax*!

In conclusion, we may cordially echo the author's wish that further Bornean material may be obtained by them, for they have certainly only obtained a glimpse of the undoubtedly rich slug-fauna of that region.—T. D. A. COCKERELL.

REVIEW OF OUR PRESENT KNOWLEDGE OF THE MOLLUSCAN FAUNA OF MICHIGAN, by Bryant Walker (address delivered before the Michigan Acad. Science, Dec. 27, 1894). Michigan has a long Malacological history, for a Western State, beginning with Dr. SAGER, in 1839, who had worthy followers in MILES, CURRIER and DECAMP, successive historiographers of the rich mollusk-fauna of that great State. Other Michigan naturalists—MCNEIL, STRENG, LATHROP *et al.*—have made large additions to our knowledge of the mollusca, not to mention the Eastern authors Conrad, Anthony, Lea, Tryon and others, who described material collected by the ardent and enthusiastic band of Michigan naturalists. All of this is most interestingly related by Mr. WALKER, in this survey of the history of Michigan Malacology. In the notes accompanying his tabular enumeration of all species reported from the State, from all sources, (284 entries), much valuable information is given, but so condensed that no useful abstract is possible. A full bibliography of Michigan conchology concludes the paper.—H. A. P.

A CATALOGUE OF THE MARINE MOLLUSKS OF JAPAN has been issued by Messrs. Frederick Stearns and Henry A. Pilsbry. It is a handsome volume of 204 pp., and 11 plates. Suitable notice of the contents will be given next month.

MOLLUSQUES DE LA BASSE CALIFORNIE, recueillis par M. Diguët-déterminés par M. Jules Mabille (Bull. Soc. Philomathique de Paris, (8) vii, pp. 54-76, 1895). This annotated list comprises both marine and inland mollusks, and many supposed new species. In most cases exact localities are not given. The forms described or mentioned as new are: *Octopus digueti* Perrier & Rochebr.; *Fissurella* (*Cremides*) *pluridentata* and *digueti*, *Patella ænigmatica*, *Crepidula nebulata* Mabille; *Pleurobranchus digueti* and *Doris umbrella* Rochebr.; *Planorbis mysarus*, *Helix indigena*, *steganella*, *invecta*, *digueti*; *H. (Polygyra) solidens*, *triangularis*; *Bulimulus (Lepto-*

byrsus) *lapidivagus*, *dentifer*, *subspirifer*, *dismenicus*; *B.* (*Scutalus*) *acholus*, *cosmicus*, *cacotyceus*; *B.* (*Thaumastus*) *digueti*; *B.* (*Globulus*) *recognitus*; *Berendtia digueti*, *minorina*; *Barbatia nova*, *digueti*; *Perna recognita*; *Anomya* [sic] *simplex* Mabilie; *Plicatula spondylopsis*, *ostreivaga*, *Chama parasitica*, *digueti* Rochebrune. The diagnoses are not accompanied by comparisons with known species, nor are figures given; and the work as a whole, instead of adding to our knowledge of Lower Californian conchology, quite appreciably darkens the subject. There are unquestionably some misidentifications, or possibly mixture of specimens from other localities, among the marine shells; and numerous typographical errors mar the paper. There should be a petition in the litany of all good conchologists against this sort of dilettante trash.

DE L'EXISTENCE DU GENRE BERTHELINIA CROSSE A L'EPOQUE ACTUELLE, par Ph. Dautzenberg (Bull. Soc. Zool. France 1895). In 1875 a peculiar, very small, *Capulus*-like shell was discovered in the Paris Basin Eocene, and named by Crosse *Berthelinia elegans*. It was supposed to be a univalve; but later another was found, and proved to be a *left valve* of the species, which was then transferred to the bivalve family *Aviculida*. The genus has also been surmised to be an embryonic bivalve, analogous to *Sinusigera* in Gastropoda. Now a living representative of *Berthelinia* has been found, and named by M. Dautzenberg *B. Schlumbergeri*, in honor of the discoverer. It is less than a millimeter long, white, with spiral beaks like *Isocardia cor*; the interior is not pearly, but mat, so that Cossmann is probably right in referring *Berthelinia* to *Prasinida* rather than to the pearl oyster group. It was dredged in sand at the island Nossibé, near Madagascar.—*H. A. P.*

NOTES AND NEWS.

DR. WM. H. DALL, Honorary Curator of the Department of Mollusks, U. S. Nat. Mus., has returned from a prolonged sojourn in Alaska, where he has been engaged in an examination of the coal resources of the country.

MUSSELS IN A CITY RESERVIOR.—During the cleaning of the East Park Reservoir, 33d St. and Columbia Avenue, Philadelphia, Mr. J. E. Ives observed numerous *Unio complanatus* in the muddy sediment in course of removal. Specimens presented to the Academy of Natural Sciences by him are well-grown and normal. The water

supply of this reservoir is pumped from the Schuylkill, where this species is abundant; and it was doubtless introduced in the state of free-swimming embryos, which found in the muddy bottom of the reservoir, a suitable station.—*H. A. P.*

PYRAMIDULA ALTERNATA AND GASTRODONTA LIGERA, REVERSED.—In the collection of the late ROBERT WALTON, of Roxborough, Philadelphia, which was presented by his father to the Academy of Natural Sciences, a reversed specimen of each of these species occurs, both taken in the vicinity of Philadelphia. In a former issue we have announced a reversed *Z. cellarius* found by the same ardent conchologist.

Another sinistral specimen of *P. alternata* has been presented to the Academy, a finely developed shell of the size of ordinary adults in this locality. It was found by Mr. JOHN FORD in the West Park (Fairmount) some years ago, in a locality now destroyed so far as snails are concerned.

It would seem that sinistral individuals occur more frequently in *Pyramidula (Patula)* than in our other groups of American Helices. Binney records a reversed *alternata* (Man. Amer. L. Sh. p. 257) in the Museum of Comparative Zoology. I have seen a fine reversed specimen of *P. strigosa*, in the collection of the late Dr. FR. STEIN, of Indianapolis, Ind. I believe that no sinistral specimens of American species of this genus other than those mentioned above, have been put on record, but it is not unlikely that others exist in collections, unrecorded. If so, we would be pleased to hear from their possessors, and to record the occurrence of such sinistral Helices as may come to our knowledge.—Eds.

THE EDITOR has had the pleasure of very pleasant calls from Dr. THEODORE GILL and Prof. A. E. VERRILL, whose attendance at the meeting of the National Academy of Sciences, of which they are distinguished members, brings them to this City of Brotherly Love.

CONCHOLOGISTS who do not already possess a copy of Tryon's "STRUCTURAL AND SYSTEMATIC CONCHOLOGY" should procure it now. This work is indispensable to the collector who wishes to gain an intelligent idea of the affinities or structure of shells, or to classify a collection. The plates illustrate thousands of species representing all of the genera and subgenera, and the text contains interesting chapters on geographical and geological distribution, structure, classification, etc. It is the most complete text book on the subject in the English language.

THE NAUTILUS.

VOL. IX.

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No. 8

NOTES OF A CONCHOLOGIST IN JAPAN.

BY JOHN B. HENDERSON, WASHINGTON, D. C.

It was my good fortune to accompany the Hon. John W. Foster on his diplomatic mission to Japan and China last winter. Official duties and the disabilities placed upon me by a suspicious military guard prevented me from doing very much collecting, although I eagerly seized such few opportunities that came my way to gather in the tempting array of mollusks that generally seemed near at hand.

There can be no more delightful country in the world to collect in than Japan. The natives are always pleasant and courteous and often show a disposition to assist. Even my solemn escort at times so far forgot pride and dignity as to remove their swords and wade in the muddy rice fields to capture the "dobukai." Land and fresh-water shells are abundant almost anywhere. The mountain sides are especially rich in that variable Helicid group of *Eulota* (*Euhadra*) *luhuana*, its many forms and varieties. *Clausilias* cluster together in old stumps, and the rice fields fairly swarm with *Corbicula*, *Vivipara* and *Melania*. One rainy day at Nikko, a coolie brought me a branch of mulberry, upon which seventeen fine specimens of *Euhadra brandti* were crawling.

The only marine collecting I could do was at Shimonoseki, and in the neighborhood of Nagasaki. Both these localities are delight-

fully rich in marine forms, especially the latter point, where a larger number of the true Indo-Pacific species occurs. At Nagasaki crowds of fisherwives and their children go out every day at low tide and gather *Tapes philippinarum* Rv. for the markets. These are found in great abundance on the pebbly beaches of the bay, an inch or so under the surface. At a little fishing village called Mogi, on the Gulf of Simibara, where a small stream meets the sea, I spent two days in a conchological paradise. I shall not soon forget the thrill at my first sight of those splendid Indo-Pacific species alive and moving along, that I had only seen before in collections and figured in books. Here at low tide an exposed stretch of rocky reef was covered with *Monodonta labio* L., *Purpura tumulosa*, *Chlorostoma lischkei* Pils., *Chl. turbinatum* Ad., *Chl. rustica* Gmel., *Turbo coronatus* Gmel., and an occasional *Turbo cornutus japonica* Rve. In the crevices of the larger boulders, hidden from the light, *Euthria ferrea* Reeve clings to the rough surfaces of the granite, and *Litorina sitchana* Phil. must be sacrificed at every step. In the little pools of clear water left by the receding tide, myriads of *Umbonium* glisten in the sunlight like gems, along with the more dingy *Potamides*. Under the stones are hidden all manner of nice things—the usual *Tapes* and a quantity of small species; occasionally a pretty *Calliostoma consors* Lisch., and now and then a fine, large, spiny *Murex* (*M. aricornis*!).

A sand- and mud-bank at the mouth of the little river is most interesting. Among a wealth of species and a profusion of specimens I stood dazed and excited. *Fusus* (two large species), with their brilliant scarlet-red bodies made furrows in the soft sand, and *Siphonalia kelletii* seemed quite as abundant. The large, fine *Polinices ampla* and *Eburna japonica* Sowb. thrive in the half mud half sand. Scattered along the shore and washed in from the deeper waters of the bay I found good specimens of *Hemifusus*, *Rapana bezoar*, *Ranella lampas*, *Triton tritonis*, *Fascolaria trapezium*, *Siphonalia cissidariaeformis* and *longirostris*, *Cassis pyrum* Lam., and *Astraliu modestum* Rve.

Among a number of bivalves I remember, in particular, *Soletellina boeddinghansi* Lisch., *Tellina practexta* Marts., *Arcasuberenata* Lisch., *Cytherea lusoria*, *Cuccella chinensis* Desh., *Dosinea japonica*, *Mactra veneriformis* *Pecten japonicus* and *laqueatus*.

While collecting at this charming spot, I was assisted by a swarm of naked children, who vied with each other in finding specimens,

and whose little, black, oblique eyes could almost see around corners.

The market places usually offer a number of the more common species, among which one can often pick out rarer and more desirable forms. *Eburna japonica* and a large *Cardium* seemed the most favored as articles of diet.

ANNOTATED LIST OF THE MOLLUSCA FOUND IN THE VICINITY OF
CLEARWATER, WRIGHT CO., MINNESOTA.

BY H. E. SARGENT, WOODVILLE, ALA.

PART FIRST—LAND SHELLS.

Having the past summer at our disposal, and needing rest, our plans were laid gastronomically to enjoy the fruits of the old homestead garden, the pride of our octogenarian parent; socially, to renew the acquaintance of relatives and friends of former years, and, scientifically, for our own gratification and perhaps that of our fellow conchologists, to work up as fully as possible the molluscan fauna of the immediate vicinity of our sojourn. The two first desiderata of the vacation were a pre-eminent success, and our friends may be our judges as to the latter.

Clearwater, Wright Co., Minnesota, is situated on the Clearwater River, at its junction with the Mississippi, some 60 miles above the famous Falls of St. Anthony.

The Mississippi, at this point is, at times, deep, rapid and filled with loose logs for the Minneapolis saw-mills. At the time of our investigations it was shallow, quiet and free from logs, thus greatly aiding in our search. Its bed being in the glacial drift, contains but little, if any, lime-rock.

Fine granite is quarried from the outcropping of the Archæan rocks at St. Cloud, only 15 miles above.

The several islands which occur at this point are low and densely overgrown with willows, elms, vines and rank weeds.

Being protected from fires, the undergrowth is a perfect tangle of dead limbs and living weeds. The portions which are overflowed in high water are cleared and more open.

The Clearwater River, a small stream easily crossed dry shod in summer, is from 8–10 miles long, and the outlet of Clearwater Lake. Except in the most rapid portions, it is muddy under its banks, with an occasional muddy slough connected.

Clearwater Lake is a beautiful sheet of water. It is 10 or 12 miles long, from a few rods to 3 or 4 miles wide, and very irregular in outline. Over most of its bed it is pebbly or rocky and quite shallow, many acres in its centre being less than two feet deep. The surrounding timber is quite heavy, and furnishes good retreats for land mollusks, while the maples, elms and oaks, by their abundant shade, keep the soil somewhat moist.

Belle and Heath Lakes, situated two miles west from Clearwater, are small, deep, weedy and muddy, and are typical of several other lakes visited, of which no further mention will be made.

Their floors, at margin, are covered with fine, marly mud deposit, and are heavily overgrown with rushes and white lillies. Beyond the water's edge, the shores are boggy and overgrown with rank grass. The surrounding country is rolling and sandy; timber, scrub-oak, poplar, birch, and other small shrubby trees—and to still further render it unfit for molluscan habitation, it is frequently overrun by forest fires. No shells were found away from the immediate vicinity of the lakes.

Land species were collected at the following stations:

Station B. Belle Lake. Among grass roots on crowns of bogs, unless otherwise designated.

Station C. Clearwater Lake. Sifted from leaf-mould taken from banks of small spring rill.

Station I. Islands in Mississippi River at Clearwater.

Station R. Rockford, Minn., 20 miles south of Clearwater.

Station D. Drift in Mississippi River at Bellevue, Ia.

Station E. Vicinity of Bellevue, Ia.

Valuable assistance has been rendered in verifying and identifying by Dr. Sterki.

1. *Selenites concava* Say. D.
2. *Pseudohyalina milium* Morse. C.
3. *Pseudohyalina minuscula* Binn. R, under chips at water's edge of Crow Creek. B, D.
4. *Zonitoides nitida* Mull. C, under boards among the reeds at lake margin. I, very abundant under fine bark chips at water's edge. E, crawling among weeds near creek.
5. *Vitrea radiatula* Ald. Common at B and C.
6. *Vitrea radiatula* Ald. (albino), very closely resembling *H. binneyana*. A beautiful variety found at both B and C, together with the typical specimens.

7. *Vitrea arborea* Say. C, B, I, R.
8. *Conulus fulvus* Drap. Very plentiful at B and C under decaying logs. I, R.
9. *Strobilops virgo* Pils. C, specimens perfectly colorless. D, R.
10. *Strobilops virgo* Pils. (dark brown variety). At C, in company with, and at B, without typical specimens.
11. *Punctum pygmaeum* Drap. C, B.
12. *Pyramidula striatella* Anth. B, C, I, R.
- 12a. *Pyramidula striatella catskillensis* Pils. Clearwater Lake.
13. *Pyramidula alternata* Say. Under decaying logs at C, I, D.
14. *Helicodiscus lineatus* Say. Very numerous and rather undersized at C, D.
15. *Polygyra (Tridopsis) multilineata* Say. I, E, island in Mississippi River near Bellevue, Ia. At both stations mature shells were very thin and delicate.
16. *Polygyra (Tridopsis) clausa* Say. D.
17. *Polygyra (Stenotrema) hirsuta* Say. D.
18. *Polygyra (Stenotrema) leai* Ward. I, under drift; E, bogs on banks of creek; B.
19. *Vallonia perspectiva* Sterki. I and R.
20. *Ferussacia subcylindrica* L. C, B, I, R.
21. *Pupa pentodon* Say. B, D.
22. *Pupa edentula* Drap. C.
23. *Pupa contracta* Say. B, C, D.
24. *Pupa holzingeri* Sterki. C, D, I.
25. *Pupa curvidens* Gld. C, D.
26. *Pupa corticaria* Say. C, under bark of decaying log.
27. *Pupa armifera* Say. B, on sandy hillside; D.
28. *Pupa procera* Gld. D.
29. *Vertigo ovata* Say. B, C.
30. *Vertigo ventricosa* Morse var. *elatio*r Sterki. B.
31. *Vertigo tridentata* Wolf (1 example, 4-dentate) D.
32. *Vertigo milium* Gld. D.
33. *Succinea ovalis* Gld. C, B, R. Crawling on slough grass.
34. *Succinea obliqua* Say. I, very fine specimens among underbrush and weeds; C, E, on island in Mississippi River.
35. *Succinea avara* Say. I, very abundant under pine bark chips at water's edge.
36. *Carychium exiguum* Say. C, B.
37. *Carychium exiguum* Say. var. R, C.

33. *Carychium exile* H. C. Lea. D, C.

The aquatic species will be enumerated in a second paper.

 DESCRIPTION OF A NEW AUSTRALIAN CHITON.

 BY H. A. PILSBRY.

Chiton Bednalli n. sp.

Oblong, *strongly elevated*, with *acute dorsal keel and straight side-slopes*. Cream-white, with a small flesh-pink spot at each beak, and a sparse mottling of same on lateral areas, the central areas clouded with green. Girdle flesh-tinted with green bars.

Median valves acutely beaked, the beaks hardly projecting on the straight or concave posterior margins of valves, which, at the sides, are *regularly serrated*. Central areas with a narrow, smooth band along the ridge (wider and triangular in valve ii), the pleura with 12 narrow, strong, rounded, longitudinal ribs on each side, separated by flat grooves wider than the ribs; *inner one or two ribs not reaching to anterior margin of valve*. Lateral areas well raised, divided by a median groove (doubled on some valves), *which widens at intervals, forming a series of triangular pits*; traces of somewhat similar pits appear along the diagonal slope, and the posterior border has a series of transverse undulations corresponding to the denticles of the sutural margin. Valve i with about 20 radial narrow grooves, also pitted; and, like the grooves of lateral areas, these do not extend to the beak, which is surrounded by a smooth area. Valve viii with central projecting mucro, the slope behind it very concave; anterior area ribbed, posterior area with pitted radial grooves.

Interior white, blue on the valve-callus. Girdle clothed with convex imbricating scales, rounded in contour, and measuring about two-fifths of a millimeter in width, faintly striated toward inner edge of girdle, blunter and smoother toward outer edge.

Length 25, breadth 11 mm.; angle of divergence 98°.

Yorke's Peninsula (W. T. Bednall).

This species resembles *C. Coxi* somewhat, but differs in the peculiar pit sculpture of the lateral areas. Its nearest ally is a still undescribed South Australian species collected by Mr. Bednall. The coloration described will probably be found subject to variation, as usual.

SOME NOTES ON THE GENITAL ORGANS OF UNIONIDÆ, WITH REFER-
ENCE TO SYSTEMATICS.

BY DR. V. STERKI.

It is generally known that in a group of Uniones comprising a great part of our species, such as *ligamentinus* Lam., *rectus* Lam., *subovatus* Lea, *parvus* Barnes, *nasutus* Say, *rangianus* Lea, *alatus* Say, etc., the females have the posterior part of their *outer branchiæ* peculiarly transformed into "branchial uteri," and also that in consequence of this, in almost all instances the shells of the female specimens are distinctly and decidedly dilated downward at the posterior end, so as to be distinguished from the males at first glance. The degree of difference between the sexes is, however, very different among the several species, but it is constant. For convenient reference in the following, this group is designated as A. There is another group, say B, in which *all four branchiæ* are charged in their totality with embryos, as already shown by Lea for some species,¹ but do not show such marked transformation and change in colors as those of the former group, and cause also no such striking differences in the shape of the mussel, according to the sexes. Examples of this group are: *U. subrotundus* Lea, *pustulosus* Lea, *aesopus* Green, *undulatus* Barnes.

There are some facts of peculiar interest in connection with this grouping. The first is that the animals are propagating at certain seasons quite different for the two groups, as the writer has ascertained by examining thousands of specimens during the last four or five years. In group A the branchial uteri are charged with embryos from late summer to the beginning of winter, and probably in most through the winter, while in early summer they are empty, the embryos having been discharged. At that time the ovaries of the females are charged with ova, and the testes of the males with spermatozoa, while the latter are missing, or quite scarce, in the time from late summer to winter, in which time the embryos attain their maturity in the branchiæ.

In group B, just the reverse is true. During the fall, *i. e.*, about from August, and probably winter, the branchiæ are empty, containing no embryos, while the ovaries are filled with ova, and the

¹ Yet Huxley, in his valuable "Man. Anat. of Inv. An.," says: "In Unio and Anodonta the young are hatched in the outer gill pouches of the parent

testes with the white, creamy sperma (rarely of a different color.) During early summer, the branchiæ will be found filled first with developing ova and then with embryos, which are discharged about in July; at that season the ovaries and testes are sterile. There are slight variations as to the time, but the general rule is as stated.

This radical difference in the season of producing ova and sperma, and maturing the embryos, coincident with the differences of the location and formation of the uterus sacs is highly interesting, the more so as they are in harmony with the differences in the shells, and thus seem to furnish systematic characters of a high order. In group A the mussels are generally more or less elongated, or at least longitudinal, that means with a small angle of torsion of the axis,² the hinge-teeth are moderately strong, and the epiconch is of a vivid color, as a rule, with numerous rays. In B, the mussels are, as a rule, shorter, the axis-torsion is more considerable, the hinge and hinge-teeth are stronger and of a different shape, and the epiconch is generally of a more uniform, dusky color.

Yet there seem to be some real or apparent exceptions, and dissident members of both groups. In *U. lens* Lea and *ellipsis* Lea the propagating organs are of exactly the same type as in group A, and also bound to the same season. In the former, which has often been mistaken for *U. circulus* Lea, the male and female mussels are very different, the latter being strongly dilated downward posteriorly—Lea's figure represents a female specimen well; the shell is also not heavy. In *U. ellipsis* the female mussel is also dilated and more full posteriorly, though not so marked, yet, as a rule, recognizable; the lighter color and green rays of the younger approaches it to group A, and more so, in the writer's opinion, the formation of the posterior mantle edge, which is of the same appearance as in the other species ranging under A.

On the other hand, two species, with an elongated mussel, *U. cuneatus* Barn. (*niger* Rat., *crassidens* v. C. Lam.) and *gibbosus* Barn. range with group B, as to their generative organs, and also in the season, while they at least show no downward dilatation of the female shell (in *cuneatus* it seems to be decidedly higher in general) and their shells are comparatively heavy, the epiconch is of a uniform deep brown or black, though having some green rays when young, as do also *U. subrotundus*, *coccineus* etc.; the shell is very

² More about this feature will be said in another place.

heavy in *crassidens*, and the teeth very strong and of the same type with the other species of group B, while the decided downward curvature at the posterior end in old specimens approaches both species to the same, and removes them decidedly from A.

In *U. multiplicatus* the female was found November 1, with evidently mature embryos filling the uterus sacs, which are of rather the same appearance as those of *U. alatus*, and occupying the most posterior part of the outer branchiæ. Also, otherwise this species is quite different from *U. undulatus* Barn., in spite of the similar appearance of the old mussels, as already pointed out by Say.

A few words about *U. alatus* Say, *laevissimus* Lea and *gracilis* Barn. may be added. Of all three the branchial uteri were found filled late in October, in the former evidently discharging the embryos, and of a rather different formation from that in the two others, while the young mussels of the two former species are very much alike. It is known that in *U. alatus* the female mussel is markedly produced downward, and more so in *gracilis*, while in *laevissimus* it is scarcely distinct from the male.

Besides these two main, and, as it seems, most numerous groups, there are some species of quite different types. In order not to let this article become too lengthy, they, together with *Margaritana* and *Anodonta* will be considered later.

It is probably known to most conchologists that during the first two or three years of life, the genital glands are not developed at all. Yet the specimens are still rather small and young when they begin producing ova and sperma, and the assertion that the presence of embryos is a criterion of maturity of the parent is as far from truth here as it is for the *Cycladidæ*. In group A the filled uterus- or embryo-sacs increase in numbers as well as in size with advancing age of the mother animal. In *U. subovatus* Lea, *e. g.*, 18, 25, 28, 40 have been counted on a side, in specimens of different sizes, and these are probably not the lowest and highest numbers to be found, and correspondingly so in other species. For every one of them there is, however, an average number the rule for an adult, and these numbers are very different for the different species.

The embryos, or glochidia, of many species have been examined and figured long ago, especially by Lea, and they prove to be of rather different forms. Very probably they would be found more or less uniform in the several groups, and with the latter show differences which may also be of value for systematics. Although

having examined some of them, and their development, the writer is not prepared, as yet, to speak in a general way about them.

New Philadelphia, Ohio, Nov., 1895.

NOTES AND NEWS.

NEW RECORDS OF REVERSED AMERICAN HELICES.—I have myself found three reversed Helices. First, reversed *thyroides*. This specimen I sent to the late John G. Anthony for the Cambridge Collection. Second, reversed *multilineata*. This also I sent to Anthony. I now have another reversed *thyroides* in my collection. I also know of a third one, collected near Cincinnati, by the late Mr. Stannage, and also of a reversed *mitchelliana* collected by Prof. F. W. Bryant near Cincinnati.

This makes a list of six reversed specimens of *Mesodon*, which I have seen. Dr. Lewis had a reversed *albolabris* in his collection. This does not indicate that *Patula* has much the start.

—A. G. WETHERBY, *Magnetic City, N. C.*

VITRINA LIMPIDA IN WESTERN PENNSYLVANIA.—The last time I saw you I promised to send you some living *Vitrina limpida* Gld. if my "colony" had not died out, so I send you a dozen and trust they will reach you in good shape.

Last year I only found 12 alive, so feared the "colony" had died out, and, up to to-day, had not found a single specimen this year. It has been exceedingly dry this season, the deficit in rain-fall being nearly 11 inches up to November 1, but yesterday we had a steady, soaking rain; so to-day I started out for *Vitrina* and collected 95 in two hours, so you see, the "colony" is still flourishing in spite of the drought, and burning off the "drift" under which they lived. I think I told you that this "colony" came down the river in the flood of February, 1891, as that was the time the drift lodged in the hollow where they are found, and the Signal Service records show that the '91 flood came from the headwaters of the Allegheny. This is a good example of "dispersal by water," and one that has practically been proved.

To-day was cold and raw, with slight snow-spits (Signal Service record for November 10 show maximum temperature 39° F., minimum 36° F.), so *V. limpida* has the same habits as its European

cousin *pellucida*, *i. e.*, out in cold weather. I noticed one or two eggs among the rotten leaves.

As to the habits of *Vitrina limpida*, they were very hard to find yesterday [Nov. 17], as it was much dryer than a week ago, and most of the shells had crawled into the curled-up leaves. One specimen was busily engaged in making a meal off of the shell of a deceased brother or sister, eating right through the shell as is the habit of the *Zonites*.—GEO. H. CLAPP, *Pittsburg, Pa., in letters.*

THE STEARNS LOAN COLLECTION IN THE DETROIT MUSEUM OF ART.—The citizens of Detroit, Michigan, are to be congratulated upon the addition to their facilities for scientific and æsthetic education, of the great collection of archaeological and ethnological material of MR. FREDERICK STEARNS. We quote the following from the *Detroit Evening News*, of November 1 :

“The occasion which last night emphasized the significance of the gathering at the Detroit Museum of Art is one which the whole Detroit public ought to recognize. It was the formal dedication to the public use of the additional gifts lately made to the museum by Frederick Stearns. The archaeological and ethnological collection which Mr. Stearns placed in the museum last night is in itself valuable enough to entitle the donor to public gratitude, but when it is considered that the presentation of last night’s collection was but an incident in Mr. Stearns’ past relations to the institution, the event places Mr. Stearns among the foremost of Detroit’s public benefactors. The very presence in a community of a goodly number of persons of Mr. Stearns’ tastes and artistic discrimination is a refining influence, but when such a man is willing to contribute not only his technical acquirements and skill, but his pecuniary substance for the common good, the fact goes a long way to negative the current notions about the crime of being rich and refined in taste. The reception of last evening was a recognition in part of the public’s appreciation of its indebtedness to Mr. Stearns’ munificence, but the best and real recognition will be given from day to day by the individuals who are edified and profited by their visits to the museum. The *News* tenders its acknowledgements to Mr. Stearns of all the benefits which he has conferred upon Detroit through his generosity to the Museum.”

We understand that Mr. Stearns is preparing a series of Mollusca for exhibition in a special hall of the Museum of Art.

NOTICES OF NEW PUBLICATIONS.

DESCRIPTION D'UNE NOUV. ESPECE DE MODIOLA (Feuille des Jeunes Naturalistes, May-June, 1895), *M. gallica*, Dautzenberg, from the ocean coast of France.

ON THE VALIDITY OF THE GENUS MARGARITANA. By Charles T. Simpson (Amer. Nat., April, 1895). The author maintains that *Margaritana* is not a natural genus, but is of polyphyletic origin, the species having arisen from various diverse groups of Uniones.

SCIENTIFIC RESULTS OF EXPLORATIONS BY THE U. S. FISH COMMISSION STEAMER ALBATROSS. *Report on Mollusca and Brachiopoda dredged in deep water chiefly near the Hawaiian Islands, with illustrations of hitherto unfigured species from Northwest America.* By William Healey Dall. Eight hauls of the dredge were made by the *Albatross* in between 300 and 400 fms., on approaching Honolulu, securing a number of very interesting new forms of the genera Scaphander, Pleurotoma, Mangilia, Spergo (a new group) Polinices, Solariella, Emarginula, Dentalium, Euciroa, Lyonsiella and Pectunculus. The anatomy of *Euciroa*, *Halicardia* and a new *Lyonsiella* is discussed by Dall at some length, and the important point that the foliobranch type of gill exists in certain members of groups in which most genera have the reticulate type, is brought forward and amply fortified by figures. Moreover, the branchial septum is shown to be of diverse origin in some allied genera, being made up in part of a reflected nephridial lamina in *Halicardia* and *Lyonsiella*. The facts developed tend strongly to break down the primary division of Lamellibranchiata based upon the modifications of the gill, as in the classification of Pelseneer. *Euciroa* is shown to be different from *Verticordia*, of which it had formerly been considered a subgenus, and a new family, *Euciroidæ*, is formed for it. In gill structure it seems to be intermediate between the foliobranchiate and the reticulate types. "The discovery of this type may be said to practically complete the series uniting the foliobranch with the reticulate gill, and give the quietus to the classification based solely on the divergencies of the ctenidia."

The examination of the soft parts of *Mytilimeria flexuosa* shows that form to constitute a new genus now described as *Halicardia*.

The second part of the paper gives additional information on Northwest American species of *Buccinum*, *Chryssodomus*, *Trophon*, etc., described in Proc. U. S. Nat. Mus., 1891, with good figures of many interesting forms. A valuable essay on the north Pacific Brachiopods concludes the article.

THE NAUTILUS.

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No. 9

TO CONCHOLOGISTS.

We regret the necessity which compels us to start the new year with an editorial of this nature; but it is nothing new to hear that the NAUTILUS must struggle for existence. This struggle has continued since the Jura, until now we have but a few species, three or four in the Indo-Pacific and one in the United States. Do you intend that the only recent NAUTILUS in North America shall become extinct? We are willing to supply the care, but not the entire environment. It needs feeding once a month in order to add another septum. You are asked to assist in this important function once a year; and when you see a slip of paper which reads, "Inclosed please find \$1.00," it means that it has come your turn to "chip in." We hope that you will no longer neglect these little reminders. They mean that *your* subscription is due. We cannot wait until the end of the year—*we must have it in advance.*

Wishing you all a Happy New Year.

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

NOTES ON THE WASHINGTON SPHERIA AND PISIDIA, WITH DESCRIPTIONS OF NEW SPECIES.

BY EDWARD W. ROPER.

The great State of Washington has been lightly touched by collectors of freshwater shells, but enough is known to indicate that when its hundreds of lakes and rivers are scientifically explored, large and interesting collections will be made. The researches of

Mr. P. B. Randolph at Seattle, and Mr. Henry Hemphill in several localities, have brought to light a goodly array of *Sphæria* and *Pisidia*, and regarding these the following notes may be of interest.

Sphærium primeanum Clessin. This shell, described in the Monograph of the Cyclades, is so little known to collectors that a brief description will be useful. Shell large, equilateral, dark brown or black with lighter beaks, shining. Outline rhomboidal, a little more elongated and the ends more rounded than *Sph. rhomboideum* Say, but the dorsal aspect very much like that of the species. The full, rounded beaks make the vertical section broadly cordate. One specimen, chestnut colored and with yellow border, is so close to *Sph. rhomboideum* as to be held in doubt. That species has been found in northern Idaho, and may naturally be expected from Washington. *S. primeanum* was found in Lake Washington, Seattle.

S. dentatum Hald. Handsome, bright green shells, differing only in color from brownish Oregon specimens, are doubtfully referred to this species. Collected at Spokane Falls by Mrs. Mary P. Olney.

Sph. nobile Gould. Identified by Dr. J. G. Cooper. It is a large, shining, dark brown shell, resembling *Sph. dentatum* Hald., but less inflated. The young shells are thin and smooth, while in *S. dentatum* they are more heavily striated than the adult. Abundant in small streams, Seattle.

Sph. occidentale Prime. Found at Spokane Falls by Hemphill.

Sph. raymondi J. G. Cooper. Small specimens abundant in streams at Seattle. Larger ones in Lake Washington. Beautiful specimens from Spokane Falls and Chehalis River (Hemphill). Also found in Idaho and Vancouver's Island. The species was found originally by Mr. Wm. J. Raymond in Tuolumne Co., Cal., at an altitude of 8700 feet, in 1889.

Pisidium idahoense Roper. First found by Mr. Henry Hemphill at Old Mission, Idaho; in 1890. Found abundantly in streams at Seattle by Mr. Randolph, and much larger than the types. One fine specimen has the following dimensions: Long. 0.45 inch; lat. 0.39 inch; diam. 0.30 inch. This is certainly the largest known species of *Pisidium*.

P. variabile Prime. Streams at Seattle. Unusually large.

P. compressum Prime. Green Lake, Seattle.

P. abditum Hald. Common in water courses at Seattle.

P. ultramontanum Prime. Unusually robust specimens from Seattle. As nearly every *Pisidium* found on the Pacific Slope has been

sent out under this name, it may be well to say that this shell is somewhat triangular with rounded margins, nearly as large and solid as the average *P. variabile*, horn colored shading to yellow at the borders, some specimens with dark blotches or stripes near the basal margin. The California types were described as having "valves shallow in the cavity," but the northern shells are more full and rounded.

P. randolphii n. sp. Shell rounded oval, moderately inflated; anterior end elongated and perfectly rounded, no angle indicating the junction of the anterior and basal margins; posterior margin sloping abruptly from the very short hinge margin; beaks decidedly posterior, fairly prominent; surface very finely and evenly striated, polished, of a most peculiar greenish-yellow color, different from other *Pisidia*, but much like some *Corbiculas*. This of itself makes it easy to separate from *P. abditum* and *P. variabile*, associated species. Long. 0.18 inch; lat. 0.14 inch; diam. 0.10 inch. Found at Seattle. Dr. J. G. Cooper says the shell most nearly resembling this is *P. harfordianum* Pr., a species practically unknown to collectors, and of which he has only a young specimen.

P. —————? n. sp. A rotund, orbiculate, dull yellow *Pisidium*, with prominent beaks and projecting scutellum, was collected by Mr. Hemphill in Patten Lake, Whatcom County. Dr. Sterki considers it identical with a species apparently common in the region of the Great Lakes, to which he has applied the name *P. scutellatum* (in letters). A deep water form is supposed to be *P. abyssorium* Stimp., but as Dr. Stimpson's manuscript was destroyed by fire, and his types mixed, this can never be certainly known. Figures and more minute descriptions of this and *P. randolphii* may be expected in Dr. Sterki's coming monograph. Additional specimens are urgently desired of this and other species of the Pacific Slope, which are, at present, deplorably scarce.

I believe it is safe to say that *P. insigne* Gabb., *P. harfordianum* Prime and *P. angelicum* Rowell are unknown, except from the original lots. *P. occidentale* Newcomb seems to be only a form of *P. abditum* Hald. Additional specimens may confirm that view or prove the contrary. The most experienced collectors disagree regarding the identity of the *Sphæria*. This tangle need not long remain if sufficient material can pass under the eye of a competent conchologist. Pacific coast collectors have generally given their attention to marine and land shells, and it would seem that a field for discovery is open among the freshwater species.

NOTES ON COLLECTING SHELLS IN CHINA.

BY JOHN B. HENDERSON.

When I saw Mr. Schmacker's splendid collection of Chinese mollusks in Shanghai, and looked over Père Heude's Unios at Sicaway, I was laying the foundation for a bitter disappointment when I took to the field myself. The great alluvial plains extending from Peking and the Gulf of Pechelli on the north to Shanghai and the lower Yangtze on the south, are not particularly rich in species. My good friend, Mr. Schmacker assured me that "the hills" fairly trembled with molluscan life; but the hills were far away, the season unfavorable, so I continued my search along the muddy banks of the rivers and the slimy waters of the canals near Shanghai, with from fair to poor success, it being then too cold (January) for land shells.

The bulk of Chinese Unios that so closely resemble our Mississippi forms, live almost entirely in the upper waters of the great rivers and their tributaries that flow through the high lands of the interior provinces. In the neighborhood of Shanghai, *Unio murchisonianus* and *Anodonta woodiana* were the only naiads I met with, but these were generally abundant. Corbiculas and the two Viviparas, *chinensis* Bens. and *quadrata* Bens. are plentiful in the canals. I secured the services of one, Ah Sin, a bland and suave celestial, to collect for me. Ah Sin brought me, day by day, numbers of *Cyclina sinensis* wrapped in endless papers, that he assured me were rare and highly desirable Unios from the inaccessible Tibetan frontier. So Ah Sin proved a failure.

Upon a three days' journey in a house-boat from Tientsin to Tungehow (on the Pei-Ho River), I did not observe a single shell of any kind. From Tungehow to Peking, about 15 miles, I gathered quantities of *Vivipara*, *Unio* and *Corbicula* in the canal, and in the dried pools by the roadside many *Limnaea*. The walls of Peking swarm with *Cathaica pyrrhozona*; I even gathered a number of them in my bed-room, where they clung to the ceiling. This species has a wide distribution throughout China, as well as *Bithinia striatula* Bens. which I gathered in the canals about Tientsin.

Unfortunately, I had no opportunity to try the good marine collecting of the southern China coast, my only attempts for marines being in the immediate vicinity of Shanghai and at Che Foo and Taku on the Gulf of Pechelli in the north. The fauna of this region is not particularly interesting, consisting only of a limited

number of boreal forms, some of which can be traced along the Aleutians to Alaska and down as far as Vancouver.

These northern waters of the Yellow Sea on the Chinese side and the Gulf of Pechelli are not conducive to molluscan life on account of the immense quantities of mud poured in by the Yangtze and the Hwang Ho Rivers. The amount of this deposit is almost incredible. The shore line from the mouth of the Yangtze, several hundred miles north, is a great mud bank that is rapidly extending out and filling up the shallow sea. The few Pelecypods that rejoice in such surroundings must keep awake to avoid being "snowed under." They are exceedingly difficult to obtain, and especially when the icy winter winds blow as they do in that inhospitable region. From such stations I secured an *Area*, a *Solecurtus*, *Cyclina sinensis* and a *Solen*.

At Che Foo, where the shore is more bold and rocky, a few *Monodonta labio* and *Littorina sitchana* rewarded a diligent search at low tide.

I made a desperate attempt to take advantage of the excellent collecting in the island of Formosa, but the circumstances of my visit to that most beautiful spot was such that I found it dangerous to venture out. Some natives, however, brought me quantities of beach worn shells, out of the lot of which I selected a few fairly good specimens of *Chlorostoma argyrostomum*, *Patella testudinaria*, two *Halotis*, and *Cypræa isabella*.

The collector in China must be of a patient and amiable disposition to endure the throng of gaping fools that follow and ply him with a thousand questions. The quick tempered man is sure to get into trouble and get no shells.

SHELLS OF SEATTLE, KING CO., WASHINGTON.

BY P. B. RANDOLPH.

The following species I have collected within the city limits during the past year:

Selenites vancouverensis Lea.	Zonites arboreus Say.
Selenites sportella Gld.	Zonites pugetensis Dall.
Selenites sportella hybrida Anc.	Zonites johnsonii Dall.
Zonites lucidus Drap. (introduced).	Conulus fulvus Drap.
	Pristiloma lansingii Bld.

Pristiloma stearnsi Bld.	Margaritana margaritifera Linné
Punctum conspectum Bld.	Sphaerium nobile Gld.
Punctum randolphi Dall.	Sphaerium raymondi J. G. C.
Epiphragmophora fidelis Gray.	Sphaerium primeanum Cless.
Epiphragmophora fidelis minor.	Pisidium compressum Prime.
Epiphragmophora fidelis albino.	Pisidium idahoense Roper.
Polygyra (Mesodon) townsendiana Lea.	Pisidium ultramontanum Prime.
Polygyra (Mesodon) columbiana Lea.	Pisidium variabile Prime.
Polygyra (Mesodon) devia Gld.	Pisidium abditum Hald.
Polygyra (Stenotrema) germana Gld.	Pisidium randolphii Roper.
Vertigo simplex Gld.	Physa gabbi Tryon.
Vertigo binneyana Sterki.	Limnæa tryoni Lea.
Succinea oregonensis Lea.	Limnæa palustris Linn.
Succinea nuttalliana Lea.	Limnæa humilis (introduced) Say.
Carychium occidentalis Pilsbry.	Planorbis trivolvis binneyi Try.
Anodonta californiensis Lea.	Planorbis callioglyptus Vanatta.
Anodonta oregonensis Lea.	Planorbis vermicularis Gld.
	Ancylus fragilis Tryon.
	Valvata sincera Say.

ISAAC LEA DEPARTMENT.

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

Next month we will be able to announce the result of the annual election of officers for the Chapter.

This has been a year of activity along conchological lines in our chapter, and plenty of good reports are sure to follow enthusiastic work.

The fraternal spirit expressed by the members of our Chapter reveals the goodwill of each member, and is a pleasant feature in work of the Association.

COLLECTING IN SOUTHERN CALIFORNIA.

[Report of Mrs. G. W. White. From the Transactions of Isaac Lea Conchological Chapter of the Agassiz Association for 1894.]

My interest in the science of conchology dates from the summer of 1893, when Prof. Josiah Keep, of Mills College, taught this sub-

ject during the Chautauqua Assembly at Long Beach, Cal. Though unfortunately, not a member of his class, some of my friends were enthusiastic students under him, and through them, the enthusiasm or "craze," as we sometimes call it, was communicated to me, and I very shortly became as eager a student and collector as my circumstances would allow. Happily for me, my husband shared my interest, and most of our collecting has been done together, and many of my choicest treasures were found by him in places I could not venture—in places where the waves dashed too high for my courage, or under rocks too heavy for my strength to lift. So this report must be understood as a record of our joint work.

In the winter of '93 and '94, we made a number of visits to Long Beach and San Pedro, going as far as Alamitos Bay in one direction and nearly to the old wharf beyond Times' Point at San Pedro. We collected quantities of shells, but as it would be impossible and unprofitable to mention them all, I will speak only of the rarer ones.

Under the rocks at Dead Man's Island, we found, on our first trip, a number of specimens of each of the following varieties: *Volvarina varia*, *Terebratella transversa*, and *Lazararia subquadrata*.

We also dug a number of fine fossil pectens out of the bank. One of the choicest shells found by us that day has never been fully identified by me. By some it is called *Cerostoma foliatum*, by others *Murex trialatus*.¹ At any rate it is a rare and interesting shell, and I have never seen another like it. On another trip up the beach above San Pedro we found, by digging in the sand with a trowel, some fine specimens of *Stenoradsia magdalenensis*, the largest Chiton on this part of the coast.

We also found several *Hinnites giganteus* Gray, *Cumingia californica* Conr., *Lucapina crenulata* Sby., and a fine old *Mitra maura* Swains., two inches in length, of which we are justly proud. In the spring of '94 we were on a visit in Ventura County, and when our friends proposed a trip to the beach, we interposed no objections. They drove to Punta Gorda, meaning Point of Rocks, most appropriately named, for I have seldom seen such a bed of rocks jutting out so boldly into the sea. They were literally covered with the largest species of mussels, many of them being nearly, if not, six inches in length. In the sheltered places in these rocks we found quantities of *Purpura saxicola* Val. and *Monoceros lapilloides* Conr. Our patient search in the rock pools was rewarded by our finding *Opalia crenatoides* Cpr.

¹ The shell proved to be *Pterorhytis trialatus* Sby.

In the summer of '94, while attending the class in conchology at Long Beach, our teacher, Mrs. M. Burton Williamson, kindly planned an excursion to Dead Man's Island, and took eighteen members of her class to San Pedro the evening before we were to do our collecting. We spent the night at an old seaman's hotel on Timm's Point, and at 3 o'clock A. M., rose to take advantage of the first beams of the sun and the tide, which was to be at the lowest point at about 4.30 A. M. There happened to be a dense fog, and as our ghostly boatman took one boat load after another of our companions away from us across the bay, we were strongly reminded of that other boatman, the Charon of our early studies and the River Styx.

However, by the time we were safely landed on our hunting grounds, the mist had risen and we could see to begin work. The most that we found of value was on the mud flats uncovered by the low tide. There we found, under the grass which lay flat on the mud, thus concealing thousand of mollusks which lay below, *Haminea virescens* Sby., and *Haminea vesicula* Gld. We also found, partly covered with mud, *Cardium quadrigenarium* Conr., and altogether covered with mud except some tiny points of a *Chorus belcheri* Hds. What a shout went around when some one called out, "Mrs. White has found a *Chorus*," and how eagerly the mud in that vicinity was scanned to see if another could not be discovered. But no, I bore off my trophy in triumph alone, for not another one was found.

On our way home, while walking along the beach, some one, I think Mrs. Williamson, called our attention to some narrow slits in the sand, where, upon digging carefully, we found a dozen *Lingula albida* Hds.

Later, on a walk to Alamitos Bay, I found *Periploma argenteria* Conr., *Petricola carditoides* Conr., *Labiosa undulata* Gld., *Yoldia cooperi* and *Clidiophora punctata* (?) Cpr. * * * * And now this account brings us up to the year of our Lord, 1895, and finds us still enthusiasts in conchology, only waiting for a favorable tide to go again in search of treasures of the sea. We are of those who believe that nature has secrets which she reveals only to those who love her, and we feel that in this kind of communion with her she has fully rewarded us.

NOTICES OF NEW PUBLICATIONS.

CONTRIBUTIONS TO THE TERTIARY FAUNA OF FLORIDA. TRANSACTIONS OF THE WAGNER FREE INSTITUTE OF SCIENCE.—Vol. III, part 3. By Wm. H. Dall, A. M. This forms an introductory chapter to Prof. Dall's work on the Tertiary Pelecypoda of Florida, and contains a new classification of the Pelecypoda, with an enumeration of the differential characters of the Orders, Suborders, Superfamilies and Families, a statement of their range in geological time, and an enumeration under each family of the chief generic groups believed to be referable to it. The paper is prefaced by a brief discussion of the features of the Pelecypod organization chiefly available as diagnostic characters. Continued study of this group has confirmed the author in the opinion that in its general features the classification which he proposed in 1889 (founded largely on the characters of the hinge, see Amer. Jour. Sci., XXXVIII, 445), and has now revised, comes nearer to meeting the requirements of the case than any other which has fallen under his notice. In describing the ligamental characters the term "resilium" is proposed for the so-called "cartilage" or "internal ligament." The Steinmann Formula, based on the teeth, sockets and resilium, is thoroughly explained. The Pelecypoda are divided into three orders—*Prionodesmacea*, *Anomalodesmacea* and *Teleodesmacea*. The first order contains thirty-four families, leading factors being *Solemyidæ*, *Nuculidæ*, *Arcidæ*, *Pteriidæ*, *Ostreidæ*, *Unionidæ*, *Trigonidæ*, *Pectenidæ*, *Anomidæ* and *Mytilidæ*. Each of the above and of the following families being the typical representatives of a Superfamily. The second Order contains fifteen families, typical ones being *Anatinidæ*, *Clavagellidæ*, *Poromyidæ*. The third contains forty-seven families, such as *Pleurophoridæ*?, *Astartidæ*, *Cyrenidæ*, *Carditidæ*, *Chamidæ*, *Hippuritidæ*, *Lucinidæ*, *Leptonidæ*, *Cardiidæ*, *Tridacnidæ*, *Isocardiidæ*, *Veneridæ*, *Tellinidæ*, *Solenidæ*, *Mactridæ*, *Myacidæ* and *Pholadidæ*. The paper is concluded with some timely notes on nomenclature.—C. W. J.

CATALOGUE OF THE MARINE MOLLUSKS OF JAPAN, COLLECTED BY FREDERICK STEARNS. By H. A. Pilsbry. Detroit: F. Stearns, 1895. 8 vo, 214pp. and 11 plates.

Every one interested in geographical distribution, or in the fauna of eastern Asia, will be grateful for the liberality of Mr. Stearns, who obtained, and the care of Mr. Pilsbry, who has enumerated and identified, the large collection here treated of.

Not content with the labor of naming and cataloging Mr. Stearns' shells, Mr. Pilsbry has searched the literature and made a catalogue, not only of the shells collected by Mr. Stearns, but of all the species described from or assigned to Japan by earlier authors, thereby producing a most handy list which no student of mollusks can afford to be without. Notwithstanding the care with which the Monographs of Dunker and Lischke were made, the present catalogue enumerates about 20 per cent. more species than the latest of them. In addition to the list of marine mollusks and brachiopods, the land and fresh-water shells collected by Mr. Stearns are catalogued, and also a supplementary series of Loo Choo Island species, obtained by a native collector in Mr. Stearns employ. The plates and presswork are excellent, and the work, as a whole, is creditable to all concerned in its production, and cannot fail to be useful to students.

—W. H. D.

PRELIMINARY CATALOGUE OF THE MARINE MOLLUSKS OF THE PACIFIC COAST OF CANADA, with notes on their distribution. By Rev. Geo. W. Taylor, Transactions of the Royal Society of Canada, Vol. 1 (2d series), pages 17 to 100. This catalogue is very complete and full of interesting notes on distribution, etc. The number of species recorded is 284, to which is added a list of 67 land and fresh-water species, making the total number of British Columbian Mollusca at present known, 351.

BULLETINS OF AMERICAN PALEONTOLOGY, Vol. I, No. 3. NEOCENE MOLLUSCA OF TEXAS, OR FOSSILS FROM THE DEEP WELL AT GALVESTON. By G. D. Harris. In this Bulletin, 19 new species and 5 new varieties are described and figured, together with notes and figures of other species. Most of the specimens were obtained from a depth ranging from 2100 to 2920 feet. Up to this date no other marine Neocene fossils are known from the Gulf slope west of the Mississippi. The Bulletin contains 32 pages and 4 well executed plates.

MOLLUSQUES RECUEILLIS SUR LES COTES DE LA TUNESIE ET DE L'ALGERIE, par Ph. Dautzenberg (Mém. Soc. Zool. de France, 1895, p. 363). List, with descriptions of some new varieties of Mediterranean shells, and full information on the occurrence of *Meleagrina* in the Mediterranean Sea.

ON SOME PLIOCENE FRESH-WATER FOSSILS OF CALIFORNIA.

ON LAND AND FRESH-WATER SHELLS OF LOWER CALIFORNIA, No. 5.

ON WEST MEXICAN LAND AND FRESH-WATER MOLLUSCA.

CATALOGUE OF MARINE SHELLS * * * LOWER CALIFORNIA. By J. G. Cooper (Proc. Cal. Acad. Sci., IV, V).

In the first of these papers, *Margaritana subangulata* is described and figured as new, and the following species are figured: *Anodonta decurtata* Conr., *Ano. nuttalliana* var. *lignitica* Coop., *Limnæa contractoste* Coop., *Plumbis pabloanus* Coop. and *Annicola yatesiana* Coop.

In the second, land shells collected about 25 miles north of Cape St. Lucas are considered. *Bulinulus decipiens* being described as new. The generic name *Plicolumna* is proposed for *Rhodea* var. *ramentosa* Coop.; it is therefore equivalent to Dall's *Pseudorhordea* (Nautilus, Sept., 1895). The *Melaniella eiseniana* J. G. Coop. is referred to Strebel's genus *Pseudosubulina*, a group of *Glandinidæ*, on evidence of the dentition, which has been worked out by Dall.

In his paper on West Mexican Land Shells, Cooper announces the presence of the northern forms *Conulus fulvus*, *Hyalinia indentata*, *Limnæa columella*, *Sphærium partumeium* var. *truncatum*, from Tepec, south of Mazatlan, as well as other species belonging to the Mexican fauna.

The last paper enumerates marine shells collected mainly by Mr. W. E. Bryant, including some interesting forms, but no new species.

NOTES AND NEWS.

PLOVER CAUGHT BY A PINNA—The article in the September number, "A Sora Caught by a Mussel," recalls a similar incident which I observed at New Pass, Sarasota Key, Fla. It was after a heavy storm, and there was a large number of *Pinna muricata* washed ashore. On my return to the boat after collecting some shells, I observed a Killdeer Plover that seemed very tame, but on a closer examination I found that it was caught by a *Pinna*. In this case it was caught by the bill. Its tongue was bleeding and the bill was indented by the sharp edges of the shell. It was with some difficulty that I removed the shell and let the Plover go rejoicing on its way.—*E. J. Post.*

MR. CHAS. LEROY WHEELER has been appointed Curator of the Lackawanna Institute of History and Science, Scranton, Pa. They desire to obtain more material in all branches of natural history,

and any assistance from older institutions or their members will be sincerely appreciated.

LEPIDOPLEURUS IN NEW ZEALAND.—Some months ago we received numerous specimens of a *Lepidopleurus* from Mr. H Suter, collected by him in Auckland Harbor. The species seemed to us to be a new one; but on requesting Mr. E. R. Sykes of London to compare with the types of certain forms in the British Museum, he found it to be identical with Reeve's *Chiton inquinatus*—a result wholly unexpected. The species was described from Tasmania, but South Australian specimens we have seen (collected by Mr. Bednall) agree in all respects with those found by Mr. Suter in New Zealand.—*H. A. P.*

THE EARLIEST PUBLICATION OF *Dorcasia* GRAY.—In examining the appendix of James Edward Alexander's Expedition of Discovery into the Interior of Africa (London, 1838), I find on p. 268 of volume II, a description by Gray of the genus *Dorcasia* and the species *D. alexandri*. This group has hitherto been dated from its publication in the *Zeitschrift für Malakozoologie*, 1845. *Helicodonta sculpturata* Gray (= *Sculptaria sculpturata*) is also described, with (on p. 269) two alleged *Bulimi*, *B. hottentota* and *B. eulimoide*. All were collected by the expedition about the Great Fish River in Great Namaqualand. *B. eulimoide* apparently belongs to the *Stenogyra* group. This publication seems to have been unknown to Pfeiffer and other writers on African land snails.—*Pilsbry*.

ON THE NAMES OF CERTAIN SUBGENERA OF *Helicostyla*.—For some inscrutable reason, the writer, when considering these groups in the Manual of Conchology, neglected to ascertain the fact that the names *Prochilus* and *Eudoxus* of Albers have long been preoccupied. They may stand in future as follows:

Dolichostyla n. n. (= *Prochilus* Alb., 1860, not of Illiger, 1811, Mammalia, nor of Brullé, 1835, Orthoptera, nor of Cuvier, 1817, Pisces).

Opalliostylia n. n. (= *Eudoxus* Alb., 1850, not of Kirby, 1837, Coleoptera). The types and limits of the groups remain as stated in *Man. Conch.* (2), ix, pp. 229, 231.—*Pilsbry*.

SINISTRAL *PATULA* STRIGOSA.—My brother, L. M. Cockerell, took a sinistral *P. strigosa* at Norwood, Colorado. It was in my possession for a long while, but is now in the British Museum.

—*T. D. A. Cockerell*.

THE NAUTILUS.

VOL. IX.

FEBRUARY, 1896.

No. 10

THE AULACOPODA: A PRIMARY DIVISION OF THE MONOTREMATE LAND PULMONATA.

BY HENRY A. PILSBRY.

If the foot of a living or properly preserved *Helix* or *Polygyra* be compared with that of a *Zonites*, *Pyramidula* (*Patula*) or *Ariolimax*, a conspicuous point of difference becomes apparent. In the latter three genera a groove or furrow may be seen running the whole length of the foot, a short distance above and parallel to its edges; while no such structure is present in the first named genera.

These furrows are the *pedal grooves*. They rise slightly at the tail, and meet above it; and at this point there is often a local deepening of the groove, and a greater development of the mucus-secreting cells lining it. This is the "caudal mucus pore," conspicuous in *Zonites*, *Ariolimax*, etc. There is vast variation in the degree of development of this pore,—from a barely visible widening of the united pedal grooves, to a deep slit or a triangular pit surmounted by a fleshy horn; and in some forms it is extremely difficult to say whether a pore exists or not, so nicely graduated are the stages of its development. Consequently, we find genera very closely allied in other characters, differing in this one. Such are *Pæcilonites*, without pore, *Gastrodonta* with it; *Ariolimax* with pore, *Prophysaon* without it; and many similar cases.¹ In spite of all the instances of this kind, the tail pore has been a great bugaboo to the systematists, while the *pedal grooves*, of which this pore is merely an

¹ Compare also, in this connection, Cockerell's remarks in *Journal of Malacology* (*The Conchologist*), Vol. ii, p. 118.

occasional extra development, have been very generally ignored.⁷ Even "families" have been based on the presence or absence of the caudal pore; but it need hardly be said that such groups are violently unnatural.

It is now proposed to unite all of the groups having the pedal grooves developed, into a superfamily to be called AULACOPODA, equivalent in value to the AGNATHIA (so-called, including *Selenitidæ*), or to the group composed of *Helicidæ*, *Bulimulidæ*, *Cylindrelidæ*, *Pupidæ* and *Achatinidæ*, which may be called HOLOPODA.

The American *Aulacopoda* may be tabulated as follows:

- I. Marginal teeth with narrow, lengthened basal-plates, either unicuspid and thorn-like, or bicuspid by elevation of outer on middle cusp.
 - a. Foot-margin wide; shell more or less spiral; ovotestis imbedded in liver, ZONITIDÆ.
 - aa. Foot-margin narrow; shell a flat internal plate, not spiral; ovotestis free from liver; slugs, LIMACIDÆ.
- II. Marginal teeth with short, wide and squarish basal-plates with one or several cusps, the outer cusp never elevated on middle cusp.
 - a. Shell spiral, usually wholly external, ENDODONTIDÆ
 - aa. Shell non-spiral, internal, more or less obsolete or wanting; slugs.
 - b. A vestigial shell present; mantle small, anterior, ARIONIDÆ.
 - bb. No shell; mantle covering the whole upper surface, PHILOMYCIDÆ.

Most of these families contain genera with, and genera without a caudal mucus pore. The *Limacidæ* and *Arionidæ* are degenerate so far as the shell is concerned, and have doubtless descended from the ancestral *Zonitidæ* and *Endodontidæ* respectively.

North American Genera.

ZONITIDÆ comprises *Omphalina*, *Vitrinizonites*, *Vitrea*, *Gastrodonta*, *Pæcilozonites*, *Guppya*, *Conulus*, *Pristiloma* and *Vitrina*. See NAUTILUS, June, 1895, p. 18.

⁷ Exceptions need not be noted here; but I cannot refrain from mentioning that the importance of the pedal grooves has been fully recognized by a brilliant Australian malacologist in dealing with the *Charopa* group.

LIMACIDÆ, *Limax* only.

ENDODONTIDÆ, *Pyramidula* (*alternata*, *perspectiva*, etc.), *Punctum*.

ARIONIDÆ, *Arion* (imported), *Ariolimax*, *Prophysaon*, *Hemphilia* and their immediate allies.

PHILOMYCIDÆ, *Philomycus* (*Tebennophorus*), *Pallifera*.

The systematic position of the *Selenitidæ*, with a revised catalogue of the species and varieties, will be considered in a future article.

ON SOME NEW SPECIES OF SCALA.

BY W. H. DALL.

Scala (*Sthenorhytis*) *Mazyckii* Dall.

Shell solid, stout, rapidly enlarging, with (on the last whorl six) stout rather carinate varices which increase in size successively, the last being very heavy, its anterior face sloping backward from the nearly circular aperture; outer margin of the varix even, rounded, slightly winged on the axial side; whorls smooth except for a single faint revolving rib encircling the base at about the level of the top of the aperture of the succeeding whorl; specimen decollate, probably with four or five whorls when complete, the spire probably short and acute. Height 31.5, diameter 28 mm. in the decollate shell.

Miocene, Cainhoy, South Carolina, W. G. Mazyck.

This fine species differs from *S. pernobilis*, *S. Stearnsii* and others of the group by its small number of distant rapidly enlarging varices. The type is in the collection of Mr. W. G. Mazyck, of Charleston, who collected it, and to whom it is respectfully dedicated.

Scala ranellina Dall.

Shell of five or more whorls, rather rapidly increasing, spirally ribbed with ten or twelve rather feeble flattish ridges which are obsolete or absent above the shoulder; basal area projecting, strongly marked, overrun by the varices which are angulated and prominent over the keel; varices of two sorts, one set large, thin, wide set at the half whorl, continuous up the spire on each side like the varices of *Ranella pulchra*, their profiles rounded, the aperture circular,

the axial edge narrower, not perceptibly angular; the other varices are much smaller and less prominent, about seven to twelve on each half whorl between the larger series, sharp edged and subequal. Height of (decollate) shell 33, max. diameter 23 mm.

Zeuglodon bed of the Jacksonian, near Cocoa P. O., Alabama, Burns and Schuchert.

This fine species is related to *S. octolineata* Conrad, which is found in the same horizon, but has the large varices less conspicuous and irregularly distributed. *S. octolineata* is also a smaller, more cylindrical shell. The present species is readily recognized by its peculiar flattened aspect recalling *Ranella*.

Scala Mitchelli Dall.

Shell rather large for the genus, thin, with rounded rather compact whorls, well marked suture and elongated spire; the color is yellowish white, the basal area and a band somewhat above the periphery dark reddish brown; surface with numerous low spiral ridges with wider interspaces covering the whorl, crossed by about 18 distant rather irregular low varical threads, slightly angulated just in front of the suture; the young whorls show a tendency to peripheral angulation; basal area well marked, bordered by a low keel, its spiral sculpture feeble but the varical ridges unchanged; axis imperforate; aperture higher than wide, the peristome interrupted over the body, the pillar lip strongly reflected, the outer lip narrow, inconspicuously reflexed; shell decollate but showing eight whorls, and originally supplied with three or four more at least; height of (decollate) shell 36, max. diameter 14, apical diameter at the decollation 1.5 mm.

Found on the beach of Matagorda Island on the Texas coast by Hon. J. G. Mitchell, to whom it is respectfully dedicated; the type is in his collection. This is the finest recent species from shallow water yet reported from the Gulf coast, and needs no comparison with any other, as no American or exotic species has been figured which is at all closely related to it. In a general way it is somewhat like *S. acuminata* Sby. from Japan.

SCULPTURE OF THE APICAL WHORLS, A NEW CHARACTER FOR DISTINGUISHING GROUPS OF BULIMULI.

BY HENRY A. PILSBRY.

The classification of the American Bulimoid snails has been an extremely intricate problem, but much has been done by Binney,

Strebel and Pfeffer, von Martens and Crosse and Fischer, toward a better understanding of it.

With all of this good work, there has remained a vast amount of confusion. Thus authors almost universally separate *Orthalicus* as a family distinct from *Bulimulidæ*; but, in reality, it constitutes merely a generic group of that family. No anatomical or shell character can be shown, of greater than generic value, between *Orthalicus* and *Drymœus*.

Again, the genus "*Bulimus*" of all authors contains forms belonging to two families—*Helicidæ* and *Bulimulidæ*.

The forms generally grouped under the name *Bulimulus* have been shown by von Martens to fall into two groups, based on the character of the jaw: *Bulimulus* and *Otostomus*. Crosse and Fischer have made the same division, calling the two groups *Orthotomium* and *Goniognathmus*. These correspond to the two Martensian groups, the first having a vertically plaited jaw, the second has the plates angularly converging toward the middle.

Binney has shown that there exist two styles of teeth, and these correspond to the two forms of jaw, and constitute a far more useful character, as the jaw forms intergrade pretty completely.

It has not hitherto been noticed that there are certain characters in the shells, and especially in the sculpture of the apices, by which the two groups, or genera, may be distinguished.¹

In the following synopsis, the leading sections are enumerated, arranged as they fall into groups according to the sculpture of the apices. Of course it is not proposed to base a classification on this single character.

Certain rectifications and substitutions demanded by the law of priority, and by the proper restriction of the subgenera to species allied to their *types*, have been made.

Genus *Bulimulus* Leach, 1814.

The species of *Bulimulus* are *terrestrial* snails, æstivating or hibernating in the ground, crawling on the ground or on plants in damp weather. There are three distinct types of apical sculpture, as follows:

¹ The only especial notices of the apical sculpture of Bulimuli which I have noticed are by the writer, *Nautilus*, viii, 1894, p. 35, and by Dall, *Proc. U. S. Nat. Mus.*, xvi, 1893. Martens also figures a few apices on the last plates of the "*Biologia*."

A.—Apex irregularly wrinkled or wrinkles dislocated, broken into granules. Subgenus *BULIMULUS s. str.*

All the species are South American and West Indian.

Bulimulus s. str., type *B. exilis* = *guadeloupensis*.

Leptomerus Alb., type *B. limnæoides*.

Rhinus Alb., type *B. heterotrichus*.

Plectostylus Beck, type *B. peruvianus*.

Scutalus Beck, type *B. proteus*.

Nesiotes Alb., type *B. nux*.

B.—Apex with vertical regular riblets. Subgenus *ORTHOTOMIUM*.
Species of Lower California and Northern Mexico, extending into U. S.

Sonorina Pils., type *B. spirifer* (*Leptobyrsus* C. & F., 1875, not *Leptobyrsa* Stal., 1873).

Orthotomium C. & F., type *B. sufflatus* (*Rabdota* part, Alb., not *Rabdota* Dej., 1833; *Globulinus* C. & F., 1875, not *Globulina* Orb., 1826. *Thaumastus* Auct. not Alb.)

Plicolumna Coop., type *B. ramentosa*.

C.—Apex smooth, rather mamillar. Subgenus *BOSTRYX*.

Species South American, mainly of Ecuador, Peru and Chili.

Lissoacme Pils., type *B. erythrostomus*.

Atarus Alb., type *B. umbilicaris*.

Bostryx Trosch., type *B. solutus*.

Peronæus Alb., type *B. pupiformis*.

Geopyrgus Pils., type *B. turritus* (*Pyrgus* Alb. not Hübner).

The only group of *Bulimulus* extending into the United States is *Orthotomium*. This includes *schiedeanus*, *dealbatus*, *baileyi*, *montezuma*, *sufflatus*, *pilula*, *alternatus* and their allies. It is very characteristic of the Sonoran life-area, as originally limited by Merriam.

It is somewhat remarkable that in each of the three subgenera of *Bulimulus*, narrow, pupiform species have been independently developed.

Genus *Drymæus* Alb., 1850.

(= *Goniognathmus* Cr. & Fisch.; *Otostomus* Martens).

Arboreal snails, never found on the ground when living. Apical sculpture an extremely fine grating formed of vertical and spiral striæ intersecting at right angles. Radula peculiar.

A.—Lip expanded or flaring.

Zaplagius Pils., type *D. navicula* (= *Otostomus* Martens not Beck & Gray; *Navicula* Spix not Blainv.).

Semioclausaria Pfr., type *D. semioclausus*.

Drymæus s. str., types *D. xanthostoma* and *hygrohylæus* Orb.

Neopetræus Mts., type *D. altoperuvianus*.

B.—Lip simple, arcuate.

Mesembrinus Alb., type *D. virgulatus* Fér.

Eudiptus Alb., type *D. pseudosuccineus*.

C.—Apical sculpture not distinctly grated.

Leiostracus Alb., type *D. vittatus* (not *Liostraca* Burm.).

The genus *Drymæus* is represented within our limits by *D. serperastrus* in Texas, belonging to the restricted section *Drymæus*, and in Florida *D. dormani* and *marielinus* represent a section perhaps requiring a new name. *D. multilineatus* belongs to *Mesembrinus*.

A certain number of Brazilian and Venezuelan forms, of which *D. vittatus*, the type of Albers' group *Leiostracus*, is an example, have superficial vermiculate wrinkles on the upper portion, excessively fine, often indistinct, spirals on the lower portion of the second apical whorl. This is quite different from the usual evenly grated sculpture. It is often very indistinct.

THE SIZE OF MUSSELS.

BY W. S. STRODE, M. D., LEWISTOWN, ILL.

Some time since, in conversation with an aged naturalist, I informed him that I had found a valve of *Unio alatus* Say, in Spoon River, Ill., that was nine inches long. He expressed surprise and said that he never saw a mussel of any kind over six inches in length, and, old as he was, he would walk five miles and go into water up to his neck to get a specimen above that size. Feeling a little taken back by his assertion, I determined to go home and make some measurements of my largest species of Spoon River Uniones. I was certain that I had several varieties that were above six inches in length. The following is the result of my measurements:

U. anodontoides Lea, length 7 in., circumference 9 in.

U. ligamentinus Lam., length 7 in., circumference 10½ in.

- U. multiplicatus* Lea, length $8\frac{1}{2}$ in., circumference $12\frac{1}{2}$ in.
U. rectus Lam., length 7 in., circumference 8 in.
U. tuberculatus Barnes, length $7\frac{1}{2}$ in., circumference $9\frac{3}{4}$ in.
U. plicatus Les., length $6\frac{3}{4}$ in., circumference $9\frac{1}{2}$ in.
U. gracilis Bar., length 7 in., circumference 11 in.
Ano. grandis Say, length 8 in., circumference 12 in.
Marg. rugosa Bar., length 7 in., circumference 8 in.
Marg. complanata Bar., length $8\frac{1}{2}$ in., circumference 13 in.
 These were all from Spoon River, Ill.
Ano. stewartiana Lea, Ripley's Lake, Tex., $7\frac{1}{4} \times 9$.
U. rotundatus Lam., Ask Bayou, Tex., $5\frac{1}{4} \times 8\frac{1}{2}$.

SMALL LAND MOLLUSCA FROM NEW MEXICO.

BY DR. V. STERKI.

A few days ago, Mr. Theo. D. A. Cockerell kindly forwarded me some small and minute shells of Mollusca collected in drift on the Rio Grande, at S. Marcial, N. M., with the request to publish a list of them with notes. The species were the following:

Hyalinia minuscula Binn.

Helicodiscus lineatus Say. One example.

Vallonia costata Mull. One example; this find is of peculiar interest.

Vallonia cyclophorella Anc. Rather small form; a few examples.

Pupa fallax Say.

Pupa arizonensis (Gabb.) W. G. Binney.

Pupa hordeaceu Gabb. Rather small; variable in size and color.

Pupa procera Gould. One example, light colored.

Pupa hordeacella Pilsb. Light colored to glassy transparent.

Pupa pilsbryana Sterki. One example; slightly more striated than those previously seen.

Pupa blandi Morse. A few; light color to colorless.

Vertigo ovata Say. Two specimens, rather typical.

Besides these, there were a few examples of *Limnæa* and *Planorbis*.

New Philadelphia, Ohio, December, 1895.

THE GEOGRAPHIC DISTRIBUTION OF PLANORBIS UMBILICATELLUS.

BY E. G. VANATTA.

This species was first described by Mr. J. W. Taylor in the Journal of Conchology, 1883-85, Vol. IV, p. 351, under the name *P. umbilicatus*; but since Müller had previously described a *P. umbilicatus* in 1774, Cockerell renamed Taylor's shell *P. umbilicatellus* in the Conchologist's Exchange, November, 1887, p. 68.

It is now known from the following localities:

Manitoba :	Brandon and Birtle,	R. M. Christy! Original locality.
Minnesota :	Dallas Lake, Wright Co.	H. E. Sargent! Coll. A. N. S. P.
	St. Michael's,	H. E. Sargent! Coll. A. N. S. P.
Iowa :	Near Davenport,	H. A. Pilsbry! Coll. A. N. S. P.
Montana :	Mingusville,	H. Squyer! Naut. VIII, p. 65.
Colorado :	Davidson's Ranch, Boulder Co.,	J. D. Putnam! Coll. A. N. S. P.

From these localities it seems to have a wide range through the northwestern States, the extreme points being Birtle, Manitoba; Mingusville, Montana; Davenport, Iowa, and Boulder Co., Colorado.

The shell is grayish-white, with a flat spire and a deep umbilicus. It may be easily distinguished from *P. parvus* Say by its deeper and narrower umbilicus and fewer whorls, and from *P. deflectus* Say by the flat spire, lack of blunt keel at periphery and the heart-shape of the aperture; *deflectus* having a rounded aperture.

No doubt this species will be found well represented in the collections of many western conchologists, unidentified or under the name "*deflectus*."

TRANSACTIONS OF THE ISAAC LEA CHAPTER.

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

The annual election for officers occurs on the last Wednesday in December, and as Christmas for 1895 occurred on the same day, our election was postponed for one day. All the members of our Chapter residing in California were invited to be present at the home of the General Secretary on Thursday, December 26, to elect officers, as provided for in Article V of our Constitution. As our President, Professor Keep, lives five hundred miles from Los Angeles, he was

not able to be present, much to the regret of those present on that day. The Honorable Delos Arnold presided. A letter from the President was read, also one from Dr. M. L. Leach, one of the founders of our Chapter. It was hoped that Dr. R. E. C. Stearns, of the National Museum who is at present in Los Angeles, could meet with us, but his health would not permit him to be present. Mr. Arnold exhibited a fine *Pecten (Janira) floridus* Hinds from Santa Catalina Island, also, *Zonites milium* Morse, from his own garden. They are the first reported from Los Angeles County.

The Secretary canvassed the votes sent in by mail, as well as those cast by the attending members. The result was as follows:

For President, Professor Josiah Keep, Mills College, California.

For General Secretary, Mrs. M. Burton Williamson, University, Los Angeles Co., California.

Before this number of THE NAUTILUS shall have been received, the volume of Transactions will be on its annual round to the members of our Chapter. Excerpts will, however, be published monthly in THE NAUTILUS, our Chapter organ.

Rules for the identification of shells were published in THE NAUTILUS some years ago, but many of the members of our Chapter may not have seen them. The following are the rules in substance: 1st. The number of species in one sending is limited to 12. 2d. The sender is to pay all expenses of transportation, and the specimens are to become the property of the Academy of Natural Sciences of Philadelphia. 3d. Each species must be numbered, so that identification may be given by number.

These same rules apply when identification is made elsewhere than at the Academy, only in this case they become the property of the one who names them. In sending shells for identification to the Secretaries of the various Sections, please bear these rules in mind. Label two sets of shells with the same numbers, retaining the duplicate set for reference when those sent for determination are reported to you.

We hope to have the best volume of transactions this year that the Chapter has compiled. A number of fine manuscripts are promised. The Chapter is in excellent condition as a working Chapter. This is the case because each member is in earnest, and because each one feels an interest in the welfare of the Chapter.

DREDGING IN LONG ISLAND SOUND.

[Report of Mr. A. H. Gardner. From the Transactions of Isaac Lea Conchological Chapter of the Agassiz Association for 1893.]

Of the species of bivalve mollusca given as dredged in Long Island Sound, all are common to the waters of New York Bay with the exception of *Pecten irradians* and *Modiola modiolus*. *Nucula proxima* has so far only been found by the writer in the curve of Sandy Hook Bay, the remaining species are more abundant in the bay than in the sound.

It must be remembered that the portion of the sound dredged in only constitutes a small section of it contiguous to New York City.

The *Odostomia* given as *bisuturalis* and *trifida* are probably one and the same thing; the distinguishing character being insignificant. The specimens dredged in Lloyd's Harbor are rather smaller than others, and apparently have a few more revolving lines. The calmer waters of the sound seem to favor the growth of many small species of univalve shells, uncommon in New York Bay, where their place is probably supplied by the larger species of *Natica* and *Fulgur*, which species are taken in almost every haul of the dredge in the bay, and are not found commonly in the sound.

List of localities and Mollusca dredged in Long Island Sound, July 15 to 22.

Hempstead Harbor, 2 to 4 fathoms, mud:

Eupleura caudata Say, 3; *Pandora trilineata* Say, 2; *Mulinia lateralis* Say, 9; *Arca transversa* Say, 1; *Nucula proxima* Say, 12; *Yoldia limatula* Say 5.

Matinicock Point, 3 fathoms, mud:

Astyris lunata Say, 3; *Tritia trivittata* Say, 1; *Pandora trilineata*, 3; *Nucula proxima*, 34.

Plum Point, Oyster Bay Harbor, 3 to 4 fathoms; oyster beds:

Tornatina canaliculata Say 2; *Astyris lunata*, 8; *Urosalpinx cinereus* Say, 4; *Fulgur canaliculatum* Say (young), *Eupleura caudata* 7; *Solen americana* Gould (young), *Pandora trilineata*, 4; *Arca transversa*, 7; *Nucula proxima* 21; *Pecten irradians*, 1.

Lloyd's Harbor, 2 fathoms; mud and eel grass:

Tornatina canaliculata, 35; *Bittium nigrum*, 29; *Odostomia trifida*, 36; *Turbonilla elegans*, 1; *Anachis avara* Say, 7; *Astyris lunata*, abundant; *Nassa obsoleta*, abundant; *N. vibex*, 2; *Urosalpinx cinereus* 1; *Eupleura caudata*, 15; *Pandora trilineata*, 1; *Mulinia lateralis*, 12; *Lyonsia hyalinia* Say, 2; *Tellina tenera*, 1; *Arca transversa*, 3; *Nucula proxima*, 34; *Yoldia limatula*, 1; *Pecten irradians*, 2.

Huntington Harbor ; shore :

Littorinella minuta, 2 ; *Litorina rudis*, abundant ; *Odostomia bisuturalis*, 46.

Lloyd's Point, 5 fathoms, sand :

Lunatia triseriata, 1 ; *Tritia trivittata*, 2 (young) ; *Pandora trilineata*, 8 ; *Mulinia lateralis*, 4 ; *Arca transversa* (young), *Nucula procima*, 56 ; *Yoldia limatula*, 5.

Portchester Harbor, shore :

Arca pexata, 1 ; *Modiolus modiolus*, 1 ; *Crepidula convexa*, 2 ; *Littorinella minuta*, 1 ; *Odostomia bisuturalis*, abundant ; *Urosalpinx cinereus*, abundant.

NOTES AND NEWS.

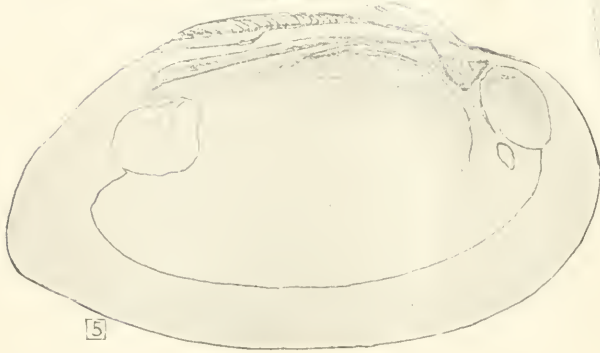
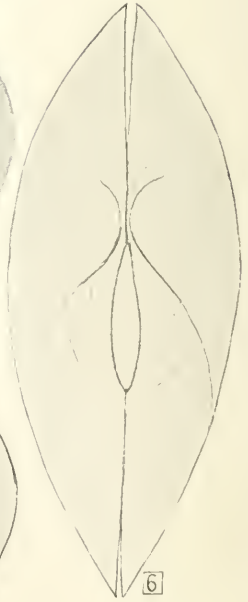
TROCHOMORPHA FUSCATA Pease. This species was listed in *Man. Conch.* (2), IX, but, so far as I know, no description has appeared. It is allied to *nigritella* and *contigua*, but the umbilicus is smaller than either (one-eleventh to one-twelfth diam. of base) ; spire slightly-convex conic, the apex much more pointed than in *contigua* ; base flattened as in *contigua*. Alt. $8\frac{1}{2}$, diam. $11\frac{1}{2}$ mm. Color uniform blackish-brown, or clear honey-yellow. It is from Ponape, or Ascension Island, near the Caroline group.

CALIFORNIA SLUGS.—Mr. Edw. M. Ehrhorn has lately sent me some slugs from California, which may as well be put on record. A box from Mountain View contained a number of *Analia gagates* (syn. *hewstoni*) and one *Agriolimax campestris*, both, in my opinion, native species. A lot from San Jose, Sta. Clara Co., consisted wholly of introduced species, namely, *Agriolimax agrestis*, heavily mottled forms, and *Limax maximus*, young and old. The three adult *L. maximus* in the box were all different, one being of the form *marmoratus* Ckll., one *moquini* Ckll., and the other an ill-defined form nearest to *czernaevii* Kal. These forms are like those which occur commonly in the southeast of England.

—T. D. A. COCKERELL.

SHELLS OF THUNDERHEAD MT., N. C.—I went to Thunderhead again last June, and I found two more specimens of *Gastrodonta patuloides* Pils., and more of the other new forms I had taken the year before [see *NAUTILUS*, p. 14]. I found, this time, what I think is a banded form of *Mesodon andrewsi* W. G. B. I have never seen this variety before. A few of the long-looking form *Mes. christyi* were found also, but they are very rare.

—MRS. GEO. ANDREWS, in letter.



WRIGHT—New Unionidæ.

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No. 11

NEW FLORIDA UNIOS.

BY BERLIN H. WRIGHT, PENN YAN, N. Y.

Unio Hartwrightii sp. nov. Pl. II, figs. 4, 5, 6.

Shell smooth, elliptical, inflated, pointed or subbiangulated posteriorly, well rounded anteriorly, inequilateral; rather thin and hard, slightly thicker in front; beaks very prominent, with two or three obscure wide undulations in one series; epidermis dark chestnut-brown with faint green rays, more or less disposed in fascicles over the entire disk; growth lines barely distinct; umbonial slope raised into an abrupt high ridge on the upper half, and rounded and flattened below; dorsal area wide, carinate, nearly cordate and usually with numerous heavy wrinkles or sharp folds; cardinal teeth double in the left and simple in the right valve, divergent, crested, rather short and subcompressed; lateral teeth long, striate and thin; nacre pinkish-purple and in concentric zones towards the margins, highly iridescent, and especially so on the posterior half; cavity of the umbones rather deep; posterior cicatrices confluent, anterior ones distinct, and the dorsal ones few and in a short line under the hinge plate.

Hab., Lake Beresford, Florida.

Types in the collection of the author, cabinet of Mrs. Geo. Andrews, Knoxville, Tenn. and Museum Acad. Nat. Sciences, Phila.

REMARKS.—Some fifteen specimens of this shell were taken in 1887, showing quite a disposition to variability, the sharp umbonial angle being more or less depressed, and the wrinkles less numerous and prominent. It does not group well with any species, but has some characters which, perhaps, suggest an affinity with *U. Anthonyi* Lea, under which name it has been sparingly distributed, but differs in being more rounded behind, rayed, in the color of epidermis, location of point of greatest diameter, prominence of umbones, elevation of umbonial ridge, and in the greater cavity of the shell and beak.

The specimen in the cabinet of Mrs. Geo. Andrews is a magnificent one, and was collected in Florida by the late Mr. F. Rugel. I dedicate this rare and beautiful species to my father, Dr. Samuel Hart Wright, A. M., Ph. D., who shared the delights of my Florida collecting tour, and whose counsel in the study of the Book of Nature, has always been an inspiration.

Another Florida *Unio* was given this name by the late Dr. Wesley Newcomb, but it was never published, its specific value being doubted.

Unio Oscari B. H. Wright. Pl. II, figs. 1, 2, 3.

The original description of this species may be found in NAUTILUS March, 1892, p. 124.

Habitat: A creek from Lake Osceola, at Winter Park, Florida.

Collections of G. W. and O. B. Webster, B. H. and Dr. S. H. Wright, Museum Academy Natural Sciences, Phila., and National Museum.

Over 100 specimens of all ages of this well marked and beautiful species were taken by the Messrs. Webster and submitted for examination. They are remarkably uniform in character and most nearly related to *U. aheneus* Lea, from which it differs in having a smoother and nearly polished epidermis, cavity of the shell very much deeper and the lateral teeth shorter, heavier and wider. This shell has been needlessly confounded with *U. Hazelhurstianus* Lea of the Satilla River, Ga., from which it differs in being more roughly furrowed (sides deeply grooved near the umbonial ridge with concentric rounded furrows) more inflated, thinner, more pointed behind and more sharply angled on the posterior umbonial angle and in having a reddish-brown epidermis instead of black, and the teeth are much slenderer.

This species is here figured for the first time.

A NEW VARIETY OF LIMNÆA.

BY L. H. STRENG.

Limnæa desidiosa var. *De Campi*.

Shell oblong, subconic, pale horn color, subdiaphanous, very finely striated. Whorls about 5, rapidly enlarging, very convex and flattened; suture very deeply impressed, forming a considerable shoulder. Aperture about equal in length to the spire, not dilated, elliptical; subumbilicate. Labium but a small portion appressed to the body whorl, and the callus very light; sinus of the fold not very prominent. Length 5 mm., breadth $2\frac{1}{2}$ mm.

Inhabits Brook's Lake, Newaygo Co., Mich.



Remarks: The shell is rather slender in appearance, its main features being the rapid enlarging of the whorls and the shoulder. It is most closely allied to *L. desidiosa* Say, except in the prominent shoulder, and it is a great deal smaller shell. It was discovered by Dr. De Camp several years ago, and has lain in our collection ever since. I name it after my

friend Dr. De Camp, who has done so much for the furtherance of our knowledge of the Molluscan fauna of Michigan, especially the western part of the State.

Nov. 22, 1895.

DESCRIPTION OF A NEW GASTRODONTA.

BY H. A. PILSBRY.

Gastrodonta collisella n. sp.

Shell rather solid, minutely perforate, above elevated and somewhat dome-shaped, below rather flattened, the periphery rounded. Surface glossy, especially beneath, the base being radially finely wrinkled, and with faint traces of spiral striation in the slightly excavated umbilical region; upper surface sculptured with irregular, arcuate wrinkle-riblets in the direction of growth-lines, and stronger toward the sutures. Whorls $7\frac{1}{2}$, slightly convex, separated by very shallow sutures, which, under the lens, seemed margined below by the partial transparence of the shell.

Aperture mainly basal, lunate, with a lining of white callus a short distance within, heavier and bearing a small tooth on the columellar slope, and a rather short white lamella toward the outer part of the base. Lip-edge thin and acute, suddenly expanded at the columellar insertion, half covering the umbilical perforation.

Alt. 7, diam. $8\frac{1}{2}$ mm.

Alt. $5\frac{2}{3}$, diam. $8\frac{1}{2}$ mm.

Described from thirty-four specimens, from Knoxville, Tenn.; Citico, Monroe Co., Tenn. (A. G. Wetherby); Knox Co., Tenn. (Mrs. Geo. Andrews), and Nashville, Tenn. (G. A. Lathrop).

Variation is observed in the height of spire and the degree of development and length of the basal lamella. It is most nearly allied to *G. ligera* and *G. cerinoidea*, being smaller than the former, with different aperture armature, and larger, duller and more elevated than the latter.

My attention was first called to this form by Mr. A. G. Wetherby, although specimens from Nashville had long been in the collection of the Academy of Natural Sciences. It seems to be a fairly common species, probably confined to the "Cumberland Subregion" of Binney.

In describing this form, it is a pleasure to add that so competent an observer as Mr. Wetherby agrees with me that it is a new species; for I suppose no living naturalist is more experienced than he in dealing with the shells of the beautiful mountain region it inhabits.

NEW NORTH AMERICAN PISIDIA.

BY DR. V. STERKI.

Pis. trapezoideum n. sp.

Mussel of moderate size, rather much inflated, irregularly quadrangular in outline; beaks slightly posterior, rather large and prominent, more or less distinctly flattened on top; superior margin little curved, with the scutum and scutellum well developed and marked by distinct angles where joining the posterior and anterior margins; the former truncated perpendicularly, and with an obtuse, rounded angle where passing into the moderately curved and comparatively long inferior margin; antero-superior margin little curved or straight and meeting the inferior in a well marked somewhat

rounded angle situated rather inferior. Surface with irregular, rather fine striæ, slightly shining; color of epiconch pale or grayish horn; shell moderately thick; nacre whitish-glassy; hinge rather stout; cardinal teeth lamellar, the right moderately curved, not reaching the inferior edge of the hinge plate, with a rather deep groove below; the left anterior cardinal tooth moderately or rather strongly curved, the posterior oblique, moderately curved, with a deep groove between them; lateral teeth rather strong, finely crenulated or rugulose, those of the left valve strongly, those of the right valve slightly projecting over the valve edge, and the latter also into the cavity of the mussel; ligament strong.

Size: long. 4.2-4.7, alt. 2.5-3.0, diam. 2.5-3 mill.

Habitat. The species has a wide geographical distribution; Michigan, many places in the Upper and Lower Peninsula; southern Minnesota; Pedan River, Canada; Philadelphia, Pa.; Adamsville, N. J.; Comal Co., Texas.

It is surprising that such a well characterized *Pisidium* has not been noticed before this. Careful comparison with the earlier descriptions of T. Prime shows that it cannot be identical with any of those species.

Pis. tropezoideum is somewhat variable in size and shape; the angles at the scutum and scutellum are more rounded in some forms, and so the superior margin is more curved, the beaks are more or less flattened on top, sometimes almost imperceptibly.

New Philadelphia, Ohio, February, 1896.

(To be Continued.)

ANNOTATED LIST OF THE MOLLUSCA FOUND IN THE VICINITY OF
CLEARWATER, WRIGHT CO., MINNESOTA.

BY H. E. SARGENT, WOODVILLE, ALA.

Part Second—Aquatic Species.

In searching for aquatic specimens a ten quart tin pail and a wire gauze dip net were the implements made use of. Sediment and specimens were dipped into the pail and washed by repeated stirring and decantation. By this means the most minute specimens were retained for future sifting and sorting.

The stations searched have been fully described and located in the first part of this article. They will be hereafter referred to by letter as follows:

Station B. Belle Lake.

Station C. Clearwater Lake.

Station D. Mississippi River at Bellevue, Ia.

Station F. Clearwater River.

Station H. Heath Lake.

Station M. Mississippi River at Clearwater, Minn.

Station R. Crow River, Rockford, Minn.

Station S. A dry meadow at St. Michaels, Minn.

Station T. Among damp moss in tamarack swamp at Clearwater, Minn.

39. *Pleurocera subulare* Lea. M.

40. *Bythinella obtusa* Lea. M.

41. *Amnicola lustrica* Pils. B, C, H, in all cases feeding upon weeds.

42. *Amnicola limosa* Say. B, C, F, R, M, H.

43. *Amnicola limosa* Say var. *porata* Say. M.

44. *Amnicola cincinnatiensis* Anth. R.

45. *Valvata tricarinata* Say. B, F, M, H, R, T, C.

46. *Valvata tricarinata* Say var. *bicarinata* Lea. B, F, H, R, T, C.

47. *Valvata tricarinata* Say var. *simplex* Gld. C.

Notes.—Typical specimens occurred alone in the Mississippi River only. Of 132 specimens taken from there, none show any tendency toward the varieties. The carinae are very prominent; specimens mostly large and dark colored. At all the other stations, specimens were much smaller, light in color and only in exceptional cases having three distinct carinae. In most cases the middle one is entirely wanting. The few specimens taken at Clearwater Lake are about equally divided among the three forms.

48. *Lyogygnus brownei* H. F. Carpenter. B, F, in muddy bottom.

49. *Campeloma rufum* Hald. F, M. 3 sinistral specimens of this species were taken.

50. *Campeloma subsolidum* Anth. D. Adult specimens are curiously depressed, closely resembling *Viripara subpurpurea* Say with which it is found.

51. *Viripara subpurpurea* Say. D.

52. *Vivipara intertexta* Say. D.

53. *Limnæa megasoma* Say. The only station for this species in this vicinity, so far as known, is a small lily-pond in the bed of the Mississippi River just below St. Cloud. It was discovered here a few years ago by Prof. Hubbard of the St. Cloud State Normal School. The snails are to be seen floating on the surface or feeding upon the lily-leaves. They are shy, sinking almost instantly when alarmed.

54. *Limnæa stagnalis* L. C, H, B, feeding upon weeds. R, found putrifying at the roots of grass in slough near the river.

55. *Limnæa emarginata* Say. C. Two quite distinct varieties of texture were taken. One corneous, translucent and rather thin in both young and adult specimens; the other nearly white, opaque and heavier, with much thickened margin. Both forms were plentiful and near together. One was found on the pebbles, the other on the sandy bottom.

56. *Limnæa gracilis* Jay. After finding dead specimens of this beautiful species in Belle Lake, I was told by Prof. Hubbard that he took it alive in Heath Lake the previous fall upon the under side of lily-leaves. Later a thorough search was made for them in the same original locality, but only two dead specimens were found. Query—where do they keep themselves in summer?

57. *Limnæa reflexa* Say. C, B, S.

58. *Limnæa reflexa zebra* Tryon. B.

59. *Limnæa columella* Say. R.

60. *Limnæa catascopium* Say. M.

61. *Limnæa caperata* Say. S.

62. *Limnæa palustris* Mull. R, on slough grass; D.

63. *Limnæa humilis* Say. C, B, M, F.

64. *Limnæa desidiosa* Say. C, B, M, F.

65. *Aplexa hypnorum* L. R, T, S.

66. *Physa gyrina* Say. D, F, B, M.

67. *Physa integra* Hald. St. Cloud, Minn.; D.

68. *Physa oleacea* Tryon. D.

69. *Physa vinosa* Gld. F.

70. *Planorbis campanulatus* Say. Abundant everywhere.

71. *Planorbis bicarinatus* Say. Abundant everywhere.

72. *Planorbis triolevis* Say. Abundant everywhere.

73. *Planorbis exacutus* Say. C, B, R, F, H.

74. *Planorbis hirsutus* Gld. C, B, T, F, H.

75. *Planorbis umbilicatellus* Ckll. B.

76. *Planorbis parvus* Say. B, T, F, D.
 77. *Segmentina armigera* Say. Everywhere abundant.
 78. *Ancylus* (sp.?). M, D.
 79. *Sphaerium sulcatum* Lam. B, F, H. Mississippi River at St. Cloud. Specimens extra large and fine.
 80. *Sphaerium striatinum* Lam. R, F, D, M.
 81. *Sphaerium transversum* Say. D.
 82. *Sphaerium truncatum* Linsley. R, F, S, B, F.
 83. *Sphaerium rhomboideum* Say. B, H. Mississippi River at St. Cloud.
 84. *Sphaerium solidulum* Prime. M, F.
 85. *Sphaerium Jayanum* Prime. Marshes near Clearwater.
 86. *Sphaerium securis* Prime. H.
 87. *Pisidium virginicum* Gmel. F.
 88. *Pisidium abditum* Hald. F, H, B, T, C. Spring at Bellevue, Iowa.
 89. *Pisidium Walkeri* Sterki. F, M.
 90. *Pisidium politum* Sterki. F, B.
 91. *Pisidium variabile* Prime. F, C, H.
 92. *Pisidium compressum* Prime. F, M, C.
 93. *Pisidium ferrugineum* Prime. F, M, H.
 94. *Pisidium rotundatum* Prime. B, T.
 95. *Unio occidentis* Lea. M.
 96. *Unio rectus* Lam. C, M, F. Red River of the North, Fargo, N. D.
 97. *Unio luteolus* Lam. C.
 98. *Unio ligamentinus* Lam. M.
 99. *Anodonta footiana* Lea.

The *Pisidia* enumerated above are certified to by Dr. Sterki; the *Sphaerium* by Mr. E. W. Roper; and such other species as there was any doubt concerning by Prof. H. A. Pilsbry.

TRANSACTIONS OF THE ISAAC LEA CHAPTER.

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

Owing to the delay of some of our reports the volume of Transactions was not started promptly on its annual round, but we hope our members will make allowance for the delay. The volume will

be found interesting and suggestive. Extracts from the Transactions will be found in this department of THE NAUTILUS each month.

A member who has joined our Chapter during the year, writes the following when forwarding her report for 1895; "I did it only because I understood that was the one thing that would insure me the privilege of reading the 'Transactions' for the year. I have read those of 1889 and 1891, and am willing to do anything in my power for the pleasure and profit of reading another volume." Please bear in mind that one week is the limit of time allowed for the retention of the volume of Transactions.

The Secretaries of Sections for our Chapter have been appointed, as provided for in Section 1, of our By-Laws, and are as follows:

Section A.—Marine shells of the West Coast, Prof. Keep, Mills College, Cal.

Section B.—Mrs. E. P. Wentworth, Portland, Maine.

Section C.—Land shells east of the Rocky Mts. (Secretary not yet chosen).

Section D.—Fresh water shells east of Rocky Mts., Dr. W. S. Strode, Lewistown, Ill.

Section E.—Land and fresh water shells west of Rocky Mts. (Secretary not yet chosen).

Section F.—Fossil shells, Hon. Delos Arnold, Pasadena, Cal.

Section G.—Juvenile Section, Mrs. Mary P. Olney, Spokane, Wash.

Section H.—Microscopic shells, Mrs. T. S. Oldroyd, Los Angeles, Cal.

Section I.—Marine shells of the S.-Eastern Coast, Mr. J. J. White, Rockledge, Florida.

The Executive Committee consists of the "President, General Secretary and one other member" (Art. IV). The Honorable Delos Arnold has been appointed a member of the Executive Committee.

WEST COAST SPECIES OF HALIOTIS.

[Report of the President, Professor Josiah Keep. From the Transactions of Isaac Lea Chapter for 1895].

The recent revision of the genus *Haliotis* and the changes of some specific names since the publication of my little book on West Coast

Shells, make it proper to place the matter anew before the members of our Chapter. Those who have the opportunity of consulting Vol. XII of the "Manual of Conchology," will find a full discussion of the subject; but as there are some who cannot consult that excellent authority, I propose to use some of the statements of Prof. Pilsbry in connection with this report.

There are six species of the genus in question to be found upon our Western Coast, only three of which, however, are sufficiently abundant to be called common. The first of these species, and probably the best represented in respect to the number of specimens, is *Haliotis Cracherodii* Leach. This is the common "black abalone," so called on account of the dark color of the outer layer of its shell. The "Manual" gives the limits of locality as "Fallarones Is. to San Diego." Probably the Farallones Is. off San Francisco are meant, a natural mistake having been made in the spelling, but I think the species reaches much farther to the northward than the latitude of these islands. I should like to have my suspicions confirmed or refuted by those who have made northern observations.

One morning during the last summer I took advantage of the low tide and explored the granite rocks that form the promontory beyond the Point Pinos lighthouse near Monterey. The waves have been breaking for ages over those venerable cliffs, and the results of their work are distinctly seen. Out in the water, quite far from land, you get glimpses of sunken rocks, the very bones of the ancient cape. Nearer are a series of small and precipitous islands, most of which you can reach at low tide. Strewn all over the bases of the cliffs are masses of granite, some of them loose boulders, while others are the seamed and weather-worn outcroppings of the underlying ledges. Many of the rocks are covered with a thick mat of seaweed, but others are gray and bare.

Venturing out as far as safety would allow, I was amazed to find the available roosting on some of the cliffs almost literally covered by young specimens of the species under consideration. The shells averaged, perhaps, three inches in length; a few were twice that size, but many were much smaller. Their keen instinct teaches these animals to seek the least exposed positions, a deep and narrow cleft in the rock being the favorite retreat, and there, away from danger, they congregate in great numbers. As the tide came in I was obliged to leave them, and so could not continue my observations, but I fancy that when they were well covered with water they loosened

their firm hold upon the surface of the rock and began to move around in search of food. It is evident that this species is very prolific, and though large specimens are not so common as formerly, there seems to be no danger that the species will soon become extinct.

The next species is the red abalone, *H. rufescens* Swainson. This animal has a much larger shell than the last, some of them reaching the length of nine or ten inches, possibly more. They were formerly very common about Pacific Grove, but they have been so persistently collected that adult specimens are rarely found. They live at a somewhat lower level than their black brothers, and are not often seen on the rocks above the water, even at low tide. The Chinese fishermen cruise around in their boats at such times armed with a hook on the arm of a long pole, with which they secure the coveted prize. The large shells are mostly collected from the more unsettled parts of the coast, and there is danger that the supply will soon become seriously diminished. Last summer I saw a two-horse wagon loaded with these shells, which had been drawn up to Pacific Grove from a point some thirty miles down the coast.

The third species, named from its beautiful internal color the "green abalone," has generally been known to scientific circles as *Haliotis splendens*. It was given that very appropriate name by Reeve in 1846, but it has been found that in 1845 it was named by Philippi *H. fulgens*, and so the latter name must stand. This beautiful shell abounds in southern waters, but as I have never had an opportunity to study its habitat, I cannot report upon its prospective decrease. The only live one I ever saw was an aged specimen which was found upon the rocks near Cypress Point. Monterey Bay seems to mark its extreme northern location, and even then I have never found a specimen in the Indian shell-heaps, though *rufescens* and *Cracherodii* are found by the thousands in all stages of decomposition.

H. corrugata Gray, does not come so far north as the last species. A fine specimen before me from San Pedro, Cal., measures $6\frac{1}{2}$ in. in length, $5\frac{1}{2}$ in breadth, and $2\frac{1}{2}$ in convexity. The shell has strong ridges upon its back, and there are four large open holes. I have never seen a living specimen, and know very little concerning its habits.

H. assimilis Dall. is now considered to be a distinct species. The Manual reports it from "Monterey to San Diego in deep water." A

specimen before me from San Diego is 4 inches long and $3\frac{1}{4}$ inches wide. It has seven open holes. The exterior of the shell is marked by many threads like Brussels carpeting, and the spire is short but distinct. The interior is smooth, silvery, and without visible muscle-scar. The shell is tolerably thick, and appears very compact and solid.

The last species to be noticed is *Haliotis gigantea* Chem. var. *Kantschatkana* Jonas. The large typical form of this species belongs essentially to Japan, but the variety seems to have come around with the warm current past the Aleutian Is., and down the coast, at least as far as the middle of California. My best specimens I purchased in Victoria, B. C., where I was told that they were gathered on the west coast of Vancouver Island. My largest specimen is 5 inches long, $3\frac{1}{2}$ inches wide, and $1\frac{1}{2}$ inches high. In shape it appears long and narrow when compared with other species. The shell is thin, the edge sharp, the spire quite prominent, the surface uneven, and the open holes are four in number, large and surrounded by high walls. A deep channel runs under the line of holes. The interior is very iridescent, light color prevailing. The muscle-scar is not distinct.

Concerning at least half of our species there is need of further information respecting the habits of the living animals, as well as observations concerning localities where specimens are to be found. In the gathering of information of this kind, even about our more common species, I believe the members of our Chapter may be able to do much good work. While a few great men may do the important work of determining the correct names and classification of the species, each one of us in our more humble sphere may make observations and collect information which will help to swell the total amount of knowledge concerning the molluscan world. I shall personally be grateful for any further information concerning any of our species of the genus *Haliotis*.

HOW TO PACK SPECIMENS FOR MAILING.—Three times within the last few days I have received small sendings in which the specimens were crushed to powder. It is too unsafe to send shells in a letter, simply packed up in paper or a paper tube, or weak quill. Strong turkey quills are better, especially when double, *i. e.* one tightly stuck into another, and fastened in the bottom of the envelope. Also a piece of thick pasteboard, or a slice of cork is suitable, with a hole in the middle, and paper pasted on both sides.—It is a pity how often valuable and even unique specimens are lost by carelessness in packing.—DR. V. STERKI.



Unio bursapastoris Wright.
Unio Friersoni. *Unio Friersoni* Wright.
Unio bursapastoris Wright.

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NEW AMERICAN UNIONIDÆ.

BY BERLIN H. WRIGHT, PENN YAN, N. Y.

Unio bursa-pastoris sp. nov. Pl. III, figs. above and below.

Shell rough, disposed to be both nodulose and pitted, very inequilateral, rounded evenly in front, umbonial ridge nearly obsolete, dorsal margin arcuate, ligament long, thick and much elevated, epidermis reddish-black, rayless, except when very young; substance of shell thick; cavity of shell shallow and uneven, with a wide flattened area extending from beak cavities to the posterior angle; cavity of the beaks very deep, compressed and very wide; pallial impression very rough and deep; greatest diameter of shell over the anterior edge of the cardinals; cardinal teeth low, thick and rather smooth; lateral teeth short, thick and widely separated from the cardinals; dorsal plate long, wide and usually notched near the cardinals. Terminal cicatrices distinct; dorsal cicatrices numerous, shallow and under the posterior cardinal. Nacre white and usually much blotched with smoky spots; occasionally with a shade of pink in the center of the cavity.

Size, length 2.5 inches, width 3.6, diameter 1.25.

Hab. Powell River, Virginia.

My Cabinet, National Museum and Mus. Acad. Nat. Sci., Phila.

Remarks.—This species belongs to the group of which *U. argenteus* Lea is typical. It differs from that species in having a darker

epidermis, an obsolete umbonial ridge and deep, compressed beak-cavities. It differs in much the same manner from *U. Lesleyi*, which has greater shell cavity. Compared with *U. abacus* Hald., it is proportionally much wider, deeper and with more compressed beak-cavities, and has not the checker-board markings of that species. Old specimens resemble *U. Pilsbryi* Marsh, interiorly, but without alation or undulations. In old specimens the base becomes emarginate, and there is more or less biangulation behind, and the teeth become almost obsolete, and of a dull smoky tinge. Thirty specimens were received.

Unio Friersoni sp. nov. Pl. III, figs. right and left.

Shell smooth, triangular, inflated, nearly equilateral, obtusely pointed behind; sides swollen not constricted, rayless or obscurely radiate when very young; substance of the shell uniformly rather thick and solid. Beaks angular to the tips and with three or four close undulations which form parallel V-shaped ridges with the angle pointing down the umbonial angle, and the long straight arms of which extend diagonally across the beaks. Ligament very short, thin and of a lighter red than the epidermis, which is a dark-chestnut color, with minute striæ and with coarse growth-lines. Umbonial slope obtusely angular. Posterior slope rounded on the margin and with a raised ridge line from beak to posterior end, forming there, generally, a slight biangulation. Dorsal area wide, cordate. Cardinal teeth large, erect, with furrowed sides, the anterior branch in the left valve being very thin and broad and with a long striate edge. Lateral teeth short, slightly curved, the outer one being the thinner. Anterior cicatrices distinct with a secondary cicatrix above, and running under the cardinal tooth. Posterior cicatrices distinct. Dorsal cicatrices few and under the posterior cardinal. Cavity of the shell very deep, and quite uniformly hollowed out. Cavity of the beaks broad, roomy, the apex within being nearly a right angle. Nacre usually white, with a tint of blue, and iridescent at posterior end; sometimes the nacre is entirely pink.

Animal always white. Size, width 2 inches, length 1.75, diameter 1.38.

Habitat Bayou Pierre, an arm of the Red River in De Soto Parish, Louisiana.

My Cabinet, U. S. National Museum, Academy of Natural Sciences, Phila. and cabinet of L. S. Frierson.

Remarks.—This species belongs to the group of which *U. trigonus* Lea, may be considered the type, although differing much from that species in outline, beaks and in the uniform roundness of the sides. It also has certain characters indicating a relationship with *U. Ridellii* Lea, *U. Chunii* Lea and *U. cuneus* Con. It differs from the first in having the posterior apex lower and more or less biangulated; the posterior margin rounded, instead of straight; posterior margin without the hip peculiar to *U. Ridellii*; the cardinal teeth are heavier and not pyramidal; and differs most remarkably in the character of the beak undulations. From *U. Chunii* Lea, it differs in having a greater depth of cavity; more massive and higher umbones and swollen sides without depressions; much shorter posterior extension; base not emarginate; entire absence of rays and the same difference in beak undulations that distinguishes it from *U. Ridellii* Lea. It differs from *U. cuneus* Con. in being smoother; lighter colored epidermis; much larger opening to the umbonial cavity; cavity of the shell much deeper and more uniformly rounded; lateral teeth more slender and the species never attains the extreme size of *U. cuneus*, the declivity of the posterior slope is much steeper; the ligament shorter; without the anterior subtruncation, and it is never cuneiform.

The peculiar undulations of the beaks amply distinguish it from any other known species.

Some twenty-five specimens have been critically examined which maintain a remarkable constancy in all the characters.

It is named in honor of Mr. Lorraine S. Frierson of Frierson Mill, La. who is a zealous student and collector of Unionidæ.

ON CERTAIN ABNORMAL SPHÆRIA.

BY BRYANT WALKER, DETROIT, MICH.

The peculiar characteristics of the hinge-teeth of the American species of *Sphærium* and *Pisidium* have been almost totally ignored by Prime and the earlier writers in their descriptions of the various species which they established. With the exception of some of the descriptions of the more recently described species, nothing but the most general remarks upon the subject are to be found in the American literature upon these genera. Among the European concholog-

ists, however, more attention has been given in this direction, and while perhaps some have gone to the other extreme and have accorded too great importance to the hinge characters, there can be no doubt, but that a careful and conservative study of our American species in this regard would be in many cases a valuable assistance to the determination of the relations and specific validity of many of the at present poorly defined and ill-understood forms.

In examining some specimens of the common *Sphærium striatinum* Lam. recently, I was struck in several instances with the occurrence of an abnormal arrangement of the hinge teeth, and was thereby induced to go further and ascertain if possible to what extent such irregularities were present.

My observations thus far have been confined to two species, *Sphærium striatinum* Lam., and *S. simile* Say. Of the former species one hundred specimens from twenty-four localities, were chosen at haphazard, the number from each locality varying from one to eleven. Of these, all the specimens from sixteen localities, forty-six in number, were normal. Of the remaining fifty-four specimens from eight localities, ten were abnormal. In only one instance, did more than a single abnormal individual occur in any one locality, and in that, three out of nine specimens were abnormal and all in the same particular.

Of *Sphærium simile* Say, sixty-four specimens from nineteen localities were examined, the number from each locality varying from one to six. Of these, ten individuals out of thirty from eight different localities were abnormal. While in those from eleven localities, represented by thirty-four specimens, no variation occurred. In both species the number of abnormal specimens seems surprisingly large, amounting to ten per cent in *S. striatinum* and to nearly sixteen per cent in *S. simile*. In no case was any attempt made to pick out unusual specimens and, indeed, no external variation in appearance was noticed as being coincident with the abnormal arrangement of the hinge.

The normal arrangement of the hinge-teeth of a *Sphærium* is as follows:

Right valve	Cardinal 1	Ant. laterals 2	Post. laterals 2.
Left valve	Cardinals 2	Ant. lateral 1	Post. lateral 1.

The variations noticed consisted in the reversing of the position of one or more pairs of these teeth.

Of the seven possible variations from the normal arrangement, but four were noticed. In no case were the cardinals alone reversed, but invariably a reversal of these teeth was accompanied by a reversal of either one or both pairs of laterals. Neither were the cardinals and posterior laterals alone, nor both pairs of laterals alone reversed in any case. The following table gives the details of the different variations observed and their relative frequency.

Normal *Sphærium*—cardinals $\frac{1}{2}$ Ant. Lat. $\frac{2}{1}$ Post. Lat. $\frac{2}{1}$.

Abnormal *S. striatinum* Lam.

No. of specimens 22: Cardinals $\frac{1}{2}$ Ant. Lat. $\frac{1}{2}$ Post. Lat. $\frac{2}{1}$.

No. of specimens 32: Cardinals $\frac{2}{1}$ Ant. Lat. $\frac{1}{2}$ Post. Lat. $\frac{2}{1}$.

No. of specimens 22: Cardinals $\frac{2}{1}$ Ant. Lat. $\frac{1}{2}$ Post. Lat. $\frac{1}{2}$.

No. of specimens 32: Cardinals $\frac{1}{2}$ Ant. Lat. $\frac{2}{1}$ Post. Lat. $\frac{1}{2}$.

Abnormal *S. simile* Say.

No. of specimens 52: Cardinals $\frac{2}{1}$ Ant. Lat. $\frac{1}{2}$ Post. Lat. $\frac{2}{1}$.

No. of specimens 32: Cardinals $\frac{2}{1}$ Ant. Lat. $\frac{1}{2}$ Post. Lat. $\frac{1}{2}$.

No. of specimens 22: Cardinals $\frac{1}{2}$ Ant. Lat. $\frac{2}{1}$ Post. Lat. $\frac{1}{2}$.

NEW AMERICAN ANCYLIDÆ.

BY HENRY A. PILSBRY.

Owing doubtless to the difficulty of distinguishing species in this group, but little work has been done upon the United States forms since the publication of Haldeman's monograph in 1842. Clessin, in the "Conchylien Cabinet," has added nothing of value to our knowledge of United States species, his *A. oregonensis* from Salem, Oregon, of which I have "topotypes," being doubtfully distinct from Tryon's *A. fragilis*. *A. caurinus* is also, as Tryon states, a synonym of *fragilis*.

In naming a series of Illinois mollusks for the Illinois State Laboratory of Natural History, my attention was directed to this genus.

The species of *Ancylus* fall into two groups, not, I suppose, of much importance systematically, but of considerable interest in a broad view of the conditions of mollusk life. One group, which may be termed the "petrophilous" *Ancyli*, live on rocks and shells in rivers, and usually have a rather highly conic shell. The other group, "phytophilous" *Ancyli*, live on water plants; some deeply submerged, as on the "leaves of grass" (to use a Walt. Whitmanism), streaming upward from the bottom; others inhabit the round

under-world of floating lily-pads; sometimes they are found on dead leaves in the water. The species of this group are mainly more fragile and depressed than those of the first group, and sometimes they are modified to correspond with their stations, as *A. parallelus*, living on narrow stems. It is evident that this difference of station means also more or less difference of food; and it will be interesting to find whether there exists any corresponding divergence in the dentition. The importance of full information on the *station* of every lot of *Ancylus* collected, will be evident from the foregoing.

Nearly all specimens when collected, are more or less coated with foreign matter, sometimes calcareous, but generally ferruginous. This must be removed before the color and finer sculpture can be observed. By floating the shell a short time on the surface of a weak solution of oxalic acid, rinsing it in water and then brushing, it may readily be cleansed. Nearly all North American species are then seen to be a clear corneous-white tint; most of them have growth-lines only, a few have radial striæ. Most of those species which have been described as dark colored, such as *A. obscurus* Hald., owe their color entirely to foreign matter, the shell itself being very pale.

Exhaustive comparisons with specimens of all North American species, and the types or author's examples of most of them, convince me of the novelty of the following species.

Ancylus peninsulæ Pilsbry & Johnson, *n. sp.*

Shell thin and fragile, with much depressed, broadly oval contour, the obtuse, rounded summit somewhat to the right of and behind the middle. Anterior, posterior and right slopes of the low cone nearly straight; left slope slightly convex. Color light horny brown, with a suggestion of olive when cleaned, usually with a very light brownish coating in a state of nature. Surface with slight, fine growth-lines and close, fine and conspicuous radial striæ.

Length 7, width 5, alt. 1.7 mill., often larger.

St. John's River and other localities in Florida, usually in creeks, living on the foliage of aquatic plants.

Somewhat like the northeastern *A. fuscus*, but readily known from all other species of the United States by its large size, broadly oval and depressed form, blunt apex, and the dense radial striation. Several Antillean and South American species are somewhat similar to this, but these large and depressed forms have the apex far more excentric.

This is by no means rare in collections of fresh-water shells from Florida, but is generally labelled "*A. filusus* Conrad," probably on account of the conspicuous radial sculpture. Conrad's *filusus*, however, is a stout, very steeply conical species with coarser radial riblets than any other known American form, and totally different from the low and delicate *A. peninsulae*. It is from the Alabama River, where it is found living on Melanians. This fact, together with the texture and form of the shell, indicate that *filusus* is a typical rock *Ancylus*, like *rivularis*; while the form from Florida is a true weed dweller.

The types of *A. peninsulae* were collected by the editors of this journal in Salt Creek, one of those sparkling streams of "sulphur water" so characteristic of Florida, arising from great brimming springs and feeding the St. John's and other rivers. Salt Creek is the northernmost stream flowing into Lake George on the west side. The *Ancylus* lives on long water-grass, and is abundant.

Ancylus eugraptus Pilsbry, *n. sp.*

Shell rather fragile, oval, the right side less arcuate than the left; rather elevated, the apex slightly behind and to the right of the middle, somewhat obtuse, with an indistinct apical depression or scar, posterior and right slopes straight, anterior and left feebly convex. Translucent horn colored and glossy when cleaned, with a blackish coating when collected. Surface with faint growth-lines and very fine, somewhat irregular radial striae, more distinct toward the periphery. Length 6, breadth 4, alt. 1.8 mm.

Illinois River at Havana, Ill.

Types are no. 67791, coll. A. N. S., Phila., from lot no. 13542, coll. Ill. State Lab. Nat. Hist.

This species, while resembling *A. obscurus* and *A. fuscus* somewhat, differs from both in the sculpture. The apex is far more excentric than in *A. borealis* or *A. ovalis*, both of which are very small species. *A. filusus* is far rounder, more steeply conic, and has stronger radial riblets. In *A. rivularis* the apex is much more strongly recurved, and the slope behind it notably concave.

ISAAC LEA DEPARTMENT.

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

One of our new members in a letter to the General Secretary writes as follows in reference to collecting Mollusks in Winter in

California: "I have discovered that the sunshine has much to do with finding shells, as they come up much more readily on a warm day than on a cold cloudy one. Even these little creatures appear to love the sunshine." Is this the experience of other collectors during the winter?

ALONG THE DAMARISCOTTA.

[Report of Mrs. E. P. Wentworth. From the Transactions of the Isaac Lea Conchological Chapter for 1895.]

The banks of one of the loveliest rivers in Maine have been the principal scene of my "shelling trips" this year, and I shall make these trips the basis of my report. The first warm days in May found me taking advantage of the low tides. I was not sanguine enough to hope to find new species, and the object of my search was merely to lay in a store of *Natica heros* var. *triseriata*, *Nassa obsoleta* (large uneroded specimens) and to find, if possible, the *Skenea planorbis* which so far, has eluded my diligent search. Armed with a wooden tooth-pick, collecting bottle and tin dish, I advanced upon the unsuspecting mollusks. I found quantities of *Naticas* underneath the sea-weed, crawling on the surface of the mud which coated the rocks covered by the sea-weed, and thousands of *Nassas* crawling on the mud near the low water mark. The *Nassa* in the water were waving their siphons in the air as if signaling to one another, but I knew they were only feeding in their own peculiar fashion. On turning over some small flat stones near low water mark my cup of joy ran over, for there, clinging to the edges and under sides of the stones, were the long looked for *Skeneas* and associated with them many of the graceful little *Rissoa minuta*.

At this period of my search the wisdom of taking a wooden tooth-pick instead of a larger and more dangerous weapon was impressed upon me, for it was the most convenient instrument imaginable for transferring these tiny mollusks to the collecting bottle. Before the tide turned I had hundreds of specimens, but, better than the shells was the consciousness that now I knew where to find *Skeneas*. I also found an *Aemæa testudinalis* Müll. clinging to an old bone, and although it was only moderate size and so fragile that I broke the edges in dislodging it, I carried it home in triumph, for it was the first one I had found in this river.

In July, my husband (who shares my studies with me) and I went up the river to a rocky point a short distance beyond the place where I found the Skeneas and here we tried our hand-net. Our efforts were rewarded by a live *Lyonsia hyalina* Conr. Our surprise and delight were unbounded. Never before had we even thought of *Lyonsia* as living so far from the sea (15 miles or more), and on a muddy bottom. This added another species to the many we had already found in this river. Repeated dredgings with the hand-net brought us no more *Lyonsias*, but on a careful examination of a small patch of mud at low water mark, covered with a hairy green sea-weed we discovered the hiding place of the fragile *Haminea solitaria* Say, and our diligent search resulted in our finding six of these transparent dainty shells. These the first we ever found alive, although in the bay at the headwaters of the river two miles away, I have found quantities of the dead shells. I am not aware that *Haminea solitaria* has ever before been found in Maine. It is a southern species and is not found in boreal waters. Its presence here along with several other distinctively southern species is regarded as evidence that the water bathing the coast of Maine was once much warmer than now, and these mollusks are the survivors of a fauna now nearly extinct in Maine.

On another trip, a short distance down the river, our net brought up a dead shell of *Nassa trivittata* Say.

As a result of this Summer's work along the salt water I have added four species to my list of Damariscotta River shells: *Lyonsia hyalina* Conr., *Aemœa testudinialis* Müll, *Skenea planorbis* Fabr. and *Nassa trivittata* Say.

But the river banks are not the only localities in this vicinity rich in molluscan treasures. On a trip to a brook in South Newcastle we found forty-one specimens of *Margaritana urenata* Barnes. A second visit to the same locality gave more *Margaritanas*, *Sphaerium partumeium* Say, *Ancylus rivularis* Say, and one *Limnœa* which I have not yet determined. While waiting for our train we found a number of fossil shells in clay which had been unearthed by men who had been getting gravel for the railroads. The shells found in this clay were all bivalves, and did not seem to be at all like the shells common to this period or locality. One shell somewhat resembled *Lyonsia hyalina* but it had numerous teeth in the hinge like the *Area*.

Picture to yourselves a wide, shallow brook bordered on either side with tall, beautiful flowering grasses, the brilliant cardinal flower and delicate lavender flowered mints, and you will have some idea of the scene of loveliness which awaited us, after our nine mile drive to South Jefferson, one fine day in August. The brook, which is called Dyer's River, is rich in Molluscan life, and quantities of *Unio complanatus* were to be found there. The dead shells of *Margaritana arcuata* were strewn along the banks, where they had been left by the pearl hunters. After collecting all the *Unio complanatus* we desired we used our hand-net with good success and the following shells were the result of the dredging: *Campeloma decisum* Say, *Pisidium aequilaterale* Pr., *P. rotundatum* Prime, var. *torquatum* Sterki, *P. abditum* Hald., *Amnicola limosa* Say.

My best hunting ground for land shells this Summer has been the crevices of an old ledge, and an old cellar where trees grow out of the cellar floor. In the cellar and on and near the ledge I found Pupas, Vallonias, Succineas, Patulas and Zonites. Under some bricks near a building on my own place I have for several seasons found *Vertigo pygmaea* Drap. but the find in land shells which I value most is *Vallonia costata*, which I found under rocks near our old sea-wall. These I have found in quantities since the tenth of November, finding some as late as the 27th of December. I believe this is the first time *Vallonia costata* has been found in Maine.

The report of the year's effort and pleasure in the conchological line would not be complete if I did not mention our trip to Old Orchard Beach and Saco, Maine, one day last October. After reaching the beach it took us but a short time to realize that our find would be small that day, and, after three hours gleaning, we had a dozen or two *Siliqua costata*, one *Astarte castanea*, three *Periploma cochlodesma* and a few other common shells; so, after eating our lunch and giving a few parting glances to the beach, we decided to take the electric car for Saco, and call on the Rev. Henry W. Winkley, whose interesting articles we have read in THE NAUTILUS. We had never met the gentleman, but our faith in the kind-heartedness of all true lovers of Nature gave us confidence, and surely this confidence was not misplaced. Mr. Winkley welcomed us most cordially and inviting us into his library gave us the exquisite pleasure of closely examining the finest collecting of New England shells we had ever seen. Mr. Winkley has been dredging for several seasons and the many rare deep water shells in his

cabinet testify to his success. We gazed with admiration upon the many rare and beautiful shells we had many times read about, but never seen, and were allowed the pleasure—not granted except to members of the guild, I suspect,—of actually handling these specimens.

After carefully examining the New England marine shells we were shown a fine collection of land shells, gathered from every country and every clime, and their various colors, forms and markings were of the deepest interest to us. But all things come to an end all too soon, we had to bid our good friend adieu and hurry to the railroad station (we were to return home by the steam cars). As we reluctantly took our departure from Mr. Winkley's home, where the latch string always hangs out invitingly to every conchologist, we felt that better than the grand collection of shells we had just seen, was the simple, generous, kindly spirit which Nature inspires in all her true disciples.

NOTES AND NEWS.

A SECTION OF CONCHOLOGY has recently been formed in connection with the Michigan Academy of Science, the following gentlemen being members: W. H. Sherzer, Ypsilanti; A. H. Boies, Hudson; C. A. Whittemore, R. J. Kirkland, M. D., W. Miller, Charles Miller, Jr., and L. H. Streng, Grand Rapids; F. E. Wood, Bay City; L. T. Schurrer, M. D., Lakeport; C. D. McLouth, Muskegon; Chas. A. Davis, Alma; Jerome Trombly, Petersburg; John M. Miller, Escanaba; Bryant Walker, Detroit.

The formal organization will not take place until the next regular meeting of the Academy, but an interesting programme of work has been planned, which will doubtless lead to substantial additions to the knowledge of Michigan conchology.

PRESERVATION OF MARINE MOLLUSCA.—Those who were interested in Mr. Hornell's paper on formalin (Nat. Sci., vol. VII, p. 416), may like to learn that this fluid has been tried for the preservation of *Aplysia* and *Pleurobranchus*. In both cases, however, a considerable amount of coloring matter was dissolved out of the integument. Dr. J. D. F. Gilchrist, who contributes this observation to Professor Herdman's report, also records a method of killing *Aplysia* in an expanded condition, which he says is the only one that can be

depended upon with certainty. "A few drops of a 5 per cent. solution of cocain were mixed with the water in which the *Aplysias* were. After a time they expanded fully. They were then left in the solution (twelve hours or more) till no contraction took place when removed and put into weak alcohol. If contraction took place, they would be put back into the cocain solution when they again expanded. This was repeated till no contraction took place, when they could, after a time, be put into stronger alcohol."—*Natural Science*, March, 1896.

NEW PUBLICATIONS RECEIVED.

A LIST OF THE SPECIES OF AMPHIDROMUS ALBERS, WITH CRITICAL NOTES AND DESCRIPTIONS OF SOME HITHERTO UNDESCRIBED SPECIES AND VARIETIES. By Hugh Fulton (*Ann. Mag. Nat. Hist.*, January, 1896). The species of this difficult genus of *Bulimi* are arranged according to their affinities in groups; the synonymy is thoroughly overhauled, and several new forms are described. Mr. Fulton has done good service in reducing to varietal rank a large number of nominal species, which have caused collectors endless pains and confusion; his treatment of the *perversus* group being especially commendable. Three excellent lithographic plates illustrate new or previously unfigured species and varieties.

RECOLTE DES MOLLUSQUES; CONSEILS AUX VOYAGEURS, par A. Bavay. Instructions for collecting mollusks, land, fresh-water and marine, with quite full information on where to find them.

CATALOGUE OF THE SPECIES OF CORBICULIDÆ IN THE COLLECTION OF TEMPLE PRIME NOW FORMING PART OF THE COLLECTION OF THE MUSEUM OF COMPARATIVE ZOOLOGY AT CAMBRIDGE, MASS.—By Temple Prime, 1895.—The species are arranged geographically and under each species are arranged by letters, the synonymy and the various localities represented. Of the genus *Corbicula* there are 58 species; *Batissa* 8; *Velorita* 3; *Cyrena* 42 recent, and 23 fossil; *Sphærium* 23 recent and 2 fossil; *Limosina* 10; *Pisidium* 31 recent and 2 fossil.

BULLETIN OF THE CHICAGO ACADEMY OF SCIENCES, Vol. II, No. 11, 1895.—Preliminary Outline of a New Classification of the Family Muricidæ, by F. C. Baker.

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