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A MONTHLY
DEVOTED TO THE INTERESTS
OF CONCHOLOGISTS.

EDITOR:
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THE NAUTILUS.

VOL. V. MAY, 1891. No. 1.

DESCRIPTION OF TWO NEW SPECIES OF UNIO, FROM ARKANSAS.

BY WM. A. MARSH.

Unio Pilsbryi.

Shell quadrate, somewhat oblique, plicate, striate, slightly inflated before, compressed behind, very inequilateral, obtusely angular before, sub-biangular posteriorly, valves thick before, thin behind, beaks small and flat. Epidermis dark reddish-brown, without rays. Cardinal teeth compressed, oblique, grooved, double in both valves, lateral teeth long, slightly curved, solid, anterior cicatrices deep, pit-like, granular, posterior cicatrices not very distinct, confluent, nacre dull white.

Habitat. Little Red River, Arkansas.

Remarks. This species bears some resemblance to *U. perplicatus* Con., which is abundant in the same stream, but differs in being much flatter, beaks very much smaller, the growth lines much closer; it also differs in being coarsely striate over the entire surface of the shell; in its undulations it is very different, the plications being very small, and much broken up; in fact, semi-nodulous; from *U. undulatus* Barnes, which is also abundant in the same stream, it differs entirely in outlines, in the manner and disposition of its folds, color of epidermis, nacre, teeth, etc., etc.

I name this shell in honor of Mr. H. A Pilsbry, Conservator Conchological Section, Academy of Natural Sciences, Phila., who first called my attention to its specific value. Specimens may be

seen in the United States Collection of the American Association of Conchologists, in the Academy of Natural Sciences of Philadelphia.

Unio Pleasii.

Shell smooth, oval, slightly elliptical, very inequilateral, valves rather thin, somewhat compressed, regularly rounded before, obtusely angular behind, beaks very small and flat, undulations very minute. Epidermis greenish-olive, usually covered with green capillary rays posteriorly, sometimes rayless. Cardinal teeth small, erect, crenulate, single in the right, and double in the left valve, sometimes tripartite in left valve; lateral teeth short and slightly curved, anterior cicatrices deeply impressed, posterior cicatrices very slightly impressed, confluent; nacre varying from pale rose to pale salmon, often silvery white and iridescent.

Habitat. Little Red River, Arkansas.

Remarks. In general form this shell bears some resemblance to *Unio spatulatus* Lea, but differs from that shell in being a much smaller and thinner shell, very much more compressed; its cardinal teeth are entirely different: it is not spatulate in form, and is very much more inequilateral; the nacre differs entirely; the very peculiar character of the females of this species must distinguish it from all others; they are deeply emarginate, very oblique, and sharp pointed posteriorly, bearing some resemblance to the females of *Unio conradianus* Lea.

I name this shell after my friend, Mr. Ellwood Pleas, of Indiana, who collected this species, with many other rare shells, in the interior of Arkansas. Typical specimens of both male and female are in the American Association Collection in Philadelphia.

EDIBLE MOLLUSKS, ETC., HERE AND THERE.

Mr. Carpenter's article in the last number of THE NAUTILUS, is fully as entertaining and profitable as his previous communications. It may be his last is a trifle more thrilling, and when this is supplemented by the usual spice of discrepancy, the picturesqueness is enhanced and the thoughtful reader is for awhile diverted from the plodding habit of careful definition and rational interpretation, and led unconsciously to soar far and wide on the reckless wings of fancy, and revel free and easy, in the salubrious atmosphere of fiction. The author's loyalty to Rhode Island is certainly commend-

able, and his belief that that illustrious commonwealth is the Banner State of the Union, in the matter of Oysters, Clams, Scallops and earless Cats, and such creature comforts, is heartily appreciated. I am prepared to wager—in vulgar parlance to bet—a bowl of "clam-chowder" against a "pan-roast," with Mr. Carpenter or any other conchologist brother, that the mollusks referred to *are abundant and nowhere of better quality* than in Rhode Island, and whether I lose the bet or not, in the spirit of fraternal sympathy, to pay the bill; but here, let us "drop a stitch," as the old ladies do sometimes in their knitting, and pick it up further on; let us leave the realms of romance and come down to the simple facts of *terra firma*.

If Mr. Carpenter will kindly turn to Mr. Keep's article in the January NAUTILUS, he will perceive *two* facts. *First*, the title is "Mollusks of the San Francisco Markets." *Not the Edible Mollusks of California. Second fact;* nowhere in Mr. Keep's paper does the word California occur.

Yet Mr. Carpenter, in the last three lines of his article, on page 137 (of the April NAUTILUS), says: "As we have seen, California has but five species and Maine only four regulars and two occasional, while Rhode Island can show eight every day and five irregular as below." The careful reader will look in vain to see any such statement in Mr. Keep's paper, and the species enumerated named therein, are such as are *usually* on the stalls in the San Francisco markets.

In addition to those named by Mr. Keep I have occasionally seen, and have purchased, *Macoma nasuta*, *Saxidomus aratus*, *Acmæa patina*, *Platyodon cancellatus* and *Haliotis rufescens*. The big Cephalopod *Octopus punctatus* is frequently met with, especially in the Clay Street market, and is a common article of food among the Italians and Portuguese. Another cephalopod, a small ten footed species or squid, is frequently, if not usually, purchasable in the Chinese markets, and dried *Abalones* or *Haliotis* meats, are a regular article of food in Chinatown. I have supplemented Mr. Keep's five species with others that pertain to the San Francisco markets, and do not propose to extend the list by going outside of the territory of that city, and up and down the *seven hundred* and more miles of the sea board of California, to name the *twenty-five or thirty* other species, that may fairly be regarded as "edible clams" and sufficiently abundant as to warrant their inclusion in a list of

species available for food supply, and therefore of commerical importance. Nor have I mentioned species that are "occasionally thrown into clam-bakes," or others that "were formerly eaten by the * * * Indians." A comparison in harmony with Mr. Keep's paper requires a list of those species of mollusks that are ordinarily on sale in the markets of Providence and Newport, and this is what Mr. Carpenter should have given.

The space occupied by this criticism, etc., is perhaps out of proportion to the importance of the matter criticised; so I will only take up the stitch previously dropped and in closing express my surprise and astonishment at the effect of Rhode Island "scallop-rims," on Pawtuxet and East Greenwich cats, tabbies or tommies, not specified, and marvel greatly over the possibility of turning mules into horses by the same kind of fodder.

Another and more serious matter is hinted at, for the mollusks of California, Maine and Rhode Island are referred to as "regulars" and "irregulars." This has the flavor of war. I have never seen any military clams on the West Coast. I presume the "regulars" belong to the standing army, and the "irregulars," are to be regarded as militia only.

R. E. C. S.

April 7th, 1891.

ON THE GENUS TEBENNOPHORUS BINNEY, OR PHILOMYCUS, RAF.

BY H. A. PILSBRY.

A recent discussion of this genus in the pages of the valuable English magazine, *Annals and Magazine of Natural History*, is probably of sufficient interest to American conchologists to justify us in reprinting the several articles.

Article I. (*Ann. Mag. N. H., Nov.*, 1890.)

Notes on Slugs chiefly in the Collection at the British Museum. By T. D. A. COCKERELL.

THE GENUS *Limacella*, BLAINVILLE.

While working on the slugs at the British Museum I came across the type specimens of *Limacella lactiformis*, Blainville. The two examples are in a bottle with the label "*Limacella lactes.ens*," and another label, apparently written by Dr. Heynemann, "Original zu Fig. 1, Taf. 7. Fér. Hist. Nat." They are true

Philomycus, presenting no generic difference from the well-known species of that genus. Heynemann (1884) has referred them to *Arion*, but he could not have examined them sufficiently, and was no doubt misled by the figure in Man. de Mal. (1827), pl. xli. That they are really Blainville's types need not be doubted, as they agree with his figures in outline, and his original description, notwithstanding that he misunderstood the characters of the slug, is sufficient to show that he had not an *Arion* before him. He refers to the absence of a shell and the genital orifice at the base of the right tentacle. The outline of the figure, and especially the anterior portion of the mantle, suggests at once a *Philomycus*. The supposed *Arion*-like mantle indicated in the figures is really due to an outline of some of the internal organs, visible on account of the transparency of the slug. The figures in Journ. de Phys., November, 1817, show how the mistake began, fig. 4 having even a sort of spiral coil in the middle of the anterior part of the mantle. The figure of *L. elfortiana* in Man. Mal. is the same outline, but apparently patched up from an *Arion ater*, with altogether fictitious rugæ on the back. Férussac's figure is after one of those in Journ. de Phys., and is fairly recognizable.

Altogether I think it must be held that Blainville described and figured his genus *Limacella* sufficiently for recognition, and as it antedates *Philomycus* by three years, the name must be used. *Limacella*, Brard, 1815, need not be considered, as it is identical with *Limax*, Linnè, 1767. The synonymy of *Limacella*, Bl., will accordingly stand:—

LIMACELLA, Blainville.

1817. *Limacella*, Blainville, "Mém. sur quelq. Moll. Pulm." Journ. de Phys. Dec. 1817, p. 443 (text), and Nov. 1817, figs. 4, 5.
1820. *Philomycus*, Rafinesque, Ann. of Nat. p. 10.
1820. *Eumelus*, Rafinesque, Ann. of Nat. p. 10.
1824. *Meghimatium*, v. Hass. Bull. Univ. Sci. iii. p. 82.
1842. *Incilaria*, Bens. Ann. & Mag. Nat. Hist. ix. p. 486.
1842. *Tebennophorus*, Binney, Bost. Journ. Nat. Hist. iv. p. 171.
1864. *Pallifera*, Morse, Journ. Portl. Soc. i. 8, fig. 5, pl. iii. fig. 6.

It does not seem necessary to recognize more than one genus here, though v. Ihering (Nachr. d. m. Ges. 1889) recognizes three—*Philomycus*, *Pallifera*, and *Meghimatium*. *Pallifera* may be conveniently retained as a subgenus.

The species of *Limacella* are as follows:—

Limacella lactiformis, Blainv.

1817. *Limacella lactiformis*, Blainv. Journ. de Phys. Dec. p. 444.
1821. *Limacellus lactescens*, Férussac, Hist. Nat. Moll. pl. vii. fig. 1.
1825. *Limacella elfortiana*, Blainv. Man. de Mal. et de Conch. p. 464.

This appears to be distinct from any species since recognized. The British Museum types may be briefly described as follows:—42 millim. long; respiratory orifice 7 millim. from anterior border of mantle. Sole, lat. 7 millim. Entirely greyish-white; mantle pellucid, semitransparent, finely granulose. Sole slightly ochreous, unicolorous. A distinct groove round the edge of the foot. Liver pale chocolate.

Gray in 1855 (Cat. Pulm. p. 158) has referred this species to *Philomycus*.

Limacella carolinensis (Bosc).

Limax carolinensis, Fér. Hist. 77, pl. vi. fig. 3.

There are two specimens of this species in the British Museum from Virginia (*Dr. J. Wyman*), agreeing excellently with Férussac's figure. This slug is cylindrical, curved, and *narrow* (in alcohol); *sole narrow;* ground-colour and colour of sole pale yellow, back thickly marbled with brown-grey, and with *two longitudinal series* of dark egg-shaped spots. Jaw bright-coloured, not ribbed. (Description from Brit. Mus. specimens.)

Dr. Gray (Brit. Mus. Cat.) also describes *L. carolinensis.*

Limacella nebulosa.

? *Eumelus nebulosus*, Raf. Ann. of Nat. 1820.

Tebennophorus carolinensis, Binney, Terr. Moll. U. S. vol. ii. p. 20.

This and the last have hitherto been included together under the one name *carolinensis*, and it is not without misgivings that I venture to separate them here.* Yet, from the specimens which I have examined, there would certainly seem to be a specific distinction between the northern and southern forms referred to *carolinensis* in the Eastern United States and Canada. The British Museum contains specimens of *nebulosa* as follows:—

(1) From Mr. W. G. Binney, labelled *T. carolinensis.*—Ochreous, marbled with black above, the marblings rather inclined to be in three longitudinal series. Sole unicolorous.

(2) W. Canada (*Dr. Maclagan*).—Pale yellow, marbled above with brownish-grey, the markings being a broadish dorsal and narrower lateral brownish-grey bands, with irregular spots over the rest, except sides near foot. Sole unicolorous.

(3) Amhurstburgh, Canada West (*Dr. O. W. Maclagan*).—Like the last, but mottling grey and more diffuse; two narrow dorsal and narrowish lateral bands, rather obscurely indicated in grey. Grey mottling thicker. Ground-colour pale yellowish.

Comparing *carolinensis* with *nebulosa*, we note:—

(*a*) The Virginia *carolinensis.*—Sole narrow, yellowish, pale, without transverse striæ; body smoothish.

(*b*) *nebulosa*, no. 1 above.—Sole broad, brown, with strong transverse striæ; body rugose.

Or, taking measurements:—

(*a*) The Virginia *carolinensis.*—Long. 35 millim., sole, lat. 3 millim.

(*b*) *nebulosa*, no. 1 above.—Long. 35 millim., sole, lat. 7⅓ millim.

(*c*) *nebulosa*, no. 2 above.—Long. 36 millim., sole, lat. 8 millim.

Rafinesque described five supposed species belonging to *Philomycus* and *Eumelus* in 1820 as *quadrilus*, *oxurus*, *flexuolaris*, *fuscus*, and *lividus*. They

* Mr. W. Binney writes (*in litt.* Sept. 9, 1890):—"I am rather sceptical about there being two species . . . . as you say . . . .—there *is* a big species of *Tebennophorus* confounded with *carolinensis*, but having a ribbed jaw."

will probably prove to be varieties of *nebulosa* or *carolinensis*, but they have not yet been identified.

* * * * * * * * * * * * * *

Limacella dorsalis (Binney).

Philomycus dorsalis, Binney, Bost. Journ. Nat. Hist. 1842, iv. 174.
Pallifera dorsalis, Morse, Journ. Portl. Soc. 1864.

N. E. United States. Jaw ribbed.

Limacella Wetherbyi (W. G. Binney).

Pallifera Wetherbyi, W. G. Binney, Ann. Lyc. of Nat. Hist. of New York, 1874, xi. 31, pl. ii. figs. 1, 2.

Kentucky. Jaw ribbed.

Limacella Hemphilli (W. G. Binney).

Tebennorphorus Hemphilli, W. G. Binney, Man. Amer. Land-Shells, 1885, p. 247; Third Suppl. Terr. Moll. U. S. 1890, pl. vi. fig. H.

Georgia and North Carolina. Jaw ribbed.

Article II. (*Ann. and Mag. N. H., Feb.*, 1891.)

Critical Notes on the Genus Tebennophorus *and the recent literature relating to it.* By HENRY A. PILSBRY, Conservator of the Conchological Section, Academy of Natural Sciences of Philadelphia.

The slugs of this genus have been commented upon lately by a number of English and continental authors, who have arrived at very different results, it has occurred to the writer that a presentation of the subject by one who has studied the species in their native forests would not be without interest.

Firstly, regarding the proper name for the genus. We will consider the several designations in the order of their publication.

In 1817 Blainville proposed a genus *Limacella* with the following characters:

"Body limaciform, entirely naked, provided with a foot as wide as itself, but separated by a groove.

"Orifices of the organs of generation widely separated and communicating between each other by a furrow which occupies the entire right margin of the body."

Blainville refers to his plate ii. fig v, illustrating the type species, *L. lactiformis*.

A moment's reflection will convince any competent malacologist that the above description does not indicate *Tebennophorus*, a slug in which the genital organs have a common outlet. It cannot be supposed that Blainville has made a mistake in observation, because in the same paper he describes at length the external anatomy of *Veronicella*, and correctly locates the orifices. The figure given is equally non-committal; so much so that Mr. Cockerell (who supposes *Limacella* to equal *Tebennophorus*) really cites "figures 4, 5" instead of 5 only*—his inability to tell Blainville's figure of *Limacella* (fig. 5) from that of *Veronicella* (fig. 4)

* That this is not mere inadvertence on Mr. Cockerell's part is demonstrated by his remarks on Blainville's fig. 4 on p. 380 of the 'Annals' for November, 1890.

being evidence enough that the former is not generically recognizable. As to the fact that Mr. Cockerell has found a couple of slugs under the name "*Limacella lactescens*" in the British Museum, which he *supposes* are the types of *L. lactiformis*, it is absolutely irrelevant to the subject. What evidence is there beyond the merest guess work that they are Blainville's types? And even if they were (a most improbable hypothesis!), their mere existence does not constitute *publication*. We have nothing whereby to judge *Limacella* save the original figures and description, and these certainly indicate a type of slug different from *Tebennophorus*.

It may also be noted that the name *Limacella* is preoccupied, having been used by Brard in 1815. If we care to be really consistent we must use *Limacella* in place of *Agriolimax!*

The second name for the genus is *Philomycus*, Rafinesque. This genus, says its author, "differs from *Limax* by no visible mantle, the longer pair of tentacula terminal and club-shaped, the shorter tentacula lateral and oblong." Rafinesque describes four species and says there are many more in the United States. Not one of those he described has been identified with any certainty, and only *two* species of *Tebennophorus* occur in the regions visited by him. Rafinesque also describes the genus *Eumeles*—"differs from *Limax* by no visible mantle, the four tentacula almost in one row in front and cylindrical, nearly equal, the smallest pair between the larger ones." Of this genus he describes two species, one of which, *E. nebulosus*, has been recognized by Mr. Cockerell, whose penetration and facilities have enabled him to identify new or old species which have escaped the observation of specialists on the American fauna.

We will not comment on these Rafinesquian genera; those who find slugs corresponding to them should of course use the names. *Eumeles* is especially remarkable, and we would invite the attention of conchologists who hunt slugs (in old collections of museums and elsewhere) to the unusual arrangement of the tentacles in this genus, and to the fact that a number of Rafinesque's species are still at large.

The genus *Meghimatium*, v. Hasselt, 1824, was founded on a species of this genus from Java, and was quite recognizably described. The names *Tebennophorus*, Binn., and *Incilaria*, Benson, were both proposed in 1842, the probable priority being in favour of the first.

Morse in 1864 established the genus *Pallifera* for a species with ribbed jaw.

This review shows that several names for the genus, more or less certainly applying to it, were proposed anterior to 1842, the date of *Tebennophorus*. Of these names *Philomycus* and *Meghimatium* are the only ones available, *Eumeles* and *Limacella* being clearly inapplicable. Since continental authors generally have adopted the name *Philomycus*, it seems advisable to retain that designation for the genus if *Tebennophorus* must be rejected.

(*To be continued.*)

PRELIMINARY NOTICES OF NEW MEXICAN SHELLS.

BY H. A. PILSBRY.

The shells here described were collected by the expedition from the Academy of Natural Sciences of Philadelphia, and will be fully described and illustrated in the Proceedings of the Academy.

Orizosoma, new subgenus of **Streptostyla**.

Shell *perforated*, the columella thickened, *simply concave*, almost imperceptibly sinuous above.

Streptostyla (Orizosoma) tabiensis, n. sp.

Shell ovate-turreted, rather thin, smooth, the base deeply indented and minutely umbilicated; whorls 6, the three earlier distorted; aperture narrow, ½ the length of the shell, outer lip sinuous; columella thickened, concave. Alt. 9·8, diam. 4·8 mill.

Cave at Tabi, Yucatan.

Carychium exiguum mexicanum, n. var.

Shell cylindrical; whorls 4½; aperture equalling or a trifle exceeding ⅓ of the total length. *Outer lip thickened at and below the middle by a very heavy deposit of callus upon its face*; columellar fold subobsolete. Surface delicately striated. Alt. 1·8, diam. ·8 mill.

Orizaba, Mexico.

Physa osculans var. **Patzcuarensis**, n. var.

Shell thin, obconic, broad above, narrow below; spire small, acute, whorls 4, rapidly enlarging; columella long, vertical, slightly sinuous; color light brown or whitish. No internal lip-rib: surface smooth. Alt. 15, diam. 11 mill.

Lake Patzcuaro, Mexico.

Holds the same relation to *Ph. osculans* Hald. that *ancillaria* + *Parkeri* hold toward *Ph. heterostropha*. The *rationale* of these bulging, broad-topped forms of *Physa* is discussed in my paper in Proc. A. N. S. Phila.

Potamopyrgus ? Bakeri, n. sp.

Shell slender, elongated, composed of 5½ very convex whorls; aperture ovate, its length contained more than three times in the length of the shell. Surface marked by delicate growth-lines, having low, inconspicuous longitudinal folds, sometimes quite regular and well marked on the upper whorls, and encircled by numerous fine, subobsolete spiral striæ. Alt. 4, diam. 1·9 mill.

Yautepec, Mexico.

Has much the general aspect of *Tryonia protea* Gld. It is named in honor of Mr. FRANK C. BAKER who collected the specimens.

Pyrgulopsis ? Patzcuarensis, n. sp.

In general form like *P. nevadensis* Stearns. Whorls acutely keeled in the middle, convex above the keel, the last whorl obtusely

shouldered above the median keel. Covered with an olive epidermis. Surface marked by delicate growth-lines and excessively fine, close spiral striæ. Alt. 5·2, diam. 3 mill; alt. of apert., 2, width 1·3 mill.

Lake Patzcuaro, West Mexico.

This species is very different from other American Amnicoloids.

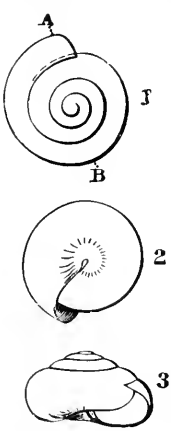
(*To be continued.*)

DESCRIPTION OF A NEW SPECIES OF HYALINA.

BY WM. H. DALL.[1]

Dr. V. Sterki, of New Philadelphia, Ohio, has of late years been giving special attention to the minute forms of Pulmonata, *Vertigo, Pupilla, Hyalina*, etc. In 1886 he collected a small *Zonites*, of the section *Hyalina* or *Conulus*, which, being submitted to several naturalists, appeared to be a new species, although of remarkably small size. In 1887 a few more specimens were obtained, which he has submitted to me with the request that I describe them.

Shell minute, thin, yellowish translucent, brilliant, lines of growth hardly noticeable, spire depressed, four-whorled; whorls rounded, base flattened, somewhat excavated about the center, which is imperforate; aperture wide, hardly oblique, not very high, semilunate, sharp edged, the upper part of the columella slightly reflected; upper surface of the whorls roundish, though the spire as a whole is depressed. Max. diameter 0.044 inch (line A—B, Fig. 1); alt. 0·026 inch.



This little shell is clearly not the young of a *Pupilla* or of any of our other small *Zonites*. It is certainly the smallest American species. *H. parvula* Rang, from Cape Verde Islands, has a little less diameter, but is higher in the spire. *H. pygmæa* and *H. minutissima* Lea are decidedly larger, besides belonging to a different group. It is probably one of the smallest species known, and remarkable for its imperforate umbilicus.

[1] From Proceedings U. S. National Museum, vol. xi, 1888, p. 214.

It was collected on a grassy slope, inclining to the northward, and covered with grass, moss, and small bushes, and so far has not been found anywhere else. Its permanent place in the system will, of course, be determined by an examination of the soft parts, which remains to be made.

GENERAL NOTES.

Owing to continued illness in his family, Mr. CAMPBELL, President of the American Association of Conchologists, has been unable to contribute the monthly reports on Association affairs. He hopes to resume them in the June issue.

Mr. C. W. JOHNSON, Junior Editor of the NAUTILUS, and Mr. WM. FOX, of the Academy of Natural Sciences, have spent the month of April in that paradise of land snails, Jamaica. They will return about the middle of May, and doubtless bring with them hosts of shells and insects.

The personal interest felt by younger students in their predecessors in science, is our excuse for clipping the following from a recent letter:

"In the March number of the NAUTILUS, Mr. Roper said that Mr. Mayo was probably the oldest student of conchology in America. Mrs. MARY B. ALLEN KING, of Rochester, N. Y., is 92 years old, having been born in January, 1799. She has studied and collected shells before Mr. Mayo (whom she met at one time) did; and has corresponded with most of the U. S. Conchologists. She was elected a member of the American Association for the Advancement of Science in 1886, at the Buffalo meeting."—*A. M. K.*

AUSTRALIAN SLUGS.—Mr. Charles Hedley exhibited and offered some remarks on specimens of *Vaginula leydigi*, Simroth, and *V. hedleyi*, Simr., two interesting slugs from Brisbane, recently added to the molluscan fauna of Australia (*vide* Zoologischer Anzeiger, 1889, p. 551; and Abstr. in Journ. Roy. Micros. Soc., 1890, p. 21). These slugs are very abundant in the Brisbane botanical gardens, occurring also in lawns and gardens in that part of the city which was formerly scrub land. After a shower they may be collected in abundance, crawling rapidly over the asphalt paths and the grass. *V. leydigi* is much commoner than *V. hedleyi*, which it resembles in shape, size and habits, but from which its coloration distinguishes it in all stages of its growth, the former being a blackish-brown with

a tawny yellow dorsal stripe, the latter a dark form without any stripe. These molluscs are the first real representatives of their genus found in Australia, the only *Vaginula* previously known here, *V. australis*, Heyneman, belonging to that trigonal group which embraces *V. prismatica*, Tapparone-Canefri, from Dutch New Guinea, *V. tourannensis*, Souleyet, from Cochin-China, and *V. trigona*, Semper, from the Philippines, constituting a natural but as yet unnamed genus. He also took the opportunity of pointing out that he had submitted specimens of *Limax queenslandicus*, Hedley (P. R. S. Q., Vol. V, p. 150, pl. 5), to Dr. Simroth, who had determined them to be *Agriolimax laevis*, Müller. This species is probably the slug (Journ. des Mus. Godeff., XII, p. 159) mentioned under the name of *L. ravotonganus*, Heyn., as occurring in Australia. Few if any land molluscs range so widely, since, under different names by various authors, this form has been recorded from Europe, North and South America, the West Indies, Madagascar, and many islands of the Pacific.—*From advance proof sheet Proc. Linn. Soc. N. S. Wales, Australia, Dec.*, 1890.

Dr. Joseph Leidy.

Professor Joseph Leidy, M. D., LL. D., the eminent scientist, died at his home in Philadelphia on April 30th, 1891. Dr. Leidy was born in Philadelphia, Sept. 9, 1823. His ancestors on both sides were Germans, from the valley of the Rhine. His taste for natural history was exhibited at a very early age, and when a mere boy he collected and studied minerals and plants. His father proposed for him the career of an artist, but so absorbed was the boy in anatomical and natural history studies that, with the encouragement of his mother, at the age of seventeen he began the study of medicine, graduating in 1844. In 1845 he was appointed Prosector to the Chair of Anatomy in the University of Pennsylvania. Dr. Leidy's first scientific work was a paper on the anatomy of *Litorina*, published by the Boston Society of Natural History. In 1844 he began, at the instance of Dr. Amos Binney, to study the anatomy of land snails. The result is seen in his beautiful anatomical drawings in the first volume of Binney's "Terrestrial Mollusks," and in the chapter on special anatomy written by him. In 1845 Dr. Leidy was elected a member of the Academy of Natural Sciences of Philadelphia. He has been closely connected with this institution

in various official positions ever since, and has been its President since 1880. Dr. Leidy published very extensive memoirs on vertebrate palæontology, on Rhizopods (a truly magnificent quarto volume), on the anatomy of Insects, and especially on Entozoa and Vermes generally. Indeed, nearly every branch of zoological literature has received valuable additions at his hands. His work is so many-sided that in the broadest sense of the word, Dr. Leidy may be called a Zoologist. He was an honored member of many scientific societies in both hemispheres, and had received substantial tokens of the value of his work from the Boston Society (Walker Prize, $1000), the Geological Society of London (Lyell Medal), and other learned bodies.

In his private relations Dr. Leidy was of a most kind and helpful disposition. He had an almost morbid dislike of contention of any kind. The loss to American zoology is irreparable.

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DEVOTED TO THE INTERESTS
OF CONCHOLOGISTS.

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ASSOCIATE EDITOR:
C. W. Johnson, Acting Curator Wagner Institute of Science.

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THE NAUTILUS.

VOL. V. JUNE, 1891. No. 2.

ON THE MEANS OF DISTRIBUTION OF UNIONIDÆ IN THE SOUTHEASTERN UNITED STATES.

BY CHAS. T. SIMPSON, WASHINGTON, D. C.

In the March number of the NAUTILUS Mr. S. Hart Wright in some notes on the distribution of *Unionidæ* in the Southeastern United States thinks it remarkable that many of the species of Georgia and the Carolinas should be found in Southern Florida, and that they should pass from one stream to the other. I think when we fully consider all the conditions of environment of these mollusks it will be easy to understand how they have migrated.

The region is one of excessive rainfall. Over a wide area of territory bordering on the Gulf and the Atlantic it is nowhere less than 45 inches a year, ranging up to 75 inches in the vicinity of Cape Hatteras. North of latitude 30° the most of this moisture falls during the winter and early spring. South of somewhere near that line the regular dry and rainy seasons of the tropics set in, and nearly all the precipitation occurs in June, July and August. Of course these conditions vary somewhat with different seasons and under different circumstances, but as a rule in any part of this area the greater amount of the annual rainfall occurs within a limited period, producing extensive floods.

It is well known that all the region indicated, or at least a wide belt of it extending along the Atlantic and Gulf coasts, is exceedingly low and flat, consisting for the most part of level, sandy plains, rising as a rule but a few feet above, and alternating with swampy streams.

Having thus outlined the physical conditions of their environment, it may perhaps be well to speak of the manner in which the Unionidæ migrate from one locality to another.

The number of young produced by the species of this family is simply enormous. Lea counted some 600,000 perfectly formed embryos in the ovaries of an *Anodonta undulata*, and estimated that a female *Unio multiplicatus* contained no less than 3,000,000 shells.

It is believed that these young bivalves sometimes attach themselves to fishes and are thus carried from place to place; no doubt others are taken up in mud on the feet or feathers of aquatic birds, and may survive a short transit through the air, and certainly they might be swept from stream to stream across the country during the time of floods, when almost the entire surface of that level area is covered with water, in many places flowing with a rapid current. During the rainy seasons in South Florida I have repeatedly seen the whole country a sheet of water, with myriads of fish swimming in every direction among the palmettoes and over the fields. That the *Unionidæ* are carried out over the land is, I think, proved by the fact that I have found *Unio obesus* existing in great numbers in low places and drains in the piney woods of South Florida, at quite a distance from any stream, where there was not a drop of water outside of perhaps three months of the rainy season, and where during the remaining nine months of the year they must have lain dormant in slightly damp sand. I have dug these unios alive out of such sand banks in such places, and during the dry season, by the bushel.

It is a well-known fact and one which seems to me much more strange than the migration of unios across such a country, that artificial ponds and reservoirs often become densely peopled with the Naiades, even when their outlets are altogether too insignificant in size to be a residence for these molluscs. In such cases it would seem most probable that aquatic birds had been the means of such distribution, and possibly in rare instances they may have been lifted from their original homes and carried by cyclones.

But once having reached the lower part of the St. Johns River, I cannot conceive of any difficulty mollusks would encounter in spreading toward its sources. The stream is really little more than a freshwater estuary for a long distance from its mouth, and has but a few feet of fall throughout its entire length. Let any of the *Unionidæ* be placed in any part of a stream and if the conditions

are favorable they will migrate against the current as well as with it. Any one who has ever collected these mollusks at all extensively will notice their furrows on sandy or muddy bottom, often extending for forty or fifty feet, and made apparently without any regard to the direction of the stream. I am led from my observations to believe that most of the unios if placed in favorable conditions would migrate over considerable stretches of water in a comparatively short period.

PALUDOMUS PALAWANICUS, n. sp.

BY DR. AUG. BROT, GENEVA, SWITZERLAND.

T. imperforata, globoso-turbinata, solidula, fusco-olivacea nonnunquam obscure flammulata. Spira breviter exserta, subintegra, sed superficialiter erosa; anfract. 4½–5, rapide crescentes, valde convexi, vix infra suturam submarginatam paulo planulati, sub lente tenuissime spiraliter striati et striis incrementi subgranosa decussati, striis infra suturam et ad basin postioribus, filiformibus. Anfractus ultimus magnus, basi striis elevatis filiformibus nonnulli distantibus, ornatus. Apertura ampla, late ovata, intus fusco-brunnea, margine dextro subserrato, vix incrassato, intus albo limbato; columella incrassata, alba, callo parietali albo crasso.

Operculum?

Alt. 19 mm., lat. 17 mm.; apert. alt. 13 mm., lat. 10 mm.

Habit. I. Palawan, Philippines (legit E. L. Moseley).

Shell globose with a short exserted spire, moderately thick, dusky-olivaceous, sometimes with irregular translucent interrupted flames. Spire short, almost entire, but superficially eroded. Volutions 4½–5, very convex, slightly flattened under the suture, which is finely marginated, covered with fine spiral unequal striæ, and decussated by the lines of growth; last whorl globose, with some distant filiform striæ at the base and along the suture. Aperture wide, ovoid, inside dusky-brown, sometimes with one or two narrow pale bands; columella thickened, white; outer lip obscurely serrated, slightly thickened inside, white at the margin.

This interesting new shell, although the operculum is unknown, belongs certainly to the genus *Paludomus* and is, I believe, the first species of the genus mentioned from the Philippines. It cannot be

confounded with any other; it might be compared only to *Paludomus lacunoides* Aldrich, from Borneo, but that species is larger, heavier, has a more elevated spire, less tumid volutions, and is entirely smooth, not to speak of the characteristic peculiar structure of its umbilical area.

The *Paludomus Palawanica* was collected by Mr. E. L. Moseley in a brook about ten miles from Puerto Princesa in the Island of Palawan, Philippine Archipelago.

TEREBRATULINA (UNGUICULA CPR. VAR?) KIIENSIS, DALL AND PILSBRY.

? T. unguicula Cpr. P. Z. S. 1865, p. 201, figs. 1–4.
? T. caput serpentis, var. *unguiculata* Dav. Trans. Lin. Soc. iv, p. 25, 1886.
Terebratulina sp. Dav. Challenger Brach. p. 36, pl. 1, fig. 10, 1880.

Habitat: Phillippines, in 82 fathoms N. E. from Mindanao, Chall. Exp.; Coast of Province Kii, Japan, Stearns; N. W. coast of America, various authorities including Carpenter, Dall, Whiteaves, etc.

Among the shells collected by Mr. Stearns in Japan, and sent to Mr. Pilsbry for identification, is a coarsely radiately striated *Terebratulina* which has been carefully studied, but in the absence of more material, cannot be finally pronounced upon. It appears to be the adult of a form of which a young specimen was submitted by Dr. Davidson in 1879 to Mr. Dall for examination and which had been collected by the Challenger Expedition. It was not named at that time in view of the fact that it was obviously young, and the number of nominal East Asian Terebratulinas obviously too great for the known species.

This shell is sculptured like *T. unguicula* Cpr. and the larger the specimen, the more *unguicula* seems to resemble the Japanese form. *T. unguicula* under the name of *caput-serpentis* has been recognized already in Japan, by Davidson.

The present form differs from the largest *unguicula* with which we have been able to compare it in the following particulars. It is larger and proportionately somewhat wider and the beak proportionately shorter, much such differences as would come about by increased size in such a species as *unguicula*. If more material should prove that the supposed variety cannot be connected with *unguicula*, the varietal name can be taken as specific. The specimen

noted measures 44 mm. in total length; 38·5 mm. in the length of the hæmal valve; 40 mm. in maximum width and 21·5 mm. in maximum diameter. It is waxen white with extraneous brown stains and has no anterior flexure. Davidson's figure of *Tr. Crossei* (Trans. Lin. Soc. IV, pl. 3, fig. 6) resembles it, but is more faintly sculptured and less transverse.—*W. H. D. and H. A. P.*

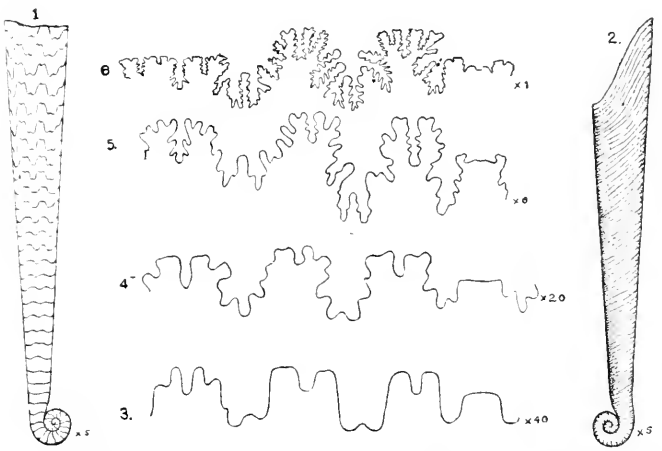
Explanation of Plate I.

Figs. 1, 2, 3. *Terebratula Stearnsii* Dall & Pilsbry.
" 4, 5. *Terebratulina var. Kiiensis* Dall & Pilsbry.
" 6, 7. " *unguicula* Cpr., typical, a large specimen.

ON THE YOUNG OF BACULITES COMPRESSUS SAY.

BY AMOS P. BROWN, PHILADELPHIA.

The young of *Baculites compressus* Say has been recently discovered by me in some cretaceous marl from the vicinity of Deadwood, South Dakota. Associated with them in the same material were several species of *Baculites*, *Scaphites* and *Inoceramus*. The



young *Baculites* were of the form shown in figures 1 and 2 and varied in length from 1 to 3 cm., with a diameter of 0·4 to 2 mm. Other larger fragments with the spiral end broken off were found from

1·5 to 6 cm. in diameter. An examination of the form of the septa and suture lines showed the forms to belong to the Ammonitidæ, and by the examination of an extensive series it was possible to determine the genus and species.

The shell originates in a spiral of two to two and one-half turns, ranging in breadth from 0·8 to 1 mm. thence it extends in a straight line, tangent to the spiral (figure 1) or sometimes slightly reflexed (figure 2). The straight portion of the shell rapidly increases in diameter from 0·38 to 0·40 mm. at the spiral, to about 1·5 to 2 mm. at 2 cm. length. Many shells were covered by the nacreous shell substance, some being preserved entire, figure 2, while in others the shell had been dissolved away leaving the suture lines exposed as in figure 1. On breaking away the pearly exterior of forms like figure 2 it was found that the last chamber occupied about one-half the length of the shell. The shell of the outer whorls somewhat envelops the inner so that from the outside view the exact form of the spiral cannot be measured; it was found, however, to closely approximate the mathematical curve known as the hyperbolic spiral. That the spiral origin of this shell was not smaller than that of allied genera was demonstrated by grinding cross sections of the shell of *Scaphites Conradi* Morton; the first two turns of its spiral being 1 mm. in breadth. The siphon in *Baculites* is excentric and was found to lie near the outer margin of the spiral, being easily seen in the fractured spirals.

The species was determined from an examination of the form of the sutures which may be traced from the simple form of that of figure 1, through forms of gradually increasing complexity shown in figures 3, 4, 5, and 6, the latter being the typical sutures of the adult of *Baculites compressus* Say. In figure 5, an individual of 6 mm. diameter, the suture of the adult form is already well outlined, the specific distinction, the two deep sinuses on the right hand, being well marked.

I have been unable in the literature of the subject to find any reference to this spiral termination of *Baculites*, and believe the observation to be new. That this spiral termination has not been formerly observed is not strange in view of its small size and fragile character, it being probably broken off long before the shell had attained adult size; and it would only be preserved when as in the present instance the shells were preserved in their immature condition. This observation tends to prove that *Baculites* origi-

nated from a coiled form, and is not as supposed by some palæontologists the original form of the *Ammonitidæ*, but is rather to be looked upon as an uncoiled form developed from originally coiled parents.

ON THE GENUS TEBENNOPHORUS BINNEY, OR PHILOMYCUS, RAF.

(CONTINUED.)

BY H. A. PILSBRY.

Article III. (*Ann. Mag. N. H., March*, 1891.)

Letter from Mr. T. D. A. Cockerell to Eds. Ann. Mag. N. H.

The Genus Limacella.

On pp. 184–186 of the February number Mr. Pilsbry has some remarks on the genus *Tebennophorus* or *Limacella*, to which I may perhaps be permitted to reply, taking his several points in order.

(1) That plate of Blainville's has certainly received bad treatment. The figures have been inaccurately copied; Férussac quoted it wrongly; and now, as Mr. Pilsbry has shown, I also have erred with regard to it! There are two figures iv., labelled respectively 1 and 2. Fig. 2 is obviously *Veronicella*, but fig. 1, for which alone my reference was intended, looks like *Limacella*, though from Blainville's text it is clearly intended for *Veronicella* also. I quite agree with Mr. Pilsbry that fig. iv. no. 1 might or might not from its appearance be of the genus under discussion; and as it is stated to be *Veronicella*, there apparently remains no doubt that my reference of it to *Limacella* was erroneous. I am still of the opinion, however, that fig. v. represents the genus Americans writers call *Tebennophorus*.

(2) There is, I think, no doubt about the slugs I described being Blainville's types; nor are these the only British-Museum slugs described by Blainville. The Museum is mentioned in the original paper.

(3) It is very difficult to say whether inaccuracy of description, when there is no doubt what was intended, ought to condemn a name. If so, there will have to be considerable slaughter of the genera described by early authors, or, for that matter, by some recent ones. *Philomycus*, which Mr. Pilsbry thinks might be adopted, was also inaccurately defined. So far as is known there is no slug in existence really *agreeing* with the original descriptions of *Limacella* or *Philomycus* taken literally.

(4) *Limacella*, Brard, if it is anything, is *Limax* of modern authors, not *Agriolimax*. But a genus founded for the *shells* only of species of the Linnean *Limax* cannot be recognized as valid, and the only authors who have adopted it are Dr. Jousseaume (1876) and Dr. Turton. The former writes *Limacella* for *Limax* auctt., and *Limax* for *Arion*; while Dr. Tur-

ton (1831) kept the name for the shells of *Limax* and allied genera, though spelling it *Limacellus*. We are told, for instance, that *Limacellus parma*, Brard, is "found in the *Limax maximus*," as though it were a sort of parasite!

(5) I think it nearly certain that my *Limacella nebulosa* is Rafinesque's species *E. nebulosus;* but if so, of course that author described it incorrectly. Mr. Pilsbry will observe that I have given the reference with a query.

While on the subject, it may be well to mention that there is a figure and description of *Limacella lactiformis* (as *Elfortiana*) in Knight's 'Pictorial Museum of Animated Nature,' vol. ii. and fig. 2598. The figure is very bad, being a rough copy of that in Man. de Mal.; but the generic description, so far as it goes, is accurate. T. D. A. COCKERELL.

3 Fairfax Road, Bedford Park, Chiswick, W.,
February 3, 1891.

Article IV. By H. A. PILSBRY.

In concluding I wish simply to emphasize a few points upon which both Mr. Cockerell and myself have already touched.

(1) That Blainville's figures are so poor that Mr. Cockerell could not tell his *Veronicella* from his *Limacella*, but repeatedly confused them in his first article. Blainville's description most certainly indicates *Vaginulus* rather than *Tebennophorus*, as anyone can see by reading the translation of it given in my article. We can allow for some inaccuracy in descriptions by early authors, but we cannot suppose that when they say "black" they mean "white."

(2) As to *Limacella*, Brard. The name as used by Brard covers species of both *Limax* and *Agriolimax*. Since the Limaces are already provided with a name, why should we not adopt "Limacella" for the other species, namely the *Agriolimax*, as has been done in scores of similar cases? Still I do not care to advocate the use of "*Limacella*" for any group, as no definition worthy of acceptance has been given of it.

(3) As to the *Limacella nebulosa* (Raf.?) Ckll., I do not see how it is to be separated from *carolinensis* as that species is figured by Férussac. The characters given by Mr. Cockerell are wholly insufficient. Why does he not tell whether the jaw is ribbed or smooth? We would then have some clue of value. Measurements taken from variously and generally badly contracted museum specimens of slugs are practically of but little use.

(4) Mr. Cockerell truly says that *Philomycus* like *Limacella* was inaccurately defined by Rafinesque. It would be well for us to adopt Fischer's course, and write "*Philomycus* Férussac, 1821." Férussac fixes the identity of the genus with certainty by including the species *carolinensis*, which he describes and figures very well.

NOTE. The writer desires to make a more careful study of the species of *Philomycus* (*Tebennophorus*), and will be glad to receive specimens. They are best if prepared by drowning in a vessel of water from which air has been excluded. Transfer to alcohol (or whiskey) and water, the former slightly in excess. They may then be sent safely by mail in an ordinary box, if removed from the spirit and wrapped in paper or muslin wet with spirit.—*H. A. P.*

GENERAL NOTES.

MR. HENRY HEMPHILL has left San Diego for a summer in the north.

SHELLS OF ERIE CANAL.—Taking advantage of the annual spring cleaning of the Erie canal, I spent one day in April of the present year collecting mollusks between Ilion and Utica with the following results:

Unio Tappanianus Lea,	350	specimens.
Unio rubiginosus Lea,	15	"
Unio luteolus Lam.,	27	"
Unio complanatus Sol.,	38	"
Margaritana marginata Say,	1	"
Margaritana undulata Say,	18	"
Margaritana rugosa Barnes,	28	"
Anodonta edentula Say,	24	"
Anodonta subcylindracea Lea,	6	"
Anodonta Lewisii Lea,	91	"
Physa heterostropha Say,	150	"
Campeloma decisum Say,	46	"
Goniobasis Virginica Gmelin,	379	"
Vivipara contectoides W. G. Binney,	5	"
Planorbis trivolvis Say,	8	"
Sphærium striatinum Lam.,	12	"
Limnæa catascopium Say,	2	"

All were collected without a dredge.—*Albert Bailey, Chepachet New York.*

The late EDWARD R. MAYO of Boston left no will, but his children have generously donated his valuable conchological collection to the Boston Society of Natural History.—*E. W. R.*

COLLECTION FOR SALE.—We learn that the Collection of Dr. Hartman is for sale, together with his Conchological Library and other works on Natural History. The Collection embraces about 8000 species of Marine, Terrestrial and fresh-water shells of the best quality, many of which are rare and difficult to obtain. All parts of the world are represented in this Collection, which has taken a period of forty years to accumulate. They are all correctly named and many are mounted. Inquiries should be addressed to Dr. W. D. Hartman, West Chester, Penna.

PUBLICATIONS RECEIVED.

MOLLUSCA OF SANTA BARBARA CO., CAL., etc., by Dr. Lorenzo G. Yates. A useful contribution to our knowledge of the distribution of West Coast shells, is this extensive local catalogue. We note a number of errors in nomenclature, such as the retention of the name "*sanguineus*" for the common *Leptothyra*, etc., but such defects do not really diminish the usefulness of the list. The following are described and figured as new: *Venus Fordii* Yates, *Vertagus Lordi* Yates, *Vermiculus Fewkesi* Yates.

BEAKS OF UNIONIDÆ * * OF ALBANY, N. Y., by Wm. B. Marshall (Bull. N. Y. State Mus. II, p. 170). A careful and well illustrated study of the undulations of the beaks in Unionidæ, with especial reference to the distinguishing marks of the various species. This excellent work should be studied by all interested in Unionidæ, and extended by observers in various parts of the country. We have elsewhere expressed the opinion that excellent group characters, as well as specific characters are furnished by the beaks.—*H. P.*

$1.00 per Year. ($1.12 to Foreign Countries.) 10cts. a copy.

THE NAUTILUS

A MONTHLY
DEVOTED TO THE INTERESTS
OF CONCHOLOGISTS.

EDITOR:
H. A. PILSBRY, Conservator Conchological Section, Academy of Natural Sciences, Philadelphia.
ASSOCIATE EDITOR:
C. W. JOHNSON, Acting Curator Wagner Institute of Science.

Vol. V. JULY, 1891. No. 3.

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THE NAUTILUS.

VOL. V. JULY, 1891. No. 3.

EDIBLE SHELL NOTES, FOR THE NAUTILUS.

BY ROBT. E. C. STEARNS.

In addition to the species of edible mollusks in the San Francisco markets heretofore noted by Professor Keep and myself, a recent letter from Mr. W. M. Wood of San Francisco informs me that "*Tivela crassatelloides* is very often sold in the San Francisco markets especially the 'California Market' so-called. I bought quite a lot of them a couple of weeks ago. They were of huge size about six inches in length. I observed they had some *five hundred*, or so behind the counter, for sale. The proprietor of the fish stall told me they were brought up from the vicinity (shore) of San Luis Obispo county. Near Fort Point (on the entrance to San Francisco Bay) known as 'Fort Winfield Scott' the soldier's boys at the Presidio go out near the fort and dig *Schizothærus Nuttalli*, with which their mothers make clam-chowder or clam-pies. In fact I have collected them myself." What good mothers!

Schizothærus Nuttalli beats any clam yet discovered for chowder, soup or pies. It is nearly like an oyster in consistency, has a very small foot, the proportion of hard or tough muscle being much less than in *Mya arenaria;* the mere memory of the soups and chowders I have eaten at various times, where *Schizothærus* was the grand staple, is like a gleam of sunshine through a London fog, and worth having; it is a noble and estimable clam. The California Indians, as well as those further north around Puget Sound, know them well and like 'em. In this conchological respect, I appreciate the red man's malacological taste and judgment. *Schizothærus* burrows

pretty deep, and sometimes weighs over a pound, which considering that the shells are usually rather thin and consequently light in weight, shows that the soft parts or edible portion is a jolly good junk of nutritious aliment, fit for the best conchologists on earth, and their friends also, without regard to age, sex or condition. Unlike *Mya arenaria* and *Panopæa generosa*, the end of the double siphon tube or sleeve is protected by two hard, valvular pieces. The siphons are not as long in proportion as in *Mya arenaria* nor does it ever reach the dimensions of *Panopæa ;* the latter sometimes attains the weight of *fifteen or sixteen pounds*, and from tip of *extended* siphons to the opposite end, measures three feet. It will easily be seen, that it is no small job to dig out one of these deep burrowing fellows. The "meat," is very nice when parboiled and fried in batter, and as tender as a humbird's eye. Bathymetrically their station is so low or deep, that is to say usually that they are not to be procured except at very low tides. Around Puget Sound they are called "Geoducks," and they are really a delicious article of food, and a truly noble bivalve.

Tivela crassatelloides makes a good chowder or soup and is justly held in high esteem, being highly estimable and of good character among its fellows of the edible mollusca, but it is more of a "muscular Christian" than the others, and not so well adapted for frying or for pies. It is abundant at many places along the southerly coast of California, and at low tide can be plowed up in great numbers.

Washington, June 9, 1891.

ON A NEW SUBGENUS OF MERETRIX, WITH DESCRIPTIONS OF TWO NEW SPECIES FROM BRAZIL.

BY W. H. DALL.

The shells which have passed under the name of *Sunetta* Link (1807, type *Donax scripta* L.) and *Tivela* Link (type *Venus corbicula* L.),—otherwise *Meroë* of Schumacher (1817) and *Trigona* Megerle (or *Pachydesma* Conrad), so far as the hinge is concerned occupy in the *Meretricinæ* much such a place as *Venus* (*mercenaria* and its allies) occupies in the sub-family *Venerinæ* of the *Veneridæ*. In both the subligamentary area is elevated and corrugated or transversely striated so that in some cases it is hardly to be termed a tooth. In both *Sunetta* and *Tivela* the shell is nearly equilateral as

regards the beaks, sub-trigonal and with a small rather rounded pallial sinus indicating short siphons. Both have compressed and inflated species; in both the epidermis in fresh specimens is conspicuous.

Sunetta differs from such species of *Meretrix* (or *Cytherea*) as *M. orum* Hanley chiefly by the impressed lunule, excavated escutcheon, and crenulated margin of the valves. In both the subligamentary ridge is transversely striated. Allowing for the mechanical differences due to the differences in form of the cardinal margin, the hinge is essentially the same, and both have the shallow pallial sinus.

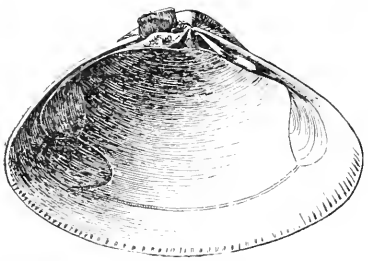
On the other hand in *Tivela* we have the cardinal margin and also the entire basal margin of the valves of *Meretrix*, while the hinge differs in that the subligamentary ridge or furrow is radiately coarsely rugose, instead of transversely regularly striate. There are flat species and inflated species as in *Sunetta*.

On the southeastern coast of South America there seems to be a group hitherto unrecognized which to the general characters of *Tivela* in regard to form, pallial sinus and hinge, unites the crenulated margin of *Sunetta*. To this section the name of *Entivela* may be applied.

Tivela (or *Pachydesma*) *crassatelloides* Conrad, of California, has the gills small, double on each side (W-fashion) dark flesh-color; the heart is orange colored, pulsating once in ten seconds; the muscles are reddish, the mantle dark flesh-color with the edge waxen, wrinkled transversely; the foot is hatchet-shaped, livid, with a swollen, wrinkled flesh-colored basal edge, the sides below the body compressed, vertically wrinkled and granulose; the body is livid flesh-color, the liver brown, the organ of Bojanus yellow; the palpi are small, single and bifid on each side; both siphons are white with black dots at the end, the incurrent granulose and the excurrent shorter, plain-edged and smaller; they are joined together for nearly all their length. The intestine is white and there is at the entrance of the stomach a curious cartilaginous translucent hollow organ through which the food must pass, difficult to describe in words, the lid or upper part of which has the form (⁀) of a bracket, while the whole is somewhat T-shaped, or perhaps vasiform. The whole thing is about 6 mm. in longest diameter and resembles an internal mandibular apparatus more than a gizzard; at least its size would seem to be insufficient for an organ of the latter kind. I have not been able to examine specimens of the smaller Tivelas with the soft parts or to get any light on the features of the soft parts of *Sunetta*.

MERETRIX (EUTIVELA) PERPLEXA Stearns, n. s.

Shell waxen-white, porcellaneous, covered with a greenish-yellow epidermis recalling that of *Iphigenia brasiliensis* or *Mactra ponderosa* Jan. The surface under the epidermis is smooth or marked with lines of growth only. The figure sufficiently illustrates the other characters of the shell. The specimen figured measures 45 mm. long by 33 in height and 23 in diameter. There is an impressed lanceolate lunule 15 mm. long and about 4·5 mm. in greatest width. As in *Tivela* there is a prolongation forward, between the beaks, of the dark epidermal coating of the ligament; forming a blackish lanceolate area in front of the beaks about 5 mm. long, resembling the dark area in *Arca*. This and the rugose subligamentary ridge are reminiscences of the period when the ancestors of *Tivela* had a more archaic type of hinge. There is no defined escutcheon.



Eutivela perplexa Stearns.

The soft parts in alcohol present several differences when compared with *Tivela crassatelloides*.

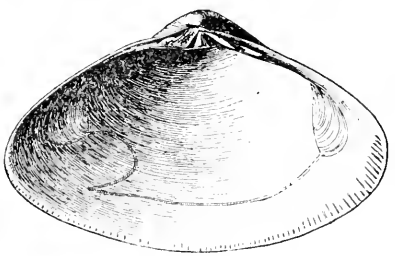
The gills are double, as in that species, but proportionately much larger and broader; the edges of the mantle are double with a groove between them; in both species they are open from the sinus to the anterior adductor; there are no papillæ or granulations in *E. Iheringi;* the foot is elongated, linguiform, and sharp-edged, without sulci or granulations; the palpi are large and distinctly paired on each side instead of being partially fused; the siphons are extremely short but rather large, the incurrent with several ranks of rather elongate tentacular processes, the excurrent with a single row of obvious papillæ; the siphons have blackish maculations toward their ends and are joined for most of their length on the adjacent sides. From the dark color of the tissues in alcohol, they were probably reddish or, at least, not white in life.

On a single shell of many, are two small brown macukæ, so that the species may sometimes be colored with brown markings. But the differences of proportion and of solidity which seem to be very constant, forbid us to unite the present species with *E. Iheringi*.

This species was dredged by the U. S. S. Albatross in several places off the mouth of the Rio La Plata in 10–15 fathoms, muddy bottom, associated with *Pectunculus* and sundry *Nuculidæ*.

MERETRIX (EUTIVELA) IHERINGI Dall, n. s.

Shell thinner, more equilateral and more elongate than *E. perplexa*, waxen-white with more or less interrupted rays of brown extending from the beaks toward the margin, modified by whitish zigzags. The exterior is smooth, with a well marked epidermis and faint, obscure radiations corresponding to the interior marginal crenulations. The interior of the beaks and the cardinal region on both sides of them below the margin more or less marked with purplish brown. The lunule is narrow lanceolate and faintly impressed. The figure illustrates the characters of the single valve upon which the species is founded, which measures 41 mm. long, 27 high, while the double diameter would be about 18 mm.



Eutivela Iheringi Dall.

It is named in honor of Dr. H. von Ihering, from whom it was received, and by whom it was collected on the beach near Santa Caterina in southeastern Brazil in about latitude 26° south.

DESCRIPTIONS OF TWO NEW SPECIES OF UNIO FROM FLORIDA.

BY WILLIAM A. MARSH.

Unio Singleyanus.

Shell smooth, oval, slightly depressed, inequilateral; valves rather thick, squarish before, rounded behind; beaks small and flat; epidermis yellowish-brown, shining, with or without rays, usually rayless. Cardinal teeth crenulate, oblique, single in right valve, double in left. Lateral teeth short and straight; anterior cicatrices small, deep, not confluent, posterior cicatrices confluent, slightly impressed; nacre white, iridescent.

Habitat. A small creek near Pilatka, Florida.

Remarks. Seven shells of this species were sent to me by T. L. Cunningham a number of years ago. This species belongs to the *parvus* group, but differs very much from any other member of that group in the yellowish color of its epidermis, in its peculiar outline and much flattened form of the females. Some specimens are cov-

ered with rays, others without rays and having a bright yellow shining epidermis. In general outline it approaches *U. marginis* Lea, but is not pointed anteriorly like that species and differs altogether in the color and texture of the epidermis.

I name this shell after my friend Mr. J. A. Singley of Texas, a gentleman who has done very much towards collecting the mollusca of that state.

Unio Ferrissii

Shell oblong, inflated, smooth before, slightly plicate posteriorly, rather thick and solid, epidermis dark green or black and shining, with green capillary rays, sometimes rayless, squarish before, pointed behind, umbonial slope raised, obtusely rounded. Cardinal teeth compressed, thick and solid, oblique, single in right valve, double in left, striate. Lateral teeth short and slightly curved, anterior cicatrices not confluent, very deep, posterior cicatrices distinct, nacre pink and iridescent.

Habitat. A small creek near Pilatka, Florida.

Remarks. Several years ago I received two shells of this species from Mr. J. B. Upson, at the time I supposed them to be a variety of *U. Anthonyii* Lea, but having some doubts as to their belonging to that species, I sent them to Mr. Chas. T. Simpson of the Smithsonian Institution, who after a very careful examination, pronounced them distinct. They differ from *U. Anthonyii* Lea in being a much smaller species but more inflated and solid, less wide, more cylindrical; they are not angular over the posterior slope, with a very different epidermis and nacre and much heavier teeth.

I name this shell after my friend Mr. Jas. H. Ferriss of Joliet, a gentleman who has done much towards bringing to light many interesting species from our own state.

THE SLUGS OF BRITISH COLUMBIA.

BY T. D. A. COCKERELL.

Mr. H. F. Wickham sent me some slugs from Victoria, Vancouver Island, in November, 1889; and the Rev. J. H. Keen recently sent some slugs from British Columbia to the British Museum, so I have been able to examine sufficient material to offer a list of the slugs of that province, with notes:

(1) *Agriolimax campestris* subsp. *hyperboreus* (Westerlund). Mr. Binney sent me a specimen of this collected at Comor, 140

miles north of Victoria (Taylor). It is figured in 3rd suppl. Terr. Moll. U. S., Pl. viii, fig. f. On p. 205 of his 3rd suppl. Mr. Binney refers to a slug from British Columbia, apparently *L. hemphilli* W. G. Binney. *Limax hemphilli* is, I think without doubt, a variety of *Agriolimax Berendti* (Strebel), and was hardly to be expected so far north.

In my copy of Pl. viii of Mr. Binney's 3rd Suppl. Terr. Moll., figures of *Ag. hemphilli* and *Ag. montanus* have some appearance of dark lateral bands, owing to the ink having run in printing. All the four forms of *Agriolimax* figured on that plate resemble *Ag. laevis* in general appearance, and of course, have no dark bands. I found them to differ slightly in the position of the longitudinal line or groove on the margin of the foot, and the figures given of the foot-margins were intended to show this difference. It will be seen that in *montanus* the line is near the upper edge of the margin, in *occidentalis* it is lower, in *hyperboreus* it is about median, and in *hemphilli* it is nearest the lower edge. I have not, however, examined this character in a sufficient number of specimens to say whether it is of really of classificatory value.

(2) *Prophysaon pacificum* Ckll.: Victoria, Vancouver Island (Wickham). Figured in Binney's 3rd Suppl. Terr. Moll. U. S., Pl. vii. In this work, Pl. vii, fig. e, is the jaw of *P. humile*, and fig. f that of *P. pacificum*: these names are unfortunately transposed in the plate, on p. 225. *P. pacificum* was described from two specimens, one of which is now in the British Museum, and the other in the U. S. National Museum.

(3) *Prophysaon andersoni* (Cooper) var. *hemphilli* (B. & B.): British Columbia, six specimens (*Rev. J. H. Keen*).

(3b) *Prophysaon andersonii* var. nov. *pallidum*. Paler, ochreous, the bands on mantle evanescent, retieulation on body not dark, back not darker than sides, neck pale. Two specimens from British Columbia (*Rev. J. H. Keen*), the largest 46 mill. long (in alcohol). One has the tail cut off, in the same way as has been described in other species of the genus. All the eight examples of *Prophysaon* sent by Mr. Keen have the sole strongly wrinkled.

(4) *Ariolimax columbianus* (Gould) forma *typicus*. Without black spots. British Columbia, two specimens (*Rev. J. H. Keen*).

(4b) *Ariolimax columbianus* forma *maculatus* Ckll. This spotted form seems to be rather more frequent than the type.[1] Mr. Keen's

[1] *Ariolimax* subsp. *californicus* forma nov. *maculatus* is a precisely similarly spotted form of the Californian subspecies. There is an example in the British Museum from Mr. W. G. Binney, 45 mm. long.

sending contains four specimens. Mr. Wickham sent me two from Victoria: one being immature, only 21 millim. long; in this small specimen the sole was not visibly divided into tracts. There is also a specimen of *f. maculatus* in the British Museum from Vancouver I. (*Lord I. Russell;* coll. by the Boundary Commission), which is 63 mill. long (in alchohol), tail well keeled for 18 millim.; a large spot on mantle; sole with median area smooth though wrinkled, lateral area rough; jaw dark, with 15 ribs.

(4c) *Ariolimax columbianus* forma nov. *niger*. Entirely black, except the sole, which is rather olivaceous. One specimen, 57 mill. long (in alch.), from British Columbia (*Keen*).

Mr. H. F. Wickham was so good as to send me some notes on the Victoria slugs, as follows: "The very large slugs [*A. columbianus* f. *maculatus*] from Victoria are found in the heavy woods on the island in rather damp situations, especially around and in the cracks of rotten logs. In damp weather I have seen them crawling around on logs and on the ground. The little ones [*P. pacificum*] from Victoria also occur under logs, but I got them in much damper places, especially under logs in ditches by the roadsides, and few or none in the woods" (*in litt.*, Dec. 12, 1889.)

LIST OF LAND AND FRESH-WATER MOLLUSCA COLLECTED IN JAMAICA.

BY C. W. JOHNSON & WM. J. FOX.

The following is a list of the mollusca obtained on our recent trip to Jamaica, during a part of April and June. As the species are extremely local in there distribution, and our collecting confined to the eastern part of the Island, and time largely occupied in collecting insects, this list, represents but a small part of the Island fauna.

Collections were made near Kingston, Bogwalk in the Parish of St. Catherine, Morant Bay, Manchioneal, Port Antonio, Hope Bay and Swift River. At Kingston, *Orthalicus undatus* was abundant on the trees, ascending to the height of ten or twelve feet; as it was very dry weather, they were all tightly closed with an epiphragm, and so firmly attached to the bark that it required considerable force to remove them. *Helix invalida*, *Cylindrella brevis* and *Tudora armata* were also numerous. Though the shells were quite plentiful we did not succeed in finding a living *Sagda Jayanus*. At Port Antonio, *Tudora augustæ*, *Cyclotus Portlandiensis* and *Hyalosagda*

similis, were the most abundant species, while near Hope Bay, *Helix acuta*, *Cylindrella alba* and *Lucidella aureola* predominated. We desire to express our thanks to Mr. Henry Vendryes of Kingston, for his kindness in directing us to collecting grounds, for valuable information regarding distribution, and for specimens.

List of Species.

Oleacina (*Varicella*) *leucozonias* Walch. Portland? This species was given to me by a gentleman in Port Antonio.

Oleacina procera C. B. Ads. Bogwalk. Two specimens.

Oleacina nemorensis C. B. Ads. Near Manchioneal.

Oleacina similis C. B. Ads. Bogwalk.

Oleacina (*Melia*) *propinqua* C. B. Ads. Near Hope Bay and Swift River.

Oleacina perplexa C. B. Ads. Near Hope Bay and Swift River.

Oleacina læviuscula. Near Hope Bay and Swift River.

Zonites (*Proserpinula*) *discoidea* C. B. Ads. Near Hope Bay.

Zonites opalina C. B. Ads. Bogwalk.

Helix (*Sagda*) *Jayanus* C. B. Ads. Long Mt. Kingston and Bogwalk.

Helix (*Sagda*) *connectans* C. B. Ads. Long Mt. Kingston.

Helix (*Hyalosagda*) *similis* C. B. Ads. Morant Bay, Port Antonio and Swift River.

Helix (*Hyalosagda*) *Haldemaniana* C. B. Ads. Morant Bay, Manchioneal.

Helix (*Microphysa*) *turbiniformis* Pfr. Bogwalk and Port Antonio.

Helix (*Microphysa*) *peraffinis* C. B. Ads. Port Antonio.

Helix (*Microphysa*) *vortex* Pfr. Port Antonio.

Helix (*Microphysa*) *diminuta* C. B. Ads. Port Antonio.

Helix (*Microphysa*) *perdepressa* C. B. Ads. Kingston.

Helix (*Lucerna*) *acuta* Lam. Near Hope Bay.

Helix (*Lucerna*) *acuta* var. *nobilis* C. B. Ads. Bogwalk.

Helix (*Lucerna*) *acuta* var. *ingens* C. B. Ads. Near Manchioneal.

Helix (*Lucerna*) *valida* C. B. Ads. Near Hope Bay.

Helix (*Lucerna*) *invalida* C. B. Ads. Near Long Mt., Kingston.

Helix (*Lucerna*) *sinuosa* Fér. Bogwalk.

Helix (*Dialeuca*) *subconica* C. B. Ads. Bogwalk, Port Antonio and Hope Bay.

Helix (*Dialeuca*) *nemoraloides* C. B. Ads. Bogwalk.

Helix (*Dialeuca*) *nemoraloides* var. *gossei* C. B. Ads. Bogwalk.

Helix (*Cysticopsis*) *tumida* Pfr. Bogwalk.

Helix (*Cysticopsis*) *tenerrima* C. B. Ads. Bogwalk.

Orthalicus undatus Brug. Kingston.
Stenogyra octona Linn. Common in all the localities.
Stenogyra octonoides C. B. Ads. Common in most of the localities.
Cylindrella elongata Chemn. Bogwalk.
Cylindrella alba C. B. Ads. Near Hope Bay and Swift River.
Cylindrella rubra C. B. Ads. Swift River.
Cylindrella Dunkeriana Pfr. Bogwalk.
Cylindrella brevis Fér. Near Rockfort and Kingston.
Cylindrella sanguinea Pfr. Bogwalk.
Cylindrella rosea Pfr. Near Manchioneal and Port Antonio.
Cylindrella lata C. B. Ads. Bogwalk.
Leia Maugeri Wood var. *striatula* C. B. Ads. Bogwalk.
Pupa fallax Say. Kingston.
Pupa contracta Say. Near Hope Bay.
Succinea latior C. B. Ads. Common in all the localities.
Succinea angustior C. B. Ads. Morant Bay.
Vaginulus sloanii Fér. Port Antonio.
Vaginulus occidentalis. Port. Antonio.
Planorbis affinis Ad. In a spring near Rockfort and Kingston.
Amnicola? sp.? Brackish water near Kingston.
Hemisinus lineolatus Wood. Rio Cobre at Bogwalk.
Ampullaria fasciata Lam. Rio Cobre at Bogwalk.
Geomelania procera C. B. Ads. Near Hope Bay and Port Antonio.
Adamsiella Grayana C. B. Ads. Bogwalk.
Tudora armata C. B. Ads. Rockfort and Kingston.
Tudora fecunda C. B. Ads. Rockfort and Kingston.
Tudora maritima C. B. Ads. Near Manchioneal.
Tudora fascia Gray. Bogwalk.
Tudora Augustæ C. B. Ads. Port Antonio.
Tudora Augustæ var. *rufilabrum.* Swift River.
Cyclotus Portlandiensis Chitty. Port Antonio.
Helicina megastoma C. B. Ads. Port Antonio and Hope Bay.
Helicina neritella Lam. Port Antonio and Hope Bay.
Helicina depressa Gray. Bogwalk.
Alcadia solitaria C. B. Ads. Port Antonio
Lucidella aureola Fér. Bogwalk, Port Antonio and Swift River.
Lucidella nana Pfr. Port Antonio and Hope Bay.
Stoastoma chittyana C. B. Ads. Port Antonio and Hope Bay.

[CONTRIBUTED.]

AMERICAN ASSOCIATION OF CONCHOLOGISTS.

JUNE 23, 1891.

Owing to long continued illness in the family of the President and absence of the Secretary in Jamaica, we have been unable to communicate our usual monthly notes to the NAUTILUS. For the same reason correspondence has been delayed and the affairs of the Association, so far as the President and Secretary are concerned have dragged somewhat. Members have been very indulgent and their kindness is appreciated.

The Association still grows. In fact, its rapid growth has astonished its projectors and has shown that such an organization was needed. American Conchologists were unacquainted with each other and in many instances had no one with whom to confer in their studies. Now they have at their command scores of willing associates, ready to extend them aid in solving disputed problems or in acquiring knowledge. Those members who have corresponded most perceive how valuable the Association has been. Before long we will not only have almost every American Conchologist enrolled, but many students and beginners will be induced to take up the study and collection of shells.

Next month we will resume the publication of the lists of new members, donations to the United States Collection etc.

Members desiring to donate shells to the United States Collection would do well first to send their *lists of species* to the President who would will mark off the species already received and thus save duplication. Send all shells to the President, care of Academy of Natural Sciences, Philadelphia.

The annual election of officers of the Association took place, by correspondence, upon the 1st Wednesday of June, and the officers assumed their duties upon June 15th. Except a few scattering votes, by the officers and others, the present officers received all the votes polled, and were therefore re-elected for another year. They wish to return their thanks for the many kind words of approval of their conduct and for the great interest taken by the members in the election. The positions involve much hard work and the giving of much time to the affairs of the Association but the work is lightened by the ready assistance and co-operation of the members.

A new edition of the pamphlet "List of Members" of the Association, is in preparation. So many new members have been elected since its publication (October 1, 1890), that a new edition is much needed. As soon as completed a copy will be sent to every member.

Members desiring to propose new members should do so at an early date, so that their names may be included in the new "List of Members."

Miss C. A. Shepard of New Britian, Conn. and C. A. Hargrave, Danville, Ind. are Associate Editors of "The Observer" a natural history monthly, published at Portland, Conn.

James H. Ferris, recently elected a member, is Editor of the Daily News, Joliet, Ill. He has chosen for his subject, the Land and Fresh Water Shells of Illinois.

William McCormick, Palm Beach, Fla. is spending the summer North, and stayed, en route, some days in Philadelphia.

John Ritchie Jr., Boston, Mass., has fortunately recovered from a serious attack of typhoid fever. Accompanied by his wife, he spent nearly a week in Philadelphia during the present month, coming and returning by steamer.

Francisco E. Blanes, Key West, Fla., is now on a visit to Cuba.

I. Greegor has finishes his winter's business in St. Augustine, Fla. and is now at Cuyahoga Falls, Ohio. He stopped in Philadelphia for a few days on his way home.

Dr. Lorenzo G. Yates, Santa Barbara, Cal. has changed his subject to "West Coasts shells." Harry E. Dore, Portland, Oreg. a new member, has chosen the same subject. Willard M. Wood, San Francisco, Cal., a new member, has chosen "California Mollusca" as his subject.

W. S. Teator, Upper Red Hook, N. Y., recently paid a visit to Philadelphia.

Rev. Joseph C. Carrier is Professor of Natural Sciences in the College of St. Laurent, near Montreal, Canada.

WANTED. The June number of The Nautilus, Vol. III, 1889. Ten cents per copy will be paid.—*C. W. Johnson, Manager of the Nautilus, Philadelphia.*

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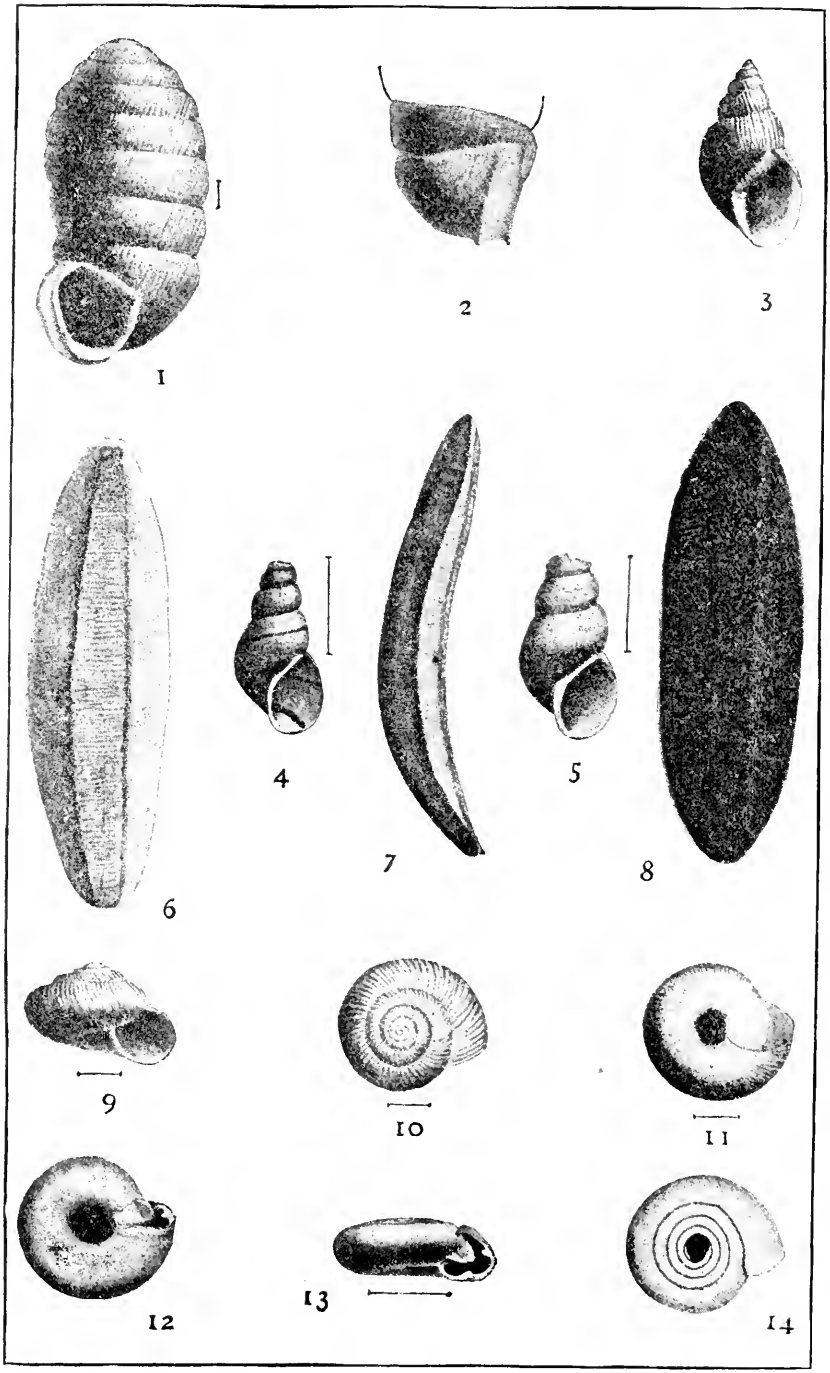

PILSBRY, ON NEW AMERICAN MOLLUSKS.

THE NAUTILUS.

VOL. V. AUGUST, 1891. No. 4.

ON HELIX HARFORDIANA COOPER, AND OTHER SHELLS.

BY HENRY A. PILSBRY.

The accompanying plate[1] illustrates a number of species described originally in THE NAUTILUS and elsewhere, as follows:

Figs. 1, 2, **Pupa syngenes.**

Pupa syngenes Pils., THE NAUTILUS IV, p. 3, May, 1890; Proc. Acad. Nat. Sci. Phila., 1890, p. 296.

This is the first sinistral Pupa described from America. It is from Arizona.

Fig. 3. **Bulimulus Ragsdalei.**

B. Ragsdalei Pils., Proc. Acad. Nat. Sci. Phila., 1890, p. 63, 296; THE NAUTILUS ~~IV~~, p. 122, March, 1890.

Northern Texas.

Figs. 4, 5. **Goniobasis Crandalli.**

Gon. Crandalli Pils., Proc. Acad. Nat. Sci. Phila., 1890, p. 301.

Mammoth Springs, Arkansas.

Figs. 6, 7, 8. **Vaginulus Schivelyæ** Pils.

Bermuda.

Figs. 9, 10, 11, **Zonites Shimekii.**

Z. Shimekii Pils., THE NAUTILUS, IV, p. 3, May, 1890, Proc. Acad. Nat. Sci. Phila., 1890, p. 297.

This species has been familiar to me for some years, under the name of *Zonites limatulus*. It agrees with that form in the number of

[1] Reprinted by permission from Proc. Acad. Nat. Sci. Phila.

whorls and sculpture, except that the *Shimekii* is more strongly, regularly ribbed above. It differs from *limatulus* in being far more robust, more elevated, with rounder mouth and narrower, deeper umbilicus. Upon comparing specimens of the two species, I am surprised that they were ever confused; for, except in sculpture, the *Z. Shimekii* is far more like *Z. nitidus* than to *Z. limatulus*. The specimens described and figured were collected by Prof. B. Shimek, of Iowa City, Iowa.

This form is interesting as being the only well-defined species of Loess fossil which seems to have become extinct; although there are a number of others, such as *Helicina occulta* and *Patula strigosa* var., which survive in greatly reduced numbers in a few limited localities, or only in a distant part of the country.

This species is rather widely distributed throughout the Loess formation of Iowa and eastern Nebraska. The name is bestowed in memory of the many happy days spent together by Prof. Shimek and the writer, then college classmates, hunting fossils and shells.

Fig. 12, 13, 14. **Helix (Polygyrella) Harfordiana.**

Dædalochila Harfordiana Cooper, Amer. Journ. of Conch., vol. V, pt. 4, 196, plate 17, fig. 8. See also *tom. cit.*, p. 214.

Helix (Dædalochila) Harfordiana Coop., Tryon, Manual of Conchology, 2d Series, vol. III, p. 130, pl. 27, figs. 55–57.

Polygyra Harfordiana Coop., W. G. Binney, Manual of N. A. Land Shells, p. 114, fig. 81, *but not the description!*

Not *Triodopsis Harfordiana Cp.*, W. G. Binney, Terr. Moll. U. S. etc., V, p. 309, fig. 203, 1878.

This shell has been so much misunderstood and so incorrectly figured that I feel impelled to refigure it and to offer a few suggestions concerning the systematic position of the species. It was discovered in the year 1869 by Mr. W. G. W. Harford in the "Big Tree" district, Fresno County, California. The locality is an elevated one, lying 6500 ft. above the sea level, in lat. 37°.

In thus devoting space to the consideration of this question of systematic position, I do not wish to be understood to attach any great importance to those divisions of our Helices which some authors call *sections*, some *subgenera*, and still others designate as full fledged *genera*. I am fully aware that many of these divisions coalesce; we can no more trace the separating line between their species than we can unmix mingled milk and water. Thus, the species *Texasiana, triodontoides* and *Levettei* bridge the space between

Polygyra and *Triodopsis ; Mullani*, *appressa*, etc., form passages from *Triodopsis* to *Mesodon ;* and through *germana* with its allies on either side, *Mesodon* flows into *Stenotrema*. The recognition of the fact that these sections are all varying manifestations of one type, and that a native American one, lead me to associate them under the oldest name, *Polygyra*, in my check-list of our land shells.[1]

So much for the one side. And on this side there is full as much danger in holding extreme views, as on the side of excessive analysis. Let us not profess sweeping views on coalescence of minor groups until we have the species which actually show transition ; and (to pass from generalizations to a special case), it may be noted here that while the species of the *Polygyra*+*Triodopsis*+*Mesodon*+*Stenotrema* group, invariably have a reflected lip, the two species belonging (as I claim) to *Polygyrella* have a blunt lip, not in the least expanded or reflexed. I prefer to keep very different things apart.

Dr. Cooper's original description is excellent, but the figures are bad. The latter are copied by Tryon in the Manual of Conchology. Binney described a wholly different shell in his two publications—a shell which has, he states, an expanded lip. In his Manual of American Land Shells the species is said by him to have four whorls and is placed in *Polygyra*. Still later (3rd Supplement to Terr. Moll. V.) Mr. Binney seems to entertain a suspicion that the *Triodopsis Roperi* Pils. (which he places in *Polygyra !*) is the same species. An examination of the type would doubtless have convinced Mr. Binney that it is, as Dr. Cooper states in his original description, most intimately allied to *Polygyrella polygyrella*. Figure 81 of the Manual of American Land Shells is incorrect in showing the parietal tooth too far within the aperture. The original figures have the same defect.

With *Polygyrella polygyrella*, this species agrees in general form, color, sculpture and texture, as well as in the form of the aperture and the *blunt, not at all expanded* lip. In *texture* and character of the lip, both species are very different from *Polygyra* and *Triodopsis ;* the species of these last two sections having the lip expanded and reflexed.

The section *Polygyrella* may be defined thus :

Shell disk-shaped, the spire nearly flat, periphery rounded, even in the young ; umbilicus wide within, showing all the whorls. Texture somewhat vitreous and subtranslucent ; ribbed-striate above,

[1] Proc. Acad. Nat. Sci. Phila., 1889, p. 193.

polished beneath; color yellow, yellowish-green or light brown. Whorls six to eight, narrow, slowly widening, the last a trifle descending in front. Aperture subtriangular, oblique; peristome blunt, not expanded, thickened within, with or without lip teeth; parietal wall bearing a stout, triangular, erect entering tooth.

The species may stand as follows:

(1.) No lip-teeth; body-whorl with several internal pairs of denticles visible through the base. *H. polygyrella.*

(2.) Peristome with two lip-teeth; no denticles inside the body-whorl. *H. Harfordiana.*

Dr. Cooper's ingenious supposition that the internal denticles of *H. polygyrella* are "swallowed" lip teeth I find to be erroneous, as they are formed quite a distance within the whorl, not at the edge of the advancing lip.

H. Harfordiana has been found only at the spot named above, and only two specimens are known; that figured on the plate accompanying this paper, and one other, a young shell, in the collection of Dr. Cooper. The earlier whorls are broken in the type specimen.

ON SOME MARINE MOLLUSKS FROM THE SOUTHERN COAST OF BRAZIL.

BY DR. W. H. DALL.

In the preliminary report on the mollusca obtained on the voyage of the Albatross around Cape Horn (Proc. U. S. Nat. Mus. XII, No. 773, pp. 219–362, 1889) I enumerated a number of Antillean mollusks which were found to extend their range from the coast of the United States to the eastern shores of Brazil, to the Abrolhos Islands and even further south. Subsequently a few others, also from the Albatross collection, were noted as extending to Brazil, in Bull. 37, U. S. Nat. Museum. Since then I have received from Dr. H. von Ihering, of Porto Allegre, a small collection of very poor, beach-worn material, largely in fragments, but still identifiable, which still further enlarges the range of some of the species, and adds to the list of species some of the common forms of the United States coast which had not before been suspected to reach such southern latitudes. It is probably that the great volume of fresh

water issuing from the Rio La Plata acts as an effective barrier against the more southern extension of shallow water species which may reach to its northern point of entrance; so that we may expect that few, if any, of these northern stragglers will be found south of Montevideo.

In the following list will be found the names of the species received from Dr. von Ihering and a few, not hitherto noted, from the Albatross collection, the whole embracing between fifty and sixty species, a good many of which have not hitherto been identified from the region in question, and two of which appear to be new to science. The northern range of most of the species common to the northern Antilles and to the coast of the United States will be found entered against the name of the species in Bulletin 37 above referred to. In some cases the identity of the species has hitherto been obscured by the southern specimens having been separately named; as in the case of *Tagelus platensis* Orb. which is positively indistinguishable by any character from *T. caribæus*.

The localities are Santa Caterina near San Francisco, in about Lat. 26° S.; Rio Grande do Sul in S. Lat. 32° 30′; and the mouth of the Rio La Plata near Montevideo and Tozitos in about S. Lat. 35°.

Ostrea virginica Gmelin var. puelchana Orb. Santa Caterina.
O. cristata Born. Santa Caterina.
Placunanomia rudis Brod. Santa Caterina.
Modiola sulcata Lam. Rio Grande do Sul.
Mytilus canaliculus Hanley (edulis of E. A. Smith). Rio Grande do Sul.
Mytilus magellanicus Reeve. Montevideo.
Arca candida Chemnitz. Santa Caterina.
Arca martinii Recluz. Santa Caterina.
Arca imbricata Bruguiére. Santa Caterina.
Arca americana Gray. Santa Caterina.
Arca incongrua var brasiliensis Orb. Santa Caterina.
Lucina jamaicensis Lam. Santa Caterina.
Divaricella quadrisulcata Orb. Santa Caterina.
Chama congregata Conrad. Santa Caterina.
Cardium brasiliensis Lam. Santa Caterina.
Cardium muricatum L. Santa Caterina.
Dione circinata Lam. Santa Caterina.
Dione purpurata Lam. (+ ligula Anton). Rio Grande do Sul.

Cytherea rostrata Koch (+ tehuelca Orb.) Santa Caterina.
Anomalocardia macrodon Desh. Santa Caterina.
Tivela mactroides Born. Santa Caterina.
Tivela fulminea (Val.) Philippi. Santa Caterina.
Tivela ventricosa Gray. Rio Grande do Sul.
Eutivela perplexa Stearns, n. s. Off Rio La Plata, 11½ fathoms.
Eutivela iheringi Dall, n. s. Santa Caterina.
Donax rugosus Lam. Rio Grande do Sul.
Donax owenii Gray. Montevideo and Maldonado.
Iphigenia brasiliensis Lam. Santa Caterina.
Tagelus gibbus Spengler (+ T. platensis Orb.). Rio Grande do Sul.
Soletellina rufescens Chemn. Santa Caterina.
Sanguinolaria rosea Lam. Santa Caterina.
Tellina versicolor Cozzens. Santa Caterina.
Macoma constricta Bruguiére. Santa Caterina.
Mactra brasiliana Lam. Santa Caterina.
Mactra scalpellum Deshayes. Santa Caterina.
Mactra symmetrica Deshayes. Santa Caterina.
Mactra byronensis Gray. Montevideo.
Mactra? isabelleana Orbigny. Santa Caterina.
Mactra alata Lam. Santa Caterina.
Labiosa canaliculata Say. Santa Caterina.
Mesodesma mactroides Deshayes. Rio Grande do Sul.
Pholas campechiensis Gmelin. Santa Caterina.
Barnea costata Linné. Santa Caterina.
Pisania variegata Gray. Santa Caterina.
Murex senegalensis Lam. Santa Caterina.
Purpura hæmastoma Linné. Santa Caterina.
Litorina irrorata Say, var. columellaris Orb. Santa Caterina.
? Paludestrina australis Orb. Montevideo.
Crepidula aculeata Gmelin. Santa Caterina.
Polynices brunnea Link. Santa Caterina.
Sigaretus maculatus Say. Santa Caterina.
Sigaretus perspectivus Say. Santa Caterina.
Acmæa onychina Gould. Santa Caterina.
Fissurella rosea Gmel. Santa Caterina.
Glyphis cayennensis Lam. Santa Caterina.

NOTE ON PUPA MUSCORUM LINNE.

BY H. A. PILSBRY.

There has been considerable discussion regarding the proper name of this species, some authors preferring the name "*marginata* Drap." In all disputed questions regarding Linnean names, we may turn with confidence to Hanley's book "The Shells of Linnæus." Hanley bestowed a vast amount of study on the actual types of Linnæus' own collection. He says of this species:

"*Turbo Muscorum.* This shell (pl. IV, fig. 6) still remains in the collection, is enclosed in a paper inscribed in the hand of Linnæus, and is the sole species in the entire cabinet which at all agrees with the diagnosis. It is a curious edentulus variety of the *Pupa marginata* of Draparnaud, to which species it had been assigned by Nilsson, in his valuable treatise upon the land and fresh-water shells of Sweden, a work especially illustrative of the *Helices* and *Turbines* of the 'Fauna Suecica.' From a sentence in the last mentioned work, 'aperture ovate-acuminata, mucrone obtuso' we are led to imagine that our author was aware of the frequent presence of a denticle in the mouth of the shell, although in the 'Systema' he had termed it edentulous. None of the Linnean examples, however, are provided with a tooth; yet in England, where this *Pupa* is most abundant, it is rarely that we obtain an example which is not thus furnished."

Hanley figures the type shell of Linnæus; and we have, it seems, little excuse for rejecting the name *muscorum* in favor of the later *marginata*. The following tabulation of the varieties of this species I take from a MSS. of T. D. A. Cockerell:

"In the number of teeth or lamellæ in the aperture of the shell, this species presents a beautifully graduated series from none at all to three, as follows:

a. *edentula* Moq-Tand. No teeth. Colorado, Massachusetts, Europe.

b. *unidentata* Stabile. One tooth on parietal wall.

c. *bigranata* Rossm.=*sterri* v. Voith. Two teeth. This form is figured by Binney, Man. Amer. Land Shells, p. 78, fig. 40.

d. *blandi* Morse. Three teeth, one being on columella.

"*Bigranata* and *blandi* are often considered as species apart from *marginata*, but I think on wholly insufficient grounds."

Mr. Cockerell is not responsible for the name *muscorum* as applied to this shell. The first variety, *edentula* Moq.-Tand., is of course equal to the typical *muscorum*.

NOTES AND EXCHANGES.

The following extract from a letter written to the Ed. by Dr. W. D. Hartman, will be of interest:

"I have just learned through Mr. Rossiter, of the Island of Noumea, that Mr. de Latour and his son (from whom I have received so many new shells from Aura Island, New Hebrides) have been murdered by natives; Mr. Garrett was wont to tell me of the great danger to be encountered by these collectors in these islands from the natives. When he was collecting in some of these islands he was obliged to be a walking arsenal and would never trust a native behind his back for fear of being stabbed and dragged off into the bushes and eaten.

I much regret the loss of de Latour as a collector. The last box he collected was lost in a vessel that was wrecked, and after floating about on the ocean was wafted to shore, and was found and sent to Mr. Rossiter."

Some of the shells contained in this box were figured in Dr. Hartman's last paper in the Proceedings of the Academy of Natural Sciences of Philadelphia.—Ed.

Wanted.—Atlantic and Gulf Coast Shells in exchange for land and fresh-water shells of the Mississippi Valley.—*Elwood Pleas, Dunreith, Indiana.*

We learn that our valued correspondent, Mr. T. D. A. Cockerell, has been appointed Director of the Natural History Museum at Kingston, Jamaica. Mr. Cockerell has many warm friends among the conchological fraternity of America, who will be glad to hear that he has been called to a field so rich for the Naturalist.—*Ed.*

Correspondence invited, with view to exchange of Conchological specimens. Desiderata: Florida, Texas, California and West Indian land shells. Offers: British, European and South African land, fresh-water and marine.—*C. L. Smout, 40 Braybrook Road, Hastings, England.*

POLYGYRA (TRIODOPSIS) MULLANI *var.* OLNEYÆ.—Shell very much depressed, the spire nearly flat; aperture transversely oval, the upper and basal lips parallel; peristome completely revolute, more curled over than in any other form I have seen; basal lip with a white callus but no tooth; no trace of a tooth on the outer or upper lip; parietal wall having a small tooth. Alt. 6, diam. 13 mill.; oblique alt. of aperture 6½, width 8½ mill., measured outside of peristome. The specimens are from Spokane, Washington, sent by Mrs. Mary P. Olney.—*H. A. P.*

THE CONCHOLOGIST is the title of a new periodical published at Leeds, England. It is issued quarterly and is devoted for the greater part to the mollusks of Great Britian. The second number, just issued, contains the following articles: Note on the locality of *Helix mandarina* Gray, by E. A. Smith; The glacial Period and British non-marine mollusca, H. E. Quilter; The Land and Fresh-water mollusca of Oxfordshire, W. E. Collinge; Adventitious Protection in Fresh-water mollusca, C. Clare Fryer; On the Burrowing Habits of Testacella, C. D. Horsman. *The Conchologist* is edited by Mr. W. E. Collinge, of Leeds, England. We wish it success.

ON SOME NEW * * WEST AMERICAN SHELLS, ETC., *by* WM. H. DALL. (Proc. U. S. Nat. Mus. 1891, p. 173–191; three plates.) The dredgings of the *Albatross*, as well as a number of West Coast collectors, Mr. J. J. Rivers, Miss Ida M. Shepard, Mrs. M. Burton Williamson and others, have contributed the shells described and illustrated in this paper. The species of *Eupleura*, both East and West, are first discussed and figured. *Nassa californiana* Conr., originally described as a Miocene fossil under the generic name of *Schizopyga* by Conrad, has been found living from Drake's Bay to Cerros Island, 25–65 fms. *Fusus Kobelti* Dall, *F. Harfordi* Stearns, *Trophon triangulatus* Cpr. and *clementia subdiaphana* Cpr. are figured for the first time. *Trophon Cerrosensis*, *Cancellaria Crawfordiana* and *Tellina Idæ*, *spp. nov.*, are figured and described. The paper concludes with brief descriptions of the following: *Beccinum strigillatum*, *taphrium*, *molinia friclei*, *strombella middendorffi*, *fragilis*, *melonis*, *chrysodomusithius*, *periscelidus*, *phœnicens*, *eucosmius*, *hypolismus*, *acrosnius*, *halibrectus*, *Trophon scitulus*, *disparilis*, *punctrella* (*galeatea var.?*) *major*, *solenya johnsoni*, *calyptogena pacifica* (new genus and species of *carditidæ*), *Limopsis vaginatus*. All are West Coast forms, mostly from Alaska. We hope that illustrations

of these will follow shortly. *Trophon triangulatus* is a fine species, resembling "*Chorus*" *Belcheri*, but smaller, without the basal groove and tooth. It has probably escaped the notice of Dr. Dall that *Belcheri* is not a *chorus* at all, the type of that genus being *C. giganteus* Lesson, of Chili, a shell that looks like a big smoothish *monoceros*.—*H. A. P.*

List of N. A. Land and Fresh-water shells received from the U. S. Dept. of Agriculture, with notes and comments thereon *by* Robert E. C. Stearns. (Proc. U. S. Nat. Mus.) The species noticed in this paper were mainly collected in Texas, Arizona and Wyoming. *Helix humboldtiana* Val., a Mexican species, is added to our fauna, the single specimen being from Altuda, Texas, at an elevation of 5000 ft. Dr. Stearns erroneously places this in the section *Pomatia;* but it by right belongs to the *Arionta* brotherhood, in Fischer's section of *Arionta* called *Odontura*. *H.* (*Pomatia*) *aspersa*, the common European edible snail, is in the National Museum from Puebla, Mexico. The members of the Academy of Science's expedition to Mexico also found this shell very abundant around the City of Mexico, doubtless imported, as the species is an excellent traveller and successful emigrant. Dr. Stearns has been able to connect the *Bulimulus Ragsdalei* with *B. dealbatus* by intermediate examples, showing a gradual transition from the strongly ribbed to the smooth form. Under the old name *B. alternatus* are placed as synonyms, *B. schiedeanus*, *B. patriarcha*, *B. mariæ* and *B. mooreanus*. I am quite disposed to accept this arrangement of our Bulimuli, and would add at least two of the Mexican so-called *species* to the list of synonyms under *alternatus*. A large number of new localities are quoted for other and well-known species.—*H. A. P.*

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A MONTHLY
DEVOTED TO THE INTERESTS
OF CONCHOLOGISTS.

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THE NAUTILUS.

VOL. V. SEPTEMBER, 1891. No. 5.

LIST OF SHELLS COLLECTED ON FAYAL ISLANDS, AZORES; AND ON MADEIRA ISLANDS; WITH PREFATORY NOTES.

BY WILLIAM H. RUSH, M. D., U. S. NAVY.

While serving as medical officer on board the Pennsylvania Nautical School-Ship *Saratoga* during the practice cruises of the year 1890 and the Spring of 1891, advantage was taken of the opportunities thus presented to collect any molluskan forms of animal life that by a little trouble and some searching could be found. No special outfit was provided other than the usual collecting box, with its forceps and knife, and the rake. Surface towing nets, made of the common bobinet, were used when sailing to collect the pelagic forms. Two dredges were kindly loaned by the Smithsonian Institution but no opportunity presented for their use.

During the cruises of the Summer of 1890, stops were made at Horta, Fayal Is. Azores; at Southampton, England, where no attempt at collecting was made although a few *H.* (*Trichia*) *rufescens* Pennant were taken at Netley Castle; and at Funchal, Madeira.

During the stay at Horta two trips were made to the small fresh water pond in the extinct crater in the mountains, for the purpose of procuring a supply of *Pisidium Dabneyi* De Guerne; but not a single specimen rewarded the visits. The journeys were made on the back of a small donkey, which knowing animal, as soon as the higher parts of the mountains were reached, selected the deep ruts in which to walk, often leaving the rider, unless with special attention upon his part, stranded; and the pleasures of the journey were not materially increased by the community of fleas inhabiting the hang-

ings and cushions of the saddle. To reach the edge of the crater it took four hours; the donkey with the guide, and his yelling companions, were then left to amuse themselves while the descent into the crater was made.

The crater is said to be seventeen hundred feet deep, and its sides are very steep so that the actual time of descent was quite small, but the amount of time, patience, wear and tear consumed in coming up was considerable.

At Funchal, Madeira, the ascent to the mountains was made in a vehicle upon runners and drawn by oxen over roads laid with very small paving stones and often in patterns of ornamental designs. Upon arrival at the desired elevation, the oxen were detached, allowed leisurely to make their way down, and the vehicle was pulled to one side of the road to await the time for making the return trip. That time having arrived the sledge is pulled into position, a man, holding the steering rope attached to the fore corner, stood upon each side, and then, with a shout, a push and a little confusion of the respiratory rhythm, away the whole affair goes amidst a great scattering of sparks, clouds of dust and a confusion of noises; but in an incredibly short time the trip was made that previously had taken the oxen a couple of hours to do.

List of Species Collected.

1. Argonanta argo L. A living specimen kindly presented by Mr. Dabney, Consul at Horta, Fayal Is.
2. Purpura (Stramonita) hæmastoma L.
3. Triton nodiferus Lam. Two living specimens.
4. Ranella (Lampas) scrobiculator Linn. One dead.
5. Fusus rostratus Oliv. Dredged in 800 fms. near Graciosa Is. by the yacht L'Hirondelle, Duke of Monaco, kindness Mr. Dabney.
6. Nassa (Hima) incrassata Ström.
7. Mitra fusca Swainson. Is smaller but agrees in internal and external coloration with the specimen labelled M. Adansonii Phil., in Phila. Acad. Nat. Sciences.
8. Olivella nivea Gmel. Pico Is.
9. Columbella mercatoria Linn.
10. Columbella (Nitidella) lævigata Linn. Pico Is.
11. Trivia pediculus Linn. Pico Is.
12. Bittium reticulatum Da Costa. Pico Is.

13. Littorina (Melaraphe) striata King.
14. Littorina (Melaraphe) cærulescens Lam.
15. Fossarus ambiguus Linn.
16. Rissoa (Cingula) cingulus Mtg.
17. Leptothyra carinata Cantr., var. peloritana Cantr. 800 fms., near Graciosa Is.
18. Monodonta sauciata Koch. Madeira Is.
19. Haliotis coccinea Rve.
20. Patella vulgata Linn. Horta and Funchal.
21. Patella Azorica Linn. Horta and Funchal.
22. Bulla striata Brüg. Pico Is.
23. Hyalinia (Polita) cellaria Müll. Horta and Funchal.
24. Hyalinia (Polita) crystallina Müll. Horta and Funchal.
25. Hyalinia (Polita) atlantica Müll. Horta and Funchal.
26. Helix (Patula) rotundata Müll.
27. Helix (Acanthinula) monas Morelet.
28. Helix (Caracolina) barbula Charp.
29. Helix (Vallonia) pulchella Müll. Horta and Funchal.
30. Helix (Placentula) fictilis Lowe. Funchal.
31. Helix (Placentula) vespertina Morelet.
32. Helix (Plebecula) nitidiuscula Sby. In the public garden at Funchal.
33. Helix (Leptaxis) undata Lowe. Funchal.
34. Helix (Leptaxis) Drouetiana Morelet.
35. Helix (Leptaxis) Azorica Alb. Young specimens.
36. Helix (Pomatia) aspersa Müller.
37. Helix (Cochlicella) ventricosa Drap.
38. Buliminus (Ena) vulgaris Morelet.
39. Buliminus (Ena) Hartungi Morelet.
40. Buliminus (Ena) delibutus Morelet.
41. Buliminus sp.
42. Cionella (Zua) lubricus Müll. Horta and Funchal.
43. Pupa (Leucochila) fuscidula M. & D.
44. Pupa (Leucochila) microspora Lowe.
45. Pupa (Leucochila) fasciolata M. & D.
46. Pupa (Leucochila) umbilicata Drap. Horta and Funchal.
47. Balea perversa L.
48. Pedipes afra Gmel.
49. Dentalium sp. 800 fms. L'Hirondelle.
50. Strigilla carnaria Linn. Pico. Two odd valves.

51. Pisidium Dabneyi De Guerne. Kindness Mr. Dabney.
52. Pinna rudis L.

Where no locality is mentioned in the list, Horta, Fayal Islands, Azores, is to be understood.

NOTES ON FAMILIAR MOLLUSKS.

BY W. M. BEAUCHAMP.

It is the custom to call *Melantho rufus* Hald., a variety of *M. decisus* Say, and there are some good reasons for this. It is more than a mere color variety, however, as those familiar with its habits know very well. The shell is usually grayer and more polished without, besides the rich purple within. It requires warmer water than *M. decisus*, and in New York is restricted to favorable localities, while the other has a very wide range. Those who have taken the animal from the shell, find that it has a greater muscular adhesion, not separating readily. The young mollusks have well marked features from the very first. Thus far in New York, I have found the shell only where canal boats have been.

Some have also thought *Valvata tricarinata* and *sincera* Say, varieties of one species. There is little to suggest this in the forms or habits of these little shells. The outer appearance is very different, they have not the same haunts, nor do they eat the same food. If they are ever found together, it is in death rather than in life, as far as my experience goes.

Bythinia tentaculata Linn, has become very abundant since I first reported it many years ago. In portions of the Erie Canal it has driven out *Goniobasis livescens* and *Virginica*, merely by eating up their food. It prefers canal waters to any other, as many species do.

In the Erie Canal I collected *Pleurocera subulare* Lea, but with this I found *P. intensum* and *pallidum*, of the same author, which seem only varieties of the former. Mr. Tryon agreed with me in this. The variations are by no means as great as in *Gon. Virginica* Gmel.; in fact there seems little difference beyond the color and markings.

I have had *Margaritana margaritifera* Linn from tributaries of the Mohawk river, but nowhere west of these in New York. It is

likely to occur elsewhere, as the *Unionidae* are not the worst of travellers. I once found a number of *Anodonta Benedicti,* which had been thrown ashore by the waves on Onondaga lake, raising themselves on edge and working their way to the water. Can any one point out an invariable feature distinguishing *Unio radiatus* and *luteolus?* The distinctions do very well for some, but others seem a good deal mixed. Has not every collector some which he has not named?

Shells are not abundant in Colorado, and I took pleasure in showing the actions of *Helix Cooperi* W. G. B. to some there who had never seen a snail. This snail is abundant in Williams' Cañon, near Manitou, but I found it nowhere else, perhaps for want of time. In Cheyenne Cañon I collected some very small snails, which I unfortunately lost before identification. Conditions there are seldom favorable but something might be done by a zealous naturalist. For myself I confess that other things proved more attractive for the time. In the East, rocks are better collecting grounds, which reminds me how greatly *Helix albolabris,* on rocky islands, differs from the same shell in more fertile lands.

A NOTE ON MR. PILSBRY'S "ARTICLE IV."

BY T. D. A. COCKERELL, INSTITUTE OF JAMAICA,
KINGSTON, JAMAICA.

It is very unfortunate that so much discussion should seem necessary about *Limacella* or *Philomycus,* but I am obliged to add still a few remarks to remove what seems to be a slight misunderstanding. (1) *Limacella* Brard. My slug notes are not just now at hand, but I think I may safely assert that when *Limacella* was proposed in 1815, the *Limax* of modern authors was *not* specially provided with a name. The Linnean *Limax* included *Arion, Limax, Agriolimax* and even an *Eolis.* The first mentioned species in the Linnean *Limax* is what we now call an *Arion* (*A. ater*). Brard's first *Limacella,* I believe was *Limax maximus* of modern authors. Thus, if we were to adopt a very strict rule of priority, we might write as follows:

Limax Linn. (=Arion *Fér.*)
Limacella Brard (=Limax *Auctt.*)

As indeed was done by Dr. Jousseaume. But Linné did not specify *types* in his genera, and there are good reasons for believing that he did not regard the first mentioned species specially as the type. Accordingly, Férusac having next proposed *Arion* for another division of *Limax* L., we may adopt his name, and the residue (leaving out *Eolis*, the true affinities of which had been recognized meanwhile) namely *Agriolimax* of modern authors, remains as *Limax* L. Thus we get:

Limax L. = Agriolimax *Mörch.*
Arion Fér.
Limacella Brard = Limax *Auctt.*

I do not adopt this arrangement, because I do not consider that we can recognize Brard's name, but this is the logical result if *Limacella* Brard be adopted.

(2). *Philomycus* (or *Limacella*) *nebulosus*. It is hardly fair to say that I give no characters for this, as I expressly state that it is the *T. carolinensis* of Binney, the anatomy, jaw, and other characters of which are well described in the *Terr. Moll. U. S.* I believe still that it is distinct from true *carolinensis*, but I rejoice that Mr. Pilsbry is going to make a more careful study of these slugs, and if he finds after examining ample material that I was mistaken, nobody will more readily accept the fact than myself.

MOLLUSKS OF SAN FRANCISCO COUNTY.

BY WILLIARD M. WOOD, OF SAN FRANCISCO, CAL., AND WM. T. RAYMOND, OF OAKLAND, CAL.

The following species have been collected by ourselves, with the exception of *Alexia myosotis*, *Limnæa nuttalliana*, *obrussa*, *Physa diaphana*, *Planorbis ammon* and *Ancylus fragilis*, which are given on the excellent authority of Dr. Cooper and others. While the list is undoubtedly incomplete, we believe it indicates fairly well the molluscan fauna of this County. There is no evidence that *Cantharus gemmatus* and *Scala grœnlandica* have been found living here. Their occurrence on our beaches is probably accidental.

PELECYPODA.

Ostrea lurida Cpr.
Placunanomia macroschisma Desh.
Pecten hastatus Sby. (valves).
Hinnites giganteus Gray (valves).
Mytilus edulis Linn.
Mytilus edulis Linn., var. glomeratus Gld.
Mytilus Californianus Conr.
Adula stylina Cpr.
Anodonta Oregonensis Lea (Nuttalliana Lea).
Kellia Laperousii Desh.
Cardium corbis Mart.
Pisidium occidentale Newc. (abditium Hald.)
Tapes staminea Conr.
Tapes staminea, var. diversa Sby.
Tapes staminea, var. ruderata Desh.
Tapes tenerrima Cpr.
Petricola carditoides Conr.
Tellina Bodegensis Hds. (valves).
Saxidomus aratus Gld.
Macoma nasuta Conr.
Matoma inquinata Conr.
Macoma inconspicua B. & S. (valves).
Angulus modestus Cpr. (valves).
Angulus salmonea Cpr. (valves).
Schizothærus Nuttallii Conr.
Standella Californica Conr. (valves).
Lyonsia Californica Conr.
Lyonsia (Entodesma) saxicola Baird.
Cryptomya Californica Conr.
Mya arenaria Linn. (introduced).
Saxicava arctica Linn. (? pholadis L.)
Siliqua patula Dixon.
Pholadidea penita Conr.
Pholadidea penita var. parva Tryon.
Zirphæa crispata Linn. (valves).
Xylotrya setacea Tryon (pennatifera Blv.)

GASTROPODA.

A. pulmonata.

Selenites Vancouverensis Lea.
Limax campestris L. var. occidentalis Cooper.
Limax campestris L. var. zonatipes Ckll. (MS) new variety.
Limax Hewstoni Cooper.
Zonites cellarius Müll. (introduced).
Ariolimax Californicus Cooper.
Punctum conspectum Bland.
Helix Californiensis Lea.
Var. Nickliniana Lea, (also albino form).
Helix arrosa Gld. (Common in Marin county).
Helix armigerus Ancey.
Helix loricata Gld.
Pupa Californica Rowell.
Succinea Oregonensis Lea.
Alexia myosotis Drap. (introduced).
Limnæa palustris Müll.
Limnæa palustris var. proxima Lea.
Limnæa palustris var. Nuttalliana L.
Limnæa palustris var. Rowellii Tryon.
Limnæa palustris var. umbrosa Say.
Limnæa palustris var. Traskii Tryon.
Limnæa Adelinae Tryon.
Limnæa humilis Say.
Limnæa humilis var. ferruginea Hald.
Limnæa obrussa Say (desidiosa Say).
Limnæa bombycina Lunge (introduced).
Physa Gabbi Tryon.
Physa Gabbi var. D'Orbignyana Lea.
Physa Gabbi var. Traskii Lea.
Physa diaphana Tryon.
Physa virginea Gld.
Planorbis tumens Cpr.
Planorbis ammon Gld.
Planorbis opercularis Gld.
Planorbis vermicularis Gld.
Ancylus fragilis Tryon.

B. Ctenobranchiata.

Pleurotoma Carpenteriana Gabb. (fragment).
Olivella biplicata Sby. (dead).
Cantharus gemmatus Rve. (one only dead).
Nassa fossata Gld.
Nassa mendica Gld.
Columbella (Amycla) carinata Hds.
Columbella (Amycla) carinata, var. gausipata Gld.
Ocinebra lurida Midd.
Ocinebra interfossa Cpr.
Cerostoma foliatum Gmel.
Purpura saxicola Val.
Purpura saxicola, var. ostrina Gld.
Purpura saxicola, var. emarginata Desh.
Purpura lima Mart. (canaliculata Desh.)
Purpura crispata Chem., var. septentrionalis Rve.
Monoceros engonatum Conr.
Scala crebricostata Cpr.
Scala grœnlandica Perry. (one only, dead).
Odostomia gravida Gld.
Litorina planaxis Nutt.
Litorina scutulata Gld.
Lacuna porrecta Cpr.
Lacuna unifasciata Cpr.
Pomatiopsis intermedia Tryon.
Assiminea Californica Cooper.
Crepidula navicelloides Nutt.
Lunatia Lewisii Gld. (dead).
Acmæa mitra Esch.
Acmæa pelta Esch.
Acmæa persona Esch.
Acmæa persona, var. umbonata Nutt.
Acmæa testudinalis L., var. patina Esch.
Acmæa testudinalis var. scutum Esch.
Acmæa testudinalis var. Cumingii Rve.
Acmæa spectrum Nutt.
Chlorostoma funebrale A. Ad.
Calliostoma canaliculatum Mart. (dead).
Glyphis aspera Esch.
Fissurella volcano Rve. (dead).

POLYPLACOPHORA.

Chætopleura Hartwegii Cpr.
Tonicella lineata Wood.
Ischnochiton Cooperi Cpr.
Mopalia ciliata Sby.
Mopalia ciliata, sub-species lignosa Gld.
Mopalia ciliata, sub-species Hindsii Sby.
Mopalia wossnessenskii Midd.
Katherina tunicata Wood.
Nuttallina scabra Rve.
Cryptochiton stelleri Midd. (young).

MOLLUSKS IN THE PORTLAND, OREGON, MARKET.

BY HARRY E. DORE.

Prof. Keep's article in the January number of THE NAUTILUS on the Mollusks in the San Francisco market interested me very much as it was in direct line with observations and notes made by me here in Portland a little more than a year ago.

The small number of species which are usually exposed for sale is as noticeable here as it is in San Francisco though not so much to be wondered at for we are 120 miles from the ocean and further still from points whese the mollusks are to be found, but I find that occasionally something out of the ordinary run is sent to the fish dealers, as for instance: about three years ago the deep sea fisheries were first attempted and the schooner "Geo. H. Chance" started outside the Columbia River Bar from Astoria for fish. Through lack of experience the nets were thrown too deep and were badly cut by the large pectens, *Amusium caurinum* Gld. allowing many of the fish to escape. In the first shipment to Portland were about two dozen large fine examples of this beauty, nearly all of which I was fortunate enough to secure at a moderate price. I have never seen it in the market since. At another time I secured one very large and perfect example of *Lunatia Lewisii* Gld. sent with bivalves to the market.

In this connection I will state that I remember when a boy and living in San Francisco that *Macoma nasuta* Conr. was commonly sold in the market; it was very abundant on the mud flats near Long

Bridge in Mission Creek at that time. It is probably not sold there now or Prof. Keep would have included it in his list.

There are practically but four species of mollusks sold commonly in the Portland fish markets:

1st. The native oyster, *Ostrea lurida* Cpr. which is so abundant on Puget Sound and Shoal Water Bay. Nearly all of the oysters sold come from either Olympia, Wash. or Oysterville, on Shoalwater Bay, Wash. The few eastern or transplanted oysters sold here are shipped from San Francisco. There are also a great many canned oysters sold here.

2d. The hard shell clam has an excellent representative in *Saxidomus squalidus* Desh., which may prove to be merely a variety of *S. nuttalli* Conr. These come from Puget Sound and are very abundant, have a large, heavy shell and can be found at all times in the fish markets. They are cheap enough to be indulged in by all, selling for one cent apiece or even less.

3d. *Tapes staminea* Conr. is also very common. The variety sent here is larger and fuller than the variety usually sold in San Francisco but not as finely sculptured.

4th. *Mya arenaria* Linn. as well as *Tapes staminea* are sent here from Shoal Water Bay, Wash. It was introduced here from the Eastern States and grows to a very large size.

By the above it would seem that Portland depends upon her neighboring state for her supply of shell fish. There is, however, a source of supply in Oregon which will become better known and its shell fish product more eagerly sought for in the near future—this is Yuquina Bay. Occasionally there are shipped to Portland a few sacks of *Ostrea lurida* and several boxes of the rock oyster, *Pholadidea penita* Conr. Newport, at the entrance to the bay, is the home of this fine piddock which attains large size and is excellent for eating.

Machæra patula Dixon and *Cardium corbis* Mart. are also occasionally offered for sale in the Portland markets; and the Chinese eat the squid which is sometimes shipped here.

The edible mussel, *Mytilus edulis* Linn. seldom finds its way so far inland; but still we seem to have our share of mollusks.

[CONTRIBUTED.]

AMERICAN ASSOCIATION OF CONCHOLOGISTS.

SEPTEMBER 9, 1891.

Though the usual notes have not appeared for some time in the NAUTILUS, the work of the Association goes on. Judging from the correspondence received, there has been much activity among the members during the last summer and much valuable material has been collected. Quite a number of new members have been enrolled, and the new "List of Members," which will contain all their names, will be ready not later than September 30th and probably by September 20th. If there are any new names to be proposed send them to the Secretary.

Two of our members, Chas. W. Johnson, Secretary of the Association, and Wm, J. Fox, brought back with them from their Jamaica trip last spring a large amount of valuable material, collected by them in that island. Most of it has been presented to the Academy of Natural Sciences and the Wagner Institute, Philadelphia.

Prof. Benjamin Sharp, Corresponding Secretary of the Academy of Natural Sciences, was a member of the Peary Expedition to Greenland. He returned home on the 7th inst.

George T. Marston, Green Bay, Wis., recently paid a visit to Philadelphia and inspected the U. S. Collection. He expressed himself as much pleased with its progress. He has been on vacation for the benefit of his health.

President Campbell paid a flying trip to Washington in the early part of August and was the recipient of much courtesy from Professor Dall, of the Smithsonian Institute. Prof. Dall is up to his eyes in work, and is one of the busiest of our members. A painstaking, conscientious student, he does everything well and stands among the foremost of living conchologists to-day. The Government is fortunate in having such a man at the head of its conchological work.

Vice-President Ford has been summering along the New Jersey Coast and discovered several "finds" of living Naticas, Fulgurs, Solens, etc. He got tired collecting them, the specimens were so numerous. There is no man in the United States, who can clean, prepare and mount shells as beautifully as Mr. Ford. His private collection, a labor of love for more than thirty years, is one of the finest in the country.

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DEVOTED TO THE INTERESTS
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THE NAUTILUS.

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MOLLUSKS OF SPOON RIVER, ILL.

BY DR. W. S. STRODE, BERNADOTTE, ILL.

Spoon river is a tributary of the Illinois. For a hundred miles from its junction with that stream its average width is about one hundred and fifty feet. It is a clear, swift-running stream, pursuing a sinuous course through a valley a half mile wide. Its banks are fringed by willows that here and there sweep the current in rhythmical response to every passing breeze. Overshadowing this border are silver-leafed maples, elms, and intertwining undergrowth, and beyond, towering above all like gigantic sentinels, stand the monarchs of the forest—giant sycamores.

No systematic study of the mollusks of this river has ever been made. Prof. Jno. Wolf, an aged naturalist of Canton, Ill., has made some researches, and probably knows more of the mollusks of the Illinois and Spoon Rivers than does any other living man, but he has written little of his discoveries.

Some of the Unios found, attain a size and perfection of form rarely equalled by shells of the same species found elsewhere. This perfection is due to the fact that each species finds in the variety of deep and shallow water, swift and sluggish currents, deposits of black mud, blue clay, sand, rock, and gravel, or a mixture of all these, the environment most suitable for perfect development.

Specimens of *U. multiplicatus* have been found over eight inches in length, and weighing three pounds. *Margaritana complanata* also

grows very large, one specimen found two years ago being nine inches long.

A half a mile below the milldam at Bernadotte there is a noted mussel bed where for many years the fishermen have resorted for bait for their trout lines; here in a few minutes an ample supply of big fat mussels was to be had, and a catch of the toothsome channel cat assured. If an eel was desired the red meat of a *trigonus* was thought to be almost a sure means of luring the slippery *Anguillidæ*. Here within a space of two feet square I have taken at one time such species as *Unio plicatus, ventricosus gibbosus, asperrimus, pustulosus, tuberculatus, anodontoides,* and *Marg. rugosa.* A little higher up in deeper water and muddier banks *U. multiplicatus,* and *Marg. complanata* were plentiful. A little lower down, where there was much sand, the *U. occidens* and *anodontoides* could be found by tracing the path made by them in moving about. A half mile further down stream are great ledges of rocks that in places project far out over the water. This is a favorite resort for pic-nics, fishing parties, and experts at throwing the gig or fish-spear can sometimes obtain fine buffalo or catfish that are disporting under the shadows of these immense rocks.

At this picturesque point are to be found in considerable numbers, *U. trigonus, gracilis, pustulosus, tuberculatus,* and *lævissimus.* The latter, up to date, I have not succeeded in finding in any other location on the river.

Above the dam, where the water for a distance of five miles is from eight to fourteen feet deep, the *Ano. grandis* and the little *U. parvus* are the main shells. Here also are to be found many *Sphærium solidulum,* and *Paludina integra.* The *Physa heterostropha* and *Somatogyrus subglobosus* I find below in more shallow water.

On a large moss-covered rock I found at one time last fall large numbers of *Pleurocera Lewisii,* and in a few minutes gathered an oyster-can full. Visiting the locality again a few days later not one could I find, nor could I again locate them during the season.

The pearl craze struck this village last fall and wagon loads of the larger species were carried ashore and eagerly opened with the expectation of finding pearls that would at once enrich the possessor. The mussel bed before mentioned was almost annihilated. The final summing up showed about one hundred pearls of various sizes and colors. These were sent to Geo. F. Kunz, gem expert with Tiffany & Co., N. Y., who reported them of little or no value.

I append a list of the mollusks that I have found to date.

Unio multiplicatus Lea.
plicatus LeS.
anodontoides Lea.
rectus Lam.
gracilis Barnes.
alatus Say.
pustulosus Lea.
tuberculatus Barnes.
metanevrus Raf.
trigonus Lea.
coccineus Lea.
fragosus Cond.
verrucosus Barnes.
parvus Barnes.
occidens Lea.
gibbosus Barnes.
laevissimus Lea.
asperrimus Lea.
Unio ventricosus Barnes.
luteolus Lam.
ligamentinus Lam.
lacrymosus Lea.
cornutus Barnes.
elegans Lea.
zigzag Lea.
Marg. rugosa Barnes.
complanata Barnes.
Anodonta grandis Say.
edentula Say.
plana Lea.
Paludina integra Say.
Physa heterostropha Say.
Somatogyrus subglobosus Say.
Sphærium solidulum Prime.
Pleurocera lewisii Lea.

LOCAL VARIATION.

BY REV. HENRY W. WINKLEY.

A good title for nature would be "Unity differentiated," and the words may be used not only of the whole, but of any part. Take as examples, the cell with its modifications, the class mollusca and its species, (an excellent comment on the variations as contributed by Mr. Chas. T. Simpson, to the February NAUTILUS and reminds the writer of a few which are noted below.)

A large continent is a grand field for the evolution of many varieties. Yet small areas often afford excellent examples of local variation. I mention a few as seen in this State.

Examples of *Fusus Islandicus* Gmel., from Eastport, Old Orchard or the Sheepscote now are before me. Specimens with about the same number of whorls vary greatly in size, being 3, 3½, and 1½ inches respectively. The color variations are also marked.

At Eastport numerous specimens of *Chiton marmoreus* Fabr. are found. In the midst of two hundred individuals distinctly marked with shades of red, one specimen was found whose color was a clear blue, a striking contrast in a species where there is much similarity.

Buccinum undatum Linn. is famous for its color variations. Its form is strikingly modified. Two specimens before me have the following characters. Length 2½, divergence 75°, and length 4 inches, divergence 50°. They are from near Eastport and Old Orchard respectively. The deep water specimens near Old Orchard are apt to be elongated. At the northern end of Grand Manan, (near Eastport) a variety occurs which has no waves, and is thus deprived of the very characteristic which gives the name *undatum* to the species.

Purpura lapillus Lamarck, is also famous for its variation in color; black, white and orange may be found, with multitudes of mixtures. The variation in thickness is conspicuous. As a rule this may be explained by its surroundings. Individuals on the open coast, exposed to the surf, are thick shelled, and in sheltered bays a thin shell suffices. I was much puzzled last summer to find them extremely thick at a point ten miles from the sea on the Sheepscote river. The situation being most sheltered I could not account for this extra strength. There is a possible explanation in the climate. The temperature at the sea shore is very much warmer than ten miles inland. Perhaps there is a protection against the cold in this case, where the surf is certainly not responsible.

The fauna of the Sheepscote river has an unusual combination. As mentioned in a previous article, oysters are found living at a point some fifteen miles inland. There are representations of a more southern fauna a few miles nearer the sea, *Pecten tenuicostatus* Mighels & Adams is very abundant. To return to the example mentioned, *i. e. Purpura lapillus* and its dwelling place, we may observe another variation. The removal of a long pile from the bridge gave me a chance to examine the mollusca attached to it. *Mytilus edulis*, Linn. was conspicuous, also *Saxicava* and others. Those living in the deep water were delicate in color and texture, resembling forms found in warm water. Directly over these, between tide marks, occur specimens, as above noted, of extremely thick shells. These are but chance examples to illustrate a variation which is as great as that seen in the human race. Could we perfect our knowledge of the lower forms we could name them as

individuals as we do men, and feel that each had some marks even though slight, to distinguish him from his companions.

LIST OF SPECIES COLLECTED ON THE ISLANDS ST. THOMAS, ST. KITTS, BARBADOS, JAMAICA, AND AT PENSACOLA, FLORIDA; WITH PREFATORY NOTES.

BY WILLIAM H. RUSH, M. D., U. S. N.

The first four months of 1891 were spent by the Pennsylvania School Ship *Saratoga* in cruising in the West Indies, the stops being at Bridgetown, Barbados; at Basseterre, St. Christopher's Island; at Charlotte-Amalia; at Kingston, Jamaica, and at Pensacola, Fla. At Bridgetown, St. Leonard's Church-yard and St. Agnes' Cemetery were the chief resorts. In the former were seen many specimens of *Bulimus oblongus*, Müll, all buried, to within a whorl or two of the apex, in the damp ground next to the vaults and under the roots of trees. They appear to be night prowlers as the sexton stated that he had often observed them walking at night, especially when moonlight. Their eggs were discovered around the roots of trees upon the surface of the ground, but none were found buried with the animal in the burrow in the earth.

In the latter cemetery were taken specimens of *Helix*, *Streptaxis*, *Stenogyra* and *Bulimulus*.

A narrow-gauge railroad crosses the island from Bridgetown to the eastern coast and advantage was taken of it to make a trip to Bathsheba Beach.

At all the other islands carriage hire was too expensive and the time at my disposal too short for any extended trip, so footing it was resorted to as the only way to reach reasonably near hunting grounds. In this manner the deep gorges up in the mountains of St. Kitts, at an elevation of one or two thousand feet, were visited, and the delightful view from that elevation, the cool continuous trade wind, and the beautiful forms of vegetation almost caused the object of the journey to be forgotten. However, many specimens of *Bulimulus*, *Helicina*, *Helix* and *Amphibulima* were taken.

On Jamaica, Long Mt. and Rockfort, both near Kingston, were visited at the suggestion of Mr. Henry Vendryes. At Mona House,

Long Mt., thousands of dead specimens of the genera *Helix, Cylindrella, Cyclotus, Choanopoma*, etc. were observed, but only a few living *Lucidella aureola* Fér., were found. At Rockfort *Orthalicus undatus* Beck were seen æstivating and a supply obtained, each *epiphragm* being carefully preserved.

At Pensacola two cemeteries were visited. In the older one *Helix* (*Dædalochila*) *pustula* Fér., were tolerably abundant, and a few *Hyalinia*. In the newer one *Helix* (*Mesodon*) *jejuna* Say, var. *Mobiliana* Lea, were seen in great numbers. As the soil is very sandy and as it had rained the night before, each shell was covered with a small heap of sand. They were found on the head and foot stones and on posts. They had crawled up from one to two feet from the ground.

The following are the lists for the regions visited:

West Indian Islands.

Where no locality is mentioned it is to be understood that the specimens were found equally abundant at Barbados, St. Kitts and St. Thomas. No marine forms were collected at Kingston, Jamaica.

1. Hyalæa limbata D'Orb. Surface N. Atlantic Ocean.
2. Hyalæa gibbosa Rang. Surface N. Atlantic Ocean.
3. Cleodora pyramidata D'Orb. Surface N. Atlantic Ocean.
4. Styliola subula Quoy and Gaimard. Surface N. Atlantic Ocean.
5. Styliola, (Hyalocylix) striata Rang. Surface N. Atlantic Ocean.
6. Cuvieria columella Rang. Surface N. Atlantic Ocean.
7. Murex (Chicoreus) brevifrons Lam. St. Thomas.
8. Murex (Chicoreus) pomum Gmel. St. Thomas.
9. Purpura patula Linn.
10. Purpura hæmastoma Linn.
11. Purpura undato Lam.
12. Purpura deltoidea Lam.
13. Ricinula (Sistrum) nodulosa Ad. St. Thomas.
14. Triton nobilis Conrad. Purchased at St. Thomas.
15. Triton (Simpulum) pilearis Linn. St. Thomas.
16. Fasciolaria tulipa Linn.
17. Fasciolaria distans Lam.
18. Leucozonia cingulifera Lam. Bathsheba.
19. Cantharus Coromandelianus Lam. Bathsheba.

20. Phos Guadeloupensis Petit. St. Thomas.
21. Nassa, vibex Say. St. Thomas.
22. Mitra Barbadensis Gmelin. St. Thomas.
23. Olivella sp. St. Thomas.
24. Columbella mercatoria Linn. St. Thomas.
25. Columbella (Nitidella) lævigtata Linn.
26. Columbella (Nitidella) cribaria Lam. St. Kitts.
27. Columbella sp. Barbabos.
28. Conus mus Hwass. Barbados.
29. Pleurotoma (Drillia) fuscescens Gray. Barbados. Semi-fossil.
30. Strombus pugilus Linn. Purchased at St. Thomas.
31. Strombus gallus Linn. Purchased at Barbados.
32. Cassis flammea Linn. Purchased at Barbados.
33. Cypræcassis testiculus Linn. Barbados.
34. Vermetus varians D'Orb. St. Thomas.
35. Eulima Jamaicensis C. B. Ad. St. Thomas.
36. Littorina nodulosus Gmel.
37. Littorina muricatus Linn.
38. Littorina ziczac Chem.
39. Littorina meleagus Beck. St. Thomas.
40. Littorina sp. Barbados.
41. Modulus lenticularis Chem. St. Thomas.
42. Planaxis lineatus Da Costa.
43. Planaxis nucleus Lam.
44. Litiopa bombyx Rang. On gulf-weed, N. Atlantic Ocean.
45. Cerithium (Lampanella) minimus Gmel.
46. Cerithium (Lampanella) minimus vas se temstriatum Say.
47. Cerithium (Lampanella) atratum Born. St. Thomas.
48. Rissoina (Schwartziella) Chesnelii Mich. St. Thomas.
49. Rissoina sp. St. Thomas.
50. Choanopoma interruptum Lam. Two dead and badly weather-worn specimens, Long Mt.
51. Tudora fecunda Ad. All dead, from Long Mt.
52. Cyclotus Jamaicensis Ch. All dead, from Long Mt.
53. Helicina sp. St. Kitts.
54. Helicina Antillarum Sby. St. Kitts.
55. Helicina induta Shuttl. St. Thomas.
56. Helicina convexa Pfr. Bridgetown.
57. Lucidella aureola Fér. Long Mt.
58. Nerita fulgurans Gmel.

59. Nerita tessellata Gmel.
60. Nerita peloronta Linn.
61. Nerita versicolor Gmel.
62. Neritina virginea Linn. St. Thomas.
63. Phasianella (Tricolia) umbilicata D'Orb. St. Thomas.
64. Astralium (Lithpoma) tuber Linn.
65. Astralium brevispina Lam. St. Thomas.
66. Livona pica Linn.
67. Chlorostoma maculostriatum C. B. Ad. St. Thomas.
68. Chlorostoma scalare Anton. St. Kitts.
69. Chlorostoma fasciatum Born. St. Kitts.
70. Chlorostoma excavatum Lam.
71. Chlorostoma sp. St. Kitts.
72. Fissurella (Cremides) nimbosa Linn.
73. Fissurella (Cremides) nodosa Bom.
74. Fissurella (Cremides) barbadensis Gmel.
75. Glyphis listeri d'Orb. St. Thomas.
76. Glyphis alternata Say.
77. Subemarginula octoradiata Gmel. St. Thomas.
78. Acmæa cubensis Rve. Barbados.
79. Acmæa candeana d'orb. St. Kitts.
80. Acmæa punctulata Lam. St. Thomas.
81. Lepidopleurus pectinatus Say. Barbados.
82. Lepidopleurus productus Rve. St. Thomas.
83. Lophyrus marmoratus Chem.
84. Lophyrus squamosus Linn. and vars.
85. Lophyrus fasciatus Wood.
86. Lophyrus assimilis Rve.
87. Lophyrus ? viridis Spengl. St. Thomas.
88. Acanthopleura piceus Gmel.
89. Atlanta peronii Les. Surface N. A. Ocean.
90. Oxygyrus keraudrenii Rang. Surface N. A. Ocean.
91. Bulla striata Brug. St. Thomas.
92. Aplysia sp. St. Thomas.
93. Aplysia sp. St. Thomas.
94. Streptaxis deformis Fér. Bridgetown.
95. Hyalinia incisa Pfr. St. Kitts.
96. Hyalinia indentatus Say. Pensacola, Fla.
97. Helix (Microphysa) vertex Pfr. St. Thomas.
98. Helix (Microphysa) subaquila Shuttl. Barbados.

99. Helix (Microphysa) sincera ad. Long Mt.
100. Helix (Microphysa) perdepressa ad. Long Mt.
101. Helix (Sagda) jayana rd. Long Mt.
102. Helix (Dædalochila) pustula Fer. Pensacola, Fla.
103. Helix (Mesodon) jejuna Say var. Mobiliana Lea. Pensacola.
104. Helix (Dorcasia) similaris Fer. Bridgetown.
105. Helix (Lucerna) sinuata Müll. Long Mt. dead spec.
106. Helix (Lucerna) acuta Lam. var. lamarckii Fer. Long Mt.
107. Bulimus oblongus Müll. Barbados.
108. Bulimulus multifasciatus Lam. St. Kitts.
109. Bulimulus exiles Gmel.
110. Amphibulima patula Brug. St. Kitts.
111. Orthalicus undatus Brug. Rockfort, Jam.
112. Orthalicus zebra Müll. Bridgetown.
113. Stenogyra beckiana Pfr. Bridgetown.
114. Stenogyra octona Ad.
115. Stenogyra subula Pfr. Long Mt.
116. Stenogyra octonoides Ad. Bridgetown.
117. Stenogyra lævinsculus Ad. Jamaica.
118. Cylindrella brevis Pfr. Long Mt.
119. Cylindrella minuda Ad. Long Mt.
120. Succinea augustior Ad. Rockfort.
121. Succinea barbadensis Pfr. Bridgetown.
122. Succinea approximans Shuttl. St. Thomas.
123. Succinea sp. St. Kitts.
124. Melampus pusillus? Gmel. St. Kitts.
125. Pedipes mirabilis Muhl. Bathsheba and St. Kitts.
126. Physa jamaicensis Ad. St. Thomas.
127. Macoma constricta Burg. St. Kitts.
128. Sanguinolaria sanguinolenta Gmel. St. Kitts.
129. Donax denticulatus Linn. St. Kitts.
130. Venus cancellata Chem. St. Thomas.
131. Venus granulata Gmel. St. Thomas.
132. Chama lazarus Linn. St. Thomas.
133. Lucina trigerina L.
134. Arca gradata Brod.
135. Arca noæ D'Orb. St. Thomas.
136. Arca fusca Brug. Yg. of St. Thomas.
137. Arca barbata Linn. Yg. of St. Kitts.
138. Mytilus exustus Linn.

139. Perna alatus Gmel.
140. Lima scabra Born. St. Kitts.
141. Semele decussata Gray. St. Thomas.
142. Semele orbiculata Say. St. Thomas.

SYNOPSIS OF THE PRINCIPAL VARIETIES OF AGRIOLIMAX AGRESTIS (L.)

BY T. D. A. COCKERELL.

As this species is now quite extensively naturalized in America, and varies considerable, it is of interest to ascertain what varieties exist on this continent, and whether they are identical with those of Europe. The following table has been prepared as a guide to the identification of the more usual forms. In some cases varietal names have been interpreted rather more widely than used by their original authors, but a certain amount of modification must be allowed under varietal groupings, just as examples of a species must be admitted to diverge from the original type.

A. *Without Spots.*

(1) Ashy or pale ochreous - - - - - **typicus* Less & Poll.
(2) Reddish-ochre - - - - - - *rufescens* Less & Poll.
(3) Reddish-ochre above, white beneath - - **succineus* Westerlund.
(4) Yellowish-amber, tentacles bluish-brown - - *xanthosoma* Fischer.
(5) Purplish or lilac-brown - - - - - - *lilacinus* Moq.
(6) Grey, rather dark - - - - - - - - *griseus* Ckll.
(7) Greyish-white, mantle darker - - - - - *cineraceus* Moq.
(8) Whitish or nearly white - - - - - - **albidus* Picard.
(9) Albino - - - - - - - - - - - *albus* Ckll.
(10) Very dark brown - - - - - - - - - *tristis* Moq.
(11) Black - - - - - - - - - - *niger* Butterell.

B. *Spotted or blotched.*

(12) With numerous black or blackish points - - - *punctatus* Picard.
(13) With grey or blackish mottling - **sylvaticus* Moq. (non Drap.)
(14) Often reddish; spots blackish, inclining to reticulation on body **reticulatus* Moq.
(15) Grey, with black spots or mottling, tentacles fuscous **varians* Westerlund.
(16) Grey, with black markings tending to coalesce, tentacles dark *nigricans* Westerlund.
(17) Reddish-ochre, with obscure brownish mottling or brown spots. **obscurus* Moq.

The varieties marked with an asterisk have been found in America. I have seen no American varieties that differ at all from those of Europe. Vars. *sylvaticus*, *varians* and *succineus* were sent to me by Mr. H. F. Wickham, who collected them at Portland, Oregon. This is, I believe, the first record of the species from the Pacific coast, but Mr. W. G. Binney informs me that he has *L. agrestis* from San Francisco.

NOTES AND EXCHANGES.

WESTERN RANGE OF BYTHINIA TENTACULATA.—This introduced European species is rapidly spreading in America, having already invaded a large part of Canada and New York. It has recently been found by Wm. H. DeCamp, M. D., in Black Lake, Ottawa Co., Michigan. Dr. DeCamp has deposited specimens in the collection of the American Association of Conchologists.

HELIX ASPERSA IN CALIFORNIA.—Apropos of the remarks in the August Nautilus on Prof. R. E. Stearns' "List," recording this snail from Puebla, Mexico, reminds me that I have some fine specimens of *Helix* (*Pomatia*) *aspersa*, collected in a garden in the city of San Jose, Santa Clara County, California, some twelve years ago; they were doubtless introduced by some of the European residents of that place. Lorenzo G. Yates, Santa Barbara, Cal., Sept. 1891.

EXCHANGE.—What am I offered in exchange for a collection of California Land, Fresh-water and Marine shells containing 65 species and numbering 130 specimens? Have plenty of duplicate sets of the above collection. Address, Williard M. Wood, C. C., 2817 Clay Street, San Francisco, Cal.

DR. GEORGE HEWSTON

DIED SEPT. 4, 1891.

Dr. George Hewston, well-known to most American conchologists for his great interest in shells, died Sept. 4, at his residence, 1132 Sutter street, San Francisco, California, from Bright's disease of the kidneys. He was born at Philadelphia on Sept. 11, 1826,

graduated from the University of Pennsylvania, and for a short period was demonstrator of anatomy in the Philadelphia College of Medicine. Dr. Hewston removed to San Francisco in 1860 and has practiced medicine there ever since. In addition he served one term as a member of the Board of Supervisors and at the time of his death was second Vice-President of the Academy of Sciences and Past Grand Master of Apollo Lodge, Independent Order of Odd Fellows. Dr. Hewston was for many years an enthusiastic collector and student of shells. Several species discovered by him bear his name. Dr. Hewston leaves a widow, two sons and daughter, as well as a large circle of friends and correspondents to mourn his loss.

NEW PUBLICATIONS.

Bibliography of the Geology of Missouri. By F. A. Sampson. Published by the Geological Survey of Missouri. Mr. Sampson has given to the compilation of this bibliography the labor of several years. The result, an 8vo. of 178 pages, leaves little to be desired, and will be found indispensable to the student of the geology or paleontology of Missouri. Under each title, a brief résumé of the contents, or list of species described in each publication, is given. The amount of investigation and labor required for the production of such a volume can be appreciated only by those who have attempted similar projects. Mr. Sampson is to be congratulated upon the completion of his work—*H. A. P.*

List of Shells Collected on the West Coast of South America, etc. (From Proc. U. S. Nat. Mus. xiv, pp. 307–335). By Robt. E. C. Stearns, Adjunct Curator, Dept. of Moll., U. S. Nat. Mus. A valuable contribution to our knowledge of the distribution of West American mollusks, with critical notes in Dr. Stearns inimitable style. A new species, *Tectarius atyphus*, from Manta, Equador, is named but not described.—*H. A. P.*

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A MONTHLY
DEVOTED TO THE INTERESTS
OF CONCHOLOGISTS.

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THE NAUTILUS.

VOL. V. NOVEMBER, 1891. No. 7

A BYSSUS IN UNIO.

BY DR. V. STERKI, NEW PHILADELPHIA, OHIO.

In the early morning of Oct. 2nd, while collecting "mussels" in the Tuscarawas river, I found a young specimen of *Unio ligamentinus* Lam., 27 mill. long, with a thread-like byssus 8 inches long, at the distal end attached to a small stone of about 8 mill. diameter. The whole thing was wound up, wrapped in a paper and put in the pocket. Several hours later, when I had time to look at it, the thread was dry, brittle, and broke, becoming detached from the stone. Thus the object was put in water with some glycerine and carbolic acid, for microscopic examination, for which I found leisure two days later.

The thread was now rather dark-brown in coloration, while, when fresh, it had shown different shades from horn color to light-brown; as far as seen in the shell—4·5 mill.—it still was colorless. Irregularly cylindric or somewhat flattened, it had a diameter varying from 0·18–0·26 mill. The distal end, where it had been attached to the stone, was flattened and split into several irregular flat filaments, while the proximal end, which now slipped out of the shell as soon as I laid hold on it with the pincers, was thickened to a short bulb of 0·42 mill. in diameter.

The inner or main part of this byssus is composed of hundreds of finest fibres, of different diameters from about 0·0015–0·007; but many of them still show more or less distinct longitudinal striation. Even at the proximal or bulb end I could not see any other formation. Outside of this cord of fibres there is a cortical layer of a

different structure; it shows a somewhat irregular, more or less oblique and waving, but in general transverse, i. e. circular striation. These undulations are almost everywhere of two different kinds; larger, averaging in width from 0·01 to 0·022 mill., and smaller, between them, about 0·004, also only 0·007 mill. In many places the two systems are not distinct, and in others the undulations are mingled with similar figures of quite irregular form and distribution. On the youngest part, that is the inner end near the bulb, there is nothing of this transverse striation, but in its place a rather thick layer of spindle cells of about 0·006 mill. diameter, more or less transversely arranged, which become the longer and narrower as they are farther from the bulb, and it is evident that the circular striation is derived from these cells. Some acetic acid added brought to appearance the endoplasts (nuclei) in some of the cells, but not very distinctly; probably the object was not fresh enough.

It is to be expected that more such specimens will be found, also of other species of *Unionidæ*; for *U. ligamentinus* is hardly the only one to have a byssus long after the embryonic stage. And some points, in which my examination was not sufficient, may then be better ascertained.

CRITICAL NOTES ON EASTERN TEXAS UNIONIDÆ.

BY H. A. PILSBRY.

A collection of *Uniones* lately obtained by the writer from Mr. W. L. McDaniel of Tyler, Texas, has given new localities for a number of species, as well as occasion for notes on their synonyms and relationships.

The species of the southern Mississippi River, described originally from Louisiana, Mississippi and Arkansas, will mostly be found in eastern Texas, and constitute nearly the entire naiad fauna of that region. There are besides these, a few forms common to the whole Mississippi drainage, and found also in the Alabama basin, and a few peculiar to Texas and Mexico, the latter becoming more and more numerous as we travel southward.

Most of the characteristically Texan species belong to Mississippi River types, a circumstance which first struck me when working up

the *Uniones* collected by myself in Texas, during two visits some years ago.

In the matter of synonyms I have mentioned only such indisputable facts as have forced themselves to my notice while identifying the specimens in hand. Far more extensive name duplication exists in many cases.

It has been obvious to me for years that Lea's system of sections founded on contour, for the classification of *Unionidæ*, is hopelessly and radically wrong. It builds up false groups in about nine cases out of ten. Lea doubtless knew this as well as we, intending his system merely to be a convenient working guide. In this case, as in most others, the natural system will supercede the artificial, as it will, when well worked up, be found vastly more convenient.

One of the main characters of the new system will be *the sculpture of the beaks*, which is greatly varied in the different types, and remarkably constant specifically. The importance of collecting *young* with old specimens cannot be too strongly impressed upon the field naturalist. The character of being winged over the hinge-ligament is of minor importance. Lea's *alate* group including a number of very diverse types.

Among the more prominent groups represented in the collection here commented on, are the *group of U. plicatus;* the *group of U. parvus* (including *parvus, Bealei, Texasensis, Sayi, camptodon,* etc., etc.); the *group of U. pustulosus,* (including *Houstonensis,* and *nodiferus* below, and a number of northern species); the *group of U. alatus* (including *purpuratus, alatus, lævissimus,* etc., etc.)

The species are as follows:

U. plicatus Les. Leon Cr., Lee Co., Texas. Common and typical at least as far south as the Colorado River at Austin.

U. trapezoides Lea. Sabine River, Shelby Co., and Neches River near Tyler, Texas. Say's name *interruptus* has priority, despite Lea's assertion to the contrary, but it had better be dropped on account of the earlier *interruptus* of Rafinesque, Conrad, *et al.*

U. perplicatus Conrad. Big Eddy in Neches River near Tyler, Texas. Apparently distinct from the numerous plicate *Uniones* of Texas, many of which are mere varieties.

U. Chunii Lea. Big Eddy in Neches River near Tyler, Texas. Belongs to the *trigonus* group, but is far less angular. It is very variable.

U. castaneus Lea. Neches River near Tyler, Texas. A compact little shell, described originally from Alabama. Specimens from "Ouichita, Kansas" are also before me. Mr. Simpson called my attention to the identity of these specimens with the Alabama species.

U. Houstonensis Lea. West Yegua Creek, Lee Co., Texas. A smooth species of the *U. pustulosus* group. It is somewhat allied to *U. petrinus* Gld., an unfigured species of which *U. Bollii* Call is a synonym.

U. nodiferus Conrad. Big Eddy in Neches River near Tyler, Texas. Lea unites this with his *Schoolcraftii*, but it is apparently as distinct as most of the *pustulosus* group.

U. asper Lea. Kickapoo Creek, Henderson Co., and Neches River at Tyler, Texas. This Janus looks on one side toward *apiculatus* Say, and on the other in the direction of *lachrymosus* Lea and *fragosus* Con. Some queer episodes will sometime be revealed in the family history of the "*apiculatidæ*." The mingling of blood has been something scandalous.

U. tuberculatus Barnes. Neches River near Tyler, Texas. Some specimens have the tubercles arranged very distinctly in V-shaped rows, as in *Unio apiculatus* Say. In fact, *tuberculatus* belongs to this same group, despite its different contour. This shell is found throughout the Mississippi (including Ohio and Missouri) drainages, as well as in the Alabama River. Some southern specimens have the nacre pink, a character I have never observed in Northern shells.

U. Berlandierii Lea. Colorado River near Austin. This is very closely allied to *U. Tampicoensis* and *U. Tecomatensis* of Lea. Belongs to the group of *U. crassidens* Lam.

U. purpuratus Lam. Big Eddy in Neches River near Tyler, Texas. Stands between *alatus* and *coloradoensis*. Lea gives the correct synonymy.

U. Hydianus Lea. Kickapoo Creek, Henderson Co.; Neches River near Tyler, and Texarkana, Texas. An apparently distinct species of the *luteolus* type. Varies in color from black to yellow or red rayed with green. The males and females are notably dissimilar in form, as in *U. luteolus*, etc. Compare *U. approximus* Lea.

U. Bealei Lea. Near Forney, Texas. Closely allied to *U. Texasensis* Lea, but the teeth are much more compressed.

U. Texasensis Lea. Wimberly Lake, Lee Co., Texas. Allied to *U. parvus, U. Bealei*, etc. Lea's *U. Bairdianus* is a synonym.

U. Sayi Tappan. Texarkana, Texas. Allied to *camptodon*, but easily separable from the types of that species. *U. subcroceus* Con. seems to be the same.

U. camptodon Say. Water works reservoir, Tyler, Texas. I do not propose to go into the tremendous and involved synonymy of this member of the *U. parvus* group. Typically the *camptodon* is distinguished by the form of the hinge-line, which is decidedly curved under the beaks. Forms very similar are found from the Ohio River to East Texas and to Florida.

U. declivis Say. Sabine River, Shelby Co., Texas. More angular posteriorly than *U. symmetricus*. *U. geometricus* of Lea is a synonym, as Lea himself ascertained.

U. symmetricus Lea. A species allied to *declivis* Say, but less angular. It has much the general appearance of the common eastern *U. complanatus*. The synonymy of *symmetricus* includes *U. porrectus* Conrad, *U. manubius* Gould, and (according to Mr. Simpson) *U. Jamesianus* Lea. Mr. Simpson kindly compared specimens with the types of *symmetricus*, confirming my identification. The localities are Blackfork Creek, near Tyler, Texarkana, and West Yegua Creek, Lee Co., Texas.

U. subrostratus Say var. *Rutersvillensis* Lea. Texarkana; Wimberly Lake, Lee Co., Texas. The extensive synonymy of this species has been worked out by Prof. R. E. Call, (Bull. Washb. Lab.)

U. anodontoides Lea. Blackfork Creek near Tyler; West Yegua Creek, Lee Co., Texas. Exhibits no variation from the common Mississippi and Ohio River types.

Anodonta Stewartiana Lea. Neches River near Tyler. Belongs to the *A. corpulenta* group. *A. virens* Lea is probably a synonym, and *H. Linnæana* Lea is closely allied.

ON THE DISTINGUISHING CHARACTERS OF UNIO RADIATUS AND UNIO LUTEOLUS.

BY GEO. W. DEAN, KENT, OHIO.

In the September NAUTILUS, Rev. W. M. Beauchamp has the following queries: "Can any one point out an invariable feature

distinguishing *Unio radiatus* and *luteolus?* The distinctions do very well for some, but to others they seem a good deal mixed. Has not every collector some which he has not named?"

After long familiarity with *luteolus* in many streams and reservoirs and having several suites of *radiatus* from different localities, and seeing it plentiful in the Susquehanna River at Muney, Pa., the thought has not come to me that they were even closely related; nor do I think they are. Sometimes there is an *indescribable* something plainly discernible to the eye of an expert that separates species, but there is no such difficult or intangible distinction in this case and I think I can make the distinctions plain to Mr. Beauchamp.

I can emphatically say that I have nothing at all like either species that is not easily named.

As a first distinction I give the *form of the female of luteolus* which at maturity becomes very broad and inflated at the posterior end and truncated, while forward it remains narrow and very small, comparatively. This characteristic I have not seen in *radiatus* and do not think it exists. The difference between the male and female is so great in *luteolus* that Anthony thought them distinct and gave to the male the name of *U. distans.*

Another and very marked difference is in the epidermis. In *luteolus* it is, in its perfect state, polished and hard as glass, giving to the radiating stripes a distinctness rarely seen in the genus. While the lines of growth in *radiatus* are very much larger, giving the surface to the naked eye more the appearance of velvet or fine plush also giving to the radiating stripes a corresponding dimness. Of course these distinctions in the epidermis come out only in cleaned shells or young specimens naturally clean; they would not be noticed in mature shells as taken from the water. But even in this state I should readily distinguish either species as it came to the light. If there is such a thing as an intermediate specimen, I should like to see it and would agree to put it in the right place at sight.

As a third distinction, the range of color in the nacre of *radiatus* is very great, whilst in *luteolus,* as far as I have seen, it is uniformly light-blue. I have heard of *luteolus* with pink nacre but have never seen one. I do not know either whether these two species are ever found together.

A NEW JAPANESE LIMPET.

BY H. A. PILSBRY.

In the pages of the NAUTILUS some months ago, the writer described a new species of *Patella* collected in Japan by Mr. Frederick Stearns of Detroit, Mich. It was with great surprise that still another large and apparently undescribed species was received, in a recent sending from the same source.

The new species, which it is proposed to call PATELLA BONINENSIS, was seen and purchased by Mr. Stearns at the Third National Exhibition at Tokyo, in 1890. It belongs to the subgenus *Helcioniscus*, as far as shell-characters enable one to judge.

The shell is large (90–100 mm. in length, 40 in alt.), solid, erectly conical, of a somewhat soiled buff color. It is sculptured with from 48–53 riblets, which vary from crenulated to markedly tubercular. The interior has a snow-white muscle-scar, surrounded by a broad brown zone, outside of which there is a silvery zone of equal width, the extreme edge being narrowly bordered with brownish or yellow. The central callus is creamy with a dark border of umber-brown. From each of the lateral angles of the "head-piece" of the central spatula, diverges a brown streak.

The nearest ally of this species is apparently the *Patella nigrisquamata* of Reeve's Conchologia Iconica, vol. 8, pl. 2, figs. 3a, 3b, a species reported by Reeve from Australia, but of which I have specimens from the Province of Concepcion, Chili. Reeve's species differs in having the central spatula of the interior constantly much smaller, having no diverging streaks, etc.

The Japanese know this species as *Yome-gaisara* or "Bride-cup shell."

The species of *Patella* now known from Japan may be tabulated as follows:

Shell more or less silvery or iridescent inside (*Helcioniscus.*)

Conical, having about 50 strong, close, elevated riblets, alternating or subequal in size.

Large, light buff; border of the inside narrow, yellowish, *P. Boninensis* Pils.

Variegated with brown; border of the inside conspicuously black-blotched, *P. Stearnsii* Pils.

Conical, having several smaller riblets in each interval between the larger ribs, *P. pallida* Gld.

Ribs fine or obsolete.

Solid, with radiating dark lines; spatula brown or orange; ribs obsolete, *P. nigrolineata* Rve.

Thin, with very finely beaded riblets or striæ, *P. amussitata* Rve.
Thin, with very fine striæ, not beaded, *P. toreuma* Rve.
Shell porcellanous inside, opaque, not iridescent (*Scutellastra.*)
Depressed, having strong irregular ribs, *P. stellæformis* Rve.

[COMMUNICATED.]

DONATIONS TO UNITED STATES COLLECTION.

Owing to illness in Mr. Campbell's family, he was unable for several months, to pay much attention to the United States Collection, but since September 10th, work has been fully resumed and the collection is making its usual rapid strides. It would be impossible in the limited spaced granted to us in the NAUTILUS to acknowledge all the shells sent since the date of the last acknowledgment, but the following will give an idea of them.

I. Greegor, Jacksonville, Fla.—

Ranella Californica, Hinds; Oliva litterata, Lam. and Nassa vibex, Say.

F. E. Blanes, Key West, Fla.—

An interesting lot of Key West Shells including Marginella guttata, Dillw., and pellucida, Pfr.; Cypræa cinerea, Gmel.; Olivella nivea, Gmel. and floralia, Duclos; Natica lactea, Guild, and canrena, Linn.; Ianthina communis, Lam.; Nerita tessellata, Gmel. and versicolor, Linn; Glyphis listeri, D'Orb.; Astralium longispinum, Lam.; Murex Salleanus, Adams; Conus verrucosus, Hwass; Strophia incana, Binney; Helix cereolus, Mühl. and numerous others.

Prof. Josiah Keep, Mills College, Cal.—

Punctum conspectum, Bld. and Pedicularia Californica, Newc.

H. A. Pilsbry, Philadelphia, Pa.—

Helix Kœmeri, Pfr.; Corbula undifera, Meek, cretaceous of Wyoming.

J. J. White, Palm Beach, Fla.—

A number of marine species from Lake Worth, Fla. including Arca Noæ, Linn.; Columbella mercatoria, Linn.; Cassis sulcosa, Born; Ovulum gibbosum, Linn.; Astralium tuber, Linn.; Iphigenia Brasiliana, Lam. and Echinella nodulosa, Pfr.

W. S. Teator, Upper Red Hook, N. Y.—

More than 30 species of land and fresh-water shells, including Helix pulchella, monodon, labyrinthica, palliata and hirsuta; Succinea obliqua, avara, ovalis aurea; Limnæa humilis, columella, palustris and catascopium; Zonites fuliginosus and nitidus; Planorbis bicarinatus and campanulatus. The Succinea obliqua Say are magnificent specimens, the largest we have ever seen, and beautifully cleaned.

Chas. LeRoy Wheeler, Cape May, N. J.—

Purpura hæmastoma, Linn., dredged at Cape May, not known there hitherto and the largest specimens we have seen; Venus mercenaria, Linn.; Modiola modiolus, Linn.

John H. Campbell, Philadelphia, Pa.—

Pholas Pacifica, Stearns; Unio ligamentinus, Lam.; Tellina Gouldii, Cpr.

Dr. Wm. H. Rush, U. S. N., Philadelphia, Pa.—

Atlanta Peronii, Les.; Xylotrya fimbriata, Jeff.; Oxygyrus Keraudrenii, Rang; Litiopa bombya, Kien.; and a fine series of Pteropoda, including Hyalæa limbata, tridentata, longirostris, gibbosa and labiosa; Cleodora pyramidata, Lessonii and spinifera; Cuvieria columella, Rang and Diacria trispinosa, Les.

John Ford, Philadelphia, Pa.—

Fasciolaria gigantea, Kiener, (a real giant); Oliva idonea, Conr. (Miocene); Oliva araneosa, Lam.; Strombus costatus, Gmel.; Terebratella Sayii, Morton (cretaceous, N. J.)

Geo. T. Marston, Green Bay, Wis.—

A suite of the finest and largest Limnæa megasoma Say we have ever seen, (Oconto, Wis.)

Dr. J. J. Brown, Sheboygan, Wis.—

Unio Canadensis, Lake Ellen, Wis.

Joseph Willcox, Philadelphia, Pa.—

A fine lot of recent and fossil shells from Florida and Md., including the Fulgur described by Prof. Heilprin as rapum, Heilpr.; Fulgur contrarium, Conrad (Pliocene); Arca plicatura, Conrad (Pliocene); Arca idonea, Conrad (Miocene); Fasciolaria scalarina, Conrad (Pliocene); Mitra lineolata, Heilpr. (Pliocene); Panopæa Americana, Conrad (Miocene); Panopæa Floridana, Heilpr. (Pliocene); Acanthopleura picea, Gmel.; Melampus coffeus, Linn.; Helix varians, Mke.; Cardita Floridana, Conr.; Perna ephippium, Lam.; Conus proteus, Hwass; Avicula alaperdicis, Reeve.

Dr. Wm. H. De Camp, Grand Rapids, Mich.—

Goniobasis livescens, Mke. (a fine series showing varieties); Goniobasis depygis, gracilior and brevispira; Planorbis bicarinatus, Say; Anodonta subgibbosa, Anth.; Physa integra, Hald.

Henry A. Ward, Rochester, N. Y.—

Spondylus princeps (fine large, white specimen.)

John Shallcross, Philadelphia, Pa.—

Spondylus princeps (fine large, red specimen.)

Mrs. M. Burton Williamson, University, Cal.—

Melampus olivaceus, Cpr.; Chlorostoma ligulatum, Mke.; Helix Traskii, Newc.; Scalaria Hindsii, Cpr.; Bittium armillatum, Cpr. (Post-pliocene);

Margarita lirulata, Cpr. (Post-Pliocene); Mytilus ungulatus, Linn.; Macoma nasuta, Conr.; Donax flexuosus, Gould; Solen rosaceus, Cpr.; Acmæa spectrum, Nuttall; two very interesting specimens of Haliotis Cracherodii, Leach, showing pink iridescent tints inside; and others.

Chas. W. Johnson, Philadelphia, Pa.—

Triton Oregonensis, Redf.; Arca ponderosa, Say and Americana, Gray; Lithophagus appendiculata, Linn.; Ancylus filosus, Conr.; Alexia myosotis. Drap. and a magnificient specimen of Turbinella regina, Heilprin, from the Pliocene of the Caloosahatchie River, Florida.

Rev. H. W. Winkley, Saco, Maine.—

Lacuna vincta, Turton; Nucula proxima, Say; Margarita helicina, Fabr.; Melampus lineatus, Say; Margaritana margaritifera, Linn.; Limnæa desidiosa Say—all fine specimens.

Total to date 329 genera, 706 species, 855 trays. (Eight large display cases are already devoted to the collection.)

All of the above have been mounted and placed in the collection. Others have yet to be mounted and will be announced in future. Owing to the rapid growth of the collection, it would be well for members, wishing to contribute to the collection, to send lists in advance to the President of the Association and he will check off the species already received and thus avoid duplicating.

All shells should be addressed to John H. Campbell, care of Academy of Natural Sciences, 19th and Race Streets, Philadelphia, where he and his Philadelphia associate members assemble once a week, to superintend the naming, preparation and placing of them in the collection.

NOTES AND EXCHANGES.

An Exchange Column will be opened in our next number. Subscribers wishing to exchange shells may insert their notices free, the limit of length being 40 words.

Mr. C. W. Johnson, Business Manager of The Nautilus, has been collecting fossils in the Carolinas for the past several weeks.

Note on Fissurella picta Gmel. In looking over the plates of Martyn's beautiful book, *Universal Conchology*, (London, 1784), I noticed on plate 64 a splendid figure of the above-mentioned species, under the name *Patella personata*. All authors seem to have overlooked this figure heretofore, including myself, for I had not seen it when I called the species *picta* in the *Manual of Con-*

chology, xii, p. 144. There remains now nothing to do but to restore Martyn's name to this fine shell.—*H. A. Pilsbry.*

TESTACELLA IN PHILADELPHIA. Mr. Robert Walton has found during the summer, the European *Testacella maugei* Fér. in a greenhouse at Lower Roxborough, Philadelphia. From their being so numerous and the green-house an old one in which no new plants have been introduced for some years, we would infer that they have been living there for some time. The specimens brought by Mr. Walton were from very small to extra large ones.—*C. W. Johnson.*

NEW SPECIES OF SHELLS.—At the regular meeting of the Academy of Nat. Sci. of Phila., Tuesday Nov. 3, Mr. Pilsbry offered descriptions of and remarks on the following new species of West Indian land shells; *Choanopoma caymenensis*, a shell having the general form and characters of *C. newtoni* Shutt., 5 whorls remaining; sutures impressed, remotely beaded, whorls encircled by spaced, unequal spiral liræ, the longitudinal striæ very close, every 8th one on the body-whorl stronger; light-yellowish, having zigzag longitudinal chestnut streaks. Umbilicus moderate, lip formed as in *C. newtoni*, except that the columellar edge is fluted. Alt. 16, diam. 9 mm., alt. of apert. 6 mm.; measured outside peristome. Caynem Is.

Helix xanthophaës, the smallest known species of *Hemitrochus*, measuring only, alt. 6½, diam. 8 mm. It is subglobose, obtusely carinated, narrowly rimate. Whorls 4. Surface shining, striatulate. Obliquely streaked with reddish-chestnut on a pale, yellowish ground, with or without a dark peripheral zone, bordered below with light. Locality Inagua. *Helix* (*Plagioptycha*) *Maynardi*, allied to *H. Brownii* Pilsbry, but not carinated, having thread-like striæ, banded with chestnut above the periphery, and having numerous lighter brown bands above and below. Umbilicus nearly covered by the reflexed baso-columellar lip, which has a heavy callus within. Alt. 8, diam. 13⅔ mm. Bahamas.

PATULA COOPERI, SINISTRAL.—Mr. Leslie M. Cockerell, writing from Norwood, San Miguel Co., Colorado, informs us that he has found a sinistral specimen of the above. This is a rare malformation in America, but it occurs more frequently in *P. cooperi* than in most species, as several cases are on record.—*H. A. P.*

RECENT CHANGES IN NOMENCLATURE.—Mr. R. B. Newton, in the *Systematic list of British Oligocene and Eocene Mollusca*, London, 1891, has made a number of changes in generic nomenclature, the principal of which are as follows:

For *Pecturculus* Lam. 1799, is substituted *Axinæa* Poli, 1795.

For *Hindsia* Desh. 1858 (not of A. Ad., 1853) is substituted *Hindsiella* Stol.

For *Cyprina* Lam. 1818, is substituted *Arctica* Schum, 1817.

For *Terebellum* Lam. (not of Linn.) is substituted *Seraphs* Montf.

For *Triton* Montf. (not of Linn.) is substituted *Lampusia* Schum., 1817.

For *Pteronotus* Swains. 1840 (not Gray, 1838) is substituted *Triplex* Humph., 1797.

For *Leiostoma* Swains. 1840 (not Lacépède, 1802) is substituted *Sycum* Bayle.

For *Lampania* Gray, 1847, is substituted *Batillaria* Bens., 1842.

For *Pomatias* Hartm. 1821 (not Studer, 1789) is substituted *Hartmannia* Newton, 1891.

For *Proserpina* Sowb. 1839 (not Hübn., 1816) is substituted *Despæna* Newton, 1891.

For *Cylichna* Loven, 1846 (not Burm., 1844) is substituted *Bulinella* Newton, 1891.

A portion of these changes may prove unnecessary, as in the case of *Proserpina*, where Mr. Newton's new name must be suppressed in favor of one of the several subgeneric names already proposed under *Proserpina*. Some others hang upon such preoccupation as *Cyprinus* for *Cyprina*, and it is still doubtful whether these should be considered equivalent as names. A further review of the work will appear later.

In the addutor muscles of Unionidæ.—The newly formed parts, anterior, and posterior, are easily distinguished from the older parts by their coloration, being lighter, even whitish. This is found most marked in spring and early summer when new growth is going on rapidly; but also in fall I have seen it in different species.—*Dr. V. Sterki.*

In Europe, a small fish, *Rhodeus amarus*, is known to deposit her eggs, by means of a long, flexible ovipositor, through the mantle opening, in the cavity of fresh-water mussels, *Anodonta*, where they are hatched, and remain until developed sufficiently to live without protection. Is anything like this known from our continent?—By the way, we know that young *Unionidæ* attach themselves on the fins, etc. of fishes, after leaving the branchial uteri of their mothers. But observations of this kind are, probably, seldom made, and it would be of value to report on each instance observed. Malacologists living in the neighborhood of fisheries could do good work in this direction.—*Dr. V. Sterki.*

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A MONTHLY
DEVOTED TO THE INTERESTS
OF CONCHOLOGISTS.

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THE NAUTILUS.

VOL. V. DECEMBER, 1891. No. 8.

ACMÆA CANDEANA VS. ACMÆA ANTILLARUM.

BY H. A. PILSBRY.

So difficult a group are the limpets that their nomenclature has been in a condition little better than chaotic from the earliest times. Years ago the West American species were studied by CARPENTER, whose genius reduced them to comparative order. It was, however, left for DALL to point out, with penetrating insight, their generic relationships.

The species of the Gulf of Mexico have never been studied with the same facilities as those of West America. Dall, in his 'Blake' Report, enumerates the forms he had seen, with critical notes on their nomenclature; and the writer has this year given a somewhat elaborate account, founded upon the specimens in the Philadelphia Academy and the Smithsonian Institution collections.

In the case of *A. Candeana* however, the earliest publication of the species, under the name *Lottia Antillarum*, has been overlooked by all. In this case, as elsewhere, we can only find safety amid the flood of conflicting names, by taking our stand upon the solid rock of *priority*.

Sowerby's figure of *Lottia Antillarum* is an excellent and characteristic picture of this species in its finest development.

The synonymy will stand as follows:

Lottia Antillarum SOWERBY, Genera of Shells, fig. 4. (Issued before 1831.)

Lottia Antillarum SOWERBY, A Concholog. Manual, p. 59, fig. 231, 1839. (A somewhat different color-form.)

Lottia Antillarum Sowb., Reeve, Conchol. System., pl. cxxxvii, f. 4 (printed from same plate as Sowerby's *Genera*) 1842.

Patella tenera C. B. Adams, Proc. Bost. Soc. N. H. ii, p. 8 (1845).

Patella tenera Ad., Reeve, Conch. Icon. fig. 104.

Patella Candeana Orb., Moll. Cuba, ii, p. 199, atlas pl. 25, figs. 1–3.

Acmæa Candeana Orb., Dall, Catal. Mar. Moll. S. E. U. S., p. 159.

Acmæa Candeana Orb., Pilsbry, Manual of Conchology, xiii, p. 38, pl. 5, figs. 91–95, and pl. 42, figs. 92–95.

? Patella (Acmæa?) elegans Philippi, Abbild. u. Beschreib. iii, p. 34, *Patella* p. 6, pl. 2, fig. 2 (1846).

? Not *P. antillarum* Sowb., Philippi, Abbild. iii, Patella pl. 2, fig. 12.

Acmæa Antillarum is found throughout the West Indies, from the Bahamas and Southwest Florida to Tobago.

NOTES ON UNIONIDÆ.

BY CHAS. T. SIMPSON.

The November number of the Nautilus seems to be devoted mostly to Unios, and to me is an exceedingly interesting issue.

Lea's classification of the *Unionidæ* was almost wholly an artificial one, and I believe he instituted it for convenience in working, just as Linnæus founded the artificial system of classification in botany. Both these great pioneers in science recognized the natural systems, and probably used these as makeshifts. All through the latter part of his writings, Dr. Lea acknowledged the fact that the *Unionidæ* were divisible into natural groups. To some capable student of the future is reserved the task of determining these groups and assigning the species to them. The accomplishment of this will be well worth a working lifetime of careful and honest study.

Mr. Geo. W. Dean claims to be able at sight, to refer to its proper species any specimen of either *Unio luteolus* or *radiatus*. I confess that this is more than I can do, and I have handled many thousands of specimens of both, collected from the entire territory inhabited by these familiar forms. The distinguishing features

given by Mr. Dean are excellent. There is generally that intangible something which is apparent to the experienced eye by which they may be separated, a difference more particularly in the texture of the epidermis than anything else; but even this difference is not always visible to my eyes, and I have handled many specimens that were so puzzling and close that I have been obliged to ask, "Where did they come from?" before I even dared to guess what they were.

Generally *luteolus* is solider, more inflated, wider posteriorly and narrower anteriorly, as well as smoother than *radiatus*, but not always. A specimen of *radiatus* in Dr. Lea's collection from Lake Champlain, collected by Dr. Ingalls (Museum No. 85035), is very solid, and as much inflated as *U. hydianus*, is narrow before, and broad behind, and can only be distinguished from *luteolus* by the color and texture of the epidermis.

It was one of the great objects of Dr. Lea in making his collection, to get material from all the different parts of the territory through which the species were distributed, to get all the variations possible, and carefully preserve the name of the collector, and the record of the place in which they were obtained. Had he never done anything more than get together in this way this unequalled collection —requiring, as it did, the educating and training of a corps of able assistants in various parts of the world—he would have deserved the gratitude of students of conchology for all time to come.

In this collection are varieties of *radiatus* of every possible form, from a great number of localities; they vary from flattened and almost lenticular, to oval, quadrate, elongated, obovate and inflated. One of these shells from Newton Creek, N. J. (85058) which is labelled *Unio radiatus*, has a smooth yellowish epidermis, save when eroded, and I should unhesitatingly pronounce it *M. luteolus* if it had come from Ohio or Indiana.

Are *luteolus* and *radiatus* ever found together? From the following table it will be seen that although *U. luteolus* is a Mississippi drainage species, and *radiatus* belongs to the waters that flow into the Atlantic, the habitats of these species considerably overlap. This last includes only a few of the localities of specimens in the Lea collection.

Unio radiatus.	*Unio luteolus.*
Saratoga Lake, N. Y.	Niagara Falls, N. Y.
Troy, N. Y.	Mohawk R., Erie, N. Y.
Little Lakes, Lycoming Co., N. Y.	Genessee R., N. Y.

Genessee R., N. Y.
Ottawa, Can., Rideau Canal.
Montreal, Can.
St. Lawrence R., Thousand Isles.
Camden, S. C.
Oguchee R., Ga.
Savannah R.
Charles Co., Indiana!
Cohoes Falls, Hudson R.
Seneca Lake, N. Y.
Oncida Lake, N. Y.
Moose R., Hudson Bay.
Lake Winnipeg.
Athabaska Lake.
Great Slave Lake.
Small Lakes, Mackenzie R.
Red River of the North.
New Mexico.

I have collected *Unio luteolus* in Eastern Colorado, and it is in the General Collection of the National Museum from Mississippi and Texas. It probably ranges from the Artic circle to the Gulf of Mexico, and from the Rocky Mountains east to the Atlantic, except in the southeastern states lying east of the Appalachian Chain. A small form occurs in Canada and the more northern states, which is quite solid, and has a dark, rather rough, brown epidermis, often without rays, sometimes almost black, and in form and texture is is strikingly like some specimens of *U. Downiei* from Southern Ga., but has not a lurid nacre as the latter has. This was named *Unio borealis* by A. F. Gray, and differs sufficiently from the type to be considered a distinct species, but it connects insensibly through forms found in Wisconsin and Michigan with the western shells. One of these in the collection of Dr. Lea (85045) from Montreal, was referred by him to *radiatus*. Other forms of this protean species are so close to *ligamentinus* that it is almost impossible to separate them and this is true of certain specimens of *radiatus*.

ON THE USE OF THE GENERIC NAME SCUTELLINA.

BY H. A. PILSBRY.

The name *Scutellina* was proposed by Gray in 1847, to replace *Scutella* of Broderip, preoccupied by Lamarck for a genus of Echinoderms. It has apparently escaped the attention of malacologists who have written upon this small but excessively interesting group, that Agassiz, in 1841, used the name *Scutellina* for a genus of Echinoderms allied to *Scutella* Lam. This generic term is still in use, appearing in the latest publications relating to that group. It

therefore becomes necessary to substitute a new generic name for the molluscan *Scutellina*, and since the root of that word has become associated with the *Echinodermata*, a change to something totally different may be advisable. As a substitute, therefore, I offer the term PHENACOLEPAS, "a deceptive limpet."

The synonyms are as follows:

Scutella BRODERIP, P. Z. S. 1834, p. 47 (in part).

Not *Scutella* LAMARCK, An. s. Vert. iii, p. 7 (1816).

Scutellina GRAY, P. Z. S. 1847, p. 168, and of authors generally.

Not *Scutellina* AGASSIZ, Monogr. d'Échinodermes, Second Monog. des Scutelles, p. 98 (1841).

DESTRUCTION OF ANODONTA CORPULENTA CPR. AT THOMPSON'S LAKE, ILL.

BY W. S. STRODE, M. D., BERNADOTTE, ILL.

Recently while on a collecting trip to Thompson's Lake on the Illinois River, I was greatly surprised at the immense number of dead mussels that lined the shores from one end of this body of water to the other.

A windrow of them extended a little beyond the water's edge clear around the lake a distance of not less than ten miles.

Upon going on to the lake in a boat I found that dead shells, with the animal still in them, were also floating all over its surface. There was absolutely thousands of them and it certainly amounted to extinction of a very beautiful and interesting species, the *Anodonta corpulenta* of Cooper.

The other Anodonta, the *suborbiculata* of Say, for which this lake is headquarters, did not seem to be affected and there were not more dead ones to be seen than in previous years.

I immediately set about to ascertain the cause of this wholesale destruction of the corpulenta.

On enquiring of Captain Schulte and other fishermen who owned the lake, they had but one theory as to the cause, and that it was the common northern bull-head catfish, *Amiurus nebulosus* L. S., that was doing the mischief.

They explained that this fish would attach his wide mouth over one end of the shell and suck until the muscular power of the mus-

sel was exhausted, the shell relax, when the juices would be withdrawn, after which the animal would die.

On further enquiry I could find no one that had ever caught Mr. Catfish in the act, and I was not altogether satisfied with this theory.

This lake, in common with the Illinois, Mississippi and nearly all of the western rivers, is at lower ebb than ever before known in the history of the country. From accounts in the daily papers there is great mortality among the fish of the Mississippi River, and immense numbers are dying as a result of this low water.

Might not this be the cause of the death of the mollusks in this lake? Is the same phenomena observed in other bodies of water? Let us hear from other points. Or, have the catfish in this lake, like an egg-sucking dog, learned a trick and are making the most of it.

ON THE BYSSUS OF UNIONIDÆ. II.

BY DR. V. STERKI.

Some time since I succeeded, not without hard work, in finding three more specimens of *Unio* with a byssus, one *U. luteolus* Lam., 15 mm. long, one *U.* (prob.) *ligamentinus*, only 9 mm. long, and *U.?* 8 mm. Unfortunately I had not leisure to make an examination as exact as I wished; yet to my account in the last NAUTILUS I can add the following: the threads were for the most part colorless, or only slightly brownish. On the parts examined I found the cortical layer little developed. The byssus were more or less branched; on a piece of one about three inches long, I counted seven branches. Of the formation of these I can give an idea best by comparing them with a grass stalk: the branches sprung out from like leaves with short sheath, the latter with circularly arranged fibres, apparently not derived from the inner part of the "stem," but at a short distance, the branch, first flat, like a leaf, further off growing more or less cylindrical, was entirely composed of longitudinal fibres, which consequently are formed for themselves by apposition and the main thread is not split.

Later I had a chance to get some other very young mussels, among which was one only 3·5 mm. long, the smallest I have found so far,

and none of them had a byssus. Possibly it was detached while being caught and washed—with other materials—in the net.

A NEW SPECIES OF LEUCORHYNCHIA.

BY H. A. PILSBRY.

Leucorhynchia Tryoni Pilsbry.

Shell having the contour of *L. Crossei* Tryon, but larger, the umbilical tongue of callus much smaller. The margin of the umbilicus has several strong lobes or teeth. Surface smooth except the first half of the base, in front of the aperture, which shows about eight radiating grooves. Color white.

Alt. 2·8; diam. 3·8 mm.

Collected at Singapore by Dr. S. Archer.

Four specimens are before me. This group is considered by Fischer a subgenus of *Teinostoma* H. & A. Adams. *Leucorhynchia* was founded by Mr. H. Crosse in 1867, for a species from New Caledonia. In 1888, Mr. Tryon, in his monograph of *Teinostoma* described a second species as *T.* (*Leucorhynchia*) *Crossei*.

The subgenus now consists of three species which may be distinguished as follows:

Umbilical lobe of callus large; surface smooth,
- Periphery carinated, *L. Caledonica* Crosse.
- Periphery rounded, *L. Crossei* Tryon.

Umbilical lobe small; base radiately grooved,
- Periphery rounded, *L. Tryoni* Pilsbry.

LAND SHELLS OF VANCOUVER ISLAND.

BY G. W. TAYLOR, ST. BARNABAS RECTORY, VICTORIA B. C.

1. Selenites Vancouverensis (Lea).
2. Selenites sportella (Gould).
3. Limax agrestis Linn.
4. Limax hyperboreus Westerlund.
5. Vitrina Pfeifferi Newcomb.
6. Hyalina arborea (Say).
7. Hyalina milium (Morse).

8. Hyalina Binneyana Morse.
9. Conulus fulvus (Müller).
10. Pristiloma Lansingi (Bland).
11. Pristiloma Stearnsi (Bland).
12. Ariolimax Columbianus (Gould).
13. Prophysaon Hemphilli Bland & Binney.
14. Prophysaon Pacificum Cockerell.
15. Patula striatella (Anthony).
16. Patula asteriscus (Morse).
17. Punctum minutissimum (Lea).
18. Punctum conspectum (Bland).
19. Lysinoe fidelis (Gray).
20. Mesodon Columbianus (Lea).
21. Mesodon devius (Gould).
22. Stenotrema germanum (Gould).
23. Pupilla corpulenta (Morse).
24. Vertigo simplex (Gould).
25. Vertigo ovata Say.
26. Ferussacia subcylindrica (Linn.).
27. Succinea Nuttalliana Lea.
28. Succinea Oregonensis Lea.
29. Succinea rusticana Gould.
30. Onchidella Carpenteri W. G. Binney.
31. Onchidella borealis Dall.
32. Carychium exiguum (Say)?

LIMAX AGRESTIS LINN. ON THE PACIFIC COAST.

BY G. W. TAYLOR.

In the October number of the NAUTILUS, Mr. T. D. A. Cockerell writing of *Limax agrestis*, recorded its occurrence at Portland, Oregon, and remarked that he believed this to be "the first record of the species from the Pacific Coast." However two years ago I myself noticed the introduction of the species into this part of the world, in a little paper on "The Land Shells of Vancouver Island" published in the *Ottawa Naturalist*, vol. 3, p. 84, etc. (December, 1889.)

I believe that I first observed this slug about seven years ago in the Victoria gardens, and it has since developed into a dreadful pest. There cannot I think be any doubt as to the species being an

introduced one as it has not yet been noticed in any part of Vancouver Island other than in Victoria, and the specimens resemble British ones in every respect save that the milky slime is not nearly so copious. The principal varieties occurring here are those that Mr. Cockerell would call *sylvaticus* and *varians*. I have appended to this note a list of the Terrestrial Mollusca of Vancouver Island as at present known to me. Further information concerning their occurrence may be found in my paper above referred to, a copy of which I shall forward with pleasure to any conchologist who may desire it, so long at least as my stock holds out.

GENERAL NOTES.

Pupa Holzingeri Sterki, in Ohio. Three, specimens of this species occurred among other small species collected last spring at Put-in-Bay Island, Lake Erie. A comparison with specimens received from Dr. Sterki leaves no doubt in my mind as to the identification.—*Bryant Walker, Detroit, Mich.*

Unio complanatus Sol. in Northern Michigan. In the Nautilus for June 1889 (vol. 3, p. 16) I recorded the discovery of an isolated colony of this species at Ocqueoc Lake, in the northern part of the lower peninsula, and queried as to how it got there. Since then I have found the species in the St. Mary's river at Lime Island, Michigan. The occurrence of the species at this locality would seem to make it probable that it will be found quite generally distributed through the upper peninsula and also affords an explanation for the existence of the Ocqueoc colony.—*Bryant Walker, Detroit.*

New Japanese Shells. *Terebra Stearnsii*, n. sp. Shell large, much elongated, having 22 whorls remaining, the apical portion (probably ¼ the entire length) being broken off. The whorls are narrowly but distinctly shouldered just below the suture. The surface of the body-whorl is divided into three subequal parts by two spiral grooves, and below the lowest of these grooves there are several others. Base cut by about 15 unequal impressed lines; growth-striæ faint. Whitish, with a single series of brown spots. Total length 105, breadth 17½ mm.; length of aperture 12, breadth 7 mm.

Thylacodes medusæ n. sp. Shells large, generally clustered, resembling *Thylacodes polyphragma* Sassi, of the Mediterranean, but

the sculpture (consisting of spaced longitudinal cords, the intervals tristriate), continuous around the whole circumference of the cylinder. Aperture circular, its diameter averaging 13 mm. For illustrations see Proc. Acad. Nat. Sci. Phila. 1891.—*H. A. Pilsbry.*

Food of Limnæidæ. Our fresh-water snails are generally believed to be herbivorous. But they greedily feed upon animal matter whenever and wherever they find such; on insects, worms, mollusks (even their own species), flesh of any kind, even when living. A *Limnæa palustris* was seen last summer having a small leech (about 3 cm. long and 4 mm. wide) in his mouth; he slowly drew it in and rasped, while the victim was moving and winding about in vain efforts to escape. This I observed for about half an hour, but had not seen how the snail had caught the worm. Afterward the Limnæa held the leech, its anterior part projecting and constantly moving, firmly in his mouth, not rasping, now resting, now creeping about as usual, for an hour and a half more. At that time I had to go away and when I came back no leech was to be seen; whether it was eaten or dropped I do not know.

When these animals are grazing on stones, glass walls in the aquarium, on leaves, or on each other's shells, they always find a good supply of small animals besides algæ, etc., as anyone knows who has examined those "pastures."—*Dr. V. Sterki.*

Additional Mollusks of San Francisco County. Since the list by Mr. Wm. J. Raymond and myself was published in the September number of The Nautilus, I have found five more species as follows:

Limax agrestis Linn.
Limax maximus Linn.
Prophysaon Andersoni J. G. C. var. *marmoratus* Ckll.
Aemœa fenestrata Nutt.
Mopalia Wossnessenskii Midd. var. *Swansii.*

Making the total number found up to date, 126 species. But two specimens of *Limax maximus* have I collected, they being apparently young specimens.—*Williard M. Wood.*

Planorbis trivolvis Say, and also other related forms, has a peculiar way of moving on or in sand; he goes "a step," as far as he conveniently can, with the shell deep down and close to the head; then he pushes it forward and upward, thus shoving the sand away, and making room for another "step." It is more than probable

that this digging is done not merely for locomotion—for he could do it much easier—but in search of food.—*Dr. V. Sterki.*

Some observations on how snails move their odontophores, may be of interest, and more should be done in this direction. *Limnæidæ* feeding on glass are easily observed, if not by the naked eye, then with a good glass. In *Planorbis* the radula is narrow, and is moved from behind forward—as seen in quite a number of species. *Physa* moves its wide, expanded radula from the sides toward the middle, not forward. *Limnæa* moves it forward, but not as decidedly as *Planorbis*, and at the same time somewhat from the sides to the middle. These different ways will be found to correspond with the formation of the teeth in the different genera.—*Dr. V. Sterki.*

EXCHANGES.

Mr. A. W. Hanham will be glad to correspond with members of the American Association of Conchologists with a view to exchanging land and fresh-water shells. Address, *Bank of British North America, Quebec, Canada.*

Wanted—Zonites from any locality in exchange for British Land and Fresh-water shells.—*Robert Walton, Charles St., Lower Roxborough, Philadelphia, Pa.*

Northwest Louisiana land and fresh-water shells for exchange. Wanted, other shells.—*T. Wayland Vaughan, Mt. Lebanon, La.*

Anodonta suborbiculata Say. I have fine specimens of this beautiful *Anodonta*, as well as many other *Unionidæ* for exchange. —*W. S. Strode, M. D., Bernadotte, Illinois.*

Japanese Shells. A large variety of Marine, Fresh-Water and Land Shells of Japan and of the Bahamas, my own collection, printed list.—To exchange for species not now in my cabinet from any part of the world; rare American Unionidæ, Strepomatidæ etc., desired.—*Frederick Stearns, Detroit, Michigan.*

OBITUARY.

DR. JOHN CLARKSON JAY.

Dr. John Clarkson Jay, a son of Peter Augustus Jay and grandson of Chief Justice John Jay, a distinguished member of the First

Continental Congress, died at his home, "Rye," at Rye, Westchester County, N. Y., on Sunday, being in the eighty-fourth year of his age. The immediate cause of his death was senile gangrene. Mr. Jay was graduated from Columbia College in 1827, and afterward took his diploma as M. D. Upon his marriage with Laura Prime, a daughter of Nathaniel Prime, a well-known banker, he left the practice of medicine and for a short time was engaged in the banking business, but in 1843 retired from both business and professional pursuits, to live at the country seat at Rye, on Long Island Sound, left to him by his father's will. This beautiful residence gave him full occupation, as it embraced upward of 400 acres of land.

Dr. Jay was well known in the scientific world as a specialist in Conchology, and his collection of shells was for many years the most noted in the United States. It was purchased several years ago by Miss Catharine Wolfe, and presented by her to the American Museum of Natural History.

Dr. Jay was for many years a trustee of Columbia College, was one of the early presidents of the old New York Club, and was one of the founders of the New York Yacht Club. He was a Republican in politics, and one of the early members of the Union League Club of this city. An Episcopalian, he was a moderate Churchman, strict in his own religious observances, but not in the least intolerant as to the views of others.

Dr. Jay was also actively interested in the Lyceum of Natural History (now the New York Academy of Sciences) and was its Treasurer from 1832 to 1843. At this time he was a man of twenty-five or thirty, of light complexion, open and pleasing countenance, and somewhat nervous temperament. During his more vigorous years Dr. Jay was much interested in aquatic sports and was the owner of a famous yacht called "Coquille." The valuable addition to the treasures of the Natural History Museum purchased by Miss Wolfe is now known as the Jay Collection. The shells gathered during the expedition to Japan under command of Commodore Matthew C. Perry were submitted to Dr. Jay and he wrote the article on them that appeared in the Government Reports. Dr. Jay was the author of "Catalogue of Recent Shells," which was published here in 1835; "Descriptions of New and Rare Shells," and of later editions of his Catalogue, in which he enumerated about 11,000 well-marked varieties and about 7,000 well-established species.

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DEVOTED TO THE INTERESTS
OF CONCHOLOGISTS.

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THE NAUTILUS.

VOL. V. JANUARY, 1892. No. 9.

ON SOME TYPES NEW TO THE FAUNA OF THE GALAPAGOS ISLANDS.

BY WM. H. DALL.

Dr. G. Bauer has recently made some energetic and praiseworthy explorations in the Galapagos Islands, with the view of obtaining material for a discussion of the origin of their fauna. Among other things obtained was a series, small but extremely interesting, of the land shells of the various islands of the group. This collection in all probability is not exhaustive, but it seems by far more complete than any yet made at this point and a full report upon it is in preparation by the writer. Among the mollusks, which comprise a large number of races of Bulimulus (of the sections *Pleuropyrgus, Nesiotus, Raphiellus,* etc.) and *Succinea* (*S. Bettii* E. A. S.) are four minute forms each of which introduces a wholly new group to the faunal list of Galapagos land shells. Preliminary descriptions of three are appended; the fourth is a *Pupa* of the usual Antillean type.

Helicina (Idesa) nesiotica n. s.

Shell small, depressed, four-whorled, with periphery rounded, base moderately arched, and peristome not thickened nor reflected; epidermis of a bright reddish-chestnut, polished, but with very evident and regular incremental lines, base with a thin white callus merging into the lower lip without notch or angle; spire depressed, suture very distinct, not channelled; operculum smooth, whitish, angulated only at the upper extreme; alt. of shell 2·3, max. diam. 3.3 mm.

Found on leaves of plants on Chatham Island at an elevation of 1600 feet above the sea.

No species of this family has been reported from the Galapagos before. The type is not unknown in the Panamic region but is said to be absent from the west slope of the Andes.

Leptinaria chathamensis n. s.

Shell small, horn-colored, with a blunt apex and six rounded whorls; suture very distinct, surface polished, delicately marked with lines of growth; base rounded, widely umbilicated; aperture with the margin hardly thickened; rounded in front and at the suture; pillar broad, thin; body with a single elevated thin, sharp lamina, extending spirally inward from a point a little behind the peristome and nearly equidistant from the inner and outer lips. Alt. of shell 3·0, max. diam. 1·6 mm.

Chatham Island, on ferns at 1600–2000 feet above the sea.

Somewhat analogous forms are found in the mountains of the Panamic region.

Zonites (Hyalinia) Baueri n. s.

Shell small, horn-colored, polished, with four whorls; periphery subangular or rounded; dome of the base more elevated than that of the spire; suture distinct; surface with delicate incremental lines and finely grooved throughout by sharp but microscopic spiral striæ. Aperture rounded-lunate without sharp angles, wider than high; lip sharp, unreflected, throat unarmed; base minutely perforate; alt. of shell 1·5, max. diam. 2·2, min. diam. 1·6 mm.

South Albemarle Island on weathered bones of tortoises.

The single specimen of this very interesting form may not be quite adult, and therefore the slight tendency to angulation on the periphery may be lost in the full-grown shell. The absence of any form of *Helix* or *Zonites* has been commented on by most of those naturalists who have treated of the Galapagos shell fauna and it was certainly a most extraordinary deficiency from any point of view. This discovery of Dr. Bauer's removes the most striking anomaly of the fauna.

In addition to the above Dr. Bauer obtained specimens of an undescribed *Bulimulus* (*Pleuropyrgus*) which had also been collected by Dr. Habel on his visit to the Galapagos in 1868. Dr. Habel presented the writer with specimens on his return and these have been named in manuscript by Dr. R. E. C. Stearns *B.* (*Pleuro-*

pyrgus) *Habeli.* This species is distinguished from *B.* (*P.*) *Chemnitzioides* by its nearly smooth polished surface, light-brown spiral bands on a white ground and usually more slender form. It has about fifteen whorls, a blunt apex and rounded base. It measures 18·0 by 3·5 mm. It was also collected on Chatham Island by the U. S. S. Albatross on her late voyage from Norfolk to San Francisco. It does not appear among shells enumerated by Wimmer from the Habel Collection in his catalogue of the Galapagos mollusk-fauna.

A NEW SPECIES OF ZONITES FROM ARKANSAS.

BY H. A. PILSBRY.

Zonites Brittsii n. sp.

Shell *imperforate, depressed, obtusely angled at the circumference,* about equally convex above and below. Color yellowish-green, somewhat translucent, becoming light straw-yellow and opaque on the last fourth of the last whorl. Surface shining, having oblique striæ under the sutures, the growth lines being quite light on the rest of the surface; base seen under a lens to be *very densely concentrically striated.* Whorls 6. Base slightly indented at the axis. Aperture slightly oblique, depressed-lunar, *the outer and basal walls lined with a heavy, opaque-white calcareous layer.*

Alt. 5, greater diam. 8·5, lesser 7·7 mill. Aperture, oblique alt. 4, width 5·6 mm.

Hot Springs, Arkansas.

This species was collected by Mr. JOHN H. BRITTS, and sent by him to the collection of the *American Association of Conchologists,* where the types may now be seen. They were submitted to the writer by the President of the Association.

The more prominent characters of this shell are its imperforate base, depressed, almost quoit-like form, the base closely concentrically striated, the shining surface, and the contrasting colors of the last whorl.

Mr. Britts sent also, specimens of the rarely found 3-toothed form of *Helix appressa* Say, from Booneville, Mo., and a number of other interesting shells.

SOME NOTES ON NORTH AMERICAN FORMS OF VALLONIA.

BY DR. V. STERKI.

According to the investigations of Dr. v. Ihering[1] this group is to be separated from Helix and regarded as a genus, for anatomical characters. The study of these forms seems to have been somewhat neglected in our country. These are some distinct and characteristic forms and probably more will be found. Those known to me at present are shortly pointed out in the following, in order to direct the attention of conchologists to them and have them collected wherever and whenever possible, with records of the natural features of their habits.

1. *V. pulchella* Müller, the common form of the old and new continents. Here it seems to be remarkably constant in its appearance throughout the country, while on the other hand, slightly but constantly different forms may be found in neighboring places. Besides the smooth surface it is characterized by the slowly increasing whorls, the inner ones being comparatively large, and the last not so peripheric as in most of the other forms.

2. *V. costata* Müller. The typical form seems to be not generally distributed, in North America. It deserves specific rank, beside *pulchella*, and differs from the latter not merely by the rib-striæ, but by the more depressed spire, the more rapidly increasing whorls, the last one being more peripheral, so that a *costata* may be recognized, even when the ribs are wanting; generally it is also somewhat smaller; thus I found them in Europe as well as in this country. And the fact that the two forms keep distinct side by side, on both continents, is in itself a strong evidence in favor of their being different species. In some localities the one is found predominant, or exclusively, in some the other, and frequently they are found together.

3. From Illinois (Mr. Jas. H. Ferriss), Iowa (Prof. B. Shimek and Mr. Geo. W. Webster) and Kansas (Mr. Frank J. Ford) I have, in 1890 and '91, obtained a peculiar form: it is decidedly smaller (in bulk about ½ of *pulchella*), strongly costate, the umbilicus comparatively wider than in *costata*, especially widening towards the aperture by the last whorl receding to the periphery, so that the

[1] Les Relations Naturelles des Cochlides et des Ichnopodes, Bull. Scient. 1891, p. 214.

aperture is very narrowly coherent with the penultimate whorl, and the aperture is circular, almost continuous, with a strongly thickened lip. The first whorls are remarkably small, the last grows rapidly in width and is more predominating than in the other forms. The spire is flat, but the whorls are well rounded above and the suture is very deep.

4. In a lot of minute shells, kindly sent for inspection a few days ago by Mrs. Judge Geo. Andrews, collected in damp moss on rocks at the Cliffs on Holston river, near Knoxville, Tennessee, there were a few specimens of a form nearly related to the preceding, and of the same size, yet with peculiar characters: the umbilicus is very wide, the "ribs" less strong, the last whorl comparatively narrower, widening more gradually; the peristome is continuous, somewhat "free" and the margin only slightly expanded, thin with no lip-thickening.

5. Mr. Theo D. A. Cockerell sent me two specimens of *V. cyclophorella* Ancey, from West Cliff, Colorado. They are of about the size of a typical *costata*, densely rib-striate, the spire is higher umbilicus a trifle narrower, the whole shell more compact in its appearance. The whorls are more slowly and regularly increasing, such as it is in *pulchella*, and the peristome is only slightly "reflected;" thin without a thickened lip.

Whether, and in how far, these forms are to be regarded as distinct species, or partly rather as well marked varieties, will and can be decided only after careful comparison of much more extensive material from different parts of the country. The soft parts also will have to be examined.

NEW PHILADELPHIA, OHIO, Dec., 1891.

LIMAX AGRESTIS LINN. IN CALIFORNIA.

BY W. J. RAYMOND.

In the NAUTILUS for October and December are notes concerning the earliest recorded appearance of this slug on the Pacific Coast, from which it appears that Rev. G. W. Taylor first observed it about seven years ago in Victoria, and recorded its presence there,

[1] Containing also, *Pupa contracta*, *curvidens*, and *Vert. Bollesiana*.

in the Ottawa Naturalist for December, 1889. I believe that the species was brought into Oakland about the same time as into Victoria, or, perhaps, a year or two earlier; certainly in 1884–5 it had become very abundant here, in gardens. In the Proc. Cal. Acad. Sci., Second Series, Vol. I, p. 13 (issued Dec. 31, 1887) Dr. J. G. Cooper published my observations on the presence of this *Limax* in Oakland, and predicted that it would become a pest to gardeners, as in fact it has done. This is the earliest published record of which I have knowledge, and the specimens, sent to Mr. Binney at that time, are probably those mentioned at the close of Mr. Cockerell's article. This slug is now gaining a foot-hold in San Francisco, for Mr. W. M. Wood has lately submitted specimens, from that city, to me, for examination, and has added the species to the San Francisco County list.

CATALOGUE OF FISSURELLIDÆ OF THE UNITED STATES.

BY H. A. PILSBRY AND C. W. JOHNSON.

A complete catalogue of the shells of the United States has long been desired by the many collectors who devote their energies especially to American mollusks, and naturally wish to know just what species are to be had. Mr. Campbell has already in these pages catalogued the *Haliotidæ*, and from time to time other groups will be taken up by various members of the American Association of Conchologists.

The *Fissurellidæ* of our area may be easily known by these peculiarities: the shell is limpet-like, and has either a perforation at or near the apex of the cone, or a slit or notch in its front edge. There are many anatomical characters also, peculiar to the family.

The group has been divided into three subfamilies, as follows:

I. Apex of shell entirely removed by the perforation, which is bounded inside by a callus-rim which is not truncated behind. Central tooth of the radula narrow. Shell entirely external, FISSURELLINÆ.

II. Shell as in *Fissurellinæ*, but hole larger. Central tooth of radula very broad, not narrowed above. Mantle wholly or nearly concealing the shell. FISSURELLIDINÆ.

III. Apex of shell subspiral, not removed; or if it be removed, the hole-callus inside is truncated or has a pit behind; or there is a plate inside, as in *Crepidula*. Central tooth of radula wide, EMARGINULINÆ.

Subfamily I. *Fissurellinæ*.

There is only one genus, *Fissurella*.

A. Summit of the shell near the middle; basal margins level, not elevated at the ends, Subgenus *Fissurella*.

a. Edge of shell not crenulated, dark-bordered inside-true, Section *Fissurella*.

b. Edge of shell crenulated, not dark bordered inside, section, Section *Cremides*.

B. Shell flattened, shield-shaped, the narrow hole in front of the middle; ends of shell elevated, Subgenus *Clypidella*.

Genus 1. FISSURELLA Brug.

1. *F. volcano* Reeve. Santa Cruz, Cal., southward.

(Section *Cremides* H. & A. Ad.)

2. *F. barbadensis* Gmelin. Charlotte Harbor, Fla., southward.
One of the commonest West Indian shells, easily known by its almost circular perforation.
3. *F. nodosa* Born. Florida Keys.
The ribs are nodular, orifice oblong.

(Subgenus CLYPIDELLA Swains.)

4. *F. pustula* Lam. Cape Lookout, southward.
5. *F. fascicularis* Lam. Florida Keys.
The anatomy of these is not known. Collectors should preserve specimens of the animal.

Subfamily II. *Fissurellidinæ*.

A. Mantle entirely or nearly covering the shell; hole large.

a. Edges of shell nearly level, beautifully crenulated, *Lucapina*.

b. Edges of shell elevated at each end, blunt at the sides, not crenulated, *Megatebennus*.

B. Mantle not enveloping the shell.

a. Perforation about central, the shape of the shell, *Lucapinella*.

Genus 2. LUCAPINA Gray, 1857.

6. *L. crenulata* Sowb. Monterey to San Diego, Cal.
   The largest and most beautiful of the American *Fissurellidæ*.
7. *L. adspersa* Phil. Key West, Florida.
   (*Fissurellidea fasciata* Pfr. of authors.)
8. *L. cancellata* Sowb. Tortugas.
   The edges of the hole are bluish-black.

Genus 3. MEGATEBENNUS Pilsbry, 1890.

9. *M. bimaculatus* Dall. Monterey, Baulinas Bay, Purissima and Lobitas, Cal.
   (*Clypidella bimaculata* of collectors.)

Genus 4. LUCAPINELLA Pilsbry, 1890.

10. *L. callomarginata* Cpr. Lobitas and San Diego, Cal.
11. *L. limatula* Reeve. Key West, Florida.

Subfamily III. *Emarginulinæ*.

A. Apex absorbed by the hole, which is bounded inside by a posteriorly-truncated callus, *Fissuridea*.

B. Apex absorbed or remaining; anal fissure either a hole or a slit in the front margin; no hole-callus, but having a more or less developed septum back of the hole or slit.
   a. A perforation at apex or on front slope, *Puncturella*.

C. No internal hole-callus or septum ; apex not absorbed.
   a. Having a distinct slit in front, and a slit-band extending from it to apex, *Emarginula*.
   b. Having a hole on the front slope, *Rimula*.
   c. Slit short ; no slit-fasciole, *Subemarginula*.

Genus 5. FISSURIDEA Swains, 1840.

This name was proposed for a highly arched species from the Philippine Is. It has hitherto been regarded as a subgenus of *Fissurella*. Its synonymy is as follows:

Fissuridea Swains., Malacol., p. 356, 1840, type *F. galeata* Helbl.
Glyphis Carpenter, P. Z. S. 1856, p. 223, type *G. aspera* Esch.
Not *Glyphis* Agassiz, 1843, nor of Gibbes, 1848, a genus of fishes.

(*Atlantic and Gulf coast species.*)

12. *F. Listeri* Orb. Florida Keys.
    A strongly latticed species, related to the *F. grata* of the Mediterranean Sea.
13. *F. fluviana* Dall. Florida Straits, 76–100 fms.
14. *F. alternata* Say. Chesapeake Bay, southward.
    Dead specimens have been collected at Cape May, N. J. by Prof. C. LeRoy Wheeler, but the species is not found there living.
15. *F. Tanneri* Verrill. Off Delaware Bay to Hatteras, in 104–142 fms.
16. *F. minuta* Lam. Turtle Harbor, Fla.
    According to Deshayes, this is not the *minuta* of Lamarck; We believe, never-the-less that it is. If not, however, it will be called *F. granulata* Anton. It is often called by Reeve's later name, *gemmulata*.

Several other small species, allied to *minuta* will probably be found in Florida, such as *F. variegata* Sowb., *F. arcuata* Sowb., etc.

(*West coast species.*)

17. *F. aspera* Eschscholtz. Sitka to Monterey.
    The common West Coast form.
18. *F. saturnalis* Carpenter. Santa Barbara and San Diego, Cal.
    This has been known universally as "Glyphis densiclathrata Reeve," but I am informed by Dr. Dall and Dr. Stearns that Reeve's shell is a young *F. aspera*.

(*Fossil species.*)

19. *F. redimicula* Say. Miocene. Yorktown and James River, Va.; Patuxunt River, Md.
    Allied to *F. alternata*, but with far finer sculpture, and the hole nearly round. *F. catilliformis* Rodgers (Trans. Amer. Philos. Soc. n. ser. vi, pl. 26, f. 4, 1839) seems to be a synonym.
20. *F. alticostata* Conrad. Miocene. St. Mary's, Md.; James river, Va. (See Foss. Sh. Med. Tert. Form. p. 28, pl. 44, f. 19.)
    The type is in the Acad. N. S. Phil. coll. Typically quite distinct from *redimicula*, but transition forms collected by Mr. Johnson in Va., seem to unite the two.

21. *F. Marylandica* Conrad. Miocene. Calvert Cliff, Md.
Types in Acad. Coll. Allied to *F. tenebrosa* Con., of the Ala. Eocene. (See Fos. Med. Tert. p. 79, pl. 45, f. 4.)
22. *F. nassula* Conrad. Miocene. St. Mary's, Md.
Type in Acad. Coll. Distinguished from the following species by its larger size,more depressed form, etc. The riblets are notably equal, close, and not conspicuously latticed. (See Foss. Med. Tert. Form. p. 78, pl. 44, f. 8.)
23. *F. Griscomi* Conrad. Miocene. Stow Creek, betw. Salem and Cumberland Cos., N. J. (See Foss. Med. Tert. Form. p. 78, pl. 44, f. 8.)
Type in Acad. Coll.
24. *F. tenebrosa* Conrad. Eocene. Claiborne, Ala. (See Foss. Med. Tert. Form. p. 39, pl. 14, f. 9.)
Type in Acad. Coll.
25. *F. Mississippiensis* Conrad. Eocene. (See Jour. A. N. S. P., 2d ser., p. 113, pl. 11, f. 2.)
Allied to *F. tenebrosa* in sculpture, but the hole is quite different. Type in Acad. Coll.
26. *F. Carolinensis* Conrad. Miocene.

A very distinct species, of which Mr. Johnson has collected specimens on the Cape Fear River, N. C. (See Kew's Rep. Geol. Surv. N. C. I, 1875, p. 22, pl. 4, fig. 1.)

Genus 6. PUNCTURELLA Lowe, 1827.

27. *P. noachina* Linn. Circumpolar, extending south to Cape Fear in deep water.
28. *P. galeata* Gld. Puget Sound.
Dr. Dall has lately described a mammoth variety of this species (var. *major*), from Bering Sea; it will probably occur in Alaskan waters.
29. *P. Cooperi* Carpenter. Catalina Id., Cal.
30. *P. cucullata* Gld. Puget Sound to Monterey.
31. *P. circularis* Dall. Florida Strait. 539 fms.
32. *P. eritmeta* Verrill. Off Rhode Island, 1451 fms.
33. *P. erecta* Dall. Off N. Carolina, 107 fms.

Genus 7. EMARGINULA Lam., 1801.

34. *E. compressa* Cantraine. Fla. Strait in deep water.
35. *E. bella* Gabb. Monterey, Cal.
36. *E. radiata* Gabb. Eocene. California.

We have not seen this species.

37. *E. arata* Conrad. Eocene. Claiborne, Ala. (See Foss. Tert. Form. p. 44.)

A magnificent species, having some characters of *Subemarginula.*

Subgenus RIMULA Defrance, 1827.

38. *R. frenulata* Dall. W. Fla. and Keys.

Genus 8. SUBEMARGINULA Blainv., 1825.

39. *S. octoradiata* Gmel. Tortugas.
40. *S. Rollandii* Fischer. S. Fla.
41. *S. emarginata* Blainv. Florida Keys.

* * *

42. *Cemoria crucubuliformis* Conrad. Miocene of Cal.

We have not been able to find this species among Conrad's types. Its generic position is of course doubtful.

43. *Cemoria oblonga* H. C. Lea. Miocene. Petersburg, Va. Type in Coll. A. N. S. P. (See Trans. Amer. Philos. Soc. 1843, p. 247, pl. 35, f. 37.)

We would consider this tiny shell a *Rimula* were it not that there is no anal fasciole extending from fissure to apex, and for the callus around the hole inside. These features cause us to believe it a very young *Fissuridea* ("*Glyphis*"), probably *F. alticostata* Conrad.

The authors will be glad to have any criticisms on this list, and also any extensions of the geographic or geologic range of the species.

GENERAL NOTES.

FOOD OF SNAILS. Have kept since last May a dozen *Helix albolabris* in confinement. Have fed them 53 species of plants of which number they have refused to eat but five species, as follows: *Achillæa millefolium* L., *Brunella vulgaris* L., *Vernonia nove boracensis* Willd., *Xanthium Canadense* Will. and a species of *Euphorbia.* They generally prefer the tenderest plants but refuse some that are tender and eat of others that are hard and stringy. They refuse the stalk and leaves of young growing maize but dig down and eat the germinating kernels. I kept them in a box with soil in the bottom and wire on the top. The corn was planted in the soil and grew to

the height of three or four inches. I shall continue these experiments next summer.—*Dr. G. D. Lind, St. Louis, Mo.*

Mr. Ellwood Pleas, of Dunreith, Indiana, has returned from a very successful collecting trip in Alabama. He secured about 100 species of marine shells from the Gulf, nearly 20 species of land shells, about 30 Strepomatidæ and 50 Unionidæ. About 250 species of fossils were collected, many very large and choice specimens among them.

EXCHANGES.

Exchange.—Land, fresh water and marine shells from France and all other regions—shells also purchased readily. Species of the genus *Pecten* solicited.—*Mr. Bavay, Grand rue, Brest, France.*

For Exchange.—The beautiful *Anodonta suborbiculata* Say and *corpulenta* Cp. from Thompson's Lake, Ill. Also many fine Unios from Spoon River, Ill. Fine *Helix multilineata* Say, and others. Will exchange for any species, not in my collection, land or sea.—*Dr. W. S. Strode, Bernadotte, Ill.*

A few new and rare shells for exchange for other rare shells. *Clementia subdiaphana* Carpenter, *Nassa californiana* Conrad, *Surcula carpenteriana* Gabb, *Cancellaria crawfordiana* Dall.—*J. S. Arnheim, 8 Stewart St., San Francisco, Cal.*

Exchange.—Offered British shells, land, fresh water and marine, for other shells not in my collection.—*E. R. Sykes, 15 Doughty St., London, W. C., England.*

Wanted.—Pacific Coast land and fresh water shells, slugs included. Will give British land and fresh water and marines, or Virginia land and fresh water species. Address, *Capt. W. J. Farrer, Box 43, Orange, Va.*

Offered—*Helix profunda, tridentata, albolabris; Zonites fulginosus, inornatus, ligerus; Patula perspectiva, alternata; Selenites concavus; Physa heterostropha; Spharium striatum; Ancylus fuscus.* Wanted, United States land and fresh water shells.—*S. H. Stupakoff, E. E. Pittsburgh, Pa.*

Wanted.—Zonites from any locality in exchange for British land and fresh water shells.—*Robert Walton, Charles St., Lower Roxborough, Philadelphia, Pa.*

Wanted.—*Vallonia* from all localities.—*Dr. V. Sterki, New Philadelphia, O.*

$1.00 per Year. ($1.12 to Foreign Countries.) 10cts. a copy.

THE NAUTILUS

A MONTHLY
DEVOTED TO THE INTERESTS
OF CONCHOLOGISTS.

EDITOR:
H. A. Pilsbry, Conservator Conchological Section, Academy of Natural Sciences, Philadelphia.

ASSOCIATE EDITOR:
C. W. Johnson, Acting Curator Wagner Institute of Science.

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MOLLUSKS OF DORCHEAT BAYOU AND LAKE BISTENEAU, LOUISIANA.

BY T. WAYLAND VAUGHAN.

Dorcheat Bayou might, with some degree of propriety, be called a river. It is the largest stream crossed by the V. S. and P. Rail-Road between Shreveport and Monroe.

It rises in Nevada County, Arkansas, flows across Columbia County, in that state, into Webster Parish, Louisiana. Toward the southern portion of Webster Parish, it widens out, and forms Lake Bisteneau, which extends out of Webster Parish, forming the boundary between Bienville and Bossier Parishes, and empties into Red River, between Bossier and Red River Parishes.

I do not know precisely the length of Dorcheat. Its width and depth are both variable, depending upon the flooding rains. When I collected there in June, during low water, in some places one could wade across without getting in water much over knee deep. The stream was from twenty to fifty feet wide, I should judge. My collecting was done near the railroad crossing. Here Dorcheat had well defined banks, often composed of white sand or pebbles. These pebbles are very note-worthy. In some places, they form the bed of the bayou, and are fine places to collect from.

Lake Bisteneau is almost thirty miles long. Its width varies from thirty to sixty feet in summer to one mile in winter. There are no well defined banks to Bisteneau, the land sloping down gradually to the water's edge. The bottom of this body of water is abominable; one often mires almost to his waist in the nasty mud.

This is a striking contrast to the firm, pebbly bottom of Dorcheat. My collecting was done near Port Bolivar in Bienville Parish.

Before the railroad was built from Shreveport to Monroe, in high water steamboats ascended Lake Bisteneau and Dorcheat Bayou to the steamboat landing two miles from Minden, in Webster Parish.

This stream, Dorcheat and Bisteneau really being one stream, is of considerable interest on account of its shells. Of these it has a fair number of species. There are some interesting facts presented as regards the differences in the mollusks of the different portions of this same stream; for instance: I could not find a single specimen of *Unio hydianus, castaneus, nigerrimus* or *turgidus* in the portion of Bisteneau that I examined, while all are very abundant in Dorcheat.

The specimens of *castaneus* were nearly all much thickened anteriorly, something that was not noticed in specimens of *costaneus* collected elsewhere. The *nigerrimus* were larger and thicker shells than any other specimens found here. The specimens of *nigerrimus, hydianus, castaneus* and *anodontoides*, in Dorcheat, were found usually where they had bored into the sloping banks, *about at the water's edge*. The other specimens of *Unio* were found mostly on the rocky bottom. I have only one *mississippiensis* from Dorcheat. It was given me in a large lot of shells from there.

The *anodontoides* from Lake Bisteneau were large, heavy shells. It was the most abundant species of *Unionidæ* there. The bottom of Bisteneau in many places was almost covered with *Campeloma decisa*, and *Vivipara subpurpurea*. *Amnicola cincinnatiensis* was very abundant.

The following is a list of the species with their localities.

Unio anodontoides Lea. Bisterneau, Dorcheat.
Unio boykinianus Lea. Dorcheat.
Unio castaneus Lea. Dorcheat.
Unio chunii Lea. Dorcheat.
Unio gracilis Bar. Bisteneau, Dorcheat.
Unio houstonensis Lea. Bisteneau.
Unio hydianus Lea. Dorcheat.
Unio lachrymosus Lea. Bisteneau, Dorcheat.
Unio mississippiensis Con. Dorcheat.
Unio multiplicatus Lea. Dorcheat.
Unio nigerrimus Lea. Dorcheat.
Unio purpuratus Lam. Bisteneau, Dorcheat.

Unio pustulatus Lea. Bisteneau.
Unio pustulosus Lea. Bisteneau, Dorcheat.
Unio texasensis Lea. Bisteneau.
Unio trapezoides Lea. Bisteneau, Dorcheat.
Unio trigonus Lea. Dorcheat.
Unio tuberculatus Lea. Dorcheat.
Unio turgidus Lea. Dorcheat.
Unio zigzag Lea. Bisteneau.
Margaritana confragosa Say. Bisteneau.
Anodonta imbecillis Say. Bisteneau, Dorcheat.
Anodonta stewartiana Lea. Bisteneau.
Anodonta tetragona Lea. Dorcheat.
Sphærium transversum Say. Bisteneau, Dorcheat.
Campeloma decisa Say. Bisteneau, Dorcheat.
Vivipara subpurpurea Say. Bisteneau, Dorcheat.
Physa heterostropha Say. Bisteneau.
Planorbis trivolvis Say. Bisteneau.
Amnicola cincinnatiensis Anthony. Bisteneau.

(Extract from Proc. Cal. Acad. Sci. 2d. Ser., Vol. III.)

A NEW VOLUTOID SHELL FROM MONTEREY BAY.

BY J. J. RIVERS.

Scaphella (Voluta) Arnheimi.

Shell regularly formed, elongate-ovate; body whorl more than two-thirds as long as the spire; the spire an inch long, and made up of six whorls, the terminal nucleus being very small, pointed and oblique, which latter character places this species in the section *Scaphella* of Dall.

Ground color obscure yellow, covered by a layer of chalk-like deposit. The body whorl has some coarse longitudinal elevations and depressions, remnants of former lip extensions, and there are two large patches of dark rusty red at a wide interval which do not appear to form an interrupted band. The aperture is elegantly formed and measures 1–$\frac{3}{4}$ inches long by $\frac{1}{2}$ inch wide. The inner lip is regularly outlined on the columella; columellar plaits four,

sharply oblique, the last one strongest, forming a prominent ridge parallel to the canal. The upper outlines of the mouth meet in a sharp angle, but the base has a well defined bifurcation. The whole of the aperture and the edge of the outer lip are heavily coated with enamel of a yellowish tint, and rust stained. Size 3¼ inches long, and 1¾ inches wide. Animal without operculum.

Dredged in Monterey Bay, California.

MORE ABOUT UNIO LUTEOLUS AND U. RADIATUS.

BY GEO. W. DEAN, KENT, OHIO.

I must admit after reading Mr. Simpson's notes in the December NAUTILUS that *Unio radiatus* is too erratic for my abilities. A species that takes on every *possible* form I apprehend would baffle any expert.

A specimen exactly like *luteolus* and wholly unlike *radiatus* as I know it, although in the Lea collection labelled *radiatus* with the locality Newton Creek, N. J., would, I fear, get into my collection in the tray with *luteolus*.

Locality is certainly important but with me does not overshadow everything else, and labels have told me so many lies that I have not the respect for them that I otherwise should have. With me the shell is the *central* idea, not the locality or the label. These are usually aids in determining species—not always.

Mr. Lea named a shell, now found in the Mahoning, *Unio subovatus*, though from what locality his types came I do not know. It is now known to be the mature male of *U. occidens* Lea. The following are, I think, all *occidens: U. ventricosus* Barnes, *U. ovatus* Say and *U. cariosus* Say.

Another Mahoning River shell Mr. Lea named *U. kirtlandianus*. This is probably a variety of that protean species *U. subrotundus*, Lea.

It is a beautiful shell when young and may very properly retain the name as a variety.

I am in favor of weeding out the surplus names as fast as possible, but I apprehend that both *luteolus* and *radiatus* will remain good

and well defined species, all attempts to connect them proving failures.

I recognize the existence of abnormal sports and possibly hybrids and albinos, etc. These I did not contemplate, nor did I consider very young or old and eroded or decayed specimens. Barring these I still think I could find a dividing line sufficiently distinct.

I have not seen the dark colored *U. borealis* Mr. Simpson mentions but the types were furnished to Mr. Gray by Mr. Latchford of Ottawa, Canada and were taken from the Ottawa river. Mr. Latchford has given me a good suite of like specimens. They seem distinct enough for a good species but it is a close relative of *luteolus*, so close indeed that very young specimens are not easily separated. The glass, however, shows the lines of growth a little coarser and the shell consequently a little rougher.

My mind still dwells on the wonderful vagaries of the *Unio radiatus* as described by Mr. Simpson. I should have some dread of looking over the Lea collection with him for fear of getting so confused that I should not know my wife unless I had her labeled and was sure of her locality.

ADDITIONAL U. S. FISSURELLIDÆ.

We are informed by Mr. T. H. Aldrich that two species were omitted from the Catalogue of this family published in the last NAUTILUS, viz:

GLYPHIS ALTIOR Meyer and Aldrich.—Eocene, Ala. Jour. Cin. Soc. N. H. 1886, p. 41, pl. 2, figs. 16, 16a, 16b. Described under the genus *Fissurella*.

PUNCTURELLA JACKSONENSIS Meyer.—Eocene, Jackson, Miss. Bericht der Senckenbergischen naturforschenden Gesellschaft zu Frankfort a. M., 1887, p. 6, pl. 1, fig. 15.

The types of both of these species are in the collection of Mr. Aldrich.—*H. A. P. & C. W. J.*

PALUDINA JAPONICA MART. FOR SALE IN THE SAN FRANCISCO CHINESE MARKETS.

BY WILLIARD M. WOOD, SAN FRANCISCO, CAL.

While on my way down town to business from my residence one morning, about nine o'clock, I found it necessary to pass through Chinatown in order to reach a certain store where I desired to leave an order, and while walking through the narrow, crowded, ill-smelling streets of that portion of the city, which by the way, contains some twenty-five thousand Chinese, my attention was called to a very large flaring red sign, upon which were Chinese letters, hung in front of a Chinese vegetable and butcher shop. I stopped a few moments to glance down toward the bottom of this sign, and saw a good sized wooden bucket. This was filled up to the top with dirty looking water and little brown shells.

I examined one and found it alive. Now was my chance to obtain a Japanese species for my cabinet; a species which I had never seen alive in this State before.

I found the proprietor of the shop and said to him, "Where did you get these, John?" "Me no sabbe," was his reply. Then I ventured to ask him for how much he sold them, and again came his reply, "Me no sabbe." Just then a Chinamen who was standing by, turned around, and evidently saw that we could not make each other understand, for he stepped up to me and said in very good English, "What you want? I tell him. I speak English."

By this fellow acting as interpreter, I found out that the shells in the bucket were the first lot brought alive from Japan. He informed me that they were called by the Chinese "Teen Law." I immediately asked him for the translation of this name. It means Field Shell.

He went on to tell me that these shells were very good to eat, and he had just bought some, intending to take them to his wife. She would throw them into boiling water, letting them remain for a few moments. Then they were to be taken out, the operculum removed, and the foot separated from the soft body, salted, peppered and eaten.

Having asked all the questions I desired, I thanked the interpreter and then purchased some, for which I paid the small sum of ten cents per dozen.

I visited the aforesaid Chinaman the next day intending to buy a few more of the shells, but was told that so eager were the Chinese in this city to eat the delicious meat of these shells that all of them had been sold in a very short time after arriving from the Steamer.

Not knowing the exact name of this species, I forwarded a few to my ever-helpful friend, Mr. Wm. J. Raymond of Oakland, Cal., who, comparing them with some of his Asiatic *Paludinidæ*, found them to be identical with a pair of specimens under the name of *Paludina Japonica*, Mart.

While preparing some of the shells for my cabinet, I discovered that each specimen contained inside, from twelve to eighteen young shells, about the size of a small *Succinea*.

I have kept two of the larger specimens alive in a tumbler full of water, changing it every two or three days, and often putting in a piece of cabbage leaf for them to feed upon.

A gentleman who recently arrived from Japan, tells me that children of the poorer classes go out in the rice fields, near Yokohama and gather the shells, selling them for a few cents a quart.

As this was the first shipment to America of this species alive, and it being also an additional species offered for sale in the markets of San Francisco, I write the above, hoping that the same will be recorded in the "NAUTILUS" and will be of some interest to its readers.

DO MOLLUSCA SHOW CHANGE OF CLIMATE IN NEW ENGLAND?

BY REV. HENRY W. WINKLEY.

A few days ago I received from Connecticut a series of shells which I was asked to identify. The specimens being in all probability a species of *Goniobasis*, I was not only unable to identify, since I know little or nothing of that genus, but also I had never known an instance of that genus being found in New England. If it is common in Connecticut will someone kindly inform me, and if not, may I ask observers if there is a tendency among shells to migrate in a northerly direction?

Reasons for the above question are as follows: A change of climate is claimed for New England, said change bringing a warmer

temperature and is probably due to the removal of forests. It is a well-known fact that species formerly common on the coast of Maine are now extinct, or nearly so, but these would indicate a colder temperature of the sea.

In support of the changed climate of the land, botany has revealed some proofs. The writer had just published a note on this subject in "The Observer" when the above named shells were received, and hence the question naturally arose, is this species a new-comer from the south? I should be glad to hear from others, for I see no reason why the mollusca may not give interesting facts as well as plants or other animal forms.

[Selected.]

ANTIPODEAN OYSTERS.

If I have a deep and lasting affection for anything in this world, it is for oysters. Wherever I go, one of the first inquiries I make is as to the oyster supply. If that is all right, I can look at the rest of things through rosy spectacles. I find a bivalvular view of life is always a cheerful one. I have made many strange acquaintances among oysters in the South Pacific, but never had any great difficulty in adapting myself to my company. You remember how wisely and feelingly dear old Tom Moore sang on that point:

'Tis sweet to know that where'er we rove
We are sure to find oysters delicious, if dear;
And when we are far from the beds that we love,
We have but to make love to the beds we are near.

I may not have quoted the lines quite correctly, but they are near enough. The chosen Paradise of the oyster-eater is the North Island of New Zealand, for there the oysters are not only delicious but ridiculously cheap. Along the seashore in the lonely, sheltered friths and inlets about Auckland, every rock consists of a mass of oysters clustered together in a wonderful manner, but easily detached and opened when you know how. The best oyster-opening machine is a Maori girl with a brad-awl. The Auckland rock oysters have long, deep, ragged shells, but the oysters themselves are very small, plump, and beautifully shaped, very sweet and not at all coppery or watery. They are equally good raw, stewed, fried, frittered, or in a pie or

timbale. If you want to get them in perfection, however, you should sail down to the Island of Waihéké, in the Frith of Thames, fifteen miles from Auckland, a veritable Fairyland. Have your fairy on hand with her brad-awl; pick out a rock just awash at high tide; sit under a tree-fern, or in the shade of the sail of your boat; swallow the oysters alive as they come from the nymph's deft hands in their pearly, cup like shell; give each just one bite, to bring out all the flavor, as it goes down; and offer up pæans of praise to the Giver of all good things. Charles Kingsley declared a genuine Havana cigar was a thing to thank God for, and Charles Lamb wanted a form of grace to be said after reading an interesting book. The soul of man ascends to Heaven in gratitude, without a shadow of profanity, after assimilating a peck or so of Waihéké oysters. They are the most ethereal of all food. From time immemorial the Maoris have come from all the neighboring parts, and even from long distances, every summer, to feast on oysters in a particular bay at Waihéké. I have been there often. It is worth a pilgrimage from the other end of the earth. In the middle of New Zealand there are the famous Queen Charlotte Sound oysters, round and flat, and very firm in flesh, with just that sub-flavor of copper which some connoisseurs set such a value on, but which I confess I am not very partial to. Not but that I can eat a couple of dozen of Queen Charlotte Sound oysters with pleasure at any time—when Auckland rocks are not to be had. In the far south, at Stewart's Island—Providence has been very gracious to those people—superb oysters of quite a different kind are obtained in vast quantities, just when Auckland rocks are out of season. Stewart's Island oysters are large, round, flat, symmetrical oysters, which look simply splendid on the half-shell, and have a grand flavor and plenty of it, which makes them invaluable for cookery. A timbale or soufflé of Stewart Island oysters is something to make your hair curl. But nothing can shake my devotion to the Auckland oysters. It is founded on a rock. I am quite safe in saying that the biggest edible oysters in the world are found at Port Lincoln in South Australia. They are as large as a dinner-plate, and the same shape. I have seem them more than a foot across the shell, and the oyster fits his shell so well he does not leave much margin. It is a new sensation, when a friend asks you to lunch at Adelaide, to have one oyster set before you fried in butter or egg and bread-crumbs. But it is a very pleasant sensation, for the

flavor and delicacy of the Port Lincoln mammoths are proverbial in that land of luxuries. I mean, when they are cooked. Many people eat them raw, cutting off pieces with a knife and fork. I draw the line there. I was going to tell you about the Sydney oysters, in New South Wales, on the other side of the Australian Continent; but I must refrain. The memories are too tender. As Mr. Guppy said: "There are chords in the human heart."—*Edward Wakefield in Once a Week.*

GENERAL NOTES.

Shells in Pine Forests.—In "Some Notes on American Land Shells," Prof. A. G. Wetherby states that "it is not worth while to search under or about pine logs for snails . . . and such I have ever observed to be the case in Tennesse, Kentucky and North Carolina; and the scarcity of land shells in forests almost or exclusively pine, is a fact well known." This statement has been of especial interest to me, having collected mollusca in Switzerland for years. There pine—especially fir—are the principal, and to a great extent exclusive, components of the forests in the valleys, and to a great percentage in the mountains, both Alps and Jura, and many of these forests are rather rich in snails. I can state from remembrance that almost all the land mollusca living in forests at all are found also in pine woods; and on the very trunks, logs, etc. of the same wood I collected *Limax*, *Vitrina* (as high as 3 feet from the ground), *Helix* (*personata*, *obvoluta*, etc.), *Buliminus montanus* sometimes higher than can be reached by the hand; *B. obscurus; Clausilia*, different species, etc.—*Dr. V. Sterki.*

Land Shells in Pine Woods.—As a supplement to Dr. Sterki's observations, we must say that our collecting in pine districts both North and South, has given the impression that Prof. Wetherby's conclusion is correct as far as the Eastern U. S. is concerned. We have always found land shells rare in pine woods. In the Catskill Mts. where the writer collected during the past summer, the land shells ascend only as far as deciduous trees grow, none being found in the coniferous belt.—*H. A. P.*

Mr. Chas. T. Simpson left Washington last month for a collecting tour in Florida.

The Physa seem to be a rather difficult object of study, as they present various aspects in different ages and from different places. They should be carefully collected and labelled and compared from a locality in the various seasons, as far as possible.—Conf. Mr. Stearn's article in Nautilus IV, 5.—*Dr. V. Sterki.*

Florida Helices.—We collected 500 well developed *Helix jejuna* on the tops of grass and weeds where they had taken refuge from the water a foot or more in depth. We also found a small form of *Vertigo ovata* and *V. ovulum* Sterki, also *Helix auriculata* and a variety of *Helix Postelliana* in great abundance. The water had driven them out to where they were easily found.—*Geo. W. Webster, Lake Helen, Florida.*

In *Zoe*, vol. II, p. 134, Mr. Henry Hemphill has given a list of the West Coast mollusks which he has himself eaten, or known to be eaten by others. "All four of the Abalones, *rufescens, corrugata, fulgens* and *Cracherodii*, are edible, and their fine flavor has long been known to the sailors, fishermen and ranchers along the coast of California."

Helix jejuna is found in the pine woods of Florida, and, so far as I know, is the only snail found in high pine timber.—*Geo. W. Webster.*

A specimen of *Pleurotomaria Adansoniana* Crosse & Fischer, lately found on the Island of Tobago, West Indies, has been purchased by Mr. R. F. Damon, of Weymouth, England. It is the largest specimen of the species known. Mr. Damon has published a life-size figure of this magnificent specimen.

EXCHANGES.

Marine, land and fresh-water shells to exchange for the same from other localities. Lists exchanged. Would also exchange shells for works on conchology.—*Thomas Morgan, P. O. Box* 164, *Somerville, N. J.*

For exchange.—Land, fresh-water and marine shells from East and South-east Fla., for shells from other localities.—*Geo. W. Webster, Lake Helen, Volusia Co., Florida.*

I STILL HAVE a few more sets of California land, fresh-water and marine shells to exchange for other Pacific Coast and Eastern species, etc. Kindly send lists to—*Williard M. Wood*, 2817, *Clay St., San Francisco, Cal.*

VALLONIA WANTED.—Dr. V. Sterki, of New Philadelphia, Ohio, desiring to make a critical study of the American forms of this groups, solicits specimens of *Vallonia* from all parts of the Country. Named sets will be returned to each person contributing specimens. The editor heartily recommends collectors to communicate with Dr. Sterki.—*Ed. Nautilus.*

NEW PUBLICATIONS.

PROCEEDINGS OF THE CALIFORNIA ACADEMY OF SCIENCES, III, Sept. 1, 1891, contains the following conchological papers:

Notes on the Subalpine Mollusca of the Sierra Nevada near Lat. 38°, by W. J. Raymond, with appendix by Dr. J. G. Cooper. A valuable paper, giving the altitudes at which many species were found, with other useful notes. In an appendix Dr. Cooper gives additional notes on the same subject and describes and figures *Sphærium Raymondi* n. sp., *S. lenticula* Gld., *S. partumiens* Say, *S. truncatum* Linsl., *Ancylus caurinus* Cp., *A. fragilis* Tryon, *Planorbis suberenatus var. disjectus* n. var., with many useful comparative notes. As a generic term for the "calyculate" species of *Sphærium*, Dr. Cooper proposes *Primella*. This name becomes a synonym of *Calyculina* Clessin, founded upon the same peculiarity. *Planorbis suberenatus, v. disjectus* is a form like Ingersoll's *P. plexatus*, having the inner whorls on a different plane from the last one.

On land and fresh-water shells of Lower California, by Dr. J. G. Cooper. The following species are described: *Bulimulus inscendens* W. G. B. var. *Bryanti*, *Rhodea california* Pfr. subsp. ? *ramentosa*. The last is an extremely interesting discovery, as the genus has been supposed to be entirely South American, the Californian citations of earlier authors having been discredited by many.

CATALOGUE AND SYNONYMY of the recent species of *Muricidæ*, by Frank C. Baker. The species of *Muricinæ* are enumerated in this paper by Mr. Baker, with notes on their distribution, variation, etc.

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THE NAUTILUS.

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IN MEMORIAM—DR. WESLEY NEWCOMB.

Dr. Wesley Newcomb, the last of the old school of conchologists, died at his home in Ithaca N. Y. on the 26th. of January at the advanced age of 84 years. His name belongs on the roll of honor as one of a distinguished group of American Naturalists, who made themselves illustrious by their services in the development and advancement of the study of Natural History in this country, and their contributions to scientific knowledge. Among those who may be specially regarded as Dr. Newcomb's contemporaries, the names of Gould, Binney the elder, C. B. Adams, P. P. Carpenter, Bland, Conrad, Lea, Anthony, Couthouy etc., at once occur. While Lea and Jay were among the last to pass within the folds of

" * * * the low green tent,"

before Dr. Newcomb, sad as it was, no doubt, to him, to note the loss of one old friend after another, he was happy in this, that his prolonged life, brought him in contact with many kindred spirits among the younger men and workers of the present, and he had the knowledge of their friendship and regard as a consolation.

In his early life he was more fortunate than many of his scientific friends. He had the conspicuous advantages of excellent teachers and a good education. He first attended the Academy at White Plains N. Y., and afterwards the Rennselær now the Polytechnic Institute, at that time in charge of one of the best of the earlier scientists, Professor Amos Eaton; subsequently at the Jefferson Medical College, Philadelphia, and last at the Castleton Medical College, Vermont, where he graduated most creditably. As a pupil of Professor Eaton, he was, to use his own expression "forced into

the study of *shells*," in order to intelligently study *fossils*, of which otherwise he would have learned but little that was satisfactory. Living or recent shells were then termed "*Concha Marina*"—a lumping together amusingly indefinite and vague as seen in the light of to-day. To quote him further "I fancied recent shells would furnish a key to Paleontology and I expected in a few weeks of study to master the science of conchology." The result was somewhat disappointing; he found as all true students have found, whatever the path of study, that fresh vistas, eternally new, are constantly opening, and that with increased knowledge comes a wider and more distant horizon, and so like others who have the love and thirst and courage of learning, undaunted he kept right on.

His father, Simon Newcomb, of the fifth generation of the family in America, the first being Andrew who came to this country in 1635, was a physician. The son it will be noticed followed the father's profession. In 1838 he was fortunate in making a marriage that was in every way congenial; his wife a most estimable woman, his companion and friend for 54 years, survives him. After practising medicine in Albany, and a prolonged visit to the Antilles in 1846–7, in 1849 he went to California, thence to the Hawaiian islands in 1850, where he resided for five years. Here the opportunity for studying the interesting shells of the *Achatinellidae* was open to him, and he added over a hundred species to the number previously known. His exhaustive series of these beautiful forms is probably the finest extant, and the conclusions reached by him are without doubt more nearly correct, than those of other authors who have published on this rather difficult group.

In 1856 he returned to New York. In 1857 he went to Europe and part of the time had Dr. Gould for a companion. In London he had the pleasure of meeting many of the leading naturalists of the old world, Reeve, Gray, Sowerby, Adams, Hanley, Owen and others, and Deshayes, Kiener, Bernardi, Hupé and others in Paris. On his return to the United States he went to California in 1858 and established himself as a physician in Oakland, where he became well and agreeably known and soon had an ample practice. Here as elsewhere he continued his conchological studies, ever enthusiastic and ever ready to assist others as he had been from the beginning and was unto the end, all the while adding to his collection, already magnificent, and one of the finest and best arranged in the world. His generous encouragement to collectors as well as

occasional field-work himself, resulted in his adding several new species of Land, Freshwater and Marine forms to the molluscan fauna of the West Coast.

In 1867 the Newcombian collection was purchased by Mr. Cornell for the University that bears his name. Doctor Newcomb soon followed it to Ithaca and its re-arrangement and installation in the Museum of said institution, received his personal attention.

The same liberality that characterized his dealings with brother conchologists and collectors in the past, and the comprehensive system of exchanges established years before, notwithstanding the serious gaps that death had made in the list of his correspondents, continued to yield good fruit, and the collection after it had ceased to be his property, still received his fostering care, and was enriched by numerous and valuable accessions.

Dr. Newcomb was no closet naturalist wise in books yet unfamiliar with the things themselves. His erudition was inclusive and covered both. Twice he visited Europe, the chief object of his first visit being the further study of his profession; thrice he collected on the reefs in the Bay of Panama and southerly to Ecuador; also at many places in the United State of Colombia, Costa Rica, Nicaragua, Honduras and San Salvador. In 1846–7 before briefly referred to, he collected on twenty-one of the West Indian islands from Santa Cruz to Demerara, and subsequently at San Domingo, Hayti and Key West, also one winter on the Gulf coast of Florida where he made a large collection on the shores and by dredging the Sarasote Bays. In 1870 he was appointed sanitary expert to the San Domingo expedition by President Grant, the voyage being made on the U. S. S. Tennessee, and the following year, he was made one of the commissioners, to examine and report on the Sutro Tunnel, Nevada.

Dr. Newcomb was an honorary and corresponding member of many scientific societies at home and abroad. His numerous papers covering the period from 1849 to 1866, have appeared in their publications.

From the above it will be seen, how active was his life, and how enthusiastic his love of Nature. This love possessed him to the last. Of his character nothing can be said but praise. All who knew him will bear testimony to his noble sincerity and great goodness of

heart, unconsciously exhibited in numberless acts of kindness, generosity and benevolence.

So closed a life well rounded with fullness of years, of good will and of generous service. R. E. C. S.

A NEW FLORIDA UNIO.

BY BERLIN H. WRIGHT, LAKE HELEN, FLORIDA.

Unio Oscari, n. sp.

Shell smooth, oblong, subcylindrical, greatly inflated; abruptly rounded anteriorly below and subangular above; basal margin submarginate, posterior margin truncate and biangular, dorsal margin slightly arched; valves solid and not thick; beaks not prominent and always eroded; epidermis reddish-brown, darker toward the umbos and in the juveniles with fascicles of broad greenish and narrow orange-colored rays; umbonial angle rather sharp; posterior slope depressed in adults but broad; sides deeply grooved near the umbonial ridge with concentric rounded furrows; cardinal teeth very broad but depressed and not thick, oblique, very variable but usually double in the left and single in the right valve; lateral teeth curved and double in left valve; cavity of the beak nearly obsolete, cavity of the shell deep; cicatrices well impressed, the anterior distinct, posterior confluent, dorsal under the base of the posterior branch of the cardinal tooth; nacre purple and somewhat iridescent.

Diam. ·8, length 1, breadth 2·4 in. (*extreme*).

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 Acad. Nat. Sciences, Phila. and National Museum.

Remarks. 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.

It must not be confounded with *U. Hazelhurstianus* Lea, which has a rougher, blackish epidermis, greater breadth and not so inflated.

We take pleasure in naming this species for the discoverer, Mr. Oscar B. Webster, of Lake Helen, Florida.

ON THE SPECIES OF DONAX OF EASTERN NORTH AMERICA.

BY W. H. DALL.

Genus Donax Linné.

The name *Donax* is derived according to most authorities from a Greek word meaning a reed or pole, perhaps in allusion to the radiating striæ which might recall a tuft of reeds. This word is derived from the feminine verb *doneo*, to wave or shake, and the author of the genus has regarded the resulting noun as feminine, forming the terminations of his adjective specific names in *a*. Some later authors have taken the derivative Latin *Donax* a reed, or, secondarily, a slender fish (Pliny), as the original form and have regarded the word as masculine. It would seem best to follow the original usage. In the endeavor to identify some species of this genus from the Tertiaries of North Carolina it has been necessary to review the recent species of the genus from the eastern coast of the United States and the result may be summarized in the following table.

Donax s. s.

A. With a distinctly sculptured lunule.

a. Striæ punctate, lunule smaller than the truncation.

D. denticulata Linné. Texas, Bahamas, West Indies to Rio Janeiro.

b. Striæ simple, lunule co-ëxtensive with truncation.

D. rugosa Linné. Extra-limital, West Indies to Rio.

B. Without lunule, striæ simple.

1. Sharply truncate.

a. Riblets of the truncate area simple.

D. striata Linné. Extra-limital, Antilles, Colon.

D. Roemeri Phil. Short, triangular. Galveston to Vera Cruz.

D. variabilis Say. Longer, sculpture feeble. Hatteras to Galveston; W. I.?

b. Riblets granular or vermiculate.

D. texasiana Phil. Small, shape of *variabilis*. Galveston to Vera Cruz.

2. Posterior end more rounded, sculpture feeble.

a. Shell compressed.

D. fossor Say. Olive with blue rays. New Jersey to Mayport, Florida.

D. incerata Hanley. Small, subovate, very flat. Extra-limital, Bahamas.

b. Shell inflated.

D. tumida Phil. Small, very stout, polished. St. Augustine to Texas and Vera Cruz, Mexico.

IPHIGENIA Schumacher.

I. brasiliana Lam. Lateral teeth obsolete. Indian River, Florida south to Rio Janeiro.

Donax protractus Conrad is an extremely large and senile specimen of *D. fossor*. *D. variabilis* presents similar modifications when very old, becoming abnormally long and arcuate. *D. parvula* Phil., is the very young *D. fossor*. *D. Lamarckii* Desh., is identical with *D. striata* Linné. *D. angustatus* Sow. is a well-grown *D. fossor*, not quite so old as the type of *protractus*. *D. elongatus* Sow. and *Hanleyana* Phil. (*fide* Sow.) equal *rugosa* Linné, *non* Sow. The writer has received adventitious specimens of *D. californica* Conr., *D. navicula* Rve. and *D. punctostriatus* Hanl. from Florida, as indigenous to that coast. The following species are known in the fossil state from the eastern United States: *D. idonea* Conrad is supposed to be Miocene and was described from a valve cast up on the coast of North Carolina and supposed to be from a submarine bed of fossils; *D. emmonsii* Dall (Emmons Geol. N. C. p. 298, fig. 227 which has been misplaced in the text) from the later tertiaries of Cape Fear River; *D. æquilibrata* Dall, same locality, collected by Mr. C. W. Johnson; *D. fossor* Say occurs in the Pliocene of Florida and South Carolina; *D. variabilis* in the Pleistocene of South Carolina. The Miocene references to these two forms are in need of confirmation and the *variabilis* of the Pliocene of Tuomey and Holmes is *D. fossor*. The Eocene forms referred by Conrad to the genus *Egeria* are doubtfully related to *Donax*. *D. æquilibrata* may be briefly characterized as follows: shell longer in proportion to its height than in any of our recent species, rounded in front, the posterior

end rostrate and pointed; truncated area impressed, its borders not carinated and ill defined, rostrum faintly grooved, the rest of the shell polished, with obsolete impressed lines; inner margin denticulate; hinge teeth well developed, laterals strong and near the cardinals; pallial sinus rounded and extending a little in front of the beaks; the latter are well-defined, not prominent and nearly central. Lon. of shell 17, Alt. 8·9, diam. 6 mm.

MOLLUSKS AS CAT-FISH FOOD.

BY CHAS. C. ADAMS, 806 EMPIRE ST., BLOOMINGTON, ILL.

In the NAUTILUS for Dec., 1891, Dr. W. S. Strode spoke of the destruction of Anodonta which some thought was the work of cat-fish.

Speaking of the food of the cat-fish, *Ictælurus nebulosus*, L. S. in Vol. II, p. 461, Bull. Ill., St. Lab. Nat. Hist., he says: "Mollusca make one-fifth of the entire amount of the food—more than one half of them Sphærium. This genus made nearly all the food of a large group taken from the Illinois River at Pekin in September, 1882, and also of two other specimens taken in the Illinois River at Peoria in Oct., 1887. Univalves were rarely present, amounting to only two per cent. of the food, taken, however by eight of the specimens. These included the usual forms—*Valvata*, *Melantho*, and *Amnicola*, taken with two or three specimens of *Physa*. Examples of *Pisidium* were rarely noted, and two had eaten Unios."

Speaking of *Ictælurus punctatus*, Raf., p. 456, he says; "Molluscan food was a decidedly important element, being found in fifteen of the fishes and amounting to fifteen per cent. of the whole. Several specimens had taken little or nothing else—notably six secured at Havana in Sept., 1887, and one at Peoria in Oct., of the same year. The Mollusca were about equally divided between gasteropods and lamellibranchs, the former largely *Melantho* and *Vivipara*, the latter usually Unio or Anodonta."

"Notwithstanding the number of bivalves eaten by these fishes, no fragment of a shell was ever found in their stomachs, but the bodies of the animals had invariably been torn from the shell while yet living as shown both by the fresh condition of the recently indigested specimen and likewise by the fact that the adductor

muscles were scarcely ever present in the fragments. Indeed, in only a single bivalve had the posterior adductor been torn loose. The Unionidæ were usually large and thin—probably in most cases Anodonta.

"I have been repeatedly assured by fishermen that the cat-fish seizes the foot of the mollusk while the latter is extended from the shell, and tears the animal loose by vigorously jerking and rubbing it about. One intelligent fisherman informed me that he was often first notified of the presence of cat-fish in his seine, in making a haul, by seeing the fragments of clams floating on the surface, disgorged by the struggling captives."

"Still more interesting and curious was the fact that the univalve Mollusca found in the stomachs of these fishes were almost invariably naked, the more or less mutilated bodies having only the opercles attached. How these fishes manage to separate mollusks like *Melantho* and *Vivipara* from the shell, I am scarcely able to imagine, unless they have the power to crack the shells in their jaws as a boy would nuts, and then pick out the body afterward. Certainly the shells are not swallowed, either whole or broken.

"The number of Mollusks sometimes taken by a single cat-fish is surprising. As high as one hundred and twenty bodies and opercles of *Melantho* and *Vivipara* were counted in a spotted cat-fish taken at Havana in September of last year."

PUBLICATIONS RECEIVED.

TERTIARY MOLLUSKS OF FLORIDA, by W. H. Dall. Part II. *On the Marine Pliocene Beds of the Carolinas.* (Trans. Wagner Institute, 1892.) In connection with his studies of the Caloosahatchie Pliocene fauna, Dr. Dall found it necessary to consider the other east American faunas supposed to be of the same age. The area where Pliocene might be expected to occur is bounded on the north by part of Virginia, and extends southward along the coast to South Florida. In his studies of the Carolinian fauna, which Heilprin has called "Carolinian or Upper Atlantic Miocene," Dr. Dall was "forced to the conclusion that the fauna catalogued and illustrated by Tuomey and Holmes in their 'Pleiocene Fossils of South Carolina' was not a true fauna at all, but a confusion of several distinct faunas, of which one was of true Miocene age, like

the Virginia Miocene, while another might reasonably be regarded as genuine Pliocene, and the stratigraphical equivalent in South Carolina of the Caloosahatchie beds of Florida.

"These views having been communicated to Mr. Joseph Willcox, of Philadelphia, that gentleman, with the assistance of Mr. Chas. W. Johnson, Assistant Curator of the museum of the Wagner Free Institute of Science, undertook to contribute to the solution of this interesting problem. In the autumn of 1891 Mr. Johnson, under the direction of Mr. Willcox, after conferring with the writer, undertook the search for genuine Pliocene beds in South Carolina. It was thought that the search would be most likely to be successful on the Waccamaw River and vicinity, a majority of Tuomey's really Pliocene species having come from that region, while the seaward position of it relative to known Miocene of the State enhanced this probability."

The sections obtained by Mr. Johnson during his investigations, and the collections obtained, enable Dr. Dall to "assert with confidence that—1, the presence of genuine Pliocene beds has been established in both the Carolinas; 2, the Pliocene of Tuomey and Holmes has been shown to be a confusion of species belonging to at least two horizons; and 3, that the classifications based upon the supposed characteristics of this non-existent fauna may now be consigned to oblivion, or at least removed from the geologic pathway in which they have been so long a stumbling-block. That their biological anomalies enabled the writer practically to predict this result is satisfactory testimony to the value of paleontology in geological work—a value which some modern writers have too hastily called in question."

The general conclusions reached upon the conditions from the close of the eocene to the present time are of such general interest that we cannot forbear quoting them in full:

"The close of the Eocene was marked by a movement in elevation which raised Central Florida as an island above the level of the sea, separated by a wide strait from the continental shore-line of Georgia. At the same time a change of conditions took place by which the character of the fauna was subjected to a notable alteration. *Nummulites* and *Orbitoides*, genera which had formed until then most conspicuous members of the fauna, together with other foraminifera of smaller size, disappeared entirely, with numerous molluscan genera, and were replaced by others, notably *Orbitolites*. The fauna was a subtropical assemblage similar to that of the Central Antilles, and this continued for a time to be its character. Orogenic changes elsewhere intervened, and, probably by modifying the course of

the ocean-currents, affected the character of the Floridian fauna even more profoundly than did those changes which terminated the Eocene.

"The period between the inception of the Miocene and the modification of its original fauna covered the deposition of the beds comprising the Chattahooche group of Langdon and the Tampa group of Dall, and, from the fact that its warm-water fauna is best displayed in the Chipola beds of Northwest Florida, along the river of the same name, may be called the *Chipola epoch*. During this epoch subtropical mollusks, such as *Cymia* and *Voluta*, flourished as far north as New Jersey. The temperature-indications of the fauna do not differ essentially as far as our knowledge goes, from those of the previous later Eocene fauna. At no succeeding epoch do we find subtropical or tropical mollusks extending northward to such a distance from their present range. If any of the leaf-beds of Greenland are really Miocene, these facts authorize the suspicion that the period when walnuts ripened on the shores of the Arctic Sea may have been synchronous with the warm Chipola epoch of the early Miocene.

"Whether an eastward deflection of the Gulf Stream, connected with elevation of the Great Carolinian Ridge, or some other undetermined cause, offered the opportunity, a colder inshore current seems to have crept southward along the continent, penetrated the strait between Georgia and Florida, and washed the northern shores of the Gulf of Mexico. With it came the cold-water fauna appropriate to its temperature. This fauna began early in the north, nearly the whole mass of the New Jersey, Maryland and Virginia Miocene being of this character. Southward the mass relative to that of the Chipola epoch gradually diminishes, being less in the Carolinas and least in the Floridian region. With this fauna were introduced the conspicuous forms which are known as characteristic of the Miocene of Maryland and Virginia, the large Pectens and Arcas, *Venus* and *Ecphora*. Profusely developed about Chesapeake Bay, where it is found in those beds to which Darton and the writer, independently, came to apply the name of Chesapeake, the period in which it flourished may appropriately be designated as the *Chesapeake epoch*. The fauna introduced at this time has left lasting traces on the fauna of the Gulf of Mexico even to the present moment, but never reached as far south as the Florida Keys or the southern portion of the peninsula. The faunal change was decidedly the most important mutation which is traceable in the fossil vertebrate faunas of the Gulf and Floridian region during the whole of Post-Eocene time.

"The Chipola epoch here, in general, was a period of very slow and gentle elevation, followed at or near its close by a slight depression equally gentle.

"The Chesapeake epoch in the South was in the main a period of quiescent deposition, and was closed by a very important movement in elevation. In the Central American region (notably Costa Rica), the Miocene rocks were elevated to a height of 12,000 feet above the sea. The Panamic connections between the Caribbean Sea and the Pacific Ocean were definitely terminated, and the connection between the continents of North and South America finally brought about. On the northern shores of the Gulf of Mexico the elevation was more moderate, but considerable, and by it the island of Florida was united to the Georgian mainland and the previously existing strait permanently closed. This event, in the classification proposed by the writer, terminates the Miocene.

"The products of erosion resulting from the rising of the land were probably those laid down as the Grand Gulf beds of Hilgard and the Altamaha Grits of Georgia. The water in which they were deposited was for the most part fresh or brackish, and the littoral subsidence so gradual as to practically exclude the sea and its fauna.

"The Pliocene of Eastern America, as understood by the writer, begins with the culmination of the movement in elevation just described, and ends with the beginning of the Glacial period.

"The elevation on the continent resulted in the immediate increase of fluvial erosion, and the continued and accelerated creation of perezonal formations similar to the above-mentioned Grand Gulf beds, especially the Lafayette or Appomattox formation of McGee. The discharge of immense quantities of sediment must have rendered the shores less adapted to profuse molluscan life than they had been during the Chesapeake epoch. At all events, the Chesapeake fauna seems to have receded, and to have been gradually followed up by the warm-water fauna which succeeded the Chesapeake and is preserved in the Caloosahatchie beds. As the peninsula of Florida has preserved an unbroken record of this era, it would seem appropriate to apply to it the name of the Floridian epoch, and slightly modifying Prof. Heilprin's use of the term, to refer all deposits of similar paleontologic contents to a single assemblage in the system under the name of the Floridian group.

It is probable that the South American vertebrates, such as *Glyptodon*, which found their way northward after the union of the continents, did not immediately reach the Floridan peninsula; but, whatever their migrations, it is certain that during the Middle Pliocene they made their appearance in that region. Their bones, sandwiched between fossiliferous rocks of Pliocene age, establish this fact beyond controversy.

The invertebrates appear—in Florida, at least—to have flourished peacefully, and the extinction of some of the most conspicuous forms of the fauna appears to have been brought about by a movement in elevation which raised their favorite shallows above the sea—an elevation not necessarily of many feet in altitude. At all events, a majority of those species which live preferably in moderate depths of water, as opposed to littoral forms, still persists in similar situations, unmodified to any notable extent.

The orogenic independence and singular tranquillity of the area which original'y formed the island of Florida, contrast strongly with the disturbances in elevation or depression of which both continental and Antillean geology give evidence. It would seem almost as if Florida had rested on the axis of the disturbances, and the tilting northward and southward been minimized at that point.

For the beds exhibited in South Carolina along the Waccamaw, above the Cretaceous marl, as sectionized by Tuomey and Johnson, the name of *Waccamaw beds* may be adopted. For those which are found along the estuary of the Neuse River the local Indian name of *Croatan beds* may be used. Both, as will subsequently appear, may be referred to the Floridian group or epoch. The relations of our later Tertiaries may be broadly summarized as follows:

Later Eocene.

Vicksburg group (Jackson, Vicksburg and Salt Hill formations).
Ocala group (Nummulitic beds of Florida).

MIOCENE.

Chipola Epoch.

Chattahoochee group (Hawthorne and Ocheesee beds).
Tampa group (Shiloh marl, Tampa and Chipola beds).

Chesapeake Epoch.

Chesapeake group (Maryland, Virginia, etc.).
Grand Gulf group (Grand Gulf beds, Altamaha Grit, etc.—Epoch of elevation begun and in progress).

PLIOCENE.

Floridan Epoch.

Lafayette group (Lagrange beds, Orange sand, etc.; culmination of elevation).
Floridian group (Caloosahatchie, De Soto and Waccamaw beds, etc.).

PLEISTOCENE.

Glacial Epoch.

A FOURTH SUPPLEMENT TO THE FIFTH VOLUME OF THE TERRESTRIAL AIR-BREATHING MOLLUSKS OF THE UNITED STATES, by W. G. Binney. (Bull. Mus. Comp. Zool. xxii, no. 4). Mr. Binney's series of *Supplements* has become one of the established Institutions of our Conchological World. This last number is no less interesting and useful than its predecessors. It contains a resumé of systematic work in this department from the date of the 3d supplement to July 1, 1891. Most of the descriptions of new forms have already appeared or been noticed in the NAUTILUS, except the following: *Glaudina decussata var. Singleyana* W. G. B., Central Texas; *Zonites shepardi* Hemphill, Santa Catalina I.; *Z. carolinensis* Ckll., Mts. of N. C.; *Z. diegoensis* Hemphill, Julian City, San Diego Co., Cal.; *Polygyra 7-volva var. Floridana* Hemph., Oyster Bay, Fla.; *Papa coloradoensis* Ckll., and a number of new color-varieties of *Patula* and *Aglaia*.

Mr. Binney gives generic diagnoses of the genera *Pristiloma* and *Punctum*, groups which he had formerly referred to *Microphysa*. Much useful matter has been added to our knowledge of the West Coast Slugs, the figures and anatomical details being especially acceptable. The four plates illustrate the new species and varieties described. There are also numerous figures in the text. We congratulate Mr. Binney on the completion of this supplement, and hope that he will, in due time, give us still another.

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A MONTHLY
DEVOTED TO THE INTERESTS
OF CONCHOLOGISTS.

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THE NAUTILUS.

VOL. V. APRIL, 1892. No. 12.

NOTES ON THE COLONIZATION OF FRESH-WATER SHELLS.

BY WM. B. MARSHALL, N. Y. STATE MUSEUM, ALBANY, N. Y.

In the American Journal of Conchology, vol. iv, 1868, p. 245, Dr. James Lewis said:

"With a view to derive useful information for experiments in the colonization of species of mollusca, it may be well to remark that, in continuation of experiments heretofore attempted, in June, 1868, a considerable number of species of mollusca were transported from the Mohawk River to the outlet of Schuyler's Lake, in Otsego County (about 18 miles south from Mohawk). The species which were deposited there are as follows: *Melantho integra* DeKay, *M. rufa* Hald., *Trypanostoma* (*Mel*). *subulare* Lea, *Goniobasis niagarensis* Lea, *Somatogyrus isogonus* Say, *Amnicola cincinnatiensis* Anth. and *Bythinella* (?) *obtusa* Lea.

"If in future years any of these species should be detected in any portions of the Susquehanna River, it may be presumed they are derived from stock colonized in the outlet of Schuyler's Lake. Experiments made, having in view the establishment of *Viripara contectoides* Binney, (*Pal. vivipara* Say), in the Mohawk River and Erie Canal, do not seem to have been successful. It is, however, thought desirable to continue these experiments, as the results of them may possibly be such as, in some instances, to throw light on the causes which influence the production of varieties. Contributions of living molluscs for this purpose are much desired by the writer."

It would be gratifying to know the results of these experiments. Dr. Lewis' language implies that the species which he deposited in Schuyler's Lake in 1868 did not inhabit the Susquehanna nor any of its tributaries previous to that year. Perhaps some of the readers of the NAUTILUS have specimens of some of these species taken from the Susquehanna. If so they may be able to show that Dr. Lewis was mistaken in supposing that the species did not inhabit the Susquehanna; or that his experiments were successful.

So far as *Vivipara contectoides* is concerned, his attempt to colonize it in the Mohawk River and Erie Canal has been eminently successful. The species is firmly established in both the canal and river, and has spread many miles from the place of its introduction. Beautiful specimens are abundant in the neighborhood of Albany, occurring in the Erie and Champlain Canals and in the Mohawk and Hudson Rivers. The specimens found here do not show any variation from specimens taken in the natural habitat of the species.

Incidentally it may be remarked that Dr. Lewis' experiment emphasizes the importance of carefully prepared local lists of species; and the importance of recording the dates on which specimens are collected. There is no doubt that the geographical distribution of many species of mollusca is being more or less influenced by human agencies. This is especially true of fresh-water species. Canals have been dug in various parts of the country, connecting the waters of streams which differ widely in their faunæ. Other canals are in the course of construction and many others are projected. It is probable that some species of fresh-water shells will thus be afforded the means of extending their habitats.

In future years it will be desirable to know, for a given locality, what species are indigenous and what species have been introduced. In order to obtain this knowledge it is absolutely necessary that there should be exhaustive lists or collections of the species of the given locality made before the operation of man's disturbing influences.

ON AN UNDESCRIBED CYTHEREA FROM THE GULF OF MEXICO.

BY W. H. DALL.

Cytherea texasiana, n. s.

Shell resembling in general features *C. convexa* Say, but larger more elongate in proportion and with a more delicately sculptured

surface. Shell moderately inflated, beaks not very prominent, surface white, the young nearly smooth but gradually becoming finely concentrically wrinkled toward the margin and the wrinkles wavy or more or less interrupted; lunule large, similarly sculptured, bounded by an impressed line but not depressed; there is no defined escutcheon; epidermis thin, pale, closely adherent and smooth; interior chalky white, polished; pallial sinus angular and deep; margins smooth; sockets of the hinge deep, hinge teeth normal, slender; the anterior tooth small but well defined.

Shape of the shell very nearly a true oval, the height greatest about midway between the two ends; base and ends evenly rounded. Lon. of shell 67·0; alt. 49·0 diam. 32·0; beaks behind the anterior end 20·0 mm.

This fine species is No. 291 of my list in Bull. 37, U. S. Nat. Mus., where it was referred with doubt to a fossil species which proved to be of a different character. It was first collected by Wurdeman during the earliest Coast Survey work on the Texan coast (about 1856) and has since been sent to the National Museum from Galveston by R. R. Gurley of the U. S. Fish Commission and later by J. H. Singley of the Texas Geological Survey. It is a *Dione* of the section represented by *D. Sayana* or *convexa* and must, when in really fine condition, be a very elegant species.

A FEW OBSERVATIONS CONCERNING DEATH OF FRESH WATER MOLLUSCA.

BY DR. V. STERKI.

In the last number of the NAUTILUS Dr. Strode reports the death of *Anod. corpulenta* Cpr., in Thompson's Lake, Ill. To his case I would add a few observations of a similar nature, though not so striking, which may, in some way, help to elucidate the question.

A few years ago, at exceptionally low water, I found in the Tuscarawas River, numerous *Unio subrotundus* Lea, dead, in their natural positions, buried in the gravel, the valves slightly gaping. The soft parts were in a more or less advanced state of putrefaction, partly dark colored. This last fall I noticed the same phenomenon in the same place; it was amidst the river bed, around some small low-water banks, in very shallow and comparatively quiet water,

while quite near, in deeper and running water, the mussels were alive and healthy as usual. There is hardly a doubt as to the cause of death in this instance: fish certainly did not kill them, nor any other animal; but evidently it was the sun heating the bottom and the water, probably also changing the latter, and in addition, promoting the development of bacteria, etc., causing disease.

As to the wholesale destruction related by Dr. Strode, the case is somewhat different, since there was a lake 5 miles long, but very shallow, as the doctor says in the April number, and *Anod. corpulenta* lived near the shore. May we not draw the conclusion from these facts, that the long continued heat and evaporation, directly and indirectly, probably were the cause of that terrible dying? On the other hand, we may think that one species is more delicate, more predisposed to and less resistant against certain destructive agents. It is too well known that the past late summer and fall were exceptionally dry, and I presume that not only millions of fish as well as Najades and other fresh-water animals fell its victims in a great part of the country—from drying up as well as from deterioration of the water—but also of the minute and delicate land snails a great percentage probably perished.

In October past I visited a few small ponds, sloughs, where the water had dried up for the most part in some, still standing 1–1½ feet deep in others. Most of the aquatic plants, thrifty in spring and early summer, were rotten or in poor condition, a dark, sooty mass covering the bottom, evidently the remnants of decayed organic matter. Of mollusca, there were very few alive, and to my surprise, the *Limnæidæ* were almost all dead, while in one place numerous *Amnicola* were living, in another *Valvata tricarinata*: is it not strange that "pulmonata" could not survive where branchiata were doing well?

Again in November I found on Tuscarawas river, a small mud hole, about 5 feet long, the water two feet deep, on the bottom a thick layer of that dark, soot-like mass. There were a number of *Melantho*, evidently in good health, while I could not detect a single specimen of *Limnæa*, *Planorbis*, *Physa* or *Ancylus*.

These observations were made somewhat hastily, and might have been more exact; yet I think they are not without some interest.

THE LAND MOLLUSCA OF THE CAYUGA LAKE VALLEY.

BY NATHAN BANKS.

Cayuga Lake is one of a series of lakes in central New York. The region around its upper end is very interesting, not only on account of its beautiful and varied scenery but also because of its rich flora and fauna. The hills are high, and there are numerous streams which have worn deep gorges in the hillsides. At the head of the lake is a large marsh. Not far from the lake (about ten miles from Ithaca) are several Sphagnum bogs. The varied natural conditions favor an augmentation of species; and, I think for a locality in the northern part of the U. S., the following list is moderately large. Some of the smaller species are not represented, perhaps because I did not look sufficiently close for them. Many notes were made on local variation, distribution and the habits of the more common species. The fresh water shells were also collected and made a good showing. In the list I follow nearly the arrangement of Pilsbry's list.

1. Selenites concava Say. Common.
2. Limax maximus Linn. Uncommon.
3. Limax flavus Linn. More common.
4. Limax campestris Binn. Quite common.
5. Vitrina limpida Gld. Rare.
6. Zonites fuliginosus Griff. Common.
7. Zonites friabilis Binn. Rare.
8. Zonites levigatus Pfr. Uncommon.
9. Zonites intertextus Binn. Frequent.
10. Zonites ligerus Say. Uncommon.
11. Zonites inornatus Say. Frequent.
12. Hyalina nitida Mull. Not uncommon.
13. Hyalina arborea Say. Very common.
14. Hyalina radiatula Alder. Frequent.
15. Hyalina indentata Say. Frequent.
16. Hyalina limatula Ward. Uncommon.
17. Hyalina minuscula Binn. Frequent.
18. Hyalina milium Morse. Rare.
19. Hyalina binneyana Morse. Rare.
20. Conulus fulvus Drap. Common.
21. Gastrodonta multidentata Binn. Frequent.
22. Tebennophorus carolinensis Bosc. Common.
23. Tebennophorus dorsalis Binn. Frequent.
24. Patula alternata Say. Very common.
25. Patula perspectiva Say. Uncommon.
26. Patula striatella Anth. Frequent.

27. Helicodiscus lineatus Say. Common.
28. Punctum minutissimum Lea. Common.
29. Mesodon thyroides Say. Common.
30. Mesodon albolabris Say. Very common.
31. Mesodon dentiferum Binn. Rare.
32. Mesodon sayii Binn. Uncommon.
33. Stenotrema hirsuta Say. Very common.
34. Stenotrema monodon Rack. Very common.
35. Triodopsis tridentata Say. Very common.
36. Triodopsis palliata Say. Frequent.
37. Vallonia pulchella Mull. Very common.
38. Strobila labyrinthica Say. Uncommon.
39. Pupa corticaria Say. Frequent.
40. Pupa rupicola Say. Uncommon.
41. Pupa armifera Say. Common.
42. Pupa contracta Say. Common.
43. Pupa simplex Gld. Rare.
44. Pupa milium Gld. Uncommon.
45. Vertigo ovata Say. Uncommon.
46. Vertigo gouldii Binn. Frequent.
47. Vertigo bollesiana Morse. Uncommon.
48. Vertigo pentodon Say. Frequent.
49. Ferrussacia subcylindrica Linn. Frequent.
50. Succinea avara Say. Rare.
51. Succinea obliqua Say. Common.
52. Succinea ovalis Gld. Frequent.
53. Carychium exiguum Say. Rare.

I include *Carychium* on the list because I have always found it, though in damp places, quite removed from bodies of water. It was usually found on the roots of various plants that grew in damp places. The *Succinea avara* was found but once, and not far from water; the *S. ovalis* usually near the lake shore. *Ferrussacia* was frequent under leaves in very damp places. *V. pentodon* was the most common *Vertigo*, often on the exposed roots of cedar. *Pupa simplex* was found but once, and in a very wet locality. *P. contracta* and *armifera* were common in various places; but *P. contracta* was found in more places than *P. armifera*. *P. corticaria* was always seen on trees. *Strobila* was found in places where *P. armifera* and *contracta* were common and *E. multidentata* was occasional. *Vallonia pulchella* could be found both in wet places and under dry stones, high up on hills. *Triodopsis tridentata* was everywhere but *T. palliata* was usually found in damp and shady glens. *S. hirsuta* and *monodon* anywhere under stones and pieces of wood. *Mesodon albolabris* was larger on the hillsides than in the valleys. In some small localities *M. thyroides* was more com-

mon than *M. albolabris*. *M. dentifera* was only seen in very dark, cold, wet swamps, in places where *T. palliata* seemed to flourish best. *M. sayii* was found on hills in dry places. I have noticed a curious habit of economy in some specimens of *M. thyroides*. On watching them crawl alternately over very rough and glazed paper, I saw that while moving over the rough paper the whole length of the foot was upon the paper; but on glazed paper the animal would only touch the paper in two or three points, keeping two or three parts of the foot free from the paper. Thus, the track of the snail over the glazed paper consisted of a series of spots of dried slime where the foot had touched, while the intermediate spaces were perfectly clean. *H. lineata* was usually found in wet and rocky places. *P. striatella* was found in similar locations, while *P. perspectiva* was found under logs and chips of wood in dry places far removed from bodies of water. *P. alternata* hibernates in large communities; forty-four specimens, over a year old, were found under a single overturned rotten stump. *T. carolinensis* usually in rotten logs, but sometimes climbing trees. *T. dorsalis* in very wet places. *H. indentata, radiatula* and *nitida* were most abundant in damp places. *Z. inornatus* usually in the valley, while *Z. lævigatus* and *intertextus* were most common on hills and rocky places. *Vitrina* was only found on a low island in a pond, almost at the water's edge. *L. maximus* was sometimes seen quite a distance from buildings. *S. concava* was most common in rocky situations.

A FEW QUERIES AND NOTES.

BY T. WAYLAND VAUGHAN.

In the discussion of Messrs. Simpson and Dean, relative to the distinguishing characteristics of *Unio radiatus* Barnes, and *Unio luteolus* Lamarck, one point seems not to be brought out, that would surely interest all lovers of *Najades*. Are there ever any variations that show the gradual vergence of the hard, highly polished epidermis of *luteolus* into the rougher epidermis of *radiatus*?

Of *hydianus*, a close relative of *luteolus*, I can say: to-day, I examined over 250 specimens (I counted the specimens), from four streams in Northwest Louisiana, to see what variation there might be in the character of the epidermis. In nearly every specimen, the epidermis was perfectly smooth, glass-like, throughout. In a *few*

large somewhat overgrown specimens, towards the margin of the shells, the epidermis was somewhat rough, corresponding to the lines of growth; but then, not in the least presenting any such appearance as shown by *U. radiatus*.

As showing how variable in form *U. hydianus* is, the following measurements from two female specimens may be of interest.

First specimen, length 61·5 mm., height 42 mm., diameter 36 mm. Second specimen, length 55 mm., height 33 mm., diameter 20 mm.

The great amount of this variation may be made clear to the eye, by laying off on a line the length of the first specimen, on a line perpendicular to the first, lay off the diameter of the first specimen; on the same lines as axes, lay off the corresponding dimensions of the second specimen.

In this day of scientific enlightenment, men have come to look upon *chance* as having no place in *Nature*—but all is the outcome of certain definite causes, which may often act in a complex manner. Accordingly our friends in the botanical world have tried to explain to us the origin and use of the varied beautiful forms and colors that we find among flowers; the entomologists try to explain to us the origin and use of various colors—some sombre, some gaudy—that we find in the insect world. A certain amount of study has been put upon the origin and use of colors among marine molluscs; and dynamical causes have been proposed for structures found among marine molluscs. Has anyone ever tried to account for the radiations in our *Unionidæ?* or for the magnificent purple nacre of the Uniones *purpuratus, graniferus* or *verrucosus?* What is the origin and use of the pustules, found in the many groups of *Unionidæ?* What is the origin and use of the plications in our various plicate *Unionidæ?* Also, have the adult *Unionidæ* been found to have any natural enemies, that feed upon them? Do turtles ever eat *mussels*, might be asked.

These are questions that no one is paying any attention to, seemingly, and surely offer room for much work among students of *Unionidæ*.

We have lately received specimens of *Helix vendryesi* n. sp. from Mr. T. D. A. Cockerell, of Kingston, Jamaica. The new form closely resembles *H. sloaneana*, but is more depressed than usual in that species, is more carinated, and of a very handsome dark purple-brown color. It is from Montego Bay, Jamaica.—*H. A. P.*

MORTALITY IN MUSSELS AT ORANGE, VA.

BY W. J. FARRER, ORANGE, VA.

Referring to Mr. Strode's paper in the December number of the NAUTILUS, I, too, have been lately much puzzled at finding dead mussels in large quantities in the ponds about this place; hundreds may be picked up each morning on the edges of one pond, especially that belonging to a grist mill. *U. hyalinus* and *A. williamsii* seem to be the principal sufferers, for although *A. edentata*, *M. undulata* and *U. complanatus* abound in the same pond, only a few *empty* shells of these latter are found and they seem to have been cleaned, out by raccoons; the other two species are always found with the animal entire and for the most part full of spawn. This, as well as the other ponds about, has been unusually low throughout the last two months and with Mr. Strode I think low water and not catfish, accounts for the bivalve mortality.

I may mention that in the same pond large numbers of catfish have died throughout the summer and autumn; some I took in a dying state had a growth of fungus on the body.

LITTORAL LAND SHELLS OF NEW JERSEY.

BY H. A. PILSBRY.

The Atlantic shore of New Jersey is so sandy that few land snails find suitable conditions there. I have seen specimens of only the following species from the immediate neighborhood of the coast, restricting this to a strip of say one or two miles inland.

Helix (Mesodon) thyroides Say.

All the eastern New Jersey specimens are thin and light, resembling the *bucculenta* form more than the typical *thyroides*.

Those from Asbury Park are toothless, have the umbilicus half covered, and measure from 17 to 19 mm. diameter.

Specimens from Point Pleasant, N. J., collected by Messrs. F. H. Brown and Witmer Stone are even smaller than those collected by myself at Asbury Park. Compared with the typical *thyroides* these specimens are much smaller, generally more globose and conoidal,

although this character is variable. The umbilicus is about half closed. Specimens measure:

a. Alt. 12, diam. 16½ mm.

b. Alt. 10½ diam. 17 mm.

A very small tooth is developed in some examples. The shells correspond more closely to the southern variety *bucculenta* than to the usual *thyroides* of the north. It appears, indeed, as Mr. Stone has suggested to me, that this form is a member of the Carolinian fauna, which extends far to the northward in eastern New Jersey.

Helix (Mesodon) albolabris maritima Pils.

Many specimens from the vicinity of Cape May, N. J., have been examined, collected by Mr. Witmer Stone and Prof. C. LeRoy Wheeler. They exhibit but little variation. I have also seen specimens from a locality in Long Island, N. Y., and a form which Mr. Bryant Walker tells me is quite similar, has been found in Michigan, inhabiting a locality having much the same physical features as the sand hills of Cape May.

Zonites arboreus Say.

The writer has collected this at Asbury Park.

Philomycus carolinensis Bosc.

A small specimen was found at Asbury Park.

PRELIMINARY NOTICES OF NEW FORMS OF FRESH WATER MOLLUSKS.

BY H. A. PILSBRY.

Vivipara georgiana var. altior Pilsbry.

Shell pyramidal, *elongated*, composed of 6½ to 7 whorls, separated by deep sutures. The whorls are flattened or sunken around the upper portion, convex below, giving a decidedly cadaverous appearance to the shell. Some specimens have a scaliform appearance. The surface is marked with growth-lines and irregular wrinkles, but some specimens show distinct spiral lirae. All of the specimens seen (30 in number) are bleached, but some show faint traces of reddish bands. The umbilicus is narrow, often a mere chink.

Alt. 46, diam. 25 mm.

Alt. 43, diam. 24 mm.

From an aboriginal shell-heap on the left bank of Hitchen's Creek, near the entrance of the St. John's River into Lake George, Florida. Collected by Mr. C. B. Moore.

The great variability of these shells and their distorted aspect inclines me to place them as a local variety of *V. georgiana*, but they are so very different in appearance from that species, that in the absence of intermediate examples, I am inclined to regard them as an individualized race deserving a name.

Fluminicola merriami Pilsbry and Beecher.

Shell small, globose-turbinate, narrowly but distinctly and deeply umbilicated. Spire low-conic, acute; whorls 4, slightly shouldered below the sutures, the upper-lateral portion rather flattened, periphery and base convex. Surface smooth, horn-colored. Aperture oblique, ovate, angled above, broadly rounded below; upper portion of the inner lip adherent to the body-whorl, lower portion arcuate, without a callous thickening.

Alt. 3, diam. 2½ mill.

Collected from a warm spring (temperature 97° F.) in Pahranagat Valley, Nevada, by Dr. C. Hart Merriam, and submitted to the writer by Dr. R. E. C. Stearns.

This species differs from *F. fusca* Hald., in the much more distinct umbilicus, thin texture, and the non-thickened inner lip.

Specimens may be seen in the National Museum (no. 123,626) and the Academy of Natural Sciences collections. *F. merriami* will be figured in the monograph of American *Amnicolidæ* now in preparation by Mr. C. E. Beecher and the writer.

GENERAL NOTES.

A CORRECTION. In the March NAUTILUS, p. 127, line 13, instead of *he says* read *Prof. Forbes says.*—*C. C. A.*

EXCHANGES.—We purpose to devote one of the inside cover pages, hereafter, to offers of exchange, and all subscribers are invited to offer their duplicates and call for their desiderata therein. Exchanges will be inserted free of charge, but they should not exceed five lines in length.—*Eds.*

A NEW GENUS of *Helicinidæ* has been described by Commandant L. MORELET, in the last number of the *Journ. de Conch.* It is like *Helicina* in form, and in absorbing the internal whorl-walls, but differs in having several plicæ or folds upon the parietal wall. This type, which is named *Calybium*, is from Laos, (Indo-China).

The operculum is unguiform, with terminal nucleus. It apparently represents there the *Proserpina* and *Ceres* of tropical America. The type is *C. massiei* n. sp., a form measuring over three-fourths of an inch in diameter.—*H. A. P.*

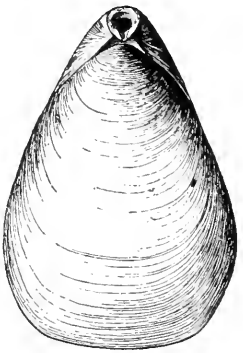
DR. W. H. DALL, of the Smithsonian Institution, is about to leave Washington for California, where he will engage in field-work for three months.

RECENT LITERATURE.

STUDIES AMONG MOLLUSKS—INSTINCT AND GENERA, by Henry Hemphill. (*Zoe.*, Jan., 1892). The author discusses certain apparent anomalies in the structure of land mollusks, freely criticising the conclusions reached by the anatomical school of investigators. He elaborates the idea formerly advanced by himself, that snails display instinctive impulses in the building and decoration of their shells. "The shell bears the same relation (mechanically) to the animal, that the web does to the spider." While we are obliged to disagree totally with Mr. Hemphill's conclusions, the paper is still in some respects suggestive.

THE AMERICAN NATURALIST for January, 1892, contains an article upon the shell-bearing mollusca of Portage Co., Ohio, by Mr. Geo. W. Dean. An annotated list of the species is given. The proof-reader is not quite as punctilious as we could desire, in the matter of spelling names, and one or two difficult species are probably wrongly identified, such as *Physa ampullacea* Gld.; but the list is generally useful. *Bythinella nickliniana* is reported from Portage Co., a locality west of any we have hitherto noticed.

The *Naturalist* is now published by Messrs. Binder & Kelly, of Philadelphia, the editors being Professors COPE and KINGSLEY, as in the past. The editors and publishers purpose to make this once excellent magazine even better than it has been in the past.—*H. A. P.*



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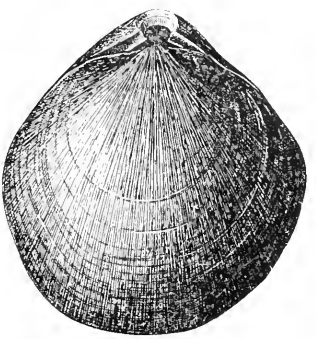

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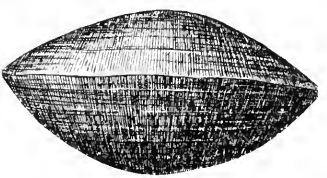

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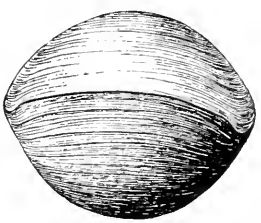

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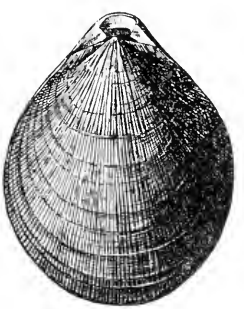

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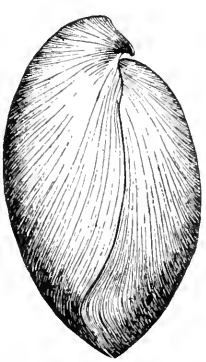

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STEARNS' JAPANESE BRACHIOPODA.