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THE NAUTILUS

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CYCLOSTREMATIDAE AND VITRINELLIDAE OF FLORIDA—I

By H. A. PILSBRY and THOMAS L. McGINTY

The minute shells known as Cyclostrematidae and Vitrinellidae have received little attention from authors and collectors working on mollusks of Florida. This is mainly owing to their diminutive size—they go through the sieves ordinarily used in collecting; but under the microscope, many of them are quite equal to larger shells in symmetrical form and elegance of sculpture.

In these papers we are giving an account of the Floridian species known to us, with illustrations. Any conchologist having undetermined material can probably add materially to our knowledge of the group by communicating it to the authors.

The genera are not taken up in any systematic sequence—the classification of these snails being admitted to be chaotic. Our observations on their anatomy will be taken up later.

Nearly all of the figures were drawn by the junior author.

Teinostoma H. & A. Adams

Teinostoma was virtually a monotypic genus for *T. politum* A. Adams, new species, which was defined by a figure; "*T. anomalum* C. B. Adams," also included by the brothers Adams, was an absolutely nude name, therefore automatically ruled out of consideration as a genotype. *T. politum* is a large (diameter 8–9 mm.), smooth, depressed species in which the outer extremity of the peristome flares outward. Figures will appear in Pilsbry & Olsson's paper on Panamic Cyclostrematidae. Our Floridian species are all far smaller and without the peculiarity mentioned.

Of the four species placed in *Teinostoma* in Johnson's list of 1934, only *T. cryptospira* (Verrill), from off Hatteras, is properly referable to this genus. *T. semistriata* (Orbigny), described as a *Rotella*, and made type of *Pseudorotella* by Fischer, apparently belongs here. We agree with Fischer and Dall in considering *Pseudorotella* to be at best only a subgenus of *Teinostoma*. "*Pseudorotella*" *solida* (Dall), described as an *Ethalia*, and "*Pseudorotella*" *floridensis* Dall, have been reported from off Fernandina, Florida, in 294 fms. Both are rather globose, the height/diameter ratio about 73 to 75 percent, and the suture is distinct. Their generic place is uncertain. We have not seen them.

The count of whorls is often somewhat uncertain on account of difficulty in seeing the suture, which in some species is glazed over with a coat of translucent enamel (opaque in fossils), sometimes covering the apex also. In some others a thick callous filling of the upper crevice of the shell cavity shows through on the spire as a line parallel to the real suture, which at best is usually quite superficial.

The following key may aid in the identification of Floridian species.

1. Umbilical callus encircled by a keel (Subgenus *Annulicallus*) ..... *T. lituspalmarum.*
2. Umbilical callus and columellar lobe not closing the umbilicus completely (Subgenus *Ellipetylus*) .... *T. cocolitoris.*
3. Umbilicus closed by the callus, which passes smoothly into the base (Subgenus *Idioraphe*).
   - A. Periphery strongly carinate ..... *T. goniogyrus.*
   - AA. Periphery rounded (or quite obtusely or indistinctly angular).
     - B. Surface spirally striate.
       - C. Umbilical callus extremely convex and thick. *T. pilsbryi.*
       - CC. Umbilical callus strong, slightly convex.
         - D. Strongly spirally striate throughout; diam. 2.3 mm. ..... *T. clavium.*
         - DD. Rather weakly striate above only; diam. 1.45 mm. ..... *T. nesacum.*
       - CCC. Umbilical callus small, imperfect, leaving a crease; striation excessively minute; diam. 1.6 mm. ..... *T. incertum.*

BB. No spiral striation.
C. Diameter about 2 (1.8 to 2.2) mm.
D. Rather globose, h/d ratio 75.
T. parvicallum.
DD. Depressed, h/d ratio about 50.
E. Callus large ..... *T. obtectum.*
EE. Callus small .... *T. biscaynense.*
CC. Diameter 1 mm.; callus thick. ... *T. lerema.*

TEINOSTOMA GONIOGYRUS, new species. Plate 1, fig. 8.

The shell is rather thin, smooth, translucent white, depressed, bi-convex, with a strong peripheral keel and a very prominent umbilical callus. There are 3 whorls, regularly increasing, with a distinct but slightly impressed suture, the last whorl convex above and below the strong, round-edged keel, which becomes weaker at the end. The rather strongly oblique aperture is circular except for an angle above. Outer lip thin, the upper margin very little arched forward, basal margin but slightly curved in basal view, the columella emitting a high, thick callus over the umbilicus. Parietal callus thin, its edge indistinct (probably on account of immaturity). Diameter 1.95 mm., height 0.75 mm.

Off Destin, west Florida, in 18–20 fms., marl bottom (T. L. and P. L. McGinty, Oct. 1941). Type in McGinty collection.

This species resembles *Teinostoma carinatum* (*Rotella carinata* Orb.) of St. Thomas, in shape, but in place of the small umbilical callus of that species, ours has a remarkable, extremely thick callus, exceeding that of any other *Teinostoma* except *pilsbryi*. Under a high power some faint traces of close spiral striation can be seen in a few places on the unique type.

TEINOSTOMA PILSBRYI McGinty. Plate 1, fig. 5.

McGinty, 1945, Nautilus 58: 142.

The type was in worn condition. A fresher specimen from the north inlet of Lake Worth shows that the strong spiral striae are more or less distinctly granose, by the incidence of close retractively axial striae. On the base these striae are conspicuous in the intervals of the spirals. The umbilical callus is not always as regular in shape as in the type, but it remains conspicuously thick. Diameter 2 mm.

Palm Beach to Cape Florida.

TEINOSTOMA CLAVIUM, new species. Plate 1, fig. 1.

The shell is solid, white, depressed, transversely dilated, closely striate spirally. Spire and base are about equally convex. There are about 2⅔ whorls, rapidly increasing; about one whorl is smooth; the rest are weakly convex, with sculpture of fine, spiral threads about as wide as their intervals. Suture superficial, becoming straight and tangential in the latter part. Periphery rounded. The base is rather evenly convex, its center occupied by the thick slightly convex, smooth umbilical callus, continuous with a heavy parietal callus, which extends in advance of the end of lip. The aperture is roundly ovate, angular above. Peristome blunt, the columella rather thick, separated from the umbilical callus by a slight ridge (indicated in the figure by a line). Diameters 2.3 and 1.8 mm., height 1.3 mm.

Tavernier, Key Largo (B. R. Bales). Type 181106 ANSP, paratypes in Bales collection.

The somewhat oval, "transversely dilated" outline, the strongly developed spiral striation and the heavy umbilical and parietal callus, are characteristic.

TEINOSTOMA PARVICALLUM, new species. Plate 2, fig 2.

The rather thin, faintly amber (or milky-translucent) shell is moderately depressed with low conic spire and glossy surface. There are 4 slightly convex whorls, appressed at the suture and with a thin wash of callus there, which makes the actual suture indistinct. Sculpture of faint lines of growth only. The periphery is broadly rounded. Base convex, quite slightly concave around the central callus. Umbilical callus small but moderately thick, translucent, a low convexity running down its middle to the basal lip; the parietal callus extends shortly in front of the upper lip insertion: it is rather thick, especially in the upper angle of the mouth. Aperture is oblique, rounded ovate, being angular above. The peristome is rather thick. Columella evenly curved, moderately thick. Diameter 2 mm., height 1.5 mm.

Missouri Key, Florida, under stones (Bales and McGinty). Type 181105 ANSP, paratypes in Bales, Weber and McGinty collections. Also 1½ miles off Cape Florida in 70 ft. (J. A. Weber). Lake Worth near the North Inlet, living under stones (McGinty). Off Palm Beach in 50 fathoms (T. L. & P. L. McGinty); Fort Myers beach, western Florida (J. A. Weber). Bonefish Key (McGinty).

A rather globose species with small umbilical callus, but closing the umbilicus at all stages of growth. The type specimen has some reddish stains, and possibly its faint amber tint is due to stain.

TEINOSTOMA BISCAYNENSE, new species. Plate 1, fig. 4.

The strongly depressed shell is glossy and smooth except for fine weak growth-lines; about equally convex above and below, with rounded periphery and small umbilical callus. There are about 3½ whorls, the first projecting, the next rather narrow and flat, the last whorl increasing very rapidly. The suture is distinct, visibly impressed, not obscured by overlaid callus. The broadly ovate aperture is rather strongly oblique, angular above. The upper margin is thin, arching rather strongly forward. The columella is rather thick, rounded, reflected in a broad callus covering the umbilicus and passing into a rather thin parietal callus, which is thickened in the posterior angle of the aperture. Diameter 1.8 mm., height 0.9 mm.

Biscayne Bay at Coconut Grove, in shell sand (J. A. Weber). Type 181104 ANSP. Also on rocky sand bars in Biscayne Bay, near Baker's Haulover, in shell sand (Weber, McGinty and Pilsbry).

This species resembles the description of *Teinostoma reclusa* (*Ethalia r.*, Dall, Blake Rep. p. 361) in size and small umbilical callus; but the figure of that species shows a much more elevated spire, and the upper margin of the lip is different in shape. The callus in our shell is not polished, rather heavy, and extends farther out behind the basal lip than usual. The umbilical lobe is rather sharply limited, but the space beyond it is filled in.

TEINOSTOMA NESAEUM, new species. Plate 1, fig. 2.

The shell is rather strongly depressed, about equally convex above and below, with rounded periphery; glossy, with some spiral striae on the upper surface, none on the lower. There are apparently about 2½ whorls, but the sutures are obliterated by a coat of translucent callus which covers the spire, with a shallow impression over the apex. The upper surface shows shallow spiral striae which weaken towards the periphery and disappear on the base. The aperture is oblique, rounded, but acute at the upper angle, which however is filled, making the cavity round. Outer lip blunt. Columella thickened, passing

into the rather thick parietal callus. Umbilical callus thick, slightly convex, a trifle rugose. Diameter 1.45 mm., height 0.75 mm.

Missouri Key, one of the middle keys, Florida, living under stones (T. L. McGinty, Mar. 1941). Type 181117 ANSP, paratypes in McGinty coll. Additional locality: rocky sandbars in Biscayne Bay near Baker's Haulover, Miami (Weber, McGinty & Pilsbry, 1945).

The type specimen, which was taken alive, has a dilute rufous tint, as if covered with a thin glossy colored epidermis, the umbilical callus translucent whitish; but possibly this is an acquired stain. Name from νησαῖος, of an island.

TEINOSTOMA OBTECTUM, new species. Plate 1, fig. 6.

The moderately solid smooth shell is strongly depressed, transversely dilated, the spire covered with a translucent glaze through which the suture shows. About three rather rapidly increasing but regularly spiral whorls are visible through the subtransparent callous coat over the spire, which superficially shows no trace of the suture. The periphery is rounded, the base not very convex. Aperture is rounded, but angularly produced and slightly channelled above, and with a flattened parietal outline. Outer margin of peristome thin, the concave columella rather thick, passing into the rather large and slightly convex umbilical callus. Parietal callus is rather thick. Diameters 2.2 and 1.65 mm., height 0.95 mm.

"Treasure Island," the first islet south of Singer bridge, northern end of Lake Worth, Palm Beach, Florida, in shell sand (T. L. McGinty, 1937). Type 181121 ANSP.

The elliptical outline, the strong depression, and the callus smoothly covering the spire, distinguish this species, which is known by a single shell. A small nick in the outer lip was restored in the figure.

TEINOSTOMA LEREMA, new species. Plate 2, figs. 1, 1a.

The shell is minute, rather solid, translucent white and smooth, about equally convex above and below. There are about 3 whorls, but the spire is glazed over, the spiral suture indistinctly visible through, not forming a line at the surface. The periphery is broadly rounded. The aperture is small, circular,

the upper angle filled with callus. Peristome thick for so small a shell. Columella rather thick. Umbilical callus thick but only slightly convex its edges indistinct, extending up into the thick parietal callus which extends somewhat in front of the upper lip insertion. Diameters 1 and 0.7 mm., height 0.45 mm.

Missouri Key, Middle Florida keys, living under rocks (T. L. McGinty, March, 1945). Type 181120 ANSP.

The smallest of our species. (Λήρημα, a trifle.)

TEINOSTOMA INCERTUM, new species. Plate 1, fig. 7.

The shell is depressed but with a low-conic spire with distinct suture, a bluntly subangular periphery, microscopic spiral striation, and very little umbilical callus. Whorls 3⅔, convex, with impressed, linear suture, the periphery of last whorl very obtusely subangular. The base is moderately convex, concave around the center. The oblique, circular aperture is somewhat angular above. Peristome blunt but rather thin outwardly; the columella very thick, passing into a moderate parietal callus. Behind the columellar thickening an umbilical callus closes the umbilicus, its edge ill-defined except towards the front of the shell, where it terminates in a rather deep crease. Diameter 1.6 mm., height 0.95 mm.

Off Destin, northwest Florida, in 18–20 fathoms, marl bottom (T. L. & P. L. McGinty, Oct., 1941). Type 181118 ANSP.

The close spiral striation is too minute to be shown in the figures, and probably would not remain in beach specimens. The uncertainty implied in the name is not as to the validity of the species, but as to its systematic place. The deficient umbilical callus and the distinct suture are rather unlike *Teinostoma*.

Annulicallus, new subgenus. Shell Teinostomoid, with the umbilical callus bounded by a keel terminating in a baso-columellar projection on the peristome. For the following species.

TEINOSTOMA LITUSPALMARUM, new species. Plate 2, fig. 3.

The moderately depressed shell is white, with a low keel or angle at the shoulder and a sharp ridge around the umbilical callus. There are slightly more than 3 whorls. The suture is impressed but somewhat calloused. The surface, in proper light, shows an extremely minute and close but shallow spiral striation. The last whorl has an angulation or low keel not far

below the suture, defining a flat shoulder, the periphery being broadly rounded; the base is convex, with a strong but narrow keel around the umbilical callus. Aperture somewhat oblique, rounded, but angular at the upper extremity, and slightly so at the termination of the shoulder angulation. Peristome thin outwardly, bearing a projecting point in baso-columellar position. Columella rather thick, and passing above into a moderate parietal callus, not spreading in front of the lip-insertion, and extending very nearly to the encircling keel. Laterally the columella is continuous with the steeply inclined, flattened pad of the umbilical callus. Diameter 1.7 mm., height 1.2 mm.

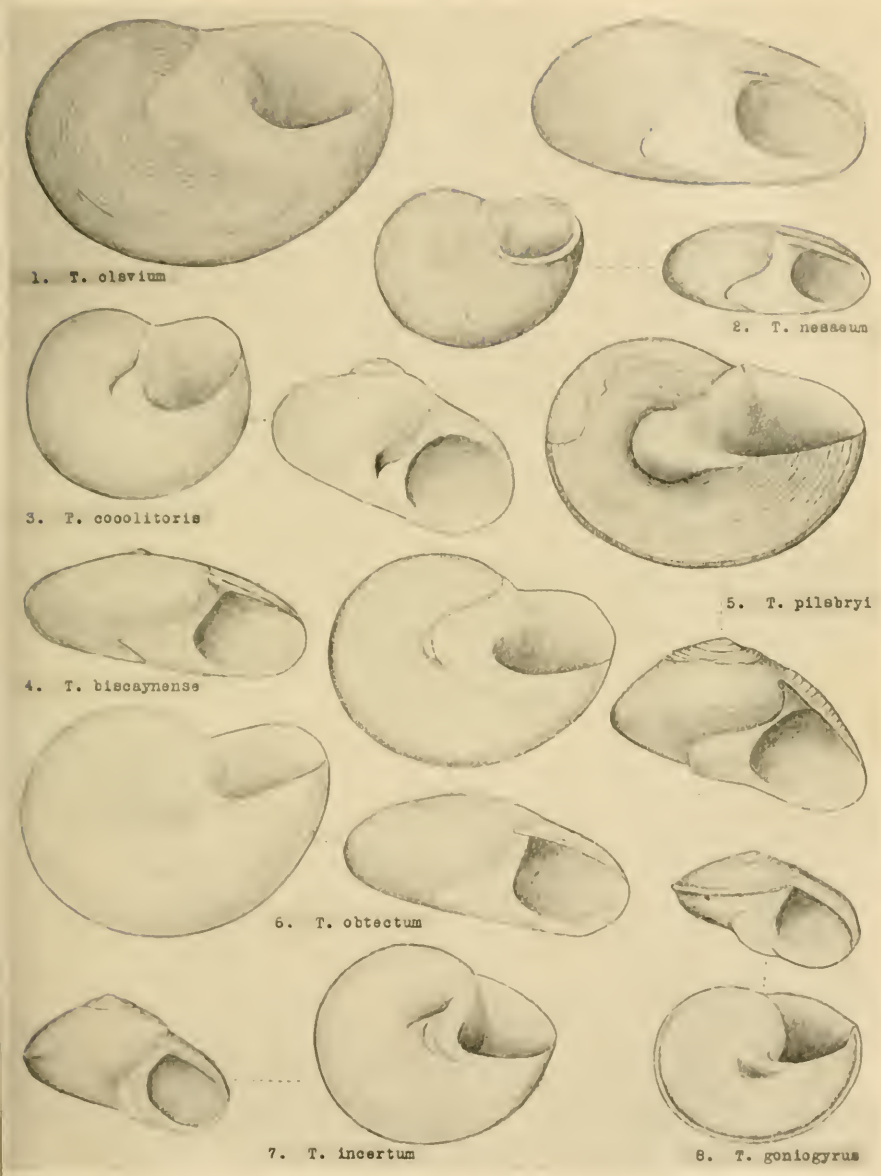
Off Palm Beach in 50 fms., rocky reef (T. L. & P. L. McGinty, 6–8–1940). Type 181103 ANSP, paratype in McGinty collection. Also, 1½ miles off Cape Florida, in 70 ft. (J. A. Weber, 1943).

This minute shell, named for beautiful Palm Beach, is unique for the smooth surface and basal keel, but it has the umbilical callus and glazed suture of *Teinostoma,* and we think belongs to that group. The spiral sculpture is so minute and superficial that it would hardly be seen on "dead" or beach specimens. The umbilical callus is slightly rugose while the columellar callus proper is smooth.

Ellipetylus, new subgenus. The shell is *Teinostoma*-like, but the umbilical callus and the columellar lobe do not completely close the umbilical orifice. For the following species.

TEINOSTOMA COCOLITORIS, new species. Plate 1, fig. 3.

The rather thin, depressed, shell is translucent whitish, smooth, with a notched callus not completely closing the umbilicus. There are 3⅓ whorls, joined by a rather distinct though superficial suture, the first 1⅔ whorls somewhat convex; the last whorl is appressed at suture, well rounded peripherally. There is a semicircular umbilical callus which does not quite cover the umbilicus, and has an indistinct outer edge, and a thick callous tongue from the columella is superposed; between them in front there is an orifice in which an umbilical fissure can be seen incompletely. The columella passes into a parietal callus which is only shortly in contact with the preceding whorl, and extends forward at the upper insertion of the lip. The aperture is circular, a callus filling the upper angle. Peristome rather thin, though a little thickened within. Diameters 3 and 2.5 mm., height 2 mm.



Teinostoma of Florida.

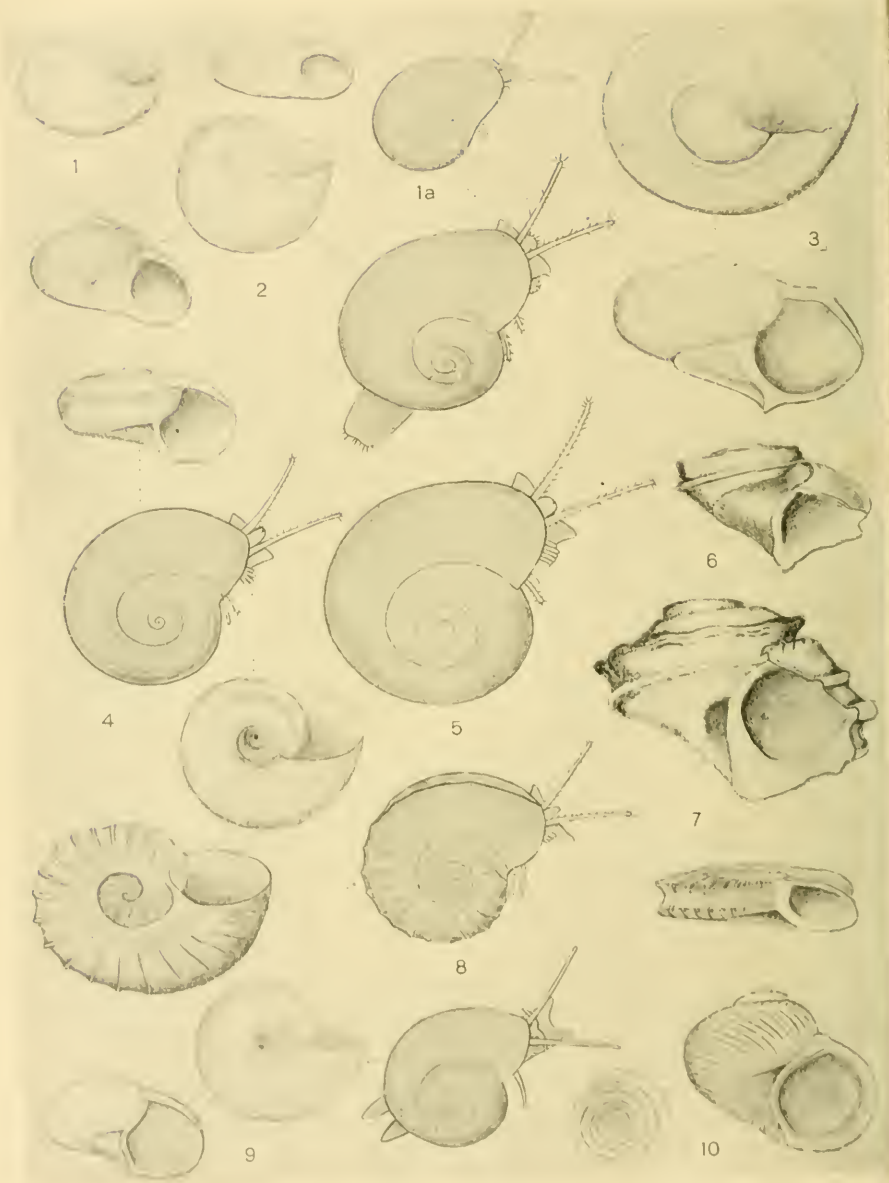


FIG. 1, 1a, *Teinostoma lerema*. 2, *T. parvicallum*. 3, *T. lituspalmarum*. 4, *Vitrinella*. 5, *Vitrinella helicoidea*. 6, *Aorotrema erratica*. 7, *Turbo castaneus*. 8, *Pseudomalaxis balesi*. 9, *Tomura bicaudata*. 10, *Didianema paulu*.

Off Lake Worth, Palm Beach Co., Florida, in 4–500 feet. (T. L. & Paul L. McGinty). Type 181122 ANSP. Paratype from off Palm Beach in 400 ft., in McGinty collection.

The imperfectly covering umbilical callus sets this species apart from all others known to us. The callus is essentially alike in type and paratype. Both are "dead" shells, dredged at stations within a few miles at about the same depth. The name is another attempt to get a Latin equivalent for "of Palm Beach."

Pseudomalaxis Fischer

Pseudomalaxis P. Fischer, 1885, Man. de Conchyl. p. 714.—Monterosato, 1913, Proc. Malac. Soc. Lond. 10: 362, type *Bifrontia? zanclaea* Phil.—Rehder, 1935, Nautilus 48: 128.

Discosolis Dall, 1892, Trans. Wagner Free Inst. 3: 331, type *D. nobilis*.

In this genus the flat shell has a squarish last whorl, with a peripheral zone defined by two subequal spiral angles or keels. The operculum (of *P. balesi*) is thin and multispiral as figured for *Cyclostrema zacalles*, but the whorls are narrower, about 8, with a smaller central area in which whorls could not be made out.

Dall, followed by Thiele and others, have classified these shells in the *Solariidae* (or Architectonicidae), but their place is in the Cyclostrematidae.

The genus *Ilaira* H. & A. Adams, has been mentioned in connection with *Pseudomalaxis*, but having examined the type, *I. evoluta* (Reeve), we believe it correctly placed in the Liotiidae, having sculpture similar to some of that family.

P. nobilis Verrill was figured in Bull. 37, U.S.N.M., pl. 46, fig. 12. *P. lamellifera* Rehder in Nautilus 48, pl. 7, figs. 8–10.

By characters of the size and sculpture our species fall into three little groups which can be retained as "sections," though it is rather fine splitting. A key to the species follows.

Shell relatively large (diam. 11 mm.) of 5 whorls; sculpture of very distinct, fine, close, raised lines of growth, becoming more prominent nodules where they cross the principal carinae. Fine spiral striae present. (Section *Pseudomalaxis* s.s.). Off Chesapeake Bay, 70 fms. . . . . *P. nobilis* Verr.

Shell smaller (diam. 3 mm.), of about 4 (?) whorls. Sculpture of prominent, rather closely set, retractively curved riblets almost nodulose when they cross the carinae; no spiral striae. (Section *Paurodiscus* Rhdr.) Florida Straits, 205 fms.
P. lamellifera Rhdr.

Shell smaller (diam. 1.8. mm.), of 3½ whorls; sculpture of fine spiral striae and strong, widely spaced radial ribs. (Section *Pleuromalaxis*.) Palm Beach to the Keys, littoral.
P. balesi P. & M.

PSEUDOMALAXIS BALESI, new species. Plate 2, fig. 8.

The moderately solid shell is subtranslucent-whitish, discoidal, the upper surface plane; peripheral zone flattened or concave between two projecting nodulose keels; the base broadly umbilicate. There are about 3½ whorls, with a well impressed suture; the first 1½ nuclear whorls are smooth, convex, the apex a trifle prominent. Postnuclear whorls are moderately convex, with sculpture of fine spiral threads and low, well-spaced, radial ribs; its upper surface is convex in the half towards the suture, flattened towards the periphery, and with about 24 radial ribs (but the later ones are very weak). These ribs form nodules where they pass over the two keels bounding the peripheral zone. The base is weakly convex, the ribs extending about halfway to the obtuse smooth angle around the umbilicus. The umbilicus is shallow and broadly open. The oblique aperture is slightly wider than high, rounded oval, with more or less distinct angles on the outer lip at the terminations of the lower peripheral and the basal angles. The peristome is rather thick; parietal callus is very short and heavy, strongly oblique. Diameter 1.8 mm., height 0.6 mm.

Missouri Key, in the middle Florida keys, living under rocks (B. R. Bales & T. L. McGinty). Type 181124 ANSP. Paratypes in Bales, Weber and McGinty collections. Also, North Inlet of Lake Worth, Palm Beach (McGinty).

This minute species is very distinct by its flatly discoidal shape, radiating ribs, and two nodulose keels projecting beyond the sunken flat or concave peripheral zone. It is far smaller than other known species of this genus, and is more elaborately sculptured. In the considerable number seen, all are very similar to the type, except that some of the shells of those taken alive are of a burnt sienna color.

Named in honor of our valued friend Dr. Blenn R. Bales, whose industry in the pursuit of mollusks leaves no stone unturned (or at least, leaves only a few, which are fastened down).

AOROTREMA, Schwengel & McGinty

Aorotrema S. & M., 1942, Nautilus 56: 17. Subgenus for *Cyclostrema pontogenes* S. & M.

The shell has few whorls which are strongly angular above, at the periphery, and around the broadly funnel-shaped umbilicus; the aperture subtriangular, peristome only shortly in contact with preceding whorl or free.

For comparison with this genus we figure a *Turbo castaneus* Gmel., of two mm. diameter, 3½ whorls, the first two quite flat above (plate 2, fig. 7). At this stage the shell is superficially much like *Aorotrema,* and could be identified with *Turbo* only by examination of intermediate stages of growth. The specimen figured was dredged in 50 fathoms off Palm Beach by T. L. and P. L. McGinty.

Three species are now known; two described as *Cyclostrema: A. cistronium* (Dall), Hatteras to Cape Fear, 22–63 fms., figured in Proc. U.S.N.M. 12: pl. 11, fig. 11, and in Dall's Bull. 37, pl. 42, fig. 11. *A. pontogenes* (Schw. & McG.), Destin, Fla., Nautilus 56, pl. 3, fig. 3; and the following.

Name from Αωρος, deformed, τρημα, an aperture.

AOROTREMA ERRATICUM, new species. Plate 2, fig. 6.

The shell is strongly depressed, the spire flat, last whorl tricarinate, becoming free towards the aperture. There are 2½ whorls, the first convex and smooth, following whorl flat above. The last half of the last whorl descends; its upper surface is slightly concave above a strong, slightly uneven keel, then slopes steeply to the peripheral keel. The base has a strong, slightly crenulated keel. The umbilical side of the whorl has a rather strong spiral convexity overhanging the deep umbilical suture. There seems to be no fine spiral or axial striation. The aperture is somewhat triangular, the rather thin peristome being strongly angular at upper insertion of lip, at terminations of the keels and at the somewhat effuse base. Diameter 1.34 mm., height 0.85 mm.

One and a half miles off Cape Florida, in 70 ft. (J. A. Weber). Type in McGinty collection.

This extraordinary mite is evidently adult though so small and few whorled. It is much more depressed than the other species of this group.

Didianema Woodring

Didianema Woodring, 1928, Miocene Moll. Bowden, Jamaica, Carnegie Inst. Wash. Pub. 385, p. 447, type *D. tytha* Woodr.

We prefer *Didianema* to *Mölleria* for the following species, mainly on account of its wholly corneous, thin operculum, its umbilical ridge, and also its geographic location. The Arctic genus *Mölleria* is described by Jeffreys [1] as having the operculum "calcareous and of the same consistence as that of *Cyclostoma.*" Sars [2] says, "operculo solido, calcareo," and figures the radula as rhipidoglossate (pl. III, fig. 5). The base curves into umbilicus without an umbilical ridge. The operculum of *Didianema* is of course unknown. However, our shell differs from Woodring's genus by being elaborately sculptured (*Didianema* being smooth), and by having a single blunt circumumbilical ridge, not "two spiral threads disappearing upward into umbilicus." We therefore propose a new subgenus for it.

Diagonaulus, new subgenus. Subglobose, with few rounded whorls and a small funnel-shaped umbilicus bounded by a blunt ridge. Nucleus of about 2 smooth whorls; the postnuclear shell with strongly retractive corrugation. Aperture round, only slightly oblique, the lip blunt, thickened within, its upper margin not arching forward; a small ledge within the inner lip. Operculum corneus, thin, slightly concave, multispiral (Plate 2, fig. 10).

Didianema pauli, new species. Plate 2, fig. 10.

The depressed-globose shell is white, solid and thick for so small a shell, with rounded whorls, a small funnel-shaped umbilicus and close corrugation, more strongly retractive than growth-lines. There are 3⅓ whorls, the first two smooth, the last 1⅓ strongly, evenly, corrugated with rounded ribs about equal to their intervals. At the summit of the whorl there is some appearance of short, protractive ribs or irregularity, and at the base the ribs weaken before passing over a blunt, rounded ridge around the umbilicus. The umbilicus contracts rapidly within. The aperture is but slightly oblique, circular. The peristome is continuous, the upper margin not arching forward, outer lip blunt, noticeably thickened within. The columellar-parietal margin is thick, and shows a slight ledge within (easily overlooked). Diameter 1.4 mm., height 1.2 mm.

[1] Jeffreys, Brit. Conch. 3: 292. 1865.

[2] Sars, Moll. Reg. Arct. Norveg. p. 128. 1878.

Off Destin, northwest Florida, in 18–20 fathoms, marl bottom (Thomas L. & Paul L. McGinty, Oct. 1941). Type 181128 ANSP, paratypes in McGinty coll.

This species stands alone by the unusual and elegant pattern of its sculpture. It is named for brother of the junior, and long-time friend of the senior, author—a good companion in the hammock, a stout hand at the dredge!

DIGGIN' 'EM OUT

By BLENN R. BALES, M.D.

The chaste beauty of the water lily which receives its sustenance from the black ooze has its counterpart among mollusks. Visitors at southern curio stores may see various objects made from sea shells. When these ornaments are made to represent an angel or a swan, there is a certain white shell used in pairs to represent wings. They really do look like pure white wings, so much so, that the local or vernacular name is "Angel wing." The scientific name is *Barnea costata*, and it, like the water lily, comes from the mud. It is usually found in scattered colonies of several dozen individuals and the home or burrow may be more than a foot deep in mud or muddy sand. Being very fragile, it is not an easy matter to collect them unbroken, for one does not dare to use a shovel in digging, but must be able to feel what he is doing and must do it all by hand. A quiet muddy bay is a favorable place to find them and they must be collected at low tide.

They are located by seeing a long fleshy siphon protruding from the entrance to the burrow. Through this siphon, which in large specimens is almost as large and long as a banana, the mollusk "breathes" water and strains out the microscopic animal or vegetable organisms which make up its diet. Should danger approach, the siphon is retracted and all that is visible is the entrance hole which is easily overlooked should the water become muddy.

Bearing this in mind, the collector secures a bundle of switches from some nearby tree and places one in the entrance to each burrow. He may then proceed from one switch to another until

he has secured as many specimens as desired, regardless of the opaque and muddy water. The switch also guides the hand when digging, as the burrow may become clogged with mud and the direction may be lost. Care must be observed lest a sharp fragment of shell imbedded in the mud or the shell itself which has many sharp angles, lacerates the hands. Once the shell is secured, the collector usually finds that he has sunk so deeply into the soft and almost bottomless mud that the next operation is to dig himself out.

The specimens containing the living mollusks must be placed in a pail of sea water at once to prevent them from injuring themselves, and many a specimen is broken by the violent contraction of the muscles which hold the two valves of the shell together. Even when this precaution is taken, some are sure to be broken.

There is no element of hurry when collecting "Angel wings," but it is either speed or no specimen when collecting "Razor clams," *Ensis directus,* for these will dig into the sand so rapidly that the collector cannot keep up with them, even when armed with a shovel. The mollusk may be located by the tell-tale little depressions in the sand where the drops of water ejected by the siphon have left their marks as it disapeared beneath the sand. A ring is dug all the way around this point, making a sort of minature plateau where the specimen is concealed, the surrounding moat being about a foot deep. Then from the bottom of the moat, the shovel is quickly thrust under the mollusk and it is thrown out upon the sand. Frequently the thrust has not been rapid enough and the shell is cut squarely in two by the sharp edge of the shovel as the mollusk was retreating more deeply into the sand.

The mechanism of this rapid movement into the sand is not hard to understand when the principle is known. It is done by the contractions of the muscular foot which is sharp and slender and is extended from the end of the upright shell. This being shaped somewhat like the handle of an old fashioned razor, offers but little resistance as the sharp foot is thrust downward and then contracted. This shortens the foot and pulls the shell down. A series of rapid contractions quickly carries the mollusk away from danger. The operation may be

more readily visualized when one considers the biceps muscle of the upper arm. When the arm is extended, the muscle is long and slender, but when contracted, it becomes short and thick. A familiar example of this is often seen when some young Penrod bares his good right arm and exhibits his "muscle" to an admiring group of little girls.

To add to the exasperation of collecting "Razor clams," they are likely to injure themselves by violent muscular contractions, and must be placed immediately into a pail of water to "soothe their nerves."

Not only must a conchologist be a worker in mud and sand, but wood working also comes in for its share of attention. Several families of mollusks choose wood for their homes. The most infamous and universally hated is the *Teredo* or ship worm. Its habits and ill reputation are well known and need not be considered here, but *Martesia*, a little fellow shaped somewhat like "Angel wings" seeks refuge in pilings about docks, ships, and in fact any woody object such as a water soaked old plank or log. These may be fairly riddled by the mollusk.

I remember one occasion when a good sized, waterlogged branch came ashore at Bonita Springs, Florida. It was heavily infested with *Martesia* and was quite a prize. A three mile walk from Big Hickory Pass back to the machine, carrying a heavy waterlogged young tree was no easy task and I was convinced it must weigh half a ton before I deposited it upon the running board of the car.

After a couple of weeks in the sun, it had sufficiently dried to permit me to saw it up in thin cross sections. These made fine specimens, as each section was honeycombed with burrows containing many choice shells in their original homes.

Nor is "diggin' 'em out" confined to those of a strictly scientific bent. On many a sandy beach in Florida, you may see some one filling a screen with sand at the water's edge and washing it vigorously in the oncoming surf. He is catching a "mess of coquinas."

Favorable stretches of sandy beach may be swarming with these little bivalves and it is an easy matter to secure a bucketful of *Donax variabilis* from which the cook will prepare a broth, so delicious as to appear unreal. It is about the ultimate

in its line. The shells are beautiful little things, being blue, red, green, lavender and variously striped and rayed with a darker shade of the same color.

All up and down both the Eastern and Western coasts many mollusks are caught for food, and most of them are dug out by clam hook, rake, dredge or various tools of the trade. One method often employed off the Virginia coast is unique. It is called "treading." Off at a distance you may see a man with his hands holding to the side of a small boat while he seems to be executing a hula dance in the water. He really is moving his feet about on the muddy bottom and locating little neck clams. Frequently you see him stoop, pick up a clam from the region of his feet and drop it in the boat.

The ultimate in "diggin' 'em out" is dredging. This calls for more or less preparation and equipment and is indulged in by only super-super collectors. They frequently dredge at a depth of six hundred fathoms, which in land-lubber language is thirty six hundred feet—more than half a mile! It is easy to see that the conchological treasures brought up from these depths are prizes greatly to be desired. Many a new species is thus brought to light, to bask as a glamour girl among shell folk until its place is taken by another.

It is hard to visualize the density of molluscan population in favorable localities, but one illustration will be sufficient. At Marco, Florida (since they have gone high brow, it is now often called Collier City) is located a canning factory whose sole output is canned clams and clam juice. These are taken by means of a mechanical dredge off the Ten Thousand Islands. According to a report issued by the Bureau of Fisheries, and of undoubted authenticity, this dredge did not move its anchor for a period of almost a year, yet the average catch of clams was two hundred barrels of clams a day.

The dredge is a curious affair and viewed from a distance when dredging was in progress near Pavillion Key, it appeared to me to be a large floating barn. The method of dredging is peculiar though evidently very efficient. A heavy anchor is put in place and a long rope or hawser a half mile long is attached to it, with the other end of the rope attached to the dredge, which is equipped with an endless chain on which are scoops or buckets which dig into the muddy bottom. An engine on the

dredge slowly winds the rope, shortening the distance between the anchor and the dredge and finally brings the two together, but digging up the mud from the bottom as it proceeds. The mud is washed from the clams as they are brought aboard by the endless chain. The rope is then unwound from the windlass and the dredge allowed to float away as far as the length of rope will permit and the operation repeated.

For nearly a year this was continued without ever changing the position of the anchor and a circle around it was completed. The wind, tide and other conditions gave the dredge a different path each time. Dredging was in depths of from six to eight feet of water. The bottom of the sea at this place must have appeared as a mosaic of living clams. Imagine two hundred barrels of clams a day for a year!

Probably the most fascinating and commonly used methods of scientific "diggin' 'em out" is sifting or screening. One never knows just what he will bring up in his next screenful. It is like patronizing a fish pond at a church sociable; one is never sure just what will be found at the other end of the line. These screens usually consist of two square or oblong frames with screen wire cloth for bottoms and are nested so that the top screen with its bottom of coarse mesh fits snugly into the bottom screen which is covered with wire cloth of much finer mesh.

A favorable place is chosen, and by means of a hoe, scoop or even an old tin can, the screens are filled with sand, mud, marl or whatever the bottom of the sea may be at that particular place. The screens are violently shaken under water and much of the finer debris is eliminated. Then the contents of the upper screen which will contain the larger mollusks (if any) are examined. Afterward the lower screen with the finer mesh comes in for its share of scrutiny.

Many of the smaller and rarer shells are taken by screening and it is so fascinating that it is seldom that a collector will stop work at a given time, even though he knows he will likely miss a good dinner of conch chowder or Florida lobster, and besides receive a lecture on promptness, such as, "One would think that anyone your age should KNOW when it is time for dinner." The reply is truthful if unconvincing. "I had to try just one more screenful."

DURANGONELLA, A NEW HYDROBIINE GENUS FROM MEXICO, WITH THREE NEW SPECIES

By J. P. E. MORRISON [1]

The recent discovery of a slender aquatic species of snail in Pleistocene or Post-pleistocene lake deposits in the Federal District of Mexico by Miss Marie E. Bourgeois, and the attempts to determine its taxonomic position have brought to light an undescribed generic group in the Mexican freshwater molluscan fauna.

Family Bulimidae; Subfamily Hydrobiinae.

Durangonella, new genus

Shell slender, elongate-conic, apex slightly obtuse, translucent, with smooth, slowly increasing, rounded whorls separated by a distinct, deep suture. The aperture is small, oval, a little angled above; the lip entire, usually slightly appressed to the preceding whorl above; the umbilicus small and deep. The operculum is thin, corneous, paucispiral.

Animal Hydrobiine, with short tentacles and a relatively shorter blunter snout. The male organ is large, simple (non-flagellate), attached dorsally a little behind the tentacles, a trifle to the left of the midline, and directed, in the "dried-in" material prepared and examined, about 45° dextro-posteriorly. It is much flattened, broadened distally (spatulate), with a weakly trilobed anterior-distal margin and an evenly, narrowly rounded tip. The females are ovo-viviparous; the many uterine young possessing short amnicoloid shells of about 1½ whorls.

Genotype: *Durangonella seemani* (Frauenfeld) = *Hydrobia seemani* Frauenfeld.

Contrary to Dr. Stearns' opinions, there are no completely smooth examples of *Tryonia protea* known. Also, a comparison of animals of *protea* from the Salton Sea area of California, and of *seemani* from the City of Durango, Mexico, has shown too much difference to consider them congeneric any longer.

The genus *Durangonella* differs from *Tryonia* by its lack of marked sculpture and more particularly by possessing a verge of

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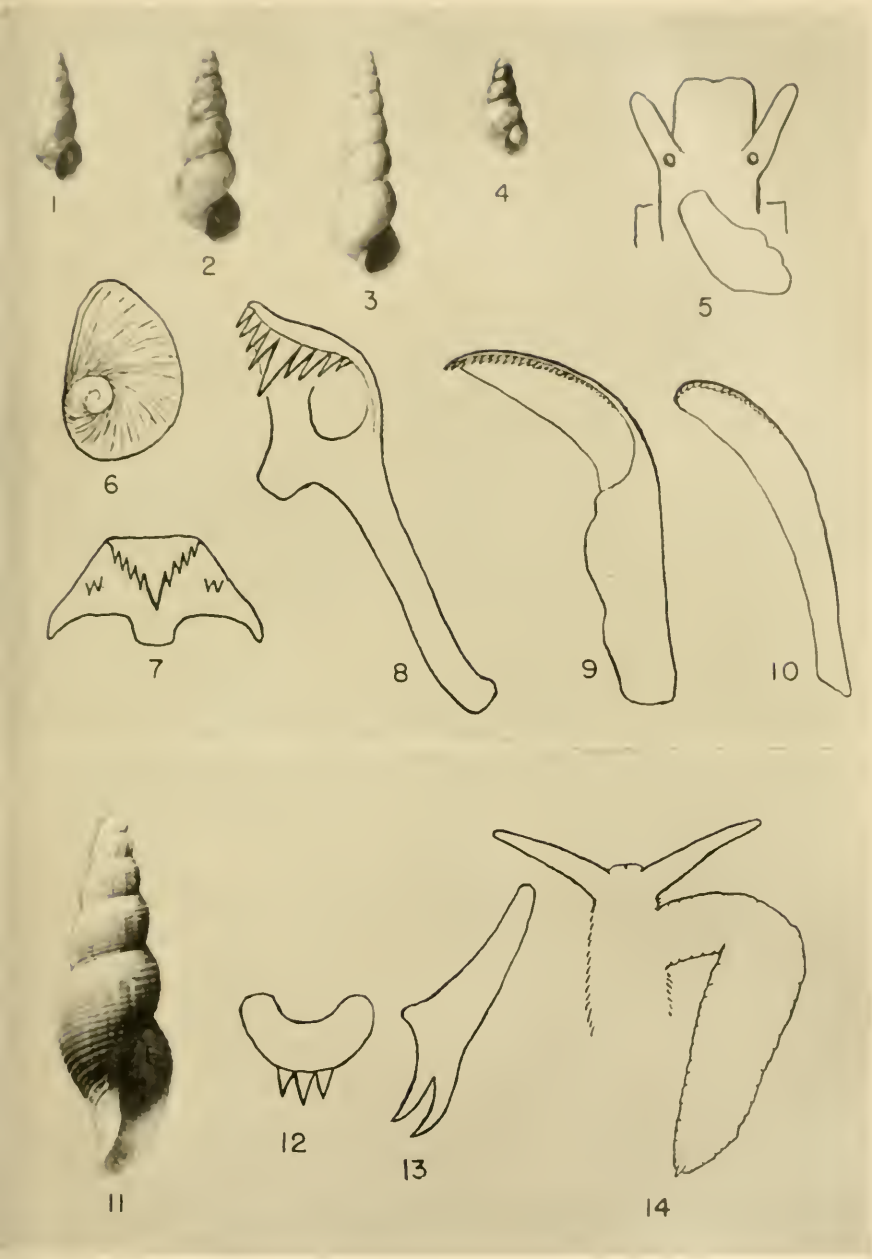

FIG. 1, *Durangonella seemani* (Frauenfeld), Topotype. 2, *Durangonella mariae* Morrison, Holotype. 3, *Durangonella dugesiana* Morrison, Holotype. 4, *Durangonella pilsbryi* Morrison, Holotype. (All × 5). 5, *Durangonella seemani*, sketch of head and verge of topotype male; 6, operculum; 7–10, teeth of radula, much enlarged, from topotype female; 7, rachidian tooth; 8, lateral; 9, inner marginal; 10, outer marginal.

FIGS. 11–14. *Morrisonella pacifica* (Dall), shell, teeth, and outline of head and verge.

different pattern in male individuals. The same characteristics will also distinguish it from the smooth phase of slender species of the genus *Lyrodes*.

DURANGONELLA SEEMANI (Frauenfeld). Pl. 3, figs. 1, 5–10.

1863—*Hydrobia seemani* Fraeunfeld, Verh. der K. K. Zool. Bot. Ges. Wien, 1863, p. 1025; *ibid*, 1865, p. 525, pl. 8.

1870—*Bythinella seemani* Tryon, Mon., p. 50, pl. 16, fig. 9.

1893—*Bythinella protea* Stearns (pars), N. Am. Fauna, vol. 7, pt. 2, p. 278.

1901—*Paludestrina protea* Stearns (pars), Proc. U.S.N.M., vol. 24, p. 277 (*seemani;* Durango only).

Original description: "Shell slender, conic, not acutely pointed, gray-green, translucent, 5½ smooth whorls, regularly increasing, rounded, suture very strongly marked. Aperture small, oval, a little angled above, lip simple, appressed to the columella above, umbilicus small, deep. Length 4 mm. Breadth 1.8 mm."

"In Cuming's collection, N.W. Mexico, Durango, Dr. Seeman."

The operculum is thin, corneous, paucispiral, of about 2 turns. The radula is minute, similar to that of *Lyrodes coronatus nicaraguanus* Ancey from Lake Izabal, Guatemala, as figured by F. C. Baker.[2] The radular formula is

$$\frac{4-1-4}{2 \qquad 2} : 4-1-4 : 25 \pm : 15 \pm.$$

The cusps on the marginal teeth are so minute they are extremely difficult to count even with reasonable accuracy. The diagnostic animal characters are furnished in the generic description above from topotypes (U.S.N.M. No. 251826), collected by Dr. Edw. Palmer "in freshwater algae, from a small pond fed by a spring from which the City of Durango gets its water."

The topotype figured (U.S.N.M. No. 251826) has 6 whorls and measures: Height 3.5 mm., Diameter 1.45 mm., Aperture height 1.1 m., Aperture diameter 0.8 m.

[2] Freshwater Mollusca of Wis., vol. 2, p. 143, fig. 63; 1928.

D. seemani differs from the other known members of the genus by the smaller size of adult shells, with usually about 5 whorls. The periphery of the whorls is not evenly arched from suture to suture, as in *D. mariae,* but shows indication of a rounded shoulder near the summit. The shell is proportionately more slender than that of *D. pilsbryi,* although of about the same size.

DURANGONELLA MARIAE, new species. Pl. 3, fig. 2.

Shell elongate-conic, terete, vitreous, almost transparent, covered by an extremely thin, light corneous epidermis; Apex narrowly pointed; whorls slowly, regularly increasing in size and tightly coiled around the axis. Nuclear whorls smooth, postnuclear whorls mostly smooth, sculptured by fine growth lines crossed by microscopic spiral striations. Suture distinct, sharp, with the well rounded whorls evenly arched from periphery to summit. Aperture elliptical, slightly narrowed and obtusely angled above; lip thin, entire, slightly sinuous above, slightly or not at all appressed to the penultimate whorl; umbilicus variable, a narrow chink or slit behind the upright columellar lip.

Operculum not found, apparently not preserved in these deposits. Animal not seen, but probably ovo-viviparous as in its conchological relatives. Great numbers of minute shells found with the adults indicate this possibility.

The holotype (U.S.N.M. No. 433399) was collected from the shell stratum (marl), 1 meter below the present surface of the dry bed of the lake at Tlahuac, 20 kilometers east of Xochimilco, D. F., Mexico, by Marie E. Bourgeois. It has 7 whorls and measures: Height 5.0 mm., Diameter 1.8 mm., Aperture height 1.2 mm., Aperture diameter 1.0 mm. The great majority of adult shells seen approximate the type in size; a few however are larger, the largest seen (one of many U.S.N.M. No. 433414) has 8½ whorls and measures: Length 7.5 mm., Diameter 2.6 mm., Aperture height 2.1 mm., Aperture diameter 1.5 mm.

D. mariae is most closely allied to *D. seemani* (Frauenfeld) from the City of Durango, but differs from that species in being larger, longer, and in possessing more evenly rounded whorls. The related form *D. dugesiana* from Michoacan is still narrower, with the slope of the whorl above the periphery somewhat flattened.

Durangonella mariae, named for its discoverer, is known only from the Pleistocene or post-pleistocene lake deposits near Tlahuac. It probably became extinct when the shallow lake dried up or was filled up by the accumulated deposits. Seeds present in the peaty marl indicate that these snails lived in a habitat with species of *Potamogeton* and of *Scirpus*. The lake deposits at Tlahuac, as sampled by Miss Bourgeois, consist of a bed of black peat at a depth of 1.5 meters below the present land surface, and above this bed a gradual transition to a light grey or whitish shell marl at 1.2 meters depth. The marl at 1 meter depth is filled with shells, forming a visible "shell stratum"; it continues upward to at least a point 0.4 meter below the surface, with shells scattered through it, but not in the profusion of the well-marked "shell stratum." No shells were to be found in the peat layer at 1.5 meters depth, but there were small lime concretions and the bones and scales of small fish in this layer. These fish remains apparently indicate the presence of small fish such as are living today in other lakes in Central Mexico. The most conspicuous shell in these lake deposits is the new species, *D. mariae;* it was present in small numbers in the samples from a depth of 1.2 meters in the lower layers of the marl, was extremely abundant in the "shell stratum" at 1 meter depth, and declined in numbers again in the upper layers to uncommon occurrence in the uppermost layer of marl sampled at 0.4 meter depth.

In company with *D. mariae* in the marl deposits, but not in great numbers, were found other species of freshwater shells, namely: *Valvata humeralis* (Say), *Physella osculans* (Haldeman), *Helisoma tenue chapalense* Pilsbry, *Gyraulus parvus* (Say)?, *Ferrissia* species, *Musculium subtransversum* (Prime), and *Pisidium* species. Another marl sample collected by Miss Bourgeois from the "shell stratum" at a point 1 kilometer distant and 1.8 meters from the surface, yielded *Durangonella mariae* in abundance, *Helisoma tenue chapalense* Pilsbry, and numbers of *Physella osculans* (Haldeman).

DURANGONELLA DUGESIANA, new species. Pl. 3, fig. 3.

Shell elongate-conic, terete, opaque white (in specimens examined), apex narrowly pointed, the whorls very tightly coiled,

slowly and regularly increasing in size. Nuclear whorls smooth, the postnuclear ones smoothish, ornamented by growth lines and microscopic spiral striations. The suture is well marked between the eight rounded whorls. The upper slope of the whorls is slightly flattened above the periphery, accentuating the discrete appearance of the whorls. Aperture subovate, obtusely angled above; lip thin, entire, slightly appressed to the penultimate whorl, erect in front of a narrow umbilical chink. Operculum and animal not observed.

The holotype (U.S.N.M. No. 433473) has 8 whorls and measures: Height 5.8 mm., Diameter 1.85 mm., Aperture height 1.3 mm., Aperture diameter 1.05 mm. The type and about thirty paratypes (U.S.N.M. No. 73908) were sent to the United States National Museum by A. Duges, from near Andocutira, Michoacan, Mexico. With these shells was also a single example of *Valvata humeralis* Say. Years ago, Prof. Duges noted: "These mollusks were found in an ant-hill at Andocutira, Michoacan. The person who sent them to me thinks that they came from an old lacustrine formation, now overlain by later deposits." This is evidently a Pleistocene or post-Pleistocene lake deposit similar to the one at Tlahuac.

This species is the narrowest form of the genus known. The slight flattening of the upper slope of the whorls will also help to distinguish it from *D. mariae*.

DURANGONELLA PILSBRYI, new species. Pl. 3, fig. 4.

Shell small, elongate-conic, with a slightly obtuse apex, translucent, of about 5 regularly increasing, well rounded whorls separated by a deep suture. Nuclear whorls smooth, post nuclear whorls smoothish, crossed by fine lines of growth and exceedingly minute spiral striations. Aperture regularly oval, slightly angled above; lip thin, almost entire, appressed to the penultimate whorl above, and erect in front of a distinct but narrow umbilical slit.

Operculum thin, corneous, paucispiral of about 2 turns. Radula and verge not seen. The females are ovo-viviparous, the uterine young possessing shells amnicoloid in shape, of about 1½ whorls.

The holotype (U.S.N.M. No. 362551), collected by Oldroyd at Paso del Rio, Colima, has 5 whorls and measures: Length 2.6 mm.,

Diameter 1.15 mm., Aperture length 0.9 mm., Aperture diameter 0.65 mm. U.S.N.M. No. 362496 contains thirty additional specimens (paratypes) from the same source. This species is close to *D. seemani* (Frauenfeld), but differs from it in possessing evenly rounded whorls (not faintly shouldered) and in being less slender.

MORRISONELLA, A NEW GENUS OF EAST PACIFIC DEEP SEA MOLLUSKS

By PAUL BARTSCH [1]

An examination of the radula and other anatomic features of *Leucosyrinx ? pacifica* Dall (Plate 3, figs. 11–14) shows plainly that this is not a member of the Family Turridae, but that it belongs in that rather heterogeneous assemblage of genera collectively called by the family name Buccinidae. The unique holotype, U.S.N.M. Cat. No. 122590 (Plate 3, fig. 11) was dredged by the U. S. Bureau of Fisheries Steamer Albatross at station 2859 in 1569 fathoms on ooze botton, bottom temperature 34.9°, southwest of Sitka, Alaska. It was described by Dall as *Leucosyrinx ? pacifica* in 1908 in the Bulletin of the Museum of Comparative Zoology, volume 43, pages 270–71. In 1921 Dall transferred it to the genus *Irenosyrinx* in Bulletin 112 of the U. S. National Museum, page 69.

The animal of the holotype is without eyes, and is a male and shows a huge verge (fig. 14). The radula consists of 3-cusped rachidian teeth (fig. 12) and 2-cusped marginal teeth (fig. 13).

I am unable to fit the characters presented by this species in any known genus and therefore bestow a new generic designation upon it. *Morrisonella* is named for my associate J. P. E. Morrison in appreciation for much helpfulness in adducing the above mentioned information.

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DETERMINING SPECIES IN PISIDIUM BY THE SHELL

By H. B. HERRINGTON

Newburgh, Ont.

In the study of the taxonomy of these little clams two different points of view have been used in the past. Mr. B. B. Woodward, in the "Catalogue of the British Species of Pisidium," seems to have depended exclusively on the hinge characters. On this continent the emphasis has been more on the external appearance of the shell.

Dr. Victor Sterki, who was responsible for giving specific rank to so many of the forms in North American *Pisidia*, was influenced by minor differences in the structure of the hinge. He, therefore, rejected the hinge characters as determinative for species. He held that what the hinge characters reveal is groups only (The Nautilus, Vol. XXXV, April, 1922, page 115). So he set to work, on the basis of the difference in the external appearance of the shell, to divide these so-called groups into species. It was this attempt to set up species on the basis of these minor external differences, by Sterki and others, that was largely responsible for the chaos in the taxonomy of the *Pisidia*. These external differences are almost infinite, and are to be found not only as between species but also within recognized species, e.g., *P. variable* Prime. Furthermore, some of the shells now passing as species are so alike in external appearance to, and so intergrade with other species, that it is impossible to set down on paper anything that would enable another conchologist to separate them. Dr. Sterki, himself, found his system unworkable. Numerous lots of shells 'just wouldn't fit in'; hence his labels bear such notes as "somewhat like," "near," "apparently," "close to," and ". . . . . ?"

After spending much time during a period of over three years going over and over some fifteen hundred lots of *Pisidia*, the writer has been driven to lean most heavily on the hinge characters. For the hinge characters, although having certain minor features that vary within a species, as Sterki suggests, have other features that are constant and yet differ as between

species. The shells brought together on the basis of hinge characters are found to also have certain external features in common—these correspond to Sterki's group features. These external features facilitate the sorting of shells.

To set up the hinge as the chief basis of specific determination will, of course, reduce the number of species of our Eastern North American *Pisidia* by more than one-half. It will also be found best, in the interest of clearness, to greatly reduce the number of varieties.

Any written description of the external features is necessarily vague, and the conchologist finds himself bewildered when he sits down with a lot of shells before him and trys to identify them by the written descriptions. It is difficult whatever be the method used. But the hinge characters lend themselves to clearer and more definite statement. Here are some of the hinge characters: length and heft of the hinge; distance of the cardinals from the anterior laterals; shape of the cusp on the laterals, and the position of the apex. Let us give some illustrations of some of these obvious points, retaining the recognized specific names:

(a) There is some external resemblance amongst *P. rotundatum* Prime, *P. ventricosum* Prime, *P. vesiculare* St., *P. ferrugineum* Prime, *P. medianum* St. and *P. costatum* St. But *P. rotundatum, P. ventricosum* and *P. vesiculare* have a hinge that is distinctly shorter for the length of the shell than the others. This readily separates these three from the others. Then *P. ventricosum* and *P. vesiculare* have hinges that are the same in heft and appearance, but are definitely heavier than that of *P. rotundatum;* their beak is also tilted back. These, and other less significant characters, show *P. rotundatum* to be a species, and *P. ventricosum* also to be a species with *P. vesiculare* as a variety of it. The other three, *P. ferrugineum, P. medianum* and *P. costatum* have hinge characters that are essentially the same. The first is the species and the other two varieties of it.

(b) Or take another case: *P. noveboracense* Prime has a longer hinge than *P. abditum* Hald. (=, or a variety of *P. pusillum* Jen., with which it is often confused), and the cardinals are farther from the cusps of the anterior laterals.

(c) Let us take one more illustration: In *P. tenuissimum* St. the cusp of the anterior lateral of the left valve (a. 11.) is an enlargement of the upward swing of the lateral at its distal end. In *P. scutellatum* St. = *P. lilljeborjii* Clessin, the cusp rises at the proximal end of the lateral.

In all of these cases there are other hinge characters that are distinct, but these will serve to illustrate our meaning.

According to our judgment in determining species use should be made of both the external appearance of the shell and of the hinge characters, but, where the external appearance of two or more forms closely resemble each other, the hinge characters should be the last court of appeal.

A LIST OF MOLLUSCS FROM WARREN COUNTY, NEW YORK

By MORRIS K. JACOBSON

The molluscs found in Warren County, New York, do not seem to have been the subject of much investigation. In the Biological Surveys of the State of New York Conservation Department (Biol. Sur. of Upper Hudson Wat. Shed No. VII, 1933 and Biol. Sur. of L. Champlain, 1929) some references are made to a number of fresh water forms, chiefly in connection with the studies of water pollution (1929: p. 218, 219; 1933: p. 214). DeKay's work on the Molluscs of New York State (1844) contains three references to Lake George, which lies within the boundaries of the County (pp. 25, 30, 223), and numerous references to Lake Champlain, which may refer to this territory although by far the greater part of the lake lies beyond the boundaries of Warren County. Pilsbry in the first two volumes of his still incomplete "Land Mollusca of North America" (Philadelphia, 1939 and 1940) has only two definite references to Warren County molluscs (pp. 683, 764), the latter coupled with the name of J. B. Henderson, whose list for Warren County, if indeed he compiled one at all, I was unable to find. In view of these facts a preliminary list of the Molluscs of Warren County, New York, may not be without some interest.

During the summer of 1944 I was able to collect intensively in the southern part of Warren County along the Schroon River above Warrensburg to as far as Brant Lake. This entire region lies just within the southern boundaries of the Adirondack State Park. One or two short trips were undertaken to the shore of Lake George. The region is discouragingly bare of land molluscs, being dry, granitic and covered largely with coniferous trees, which are at present the subject of intensive logging operations. Among the larger snails only *Triodopsis albolabris* and *Philomycus carolinianus* appear in any satisfying number. Even the smaller and minute species are none too numerous. The bodies of fresh water investigated, however, offer somewhat better conditions; Brant Lake swarms with *Viviparus contectoides* of all sizes, the spires of which, however, are almost invariably badly corroded. In Schroon River *Sphaerium striatinum* can be freely dredged from sand in the lee of sunken logs and boulders. Hardly less numerous are several of the smaller Sphaeridae as well as *Helisoma anceps, Gyraulus hirsutus* and *G. deflectus*. The two kinds of Valvatidae were freely taken in one restricted, richly mudded locality. Except for one dead specimen from Lake George none was found outside this one spot. Brant Lake offers many fine *Helisoma campanulatum,* during the collection of which, however, the author made the painful discovery that sharp reeds of sedge grass, seen from directly above, are practically invisible. I was stabbed full in the left eye as I bent over to retrieve a—for the record be it stated—very mediocre specimen of Helisoma. Even now, ten months after, I still feel sharp twinges in the wounded optic. Warning: look well before you stoop! Dead shells of *Elliptio complanatus* are also very plentiful in Brant Lake, especially at the southern outlet, where a colony of muskrats have their dens. In almost all bodies of water *Amnicola limosa porata* is as common as sand. The shells I have listed as *Helisoma campanulatum minus* Dunker seems to agree with the brief description offered by Mina L. Winslow (Occ. Pap. Mus. of Zool., U. of Mich. No. 180, p. 3).

My most successful land collecting was done in the mouldy folds of a much deteriorated but comfortably moist horse blanket,

discarded on a depressing refuse heap of old bottles, tin cans, etc. Here I found the two live *Mesodon sayanus* and the one live *Triodopsis dentifera*. Many a happy hour was spent turning over mouldering heaps of blanket, paper and straw. All was well, except that it made it somewhat difficult to point out to polite scoffers that snail hunting was really quite a healthful avocation—it kept one, I carefully pointed out, out in the fresh air. My case was considerably weakened when they discovered just where it was that I went to for "fresh air."

A particularly happy, if mosquito plagued time was spent in an intermittent woodland swamp of small proportions, where considerable numbers of *Fossaria umbilicata* and *Pisidium noveboracense* were gathered. The latter species appears also in Sehroon River, but here the size varies greatly from minute to large, whereas in the swamp there was a striking uniformity of size.

The identification of all "hard" species was kindly made by Dr. Bartsch of the U.S.N.M., for whose solicitude and kindness in guiding a bungling amateur the author cannot express enough thanks.

Land

Carychium exiguum Say
Discus cronkhitei catskillensis (Pilsbry)
Euconulus chersinus (Say)
Gastrocopta contracta (Say)
Haplotrema concavum (Say)
Helicodiscus parallelus (Say)
Mesodon sayanus (Pilsbry)
Philomycus carolinianus (Bose)
Retinella electrina (Gould)
Retinella indentata (Say)
Stenotrema fraternum (Say)
Succinea avara Say
Succinea ovalis Say
Succinea peoriensis Walker
Triodopsis albolabris (Say)
Triodopsis dentifera (Binney)
Vertigo pentodon Say
Zonitoides arboreus Say

FRESH WATER

Amnicola limosa porata (Say)
Anodonta grandis (Say)
Aplexa hypnorum (Linne)
Campeloma decisum (Say)
Elliptio complanatus (Dillwyn)
Fossaria modicella (Say)
Fossaria obrussa (Say)
Fossaria umbilicata (C. B. Adams)
Gyraulus deflectus (Say)
Gyraulus hirsutus (Gould)
Gyraulus parvus (Say)
Helisoma anceps (Menke)
Helisoma campanulatum (Say)
Helisoma campanulatum minor (Dunker)
Lampsilis radiata (Gmelin)
Physella sayii (Tappan)
Pisidium abditum Haldeman
Pisidium noveboracense Prime
Pisidium politum Sterki
Sphaerium rhomboideum (Prime)
Sphaerium striatinum (Lamarck)
Sphaerium sulcatum (Lamarck)
Valvata sincera Say
Valvata tricarinata simplex Gould

BUCCINUM ZEBRA MULLER, THE TYPE OF ORTHALICUS

BY HARALD A. REHDER

[FOREWORD by H. A. Pilsbry—As I wish to exclude discussions of only temporary interest from my work on Land Snails of North America, as far as possible, this opportunity is taken to give needed details in the case of *Orthalicus*. While questions of nomenclature are of the first importance, the discussion of names is not a permanent part of science, though it is an essential step before we may pass on to matters of more interest.

Beck in 1837 proposed the new genus *Orthalicus* for ten species, which he enumerated with references. The first author to select a type from this list was Herrmannsen, Ind. Gen. Moll. 2: 159, Sept. 8, 1847, who chose "*Bulimus zebra* Müller," evidently meaning *Buccinum zebra* Müller. About two months

later,[1] Gray, Proc. Zool. Soc. London, p. 176, Nov., 1847, selected *Helix sultana,* a species described by Dillwyn in 1817. Müller's species has been understood differently by nearly every author considering it. Beck, Shuttleworth, Binney, Fischer & Crosse and Strebel have given their various views of its identity. Von Martens relinquished the name *zebra* as too heterogeneous for recognition. Under these conditions, revival of the name *Oxystyla* was accepted in my monograph of 1899 as the simplest solution of the puzzle. However, on taking the matter up anew the propriety of this decision was doubted, and it was thought well to obtain the opinions of others. While there may still remain room for differences of opinion, I am wholly disposed to accept the result of Dr. Rehder's investigation as finally fixing the identity of *Buccinum zebra,* and thereby supplying a valid type for *Orthalicus.*]

The problem concerning the type of Orthalicus reduces itself ultimately to the question whether *Buccinum zebra* Müller, 1774, is a recognizable species, and if so, what it is.

Buccinum zebra was described rather well by Müller, considering the times, and is recognizable as a member of the genus *Oxystyla.* Some of the figures referred to by Müller agree with his diagnosis and others do not, as was so often the case with Linnaeus and other old authors. He states that the specimens on which he based his description are in the Spenglerian Museum.

The first subsequent discussion of this name was given five years later by Schröter (Geschichte der Flussconch, 1779, pp. 325–326), who, using a specimen in his collection, described it as possessing three spiral bands (as in Seba, pl. 39, figs. 50, 51. which is *O. maracaibensis imitator* Pilsbry). The flammulate forms he subordinates as varieties. This is the reverse of the arrangement of Müller, who described the flammulate specimens as the principal form, and the three-banded form as a variety.

The next important discussion is by J. H. Chemnitz in 1786 (Syst. Conch. Cabinet, vol. 9, pt. 2, pp. 24, 25, pl. 118, figs. 1015–1016). He describes and figures a form resembling in coloration the *O. maracaibensis* Pfeiffer as figured by von Martens in Binnenmoll. Venezuelas, p. 32, pl. 1, fig. 7. This fits the original description of Müller, and, moreover, in the fore-

[1] By some confusion in noting the dates, I gave priority to Gray in Man. Conch. XII.

word Chemnitz says: Ich liess es mir einen ganzen Ernst seyn, die ansehnliche Sammlung derselben [land and fresh-water shells], die sich im Spenglerischen Cabinette befindet, durch die Beyhülfe dieses edelmüthigen Freundes und Gönners besser kennen zu lernen'' (pp. XXII–XXIII). We see therefore that Chemnitz studied the Spengler collection which was in his native city, and thus must have been acquainted with this *Buccinum zebra* of Müller, although he used a specimen from his own collection for his figure. We may therefore consider Chemnitz as fixing this species. And the species he figures is closest to *Oxystyla maracaibensis* Pfeiffer. *O. undata* Bruguière has a white basal zone which is not noticeable in the Chemnitzian figure, and *O. undata jamaicensis* has in addition to the basal zone much lighter parietal coloring.

The Mexican and Central American forms can, I believe, be eliminated from consideration on the basis that this fauna was unknown at that time. Not one of the very numerous and often striking mollusks that make up the land and fresh-water fauna of Mexico and Central America was described earlier than 1819, and this malacological fauna was not known before the exploration of Humboldt and Bonpland (1803–04), Deppe (1824–1837), Cuming (1827), Schiede (1828), and Say (1828).

On the other hand, the malacological fauna of northern South America and the West Indies was well known in Linnean times, and it is in these regions that I believe we must search for the home of Müller's *Buccinum zebra.* And the species coming closest to the description of Müller, and the figure of Chemnitz is what has been called *Oxystyla maracaibensis* Pfeiffer. We must of course keep in mind the fact that the figures in these early works are not always exact.

It is better, I think, whenever possible to fix an old name, especially where we have a rather extended description, and a figure based at least partly on a knowledge of the original specimen. A precedent which might later be abused, would be set up if we regarded the species in question as a *species dubium.*

Buccinum zebra Müller is therefore, in my opinion, the oldest name for what has been called *Oxystyla maracaibensis* Pfeiffer. The genus *Orthalicus,* with that species as type, will again be used for the group now known as *Oxystyla.*

THE WEST INDIAN FAUNA IN SOUTHERN FLORIDA

By WILLIAM J. CLENCH

There have appeared rather recently a few papers dealing with the mollusks of southern Florida. Several species have been described as new which seem to be very close to or identical with certain rather widely distributed West Indian species.

It should be borne in mind that the southern tip of Florida from Jupiter Inlet to Key West contains a fauna which is composed mainly of West Indian species. Carolinian species are present as well, but they are in the minority.

During the past fifteen or more years there has been considerable collecting in this part of Florida, collecting done by many experienced people, which has added much to our knowledge of this area. Prior to this period the collecting was spasmodic and many of the records were never published.

Johnson's list [1] was a publication based mainly on the records published prior to this later period. As a consequence, many West Indian species are not included, even many of the common forms. For this reason, this list of Johnson's does not by any means present a complete record. At the time Mr. Johnson was making up this report it was impossible for him to review the many collections extant relative to this area for the added records. His aim was to bring the names up to date and add to the list such records as had been published.

In a figurative sense, South Florida has a finger in the West Indian pie. A species found in South Florida and not recorded in Johnson's list is not necessarily new by any means. In fact, the real fun begins when you have exhausted the species references in Johnson's list. From then on you have a wide field of investigation through scattered literature, much of it old, many items not accessible locally. The descriptions are brief and when these are found, they have a series of secondary references to publications still older. The shells are figured by wood cuts, sometimes hand colored, that allow free play of the imagination.

[1] Johnson, C. W., 1934, List of the Marine Mollusca of the Atlantic Coast from Labrador to Texas. Proc. Boston Soc. Nat. Hist., 40, no. 1, pp. 1–204.

A very great deal of West Indian material reached Europe during the early days of describing. Trade with these islands and the Spanish main was extensive and shells easily collected by the local inhabitants found a ready sale to returning merchants, sailors and others who found an open market in Europe. A cabinet of natural history specimens was considered as essential in a library as the books that lined the walls. Certain of these cabinets became famous and the describers of that period were called in or sought out such collections to study and report upon the novelties. Many of these shells were without a stated locality and many of the localities given are now known to be incorrect.

Unquestionably there are many new species in Florida as well as in the West Indies, but caution should be exercised before considering every Florida novelty as new to the literature, at least until most of the standard manuals have been examined with care and comparison made with the many species that are known to exist in and about the islands to the south.

NOTES AND NEWS

Dates of the Nautilus.—Volume 58, no. 1, pp. 1–36, pl. 1, was mailed August 17, 1944. No. 2, pp. 37–72, pl. 2, November 24, 1944. No. 3, pp. 73–108, pls. 3, 4, Feb. 19, 1945. No. 4, pp. 109–146, i–vi, pls. 5, 6, June 20, 1945.—H. B. B.

The Glade fires have been terrific this year. They are still burning now (June 8) but mostly down to muck. The Trail has been closed twice that I know of. There are very few open spaces that have not been burnt over at least twice, all the way from the big Lake [Okeechobee] to Cape Sable. Many small hammocks have been burnt seriously, while the large ones fared better. Royal Palm Hammock is badly charred, but the Long Pine Key ridge is not as hopeless as some spots in Pinecrest and Collier County. No one can estimate the damage to wild life, but it must be far greater than ever before known. Combined with the drought, shells have taken a terrific licking, and still we have had only a couple of showers. In spite of the serious destruction, I believe that plenty of rain will restore the flora.—Ralph H. Humes, Coconut Grove, Florida.

A Pliocene Pisidium.—In my paper on freshwater mollusks of the Idaho formation at Hammett, Idaho (Journal of Palaeontology, vol. 18, no. 1, pp. 101–108, 1944), a new species of *Pisidium* was described as *P. exiguum* Yen. I overlooked that the name *exiguum* has been used by V. Sterki for a subspecies of *P. abortivum* (Annals of the Carnegie Museum, vol. 10, nos. 3–4, art. 16, p. 470, 1916). The preoccupied name for the Pliocene species from Idaho is consequently to be changed into *Pisidium woodringi,* after Dr. W. P. Woodring of the U. S. Geological Survey, who kindly pointed out to me this homonym.—Teng-Chien Yen.

Northern Limit of Dosinia Ponderosa.—Since the publication in 1921 of Bulletin 112 of the United States National Museum, in which Dall cited San Diego as the northern limit of the present range of *Dosinia ponderosa,* that record has been repeated in numerous publications. Local collectors, however, have not found recent specimens of *D. ponderosa* at or near San Diego. Their misgivings concerning this matter are expressed by Burch in his recently issued Distributional List. Dall's record was evidently based on a right and a corresponding left valve in the National Museum collection, labelled "San Diego Bay" (catalog no. 123402). The catalog record reads "San Diego Bay, Shepard, 1891." The valves are bleached, have no ligament or epidermis, and some sand grains are attached to the nymph. These specimens evidently are fossils and are presumably from late Pleistocene deposits, in which this species is known to occur at San Diego, as well as farther northwest at Signal Hill (near Long Beach), the San Pedro district, and Santa Monica. The northernmost Recent specimens in the National Museum collection are from Scammon's Lagoon, Lower California (off Sebastian Vizcaino Bay), 350 miles south of San Diego. I have not, however, searched the literature for possible records between Scammon's Lagoon and San Diego.—W. P. Woodring.

Marquis de Gregorio's Claiborne Types.—A note was published by the writer in Nautilus, vol. 50, No. 3, 1937, p. 100, on the location of the types and figured specimens of the Eocene species described by Antoine de Gregorio in "Monographie de la Éocénique de l'Alabama," Ann. Geol. Pal., 7 et 8 liv., 1890.

The material was in 1937 at the De Gregorio home in Palermo, Sicily. Such information was also included in the paper on Claibornian Mollusca by the author (Bull. Amer. Paleont., vol. VII, No. 32, 1937) under the discussion of the respective molluscan species described by De Gregorio. The late marquis' daughter, Rosalia de Gregorio, wrote us recently (May 3, 1945) that all of the collections of shells that belonged to her father had been given to the University of Palermo.—KATHERINE V. W. PALMER, Paleontological Research Institution, Ithaca, N. Y.

EGG LAYING PROCESS OF STROMBUS PUGILIS ALATUS Gmelin, as observed May 11, 1945, in Boca Ciega Bay at the foot of 31st St., S., St. Petersburg, Pinellas County, Florida.—All the shells were found on a bar of clean white sand, about 150 feet out from high water mark. As the tide ebbed, exposing the bar, the shells began to pop out of the sand, very much like Terebras on an exposed bar. Of the 122 specimens examined there were only 7 laying eggs. These were partly buried in the sand, with the lip of the shell exposed. The eggs emerged from the mollusk imbedded in a continuous string of matter, about a millimeter in diameter. This string piled up into a loose ball in the space between the lip of the shell and the sand. Microscopic examination showed this egg-string to be composed of small grains of white sand, agglutinated by an albuminous substance. As the egg-string did not pass through the sand, the mollusk apparently takes in the sand, and fabricates the egg-string around the eggs as they emerge. The egg-string balls averaged about the size of an English walnut, but one was about twice that bulk.—W. J. BOWER, St. Petersburg 5, Fla.

TELLINA GEORGIANA Dall IN FLORIDA.—A few years ago the writer procured a fine living example of this species near the South Inlet in Lake Worth. The species was described by Dall in 1900. He placed it under *Eurytellina* and the range was reported as "Cape Hatteras, North Carolina, southward to St. Thomas, West Indies."

This species is not well known and a few notes may be helpful. The shape of the shell recalls the common *Tellina nitida* Poli from the Mediterranean. The surface has the same silk-like sheen, the concentric growth lines being similarly distinct.

Our shell, however, has a pale flesh-colored ground with numerous reddish radiating color lines which suggest *Tellina radiata* Linné but are more numerous, extensive and finer than on that shell.

Tellina georgiana will be figured in the revised and enlarged edition of East Coast Marine Shells which is now in the hands of the printers.—MAXWELL SMITH.

VALVATA PISCINALIS (Müller) IN LAKE ERIE.—The occurrence of this European species in the Great Lakes, first reported in 1898, was discussed by John Oughton in *The Nautilus* in 1938 (Vol. 52, Nos. 1 and 2, pp. 30 and 60). At that time it was reported as abundant on the shores of Lake Ontario from Belleview to Port Dalhousie, with a single specimen from Lake Erie, collected by Clifford L. Blakeslee at Presque Isle. Dr. Oughton suggested the Welland Canal as the route through which entry may have been made.

That the species already is becoming established in Lake Erie is confirmed by the finding of a specimen previously overlooked in material which I collected in 1939 on the lake shore near Angola in Erie County, New York. This material had been put away without sorting until recently when I had occasion to look it over and so made this interesting discovery.—IMOGENE C. ROBERTSON.

SOUTHERN RECORD FOR HESPERARION NIGER.—Dr. W. Harry Lange (Bull. So. Calif. Acad. Sci., Vol. 43, Part 1, 1944, p. 33–40) recently listed counties in which this slug has been found giving it a distribution extending from Tehama County, California, in the north, southward to Monterey County, Calif. On a recent collecting trip with Mr. M. L. Walton a single adult specimen of *Hesperarion niger* (Cooper) was collected in a swampy meadow west of Poso Creek and about one-half mile north of the Glenville-Woody road in northern Kern County, which is approximately 35 miles northeast of Bakersfield, Calif. It was taken from the under side of a log associated with *Helminthoglypta allyniana kernensis* Berry. This establishes the most southern as well as the most eastern record for *H. niger*. It is the first record of that species from east of the San Joaquin Valley.—WENDELL O. GREGG.

THE NAUTILUS

Vol. 59 October, 1945 No. 2

THREE NEW SPECIES FROM AN UPPER MIOCENE OYSTER "REEF" IN TAMPA BAY

By JULIA GARDNER [1]

Plates 4, 5; text fig. 1

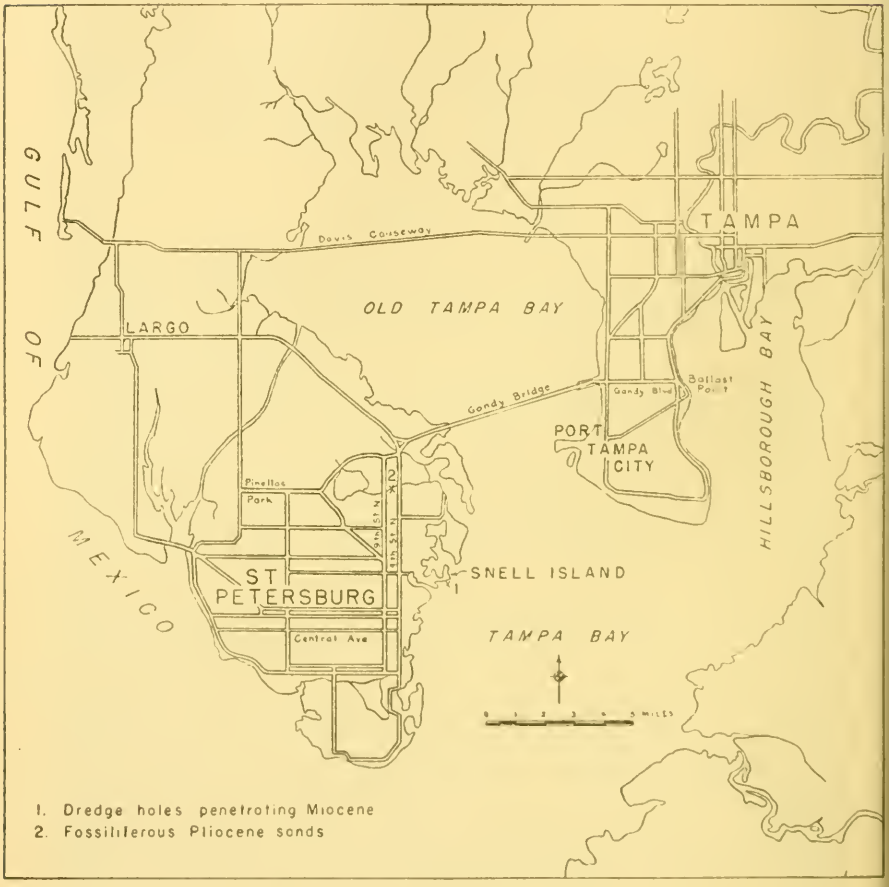
The Tertiary beds around Tampa Bay have been represented in mineralogical and shell cabinets since the middle of the last century. The beach rocks near Ballast Point, especially those containing the silicified shells and corals, attracted the attention of army officers stationed at old Fort Brooke at the head of Tampa Bay. John H. Allen, a Lieutenant of Artillery in the U. S. Army of Florida, reported at some length in the *American Journal of Science,* 1846, on the general character of the geology of the western part of the Bay. Even in that year the silicified organic masses were well known to collectors as the "chalcedony from Tampa Bay." The so-called "Tampa Silex beds" have been exhaustively studied by Dall and subsequent investigators and have proved to be of lower Miocene age.

The upper Miocene and Pliocene deposits of the Tampa Bay district were unrecognized until the Florida boom in real estate in 1924–1926. Highly fossiliferous sands were uncovered in developments directly east of Pinellas Park, St. Petersburg (locality 2 on key map). A superb collection, probably synchronous with the Caloosahatchie fauna, was assembled by William G. Fargo of St. Petersburg.

A third fauna apparently derived from an upper Miocene oyster "reef" was dredged off the southeastern end of Snell Island. According to Charles R. Locklin of St. Petersburg, Snell Island was subdivided in 1925. The island was united

[1] Published with the permission of the Director, Geological Survey, United States Department of the Interior.

with the mainland, and the neck filled in with dredged sand and clay. The dredge which excavated to a depth of 25 feet penetrated the "reef." The interstices between the closely packed "reef" oysters and most of the interiors of the double valves are



Map of Tampa Bay and environs

filled with clear quartz sand and light gray limey clay. The fauna recovered from the "reef" includes a few species not hitherto recorded. The description of two oysters and a *Placunanomia* follows.

PLACUNANOMIA PINELLA Gardner, n. sp. Plate 4, figures 1, 2, 5, 6.

Shell rather large, commonly warped, subcircular to ovate; dorsal area squarish. Outer margin broadly and regularly fluted in some individuals; in others, as in the type, irregularly warped and rippled. Irregular radial or oblique surficial threading developed over the entire shell but commonly rubbed off. Cardinal crurae in right valve, elongate, sturdy, converging at a small angle; fitted into the corresponding depression in the left valve; lateral margins of depression much thickened; armature of left valve imperfectly preserved in all available material. Scar of byssal plug distinct, vertically elongated, placed ventral and slightly anterior to the cardinal crurae. Single adductor scar very large, linguiform, the rounded ventral margin of the scar reaching in some individuals three-fourths of the distance from the dorsal margin to the base. Byssal scar indistinct.

Dimensions: Double valves; height, 77 millimeters; width, 72 millimeters; thickness, 31 millimeters.

Locality: Spoil bank from dredgings of upper Miocene in Tampa Bay off Snell Island, St. Petersburg, Pinellas County, Florida.

Holotype, paired valves: U. S. National Museum No. 559874. *Topotypes,* 9 sets of paired valves and 6 single valves: U. S. National Museum No. 559875.

Placunanomia pinella differs in the development of a secondary radial threading from *Placunanomia plicata* Tuomey and Holmes of the Duplin marl of the Carolines, Georgia, and Florida. The more regular, worn shells are commonly difficult to separate from the Duplin species.

OSTREA LOCKLINI Gardner, n. sp. Plate 4, figures 3, 4; Plate 5, figures 1, 2.

Shell of medium size, broadly falcate, attached by only a small area on the left umbone. Valves subequal, the right valve a little smaller, more compressed and less strongly rippled than the left. Anterior and ventral margins forming a broad arc, the posterior lateral margin rather strongly concave. Marginal folds deep, confined in some individuals to the outer arc, in other individuals originating in the umbonal area; average number 5 or 6. Concentric sculpture feeble, incremental only. Possibly a crude radial cording may be developed, but only faint traces

are discernible on the weathered surfaces. Ligament area small, low, flattened, depressed medially in the left valve. Inner marginal denticulations very fine, extending along the inner posterior lateral margin and at least a third of the way down the inner surface of the anterior lateral and ventral margin. Muscle scar relatively large, pyriform, posterior, distinct.

Dimensions: Height, right valve, 56 millimeters; left valve, 59 millimeters; width, right valve, 38 millimeters; left valve, 41 millimeters; thickness of double valves, excluding marginal rippling, 16 millimeters; including marginal rippling, 21 millimeters.

Locality: Spoil bank from dredgings of upper Miocene in Tampa Bay off Snell Island, St. Petersburg, Pinellas County, Florida.

Holotype, paired valves: U. S. National Museum No. 559870. *Topotypes,* 5 sets of paired valves and 4 single valves: U. S. National Museum No. 559871.

Paired valves of the related *Ostrea sculpturata* Conrad are common in the same dredgings. The right and left valves of *O. sculpturata* are less similar to each other in size, outline, and sculpture pattern than those of *O. locklini.* The fluted crescent outline is exceptional in *O. sculpturata,* but is the normal form of *O. locklini.* The plications in *O. sculpturata* commonly number at least twice those of *Ostrea locklini* and are consequently narrower and sharper and usually originate nearer to the tips of the umbones.

Ostrea locklini has not been recognized in the outcrop.

The species is named in honor of the donor, Mr. Charles R. Locklin.

Ostrea coxi Gardner, n. sp. Plate 5, figures 3–6.

Shell of medium size, trigono-falcate. Right valve much smaller than the left, flattened and sculptured only with concentric laminae. Left valve also compressed but not so much so as the right; sculptured with concentric laminae and with radial lirae; laminae worn down on all individuals but, in fresh specimens, probably free-edged and ruffled, as in *Ostrea disparilis;* radial liration irregular, strongest near the beak, restricted to the left valve. Beaks very narrow, produced and bent strongly backward. Ligament groove also very narrow, elongated parallel to the anterior dorsal margin. Posterior

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3

4

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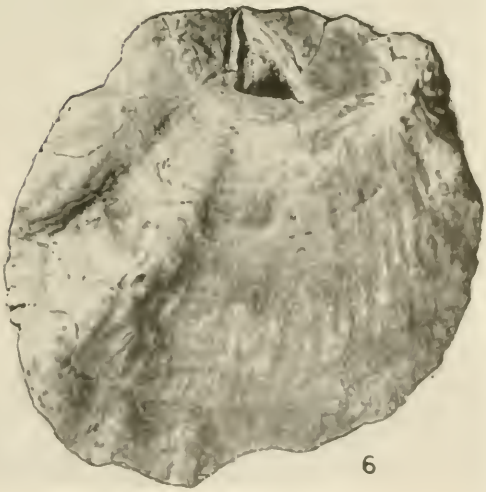

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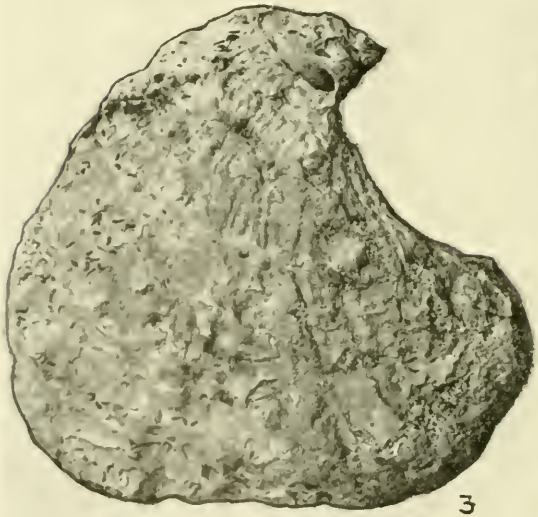
1


2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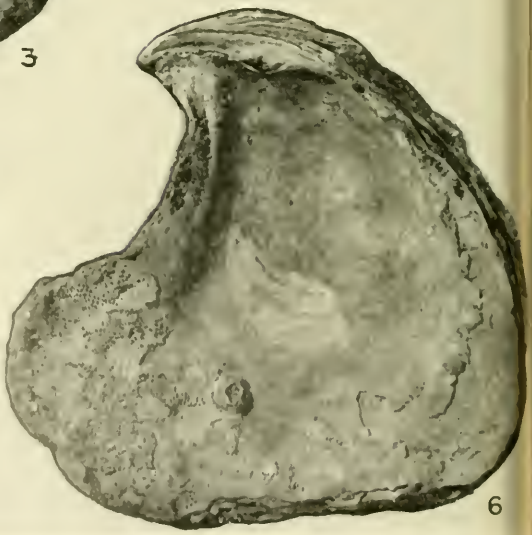
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dorsal margin thickened and denticulate in the right valve and, in both right and left valves, denticulate along the anterior margin almost halfway down to the base. Single muscle scar obliquely pyriform, the narrowed posterior portion directed backward.

Dimensions: Height, right valve, 60 millimeters; left valve, 71 millimeters; width, right valve, 53 millimeters; left valve, 68 millimeters; thickness of double valves (worn): 16.5 millimeters.

Locality: Spoil bank from dredgings of upper Miocene in Tampa Bay off Snell Island, St. Petersburg, Pinellas County, Florida.

Holotype, paired valves: U. S. National Museum No. 559872. *Topotypes,* 6 sets of paired valves and one single right valve: U. S. National Museum No. 559873.

Ostrea coxi is remarkable for the very narrow curved beaks and the discrepancy between the two valves. The sculpture pattern of both the right and the left valves is similar to that of *Ostrea disparilis* Conrad with which it is associated, but the outline of the dorsal half of the shell is distinct from the usual oval outline of *O. disparilis.*

The species is named in honor of Mr. George H. Cox, who submitted the first examples of this remarkable species.

Plate Descriptions

Plate 4

Figures 1, 2. *Placunanomia pinella* Gardner, n. sp. 1, Interior of right valve. × 5/6. 2, Interior of left valve. × 5/6.

Figures 3, 4. *Ostrea locklini* Gardner, n. sp. 3, Exterior of left valve. × 5/6. 4, Interior of left valve. × 5/6.

Figures 5, 6. *Placunanomia pinella* Gardner, n. sp. 5, Exterior of left valve. × 5/6. 6, Interior of left valve. × 5/6.

Plate 5

Figures 1, 2. *Ostrea locklini* Gardner, n. sp. 1, Interior of right valve. × 1. 2, Exterior of right valve. × 1.

Figures 3–6. *Ostrea coxi* Gardner, n. sp. 3, Exterior of left valve. × 1. 4, Exterior of right valve. × 1. 5, Interior of right valve. × 1. 6, Interior of left valve. × 1.

NIGHT COLLECTING

By BLENN R. BALES, M.D.

The long chain of islands extending from the tip of the Florida mainland all the way to Key West, a distance of one hundred and twenty-five miles, is well known as the Florida Keys and their number is legion. The name comes from the Spanish cayo which means island. The very name of Key West is a corruption of the Spanish "Cayo Hueso" which means Bone Island. Relics of Spanish occupation still persist in the names of Key Vaca, Key Largo, Boca Chica and Bahia Honda Keys.

The ancient geographers must have been hard put to find names for all of them, for we have Big Pine Key and Little Pine Key; Duck Key and Little Duck Key; Grass Key and Grassy Key; Sand Key, Sandy Key and Sand Island; Molasses Key, Sugar Loaf Key, Knock-em-down Key, Sombrero Key and finally, when they apparently ran out of names, No Name Key.

The region has been a Mecca for shell collectors for generations past and is now readily accessible over a fine highway. One may drive to good collecting regions, park his car, and within five minutes be picking up good specimens of shells. Nor need he confine his activities to any one locality, for he can change his collecting grounds (or waters) daily.

In places the warm, tropical waters lie within a few feet of the road and in many places a person may stand in the road and toss a pebble into the Gulf of Mexico on one side or into the Atlantic Ocean on the other. One would think that every known species of shell indigenous to this region had been found, but there has not been a year for the past five years but what at least one shell, never before known to science, has been brought to light. New methods of collecting or improvements on older ones are accountable for this. One of these is hunting mollusks by the use of a gasoline lantern. Some dark night what might appear to be a watery will-o'-the-wisp, or Diogenes searching for an honest man, is likely to be one of the shell fraternity hunting specimens. The intense white light produced by the asbestos mantle of a good gasoline lantern illuminates the water to such an extent that every object is as clearly seen as by daylight.

Of course it is necessary that the tide be low and there be very little wind to ruffle the surface of the water. Tide and atmospheric conditions are the controlling factors, and frequently a month or two may pass before conditions are just right, but when this does occur, a whole new world is opened to the vision. The sea bottom is a wonderful moving panorama. Right at your feet is a long spotted moray, a vicious creature under normal conditions, but it slowly wriggles its slimy eel-like body in and about the heavy growth of the sea bottom and pays not the slightest attention to you as it seeks its supper.

Small fishes are attracted and swim about endlessly within the circle of light as if fascinated by its brilliancy. A barracuda, tiger of the sea, splashes just beyond your vision. The sea floor, gorgeous with brilliant plant and animal life, is as colorful as a flower garden. Amidst such beautiful and unusual surroundings, it is no wonder that the shell collector forgets the purpose of his quest, and he frequently pauses in his search for mollusks to admire the marine flower garden.

Many mollusks are nocturnal, and species that are considered rare when collecting by daylight almost swarm about at night, crawling among the clumps of coral or over the thick marine growth. Such proved to be the case with *Marginella carnea*, a beautiful red mollusk. The usual winter's take hardly ever exceeded a half dozen specimens, but the first time we collected at night, more than a hundred were secured. We found that, like the shell, the body of the mollusk was red also and beautifully marked. We also found that it took quick action to secure them. Upon the slightest provocation, the mollusk would quickly drop, and to find it among the thick undergrowth was no easy task and very few that dropped were ever found. The red body was retracted into the shell which is white on the bottom and matched the white sand perfectly.

Collecting at night is an eerie and weird sort of thing, for as the collector moves away from the shore, he gradually moves from the sight of any particular object he might use as a landmark. Soon no shore is visible and he is in a new world, unfamiliar and a little ghostly. He is just as likely to wade right out to sea as toward the shore, having nothing to guide him. No familiar object presents itself to view. All this is obviated if

he has the presence of mind to set up some bright object on the shore, such as an old tin can atop a stick. The light of the lantern is reflected from this and acts as a beacon. Light reflected from the windshield of an automobile may be seen, like a neon sign, for more than half a mile.

Just as terrestrial animals seek their food in the early morning hours, we found that many marine mollusks do a great part of their feeding early in the evening. When low tide came later than midnight, much molluscan activity had subsided.

With the possible exception of diving, equipped with water goggles or descending deeper with head helmet, where the water denizens look you right in the eye, hunting mollusks at night is the most thrilling and unearthly manner in which to collect shells.

THE CEPAEA NEMORALIS OF BRIGHTON, MONROE COUNTY, NEW YORK

By C. L. BLAKESLEE

On a warm morning during the middle of last July I happened to call on a friend who lives some distance from my home and was enthusiastically greeted with "You are just the person I want to see." Inquiring why, I was told that he had a snail that he had been saving for some time for me. He directed me to his garage where I found a paper bag containing the mollusk. Feeling intuitively that it would prove to be uncommon I eagerly opened the bag and peered into it to discover a beautiful bright yellow specimen of *Cepaea nemoralis*. Inquiry revealed that a neighbor's wee daughter, while on a visit to the home of a friend, had noticed this snail crawling on a tree and remembering that her neighbor had a friend who wanted snails she immediately captured it and confined it in the bag.

Having no knowledge of the establishment of this species in the vicinity I insisted on meeting the finder at once but my friend pointed out that obviously the mother and her daughter were taking a siesta, judging by the haze of serenity that enveloped their house, and that it behooved me to go away for a while until the child and mother had had their customary rest. Considering the importance of the find (to me) I could see no

point in his argument but he was resolute and I was obliged to yield to his demands. A couple of hours later I returned and I was rewarded with the coveted interview with the mother and the embryo shell collector. The girl's bashfulness acted as a deterrent to obtaining any coherent information until a deserved gift stimulated an outpouring of directions that necessitated considerable unraveling and interpreting by the mother. The site was found to be in a somewhat newly populated district that this collector, always on the lookout for mollusks, had passed through many times without a suspicion that it was sustaining a large colony of *Cepaea nemoralis*.

The site is in the village of Brighton, a suburb of Rochester, New York, and is in the vicinity of a center known as the Twelve Corners. It occupies an area no less than four miles long and two miles wide and is bisected by an improved arterial highway from which improved streets branch in both directions. There are few houses along the main highway but many new homes cluster along the laterals. The soil is uniformly clay, with no stratified rock visible, is of glacial origin and reflects the erosion of the Medina shales and sandstones and an amount of Queenston shale that are exposed along the south shore of Lake Ontario some twenty miles to the north and northeast. Many years ago a brick works operated over the site and the whole area was stripped of workable brick clay. In vegetation it supports mature elms, poplars and maples along the street curbings, and over the collecting area can be found scrub elm, wild cherry and apple, young poplar, willow and the plants of milkweed, goldenrod, asters, dandelion, teazel, thistle, low growing plants not recognized, coarse grass and a matting of dead weed stems and grass. The soil is inclined to be damp. Snails were feeding and estivating on all these species of vegetation except the cherry and a few cedars. They also clustered in cool spots under the matting of dead material.

At the time of the first visit in July the atmosphere contained considerable humidity and a thunderstorm was complaining in the west. The ground was damp and the sun was hot. Snails were everywhere in profusion. One vacant lot yielded nearly three hundred in twenty minutes from a space thirty by twenty feet. The creatures were on the weeds in abundance, in the

coarse grass and along the trunks and the branches of the trees to a height, in some instances, of over twenty feet. A large swarm was estivating in the sun on a section of the curbing, with a southern exposure, along the main highway.

The shells are multicolored, ranging from banded varieties on white or a gray white background to solid colors of yellow, brown and tan and their tints. Shells in all stages of growth were available. It might here be noted that apparently the different colorations are not determined by the organic elements of the soil, as the banded varieties were found on the same vegetation in the same sites as were the solid colors. However, of four plots, separated from each other only by the improved roadways and walks, it was found that one yielded a much higher percentage of banded shells than did either of the other three. And one of the plots was very low in its percentage. Inasmuch as soil, vegetation, sunlight and surface conditions were almost identical in the four plots, no satisfactory explanation can be offered here to account for the disparity in percentages. According to a neighborhood resident, the plot of low percentage of banded shells is frequently visited by individuals who collect the snails for food. One might conjecture that the shortage of the banded varieties in this plot could be due to a preference of the individuals mentioned for snails of that particular coloration.

A number of visits were paid the colony in September. On cool days few snails were in evidence, yet on one visit, after a night's rain, with the thermometer down to thirty-eight, snails were found estivating on everything but the cedars and cherries in great numbers. Many snails, at this time, had reached maturity and many fine, large shells were obtained.

An attempt was made to ascertain how and when the colony originated, by interviewing the residents of the oldest houses in the area. It was found that though the houses were aged the residents were comparative newcomers with one exception—an Italian family whose house stood in the center of density of population of the colony area. The owner "thought" the snails had been there as long as he had, twenty years, but disclaimed any knowledge of how they got there.

From information obtained from Dr. Pilsbry, *Cepaea nemoralis* has been found in the following established colonies east of

the Mississippi. Ontario: Owen Sound and Meaford on southern Georgia Bay. Massachusetts: Marion; G. L. Archer estate, Steyson Road; Norwell, Plymouth County (planted from the Marion colony). New York: Long Island at Flushing (1906) and Astoria; Lloyd's Neck (extinct before 1894). New Jersey: Burlington. Kentucky: Lexington. Tennessee: Knoxville. Virginia: Hot Springs, Warm Springs, Lynchburg and Staunton.

In addition to the above there is the recently discovered Brighton colony. Furthermore, Mrs. Margaret Teare, of the Conchological Section of the Buffalo Society of Natural Sciences, has generously supplied its members with excellent banded specimens collected at Southampton, Lake Huron, Ontario. Presumably other colonies of more or less importance are in existence.

RHODE ISLAND IS INVADED

By ELLEN G. MATTESON

Some time in July of this year a colony of *Cepaea nemoralis* appeared in Norwood, R. I., from where no one knows. A resident of Norwood took one of the snails in to the newsroom of the Providence *Journal* where it was received with curiosity and some skepticism. The fact that snails had been found in trees was almost too much to believe. I quote from an article printed in the *Journal:* "There was brought to the newsroom the curiosity of the month if not the year—a snail which climbs trees to partake of the leaves. The curiosity was all the more curious because Rhode Island is a maritime State whose shores are littered with millions if not billions of marine snails of different kinds, and these have come to be popularly accepted as the only local varieties." The reporter went on to tell of consulting the *Encyclopedia Britannica,* and the curator of the Roger Williams Park Museum. From both sources he learned that snails really do climb trees.

Shell collecting is my hobby and I am interested in the mollusk, too, so naturally I wanted to add some of these to my collection. Norwood is about three miles from Providence and seven from my home, making it not too distant to go "shelling."

The snails had invaded the gardens and were in the elm trees and shrubbery beside the road. The place where I did my collecting was, around thirty years ago, the site of a Home Nursery. No one can recall having seen snails of this kind here so it is possible that eggs were deposited on the nursery plants and so the colony gradually developed. Anyway, the weeds (especially milkweed), trees and shrubs were covered. This was in August when the snails were feeding and lively.

The shells are very attractive. Some are pink and some yellow, but all are spirally banded. On some the bands are so wide as to make the shell itself seem to be of a dark color.

In September I again went for more snails and this time found them on the ground under the clover and dandelion plants. A very few were still on the trees and weeds. I had noticed that some of the adult shells were eroded so I checked and found that about twenty per cent were in some stage of erosion.

A hundred have been released in various trees in my yard so that I may learn more about them. When placed on the tree trunk they immediately started for the top. A few that I gathered in August have been kept, as pets, in a glass bowl. They are most interesting to watch. They show their preference for milkweed and lettuce, leaving spinach and cabbage leaves untouched. One day I placed in the bowl several quahog shells from which the muscle had not been removed. The muscle was promptly cleaned out and the outside of the shell polished. I have since discovered that a deceased member means a party with everyone there for a feast.

It seemed to me that enough publicity had not been given to the *nemoralis* so I contacted the editor of the Providence Sunday *Journal*. He felt as I did, so he came to my home bringing a photographer with him. A recent edition of that paper featured the snails with pictures of them in their bowl and crawling on my hand.

This morning, October 4th, I found some of my *nemoralis* decending the trees. Several were on the grass. I intend to watch them this fall and winter to discover, if possible, where they go during cold weather. I hope by another year to know more about these little visitors to Rhode Island.

MESODON APPRESSUS (SAY) AT JAMESTOWN, VIRGINIA

By ANNE GRAY HACKNEY

Early in May, 1945, I collected a living specimen of *Mesodon appressus* (Say) in the ivy which grows in the old graveyard at Jamestown, Virginia, the site of the first permanent English settlement in America. Six dead specimens were found a few yards away, in the hollow trunk of an old tree. Later, another living specimen was found under an old log on a woody slope at Carter's Grove, also on the James River and about ten miles south of Jamestown.

All of the shells are quite small, measuring from 13 to 14 mm. in diameter. Compared with *appressus* from other localities, they agree with Dr. Pilsbry's description of the Bermuda form *sanctageorgiensis* "Prime" Verrill; the lip being noticeably wider, in comparison to the size, than in typical *appressus*.

In "Land Mollusca of North America" (Part 1, Vol. 2, 1940; pp. 752–753), Dr. Pilsbry states: ". . . The small shells about 14 mm. diameter, taken at the Natural Bridge, Virginia, by Clench, Archer and Rehder, are also similar [to *sanctageorgiensis*]. Probably the Bermuda colony was accidentally transplanted from somewhere in Virginia, in colonial times."

He also reports (p. 751; footnote 1) that "Mr. Vanatta picked up a small dead specimen of *appressus* on the Chester River, opposite Chesterton, Queen Anne Co., Maryland."

If all of these are form *sanctageorgiensis*, and in my opinion it seems quite likely that they are (note that Mr. Vanatta's specimen was "small" and well out of the given range of *appressus*), they were probably introduced from Bermuda to Jamestown at an early date, with some sort of cargo, and have since spread, or been carried, to other places.

Natural Bridge is much farther west, but it is on the James River, and they may well have been carried in some manner along this waterway and introduced there from Jamestown. Chesterton is close by the Chesapeake Bay, which the colonists used extensively in trading and travelling.

The Jamestown specimens may explain the presence of *sanctageorgiensis* in this country. Perhaps more thorough collect-

ing will disclose that it has become well established in this section of the Coastal Plain.

A NOTE ON THE BOLTEN CATALOGUE

By HARALD A. REHDER

The controversy over the catalogue of the Bolten collection has to a large extent abated, and though some may have questioned the wisdom of its resurrection and the validification of its nomenclatorial availability, its names are now quite generally accepted and in extensive use. Two criticisms that are brought against it from time to time are that we do not know the exact date of publication, and that it was not validly published, since so few copies are in existence.

My only reason for publishing the following communication is to put on record some data which may clarify the status of this catalogue. It is timely in view of the recent paper by R. Winckworth on the types of the Boltenian genera (Proc. Malac. Soc. London, vol. 26, pts. 4 and 5, July 25, 1945, pp. 136–148). It also contains the answer to his query in the second footnote on page 136.

In the issue of January 16, 1799, of the Intelligenzblatt der Allgemeinen Literatur-Zeitung, in columns 39–40, the following notice appears, which I am giving verbatim for the sake of completeness:

III. Naturalien so zu verkaufen

Unter dem Nachlass des Hrn. Bolten, weiland ersten Physicus in Hamburg, befindet sich, ausser andern grossen Schätzen von Naturseltenheiten, eine sehr vollständige Sammlung von Conchylien. Es enthält dieselbe gegen 7000 Stück einschalige Schnecken, und an 1300 zwey und vielschaalige Muscheln. Sie sind insgesamt auf das sorgfältigste erhalten, und von Seeschmutz gereinigt. Der seel. Hr. Besitzer hat dieselbe, nach seinem eigenen, auf das scharfsinnigste ausgearbeiteten System geordnet. Die Erben desselben haben durch den Hrn. Professor, nunmehrigen General-Superintendenten Lichtenstein, wie auch durch den Hrn. Böding [sic], das Handschriftlich vorhandene, genaue Verzeichniss, in welchem die grossentheils unter neuen, wohl erfundenen Namen, aufgezählten Boltenschen Gattungen beybehalten sind, nachsehen, auch die Arten und

Abarten mit den nöthigen Synonymen, nach der 13ten Ausgabe des Linneischen Natursystems, und mit Nachweisung auf die neuesten und prächtigsten conchyliologischen Kupferwerke versehen, und alsdann jenes dem Drucke übergeben lassen. Es wäre für das Beste der Naturgeschichte zu wünschen, dass dieses unglaublich vollständige Kabinet, darinn der Kenner nicht gleich eine bis jetzt bekannte Conchylie vermissen wird, seiner Vollständigkeit halber, bey einander bleiben, und in die Hände eines systematischen Kunstkenners gerathen möchte. Daher ist denn auch die Familie entschlossen, diese Sammlung nicht zu vereinzeln, sondern im Ganzen zu verkaufen.

Auswärtige Liebhaber können sich deshalb in postfreyen Briefen an den Buchhändler Hn. Bohn und Hn. P. J. Röding beym Neuenkrahn No. 42, melden, daselbst über alles nähere Auskunft, wie auch das Verzeichniss für 6 ss. erhalten.

Noch dienet zur Nachricht, dass, obgleich auf dem Titel des Verzeichnisses—2ter Theil—steht, es dennoch nicht unvollständig ist. Den das Verzeichniss der (schon im ganzen verkauften) Spirituosen u. s. w. machte den 1sten Theil aus.

A free but faithful translation of this notice follows:

Among the estate of Mr. Bolten, late leading physician in Hamburg, there is, besides other great treasures of natural history varieties, a very complete collection of mollusks. It contains nearly 7000 specimens of univalves and about 1300 bivalves and multivalves. All are in the best condition, and free from incrustations. The worthy owner arranged the same according to his own system, most carefully worked out. His heirs have had his careful handwritten list, in which the Boltenian genera are arranged, largely with new well-founded names, gone over by Professor, now Superintendent-general, Lichtenstein, as well as by Mr. Böding [= Röding], who have added to the species and subspecies the necessary synonyms, according to the 13th edition of the Linnean System, together with references to the newest and most elegant illustrated conchological works, and they have then had it [the list] printed. It would for the sake of natural history be most desirable if this unbelievably complete collection, in which the connoisseur will not immediately find lacking a single hitherto described species, remained intact because of its completeness, and come into the possession of a scientific scholar. Therefore, the family is resolved not to break up this collection but to sell it as a whole.

Amateurs outside of the city may communicate in post-free letters with the book dealers, Mr. Bohn and Mr. P. J. Röding at Neuenkrahn No. 42, concerning details of the same, as well as to receive the list for 6 shillings.

It may further be remarked that although "2nd part" is printed on the title page of the list, it is nevertheless not incomplete. For the list of the preserved specimens, etc. (already sold) comprised the first part.

From this we see that the catalogue was already in print by January 16, 1799, and hence was probably published late in the year 1798, or at the latest during the first half of January, 1799, at least five months before the appearance in May–June of Lamarck's *Prodrome d'une nouvelle classification* in the *Memoires de la Société d'Histoire naturelle de Paris*.

We also observe that it fulfils the principal conditions of publication, for it was offered for sale to the general public through the medium of a widely read journal. When we consider the labor of adding references from Gmelin and other conchological works to the Boltenian names, we may conjecture that Roeding regarded this catalogue as more than a checklist to be used and then discarded.

It may be emphasized here again that the names proposed in this work should, according to the International Rules, be credited to Roeding, as Bolton furnished the names only, and not the "name *and* (italics mine) its indication, definition or description" (last part of Article 21, International Rules of Zoological Nomenclature).

"CYCLOSTREMATIDAE" AND VITRINELLIDAE OF FLORIDA, II

By HENRY A. PILSBRY and THOMAS L. McGINTY

Cyclostrema Marryatt

Cyclostrema Marryatt, 1818, Trans. Linn. Soc. London, 12: 338.

This genus was based upon *C. cancellata* Marryatt, who said: "I found this beautiful little shell among a collection of chiefly West Indian shells." The size was not stated,[1] but the figures measure 12.5 mm. diameter. They are apparently of natural

[1] Marryatt's brief descriptions of genus and species follow: "*Cyclostrema.* Testa depressa, perspective umbilicata; apertura circularis. *C. cancellata.* C. testa alba, lineis longitudinalibus et transversis elevatis decussantibus, inde cancellata. Habitat. . . . Apertura labiis cancellatis, cancellis transversim striatus."

size. No later author appears to have identified *C. cancellata* correctly; the type specimen has apparently been lost; but the species seems to have been found again, and curiously enough described in 1839 under the same specific name. As E. A. Smith wrote: "Kiener's *Delphinula cancellata* (Icon. Coquilles vivantes, p. 10, pl. iv, fig. 10) = *kieneri* Phil. is, I consider, Marryatt's species."

Enlarged photographic copies of Marryatt's figures of *Cyclostrema cancellata* (Plate 6, fig. 10) and of Kiener's *Delphinula cancellata* (Pl. 6, fig. 11) are given here. Kiener gave the size as "long. 3 lig., larg. 5 lig.," that is, about 7.75 × 12.25 mm. His locality was vague, "Mers de l'Inde."

E. A. Smith was a man of sound judgment in matters of specific discrimination, and we agree with him that the species of Marryatt and Kiener are probably identical, or at least closely allied. The figures of these species show a shell having several spiral cords crossed by stronger axial ribs which over-ride the spirals. These characters and the size—over 12 mm. diameter —are not unlike some East Indian species of *Liotia* (in the wide sense). The resemblance of *C. cancellata* to this rhipidoglossate group seems to be greater than its likeness to the very small or minute shells commonly referred to *Cyclostrema,* one of which K. M. White has shown to be taenioglossate. However, as we have not seen the species of Marryatt or of Kiener, we merely suggest that the characters of *Cyclostrema* still call for investigation.

After the above estimate was written (and in fact in type) we looked further into the history of *Cyclostrema,* and found that our opinion of its affinities had been anticipated by Iredale, who noted the resemblance to *Liotina* as long ago as 1915 (Trans. New Zealand Institute, 47: 440), and criticized its use for the minute snails usually called *Cyclostrema.*

Dall (Bull. 37: 166) reported "*C. cancellatum* Jeffreys"[2]

[2] On application to the U. S. National Museum for information on Dall's species, Dr. Harald A. Rehder very kindly investigated the matter, informing us that in Dall's working copy of Bulletin 37 there is a note stating that *C. cancellata* Jeffreys = *Vetulonia jeffreysi* Dall (Nautilus 27: 86, 87), the species having originally been named *Trochus cancellatus* Jeffreys, which was a homonym. *Vetulonia* was considered by Dall to belong to the Trochidae.

from Georgia and southward; and being unable to trace any *C. cancellatum* in Jeffrey's writings, Johnson (List, 1934, p. 74), who copied all these names from Dall, changed it to "*C. cancellata* Marryatt," which is an entirely different thing. Cf. also, Katherine J. Bush 1897, Trans. Conn. Acad. 10: 97–99, for notes on various species which have been confused with *C. cancellata* and other information. Also Kathleen M. White, 1942, Proc. Malac. Soc. Lond. 25: 89.

At all events, nothing agreeing at all closely with the type of *Cyclostrema* has yet been found in Florida or adjacent seas, or on the West Coast of the Americas. *Cyclostrema* possibly may still cause discord in the Liotia family, but it fades out of the Florida picture.

PARVITURBO, new genus

The very small shell is solid, perforate or narrowly umbilicate, turbinate or globose-conic, of few strongly convex whorls, with one to two smooth nuclear whorls, the rest sculptured with subequal spiral ridges, the intervals crossed by axial threads. Aperture rounded, the concave columella somewhat thickened. Operculum thin, corneous and multispiral. The living animal has a rather long narrow foot, expanding in narrow auricles in front, bearing three pairs of long, ciliated epipodial cirri and a much shorter pair forward. Tentacles tapering, ciliated. Radula rhipidoglossate. Type *P. rehderi*, n. sp.

This group of Florida, the West Indies and the Panamic province will probably prove to be rather numerous in species. *Cyclostrema turbinum* Dall, from off Havana in 80 fms., and *C. granulum* Dall, Samana Bay, Santo Domingo, apparently belong here. *Parviturbo* needs comparison with the Mediterranean genus *Pseudorbis* Monterosato (1884, Nomencl. Gen. e Specif. Conch. Medit., p. 109), founded on *Fossarus granulum* Brugnone (1873, Miscellanea Malac. 1: 13, fig. 25), of which the animal and operculum are unknown, and the shell lacks interstitial cross-threads. The living animal and the radula of *Parviturbo* will be illustrated in a future paper.

PARVITURBO REHDERI, new species. Plate 6, fig. 8

The shell is solid, white, subglobose with conic spire, rather narrow umbilicus, and seven strong subequal spiral carinae.

There are 4 strongly convex whorls with deep suture, the smooth nucleus of slightly more than one high whorl, narrowly rounded at summit; following whorl strongly angular, with some low weak spirals below the angle. Last whorl has seven strong spirals, the upper one with rather wide intervals above and below it, the rest with intervals about equal in width to the spiral ridges. The intervals are crossed by low, well spaced axial threads, which continue weakly on the slopes of the ridges but not over their summits. The round aperture is slightly angular above. Peristome rather thick. Columella somewhat thickened, rounded, the parietal callus moderate. Diameter 1.7 mm., height 1.6 mm.

North Inlet of Lake Worth, Palm Beach, under rocks (T. L. McGinty, 7–7–'45), type 181312 A.N.S.P.; paratypes in Weber and McGinty collections. Also Fisher Island, Biscayne Bay (McGinty & J. A. Weber). Ft. Myers Beach (Weber, 5–14–'44).

Characterized by the strength and small number of subequal spiral ridges or carinae. "*Cyclostrema*" *granulum* Dall (1889, Blake Rep., Gastropoda, M. C. Z. Bull. 18: 395, from Samana Bay, Santo Domingo) has more numerous spirals, the lower ones smaller, and it is relatively higher. For comparison we figure (Plate 6, figs. 3, 3a) the type of *C. granulum* kindly lent by Dr. Bartsch, of the U. S. National Museum.

Named for Dr. Harald A. Rehder of the National Museum.

PARVITURBO WEBERI, new species. Plate 6, fig. 1

The shell is solid, turbinate, with rather high spire and narrow umbilicus; last whorl encircled by seven subequal cords, and one smaller within the umbilicus. Whorls 4½, strongly convex, with deeply impressed suture. First two whorls are smooth. The penult whorl has four low spiral cords; the last whorl has seven strong spiral cords (and sometimes an eighth one, short, within the margin of the umbilicus). The cords are about as wide as their intervals, the upper two spirals rather strongly nodulose where they are crossed by very low axial ribs radiating from the suture. These axial ribs are obsolete in the peripheral region, but reappear weakly at the base, where one or two lower spirals are weakly nodulose. The intervals between spiral cords are crossed by fine, closely and evenly spaced axial threads. The umbilicus is narrow, smooth within, bounded by the eighth spiral cord. The aperture is slightly oblique, circular; the thick peristome is scalloped by the spiral cords. Parietal callus thick.

Diameter 1.7 mm., height 1.75 mm. (off Cape Florida).

Diameter 1.6 mm., height 1.65 mm. (Fort Myers Beach).

One and one-half miles off Cape Florida, in 70 feet (J. A. Weber). Type 181313 A.N.S.P.; paratypes in Weber and McGinty collections. Also in shell sand, Fisher Island, near Miami (J. A. Weber, March 1945). Loggerhead Key, Tortugas (T. L. McGinty, August, 1941). Ft. Myers Beach, in shell sand (J. A. Weber, May 14, 1944).

Distinct from otherwise similar Floridian species by the nodose upper spiral. Named for Mr. J. A. Weber of Miami. It differs from the West Indian *P. tuberculosa* (*Delphinula* t.) Orbigny, by having a higher, more produced spire and much more prominent apical whorl. The apex of *P. tuberculosa* is obtuse, the tip being depressed, the spire is shorter and the form more globose. It is also thicker.

PARVITURBO FRANCESAE, new species. Plate 6, fig. 6

The moderately solid but not thick white shell is broadly turbinate, with somewhat elevated but short spire, rounded periphery and narrow umbilicus, and with sculpture of strong spiral cords, nine on the last whorl. There are 4½ strongly convex whorls, with deep suture. The first whorl is smooth; the next (or first post nuclear whorl) has 3 or 4 spiral cords crossed by delicate axial threads. The last whorl has nine strong spiral cords, the upper one somewhat smaller, the lower or ninth cord bordering the umbilicus. The cords are separated by decidedly wider intervals, which are closely sculptured across by delicate axial threads. The umbilicus is narrow and deep, its walls smooth within. The aperture is subcircular, peristome somewhat thickened within, continuous, with scalloped outer margin. Diameter 3.4 mm., height 3.15 mm.

Off Palm Beach, in 50 fms. (T. L. and P. L. McGinty). Type 181316 A.N.S.P., paratypes in McGinty collection.

This is a broader shell than *C. weberi* with narrower umbilicus, and having exceptionally delicate and beautiful sculpture in the intervals of the spiral cords. The projecting embryonic shell of only one whorl, or at most one and one-fourth, is also characteristic. Named for our companion on this dredging trip, Frances Allen, of Atlanta, Georgia.

PARVITURBO CALIDIMARIS, new species. Plate 6, fig. 4

The moderately solid but not thick white shell is broadly turbinate, with a moderately elevated conic spire, rounded last

whorl and rather narrow umbilicus, the last whorl encircled by ten major spiral cords. There are 3¾ strongly convex whorls, with a deep suture. The initial 1½ smooth, rounded whorls form the rather projecting nuclear shell. Following whorl matt, rounded (worn?), with traces of spiral cords at first, becoming well developed on its last half. Penult whorl has three strong spiral cords and a smaller one below the suture; the last whorl has about ten high, narrow spiral cords, those at and above the periphery are more widely spaced, with an interstitial spiral thread in the last half whorl. All of the intervals are crossed by low, fine axial threads. The umbilicus is small, its walls smooth within, and bounded by a high cord. The aperture is subcircular. Peristome thin, the outer margin scalloped, columella narrow, nearly straight. Parietal callus rather thin. Diameter 2 mm., height 1.75 mm.

One and a half miles off Cape Florida, in 70 ft. (Jay A. Weber). Type 181319 A.N.S.P., paratypes in Weber and McGinty collections. Also, North Inlet of Lake Worth, Palm Beach, under stones (T. L. McGinty, 4–14–'45). Ft. Myers Beach (J. A. Weber, 5–14–'44).

This species has more spiral cords than *C. weberi* and lacks the imperfect axial folds which make the upper and the lowest cords nodulose in that species. It is similar in figure to *P. francesae,* but is much smaller, and the last half whorl has a spiral thread in the intervals (not showing in the face view). It differs from *P. zacalles* by the same character, and also by the form of the umbilicus and the columella.

Possibly none of the specimens are fully adult, as the lip is still thin, not thickened as in similar species; but the sculptural characters show that it is not the immature stage of any other known species.

The epipodial cirri have been observed in specimens from the North Inlet of Lake Worth.

PARVITURBO ZACALLES (Mazyck). Plate 6, figs. 2, 2a, 5

Cyclostrema zacalles Mazyck, 1913, Contrib. Charleston Mus., 2: 18.

"Shell minute, white, solid; whorls four, with rather distant strong spiral rounded ridges, the last one disappearing into the small deep umbilicus; of these ridges there are two on the penultimate whorl, and seven or eight on the body whorl. Radiating

sculpture of fine, close, sharp, somewhat oblique threads which cross the spiral ridges. Aperture very oblique; lip sinuous. Diam. max. about 1.6 mm. Alt. 1.4 mm." (Mazyck).

Isle of Palms (Long Island), near the entrance of Charleston Harbor, South Carolina, in sand sifted from a sponge. Type in coll. Charleston Museum (Mazyck).

A specimen kindly lent by the authorities of the Charleston Museum measures, height 1.2 mm., diam. 1.25 mm., 4 whorls, of which 2⅓ are smooth, rounded, the next with three spiral cords, beginning abruptly. On the last whorl the cords are less than half the width of the intervals, not strongly projecting, and rather weak on the base. There are about 8 cords on the last whorl, with some additional fine spirals around the umbilicus. The intervals are crossed obliquely by fine thin unequal striae, like very fine threads. There is a rather indistinct spiral ridge bounding the umbilicus. The last whorl is appressed at the suture. The aperture is oblique, subcircular, but angular and somewhat channelled above. Outer lip thin. Columella somewhat reflected, thickened; parietal callus rather thin.

The operculum (Fig. 5) is thin, pale yellow, flat; about 5 or 6 closely coiled whorls can be counted, the central part showing only indistinct traces of close whorls. The living animal has not been observed.

"CYCLOSTREMA" INTERRUPTUM SANIBELENSE Pilsbry.

Plate 6, fig. 9

Cyclostrema sanibelense Pilsbry, 1939, Nautilus 53:53, pl. 8, fig. 3.—L. M. Perry, 1940, Mar. Shells Southwest Coast Florida, p. 102, pl. 22, figs. 141a, b.

This minute species has 3½ whorls; slightly more than two are smooth and convex, forming the embryonic shell. Spirals begin abruptly, the last whorl being sculptured with seven principal spiral cords, and interstitial obliquely axial threads, or more exactly, low laminae. These are more widely spaced than in *P. zacalles* except on the last third of a whorl, where they become much closer, and the spiral cords diminished there. Diameter 1.05 mm., height 0.9 mm.

Off Sanibel Island, on *Atrina* in 4 fms. (L. M. Perry). Type 181119 A.N.S.P. Also, off Palm Beach, 50 fathoms, rocky bot-

tom; Manalapan wreck near Boynton, 30 ft., on a sponge; Boynton, in Lake Worth, and on Boynton Beach, in drift material; Delray wreck, 30 ft., on sponge (McGinty). Baker's Haulover Inlet, Miami, and off Cape Florida, Miami, in 70 ft. (J. A. Weber).

This snail is evidently a close relative of "*Vitrinella*" *interrupta* C. B. Adams, of Jamaica; if the small differences prove constant it may stand as a subspecies. Its generic position is doubtful at present. By the shell, operculum and radula it appears to be a *Parviturbo,* but the living animal differs remarkably by having no epipodial cirri, and the foot is bifid posteriorly. It will be figured in a later paper.

NEW FLORIDIAN MARINE MOLLUSKS

By HENRY A. PILSBRY

Dissentoma, new genus

Shell Risson-like but aperture with expanded outer lip with a stromboid notch and a short anterior canal. For the following species.

Dissentoma prima, new species. Fig. 1

The shell is long-conic, with obtusely conic summit, rather solid, smooth, and dark brown. There are six whorls, the apex conic, minute. The whorls are moderately convex, the last whorl contracted below, expanding towards the lip, the expansion abruptly becoming spirally grooved and white with brown bands. The aperture is subtriangular, whitish with two brown bands, produced below in a short canal directed somewhat to

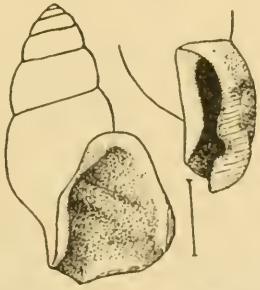


Fig. 1. *Dissentoma prima.* Scale line = 1 mm.

the left; narrowly rounded at the posterior extremity. The peristome is white, thick, the outer lip broadly embayed, with an external rounded ridge in the outer-basal region, where the lip projects forward, followed by a moderately deep stromboid notch, the basal lip approaching horizontal. The columellar margin of the aperture is sigmoid, the columellar margin with a reflexed free edge. Length 3.6, diameter 2 mm.

Off Singer's Island, near North Inlet of Lake Worth, Palm Beach, Florida, dredged in 15–20 feet, grassy bottom (Thomas L. McGinty). Type 181369.

Operculum unknown. The smooth, brown shell is unlike others of rissoid form by the expanded mouth with an anterior canal and a distinct stromboid notch. No exact estimate of its affinities can be made until living specimens are found.

"CYCLOSTREMA" THOMASI, new species. Plate 6, figs. 7, 7a, 7b

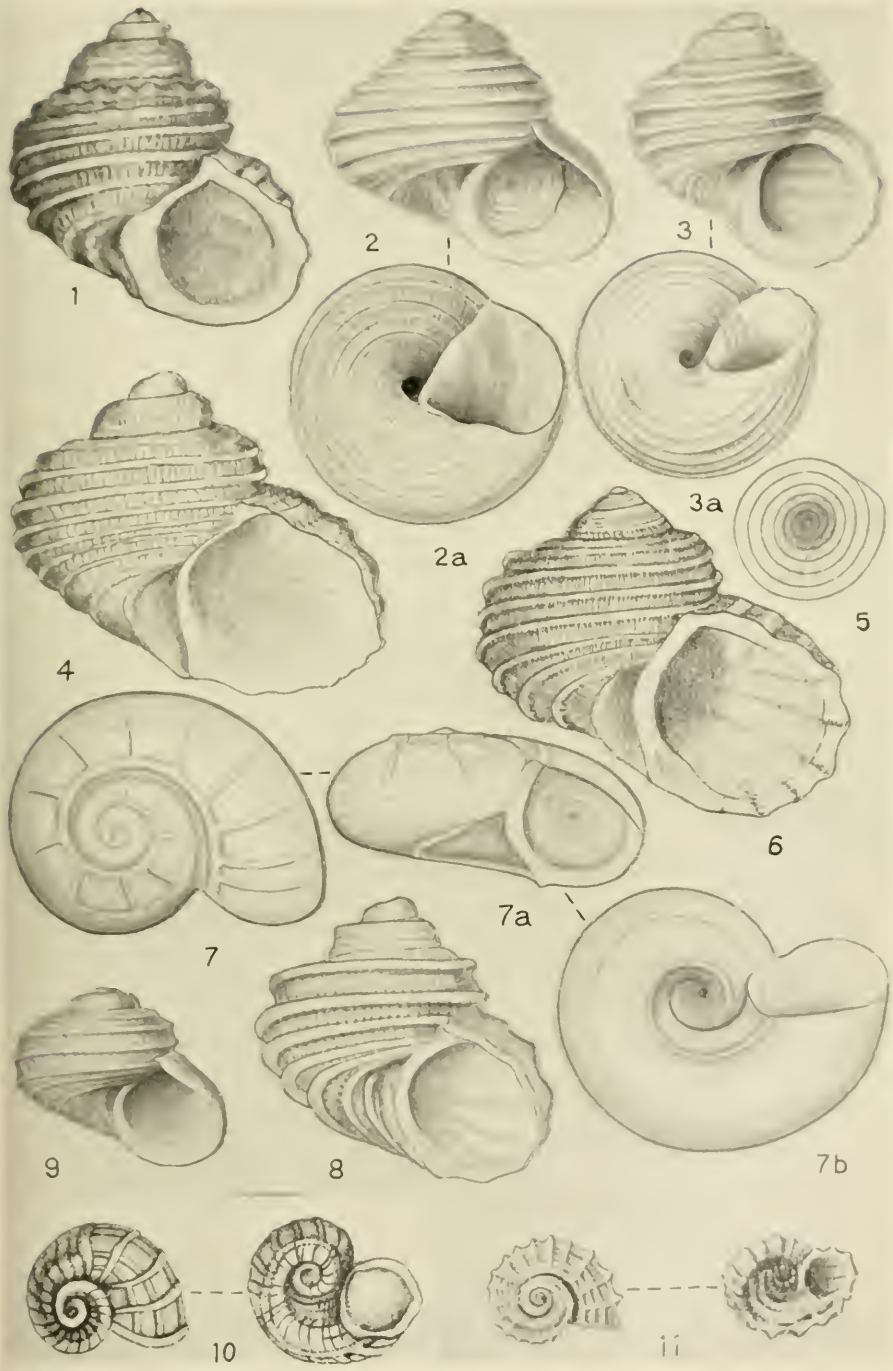
The cinnamon-buff shell is minute, discoidal, openly umbilicate above, with widely separated low riblets radiating from a subsutural ridge, below smoothish with a circum-umbilical cord. There are 3 whorls, of which the first 1½ are smooth, convex, the first projecting a little, forming the nuclear shell. Following whorls have a narrow, rather sharp raised ridge separated from the suture by a narrow space. From this ridge narrow, widely spaced radial riblets radiate to near the peripheral region, where they disappear; 11 or 12 on the last whorl, those on the penult whorl weak. There are very low and weak but rather coarse spirals over the peripheral region and base and a stronger thread in outer-basal position. A strong spiral cord limits the umbilical area. The oblique aperture is rounded, a little flattened at the parietal wall. Peristome is rather thin in its outer arc, the columella thickened, concave; parietal callus thin. Diameter 1.0 mm., height 0.56 mm.

The operculum is apparently multispiral, but only traces of the whorls are visible.

North Inlet of Lake Worth, Palm Beach, Florida (Thomas L. McGinty, June 9, 1945). Type 181309 A.N.S.P.

I do not think this species congeneric with *Cyclostrema cancellata* Marryatt, but it would go into that genus as used by many recent naturalists. I am using the name provisionally, as it does not seem expedient to base a new genus on this species until further studies of some allied forms can be completed.

Named for my collaborator in the investigation of Florida Vitrinellidae.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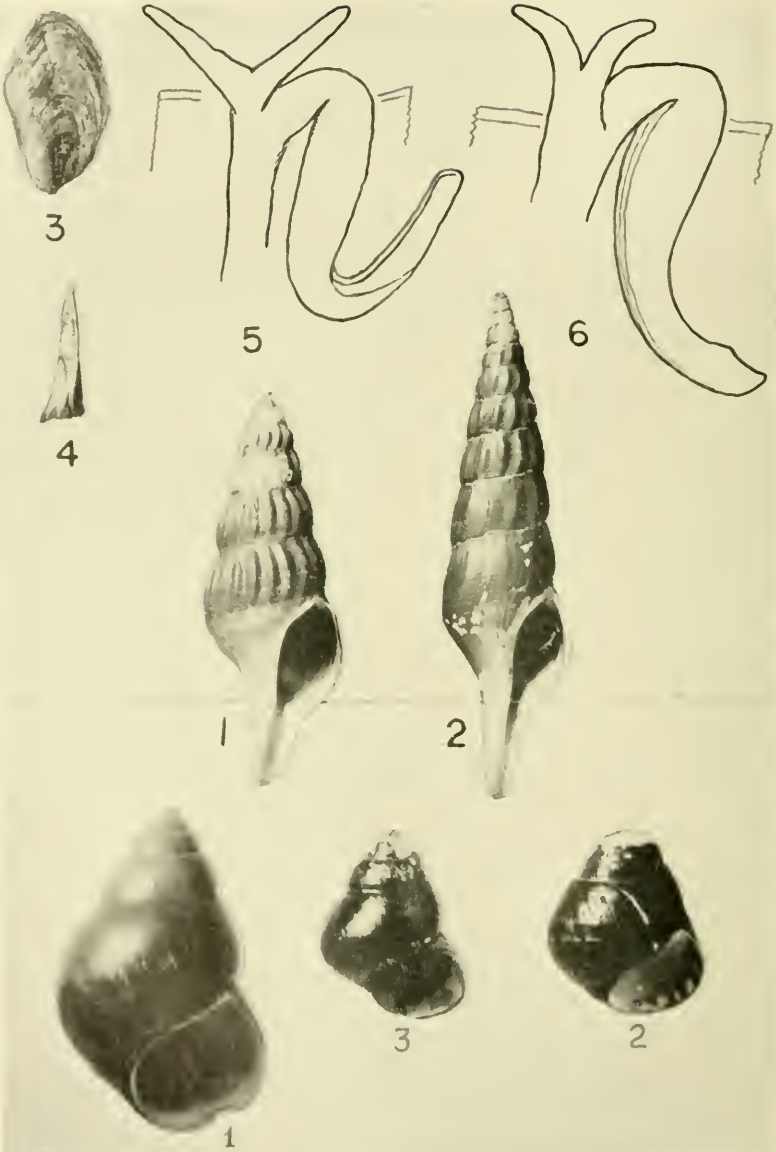

FIGS. 1, 4, 5, *Exilioidea kelseyi*. FIGS. 2, 3, 6, *Exilioidea rectirostris*. Lower line: FIGS. 1, *Viviparus suifuensis*. FIG. 2, *Viviparus pingi*. FIG. 3, *Viviparus quadratus grahami*.

SOME NOTES ON THE GENUS EXILIOIDEA *

By PAUL BARTSCH

Curator, Divisions of Mollusks and Cenozoic Invertebrates, United States National Museum

Exilioidea was created by Grant and Gale in 1931 [1] with *Chrysodomus rectirostris* Carpenter as type.

The type species has enjoyed a rather extensive shifting of superspecific position which even the present note may not unalterably fix. Carpenter in 1864 placed it in the Muricidae, in the genus *Chrysodomus*. A year later he placed a ? in front of that generic designation. Tryon in 1881 placed it in the subfamily Melongeninae of the family Buccinidae. Dall in 1902 put it in the Chrysodominae which he considered a subfamily of the Buccinidae. Arnold in 1903 put it in the subfamily Fusinae of the Fasciolaridae. In 1918 Dall placed it in the genus *Exilia* with a ? and this he aligned in the Chrysodomidae. Thiele in 1929 placed it in the Buccinidae with a ?. In 1931 Grant and Gale made it the type of a new genus, *Exilioidea,* and placed this in the family Neptuneidae. In 1940 Bentson placed it in the family Fusinidae where it may rest until more evidence for another relationship is produced.

My justification for this is: Some similarity in shape, nuclear characters, sculpture, and anterior canal. Its distinctness from all other known genera of the family includes blindness and absence of a radula as well as opercular characters, which are described under the recent species listed in the present paper.

EXILIOIDEA RECTIROSTRIS Carpenter. Plate 7, figs. 2, 3, 6

1864. *Chrysodomus rectirostris* Carpenter, Rep. Brit. Ass. Adv. Sci. for 1863, p. 664.
1865. *?Chrysodomus rectirostris* Carpenter, Proc. Acad. Nat. Sci. Philadelphia, p. 64.
1881. *Sipho rectirostris* Tryon, Man. Conch., ser. 1, vol. 3, p. 131, pl. 53, fig. 348.
1902. *Tritonofusus* (*Plicifusus*) *rectirostris* Dall, Proc. U. S. Nat. Mus., vol. 24, p. 525, pl. 34, fig. 2.

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[1] Mem. San Diego Soc. Nat. Hist., vol. 1, pp. 665–666.

1903. *Chrysodomus rectirostris* Arnold, Mem. California Acad. Sci., vol. 3, p. 228, pl. 7, fig. 7.
1918. *?Exilia rectirostris?* Dall, Proc. U. S. Nat. Mus., vol. 54, p. 221.
1921. *Exilia rectirostris* Dall, Bull. 112, U. S. Nat. Mus., p. 92.
1929. *Exilia rectirostris* Thiele, Handb. Syst. Weicht., pt. 1, p. 309.
1931. *Exilioidea rectirostris* Grant and Gale, Mem. San Diego Soc. Nat. Hist., vol. 1, pp. 665–666, pl. 28, fig. 5.
1940. *Exilioidea rectirostris* Bentson, Univ. California Publ. Bull. Dept. Geol. Sci., vol. 25, p. 224, pl. 1, fig. 22.

A dissection of 5 specimens has revealed the characters noted below: Two, U.S.N.M. No. 226117, were dredged by the U. S. Bureau of Fisheries steamer *Albatross* at station 4201 in Queen Charlotte Sound, British Columbia, in 145 fms. on mud bottom; bottom temperature 45.5°. One of these is a male, the other a female. U.S.N.M. No. 122662, 2 specimens dredged by the *Albatross* at station 2890 off the coast of Oregon in 277 fms. on sand bottom; bottom temperature 42.2°. One of these is male, the other a female. U.S.N.M. No. 210621, a male dredged by the *Albatross* off Point Pinos, California, in 389–456 fathoms on mud bottom at station 4513. This specimen has served as the basis for our sketch.

The animal is without eyes. It has a large flattened ribbon-shaped verge (see sketch), bearing a seminal groove on the posterior edge. The operculum is elongate-ovate with a somewhat spur-like projection forming the terminal nucleus; it is twisted and marked by concentric lines of growth on the outside; on the inside the apical end bears a pit corresponding to the spur on the outside. No radula was found in the 5 specimens mentioned above. In only one lot out of 21 are the nuclear characters of the shell sufficiently well preserved to be described; in all the others the early whorls are badly eroded or lost. This lot, U.S.N.M. No. 216335, 3 specimens, was dredged by Mr. George Willett in 60 fms. off Forrester Island, Alaska. These show that the nucleus consists of about 1.5 well rounded, smooth turns that form a blunt apex.

EXELIOIDEA KELSEYI (Dall). Plate 7, figs. 1, 4, 5

1908. *Tritonofusus (Plicifusus) kelseyi* Dall, Proc. U. S. Nat. Mus., vol. 34, p. 249.

1921. *Exilia kelseyi* (Dall), Bull. 112, U. S. Nat. Mus., p. 92.
1940. *Exilioidea kelseyi* Bentson, Univ. California Publ. Bull. Dept. Geol. Sci., vol. 25, p. 225.

The type of this species, U.S.N.M. No. 110631, was dredged by F. W. Kelsey in 50 fms. off San Diego. The dissection of 2 specimens, U.S.N.M. No. 224346, dredged by the *Albatross* at station 3172 in 62 fms. on sand bottom; bottom temperature 48° off Bodega Head, California, and another, U.S.N.M. No. 186069, dredged by J. H. Paine in 56 fms. off San Diego, shows parallel characters to *E. rectirostris*.

The animal is blind. The verge is long, extending through almost the whole length of a turn with the seminal groove on the lower side. No trace of a radula was found.

EXILIOIDEA RECTIROSTRIS HERTLEINI Bentson.

1940. *Exilioidea rectirostris hertleini* Bentson, Univ. California Publ. Dept. Geol. Sci., vol. 25, pp. 224–225, pl. 2, figs. 23, 24; pl. 3, fig. 3.

This subspecies, which was reported by Bentson, "has been found in the Pliocene of California from two localities: in the Wildcat formation of Humboldt County, loc. 1859, C. A. S. loc. 115; and at Fourth and Hill streets, Los Angeles, in the 'Fernando,' loc. 3030."

EXPLANATION OF FIGURES.—1, Shell of *Exilioidea kelseyi* (Dall). 2, Shell of *Exilioidea rectirostris* (Carpenter). 3, Operculum of *Exilioidea rectirostris*, outside view. 4, Operculum of *Exilioidea kelseyi* in profile. 5, Sketch of head and verge of *Exilioidea kelseyi*. 6, Sketch of head and verge of *Exilioidea rectirostris*.

TWO NEW SPECIES, ONE NEW SUBSPECIES AND ONE NEW NAME OF CHINESE VIVIPARIDAE

BY SUI-FONG CHEN

(Research Fellow, China Foundation 1938–1939)

In working on the collection of the Chinese Viviparidae in the United States National Museum, two species and one subspecies

were found to be undescribed. Also one described species was found to be in need of a valid name.

I wish here to express my appreciation to the authorities of the United States National Museum for the opportunity to study their collections and especially to thank Dr. Paul Bartsch for his guidance in this work.

VIVIPARUS SUIFUENSIS, new species, plate 7, fig. 1.

Shell rather large, strongly solid, elongate-ovate, olive green throughout excepting the aperture which is bluish. Nuclear whorls 2, small and convex. Postnuclear whorls 5, convex, and marked by microscopic spiral lirations of which 8 occur on the third, 12 on the fourth and fifth, 13 on the penultimate and 14 on the last whorl; they are most prominent in the fourth whorl. Suture well impressed. Umbilicus absent. Aperture pyriform, ovate; peristome simple, moderately thick, well expanded, and tinged internally with black along the edge; parietal wall thickly calloused; columella concave and thickly calloused. The operculum is thin, ovate, with subcentral nucleus toward the left. The radula has the formula: 5–1–5 : 4–1–4 : 4–1–5 : 20.

The type, United States National Museum Cat. No. 573611, was collected by Rev. D. C. Graham in Suifu (Ipin), Szechuan Province, China, and yields the following measurements: No. of whorls 7; height 40.7 mm.; diameter 27.1 mm.; length of aperture 21.5 mm.

Two other specimens from the same source as the type, give the following additional information:

No. of Whorls	*Height* (mm.)	*Diameter* (mm.)	*Length of Aperture* (mm.)
6.8	32.9	23.9	18.8
6.5	29.8	22.2	16.3

This species resembles *Viviparus chinensis* Gray, but it is much thicker and more slender, and has no umbilicus.

VIVIPARUS PINGI, new species, Plate 7, fig. 2.

Shell rather small, solid, thick, ovate, dark olive brown throughout excepting the aperture which is purplish gray. Nuclear whorls decollated. Postnuclear whorls 2.4 remaining, convex, and marked by 4 evenly spaced spiral cords on each whorl.

A spiral liration is present between the middle two cords of the body whorl. Suture deeply excavated and well constricted. Periphery inflated and strongly rounded. Base short, well rounded and marked by 5 spiral lirations. Umbilicus obsolete. Aperture pyriform, well angled posteriorly and broadly ovate anteriorly; peristome simple, thick, well expanded and tinged with black along the edge; parietal wall slightly calloused; columella concave. Operculum thin, horny, with subcentral nucleus toward the left. The radula has the formula: 5–1–5 : 4–1–4 : 5–1–4 : 25.

The type, United States National Museum Cat. No. 333887, was collected by C. Ping at Foochow, Fukien Province, China, and yields the following measurements: Height 26.1 mm.; diameter 20.8 mm.; length of aperture 16.1 mm.

Two other specimens from the same source as the type, give the following additional information.

No. of Whorls	*Height* (mm.)	*Diameter* (mm.)	*Length of Aperture* (mm.)
4.0	22.8	18.3	14.5
2.6	21.9	19.5	14.4

This species resembles *Viviparus quadratus* Benson, but it is much thicker and has a larger body whorl, and its umbilicus is obsolete.

VIVIPARUS QUADRATUS GRAHAMI, new subspecies, Pl. 7, fig. 3

Shell small, thin, elongate-ovate, olive green throughout. Nuclear whorls 1.5 convex. Postnuclear whorls 4, well convex, and marked by two spiral brown bands of which one appears on the summit while the other is just above the periphery. The sculpture consists of spiral lirations of which 3 occur on the third, 8 on the penultimate and last whorls. Suture well impressed, periphery inflated and strongly rounded. Base short, well rounded and marked by 20 microscopic spiral lirations. Umbilicus moderately perforated. Aperture ovate, nearly round, bluntly angled posteriorly and broadly rounded anteriorly; peristome simple, thin; parietal wall slightly calloused; columella slightly concave. Operculum thin, horny, pyriform, with subcentral nucleus toward the left. The radula has the formula: 4–1–4 : 5–1–5 : 5–1–5 : 18.

The type, United States National Museum Cat. No. 334007, was collected by Rev. D. C. Graham from Suifu (Ipin), Szechuan Province, China, and gives the following measurements: No. of

whorls 5.5; height 26.8 mm.; diameter 19.0 mm.; length of aperture 14.1 mm.

Selected specimens, from the same source as the type, give the following additional information:

No. of Whorls	*Height* (mm.)	*Diameter* (mm.)	*Length of Aperture* (mm.)
6.0	23.8	16.2	11.8
5.4	24.4	16.8	12.4
5.5	19.7	14.5	10.5

Average of 15 specimens: whorls 5.5; height 19.6 mm., diameter, 14.2 mm., length of aperture 10.2 mm.

This subspecies resembles *Viviparus quadratus* Benson very much, but it has two spiral brown bands and a straighter columella.

VIVIPARUS NINGKUOENSIS, new name.

Paludina heudei Ping, 1938, Contr. Biol. Lab. Sci. Soc. China, Nanking, Zool. 13, 1, p. 2, figs. 1 and 2. (Not *Vivipara quadrata heudei* Dautzenberg and Fischer, 1905.)

I take the liberty to rename this species after the type locality.

NOTES AND NEWS

THE GENOTYPE OF ARCA.—Opinion 189. The International Commission on Zoological Nomenclature has decided: "Under suspension of the rules:—(i) to set aside all type designations for *Arca* Linnaeus, 1758, Syst. Nat. (ed. 10) 1:693 (Class Pelecypoda, Order Filibranchiata), made prior to the date of this *Opinion;* and (ii) to designate *Arca noae* Linnaeus, 1758, Syst. Nat. (ed. 10) 1:693, as the type of *Arca* Linnaeus, 1758."

OTESIA H. & A. ADAMS *versus* VITRINULA "GRAY" CARPENTER. —In the B. M. Catalogue, Pulmonata, p. 65 (1855), Dr. Gray established a new genus, *Vitrinella,* for two Celebes land snails, *Helix flammulata* Q. & G. and *Vitrina viridis* Q. & G. As that generic name had been used by C. B. Adams in 1850 for a group of Jamaican marine shells, the brothers Adams (Genera of Recent Mollusca 2:642, Nov., 1858) proposed the new name *Otesia*

as a substitute for *Vitrinella* Gray not C.B.A., with the same two species. But meantime in 1857 Philip P. Carpenter (Catal. Mazatlan Shells, p. 237) had discussed the double employ of *Vitrinella*, and stated in a footnote that "Dr. Gray proposes to alter the name of this latter group [*Vitrinella* Gray] to *Vitrinula*." This was apparently a verbal communication to Carpenter, as Gray did not elsewhere publish *Vitrinula*, so far as I know.

Vitrinula clearly has precedence over *Otesia*, but it has been overlooked by later authors on the Zonitacea, and it eluded Neave and former nomenclators.—PILSBRY.

A NOTE ON *Megaspira elata* GOULD.*—On critically examining the type of *Megaspira elata* Gould 1847 (U.S.N.M. 5503), collected in Brazil by the United States Exploring Expedition, I discovered that it is *M. elatior* Spix 1827, agreeing with it in sculpture and in the internal armature. The species described as *M. elata* Gould by Pilsbry (Man. Conch. (ser. 2), vol. 16, p. 186, pl. 28, figs. 5, 6; pl. 29, figs. 12, 13, 1904) differs in having more crowded, less retractively inclined ribs and in having the radial basal lamellae lower and without hooks. This species may be called MEGASPIRA PILSBRYI, new name (= *M. elata* (Gould) Pilsbry 1904, not Gould 1847). It is apparently a rarer shell than *M. elatior*. In the collections of the U. S. National Museum there is only one specimen of *pilsbryi*, and 6 of *elatior;* I have also seen the two specimens of *pilsbryi* from the collections of The Academy of Natural Sciences of Philadelphia (Cat. Nos. 3057 and 25041), which are figured on plate 28 of the Manual. It may be noted that the species figured by Gould as *Megaspira elatior* Spix (U. S. Explor. Exped., vol. 12, Moll. and Shells, pl. 7, fig. 102, 1852) (U.S.N.M. No. 5504), and the other specimens so labeled and also collected by the Exploring Expedition (U.S.N.M. No. 22073), are all *M. ruschenbergiana* 'Lea' Jay.—H. A. REHDER.

A NOTE ON VOLSELLA TULIPA (Lamarck).—Mr. Henry Dodge, Scarsdale, New York, has recently called my attention to the fact that in most of the recent works on the mollusks of the West Atlantic the name *Modiolus tulipa* is credited to Linné,

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instead of to Lamarck. It is so quoted in Johnson's "List of Marine Mollusca" (1934), Maxwell Smith's "East Coast Marine Shells" (1937), and Perry's "Marine Mollusks of the Southwest Coast of Florida" (1940). The earliest record of this erroneous use that I have found is on page 187 in Tryon's "American Marine Conchology" (1873). Dall also gave Linné as authority in his Bulletin U. S. National Museum No. 37 (1889), as well as in the reprint of that bulletin in 1903, but quoted the author correctly in his "Contributions to the Tertiary Fauna of Florida" (Trans. Wagner Free Inst. Science, vol. 3, pt. 4, 1898).

There is, however, an earlier name which should be used for this species. Leach (The Zoological Miscellany, vol. 2, 1815, p. 32, pl. 72, fig. 1) described *Modiola americana* from Bermuda, which is without question the same shell as Lamarck's *tulipa*. The name of this species will therefore be: *Volsella americana* (Leach) 1815 (+ *tulipa* Lamarck 1819).—H. A. Rehder.

Triodopsis albolabris traversensis Leach.—Specimens were taken Sept. 4, 1945, near Annsville, Westchester Co., N. Y., crawling on and under boulders of Annsville Phyllite and in the shrubbery near the Cut. It was associated with *Mesodon thyroidus, Mesomphix inornata* and *Deroceras agreste*. Inside some of the dead and bleached specimens I found *Coelicopa lubrica, Vallonia pulchella,* and *Retinella electrina*.

The shells were collected at the famous Annsville Phyllite Cut at Annsville, Westchester Co., N. Y. After having collected quite typical *albolabris* in very small quantities in other sections around Peekskill, N. Y., I was much impressed by the comparatively large numbers of these shells that were found in a short time—most of them taken by my nephew, Walter Smit, who became a sharp shell collector. In about one and one-half hours collecting we took 25 mature live shells, at least twice as many well preserved dead ones, in addition to seeing large numbers of immature shells, which, of course, were left unmolested.

These specimens are entirely typical *traversensis* measuring 21 to 25.5 mm. diameter. One dissected by Dr. Pilsbry has, he informs me, the relatively very short vas deferens characteristic of the race, and unlike the long duct of typical *albolabris*.

Since this small race of *T. albolabris* has been found before in arid places near sea or lake shores, such as the patches of vegetation among sand dunes, some account of ecologic conditions in this locality may be in order. The Annsville Cut was made in a hill between Annsville and Canopus Creeks in Westchester Co., N. Y., to accommodate the short stretch of road that connects U. S. 9 (Albany Post Road) with the Bear Mt. section of the Taconic Highway near Peekskill, N. Y. I collected the first specimens from the face of the Cut, where they were clinging to the underside of shallow overhangs. (Phyllite tends to cleave in layers like slate.) Small trickles of ground-water were oozing from the hill and it was near these spots that the snails were found. In grass at the foot of the cut more specimens were taken. At the end of the Cut, where the original hill cover (largely rough gravel) was undisturbed, we found many dead and bleached specimens, with only an occasional live one, usually immature. On the south side of the Cut, at the Annsville Creek end, there are several large loose phyllite boulders. Under these we found several more specimens. On September 29, when we visited the spot again, we found the edge of the road literally covered with dead and dying specimens. For some reason they had left the natural cover and were dying in the road.

Dr. Antine-Biren, of the faculty of Mineralogy of Brooklyn College, informs me that the entire Peekskill region is very poor in any type of lime-bearing minerals.—M. K. Jacobson.

The Genus Pecten at Cape Ann, Massachusetts.—The genus Pecten is not usually found in the Annisquam inlet at Cape Ann, Massachusetts. Two sporadic records are known, however. Mrs. John W. Beardslee and family collected in the early 1920's a single, small specimen of the common scallop *Pecten irradians* Lamarck living on a mud flat along the tidal river. It has not been found there since to the knowledge of those who have collected mollusks in this region, although discarded shells have been collected in certain places about Cape Ann. This species does not usually occur north of Cape Cod except for a number of scattered localities.

Shells of *Pecten grandis* Solander have been found on the shores of Cape Ann, but without doubt they had been discarded

on certain beaches along with shells of other edible species. (See Nautilus 57:67–68). The species was not collected while dredging in Ipswich Bay or in the Annisquam River. It is possible that it may actually be present in Ipswich Bay, but it is reasonably certain that it does not ordinarily occur in the Annisquam inlet which joins the bay. A single specimen of this giant scallop 4⅛ x 4½ inches was found on August 19, 1945, by a Mr. Lindberg and was given to the writer. It was found lying on a mud bank in Goose Cove, a side channel and cove of the Annisquam waterway, in about one foot of water at low tide. It was kept alive in sea water for several days.—Ralph W. Dexter, Kent State University, Kent, Ohio.

PUBLICATIONS RECEIVED

The Molluscan Family Planorbidae. By Frank Collins Baker, Collation, revision and additions by Harley Jones Van Cleave. xxxvi + 530 pp., 141 plates, with portrait of author. Urbana. Univ. of Illinois Press, 1945, $14.50. Since the times of Haldeman, Binney and Tryon there has been no comprehensive American work on this important family of aquatic snails. Meantime a great many new species and races have been defined, and a new classification, based upon the internal anatomy, has been developed, in great part by the investigations of Mr. Baker.

Baker planned to treat the subject in two parts or volumes, the first dealing with the anatomy and classification of Planorbidae of the world, the second to contain descriptions of the species of both Americas.

In the first part, after chapters dealing with the general morphology, reproduction, ecology and distribution, Baker considers the classification, in which subfamilies are based upon characters of the genitalia, and genera, while mainly according to structure of the male organs, also depend upon shell structure. Four subfamilies are recognized: I, Segmentininae; seven genera, represented in the United States only by *Drepanotrema cultratum* Orb. II, Planorbinae, with six genera, of which *Gyraulus, Armiger* and *Tropicorbis* have representatives in this country. III, Helisomatinae, comprising all of our large planorbids of the genera *Helisoma, Carinifex* and *Parapholyx*. IV,

Planorbulinae, with *Planorbula*, *Menetus* and *Promenetus*. Of these subfamilies, the Planorbinae are nearly world-wide in distribution. Segmentininae is mainly an Old World group, but with *Acrorbis* and *Drepanotrema* in South America, the latter extending into Florida and Texas (one species). Helisomatinae is mainly American, but one genus, *Planorbarius*, typified by *P. corneus*, is European, and familiar to us as an aquarium snail. The Planorbulinae appear to be an exclusively North American group.

A systematic review of all of the 36 genera and their subgenera follows, with anatomical details admirably worked out, and figured on 75 plates. The species and subspecies considered valid are enumerated. It is fortunate that this part of Baker's work, which is of value to those concerned with fresh water faunas everywhere, was left practically complete. His classification seems well considered, and a great advance over former taxonomic arrangements. It will also direct attention to the groups of doubtful generic status, requiring further investigation.

The second part of the work was designed to include a monographic account of the Planorbidae of North and South America; but while copious notes had been prepared, the material was left in form too unfinished for publication. To the 54 plates which he had completed, with descriptive legends, Professor Van Cleave was able to add 6 from unassembled photographs. On these 60 plates, most of the American species are fully illustrated. As Baker had worked for years on the problems presented by the many species and varieties and their distribution, his death before making a permanent record of these details is a great loss to American malacologists concerned with this family. An imperfect idea of his intentions, in many cases, may be gleaned from the explanations of the sixty plates which Professor Van Cleave has included.

A final chapter contains descriptions of nine new species and seventeen new varieties, for which Baker had left longhand notes.

Malacologists are deeply indebted to Professor Van Cleave for the interesting biography of Mr. Baker, accompanied by an excellent portrait, and for his competent handling of a difficult editorial task.—H. A. P.

Revision of the Mollusca of Indiana. By Calvin Goodrich and Henry Van der Schalie. Amer. Midland Nat. 32, Sept. 1944. This paper of 70 pages reviews the Indiana fauna bringing the classification, nomenclature and occurrence data up to date. Knowledge of the mollusks of this state began with Thomas Say, was extended by R. E. Call (1899), F. Stein, E. Pleas, A. W. Butler, and especially by L. E. Daniels (1903), whose researches supplied a large part of the information on distribution. The sequence of species throughout river systems is discussed, with especial reference to the distribution of Pleuroceridae and Unionidae in the Wabash River. The text following contains keys to genera, brief notes on the characters of many of the species, and full records of their distribution. There is little to criticize in the work. We doubt whether *Triodopsis tridentata juxtidens* occurs so far west, but we have not seen their material. In very few states has the entire mollusk fauna been so satisfactorily dealt with.—H. A. P.

Molluscan species common to Western North America and Japan. By A. Myra Keen. Proc. Sixth Pacific Scientific Congress III, pp. 479–483. Of 66 species said by one author or another to be common to these coasts, Japanese examples of about half were obtained for comparison. It appears that "The large number of identical species seems an exaggeration." "In the faunal area represented by the Bering Sea, about 5 per cent of species present there range southward as far as to Puget Sound on the east, and to northern Japan on the west. Of the faunas in California and in Japan, only about 0.3 per cent range the entire intermediate distance; not more than 0.2 per cent can be said to occur in the two areas without also occurring in Alaska." In this connection see also Hatai, same Proceedings, 2:479.—H. A. P.

Addendum.—On page 53 it should have been mentioned that "*Cyclostrema*" *bushi* Dautzenberg & Fischer, which Kathleen M. White found to be taenioglossate, apparently belongs to the genus *Pseudoliotia* Tate.—H. A. P.

GEORGE WILLETT (1879–1945).

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THE BAR

By BLENN R. BALES, M.D.

Have you ever collected shells on a sand bar at extreme low tide, or better still on a minus tide? No? Well you've missed a lot.

All active conchologists constantly while on a collecting expedition consult the Tide Tables published by the Geodetic Survey, and are generally better acquainted with them than they are with the Golden Text of next Sunday's Bible School lesson.

It is not necessary to consult the Tide Tables to learn that "the tide ebbs and flows twice each twenty-four hours," but it does give the time of low tide, and that makes the whale of a difference in the collecting. At that time many sandy beaches and bars are bare, while at high tide they may be deeply covered with water.

Twice each month, at new moon and full moon, the tides are lower than low; that is, the water may fall lower than a normal low tide, and it is known as a minus tide. The Tide Tables simply state that on a particular date there is −0.1 or −0.2, which means that the tide will be one tenth or two tenths of a foot lower than normal. These minus tides at times may be considerably more than a foot below normal and it takes but little imagination to visualize the extent of sea bottom which may be exposed at such a time. Large stretches of sand bars and beaches that are covered with water practically all of the time, then provide a collecting ground that can hardly be surpassed. Mollusks that have lived day after day in congenial water-covered homes suddenly find themselves high and dry and the experience seems to be anything but pleasing to them. They emerge from their homes and try to find more congenial sur-

roundings. Their sense of direction must be poor, for they are just as likely to travel directly away from the water as toward it.

This is especially true of *Olives* and *Olivellas*. The wise collector is generally on hand as the tide recedes from the bar on which he intends to collect, and if it be one that harbors *Olives*, he at once begins the search. It is like tracking a rabbit in the snow, for as the tide exposes the bar, they emerge from the sand and start to crawl about, leaving a well marked trail and to secure a specimen, one must follow it to the "trail's end." Occasionally an *Olive* will come out of the sand but not start to crawl, and there it stands upright and as evident as a sore thumb. In some localities where *Tellinas* are common, they may come up and start away, but are evidently cross eyed or have some similar affliction. They never move in a straight line, but always proceed in a circular manner so that their sharply cut tracks assume the design of a large irregular watch spring.

Many of the conchological prizes do not emerge entirely, but seem to start and then change their minds, but to the observant and experienced collector, they are almost as evident as those that move about, for their presence is betrayed by the small unnatural elevations or humps in the smooth sand. It is a simple matter to dig them out with the fingers, as they are just below the surface. Hundreds of shells are dug out and about as many discarded, for it is only the rarer ones that are desired. One never knows what is hidden under the slight elevation in the sand and the only way to find out is to dig. Constant stooping makes one aware that part of his anatomy is his BACK after a busy session on the bars.

Larger specimens may be seen some distance away as the elevations in the sand are very evident and plainly seen. Not all the "signs" indicate the presence of a buried mollusk and many are the times when a starfish, a sand dollar, a sea biscuit or a "rooster" crab is dug up only to be disgustedly thrown into the nearby water.

Seldom are the really large mollusks trapped by a low tide for they will move to deeper water as the tide recedes, but such small or medium sized shells as *Terebra*, *Pyramidella*, *Oliva* and the smaller varieties of *Conus* are usually found in considerable numbers.

While "working" an exposed sand bar, the search is never over as long as it is exposed, for all the mollusks do not appear at the same time, but keep popping up from time to time. One may retrace his steps several times and secure specimens each time. A favorable time for some varieties is when the tide is just beginning to return and wetting the sand. This induces activity in the larger *Conus* and others.

On rare occasions, a large hump in the sand may cover a specimen of *Xenophora*, often called "carrier shell" or the "collector shell," and both of these names are very descriptive. This is one of the most interesting of molluscan families, for it decorates its shell in an interesting and unusual manner.

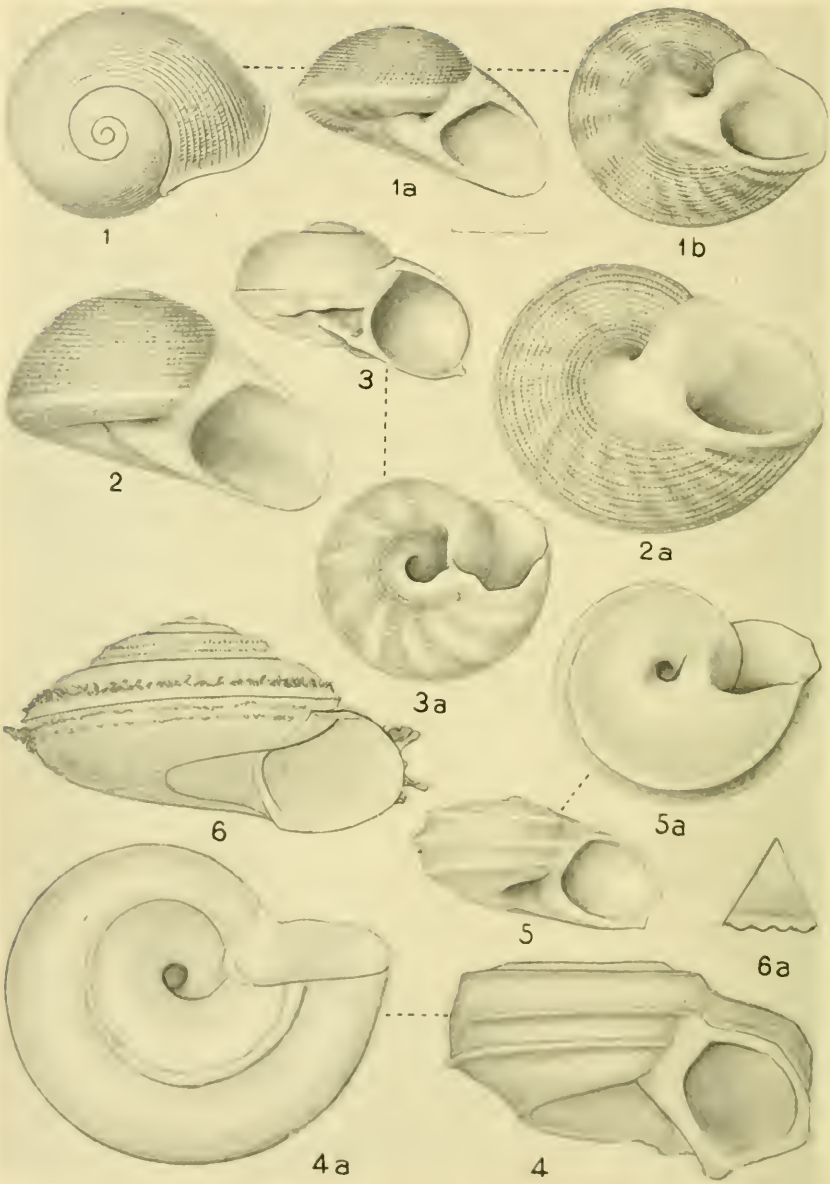
The growth of all mollusks is not a steady, uninterrupted one, but there is a period of growth during which time some shell is added and then a period of apparent rest when no shell is formed followed by another growth period. The new shell growth is added to the aperture or opening, a little at each growth period and during this time, it is soft and plastic, but it hardens rapidly. The *Xenophora,* at this time presses foreign objects that happen to be close-by into the soft, newly formed shell which soon hardens and the object remains there during the life of the mollusk (and a long time after). It is about the same as pressing some object into a mass of putty. This gives the shell the appearance of a heap of small shells and the disguise is a perfect one. No doubt hundreds of *Xenophora* are overlooked, even though the collector makes diligent search. When the growth period is at its height, the time is ripe for the addition of the disguising material and almost any convenient object is used, but the mollusk is careful when using the small saucer shaped halves of a bivalve, to place them with the convex side down. The sharp edges of the added shells are thus in an upturned position and may possibly serve as a cutting edge to aid the owner in getting about. When shells are not available, any other object such as a piece of coral, a fragment of rock or a small lump of coal may be used and Frank Lyman of Lantana, Florida has told me of seeing one specimen in Lake Worth, Florida that had adorned itself with a piece of a wooden match box.

Any collector who is familiar with the characteristics of the ocean bottom at various localities in Florida, will be able to identify the locality where a specimen has been taken in at least fifty per cent of the cases, for the mollusk's camouflage corresponds to the ocean bottom where it lives. It must not be understood that these shells are clean and that the various objects cemented to them are in any way prominent, for such is not the case. They are covered with moss and all manner of small marine growth and it takes quite a bit of cleaning to uncover the hidden beauty of the specimen.

Sea urchins add their bit to the confusion of a *Xenophora* hunt, for there is a short spined variety that habitually covers itself with pieces of shell, leaves or any other convenient small object. When one of these, completely plastered with small shells, is found, the thought of *Xenophora* at once flashes through the collector's mind, only to be dispelled when he finds it is another so-and-so sea urchin. In all sincerity, I believe a million sea urchins are examined each year by enthusiastic *Xenophora* hunters.

Many of the deep sea mollusks come into shallow water to breed and spend part of their early life, but as they increase in size, they seek deeper water. It has seemed to me that with *Xenophora,* this has been reversed, for specimens brought up from great depths by means of a dredge are very much smaller than those found in shallow water. It is a great temptation to keep every specimen taken, as naturally, each one is different, but cabinet drawers are not elastic and "enough's enough of anything."

It is generally admitted that the camouflage of *Xenophora* is for protection rather than ornamentation, for it would be inconceivable that a female *Xenophora* would call over the back fence to her girl friend with, "Come and see the perfect dream of a shell I picked up today and tell me if I have it on straight."



FIGS. 1, 1a, 1b, 2, 2a, *Climacia tholus*. FIGS. 3, 3a, *C. athleenae*. FIGS. 4, 4a, *Cyclostremiscus jeannae*. FIGS. 5, 5a, *C. suppressus*. FIGS. 6, 6a, *Episcynia multicarinata*.

"CYCLOSTREMATIDAE" AND VITRINELLIDAE OF FLORIDA, PART III

By HENRY A. PILSBRY and THOMAS L. McGINTY

Climacia Dall

Climacia Dall, 1903, Trans. Wagn. Inst. 3, pt. 6, p. 1633, expl. of pl. 60, figs. 1–3, for *Teinostoma* (*Climacia*) *calliglyptum* Dall.

The shell is wider than high, with dome-shaped spire of few whorls and flattened base which is excavated and concave around the central callus or umbilical cord. Surface with sculpture of close spiral threads with punctate intervals (sometimes obsolescent); the base having radiating folds or waves. The oblique aperture is somewhat quadrangular; peristome thick, the columella backed by a callous ridge or lobe spirally emerging from the umbilicus; parietal callus curving forward.

The name is from κλιμαξ, a climax.

Neither the group *Climacia* or its type species was described by Dall, both being defined only by figures, and the size, "diam. 3.0 mm."

Climacia reached its climax in the Pliocene, in such species as *C. radiata* (Dall), (described as *Collonia radiata,* Tr. Wagn. Inst. 3: 387, pl. 19, figs. 6–8), *C. calliglypta* (Dall), and two species, not yet described, from the St. Petersburg Pliocene. The living *C. schumoi* (Vanatta), from Monkey River, British Honduras (described as *Discopsis schumoi* Vanatta, 1913, Proc. Acad. Nat. Sci. Phila. 65: 24, pl. 11, figs. 2, 7), and *C. athleenae* n. sp., probably Pleistocene or Recent, also belong to this typical group. In all of these the radial folds are strongly developed, the axial callus of the base is reduced to a spiral cord around the umbilicus, and the spiral striation is more or less effaced in part of them.

These species would seem to form an excellent generic group, but another living species, *C. tholus,* is transitional to *Teinostoma.* In this species the spiral cord which emerges from the umbilicus in the typical climacias is transformed into a broad callous lobe, almost entirely filling the umbilicus, and the radial waves of the base are only weakly developed. In *Teinostoma pilsbryi* the callus wholly covers the axial region of the base, and

no radial waves are perceptible, but the spiral sculpture is like that of *C. tholus*. This appears to be the structure also in *T. laccus* Woodring, of the Bowden Miocene. These transitional species are probably survivors of the original stock which gave rise to *Climacia*. Their existence may perhaps make it advisable to treat *Climacia* as a subgenus of *Teinostoma*. The exact status of vitrinellid groups is still to be worked out, but for the present we leave *Climacia* as a genus.

CLIMACIA ATHLEENAE, new species. Plate 8, figs. 3, 3a

The rather thin shell is dome-shaped, smoothish, with flatter base and rather large umbilical cavity which becomes very narrow beyond the last whorl. There are about 3⅔ whorls, the first one convex, forming the smooth and glossy nucleus, the apex projecting slightly; following whorls dull. Suture well impressed, in the last whorl accompanied by a deep groove about as wide as the space between groove and suture. The last whorl is extremely convex, impressed above the projecting peripheral keel; with sculpture of fine and regular but very faint spiral striae (but on the penult whorl the spirals are more distinct, the intervals punctate). The base is but slightly convex below the keel, then concave near the umbilical callus, the convexity having about 8 low radiating waves or folds, otherwise smooth, but in the concavity around the callus some weak spirals are visible. A spiral callus forms the border of the umbilicus, which is quite narrow at first, becoming rather capacious in the last whorl, where it has a vertical wall overhung by the spiral callus. The aperture is moderately oblique, nearly round, the outer lip inserted above the peripheral keel. Peristome is rather thin, bearing a little point where the keel terminates. Columella concave and running forward, triangularly widened at the end of the circum-umbilical callus. Parietal callus thin. Diameter 2.55 mm., height 1.7 mm.

Boca Ceiga Bay, in dredged material (Charles R. Locklin and Athleen V. Underwood). Type 181291 A.N.S.P.

This charming snail is known by a single specimen "found in 'drift' taken from Boca Ceiga Bay. The lay-down is from the northwest end of Central Avenue Causeway to Treasure Island, and as the causeway was made of dredged material from the Bay, it would be hard to determine just what was the original position. It should be taken into consideration that Pliocene and Pleistocene horizons are found in the vicinity, thus any material taken could be either of the three ages."

It is larger than *C. schumoi* (Vanatta), with the suture more impressed and accompanied by a furrow (lacking in *C. schumoi*); the base is less convex and the radiating folds are fewer and lower than in *schumoi*. Whether *C. athleenae* would develop a projection of the lip at termination of the carina remains to be seen when fully adult specimens are found. The rather thin peristome and thin parietal callus apparently indicate some degree of immaturity; yet it has doubtless reached full size, and its recognition should be easy, even though the parts mentioned acquire a thicker finish.

Named for Athleen (Mrs. P. O.) Underwood, who found this strange species and brought it to our attention.

CLIMACIA THOLUS, new species. Plate 8, figs. 1, 1a, 1b

The shell is solid, white, dome-shaped with flattened base, spirally striate surface, and narrowly open umbilicus. There are about 3½ whorls, the first one smooth, the rest flattened, evenly sculptured with spiral threads about equal to their intervals, the threads minutely irregular or somewhat beaded by more minute axial striae which are chiefly noticeable as making the intervals punctate. The last whorl is bluntly carinate at the periphery. The base is somewhat convex, then concave around the central callus; the convex part has (about ten) low radial waves, and spirals like those of the upper surface. The strongly oblique aperture is squarish with rounded angles. Peristome is rather thick and in the fully adult stage the edge is slightly expanded. The columella is deeply concave, thick, backed by a thick, convex, smooth callus which curves spirally around and into the umbilicus, nearly filling it. Diameter 2.6 mm., height 1.7 mm.

About four miles off Carysfort Light, Florida, in about 500 ft. (Mr. and Mrs. Leo A. Burry). Type 181290 A.N.S.P. paratypes in collections of Charles H. Locklin and T. L. McGinty.

The low radial waves of the base become irregular on the last part of adults. The umbilicus is very much reduced in some specimens. The lip is not produced in a point at the keel, as it is in *C. schumoi*, and the upper surface of the last whorl is far less convex than in either *C. schumoi* or *C. athleenae*. The spiral striation is much stronger than in any other *Climacia*, and the umbilical callus is conspicuously heavier, leaving only a small part of the umbilicus uncovered.

A specimen (plate 8, figs. 2, 2a) from Baker's Haulover, Miami, differs from the type of *tholus* as follows: it is larger, diameter 3.6 mm., height 2.2 mm., of 4 whorls, the initial 1¼ forming the glossy embryonic shell, the rest spirally striate with punctate intervals, as in *tholus*. The base has radiating waves somewhat weaker than in the type of *tholus*. The periphery is blunter than in *tholus*, the umbilical callus is not so thick and wholly fills the umbilicus, but it is not appressed in front, there being a notch and cavity where the umbilical callus joins the parietal, as in typical *tholus*.

Compared with *Teinostoma pilsbryi* McGinty, this shell from Baker's Haulover differs by its larger size, more dome-like shape, the incompletely adnate callus, and more importantly by the radial waves of the base. The constancy of these differences remains to be tested.

Episcynia Mörch

Episcynia Mörch, 1875, Malak. Blätter 22: 155, for *Architectonica* (*Episcynia*) *inornata* Mörch, *Solarium inornatum* Orbigny.

The small shell is depressed, with low conoidal spire of about 5 convex whorls with a minutely serrate peripheral keel; umbilicus deep, scalar, bounded by an angle or keel. Surface nearly smooth under a thin periostracum which bears spiral fringes of filaments above and below the periphery.

Episcynia occurs in both east and west American tropical and subtropical waters, but has not been reported from elsewhere.

The type is *E. inornata* (Orbigny) from St. Thomas, as defined by Mörch. Orbigny worked from a shell found in sand from St. Thomas and evidently beach-worn. He did not mention or figure the epidermal fringes or the serration of the keel, both likely to be worn from beach specimens. Mörch described his specimens as having two ciliate lirulae.

The greater number of whorls and smaller apex, the serrate carina, and in fresh specimens the epidermal processes, distinguish this genus from *Vitrinella*. The operculum and living animal are still unknown.

EPISCYNIA MULTICARINATA (Dall) Plate 8, figs. 6, 6a

Vitrinella (*Episcynia?*) *multicarinata* Dall, 1889, 'Blake' Report, Bull. M. C. Z. 18: 392; 1892, Trans. Wagn. Inst. 3: 419.

Besides characters mentioned in the generic definition, it may be noted that the serration of the narrow peripheral carina is very minute. On the last whorl there is a blunt ridge, or spiral angulation of the whorl, a short distance above the periphery, another below it. In fresh specimens, these ridges bear fringes of flattened filaments, heaviest on the upper ridge. There may be two or three of these fringes. The base, mainly in its last half, has rather strong radial riblets or wrinkles. Diameter (without the epidermal filaments) 3.4 mm.; height 2 mm.; 5 whorls.

North Inlet of Lake Worth, Palm Beach; off Palm Beach in 300–350 ft. (T. L. McGinty); off Cape Florida, Miami, in 70 ft. (J. A. Weber); Destin, northwestern Florida (McGinty). Dall gave the range as "Hatteras to Florida, low water to 15 fathoms." Also, Miocene, Duplin Co., N. C.; Pliocene, Cape Fear River, N. C., and Caloosahatchie River, Florida.

Dall has raised the question whether this species is identical with *Architectonica gemma* Holmes, 1860, from the Wando River marl beds at Cainboy, S. C., Pleistocene. In view of the wide distribution of *E. multicarinata* in time and space, its identity with *gemma* appears highly probable; but it can be demonstrated only by the collection of topotypes of *gemma,* as Holmes's figures do not show the accessory spiral ridges and are more elevated than *multicarinata.* However, they may not be correct, as such small shells have often been drawn inaccurately. The Miocene *Episcynia naso* (Pilsbry & Johnson) of Santo Domingo, has fewer, larger teeth on the carina, and is evidently distinct. No satisfactory comparison with *E. inornata* (Orbigny) can be made until St. Thomas material is available.

CYCLOSTREMISCUS Pilsbry & Olsson

Proc. Acad. Nat. Sci. Phila. 97: 266. Type *C. panamensis* (C. B. Adams).

The typical group of this genus, in which there are axial riblets in the spaces between the keels, is not known to be represented in Florida.

CYCLOSTREMISCUS JEANNAE, new species. Plate 8, figs. 4, 4a

The moderately solid, translucent-whitish shell is discoidal with flat spire, four-keeled last whorl and funnel-shaped umbilicus. There are about 3⅓ whorls, the first glossy, convex. Penult whorl has a median keel, which extends upon the first part of the last whorl. The last whorl has strong upper and lower keels limiting a flattened peripheral zone, which has a submedian smaller keel in front, but diminishing and disappearing on the latter part of the whorl. The base is strongly keeled around the funnel-shaped umbilical region. The aperture is rounded-pentagonal, not very oblique. The peristome is blunt, the parietal callus rather thick. Diameter 1.8 mm., height 1.1 mm.

Off Palm Beach, Florida, in 150 feet, rocky bottom (T. L. and P. L. McGinty, 1940), Type 181371 A.N.S.P., paratypes in McGinty collection. Also Fort Myers beach on the west coast of Florida.

This species is closely similar to the Pacific *C. bartschi* Pilsbry and Olsson, from southern Panama, but that species is a little more depressed, has a much wider umbilicus, and differs in several details of sculpture. The surface between basal carina and umbilicus proper is distinctly but irregularly concave in *C. jeannae.*

In a specimen from Ft. Myers the keel of the penult whorl is subobsolete, merely a low convexity, and the median peripheral keel is somewhat longer.

We take pleasure in naming this charming little shell for Dr. Jeanne S. Schwengel, who has taken an active part in arousing interest in the study of Florida sea shells.

CYCLOSTREMISCUS SUPPRESSUS (Dall). Plate 8, figs. 5, 5a

Ethalia suppressa Dall, 1889, 'Blake' Rep., Bull. M. C. Z. 18: 362.

The specimen figured has been compared with the type. It is apparently somewhat related to *C. jeannae*, but not at all closely. The top is flattened; the peripheral region has three keels extending to the aperture, and the base is flattened, with an angle bounding a sloping area behind the columellar margin, the deeper part of this area being heavily calloused continuous with

the parietal callus, and overhanging the umbilical cavity. The surface is marked with fine lines of growth. Diameter 1.5 to 1.7 mm.

Goodland Point, Collier Co. (Hemphill, type loc.); Baker's Haulover, head of Biscayne Bay, Miami (J. A. Weber).

The callus overhanging the umbilicus varies, often half covering it, but in others leaving a rounded orifice.

(*To be continued*)

TWO MISUNDERSTOOD SPHAERIIDAE

By HENRY A. PILSBRY

About twenty-five years ago the writer had occasion to review and figure the Sphaeriidae of New York State. In the course of this work which has not been published, various discrepancies in the published records appeared, two of them noticed below.

SPHAERIUM STAMINEUM (Conrad). Fig. 1, A–E

Cyclas staminea Conrad, 1834, Amer. Jour. Sci. 25: 342, pl. 1, fig. 5. Not *Sphaerium stamineum* of Prime and later authors.

The shell is oval with the posterior end somewhat truncate obliquely, the anterior rounded, the upper and basal margins about equally curved, the beaks moderately full but low, not projecting much above the hinge-line. The lunule is distinct, wide; escutcheon very narrow. The surface is slightly glossy, finely, subregularly rib-striate throughout, the striae extending on the ends, and well developed on the beaks. Color straw yellow, fading to light grayish olive near the beaks. The hinge is moderately curved, the ligament occupying more than half of its width. Right cardinal tooth angular, the posterior limb longer than the anterior, neither ramus bifid. Left anterior cardinal triangular, somewhat excavated below, its crest therefore the shape of an inverted V. Anterior laterals heavy, towards the cardinals curving under the level of the hinge; posterior laterals rather slender.

Length 12, alt. 9.6, diam. 6.8 mm.

"Inhabits small streams in south Alabama" (Conrad). Type 10186 A.N.S.P.

Figures 1, *a-e* and the description, are from the type specimen, collected by Conrad. His original diagnosis and description are good, as far as they go, except that he did not see the minute cardinal teeth; but the figure is misleading. It has the size and shape of the type specimen except that the dorsal margin, on each side of the beak, was not finished in the lithograph. It should have been built up nearly as high as the beak. This led to an erroneous idea of the species on the part of Prime and others, who identified as *S. stamineum* a northern Sphaerium having the "beaks very full and prominent."

Other series of *S. stamineum* show some variation in contour. The shell may be shorter. The posterior limb of the right cardinal may be shorter than the anterior, and weakly bifid, and this is apparently the normal structure. The color is often light grayish olive with a yellow zone below. These variations are noted in a series from Greer Creek, Marengo Co., Alabama, containing also typical examples. Two measure:

Length 14.4, alt. 10.7, diam. 8 mm.

Length 14, alt. 11.3, diam 8.2 mm.

S. stamineum is closely related to *S. solidulum* (Prime) and *S. fuscatum* (Prime), but the beaks are not so full and high, and the hinge is a little less arched. The narrow, steeply sloping, anterior interdental part of the hinge-plate is the same in all, the anterior lateral teeth appearing to emerge from the cavity of the beaks even more than in most Sphaeria, though something of the same appearance is seen in other amesodas.

In *S. solidulum* the ribs on the beaks are coarser and more spaced than in *stamineum;* otherwise the sculpture is about the same. *S. striatinum* differs by its coarser, less regular sculpture, which becomes more or less obsolete posteriorly; and the shape of the hinge is different. Possibly *S. solidulum* and *S. fuscatum* are subspecifically related to *S. stamineum,* yet the three appear to be distinguishable.[1]

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[1] These notes were penned long ago. In 1944 S. T. Brooks and H. B. Huntington reduced most of the Sphaeria to synonyms of *S. sulcatum* and *S. striatinum;* but though a move in the right direction, this appears rather an extreme reaction from Dr. Sterki's splitting. Cf. Nautilus 57: 95.

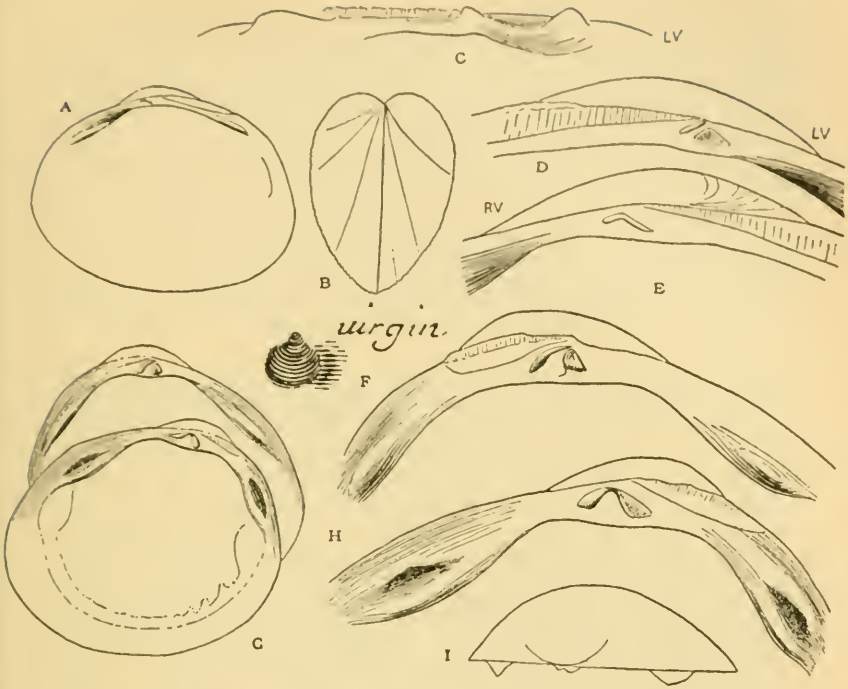

FIG. 1. A–E *Sphaerium stamineum* (Conrad); C, ventral view of hinge of left valve; D, E, Left and right details of cardinal area of hinge. FIG. F, photographic copy of Lister's figure, the basis of *Tellina virginica* Gmelin. FIGS. G–I, *Pisidium dubium* (Say); G, inside of left and right valves; H, more enlarged views of the hinge; I, dorsal profile of the left valve.

We possess several lots of *S. stamineum* from Alabama, but I have not taken time to work out its distribution in the southern states. Though it has been reported from many localities in New York by Beauchamp, Letson, F. C. Baker, J. B. Henderson, and in the Sterki and Bryant Walker collections, all of the New York specimens so labelled which I have seen turned out to be *S. solidulum* (Prime), *S. striatinum* (Lam.) or other species. The true *S. stamineum* probably does not occur in New York or elsewhere so far north.

PISIDIUM DUBIUM (Say). Figs. 1, G–I

Cyclas dubia Say, 1816, Nicholson's Encycl. pl. 1, fig. 10.
Pisidium dubium Gould, Prime, 1852, Bost. Jour. N. H. 6: 254.
Cyclas equalis (*Phymeroda equalis*) Rafinesque, 1820, Ann. Gen. Sci. Phys. Bruxelles, p. 319.
Pisidium abruptum Haldeman, 1841, Proc. A. N. S. Phila. p. 53 (Elk River, Md.); later (p. 103) said to be "not distinct from *P. dubium* Say."
Pisidium virginicum Bourguignat, Prime, 1865, Mon. Amer. Corbiculadae, p. 61, figs. 61, 62.
Pisidium virginicum (Gmelin), Sterki, 1916, Ann. Carnegie Mus. 10: 446. Not *Tellina virginica* Gmelin, 1792, Syst. Nat. (13), p. 3236.

This well known pea-clam need not be described here, but notes on the hinge may be given. The interior is pale blue. The right valve has a cardinal tooth with stout, wedge-shaped limbs, or sometimes oval posterior and more slender anterior limbs, standing about at right angles, and deeply notched at the umbonal bend; the laterals are very low, but between each pair are *deep sockets* with more or less granulate or crenulate borders. The left valve has a triangular anterior and a slender, *strongly curved,* diagonally descending posterior cardinal; laterals are well developed, short, high and triangular in profile (Fig. I).

Length 7.6 mm., height 6.6 mm., diameter 4.6 mm. It often attains a length of 9 mm.

Dr. Sterki gave the distribution as "United States east of the Rocky Mountains, north to Yukon and Alaska." Type 59830 A.N.S.P., from the Delaware River (doubtless at Philadelphia, where Say collected). The southern limit of the species needs investigation. In New York it occurs all over that state. I have seen it from the Boquet River, Essex Co., in the north, to Bronx River in the south. The records are from 14 counties.

This species is widely spread in the east, to be found in running water. The large size, irregular, coarse striation and somewhat flattened beaks distinguish it. There is also a peculiarity in the hinge of the right valve: the lateral teeth are very weakly developed, but the cavities between each pair are very deep, to receive the high, short laterals of the left valve. The cardinal teeth are rather variable in shape; they are usually as in fig. H, or the size relations of the posterior limb of the tooth may be reversed.

For the last 80 years this common, large species has been known as *P. virginicum*,[1] supposed to have been described by Gmelin. But Gmelin's *Tellina virginica* was based solely upon the figure of a Virginian shell in Lister, 1686, Historia Conchyliorum, pl. 159, fig. 15, which looks more like a young *Musculium partumeium*, and could only be taken for a *Pisidium* in the dark. Our Fig F is a photographic copy from Lister. Say's description of *Cyclas dubia* was good for the time, and his type is still preserved. Say gave the species a rather disparaging name, but it is probably the least "dubious" of our eastern Pisidia.

LAND MOLLUSCA OF THE EDMUND NILES HUYCK PRESERVE, RENSSELAERVILLE, NEW YORK

By WILLIAM MARCUS INGRAM

Mills College, California

The Edmund Niles Huyck Preserve at Rensselaerville, Albany County, New York is a tract of some five hundred acres situated in the Helderberg Mountains. The altitude of the preserve varies from approximately 1500 to 1750 feet. Varied plant areas ranging in composition through grass and berry-covered fields; abandoned apple orchards; maple, beech-maple, hemlock, and beech-hemlock forest strips; flood-plain forests; maple and oak hedge-rows; and bogs make the Huyck Preserve an interesting area in which to study the distribution of land mollusks. In addition to the native flora, white and red pine and spruce plantings have been made; these plantings are so dense that they are devoid of snail life. The climax forest on the "low land" is composed of a mixture of beeches and hemlocks; on the rises hemlock trees represent the climax forest.

Previous reports on the specific fauna of the preserve have been made by Hamilton (1940), (1941), Raney (1940), Raney and Ingram (1940), Raney and Ingram (1941), Ingram (1941a), (1941b), (1941c), (1941d), (1941e), Ingram and Odum (1941), Odum (1941a), (1941b), and Davis (1941).

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[1] In a few papers which have passed through my hands I have substituted *dubium* for *virginicum*.

Sixteen species of land snails and three species of slugs were collected on the preserve from June 15 to September 1, 1940 amongst approximately 5,000 individuals which were observed in the field. These species are discussed here in relation to the habitats in which they were found and in relationship to the associated vertebrate fauna. This list should add to the slight knowledge now available on the distribution of land mollusks of New York State.

Triodopsis albolabris (Say). This was the most abundant large snail of the natural forest areas of the preserve. It preferred beech-hemlock, beech-maple and maple areas where the humus and wet-rot logs were abundant. It was almost absent from the pure hemlock forest and from decadent farmed land overgrown with wild black and raspberry bushes. It was occasionally found in deserted apple orchards. Individuals were often taken in maple and oak hedgerows which ran between cultivated fields from wooded areas. Individuals were found to be active throughout the daylight hours. When at rest they were collected from beneath the sprung bark of logs, from beneath logs, and from beneath the upper humus layer of the forest floor. Occasionally they were found during the day inactive on the surface of the forest floor. This snail was typically terrestrial except during summer rainy periods when they were found to ascend trees. Individuals generally avoided flood-plain forest areas where a rich humus covering was absent.

Individuals were taken from humus runs of the following small mammals, the short-tailed shrew, *Blarina brevicauda,* and the deer mice, *Peromyscus leucopus noveboracensis* and *P. maniculatus gracilis.* Extensive trapping and stomach analysis indicate that these three mammals use this snail species as a food item.

Triodopsis tridentata (Say). This species was the third most common of the five species of Polygyridae. It was the only one of the family at all common in pure hemlock stands; here it was always taken from beneath the sprung bark of fallen logs. It was most abundant in the beech-hemlock and maple stands. Here it was commonly found at rest on top of humus on the open forest floor; when found in such a situation individuals were usually taken from depressions in the humus. Its local dis-

tribution is apparently affected by man's cultivation efforts, for it never was found in grass or berry-covered fields or in old apple orchards. Individuals were rare in hedgerows and on flood plains. Opened "fresh" shells of this species in the feeding chambers of the short-tailed shrew were commonly found.

Triodopsis dentifera (Binney). This was the second most common Polygyrid of the preserve. It reached its greatest abundance in the beech-hemlock forest, but was not generally taken with *T. albolabris*. Gathered data indicate that this species is possibly a marginal snail; it was commonly found along the edges of the various forest strips and in hedgerows bordering pasture land and abandoned fields. The species was apparently well established in maple and oak hedgerows, for egg masses and young were generally encountered here.

Triodopsis notata (Deshayes). Only one individual was collected during the summer from beneath the sprung bark of a yellow birch log. Although other yellow birch logs were examined none revealed the presence of this species. At Ithaca, New York this mollusk is abundant beneath the sprung bark of yellow birches in the Sapsucker woods; here too it has often been taken from beneath yellow birch and beech logs.

Stenotrema fraternum (Say). Individuals were generally collected from beneath logs and on stumps in the beech-hemlock, beech-maple, and maple areas. They were rarely found in the humus layer. Young individuals were occasionally found in hedgerows adjoining forest strips. They were marginal forms in flood-plain areas. The short tailed shrew and the white-footed deermouse feed on this species.

Mesomphix cupreus (Rafinesque). Individuals were very abundant in pure maple stands; their distribution in other areas was negligible. Data indicates that this species prefers cool areas with a dense overhang. On the preserve the maple area in which they abounded was in a deep gorge; here a stream was present and the maple leaf humus was two to four inches thick. Their typical resting place was beneath such a humus layer in contact with the soil substratum. Specimens were rarely taken from beneath logs. Individuals were almost strictly nocturnal in their habits, although several were collected moving about during the daylight hours. On the pre-

serve, individuals were found in groups varying from four to six. Their tendency to aggregate was indicated when twenty-six were found in a ten foot square quadrant. In the maple areas this mollusk was the principal snail eaten by the short-tailed shrew and the white-footed deer mouse; here too it fell ready prey to the predatory snail, *Haplotrema concavum* (Say).

Mesomphix inornatus (Say). Individuals were obvious because of their rarity. They were found on the forest floor in maple and beech-hemlock areas. Only half a dozen were collected.

Euconulus fulvus (Müller). This small mollusk was occasionally found beneath maple humus, and beneath old boards on the bank of Myosotis lake.

Zonitoides arboreus (Say). This was the most common small snail of the preserve. It was found in all of the available areas with the exception of grass covered fields. It was one species that did not noticeably avoid hemlock areas. The only area that it avoided was the flood plain forest where humus and logs were not abundant.

Ventridens intertextus (Binney). Individuals were erratic in their distribution, being found in all areas but fields and orchards. Specimens were most abundantly taken from flood-plain forests. On flood-plains individuals sought shelter beneath water carried debris piles; less commonly it was collected from beneath water carried logs. On the flood plain its companion was *Anguispira alternata* (Say); these two species were the dominant snails of the flood-plain area. Both were preyed upon by *H. concavum* and the short-tailed shrew. *V. intertextus* seemed generally to avoid wooded areas where thick humus abounded.

Anguispira alternata (Say). Individuals preferred flood-plain areas; water-carried debris piles resting over moist soil formed their typical habitat. Collections were also commonly made from beneath debris piles and logs along the waterways of the preserve. Although they were found in all of the forest areas, it was the exception rather than the rule to take them from deep in forest areas. Fields and bogs were avoided. Several apparent strays were found beneath the rocks and in hedge

rows. In hedge rows they made their abodes beneath fallen branches. In two instances specimens were found aestivating in hollow beech trees resting upon the ground. In one such instance six specimens were co-inhabitants of a hollowed tree with a raccoon. The latter apparently did not relish this mollusk or was well fed on the customary crayfish diet, for the snails remained in the hollow tree for 60 days before they were removed. Fresh scats of the raccoon indicated that the tree was used continually by this mammal as a daylight retreat throughout the summer. On the flood plains this snail was eaten by the short-tailed shrew.

Discus cronkhitii catskillensis (Pilsbry). This abundant small snail was found in all of the wooded areas adhering to the undersurfaces of logs. It was also a common lake margin snail where it was found beneath prostrate decaying fence posts resting on blackberry bushes. Individuals were also taken from beneath maple leaf humus and fallen bark in young maple stands and maple hedge-rows.

Helicodiscus parallelus (Say). This small mollusk was the dominant bog species where it was found in abundance on hummocks at the base of bog ferns. None were found in forest stands.

Haplotrema concavum (Say). This mollusk was found in all plant associations except in grassy fields and bogs. Individuals were rather sparsely distributed in all areas but the flood plains; here individuals were commonly found concealed beneath water-carried debris piles with *Anguispira alternata* and *Ventridens intertextus*. Throughout its distributional range on the preserve individuals prefered to seek shelter beneath stick debris piles and logs to humus. Ingram (1941d) based on field observations reported *Haplotrema* using the following snails as food, *Triodopsis albolabris* (Say), *Triodopsis dentifera* (Binney), *Mesomphix cupreus* (Rafinesque), *Zonitoides arboreus* (Say), and *Anguispira alternata* (Say).

Cochlicopa lubrica (Müller). This small mollusk was typically found beneath fallen fence rails and discarded lumber piles on the shore of Myosotis lake. Careful search around the bases of wild blackberry bushes often revealed numerous individuals.

Specimens too were found beneath humus and fallen bark in young maple stands. Clearing of forest areas from the preserve has no doubt numerically increased the population of this species on the preserve. In grass covered fields it was common at the bases of grass roots. It did not extend its range into climax forest stands.

Succinea ovalis Say. This snail was typically a flood plain inhabitant where it was taken from beneath stick debris piles; specimens were also taken from beneath logs bordering the lake. Sixteen individuals were collected beneath humus and logs deep in the beech-hemlock forest strips. In bogs individuals were found at the bases of bog ferns on hummocks. On the preserve this species apparently adapts itself well to civilization for it was not uncommon to make collections in hedge-rows bordering roads. The short-tailed shrew fed on this species.

Succinea retusa Lea. Individuals were confined to lake and pond margines. Collections were made from partially submerged logs in Myosotis lake and in Lincoln pond. Individuals were rarely collected from small stagnant ponds.

Philomycus carolinianus (Bosc). This was the most common of the forest slugs. It was one of the dominant animals in the beech-hemlock forest areas. Its local range did not extend into fields or orchards. On the flood plains it was an outer marginal form. In forest areas during summer dry periods they were found concealed beneath humus, logs, fallen bark, and in decaying log crevices. Occasionally they were taken from beneath large mushrooms.

Deroceras laeve (Müller). This small, introduced slug was rarely taken. It was most often observed crossing roads before the sun was high. It seemed to prefer forested land to overgrown berry and grass covered fields. Collections were made from beneath logs and humus in maple and beech-hemlock areas.

Arion circumscriptus Johnston. Individuals avoided forest areas. They were abundant in fields at the bases of berry roots, and on flood plains beneath logs and debris piles. Turning boards around human habitations revealed good collecting grounds. In oak hedge-rows specimens were taken curled up in down-turned acorn cups.

Discussion

The land mollusks generally have been thought of as being of slight significance in relation to other animals and plants in forest areas. There is no doubt that ecological studies of land mollusks and not just shell collecting will show that their importance as scavengers and as food for vertebrates has been overlooked.

Three species, *Zonitoides arboreus* (Say), *Triodopsis albolabris* (Say) and *Triodopsis dentifera* (Binney) have been shown to have definite scavenger tendencies (Ingram 1941d).

Seven species of the nineteen species of land mollusks listed here were found to serve as mammal food. Notably, Hamilton (1940) (1941) in his small mammal studies has shown snails to be generally an important food item in the diet of small mammals. Hamilton (op. cit.) found the following small mammals feeding on snails: Long-tailed shrews, *Sorex cinerus* and *Sorex fumeus;* Short-tailed shrew, *Blarina brevicauda;* Deer mice, *Peromyscus leucopus noveboracensis* and *Peromyscus maniculatus gracilis;* Red-backed mouse, *Clethrionomys gapperi gapperi;* Lemming mouse, *Synaptomys cooperi,* and the Hairy-tailed mole, *Parascalopus breweri.* The importance of snails in the diets of some mammals is especially realized in Hamilton's (1941) analysis of 460 stomachs of the short-tailed shrew where 5.4 percent of the stomachs contained snail remains; in 180 stomachs of *Peromyscus* 3.9 percent were found with snails in them.

All of the larger species of land snails in eastern forest areas in their activities beneath forest floor humus turn the humus thus allowing increased weathering to take place which adds to the fertility of the forest floor.

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TWO NEW PAPUINA

By MAXWELL SMITH

Among some land shells recently submitted by William H. Weeks for identification there were found the following novelties:

PAPUINA LAMBEI NOVOHIBERNICA, new subspecies. Plate 9, fig. A (To appear in April number).

Shell imperforate, depressed, wider than high; apex deep flesh-color, obtuse, shining, whorls four and one-half as in *lambei* Pfeiffer. Sculpture consisting of obliquely descending wrinkles as in that species. Color light buff with two broad dark chestnut-brown zones, one above and the other below the periphery, the latter strongly keeled, patterned with zig-zag brown stripes and a few dots which largely cover the remaining surfaces. Aperture oblique, dark within, the exterior color pattern showing through, peristome whitish, broadly expanded, slightly reflexed, not so rapidly descending from the wall as in *lambei*. Alt. 17, greater diam. 26.5, lesser diam. 21.5 mm.

Type (in the writer's collection) from New Ireland. Paratypes mostly immature shells.

PAPUINA WEEKSIANA, new species. Plate 9, fig. B

Shell imperforate, globose, wider than high; apex obtuse, whorls four and one-half, suture slightly impressed, surface shining. Sculpture consisting of distinct growth lines crossed by minute irregular spiral punctulations which cover almost the entire surface. Ground color ivory-white with chestnut-brown colored zig-zag lines which extend from just below the suture to the peripheral zone which is unmarked, the base of shell ornamented with narrower brown lines which are more or less spiral, the terminations of these lines toward the periphery being in some cases deflected. Aperture oblique, showing inside the external pattern, peristome slightly expanded, of old fashioned caramel color, parietal callus of the same shade but moderately applied, the color extending in the form of a darker blotch below the axis. Alt. 16, greater diam. 19 mm.

Type (in the writer's collection) from the Solomon Islands.

This species does not appear to have any close ally. The globose shape, rounded periphery and ornamentation are all peculiar.

ECOLOGIC NOTES CONCERNING ELYSIA CHLOROTICA, GOULD AND STILIGER FUSCATA, GOULD

By HENRY D. RUSSELL

On May fifth and sixth while visiting Pasque Island, one of the smaller islands of the Elizabeth Island chain which is situated to the southwest of Woods Hole, Massachusetts, specimens of *Elysia chlorotica,* Gould and of *Stiliger fuscata,* Gould were collected by the author in a salt marsh.

The Salt Marsh. The marsh where these specimens were collected consisted of a tortuous, tidal, main channel three-quarters of a mile in length and varying in width from a few feet at low water to over fifty at high tide. It terminated in a wider, shallow, muddy bay. The main channel was contained within firm banks of peat upon which grew coarse marsh grasses. There were many small bays and estuaries leading into the main channel and the bottoms of these consisted of a mixture of sand and flocculent peat mud. Only during storms from the south when the waters of Vineyard Sound broke over the outer barrier beaches was the marsh completely flooded. The salinity of the main channel ranged between 31 and 32 parts per thousand and the water temperature was 57° F. The marsh itself was over fifty acres in extent.

The Pools. The irregular tide pools in the peat were located chiefly at the upper end of the marsh, and varied in size and depth from small depressions a few inches deep to those that were approximately fifty feet long by thirty feet wide and two or three feet deep. They were scattered along the banks of the main channel above the mean high tide mark and it is interesting to note that their water level changed very little with the rise and fall of the tide. Probably they were flushed only by slow subterranean seepage or during unusually high tides. Their salinity was 32 parts per thousand which compares favorably with the 31 to 32 parts per thousand for nearby Buzzard Bay water. The bottoms of these pools consisted of peat mud from which grew thick masses of *Enteromorpha clathrata.* During the day the temperatures rose as high as 71° F. and returned at night to 54° F. or less.

Elysia chlorotica, Gould. About fifty specimens of *Elysia chlorotica,* Gould were collected both in the pools where they were found chiefly on the alga *Enteromorpha clathrata,* and along the peat banks of the main channel of the marsh at high tide. Many more specimens could have been collected, since they were very abundant. At high tide, in one small bay 15 per square foot were counted near the shore. At the same place at low tide only a few could be found crawling sluggishly about on the mud or just under its flocculent surface. Presumably the majority moved off shore as the water receded. The specimens collected varied in length from ¼ to ¾ of an inch long and about 1/16 to 1/8 of an inch wide. The color was also variable and ranged from a bright emerald and olive green to deep chocolate brown. All specimens possessed the irregular small light colored spots along the lateral expansions, but a few specimens were found that lacked the small irregular red spots mentioned by Gould.[1] No egg masses were found at this time nor were any animals seen copulating. It is possible that these were immature specimens, since Gould [1] mentions that his specimens were 1 to 1½ inches in length.

Stiliger fuscata, Gould. Twelve specimens of *Stiliger fuscata,* Gould were collected exclusively from the *Enteromorpha clathrata* growing in the tide-pools. The specimens were very nearly uniform in size, measuring ¼ of an inch long by 1/32 of an inch wide. None was seen copulating at this time nor were any egg masses found, though these specimens closely approached in size those reported by Gould, A. A. and Binney, W. G. loc. cit. p. 250 as found "on logs in a mast yard, Boston, July 22, 1842." Since these authors described the ova as "deposited in little oval clusters" in July, it is possible that those specimens taken by the author in April had not yet spawned.

The occurrence of this species at Pasque Island extends its range approximately 85 miles southward on the New England coast from its previous recording at Boston, Mass. by Gould.

Fifty specimens of *Elysia chlorotica* and twelve of *Stiliger fuscata* were brought back from Pasque Island in a 400 cc. jar of salt water into which had been placed a small clump of *Entero-*

[1] Gould, A. A., and Binney, W. G. Report on the Invertebrates of Massachusetts pp. 235 and 236, 1870.

morpha. They were kept in a refrigerator at a temperature of 40° F. To insure a constant salinity as evaporation occurred, a mark was placed on the jar at water level and unsalted water was added as needed to maintain this level. The specimens thus lived in an apparently healthy condition for two weeks as no dead or dying animals were noted. However, at this temperature they were comparatively sluggish. When the jar was removed from the refrigerator to room temperature they became more active as the water temperature increased. No specimens were seen to copulate nor were any egg masses observed during this period.

A list of the mollusks found inhabiting the marsh at Pasque Island during the latter part of April is appended. C following the name denotes species from the Main Channel, T those in the tide pools.

Gemma gemma Tot. C.
Modiolus modiolus L. C.
Ensis directus Con. C.
Mya arenaria L. C.
Venus mercenaria L. C.
Solemya velum Say. C.
Siliqua costata Say. C.
Tellina tenera Say. C.
Nassarius obsoleta Say. C.
Littorina littorea L. C, T.
Littorina saxatile Olivi C. T.
Polynices heros Say. C.
Polynices duplicata Say. C.
Elysia chlorotica Gould C, T.
Stiliger fuscata Gould T.
Paludestrina minuta Tot. T.

A LETTER CONCERNING THE CONES OF HWASS AND OTHER COLLECTIONS IN SWITZERLAND

By HENRY DODGE

I presume I am only one of a great number of amateur conchologists who are confused by the history of the Hwass names in the genus *Conus* and by the vicissitudes which these species underwent at the hands of Lamarck, Bruguière and other authors of their time. The following letter may offer a lead for investigation to those who are studying *Conus* and who may contemplate a trip to Switzerland, as well as being a record as to the validity of certain names and as to the where abouts of several of the important European collections of the last hundred and fifty years.

I had seen a reference to the effect that the Hwass collection of cones was held in the Musée d'Histoire Naturelle at Geneva and, knowing that I would go to Europe as soon as conditions permitted, I wrote to the Director of the Museum to inquire as to the extent of the collection and its availability to students.

As M. Mermod says that a study of the source of the cones in the collection had never, up to now, been systematically undertaken, the list of figures from the Encyclopédie which either certainly or probably represents specimens used by Hwass in his descriptions constitutes a long step towards clarifying the nomenclature of many of these species, if, indeed, it be not the final step. Therefore it seems timely to reproduce a translation of his letter not only for the benefit of those who may have an opportunity to study the Hwass shells at first hand but also for the information of all who are interested in the taxonomic questions involved and in the data which the letter supplies as to the dispersion and present custody of some famous collections.

Geneva, Sept. 5, 1945.

SIR:—

The Director of the Museum of Natural History in Geneva has given me your letter of April 18th. I am the Curator of the Collections of Invertebrates at the Museum in Geneva and I give you such information as I can furnish.

In the first place, as to the Hwass collection: If I have not replied more promptly to your letter it is because it arrived only after a long delay, in June, and also because I wished to give you some precise data upon just what we possess of the Hwass collection. This is a study which had not been methodically undertaken. In 1869 the Geneva Museum received, as a gift from the heirs of Baron Benjamin de Lessert of Paris, the shell collection of that wealthy collector (1773–1847). This collection, which was one of the most famous of its day, had been formed out of several well-known earlier collections: the Dufresne collection, acquired in 1833, and that of Masséna in 1840. This latter collection contained the collections of Bandeville, Solier la Touche, Castellin and finally Lamarck. In the collection of Solier la Touche was incorporated the Hwass collection.

(See Notice sur le Musée Conchyliologique de M. le Baron de Lessert, par Chenu, Paris, 1844).

Unfortunately, as in the case of almost all of the old collections which have passed from owner to owner, there exist in them many errors and indications of carelessness, so that it is impossible, in the case of many specimens, to state their source. As to the Hwass collection and especially as to the genus *Conus*, the situation is this: In the Encyclopédie Methodique (Paris, 1789, vol. 1, p. 598) Bruguière said that the figures and descriptions of the cones were the work of Hwass. Therefore the originals of the figures in plates 315 to 345, to wit, 174 figures, came from the Hwass collection. In our collection I have [word illegible, "isolated"?] 67 specimens which may be considered as certainly from the Hwass collection and 20 others which are probably, but not certainly, from that collection.

The figures from the Encyclopédie are frequently so bad that it is often impossible to make a certain identification. I cite below the plates and figures which are represented in our collection by original specimens, many of which are consequently Types. The questionable figures are followed by a " ?".

The Solier la Touche collection in which the Hwass shells are found had all its specimens marked on the outside with a small "s". This is therefore the case with all the Hwass shells, but apart from the original figures listed above it is not possible to state which of the specimens marked with an "s" had their origin in the Hwass collection.

The Museum in Geneva possesses, as a collection, a large part (une bonne partie) of the shells from Lamarck's collection, including many hundreds of Types, of which a goodly number are figured either in the Encyclopédie, or in Kiener (Iconographie des Coquilles Vivantes) or in Chenu (Illustrations conchyliologiques), or in Delessert (Choix de coquilles etc. . . .). Geneva has also the Bourguignat collection (Coquilles terrestres et fluviatiles), the *Melania* of Brot (See *Melania* in Martini and Chemnitz), the greater part of the specimens originating in the collection of Angrand (Péron) published by Morlet [sic] in the Séries Conchyliologiques, and the collection of Moricand, especially South American species, a collection not yet entirely integrated with ours.

Encyclopédie Methodique [1]

Plate	318,	fig.	2	Plate	338,	fig.	5
"	320,	"	4	"	317,	"	1
"	345,	"	5	"	341,	"	5 ?
"	317,	"	7	"	318,	"	2
"	343,	"	3	"	339,	"	3
"	339,	"	4	"	331,	"	3
"	339,	"	6	"	330,	"	5
"	321,	"	10	"	330,	"	1 ?
"	327,	"	2 ?	"	330,	"	2 ?
"	334,	"	4	"	336,	"	2
"	342,	"	4 ?	"	343,	"	5
"	325,	"	3	"	319,	"	8
"	325,	"	4	"	331,	"	2
"	329,	"	5	"	331,	"	8
"	342,	"	9 ?	"	332,	"	5
"	340,	"	6	"	332,	"	6
"	337,	"	6	"	341,	"	2
"	321;	"	7 ?	"	331,	"	1
"	321,	"	1	"	341,	"	6
"	327,	"	5 ?	"	319,	"	5 ?
"	319,	"	2	"	339,	"	1
"	319,	"	1	"	326,	"	7
"	334,	"	6	"	335,	"	6
"	334,	"	5	"	347,	"	2
"	335,	"	5	"	346,	"	2
"	326,	"	2	"	347,	"	3
"	338,	"	8	"	344,	"	5
"	321,	"	5 ?	"	345,	"	7
"	322,	"	3	"	341,	"	3
"	341,	"	8	"	338,	"	6
"	317,	"	10	"	336,	"	8 ?
"	318,	"	5	"	326,	"	4
"	335,	"	4	"	326,	"	8
"	333,	"	7 ?	"	316,	"	2
"	329,	"	9 ?	"	316,	"	9 ?
"	342,	"	3	"	316,	"	3
"	329,	"	1 ?	"	316,	"	6
"	325,	"	8	"	316,	"	5
"	320,	"	9	"	314,	"	7

[1] I have eliminated certain repetitions in the list of figures as given in the original letter. H. D.

The Shuttleworth collection is at Berne; the Mousson collection at Zurich; that of Charpentier at Lausanne; that of Godet at Neuchatel, consisting predominantly of recent shells, and also a part of the collection of Agassiz and Desor (perhaps principally fossils).

I am at your service for any other information, and if you come to Geneva we will be happy to show you whatever may interest you in our Museum.

Accept, Sir, etc.

G. Mermod.

Bibliographic References

Chenu, 1844. Notice sur le Musee conchyliologique de M. le Baron de Lessert. Paris.

Lamy, 1915. Musee d'Histoire Naturelle, Paris. Bulletin No. 3.

1930. Journal de Conchyliologie, pp. 42–60.

1930. Les cabinets d'Histoire Naturelle en France au 18 me. siecle. (separate, p. 28 et seq.)

GEORGE WILLETT

The Conchological Club of Southern California lost one of its most valued members when its president, George Willett, passed away on August 2nd, 1945. He was born in Hawksbury, Ontario, Canada, on May 28th, 1879. His parents moved to California while he was still very young, the family home being a ranch near Highland. Willett attended Whittier College from 1896 to 1898, leaving school to join the United States Army and serve in the Philippine campaign of the Spanish-American war.

Upon his return to California he joined the Los Angeles police force with which he worked for several years, part of the time as sergeant of the Chinatown squad. In the work he won the lasting confidence and friendship of many of the Chinese, and throughout his later years enjoyed the occasional opportunities to meet with them in their "Tong" gatherings.

In 1912 he became a Reservation Inspector for the U. S. Department of Agriculture Biological Survey, spending six years

in the field. One of his early assignments was to Laysan Island, which is, so far as I know, the first place where he collected shells. From 1914 to 1918 he was stationed during the summers at Forrester Island, southeastern Alaska, where he did intensive work both as a shell collector and an ornithologist. Leaving the Biological Survey he re-entered the Army in the first World War, and was at a training camp in this country when the Armistice was signed.

Returning to the neighborhood of Ketchikan, Alaska, he spent some time fishing, had charge of a fox farm for a while, and served as Deputy U. S. Marshall.

In 1927 he returned to California where he became Assistant Ornithologist at the Los Angeles County Museum. One year later he was appointed Curator of Ornithology and Mammalogy, retaining that position until his death. He leaves his wife, Ora, a son by his first marriage, George Jr., and a brother and sister.

Mr. Willett joined the Conchological Club of Southern California in October, 1916, and was always a faithful and active member. He served as President for the first time from 1929 to 1931, and was recalled to that office at least twice in later years. An unusually well rounded naturalist, he combined ability and energy in field work with a keen sense of biological relationships as well as facility in expressing his conclusions.

His generosity in making available to others the results of his wide observation and collections has been of great help to those working in the subjects in which he was interested. How numerous these were is indicated by the fact that he was a member, and in many instances an officer, of the following scientific societies: American Ornithological Union, Cooper Ornithological Club of Southern California, California Academy of Sciences, Southern California Academy fo Sciences, Biological Society of Washington, Northwest Bird and Mammal Society, American Society of Mammalogists, Society of Vertebrate Paleontology, and the San Diego Society of Natural History.

The following list is believed to cover Mr. Willett's published works on shells. His studies of birds and mammals make an equally impressive list.

1918. Description of a new Pandora of the Subgenus Kennerlyia. Nautilus 31: 134.
Notes on the Mollusca of Forrester Is. (Bivalves). Nautilus 32: 65–69.
1919. Notes on the Mollusca of Forrester Is. (Univalves). Nautilus 33: 21–28 (Description of *Velutina rubra*).
1928. Notes on some Pacific Coast Acteocinas. Nautilus 42: 37–38.
1929. Description of two new species of Mollusca from the West Coast of North America, Nautilus 43: 26.
Description of two new Land Shells from Southern California. Bull. S. Cal. Acad. Sci. 28, part 2, p. 17.
1930. Micrariontas of the *indioensis* group, with description of a new subspecies. Nautilus 43: 115.
Notes on *Micrarionta rixfordi*. Bull. S. Cal. Acad. Sci. 29: 15.
Desert Helicoids of the *M. hutsoni* group. Nautilus 44: 4–6.
1931. Two new Helicoids from the Mohave Desert, California. Nautilus 44: 123–125.
Three new Mollusks from Catalina I., California. Nautilus 45: 65–67.
Psephis (Petricola) *tellimyalis* (Cpr.) not the young of *Petricola denticulata* Sby. Bull. S. Cal. Acad. Sci. 30: 30.
1932. A new chiton from S. California. Nautilus 45: 101.
A new Helminthogypta from Monterey Co., California. Nautilus. 45: 134–135.
A new Cardita from the Aleutians and a new *Epitonium* from Southern California. Trans. San Diego Soc. Nat. Hist. 5: 85–90.
1934. Two new Cingulas from Alaska. Nautilus 47: 103.
A new Helminthogypta from the east slope of the Sierra Nevada Mts. California (*H. caruthersi*). Bull. S. Cal. Acad. Sci. 33: 57–58.
1935. Further notes on the desert snails of Riverside Co. California (*M. granitensis, M. mccoiana*). Bull. S. Cal. Acad. Sci. 34: 1–2.
Three new Micrariontas from the Central Colorado Desert. (*M. brunnea, M. chocolata, M. chuckwallana*). Nautilus 49: 14–16.
1935. Some superfluous names in West American chitons. Nautilus 49: 42–44.
1937. Buccinum baerimorchianum (Fischer) not a tenable name. Nautilus 50: 101.
Micrariontas of the southwest Colorado Desert. (*M. carrizoensis, M. remota*). Nautilus 50: 122–125.

A new Land Shell from the Riverside Mts., Colorado Desert. (*M. immaculata*). Bull. S. Cal. Acad. Sci. 36: 6–7.

A new Callistochiton from Lower California. (*C. connellyi*). Nautilus 51: 25.

Additions to knowledge of the fossil invertebrate fauna of California. (*Triphora fossilis, Leptothyra subobsolcta*). Bull. S. Cal. Acad. Sci. 36: 61–64.

An Upper Pleistocene fauna from the Baldwin Hills, Los Angeles Co., California. Trans. San Diego Soc. Nat. Hist. 8: 379–406.

Report on Pleistocene molluscan fauna at Capistrano Beach, Orange Co., California. Bull. S. Cal. Acad. Sci. 36: 105–107.

1938. Remarks on some West American mollusks. Nautilus 52: 10–11. Two new land shells from Kern Co., California. (*Micrarionta stageri, Helminthoglypta cuyamacensis piutensis*). Bull. S. Cal. Acad. Sci. 37: 52–54.

A new Pseudochama from Clarion I., Mexico. (*Pseudochama clarionensis*). Nautilus 52: 48-49.

1939. Description of a new mollusk from California. (*Lamellaria sharoni*). Nautilus 52: 123–124.

Micrariontas of desert ranges bordering the east side of Coachella Valley and the Salton Sink, California. Bull. S. Cal. Acad. Sci. 38: 14–16.

A new species of mollusk from the San Pedro Pleistocene. (*Alabina effiae*). Bull. S. Cal. Acad. Sci. 38: 202.

1940. A new land shell from Lower California. (*Micrarionta chacei*). Bull. S. Cal. Acad. Sci. 39: 80–82.

A new Ischnochiton from Catalina Island. (*Isch. catalinae*). Bull. S. Cal. Acad. Sci. 39: 185–186.

1941. California desert snails. Minutes Conch. Club of S. California, November.

1943. Northwest species of Glycimeris. Bull. S. Cal. Acad. Sci. 42: 107–114.

1944. Two new West American Pelecypods. (*Cardita hilli, Chione picta*). Bull. S. Cal. Acad. Sci. 43: 19–22.

New species of mollusks from Redondo, California. (*Nuculana burchi, Volvulella tenuissima, Philine californica, Melanella rosa*). Bull. S. Cal. Acad. Sci. 43: 71–73.

1945. The Acteocina of Salton Sink, Colorado Desert, California. Bull. S. Cal. Acad. Sci. 44: 28–29.

ELSIE M. CHACE.

NOTES AND NEWS

THE NAME MESOPTERYX Pilsbry & Olsson (Proc. A.N.S. Phila. 97: 265) is preoccupied by *Mesopteryx* Saussure, 1870 (Mittheil. Schw. Ent. Ges. 3: 235; Orthoptera). We substitute *Cymatopteryx* for the molluscan group.—H. A. PILSBRY & A. A. OLSSON.

THE SUBGENERIC NAME TOMOPEAS Pilsbry, 1906, Man. Conch. (2) 18: 123 (Mollusca: Achatinidae), was preceded by *Tomopeas* Miller, 1900, Ann. Mag. N.H. (7) 6: 570 for a Peruvian bat. The molluscan *Tomopeas*, type *Opeas layardi* (Benson) from Ceylon, may be known by the new name *Eutomopeas*.—PILSBRY.

OUR SENIOR EDITOR, Dr. Pilsbry, is visiting his daughter, Mrs. F. J. Barcroft, Avenida del Hipodromo 58, Guatemala City, Guatemala. He left chilly Philadelphia Dec. 19th by train to New Orleans, and then flew to his destination. In the meantime, material for THE NAUTILUS should be sent to his permanent address. We all wish him the best—and may all his troubles be little—snails!

LT. R. TUCKER ABBOTT, who is studying snails that transmit human parasites, wrote in September from Leyte, P. I.

MRS. W. S. S. VAN DER FEEN (VAN BENTHEM JUTTING) of the Zoölogisch Museum, Amsterdam, Netherlands, writes: "Five years of German occupation have made us 'a sadder and a wiser man.' Still, you can congratulate us that Amsterdam and the Museum have emerged with so little damage. Fortunately the Germans did not rob scientific institutes or libraries, so we could continue working more or less regularly. It was a severe loss, however, that all international contact became impossible, especially with the East Indies. From the enclosed circular, you will see that I married in August of this year. It coincided almost beautifully with the liberation of our country. I can keep my situation as a curator of mollusks, and my husband is working in the same institute."

DR. W. ADAM, Musée Royal d'histoire naturelle de Belgique, says in a letter: "Fortunately our Museum did not suffer any war

damage. Personally I suffered very much from undernourishment, which rendered all serious scientific work impossible. Apart from some publications on cephalopods from the Red Sea, which I studied during my evacuation, in 1940, in Paris, I only published a few notes on Belgian shells. Now food conditions are improving and gradually I take up work again which had to be abandoned during the war. Most of us suffer still from a serious loss of memory (perhaps owing to loss of proteins) which is a great handicap in our work.''

THE PRECEDING excerpts from letters are published without permission of their writers, to whom all due apologies are presented.—H. B. B.

NEW RECRUITS FOR CONCHOLOGY.—About the middle of December, the Assistant Curator arrived back at the Mollusk Department of the Academy of Natural Sciences of Philadelphia, after an absence of three years almost to the day. A goodly portion of this time was spent in the Admiralty Islands, and of course shells were not entirely overlooked, although not as much time could be spent on shell hunting as might have been wished.

Similarly elsewhere, conchologists both amateur and professional are returning to other institutions from the armed forces and from the far corners of the earth. Many people who formerly had no especial interest in shells have taken this up as a hobby. On an isolated tropical island, the prospect of recreation seemed slim indeed. However all over the Pacific an interest in shell hunting sprang up. Not only the bespectacled butterfly hunter prowled the beaches. Sergeants vied with boatswain's mates and marines. Most popular among the trophies sought were the cat eyes or opercula of the turbos. Perhaps next on the list would be the money cowry *Cypraea moneta.* All types were gathered, the more showy ones having priority.

A certain amount of the collector's lore apparently spread to these widely separated enthusiasts or perhaps necessity proved the mother of invention. At any rate glass-bottomed buckets and boxes, pearl divers' masks, goggles and even shallow water diving gear were frequently used. The beaches, coral reefs and lagoons proved a fertile field. Some of this booty found its way

back to museums and some to the families and friends of the collector. In many cases, the interest still lingers and the former beach combers are finding their way to museums and conchologists to inquire about their specimens and compare notes on the spoils of others.

The recent travel difficulties have temporarily curtailed the activities of the vacationist collector here at home but their interest will return. When these regulars are taken together with the new recruits from the armed services, it is safe to say that there is a greater interest in shell hunting and conchology now than there has been for many years. Shell clubs will probably benefit in membership and museums and private collectors alike may be expected to profit both in material and ideas from these new devotees of the ancient and honorable art of combing the beaches.—RICHARD A. MCLEAN.

PUBLICATIONS RECEIVED

JOURNAL DE CONCHYLIOLOGIE, founded in 1850, has become the oldest conchological periodical. American students are delighted to learn that it is continuing publication, numbers 1 and 2 of volume 86 having appeared in September and October, 1945. Forbidden by a German order after April 1, 1942, the last 3 numbers of volume 85 were printed secretly in that year, so volume 86 stands for 1943 to 1945. Subscriptions (275 francs per annual volume) may be sent to Madame H. Fischer, 51, Boulevard Saint-Michel, Paris 5e, France.

The first number of volume 86 is largely devoted to the memory of EDOUARD LAMY (1866–1942), whose valuable revisions of many pelecypod families and genera are so well known. An obituary, with a fine portrait, a list of his scientific publications, another of his new species and new names, a list of his lamellibranch revisions, and a posthumous paper on "Gastéropodes abondonnant leur coquille," are included. It also contains a paper on "Les affinités de *Nassa verbecki* Martin et le groupe de *Nassa hirta* Kiener" by René Abrard.

Notices also are given of the deaths of the very eminent Belgian malacologist PAUL PELSENEER and of LOUIS GERMAIN, professor of malacology and director of the National Museum of Paris.

The second number consists of a paper on Jurassic fossils: "Les lamellibranches hétérodontes des sables astartiens de Cordebugle (Calvados), 1) Astartidae, Cyprinidae, Isocardiidae," by A. Chavan. A new subgenus *Nicaniella*, type *Astarte communis*, and new species of *Astarte*, *Neomiodon*, *Isocyprina* and *Pseudotrapezium* are described and figured.—H. B. B.

Basteria, the esteemed journal of the Dutch Malacological Society, is also continuing publication, and is finishing its 9th (1945) volume. Subscriptions (2.50 florins per volume) may be sent to the Hon. Treasurer, Nederlandsche Malacologische Vereeniging, Parklaan 323 (postgiro 288032), Katwijk aan Zee, Netherlands.—H. B. B.

Phylogeny and Distribution of Siphonariidae, elucidating the Phylogeny of Basommatophora and the Origin of Pulmonata. By Bengt Hubendick. Zoologiska Bidrag från Uppsala 24: 1–126, figs. 1–105 (In German, with English summary). Two living genera, *Williamia* and *Siphonaria*, are recognized. The latter is divided, largely on differences in genitalia, into 2 subgenera: *Liriola* and s.s. *Liriola* is subdivided into 5 sections: s.s., *Pachysiphonaria* (new) type *S. lessoni*, *Benhamina*, *Kerguelenia* and *Patellopsis*. In addition to *Siphonaria* s.s., 4 new sections of the typical subgenus are proposed: *Simplisiphonaria*, type *S. cookiana*; *Ductosiphonaria*, type *S. bifurcata*; *Heterosiphonaria*, type *S. gigas*; and *Sacculosiphonaria*, type *S. japonica*. Although this monaulic family has a striking epiphalloid organ, which secretes a horny spermatophore, and often has a muscular penis (Scheide), the male and female channels are not divided structurally, which the author considers a primitive condition. Largely because of the elongate parietal and abdominal connectives of the Chilinidae, etc., the usual position of the Aetophila, as generalized basommatophores, is rejected. The possibility of convergence in the patelliform Gadiniidae is doubted, but Hubendick seems unfamiliar with the similar ancylid-lancid parallelism, as he also has missed the crucial studies of F. C. Baker on so many fresh-water pulmonates. And, his dissertation is done in the grand manner, so that much rocky hypothesis must be excavated to unearth the golden veins of original contribution, that strike through it.—H. B. B.

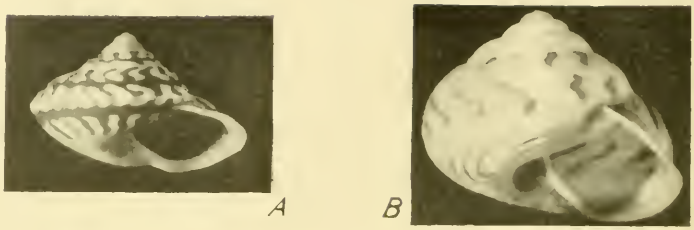
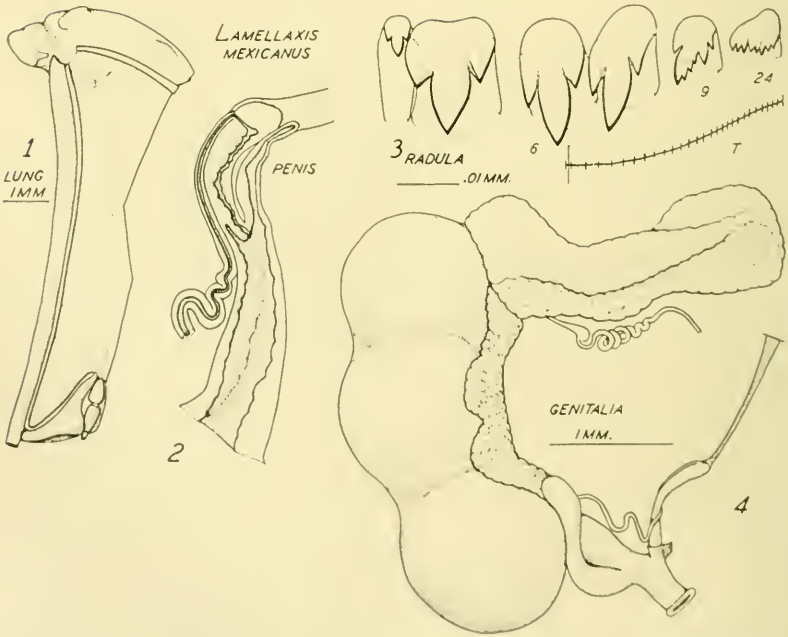


FIG. A, *Papuina lambei novohibernica*. FIG. B, *P. weeksiana*. See Maxwell Smith, Naut. 59 (3): 94.



FIGS. 1 to 4, *Lamellaxis mexicanus*, anatomy. See H. Burrington Baker, Naut. 58 (3): 91.

THE NAUTILUS

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WINTER COLLECTING IN THE BARGE CANAL AT PITTSFORD, N. Y.

By C. L. BLAKESLEE

Who can say one cannot go shelling in the winter time in northern latitudes? Well, it can be done. This conchologist lives close to latitude 43°, which latitudinal position is almost a taboo to any outdoor collecting along this and more northern belts during the late fall and winter months. In this period, the waters are more or less frozen over and as winter recedes the high waters from the melting snow and ice are for some time a deterrent to any work in the streams, ponds and lakes. So while those living in warmer climes are collecting and adding to their collections, the conchologists of these more inhospitable regions have their equipment laid away and accept the season as a good time to sort over the summer's shells, post up the records, tidy up the cabinets and do a little exchanging.

Yet at this particular location, Pittsford, N. Y., there comes at times a few hours or maybe a day or two when certain conditions combine to give the Northerner an opportunity to get in a little shelling. The medium is the New York State Barge Canal that flows through the village and the site is immediately below a lock and accompanying spillway.

At the close of boat traffic, customarily during the fore part of November, the authorities begin to drain the water from the ditch. This is accomplished before the middle of December but usually by this time the top water has been frozen and during the draining this ice drops and fills the bed of the stream. Whatever water may be underneath is limited to a couple of feet or less in depth and the mollusks seek this haven for the winter period.

Sometimes in January, we have a thaw. Again, in February, we may be blessed with another or an initial period of warmth. If these periods are warm enough and remain for a few hours, it will result in the thawing of spots of ice along the canal bed and at the lower terminal of the spillway for a distance of approximately two hundred feet. The water from this spillway has considerable current, though narrow, and apparently it contains an abundance of molluscan food for in it can be found an abundance of fine shells. Their inhabitants congregate in and along the edges of the stream and may easily be collected by hand.

Collections made during such favorable periods over the past five years have brought in the following species:

Alasmidonta marginata Say
Amblema costata Raf.
Anodonta grandis Say
Anodontoides ferussacianus var. *buchanensis* Lea
Bythinia tentaculata Linné
Campeloma rufum Hald.
Carunculina parva Hald.
Elliptio complanatus Dill.
Fusconaia flava Raf.
Helisoma trivolvis Say
Goniobasis livescens Mke.
Goniobasis virginica Say
Lampsilis siliquoidea Barnes
Lampsilis ventricosa Barnes
Leptodea fragilis Raf.
Lasmigona costata Raf.
Ligumia recta Lam.
Ligumia nasuta Say
Physa gyrina Say
Proptera alata megaptera Raf.
Strophitus rugosus Swain.
Viviparus contectoides Binney

Lampsilis can be obtained here in abundance but they are a puzzle. A set of over one hundred show no two exactly alike in marking or appearance. However, until something is done about it they will all remain classified as *L. siliquoidea*. A number create a doubt as to whether they are *L. siliquoidea* or *L. radiata*. A specimen recently collected is typically *L. rosacea*.

Fifty specimens were sent to Henry van der Schalie for examination and were returned with the following comments: "That Barge Canal is a tough one. I have broken the lot into two groups which show tendencies to be more or less *radiata* or *siliquoidea*. I am left with the same feeling you experience, i.e., no real feeling of certainty as to whether the division was properly made. There seems to be some intergradation and it might be of interest if the problem could be investigated in a region such as the Barge Canal. Ortmann was of the opinion

that intergradation did not occur in his Pennsylvania material but he did have some doubt and it certainly is still open for investigation."

Tied into this problem are influences that are constantly being siphoned into the canal from the Great Lakes and their tributaries, except Ontario, at its intake at the Niagara River and also from the Genesee River, which crosses the canal at water level seventy miles east of Buffalo. All these influences may be distributed as far east as Oneida Lake in Central New York, a distance of about two hundred miles. The land traversed by the canal slopes toward the east with a drop of two hundred feet over that distance and the canal bed conforms rather uniformly to the drop, thereby necessitating the services of twelve locks, variously placed, all with their lower terminals toward the east. At Oneida Lake, higher land is reached which is a bar to any further eastern progress of the Naiadacea of the western sections.

The canal section west of and adjacent to the Oneida lock is about twenty miles in length and is lower than either section at its ends. From the west presumably comes an amount of glochidia attached to fish swept in by the filling of the ditch in the spring and also young bivalves dislodged, by the same water, from the bed silt. Meeting this, from the east, dropping through the lock, must come some of the interesting mollusks of Oneida Lake. Right here, there may be opportunities for studies in intergradation.

The *Goniobasis virginica* found here is an eastern form that probably has established itself by transportation on the sides and bottoms of boats coming in from the east. A number of varieties are found ranging from the smooth form to *multilineata*. The discovery of *G. virginica* in the canal was the climax of several years search. In the first year of collecting, a number of its dead shells were found among the stones of the embankments. A long and thorough search brought no live specimens. During the following three years, similar searches were conducted but only dead shells were found. In 1944, starting out from the foot of the lock a search was made along one embankment for a couple of miles and then returning, on

the opposite side, that embankment was thoroughly gone over but without success.

Back at the starting point, I stood for a moment wondering where the elusive mollusk could be hiding. While so engaged, I glanced across the spillway stream and noticed a sheet of quiet water lying at the foot of a concrete wall, a part of the lock's basin. Its area was about six by twenty feet. I had no hope it would be the answer to my prayer but decided to try it for it was the only place I had not examined and so could go away with the satisfaction that I had seen everything. Glancing into it, it was found to be teeming with *Goniobasis*. A dip of the metal sieve net brought up a fine lot of *G. virginica* and *G. livescens*. That night the water froze over and before there was another opportunity to collect from the site the water had been turned into the ditch for the season. The following year a visit to the same site at the first warm spell found the cover ice melted and the place again full of *Goniobasis*.

Mention should be made of a beautiful *Campeloma rufum* that is here. It is of an olive green color,—some are streaked with brown. Several that were gathered had attained a length of fifty mm. This color is not unusual in some regions but in Western New York it is a novelty.

Over fifty years ago, an ardent Rochester conchologist, John Walton, collected from these waters in Pittsford. In a paper read October 26, 1891, before the Rochester Academy of Science Mr. Walton said: "Shells found in the canal only are common in the large lakes and their tributaries west of us and doubtless reach here in their young state with the influx of the water in spring-time when the Erie (Barge) canal is replenished. The most favorable time for canal collecting is in the spring as soon as the weather will permit. At such times whatever the canal contains can easily be seen. It is a delightful pastime in the sunny days of early spring to traverse the canal and follow in the wake of the muskrat and if possible forestall him in the appropriation of some choice living specimen. * * *"

For the past three years I have enjoyed during my trips along the canal the chance companionship, at times, of a young trapper making the daily rounds of his muskrat traps. I did not know John Walton nor did he know me but I sometimes wonder as I

walk along these paths that he trod fifty years ago, if he also, had some sturdy young trapper walking by his side proudly explaining the subtleties of his occupation in exchange for a glimpse into a part of creation that began too long ago for human mind to fully comprehend.

A CONTRIBUTION ON THE SHELL DEVELOPMENT OF CYPRAEA MUS LINNAEUS

By WILLIAM MARCUS INGRAM

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The available literature referring to *Cypraea mus* Linnaeus is largely of a systematic character. Here the developmental stages in the shell growth of this cypraeid are described, thereby adding data, although fragmentary, to this little known phase of conchology.

The immature shell stages upon which the descriptions are based were obtained through the courtesy of the late Dr. Bruce L. Clark of the Department of Paleontology of the University of California, Berkeley, California. They are a part of the vast South American Standard Oil Collection, housed as a separate unit at the above institution. The immature shell forms were collected at El Cardon, Colombia; from their fresh appearance they were either collected alive or were gathered from the beaches shortly after death. They are not fragmented, and the color is generally well enough preserved to have enabled the writer to describe it accurately.

The immature shells represent four growth stages in the development toward an adult shell. These stages were designated by numbering from 1 to 4. The terms applied to the bullae are coined here for convenience of designation only; no "extremely young" bullae are among the specimens.

Stage 1, *Young bulla:* This shell representing this stage is 27.50 mm. long, 18 mm. wide, and 15 mm. high. The posterior region of the shell is nearly flat, and the spire is represented by a small, brown conical structure in its center. No evidence of a posterior canal is present. The anterior canal is beginning to form and is already bent to the left. The shell has seven trans-

verse color zones running across the dorsum: the most anterior is light brownish-grey, 9 mm. broad; the second is a white band 1 mm. broad; the third is a dark brown band 3 mm. broad; the fourth is a light grey band, 1.50 mm. broad; the fifth is a light-brown band 3 mm. broad; the sixth is a white band 1 mm. broad; the seventh is a light greyish-brown band 9 mm. broad. The anterior one-half of the columella is cream color, while the posterior one-half is grey-brown. The columellar anterior canal lip is beginning to form.

Stage 2, *Intermediate bulla:* The shell representing this stage is 36 mm. long, by 23 mm. wide, by 19 mm. high. The body whorl is now relatively inflated, leaving the spire projecting from a concavity. There has been some loss of color in this specimen, for only 5 color zones are clearly defined; they are: the most anterior is creamy-brown; the second a narrow white zone; the third a creamy-brown zone; the fourth a narrow white zone; and the fifth a creamy-brown zone. The shell interior and the base are creamy-brown. The columellar anterior canal lip is thickened, and projects as a prominent beak. The outer lip has not yet begun to turn ventrally toward the left basal region of the shell.

Stage 3, *Late bulla:* The shell representing this stage is 43 mm. long, 30 mm. wide, and 25 mm. high. The available specimen would have represented a large, mature form had it survived to adulthood, for, although immature in markings and shell characteristics, it is larger than the nearly mature bulla herein described. The dorsum is of a uniform creamy-brown with no color zones present; this lack of color zonation is possibly accounted for by bleaching on the beach, for the next stage in bulla formation has them clearly defined. An irregular brown spot 4 mm. wide by 3 mm. long is present over the spire on the body whorl. The shell interior and base are creamy-brown. The outer lip teeth are beginning to develop along the entire outer lip, giving the lip a serrate appearance; the teeth are confined to the lip margin and do not project at all over the base. They are most strongly developed on the anterior one-half of the outer lip. The columellar posterior canal lip is represented in its formative stage by a slightly raised, broadly rounded ridge. Both anterior canal lips are present. A shelf is beginning to develop over the dorsal surface of the anterior canal.

Stage 4, *Nearly mature bulla:* The shell representing this stage is 38 mm. long, 28.50 mm. broad, and 21 mm. high. The seven color zones observed on the young bulla stage are present; from anterior to posterior extremity they are: grey-brown, grey-white, grey-brown, grey, grey-brown, grey-white, and grey-brown. Four color zones are present on the columellar side of the base; they are: a posterior grey-brown zone, a grey-white zone, a grey

zone, and a grey-white zone. Brown dots and flecks are superimposed over these basal color zones. The most anterior one third of the columellar side of the base is brown; this color continues over the anterior canal lips. The dorsal color zones likewise have brown color spots and flecks superimposed over them. These spots are arranged in lines running along the long axis of the shell. The spire is depressed and has a brown blotch above it on the body whorl. Both anterior canal lips are well developed, and a narrow shelf rests above the canal. The columellar lip of the posterior canal is slightly advanced over that of stage three. The lateral margin of the base on the outer lip side is of a uniform brown color, lighter than that forming the spots. The brown and white color striping characteristic of the mature shell on the basal area is beginning to appear. The teeth on the anterior one-third of the outer lip are especially well developed, and are beginning to extend over the base. Only three columellar lip teeth are present as minute projections less than .50 mm. high.

Definitive Shell Characteristics: By a comparison of the mature shell with stage four of the bulla the following characteristics are shown to be the last to develop:

1. Anterior canal lips become flanged.
2. The posterior canal columellar lip becomes greatly elongate.
3. The columellar teeth behind the anterior three develop and become marked with brown.
4. The outer lip teeth become marked with brown, and the most anterior extend partially out upon the base.
5. The shell assumes the mottled adult coloration, adding white to the grey-brown and brown already present in the nearly mature bulla.
6. The spire becomes obscured by the addition of shell material.
7. There is everywhere a general thickening of the shell.

SOME OF FÉRUSSAC'S GENERIC NAMES

By H. BURRINGTON BAKER

A. S. Kennard's careful researches [1] into the dates of the various livraisons of Férussac solve many perplexing questions. Very wisely, he has decided that, out of all the divisional names proposed in livraison 9, only those are valid, which include spe-

[1] 1942, Proc. Malac. Soc. London 25: 12–17, 105–118.

cies, or which cite older names that do include them. Thus, *Cochlitoma, Cochlodina, Helicella, Helicigona* and *Helicostyla,* among the names which will be discussed here, date from livraison 9 (April 6, 1821).

The others proposed on pages 27 to 28 (or 23–24) of the "Prodrome limaçons," e.g., *Cochlicella, Cochlostyla* and *Helicodonta,* are not accompanied by a definition or description, in the sense of Article 25a of the International Rules. They certainly cannot be considered as "Genera for which no species was distinctly named," in the sense of Opinion 46 of the International Commission, since none was distinguishable, in livraison 9, from all the other new names proposed in the same publication. Apparently Kennard considers these as practically nude names, which he dates from livraison 10 (May 26, 1921). The only other alternative would be to regard each as a "genus dubium," in which case, if I understand the discussion of Opinion 54, it would preoccupy any subsequent use, even by Férussac himself.

On the other hand, the Rules contain no authority for the two propositions submitted by Kennard on p. 112 (op. cit.). Quite the contrary, in the discussion of Opinion 9, "composite genera," founded on two (or more) older names, are not considered substitute names, but are treated as if subject to Article 30 of the Rules, as regards selection of type. Actually, the Barons de Férussac were proposing a new SYSTEM, with arrogant contempt for all predecessors, including themselves.

Auris Spix (1827), type *A. melastoma* (Swainson).

This genus of Bulimulidae is not invalidated by the "Auris" of non-binomial Chemnitz or by any subsequent citation of it in synonymy. Opinion 5 has decided that pre-1758 names only become valid when accepted by some post-1758 binominal author. The welcome Padua amendment (1930) to the Rules evidently places non-binomial post-1758 names (e.g., those of Chemnitz) under the same regulations. Since neither Dillwyn nor Férussac accepted "Auris Chemnitz," it cannot be dated from either of them, but should be dated from Kennard (1942, p. 112).

CHERSINA "Humphrey" Fér. (1821, livr. 10, Prodrome: 53–54 or 49–50).

Pilsbry's selection [2] of *Bulla achatina* L. as the type of "*Chersina* [Humphrey]" would seem to make it a synonym of *Achatina* Lamarck (1799).

CAROCOLLA Schumacher (1817, Ess. Vers Test.: 192–193), type *C. lampas* (Müll.)

This generally neglected but valid name needs discussion. Originally, it included 3 new species: *C. magna* = *Carocolla lampas* (Müller), *C. gualtieriana* = *Iberus gualtieranus* (L.) and *C. unifasciata* = *Pleurodonte* (*Caracolus*) *marginella* (Gmelin). Neither *P.* (*Caracolus*) *carocolla* (L.) nor *Caracolus* Montfort (1810) was mentioned, so it cannot be a substitute for the last. According to Opinion 31, Gray's [3] selection of *Helix lampas* as type was not valid because Schumacher did not mention this specific name. Pilsbry's [4] selection of Schumacher's second species would place *Carocolla* in the synonymy of *Iberus* Montfort (1810). But, since *C. magna* was founded on two selected figures of "*Helicis carocollae* variet. Chemn.," [5] was not *C. magna* the type of *Carocolla* by absolute tautonymy? If so, it would replace *Pyrochilus* Pilsbry (1892). Even worse, if Thiele's (1931, Handbuch: 688) arrangement were accepted, it would become the generic name to replace *Helicostyla* Férussac (1821).

COCHLICELLA Fér. (livr. 10, Prodrome: 56 or 52), type *C. conoidea* (Drap.).

Since a subsequent type selection must be definite, Thon's [6] designation of *Helix decollata* L. as the type of "Fam. Turritae"

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[2] 1919, Nautilus 32: 98.

[3] 1847, Proc. Zool. Soc. London: 172, no. 457.

[4] 1931, Nautilus 44: 138.

[5] *Helix carocolla Linnaei* Chemnitz, 1795, Conch. Cab. 11: 267, pl. 208, figs. 2044, 2045.

[6] 1829, Ersche & Grube, Allg. Encyckl. Wissensch. Künste, sect. 2, vol. 5: 138. My knowledge of this work is based solely on notes kindly made by Dr. Harald A. Rehder.

probably was not valid for *Cochlicella,* even though "Turritae" was the only group included in Thon's "*Cochlicolla*" and Férussac's *Cochlicella.* Pilsbry[7] has accepted Gray's (p. 173)[3] selection of *Helix conoidea* as the type of "*Cochlicella,* sp. Férus." Von Martens (1860) and probably Pfeiffer (1848) chose *Helix acuta* Drap. Perhaps the best solution would be to regard *Cochlicella* of livr. 9 (Prodrome: 28 or 24) as a "genus dubium."

COCHLITOMA Fér. (livr. 9, Prodrome: 28 or 24), type *C. zebra* (Bruguière).

This name was founded on "Liguuae, Montfort" and "Achatinae, Lam." but was a substitute for neither *Achatina* Lam. (1799) nor *Liguus* Montfort (1810). Since Lamarck[8] already had included *Bulimus zebra* Bruguière[9] in *Achatina* and, in fact, had quoted part of Bruguière's remarks (p. 358) on that species in his description of the genus, Pilsbry's[10] selection of *B. zebra* as the type of *Cochlitoma* seems valid, unless an earlier designation be found.

COCHLODINA Fér. (livr. 9, Prodrome: 28 or 24), type *Marpessa laminata* (Montagu).

Cochlodina was vested solely by the inclusion of "Clausiliae, Draparn.," but Férussac's addition of 3 other, nude sectional names and his use of the plural seem proof enough that he did not propose it as a substitute. Since *Clausilia* Drap. (1805) included *C. bidens* Drap. = *C. laminata* (Montagu), Pilsbry's[11] selection of this species as the type of *Cochlodina* remains valid, unless an earlier choice be found. But anyway, *Marpessa* Gray[12] seems to be the prior name.

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[7] 1939, Land Mollusca of North America I: 22. (*Theba,* p. 13; *Helicella,* p. 21).

[8] 1801, Système anim. sans vertebr.: 91.

[9] 1792, Encycl. Meth. I: 357, no. 100.

[10] 1904, Man. Conch. (2) 17: 77.

[11] 1922, Nautilus 36: 31.

[12] March, 1821, London Med. Rep. 15: 239. (*Jacosta* on p. 236.)

COCHLOSTYLA Fér. (livr. 10, Prodrome: 51–52 or 47–48), type *Helicostyla ovoidea* (Bruguière).

If *Cochlostyla* of livraison 9 be regarded as a practically nude name, its second use will replace the preoccupied *Canistrum* Mörch (1852), as a subgenus or section of *Helicostyla*.

HELICELLA Fér. (livr. 9, Explic. pls. 1–47), type *H. subdentata* (Fér.).

As shown by Kennard (1941), *Helicella* unfortunately must replace *Theba* [7] Risso (1826) or *Euparypha* Hartmann (1842) as the generic name of *Helicella pisana* (Müller) in the Helicidae. This apparently means that *Planatella* Clessin (1876), type *Helix cricetorum* Müller, becomes the name of the group "*Helicella*" [7] of the genus *Jacosta* Gray (Mar. 1, 1821) [12] in the Hygromiidae. Anyway, *Jacosta* seems to be prior to *Helicella* (Apr. 6, 1821).

HELICIGONA Fér. (livr. 9, Prodrome 27 or 23 and Expl. pls. 1–47), type *Vortex lapicidus* (L.).

Since *Vortex* Oken (1815) contained *V. lapicida,* Pilsbry's [13] selection of this species as the type of *Helicigona* seems valid. *Helicigona* drops into the synonymy of *Vortex* Oken (1815), with the same type, selected by Thon (1829: 138).

HELICODONTA Fér. (livr. 10, Prodrome: 37–39 or 33–35), type *H. obvoluta* (Müll.).

Since "Anostomae, Lam." was just as nude in 1821 as the other "four with Latin vernacular plurals," *Helicodonta* of livraison 9 (Prodrome: 27 or 23) was just as "not defined" as were *Cochlostyla* and *Cochlicella.* Either it was a "genus dubium," which means that no subsequent usage would be valid, or it dated from livraison 10, where it included *H. obvoluta* (Müller), which was selected as its type by Pilsbry (1895: 284) and possibly also by Pfeiffer.[14] Gray's (1847: 174) designation of *Helix gularis* as the type of "*Helicodonta,* sp.

[13] 1895, Manual of Conchology (2) 9: 296.

[14] 1846, Monogr. Helic. II: 545.

Féruss.'' is not valid because Férussac did not mention this specific name (Cf. Opinion 31).

HELICOSTYLA Fér. (livr. 9, expl. pls. 1–47), type *H. mirabilis* (Fér.).

Although its result would be the same, Gray's (1847: 171) selection of *Helix galactites* as the type is not valid, since Férussac did not mention this subsequent specific name (cf. Opinion 31). Martens' (1860) is.

As pointed out by Bartsch (p. 378),[15] *Cochlostyla* would take precedence over *Helicostyla,* if the two groups were of equal date. In this connection, the careful study of Drs. Bartsch and Rehder on a copy of Férussac's ''Histoire'' in the U. S. National Museum, generously shared with me in letters, solved the question of the contents of livraison 9 mentioned by Kennard (1942: 105, 107), and determined the priority of *Helicostyla.* The following subgenera or sections of *Helicostyla* will require or have suffered changes in names:

Helicostyla s. s. of Pilsbry (p. 224) [13] and Bartsch (p. 399) [15] would be valid even if the prior *Carocolla* Schumacher were considered congeneric.

Cochlostyla Férussac (1821), type *H. ovoidea* (Brug.), might replace the preoccupied *Canistrum* Mörch (1852), used by Pilsbry (p. 230).

Orthostylus Beck, 1837, Ind.: 49, type by subsequent designation of Herrmannsen,[16] *H. metaformis* (Fér.), replaces *Cochlostyla* s. s. of Bartsch (p. 407). Gray's later selection of type was not valid.

Bulina Lesson, 1831, Ill. Zool., pl. 22, only species (type) *H. rufogaster* (Lesson), replaces ''*Orthostylus* Beck'' of Gray (1847), Pilsbry (p. 227) and Bartsch (p. 434), unless *Bulina* be considered a misspelling or emendation of *Bulinus* or *Bulimus* (cf. Opinion 120). *Pithohelix* and *Pythohelix* Swainson (1840) are available synonyms.

Dolichostyla Pilsbry, 1896, Naut. 9: 108, type *H. virgata* (Jay), has replaced the preoccupied *Prochilus* Albers (1860) of the Manual (p. 231) and Bartsch (p. 454).

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[15] 1938, U. S. Nat. Mus., Bull. 100: 373–533.

[16] 1847, Index Gener. Malac. II: 166.

Opalliostyla Pilsbry (1896), type *H. effusa* (Pfr.), has replaced *Eudoxus* Albers (1850) of the Manual (p. 229) and Bartsch (p. 446). The preoccupation of *Eudoxus* Albers depends on whether *Eudoxus* "Kirby" Agassiz[17] is considered an emendation or a mere misspelling of *Endoxus* Kirby (1837).

Steatodryas Pilsbry, 1932, Naut. 46: 72, type *H. cepoides* (Lea), has replaced *Columplica* Hartmann (1843) of the Manual (p. 226). But, according to Opinion 31, Herrmannsen's (1847, I: 274) and Pilsbry's (1932) selections of *Helix unidentata* "Chemnitz" as type of the last were not valid, since this specific name was not mentioned by Hartmann in the synonymy of his *C. uniplicata* = *Stylodonta microdonta* (Deshayes), which I now designate as the type of *Columplica*.

NOTES ON SOME SOUTHWESTERN PUPILLIDAE

By GORDON K. MacMILLAN, Carnegie Museum

In the summer of 1940, Dr. Arthur C. Twomey, Curator and Field Collector for the Section of Ornithology at the Carnegie Museum, on one of his expeditions to the southwestern part of the United States, made a small collection of mollusca from the Huachuca Mountains in Cochise County, Arizona. Among these mollusca were two species of *Vertigo* worthy of notation.

Three specimens of *Vertigo hinkleyi* were collected in Ramsey Canyon, which is northwest of the reservoir of Cave Canyon, the type locality of this species, and on the northeast slope of the Huachuca Mountains. The Ramsey Canyon specimens are smaller in length than the type. In two of these specimens, in which the epidermis has been partially worn off, the parietal lamella is long, somewhat tongue-shaped, and slants towards the upper palatal fold and is directly opposite the highest part of it. The parietal lamella has somewhat the same shape as the one of figure 12 on plate 6 of the 26th volume of the Manual of Conchology, but occupies a position farther down the parietal wall towards the columella and might be mistaken for the supracolumellar lamella if the columellar and subcolumellar lamella were not present.

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[17] 1846, Nomenclat. Zool. Coleoptera: 67.

From Miller Canyon was collected one specimen of *Vertigo concinnula*. This shell differs from most examples by having more prominent, oblique striations and by a reduction in the size of the teeth. The parietal lamella is normal, but is much more vertical than usual and slants downward to the lower palatal fold. The angular lamella has been reduced to a mere "pimple." The lower palatal fold is slightly smaller, while the upper palatal fold has become much reduced, to about one-quarter normal size. The columellar lamella has been reduced to one-half normal size.

Of the records that I have on hand, *V. concinnula* has been collected at the following localities in Arizona:—

Miller Peak, Huachuca Mountains, Cochise County, which is south of Miller Canyon, the locality from which Dr. Twomey obtained his specimens of *concinnula*.

Mt. Mingus, near Jerome, Yavapai County, northeast of Cochise County.

Nogales, Santa Cruz County, southwest by west of the Huachuca Mountains.

San Francisco Mountains and Big Williams Mountain, both in Coconino County, northwest of Cochise County.

Dr. J. LeRoy Kay, Curator of the Section of Vertebrate Paleontology at the Carnegie Museum, invited me to accompany him on his annual collecting expedition for western fossils in the summer of 1941. The first stop for collecting was made in Arches National Monument, situated in the east-central part of Utah in Grand County. This Monument consists mainly of semi-desert conditions and sandstone outcrops that have been sculptured in a multitude of designs by the action of the wind. Throughout this area, deep washes have been cut by rains, whose turbulent waters race madly to the Colorado River to the south. The first collecting locality in the Monument was at Willow Springs, where natural springs have created a small stream that flows for a mile through a narrow, winding, rocky canyon before it gradually disappears in the sandy soil comprising most of the floor of the wash. In the more sheltered parts are found small clumps of willows, and a thick carpet of grass forms the floor of these growths, together with twigs, willow leaves, and a few rocks. Only two species of land snails

were collected at this place. These were *Vallonia cyclophorella* Ancey and *Gastrocopta pellucida parvidens* (Sterki).

The five specimens of *G. p. parvidens* from Willow Springs differ from the type of this race at the Carnegie Museum in being longer and narrower in shape and in the reduction of the size of the teeth. The bifid parietal lamella is typical. The upper palatal fold has become so reduced that it is barely visible under the binocular microscope, while the lower palatal fold has become reduced to half its normal size. The columellar lamella is also normal.

The discovery of *G. p. parvidens* at Willow Springs, Arches National Monument, Grand County, Utah, extends the known range of this race much further northeastward than reported to date. Dr. Pilsbry mentions only two localities for this race in the Manual of Conchology, vol. 24, 1916, p. 81. These are Mescal Gulch and Drift of Verde River, near Jerome, Yavapai County, Arizona, which is on a branch of the Gila River, a tributary of the Colorado River; and Navajo Springs, Apache County, Arizona, on Sherelons Fork of the Colorado River. It is not difficult to understand the presence of *G. p. parvidens* at Willow Springs, Arches National Monument, when one remembers, as stated above, that the waters from this Monument drain also into the Colorado River.

H. A. Pilsbry and J. H. Ferriss recorded this race from Pecos River drift, Pecos, San Miguel County, New Mexico (Proceedings of the Academy of Natural Sciences of Philadelphia, vol. 58, 1906, p. 144) and Junius Henderson had it from the Jemez Mountains, near Valle Grande, Santa Fe County, New Mexico (The Nautilus, vol. 26, 1912, p. 81). Both these last two localities are in the drainage system of the Rio Grande, and are not mentioned in the locality records of this race in the Manual of Conchology. This might be due to the fact that Dr. Pilsbry considered them as *G. pellucida hordeacella* and not *G. p. parvidens*.

Until 1922, the westernmost record for *G. p. hordeacella* was from Quartzsite, Yuma County, Arizona. In that year, S. S. Berry recorded it from Palm Creek, San Jacinto Mountains, Riverside County, California. This extended the distribution of this race nearly to the West Coast. More collecting in the

territory between the Plumosa Range in Yuma County, Arizona, and the San Jacinto Mountains in Riverside County, California, and between this latter locality and the Pacific Ocean might bring to light new locality records for this race and extend its range still further westward. More collecting is also needed in Louisiana and Oklahoma in order to complete the distributional range of this race in that territory.

G. Dallas Hanna (Nautilus, vol. 23, 1909, p. 94) includes *G. pellucida hordeacella* in the fauna of Douglas County, Kansas, one specimen being found in the river debris at Lawrence. I am inclined to discredit this locality as this seems to be too far out of the present distributional range of this race. Dr. Hanna has also included in this same fauna *Planogyra asteriscus* (Morse), a northern species whose distribution has not been recorded south of Michigan, and *Retinella rhoadsi* (Pilsbry), which has not extended its distributional range westward beyond Ohio and Michigan.

COLOR VARIATIONS IN PEDICULARIA CALIFORNICA NEWCOMB

By SYLVIA JACOBS [1]

I have before me what is perhaps the largest group of *Pedicularia californica* Newcomb ever available for study at one time. Though this little shell was described by Dr. Wesley Newcomb on February 1, 1864, the last edition of Keep's "West Coast Shells" states that it is "still rare." Those previously gathered came almost exclusively from pieces of coral and gorgonias brought up from fairly deep water by dredges or caught in fish nets.

In October, 1945, my husband, who is a commercial diver, made two exploratory dives on Farnsworth Banks, a treacherous coral reef near Catalina Island. No other diver is known to have made a successful descent there. (A popular account of these dives will appear soon in Esquire magazine.) He sent up several fine pieces of *Hydrocoral allapora californica* Verrill, and

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from this coral the *Pedicularia* were detached. This is the first known occurrence of these shells south of Monterey. They came from 150–200 foot depth. (During the second dive, he also found a perfect living specimen of the rare *Tegula regina* Stearns.)

In describing *Pedicularia,* Baily states, "The color is peculiar for our shells, being a rich, rosy pink, far more beautiful than that of the famous 'Peach-blow vase.'" I might venture a guess that the shells so described lived on gorgonias in the red color range, which are most often seen by divers in these waters, or on reddish corals such as *Balanophyllia elegans* Verrill, which are more common than the *Hydrocoral allapora.*

It is of interest to note that the great majority of the louse shells in this group are a pronounced purple, so close to the color of the coral while wet as to be almost invisible. Whether this is an example of protective coloration, I am not quite qualified to state. There is some evidence of a micro-organism in the water which affects the color of marine life in the waters above Farnsworth Banks. Mr. Jacobs reported a blue haze which he had not seen at the same depth in other areas. Also, sheephead caught at Farnsworth Banks were a different color than the sheephead usually seen. The coral itself is far more fast to action of boiling bleach than other corals I have tested, though, like most corals, it fades on prolonged exposure to sunlight.

The larger shells (to 13 mm.) have a purple bull's-eye at the apex, with concentric rings of irregular widths around it, these rings ranging in color through tints of purple to white. The smaller shells (smallest found 5½ mm.) tend to be far more uniform, both in color and shape, than the larger ones. The small ones, at first glance, appear to be all purple, but closer examination shows a narrow band of lighter tint around the aperture. It would seem that these shells start with the bull's-eye, adding growth rings of lighter tints.

Only about one percent of the shells in this group could be described as pink without a tinge of purple, and only about six percent are more pink than purple.

The purple and pink specimens have a translucent quality, are transparent when held over a light. But about two percent

of those gathered are chalky and opaque, ranging from greenish gray to white. Upon removal of the animals, it is found that this color tinges the inside of the shells as well, modifying the purple color inside. In two or three shells, there is almost no trace of purple inside. These curious chalky shells illustrate more clearly than any of the others Keep's statement that *Pedicularia* are shiny inside but rough outside.

I am not qualified to state that this chalky effect is not caused by a foreign encrustation. But I do not believe that it is. My reason for this, aside from the inside color, is that the characteristic pattern of lines of these shells may be seen as clearly with the glass on the chalky specimens as on any others. Also, these shells seem to be extremely resistant to foreign growth. Almost all are perfectly clean. Only half of one percent have barnacles and coral on the back, only one shell has been drilled by a borer.

These shells are very strong, considering their small size. Considerable force had to be used to loosen the hold of the living animals, but only one shell was broken in the process. Practically every adult shell shows marked distortion in shape, accommodating itself to the snug corners of the hard coral, where they lodged when young. Even after the hold of the animals was loosened, most of the shells did not fall from the coral, but had to be shaken out of the intricate coral labyrinths by turning the piece of coral upside down. This would seem to indicate that the animals do not travel from home base when mature; in many cases, motion would have been impossible.

The specimens showing most marked color variation have been sent to U. S. National Museum. A graduated series of ten of the purple shells may be seen at Buffalo Museum of Science. Pieces of coral from these two dives are on display at Cabrillo Museum, San Pedro, Calif., and the study collection of Chicago Natural History Museum. Dr. Hill of Exposition Museum of Los Angeles has both coral and specimens of the *Pedicularia* in his private collection. Joshua F. Baily, Jr., revisor of "Keep's" has purchased specimens.

INDEX TO F. C. BAKER'S "THE MOLLUSCAN FAMILY PLANORBIDAE"

By H. BURRINGTON BAKER

The following abbreviated taxonomic index to the late Frank Collins Baker's "The Molluscan Family Planorbidae"[1] is meant simply to assist systematists to find the species and subspecies in their new or unfamiliar generic and subgeneric positions. No distinctions are made between species (or genera), subspecies (or subgenera) and synonyms. Only those page references which determine the systematic position or are of nomenclatorial importance, are included, and the accepted usages are given first. The dates, after a few of the trivial names, are taken from the Index Animalium, the Zoölogical Record and various monographs, without examination of the original sources. For these reasons, some of them may be inaccurate, but their inclusion may assist students in their searches for the original descriptions. Attention is called to errors (or emendations) in spelling, except where they involve only changes in endings. Most planorbid species were originally described in the genus *Planorbis,* but the exceptions which involve a change of genus are indicated by inclusion of the original generic name, or an abbreviation, after the date.

[1] April 4, 1945, is the exact date of publication, according to a letter from the University of Illinois Press.

[2] Proposed as substitute for *Planorbis siliceus*.

[3] This is the name of the species, with *M. c. cooperi* as a variety.

[4] Preoccupied by *Planorbis compressus* Marcel de Serres (1818).

[5] Variety of *M. callioglyptus*, not vice versa.

[6] Included in *Gyraulus*, subg. *Carinogyraulus* Polinski (1929).

[7] Not preoccupied by *P. s.* "Ziegler" Menke, 1828, Syn. Meth.: 23, which is included as form c of "*P. similis* Fér.," but is completely nude. Anyway, *Physa carinifera* Ancey (1886) is available.

[8] Proposed as substitute for *Planorbis declivis* Tate.

NOTES ON SOME GROUPS IN THE MURICIDAE OF THE WEST ATLANTIC, WITH DESCRIPTION OF A NEW SUBGENUS [1]

By H. A. REHDER

In the process of preparing a report on the mollusks of the Chipola formation of the Miocene Alum Bluff group, Dr. Julia Gardner asked me to check over the generic assignment of some of the species of Muricidae. In this connection I have made use of the very useful monograph of the Western Atlantic Muricidae by Clench and Farfante in Number 17 of Johnsonia (May 29, 1945). I have come, however, to a few divergent conclusions on the generic classification of some of the species, which I wish here to put on record:

Paziella Jousseaume 1880

1880. *Paziella* Jousseaume, Le Naturaliste, vol. 1, no. 42, p. 335.
1882. *Paziella* Jousseaume, Rev. Mag. Zool., 1879, vol. 42, p. 325.

This West Indian group, which was synonymized by Clench and Farfante with *Poirieria* Jousseaume 1880, should, in my opinion, be considered a distinct genus. The neozelanic *Poirieria* has a longer, spineless siphonal canal, while *Murex pazi* Crosse, the type of *Paziella*, has a row of prominent spines on the canal. *Poirieria* has a fossil history in New Zealand beginning in the Miocene (Finlay, Trans. N. Z. Inst., vol. 55, pp. 496, 508, 1924; Powell, Rec. Auckland Inst. Mus., vol. 1, p. 88, 1931).

Subgenus Dallimurex, new subgenus

Subgenotype: *Murex nuttingi* Dall.

Shell differing from typical *Paziella* in having stronger laminated varices, which have the spine on the shoulder shorter and stouter, and which bear numerous shorter spines below the shoulder. The whorls below the shoulder have strong irregular spiral ridges, which culminate in the varicial spines. The siphonal canal is broader, the spiral succession of previous canals forming a prominent umbilical chink.

Murex nuttingi, from the region of Key West, Florida (the collection of the U. S. National Museum contains seven specimens all restricted to this area), and *Murex carnicolor* Clench and Farfante from the Lesser Antilles belong in this subgenus.

[1] Published by permission of the Secretary of the Smithsonian Institution.

There is also an undescribed species from the Chipola River Miocene of Florida which belongs here, bespeaking an extended phylogenetic history for this group, of which typical *Paziella* may be a more recent, deep-water offshoot.

Clench and Farfante placed the species of this complex in *Murexsul*, another neozelanic group. The type of this genus, *Murex octogonos* Quoy and Gaimard, has stronger, more numerous spiral ridges and as a consequence more numerous varieial spines. There are two rows of spines on the anterior canal as opposed to only one in *Dallimurex*. The nuclear characters are also different, the nuclear whorls in *Murexsul* being somewhat flattened, bluntly shouldered and roughened, see Finlay, Trans. New Zealand Inst., vol. 47, p. 487. 1926 (Jan. 15, 1927), while in *Dallimurex* they are evenly rounded and the first nuclear whorl is bulbous and smooth. *Murexsul* has a parallel geological history of its own in the New Zealand tertiary.

NOTES AND NEWS

Pinellas County, Florida, Tertiary Fossil Localities.—Corrections of errors in published localities are here made to prevent further misapprehension. (1) In Nautilus, vol. 59 (Oct. 1945), p. 38, the locality for Pliocene collections is shown on the map at No. 2, on the stream or ditch, which is the outlet of Sawgrass Lake, where it crosses 9th Street. However, all the shells in the spoil banks along this four to six foot deep ditch are distinctly of Pleistocene age, none extinct. While the more deeply underlying strata are believed to be of Pliocene age, the only Pliocene outcrop, now known, in this general area begins about three fourths of a mile south from that ditch. It lies on the east side of 9th Street, between 69th and 70th Avenues, North, in the City of St. Petersburg. At this place, there is a Pliocene reef, less than an acre in extent, close to the surface on low level ground. Its northern end is about 200 feet east of the N.W. corner of Sec. 31, T. 30 S.R. 17 E., and extends roughly S. 45° E., some 400 feet. It is surrounded on the surface on all sides by Pleistocene material. This small reef or bar, mostly less than 50 feet wide, and about three feet deep to its base, has been rich in well preserved Pliocene shells and some corals, but now

is nearly exhausted by intensive collecting for eight years. Here occurred in profusion such characteristic Caloosahatchee Pliocene species as *Arca wagneriana* Dall, *Turritella apicalis* Heilprin, *Solenosteira mengeana* Dall, along with hundreds of other species of which about one half are now extinct.

(2) In the 20th Annual Report of the Florida Geological Survey (1929), p. 224, the location of the Melbourne bone beds of Pinellas County, explored by Walter W. Holmes et al. in the 1920's, is given as in "Sec. 5, T. 31 S.R. 16 E., about 2¼ miles S.SW. of Pinellas Park." However, the principal site of the extensive Pleistocene vertebrate collections made by Mr. Holmes and now in the Am. Museum of Natural History in New York, was not in Sec. 5 of that Township, but near the center of Sec. 6. Here, in 1942, could still be seen a considerable heap of discarded vertebrate bone fragments and remains of Mr. Holmes' office. This site is on the northerly or right bank of Joes Creek, a few hundred feet upstream, southeasterly, from where the creek crosses County Highway No. 16, which here is on the east and west quarter line of Sec. 6. See "Extinct Land Mammals of Florida," by George Gaylord Simpson, 1928, p. 264.—William G. Fargo, Jackson, Michigan.

Praticolella griseola Pfr. in Hispaniola.—While in Banes, Cuba, my friend Alberto Queñones gave me a few shells that had been sent to him from Colonia "Lechugas," Central Santa Fé, San Pedro de Macorís, Hispaniola. Among these, there were several specimens of *Praticolella griseola* Pfr. that agree in all details with another series, also introduced, from Habana, Cuba. I have not been able to find any previously published record of this species for either Santo Domingo or Haiti, the two republics that compose the island of Hispaniola.—W. J. Clench.

Helix aspersa in New Mexico.—It may be worth while to record that, when visiting Santa Fé last spring, I found *Helix aspersa* well established there.—T. D. A. Cockerell.

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EDITORS AND PUBLISHERS
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Academy of Natural Sciences, Philadelphia 3

H. BURRINGTON BAKER, Professor of Zoology,
University of Pennsylvania

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