Is it luck or good planning; Vermont campaign continues to thrive

By Harry G. Lee

The preceding sixteen months, the time elapsed since the last family outing to The Homestead in Manchester Center, VT, provided time to refine the landsnailing strategy that had never failed to increase the biodiversity inventory of surrounding Bennington Co. The impact of diminishing returns had been felt, but one way or another (*e.g.*, Lee, 2008c), net accretion had been achieved in each of six campaigns spanning 47 years through May, 2008. One new destination haunted me, the riparian flanks of the Batten Kill about a mile northeast of The Homestead. Here, VT 11 crosses the famous trout stream in a relatively treeless valley running north-south between the Taconic and Green Mts.

Near that point is a tiny settlement called Barnumville, which, my in-laws told me, was originally a summer retreat for members of P.T. Barnum's circus. I could find no independent confirmation of this history on an Internet search, but these sources have never disappointed me in the past - ably guiding me to obscure and productive collecting sites elsewhere in the county.

Unconcerned with such minor matters, I headed out to Barnumville in the morning of September 19, 2009. The dog days of summer somehow had skipped that day's calendar; although clear, it was sweater and windbreaker weather. I reached the destination I had envision for many months, parked the car, and descended from the northeast bridge approach into what appeared to be a low grassy area - a habitat somewhat different from what I'd exploited over the preceding years of collecting the area. To my chagrin, the water table and the riparian marshland coincided, and the surface was soft enough to allow a generous sampling of very cold water into my shoes. That experience quickly forced a retreat and a redesign of a collecting strategy. The safe refuge provided by the bridge embankment allowed an inspection of the vertical wall of the concrete bridge abutment. Surprisingly the surface was studded with hundreds of *Pupilla muscorum*! The new strategy was obvious - collect lots of these little gems - then search for other micro's in the vegetation and soil below.

Eventually I inspected all four quadrants of the bridge abutments and embankments and confirmed - especially in the southeast sector, the presence of plenty of snails. As has become my custom, collecting by visual surveillance collecting was supplemented by generous soil/vegetation sampling.

Two days later, I went with a family delegation to the "upper" marble quarry on Mt. Aeolus first visited in on the previous trip of May, 2008 (Lee, 2008c), where soil samples were also obtained. The results from the two trips' samplings accrued over the following two weeks and are reported in the appendix below.

I culled the quarry sample first. The contents were pretty much as expected until I plucked one, then a second *Strobilops labyrinthicus* (Say, 1817) Maze Pinecone. Bingo! A new county, number 56 on the native snail tally from Bennington Co. (see appendix). A shutout was averted in the late innings!

But there was more to be reckoned with, and things **really** got interesting during the analysis of the Barnumville stuff. The first stunner was the sheer numbers of shells from the Barnumville bridge southeast embankment: 527 specimens of 14 (13 landsnail) species. As Hubricht (1985) indicated, concrete is a snail attractant, and the provision of even a little calcium in this granitic landscape can be critical. Second was the discovery of a new non-native snail for Bennington Co. in the southwest embankment sample, *Discus rotundatus* (Muller 1774) Garden Disc Snail. This is a species I had never collected before, it's quite pretty, and there were 58 of them, many taken alive. Before magnification, I had suspected these were a native *Discus*, two species of which I'd collected at higher altitudes in far less disturbed habitats. I hadn't given an alternative diagnosis any thought until the obvious leapt at me through the microscope. It probably arrived from NW Europe as did *Oxychilus cellarius* (Muller, 1774) Cellar Glass-snail, with which it occurred in the same sample. The situation was now an embarrassment of riches.

Yet there was one more even greater surprise, number three: in this southwest Barnumvile sample four specimens of a *Punctum* species were found. These shells ranged from 1.45 to 1.65 mm in maximum diameter, had an umbilicus about 1/3 that measurement, and were a translucent light reddish brown. They

appeared distinct [see **Figure 1** L to R: *P. pygmaeum* Barnumville, *P. minutissimum*, Mt. Aeolus upperquarry; *P. vitreum* Bullitt Co., KY; scale line 1.0 mm] from each of the (smaller) four nominate species from eastern North America - and a fifth, un-named but described by Nekola (2004: 33) - and, rather surprisingly, matched the description of the European *P. pygmaeum* (Draparnaud, 1801) in Kerney and Cameron (1979: 101) as well as its differential diagnosis vs. *P. minutissimum* given by Pilsbry (1948: 645). Typical specimens of the latter are easily collected in the region, but they are much more closely associated with upland forest habitat than a ruderal situation like the above station. Furthermore, their shells, aside from being smaller overall, have whorls of a much smaller caliber [see **Figure 2** L to R, top to bottom: *P. vitreum* Bullitt Co., KY; *P. minutissimum*, Mt. Aeolus upper quarry; two *P. pygmaeum* Barnumville; scale line 1.0 mm]. Although Kerney and Cameron (*Idem*) characterize *P. pygmaeum* as "holoarctic," I was unable to confirm the presence of *P. pygmaeum* in North America using all my available library resources. Although there were historical records for North America, these were debunked by Pilsbry (*Idem*). Further, Dr. David Robinson (pers. comm. 1 Dec., 2009) confirmed that no *bona fide* occurrences of *P. pygmaeum* had been reported in the six decades since Pilsbry's analysis.

Fig. 1

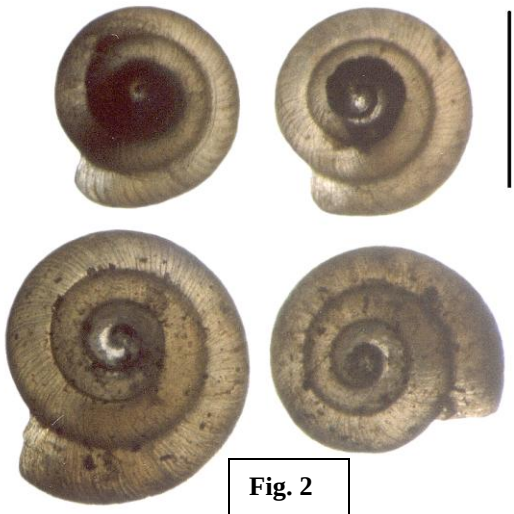

Fig. 2

This had gotten **really** interesting! My next step was to visit the Florida Museum of Natural History (Gainesville), where, among other projects, I compared my four VT *Punctum* to the museum's holdings of *Punctum pygmaeum* (Draparnaud, 1801), numbering about eight lots. As suspected, my shells appeared identical to specimens those specimens of *P. pygmaeum* from NW Europe. Shortly afterward I presented an selected array of *P. pygmaeum*, two of my four specimens, and two selected VT *P. minutissimum* to Malacology Collections Manager John Slapcinsky, and he concurred with the diagnosis! A week later I received two lots of *P. pygmaeum* (Netherlands and Germany) from Dr. Wim Maassen of the National Museum of Natural History, Leiden. As expected by then, all those shells likewise matched the four Barnumville specimens beautifully.

Instead of succumbing to cold stochastic probability, the Sept., 2009 Bennington Co. expedition proved to be provident beyond expectations: a previously unreported native species (total now 56), an increase by two non-native species (now four; total 60 overall), and, among the latter, a first for the Western Hemisphere! If I were superstitious, I might suggest that seven, which is believed to be a lucky number in many cultures, trumped math and science on the occasion of this, the seventh, regional snailing campaign. Before committing this notion to belief, however, one should reconsider P.T Barnum's adage regarding the natal frequency of the vulnerably gullible. This August we'll see if the charmed life of this biodiversity juggernaut will continue.

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APPENDIX:

Account of collections made in Bennington Co., VT 19 to 21 September, 2009

USA: Vermont, Bennington Co., 300 m E Barnumville, 2.0 mi NE Manchester Ctr. VT 11, **NE** bridge approach, embankment and adjacent floodplain marsh along L bank Batten Kill. H. Lee! 19 September, 2009.
Pisidiuma species
Fossaria species
Carychium exiguum (Say, 1822) Obese Thorn
Cochlicopa lubrica (Muller, 1774) Glossy Pillar
Gastrocopta tappaniana (C. B. Adams, 1841) White Snaggletooth
Pupilla muscorum (Linnaeus, 1758) Widespread Column
Vertigo elatior Sterki, 1894 Tapered Vertigo
Vertigo ventricosa (E. S. Morse, 1865) Five-tooth Vertigo
Vallonia pulchella (Muller, 1774) Iroquois Vallonia
Punctum minutissimum (I. Lea, 1841) Small Spot
Catinella vermeta (Say, 1829) Suboval Ambersnail
Nesovitrea electrina (Gould, 1841) Amber Glass
Zonitoides nitidus (Muller, 1774) Black Gloss
***Oxychilus cellarius* (Muller, 1774) Cellar Glass-snail**

USA: Vermont, Bennington Co. 300 m E Barnumville, 2.0 mi NE Manchester Center. VT 11, **SE** bridge approach, well-drained embankment vegetated with lawn grasses above L bank Batten Kill. Harry G. Lee! 19 September, 2009.
Fossaria species 3
Carychium exiguum (Say, 1822) Obese Thorn 1
Cochlicopa lubrica (Muller, 1774) Glossy Pillar 41
Pupilla muscorum (Linnaeus, 1758) Widespread Column 89
Vertigo elatior Sterki, 1894 Tapered Vertigo 1
Vertigo ovata Say, 1822 Ovate Vertigo 1
Vertigo pygmaea (Draparnaud, 1801) Crested Vertigo 18

Vallonia costata (Muller, 1774) Costate Vallonia 178
Vallonia excentrica Sterki, 1893 Iroquois Vallonia 101
Vallonia pulchella (Muller, 1774) Lovely Vallonia 7
Catinella vermeta (Say, 1829) Suboval Ambersnail 2
Nesovitrea electrina (Gould, 1841) Amber Glass 78
Zonitoides nitidus (Muller, 1774) Black Gloss 1
***Oxychilus cellarius* (Mller, 1774) Cellar Glass-snail** 6

USA: Vermont, Bennington Co. 300 m E Barnumville, 2.0 mi NE Manchester Ctr. VT 11, **SW** bridge abutment and adjacent well-drained embankment vegetated with tall weeds and shrubs above R bank Batten Kill. H. Lee! 19 September, 2009.
Cochlicopa lubrica (Muller, 1774) Glossy Pillar 8
Gastrocopta tappaniana (C. B. Adams, 1841) White Snaggletooth 1
Pupilla muscorum (Linnaeus, 1758) Widespread Column 8
Vertigo pygmaea (Draparnaud, 1801) Crested Vertigo 4
Vallonia costata (Muller, 1774) Costate Vallonia 25
Vallonia excentrica Sterki, 1893 Iroquois Vallonia 1
***P. pygmaeum* (Draparnaud, 1801)** 4
***Discus rotundatus* (Muller 1774) Garden Disc Snail** 58
Nesovitrea electrina (Gould, 1841) Amber Glass 3
***Oxychilus cellarius* (Muller, 1774) Cellar Glass-snail** 20

USA: Vermont, Bennington Co., 1.0 mi N Manchester Center, 70 m SW VT 7A, just NW North Road. Low, wet grassy area at edge of pasture. H. Lee! 20 September, 2009.
***Arion fasciatus* (Nilsson, 1823) Orange-banded Arion** 12
Note the six records for the four non-native species in **boldface a**bove. Of these, I had taken, but not reported, *Arion fasciatus* and *Oxychilus cellarius* in Bennington Vo., VT previously.

USA: Vermont, Bennington Co. Mt. Aeolus, upper quarry east flank. Leaf litter at base of north-facing marble scarp. H. Lee! 21 September, 2009.
Cochlicopa morseana (Doherty, 1878) Appalachian Pillar 1
Columella simplex (Gould, 1841) Toothless Column 1
Gastrocopta pentodon (Say, 1822)Comb Snaggletooth 15
Vertigo bollesiana (Morse, 1865) Delicate Vertigo 3
***Strobilops labyrinthicus* (Say, 1817) Maze Pinecone 2**
Anguispira alternata (Say, 1817) Flamed Tigersnail 3
Discus catskillensis (Pilsbry, 1896) Angular Disk 12
Guppya sterkii Dall, 1888) Tiny Granule 3
Striatura exigua (Stimpson, 1850) Ribbed Striate 3
Striatura ferrea E. S. Morse, 1864 Black Striate 8
Striatura milium (E. S. Morse, 1859) Fine-ribbed Striate 1
Zonitoides arboreus (Say, 1817) Quick Gloss 5
Vertigo gouldii (A. Binney, 1843) Variable Vertigo 24
Punctum minutissimum (I. Lea, 1841) Small Spot 72
Euconulus fulvus (Muller, 1774) Brown Hive 24
Euconulus polygyratus (Pilsbry, 1899) Fat Hive 13
Nesovitrea binneyana (E. S. Morse, 1864) Blue Glass 8
Nesovitrea electrina (Gould, 1841) Amber Glass 5
Boldface indicates new Co. record

Cumulative account of all known Bennington Co., VT native land snails as 1 March, 2010
[year first collected by author; first publication of record]

Carychium exile H. C. Lea, 1842 Ice Thorn [2003; 2004a]
Carychium exiguum (Say, 1822) Obese Thorn [1961; 1985]
Cochlicopa lubrica (Muller, 1774) Glossy Pillar [1961; 1985]
    Cochlicopa morseana (Doherty, 1878) Appalachian Pillar [2003; 2004a]
    Columella simplex (Gould, 1841) Toothless Column [2003; 2004a]
Gastrocopta armifera (Say, 1821) Armed Snaggletooth [1961; 1985]
Gastrocopta contracta (Say, 1822) Bottleneck Snaggletooth [1961; 1985]
Gastrocopta corticaria (Say, 1817) Bark Snaggletooth [2006; 2008a]

Gastrocopta pentodon (Say, 1822) Comb Snaggletooth [1961; 1985]
Gastrocopta tappaniana (C. B. Adams, 1841) White Snaggletooth [2005; 2008a]
Pupilla muscorum (Linnaeus, 1758) Widespread Column [2007; 2008b]
Pupoides albilabris (C. B. Adams, 1841) White-lip Dagger [1961; 1985]
Vertigo bollesiana (Morse, 1865) Delicate Vertigo ["2008;" 2008c]
Vertigo elatior Sterki, 1894 Tapered Vertigo [2005; 2008a]
Vertigo gouldii (A. Binney, 1843) Variable Vertigo [2003; 2004a]
Vertigo ovata Say, 1822 Ovate Vertigo [1961; 1985]
Vertigo pygmaea Sterki, 1894 Crested Vertigo [2007; 2008b]
Vertigo ventricosa (E. S. Morse, 1865) Five-tooth Vertigo [2003; 2004a]
Vallonia costata (Muller, 1774) Costate Vallonia [2004; 2004b]
Vallonia excentrica Sterki, 1893 Iroquois Vallonia [2004; 2004b]
Vallonia pulchella (Muller, 1774) Lovely Vallonia [2005; 2008a]
Strobilops labyrinthicus (Say, 1817) Maze Pinecone [2009; 2010]
Haplotrema concavum (Say, 1821) Gray-foot Lancetooth [1961; 1985]
Punctum minutissimum (I. Lea, 1841) Small Spot [1961; 1985]
Helicodiscus parallelus (Say, 1817) Compound Coil [1961; 1985]
Helicodiscus shimeki Hubricht, 1962 Temperate Coil [2003; 2004a]
Anguispira alternata (Say, 1817) Flamed Tigersnail [1961; 1985]
Discus catskillensis (Pilsbry, 1896) Angular Disk [1961; 1985]
Discus whitneyi (Newcomb, 1864) Forest Disc [2005; 2008]
Catinella vermeta (Say, 1829) Suboval Ambersnail [1961; 1985]
Novisuccinea ovalis (Say, 1817) Oval Ambersnail [2003; 2004a]
Oxyloma retusum (I. Lea, 1834) Blunt Ambersnail [2001; 1985]
Euconulus alderi (Gray, 1840) Shiny Hive; first record from New England! ["2008;" 2008c]
Euconulus fulvus (Muller, 1774) Brown Hive [1961; 1985]
Euconulus polygyratus (Pilsbry, 1899) Fat Hive ["2008;" 2008c]
Guppya sterkii Dall, 1888) Tiny Granule; first record from New England! [2005; 2008a]
Glyphyalinia indentata (Say, 1823) Carved Glyph [1961; 1985]
Glyphyalinia rhoadsi (Pilsbry, 1889) Sculpted Glyph [2005; 2008a]
Glyphyalinia wheatleyi (Bland, 1883) Bright Glyph [2005; 2008a]
Hawaiia minuscula (A. Binney, 1841) Minute Gem [1961; 1985]
Mesomphix cupreus (Rafinesque, 1831) Copper Button [1961; 1985]
Mesomphix inornatus (Say, 1821) Plain Button [2003; 2004a]
Nesovitrea binneyana (E. S. Morse, 1864) Blue Glass [1965; 2004a]
Nesovitrea electrina (Gould, 1841) Amber Glass [1961; 1985]
Paravitrea multidentata (A. Binney, 1840) Dentate Supercoil [2003; 2004a]
Striatura exigua (Stimpson, 1850) Ribbed Striate [1961; 1985]
Striatura ferrea E. S. Morse, 1864 Black Striate [1961; 1985]
Striatura milium (E. S. Morse, 1859) Fine-ribbed Striate [1961; 1985]
Zonitoides arboreus (Say, 1817) Quick Gloss [1961; 1985]
Zonitoides nitidus (Muller, 1774) Black Gloss [2001; 2004a]
Vitrina angelicae Beck, 1837 Eastern Glass-snail [1965; 2004a]
Appalachina sayana (Pilsbry, 1906) Spike-lip Crater [1961; 1985]
Euchemotrema fraternum (Say, 1821) Upland Pillsnail [1961; 1985]
Neohelix albolabris (Say, 1817) Whitelip [1961; 1985]
Triodopsis tridentata (Say, 1817) Northern Threetooth [2003; 1985]
Xolotrema denotatum (Ferussac, 1821) Velvet Wedge [2003; 2004a]
56 species; 29 new county records, of which 13 are new state records [indented; and two of these 13 New England records as noted] vs. Hubricht (1985).

Native land snail species reported from VT by Hubricht (1985) but not found in Bennington Co. by the author as of 1 March, 2010 (six of 49 reported)
Carychium exile canadense G. H. Clapp, 1906
Cochlicopa lubricella (Porro, 1838) Thin Pillar
Cochlicopa nitens (Gallenstein, 1848) Robust Pillar
Vertigo milium (Gould, 1840) Blade Vertigo
Zoogenetes harpa (Say, 1824) Boreal Top
Neohelix dentifera (A. Binney, 1837) Bigtooth Whitelip*
* Collected by the author in nearby Cheshire Co., NH and Albany Co., NY.

Adding the two lists above, we get a hypothetical Bennington Co. fauna of 62 native species, similar in composition

and only 25% lower in biodiversity than that reported for 22 counties in NE Wisconsin and the contiguous SE Upper Peninsula of Michigan (Nekola, 2004: 82 spp.). The latter region, while much larger in area and varied in ecosystems sampled, lies on roughly the same latitude despite being some 750 miles west. The Bennington Co. tally, even without the hypothetical addenda, closely approximates the inventories of two more southerly US counties closely- and similarly-studied by the author: Duval in FL (64 species) and Nelson in KY (60 species) [Lee, unpublished; based on analysis and addenda, respectively, to <http://www.jaxshells.org/checklis.htm> and <http://www.jaxshells.org/blitz08.htm>, respectively].