Historical Contributions

Banisteria, Number 37, pages 44-46 © 2011 Virginia Natural History Society

T. A. Conrad's Calfpasture River Mussels (Bivalvia: Unionoida: Unionidae)

Richard L. Hoffman

Virginia Museum of Natural History 21 Starling Avenue Martinsville, Virginia 24112

ABSTRACT

The circumstances leading to T. A. Conrad's visit to Virginia in 1845, which resulted in historically important freshwater mussel collections, are reviewed in the context of the occupation of his host, Constant Newkirk, in iron smelting activities near Goshen, Virginia.

Key words: T. A. Conrad, Virginia, Calfpasture River, Rockbridge County, mollusks.

Along with his contemporaries C. S. Rafinesque, Thomas Say, and Isaac Lea, Timothy A. Conrad (Fig. 1) described a substantial number of the freshwater mollusks known to occur in eastern North America, and is the only one of that coterie known to have collected them in Virginia.

Conrad (1803-1877) was born in New Jersey and spent most of his life in Philadelphia, where he was actively associated with the Academy of Natural Sciences. Although he was very literate and a competent poet, his retiring, almost reclusive personality did not inspire much biographical information in the writings of his colleagues.

During the summer of 1845, Conrad was the guest of his friend Constant W. Newkirk, proprietor of an iron furnace near Goshen, on the headwaters of the Maury River in Rockbridge County, Virginia. While there, Conrad "... paid some attention to the Naiades and univalves of the vicinity" and in the following year (1846) published a short account of his discoveries as well as his impressions of that region. Since the stream investigated by Conrad was later apparently sterilized by chemical contamination, his observations provide a glimpse of the original freshwater mussel (unionid) diversity of the upper Maury River, now lost beyond hope of recovery. His short paper is printed below in its entirety to provide both the factual information and the opportunity to enjoy Conrad's picturesque writing style.

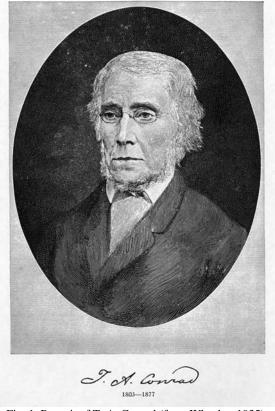


Fig. 1. Portrait of T. A. Conrad (from Wheeler, 1935).

Those familiar with the old literature on unionids may recall an earlier cameo appearance of Constant Newkirk, mentioned by Conrad (1836) as collector of the types of Unio subplana in the North River at Lexington, Virginia. Newkirk came from a Philadelphia (ex New Jersey) family, and presumably had met Conrad in that city prior to 1835 when he was a student at the then-Washington Academy, and was inspired to procure local bivalve specimens for him¹. He was the nephew of Eliza Newkirk Weaver, the wife of William Weaver, a well-known owner and operator of several iron furnaces in Rockbridge County. One of these was located on Buffalo Creek, and its name persists on many modern maps as Buffalo Forge, just north of Buena Vista. Others were founded on the upper North River (there called Calfpasture), in the intermontane valley where the main stream is confluent with the Little Calfpasture. One of these, called Bath Iron Works, was under Newkirk's management from 1843 until 1847, when he gave up that (perhaps onerous) responsibility and returned to Philadelphia. So Conrad's visit in 1845 was propitious: without his discoveries there the Calfpasture would surely not have come to the attention of Conrad's distinguished successor and facile princeps of American unionid studies, Arnold E. Ortmann.

Some six decades after Conrad's exploration, in 1912, Ortmann collected in the Calfpasture at Conrad's locality and farther downstream in the North River near its confluence with the James². Without specifying in which part of the river he found which species, Ortmann (1913) reported eight species of unionids, two of which (*Strophitus undulatus* and *Lasmigona subviridis*) were not mentioned by Conrad, but he failed to recover two others (*Alasmidonta varicosa* and *Pyganodon cataracta*) listed by Conrad. Conceding these exceptions as likely residents of the Calfpasture, Ortmann thus accounted ten unionids

as native to the river, a substantial number for an upland stream in the Altlantic drainage. According to the map provided in Weaver's biography (Dew, 1994), Bath Iron Works was situated near the confluence of Guys Run, at the present Route 601 bridge. Whether Ortmann was able to localize his efforts that precisely is unknown.

Another eminent malacologist was drawn to Conrad's site. Joseph P. E. Morrison was in the river on 24 July 1937, 25 years after Ortmann's visit, and obtained specimens of *Villosa constricta* [USNM]. His label specifies "upper end of Goshen Pass" which would be about two miles downstream from the Bath Iron Works site.

On 10 July 1988, I waded the Calfpasture at a point just below the Brattons Run confluence, some two miles upstream of the Bath site. In over an hour of visual and tactile search, I could not find a single unionid, even a dead valve. Although personal surveys conducted subsequently in the river at Goshen have been consistently negative, Michael and Elizabeth Lipford found three male and one female living specimens of *Villosa constricta* (VMNH 289) further upstream: near the intersection of Routes 600 and 614, on 14 September 1989 (ca. 4 miles north of Goshen, in Rockbridge County).

Desiring a more recent impression, I returned to the Calfpasture on 13 October 2008, and waded for about an hour in a reach of the river somewhat closer to the iron works site. My findings were curiously contradictory: the stream bed looked clean and healthy, with numerous colonies of an Elodea (?canadensis) and a Potamogeton (?nodosus). Many small fish (apparently Rhinichthys atratulus) were seen, as well as a large gravel mound piled up earlier in the season by spawning cyprinids. Mollusks were represented by astronomical numbers of a pleurocerid snail (Mudalia sp.), all of which were either immature or depauperate — less than 8 mm in height. With respect to bivalves, however, this search was essentially a rerun of 1988: no trace of unionids could be found. A new element however was detected: several small, separated, worn valves of the exotic Asian clam (Corbicula fluminea), none more than about 10 mm long, perhaps remnants of a much earlier, unsuccessful, invasion.

A factor present in both 1988 and 2008 is a wood processing plant located at the intersection of State Route 39 with Route 780, two miles west of Goshen. The primary product appears to be railroad cross-ties, which requires infusion of the wood with creosote, an infamous agent of mass destruction. Although the diversity of aquatic organisms immediately downstream, in both years, did not reflect any recent contamination, in a less regulated earlier time, creosote leakages could easily have sterilized the Calfpasture/Maury River all the way to its

¹A compilation of the alumni and faculty during the 1800s filed in the Special Documents section of the Leyburn Library at Washington & Lee University registers a "Constance W. Newkirk" as a student in 1835-1836. Despite the slight difference in spelling, the singularity of the name itself is assurance of the identity of the individual.

²The nomenclature of this stream is a little ambiguous. The main stem was called the North River as far as the west portal of Goshen Pass where, at its confluence with the Little Calfpasture, the name changed arbitrarily to Calfpasture, thence to its source near Deerfield, some 30 miles to the north in Augusta County. In an attempt to humanize this already well-named stream, its name was changed from North to Maury to commemorate the oceanographer Mathew Fontaine Maury (who was said to be so fond of Goshen Pass that he requested to be driven through it, postmortem, on the way to his interment).

confluence with the James. Recolonization from feeder stream populations rarely reconstitutes the original mussel fauna in such situations.

Files of the Goshen Public Library contain extensive historical materials relating to the former iron industry of that region. Several sources placed the Bath Iron Works on the Calfpasture about half a mile upstream of its confluence with the Little Calfpasture. One old map even indicated the exact location as being a few hundred yards west of the present State Route 39 bridge over Guys Run. I walked over the site and found no trace of any former activity. The Bath Iron Works site was abandoned and demolished in 1850, and more recently, during improvement of State Route 39 by the Virginia Department of Transportation, even the foundations were broken up and utilized in the new construction.

Although there appear to be no extant populations of unionids in the entire length of the river downstream of Goshen, a thriving, albeit very localized, community consisting of several unionid species has been found near the headwaters of Mill Creek (D. H. Stansbery and W. J. Clench, unpub. data; specimens collected 2 October 1970 are deposited in the Ohio State University collection; recent observations at same site by M. A. McGregor and B. T. Watson, pers. comm.), a major tributary confluent with the Calfpasture at Goshen, so further exploration and protection of the region is certainly desirable.

While the location of Newkirk's residence, vis-à-vis the furnace, is unknown (and could even be as distant as Goshen itself), it seems probable that a view upstream from the Route 601 bridge would show one of the very reaches of the Calfpasture investigated by Conrad. He also mentioned collecting at millponds, of which there are none presently extant in that vicinity, although tautologically one obviously must have existed on Mill Creek itself, and perhaps others were on the Little Calfpasture.

Ortmann's mussel collections are in the Carnegie Museum, and perhaps Conrad's specimens may exist in the Academy of Natural Sciences of Philadelphia, although I did not find any during a visit there in 1989.

ACKNOWLEDGEMENTS

I am indebted to the staff of the Goshen Public Library and of the Leyburn Library at Washington & Lee University for access to historical resources, to Jay Gilliam (Greensville, Virginia) for loan of Charles Dew's book on Rockbridge County iron furnaces, to Dr. Ellen Strong for help in locating material in the National Museum of Natural History collections, and to Dr. Lauck W. Ward for bringing Wheeler's biography of Conrad to my attention.

LITERATURE CITED

Conrad, T. A. 1836-1840. Monography of the Family Unionidae, or Naiades of Lamarck, (Freshwater Bivalve Shells) of North America. J. Dobson, Philadelphia. 118 pp.

Conrad, T. A. 1846. Notices of fresh water shells, &c., of Rockbridge County, Virginia. American Journal of Science, series 2, 1(3): 405-407.

Dew, C. B. 1994. Bond of Iron - Master and Slave at Buffalo Forge. W. W. Norton, New York. 429 pp.

Ortmann, A. E. 1913. The Alleghanian Divide and its influence upon the freshwater fauna. Proceedings of the American Philosophical Society 52: 287-390.

Wheeler, H. E. 1935. Timothy A. Conrad. Bulletins of American Paleontology 77: 1-157.

Historical Contributions

Originally published in: *American Journal of Science*, Second Series, Vol. 1, No. 3, May 1846, pages 405-407.

Art. IX. — Notices of Fresh Water Shells, &c, of Rockbridge County, Virginia; by T. A. CONRAD.

Last summer, while on a visit to my friend, Constant W. Newkirk, Esq., in Rockbridge County, Virginia, I paid some attention to the Naiades and univalves of the vicinity. The river here is called the "Calf Pasture," and is a small stream flowing through a mountain gorge. It is a branch of North river, which latter unites with James river near the Blue Mountain chain. It may not be uninteresting to conchologists to learn that the second species of Unio known to have spines is abundant in these rivers. I collected a great variety of them, and observed some peculiarities that may not be unworthy of notice. I was indebted to muskrats for all the specimens having spines, except some very young shells which I took alive; and thirty or forty occurred in one spot, in company with the very young of U. lanceolatus. No where else, after a diligent search, could I find the young of either species. On the muddy shore of the river where muskrats resort, especially about the still water of the dams. I procured many specimens of Unio collinus, with spines, which I found to vary in the number and position of these spines; some would have a rather long spine on one valve only, others a spine on each valve; others two short ones on the umbo, ranged in the direction of the shell's length; others with three spines, and some with two ranged in a line from beak to base. One specimen has a spine just below the umbo, and near the base are two thick ones in a line with the shell's length. In very rocky places where the water is rapid I found some living specimens of this species, all destitute of spines, which indeed is the condition of a great majority of the collinus. It is worthy of observation that this spinous character prevails most among the specimens in still water where there is a muddy bottom, and least of all where the water is most rapid. On the rocks live vast numbers of Anculosa dilatata, a very variable univalve, and this, with a few specimens of Melania virginica, Ancylus rivularis, Planorbis parvus and Paludina decisa, were the only univalves I noticed. The Unio lanceolatus is abundant, and may be found alive among the rocks and stones. Great numbers always occur, with the animals eaten out, about the muskrat haunts and holes in the banks. Unio subplanus, Con., is not uncommon in similar situations, and U. constrictus, Con., is still

more abundant. The latter species and U. purpureus of Say, are the two species most commonly obtained alive.

It is curious to observe the partiality of the muskrat for particular haunts, as is made evident by heaps of shells, the relics of their nightly repasts. A particular rock near shore, surrounded by water, will be seen covered with shells, and on one side of the rock a deep stratum of them in the mud, while other rocks near, apparently equally well fitted for the festive board, are never furnished with a single shell. I have repeatedly visited one of their favorite rocks in a morning, and collected fine specimens which had been fished up and the animal eaten over night. But although Unio collinus was common among them, and the water was shallow, I was unable to find the living specimens whose haunts seem to be so well known to the Naiad-loving quadruped.

Between the different mountain spurs in this wild region, there are beautiful valleys with level and fertile land. The mountains are quite steep and composed of non-fossiliferous rocks of the carboniferous system, but coal does not occur. Iron ore is excellent and abundant, and within a short distance of Mr. Newkirk's furnace. The climate here is about the same as that of the latitude of Philadelphia, the elevation of the land being equivalent to the difference of latitude. But in these wooded and mountain regions the sudden fall of temperature at night, is often very great, particularly after rain, and therefore ill suited to an invalid's constitution.

The shells of Calf Pasture river are comprised in the following list: —

Bivalves.
Unio collinus, Con.
U. purpureus, Say.
U. constrictus, Con.
U. subplanus, Con.
U. lanceolatus, Lea.
Alasmodon undulata Say.
A. marginata, Say.
Anodon cataracta, Say.
A. marginata ? Say.

Univalves.
Planorbis parvus, Say.
Ancylus rivularis, Say.
Paludina decisa, Say.
Anculosa dilatata, Con.
Melania virginica, Say.