

Review

Not peer-reviewed version

Herbert D. Athearn and the Museum of Fluvial Mollusks

[Arthur E. Bogan](#)*, Jamie M. Smith, Cynthia M. Bogan

Posted Date: 17 March 2025

doi: 10.20944/preprints202503.1155.v1

Keywords: Unionidae; Margaritiferidae; Sphaeriidae; freshwater mollusks; Pleuroceridae



Preprints.org is a free multidisciplinary platform providing preprint service that is dedicated to making early versions of research outputs permanently available and citable. Preprints posted at Preprints.org appear in Web of Science, Crossref, Google Scholar, Scilit, Europe PMC.

Copyright: This open access article is published under a Creative Commons CC BY 4.0 license, which permit the free download, distribution, and reuse, provided that the author and preprint are cited in any reuse.

Review

Herbert D. Athearn and the Museum of Fluvatile Mollusks

Arthur E. Bogan *, Jamie M. Smith and Cynthia M. Bogan

North Carolina Museum of Natural Sciences, 11 West Jones Street, Raleigh, NC 27601, USA

* Correspondence: Arthur.Bogan@naturalsciences.org

Abstract: Herbert D. Athearn (1923-2011) was an avid student of freshwater mollusks. He named his private shell collection “The Museum of Fluvatile Mollusks,” which was meticulously organized at his residence. This collection was curated at current museum standards with detailed labels, all lots with catalog numbers, and all unionoid valves with catalog numbers in india ink. Specimens span collecting dates between 1850 and 2005, with 23,344 cataloged lots containing over 3,000 lots of imperiled and extinct taxa. Many lots contain growth series from the smallest juveniles to the largest specimens seen. He traded extensively with collectors worldwide, obtaining specimens from 84 countries. This collection was donated to the North Carolina Museum of Natural Sciences in 2007. To date, 64 percent of this collection has been databased, totaling 583,383 specimens. The collection consists of bivalves, primarily Unionidae, Margaritiferidae, and Sphaeriidae, as well as gastropods. There are 72 families represented, with the greatest abundance found in the freshwater Pleuroceridae. The Athearn collection donation included his correspondence, his library, field notes, and USGS topographic maps with marked field localities.

Keywords: Unionidae; Margaritiferidae; Sphaeriidae; freshwater mollusks; Pleuroceridae

1. Introduction

Shell collecting has been around for over 10,000 years; the first documented collector was the Roman Emperor Caligula, who thought he had captured the ocean by collecting shells. Something in humans drives us to know more about what is out there, and there is this inner need to bring something back to remind us of our journey. The role of the non-professional malacologist or shell collector has long been recognized as necessary to the study of mollusks. These individuals have a deep appreciation for mollusks, and their collections reflect a broad spectrum of interests, ranging from general mollusks to more specialized focuses on specific genera, families, or mollusks from limited geographic locales. As an example, William J. Clench, former Curator of Mollusks at the Museum of Comparative Zoology (MCZ) at Harvard University, observed that MCZ’s mollusk collection was started by John G. Anthony, an amateur who worked as an accountant [1]. Clench [1] remarked that nearly 50 percent of the accessions of the MCZ mollusk collection were the results of amateur collections. He also remarked that many major museum mollusk collections are based on or contain significant contributions from amateur collections. The assessment of the recent mollusk collections of North America reported by Solem [2] who observed:

“one unusual feature of malacological work is the great number and size of private collections and the large degree to which systematic and faunistic work on mollusks is dependent upon collecting efforts and publications by “non-professionals,” people not employed as malacologists and university biologists. Probably 85% of the mollusks in major institutional collections today are materials collected by amateurs rather than professional biologists.”

Solem [2] summarized the locations, size, and resources of significant mollusks collections and included a section on private collections of recent mollusks. He enumerated 12 extensive collections of the time, including Leslie Hubricht’s collection of 25,000 lots and 300,000 specimens of land snails

(now at the Field Museum of Natural History, Chicago, IL) and the H.D. Athearn freshwater mollusks of eastern North America with 13,000 lots and 328,000 specimens.

2. Materials and Methods: Herbert D. Athearn's Background

Herbert D. Athearn (1923-2011) was a passionate researcher of freshwater mollusks and a distinguished private shell collector, contributing significantly to the appreciation and understanding of these remarkable organisms [3]. He was born in Fall River, Massachusetts, U.S.A. Athearn began keeping field notes on his freshwater collecting in 1940, interrupted by his service during World War II. After the war, Athearn returned home and, for seven years, volunteered with Dr. William J. Clench in the Mollusk Section of the Museum of Comparative Zoology, Harvard University, learning the basics of museum curation. In 1955, he and his family moved to Cleveland, Tennessee, where he spent the rest of his life working primarily for the U.S. Postal Service. Most of his spare time, weekends, and holidays were spent either collecting freshwater mollusks across the southeastern United States or curating his collection. He made two trips to Mexico and worked with Arthur H. Clark, collecting freshwater mollusks across Canada. His collection of Sphaeriids is noteworthy because many specimens were collected and/or identified by the late Reverend H.B. Herrington, a recognized authority in this group. Athearn remarked on field notes that the exactness of collection localities should be based on distance from the post office in town, not the city limits, which change with time. He reported ecological conditions for each site visited, noting if no mollusks were collected and why he thought they were absent. Athearn collected USGS 7.5-minute quadrangle topographic maps for the areas he was collecting, marking the areas he collected as highly beneficial in finding the more challenging locals. Athearn was collecting when few malacologists were active and during significant dam construction in the southeastern United States. When a dam was completed, he would have his daughter, Marjorie, outline the high-water level of the reservoir and then collect from the dam upstream to the top of the reservoir.

Athearn was awarded one of the first two Freshwater Mollusk Conservation Society Willam J. Clench Memorial Awards in 2001 (Figure 1). This award is for "singular accomplishments and long-term contributions that have advanced the natural history and understanding of freshwater mollusks." Athearn published 16 papers in 6 different journals. (1952-2004) [3]. He described three new species of southeastern United States Unionidae. He was honored with four eponyms: two Pleuroceridae, one Physidae, and one Unionidae. His cataloged collection contained specimens of freshwater bivalves and gastropods in 23,344 lots. The freshwater bivalves are all dry, mostly live collected. The gastropods were preserved in methyl alcohol and allowed to dry, so many still have dried tissue that might be used in current genetic research. The cataloged entries began in July 1940 and stopped on 27 June 2000.



Figure 1. Herbert D. Athearn in front of his home with the Freshwater Mollusk Conservation Society Willam J. Clench Memorial Award, 2001.

3. Results: Museum of Fluvatile Mollusks

Athearn’s collection, The Museum of Fluvatile Mollusks (MFM), was well curated, containing specimens collected between 1850 and 2005. The Museum was contained in his house in Cleveland, Tennessee (Figure 2). The museum cabinets occupied much of the house and were custom-built into it. (Figure 3). The cabinets and drawers were styled after the old cabinets in the Mollusk Collection at the MCZ (Figures 4, 5).

The first specimen cataloged was one *Anodonta implicata* Say, 1829 [now *Utterbackiana implicata*]. The first gift to the MFM was an *Elliptio complanata* from R.I. Johnson in December 1940.



Figure 2. View of the Athearn home and the Museum of Fluvatile Mollusks.

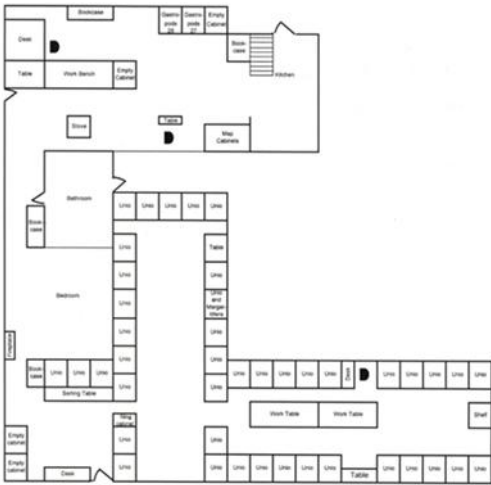


Figure 3. The floor plan of the H.D. Athearn home and cabinets in the Museum of Fluvatile Mollusks, Cleveland, Tennessee.



Figure 4. Built-in mollusk cabinets in the Museum of Fluviatle Mollusks.



Figure 5. Drawers of freshwater mussels in the built-in cabinets in the Museum of Fluviatle Mollusks.

The handwritten museum catalog entries extended across two adjoining pages, detailing his collection of 23,344 lots. The last lot Athearn cataloged was on 27 June 2000. He used printed labels first with “H.D. Athearn Coll. Taunton Mass” and later printed labels with “Museum of Fluviatle Mollusks” across the top. Athearn then hand-wrote the identification, date collected, collectors, and locality on them.

4. Discussion

This collection contains over 3,000 lots of imperiled and extinct taxa. He traded extensively with collectors worldwide, obtaining specimens from 84 countries, and his collection contained 7,238 localities worldwide (Figure 6).

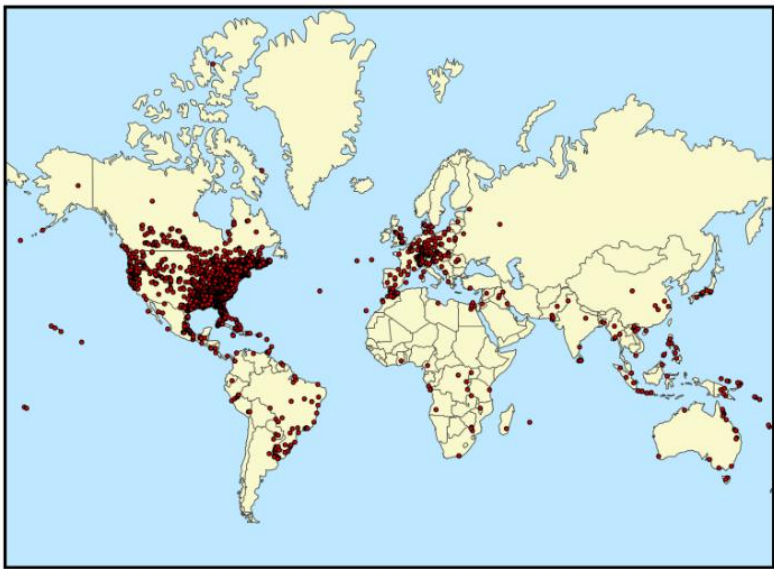


Figure 6. Map of the distribution of cataloged localities contained in the Museum of Fluviatle Mollusks.

In 2007, the Museum of Fluviatle Mollusks collection was donated by Athearn to the North Carolina Museum of Natural Sciences [4–6]. The total databased portion represents 64% of the cataloged collection, totaling 583,383 specimens (Tables 1, 2, 3; Supplemental Table 1). The collection contains bivalves from 16 families, primarily in the families Unionidae, Margaritiferidae, and Sphaeriidae (Table1, Supplemental Table 1, and gastropods (Table 2), represented by 56 families, with the most abundant being the freshwater Pleuroceridae (Table 2). Taxa from both Terrestrial and

brackish and marine environments were also included in the collection (Tables 1, 2). The databased portion of the Museum of Fluviatile Mollusks rerpresented by freshwater mollusks is 99.4%.

The Museum of Fluviatile Mollusks also contained 52 type lots. The collection is focused on the Eastern United States, Canada, and some from Mexico, as well as other countries for a total of 58 countries represented in the bivalve section and 62 countries represented in the gastropod section for a total of 84 countries represented in the Museum of Fluviatile Mollusks.

Table 1. Summary of the currently databased bivalve lots in the Museum of Fluviatile Mollusks.

Freshwater Bivalves	Families	Genera	Number Species	Number Lots	Total Specimens
Cyrenidae	1	2	2	243	4913
Dreissenidae	1	2	2	13	179
Hyriidae	1	11	25	50	312
Iridinidae	1	2	4	5	22
Margaritiferidae	1	2	5	34	334
Sphaeriidae	1	5	48	1369	55180
Unionidae	1	83	305	3777	44592
Total Freshwater Bivalves	7	107	391	5491	99772
Marine/Brackish Water Bivalves	Families	Genera	Number Species	Number Lots	Total Specimens
Arcidae	1	2	2	2	8
Mactridae	1	2	3	16	99
Myidae	1	1	2	2	23
Mytilidae	1	2	2	3	46
Pholadidae	1	1	1	1	3
Psammobiidae	1	1	1	1	6
Semelidae	1	1	1	1	2
Tellinidae	1	1	2	4	38
Veneridae	1	2	4	4	24
Total Marine Bivalves	9	13	18	34	250
Summary Bivalves	families	Genera	Number species	Number Lots	Total Specimens
Total Freshwater Bivalves	7	107	391	5491	99,772
Total Marine/Brackish Bivalves	9	13	18	34	250
Total Bivalves	16	120	409	5525	100,022

Table 2. Summary of the databased gastropod lots in the Museum of Fluviatile Mollusks.

Freshwater Gastropods							
Family	Family	Number Genera	Number Species	Number Lots	Total Specimens	Number Countries	Number States (USA)
Amnicolidae	1	5	6	215	13669	7	31
Ampullariidae	1	7	22	143	594	17	1
Bithyniidae	1	1	1	22	1241	2	3
Chilinae	1	1	1	2	13	2	0
Cochliopidae	1	4	5	26	3521	2	4
Hydrobiidae	1	20	35	106	6293	10	24
Lithoglyphidae	1	6	29	118	12348	3	17
Lymnaeidae	1	11	54	792	17467	10	44
Melanopsidae	1	1	12	15	150	3	0
Pachychilidae	1	6	15	21	535	10	0
Paludomidae	1	3	3	3	14	3	0
Physidae	1	6	35	1229	26718	7	46
Planorbidae	1	23	65	1311	21579	17	44
Pleuroceridae	1	7	157	4030	351718	3	29
Pomatiopsidae	1	2	5	12	107	2	5
Semisulcospiridae	1	1	6	35	751	1	3
Tateidae	1	1	1	4	49	3	0
Thiaridae	1	10	22	45	732	18	2
Valvatidae	1	1	9	103	4178	2	18
Viviparidae	1	9	35	908	18481	20	34
Total Freshwater Gastropods	22	125	518	9140	480158		

Marine/ Brackish Gastroids							
Family	Family	Number Genera	Number Species	Number Lots	Total Specimens	Number Countries	Number States (USA)
Amphibolidae	1	1	1	1	2	1	0
Batillariidae	1	1	1	1	280	1	1
Cerithiidae	1	1	2	2	9	2	0
Cerithiopsidae	1	1	1	2	106	2	1
Cocculinidae	1	1	1	1	14	1	0
Ellobiidae	1	5	8	9	24	7	1
Littorinidae	1	2	2	3	41	2	1
Lottiidae	1	1	1	1	1	1	1
Nassariidae	1	2	2	3	69	1	2
Naticidae	1	1	1	1	1	1	1
Neritidae	1	10	27	45	745	18	4
Planaxidae	1	1	1	7	7	1	1
Potamididae	1	4	8	13	195	6	1
Terebridae	1	1	1	1	1	1	1
Total Marine/Brackish Gastropods	14	32	57	90	1495		

Terrestrial Gastropods							
Family	Families	Number Genera	Number Species	Number Lots	Total Specimens	Number Countries	Number States (USA)
Achatinidae	1	2	2	2	109	2	1
Camaenidae	1	6	10	13	82	4	3
Cerionidae	1	1	14	14	215	3	1
Chronidae	1	1	1	1	1	1	0
Discidae	1	2	1	3	22	2	1
Gastrodontidae	1	1	1	1	1	1	1
Haplotrematidae	1	1	2	2	3	2	0
Helicarionidae	1	1	2	2	34	1	0
Helicidae	1	2	2	3	13	2	1
Helicinidae	1	1	1	1	6	1	0
Hemisinidae	1	4	6	19	64	3	0
Hygromiidae	1	1	1	1	1	1	1
Neocyclotidae	1	1	1	1	59	1	1
Orthalicidae	1	6	11	23	139	8	4
Partulidae	1	1	1	1	9	1	1
Polygyridae	1	7	8	10	67	2	6
Solaropsidae	1	1	1	1	4	1	0
Spiraxidae	1	1	1	3	6	1	2
Succineidae	1	5	20	111	816	4	26
Urocoptidae	1	1	1	1	8	1	0
Xanthonychidae	1	1	1	1	48	1	0
Zonitidae	1	1	1	1	1	1	1
Total Terrestrial Gastropods	20	48	89	215	1708		
Total Databased Gastropods	56	205	664	9445	483361		

Table 3. Summary of the bivalves and gastropods databased in the Museum of Fluvatile Mollusks to date.

Bivalves	Famiily	Number Genera	lumber Specie	Number Lots	Total Specimens
Fresahwater Bivalves	7	107	391	5,491	99,772
Marine/Brackish water Bivalves	9	13	18	34	250
Total Bivalves	16	120	409	5,525	100,022
Gastropods	Famiily	Number Genera	lumber Specie	Number Lots	Total Specimens
Total Freshwater Gastropods	22	125	518	9,140	480158
Total Marine/Brackish Gastropo	14	32	57	90	1,495
Total Terrestrial Gastropods	20	48	89	215	1708
Total Databased Gastropods	56	205	664	9,445	483361
Total Mollusks Databased	72	325	1,073	14,980	583,383

The donation of the Athearn collection included the cataloged specimens and his correspondence, a library of books, a journal, reprints, and duplicate specimens from 2000 cataloged bivalves and gastropods lots that he used for trading. The collection contained around 3,500 USGS topographic maps covering var-ious regions across the United States and Canada, along with his original field notebooks. Also included were approximately 700 field collections of freshwater mollusks made during the 1970s that were wrapped in newspapers and stored on the second floor of his house. These unprocessed collections have not been opened, washed, or identified. It is known that these collections from the eastern United States contain rare, endangered, and extinct freshwater mussels and a great variety of freshwater gastropods. We have found that one lot contained five female *Epioblasma haysiana* (Lea,1834) specimens, a species now extinct. This col-lection includes the largest known specimen of *Alasmidonta arcua* (Lea, 1838) and a growth series of *El-liptio spinosa* (Lea, 1836). These collections all have the Athearn field number with them. These field numbers are found in his field notebooks, which contain a wealth of data and observations.

Athearn’s fieldnotes and catalogs present a gold mine of information, collecting conditions, growth series, other animals observed, and some of the last specimens of some extinct species, such as the “Last Call for *Gyrotoma*” in the Coosa River. Athearn noted in his museum catalog when cataloging the collection he made in 1965

“24 shells, dry. This was the last call to collect *Apella* from a creek anywhere in the World. In a few weeks, this station was inundated by Lock 3 Reservoir. The genus does not live above this shoal. I strongly suspect it also was not found in any other creek. As the water level was high today, only species which move to the stream margin at high water were collected.” May 2, 1965.

Apella Anthony, 1843 is an invalid name based on an unknown species and was later shown to be a synonym of *Gyrotoma* Shuttleworth, 1845 in the freshwater gastropod family *Pleuroceridae*. All six recognized spe-cies of *Gyrotoma* were restricted to the Coosa River in Alabama and are considered extinct [7–9].

5. Conclusions

Digitizing the Athearn cataloged specimens is still in progress, with about 60 percent of the collection completed. Over 350 duplicate or “stock” lots of bivalves and gastropods have been reassociated with their original lots and have been incorporated into the NCSM collection, with another 800 *Unionidae* lots of “stock” lots to be reassociated. The 1970’s collections await curation and databasing. The Athearn collection, library, maps, and archives are available for study. The

databased information is available for search on the North Carolina Museum of Natural Sciences website <https://naturalsciences.org/research-collections/collections/mollusks-collection>.

Author Contributions: Conceptualization, A.E.B., J.M.S., and C.M.B.; methodology, A.E.B. and J.M.S.; software, J.M.S.; data curation, J.M.S. writing—original draft preparation, A.E.B.; writing—review and editing, A.E.B., J.M.S., and C.M.B. All authors have read and agreed to the published version of the manuscript.

Funding: This research/digitization of the Athearn Collection was funded by National Science Foundation, grant number [NSF 0844873]. A.E.B. and J.M.S. were funded by the grant “Computerization of Orphaned Aquatic Collections” – North Carolina State Museum of Natural Sciences (NCSM) with Principal Investigators W.C. Starnes and A.E. Bogan.

Data Availability Statement: The Museum of Fluvatile Mollusks will be available online on the North Carolina Museum of Natural Sciences website under the Mollusk Section. <https://naturalsciences.org/research-collections/collections/mollusks-collection>.

Acknowledgments: We thank the late Herbert D. Athearn for donating his collection to the North Carolina Museum of Natural Sciences. Marjorie and Larry Gates are thanked for their time and assistance in completing the donation of the supporting materials for this collection and discussing their recollections of the collecting associated with the development of the collection.

Conflicts of Interest: The authors declare no conflicts of interest.

References

1. Clench, W.J. The importance of the amateur. *Am. Malaco. Union, Ann. Rept.* 1957 **1958**, 23: 9–10. <https://www.biodiversitylibrary.org/item/218164#page/193/mode/1up>.
2. Solem, A. The recent mollusk collection resources of North America. *The Veliger* **1975**, 18, 222–236.
3. Bogan, A.E.; Johnson, P.D. Obituary—Herbert D. Athearn (1923–2011). *Ellipsaria* **2011**, 13(1), 31–33. <https://molluskconservation.org/PUBLICATIONS/ELLIPSARIA/EllipsariaMarch2011.pdf>.
4. Bogan, C.M.; Smith, J.M. Museum acquires extensive freshwater mollusk collection. *N.C. Naturalist* **2007**, 15(3), 13.
5. Bogan, A.E.; Smith, J.M.; Bogan C.M. The H.D. Athearn Museum of Fluvatile Mollusks, Cleveland, Tennessee. *Tentacle, The Newsletter of the IUCN/SSC Mollusc Specialist Group* **2008**, No. 16, 14–15. ISSN 0958-5079. https://www.hawaii.edu/cowielab/tentacle/tentacle_16.pdf.
6. Bogan, A.E.; Smith, J.M.; Bogan, C.M. The H.D. Athearn Museum of Fluvatile Mollusks, Cleveland, Tennessee. *Am. Malaco. Soc. Newsletter* **2008**, 39(1), 4–5. https://ams.wildapricot.org/resources/Documents/AMS%20Newsletter/AMS_nl_2008_Spring.pdf.
7. Freshwater Mollusk Conservation Society. [FMCS]. Appendix 1. The 2023 FMCS checklist of freshwater mussels (Mollusca: Bivalvia: Unionida) of the United States and Canada. Considered and approved by the Bivalve Names Subcommittee in October 2023. https://molluskconservation.org/Library/Committees/Names/Appendix_1_Bivalves_Revised_Names_List_20230928_draft.pdf.
8. Johnson, P.D.; Bogan, A.E.; Brown, K.M.; Burkhead, N.M.; Cordiero, J.R.; Garner, J.T.; Hartfield, P.D.; W. Lepitzki, D.A.; Mackie, G.L.; Pip, E.; Tarpley, T.A.; Tiemann, J.S.; Whelan, N.V.; Strong, E.E. Conservation status of freshwater gastropods of Canada and the United States. *Fisheries* **2013**, 38 (6), 247–282. <http://dx.doi.org/10.1080/03632415.2013.785396>.
9. Whelan, N.V.; Johnson, P.D.; Garner, J.T.; Garrison, N.L.; Strong, E.E. Prodigious polyphyly In Pleuroceridae (Gastropoda: Cerithioidea). *Bull. Soc. Syst. Biol.* **2022**, 1, 8419. <https://doi.org/10.18061/bssb.v1i2.8419>.

Disclaimer/Publisher’s Note: The statements, opinions and data contained in all publications are solely those of the individual author(s) and contributor(s) and not of MDPI and/or the editor(s). MDPI and/or the editor(s)

disclaim responsibility for any injury to people or property resulting from any ideas, methods, instructions or products referred to in the content.