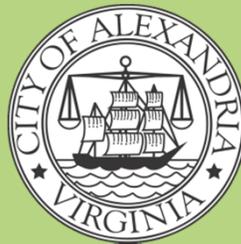


# Vanishing Flora of Washington and Vicinity: Three Centuries of Botanical Exploration in Alexandria, Virginia

Capital Science 2012 Conference

Rod Simmons, City of Alexandria Dept. Recreation, Parks, and  
Cultural Activities, Natural Resources Division



The City of Alexandria is one of the oldest cities in the eastern U.S., and was famous as Virginia's primary northern shipping port from the early 1700s to the mid-1800s when the railroad became important.



1. Howard Street Bridge - 2. Market Street - 3. Fort Lytle  
4. Fort Ellsworth - 5. Fort St. George - 6. Fort Mifflin  
7. Fort Monroe - 8. Fort Cassin - 9. Fort Mifflin  
10. Fort Mifflin - 11. Fort Mifflin - 12. Fort Mifflin

BIRDS EYE VIEW OF ALEXANDRIA, VA

Map Division  
JUN 2 1903  
Library of Congress

13. Fort Mifflin - 14. Fort Mifflin - 15. Fort Mifflin  
16. Fort Mifflin - 17. Fort Mifflin - 18. Fort Mifflin  
19. Fort Mifflin - 20. Fort Mifflin - 21. Fort Mifflin  
22. Fort Mifflin - 23. Fort Mifflin - 24. Fort Mifflin

Benjamin Banneker: A prominent early American scientist who performed the mathematical calculations for the original boundaries of Washington, D.C. He also worked from the survey team base camp at Jones Point in Alexandria on astronomical calculations (Alexandria Archaeology).

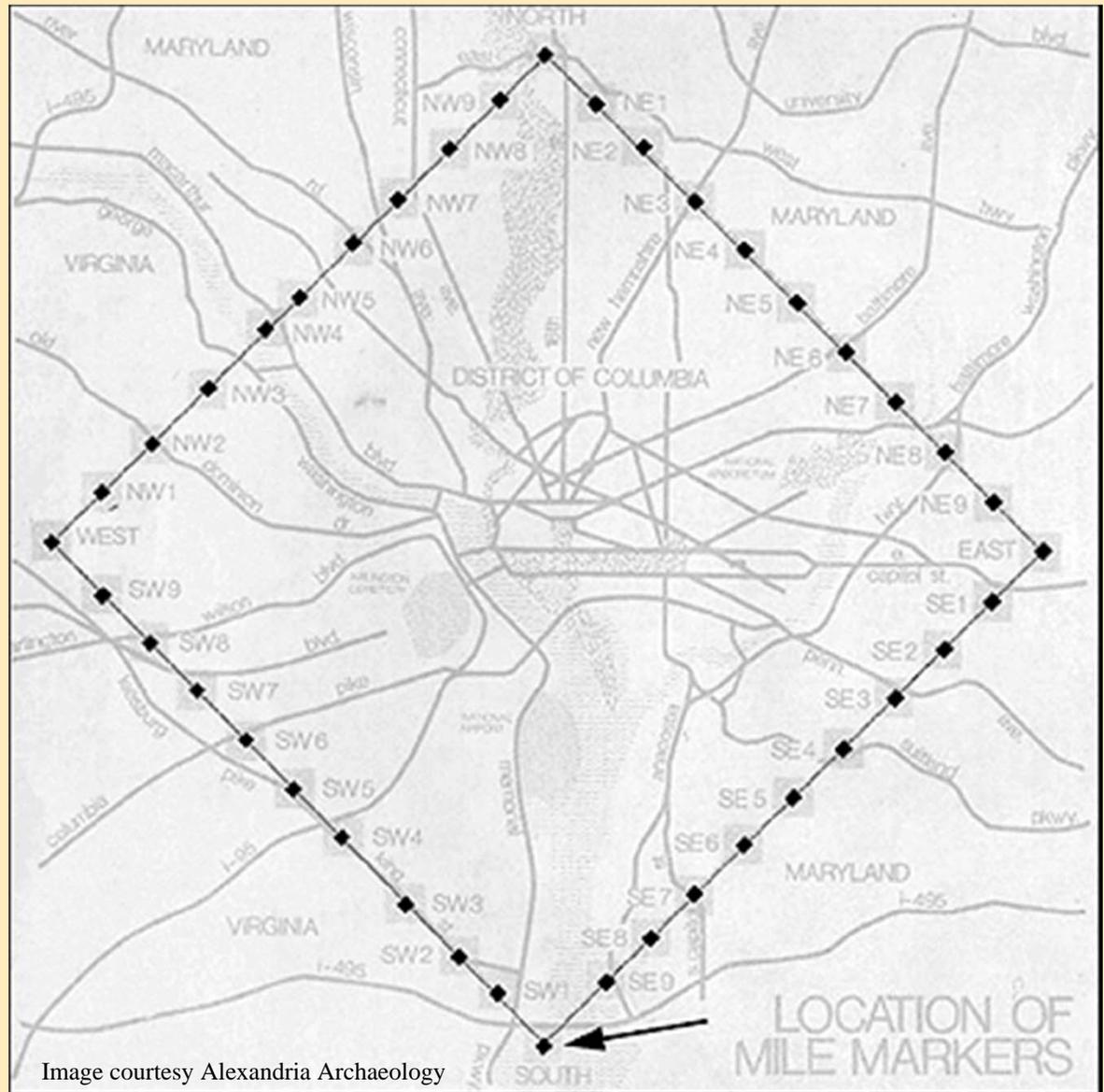


Image courtesy Alexandria Archaeology



Constantine Samuel Rafinesque (1783-1840)



In the early days of American botany and expeditions into the wilds of the eastern U.S., Rafinesque was apparently the first to explore areas near Alexandria. He writes, “I came to North America in 1802, and traveled chiefly on foot until 1804, over New Jersey, Pennsylvania, Delaware, Maryland, and Virginia, from the Juniata to the Sea Shore, and from the Alleghany Mountains beyond Easton, to the Potomac beyond Washington and Alexandria” (Rafinesque 1836).



Asa Gray



A.H. Curtiss



*Polygala curtissii* Photo © Daniel Reed –  
www.2bntthewild.com



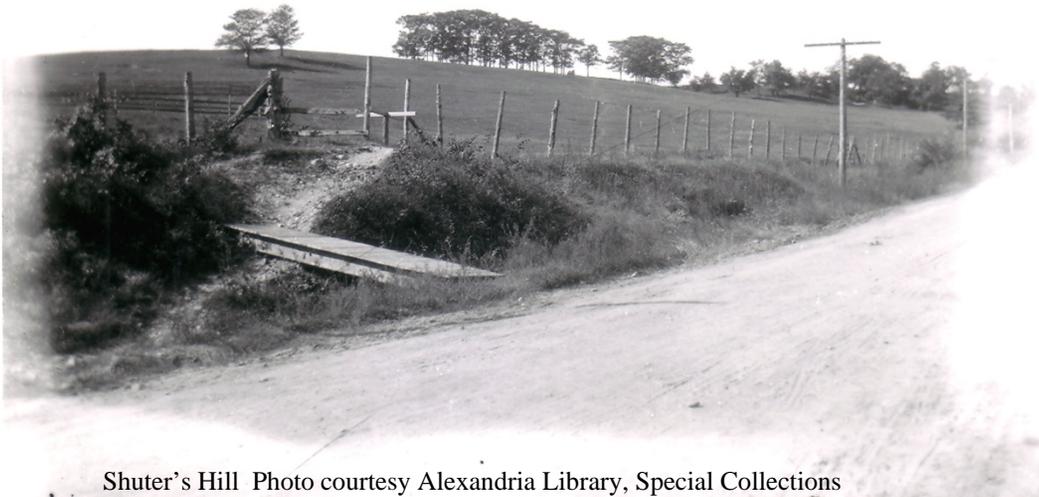
*Elatine minima* Photo courtesy Wisconsin State Herbarium

The first known botanical collections from Alexandria were of *Polygala curtissii* (Curtiss' Milkwort) in 1865 and *Elatine minima* (Small Waterwort) [unknown date] by A.H. Curtiss. The Milkwort was sent to Asa Gray at Harvard for identification, and was named for Curtiss by Gray. It remains a possible type specimen.



Steam Locomotive in Old Town. Photo courtesy  
Alexandria Library, Special Collections

Drawn to the pristine and exceptionally-diverse tidal communities at Four Mile Run and Hunting Creek, numerous botanists and collectors came to Alexandria in the late 19th century from the Smithsonian Institution, USDA, Galludet College, University of Maryland, National Arboretum, and other nearby locales. Transportation was readily available from these places via the well-established railroad lines and, later in 1892, when electric trolley cars began operation in Alexandria (Merriken 1987).



Shuter's Hill Photo courtesy Alexandria Library, Special Collections

Exploration during this time occurred mainly along the Potomac River and its tidal estuaries, largely because transportation routes were well developed to these areas, but also because much of the land to the west was heavily forested, fenced off, or generally less accessible.



Mush Pot Road c. 1900 Photo courtesy Alexandria Library, Special Collections



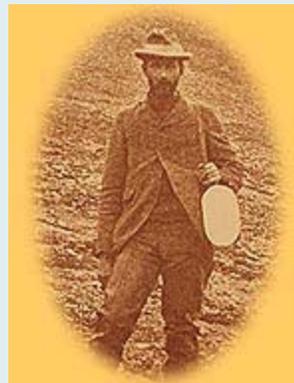
Cameron Mill Race c. 1889 Photo courtesy  
Alexandria Library, Special Collections



George Vasey



C.L. Pollard



F.V. Coville

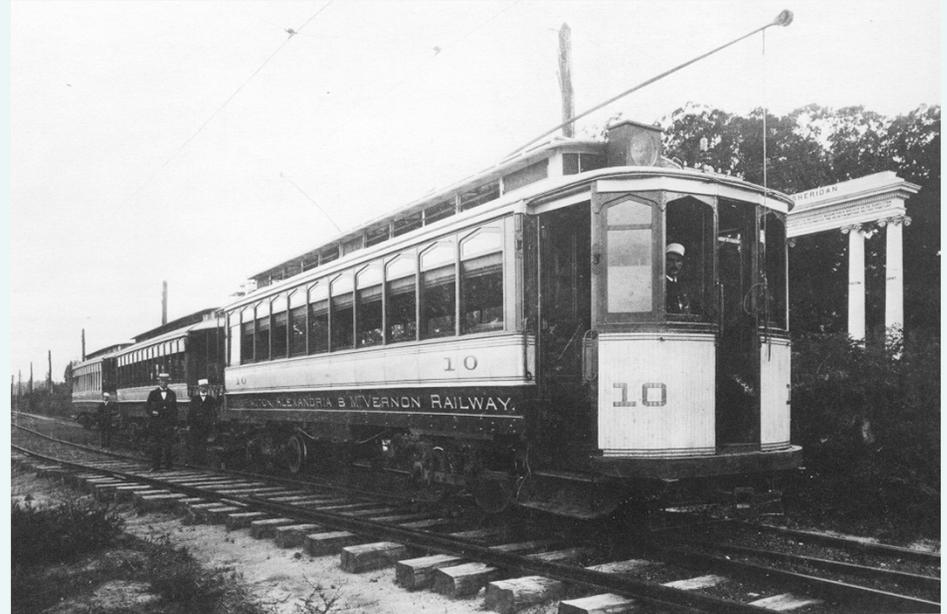


Lester F. Ward

Early significant collectors in Alexandria include J.W. Chickering, Jr., F.M. Comstock, Frederick V. Coville, Dr. Foreman, H.W. Henshaw, W. Hunter, Charles Louis Pollard, Joseph Nelson Rose, Edward C. Steele, G.B. Sudworth, David LeRoy Topping, George Vasey, and Lester F. Ward.

Ward was a prolific collector who also published the first comprehensive guide to the flora of Washington, D.C. and vicinity (1881), which had numerous references to Alexandria.

Photo courtesy *Old Dominion Trolley Too* (Merriken 1987)



The early years of the 20th century through the 1920s ushered in a whole new group of collectors in Alexandria, many of whom were successors at the aforementioned institutions. Of the previous generation, Edward S. Steele continued to collect occasionally, with Mrs. Steele. Aided by the newly expanded electric trolley routes and improved roads, mainly along the Four Mile Run Valley and into parts of upland Alexandria, botanists were able to explore new areas (McAtee 1918).

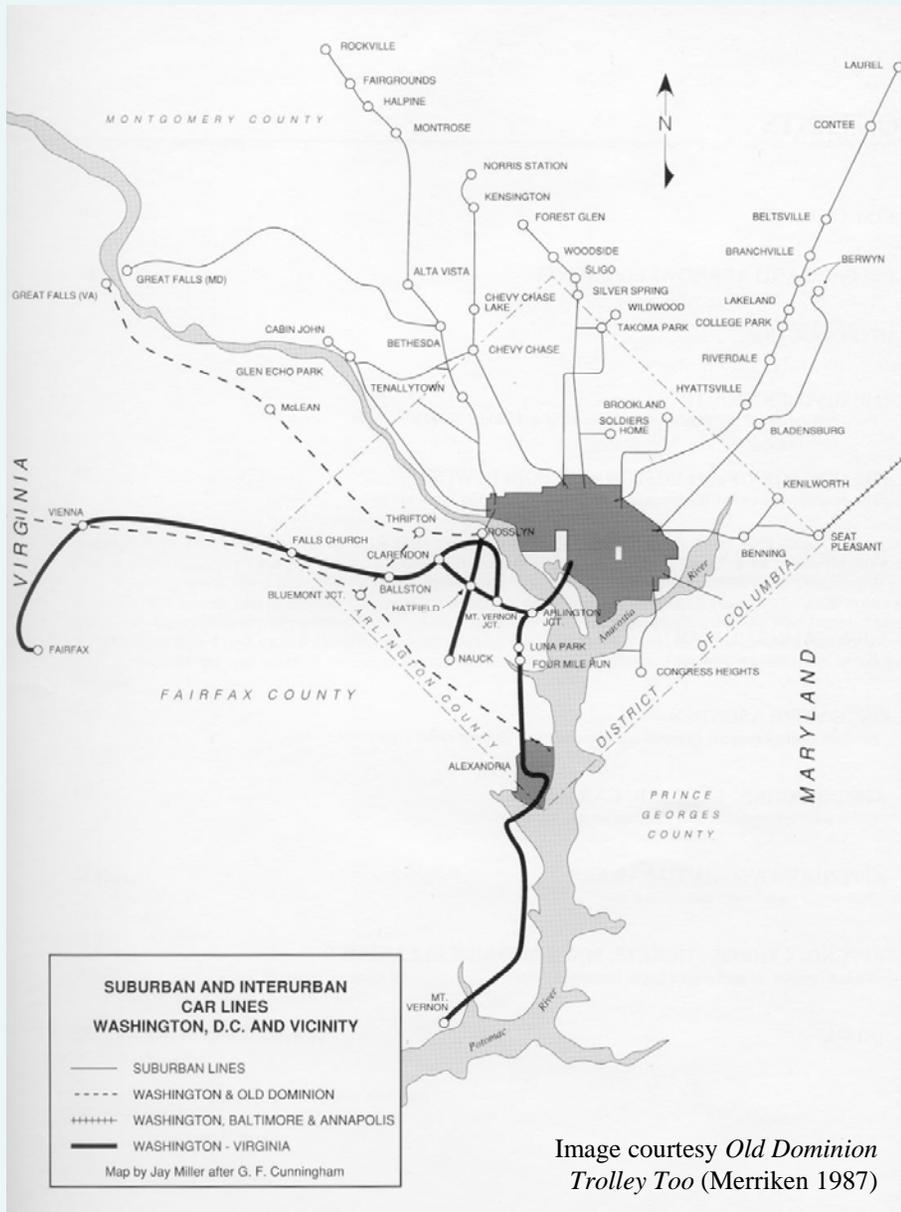
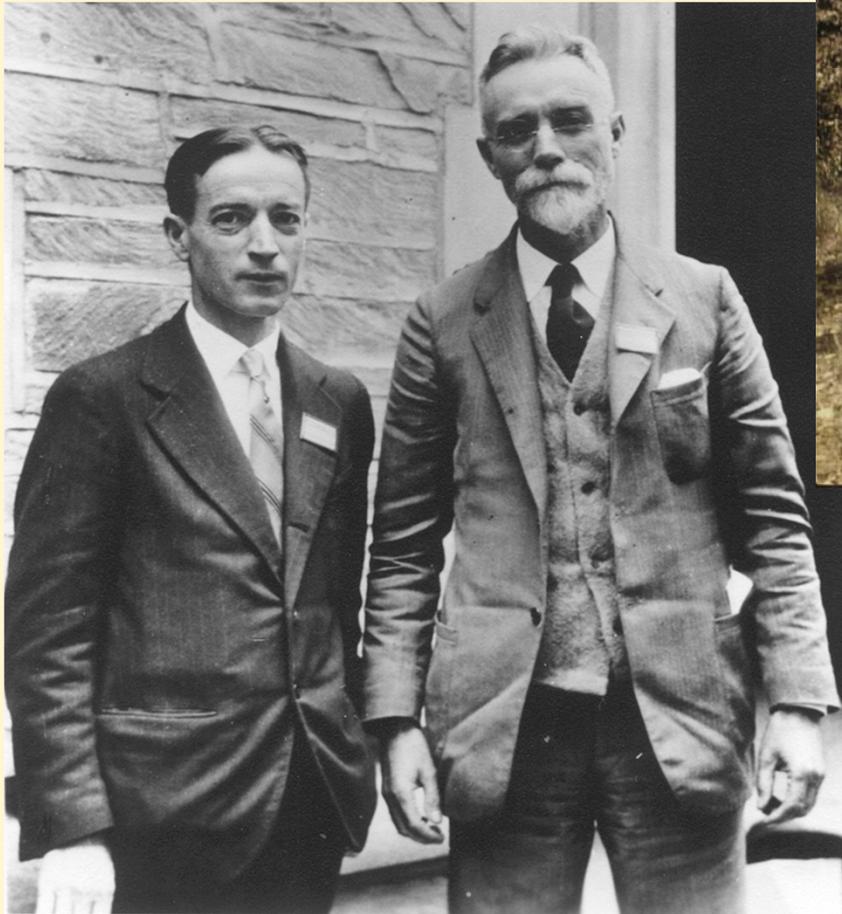


Image courtesy *Old Dominion Trolley Too* (Merriken 1987)

Prominent collectors of this period were Bartlett, Sydney F. Blake, Agnes Chase, Philip Dowell, Mr. and Mrs. Oliver M. Freeman, Albert Spear Hitchcock, Homer D. House, Ellsworth P. Killip, Emery C. Leonard, Gerrit S. Miller, Jr., Waldo Lee McAtee, William R. Maxon, John Bitting Smith Norton, Joseph H. Painter, William Palmer, W.H. Seaman, George H. Shull, Paul C. Standley, and Ivar Tidestrom. Nellie C. Knappen, who apparently did not collect locally, visited numerous important sites throughout the region, including Alexandria, and made invaluable contributions by documenting flora.



Paul C. Standley (l) and Albert S. Hitchcock (r)



W.L. McAtee at Powder Mill Bog #3 c. 1909  
Photo courtesy Chris Frye from R.B. McAtee

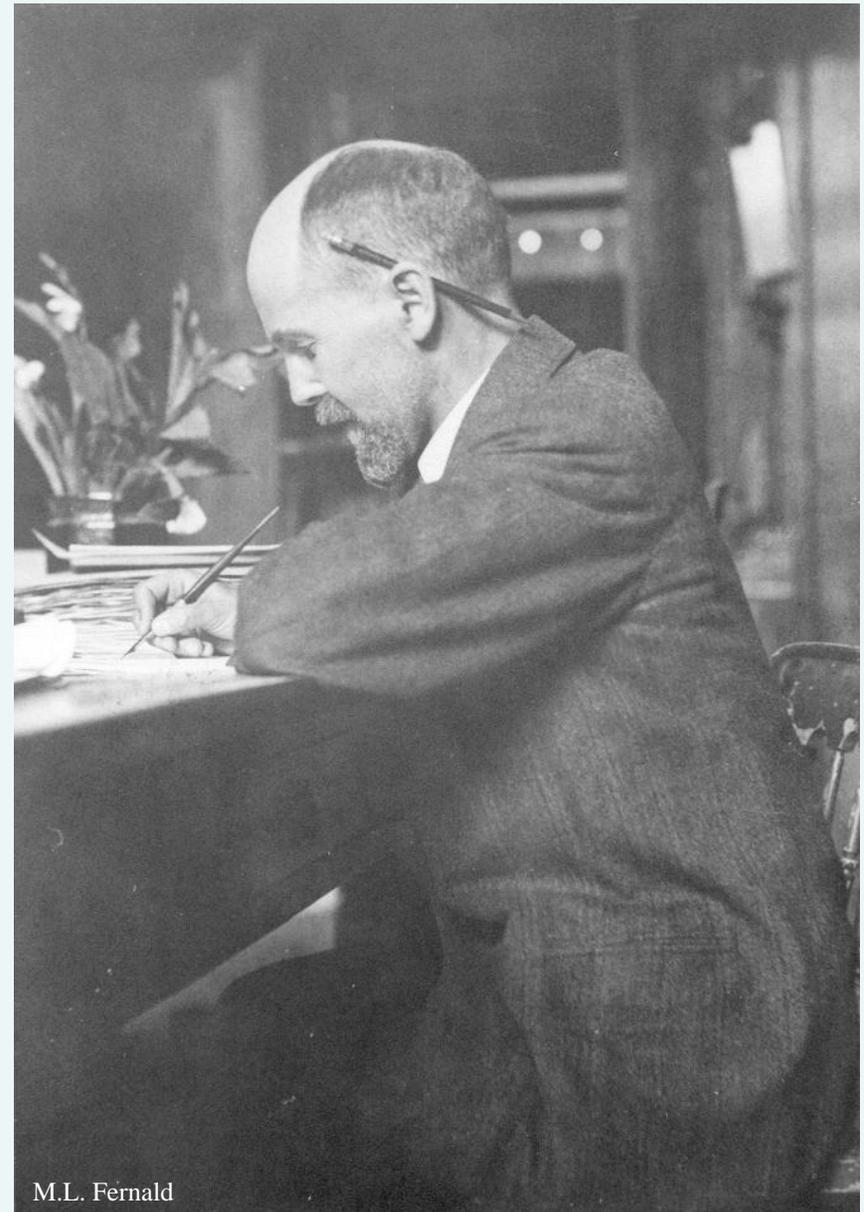


Agnes Chase



Harvard botanist M.L. Fernald annotated collections of pondweeds from Alexandria and included them in his treatment of *Potamogeton* (1932) and Alfred Rehder examined collections of various woody plants from Alexandria and vicinity and published his findings in the *Journal of the Arnold Arboretum*.

Two landmark publications during this period on the flora and natural communities of the Washington D.C. area in which Alexandria is represented were produced by McAtee (1918) and Hitchcock and Standley (1919).





Four Mile Run tidal channel. Photo by G.S. Miller, July 1899, U.S. Herbarium – D.C. and Vicinity Collection

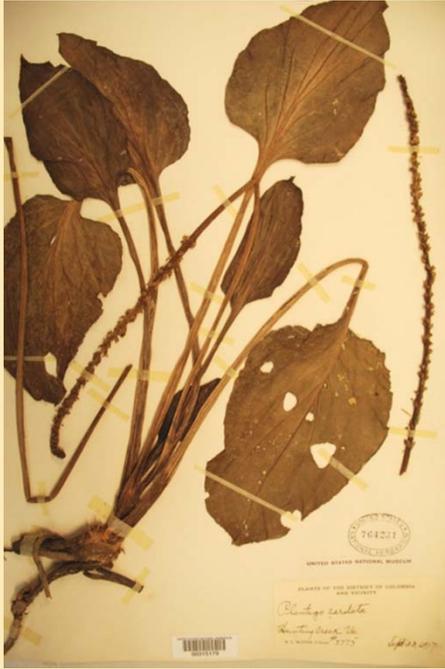


Mouth of Hunting Creek Photo © R.H. Simmons



Cameron Run valley and Hunting Creek in background. Photo courtesy Alexandria Library, Special Collections

# Historic Flora of Hunting Creek



Heart-leaved  
Plantain (*Plantago  
cordata*) at left

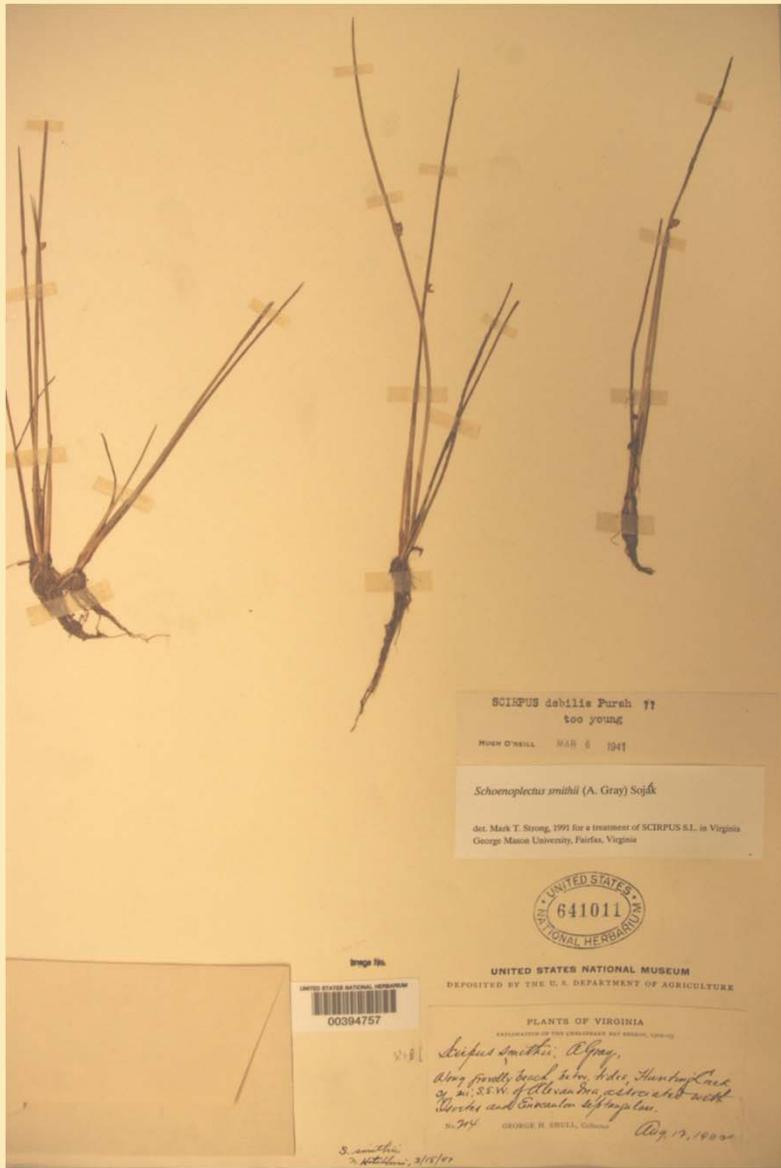
Soapwort Gentian  
(*Gentiana  
saponaria*) at right



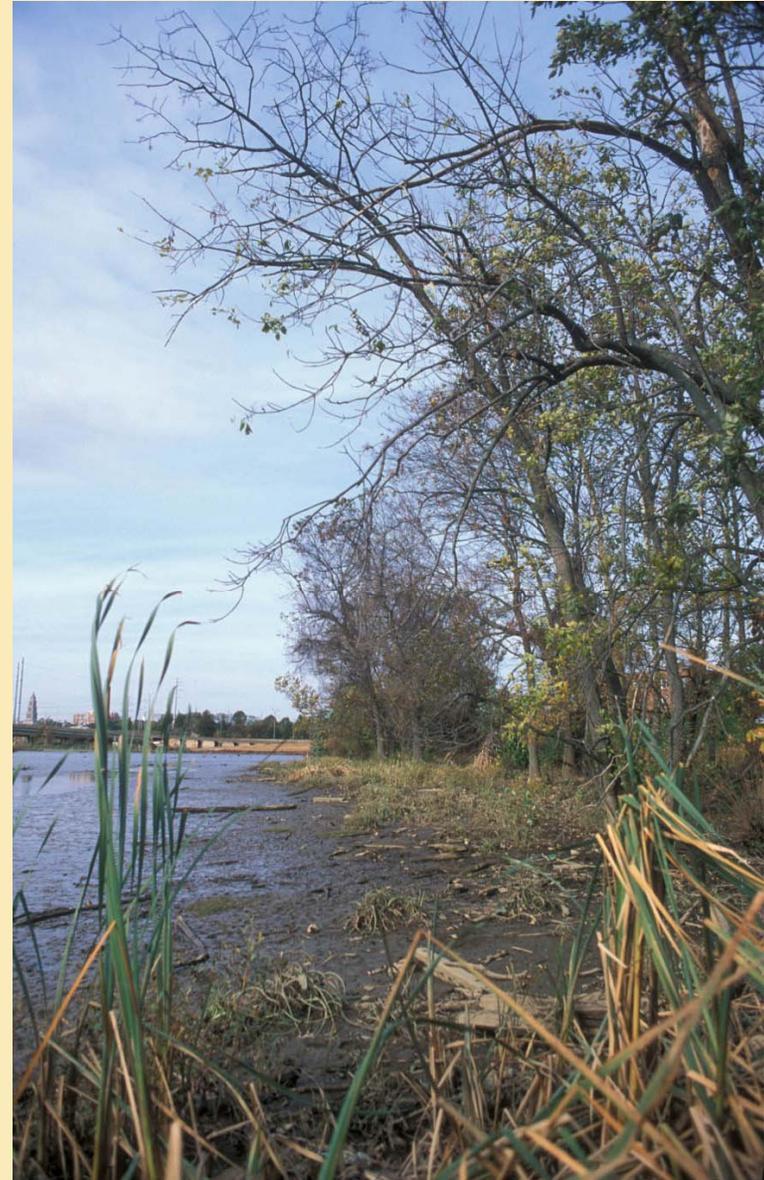
Photo © John Hilty – hilty@shout.net



Nuttall's Micranthemum (*Micranthemum micranthemoides*)



Smith's Bulrush (*Schoenoplectus smithii*)



Hunting Creek Tidal Shore Photo © R.H. Simmons



Photo © Irvine Wilson, VA DCR,  
Division of Natural Heritage

Riverine Aquatic Beds composed of floating and submergent herbaceous vegetation were once common along shallow, gravelly areas of Hunting Creek.



After the second wave of collecting subsided, botanical exploration picked up again in the late 1930s and continued through the 1940s. Carleton R. Ball, C.E. Chambliss, C.O. Erlanson, Neil Hotchkiss, F.R. Fosberg, Francis W. Pennell, and F.M. Uhler were prominent figures of this time. A decades-long hiatus followed this period until Ted Bradley began surveying flora along streams in the Eisenhower Valley region in the early 1970s. Bradley also surveyed areas along the Potomac River and railroad tracks at Potomac Yards in the early 1980s.



Rod Simmons and old-age Chestnut Oak. Photo by Gary Hopper

The most thorough botanical documentation thus far occurred in the mid-1980s when Bill Olson began systematically inventorying the flora of the newly-created Winkler Botanical Preserve, which at the time was a large tract of fairly pristine, old-age forest near the western edge of the City. Ted Dudley, Peter Hornbeck, and others also contributed in part to the early surveys of the Preserve, beginning in the early 1980s. Several checklists of the Preserve's flora were produced by Olson in the late 1980s. Steve Hootman, Keith Tomlinson, Gary Hopper, Tom Sundin, Richard Falcone, Rod Simmons, and John Walsh continued to document the flora into the 1990s and added considerably to the original checklist with numerous revisions. Tomlinson (1989) described the vegetation of a highly rare, acidic woodland seep at the Preserve. Sundin (1994) inventoried and described the forest cover types of the Preserve. Walsh and Simmons also surveyed other upland forest communities in Alexandria and vicinity through the mid-1990s. Floristic inventories of the Winkler Botanical Preserve from this time yielded a total of 322 naturally-occurring, native species (40.25% of the City's documented native taxa).

Also in the 1980s, Larry Morse and Mark Strong began conducting surveys of the tidal communities at the mouth of Hunting Creek for extremely rare species that were historically known from that site.



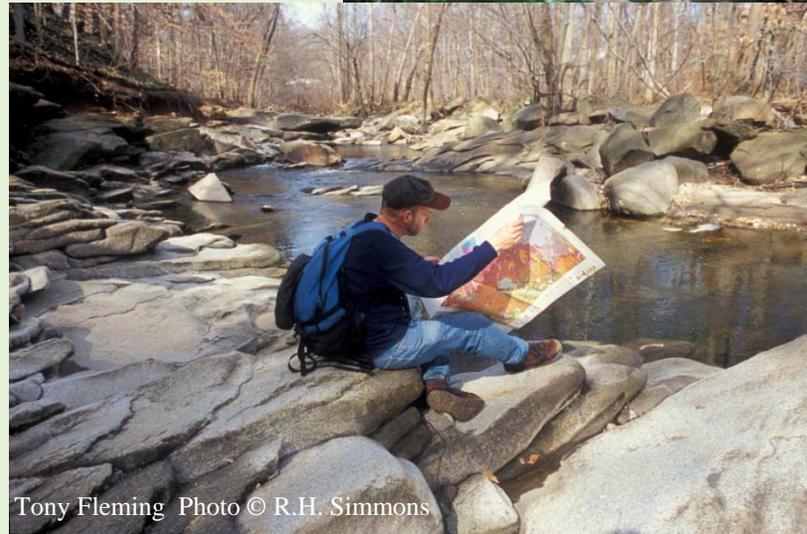
Greg Zell



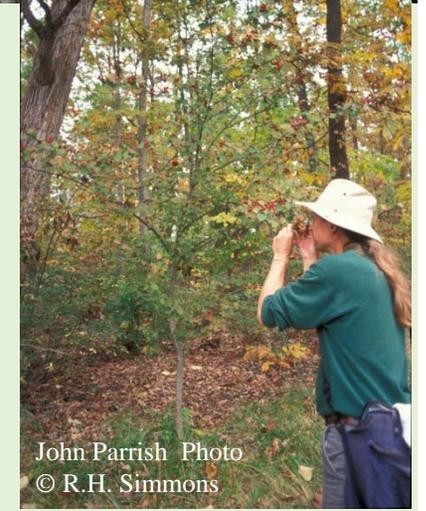
Lou Aronica and Mark Strong  
Photo © R.H. Simmons



Andrew Macdonald Photo © R.H. Simmons



Tony Fleming Photo © R.H. Simmons



John Parrish Photo  
© R.H. Simmons

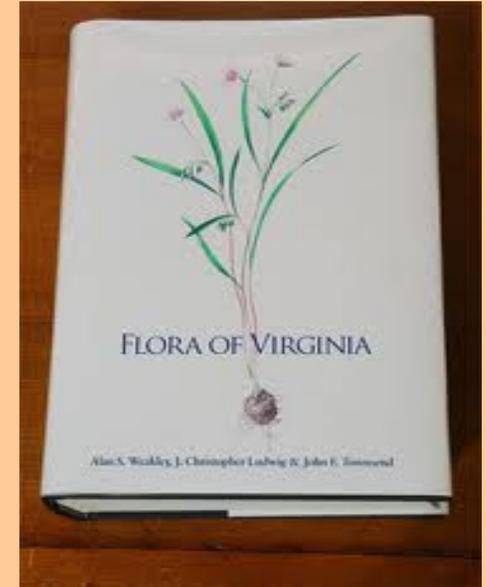
Later in the 1990s, exploration of some of City's more remote natural areas was conducted by Andrew Macdonald, with botanical assistance from Rod Simmons. Floristic details of many of these forays were described in the weekly "Earth Watch" column of the *Gazette Packet* newspaper. Traditional botanical studies resumed in the 21st century with vegetation surveys of Holmes Run, Cameron Run, and tidal Hunting Creek by Rod Simmons and Mark Strong. Recently, Mark Strong, John Parrish, Lou Aronica, Tony Fleming, Greg Zell, and Joe Metzger, Jr. assisted with surveys in various areas throughout the City.



Chris Frye collecting *Carex* specimens.  
Photo © R.H. Simmons



Photo © R.H. Simmons



## Continuing Botanical Surveys and Research



Research collaboration at the U.S. National Herbarium, Smithsonian Institution.  
Photo © R.H. Simmons



Photo © G.P. Fleming



Southern Blue Monkshood (*Aconitum uncinatum*), one of many plants collected in Alexandria with a primary range in the western piedmont and mountains that reach their eastern limits along the fall line in the Washington, D.C. area.



Photo © R.H. Simmons

# Springs of Alexandria



*Platanthera ciliaris* Photo © Darel Hess – [www.2binthewild.com](http://www.2binthewild.com)



Photo © R.H. Simmons



Hume Spring c. 1900 Photo courtesy Alexandria Library, Special Collections



### Fall Line Terrace Gravel Magnolia Bog

*Nyssa sylvatica* - *Magnolia virginiana* - (*Pinus rigida*) / *Rhododendron viscosum* - *Toxicodendron vernix* / *Smilax pseudochina* Woodland

USNVC: = [CEGL006219](#)

Global/State Ranks: G1/S1



“Bean Dip” Photo © G.P. Fleming

Sections of Acidic Oak-Hickory Forest dominated by legumes and species with a more western distribution, such as Devil’s Bit (*Chamaelirium luteum*), bottom right, occur in Alexandria.



Photo © G.P. Fleming



Photo © R.H. Simmons

A rich diversity of oaks is represented in the greater Washington, D.C. area, including Alexandria.



*Quercus x incomita*  
Photo © R.H. Simmons

Photo © R.H. Simmons



Spring Ephemerals have co-evolved with other plants, animals, and microorganisms over millennia, each occupying its special niche.

In Alexandria, extensive colonies occur at the eastern end of the Holmes Run Gorge and in floodplain forests.



Photo © R.H. Simmons



Photo © R.H. Simmons



Photo © R.H. Simmons



Photo © Greg Zell



Photo © R.H. Simmons

## Alexandria Flora Project

The vascular flora throughout the City of Alexandria was surveyed from 2002 to the present. In addition to field surveys, herbaria were searched for historical collections. However, only native taxa were included in an attempt to document Alexandria's indigenous flora. Surveys and historical collections yielded a total of more than 800 native vascular plants (including infraspecific taxa and hybrids) representing 366 genera and 128 families.

In species richness, the largest families were Cyperaceae (102), 69 of which were *Carex*, Asteraceae (98), and Poaceae (73). The next largest in size were Fabaceae (34), Rosaceae (30), Fagaceae (26), and Scrophulariaceae (20).

Historical collections, up to and including Ted Bradley's, comprised 316 taxa or 39.5% of the total flora.



Photo © R.H. Simmons



Photo © R.H. Simmons



Photo © R.H. Simmons

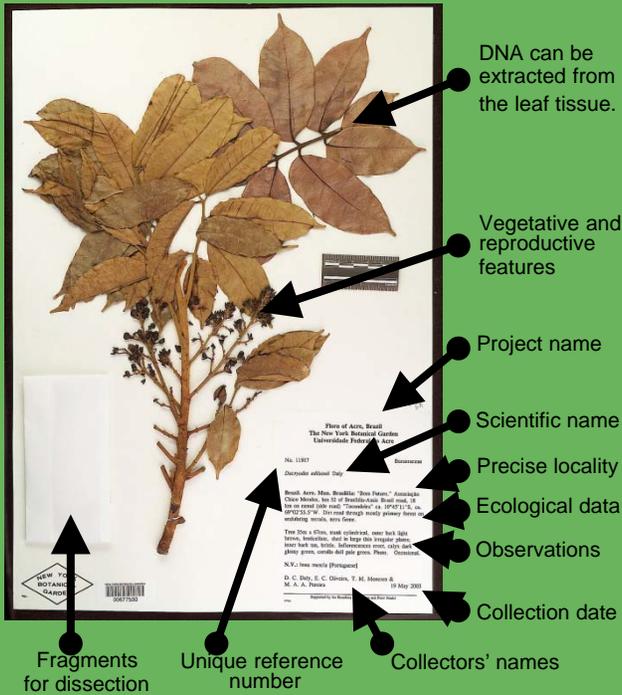
# What is an herbarium?



Did you know that the City of Alexandria maintains a collection of several thousand scientific plant specimens?

**What is an herbarium?** - a collection of dried plant specimens maintained for scientific reference, like a museum. It can also contain reference books, photographic slide collections, as well as specimens of fungi and lichens. Specimens are prepared with archival-quality materials and are intended to last for *centuries*.

What type of information does a specimen contain?



How are herbaria useful to science? A few examples...

- By housing physical evidence of all plant species for comparative study.
- By maintaining historical ecological data about the natural landscape.
- By enumerating all plants of specific geographic regions, such as Northern Virginia.



A record of a newly discovered Virginian plant species.



A historical document about Alexandria's plant communities.



Specimens of invasive exotic plants to aid identification.

Adapted from image courtesy of Dr. Andrea Weeks, Director of the Ted R. Bradley Herbarium (GMUF) at George Mason University, Fairfax, Virginia. The City of Alexandria herbarium is located at 2900 Business Center Drive - Dept. RPCA, Horticulture and Natural Resources Section office. For further information contact Rod Simmons at Rod.Simmons@alexandriava.gov



Photo © Irvine Wilson, VA DCR,  
Division of Natural Heritage



Photo © R.H. Simmons

This section of Virginia, including the two neighboring counties Fairfax and Arlington, contains a broad diversity of habitats and is perhaps the most floristically diverse in the Commonwealth.

For example, 2,810 native vascular plants are reported for Virginia (John Townsend and Gary Fleming, Virginia Botanical Associates), which occupies 40,767 square miles. Alexandria, in comparison, with just 15.75 square miles, has recorded nearly 28.5% of the total flora listed for the Commonwealth.



Photo © R.H. Simmons



Photo © R.H. Simmons



Photo © R.H. Simmons

A project of this scope would not have been possible without the many contributions of botanists from previous generations.

Equally important is the expert assistance provided by numerous botanists and ecologists in recent years. Those who have helped identify difficult taxa include: Mark Strong; John Parrish (*Crataegus*); Chris Frye (*Carex* and *Amelanchier*); John Townsend (*Dichanthelium*); Gary Fleming; Rob Soreng (Poaceae); Julian Campbell (*Elymus*); Paul Peterson (*Eragrostis* and *Sphenopholis*); Tony Reznicek (*Carex*); Aaron Goldberg; Harold Robinson (Asteraceae); Joe Metzger, Jr.; Alan Whittmore (*Celtis*); Stan Shetler; Ted Bradley; Carol Kelloff (*Athyrium*); John Walsh, Brent Steury, Carl Taylor (Pteridophytes and Lycophytes), and Jim Montgomery (Dryopteridaceae).



Photo © R.H. Simmons

Alexandria's natural communities were also quantitatively sampled. Data was analyzed by Gary Fleming of the Virginia Department of Conservation and Recreation, Division of Natural Heritage and included in the National Vegetation Classification analysis of the National Capital Region.

Information on regional and local floristics, natural history, and resource management is posted on the Alexandria Flora, Geology, and Natural Communities webpage at <http://alexandriava.gov/22560> and the City Natural Resource Management webpage at <http://alexandriava.gov/48838>



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**Acknowledgements:**

**PowerPoint presentation by R.H. Simmons and M. First**

**City of Alexandria Department of Recreation, Parks, and Cultural Activities,  
Natural Resources Division**

**Smithsonian Institution National Museum of Natural History, Department of Botany and  
Smithsonian Libraries**

**Francine Bromberg and Pamela Cressey, Alexandria Archaeology**

**Rita Holtz and George Combs, Alexandria Library, Local History Special Collections**

**Gary Fleming and John Townsend, Virginia Department of Conservation and Recreation,  
Division of Natural Heritage**

**Tony Fleming, Professional Geologist**



Pristine, acidic woodland seep in the Lincolnia area  
of the City of Alexandria. Photo © R.H. Simmons