The Vasculum

The Society of Herbarium Curators Newsletter
Volume 10, Number 2 - July 2015

FROM THE EDITOR

The January and July 2015 issues of *The Vasculum* represent our newsletter's 10th year as the official publication of SHC. I find it hard to believe that 10 years have passed, but it's true! I thank all of our presidents for their support over the past decade, especially in providing an update on our society in each issue. I also thank our assistant editors, who have given so generously of their time. Of course, the newsletter would be nothing without those of you who have contributed stories. Special appreciation goes to Eric Ribbens, who has kept us "wired" since the very first year. It is my hope that our members will continue to share news of their herbaria in *The Vasculum* for years to come!

- Conley K. McMullen, James Madison University, mcmullck@jmu.edu

Xerophyllum asphodeloides (L.) Nutt. (Xerophyllaceae) - *© C.K. McMullen*

SHC NEWS

A Message from the President

Mid-summer greetings from N 38° 56.253', W 77° 37.224'. Spring came late this year, and then rapidly transitioned to full-blown summer; this field-season has been particular productive. Green, growing and getting bigger is also a theme these days with SHC.

I am pleased to report that Society of Herbarium Curators membership has tripled since 2014. Our ranks now include 60 students, 193 regular members, 36 sustaining members, and 20 lifetime members across 18 countries. This rate of growth is truly phenomenal, and has been driven in large part by our increased visibility online and new membership renewal system. The majority of non-US members have joined this year. However, I also think our more numerous ranks reflect a growing sentiment worldwide that herbaria and herbarium-based research need greater support. The recent *Nature* article, "Plant collections left in the cold by cuts" [523: 16, doi:10.1038/523016a] summarizes what many members already know and want to reverse through community building, advocacy and education.

In this summer alone, we have made concrete progress toward fulfilling Society goals. The SHC Executive Board has approved a new research grant competition for undergraduate students, which was made possible by our increased member ranks. It has submitted two letters, directed to the US Department of the Interior and the State of Illinois, in opposition of policies that would negatively impact herbaria. We will also unveil our new promotional materials at Botany2015 in Canada in late July; SHC is a participating society in this international conference. In September, I will issue a general call to the membership for volunteers, both for elected and appointed positions, to help us continue this positive trend and to elicit new ideas about how SHC can serve its members' interests most effectively. Please consider becoming involved - we welcome newcomers! Happy collecting!

- Andrea Weeks, George Mason University, aweeks3@gmu.edu

HERBARIUM NEWS

Featured Herbarium: WVA - The West Virginia University Herbarium

The West Virginia University (WVU) Herbarium (WVA) is the largest such facility in the state. It contains ca. 172,000 mounted and accessioned vascular plant specimens and ca. 34,000 bryophyte and lichen specimens. It is designated a National Resource Collection (Clarkson & Rader 1991), with a primary focus on West Virginia and central Appalachian plant species. There are also over 2,000 seed collections in the Elizabeth Bartholomew Seed Collection (established in 1950). In addition, there are over 25,000 color photographic slides comprising the Earl Core Botanical Slide Collection (begun in the 1940s).

History and Personnel (more details in Kass, *et al*. 2012) - The WVU herbarium originated at the West Virginia Agricultural and Forestry Experiment Station (AES). The AES was an important part of the university's land-grant mission, providing botanical research to improve rural community farming practices. AES botanist, Charles Millspaugh founded the herbarium in 1889 and collected 1,580 specimens (Fig. 1). Millspaugh published three West Virginia floras, the last (1913) including collections by John Sheldon, WVU Botany Department head (1903-1919).

In 1926, Botany Department head, Perry Strausbaugh organized the WVU Botanical Expedition, which continued each summer for more than 20 years. Millspaugh's herbarium joined these holdings in 1933, when Botany, Zoology, and Plant Pathology merged to form the Biology Department. Earl Core was WVA director (1934-1972), with Elizabeth (Betty) Bartholomew as assistant/curator (1938-1977)**.** Betty managed the collections and exchanges for the Southern Appalachian Botanical Society, founded and headquartered at WVA (1936-1983). Strausbaugh and Core published two editions (1952-1964, 1970-1977) of the *Flora of West Virginia*, both issued in four volumes.

Roy Clarkson was the next WVA faculty curator (1972-1992), and Linda Rader the next assistant (1977-1993). They undertook the task of organizing and processing an enormous specimen backlog. In 1995, Donna Ford-Werntz was hired as clinical faculty herbarium specialist, with Susan Studlar curating bryophytes and lichens. Ford-Werntz implemented an accession program and initiated a West Virginia specimen label database. During the last 20 years, an average of eight support staff (from grant funds, work-study, course credit and community volunteers) have assisted each year in the herbarium.

Facilities and Collections - Throughout the years, the herbarium has been located in various WVU colleges (Agriculture or Arts and Sciences), departments (see above), and buildings. It moved from a first home at the WVAES to adjacent Oglebay Hall in 1918. By 1933, WVA was housed across the street in Science Hall, and in 1950 it was quartered on the 4th floor of Brooks Hall. There, it occupied 2,561 sq. ft., including office space. By 1990, the total number of cases was 98, including 85 new cases (replacing old, inadequate storage) purchased with an NSF grant to Clarkson in 1988.

Figure 1 - Ginseng specimen cited in Millspaugh's first flora (1892).

In 2002, WVA moved into its current space in the new Life Sciences Building. The vascular plant collection (123 cases) is compactorized (875 sq. ft.) in the basement level (Fig. 2). Also part of the complex is a 590 sq. ft. workroom (for mounting, digitization and seed collection storage) and a 120 sq. ft. "quarantine" room (drying and shipping area). Ford-Werntz's office space houses the herbarium library, containing books in floristic and systematic botany. Bryophytes and lichens are in 12 cases on the 5th floor in the joint office of Studlar and the arboretum specialist (and slide collection storage). A small greenhouse annex (top floor) is used for non-vascular plant collections processing.

As in other herbaria, much of the work is focused on preparation and cataloging of plant materials. Vascular

plants are pressed, dried and mounted on standard 11.5 x 16.5 inch, acid-free, 100% rag paper. The label includes plant species, collector name, and other data including locality, habitat, and date of collection. Lichens and bryophytes are dried and stored in 3 x 5 inch folded paper packets with the label attached to the outside. Conversion from mounting sheets to box drawers (Fig. 3) is in progress for the non-vascular specimens.

Pest control measures are used on incoming plants by freezing them for at least seven days. Specimens are filed in steel cases systematically by family, and then alphabetically by genus and species. Collections are separated into three geographic areas (West Virginia, other states, and foreign), providing an invaluable catalogue of the world's flora. WVA contains hundreds of locality records for rare plants, as well as at least 78 nomenclatural type specimens. Current efforts focus on collecting West Virginia county records and documentation of endangered, wild-harvested, and invasive plant species.

Figure 2 - Ford-Werntz in compactorized vascular plant collections.

In 1950, WVA had 115,000 specimens, and Sheldon's private herbarium was added by purchase in 1951. By 1991, it had grown to about 157,000 specimens (130,000 vascular, 20,000 bryophytes, 7,000 lichens). William (Bill) Grafton added nearly 19,000 collections to WVA from 1995 until his death in 2009. In the last 20 years, over 28,000 vascular collections have been received, and more than 40,000 specimens have been mounted. The accessioned vascular holdings now number 171,693 specimens. The majority of the collections are from West Virginia (ca. 55%), although all parts of North America (35%) and many areas of the world (10%) are represented. The total number of specimens in the bryophyte-lichen holdings is estimated at 34,000.

WVA has a program, involving about 56 institutions, to exchange specimens with other herbaria to strengthen and expand the holdings. In the 1980s 14,900 specimens were sent and 6,724 received. Since 1995, WVA has sent ca. 8,000 specimens and received ca. 6,000 specimens. Exchanges are currently being curtailed due to lack of space.

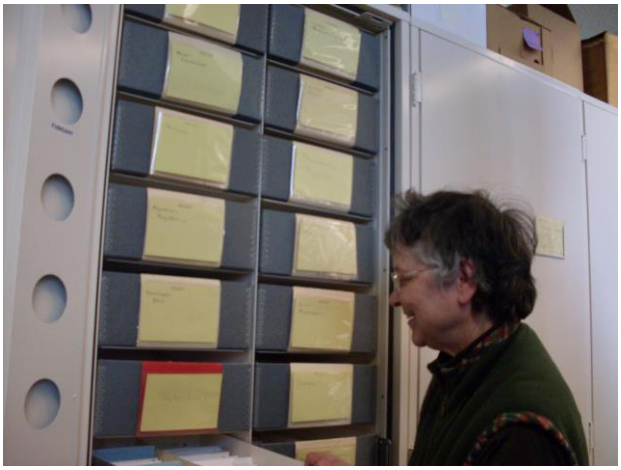

Figure 3 - Studlar showing bryophyte packets in box drawer storage.

Projects and Research - Herbarium specimens are vital for science, as they provide a record of the presence, distribution and morphology of plants through time. WVA is involved in floristic inventory programs, taxonomic research and conservation projects. The herbarium has collaborated with the WV Division of Natural Resources (DNR), WV Department of Agriculture, the Nature Conservancy, the US Forest Service and the National Park Service (NPS).

Digitization technologies, including computer databases, specimen imaging, and/or locality georeferencing for mapping are being implemented at WVA. Since 1995, a project has been underway to database label information from all West Virginia material. More than 90,000 specimens are now recorded, making it possible to compile data for a particular plant species, location or collector. WVA databases provided information for the state flora atlas (Harmon *et al*. 2006) and bryophyte checklist (Studlar *et al*. 2002).

Herbarium project funding has come from WVU Public Service grants, American Women in Science, WV DNR Natural Heritage Program, Harvill Foundation, Canaan Valley Institute, NPS and the WVU Davis herbarium endowment (established in 1997). Current grant support is from two NSF digitization networks for southeast U.S. flora and for bryophytes and lichens. A project is also underway to create an interactive computerized identification system for West Virginia vascular plants.

WVA is an important resource for botanists from interested amateurs to world experts, as well as scientists working in ecology and evolution. Since 1936, herbari-

um specimens have been the basis of nine books and 134 papers. In the 1980s, loans of 13,176 specimens were sent to 124 herbaria, resulting in at least 66 papers citations in scientific journals. In the past 20 years, more than 250 loans of over 17,000 specimens have been shipped. An average of ca. 30 label data requests are fulfilled each year also. WVA welcomes visiting plant biologists and cooperates in many ways to advance botanical knowledge. During the past 20 years, there have been an average of 37 visits to the herbarium annually.

Teaching and Outreach - Since 1995, the herbarium has supported 11 WVU courses, including three each taught by Ford-Werntz and Studlar. In the past 20 years, there have been regular visits by classes from six other colleges, as well. WVA graduate students have produced at least 18 Ph.D. dissertations and 74 M.S. theses. Since 1996, an annual newsletter has been published, available on the WVA website (biology.wvu.edu/facilities/herbarium) along with other herbarium information.

WVA offers tours and programs (average three per year each since 1995) for community members, including Master Gardeners, WV Herb Association, garden clubs, Master Naturalists, Sierra Club, Audubon Society, and scout groups. Ford-Werntz has done 50 herbarium talks, 70 poster presentations and led 60 natural area hikes in the last 20 years.

WVA provides plant identifications to a wide range of agencies and public citizens (often via the WVU Extension Service or the WV Native Plant Society). The herbarium receives an average of 55 requests a year to identify plants and 75 information inquiries. WVA is collaborating with the Smithsonian Institution herbarium to digitize the color slide collection. In the past 20 years there have been 91 photo requests and over 6,000 images provided.

Modern computer and digitization technology enable herbaria to make data widely available and to participate in creative new investigations. With increasing awareness of the value of biodiversity and the threats of invasive exotic species, WVA will continue to be an important asset serving West Virginia and beyond.

Acknowledgments - Thanks to my herbarium predecessors, botanical colleagues, student workers and community volunteers who have contributed to the success of WVA.

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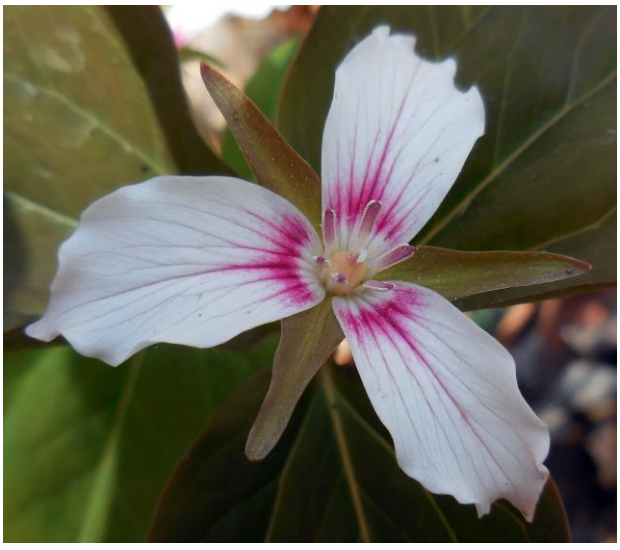
- Donna Ford-Werntz, West Virginia University, dford2@wvu.edu

Arisaema triphyllum (Araceae) and Dicentra canadensis (Goldie) Walpers (Fumariaceae) - © C.K. McMullen

Valdosta State University Herbarium Receives NSF CSBR Grant

In April 2015, the Valdosta State University Herbarium (VSC) began a three-year project funded by the National Science Foundation, Collections in Support of Biological Research (CSBR) program. This project will enhance VSC infrastructure through installation of a high-density storage system increasing its specimen holding capacity by about 30%, will enable processing and digitizing 5,000 backlog specimens and georeferencing nearly 15,000 specimen records, and will promote learning through involvement of undergraduate students in these activities. Space and resources provided through the project will revitalize the extensive and currently dormant Vanderbilt University teaching collections by bringing them to VSC where they will be used to train future generations of students and biodiversity researchers. Outreach programs targeting young people at an impressionable age, their teachers, and others will bring issues of biological collections and biodiversity before a large and diverse audience through herbarium tours, informal presentations, and a summer workshop for teachers. The herbarium will not be publically accessible during July 2015 to accommodate installation of the high-density storage system. Additional information is available at http://ww2.valdosta.edu/~rcarter/HERB/Herbindex.htm.

- Richard Carter, Valdosta State University, rcarter@valdosta.edu



Trillium undulatum Willd. (Trilliaceae) - © C.K. McMullen

THE WIRED HERBARIUM
The Importance of Online Herbaria

Linda Curtis recently published a book, *Bog-Fen Carex of the Upper Midwest*, which covers not only bogs, bog-fens, and fens, but also wetlands that include seeps, sedge meadows, wet prairies, and marshes (http://curtistothethird.com/wp1/). It is a three-ring binder form of book that allows the reader to add his/her own small pressed seed heads, and also allows insertion of separate pages for notes.

Retired and working from home, Linda extensively accessed digitized herbarium information for her sedge research. Such herbarium information is also used in her other books and journal articles.

Why use online herbaria when one could travel to a university or institution herbarium and look through lines of cabinets? To answer that question, one must understand that Linda's *Carex* books cover the Midwest, a much broader range than a single state coverage. This would require extensive travel to the herbaria of each individual state. The most obvious advantage of working with online herbaria is that one can easily view many specimens in a relatively short amount of time, and easily obtain information such as where and when they were collected. Each state has its own species of *Carex*, with Indiana and Ohio having ca. 100 species, Illinois, 194, Wisconsin, 157, and Michigan 184. By comparing online herbarium databases, one finds that some species are located in all states, and a few are endemic to their own state. Online herbaria show county distribution maps, which is also useful, and the northern range and southern range of species is revealed.

The challenges of working with online herbaria are the same as in any type of research, except the pencil is replaced with the download or screen capture of images. Diligence in rechecking is important, as data is continuously added to the database. Sometimes, it takes weeks, months, and apparently years for new data to be processed and uploaded. Many herbaria depend on volunteers and the number of skilled herbarium workers is often insufficient to the number of incoming specimens.

Linda verifies information received from online herbaria by comparing their images with each other, and if she thinks a specimen is wrongly identified, she reports this and explains why. If the curator is convinced, an annotation label is attached with the correct plant name, the annotator's name, and the date. For those with a photo or image database, she sends images to help other botanists and herbarium managers. Linda's Florida *Carex* images are at www.florida.plantatlas.usf.edu, and Wisconsin images at http://wisflora.herbarium.wisc.edu/.

We see the future of online herbaria becoming more useful as both employed researchers and citizen scientists

continue to send specimens to herbaria. Some herbaria have worldwide collections and their virtual specimens are a window to a world not ordinarily reached, such as the East and Southeast Asian species available at: www.elsevier.com/locate/ympev. The number of *Carex* in the world is estimated at nearly 2000 species.

No herbarium is too small, and new herbaria can begin at nature centers that purchase their first herbarium cabinet. All herbaria begin with a single cabinet.

The friends of nature organizations often provide the funds for supplies and a scanner to cyber-document the specimens housed in a cabinet. Handling of specimens can be reduced with good scanned images on bulletin boards near the cabinets. Users can later access them online and prompt their mind's "search image" so if they encounter the species in the wild, they will recognize it.

- Eric Ribbens, Western Illinois University, E-Ribbens@wiu.edu; Linda Curtis, lcurtisbotanist@ameritech.net

Lilium canadense L. (Liliaceae) - © C.K. McMullen

OTHER NEWS

Everhart Botanica: Selections from the Twining Herbarium

The Everhart Museum (Scranton, PA) science collections include an important group of historical plant specimens that was donated by Dr. Isaiah Everhart's friend, Alfred Twining. The 1700+ plants were collected during the period 1890-1937 and represent a wide range of native plants and introduced species documented throughout the region of northeastern Pennsylvania. The specimen photographs chosen for *Everhart Botanica* complement the Everhart Museum's exhibit *To Your Health!*, as the selected plants are all used to either make or flavor alcoholic spirits, liqueurs, cordials, and other drinks, as well as medicinal formulas and applications. Both exhibits run from 10 July to 31 December 2015. For more information: http://everhart-museum.org/exhibitions/current-exhibitions/.

- Nezka Pfeifer, Curator, The Everhart Museum of Natural History, Science & Art, curator@everhart-museum.org

Isotrema macrophyllum (Lam.) C.F. Reed (Aristolochiaceae) - © C.K. McMullen

NAME THAT PLANT

I have decided to make this issue's "Name that Plant" a bit different. Rather than several photos, I'm including only one. Let me know via email the total number of species that you can identify.

I would be happy to include any of our member's photos in the next issue!

- Conley K. McMullen, James Madison University, mcmullck@jmu.edu

Rockingham County, Virginia - © C.K. McMullen

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