The Vasculum

The Society of Herbarium Curators Newsletter
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FROM THE EDITOR

It's snowing outside as I type, and there's no doubt that I'm at least as anxious for spring to arrive as the little fellow seen below, outside the Bioscience building here at JMUH. But, until that day arrives, and it *will* arrive, perhaps the latest issue of *The Vasculum* will serve as a reminder of greener days ahead. Enjoy!

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

American robin (Turdus migratorius L.) - © C.K. McMullen

SHC NEWS
A Message from the President

Greetings at the beginning of a new year. Winter is well underway, and at least here in Virginia, summer field season is many months ahead. Happily, a number of interesting prospects for SHC are growing despite the snow outside. Starting in late fall 2014, our website has featured PayPal functionality for membership renewal and donations. At the same time, our social media outreach was expanded through Facebook, which now appears to be driving online enrollments. Our application for 501c3 status is also under consideration by the Internal Revenue Service after being submitted this January. Last but not least, plans for our presence this summer at the Society for Preservation of Natural History Collections meeting and Botany2015 conference are underway. The SHC Executive Board will meet at SPNHC in May and the annual members meeting will take place at Botany2015 along with SHC's promotional booth in the vendor area. Booth volunteers and authors of promotional materials are needed. If interested, please contact our Membership Committee. The year has gotten off to a great start for SHC - let's continue!

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

HERBARIUM NEWS
Featured Herbarium: INHS - Illinois Natural History Survey

The Illinois Natural History Survey (INHS), part of the Prairie Research Institute at the University of Illinois Urbana-Champaign, is not only one of the older surveys in the country, but is also one of the most successful in the history of the United States. The INHS Biological Collections include more than 9.5 million specimens separated into 11 major collections. Together, these make up the most complete record of Illinois biota found anywhere. The plant, fungi, bryophytes, and algal collections are housed in the INHS Robert A. Evers Laboratory at the University of Illinois Urbana-Champaign (Fig. 1). These collections include the Illinois Natural History Survey (ILLS), University of Illinois Plant Biology Department (ILL), and University of Illinois Crop Evolution Laboratory (CEL). Together, these collections contain over 1,000,000 specimens making this the second largest herbarium in Illinois and one of the 15 largest in the United States.

Establishment & History - In 1857, the state of Illinois had both an Agricultural Society and a Horticultural Society. As one would expect, these organizations were mostly interested in farming techniques and applications.

Wanting to expand the research field, Cyrus Thomas, a self-taught entomologist, proposed that a society be established for the scientific examination of Illinois natural history (INHS 2015a). Thomas' vision transpired the following year with the creation of the State Natural History Society of Illinois. This was first housed at Illinois State Normal University (later to become Illinois State University). The society was legally chartered in 1861 by the state legislature with a dual purpose: to create "a scientific survey of the State of Illinois in all departments of natural history" and to establish a museum of natural history (INHS 2015b). Some of the Illinois Natural History Survey biological collections date back to this first society and museum. These first specimens were housed at the Illinois Museum of Natural History. The State Natural History Society was later renamed the State Laboratory of Natural History in 1887 by Stephen Forbes, a pioneer of ecology who became the fourth curator of the museum and was named the director of the society as well as the State Entomologist. Not wanting to limit the research to the census of organisms and the publication of distribution lists, Forbes strove to study the relationships between organisms and their environments not only in his own research but also in the organization, creating one of the first ecological surveys (Croker 2001; INHS 2015a,b). In 1885, Forbes accepted a position as a professor of zoology at the Illinois Industrial University (now the University of Illinois) located in Urbana, IL. The State Laboratory of Natural History followed Forbes when he moved from Normal, IL to the university campus in Urbana (Croker 2001; INHS 2015a).

Figure 1- Robert Evers Laboratory

In 1917, the State Laboratory of Natural History and the Office of the State Entomologist were merged and became the Illinois Natural History Survey with Stephen Forbes as its first chief, a title he held until his death in 1930 (Croker 2001; INHS 2015a). The first botanist/mycologist, Leo R. Tehon, was hired in 1921 to study plant diseases (INHS 2015a). Many of the early botanists at the survey were interested in plants and their diseases and, thus were specialized in both botany and mycology. In 1946, Robert A. Evers was hired with the objective to build the ILLS plant collection. In less than 30 years, he collected 114,266 specimens mostly from Illinois, which equates to about 44% of the entire present-day collection, making him the largest contributor to the ILLS herbarium (INHS 2014a).

The mycological collection originated in 1888 with the creation of a plant disease program with an emphasis on fungal plant pathogens in Illinois. The first specimens include rusts collected by A.B. Seymour and powdery mildews collected by T.J. Burrill from the late 19th century. These were housed with the ILL collection until 1921 when they were separated and became the first mycological collection for ILLS. The program was expanded in 1921 and again in 1924. By the end of 1924, there were 18,000 specimens of plant pathogens, mostly from Illinois (Crane & Tazik 1992).

The ILL plant collection originated in 1868 with the first collections made by Burrill on expedition to the Rocky Mountains in Colorado, as well as some collections closer to home in Champaign County, IL. Burrill is considered the Pioneer of Plant Pathology, being the first person to discover that bacteria can cause plant disease (Anonymous 1916; Crane & Jones 1997; Glawe 1992). The first of the mycological collections began with specimens from A.B. Seymour, F.S. Early and G.P. Clinton in 1861. G.N. Jones was responsible for much of the growth of the ILL plant collection. When Jones arrived in 1939 at the University, the collection had about 200,000 specimens and by 1968 it had grown close to 500,000, with Jones contributing roughly 46,000 specimens himself. In 2011, both ILL and CEL collections were moved to the new INHS facility.

Collections - The herbarium is 4,527 square feet and includes over 800 compactor cabinets (Fig. 2). The collection is temperature and humidity controlled to aid in the prevention of pests. The herbarium also includes a large prep room, a storage area, and two workrooms, one for ILLS and one for ILL. The combined herbarium libraries of ILLS and ILL hold over 300 rare and unique books including field guides, floras, and identification manuals.

In total, there are approximately 259,000 plant specimens in ILLS (Fig. 3), all of which have been databased. About 80% of the specimens are from Illinois including a large number of threatened and endangered species. Additionally, there are about 8,000 plant specimens from the Great Smoky Mountains National Park (GSMNP), more than 3,000 from Krygyzstan and about 3,000 from China (INHS 2014a).

The earliest plant specimen in the ILLS collection, which was donated by the University of Wisconsin, is *Galium aparine* L. collected in Macon County, IL in 1873 (INHS 2014a; INHS 2015a). The next oldest is *Aristida tuberculosa* Nutt., collected from Carroll County Illinois in 1877 by H.S. Pepoon, the original author of the Flora of Chicago Region.

Figure 2 – Herbarium compactor cabinets.

Figure 3 – Cabinet folders.

In total, there are approximately 70,000 fungal specimens in ILLS including about 14,300 basidiomycetes, 14,500 ascomycetes, 18,400 lichens, 2,200 myxomycetes, 10,400 hyphomycetes, 5,300 coelomycetes, and 1,300 pyrenomycetes (Fig. 4). Most specimens are from Illinois, but other significant collections are from Florida and the GSMNP. The SIUC fungal specimens were donated to ILLS in 2011 and include approximately 8,000 basidiomycetes and over 600 of G.W. Martin's myxomycetes. ILLS will also soon be incorporating the fungal collection from EIU, a collection of about 15,000 specimens of mostly basidiomycetes and over 4000 lichens. ILLS holds 243 holotypes, 356 isotypes and 217 paratypes, most of these in the fungal collection (INHS 2009). Important collections at INHS include G.H. Boewe, J.C. Carter, J.L. Crane, R.A. Evers, S.R. Hill (Fig. 5), A.D. Parker, H.S. Pepoon, C. Robertson, L.R. Tehon, J.D. Schoknecht, and L.M. Umbach (New York Botanical Garden 2007).

Figure 4 – Mycology collection.

Figure 5 – Dr. Steven R. Hill, filing specimens into the new compactors in the combined ILLS and ILL herbarium.

ILL has approximately 500,000 plant specimens. Approximately a third of this collection is from Illinois; one-third from other states, largely the western states, and the final third from throughout the world. ILL holds large collections of Asteraceae, Fabaceae, Momosaceae, and Viscaceae, as well as over 4000 type specimens, many of Piperaceae, *Quercus,* and *Phoradendron.* Unfortunately, there are fewer than 10,500 specimens fully databased. ILL also has over 145,000 fungal specimens, made up mostly of ascomycetes and imperfect fungi, including approximately 50,000 specimens from exsiccati (INHS 2014b). Important collections at ILL include F. Brendel, J.T. Buchholz, T.J. Burrill, V.H. Chase, G.P. Clinton, E.J. Hill, G.N. Jones, L.F. Koch, S.B. Mead, W.S. Moffatt, D.P. Rogers, P. Shildneck, F.L. Stevens, and W. Trelease (New York Botanical Garden 2007).

Together, ILL and ILLS have about 5,600 algae specimens and over 30,000 bryophytes including 286 specimens collected by Thomas Drummond during the Second Land Arctic Expedition under the command of Captain Franklin. These were published in 1828 and are likely the oldest specimens in either collection.

CEL has approximately 55,000 specimens. This collection specializes in Poaceae, particularly Andropogoneae, and cereals in addition to cultivated Fabaceae. This collection contains many artificial hybrids of cultivated plants and their wild ancestors, something not found in most herbaria today (INHS 2014a).

Digitization - Although all specimens at ILLS have been databased, recent efforts have been made to digitize and barcode the specimens. We have received two Mellon Foundation Grants to digitize the plant types and fungal types, respectively. These data are available to members of JSTOR's Global Plants Initiative. We have also received four grants through NSF's ADBC (Advancing Digitization of Biological Collections) program to digitize all bryophytes, lichens and macrofungi along with several groups of vascular plants. To date, 28,030 bryophytes, 21,049 lichens, 20,380 macrofungi and 75,000 plants in ILLS and ILL have been digitized and barcoded. Our most recent grant aims to digitize approximately 103,000 plant specimens.

Personnel - The Director of ILLS is Dr. Andrew Miller and the newly-appointed Collections Manager position is held by Jamie Minnaert-Grote, who replaced Dr. Loy Phillippe after 26 years of dedicated service. Dr. Phillippe conducted extensive field work adding close to 40,000 plant and lichen specimens to the ILLS collection and is currently working on our most recent NSF digitization project. Dr. Lee Crane, Emeritus mycologist, added approximately 15,250 fungi, lichen and plant specimens to ILLS and currently devotes his time to curating the exsiccati collections, identifying specimens, and accessioning orphan collections. Additionally, there are many other botanists at INHS with long-term projects funded by the Illinois Department of Transportation and the Critical Trends Assessment Program as well as other retired INHS botanists, who regularly contribute to and use the herbarium. ILL is currently under the care of Dr. David Seigler, Emeritus.

Future goals - Currently ILLS is working to move all of the plant specimens to acid free folders and the fungi into acid free packets. We also hope to begin updating the taxonomy based on the most current systematics. Our collections will soon be available online through the INHS website with a searchable database and mapping capabilities. Finally, our long-term goal is to digitize and barcode all collections at ILLS and ILL and make them available online. These collections are available to qualified researchers on loan. We also welcome visits to tour our facilities and study our materials.

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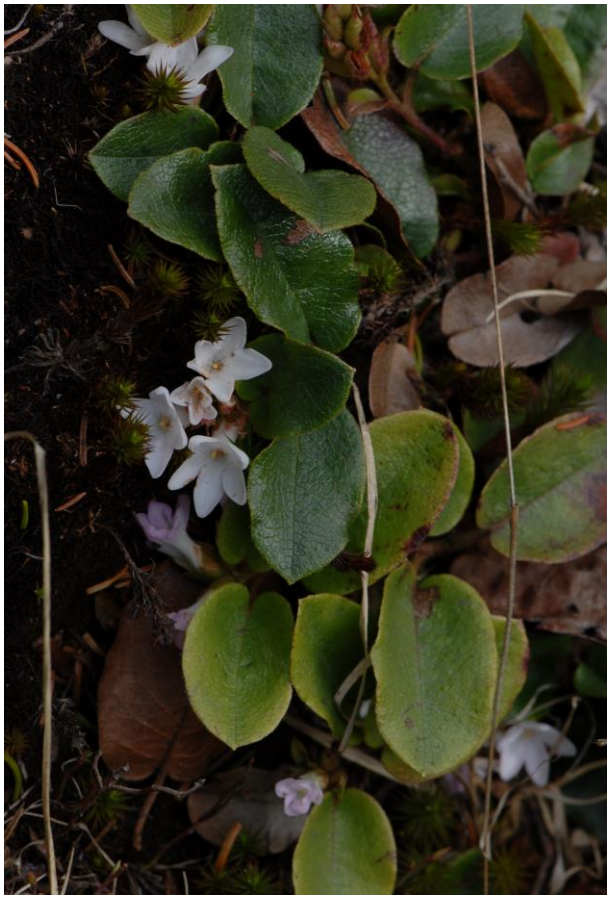
- Jamie Minnaert-Grote, Collections Manager, Illinois Natural History Survey at University of Illinois, Urbana-Champaign, minnaert@illinois.edu



Epigaea repens L. (Ericaceae) - © C.K. McMullen

Janice C. Swab Award

The W. T. Batson Endowment for the A. C. Moore Herbarium at the University of South Carolina recently received a major and most generous donation from a donor who has supported the endowment annually from its beginning in 2001. This particular gift raises the endowment principal to an earning level that now permits the establishment of the Janice C. Swab Systematic Botany Award given periodically to botanists who are engaged in the study of plant systematics. Projects to be considered for this award belong to several diverse categories of investigation. The criteria for evaluating and selecting studies for this award will be announced in detail later.

The major portion of support for the A. C. Moore Herbarium comes from the earnings of the Batson Endowment. This support provides for the purchase of all herbarium supplies, funding stipends for two or three student workers, defraying the cost of travel to collecting sites, covering expenses for printing the herbarium newsletter, *The Florascope*, and funding some of the costs for research publicaton.

- John Herr, University of South Carolina, herrjr@mailbox.sc.edu

Liverworts and Diatoms

Recently, I've seen two herbarium collections that, quite literally, stray from the specimen sheet. While in Chicago for the History of Science Society (HSS) meeting, I visited the Field Museum and met with Matt von Konrat, collection manager for bryophytes and pterophytes. I wanted to see the Field Herbarium because it is one of the larger in the United States. I chose to contact von Konrat for two reasons, because I had heard him speak passionately about the MicroPlants citizen science project, and I wanted to get some insight into how one deals with specimens other than angiosperms. Von Konrat's specialty is liverworts, which are usually stored in paper packets as are other bryophytes. He explained that in the Northern Hemisphere the packets are then often pasted onto standard herbarium sheets and stored stacked on top of each other in shelves. In the Southern Hemisphere, however, the packets are kept in drawers or trays, stored either vertically or at an angle; this puts less pressure on the specimens and also saves space. Since von Konrat is a New Zealander, it's no surprise that the Field Museum's bryophyte collection is kept in drawers.

I was able to see various types of work being done on liverworts, including the drying and sorting of specimens that von Konrat had collected on a recent trip to New Guinea. I met Daniel Le, a digital media specialist who photographs specimens and has a wonderful blog about his work at the museum and his own art/science projects. I also spoke with Charlie DeLavoi who is photographing liverworts under the microscope. While these specimens are frequently photographed without microscopy, their small size often makes this approach inadequate in documenting identifying characteristics. The technique that DeLavoi uses involves specimens that have been rehy-

drated. They are photographed under a microscope using a digital stacking method, that is, up to 20 photographs, each focused at a different depth within the specimen are digitally stitched together for an extremely clear image. It may take up to a half hour for one finished photograph, so this is a time-consuming technique. One can see that the results are worth the effort, as in the case of *Frullania asagrayana*.

By this time in my tour, we were joined by Nancy Slack, a professor emerita of biology at Russell Sage College and a bryologist. She, too, was attending the HSS meeting, since she is also a historian of science, working now on Richard Spruce the 19th-century botanical explorer and bryologist. Von Konrat took us to see the large bryophyte collection that had recently come to the Field Museum from the estate of the noted bryologist Rudolph M. Schuster. Also acquired were Schuster's library and original illustrations, many of which he did himself or in close collaboration with an artist. They are magnificent and a great resource both scientifically and artistically. We then met up with John Engel, curator emeritus at the Field, and another liverwort aficionado. Thanks to this group, I was learning about bryophytes in a way I had never expected when I had arrived that day.

Engel took me to his lab and showed me how he draws specimens. He has a dissecting microscope with a removable *camera lucida* that extends from the side of the microscope and projects onto paper. He uses this to draw a plant's habit and employs a compound microscope with a stationary camera lucida and a narrower field to get greater detail. In addition, Engel has a compound microscope mounted upside-down with a light source that projects onto a sheet of paper beneath it. He had the device built based on Schuster's design. The apparatus has weights and pulleys so he can move it up and down. It has a very Rube Goldberg look to it, but the advantage of this setup is that he doesn't have to crouch over the microscope and so can draw this way for hours. The finished drawings for Engel's publications are done in collaboration with an artist with whom he has worked for 30 years. He does some of the drawing and so does she; she also inks the final work. Their working relationship is about as collaborative as any between artist and scientist. After the visit to Engel's lab, von Konrat gathered even more members into our group and we all enjoyed lunch in the museum's cafeteria. The experience not only made me appreciate liverworts, but encouraged me to continue my investigation of non-angiosperm collections.

A couple of weeks later, I visited the Diatom Herbarium at the Academy of Natural Sciences in Philadelphia (ANS), now part of Drexel University. Marina Potapova, an assistant professor in the Department of Biodiversity, Earth & Environmental Science and assistant curator, gave me a tour of a very different herbarium world. Yes there are the usual metal cabinets, but inside are box after box of glass microscope slides. In addition, there are vials and small bottles filled with the sandy remains of diatoms. She also showed me why it is such a slow process to digitize the information about the specimens. A single vial may contain a number of diatom species, and individual species from these vials may have been mounted on a number of different slides. However, the links between slides and vials may not have been noted. Making these connections is possible through dates, collectors, etc., but it takes time.

Potapova also showed me several rare *exsiccatae* that contain many type specimens. The oldest, that of the German botanist Friedrich Traugott Kützing—*Algarum Aquae Dulcis Germanicarum* (1833-1836)—is in 16 notebooks with specimens wrapped in tiny paper envelopes or on glass. Another is the set of 22 small leather-bound book-like boxes filled with slides. The title on each spine is *Diatomées de Belgique* (1882-1885), and the collection was assembled by the Belgian botanist Henri Van Heurck. These are among the treasures of the collection, which includes specimens gathered in the 1800s by members of the ANS, many of whom were wealthy men who had microscopy as a hobby. The origins of the collection was in the Microscopical Society of Philadelphia, founded 1858. The first evidence of interest in diatoms at the ANS were three papers on marine and freshwater diatoms published by F.W. Lewis in 1860s. The Microscopical Society eventually merged with the Biological Section of the ANS to form the Biological and Microscopical Section.

Women could not become ANS members until well into the 20th century. In fact, Ruth Patrick (1907-2013), who had a doctorate based on diatom research at the University of Virginia, wanted to volunteer at the ANS but was kept out for several years. She finally become a volunteer in 1935, serving first as a virtual servant to the Section, setting out specimens for their meetings among other duties. She eventually became the first woman member of the ANS. In the late 1940s, after she had become a paid employee, Patrick founded the ANS Limnology Department. Through her work, the ANS developed a focus on freshwater diatoms; before that it had collected mostly fossils and saltwater species. She directed studies of rivers and streams, especially in terms of using diatoms to gauge water quality. She collaborated with the noted ecologist Evelyn Hutchinson among others. Her influence lives on in the ANS's Patrick Center for Environmental Research. Potapova and her associates continue to do both taxonomic and ecological studies on diatoms. On the walls of the herbarium are posters from presentations they've given, several with striking SEM images of diatoms. At both the Field and the ANS, I had a wonderful visual feast while also learning a great deal about the breadth of herbarium collections. I am grateful to all those I met for their expertise, patience, and intellectual generosity.

- Maura C. Flannery, St. John's University, New York
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By the Numbers

Last summer (2014), barcoding, imaging, and databasing specimens at JMUH began in earnest. All of the necessary equipment was made available due to the generosity of the JMU Department of Biology. I began barcoding each specimen, while Jamie Smith was responsible for imaging. Jamie, who received a summer stipend for her efforts also accomplished most of the databasing.

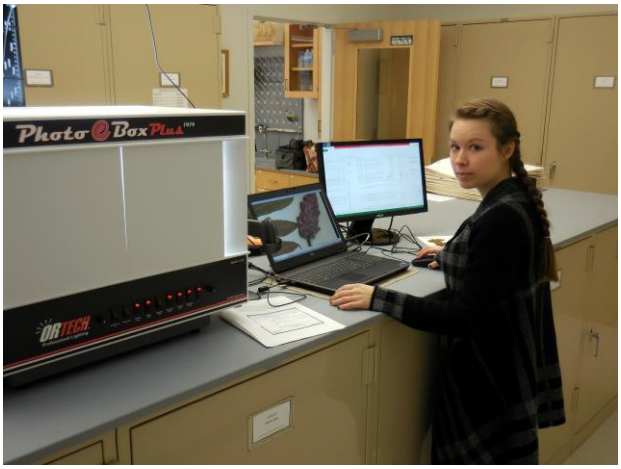

Figure 1 – Jamie Smith imaging JMUH specimens.

As of last month, most of the specimens had been barcoded (over 18,000), and over 2,800 had been imaged and databased. Although Jamie has now graduated (M.S. in Biology), our efforts continue (albeit a bit more slowly), with the assistance of a dedicated undergraduate biology student. Discussions are underway for making the information available online.

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

THE WIRED HERBARIUM
A Small Herbarium Digitizes

The DEK Herbarium is part of the Biological Sciences department at Northern Illinois University in DeKalb, IL. Started in 1962, it currently has ca. 23,000 specimens (see http://www.bios.niu.edu/about_us/herbarium.shtml). Until recently, the herbarium had no electronic database.

Last spring, Dr. Paul Sorensen attended an invitation-only iDigBio workshop in Tallahassee, FL. He was also contacted by Mary Barkworth, and ultimately joined an NSF grant proposal that included efforts to digitize smaller herbaria. That grant was not funded, but it did start Drs. Sorensen and Melvin Duvall thinking about digitization and electronic possibilities. About the same time, undergraduate student Ramona Terwedow wrote an internal proposal to purchase a camera, copy stand, a barcode reader, 5000 barcode labels, etc., with the goal of digitizing 2000 herbarium specimens, as a start towards complete herbarium digitization.

The grant was awarded (congratulations!), and equipment was procured and prepared. The digitization start was delayed for several months due to problems first with the camera lens and later with a camera malfunction. Meanwhile, curator Sorensen and assistant curator Duvall investigated ways to provide herbarium data online. They considered using Specify to drive a new data portal for DEK, but quickly decided they did not have the expertise or funds to manage a new data portal. Eventually they joined the Northern Great Plains data portal (http://ngpherbaria.org/portal/index.php), driven by Symbiota. Currently they have 379 specimens available online.

I visited the DEK herbarium recently. The herbarium is part of the first floor of Faraday Hall, nestled near a small river that winds through the pleasant campus. The herbarium is in one room, with a separate room as a work area. Their camera is mounted above a light table, and takes 6MB jpegs. Ramona has been barcoding, photographing, and entering data one specimen at a time (Fig. 1). She says she can complete 8-10 specimens per hour, and enters data directly into the Northern Great Plains DeKalb data portal.

Figure 1 – Ramona Terwedow databasing specimens.

I asked them why Symbiota? The primary reason was that Symbiota was the interface for direct entry of data into the Northern Great Plains data portal. They also feel that Symbiota is easier to understand, and that while Specify is a very powerful package it seemed more difficult to work with.

Why 6MB jpegs? Their camera budget was small, and they were told server and archiving space would quickly become a major issue if they captured larger images in other formats.

Mona told me "What has surprised me most about the digitization process is how easy it turned out to be, especially once we decided to go with the Northern Great Plains Herbarium website. We started out with just a spreadsheet we set up on our own, and that wasn't bad, but having a standardized format that a lot of other herbaria are using is better. Being able to share information is the main reason for doing this, after all." She added "My favorite part of digitizing has been seeing the variety of labels. Some are beautifully handwritten from a hundred years ago. Some are typed or computer-printed, and have so much information on them you'd think you were reading a novel."

What are plans for the future? Dr. Duvall told me, "We are pleased with the progress that we have made and we anticipate continuing our digitization project and training students in this process into the foreseeable future."

I personally think that their experiences are representative for smaller herbaria. Digitization IS important, and smaller herbaria should not be overlooked simply because they have few specimens. DEK, for example, has a very important collection of *Dahlia* specimens. The process of digitizing can seem overwhelming, and resources are almost always hard to get. Some of the decisions DEK has made that I think are important include:

1) Do not try to produce your own data portal. Yes, it is possible, but it will absorb time and funds that could be better spent elsewhere. Instead, join one of the already established regional data portals.

2) Consider your software carefully. To some extent, what software you use will depend on the data portal you join. Direct data entry is an attractive option, but build in regular backups of your data.

3) Design an efficient workflow. For example, DEK has the camera set up to automatically save each jpeg with a unique name incorporating the barcode that works with the database.

4) Ultimately the scarcest resource will be people power. DEK estimates it will need 2500 to 3000 person-hours to migrate all of their specimens into their online database. Future student technicians will be identified, trained, and employed to digitize the rest of the collection.

So, welcome to the digital herbarium world DEK! I hope your plans progress smoothly.

- Eric Ribbens, Western Illinois University,
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OTHER NEWS

"Stained with the Blood of Heroes"

Ken Cameron (WIS) recently shared with the editor an extremely interesting article dealing with a plant collection made in Georgia during the Civil War. Readers are encouraged to see it at http://www.news.wisc.edu/23312.

SHC Research Grants

Two $500 research grants sponsored by the Society of Herbarium Curators will be awarded to students whose research contributes to or uses herbarium resources in ways that augment the collections. Research on any taxa typically accessioned in herbaria including plant, fungal, lichen, and algal lineages is eligible. Supported activities could include, but are not limited to, fieldwork to generate vouchers for revisionary or floristic work, collecting morphological data from specimens, traveling to herbaria, or making and distributing physical specimens. Thus, students' overarching research could include molecular approaches but the merit of the proposal would be based on the ability of the work to contribute to building or improving herbarium resources. Additionally, meta-analysis of herbarium data would also be eligible, provided that a component of the research includes direct study of specimens.

Eligibility: Undergraduate and graduate students may apply. It is expected that only student research projects with the clear potential to lead to publication will be competitive. The student and the student's research advisor, who should provide a letter of recommendation, must be members of SHC at the time of application. To become a member or to renew a membership, please complete and return a membership application to our Treasurer (address provided on form). Membership is not limited to curators, but is open to anyone with an interest in herbaria.

Application Materials: 1) a one page grant application form ("Awards" tab at http://herbariumcurators.org/) listing student's name, address, and SHC advisor's name and proposal title; 2) a two-page proposal including project description, itemized budget justification and references cited (1 inch margins, 11-12 point font); 3) one letter of recommendation from the student's research advisor, who should be a member of SHC at the time of application. All materials should be sent electronically to the chair of the research grant committee, Dr. Rebecca Dolan (rdolan@butler.edu). PDF format is preferred. The letter of recommendation may be sent separately from the student's materials.

Deadline: 1 Feb 2015

Retirements

Dr. Steven R. Hill, field and herbarium botanist at ILLS and formerly herbarium curator at MARY and CLEMS has recently retired (May 1, 2014) after 20 years at the Illinois Natural History Survey. He remains active with research space at ILLS and contact information in Champaign, Illinois, remains the same. Research in the Malvaceae and general floristics continues, as well as collecting. His collection numbers are approximately 40,000 currently, with duplicates in numerous other herbaria. Steve continues to be willing to receive Malvaceae specimens for identification. His treatment of the Malvaceae of North America north of Mexico, with contributions by others, is set to come out in Flora North America, volume 6, in the not too distant future. His most recent publication, December 2014, "A new subspecies of *Sidalcea hickmanii* from Oregon" in the journal Phytoneuron 2014-113: 1-8 is available at http://phytoneuron.net/2014Phytoneuron/113PhytoN-SidalceahickmaniiSubsp.pdf

Steve Hill collecting in the field in Bolivia.

In Memoriam

Norlyn L. Bodkin (1937-2014) – Dr. Bodkin, 77, of Harrisonburg, VA, died September 28th, 2014 after a brief illness with leukemia. He was the son of the late Joe P. Bodkin and Nellie Painter Bodkin, and was born in Rockingham Memorial Hospital (Harrisonburg, VA). He was raised on a farm in Upper Tract, WV. His elementary education was in a two-room school in Upper Tract, and he graduated from Franklin High School (now Pendleton County High School, WV). He earned his BA and MS degrees in Biology from West Virginia University and his Ph.D. in Systematic Botany from the University of Maryland at College Park. He is survived by his wife, Susan Page Showalter Bodkin; two daughters, Marian Bodkin Rabeno of North Beach, MD and Dr. Anne Neville Murphy of Encinitas, CA; and his granddaughter, Katherine Linnea Murphy.

Dr. Bodkin started his college teaching career at Westminster College, New Wilmington, PA in 1962 and later came to James Madison University (then Madison College) teaching in the Department of Biology from 1964 until retirement from teaching in 1998. He taught a wide range of subjects throughout his tenure, with favorites being the botanical field courses. His outdoor field laboratories ranged from the Coastal Plain in Virginia to the higher elevation and Canadian vegetation at Dolly Sods, WV. Students were introduced to a wide variety of courses including Plant Taxonomy, Flora of Virginia, Plant Ecology, Plant Communities and Plant Pathology. He was always proud that the students loved the fieldwork and that class enrollment was always full.

In 1977, Dr. Bodkin wrote a proposal for the development of an arboretum on the campus of James Madison University, and in 1985 construction began on what would eventually be named The E.J. Carrier Arboretum (http://www.jmu.edu/arboretum/index.html). He served as Director for the following 15 years and often said that he was a very lucky man, having two full time jobs. Besides teaching students, he thought of the Arboretum as his greatest accomplishment at JMU and he would smile when referred to as the "father of the arboretum".

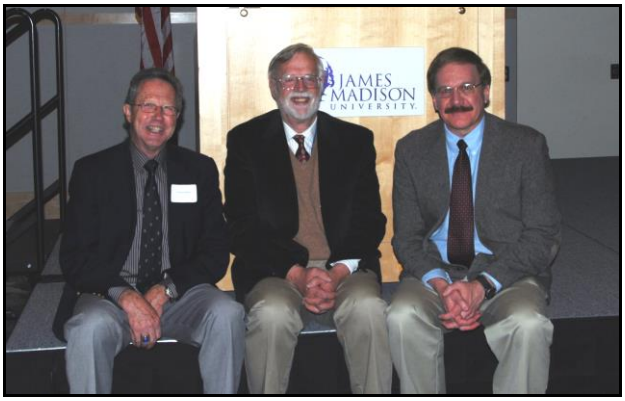
Dr. Bodkin was a member of the American Society of Plant Taxonomists, the International Association for Plant Taxonomy, the Southern Appalachian Botanical Society, the Virginia Academy of Science, and an elected Fellow of the Linnean Society of London. He spent a semester in London while on sabbatical and worked at the British Museum of Natural History in South Kensington separating John Clayton's 1700s collection of Virginia plants from the more than 4 million world plant specimens stored in their herbarium. His, and Frederick H. Utech's treatment of *Melanthium* appeared in the Flora of North America.

For over 35 years, Dr. Bodkin was a leader at the Annual West Virginia Wildflower Pilgrimage, where he was a favorite among the flora aficionados. He also led Natural History Studies Tours for students and community members to the Galapagos Islands, the upper Amazon Rain Forest in Ecuador and to western Ireland.

Dr. Bodkin received numerous awards and recognitions over his tenure at JMU including the Society of Land-

scape Architects Merit Award for Stewardship of the Land, Outstanding Achievement Award for Preservation of Natural Resources of our Country from National Conservation Committee of the Daughters of the American Revolution, JMU Board of Visitors Resolution for the Development of the JMU Arboretum, 1995-96 Distinguished Teacher Award in the College of Science and Mathematics, and the Faculty Distinguished Service Award for Outstanding Service to JMU. In 2006 the Norlyn L. Bodkin Scholarship for Arboretum and Botanical Field Studies was established. A new *Narcissus* (daffodil) variety, 'O'BODKIN' was hybridized and named for him by Brent Heath in honor of his being the first Director of JMU's arboretum.

James L. Reveal (1941-2015) – Dr. Reveal passed away on January 9th, 2015. At the time this was written, an obituary was not available. For now, I would encourage interested readers to visit his academic website at: http://www.plantsystematics.org/reveal/. Prepare to be amazed, especially when viewing his curriculum vitae!



Bodkin, Reveal, and McMullen in spring of 2008 at 2nd Annual Litten Botanical Lecture - © C.K. McMullen

On a personal note, I was blessed to have known both of the above botanists. Norlyn Bodkin served as my M.S. degree advisor (James Madison University) and Jim Reveal served as my Ph.D. degree advisor (University of Maryland at College Park). Dr. Reveal also served as Bodkin's Ph.D. advisor. I was honored to be asked to speak at Dr. Bodkin's memorial service last October 25th, and I was so pleased to have an opportunity to chat with Dr. Reveal and his wife Rose, who were in attendance. Dr. Reveal drove down from Ithaca, NY and back the same day, just to be able to show his respects. That is the kind of man he was. Both Dr. Bodkin and Dr. Reveal were true gentleman scholars, and their passing is a great loss to systematic botany and science in general. But, their legacies continue in their students! And, my admiration and affection for them continues as well.

Conley K. McMullen, James Madison University,
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Landon E. McKinney (1949-2014) – The following memoriam appeared in the summer 2014 issue of the Kentucky Native Plant Society newsletter, *The Lady-Slipper*. It was written by Ronald L. Jones, Eastern Kentucky University Herbarium, Richmond, Kentucky 40475, and Ralph L. Thompson, Berea College Herbarium, Berea, Kentucky 40404. Please see the original article for included photos of Landon and his wife Lela.

Landon E. McKinney, a talented field botanist and naturalist, passed away on Thursday, June 5th, 2014, at the Wade Park Veteran's Medical Center in Cleveland. He was 65 years old. Landon Earl McKinney was born May 17, 1949 in Nashville, Tennessee, to the late Lawrence Vern and Constance Joy McKinney. After graduating from Donelson High School in Nashville in 1967, Landon joined the Navy and served as a Marine Navy Corpsman from 1968–1970. He was a field combat corpsman in Vietnam during 1969. He earned a B.S. in Biology in 1973 from Middle Tennessee State University and subsequently his M.S. in Botany in 1977 from Middle Tennessee State University (MTSU). He was a Post-Graduate Research Associate in Plant Taxonomy at Vanderbilt University, working with Dr. Robert Kral, from 1985–1989. Landon began his life-long fascination with the stemless blue violets under the direction of Dr. Kurt Blum at MTSU. His master's thesis was "Preliminary Studies of the Acaulescent Blue Violets (*Viola*) with Special Reference to Middle Tennessee."

Landon had a varied career that included working for a pharmaceutical company and operating his own printing business. Nevertheless, after his family, his true passion was botany which he focused upon all his life. His botanical career including working in various capacities for several state heritage programs, including the Kentucky State Nature Preserves Commission from 1990–1996. Landon often worked part time or full time as an environmental consultant, and in recent years he worked full time for several different companies in Kentucky, Ohio, Tennessee, and throughout the eastern U.S. He conducted hundreds of status surveys for rare plant species over the years, including many federally endangered species. Landon was also an expert on habitat analysis and invasive species issues, and his work often involved the assessment of wetland communities and species, and making management recommendations on pre-serving natural habits and controlling invasive species.

Landon was heavily involved in the Kentucky Native Plant Society (KNPS) for many years; he regularly attended the annual meetings and frequently led field trips. Landon served as the KNPS President from 1992–1996 and from 2002–2006. Landon stepped up during these periods when KNPS needed a strong leader, and helped the KNPS to become one of the most successful native plant societies in the region. He also served a term as the Director of the KNPS Certification Program in Native Plant Studies, and taught a number of courses in the program, including Plant Ecology, Woody Plants, Sedges,

and Wetland Plants, at both Eastern Kentucky University and Northern Kentucky University. He taught a spring quarter course on "Native Plants of the Tri-state" as an adjunct instructor with the University of Cincinnati during 2006–2009.

Landon was an avid plant collector throughout his career. He collected thousands of specimens during all his various botanical activities and deposited them at regional herbaria. At the EKU Herbarium alone there are over 1,000 specimens on de-posit collected by Landon. These specimens serve as an important permanent legacy of Landon's botanical career. Landon eagerly collected difficult grasses, rushes, and sedges, and he possessed a special skill in identifying these problematic species. He was especially skillful in the genus *Carex*, a group of over 140 taxa in Kentucky alone, and he wrote the *Carex* keys for the 2005 book, *Plant Life of Kentucky*.

Landon's primary passion throughout his career was the genus *Viola*, in particular the stemless blue violets, and he was nationally known for his expertise in this genus. The seminal publication of his career occurred in 1992 with a book on the stemless blue violets—*A Taxonomic Revision of the Acaulescent Blue Violets (Viola) of North America*, published by the Botanical Research Institute of Texas. This work is very highly regarded and had a great influence on subsequent studies of this group of violets, with other experts often citing Landon's work and comparing it to their interpretations. Landon also wrote the *Viola* treatment for *Plant Life of Kentucky*. Altogether Landon authored or co-authored approximately 50 scientific publications and professional presentations, mainly on *Viola*, but on a variety of other topics as well. He was a frequent presenter at the Annual Meetings of the Association of Southeastern Biologists, Kentucky Academy of Science, and Tennessee Academy of Science. Landon continued his work and interest in *Viola* until the very end. In an email sent December 4, 2013, Landon noted that he had just about finished his work on the Violaceae (with R. John Little) for the Flora of North America project, and was working on a paper to be submitted to the journal *Castanea*. He was also developing a treatment of violets for West Virginia. On this past April 18, he sent an email to local botanists concerning the recent discovery of a new county record for *Viola egglestonii*, and noted that …"after 40+ years of working with them [violets], they still excite me and after looking at them, this population is as classical cedar glade violet as you can get."

Landon is survived by his devoted wife of 31 years, Lela McKinney; children Adam McKinney, Amanda (Troy) Chitwood and Eric (Amy) McKinney; grandchildren Landon, Lucas, Erica, Katelyn and Whitney. Landon will be sadly missed by his many extended family members, special friends, and botanical colleagues.

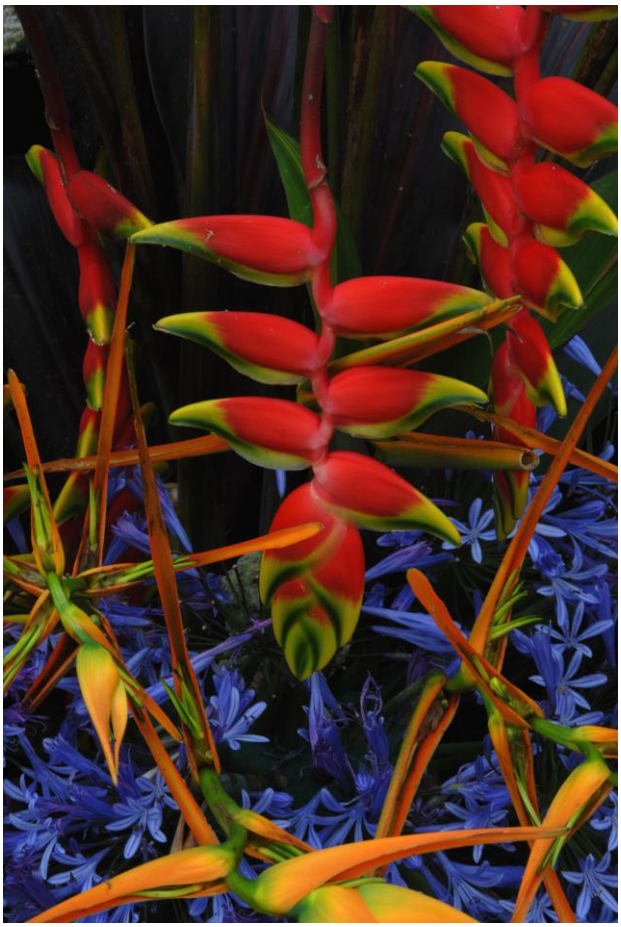
John Herr, University of South Carolina,
herrjr@mailbox.sc.edu

NAME THAT PLANT

Congratulations, *once again* to Donna Ford-Werntz (WVA) for receiving the highest score on the latest plant "quiz", which appeared in the July 2014 issue of *The Vasculum*. The species were: Fig. 1 - *Spinulum annotinum* (L.) Haines (Lycopodiaceae) and *Gautheria procumbens* L. (Ericaceae), Fig. 2 - *Clematis albicoma* Wherry (Ranunculaceae), Fig. 3 - *Minuartia patula* (Michx.) Mattf. (Caryophyllaceae), Fig. 4 - *Galearis spectabilis* (L.) Raf. (Orchidaceae), and Fig. 5 - *Rhododendron* sp. (Ericaeceae).

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



Garden in Costa Rica - © C.K. McMullen

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