



# FRIENDS

OF THE UNIVERSITY  
OF MONTANA

# HERBARIUM

Spring 2019

## NEW VASCULAR PLANT CABINETS INSTALLED

The Friends raised almost \$16,400 for new vascular plant cabinets in 2017 and early 2018 through private donations (see cover article in previous newsletter). New cabinets were necessary to alleviate crowding and compaction in MONTU's current vascular collection, and to create new space for incoming specimens. A total of 11 new cabinets were purchased in early 2018, shipped to UM's loading dock, and scheduled for installation on June 12, 2018.

The UM Herbarium occupies the 3<sup>rd</sup> floor of UM's Natural Sciences (NS) Building, one of the oldest structures on campus. The building has never been retrofitted for an elevator, so delivery of the 350-pound cabinets was a complicated task for the University's Facilities Services crew. To lift each cabinet to the NS building's 3<sup>rd</sup> floor, the crew brought in a small hydraulic crane with a telescoping boom, and positioned it outside one of the Herbarium's windows. Cabinets were then delivered through the window and placed on a separate hydraulic lift, wheeled into place, then lowered and tilted into position (see image below). The operation involved four crew members and was overseen by the herbarium curator.

Post-installation, Herbarium staff has been working to shift specimens into MONTU's newly acquired cabinets. We've also been relabeling cabinets to reflect their contents, and updating the index of specimens that guides Herbarium users to the collections in which they're interested. The collection must be kept in order, similar to a library, or specimens might be misplaced or misfiled.

With the cabinet project nearly completed we would like to offer heartfelt gratitude to the donors who contributed to the Cabinet Fund. These contributions have ensured that MONTU's current collections will be safe from compaction in the foreseeable future, and that the plants brought in by future collectors will have a suitable archival home.



## Herbarium Activities

MONTU ended 2018 with a healthy list of accomplishments. Our volunteers, students, and assistants steadily moved the following projects forward:

2,900 Montana moss collections were entered into MONTU's online database portal, the Consortium of Pacific Northwest Herbaria ([pnwherbaria.org](http://pnwherbaria.org)). Our moss catalog is now accessible worldwide, giving bryologists from any location the ability to remotely examine its contents. Funding for this work was made possible by a grant from the Institute for Museum and Library Sciences (IMLS).

MONTU's Montana lichen catalog was quantified and listed by collector, which is the first step in our digitizing process. Once we've found a skilled lichenologist to check determinations we'll pursue grant funding through IMLS.

With over \$16,000 raised by MONTU's supporters from around the country, we were able to purchase 11 new vascular plant cabinets (see Cabinet article).

MONTU's fungi collection, with over 1,100 specimens, was deaccessioned and moved to the Sam Mitchel Herbarium of Fungi, a regional and well-curated repository of fungi specimens at Denver Botanical Gardens. The deaccession process involves listing the accession number and species name of each individual collection, which is crucial to tracking its movement from one archival home to another.

A formal MONTU Teaching Collection was started. The Teaching Collection can be loaned for outreach activities, including classes, artistic work, and educational displays. The project was initiated in response to frequent requests for specimens from educators and organizations that promote the importance of native plants. A list of available species in the Teaching Collection will soon be available on MONTU's website ([hs.umt.edu/herbarium](http://hs.umt.edu/herbarium)).

Educational tours were given to members of the public as well as students of UM's Rocky Mountain Flora class and UM's Western Plant Systematics class. The student tours included over 200 undergraduates, enrolled in majors such as wildlife biology and environmental studies. Herbarium tours give students a chance to see the resources available to them as professionals.

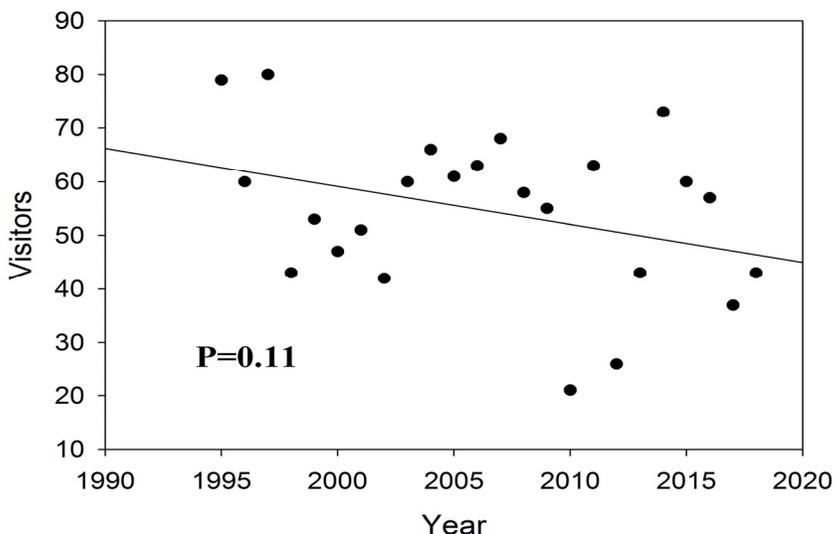
An educational display was assembled for a large case on the first floor of UM's Health Sciences Building. The case is located directly across from the Division of Biological Sciences office. New MONTU displays will be assembled and installed at least annually and will feature notable achievements made possible by the collection and archiving of Montana vascular plants, bryophytes, and lichenized fungi.

The Montana Native Plant Society held an Herbarium Night in January led by Peter Lesica and focused on the genera *Saxifraga* and *Micranthes*.

# Notes from the Board

Although I am not an official member of the Friends of the UM Herbarium (FOH) Board of Directors, I have been the editor of this newsletter for over 20 years. Each year one of my chores is to summarize herbarium visitation. I've noticed a few things when looking over the data for the past years. First, there appears to be a gradual and statistically insignificant downward trend in personal visitation over the past two decades (see below). This trend would nearly disappear if the two anomalous years of 2010 and 2012 were removed from analysis. Any remaining downward trend could probably be explained by the ability of users to obtain the information they want remotely from the Pacific Northwest Consortium database. A few university classes visit the herbarium each year, but in general there are only a small number of visits by University of Montana student or faculty researchers each year. Interestingly, although the herbarium is a university facility, the largest group of users across all the years is composed of federal and state land managers (e.g. U.S. Forest Service, Bureau of Land Management, Montana Natural Heritage Program, etc.). The University of Montana no longer has a faculty plant systematist, so the decline in student/faculty visitation is understandable. In addition, interest in descriptive vegetation ecology has declined in favor of experimental, reductionist studies. On the other hand, use by land managers has remained steady or perhaps even increased, probably a reflection of a continued concern with the conservation of biological diversity. Perhaps the take-home message for FOH members is that the future of our herbarium can benefit when we speak up for defending conservation of plant diversity on public lands by attending public meetings and commenting on management plans. The herbarium is an indispensable tool in preserving what we love.

Peter Lesica



## FRIENDS

of the University  
of Montana

## HERBARIUM



**DIVISION OF  
BIOLOGICAL SCIENCES  
UNIVERSITY OF  
MONTANA  
MISSOULA, MT 59812**

*THE MISSION OF THE  
FRIENDS IS TO SECURE  
SUPPORT FOR AND TO  
ENRICH THE  
COLLECTIONS AND  
OPERATIONS OF  
THE UM HERBARIUM*

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The *Friends* Newsletter  
Edited by  
Peter Lesica

Layout & Copy Editing by  
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## Thanks to new members of the Friends!

Your continued interest and support is what makes us effective. Thanks, and welcome to these new members.

Justina Dumont, Helena  
Klara Varga, Lincoln  
Vicki Watson, Missoula

## Flora of the Pacific Northwest, 2nd Edition Now Available\*

The University of Washington Herbarium of the Burke Museum is pleased to announce the publication of *Flora of the Pacific Northwest*, 2nd edition. It has been 45 years since C. Leo Hitchcock and Arthur Cronquist published their groundbreaking one-volume, condensed version of the 5-volume *Vascular Plants of the Pacific Northwest*.

For decades academic researchers, field botanists, students, and amateur botanists have relied on the one-volume of “Hitchcock” to identify and understand the evolutionary relationships of the region’s vascular plants. One is hard-pressed to find another regional flora with such well-honed keys and comprehensive illustrations. However, the passage of 45 years has a way of rendering any flora obsolete due to the new knowledge generated over such a length of time. This is especially true for the past 45 years.

In 2012, the UW Herbarium approached the University of Washington Press about producing a 2nd edition *Flora*, and the idea was enthusiastically received. Serious work on the new *Flora* began in 2013 and culminated in the new print volume in 2018. This was truly a regional team effort, with treatment authors and financial support for the project coming from all areas covered by the *Flora*: Washington, Idaho, Montana, Oregon, and southern British Columbia.

Table 1 summarizes the changes between the 1st and 2nd editions of the *Flora*, and these changes are extensive. Most notably perhaps are the increases in the numbers of family and genera, along with a near doubling of the non-native taxa now documented in the region. You can read more about taxonomic changes elsewhere in this newsletter and find out more about the *Flora* 2nd edition on the project website: <http://www.pnwherbaria.org/florapnw.php>

With the print version out, the UW Press is pursuing development of an eBook version suitable for tablets and iPads. eBook

**Table 1.** Summary statistics for contents of 1<sup>st</sup> and 2<sup>nd</sup> editions of *Flora of the Pacific Northwest*.

	1st edition	2nd edition	Net change	% Increase/Decrease
<b>Families</b>	129	159	30	23.3%
<b>Genera</b>	826	1,141	315	38.1%
<b>Species</b>	3,555	4,818	1,263	35.5%
<b>Infraspecies</b>	1,393	1,329	-64	-4.6%
<b>Native taxa</b>	3,559	3,891	332	9.3%
<b>Exotic taxa</b>	722	1,444	722	100%
<b>Total taxa</b>	4,281	5,335	1,054	24.6%
<b>Excluded taxa</b>	134	210	76	56.7%
<b>Total pages</b>	760	920	160	17%

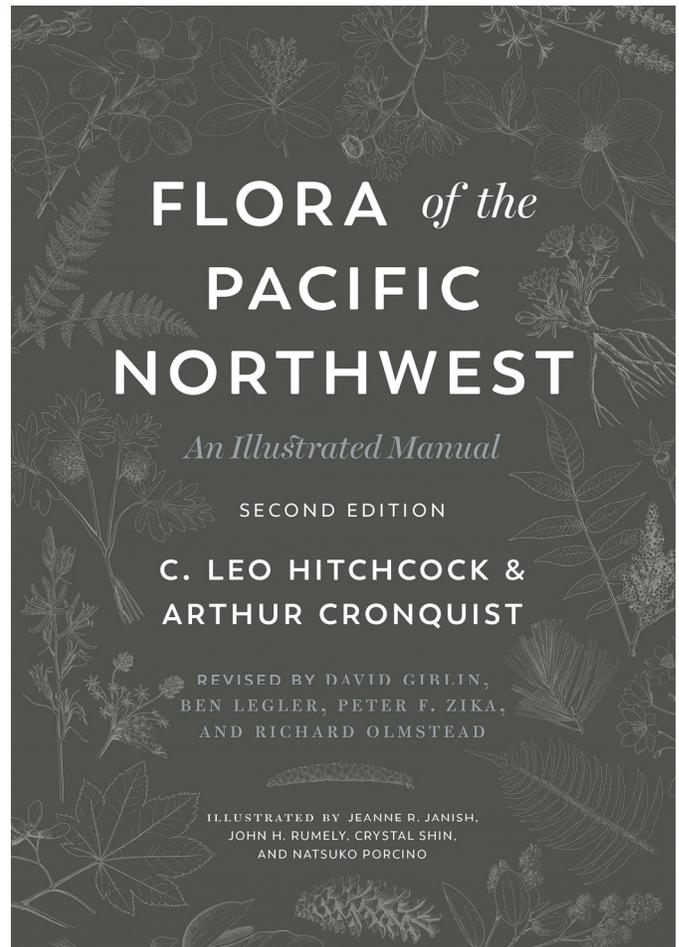
versions of the *Flora* 2nd edition are now available through Google Play and iTunes.

In 2019, we will continue raising funds to expand the project website to provide updates to taxonomy, nomenclature, and identification keys as new information becomes available. In this way we hope to make sure that we don’t have to wait another 45 years before the contents of the print version are updated.

Special thanks go to Peter Lesica for authoring the Ericaceae and *Erigeron* treatments, as well as for providing helpful feedback on draft versions of other treatments in the book. Contributions from the herbaria at the University of Montana and Montana State University to the Consortium of Pacific Northwest Herbaria database were indispensable. The *Flora* 2nd edition can be purchased through the UW Press website (<http://www.washington.edu/uwpress/search/books/HITFL2.html>) and should be available through your local booksellers.

David Giblin  
University of Washington Herbarium, Burke Museum

\*A version of this article appeared in the December 2018 *Sage Notes* published by the Idaho Native Plant Society.



# The Challenges of Achieving Nomenclatural and Taxonomic Stability

David Giblin, University of Washington Herbarium, Burke Museum

In October 2018, the UW Herbarium published a 2<sup>nd</sup> edition of Hitchcock and Cronquist's one-volume *Flora of the Pacific Northwest* (*Flora*, hereafter). Because 45 years had passed since its original publication, the 1<sup>st</sup> edition *Flora* was less than 50% up-to-date in terms of its names (nomenclature) and classifications (taxonomy). Any professional tool with less than 50% reliability needs replacement.

When I look at the taxonomic changes between the 1<sup>st</sup> and 2<sup>nd</sup> edition *Flora*, I believe that our understanding of Pacific Northwest vascular plant diversity has improved over the past 45 years. For example, the molecular evidence is incontrovertible that *Penstemon* (Plantaginaceae) does not share a direct common ancestor with *Scrophularia* (Scrophulariaceae), and that what we called Liliaceae in the 1<sup>st</sup> edition *Flora* is actually more than half a dozen families, including Liliaceae, each with a unique evolutionary history. I have to confess to not yet memorizing which genera belong to which newly recognized families in this group, but I will, and in so doing will have a better understanding of family diversity and generic relationships. Promoting such improved understanding was a priority for producing the 2<sup>nd</sup> edition *Flora*.

I believe that taxonomic changes from molecular systematics research are bringing me closer to the truth. I first need to clarify that by "truth" in this statement I mean a more accurate characterization of plant evolutionary relationships. For example, molecular studies have clearly demonstrated that *Mimulus* is native almost exclusively to Australia, with only two North American species (native to the Northeast, but one introduced in the Pacific Northwest). To ignore the evolutionary uniqueness and endemic origin of *Erythranthe* and *Diplacus* (genera in the 2<sup>nd</sup> edition *Flora* segregated out of *Mimulus* and placed in the Phrymaceae not Scrophulariaceae) in western North America because it requires learning new names seems to fall short of our responsibility to communicate accurately the true diversity of our flora.

I should add that some taxonomic changes based on molecular systematics have been incorrect and have obscured our understanding of evolutionary relationships. Some molecular-based studies with less robust results have resulted in taxonomic and nomenclatural changes that may be reversed over time (e.g., splitting the genus *Mitella* (miterwort) into several genera). Such scenarios generate frustration among field botanists and ecologists tasked with quantifying and communicating about vascular plant species' richness or diversity. While I share the pain of these frustrations, I see this exasperation as an unavoidable consequence of the scientific process in general (hypothesis testing) and the exercise of systematics in particular (data interpretation). On balance, however, I believe most of the new changes have been correct far more often than not.

At the heart of this frustration and exasperation is the fact that naming things (nomenclature) and classifying things (taxonomy) make competing demands. Addressing nomen-

clatural stability, we could decide to have a stable naming system for entities (e.g., family, genus, species) that did not change (e.g., field botanists decide to call all monkeyflower looks like). However, over time nomenclature and taxonomy would diverge such that communication among field botanists, systematists, and university instructors would break down.

Regarding taxonomic stability, I wish there was an easy way to sort out the good and not-so-good taxonomic changes resulting from molecular-based studies that ultimately result in nomenclatural whiplash. Because molecular-based studies are an objectively-based scientific process that involves subjective data interpretation, the notion of a probability threshold for "accepting" the results is unlikely to garner support in the scientific community. In fact, an article published in *Nature* proposing a taxonomic governing body (Garnett and Christidis 2017) was roundly criticized by taxonomists across organismal disciplines worldwide (Thomson et al. 2018).

I think that over the last 35 years, molecular-based studies have introduced more taxonomic stability than instability to our understanding of the Pacific Northwest flora. I'm also reasonably confident that the majority of taxonomic and nomenclatural changes that needed to be made for our flora have been made, at least at the rank of family and genus. Consequently, nomenclatural and taxonomic stability for most elements in the Pacific Northwest flora is nearly at hand. Additional studies will solidly confirm or reject those instances where the data are currently weak (e.g., *Mitella*). Enduring the recent upheavals will benefit future communication about taxonomic relationships. Of course, this is small comfort to those of us who have been learning new names and classification for the past few decades. For me, if at the end of such efforts I had a truer understanding of the evolutionary relationships among elements of our flora, then I believe the effort would be worthwhile.

Garnett, S. T. and L. Christidis. 2017. Taxonomy anarchy hampers conservation. *Nature* 546: 25-27.

Thomson, S. A. et al. 2018. Taxonomy based on science is necessary for global conservation. *PLOS Biology* 16: 1-12.

In honor of the memory of Herbarium Volunteer Ron Pagel, we thank the following donors:

Adina Pagel, William O'Connor, Kelly Chadwick, John & Linda Pilsworth, James & Jeanine O'Connor, Roberta Burnett, Douglas & Gael Harris

We miss seeing Ron in the Herbarium.

## A Primer on Plant Taxonomic Instability

### Peter Lesica

Taxonomy is a tool for communication. For example, in the “taxonomy” of furniture there are dressers and desks and tables and chairs, etc. If I say chair, you know I mean something you sit on not something you put your clothes in. Within the “genus” of chairs, if I say “folding chair” you know I’m not talking about a rocking chair. Nonetheless, a folding chair is more similar to a rocking chair than it is to a dresser. Taxonomy applies a different name to every entity and groups similar entities together. Taxonomy allows biologists to know that they are communicating about the same or different organisms. This is useful for many reasons. For example, one can accurately compare the species composition of a forest taken at two locations or at the same location at two different times. Nomenclatural stability is essential for purposes of communication.

Nomenclatural changes happen when new species are discovered and described. The increased communication between researchers across the globe has also promoted change. For example, “our” *Poa sandbergii* was found to be the same as *Poa secunda* from South America. International rules for botanical nomenclature state that the latter name should be used because it was described first.

Some of this change has been “one step forward followed by one step back” as different ideas wax and wane (i.e., lumpers versus splitters). Rydberg, Greene, and others in the early part of the last century were primarily splitters. Then came Cronquist and Hulten who tended to be lumpers. Recently the tendency has been a return to splitting with revival of many of the generic circumscriptions put forth by Rydberg et al. (see Endersby 2009 for a lucid description of the lumpers vs. splitters phenomenon). This philosophical flip-flop has been a long-standing source of taxonomic instability. There has been continuous change in the taxonomy of plants since Linnaeus’ time as new species are discovered and new ideas embraced.

Recently a large proportion of the nomenclatural changes are happening due to advances in molecular genetics. For evolutionary biologists, taxonomy is a tool for expressing relationships among organisms. In the past it was often assumed that similar-appearing organisms were more closely related than dissimilar organisms. For example, sunflowers are more closely related to fleabanes than they are to lupines. However, looks can be deceiving due to a phenomenon called convergent evolution. For example, cactus and stonecrops are not closely related in spite of the fact that both have succulent stems, presumably as an adaptation to environments with limited water. Over the past several decades evolutionary biologists have been using molecular markers to provide information on evolutionary relationships that do not rely on morphological appearances. These molecular methods are not “fooled” by convergent evolution. Molecular genetics holds the promise of positively determining evolutionary relationships among species, genera, and families and bringing stability to taxonomic nomenclature. Sounds good, but there are some problems.

Differences in groups of genetic markers among taxa are used to construct phylogenetic trees that express the relationships among species, genera, or families. These phylogenetic trees are computed using algorithms that determine the most likely relationships among the taxa. The degree of confidence in this relationship tree can vary from very strong to weak. Taxonomy built on a weak phylogenetic tree is likely to change with future research, and this makes taxonomic change more likely, leading to instability. Another problem is that a phylogeny based on

results from one type of genetic marker can differ to some degree from that obtained with a different type of marker, even when phylogenetic relationships are strongly supported (see Rydin et al. 2017).

Regardless of these problems, many plant systematists promote nomenclatural changes based on their research. The result is taxonomic instability that reflects the search for true evolutionary relationships but hampers communication among ecologists, conservationists, physiologists, restorationists and other practitioners describing non-evolutionary aspects of plant biology. The problem is that taxonomy is being used to serve two masters—communication and the study of evolution. Is there a way to reduce instability while continuing to gain insight into plant evolution?

Ornithologists don’t have nearly the problem with taxonomic nomenclature as botanists for the simple reason that the American Ornithological Union has a policy of standardizing common names. In most cases this means that if systematists change the genus of a bird species, the common name will remain the same or be little changed. For example, in recent years *Dendroica coronata* was changed to *Setophaga coronata*, but it is still known as a Yellow-rumped Warbler. A good, albeit uncommon, plant example of this is bluebunch wheatgrass, which maintains the same common name whether it is placed in *Agropyron*, *Elymus*, or *Pseudoroegneria*. Unfortunately, most plant common names are far from being standardized. For example, *Philadelphus lewisii* is commonly called syringa in Idaho but mock orange in Montana. Furthermore, standardizing plant common names would be a big chore because there are over 10,000 native plant species in North America compared to fewer than 1,000 bird species. However, the USDA PLANTS database provides a single common name for each plant species recognized as valid.

Another possible way to reduce the degree of taxonomic instability without retarding advances in evolutionary biology is to curtail taxonomic changes unless they are well supported (for example, phylogeny nodes with at least 90% confidence) by at least two phylogenies based on different molecular markers (e.g., mitochondrial, ribosomal, chloroplast DNA, etc.). In this case phylogeneticists could publish their evolutionary biology results, advancing our understanding of the evolution of the group, but can only publish a new taxonomy if their phylogeny is well supported by data from two different types of molecular markers.

Whatever the solution, it would be great if phylogeneticists, evolutionary biologists, and on-the-ground botanists and ecologists could work together to help solve this problem.

Endersby, J. 2009. Lumpers and splitters: Darwin, Hooker, and the search for order. *Science* 326: 1496-1499.

Rydin, C., N. Wilkstrom and B. Bremer. 2017. Conflicting results from mitochondrial genomic data challenge current views of Rubiaceae phylogeny. *American Journal of Botany* 104: 1522-1532.

### 2019 FOH Annual Meeting

The annual business meeting of the Friends of the UM Herbarium will be held Saturday, November 2nd from 10:00 AM to 2:00 PM. The meeting will be held in Rm. 202 of the Natural Sciences Building on the UM Campus. This is the annual meeting of the Board of Directors and is open to the membership.

## MONTU NEWS BRIEFS

### New Acquisitions

**Peter Lesica:** Seventy-two vascular plant collections from various locations in Montana; **Richard Halse:** Vascular plant collections from Montana and seven western states; **Joe Elliott:** Approximately 100 moss collections from Montana and western Canada; **Shannon Kimball:** Ninety vascular plant collections from Golden Valley, Flathead and Wheatland Counties, Montana; **Marirose Kuhlman:** Nine vascular plants from Missoula and Richland Counties; **Scott Mincemoyer:** Fifty-six vascular plants from various Montana counties; **Andrea Pipp:** Mosses collected from Milton Ranch, Musselshell County; **Karissa Ramstead:** One vascular plant collection from Lewis and Clark County; **Klara Varga:** Two collections of *Lycopodium dendroideum* from Lewis and Clark County; **Dorothy Wallace-Senft:** *Carex occidentalis* from Madison County; **Prairie Wolfe:** *Poa bulbosa* collected from MPG Ranch in Missoula County.

### Loans for Research

**University of British Columbia:** *Bartramia stricta* collection from Logan Pass loaned for determination.

### Gifts and Exchanges

**University of Washington (WTU), David Giblin:** Gift of 7 Peter Lesica vascular plant collections from Montana to WTU for accession.

**Boise State Herbarium (SRP), Barbara Ertter:** *Rosa canina* collected by Peter Lesica, gift for determination.

**University of Idaho Stillinger Herbarium (ID), Ben Legler:** Exchange of 229 vascular plant collections from the Idaho Panhandle and northwest Montana.

### Publications

Hitchcock, C.L. and A. Cronquist. 2018. *Flora of the Pacific Northwest: An Illustrated Manual*, 2<sup>nd</sup> Edition. Edited by D.E. Giblin, B.S. Legler, P.F. Zika, and R.G. Olmstead. University of Washington Press, Seattle, WA. 936 pp.

## Visitors to the MONTU Herbarium in 2018

### General Public and Private Consultants

Evelyn Neel (MCWD), Scott Mincemoyer, Nika Scade (Koda Maps)

### UM Researchers and Students

Kory Kolis, Mariah McIntosh, Lila Fishman, Rocky Mountain Flora class, Vicki Watson, James Habeck

### Federal, State, Tribal, NGO Biologists

Justina Dumont (USFS), Susan Rhinehart (USFS), Andrea Pipp (MTNHP), Hillary Cimino (USFS), Steve Shelly (USFS), Klara Varga (USFS), Kadie Gullickson (USFS), Jen McNew (BLM)

### Other Academic Researchers

Marirose Kuhlman (MPG Ranch), Prairie Wolfe (MPG Ranch), Jack Adcock (MPG Ranch), Rushabh Kamdar (MPG Ranch), Zdenka Krenova (Global Change Research Institute of Czech Republic), Zdenka Chocholouskova (University of West Bohemia)

## Herbarium Volunteers & Assistants

MONTU's faithful crew keeps the wheels of progress turning in a number of important areas, and 2018 was especially busy. Whether it's mounting newly accessioned plants or shelving recently returned loans, tasks were accomplished accurately and efficiently this past year by these skilled people:

**Maggie Ross** arrived at UM with a bachelor's in environmental studies from the University of Wisconsin-Eau Claire, and quickly learned the ropes as a volunteer in 2017. She moved into the role of Herbarium Assistant in 2018, and tackles every chore we toss in her direction. Maggie was primarily responsible for entering 2,900 moss collections into our online database over the winter of 2018-2019. Maggie's interests include hiking, reading, and spending time outside.

**Peter Donati** expressed interest in volunteering and learning more about MONTU upon his arrival to UM for the 2018-2019 academic year. We were able to secure funding for him and put him to work mounting, databasing, and filing incoming collections. Peter has also been searching for and fixing database errors. Peter is majoring in wildlife biology, and his aptitude for plant taxonomy will serve him well in that vocation. When not busy with homework or at the Herbarium Peter hikes, skis, and camps.

**Dorothea Kast**, Missoula-area landscaper, has been hard at work this winter mounting expertly-pressed plants collected by Peter Stickney. The Stickney collections fill cabinets in the Intermountain Research Station Herbarium (MRC), which is in a room adjacent to MONTU. Dorothea has a masters in comparative literature from the University of Wisconsin-Madison and did doctoral work at Northwestern University. She's lived in Missoula since 2009 and spends her free time practicing yoga, reading, and trying to center clay on a potting wheel!

**Barbara Amadon** recently retired and moved to Missoula to be closer to family. Her work in the Herbarium has focused on mounting plants for our newly developed Teaching Collection (see Herbarium Activities). Barbara's steadfast dedication as a volunteer has been remarkable and has allowed us to accumulate over 300 mounted vascular plant sheets that are available for educational loan. She loves reading, working on landscaping and garden projects, and spending time with her family.

**Marty Skinner** enjoyed a long career as a Helena physician before retiring and moving to Portland, Oregon. He volunteers there for the Hoyt Arboretum Herbarium and is sharing the skills he's learned with us when he visits his Missoula-area daughter. Marty is willing to jump into whatever project we're working on and we're always grateful for the extra set of experienced hands. He keeps himself quite busy in retirement learning all that he can about the flora of western Montana.

**Zachary Sippel** has joined us as a student intern for his freshman year at UM. He's been entering species names from the growing Teaching Collection into an Excel database, which will soon be available for view on MONTU's website. Zac's true passion is telemark skiing, which he fits in between a very full load of classwork.

### Photo captions for Page 7

1. Peter Donati enters new collections into the database
2. Dorothea Kast mounts new collections
3. Evelyn Neel, scientific illustrator, works on plant drawings
4. Students interning with faculty member Bill Holben remove small sections of material for genetic barcoding
5. Maggie Ross moves species folders into the new cabinets
6. Kadie Gullickson and Justina Dumont, botanists for the Helena-Lewis & Clark National Forest, use specimens to identify their collections



**YES!** *I want to help protect the irreplaceable collections and enhance the facilities of the University of Montana Herbarium*

- |                          |                            |              |
|--------------------------|----------------------------|--------------|
| <input type="checkbox"/> | <b>REGULAR MEMBER</b>      | <b>\$15</b>  |
| <input type="checkbox"/> | <b>SUSTAINING MEMBER</b>   | <b>\$25</b>  |
| <input type="checkbox"/> | <b>CONTRIBUTING MEMBER</b> | <b>\$50</b>  |
| <input type="checkbox"/> | <b>ORGANIZATION</b>        | <b>\$50</b>  |
| <input type="checkbox"/> | <b>LIFE MEMBERSHIP</b>     | <b>\$300</b> |
| <input type="checkbox"/> | <b>SPECIAL GIFT</b>        | <b>\$___</b> |
| <input type="checkbox"/> | <b>HONORARIUM FUND</b>     | <b>\$___</b> |



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The University of Montana – Missoula, MT  
59812

Dues are for a period of **two** years. Dues for current members are payable in even-numbered years. New memberships are accepted at any time. All contributions to the Friends are tax deductible to the full extent provided by law. All checks should be made payable to: U.M. Foundation/Friends of the U.M. Herbarium-Fund #29H.

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