

FRIENDS *of The University of Montana* HERBARIUM

Spring 2000

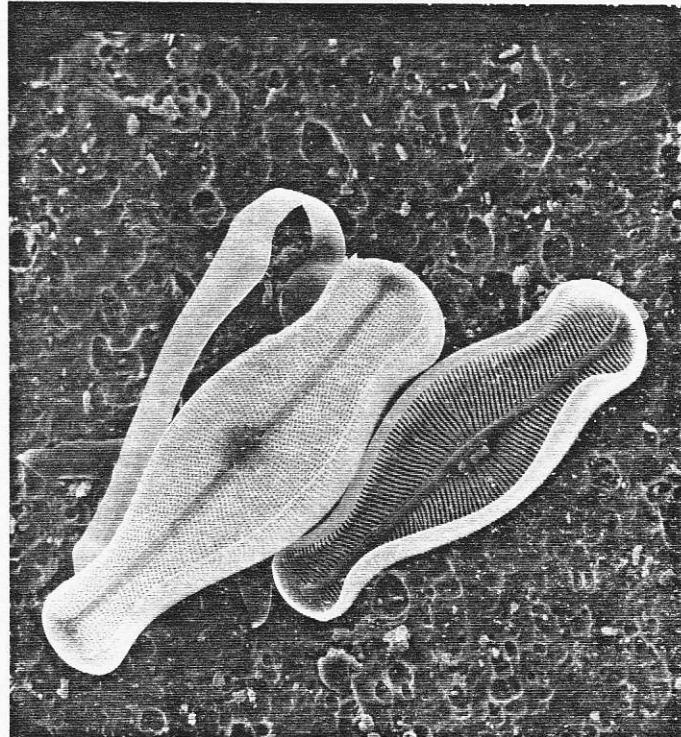
UM Herbarium Gains Valuable Diatom Collection

By Loren Bahls

The Montana Diatom Collection (MDC) is coming to the University of Montana Herbarium. Representing the combined collections of Helena diatomists Loren Bahls and Erich Weber, MDC consists of about 5,000 diatom samples from over 2,000 locations across Montana and neighboring states. MDC was started in 1968 and continues to grow by about 200-300 samples each year.

Diatoms are one-celled plants whose cell walls are constructed of opaline glass (hydrated amorphous silica). Diatom cells consist of two opposing glass valves that fit together like a pill box to enclose the chloroplast and other soft structures. The valves are held together by one or more encircling bands of silica,

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Didymosphenia geminata, a large diatom from western Montana, showing the two valves (separated) and a girdle band (700X). SEM photo by Dan Corwin, Rocky Mountain Laboratory.

Thank You!

The following individuals and organizations have become new members or contributed to the Cabinet Fund, between the last newsletter and Feb. 1, 2000:

Helen Atthowe
Loren Bahls
Drake Barton
Arthur Callan

Meyer Chessin
Pam Hackley
Kathy Lloyd
David Ramsden

Steve Slaughter
Peter Stickney
Jeanne Worthy

2000 FRIENDS OF THE UM HERBARIUM ANNUAL MEETING

The Annual meeting of the Friends of the UM Herbarium will be held Saturday, November 11, from 10 a.m. to 2 p.m.

The meeting will be held in Room 202 of the Natural Sciences (Botany) Building on the UM Campus. This is the annual meeting of the Board of Directors and is open to the membership.



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.

BOARD OF DIRECTORS
Joe Elliot
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The *Friends Newsletter* is edited by Peter Lesica and David Dyer.
Layout by Kim Todd

Notes from The Board

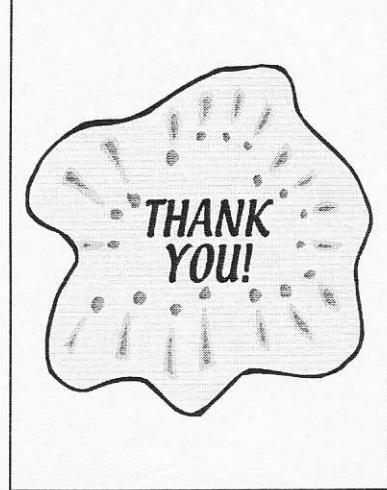
There are many similarities between libraries and museums or herbaria. Both contain objects that encapsulate knowledge from a given time and place and which are being carefully stored for use by future researchers. Both provide services to users, lend their collections, decide on a balance between access and preservation, and are faced with perpetual funding needs. In recognition of these similarities, the formerly separate national agencies that provide grants to museums and libraries merged in 1996 into a single agency with the title of "Institute of Museum and Library Services."

Creating electronic databases of specimen collections, like automated library catalogs, increases the utility and use of collections by allowing browsing from remote locations and new information search possibilities (for example, all the plants collected from a particular location). Museums and herbaria have generally been slower than libraries to automate their collection records. It has been a long-standing interest of mine to see the UM Herbarium computerize their collection records and even perhaps digitize and link some related specimen information. Web-based catalogs allow the potential integration of specimen images, collector field notes, and publications with traditional catalog records. At a time when the world is losing species at an unprecedented rate and land-use decisions are continually under debate, a computerized UM Herbarium specimen collections catalog would serve as an important resource for students, anthropologists, and others researching the biological diversity, ecology and natural history of Montana and the Northern Rocky Mountains.

--Barry Brown, Science Librarian, University of Montana Mansfield Library

Fund-Raising Drive for New Cabinets Successfully Completed

The Friends of the UM Herbarium have successfully completed their drive to obtain new cabinets. Since 1996, we have raised a total of \$13,000 to purchase 16 new cabinets. Ten of these were obtained in 1997. Since then we raised an additional \$4,800 and, with a generous, last-minute contribution from Peter Stickney, the Board was able to authorize purchase of six cabinets at their meeting in November. These additional cabinets will completely fill the space currently available and will finish the job of relieving the overcrowded specimens. We can all breathe a sigh of relief. The cabinets were ordered in December and should arrive this spring. With a little rearranging and shuffling of specimens, the job will be done by summer. Thanks to all of you who helped. There is no doubt that botanical natural history is alive and well in Montana.





Frank Hubert Rose

On December 5, 1940, Frank Rose, along with students and life science professionals, was inducted into the University of Montana's chapter of Phi Sigma, a national biological honorary society. In an article in the *Kaimin*, UM's student newspaper, Frank Rose, aged 54 years at the time, is identified simply as a "native plant collector." But, as we'll see, he deserved this recognition from his fellow scientists.

Frank Rose was born in the tallgrass prairie country of Cherokee County, Kansas, on April 18, 1886. His grandfather was Thomas Rose, a well-known horticulturist, nurseryman, orchardist and farmer. Frank was raised and early-schooled in Kansas and influenced by his granddad. Frank attended the University of Oklahoma and later the University of Colorado. He recalled how one of his Oklahoma professors told him "he was not too good in botany," and admitted it was at Colorado "where I got my knowledge of plants." His training was in range management, and he worked as a U.S. Forest Service district ranger in Colorado, Wyoming, and eastern Montana. In 1915, during his stay in Colorado, Frank married Alma Brashear Cooper. The couple had three children, Robert, Rachel and Hubert. Frank, Alma, and the children moved to Moiese, Montana in 1923 where, at the age of 37, Frank was appointed superintendent of the National Bison Range, a post he held until 1930. Frank developed a large personal herbarium during this time, but it was destroyed in a fire at the Bison Range near the end of his tenure.

Frank and Alma divorced in 1930, the same year Frank left the Bison Range and came to Missoula. He lived in the lower Rattlesnake Valley, and the Missoula City Directory from the late 1930s lists his employment as nurseryman and native plant collector. He collected and partially processed seeds and whole plants for drug companies, often as much as hundreds of pounds of material. Frank also collected seed and plants for the horticul-



Frank Hubert Rose and his wife, Louise Rose.

ture trade. His collecting took him to eastern as well as western Montana and northern Idaho throughout the 1930s and 40s.

After World War II Frank began advertising for student summer help. One of his recruits was Louise Ewan from Illinois who was formally trained in botany with graduate work in plant ecophysiology. She helped Frank understand the ecological aspects underlying the distribution of native plants. Frank and Louise fell in love and were married in June, 1951; Frank was 65 years old at the time, while Louise was 50. As a married couple Frank and Louise continued collecting plants for another two decades, and she supplemented their family income by teaching poetry at the University of Montana in the winter. Gertrude Lackschewitz remembers Louise as "warm, intelligent, capable and straightforward, the quintessential pioneer woman, pleased to share Frank's connection with the wilds, just as strong headed as he but more conversant with the ways of academia and middle-class life."

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Katherine Ake

Fleabanes (*Erigeron* spp.) are one of the most diverse groups in the Aster Family in western North America. Many species, including a number from Montana, have restricted ranges. So it is not surprising that a University of Montana grad student would choose this group for a Master's thesis. It is one of the genera that Arthur Cronquist cut his teeth on, and it was on his recommendation that Katherine Ake took up her study.

Kathy is a westerner; she grew up in Littleton, Colorado, just outside of Denver. She attended Colorado College and received her undergraduate degree in biology in June of 1980. Without letting the ink dry on her diploma, she moved to Missoula and started graduate school at UM that

fall. She picked botany as her field of study and chose Kathleen Peterson, the newly arrived plant systematist (and only female botany faculty member at the time) for her advisor.

Cronquist suggested a study of six closely related species of *Erigeron* endemic to the Intermountain West. Three of these, *E. tweedyi*, *E. tener* and *E. asperugineus*, occur in southwest Montana and adjacent Idaho; the others are found in Utah, Nevada and California. Kathy conducted field work throughout the range of her group in 1981 and 1982, collecting material for further study at 26 sites. Vouchers for all these collections are housed in the UM herbarium. She cleared and stained leaf material from these collections to study the anatomy of the hairs. She also used her collections for paper chromatography to study differences in flavonoid chemistry among the species. In addition, Kathy measured 59 morphological characters on one plant from each of 356

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New Acquisitions

The UM Herbarium received a total of 427 specimens for accession in 1999. These included exchange material from: **Rancho Santa Ana** (22), **Oregon State University** (7) and **University of Michigan** (35 Belovsky collections from Montana). Montana Natural Heritage Program botanists **Bonnie Heidel** and **Jack Greenlee** donated 97 and 28 specimens respectively. **Steve Kohler** with the Montana Department of Natural Resources, who is preparing a book on Montana's butterflies, submitted 12 specimens of *Eriogonum* as part of his research. **Peter Lesica** donated 225 specimens with duplicates from around Montana. **Leslie Gottlieb** at the University of California at Davis donated an isotype of *Stephanomeria fluminea*, a species he just described new to science.

Loans for Research

The UM Herbarium sent out 8 loans for research projects in 1999. The loans went to: **Leigh Johnson**, North Carolina State University, who is monographing *Gilia* for the Flora of North America Project; **John Maron**, University of Washington, for a study on St. John's wort; **Carlos Aedo**, Real Jardin Botanico in Spain, specimens of *Geranium molle*; **Robert Dorn**, Rocky Mountain Herbarium in Wyoming, specimens of *Salix* for the Flora of North America Project; **Anton Reznicek**, University of Michigan, specimens of *Carex* for annotation; **William Cody**, Canadian Department of Agriculture, specimens of *Saxifraga* for annotation; **Gerald Mulligan**, Canadian Department of Agriculture, specimens of *Arabis* for annotation; and **Barbara Ertter**, University of California at Berkeley, specimens of *Potentilla* for annotation.

In addition, MONTU sent five loans to **Debbie McNeil** who is preparing illustrations for a flora of Glacier National Park. MONTU also loaned specimens from the teaching collection to **Dann Ericson** at the Swan Ecosystem Center and **Naomi Fox** at the University of Montana.

...Frank Hubert Rose

(Continued from page 3)

Both before and after his marriage, Frank Rose travelled preplanned circuits wherein he made collections to fill specific drug company orders. He regularly visited such places as Lewis and Clark Pass, the Blackfoot River, Packers Meadows, the Dillon area, and the Big Hole. Mike Chessin recalls him collecting gentian and nearly a ton of prince's pine on the Lochsa River and near Tom Beale Park in Idaho. Frank once had to hire blossom pickers and rent drying sheds to fill an order for a ton of arnica flowers. Frank expressed special delight in collecting uncommon plants such as Parry's primrose in the Pintlars and Jones' columbine in the Little Belts, travelling roadless miles in a World War II surplus jeep. His business was called "Northern Rocky Mountain Evergreens" and continued to be based on Poplar Street in the Lower Rattlesnake.

While in the field, Frank made museum collections in addition to his commercial enterprises, and many of his specimens found their way into the Herbarium at the University of Montana (MONTU). He made these collections at his field base camps as well as many Missoula-area locales, such as Fort Missoula, Waterworks Hill, and Mount Jumbo. One batch of just under 600 specimens made between 1934 and 1937 were examined and identified by employees of the Bureau of Plant Industry while Fred Barkley was curator of the Herbarium in 1937-42. Frank continued his museum collecting up until at least the early 1950s. MONTU gained possession of Frank Rose's personal herbarium through a specially funded purchase agreement with Rose's relatives. These remained in storage until the early 1980s when Sherman Preece, the curator, and John Pierce, then a graduate student, accessioned

"Frank expressed special delight in collecting uncommon plants such as Parry's primrose in the Pintlars and Jones' columbine in the Little Belts, travelling roadless miles in a World War II surplus jeep."

those with adequate label information into the Herbarium. There are probably between 2,000 and 2,500 Rose specimens in MONTU.

In 1955 Frank Rose told the *Spokesman Review* that his age was finally catching up to him; "I'm going to have to start tapering off from all this field work traipsing up the mountains," he said; "I find that each year these mountains get higher and steeper." He also lamented that the Missoula area was being impacted by "advancing civilization" that could eventually cause the local extinction of our state flower, the bitterroot.

Klaus Lackschewitz got Frank Rose's name from the New York Botanical Garden, and the two became plant collecting companions shortly after Klaus and his wife Gertrude moved to Missoula in 1960. Gertrude and John Pierce both believe that it was Frank Rose who introduced Klaus to the Montana flora and initiated him into collecting plants for museum specimens. Frank took Klaus to many of his favorite collecting spots, and Klaus returned to many of these places in subsequent years. According to Gertrude, Frank and Klaus "shared a certain disdain for technical advances, a luxury made easier by the company of more practically-minded wives." Frank Rose died of a heart condition in Missoula on December 27, 1969, at the age of 83.

...Diatoms, One-Celled Plants Used to Assess Water Quality, Coming to UM Herbarium

(Continued from page 1)

collectively called the girdle. The two valves and the girdle compose what is called the frustule. Intricate patterns of spines, pores, ridges, canals and other features are sculpted onto the faces of the valves, and these patterns are taxonomically diagnostic.

Diatoms are among the least appreciated and least understood components of Montana's flora. As micro-organisms, the exquisite symmetry and ornamentation of diatoms are lost to all but those who have access to a compound microscope with quality optics. Diatoms are at the base of all aquatic food chains and account for an estimated 25% of the earth's biomass.

Compared to other algae, diatoms are relatively easy to identify, and a large body of autecological information has accumulated in recent years. As a result, diatoms are widely used to assess water quality in lakes and streams. Because diatoms preserve well in lake sediments, they are commonly used to reconstruct prehistoric environmental conditions.

Some of the most diverse diatom assemblages in Montana and elsewhere are found in soft water lakes or lakes rich in humic acids. These water bodies are especially vulnerable to acid deposition and eutrophication. Thanks to collections made in recent years by John Pierce of Missoula, we are learning much more about the unique diatom floras of these threatened habitats in Montana.

With an estimated 100,000 species worldwide, diatoms account for a significant portion of the earth's biodiversity. To date about 1,000 diatom species have been recorded from Montana. Serious research on Montana's diatom flora did not begin until the 1970s, and much of the state remains to be surveyed. Although most diatoms recorded from Montana are cosmopolitan, many have limited distributions, and a few are endemic. The author tallies new records for Montana every few weeks. Many Montana taxa cannot be identified with existing keys, and some of these may be new to science. On average, 400 new diatom species are described each year, worldwide.

The diversity of Montana's diatom flora is represented in the Montana Diatom Collection. Each species in MDC is represented by a microscope slide containing a permanent strewn mount of acid-cleaned frustules embedded in a high-refractive mounting medium. Slides are labelled and housed in two oak cabinets, each holding 2,000 slides and in a series of museum-quality wooden slide boxes, each holding 100 slides.

One of the cabinets contains the TAXON FILE. Eventually the Taxon File will include at least one slide devoted to each Montana diatom species. Whenever possible the slide will contain a large population of that species representing its range of morphological variation. On the coverglass of each slide, one or more voucher specimens will be circled with a diamond scribing tool. The other cabinet will house the BASIN FILE, miscellaneous collections from across Montana. Since diatoms are largely aquatic organisms, these collections will be organized by U.S. Geological Survey hydrologic units (i.e., drainage basins). There are 100 USGS hydrologic units in Montana and, conveniently, 100 trays in the cabinet, each holding 20 slides.

Special collections will be housed in wooden slide boxes. The first of these collections to be transferred to the UM Herbarium will be a set of several hundred slides representing annual monitoring in the Clark Fork

River drainage. This collection provides a permanent biological record of changing environmental conditions at nearly 30 sites on the river and its tributaries. This biological monitoring was conducted without interruption from 1984 to 1999.

Accompanying MDC will be an electronic database of Montana diatom samples and taxa, and a series of three-ring binders containing species profile sheets. These sheets will summarize the taxonomy, autecology and conservation status of each species and include a Montana range map. MDC, the database and the profile sheets are intended to encourage diatom research and conservation in Montana and to expand our knowledge of these important but overlooked plants.

Further Reading

Round, F.E., R.M. Crawford and D.G. Mann. 1990. *The Diatoms: Biology and Morphology of the Genera*. Cambridge University Press, New York.

Stoermer, E.F. and J.P. Smol (eds.). 1999. *The Diatoms: Applications for Environmental and Earth Sciences*. Cambridge University Press, New York.

Werner, D. (ed.). 1977. *The Biology of Diatoms*. Botanical Monographs Vol.13, University of California Press, Berkeley.



VISITORS TO MONTU

There were 53 recorded visits to the UM Herbarium in 1999. Among those who signed the guest book were the following:

Consultants

Scott Miles, Riparian Resources
John Pierce
Madeline Mazurski
Lisa Schassberger

UM Students

Kurt Reinhart
Jason Sexton
Liz Barker
Brad Cook
Marirose Spade
William Schlegel
Beth Peluso
Dawn White
Lucretia Olson

UM Researchers

Jay Hall
Jim Habeck
Scott Godfrey
Marilyn Marler
Janet Hardin

Montana Natural Heritage Program

Bonnie Heidel
Jack Greenlee

U.S. Forest Service

Peter Stickney
Steve Shelly

Montana Department Natural Resources & Conservation

Steve Kohler

Fort Peck Tribes

Myrna Walking Eagle

U.S. Geological Survey

Alison Colwell

Out-of-town visitors included Robert Belbey (University of Arizona), Ken Puliafico (MSU), Amy Schmeterling (*Sports Illustrated*), Una Thompson (Indianapolis) and Jacque Wolfe (Salt Lake City). Drake Barton & Kathy Lloyd of Helena came by to identify plants they collected as part of an inventory of the U.S. Forest Service's Red Mountain Research Natural Area.

....Katherine Ake

(Continued from page 3)

specimens obtained on loan from herbaria throughout the United States. She found that the six species are closely related and are best distinguished by characters of stem and leaf hairs. She also proposed a system of evolutionary relationships among the six species.

Kathy completed her Master of Arts degree in June of 1984, but she began her career with the U.S. Forest Service before that. In June of 1983, Kathy took a summer job doing bark beetle inventories for Flathead National Forest, and she continued this summer work through 1986. She left Missoula for Kalispell after finishing school and began doing geographic information system (GIS) work for Flathead Forest in the winter of 1985. She became a full-time Forest Service employee in 1988. GIS is now Kathy's primary work, although she also does rare plant surveys during the field season. Kathy has done GIS analysis for studies of road density, snowmobile use, grizzly bear and lynx habitat, and rare and endangered plant locations. Knowledge of computers and programming she gained doing taxonomy came in handy in unexpected ways.

As a graduate student, Kathy spent a lot of time playing the piano, but she's given that up for an after-work career in soccer. She has been assistant soccer coach at Flathead High School for the past eight years and referees for the Montana Youth Soccer Association. In the little time that's left, Kathy and John Babcock, her partner of 15 years and a civil engineer on Flathead Forest, go out and fight the bears for huckleberries and raspberries. Then they spend the long winter eating toast and jam.

Meet the UM Herbarium Staff

So who's behind that locked Herbarium door, day in and day out, doing the hands-on work of the Herbarium? Most often it's our dedicated work-study students. The Herbarium hires two students, usually juniors or seniors. We look for motivated students who have botanical knowledge and above-average organizational skills and attentiveness to detail. Our work-study students this year are **Pam Purdy** and **Jonathan Rothman**. Pam started last fall and has concentrated on organizing and shipping out the Herbarium's collection of exchange material. A junior in resource conservation, Pam brings to the Herbarium exceptional administrative, analytical, and detail skills. Jonathan started in the Herbarium in January and is a senior majoring in biology with a botany emphasis. He plans to attend graduate school in botany with the goal of working in the rain forests of Central and South America. Please say "hello" to our hard-working students when you visit the Herbarium!

Publications Based on MONTU Specimens

Gottlieb, L. D. 1999. A new species of *Stephanomeria* (Asteraceae) from northwestern Wyoming. *Madrono* 46: 58-60

Lesica, P., P. Husby and S. V. Cooper. 1998. Noteworthy collections: Montana. *Madrono* 45: 328-330

Phipps, J. B. 1998. Introduction to the red-fruited hawthorns (*Crataegus*, Rosaceae) of western North America. *Canadian Journal of Botany* 76: 1863-1899

Phipps, J. B. and R. J. O'Kennon. 1998. Three new species of *Crataegus* (Rosaceae) from western North America: *C. okennonii*, *C. okanagensis* and *C. phippsii*. *Sida* 18: 169-191.

Dear Friend of The University of Montana Herbarium,

It's a new century and The Friends of the UM Herbarium has already been around for four years. In that time the UM Herbarium has made some big advances. We just successfully completed a drive to obtain new specimen cabinets. Now the 130,000 specimens won't suffer from compaction. Two members donated valuable collections: one of seeds and another of diatoms. Contributors to the newsletter write biographies that tell the Herbarium's history. We continue to make the Herbarium known to the public and promote its mission to the University.

Now it's time again to renew your membership. It's still just \$15 for two years. There's lots more work to be done. We want to electronically catalog the herbarium holdings. We're looking for an assistant curator to bring continuity to the curation and cataloging process. We hope to improve the teaching collection and make it more available for public outreach. Send in your renewal today!

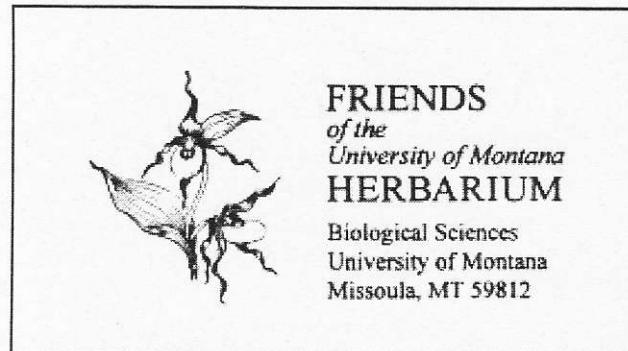
Sincerely,

Peter Lesica, President

David Dyer, Secretary-Treasurer

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

- | | | |
|--------------------------|------------------------------|-----------------|
| <input type="checkbox"/> | REGULAR MEMBER-- | \$15 |
| <input type="checkbox"/> | SUSTAINING MEMBER-- | \$25 |
| <input type="checkbox"/> | CONTRIBUTING MEMBER-- | \$50 |
| <input type="checkbox"/> | ORGANIZATION-- | \$50 |
| <input type="checkbox"/> | SPECIAL GIFT-- | \$ _____ |



Dues are for a period of **two** years. All contributions to the Friends are tax deductible to the full extent provided by law. All checks should be made payable to UM Foundation/Friends of the UM Herbarium.

Send checks to:
Herbarium
Division of Biological Sciences
The University of Montana
Missoula, MT 59812