



MINNESOTA PLANT PRESS

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Beaked Spike Rush and the Discovery of a Calcareous Fen

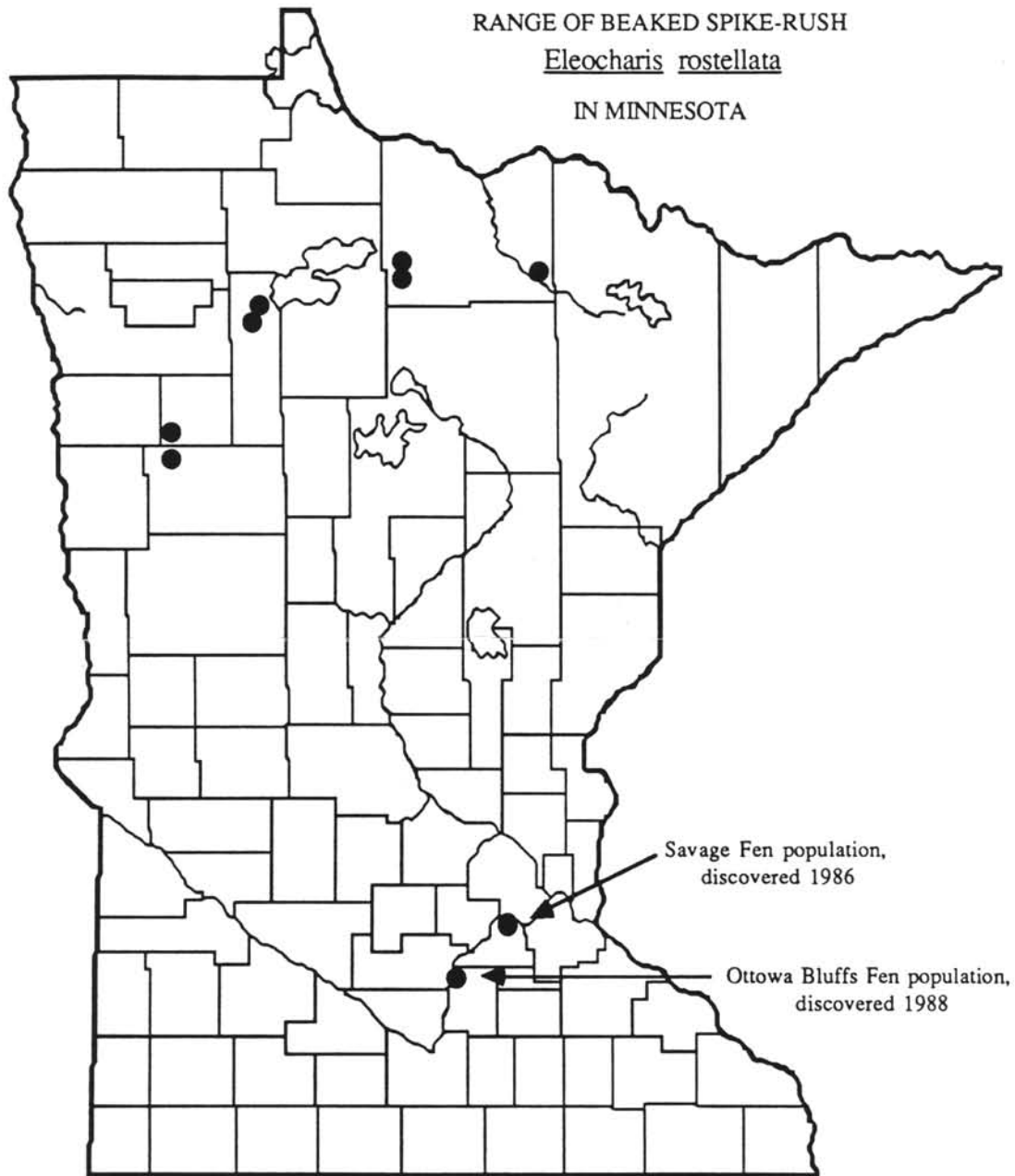
On October 22, 1988, I travelled to the Nature Conservancy's Ottawa Bluffs parcel in Le Sueur County to photograph fall colors. The bluffs overlook the Minnesota River valley and an extensive wetland complex. It was from the vantage point of the bluff that I recognized a "peat dome" in the Fort Snelling State Park Fen, also in the lower Minnesota River valley. I knew that such peat domes are ideal locations for Minnesota's rarest wetland plant community, the calcareous fen.

True to the creed of wetland ecologists ("Have Marsh Will Slog"), I quickly left the uplands behind and proceeded to go "marsh mucking." Even though the dome was the highest elevation within the wetland complex, it was one of the wettest areas due to the emergence of numerous springs and seepages. It is believed the peat domes are caused by the vertical upwelling of groundwater, and I estimated that this particular dome was about 5 to 8 acres in size. A solid stand of hardstem bulrush (Scirpus acutus) was encountered at first, but it then "opened up" into a meadow-like area dominated by calciphiles characteristic of the calcareous fen community described by John Curtis in The Vegetation of Wisconsin.

Lesser fringed gentians (Gentianopsis procera) were still in bloom, and I observed brook lobelia (Lobelia kalmii), Riddell's goldenrod (Solidago riddellii), grass-of-parnassus (Parnassia glauca), swamp lousewort (Pedicularis lanceolata) and fen muhly grass (Muhlenbergia glomerata). In addition, I believe both species of bog arrow-grass (Triglochin maritimum and T. palustre) were present, although this remains to be confirmed because the post-growing season condition of the plants made it difficult to determine. Also to be determined is whether the fine caespitose sedge I observed was sterile sedge (Carex sterilis), an obligate calciphile that is listed as a threatened species in the state. Although not observed, habitat conditions are also excellent for white ladyslippers (Cypripedium candidum), a species of special concern.

But the most exciting find was a rare member of the sedge family that wasn't even known to exist in the state until 1980 (you know you've become a confirmed botany enthusiast when you get excited over sedges). In areas surrounding the spring seeps were plants with long, arching stems that root at the tip - this is beaked spike rush (Eleocharis rostellata), a species listed as threatened in the state. It was especially conspicuous because the stems turn light orange in autumn. Although beaked spike rush is primarily associated with salt marshes along the Atlantic coast, it finds a niche in midwestern calcareous fens because of alkaline peat, rich in calcium and magnesium salts.

This is the second disjunct population of beaked spike rush discovered in Minnesota River valley calcareous fens (see range map*). The discovery of the Savage Fen population was reported in a previous issue of the Minnesota Plant Press. The other 6 populations were discovered in the northcentral and northwestern part of the state, about 200 miles disjunct from Minnesota River populations.



*From Ownbey & Morley, "Checklist and Atlas of the Vascular Plants of Minnesota," in press.

I checked with Welby Smith of the Natural Heritage Program to confirm if this calcareous fen plant community had been reported before, or if it was an addition to the 21 calcareous fen plant communities known in the state (totaling less than 750 acres). Welby stated this was a new find. He said that he had discovered the St. Peter's Fen in this same wetland complex, but about a mile and a half to the south of the fen community I found. The wetland complex that includes these two fen communities extends for about 3 miles along the base of the bluffs

and possesses high potential for supporting other fen communities. Welby and I plan to inventory the Ottawa Bluffs Fen, and the wetlands complex in general, this coming growing season.

Once the additional inventory work has been done, it will be interesting to compare and contrast the Ottawa Bluffs Fen with the other Minnesota River valley fens. One difference already noticed is that it lacks shrubby cinquefoil (*Potentilla fruticosa*), which is present in Savage Fen (even dominant in some parts) and Black Dog Fen (Scott and Dakota counties, respectfully).

I can't help but wonder how many botany enthusiasts have visited the TNC's Ottawa Bluffs parcel and unknowingly walked by all the rare plants and showy wildflowers supported by the fen at the base of the bluff. If only they had rolled up their pant legs and gone marsh mucking...

---- Steve Eggers

MNPS NEWS ****

Upcoming Meetings

General meetings are held the first Wednesday of each month on the **UM St. Paul campus, 335 Borlaug Hall**. Meetings start at **7:30 pm** and are open to the public. Board meetings are held in the St. Paul Student Center Cafeteria, at 6:00 pm, on the same evenings as the general program and are open to all MNPS members.

3 May - Agenda

- Speaker: **Audrey Engels** (retired botanist), "Riverbank plants of central Minnesota"
- Summer campout discussion
- Summer field trips discussion
- Annual plant exchange

Carpooling is encouraged. Please consult the Directory included with this issue for members near you.

PLEASE NOTE: This will be our last meeting for the year (the new year starts 4 October 1989).

Native Transplant and Seedling Sale

The annual sale of wildflower garden-transplants and seedlings will be held at the May 3 meeting. The sale is a fundraiser with a suggested donation of \$ 1.00/plant purchased. One of the goals of the MNPS is to promote the conservation of native plants. Enjoy gardening with native wildflowers without disturbing wild populations -- create gardens with plants started from seed or with transplants from other gardens.

Please help make this project a success by donating (and purchasing) native plants started from seed and native wildflower transplants from member's gardens. **DO NOT COLLECT WILD PLANTS FOR THIS SALE.** Plants should be labeled with the name of the plant (include scientific name if possible) and the name of the donor. Please divide transplants and place in individual pots. Come early to drop-off your plants; this will give us time to organize them. The sale will begin after Audrey Engel's presentation and the discussion of summer activities. Those who have donated plants will have the first opportunity to make three selections. The sale will then be opened to all. You do not have to donate plants to participate in the sale.

---- Chris Soutter

Election Results

The slate of nominees to the Board of Directors was approved by acclamation at the March Annual Meeting. The new board members are Cole Burrell, Ellen Fuge, and Nancy Sather. Their terms begin September 1989 and expire September 1992. Congratulations, and thanks for the willingness to serve.

Erratum

In the winter newsletter (Vol. 8:2) it was incorrectly stated that Steve Egger's term as Director would expire this summer. Instead, Ruth Phipps is leaving the Board. Steve remains for another year.

Special Thanks

A big "thank you" to all who helped make this year's symposium a rousing success. Special gratitude goes to Nancy Sather and Ellen Fuge for coordinating the symposium. Thanks also go to those who helped create the "What Is A Native Plant" display used at the Bell Museum's Prairie Conference: Nancy Albrecht, Anita Cholewa, Bob Jacobson, Rose Meier, and Dwayne Stenlund. Thanks also to Doug Pratt for the use of his laser printer.

New Members This Winter

Please welcome our new members: John C. Anderson (Bloomington), Julie Barrett (Wayzata), Char Benson (Northfield), Peg Birse (St. Paul), Bill Bleckwenn (St. Paul), Sidney Burtlow (Minnetonka), Mariette Cole (Bloomington), Cecelia Cope (Bloomington), Kriste Ericsson (Minneapolis), Michael Ferris & Kathleen Shea (Northfield), Mary Finn (St. Anthony), Anna Gerenday (Afton), Dan Jordan (Hibbing), Sonja Larson (Lake Shore), Patricia McCusker (St. Paul), Mary McGee (Minneapolis), Joan Miller (St. Paul), Madeline and Clarence Moes (St. Paul), Bill & Cheryl Morrison (Forest Lake), Bill Morrissey (Maplewood), Martha Phillips (Minneapolis), Cathy Schlecher (Circle Pines), Alice Stenlund (Manhattan Beach), Daniel & Mary Jo Truchon (Blaine), Ernest Tursick (St. Louis Park), Karen Wargo (St. Paul), and Elaine Yorkgits (St. Paul).

President's Report

This has been an exciting year for those of us interested in the native plants of Minnesota. The Lieutenant Governor's Wildflower Task Force has recommended the development of our roadsides with native flowers and the formation of a Wildflower Council to serve as a resource in promoting Minnesota flora. The MNPS is expected to have a voice on the proposed council.

Planning is underway to develop a Midwest Native Plant Center, which will be affiliated with the National Wildflower Research Center in Austin, Texas and the University of Minnesota Landscape Arboretum. The Midwest Center has as its goal the promotion of research on the preservation and propagation of native plants. It is anticipated that the Wildflower Council will become affiliated with the Midwest Center.

There is also continuing interest in the "Reinvest in Minnesota" (RIM) program, to return marginal lands to native plants and communities. However, there is growing concern that ways be developed to provide truly native seed, ie., from local populations, for these plantings.

Your Society has become increasingly aware that the public often does not know what is meant by a native plant. Our knowledge of the variation within plants is often so limited that it is important to use very local sources of seed to preserve the integrity of local populations. The Society has prepared a new display on "What is a Native Plant" to bring this message to the public. If you would like a copy of the text of the display or would like to use the display at a meeting, please let us know.

Threats to Minnesota's flora continue, as those of us in the Metro area have seen reports of the invasion of several lakes by the Eurasian watermilfoil (*Myriophyllum spicatum*). However, it is not widely known that there are five native watermilfoils, which are hard to distinguish from the invasive Eurasian watermilfoil [editor's note: see article later this newsletter].

The increasing activity of the Society is a result of the greater involvement of its members during the past year. We are greatly indebted to the many members who have helped with the Wetland Restoration Symposium, the new display, and in innumerable other ways. We are also greatly indebted to our monthly speakers who have volunteered their expertise, time, and enthusiasm.

To become really effective as an organization that represents the entire state we need still more involvement of our members. For example, we need a membership chair to lead the annual membership drive. We would like to find members in Greater Minnesota to act as regional coordinators to promote local activities and help plan field trips by the Society to different parts of the state. In time it may be possible to develop regional chapters. If you are interested in acting as a local coordinator, please let us know. We are also interested in hearing from you about the flora as well as plant-oriented activities of Greater Minnesota.

---- David McLaughlin

Treasurer's Report - 1988 Fiscal Year

balance forward, 1 January 1988	2901.69
1988 income*	+ 3195.44
	<u>6097.13</u>
1988 expenses**	- 4330.52
balance as of 31 December 1988	<u>1766.61</u>

* income itemization:

membership & donations	2617.00
88 symposium registrations	395.00
plant sale	65.00
interest	<u>118.44</u>
	3195.44

** expense itemization:

legal fees	2093.00
printing	743.12
(newsletters & symposium brochures)	
postage	600.69
(newsletters, monthly meeting notices, symposium brochures)	
88 symposium	369.08
display	414.17
misc. expenses	<u>150.46</u>
	4330.52

---- Ruth Phipps

Reports of Committee Chairs

Education Committee -- The following actions were addressed this past year: 1) answered a request from the librarian of the New England Wildflower Society to send a complete group of our newsletters, "The Minnesota Plant Press;" 2) also a request from the same organization for copies of my publications on wildflower seed germination and culture for their library and listings; 3) received and answered 20 letters asking for information on various topics, such as: Which plants are native to Minnesota, "How to make a prairie," "Where can you obtain native trees and shrubs," "How do you start a wildflower garden," and similar topics. In answering the letters I emphasized the need for using native plants and not including alien species and listed the advantages of using seeds or plants from Minnesota or nearby areas instead of from distant states. Brochures were sent with an invitation to join the society. Evidently our brochure and poster have been drawing attention to our society from all over the state and beyond.

---- May Wright

Conservation and Legislation Committee -- Don Knutson has agreed to be the temporary replacement for Harriet Mason (who is in Japan). Don has a Ph.D. in Plant Pathology/Forestry and has occasionally taught extension plant classes. The following is his report....

The Conservation Committee has registered support for the National Biological Diversity Conservation and Environmental Research bill to be introduced in the U.S. Senate by Sen. Robert W. Kasten, Jr. In the letter sent to Sen. Kasten we pointed out that nearly 10% of Minnesota's wild plants are endangered, threatened, or in the category of "high concern." We urged him as author of the Senate bill: 1) to establish conservation of biological diversity as a goal both in this country and abroad; 2) to require that environmental impact statements include the impact on biodiversity and 3) to establish a coordinated federal program for maintaining and restoring biological diversity within this country. The Society's input has been requested by State Senator Clarence Purfeerst, Chair of the MN Future Resources Commission, concerning the "issues and needs of Minnesota's environment and natural resources." We plan to list the following as highest priority: 1) need for additional vegetational

surveys, by county, to document accurately all of Minnesota; 2) development of management programs to insure success of all wild species within their native habitat; 3) adequate support for the University of Minnesota resources that support survey and other research efforts, including the herbarium, that are critical to the documentation effort and to long-term management evaluation.

---- Don Knutson

Membership Committee -- A volunteer is needed to chair this important committee. Responsibilities consist of coordinating the following activities: 1) develop a New Membership information card; 2) develop a membership poster (work with artist Vera Wong); 3) work with membership directory person (currently Pat Leacock) to keep records up-to-date; 4) develop membership ads for the "Minnesota Horticulturist" and other related magazines; 5) develop a program for increasing Greater Minnesota membership. Anyone interested in this position should contact Dave McLaughlin, . If you would like to assist the chairperson on any of these projects please call Dave also.

SUMMER FIELD TRIPS ****

2nd Annual Summer Campout

Last year's campout was so successful (see fall newsletter, 8:1) that we've decided to make this an annual event. This year's campout is scheduled for 23-25 June, Friday evening through Sunday. The main field trip will take place on Saturday and will consist of exploring the plant communities of Savanna Portage State Park, in northeastern Aitkin Co.: Upland hardwoods, tamarack bog, marsh and riverine communities. Leaders will be Anita Cholewa and Audrey Engels.

Audrey again opens her farm to participants; huge barn in case of rain and to show slides, plenty of room for tents, limited hookups for trailers, and outhouses. Arrangements can be made for motels by calling the Aitkin Chamber of Commerce, . You will be responsible for your own meals (grill available) but plan on lots of camaraderie.

Reservations are required and should be made by 10 June, complete directions will be mailed shortly thereafter. Contact: Anita Cholewa at or Audrey Engels at
There is no fee for camping at the farm, but a park permit will be necessary for the field trip.

Day Trips

The following day trips have been arranged by MNPS for enjoyment and education. Old cloths and sturdy walking shoes are the best attire. Bring a bag lunch. **Reservations are required for all trips.** Please call Charlotte Menzel, , if you plan on attending any of these trips; she will coordinate our day trips and will also help with the carpooling arrangements.

Cedar Creek Natural History Area, Anoka & Isanti counties

Date: Saturday, April 22

Time: 9:30 am to noon

Meeting Place: Cedar Creek NHA laboratory

Leader: Barbara Delaney (botanist, DNR Natural Heritage Program)

This trip will take participants into "The Enchanting World of Mosses." A deciduous swamp and a white-cedar swamp will be visited and their moss inhabitants revealed. This trip is nearly full; only a few "seats" remain.

Queen's Bluff, Winona County

DATE: Saturday, June 3

TIME: 8:00 am to late afternoon/early evening

MEETING PLACE: Biological Sciences Center on the UM St. Paul campus, NW side of building.

LEADER: Dr. Gerald Ownbey (professor emeritus, UM)

Queen's Bluff and flanking stream valleys contain tremendous botanical diversity, including a disjunct northern white-cedar community. This is in the Driftless Area and many unusual plants can be found here (see fall newsletter). This area is 3 hours away so it is very important that you be on time.

University of Minnesota Landscape Arboretum, Hennepin County

DATE: Saturday, July 9

TIME: 10:00 am to early afternoon

MEETING PLACE: Parking lot of the Earle Brown Continuing Education Center on the UM St. Paul campus IF YOU WANT TO CARPOOL, otherwise meet in the lobby of the Snyder Building at the Arboretum (identify yourself as a member of the MNPS at the Arboretum gate and admission will be waived).

LEADER: Dr. Shirley Mah Kooyman (taxonomist at the Arboretum)

The Arboretum is part of the Dept. of Horticultural Science and Landscape Architecture. The 905 acres consist of landscaped gardens, generic collections, and natural areas. The field trip will tour the prairie and study the restoration project and perhaps visit the bog.

Savage Fen, Scott County

DATE: Saturday, September 9

TIME: 10:00 am to 1:00 pm

MEETING PLACE: Parking lot of the Earle Brown Continuing Education Center on the UM St. Paul campus IF YOU WANT TO CARPOOL, otherwise meet at the Maintenance Building parking lot at Savage Fen (take hwy 13 west through Burnsville and Savage. At the stoplight, hwy 13 makes a 90 degree turn to the south towards Prior Lake. Make the turn and follow hwy 13 for 1/2 mile to 128th Street, which will be on the east (left) side. Follow 128th Street for about 1/3 mile, turn south (right) before the deadend, to Bay & Bay Transmission).

LEADER: Steve Eggers (wetland ecologist with the U.S. Army Corps of Engineers)

At the base of 100-foot high bluffs of the Minnesota River Valley lies a 500-acre, sloping peat deposit -- Savage Fen. Cold calcareous groundwater bubbles to the surface creating numerous springs and seepages. Calcium and magnesium salts, dissolved by the passage of the groundwater through dolomite bedrock, precipitate at the surface creating a harsh, alkaline soil. Only a select group of calcium-tolerant plants can survive these conditions - the calcareous fen community, the rarest of Minnesota's wetland types. The field trip will concentrate on a 30-acre parcel recently designated as a Scientific and Natural Area. Five plant species listed as State Threatened and two on the Special Concern list have been documented within this parcel.

Botanically oriented field trips are also being sponsored by other organizations....

The Nature Conservancy (call Julie Muehlberg,

for reservations and information):

May 6 -- Prairie Ridges and Meadows, Lac Qui Parle Co.

May 20 -- Uncas Dunes, Sherburne Co.

June 10, 11 -- work days, Bluestem Prairie & Pembina Preserve, Clay Co.

June 24 -- work day, Allison Savanna, Anoka Co.

July 30 -- Battle Point Natural Area, Itasca Co.

August 26 -- Red Rock Prairie & Jeffers Petroglyph Historic Site, Cottonwood Co.

September 3 -- work day, Pankratz Prairie, Polk Co.

Dept. of Natural Resources:

August 19 -- PRAIRIE DAY at Agassiz Dunes (Norman Co.), Lac Qui Parle Wildlife Mgmt Area (Lac Qui Parle Co.), Prairie Bush Clover SNA at Kilen Woods State Park (Jackson Co.), Shooting Star Prairie (Mower Co.), or Afton State Park (Washington Co.). Call 218-739-7576 or 612-297-2357 for reservations and information.

September 30 -- Wild River State Park, Chisago Co. -- Celebrating the 10-yr anniversary of the MN Natural Heritage Program; canoe trip, speakers, entertainment, field trips. Call 612-296-3344 for information.

---- Robin Fox

NATIVE PLANT NOTES *****

Dave McLaughlin and I thought it might be fun, as well as informative, to begin an "earliest sighting diary" for a few of our common wildflowers. Recognizing that different regions of the state experience spring at different times and that spring arrives at different times over the years, I have tried to find the earliest flowering dates (based on specimens at the UM Herbarium) for several different counties ranging south to north. See if you can beat these dates.

In prairies:

Anemone patens (Pulsatilla nuttalliana) ** pasque flower

Houston Co. - 5 April; Anoka Co. - 13 March; Douglas Co. - 16 April; Norman Co. - 27 April; Roseau Co. - 11 April

Cypripedium candidum ** white lady's slipper

Winona Co. - 17 May; Pipestone Co. - 30 May; Norman Co. - 16 May; Marshall Co. - 11 June

In rich hardwood forests:

Arisaema triphyllum ** jack-in-the-pulpit

Houston Co. - 1 May; Carver Co. - 18 April; Norman Co. - 11 May; Kittson Co. - 12 June; St. Louis Co. - 16 May; Cook Co. - 7 June

Asarum canadense ** wild ginger

Le Sueur Co. - 24 April; Ramsey Co. - 8 April; Becker Co. - 15 May; St. Louis Co. - 1 May; Lake of the Woods Co. - 4 June

In bogs:

Arethusa bulbosa ** dragon's mouth

Hennepin Co. - 12 June; Itasca Co. - 29 May; Koochiching Co. - 12 June; St. Louis Co. - 12 June

Calopogon tuberosus (C. pulchellus) ** grass-pink

Anoka Co. - 1 July; Stearns Co. - 20 June; Aitkin Co. - 18 June; Beltrami Co. - 19 June; Koochiching Co. - 17 July

---- Anita Cholewa

BOTANICAL EXPLORATION OF MINNESOTA'S PRAIRIES: 1838-39, CARL ANDREAS GEYER *****

In late May, 1838, the members of Joseph Nicollet's mapping expedition ascended the Mississippi River aboard the steamer "Burlington." The party was headed for Fort Snelling, established less than 20 years earlier on a bluff above the confluence of the Mississippi and Minnesota rivers. From the Fort the expedition would set off to explore the prairies and woodlands of present-day southern Minnesota. Among the members of the expeditions was Carl Andreas Geyer (1809-1853), a German botanist who was one of the first to collect extensively in the state.

Nicollet was under orders from the Army Corps of Engineers to map the vast region between the Upper Mississippi and the Missouri River. To achieve his objective, Nicollet explored the Minnesota River from Fort Snelling to Big Stone Lake and the Cottonwood, Des Moines and Blue Earth rivers. He surveyed Pipestone Quarry and the Coteau des Prairie and a region he called the Undine, which included the Cannon River watershed and present-day Waseca, Blue Earth, Martin and Jackson counties. In the great age of exploration, the geographer Alexander von Humboldt of Paris had made it unthinkable to map a region without plotting the distribution of its plants and wildlife; so Nicollet asked Geyer to join him and paid out of his own pocket for the botanist's services.

Geyer had been in the United States only three years before he accompanied Nicollet in 1838. Geyer was born in Dresden, Germany, on November 30, 1809, the son of a market gardener. After some instruction in Latin, Geyer in 1826 entered the garden at Zabelitz as an apprentice. In 1830 he returned to Dresden as an assistant in the Botanical Garden. He left Dresden in February 1835 for the United States to make his name as a botanist discovering the unknown plants of the West.

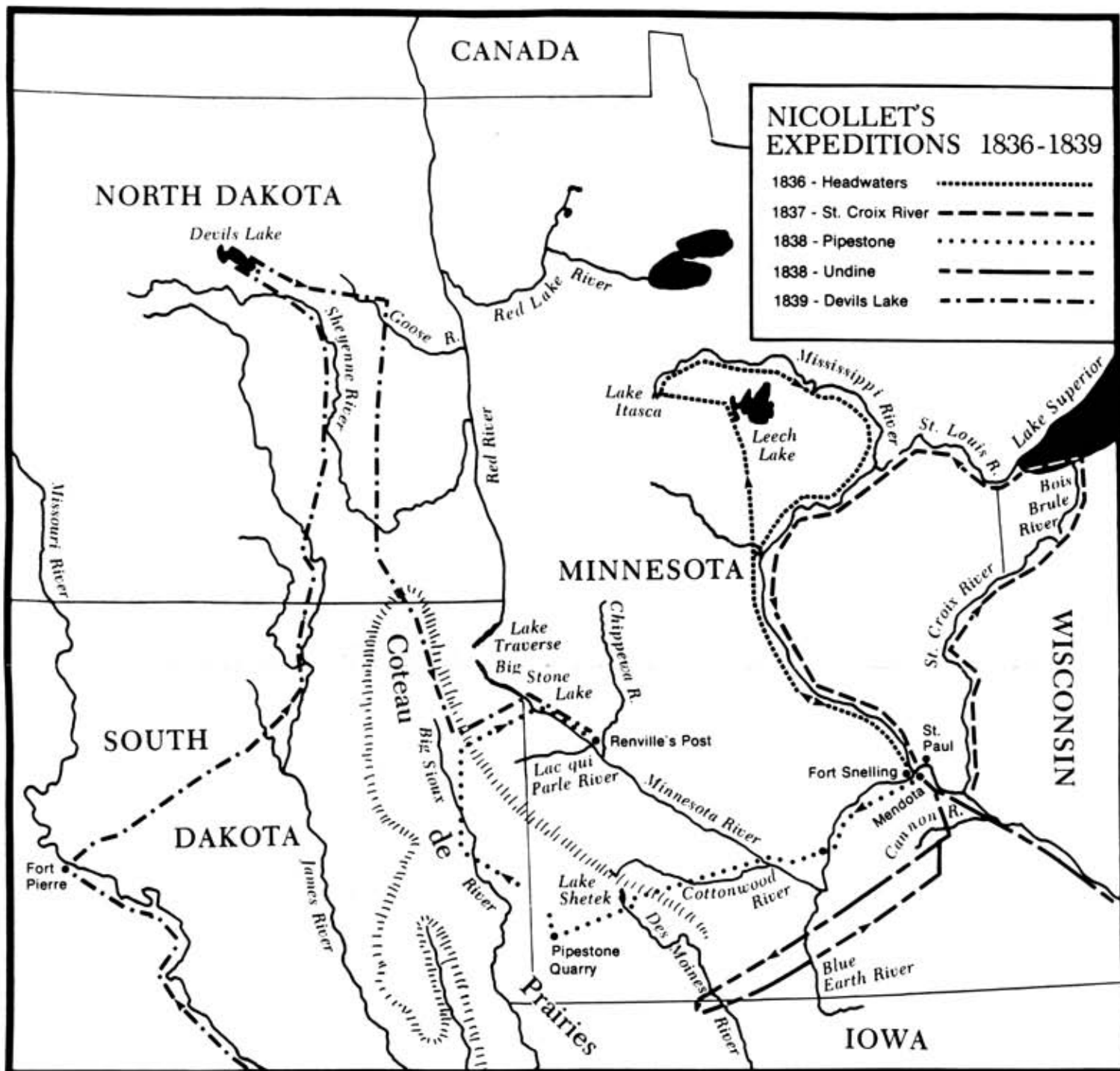
Geyer left New York City and headed straight for St. Louis. Arriving in April, Geyer immediately set off up the Missouri River into the Indian country along the lower Platte River. This hasty botanical tour nearly ended in disaster, for Geyer had difficulty with the Indians and became ill with a fever. But Geyer's fortunes would change. Returning to St. Louis aboard the steamer *Diana*, Geyer met Nicollet, who also was ill with a fever and had to cut short his work mapping the confluence of the Mississippi and Missouri rivers. Nicollet asked Geyer to join his 1836 expedition to the source of the Mississippi River at Lake Itasca, but Geyer declined, citing his bad experience on the Platte. Upon his return to St. Louis, Geyer became a printer to support himself and learn the English language. In March 1838, Nicollet sent Geyer a letter asking him to accompany him on his expedition to the Coteau des Prairies, and this time Geyer accepted. Geyer considered himself in the employ of Nicollet from 1838-1840.

In 1841 and '42, Geyer collected plants in Iowa, Illinois and Missouri for the prominent botanist George Engelmann of St. Louis. The next year Geyer embarked on the collecting tour for which he is best known. He accompanied the Scottish adventurer and explorer Sir William Drummond Stewart across Missouri, Nebraska and the mountains of Wyoming. Geyer then left the group and headed west to northern Idaho and eastern Washington State, where, in 1844, he made several botanical excursions. He descended the Columbia River to Fort Vancouver and in 1845 returned to Europe via the Hawaiian Islands. He gave his specimens, about 10,000 plants, to Sir William J. Hooker (at the Royal Botanical Gardens in Kew), who published a list of them in his *Journal of Botany*. No less than 13 North American plants have been named for Geyer, among them Allium geyeri, Aster geyeri, Astragalus geyeri, Carex geyeri, Cogswellia geyeri, Delphinium geyeri and Euphorbia geyeri. By fall of 1845 Geyer had bought some land in Meissen, Germany, and begun a nursery. He married in 1846, and during the last years of his life he edited *Die Chronik des Gartenwesens*, a horticultural journal. He died November 21, 1853.

The devotion that Geyer showed collecting in the western United States, he also displayed in his work in Minnesota. By the end of October, 1838, he had collected more than 450 plants, most from Minnesota. Geyer was the fourth botanist to enter the state to collect plants, the others being David Bates Douglas in 1820, Thomas Say in 1823, and Douglass Houghton in 1832. Geyer's collection would have been the most outstanding before Minnesota Territory opened for white settlement in 1851 had the collection not been lost while being shipped by steamboat from Fort Snelling to St. Louis. The tragic loss occurred before the boat reached St. Louis, somewhere downstream from the Des Moines or Lower Rapids of the Mississippi near Warsaw, Illinois. Geyer also collected in the state in 1839 as he and Nicollet returned in the fall from a trip up the Missouri River and overland north to Devil's Lake in North Dakota. The plants that survived the 1838 expedition and those of the 1839 tour Geyer sent to John Torrey, of the New York Botanical Garden for identification. Torrey included a list of Geyer's plants in Nicollet's "Report Intended to Illustrate a Map of the Hydrographical Basin of the Upper Mississippi," published in 1845. Seventy-seven of the plants Geyer collected in Minnesota in 1838-39 reached Torrey, but Torrey's list does not provide the year of collection. Fortunately, Geyer faithfully kept a field record of his work in 1838, a small notebook with 143 inscribed pages. The journal and Torrey's list give a reasonably complete picture of Geyer's botanizing in Minnesota.

The region Geyer explored in the state was chiefly prairie, with islands of woods that Nicollet called oases. Perhaps the biggest oasis was the Big Woods, a hardwood forest of oaks, sugar maple and basswood, which Geyer encountered in present-day Scott, Le Sueur, Rice and Blue Earth counties. Along the rivers were gallery forests of cottonwoods, elms and green ash.

Most of Geyer's records of the more common species reinforce our understanding of how they were distributed in the state. For example, from the prairies of southeastern Minnesota west to the Des Moines River, Geyer notes rattlesnake master (Eryngium yuccifolium), compass plant (Silphium laciniatum), yellow gentian (Gentiana flavida), and cream wild indigo (Baptisia leucophaea), among others. On the Coteau occurred purple coneflower (Echinacea angustifolia), downy paintbrush (Castilleja sessiliflora), stiff flax (Linum rigidum), silvery-leaved scurf pea (Psoralea argophylla), scarlet gaura (Gaura coccinea), ascending milk vetch (Astragalus adsurgens), plains evening-primrose (Calylophus serrulatus), white penstemon (Penstemon albidus) and skeleton weed (Lygodesmia juncea). From the Big Woods Geyer collects showy orchis (Galearia spectabilis), ginseng (Panax quinquefolium), wild sarsaparilla (Aralia nudicaulis) and zigzag goldenrod (Solidago flexicaulis). White lady's slipper (Cypripedium candidum) is noted throughout the region's prairies.



Drawn by Alan Ominsky, Minneapolis, MN

from: M. C. Bray. 1980. "Joseph Nicollet and His Map." Philadelphia, Amer. Philosophical Society.

Geyer's journal and letters indicate that he may have collected several new species in Minnesota, but the only plant Torrey determined to be new from the state was Muhlenbergia ambigua, what botanists today call M. mexicana forma ambigua, an awned form of wirestem satin grass. Torrey called the plant a "remarkable specimen," collected on the stoney banks of Okamen Lake, Sioux County, September 20. Geyer's journal shows that he visited Okamen Lake, today known as Lake Elysian, Waseca County, on September 20, 1838. He says the lake is well-timbered with some of the "largest-size trees," including sugar maple, red oak, butternut (Juglans cinerea), black walnut and american elm. On his approach to the lake from the north Geyer notes a "marshy area" with bog bean (Menyanthes trifoliata) and bladderworts (Utricularia spp.). His journal suggests the new satin grass might have been from the marshy area. Geyer lists only one unidentified grass from the region. It is from the marsh, and the entry is starred, perhaps to show its importance.

To the west of Lake Elysian, in the basin of Blue Earth River, Geyer records Gerardia auriculata, the eared gerardia, today called Agalinis auriculata. Geyer collected this distinctive species, which has not been seen in the county since 1960, on August 16, 1838, while travelling overland on the prairie between a camp near present-day Vernon Center and the junction of the Watonwan and Blue Earth rivers. He says he saw the gerardia in "high grasses, borders of woods, foot of bluffs and bottom bushes". Associates included compass plant (S. laciniatum), indian grass (Cacalia spp.) and rattlesnake master (E. yuccifolium).

Geyer may have been the first to record Coryphantha vivipara, the pincushion cactus, from the granite outcrops south of Big Stone Lake. On July 22, 1838, Geyer camped on the "granite masses" south of the lake near present-day Ortonville. He says he climbed the rocks to search for plants in the cracks and on "accumulated thin soil." In this habitat he finds purple prairie clover (Dalea purpurea), common polypody (Polypodium virginianum), whorled milkwort (Polygala verticillata), and a curious entry for another milkwort, P. purpurea, synonymous with P. sanguinea. Blood milkwort would be far from its range in the eastern part of the state. As he heads to the west side of the outcrop, Geyer finds the pincushion cactus, what he called Mammillaria rubra, in "great perfection in flower and ripe seed" with sleepy catchfly (Silene antirrhina), sand clubmoss (Selaginella rupestris), long-leaved bluets (Houstonia longifolia), prickly pear (Opuntia spp.), cinquefoil (Potentilla pensylvanica) and prairie cinquefoil (P. arguta).

Geyer's records abound with references to many interesting plants, and a few are included here. From the bluffs along the Minnesota River in present-day Scott, Carver and Le Sueur counties, grew a woolly-seeded milkvetch that Geyer called Astragalus eriocarpus. This plant probably is A. lotiflorus, the lotus milkvetch, which today still occurs on a bluff in Le Sueur County, disjunct from the species' main range in western Minnesota. From Louisville Swamp, now part of Carver Rapids State Wayside, tamaracks (Larix laricina) appeared in "high and deep swamps." Geyer also notes that tamaracks were "abundant at lakes Calhoun and Harriet near St. Peter's (Mendota)." From Castle Rock in Dakota County and Carver's Fortifications near Kellogg, Wabasha County, grew false heather (Hudsonia tomentosa) and silky prairie clover (Dalea villosa), which today are still characteristic plants on the regions' sandy soils. From Lac Qui Parle County, Geyer lists soft goldenrod (Solidago mollis) and cutleaf ironplant (Haploppapus spinulosus), which reach the eastern edge of their range in Minnesota. The fringed orchid, Habenaria blephariglottus (probably Platanthera praecleara), grew in wet prairie along the Minnesota River near Beaver Creek in Renville County. From the Cottonwood River between New Ulm and Sleepy Eye, Geyer notes saltwort (Salicornia rubra). The location for saltwort, a western plant of saline lakes and depressions, is unexpected, but salt springs occurred in eastern Minnesota, including on Belle Plaine, Scott County. Geyer makes a most puzzling notation for collection No. 389, an "Asarum-like" plant found on August 18 in Nicollet County across the Minnesota River from present-day Judson. He records the plant from damp prairies with narrow-leaved loosestrife (Lysimachia quadriflora). It is curious entries such as this that leave a sense of regret that most of Geyer's specimens, including this one, were lost.

---- Michael Heinz

ANOTHER EUROPEAN INVASION

Some months ago the Star Tribune (26 December, 1988) ran an article on the invasion of some Metro-area lakes by the Eurasian watermilfoil (Myriophyllum spicatum). This plant has the potential to become another purple loosestrife. Not mentioned in the newspaper article, and perhaps not widely known, is the

fact that Minnesota is home to five other species of watermilfoil, all natives. Only two are to be found in Metro-area lakes -- M. verticillatum and M. sibiricum (which used to be called M. exalbenscens) -- neither of which is known to be aggressive.

Characters used to distinguish the six species are not overtly obvious to the uninitiated. The following key is adapted from S. Aiken, 1981, "A conspectus of Myriophyllum (Haloragaceae) in North America," Brittonia. 33: 57-69:

1. Leaves scale-like or absent (plants uncommon; Northeastern MN) M. tenellum
1. Leaves pinnately divided.
 2. Flowers and fruits in axils of limp submersed leaves (plants uncommon; Northeastern MN) M. farwellii
 2. Flowers and fruits in erect spikes above the water surface.
 3. Uppermost flowers and all submersed leaves whorled.
 4. Upper bracts (leaf-like structures associated with flowers) with entire margins; lower bracts with entire, serrate, or deeply divided margins; bracts < 2x the length of adjacent flowers.
 5. Stem thickened below the inflorescence, curved to lie parallel with the water surface, branching prolifically at the water surface..... M. spicatum*
 5. Stem not thickened, straight not curved, rarely branching near the water surface (plants common; throughout MN)..... M. sibiricum
 4. Upper bracts with margins deeply divided or dentate; lower bracts with margins deeply divided; bracts > 2x the length of adjacent flowers (plants uncommon; throughout MN)..... M. verticillatum
 3. Uppermost flowers alternate; leaves whorled or alternate (plants uncommon; throughout MN)..... M. alternifolium

Watermilfoils propagate vegetatively quite easily -- this is one reason why Eurasian watermilfoil is becoming a problem. One way to help prevent (or at least slow) the spread of Eurasian watermilfoil is to clean your boats and trailers **before** leaving the lake area and to ask fellow boaters to do the same. Eurasian watermilfoil is known to occur in Lake Minnetonka, (first report for the state, 1987), Libbs Lake, Lake of the Isles, White Bear Lake, and a private lake near Rochester. Please help prevent further spread, check your watercraft!

Additional reading:

- Aiken, S.G., R.R. Newroth, and I. Wile. 1979. Biology of Canadian weeds. 34. Myriophyllum spicatum L. Canadian Journal of Weed Science. 59: 201-215.
- Aiken, S.G., and R.R. Picard. 1980. The influence of substrate on the growth and morphology of Myriophyllum exalbenscens and Myriophyllum spicatum. Canadian Journal of Botany. 58: 1111-1118.
- Patten, B.C. 1954. The status of some American species of Myriophyllum as revealed by the discovery of intergrade material between M. exalbenscens and M. spicatum in New Jersey. Rhodora. 56: 213-225.
- Reed, C.F. 1977. History and distribution of Eurasian watermilfoil in the United States and Canada. Phytologia. 36: 417-436.

---- Anita Cholewa

UPCOMING EVENTS ELSEWHERE

DNR Needs Volunteers for Plant Projects

Minnesota Natural Heritage Program botanists are now eagerly planning our field season. Last year the efforts of several informal volunteers who came forward made significant contributions in the discovery and survey of populations of several rare plants. This year we hope to expand and formalize our volunteer program by defraying expenses for short-term volunteers. We also have some funds available to hire field assistants for periods of several days at a time at a rate of \$8 to \$12 an hour (no benefits) depending on experience and training.

Specific projects for which we are seeking volunteers or short-term employees include:

1. Monitoring of Minnesota dwarf trout lily in Rice and Goodhue counties, late April-early May. Volunteers are needed for a minimum of 4 hour time slots.
2. Survey of known site for western Jacob's ladder in St. Louis County, to determine full size and extent of population, late June or early July. Volunteers are needed for a minimum of one day.
3. Search potential cedar swamp habitat for western Jacob's ladder in St. Louis and Itasca counties, late June or early July. Volunteers are needed for time slots of a minimum of one day.
4. Search potential wet prairie habitat in Polk and Kittson counties for white fringed prairie orchid, 2 weeks in early July. Volunteers are needed for time slots of a minimum of one day.
5. Search potential native prairie habitat in Cottonwood, Jackson, Brown and Redwood counties for prairie bush clover, late July through mid-September. Volunteers are needed for time slots of a minimum of one day.
6. Conduct population counts of prairie bush clover in long-term monitoring plots at Kilen Woods State Park, the last week of August. Volunteers are sought for a minimum of 2 days. Preference will be given to persons available for a full 5 days.

All volunteers will work in the field as part of a team including DNR botanists. Qualifications include an interest in rare plants or native habitats, sharp eyes and the ability to withstand walking and bending over for a full day at a time in outdoor conditions. Formal training in botany is not required. All volunteers will be trained in the field.

Volunteers may be of any age able to do the work (teenage and up) and willing to work at least a four hour day (see specifications for individual projects). We would welcome your participation in our volunteer program or your expression of interest in becoming a short-term employee. For further information call

---- Nancy Sather

UM Landscape Arboretum

Numerous events and classes have been scheduled for the upcoming seasons. A complete calendar may be obtained by calling or writing the Landscape Arboretum, P.O. Box 39, Chanhassen, MN, 55317; 612-443-2460. Some of the classes deal with native plants and are listed here for your convenience.

20 & 27 April - Spring Woodland Wildflowers
28 April - Minnesota Beautiful Conference
17 June - Exploring Plant Habitats of the Arboretum

Minneapolis Institute of Arts

"Art in Bloom" showing **26-29 April**.

St. Croix Valley Watershed Seminar

An informal seminar on wetland ecology "Saving Our Wetlands: The Threat of Purple Loosestrife and Other Aquatic Exotics," is being sponsored by the Marine-Carnelian Watershed District, the Valley Branch Watershed District, and the Sierra Club's St. Croix Valley Group. The seminar will be held on Tuesday, **June 13**, at the County Commissioners Room in the south wing of the Washington County Government Center in Stillwater, MN. For more information call: John Baird ; Russ Kirby ; or Dale Anderson

Shiitake Mushrooms: National Symposium and Trade Show

Sponsored by the University of Minnesota, the Forest Resource Center (Lanesboro), the USDA Forest Service, and the National Exotic Mushroom Assoc., this event hopes to: 1) assess the current status of the shiitake industry; 2) share information on production and management; 3) suggest marketing strategies; and 4) identify research needs. The symposium will be held **May 3-5** at the Ramada Hotel, 1870 Old Hudson Rd., St. Paul. For more information call the UM Educational Development System at 1-800-367-5363 or 612-625-2722.

Denali Parks of Alaska

Wasilla Community Schools (Anchorage AK) is offering an opportunity to study the natural history of Denali Parks (Denali National Park and Denali State Park). Under the guidance of a professional naturalist/wildlife biologist, you will travel by Alaska Railroad and by river rafts on a 12 day expedition, which will emphasize understanding the ecology of the parks' birds, mammals, and flowering plants. Trip dates: **13-23 July** and **17-28 August**. For full information contact John Wenger, 6038 E. 12th, #10, Anchorage, AK 99504.

MISCELLANEOUS NOTES -- BOOK REVIEW *****

Adventures of a 'Wild' Plants Woman, by Norma Phillips --

This is a book mainly about wildflowers, but with a different approach. It is a chronicle of the author's experiences as a plant collector and propagator in connection with the nursery she and her husband conducted for years.

Most of the approximately two hundred species covered are the attractive herbaceous ones that are native to her area of northcentral Minnesota. Since these have wide distribution in northern evergreen forests, northern hardwoods areas and bogs across the country, the book should have wide application. The chapter on ferns also includes the fern allies, which is a rather unique feature. Some shrubs are also dealt with.

Unlike the books that picture and describe the plants in bloom, the author's descriptions are of the plants in their fruiting and dormant stages. This information could be crucial to the successful collecting or moving of plants from a threatened area. It could also be helpful in the recognition of the plants during seed collection. The text is not just a list, but a readable story. However, it will probably be used to a large extent as a reference for its cultural notes on each species.

To keep from depleting the area by continuous collecting, the author did some propagating. Vegetative propagation methods are given in detail, especially for more difficult species. When seed propagation was tried, it was usually done by sprinkling fresh seed around the base of the mother plant. The results therefore could not be very precise. Readers may find that some statements may not be in accord with their own experiences or that given by other authors. One should realize that fresh seeds can differ greatly in their germination from those that have become dormant by drying and storage. Many gardeners do not have access to fresh seed.

An additional feature is the chapter on the building of their nursery business by the author and her husband. This may be of interest to some. Personally, I enjoyed the author's poems sprinkled throughout the book. They show her sensitivity to the natural environment. (Price \$12.95. Quality soft cover. Minnesota residents add 6% tax. Postage \$1.75. From Little Bridge Publishing Co., 6700 Splithand Rd., Grand Rapids, MN 55744).

---- May Wright

MEET NEW FRIENDS THIS SUMMER -- ATTEND A FIELD TRIP

1988/89 MNPS Board of Directors

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Minnesota Plant Press may be obtained through membership in the Minnesota Native Plant Society. The newsletter is distributed 3 times each year. Items of interest for inclusion in the newsletter may be submitted by anyone but must be typed and double spaced. The editor reserves the right to edit for grammar and clarity.

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220 Biological Sciences Center
University of Minnesota
St. Paul, MN 55108