MONTANA LICHENS...the BIG PICTURE - Bruce McCune

Vascular plant botanists who tend to view the end of summer as the beginning of the doldrums (leading inevitably to cabin-fever season) should take advantage of the next few Indian Summer days to step outside and enjoy a bit of lichenizing.

Montana is so diverse environmentally that a casual observer can see large differences in the lichen flora over short distances. Although they respond to very small scale differences (such as bark furrow vs ridge), you can also see differences across larger gradients from your car at 55 mph. Here are a few observations about regional differences in the lichen flora of Montana.

The continental divide sets up a major contrast between the heavy lichen flora on trees on the west slope as opposed to sparse epiphytic flora on the east slope. The best pass I know for seeing this is Marias Pass, just south of Glacier Park (Chief Joseph, Rogers and Logan Passes are OK too; Homestake Pass is not so good, the road down to Butte being cut into exposed south- and west-facing slopes). There are lodgepole pine forests on both sides of Marias Pass. On the west side they are heavily clothed with lichens, the most prominent genus from a distance being Bryoria. There are about a dozen species of Bryoria in Montana and all are brown to blackish and stringy in appearance; they were formerly in the genus Alectoria, which now includes just straw- to green-colored stringy species. Bryoria varies in appearance from horsehair to more kinky - somewhat like steel wool. There, you've just learned your first lichen genera. That didn't hurt, did it?

The east side of Marias Pass is by no means a total loss. You just have to turn your eyes from the trees to the rocks, where you'll see a great diversity of species, many of them crustose. Pick any exposed outcrop - you should see from one dozen to several dozen species on the typical square meter of rock. Limestones have almost completely different lichen communities from non-calcareous rocks. In general, lichens are more prominent on dolomites than limestones, and even more prominent on siliceous rocks, although there are exceptions...
FROM THE PRESIDENT

I hope all had an interesting summer. In all the areas of the state that I found myself in, it seemed that there were abundances of some rather uncommon plants this year, not necessarily in areas recovering from last year’s fires.

As I mentioned in the last newsletter, one of my prime objectives for the coming year is to forge ahead in getting you members to participate more. We are on our way, with the Landscape, Conservation, and Field Trip & Program Committees working hard. However, we still have more to do.

The Membership Committee has neither a chairperson nor any members. The function of this very important committee is to suggest ways to attract members from new regions, find out what the membership wants of MNPS, and assist in reminding members of past due dues. Without maintaining membership through acquisition of new members and retaining old members, we will dwindle in our ability to provide varied programs and support for special projects.

The Newsletter & Publications Committee is still in need of a chairperson. So far, I have been successful in that responsibility as well as being Editor, but we cannot expect her to do both jobs. PLEASE, someone volunteer to head this committee. I envision this committee completing the draft of a brochure that explains MNPS, its functions and aims; possibly developing a newsletter directed at youngsters (which was discussed at some length in the Spring Meeting), helping to promote additional advertising, and creating other brochures as needed (as such guidelines for collecting native plants currently being developed by the Landscape Committee).

We now have a permanent chairman for the Landscape Committee: Greg Hallston, of the Kelsey Chapter. Welcome aboard, Greg! This committee was designed to provide a resource for members who wish to establish native plants in their gardens. They are currently working on guidelines for collecting native plants. I hope to also get them involved in assisting local chapters in designing special projects, such as the native plant garden at the Capitol in Helena. Their expertise will be invaluable in such matters.

The Conservation Committee is headed by Allan Cook of Valley of the Flowers Chapter. This committee serves as our educational arm and sounding board for environmental issues. I hope to see them develop guidelines for basic programs in plant habitats and communities, and to propose criteria and guidelines for environmental issues to be submitted to the Board of Directors for presentation to the membership.

The Field Trip and Program Committee is to assist local chapters in preparing the basic program for our annual meeting, and to plan some statewide field trips for the coming year. This committee, headed by Juanita Lichtardt of the VoF chapter, has been active since the last state meeting. Keep up the good work!

I know that we are all pressed for time by our jobs and many interests other than MNPS, but we need you to give a little of your time. More members participating in these committees means less time and burden placed on any one individual. PLEASE VOLUNTEER TO DO A SMALL PART! For those of you who cannot find the time to be a committee member, please do take the time to convey to the chairperson suggestions for projects, events, or concerns, and then participate in the events that are planned by these committees. Please, we need some help here!!!

Also, please be reminded that MNPS is a Non-Profit Organization registered with the IRS, so private or corporate donations of materials, services or money are tax deductible.

Feel free to call me any time to discuss ideas or problems. I am here to serve you, the members.

Stephen J. Harvey, home 586-1348, work 994-4212 (leave a message if need be).

TENTH BIENNIAL DIATOM SYMPOSIUM

The Tenth Biennial North American Diatom Symposium will be held Wednesday through Saturday, October 11-14, at the Forestry and Biological Station of the University of Minnesota, Lake Itasca MN.

Kelsey Chapter member Loren Bahl, whose excellent article on diatoms appeared in the spring issue of KELSEYA, suggests that any other “diatomarians” among our membership would find this symposium very interesting and engaging. Preregistration is $25 ($30 at the door). For more information, write: David B. Czarnecki, Department of Biology, Loras College, Dubuque, IA 52004-0178, or phone (319) 588-7221.

GENETICALLY ALTERED FUNGUS USED ON MISSOUA WEEDS

Two strains of a genetically altered fungus were used in weed control experiments at sites in Missoua this past summer.

The applications were made to weeds in vacant lots of the Big Flat area of Missoua under the direction of Gregory Kennett, Missoua County Conservation District officer and project coordinator for the experiments.

Montana State University plant pathologist Dave Sands says the goal of the release in Missoua is to control broadleafed weeds in a manner that is environmentally safer than any chemical herbicides.

“This fungus occurs naturally on food crops and will not grow at human body temperature,” says Sands. Other research has shown it to have no adverse effects on mammals. These fungi would not even harm nearby fields of wildflowers. However, if the wildflowers were broad leaved and in the field to which the fungi and a "vitamin" were added, the wildflowers would die along with the weeds.

Both applications involve strains of Sclerotinia sclerotiorum that have been altered by ultraviolet light.

Three years ago, these strains were released at a range site at the MSU Agricultural Experiment Station’s Red Bluff Research Ranch in Madison County. As hoped, they did not survive the winter. From hundreds of selections of altered fungi, Sands — together with MSU plant pathologists Gene Ford and Vincent Miller — chose these because their survival will be limited unless humans help them.

The first strain, called Al-PYR, was altered so that it can only live and reproduce if the area in which it is applied also contains a chemical that is not freely available in nature; without human help, it self-destructs.

The second strain, referred to as SL-1, cannot survive through the winter.

Creating biocontrol agents that self-destruct is the newest approach researchers are using to ensure that altered organisms have a minimum impact on our environment, says Sands.

Sands has been working with Kenneth and University of Montana environmental analyst [and MNPSer] Don Bedunah for the last six years on Sclerotinia sclerotiorum.

One of the earliest indications that the fungus might be effective in weed control was its effect in nature on spotted knapweed that was observed in an irrigated alfalfa field in the Bitterroot Valley, according to Sands. He, Bedunah and Kenneth released an unaltered form of the fungus on knapweed near the Lubrecht Experimental Forest two years ago and got about 80 per cent control at one of the sites and less control at the other site, according to Bedunah.

The alterations in the Sclerotinia strains allow them to be contained on only specifically-treated areas, says Sands. The release was done under an Environmental Protection Agency permit issued to MSU — adapted from a news release prepared by Carol Flaherty of the MSU News Service.

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KELSEYA, Fall 1989
Mat’asoomao, it is the spiritual potential consisting of four separate forces. All wild plants and wild animals and humans have this. These forces can separate and interchange between a person, person and animal, animal and plants. Plants have both physical and spiritual components. Edible plants are regarded

- Bill Tall Bull

as powerful beings because they allow animal and human life.

Plants should not be abused. Plants eaten by animals and humans take on the power of these plants, and because game animals sustain themselves on the original power potency of plants, their flesh becomes sacred. The ingestion of animal flesh makes the humans part of the animal community.

In Cheyenne thought, the human body Mat’asoomao had separated and became animal food and after the Omo’tome had departed

the body became plant food and an inseparable participant of the eternal cycle of transformation.

Plant, animal, human; human, animal, plant; are parts of each other in kinship as deep as the mystery of life.

- Bill Tall Bull is Professor of Native American Studies at Dull Knife Memorial College in Lame Deer, and an elder of the Northern Cheyenne Tribe.

BOOK REVIEW...

A Field Guide to Wildflowers of the Southern Interior of British Columbia and Adjacent Parts of Washington, Idaho and Montana
Joan Burbridge, 1989
University of British Columbia Press, 303-6344 Memorial Rd., Vancouver BC, V6T 1W5 Canada. 400 pp., $19.95 paper or $29.95 cloth [Canadian currency]

This field guide is illustrated with over 300 color photographs. Each page contains a photo of a single plant with its scientific and common names. Descriptions are organized according to flower color, and include information on height, flower arrangement, flower formation, leaves, stems, blooming period and habitat.

A glossary is provided for the few specialized terms, as well as illustrations of flower structure and leaf terminology.

The area covered by the guide stretches from the Cascade Mountains in the west to the Alberta border in the east; from the Trans-Canada highway in the north to the 45th Parallel in the south (through Washington, Idaho and Montana). Joan Burbridge is a guide and warden of Woodhaven Nature Conservancy in Kelowna, BC. She lectures and writes on the flora and fauna of the region.

-Kathy Ahlenslager

AN UPDATE ON BIOLOGICAL CONTROL OF DIFFUSE AND SPOTTED KNAWEED

Research continues on biological control of knapweeds by the USDA Agricultural Research Service in Montana, Idaho, Washington and Oregon, emphasizing the importation, release and establishment of root-boring moths and beetles for control of diffuse and spotted knapweeds (Centaurea diffusa and C. maculata). These additional insects will complement species already established, such as the seedhead flies, Urophora affinis and U. quadridifasciata. While seedhead-targeted insects such as these two reduce knapweed seed production, they have not yet markedly reduced populations of their hosts.

The diffuse knapweed boring beetle Sphenoptera jugoslavica has been released in all the northwestern states. Research has begun to determine its effectiveness in different areas. Clearance has also been obtained from AFRS [Animal and Plant Health Inspection Service] for the release of a spotted knapweed root-boring weevil, Cypholeon euchates, in the United States.

The yellow-winged root moth, Agapeta zoegana, has been established on spotted knapweed at four sites in Washington, and was released during 1987 in northern Oregon and in 1988 in central Montana. During the summer of 1989, emphasis has been on obtaining establishment of the gray-winged moth, Pterolanche inspersa, and the brown-winged root moth, Pelochrista medullana, on both diffuse and spotted knapweed.

Other knapweed organisms that have been studied by the USDA in Italy and Greece include a seedhead weevil and leaf-galling mite. The larvae of the seedhead weevil has so far only completed its development in diffuse or spotted knapweed. The leaf-galling mite also appears to highly host specific, but has a complex life cycle needing further study.

- Adapted from an article by Sara S Rosenthal, Research Entomologist with the USDA-ARS Rangeland Insect Laboratory in Bozeman, for the excellent publication Knappedeed, Vol 3, No. 2, produced by the Washington Interagency Knapweed Committee.
MEETINGS

THURSDAY, SEPTEMBER 14, CLARK FORK CHAPTER: 7:30 p.m., Room 307, Botany Bldg, UM campus. Take a wildflower walk to Grinnell Glacier in Glacier National Park. Long-time interpretive naturalist Kathy Ahlsnager will show slides taken over ten summers in Glacier Park. Come and find out if there’s any beargrass....

THURSDAY, OCTOBER 5, VALLEY OF THE FLOWERS CHAPTER: 7:30 p.m., Fish, Wildlife & Parks building on South 19th, Bozeman. The program is tentative at this point, but please bring 6-8 of your favorite slides from this summer and let us see what you’ve been doing! PLEASE NOTE: we have changed our regular meeting day/place to the first Thursday of each month, FWP building. We hope this change will help eliminate some of the conflicts with other organization meetings, and make us easier to find.

THURSDAY, OCTOBER 12, CLARK FORK CHAPTER: 7:30 p.m., Room 307, Botany Bldg, UM campus. Bill Gabriel will present “Describing Alaskan Vegetation.” Bill spent 15 years with the Forest Service, much of it in Alaska. He is currently a freelance writer and photographer. Come and hear him tell about his adventures in the frozen north.

SATURDAY, OCTOBER 14, MNPS BOARD OF DIRECTORS’ MEETING: 11 a.m. at the Plant Growth Center, MSU campus, Bozeman. All officers, rectors, and committee chairs please plan to attend - we have many important items to discuss. And any member is welcome also. Bring a sack lunch; we’ll try to finish up by 5 p.m.

WEDNESDAY, OCTOBER 18, FLATHEAD CHAPTER: 7 p.m., meeting room of the Montana Power building on Meridian in Kalispell. Program TBA.

WEDNESDAY, NOVEMBER 1, VALLEY OF THE FLOWERS CHAPTER and THURSDAY, DECEMBER 6: 7:30 p.m., Fish/Wildlife/Parks building on S 19th, Bozeman. Program TBA.

THURSDAY, NOVEMBER 9, CLARK FORK CHAPTER, and THURSDAY, DECEMBER 14: Room 307, Botany Building, UM campus, Missoula. Program TBA.

WEDNESDAY, NOVEMBER 15, FLATHEAD CHAPTER: 7 p.m., Montana Power meeting room on Meridian in Kalispell. Program TBA.

FIELD TRIP REPORTS

MNPS had an outstanding field-trip season. If you led a trip this summer, please send in a writeup by December 1, so it can be included in the Winter issue of KELSEYA. Reading about other chapter’s outings helps us all get good ideas about new places to explore, best times/seasons, and interesting things to look for. Let’s hear from you!

YELLOWSTONE IS ALIVE!

Yep, Yellowstone is truly still alive!! On July 22, 1989, a terrific group of nearly twenty intrepid plant watchers ventured to an area in northwestern Yellowstone National Park which was burned by the 1988 fires. This was a scheduled joint venture with the Valley of the Flowers Chapter and the Montana Wilderness Association. The beauty of these types of outings is that they encourage a diverse and fun mix of people to get out and enjoy nature together...our party included a carpenter and a building contractor, a university botany professor, a retired couple from California (now living in Bozeman), and a human-nutrition researcher. Everyone brought knowledge and interest, and each was excited to explore with and learn from the others.

It was our intention to survey locations ranging from unburned to severely burned, and with topographic gradients from a flat, marshy meadow to a relatively steep hillside - and that’s just what we found. Following an easy trail past rock outcrops and aspen - with loads of ripe strawberries underfoot - we learned interesting details about lichens, hydrologic relationships and solar aspect. The willow meadow offered a prime location to investigate a fire’s ability to affect wet soil and vegetation. Shallow pits were dug to determine fire depth; the small, spotty burned areas of the meadow had gone no deeper that 1-2 cm, or just to the depth of the interface of matted organic matter and soil. A pair of permanent photo points was established, one in a burned and one in an adjacent unburned area. Species in each were recorded, and vegetation heights noted.

As we walked further up the trail, we could see how the fire in that area had skipped through lodgepole pine (Pinus contorta) stands, leaving some trees, understory and grasses untouched, while vegetation immediately adjacent appeared burned quite severely. In late Jan we found a partly-melted and twisted lump of glass, an insulator from the old power line which once ran along the edge of the Park, so the heat at the ground must have been quite intense. And yet - again - we found that the soil only a few centimeters below the duff layer was unscorched and apparently had not received much heat. When scouting this area in early July, we had noted many glacier lilies (Erythronium grandiflorum) just finishing blooming, some with early fruit. They and emerging grasses were almost the only non-woody plants in evidence in the burned areas. By the time of the field trip (three weeks later), heart-leaf Arnica (Arnica cordifolia), fireweed (Epilobium angustifolium), puffytoes (Antennaria spp.) and fleabanes were abundant.

An interesting observation was made on an east-facing hillside where we stopped for lunch, overlooking a pretty stream. The lodgepoles had been burned and the ground was gray, with both the understory and grasses completelyashed. It was fun to see what appeared to be huge dinosaur footprints, deep into the gray earth - the truth is that these indentations were made by trunks and roots that were burned with enough heat to leave nothing but a cast deep into the soil. An impromptu identification session during our picnic lunch turned into a lesson-in-the-field on key use, and the relative merits of different keys (their content and their weight in the backpack!).

Small burned but still standing aspens had sprouted from the bases, showing juvenile-stage leaves which are several times larger than the familiar quarter-sized foliage. This is a common response by aspen to fire. Another pair of photo points was established which included these "baby" aspens, looking both down and across the fairly steep slope on which they stood.

We also noted a number of emerging lodgepole seedlings, some of them just breaking through the ash. Additional photo points were established in areas of the forest which showed varying degrees of burn severity.

Fireweed was an appropriate species to find in the burned areas; the pink flowers (sun, water, and fire) added a welcome splash of living color. We were stumped on the identification of a plant with a low, tightly clustered rosette of dark green leaves - it was beautiful, but didn’t ring any bells with the "hard core" botanists. Then suddenly, it came to us - it was a newly emerging fireweed! It can be fun to stretch the brain cells to figure out what one is looking at!

Our plan is to visit this same location every summer for at least the next five years, in order to observe and record any changes in the floral component of this part of the ecosystem following a fire. We would welcome you to join these future explorations.

- Renee’ Cook

BRRR...ON THE BEARThOAT

Late June is spring in the high mountains, and - though some years that means it’s warm and sunny - June 24 this year found nearly six inches of fresh snow across the whole Beartooth Plateau! That didn’t stop a group of hardy souls from gathering, but did change our plans about where to spend most of the day. Understanding the alpine zone means recognizing the ways that wind, water and topography interact to create micro-habitats, each with its distinctive plant community, and we were able to spot a few representatives of these under the snow and along road edges that were beginning to melt off.

Working our way down the switchbacks, we noted the changes
in size, lushness and composition of the plant cover to be found at each of the four crossings of Quad Creek – an
excellent example of how increasing (or decreasing) elevation
affects the height, numbers and diversity of the flora.

Finishing lunch in the welcome sunshine at the Rock Creek Recreation Area, we were amazed to stumble over – literally –
a couple of clumps of bitterroot (Lewisia rediviva) leaves,
along the road edge by the picnic area, in what seemed most
unlikely bitterroot habitat.

(I visited that same spot a few weeks later. I discovered more than a dozen bitterroot clumps blooming; the area has since been bulldozed over by road construction and campground expansion.)

We spent the afternoon exploring up Rock Creek, which flows
in a classic U-shaped glaciated canyon, and saw many typical
forest and meadow species, including fairy slipper orchid
(Calypso bulbosa), elegant death-camass (Zigadenus elegans),
columbia lousewort (Clematis columbiana), two different
paintbrushes (Castilleja spp., leopard lily (Fritillaria
atropurpurea)... and more bitterroot!

This trip, which is jointly sponsored by MNPS and the
Montana Wilderness Association, always has so much interest
that it’s offered two days – with this year’s second trip
Sunday, June 25. Although the previous day’s snow was gone,
large residual snow patches remained in many areas, with solid
snowpack of about 3-4 feet around the West Summit.

And although sunny, a sharp west wind encouraged us to head
for more sheltered, lee-side locations. We spent some time
looking at the krumholz, the lower slopes of which have
become increasingly smaller and more deformed, at their upper
limits of growth tolerance. Of particular interest are the
huge fallen trunks of ancient trees – many times larger in
diameter than anything growing around them today – which
suggest that a warmer climate in the past may have permitted
timberline to be higher than it currently is.

Species seen on Sunday included the regional endemic Oeder’s
lousewort (Pedicularis oederi); Ross’s gum (Geum rossii),
which is the dominant forb of windward-slope turf communities;
cushion-plant species moss campion (Silene acaulis) and alpine
forget-me-not (Fritillaria nunam), which are typical of the
more-exposed ridgetop locations; and two other regional
endemics, dwarf alpine clover and Parry’s clover (Trifolium
nunam and T. parryi). The beautiful but skunk-smelling
polecat flowers - sky pilot and Jacob’s ladder (Polemonium
viscosum and P. pulchellum) were both in evidence, as well.

No matter what the weather on the Plateau, there are always
exciting discoveries to be made!

– Jan Nixon

EXPLORING THE GIANT RIPPLE MARKS

On May 24 members of the Clark Fork and Flathead Chapters
had a chance to observe the impacts of a major geological
event and its effect on flora, when they explored the Giant
Ripple Marks south of Hot Springs.

The Ice Age draining of Glacial Lake Missoula created
alternating hills and swales made more dramatic by the plants
now inhabiting them. The dry thin soils of the hills were
dominated by the buckwheats Eriogonum heracleoides and E.
palavifolius which lent them a silver-gray hue. The moist
swales were yellow with nineleaf biscuitroot (Lomatium
triternatum).

In a few swales, vernal ponds are present. These seasonally
wet areas have a unique flora dominated by tiny native
annuals; Representative species in the vernal ponds included
Scouler’s popcorn flower (Plagiobothryum scouleri), least
mousetail (Myosurus minimus), narrowleaved and dwarf montias
(Montia linearis and M. dichotoma), and dwarf woolyhead
(Palicarpus brevissimus). Lots of bitterroots were present,
although still in the bud stage.

– Anne Bradley

PRYOR-BIG HORN MOUNTAINS FIELD TRIP

On Saturday morning of Memorial weekend we started our trip
at Red Lodge. The weather was cool and a little breezy, but
the sun was out. We began by looking at the Idaho fescue
and mountain big sagebrush (Artemisia tridentata vaseyana)
dominated habitats. Although fritillary, shooting star and
Besseya were through flowering, hoary balsamroot (Balsamorhiza
perfoliata) and lousewort (Lysimachia vulgaris) and elegant death-camass
(Zigadenus elegans) flowers were in abundance. After compiling
a list of species for the sites we headed east toward
Bridge and dropping off the penepanes near Red Lodge to the
dry, semiarid canyon leading to the Big Horn Basin and
stopping several places to look at plants, one of which was
Scouler’s popcorn flower (Plagiobothryum scouleri) on the sensitive plant
list for the state. The further we traveled east, the
more plants appeared which belong to the Great Basin floristic
element. In the bottom of the canyon, we found basin big
sagebrush (A. t. tridentata) up to six or seven feet tall.

After lunch in the sun at a park in Bridge, we continued
east toward the Pryor Mountains, passing through valley
top dominated by silver sage (A. cana cana) or
by greasewood (Sarcobatus vermiculatus), to hills covered
with Rocky Mountain juniper (Juniperus scopulorum) and limber pine
(Pinus flexilis). At one stop, the hillside abounded with
every shade of Castillela chromosa (desert indian paintbrush).
There was near white, the palest of pink, deeper pink, salmon,
ioange, red-orange and brilliant scarlet to be found in an
area of a few hundred square meters. We also found
Fritillaria howardii and Arenaria nuttallii.

As the hills gave way to more open slopes, black sage
(Artemisia nova) became the dominant shrub. Along one broad
plains at the crest of the hills, the ground was a mass
of bark and the occasional prairie rose, (Roselle virginica) and
summer locoweed (Dodecatheon meadia) and
elegant death-camass (Z. elegans), A. gilviflorus (plains orophracca), A. purshii
(Pursh’s milkvetch), and A. spatulatus (tufted milkvetch) gave
the ground among the black sage a radiance of color. At
the base of the Pryor Mountain slopes these same cushion plants
were again in abundance, along with the desert indian
paintbrush and pale Indian paintbrush (Castillella pallescens). The
lower south and west facing slopes of the Prories
were dominated by Utah juniper (Juniperus osteosperma) 
which showed definite signs of damage from last winter –
and mountain mahogany (Cercocarpus ledifolius).

We spent a very windy but enjoyable evening and night at
the Big Horn Canyon National Recreation Area northeast of Lovell.
We found many plants of the Great Basin flora here, with
Chenaecasis spp., Lonicera fremontii, Gotheria cneasitis, O. pallida, Ipomopsis spp.,
and Cleome lutea among the most interesting. Many moist drainages
in the Recreation Area are infested with Tamarix chinensis
(tamarisk), a truly noxious introduced weedy shrub.

The following morning, we journeyed to the Medicine Wheel
at the top of the Big Horn Mountains. Spring was arriving
here at 10,000 ft. Some of the plants to be seen in the alpine
and subalpine areas were Fritillaria nunam, Arenaria rossii,
A. rubella, Claytonia lanceolata, Dodecatheon conjugens,
Ampneus patens, A. parviflora, Caltha leptosepala, and
Telesonai janesi. We ate lunch amongst the rocks and
clinging alpine plants, then returned to the Big Horn Basin.
As we descended the mountains, we had a dramatic example
of the change in vegetation with elevation, from alpine rocks
to alpine meadows, to subalpine meadows with tree rings, to
subalpine fir forest, Douglas fir forest, mountain mahogany
and black sage slopes and foothills, then back out onto
the plains of shadscale and Wyoming big sage (Artemisia
tridentata wyomingensis).

When we got back to Lovell, we turned north and drove
to the two main ridges of the Pryor mountains along
Crooked Creek. This drive was most interesting, as you begin
in the dry desert flora of the Big Horn Basin, pass into a
long zone of Utah juniper and sagebrush, then into dry Douglas
fir forest, and then into brilliant Douglas fir forest. Among the
plants seen along the way were: Attriblus argenteus, A.
canescens, A. confertifolia, A. gordonii, Suada depressa, Suada riga, Artemisia calafastria, A. filifolia, A. frigida,
A. judiciviana, A. pedatifida, Lithospermum incisum,
L. ruderale, Mentzelia oblongifolia, Arnica cordifolia, continued on Page Six
MONTANA LICHENS...the BIG PICTURE
continued from Page One...

to this. For instance, wherever the Madison Limestone outcrops, you are likely to see some huge areas splattered by the small orange foliose lichen Xanthoria. Good spots are (1) the Clark Fork valley between Drummond and Bearmouth (EZ on EZ off or you can see it as you sail by); (2) along the Big Hole River between Wise River and Divide; and (3) Jefferson Canyon between Cardwell and Three Forks (all of these on Madison Limestone). This species is also common on acidic rock, but generally doesn't develop the same level of dominance as on calcareous rock.

Another kind of lichen "paint" easily seen on distant rocks is the yellowish-green Acarospora chlorophana. This crustose species is a vivid fluorescent yellow green when seen up close. It is mainly found on acid rocks, especially vertical or overhanging cliff faces on granite (both sides of the Divide). Virtually every siliceous rocky summit in Montana has some of this lichen.

The foliose growth form of this Cladonia species shows up dramatically against the dark background.

The color of A. chlorophana is similar to the most garish of Montana lichens, the genus Leptoria. These are bushy crustose species, colored a stunning fluorescent chartreuse. Most often they grow on trees. The common name is "wolf lichen" - so named because the compound responsible for the garish color, vulpinic acid, is toxic to animals, and reportedly has been used to poison wolves in Scandinavia. There are two species in Montana. Leptoria columbiana is almost always fertile, having brown spore cases (fructifications), and is found most often in subalpine forests and on isolated ridgetop trees. L. vulpina closely resembles L. columbiana but reproduces asexually by (and can be identified by) its powdery to granular propagules (soredia). It can be found at all elevations where there are trees and is more common than L. columbiana.

You can tell you're under strong oceanic influence when you see long streamers of greenish to yellowish Aleutia sarmentosa hanging from the conifers. Good places include the northern Swan Valley, the Lake McDonald area of Glacier Park, and just over the Idaho border in the Lochsa Valley. Another genus that is most prominent in the wetter climates of Montana (but also throughout western Montana forests) is Hypogymnia. From a distance, this genus gives tree branches a grayish woolly appearance. All members have hollow lobes (appearing inflated) and are generally white to gray above and black below. Although there are eight or so species in Montana, each with its own distribution pattern, the genus is generally most abundant west of the Divide. Moist forests of low- to mid-elevations have the greatest diversity of Hypogymnia.

But in south central Montana, yellow-green is the color of lichenized tree branches. The yellowish tinge is the color of usnic acid, the dominant secondary chemical in the genus Usnea. Up close, these are tufted or drooping crustose species, generally with lots of small, erect branches. Because Bruchia and Hypogymnia are much less abundant and Usnea dominates, tree stands of the Gallatin Canyon and around the Madison Valley look yellowish green below the living branches.

Lichens on soil also show interesting regional patterns in Montana. East of the Divide on noncalcereous soils, there is a common vagrant lichen, Xanthoparmelia chlorochroa. This yellowish-green lichen (also containing usnic acid) is foliose but forming tufts about 2-4 cm broad. These lie loose on the ground. Look for them on open sites (sagebrush, rabbitbrush, grasslands), though you will seldom see this species west of the Divide. (Please send me a note if you see it on the west side.) Calcereous soils have a variety of interesting crustose and small foliose lichens, one of the most prominent being the nitrogen-fixing, dull black Collema tenax. This one forms soil crusts on arid soils, usually in mixture with mosses, lichens and algae.

In western Montana, the most prominent ground lichens are in the genus: large lobed, sprawling Peltigera and a genus with upright stalks (often tipped with cups), Cladonia. There are about 20 species of Peltigera in Montana, and 50 species of Cladonia. There are two main groups of Peltigera: one group with a dominant green alga, giving the lichen a bright green appearance when wet (they look like they belong in a salad but are actually barely edible), the other group with a dominant blue-green "alga" which gives the lichen a grayish, blue-gray or blue-green color when wet.

In some ways, the distributional patterns in lichens seem to parallel those of vascular plants: Pacific coastal, boreal, cordilleran, intermountain, arctic-alpine, and Great Plains floristic elements are all represented. There are some other curious patterns, however, that may or may not be paralleled by vascular plants. For instance, a few lichens are known only from the western American alpine and the southwest coast of Greenland. One of these species, Bryoria subuligera, is a ground-dwelling species that is so far known only from Greenland and several granitic summits in the Bitterroot Range of the north central lichens. Hypogymnia venosa, is known only from the Appalachians, a single site in the northern Rockies, and the west slope of the Cascades-Sierra axis.

Lichenology in Montana is in an exciting stage of rapid discovery. Range extensions and new records for North America are fairly common. The genera are better known, however, and most of these arise from monographic revisions. As far as I know, there are few - if any - lichen species endemic to Montana. There are certainly rare species of lichens, but with our present level of knowledge, it is sometimes difficult to be sure which are the rare and which the poorly known species.

Because there is no lichenological equivalent to Hitchcock and Cronquist [Vascular Plants of the Pacific Northwest], serious lichen identification requires a good collection of the primary literature, a big obstacle to beginners. Novices should use Mason Hale's How to Know the Lichens and a hand lens or dissecting scope. For Montanans, the second edition is much improved over the first edition, partly because the second incorporates Hale's teaching experience at the Flathead Lake Biological Station. The recent book by Vitt et al on Mosses, Lichens and Fungi of North America has some good photos but many common Montana lichens have been omitted. Some lichenologists, including myself, are happy to exchange our identifications for well-labeled duplicates. My address is: Department of General Science, Oregon State University, Weniger Hall 355, Corvallis, OR 97331-8605.

- Bruce McCune is an Assistant Professor in the Department of General Science at Oregon State University.

FIELD TRIP REPORTS...continued from Page Five


A useful floral key which we obtained at the Recreation Area Visitor Center near Lovell is Earl R Jensen's Flowers of Wyoming's Big Horn Mountains and Big Horn Basin, published in 1967 by Basin Republican Rustler Printing, $15.00. As the time we arrived on the north side of the Pryors, the light was nearly gone and it was time to call it a trip. We drove back to Bridger, and went our separate ways. By the time my group got to Laurel, it was raining moderately, and by Livingston the snow was coming down hard, Coming over Bozeman pass was slow going, and when we reached Bozeman, there were two inches of snow on the ground. What a change in the weekend to be back away from the snows; and cold of southwestern Montana's spring.

- Stephen J Harvey
STATEWIDE MEMBERSHIP WITH CHAPTER AFFILIATION*

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CLARK FORK CHAPTER - Lake, Mineral, Missoula, Powell and Ravalli Counties
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All MNPS chapters welcome members from areas other than those counties indicated - we've listed the counties just to give you some idea of what part of the state is served by each chapter. More chapters are in the planning stages for other areas; watch for announcements of meetings in your area. Ten paid members are required for a chapter to be eligible for acceptance in MNPS.

Membership in the MONTANA NATIVE PLANT SOCIETY is on a calendar-year basis, March 1 through the end of February of the following year. New-member applications processed before the end of June each year will expire the following February; those processed after the first of July will expire in February of the year after. Membership renewal notices are included in the Winter and Spring issues of KELSEYA. Anyone who has not renewed by the Summer edition of KELSEYA will be dropped from the mailing list/Society roster.

Your mailing label tells you:
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INVENTORY OF RARE PLANTS IN THE GREATER YELLOWSTONE ECOSYSTEM

Kathy France, working as a volunteer for the Bozeman-based Greater Yellowstone Coalition, has compiled an ecosystem-wide inventory of rare plants. The Greater Yellowstone Ecosystem lies in the states of Idaho, Wyoming and Montana, and encompasses lands administered by the National Park Service, National Forest, BLM, BIA and state land agencies, as well as lands in private ownership.

Using data from the federal agencies and the natural heritage programs in all three states, Kathy has developed an extensive inventory - currently standing at over 500 records - of the unusual plants known to occur in Greater Yellowstone. This information has already proved to be indispensable in alerting agencies about rare plant occurrences and possible consequences of proposed management actions.

Kathy has computerized the data, so it can be searched, sorted and printed for use by other conservationists. If you are interested in using this database, you may contact GYC at P O Box 1874, Bozeman MT 59771-1874, or call (406) 586-1593.
MONTANA NATIVE PLANT SOCIETY
KELSEYA Editor
P O Box 992
Bozeman MT 59771-0992

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Montana Native
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MONTANA NATIVE PLANT SOCIETY
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corporation chartered for the purpose of learning more
about plants native to our state and their habitats, and to
share that knowledge. Contributions to MNPS are tax
deductible, and may be designated for a specific project or
chapter, or be made to the general fund.
KELSEYA, newsletter of MNPS, is published quarterly. We
welcome your articles, clippings, field trip reports, meeting
notices, puzzles, recipes, book reviews, cartoons or drawings
- almost anything, in fact, that relates to our native plants
or the Society. Please include a one- or two-line "bio"
sketch with articles.
Drawings should be done in black ink with a fine-point
pen. If you send clippings, please note the source, volume/
issue and date. We especially need short (one to three
paragraph) items which can be tucked in anywhere.
Changes of address and inquiries about membership or MNPS
should be sent to MNPS, P O Box 992, Bozeman, MT 59771-0992.
All newsletter material should be mailed to Jan Nixon at the
same address.
Advertising space is available in each issue at $5/column
inch. Ads must be camera-ready, and must meet the guidelines
set by the Board of Directors for suitable subject matter:
that is, be related in some way to plants or the interests of
MNPS members.
Deadline for the Winter issue is DECEMBER 1; newsletters
will be mailed the third week of December.

BOOK REVIEW...

GREAT ESCAPES: Montana State Parks
Rick Newby, 1988
Falcon Press Publishing Co
P O Box 279
Billings MT 59103
This is an attractive publication, packed with excellent
photos by many of Montana's top photographers. Helena free-
lance writer Rick Newby grew up visiting the state's parks,
and brings a breadth of interest and knowledge to the work.
Many of us are familiar with Lewis and Clark Caverns, or
Headwaters State Park, Pictograph Cave or Wild Horse Island,
but do you know where Sluice Boxes is? Or Pirogue Island? Lost
Creek or Black Sandy? This book has 'em all, including a
recap of facilities available, and directions (where needed).
Whether your interest runs to historical or cultural parks,
such as Bannack, or magnificent natural beauty such as
Medicine Rocks, 3 or the eerie badlands of Makoshika, you'll
find many new possibilities to visit around the state.
Produced in cooperation with the Parks Division of the
Montana Department of Fish, Wildlife and Parks, it would make
a great idea for your own use or as a stocking stuffer
(Christmas is coming!). It's available at any Fish/Wildlife/
Parks office for $9.95.