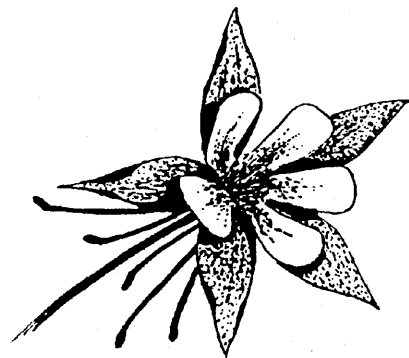


Aquilegia



Newsletter of the Colorado Native Plant Society

“... dedicated to the appreciation and conservation of the Colorado native flora”

Volume 15, Number 4

July/August 1991

Tripping in the San Luis Basin

Peter Root

Having complained for some time about the shortage of field trip reports in *Aquilegia*, when I finally went on one of our trips, I felt compelled to write a report about it. Our trip to the San Luis Basin on July 13th began in Alamosa and took us to sites in the San Luis Valley and the eastern San Juan Mountains. Hobey Dixon of Adams State College was our leader. We stopped first at a wetland site on the Monte Vista Wildlife Refuge where we saw *Cleome multicaulis*, one of Colorado's rare plants which has been extirpated from much of its range where marshes have been drained. It is much smaller than the huge garden *Cleome* familiar to most of us. Here we also saw white-faced ibises, avocets, and gallinules (now called 'moor hens' by the birding establishment). The hungry biting flies of this area reminded me of the New Jersey salt marshes.

On the way to our next stop we went up the Alamosa Canyon past cliffs of volcanic rock, where we learned that compressed volcanic ash can look just like sandstone! We stopped near Cat Creek and saw the rare *Astragalus ripleyi* which is endemic to this area.

Our next stop was near Lookout Mountain. On the way we passed from

foothills piñon-juniper into spruce and fir forest. For most people this was a lunch stop, but Hobey had said there were moonworts there, so I went off looking for them. I found quite a few and was still making discoveries when it was time to leave. I look forward to returning to this excellent moonwort locality!

The next scheduled stop was to be at Elwood Pass, but on the way we stopped at a seeping roadside area where we saw a wide assortment of wildflowers. Elwood Pass had both wet subalpine meadows and dry rock outcrops. Most people spent quite a bit of time looking at a short purple penstemon (*Penstemon hallii*) on the rocks. Many other plants provided opportunities for photographing and just looking.

From Elwood Pass we drove by the old mining town of Summitville, where a company from Nevada is busily tearing down a whole mountain and leaching

the rock with cyanide in an immense pit to extract gold and silver. This provides some of the "economic development" that politicians extol, but there appears to be only a token effort at revegetation, and the creek draining the area is bordered by a strip of sterile ground.

Near Grayback Mountain we stopped to see plants of the alpine tundra. We did see quite a few species, but fewer than we might have if the area had not been recently grazed by sheep. There were still snowbanks near the road and the snow buttercup (*Ranunculus adoneus*) grew in the wet soil near them.

Our final stop of the day was at Elephant rocks north of Del Norte. Here the rocks of compressed volcanic ash look just like granite! In the right light they resemble a herd of elephants. This is the habitat of *Neoparrya lithophila*, a rare

— continued on page 11

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Denver Chapter Meetings

Sept. 25th: Election of officers; meeting schedule for season

Come greet old friends and help us get the meeting year started! A speaker or slide show is planned.

Oct. 23rd: Bring slides of your favorite plants or plant places from summer's explorations.

All meetings this year will be held at the **Denver Botanic Gardens, Classroom A, at 7:30 p.m.** unless otherwise announced. Meetings are generally held on the last

Wednesday of the month, but we will discuss dates for November and December 1991 to avoid conflicts with holidays. Contact Carol Dawson, 722-6758, for meeting information.

We look forward to seeing you soon!

Field Trip Canceled

The trip to the Sterling Sand Hills scheduled for September 14th has been canceled.

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Aquilegia

Aquilegia is published six times per year by the Colorado Native Plant Society. This newsletter is available to members of the Society and others with an interest in native plants. Contact the Society for subscription information.

Articles from *Aquilegia* may be used by other native plant societies if fully cited to author and attributed to *Aquilegia*.

The Colorado Native Plant Society is a non-profit organization dedicated to the appreciation and conservation of the Colorado native flora. Membership is open to all with an interest in our native plants, and is composed of plant enthusiasts, both professional and non-professional.

Please join us in helping to encourage interest in enjoying and protecting the variety of native plants in Colorado. The Society sponsors field trips, workshops and other activities through local chapters and statewide. Contact the Society or a chapter representative or committee chair for more information.

Schedule of Membership Fees

Life	\$250.00
Supporting	\$ 50.00
Organization	\$ 25.00
Family or Dual	\$ 12.00
Individual	\$ 8.00
Student or Senior	\$ 4.00

Membership Renewals/Information

Please direct all membership applications, renewals and address changes to the Membership chairperson, in care of the Society's mailing address. Please direct all other inquiries regarding the Society to the Secretary in care of the Society's mailing address.

Newsletter Contributions

Please direct all contributions to the newsletter to:

Peter Root
4915 West 31st Avenue
Denver, CO 80212

Deadlines for newsletter materials are February 15, April 15, June 15, August 15, October 15 and December 15.

Short items such as unusual information about a plant, a little known botanical term, etc. are especially welcome. Camera-ready line art or other illustrations are also solicited.

Please include author's name and address, although items will be printed anonymously if requested. Articles may be submitted on disks (IBM-compatible, 5.25-in. DS/DD) if desired; please indicate word processing software and version used.

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The Alpine Flora of Summit Lake, Mount Evans, Colorado

William A. Weber, University of Colorado Museum
Campus Box 350, Boulder, CO 80309

Introduction

Summit Lake, Mount Evans, Colorado, a high cirque lake in the Colorado Front Range just west of Denver, supports a unique assemblage of alpine plants including a number of rare disjuncts. The area was designated the first Natural History Landmark in Colorado 26 years ago. This paper gives the history of its proposal and designation, a description of the habitats found there, and a catalog of the vascular plants, bryophytes, and lichens thus far known to occur.

History of Landmark Designation

The National Registry of Natural History Landmarks is a program initiated in 1960 by then Secretary of the Interior Stewart Udall. The guidelines for the program were given as follows (Dale 1964).

"Sites eligible for registry must have a high degree of scientific or educational value. They must contain geologic or ecological values, or both, of exceptional quality and significance in illustrating the natural history of the United States.

"Sites representing rare or vanishing geological features or phenomena, or types of ecosystems, will generally qualify. Sites may also qualify by being excellent examples of natural history features of common occurrence. But rare or common, they must be natural or reasonably successful recreations of natural conditions.

"Few sites exist in America which are entirely free from man-caused influences. However, successful re-establishment of natural environments is often possible. Such sites may be considered for designation if owners are sympathetic with, and press toward, that objective.

"The site should be large enough to satisfy a minimum of ecological requirements and must be reasonably invulnerable to deterioration, dilution, or destruction. It is desirable that the site be reasonably easy of access and available for appropriate uses by scientists, conservationists, and educators.

"Sympathetic and responsible ownership is, of course, requisite. In requesting registration of sites, there must be unanimity of agreement on the part of owners to comply with a few basic conservation practices relating to management and protection. Owners agree also to periodic consultation and visits by National Park Service representatives as a basis for continuing landmark status.

"Sites which are believed to meet these criteria may be suggested to the Director of the National Park Service for consideration as Natural History Landmarks."

Summit Lake, 4,000 meters altitude, on Mount Evans west of Denver, was the first Colorado site designated by the National Registry. Designation of the first seven Natural History Landmarks was announced on March 17, 1964. I nominated Summit Lake for designation in a letter to the Regional Director, Midwest Region, National Park Service in Omaha, Nebraska, on 9 January 1965.

In seeking this designation, I enumerated the following qualifications of the site.

"1. Physical features: Summit Lake is a unique alpine lake for the following reasons. It is the largest lake of its altitude (12,800 feet) in the region and lies in a protected northeast niche of the arete of Mount Evans. Unlike most alpine cirque lakes, it has an extensive inlet area of gentle slopes, with meandering and anas-

tomosing streamlets, gravel bars, sedge hummocks, frost-push ponds, boulderfields, and a large persistent snowbank at the upper end.

"2. Ecological features: Summit Lake is unique because here are concentrated a number of extremely rare Arctic-alpine plants occurring here at their only station outside the Arctic Circle. A few of these are known in the United States (outside Alaska) only in areas of a few square feet in the lake's inlet area. Other alpine wildlife are here in goodly numbers and are easily seen: ptarmigan, mountain sheep, elk, and rosy finches. Although the invertebrate fauna has not been studied much, there are similar rarities in the butterflies and craneflies.

"3. Present and potential uses: Summit Lake essentially is a scenic area and is served by a paved highway which crosses the outlet en route to the mountain summit. A picnic shelter has existed for some years near the road, and a trail goes from this point to the overlook of the Chicago Basin to the west. With careful development, the picnic area could be maintained without destruction of the natural values that chiefly exist in the inlet area and in the frost-push ponds across the outlet from the picnic area. With proper interpretive literature, the area could serve at a distance by classes from the Denver Metropolitan area. Trampling of the lake margin would have to be prohibited, since this is very destructive at high altitudes. In small numbers, students of the flora and fauna would be able to make a vicarious excursion to the Arctic at a fraction of the cost and time of a real one. Collection should be discouraged or strictly limited to a degree that would not deplete the existing flora. Grazing and other sorts of experimental use should be strictly for-

bidden. The area is a relict of the Pleistocene and represents one of the only remaining spots in the Southern Rocky Mountains where the Pleistocene alpine flora is preserved at its best.

"4. Vulnerability to destruction or deterioration: Before the significance of the lake was made clear to the Denver Parks Department, it was possible for cars to drive off the road onto the lake shore. This made tracks in the wetland, cut the turf, and resulted in severe deterioration [in the outlet area], and a [vegetation-depleted] gravelly flat resulted. Fortunately, the talus that reaches the lake shore makes it impossible for vehicles to reach the far end of the lake from either side. At my suggestion, the Parks Board has placed large boulders along the road, and this has kept vehicular traffic out. The land immediately surrounding the picnic shelter and down to the shore has not been provided with fireplaces and rubbish bins. Much of this shoreline has been degraded by casual fires and moving of boulders to make temporary fireplaces. A little care to facilities will help this situation. It should be pointed out that this particular portion of the area is not of much scientific importance but should be saved for its aesthetic values.

"The lake has been stocked routinely by the Colorado Game and Fish Department [now Division of Wildlife], despite the fact that the lake is of no productivity and cannot support fish for any length of time. Furthermore, late summer fishing is somewhat dangerous because of the incidence of sudden snowstorms which may strand motorists or put human life in danger generally. Access to Summit Lake is shut off at Echo Lake whenever weather conditions become threatening, and the road is not kept open after the first heavy snow of the winter.

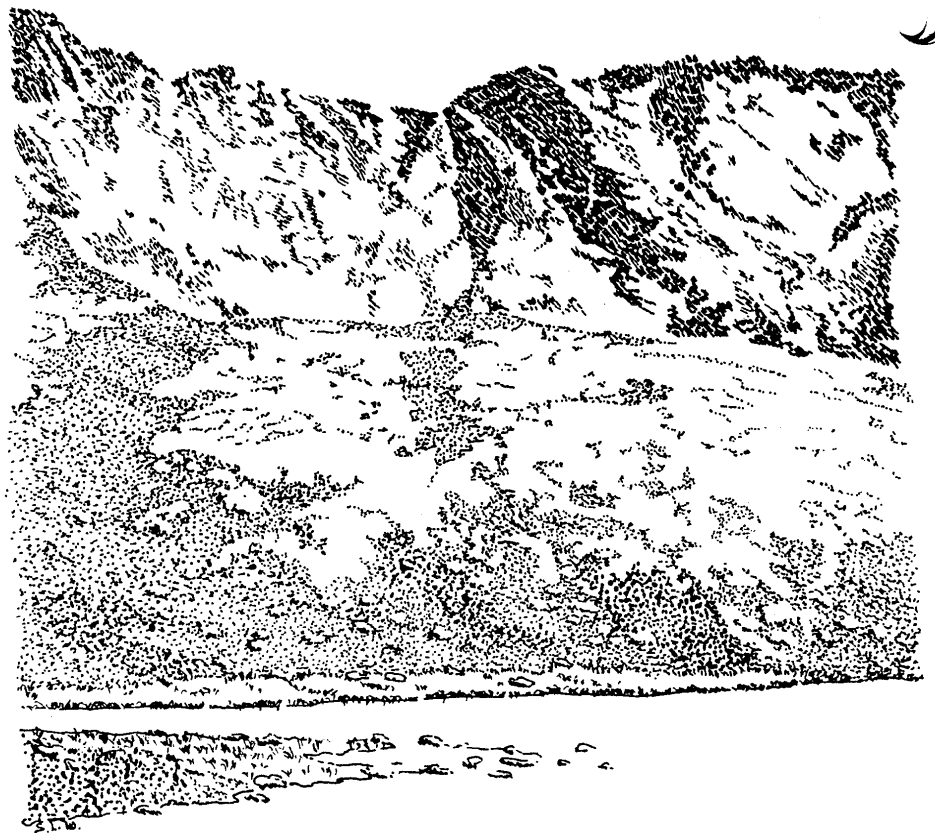
"The Parks Board has assured me that they will cooperate in helping to protect the area from encroachment

of vehicular traffic and from undue use outside of established picnic areas. They also suggest that the Game and Fish Department may be prevailed upon with little difficulty to cease stocking of Summit Lake.

"5. Other considerations: Summit Lake is an integral part of a series of scenic and otherwise interesting mountain phenomena reached by the Mount Evans highway. At timberline on Mount Goliath, part way up, there is an ancient stand of gnarled bristlecone pines that is protected from wood-gatherers by prominent signs and, presumably, patrols [unfortunately, by 1989 every scrap of loose wood had been removed!]. Higher up on Mount Goliath, a spur of Mount Evans, is an area of tundra which has been set aside by the Denver Botanical Garden as a nature trail with marked stations. The summit of Mount Evans,

at 14,000 feet, commands a view reaching to Pike's Peak, Mountain of the Holy Cross, Long's Peak, and far out on the plains. An excellent view of Summit Lake is available from near the summit. A restaurant is operated at the summit [since destroyed by fire; no facilities now exist there]. Mount Evans is an example of what can be done in the public interest without overemphasizing the commercial. Pike's Peak, on the other hand, is an object lesson in what can happen when commercialism is unbridled. The addition of Summit Lake to the natural interest points of the mountain would be an important step in the recognition of the natural scene as an educational adjunct to a metropolitan area."

Formal designation of Summit Lake as a Natural History Landmark was made on August 30, 1965. Dedication of the site



The cirque basin of Mt. Evans looms over Summit Lake, whose shores provide a variety of habitats for disjunct Arctic plant species rarely found in Colorado. Illustration by Sally White.

coincided with a field trip of the VII Congress of the International Association for Quaternary Research, held in Boulder August 30-September 5, 1965 (Weber 1965). The party attending the ceremony included James Calder, Agriculture Canada; Áskell and Doris Löve, Icelandic cytotaxonomists; Mai-Britt Florin, diatomist, Univ. of Uppsala; Ann Connolly, Univ. of Leicester; Roland Beschel, pioneer lichenometrist, Canada; Misao Tatewaki, plant geographer, Univ. of Hokkaido; and representatives of the City of Denver Parks Dept. and the National Park Service.

A bronze dedication plaque had been riveted to a granite boulder, but a few days after installation it was stolen. A new one, fortunately, was in place for the actual dedication. The inscription read: "Summit Lake / has been designated / a Registered / Natural Landmark / under the provisions of the / Historic Sites Act of 1935 / This site possesses exceptional value / in illustrating the natural / history of the United States / U. S. Department of the Interior / National Park Service."

The official papers dealing with the designation of Summit Lake are housed with the City of Denver Parks Department, which administers the site.

Specific Aspects of the Site

Summit Lake lies in a granite cirque basin facing northeast. Unlike most alpine tarns of the Southern Rocky Mts., the lake's upper margin does not directly abut on a rock wall, but is fed by a gently sloping or level inlet fed by late-lying snowbanks above. A smaller cirque basin, essentially dry, lies to the south between Summit Lake and the summit of the mountain. The aspect presented by the cirque wall and the summit area ensures that the lake receives relatively little direct sunlight and remains in shadow for much of the day. This protection from sun (and wind) results in slow and gradual snow melt and a moister substrate throughout the year.

The steeper part of the inlet contains several swift-flowing rills that end in a level *Carex scopulorum* stand on ice-push hummocks, between which are

numerous anastomosing streamlets and pondlets. The rills carry water throughout the growing season; their most notable feature is the abundant patches of the rare aquatic moss, *Hydrogymmia mollis*. The hummocks have vertical sides with sparse or medium cover of mosses, hepatics, and small vascular plants, the most unusual of which is *Spatularia (Saxifraga) foliolosa*, a disjunct from the Arctic. Where the streamlets are wide and shallow enough to contain small gravel bars in the center, small colonies of *Phippsia algida* (Weber 1952), another Arctic disjunct, occur. Along bends in the streamlets, exposed gravels covered with mosses support a third Arctic disjunct, *Koenigia islandica*.

The small ponds support dense floating stands of mosses, notably *Sarmentypnum sarmentosum*, *Warnstorfia exannulata*, and *Calliergon stramineum*. Scattered boulders fallen from the surrounding talus support various lichens and bryophytes, among which the rare *Andreaea heinemannii* has been found. In depressions between the rocks, the lichens *Stereocaulon rivulorum* and *Cladonia turgida* occur, along with common mosses of saturated substrates.

The south side of the lake is bounded by a steep slope at the base of which are massive granite boulders forming a stabilized talus extending beyond the water's edge. These are essentially barren. Above the blocky talus are areas of talus that have been filled in by soil, or

with the rocks still partially exposed and often presenting small overhangs. This is a very rich area of mosaics of ground, some moist and others quite dry. Among the most interesting moss species are the widely world-disjunct *Oreas martiana*

(Weber 1960a), *Mnium spinosum*, and *Entodon concinnus*. The vascular flora is also rich, including *Chrysosplenium tetrandrum*, *Ranunculus pygmaeus*, *Saxifraga cernua*, *S. hyperborea*, and *S. rivularis*.

The north side of the lake is usually quite dry, supporting the usual dry tundra *Trifolium* and *Artemisia* species, but in areas where late snowbeds persist there are stands of *Carex crandallii* and *Ranunculus adoneus*. The topography is fairly gentle and the site comparatively well-isolated.

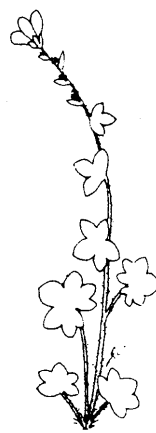


Trifolium parryi

The outlet of the lake is bisected by the motor road. The portion of the outlet adjacent to the lake shore was once heavily disturbed from old access ruts of fishermen and fish-planting vehicles. However, there are several sites that have recovered sufficiently to support a number of interesting plants, such as *Kobresia myosuroides*, *K. sibirica*, and *K. simpliciuscula* and fine stands of *Hirculus (Saxifraga) prorepens*. The area across the motor road is not particularly noted for rarities, but is a highly saturated tundra with pools and hummocks and many typical wet-tundra species, notably *Psychrophila leptosepala* and *Rhodiola integrifolia*.

The Botanical Discovery of Summit Lake

Following the rediscovery of *Phippsia algida* at Summit Lake, a steady stream of field botanists from all over the world came to visit the lake, and each one seems to have brought field experience that resulted in new discoveries. Some of

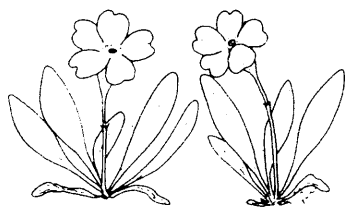


Saxifraga cernua

the anecdotal accounts of these discoveries are worth relating.

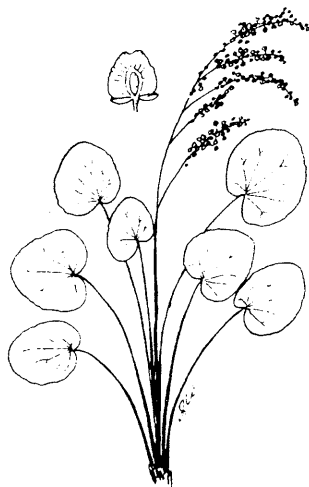
My first acquaintance with Summit Lake came when I had been searching for *Phippsia*, a minute Arctic grass, for many years without success. Had I done my homework the search might have ended much sooner, but I was young and had not mastered the proper steps in scientific method. *Phippsia algida* was reported for North America by A. S. Hitchcock in his monumental *Manual of the Grasses of the United States* (1935), as having been found on the "summit of Gray's Peak." Never having visited the Arctic, I knew nothing about the ecology of the plant, and so for several years I made it a point to search on the summits of this and other mountains, without success.

Finally, in 1950, I was able to locate and borrow the specimen, collected by Harry N. Patterson, from the Field Museum of Natural History. From the label on the specimen it was clear why my search had not succeeded. Patterson was a printer living in Oquawka, Illinois, and printed his own collection labels and those of many other botanists of the time. His printed label was headed: "Colorado Flora: Mts. about the headwaters of Clear Creek, alt. 11-14,000 feet. High mountains, Gray's Peak and vicinity, Sept. 2, 1885." This, then, was the information used by Hitchcock. However, the name was printed by hand, along with the following: "wet places, alt. 1,000 ft. above (S of) Upper Chicago Lake."



Primula angustifolia

Anyone unfamiliar with the area might be excused for citing the specimen as having come from Gray's Peak, but the Upper Chicago Lake is on Mount Evans, in the cirque basin to the west of Summit Lake, and about a thousand feet below.



Oxyria digyna

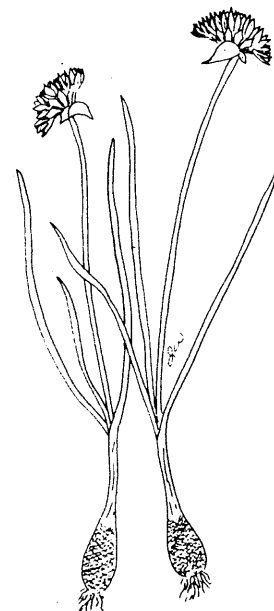
The search would appear to have been at an end then and there, but I was still in ignorance of the ecology, so one day Dr. Paul Maslin, herpetologist of the University Museum, and I skirted the upper part of the Chicago Basin cirque, risking our lives in very unstable scree, without any luck. We sat down at the picnic shelter of Summit Lake and ate lunch and, before calling it a day, decided to take a turn around the lake. Of course, we found the plant in the cold, wet gravel bars of the inlet area! But unpreparedness gremlins struck again. I had forgotten my hand lens! The herbarium at that time did not contain any specimens of *Phippsia*, and all we had to go on was a line drawing and description. The critical characters were in the very small spikelets. In my desperation I attempted to make a lens by inserting a drop of water in a loop of grass stem; I believe that it worked, because I was convinced that the characters were correct.

For a number of years, this was the only locality known in Colorado for *Phippsia* (Weber 1952), but the ecological field work done by Vera Komárková (1979) has revealed several additional localities in the Front Range, the Mosquito Range, and in the Ten Mile Range, where she discovered a stand occupying one to two acres!

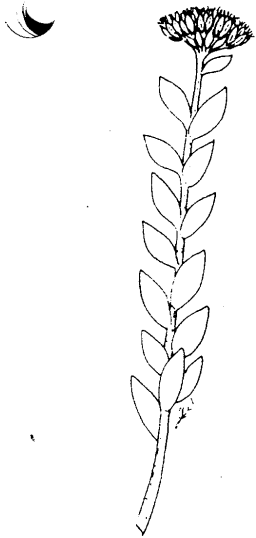
On July 23, 1953, George Neville Jones, who was teaching my field course that

summer, accompanied me to Summit Lake to see *Phippsia*. As we walked along the inlet area I subconsciously noticed what appeared to me to be small, reddish seedlings. I thought no more about them, because at about that time we happened to discover *Saxifraga foliolosa*, a small, inconspicuous plant in which the few flowers are replaced by small bulblets, growing on the vertical walls of the rivulets. This, of course, was new to Colorado (although I later found that E. L. Greene had collected it on a nearby saddle years before, calling it *Saxifraga vreelandii*).

The little red "seedlings" were forgotten. A week later I brought the great Norwegian ecologist and lichenologist, Eilif Dahl, to the lake. On the way up in the car, he asked me: "Well, Bill, what shall we find today?" Again, having no real knowledge of the plant, I simply pulled out of my head the name of an Arctic species, and said, "How about *Koenigia islandica*?" We both laughed and we continued on our way. Not five minutes after getting out of the car, Eilif was on his hands and knees. "Bill, what did you say about *Koenigia islandica*? For here it is!"



Allium geyeri



Rhodiola integrifolia

On one of his visits to Colorado in 1960, Erling Porsild, preeminent floristic botanist of the Canadian Arctic, on being shown *Koenigia* at Summit Lake, remarked that he remembered seeing a collection of the species in the herbarium in Copenhagen, having been collected at a place called "Severn Lakes" and that I should look for it next time I visited there. I did find the specimen, collected, not at any "Severn Lake," but at Seven Lakes, 3,300 meters, in the Pikes Peak watershed, by Ove Paulsen, the Danish plant geographer, on the first International Phytogeographic Excursion in America, on August 19, 1913! This remarkable two-month excursion, which had much to do with the future blossoming of American plant ecology, was led by F. E. Clements, and brought to the Rocky Mountains many noted taxonomists and ecologists, among them Adolf Engler, Carl Schröter, E. Rübél, and A. C. Tansley (Tansley 1914). It is curious that Ove Paulsen never reported *Koenigia*, which would have been a new record for the United States, although he was interested enough in it to collect a full liter jar full of pickled material, which I was brought upon my inquiry about a note accompanying the herbarium specimen!

The third and last anecdote concerns a bryological colleague, the late Kjeld Hol-

men, of the University of Copenhagen. He came to visit me from north Greenland via Lake Peters, Alaska. Dr. Erling Porsild was with me at the time, and the three of us went to Summit Lake. Again, hardly had he gotten out of the car, he was on his hands and knees, exclaiming, "I cannot believe it! Here is *Oreas martiana*. I have been in Peary Land, North Greenland, where I discovered it for the first time, and yesterday at Lake Peters, where I discovered it new for Alaska, and now here in Colorado!" This was an instance in which only his intimate acquaintance with this small moss enabled him to spot it immediately, because it does have a superficial resemblance to some other alpine turf-forming mosses. But, with experience, its rich golden color and extremely dense turfs make it fairly easily recognized (Weber 1960a). Again, the field research of Vera Komárková demonstrated that it is not a rare species at the proper ecological sites in the Front Range of Colorado.

Almost every visit to Summit Lake has yielded new and exciting plant discoveries, often made possible by the experience and specialty of the botanists who have come to see the flora. The list of prominent arctic and alpine botanists who have visited and thrilled to the flora of Summit Lake has made the site one of the most popular places in America for alpine rarities, and includes Ove Almborn, lichenologist, Sweden; Lewis E. Anderson, bryologist, Duke University; D. D. Awasthi, lichenologist, India; Eilif Dahl, ecologist, lichenologist, Norway; Kjeld Holmen, bryologist, Den-



Oreoxis alpina

All illustrations of alpine plants in this issue are from *Alpine Wildflowers of Mt Goliath*, by Jan Wingate, used by permission. This pamphlet is available at the Denver Botanic Gardens gift shop.

mark; Eric Hultén, plant geographer, Sweden; George Neville Jones, vascular plants, Univ. of Illinois; Per Magnus Jörgensen, lichenologist, Sweden; Kul-dip Khanna, bryologist, India; Timo Koponen, bryologist, Finland; Áskell and Doris Löve, cytotaxonomists, Iceland; A. Erling Porsild, plant geographer, Canada; and Antero Vaarama, bryologist, Finland.

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Catalog of Plants of Summit Lake

Dr. William A. Weber

Although we now have a very good understanding of the flora of Summit Lake (Weber & Willard 1969), no comprehensive catalog has been published to this date. It is time that this be made available, for full documentation in the event of future threats to the integrity of the site, and for better interpretation for future visitors and researchers. The following is a list of the bryophytes, lichens and vascular plants that have been collected at Summit Lake. Each item is represented by specimens on file in the herbarium of the University of Colorado Museum, Boulder (COLO).

This list includes plants found only in the immediate vicinity of Summit Lake's shores. Nomenclature follows Wittmann & Weber (1991). The list would be tripled in size if one included the drier tundra areas above and below the lake. An account of the flora of the entire mountain can be left to the future.



Acomastylis rossii

Bryophytes: Mosses

Note: several of these species were reported by Weber (1960b).

- Andreaea heinemannii*: 4475
Anomobryum julaceum: 58532
Atrichum undulatum: 4359
Aulacomnium palustre var. *imbricatum*: 15844
Bartramia ithyphylla: 16014
Brachythecium collinum var. *subjulaceum*: 17615
B. turgidum: 11033
Bryoerythrophyllum ferruginascens: 39080
B. recurvirostre: 39094
Bryum algovicum: 93694
B. alpinum: 16524
B. argenteum: 16562
B. cryophilum:
B. pseudotriquetrum: 39096
Calliergon stramineum: 17112
Campylopus schimperi: 21676
Cirriphyllum cirrosum: 1406
Desmatodon latifolius: 11614
D. systylius: 4459
Dicranoweisia crispula: 4474
Dicranum elongatum: 4464
Didymodon asperifolius: 11039
Distichium capillaceum: 4469
D. inclinatum: 36519
Ditrichum flexicaule: 36518
Encalypta raptocarpa Schwaegr.: 4463
E. vulgaris: 4471
Entodon concinnus: 4348
Eurhynchium pulchellum: 4460
Fissidens osmundoides: 15321
Grimmia donniana: 4343
G. elatior: 4361
G. incurva: (on loan)
Hydrogrimmia mollis: 4352
Hylocomium splendens: 4346
Hypnum revolutum: 4351
Limprichtia revolvens: 93474
Mnium blyttii: 4461
Mnium spinosum: 22449
Mnium thomsonii: 4478
Oncophorus virens: 23113
Oncophorus wahlenbergii: 219
Oreas martiana: 4341
Paraleucobryum enerve: 23461
Paraleucobryum longifolium: 10883

- Plagiobryum demissum*: 23651
Plagiobryum zierii: 40082
Plagiomnium ellipticum: 11027
Plagiothecium denticulatum: 4470
Pogonatum urnigerum: 4357
Pohlia cruda: 11252
P. elongata var. *minor*: 4458
P. longicolla: 4358
P. prolifera: 4354
Polytrichastrum alpinum: 3242
P. longisetum: 4359
P. lyallii: 4466
Racomitrium canescens: 4362
R. fasciculare: 24886
Sanionia uncinata: 9288
Sarmenthyllum sarmentosum: 17104
Schistidium agassizii: 36117
S. alpicola: 4472
S. gracile: on loan
Stegonia latifolia: 4459
Tayloria hornschurchii: 4355
Timmia austriaca: 4451
Tortella arctica: 11613
Trichostomum tenuirostre: 4360
Voitia nivalis: 11028
Warnstorfia exannulata 60467

Bryophytes: Hepatics

- Anthelia juratzkana*: 91934
Blepharostoma trichophyllum: 11251
Cephaloziella divaricata var. *scabra*: 4450
Gymnocolea inflata: 10879 (with *Scapania hyperborea*)
Gymnomitrium corallioides: 19885
Jungermannia exsertifolia: 25723
Jungermannia sphaerocarpa: 4452
Lophozia attenuata: 21828
Lophozia barbata: 21858
Lophozia hatcheri: 4347
Lophozia incisa: 21944
Plagiochila porelloides: 8910
Scapania hyperborea: 25106
Scapania irrigua: 25421
Scapania mucronata: 36118
Tritomaria exsecta: 10878
T. polita (Nees) Schiffner: 11036

Lichens

Note: taxa enclosed in square brackets have been observed but not collected.

- Acarospora chlorophana*: 5634 pr. p. (with *Rhizocarpon effiguratum*)
A. fuscata: 5638
A. nitida: 65129 (saddle between summit and Mt. Epaulet)
Aspicilia caesiocinerea: 1592
A. cinerea: 1604c
A. mazarina: 65133 (between summit and Mt. Epaulet)
A. cf. rolleana: 1003 (identification doubtful)
Brodoa oroarctica: 1596
Bryonora castanea: 5645
Buellia geophila: 5643
B. papillata: 1617
Caloplaca adnexa: 1592a
C. cinnamomea: 14248
C. jungermanniae: 3756 (above Lincoln Lake)
C. tetraspora: 3760
Candelariella aurella: 35251
C. placodizans: 32527
C. vitellina: *
Catapyrenium cinereum: 1597
Cetraria commixta: 1595
C. cucullata: 3754
C. ericetorum: 2917
C. islandica: 3763
C. nivalis: 1408
C. tilesii: 5617
Cladonia cariosa: 14249
C. chlorophaea: 272
C. gracilis: 1603
C. pocillum: 1609
C. pyxidata: 1606
C. turgida: 35253
Coelocaulon aculeatum: 1614
Dactylina madreporiformis: 3761
Diploschistes scruposus: 5639
Ephebe lanata: 35261
Lecanora epibryon: 3764
L. polytropa: *
L. pringlei: 35265
L. reagens: 1599
Lecidea atrobrunnea: 276
L. berengeriana: 3765
L. elata: 1604
L. scrobiculata: 1604b
Lecidella wulfenii: 5640
Lecidoma demissum: 1613
Leciographa lamyi: 4701
Massalongia cariosa: 1453
Micarea assimolata: 5641

- Ochrolechia frigida*: 3758
O. upsaliensis: 2930
Pachyospora verrucosa: 4697
Pannaria pezizoides: 5636
P. praetermissa: 2921
Parmelia saxatilis: 5637
Peltigera apthosa: 5618
P. erumpens: 5630
P. lepidophora: 2922
P. malacea: 1602
P. rufescens: 1607
Phaeorhiza nimbosa: 3755
Physcia constipata: 35255
Physconia muscigena: 1615
Porina mammillosa: 35259
Pseudephebe pubescens: 1598
P. minuscula: 1610, 1612
Psoroma hypnorum: 2921 pr. p.
Rhizocarpon effiguratum: 5634
R. geographicum: 1594
Rhizoplaca melanophthalma: 281
Rinodina archaea: 35254
R. mniaraea: 35260
R. turfacea: 14247
Solorina bispora: 1591
S. crocea: 268
S. octospora: 1593
Sporostatia testudinea: 1605
Stereocaulon alpinum: 278
S. rivulorum: 14245
Thamnomia vermicularis: 3753
Thrombium epigaeum: 5635
Toninia squalida: 37191
Umbilicaria decussata: 2926
Umbilicaria hyperborea: 1608
U. krascheninnikovii: 5633
U. virginis: 1616
Verrucaria sp. *
Xanthoparmelia coloradensis: 282
Xanthoria elegans: 2925



Rydbergia grandiflora

Vascular Plants

Summit Lake is not notable for rich assemblages of vascular plants, probably due, in part, to the very short growing season and the wet, mossy substrates. Many more species occur not far from Summit Lake along the road from Echo Lake, where the tundra is drier and more stony, and above Summit Lake up to the summit of the mountain.

Note: voucher specimens were not collected for many common species (*) for which verification is not necessary.

Apiaceae

Oreoxis alpina: COLO 274520

Alsineaceae

- Alsinanthe stricta*: 8613
Cerastium beeringianum: 8610
Eremogone fendleri *
Lidia obtusiloba *
Paronychia pulvinata *
Sagina saginoides: 8937
Stellaria umbellata: 7890
Tryphane rubella *

Asteraceae

- Artemisia scopulorum* *
Erigeron grandiflorus *
Erigeron simplex *
Ligularia taraxacoides: 71188
Rydbergia grandiflora *
Senecio fremontii: 2915
Taraxacum ovinum *
T. scopulorum *

Boraginaceae

- Eritrichum aretioides* *
Mertensia lanceolata (viridis) 10975

Brassicaceae

- Draba exungiculata*: 8603
D. grayana: 8538
Erysimum capitatum *

Campanulaceae

- Campanula rotundifolia* *
C. uniflora *

Caryophyllaceae

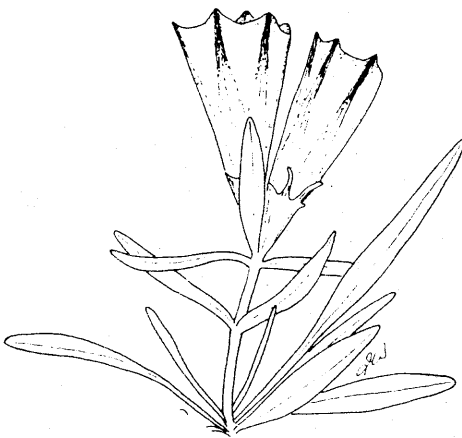
- Silene acaulis* *

Coptaceae*Thalictrum alpinum* ***Crassulaceae***Rhodiola integrifolia* ***Cyperaceae**

C. crandallii: 9252
C. elynoides: 8539
C. haydeniana: 8931
C. maritima ssp. incurviformis: 10918
C. misandra: 7277
C. nelsonii: 170365
C. rupestris: 8543
C. scopulorum: 8536
Kobresia myosuroides: 8604
K. sibirica: 8609
K. simpliciuscula 11133

Fabaceae

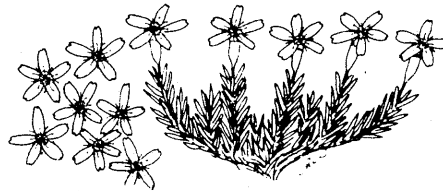
Trifolium nanum *
T. salictorum: 8494

*Gentianodes algida***Gentianaceae**

Chondrophylla prostrata *
Gentianodes algida *

Helleboraceae*Psychrophila leptosepala* ***Hydrophyllaceae***Phacelia sericea* ***Juncaceae**

Juncus biglumis 8612
Juncus drummondii *
Luzula spicata *

*Silene acaulis***Liliaceae***Lloydia serotina* ***Poaceae**

Deschampsia cespitosa subsp. *alpicola*: 6301
Deschampsia cespitosa *
Festuca brachyphylla
 subsp. *coloradensis* *
Festuca minutiflora: 8925
Phippsia algida: 7278
Poa abbreviata subsp. *pattersonii*: 119945
P. alpina: 8529
P. arctica: 8601
P. glauca *
P. lettermanii: 8602
Trisetum spicatum: 195328

Polygonaceae

Bistorta bistortoides *
B. vivipara *
Koenigia islandica: 8600
Oxyria digyna *

Portulacaceae*Claytonia megarhiza* ***Primulaceae**

Androsace septentrionale *
Primula angustifolia *

Ranunculaceae

Ranunculus adoneus *
R. pedatifidus: 8531
R. pygmaeus: 8535

Rosaceae

Acomastylis rossii *
Potentilla diversifolia *

Salicaceae

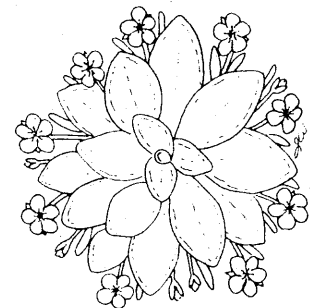
Salix arctica *
Salix brachycarpa *
Salix planifolia *
Salix reticulata subsp. *nivalis*: 8533

Saxifragaceae

Hirculus prorepens: 2281
Micranthes rhomboidea *
Saxifraga cernua *
S. hyperborea *
S. rivularis: 8611
Spatularia foliolosa: 8525

Scrophulariaceae

Besseyia alpina *
Castilleja occidentalis *

Selaginellaceae*Selaginella densa* **Claytonia megarhiza*

—San Luis, continued from page 1

umbellifer. We found it in fruit — just the way umbellifer enthusiasts like to find them. This endemic is confined to volcanic rocks in south-central Colorado. In Weber's *Colorado Flora: Eastern Slope* this species has been kept in *Aletes*. In a crevice between the rocks here I found *Asplenium trichomanes*, the maidenhair spleenwort, which surprised me because it is usually found in cooler shady places.

Throughout this long but very rewarding trip, Hobey Dixon did an outstanding job of planning and keeping the group together. I enjoyed the opportunity to see a new area and some of its rare plants. If you haven't been on a CONPS field trip, plan to go on one next year. You don't have to be a taxonomist to enjoy a day seeing plants with people who share your interest. ♣

High Creek Fen Update

The Nature Conservancy reports that High Creek Fen is well on its way to being purchased, although there have been delays in the negotiations. Many contributions have been received toward the amount needed for protection of this unusual calcareous fen, which contains an abundance of rare plants (see *Aquilegia* 15, #1 for details).

The Nature Conservancy is encouraged and is proceeding with the purchase, but there is still a need — and still time — for you to contribute if you haven't yet. If interested, contact The Nature Conservancy at: 1244 Pine St., Boulder, CO 80302. ♣

Southwestern Rare Plant Conference

The New Mexico Forestry and Resources Conservation Division and the U.S. Fish & Wildlife Service are hosting a conference on southwestern rare plant biology and management March 30 to April 2, 1992. Authors with topics concerning rare plants in the Four Corners states are invited to submit abstracts of papers they would like to present at the symposium. The categories include endangered plant law and policy, survey and impact assessment, habitat assessment, land use

planning, population genetics, species biology and demography, monitoring techniques, and recovery. Location and agenda will be announced at a later date.

Abstracts should be submitted by October 1, 1991 to:

Robert Sivinski/Karen Lightfoot
NM Forestry Division
PO Box 1948
Santa Fe, NM 87504 ♣

Ethics Expanded

Following up on our draft collection policy, we offer these notes from other native plant societies dealing with similar concerns. The **Virginia Native Plant Society** has distributed an article on alternatives to plant collection assignments by secondary schoolteachers to every public school system in the state. Instead of collecting plants, students are asked to collect data from living plants, a practice which teaches them about the plants while encouraging them to recognize and respect their value, preventing the needless loss of individuals of rare species to inexperienced collectors.

In an article for the **Bulletin of the Native Plant Society of Oregon**, David H. Wagner, curator of the University of Oregon Herbarium, proposes a "1-in-20" guideline for collectors of any plants, whether or not the species is rare. As he remarks, his challenge now on seeing an unusual plant is "Can I find twenty?" Only then will a single specimen be collected; at least forty must be present before two specimens are taken.

In advocating the use of the 1-in-20 rule, Dr. Wagner cites specimens of the rare pumice grape fern (*Botrychium pumicola*) he has been studying. A single specimen, collected in 1941, represents fully 50% of the total population found at a location where the plant no longer occurs. In the early 1950's, a student intern searching for additional sites in Crater Lake National Park found two localities and collected all three plants from these sites where it has also not been found since then.

Although such incidents may be considered extreme, they clearly do not advance our knowledge or the species' survival. Supporting the Oregon Society's policy that "Collecting must never endanger a plant population," Dr. Wagner recommends widespread application of the 1-in-20 rule as a **minimal** criterion to be met before any taking of a plant be considered. ♣

—S.L.W.

Calendar Overview

1991 Fall Workshops

Sept 28 **Selected Genera in the
Apiaceae; Univ. Wyoming**

Oct 12 **Botanical Illustration
Foothills N.C., Boulder**

Special Events

Nov 2 **Annual Meeting
Museum of Natural History, Denver**



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