

Newsletter of the **FRIENDS**
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FARLOW

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L.B. Berard, editor

**Recent Bryological Studies of Adirondack
Mountain Alpine Summits**

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The Adirondack Mountains encompass large parts of northeastern New York. However, alpine tundra is present on only some 80 acres on the highest summits, mainly in the towns of North Elba and Keene, Essex County. Much lower than Mount Washington and farther south than the Katahdin and Bigelow massifs in Maine, the Adirondack High Peaks nevertheless support many arctic-alpine bryophytes at their southernmost stations in eastern North America.

This distribution was discovered in the 1860s when some of the highest Adirondack Mountains were botanized independently by Leo Lesquereux and Charles Peck. The latter was to become highly regarded for pioneering work in taxonomic mycology, but he also had a keen eye for mosses and hepatics and made numerous important discoveries in northern New York. Lesquereux collected on Mount Marcy, the highest Adirondack mountain (5344 ft) and on Whiteface Mountain (4867 ft),

which is north of Marcy and somewhat isolated from other peaks with tundra.



*Alpine tundra and glacial erratics
on Mt. Skylight, a peak near Mt. Marcy*

Peck and Lesquereux were regular correspondents during this early period, and Peck's lengthy catalog of the bryoflora of New York (1866) credits many Adirondack records to his friend. Entries in the Lesquereux and James *Manual* (1884) affirm these discoveries. Unfortunately, I have not yet been able to locate voucher specimens for any Lesquereux Adirondack collection, so some of his phytogeographically more interesting discoveries not confirmed by later collections must be considered doubtful.

The Adirondacks were a magnet to numerous bryologists in the late 1800s and early 1900s, including such capable workers as Elizabeth Britton and Carolyn Haynes. Edwin Ketchledge, particularly in the 1940s and 1950s, added much to what is known about the contemporary Adirondack bryoflora.

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Three published accounts by Peck (1873, 1880, 1899) summarize his knowledge of the Mount Marcy alpine bryoflora and are helpful benchmarks for evaluating the present-day status of what he found there nearly a century and a half ago.

Our inventories of almost all of the Adirondack alpine summits, often also including the sub-alpine zone of balsam fir krummholz, have located populations of many of Peck's arctic-alpine mosses on Marcy or nearby mountaintops (*Arctoa fulvella*, *Aulacomnium turgidum*, *Conostomum tetragonum*, *Cynodontium strumiferum*, *Dicranum elongatum*, *Kiaeria blyttii*), no stations for some (*Grimmia ovalis*, *Sarmenthypnum sarmentosum*), and species (mosses and hepatics) previously unrecognized in the Adirondacks or elsewhere in New York (*Barbilophozia lycopodioides*, *Grimmia reflexidens*, *Warnstorfia pseudostraminea*).

As a result of heavy hiker traffic, there has been much deterioration of alpine tundra near trails on most summits, particularly in small, bryologically interesting, shallow alpine fen wetlands that once were more widespread. I have not been able to find either *Aulacomnium turgidum* or *Sarmenthypnum sarmentosum* on Marcy, for example, possibly because of the loss of suitable habitat from disturbance.

Alternatively changes could be due to some environmental factor such as late 20th century acidic deposition resulting in competitive interactions among bryophytes. Could, for example, the present abundance at high elevations in the Adirondacks of a peat moss, *Sphagnum pylaesii*, be a response to recent acidic deposition? I do not yet have an answer to that question, but thin pure mats of *S. pylaesii* grow outward or down-

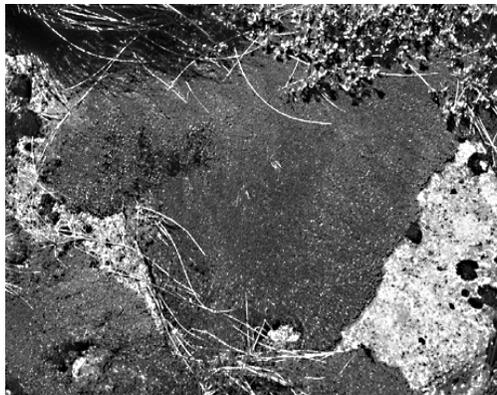
ward over bedrock from pockets of wet soil on ledges (in stark contrast to the erect growth-form of most terrestrial peat mosses), sometimes burying *Andreaea rupestris* and other mosses.

Our work in the alpine zone has also included studies into the dispersal ecology of bryophytes. Strong winter winds are common at high elevations in the Adirondacks, as all backcountry skiers and snowshoers in this region will know.

Timberline position on Adirondack summits reflects the prevailing westerly wind, and, as a consequence, the transition between krummholz and treeless tundra is several hundred feet lower on western slopes than eastern ones. Deep snow is usually absent from mountaintops in winter, because it is blown to eastern slopes where

snow beds accumulate. During this process, bryophytes become fragmented (perhaps by being blasted by ice crystals), and the pieces are carried along with the wind. Even small bits of moss and liverwort can proliferate anew, if they lodge in a suitable habitat.

Stuart McDaniel (now a graduate student in bryology at Duke University) and I measured the abundance and diversity of bryophyte fragments in high elevation, late-lying snow on Algonquin Peak (5115 ft) and Whiteface Mountain (4867 ft) and in snow in balsam fir-red spruce-paper birch forest near Lake Colden (2765 ft). Low elevation snow had few pieces representing a small number of species, whereas at alpine sites many more fragments of over 30 species were found, including some pieces that had begun to proliferate new growth during a cycle of fragmentation, transport, lodgment, and dislodgment a year or more before we gathered our samples. Most fragments in alpine snow were from species present on mountain summits, but some fragments were mosses more



A mat of Sphagnum pylaesii growing downward over bedrock. Small dark cushions are Andreaea rupestris. Vascular plants are Vaccinium uliginosum and Scirpus cespitosus.

characteristic of subalpine balsam fir forest. These results indicate potential local sources and a mechanism for bryophyte dispersal across treeless mountaintops, whereby barren, disturbed soil may become revegetated through the yearly application of wind-delivered plant fragments.

We conducted a different kind of study Whiteface Mountain that produced results consistent with our discovery that bryophytes can disperse and establish predictably when the right conditions exist. Between 1930 and 1935, a two-lane paved highway was constructed on the north slope of the mountain, and stone buildings at the end of the highway and the summit were added a few years later.

The peaty soils of the mountain are acidic, as is the anorthosite and gneiss bedrock near the highway and elsewhere on the mountain. Consequently, the bryoflora consists mostly of species of non-calcareous habitats. However, mortar, providing a locally exotic substratum rich in calcium carbonate, was used in the construction of highway guard walls, the buildings, and the Stairway Ridge Trail between them. Our sampling of mortar along the highway, on the outside of the buildings, and along the trail to the summit revealed populations of numerous mosses that otherwise are unknown at high elevations in the Adirondacks, including calcicoles in the following genera: *Barbula*, *Bryoerythrophyllum*, *Didymodon*, *Distichium*, *Ditrichum*, *Encalypta*, *Gymnostomum*, *Myurella*, *Schistidium*, *Tortella*, and *Tortula*.

We sampled along a hiking trail up the east slope of the mountain at the same elevations as our north-slope collection sites and found only species of acidic habitats.

The introduction on Whiteface of an exotic substratum 65 years ago provided an opportunity for species to become established where they were not present before, thereby greatly increasing species diversity on this mountain. Some of the calcicoles are common, possibly weedy, lowland mosses but others (*Myurella julacea*, *Ditrichum flexicaule*) are rare in New York. We suspect that spore dispersal initiated many of

the populations on mortar, but our samples of plant fragments in snow contained a few fragments of mortar calcicoles.

In future field seasons, we will continue to explore Adirondack summit areas and gather new floristic information, with an expectation that other previously undocumented mosses and liverworts will come to our attention.

Moreover, we have become increasingly interested in the role of high elevation bedrock freshly exposed by landslides, which are common on the sides of many of the higher Adirondack mountains. New ones were created in September 1999 as a result of heavy rainfall associated with hurricane Floyd. Could such new pioneer habitats somehow be an important factor in maintaining populations of arctic-alpine bryophytes in the Adirondacks? We soon will be wearing thin the Vibram lug soles of our hiking boots in an effort to find out.

Sources

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Editor's Note: Norton Miller is Principal Scientist of the Biological Survey at the New York State Museum. He was an FOF Visiting Scholar at the Farlow in 1999, has lectured at our Annual Meeting, and led the Clara Cummings Walk at Ponkapoag Bog.

News of the Farlow

Scott LaGreca

Don Pfister's graduate student, **Kris Peterson**, will be going to New Zealand to collect *Cytarria* in November, 2001.

Another of Don's students, **Brian Perry**, has chosen for his PhD research the systematics of the Pyronemataceae (Discomycetes), one of the few groups of Pezizalean fungi whose evolutionary relationships are still unresolved.

Don's newest graduate student, **David Hewitt**, comes to us from the Philadelphia Academy of Sciences. David is considering working on *Neolecta* (Ascomycota) for his PhD. Please join us in making David feel welcome. Come by and say hello!

Ray Abair, Doug Greene, Elizabeth Kneiper, Scott LaGreca, Elisabeth Lay, and Mary Lincoln have finished their first field season collecting lichens and bryophytes on the Boston Harbor Islands. Almost all of the islands in the park were visited over the course of this summer, and identification will continue this winter.

In August **Don Pfister** and his students **Brian Perry, Kris Peterson, and Zhihong Zhong** attended the annual meeting of the Mycological Society of America in Salt Lake City. At the meeting, it was announced that Zhihong has received this year's MSA Research Fellowship, a highly competitive award used to fund research in the final years of graduate school.

Charis Bratt, Santa Barbara Botanical Garden, visited the Farlow in September to look at historical lichen specimens from Santa Catalina Island, California. Charis is the foremost lichenologist in California and serves on the advisory board of the International Association of Lichenologists.

Karen Hansen successfully defended her dissertation on the evolutionary relationships of

the Pezizales (Discomycetes) in August. Don Pfister was a special guest at her defense at the University of Copenhagen. Karen will be joining us at the Farlow for a year-long postdoctoral fellowship beginning in October.

Sandra Lucia Muneton of Colombia is visiting the Farlow in October to work on Xylariaceae (Ascomycetes). She is an FOF Graduate Student Fellow.

Tom Volk, Associate Professor of Biology at the University of Wisconsin, La Crosse, will be in town November 1-4. Tom has a broad interest in basidiomycete fungi, and his visit is sponsored by the Boston Mycological Club. He will be giving a talk at Harvard while here; details to be announced.

We have a number of new "herbarium helpers" this fall. **Melanie Shori**, from the Arnold Arboretum, and senior FAS student **Bill Fash** are helping us work through the "backlog" of specimens. Also, **Brett Huggett**, who has been helping Don Pfister with various culture work this past summer, will be working in the herbarium starting in October.

FOF Annual Meeting November 3, 2001

This year's annual meeting will begin with a business meeting at **3:30 PM on Saturday, November 3** in the Herbaria Seminar Room.

Our speaker will be R. Greg Thorn of the Botany Department at the University of Western Ontario. Greg is a specialist in fungal systematics and ecology and has field experience in North and Central America. He is a former student of David Malloch and has published on subjects as diverse as nematode-trapping fungi and soil microbial diversity. His topic for us will be "Mushrooms and Other Fungi of Costa Rica."

A reception will follow in the Farlow Reading Room. Please join us!

A Farlow Exhibit of Select Mycological Illustrators 1890-1925

Lisa DeCesare
Reference Librarian

The Farlow Herbarium Archives is a rich source of cryptogamic illustrations. Starting on Thursday, November 1 we will be premiering a new exhibit of mycological illustrations from the 1890s and early 1900s. The exhibit will showcase the work of five illustrators with ties to the Farlow.

Lizzie C. Allen is the Farlow's mystery woman. Nothing is known about her background but she left the Farlow a wonderful collection of over 700 watercolors of fungi.

Eliza B. Blackford (1847-1935) studied drawing and painting at Boston's "Museum School." Eventually she joined the staff of the Museum of Fine Arts where she stayed until her retirement in 1925. Eliza took a great interest in Botany, particularly fungi. Besides her work at the Museum, she was President of the Boston Mycological Club for several years and had four mushrooms named for her by Prof. Peck of NY. She left a sizable collection of watercolors, spore prints, correspondence, and notes to the Farlow.

Joseph Bridgham (1845-1915) achieved recognition in the scientific world as an entomologist and a nature artist. In addition to the United States government, Bridgham worked for colleges and institutions in the U. S. and many other countries. He became especially well known for his rendering of microscopic images. Bridgham worked with Professor William Farlow from 1889-1899 on the fungi of North America. Quite a few of these images were used in the creation of Farlow's *Icones Farlowianae*.

Louis Charles Christopher Krieger (1873-1940) began his professional career as an assistant artist in the U.S. Department of Agriculture. He was assigned to the Division of Microscopy, where he worked until 1895 under the supervision of Dr. Thomas Taylor, whose hobby

was the study of mushrooms. Krieger was soon put to work painting mushrooms found in and around Washington, D.C., as well as copying plates from European works. After 1895 Krieger studied art in Munich and returned to Maryland where he taught drawing and painting. An offer in 1902 from Professor William Farlow enticed him to leave his native city and return to his earlier occupation, mycological illustration. He worked with Farlow for the next ten years. Many of his illustrations were used in the creation of Farlow's *Icones Farlowianae*.



George Edward Morris (1853-1916) taught drawing in the public schools of Waltham up to the time of his death. He was interested in all phases of natural science. He became especially interested in botany through his artwork and the use of plants as a basis for design. He studied botany at the Martha's Vineyard Summer School and at the Teachers' School of Science in Boston. His herbarium took the form of sketches of plants in watercolor. Morris became interested in mushrooms in the late 1890s and he devoted his spare time during the warmer months for the remainder of his life very largely to collecting, studying, and drawing them. About 1100 portraits of the fleshy fungi remain in the Peabody Essex Museum in Salem today. We hope to work closely with the museum to bring copies of a few of his watercolors here for this display.

Please come by the Farlow in November to see the exhibit. It promises to be something special!
