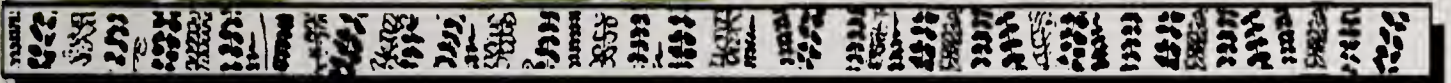




**Hardy Fern Foundation
Quarterly**



Fall 2008

THE HARDY FERN FOUNDATION

P.O. Box 3797

Federal Way, WA 98063-3797

Web site: www.hardyferns.org

The Hardy Fern Foundation was founded in 1989 to establish a comprehensive collection of the world's hardy ferns for display, testing, evaluation, public education and introduction to the gardening and horticultural community. Many rare and unusual species, hybrids and varieties are being propagated from spores and tested in selected environments for their different degrees of hardiness and ornamental garden value.

The primary fern display and test garden is located at, and in conjunction with, The Rhododendron Species Botanical Garden at the Weyerhaeuser Corporate Headquarters, in Federal Way, Washington.

Satellite fern gardens are at the Birmingham Botanical Gardens, Birmingham, Alabama, California State University at Sacramento, Sacramento, California, Coastal Maine Botanical Garden, Boothbay, Maine, Dallas Arboretum, Dallas, Texas, Denver Botanic Gardens, Denver, Colorado, Georgeson Botanical Garden, University of Alaska, Fairbanks, Alaska, Harry P. Leu Garden, Orlando, Florida, Inniswood Metro Gardens, Columbus, Ohio, New York Botanical Garden, Bronx, New York, and Strybing Arboretum, San Francisco, California.

The fern display gardens are at Bainbridge Island Library, Bainbridge Island, WA, Bellevue Botanical Garden, Bellevue, WA, Lakewold, Tacoma, Washington, Les Jardins de Metis, Quebec, Canada, Rotary Gardens, Janesville, WI, University of Northern Colorado, Greeley, Colorado, and Whitehall Historic Home and Garden, Louisville, KY.

Hardy Fern Foundation members participate in a spore exchange, receive a quarterly newsletter and have first access to ferns as they are ready for distribution.

Cover Design by Willanna Bradner

HARDY FERN FOUNDATION QUARTERLY

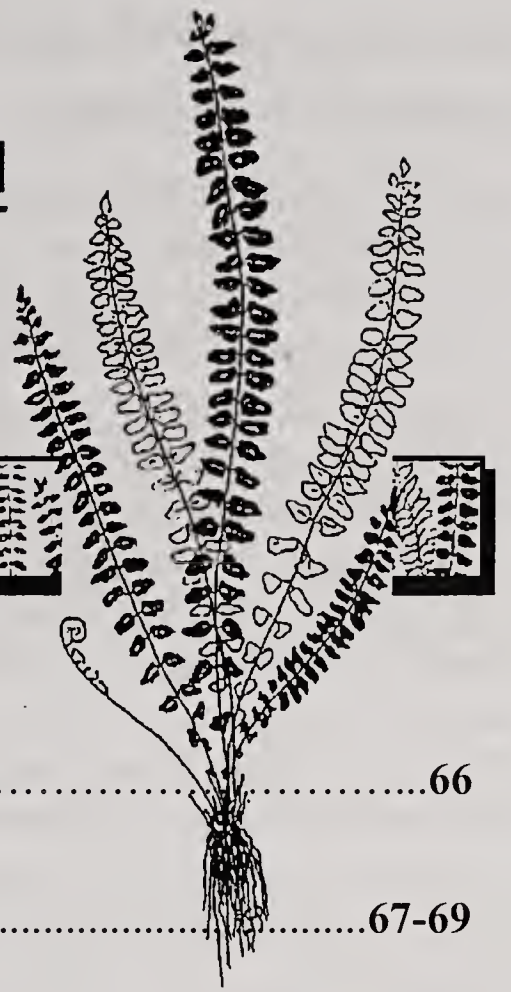
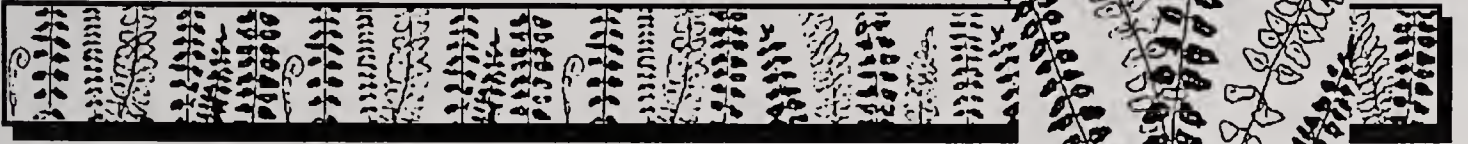
THE HARDY FERN FOUNDATION QUARTERLY

Volume 18

No. 4

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The Spore Exchange Needs You!

Please send your cleaned spores to our Spore Exchange Director:

Katie Burki

501 S. 54th ST

Tacoma, WA 98408

Fern Quarterly Fall 2008

President's Message

Typically I am done with gardening in the autumn. It is all I can do to muster the will to clean up the fallen leaves and chop down the withering perennials. This year, however, I have entered the end of the growing season completely recharged and excited. I have just returned from a short fern foray to England and Wales with a bevy of new cultivars and species of ferns to grow. Of particular interest is a collection of *Polypodium australe* and *Polystichum setiferum* cultivars either new or extremely rare in North America. One of the *Polypodium* cultivars dates back to the late 1600's! I was delighted to find a beautiful specimen of *Adiantum chilense* as well. I have lusted after this species since I saw it growing on the slopes of the Andes in southern Chile. Another treasure I was fortunate enough to acquire was a stunning new species introduction, *Adiantum taiwanianum*. This small maidenhair cost a fortune, but I think it will be well worth the investment. As these plants are added to the garden and become established I hope to report on their performance in the future.

For those less inspired by the change of the season, I hope you enjoy this issue of the Quarterly. Jack Schieber has written an insightful article on the ferns of Vermont. I am also looking forward to reading about one of my favorite ferns, *Woodsia polystichoidea* and leaning more about *Pyrrosia*, a favorite genus. The *Woodsia*, a great little fern, is the focus of the species profile and it is a must for anyone who loves ferns. It is always the first fern to emerge in the spring, toughing it out through late frosts without a blemish. The banter on *Pyrrosia* continues with responses to the summer Quarterly article written by Tom Stuart.

Those of us who prefer to garden in our own yards rather than pursue fern events can catch up with a review of the HFF sponsored stumpery class, hosted by board member Pat Riehl as well as an account of the field trips taken during the American Fern Society's meeting in Vancouver, BC this summer. And for your winter reading, Graham Ackers has contributed an informative review of the newly published fern tome, *Biology and Evolution of Ferns and Lycophytes*.

On behalf of the HFF board, I would like to thank our new volunteers, Carolyn and Jerry Doherty. Their enthusiasm and hours of help are greatly appreciated.

On a final note, but one that is quite important, the HFF recently received an email message from a member alerting us to proposed changes to the trail at Perry Creek, the famous fern site in Washington State. Perry Creek contains the widest diversity of ferns in the state and there is a trail into this area that begins at a point that has relatively easy access. It is a popular destination for fern lovers from throughout the world. (Our August HFF foray there jointly offered to AFS members drew over 20 intrepid participants who enjoyed the ferning in spite of lingering "mists".) Unfortunately there currently are plans to change the point of entry which will make it more difficult to access this significant site and possibly endanger several of the rarer species of ferns growing there. Be sure to read the brief write-up in this issue of the Quarterly and watch for future emails so that you can help preserve this unique location.

All the best,
Richie Steffen

Vancouver Fern Foray 2008

Melanie A. Link-Pérez
Miami University
Oxford, Ohio

Co-published with the Fiddlehead Forum of the American Fern Society

The Fern Foray for Botany 2008 in Vancouver, British Columbia, took place on Saturday, July 26. Thirty fern enthusiasts joined trip coordinators Chris Sears, Mike Barker, and Steve Joya (Frank Lomar could not attend) for an all day field trip to visit three sites in the North Vancouver and West Vancouver regions. The group departed from the University of British Columbia in a touring bus under clear, sunny skies that promised a day perfectly suited to botanizing in comfort.

The first stop of the foray was the **Lower Seymour Conservation Reserve (LSCR)** in North Vancouver, approximately a thirty-minute drive from campus, the last part of which afforded many scenic views of mountains covered in coniferous forests. The LSCR is a 5,668-hectare coastal forest that is part of the Seymour Watershed. Within the LSCR is a network of over 25 kilometers of hiking trails. Along the Old Growth Trail and Spruce Loop trail (between 200-220 m elevation) the group observed eleven fern species.

We entered the trails at the top of a gentle slope and were greeted with a mixed deciduous/coniferous forest with trees draped in epiphytes, their lower branches arching down over boulders that were cloaked in bryophytes and ferns. Immediately we encountered our first ferns of the trip (if we don't take into account the ubiquitous roadside bracken fern, *Pteridium aquilinum*), the sword fern (*Polystichum munitum*), the lady fern (*Athyrium filix-femina* ssp. *cyclosorum*), and the deer fern (*Blechnum spicant*). All three of these species were frequent along the trail, with *B. spicant* appearing particularly stunning with the erect fertile fronds set amongst the surrounding sterile fronds, which were so shiny that their dark, blue-green color appeared almost iridescent.

The trail quickly led down to a wetland area with a boardwalk and observation deck from which we could admire the landscape while keeping our boots dry. The water was so pristine and still that it was difficult to discern the junction between skunk cabbages and their reflections in photographs taken of them. The alder trees and the rampant Salmon-berry (*Rubus spectabilis*) distracted some of us from ferns momentarily—but only until we caught sight of the *A. filix-femina* growing along the boardwalk. The fronds of the lady fern in that location were so tall that several participants were enticed to climb down from the boardwalk to serve as



Botrychium multifidum

Photo courtesy of Melanie A. Link-Pérez

human scale bars - numerous fronds overtopped these intrepid volunteers.

Further along, the trail skirted the Seymour River floodplain and took us through a stand of old growth forest. There were many Sitka spruces (*Picea sitchensis*), the oldest of which is more than 500 years old with a diameter of more than nine feet. Hemlocks (*Tsuga* spp.) and Douglas firs (*Pseudotsuga menziesii*) also towered over us as we made our way along the trails that we shared with mountain bikers, who were occasionally curious about the large groups of people peering at the undersides of fern fronds with hand lenses. Other notable seed-plants included western red cedar (*Thuja plicata*), vine maple (*Acer circinatum*), and the spiny devil's club (*Oplopanax horridus*).

The licorice fern (*Polypodium glycyrrhiza*) was a treat for many of us to see, but one fern enthusiast (who shall remain unnamed to protect the guilty) decided to see if it would also be a treat to eat, since the stems are said to be very sweet and licorice-flavored. This unnamed individual sampled a small portion of the rhizome (in a responsible fashion), but reported disappointment on not detecting the sought-after flavor. Another star among the ferns sighted at LSCR was Anderson's holly fern (*Polystichum andersonii*). This allotetraploid (formed from the diploid parents *P. munitum* and *P. kwakiutlii*) has the distinction of bearing bulblets on the distal portion of its rachis. These vegetative propagules were the subject of much admiration from the foray participants. The small, low-growing oak fern (*Gymnocarpium disjunctum*) was also a stand-out of the day because its light green triangular lamina—held horizontally above the forest floor—made it seem almost out of place among the larger, more robust-looking, dark-green ferns of the understory. Other ferns checked off our list at the LSCR were the spiny wood fern (*Dryopteris expansa*), Braun's holly fern (*Polystichum braunii*), narrow beech fern (*Phegopteris connectilis*), and mountain fern (*Thelypteris quelpaertensis*).

The LSCR was an excellent starting location for our fern foray, and we were reluctant to leave at the appointed time—and truth be told, many of us couldn't leave at the set time because we had become quite turned around within the network of trails. Apparently, a significant number of us (possibly, half or more) were so engrossed in the ferns and other plants that we had failed to notice all the turns we had made along the trails. Numerous splinter groups came together and then parted again looking for the elusive trail back to the bus. The various "lost groups" eventually aggregated at the Seymour Dam Construction Site and Fish Hatchery (where resourceful participants consulted a large, wooden kiosk bearing a trail map), and cheerfully discussed the morning's adventures until scouts ascertained the best exit strategy. When the scouts returned, we learned that we were so close to the bus that it was almost embarrassing.

With the group all together again, we traveled to our second stop of the day, Mount Seymour Provincial Park. Along the way, we stopped briefly at a grocery store to supplement our box lunches or make up for shortages (botanizing can work up such an appetite!). To make up for lost time, we enjoyed lunch on the bus or trailside.

Mount Seymour Provincial Park, established in 1936, is a semi-wilderness area covering 3,508 hectares, with the lower elevations (below 1000 m) dominated by old-growth Douglas fir and western red cedar, and the higher elevations comprised mainly

of pacific silver fir (*Abies amabilis*), yellow cedar (*Chamaecyparis nootkatensis*) and mountain hemlock (*Tsuga mertensiana*). We spent most of our time exploring the trails and the chairlift right-of-way north of Parking Lot 4. At this site, we observed a total of 18 ferns and lycophytes, including 6 species that were present at the LSCR (*Pteridium aquilinum*, *Blechnum spicant*, *Athyrium filix-femina*, *Dryopteris expansa*, *Gymnocarpium disjunctum*, and *Polystichum munitum*).

An impressive sight for some participants was the dense and expansive carpet of common horsetail (*Equisetum arvense*). The occasional dandelion inflorescence popping out from this lush colony of horsetails made it look like some whimsical chimera of fern and composite. The showstopper, however, was the assemblage of *Botrychium* species found in the chairlift right-of-way: leather grapefern (*B. multifidum*), western moonwort (*B. hesperium*), and northwestern moonwort (*B. pinnatum*). In some spots, the *Botrychium* was abundant enough that we had to carefully select where to place our next step so as not to crush the diminutive fronds. These ferns elicited so much excitement that at the end of the first hour, the bulk of fern participants had not advanced more than a few hundred meters from our starting point, and many enthusiasts had dusty knees from kneeling down to observe and photograph the botrychia more closely.

Eventually, participants made their way further up the slope and added three lycophytes to the Mount Seymour list: stiff clubmoss (*Lycopodium annotinum*), common clubmoss (*L. clavatum*), and Sitka clubmoss (*Diphasiastrum sitchense*). Ferns included the fragile fern (*Cystopteris fragilis*), holly fern (*Polystichum lonchitis*), irregular polypody (*Polypodium amorphum*), western maidenhair (*Adiantum aleuticum*), and parsley fern (*Cryptogramma acrostichoides*). Despite the amazing views and abundance of interesting ferns, however, even the most staunch fern-lovers were ultimately driven back down the slope and onto the bus by the swarms of black flies that were increasingly emboldened in their attacks on the eyes, nostrils, and ears of foray participants.



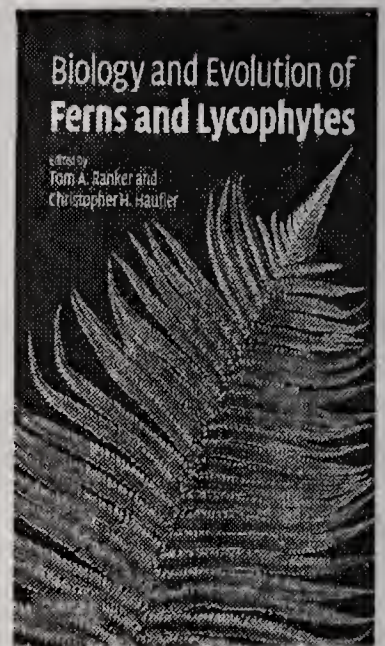
Larson Bay, West Vancouver
Photo courtesy of Melanie A. Link-Pérez

The third and final stop for the field trip was **Larson Bay** in West Vancouver. After a leisurely walk through a neighborhood of spectacular homes with oceanfront views, participants reached the cobble beach and the bayside trails beyond. This site added one more lycophyte to our checklist of the day, Wallace's spikemoss (*Selaginella wallacei*), and three more ferns: giant horsetail (*Equisetum telmateia*), maidenhair spleenwort (*Asplenium trichomanes* ssp. *trichomanes*), and goldback fern (*Pentagramma triangularis*). A dead shark on the beach provided a non-botanical highlight for the less squeamish among us. We returned to the UBC campus at the end of the afternoon with 27 ferns and lycophytes crossed off our checklists and with the satisfaction of a day well spent. The four field trip coordinators planned a great foray. The day was filled with amazing ferns, great scenery, and enjoyable interactions with friends both newly-made and of long-standing.

Biology and Evolution of Ferns and Lycophytes

Edited by Tom A. Ranker & Christopher Haufler. Cambridge University Press 2008.
ISBN 978-0-521-87411-3 hardback, & 978-0-521-69689-0 paperback.

This worthy tome contains 16 chapters by various authors who review the current status of their chosen topic. The chapters are arranged in four logical topic sections (parts), the whole being aimed at advanced undergraduates, graduates and academic researchers. Similar themes characterise the chapters – historical reviews, up to date subject reviews, areas where further research is required, suggested ways ahead, and (as an introduction to the subject) comprehensive lists of references. There is so much information in this book that I can only give a flavour of the contents here, and in some cases I am not qualified to do even that (particularly in the first two parts)!



Part I “Development and Morphogenesis”, consists of three chapters. Although technical in nature, they are reasonably accessible, and I particularly enjoyed reading Liz Sheffield’s review of the fern life cycle.

Part II “Genetics and Reproduction” is a rather different matter, covering as it does population genetics, antheridiogens, structure and evolution of fern plastid genome, and the evolution of the nuclear genome. I am writing here as an amateur fern natural historian and grower, and I predict that others with similar interests and backgrounds will find these 4 chapters hard going. I am reminded of Irene Manton’s advice (Manton, 1950, page viii) as to how her less technical potential readers might approach her book. Well, for what it is worth, I would not recommend attempting to read this part without first studying such books as Raven, Evert & Eichhorn 1992, Gifford & Foster 1988, and perhaps Manton’s book too. Indeed a familiarity with literature such as this would be a helpful background for approaching most of this book.

Happily the 4 chapters of Part III “Ecology” are more accessible. Klaus Mehltreter’s chapter 8 “Phenology and Habitat Specificity of Tropical Ferns” is full of interest. Within each of the two heading subjects he discusses the behaviour of terrestrial ferns, rheophytes (water loving), lithophytes (rock growing), climbing ferns and epiphytes. One of the many fascinating aspects covered is the advantage to species having monomorphic or dimorphic fronds, and how long these frond types last in both relative and absolute terms, and why. Clearly much of the work reviewed in this chapter has been qualitative rather than quantitative, and where the latter, on too small a scale to enable many general conclusions to be made. Nevertheless many absorbing studies have been conducted, and one of the aims of future studies (as Klaus explains) could be to understand better the requirements of horticulturally challenging fern groups such as grammitids, filmy ferns and gleichenids.

There is much of interest too in chapter 9, “Gametophyte Ecology”. Most gametophyte studies have been performed in the laboratory because finding, identifying and studying them in the field is difficult. In discussing whether laboratory study results do mirror

wild populations, the authors have found that they do so in many, but not all categories, but doubts were expressed about data for sexual development. In a section on ecomorphology, five morphological gametophyte types are identified, described and discussed. I never realised there were so many, but most ferns with which we are familiar produce the common cordiform type, which is adapted to grow in temporary, disturbed habitats. The ecophysiology section covers topics like water relations and desiccation tolerance, the summarised results being of some interest and relevance to the propagation of ferns.

Chapters 10 & 11 cover “Conservation Biology” and “Ex Situ Conservation of Ferns and Lycophytes” respectively. As pointed out in the former chapter, many ferns and lycophytes have specialised ecological niches, and most are very exposed to the current rate of habitat defragmentation and deforestation. Conservation efforts should focus on biodiversity hotspots and areas of high endemism, but studies to date in such areas have not been encouraging. Furthermore, many tropical and sub-tropical areas lack adequate floras to provide the starting point for conservation studies. This review also covers other topics, such as the conservation importance of ferns and lycophytes, and the impacts of historical commercial collecting, introduced and invasive species, and climate change. The main focus of chapter 11 is a review of the various methods attempting to achieve the ex situ conservation of spores, many of the trials having been performed by author Valerie Pence herself at her institution in Cincinnati. The conclusion from these trials is that one optimal method for all species probably does not exist. Other topics covered are ex situ cultivation, in vitro cultures and collections, ex situ cryostorage of gametophytes and sporophytes (preserving small samples of tissue only), in vitro collecting for ex situ conservation (using tissue culture). Perhaps disappointing is that ex situ cultivation of sporophytes currently seems to be a relatively insignificant contribution to conservation, and so perhaps some of our horticulturally based fern societies could do more here.

Part IV, “Systematics and Evolutionary Biology”, contains five chapters, all of interest. In his introduction to chapter 12, “Species and Speciation”, Christopher Haufler considers whether species really do exist, and asks the question “why is the variety of life on earth subdivided into a set of discontinuous and distinct groups rather than existing as a seamless series of intergrading populations?” Well, no-one seems to have satisfactorily answered that question, but it is accepted that species do exist. From this starting point, species concepts and definitions are discussed (an excellent summary tracking our historical understanding of species), as are sexual species and cryptic species, then follows an example of the progress in discovering species boundaries using *Polypodium*. In the second part of this chapter, three types of speciation are identified and discussed – primary (divergence of a single lineage to produce a new lineage), secondary (initiation of a new lineage resulting from hybridisation and/or polyploidy of existing lineages), and tertiary (speciation through changes in polyploid species).

Chapter 13, “Phylogeny and Evolution of Ferns: a Paleontological Perspective”, is designed (according to the authors) primarily for the non-paleontologist with the goals of imparting a general understanding of what is known about the fossil record of

ferns. The competing hypotheses for the relationships of fossil and extant fern groups are described, followed by accounts of all the major groups of extinct and living ferns and fern-like groups in a rough geological time sequence. I predict that the taxonomic terminology applied to extinct ferns will be alien to some readers.

In chapter 14, "Diversity, Biogeography and Floristics", Robbin Moran has chosen some fascinating themes. Under diversity, he describes the latitudinal diversity gradient phenomenon whereby the number of species per unit area increases moving from the poles to the equator. Altitudinal differences in diversity and endemism are also discussed, as is long distance dispersal. Under vicariance, he cites the well known similarity between the floras of eastern N. America and eastern Asia. In the area of floristics, much remains to be done as a knowledge of what species occur where is essential to the study of biogeography. Robbin then goes on to discuss the state of play, identifying areas with good, partial or no fern floras. This chapter had much of interest for me, and the comprehensive list of references is most welcome.

The final two chapters, "Fern Phylogeny", and "Fern Classification" cover topics that have been the subject of much research and published literature in recent years, spearheaded by Kathleen Pryer, Alan Smith and associates. By using DNA sequence data and phylogenetic approaches, much progress has been made in understanding fern relationships. In the first chapter (15) evolutionary divergencies are discussed with reference to the several clades figured to show various levels of detail. The most significant result from these studies of course was the discovery that ferns and lycophytes are not at all closely related. In chapter 16, a comparison of historical classifications is presented, followed by a review of critical recent advances, with the rest of the paper taken up with the current classification. At the end of this, some of the main differences from the older systems are outlined, and some questions still to be resolved are identified (so this may not be the last word in fern classification!). Currently accepted families and genera are listed in Appendices A & B respectively and will thus serve as very useful references – for the time being.

In conclusion, I would recommend this book to those in the community for whom the book was intended (see first paragraph). However, I predict that most readers of this review will not fall within that community, and so an outright purchase might seem too much of a luxury. Consider therefore a loan from a library or colleague. Personally I found several (but not all) chapters very interesting and readable - an excellent book to dip into, but not perhaps to read from cover to cover.

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Reviewed by Graham Ackers, England - October 2008

Perry Creek Trail Needs Your Help!

The Perry Creek trail in Washington State contains ~ 30 species of ferns and lycophytes, the greatest concentration of ferns and lycophytes in the state. In order to protect this wealth the area was declared a Research Natural Area in the 1990's. Many members of our organization as well as fern enthusiasts from around the world have enjoyed the four mile hike with lovely distant views as well as the opportunity for close up inspection of our native flora. We have just learned that the U.S. Forest Service is planning to close the road to the trail head, hence adding some three miles to the hike. In its place they are proposing to build a parking lot alongside the nearby highway approach that will accommodate up to 70 vehicles. The potential for destruction of the fragile landscape is immense as the number of recreational hikers will likely increase while the number of plant enthusiasts will likely decrease. The proposal also ignores the protective intent and purpose of the regulatory structure involved in establishing a Research Natural Area.

Therefore we are asking for your help in opposing the plan.

Please address letters expressing your concern to:

Peter Forbes, District Ranger
Mt. Baker – Snoqualmie National Forest
1405 Emmens Street
Darrington, WA 98241
USA

**THANK YOU FOR YOUR HELP . . .
THE HFF BOARD OF DIRECTORS**



Perry Creek Trail, Washington State
Photo courtesy of Michelle Bundy

Pyrrosia continued:

Our last issued contained a comprehensive article on *Pyrrosia* written by Tom Stuart. Here are some further observations.

Dear Tom:

I enjoyed your recent articles on *Pyrrosia* in both Fiddlehead Forum and HFF Quarterly. You asked for notes on hardy *Pyrrosia*, so here goes with experiences from my garden (which you visited some years ago).

The Australian species *Pyrrosia rupestris* has for many years been growing out of doors, and without winter protection, at Logan Botanic Garden in southwest Scotland, near the town of Stranraer. The Logan Garden is well known for growing all kinds of tender vegetation because of its proximity to the sea, which is warmed by the North Atlantic Drift (as the Gulf Stream is known when it gets up here). The *P. rupestris* is planted at the base of tall-trunked *Dicksonia antarctica* and scrambles along the ground and a couple of feet up the trunk. It is exposed to full sun and fairly dry conditions, I would say. These large *D. antarctica* at Logan are left unwrapped during the winter but the small, short-trunked specimens get winter protection. After each winter the big *D. antarctica* typically have their fronds browned, while the *P. rupestris* at the base comes through unscathed.

I was given a small pot of surplus *P. rupestris* from Logan in 1995. I planted it out on a log and have kept it going with no special care for 13 years now. The accompanying picture shows it scrambling along a small pine log which lies on sloping ground with overhead cover from a large rhododendron. It doesn't seem to mind the moss growing with it; in fact, I wonder if the moss is necessary. Its location is constantly moist and it gets no more than speckled sunlight for a few hours each day. I don't have temperature measurements actually taken beside the plant, but I do have many years of 'shade' and 'grass' temperatures in my garden. In USDA terms I am in Zone 9a, although I have an oceanic climate to which the zonation may not apply very well (particularly our lack of warm summers).

My *P. rupestris* produces fertile fronds which are longer and narrower than the sterile ones, and I have grown further plants from the spores. You can just about see the back of a fertile frond in the middle of the picture. The picture also shows the rhizomes scrambling over the surface of the log but not venturing on to the adjacent soil, which remains uncolonized. From time to time I cut off bits of the growth to give to visitors, hence the bare area at the front of the picture. I have tried growing the *P. rupestris* directly on leaf-littered soil but it doesn't



Pyrrosia rupestris

Photo courtesy of Alastair Wardlaw

seem to like it. It definitely needs, or prefers, either a log or rock surface to scramble over. At Linn Botanic Gardens in the Clyde Estuary, Jamie Taggart has *P. rupestris* scrambling over bare rock. I commend Linn to anyone wanting to see lots of tender ferns thriving outside.

Down the years I have been given other species of *Pyrrosia* to try out in the garden. My records show that I have had *Pyrrosia lingua* 5 times but only been able to over-winter it safely in a cold frame that gets no colder than -3 Celsius. The other 4 plants failed to survive their first winters outdoors, in sites on logs with overhead cover similar to where the *P. rupestris* is growing. I have also tried outdoor plantings with glasshouse-grown mature plants of *P. adnascens*, *P. eleagnifolia*, *P. lanceolata*, *P. longifolia* and *P. piloselloides*. None survived, I regret to say, but this could be because they were too shaded and didn't 'charge their batteries properly' during our cool, wet summers. In other words, long-term survival may depend on summer heat being available to ensure robustness to winter cold. I have a spore-grown *P. sheareri* which has just about stayed alive for several years but does not thrive.

Out of all this I believe that *P. rupestris* is in a class by itself as a reliable hardy species and a good one to go for. In Australia it has a wide distribution down the east coast, from tropical Queensland down to temperate Victoria. But it doesn't seem to jump the Bass Strait into Tasmania.

Best wishes,
Alastair

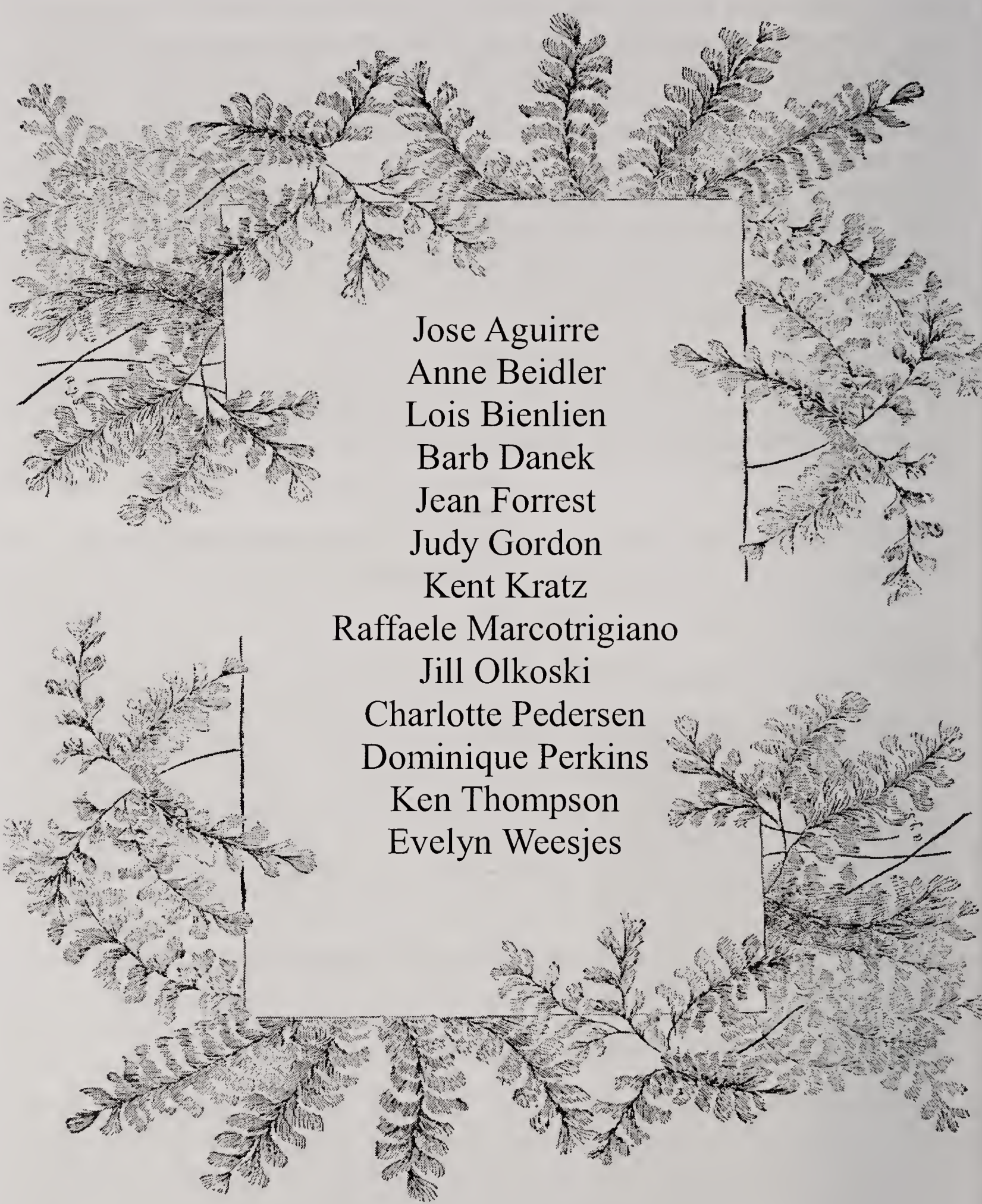
Alastair C. Wardlaw, 92 Drymen
Road, Bearsden
Glasgow G61 2 SY - Scotland, UK
Tel: 0141 942 2461

Alastair,
Pleased to see your experience with *P. rupestris*. I too am surprised it does so well for you, but never got down to Tasmania. I've been puzzling over the difficulty with others in your garden. Some of them are tropical and success would be a surprise. However, *P. lingua* is definitely not done in by the cold. It grows on the West Coast and in the Southeast of North America, both areas with colder winters than yours, not to mention in colder areas of its native haunts. That would seem to limit the climatic culprit to winter cold combined with wet or to summer heat as you suggest. You cannot do much about the latter (maybe summer in the greenhouse, like a tomato?) but you could test winter wet by covering it or limiting moisture. Or try both. I see it for sale at Rickard's, so someone has succeeded. I've thought often of your wonderful garden. Best to Jackie.
Tom

The following comments are from Joyce Descloux of Florida:

I have 10 plants of six species of *Pyrrosia*. The most interesting and beautiful is *P. princeps*, which has 16" linear leaves coated with silver down. I got it and three others from Charles Alford in Vero Beach. They include *P. lingua* 'Monstrifera', *P. longifolia* crested (which looks more like a succulent than a fern), and *P. nummularifolia*, which resembles the *piloselloides* in your book; it is also covered with silvery down, and is quite charming, growing on a tree fern. I am looking to obtain more *pyrrosias*, but they are hard to find.

Welcome New Members!



Jose Aguirre
Anne Beidler
Lois Bienlien
Barb Danek
Jean Forrest
Judy Gordon
Kent Kratz

Raffaele Marcotrigiano

Jill Olkoski

Charlotte Pedersen

Dominique Perkins

Ken Thompson

Evelyn Weesjes

Visit to the Vashon Island Stumpery

Deborah Heg
Greenbank, WA

On an appropriately misty morning in June, almost fifty fern lovers were welcomed to the lovely Vashon Island garden of Pat and Walt Riehl. The Hardy Fern Foundation and the Northwest Horticultural Society organized a fantastic day to immerse ourselves in all things fernish and stumpy, guided by stellar experts Martin Rickard, Sue Olsen and Richie Steffen. And the special treat of the day was the chance to view the newly created jewel of the Riehl garden - a classic Victorian style 'stumpery'.

Our large group, divided into two manageable classes, rotated through four excellent events. Martin Rickard, who had partnered his expertise with Pat's vision to craft the stumpery months earlier, gave a delightful slide show and lecture, talking of ferns and giving us some history and understanding of the stumpery tradition. As a bonus he gave me a new favorite saying - referring to moneyed folks as having 'pots of dosh'. I use it now when relevant, and also when not.

Next, Martin and Pat led us into the stumpery. This was a garden experience like no other. The stumpery has been created in a gully, or swale, so when winding through it the plants and stumps rise up on either side. The beautiful stumps have been cleaned so the fantastic, sinuous and giant upturned roots have become gorgeous sculptures. At one end of the installation an impressive tunnel of stump wood has been built. All along the way myriad ferns, hostas and other woodlanders are making their starts. For me, the overall feeling of the stumpery was one of being sunk into the earth, or under the sea, among the twisting trunks and roots, with the terrific mixed textures of smoothed wood, frilly ferns and leathery hostas. It is a wonderful accomplishment for Martin and Pat and will just get better and better with time.

Then, bringing us from the massive to the mini, Richie treated us to a 'fern table' demonstration. In what seemed like no time at all, he took a flat square board, mounded soil and rock, tucked in myriad ferns and sympathetics, and voila! – here was a fabulous small world perfect for a patio. It reminded me of the concentrated beauty of fine bonsai. Next spring I will be trying one myself.

As if we had not already experienced a very special day, we then were privileged to have another great slide presentation by Sue Olsen, this one completely concentrating on ferns. What a pleasure to revel in her encyclopedic knowledge, and to leave the Riehl's chock-full of new information and ideas. It was an exceptional day!

The Gardens of Dewstow

Pat Riehl
Seattle, WA

During the summer of 2007 I had the wonderful opportunity to travel around the United Kingdom visiting fern gardens with Sue Olsen, Naud and Wim Burnett and Martin Rickard. Part of the joy of this trip was spending time beforehand searching for gardens I wanted to visit. One garden I wanted to see was Dewstow. It is a garden with a remarkable history. The creation of this seven acre garden in Wales was possible because of two men, the owner Mr. Henry Oakley and the craftsman, James Pulham #3. In 1893 the Dewstow estate was purchased by Henry Roger Keane Oakley, a director of the Great Western Railroad. As a bachelor he had two passions: horses and ferns. James Pulham #3 was the third generation of a four generation family that always called the first son James, hence #3. The firm they established, Pulham and Sons specialized in creating picturesque gardens using both real and artificial stone. This artificial stone was concrete or what is now called Pulhamite. The genius of their work was to create landscapes using both side by side so as not to be able to tell the difference between the real and the artificial.

Oakley was a very private man and when he died in 1940 the property passed to his attorney. It was broken into several parcels in the 1950's. The house and farm were sold separately with the farm going to W.E Harris. The Harris's farmed the land until 1987 at which time they elected to use part of the land to create Dewstow Golf Club. In 2000 the house came up for sale and the Harris's bought the house uniting the old estate for the first time in 50 years. The Harris's had farmed in the area of Dewstow for many years and had heard stories of the gardens. So they started to explore their new purchase. What they found started them excavating.

At first they found a staircase leading down. The digging continued and still continues for what they found was an extensive tunnel system. Oakley and Pulham had created an underground garden, a maze of long tunnels, grottos, skylights, waterfalls and pools. Tragically all were buried after the Second World War and were turned into farm land. They were further buried by soil from the excavation for the M4 highway.

The Harris's have opened the gardens to the public and the above ground gardens are wonderful but it was the underground that I wanted to see. We walked into a small woodland with a stream and by following the stream we entered the underground. There were stepping stones in the stream bed and we walked on these through an arch and into the tunnels. If we went right we walked a short distance and popped out again into a sunny warm above ground garden area called the alpine garden. This area has a series of pools or small lakes edged by boulders and heavily planted with grasses and sun loving plants. It is a Mediterranean garden soaking up all the sun's heat with crushed stone pathways surrounded by buildings. Here the trickery began. How much of the rock is real and how much Pulhamite? Was I fooled by the stepping stones and the arch at the entry? There are gargoyles carved in stone at the waters edge but how much of the rock is real and how much Pulhamite?

We went back the way we came and into the tunnel again. This time we took the other route and entered a room through an opened door. The room is small and cool a contrast to the warmth of the alpine garden. A grand waterfall tumbled from the top of the wall and into a large pool. There are niches for plants and stone columns to hold up the roof with mighty stalagmites flowing down from the ceiling. The ceiling has a skylight which provides the only light. Pulham was known for creating this sort of effect so what is real stone and what isn't?

As we continued through the tunnels skylights gave way to electric light but only enough to give an eerie feeling to the journey. It was dark and the tunnels are narrow but as we walked suddenly the tunnel widened and we saw Doric columns carved into the walls. At another point the Pulhamite had fallen away and the under structure of brick and rubble was visible. Suddenly the tunnel expanded again and we entered the Tufa Grotto, an amazing room. It was large, and also had waterfalls and a large pond bridged with a balustrade walkway, more stalagmites and planting niches lit by skylights. It was cool and softly lit and one could enjoy the noise of the waterfall.

From our underground tunnel we walked up a set of stone steps and came out into an area that is still being excavated. We were at the edge of a large building open at one end. This was the old greenhouse. The roof is supported by the original cast iron pillars. Not much to see here so back down we went. The tunnels seem to go on forever in this lost world without any sense of time or direction. Finally we popped out for good some distance from where we entered. The exit looks like a nice subway entrance with wide steps and Doric columns.

It is close to the main house so perhaps Mr. Oakley and Mr. Pulham intended this as the entrance.

The above ground gardens have their own curiosities and wonders - fountains with water shooting out of an artichoke, streams running through rock work, ponds and long stone terraces. I could go on and on. I have only scratched the surface of this great garden.

**For more information go to the website for Dewstow
at www.destow.co.uk**

For information on Pulham and Sons go to www.pulham.org.uk



Ceterach officinarum

Vermont Ferning

June 22-28, 2008

Delaware Valley Fern and Wildflower Society

Jack Schieber

Holland, PA

I've been to Vermont several times over the years to see the ferns and it has always been a satisfying excursion. This trip was a standout. Our guides were Mike and Sharon Rosenthal who a few years ago had retired to Vermont from New Jersey. Both have a sharp eye and the ability to note the nuanced differences in morphology of the hybrids. Mike is an indefatigable and intrepid explorer. He spent a night lost in a swamp in Florida. He has hiked the entire Appalachian Trail from Georgia to Maine, 2175 miles, in 4-1/2 months. He has climbed all 111 peaks over 4000 feet in the northeast. He places no limits upon himself when searching for ferns. So-ooh, you can begin to sense the flavor of our trip.

We began at a small pond near a golf course in Arlington Park. Here we saw *Equisetum hyemale* ssp. *affine*, common scouring rush, *Equisetum variegatum*, variegated scouring rush and *Equisetum x mackaii*, the hybrid between the two. Walking farther onto a woods trail we saw *Selaginella apoda*, meadow spikemoss, a mat-like groundcover that is similar to moss in appearance.

For lunch sandwiches we went to the Wayside Country Store, an old fashioned general store which sells just about everything and which is open from 4 AM to 10 PM, 365 days a year. Then we drove along River Road which parallels the Battenkill River. I was struck by the beauty of the drive with the small quiet river on the left and a verdant tree-covered hillside on the right with a dense band of *Adiantum pedatum*, northern maidenhair, along the road for hundreds of yards. This fern is not uncommon and I'd seen it on shady roadsides before, but never like this. Lush growth like bracken in the Pinelands, hayscented fern (on acres of open forest or a hillside cover with evergreen wood fern) as seen in Hocking Hills or Dunnfield Creek can lead to the notion of weedy abundance. But stop and see. Find a rock and sit down and just simply see without looking. There's a kind of shared joy. I go on fern trips to learn and to search for species and that's great fun even when we don't find what we are looking for. But there is this other joy, which curiously seems only to have to do with ferns. How is it with us fern lovers?

We were on River Road specifically to stop at a small old quarry overgrown with trees and shrubs. After struggling through a barrier of bushes and weeds we were rewarded to see *Cryptogramma stelleri*, slender rock brake, growing in a fissure in the wall. This small fern, uncommon in the U.S., needs calcareous rock and cool conditions.

Mike and Sharon have a lovely hillside home that they designed and largely built themselves and this includes an extensive garden of about 60 species of ferns. We spent an afternoon here touring the garden and then checking out some of the surrounding woods. Mike and Sharon share our rule that we never take anything from the wild that is the least bit uncommon, but Mike had been fortunate to come upon some housing

developments where plants were to be eradicated and he had saved five different *Dryopteris* hybrids. Of course, the hope is that they will survive the move. One time in New Jersey the state was having repointed the mortar in the stone wall of an old lime kiln in which *Pellaea glabella* was growing. The state refused our request to stop the process so we dug out a few plants and took them home. Although I planted them in limestone and crumbled mortar they did not survive. Checking back at the kiln a couple years later we were happy to find that a few ferns had apparently found their way through the new mortar or maybe the contractor didn't do a thorough job.

Near a mailbox on the roadside near the home of Mike and Sharon's son in Sunderland we saw *Dryopteris intermedia* x *marginalis*, a hybrid that has never been given a distinctive name like *D. x neo-wherryi*, (*goldiana* x *marginalis*) or *D. x separabilis*, (*intermedia* x *celsa*). So, the lesson is if you have ferns growing on your property, look hard and you may find something unusual.

We climbed most of the way up Mount Equinox near Manchester to see *Woodsia glabella*. From among the houses in the valley you could clearly see the rock outcrop on the upper side of the mountain where we were heading. Getting there was another story. It seems that the way up is through a number of rocky enclaves hidden among the trees. It was interesting because Mike and Sharon didn't exactly remember how they had gone up before -- after all, they had been looking for ferns -- not finding a way. It was just sloping mountainside and rocks and trees so you couldn't see where you were headed. Fortunately, Mike and Sharon have a pretty good sense of direction and most of the time they agreed on our direction -- after a while.

Well, naturally, *Woodsia glabella*, smooth cliff fern, was not growing at the base of the outcrop nor on top. By climbing around the side above a 30 foot drop and holding onto a tree branch it was possible to get within a couple feet of the little fern (As I recall there were a couple more a little more remote). We mostly used binoculars and the camera zoom. *Woodsia glabella*, like *Woodsia alpina*, occurs circumboreally extending south into the U. S. only in the east and there only into northern New York and New England. They need the consistent coolness of the higher elevations.

Botrychium minganense had been reported to be on Mount Aeolus and last found in 1985. Mike went up there to find it again and he failed. But lo, he found a considerable station of what he was sure had to be *Botrychium ascendens*, upswept moonwort, not only never before found in Vermont but never before found in the eastern U.S. He called in Art Gilman who agreed and has sent a specimen to Don Farrar for genetic study. I had never even heard of this fern before. The walk up Mt. Aeolus was a comfortable woods road, the sides of which displayed a variety of ferns, lovely as always. The group of *B. ascendens* was in a small glade at the very top of this small mountain and Mike had temporarily ribboned it off so we wouldn't step on them

In northern Vermont we stayed in the town of Morrisville and did a couple more mountains. Mount Mansfield is a well-known ski resort not far from the town of Stowe. Here we cheated, riding up in the gondola towards the "chin" of Mt. Mansfield overlooking Smuggler's Notch. The gondola ends 300-500 feet vertically from the top of the mountain at the base of a cliff that more or less runs along the east side of

mountain. Here we walked somewhat horizontally on the Cliff Trail which follows along the base of the cliff – kind of. Although we weren't climbing much, the trail had its high steps and short steep rock slopes and I was continually looking as to where I could hold on. And then there was the "lemon squeeze", where the trail was underground for about 20 feet and where there was a narrow misshapen section where one has to figure out how to fit through. It seemed a little easier coming back and it was certainly worth the effort for here we saw *Dryopteris fragrans*, fragrant wood fern, and *Woodsia alpina*, alpine cliff fern. Both, like *W. glabella*, are circumboreal, rare, and occurring usually in calcareous rocks. This time they were close at head height and we were able to smell the fragrance of the *Dryopteris*. It wasn't quite like a rose but after all, it's not a flower attempting to attract bees. Why is it fragrant?

The next day we went to an abandoned asbestos mine, an open, quarry-like area on Mount Belvidere. This was an easier walk past a number of intimidating "keep out" signs threatening prosecution. But Mike had taken care to get informal permission from the contractors to the federal government cleaning up the place. It didn't seem all that dangerous for there was no dust or wind. This is serpentine territory and here we saw *Adiantum viridemontanum*, green mountain maidenhair, restricted only to serpentine sites. This is a fertile cross between *A. pedatum* and *A. aleuticum* that has been found only in north central Vermont. Here the plants were quite numerous although they were smaller than those I had once seen on a roadside in Vermont, perhaps the result of the austere conditions. We also saw here the tiny *Botrychium simplex*, least moonwort, so easy to miss or step on, as well as *B. multifidum*, leathery grape fern. And here, too, were *Huperzia selago*, northern fir-moss, *H. lucidula*, shining fir-moss, and their hybrid, *H. buttersii*, which I had never even heard of.

We visited Barr Hill Nature Preserve near Greensboro where we walked a mile loop nature trail with several vistas. Here we saw the fern relatives, *Diphasiastrum x sabinifolium*, *Diphasiastrum complanatum*, northern running pine and *Spinulum canadense*, northern interrupted clubmoss. The genus spinulum is a newer addition within the clubmoss family, *Lycopodiaceae*. It doesn't help me much with my confusion.



Cryptogramma stelleri
Photo courtesy of Sue Olsen

One of the highlights of our trip was a visit to Cadys Falls Nursery recommended as a necessary visit by Sue Olsen. Operated by Don and Lela Avery, the nursery sells only from onsite. It was a wonderful stop with beautiful gardens and a variety of ferns, orchids and perennials. I was able to buy *Lygodium palmatum*, American climbing fern, which Don had grown from spores. We tried growing this fern from spores some years ago. We were able to get sporophytes but had no success in hardening them off and getting them outside.

And so, stop by Vermont, if not now, then later. In the meantime go to "fern images" on Mike's website www.msrosenthal.com and see fine photos of some of ferns we saw.

Woodsia polystichoides

Holly fern woodsia

James Horrocks

Salt Lake City, Utah

The woodsias are an interesting group of ferns comprising some two dozen or more species mostly found in the cooler northern hemisphere but also "down under" and in Africa and South America. Named in honor of the English botanist and architect, Joseph Woods, they are quite charming with their bundle of fronds displayed in a dense clump. *Woodsia polystichoides*, as Martin Rickard observes, "is a very pretty little fern". It has the appearance of a small once-pinnate *Polystichum*, complete with auricles, but with a softer feel, hence the epithet "polystichoides" meaning "like polystichums". This is one of the few cultivated woodsias that is but once-pinnate. *Woodsia intermedia*, a fairly new introduction to cultivation, at least in the West, is also once-pinnate. It is smaller than *W. polystichoides* and the upper pinnae are adnate, that is, broadly attached to the rachis, while in *W. polystichoides*, all of the pinnae are stalked. *W. pseudopolystichoides* from Russia is once-pinnate as well, but the pinnae are somewhat lobed and rounded at the edges.

W. polystichoides is found growing in the mountains among rocks, mostly in sunny exposures. It is native to and rather common in Japan, Taiwan, Korea, China, Manchuria, and eastern Russia. A heavily cloaked form is known from Kamchatka, appearing almost white with the abundance of hairs and scales.

Description: The rhizomes are short, erect to creeping and densely scaly, exhibiting tufts of old stipe bases. The straw-colored to red-brown stipes are jointed, breaking off evenly near the rachis, forming an even stubble. This is in contrast to *W. oregana* (Vol.16 #2 Spring 2006) having stipes without joints, therefore breaking off unevenly. The stipes are scaly and hairy, the scales a rather pale brown and lanceolate to acuminate. The six to fourteen inch fronds are firm but soft-textured compared to polystichums and are narrowly lanceolate to acuminate with a blunt or obtuse apex. They form a rosette of arching fronds usually held erect, although some may trail close to the ground. The fronds are slightly narrowed at the base, the pinnae being once-pinnate with distinct auricles on the anterior side. The pinnae are spreading, oblong-lanceolate with tips that are usually acute but occasionally obtuse. They are attached to the rachis by a stalk the entire length of the frond. The sori run in one series along both sides of the margin, *Polystichum* fashion. The indusia are subglobose, shallowly lobed and ciliate. The spores are brown.

Culture: The holly fern woodsia is a perfect rock-garden plant, preferring sunny spots, although in drier semi-arid climates, this can pose a bit of a problem. In areas of less humidity, medium light may be advised or at least protection from the sun during the hottest time of day. Sue Olsen advises that generally woodsias "are unsuited for warm



Woodsia polystichoides
Photo courtesy of Richie Steffen

summer sites." Good drainage is a must and the soil should be neutral to slightly acidic, and on the gritty side. It is not likely to appreciate the proximity of limestone or even cement for that matter, being more likely to thrive near metamorphic or igneous rocks. This species can be easily divided by carefully pulling the crowns apart in mature specimens. It is, as has been mentioned earlier, a "charming" little plant and well worth trying.

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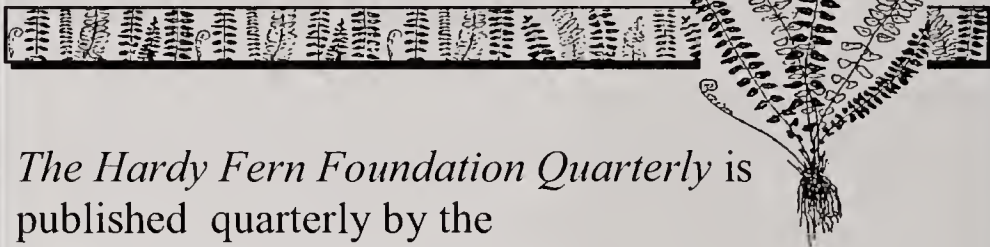
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