

Fiddlehead Forum

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Editors: Joan Nester-Hudson and David Schwartz

Barbara Joe Hoshizaki 1928-2012

Barbara Joe Hoshizaki, born June 14, 1928, in Oakland, CA, died at age 83, May 30, 2012 in Los Angeles, CA. Barbara attended public schools in Los Angeles and received her BS from the University of California, Los Angeles in 1951. There she met Mildred Mathias, a botany professor, who became Barbara's mentor and encouraged her to study ferns. Her MS was awarded by UCLA in 1954. Barbara was professor of biology and taught 28 years at Los Angeles City College. She was also Curator of Ferns at the UCLA Herbarium.

Barbara traveled widely. Early in her career she spent three months in Costa Rica studying ferns with the Organization for Tropical Studies. She continually worked with and developed close relationships with her academic colleagues and also with amateur and professional growers around the world. She introduced many fern species into cultivation and wrote numerous scientific and popular papers on ferns. An avid taxonomist, she corrected scientific names of misidentified ferns through extensive research.

Barbara was president of the American Fern Society, the Southern California Horticultural Institute, the Los Angeles International Fern Society, and vice-president of the Pacific Horticultural Foundation. She served on the boards of many horticultural and botanical organizations. She was an honorary member of the American Fern Society, the Los Angeles International Fern Society, and the Tropical Fern and Exotic Plant Society, Inc.

She is well known for *The Fern Grower's Manual*, published in 1975. This seminal work established a bench mark for ferns in cultivation in the United States. A revised and expanded second edition with co-author Robbin C. Moran of the NY Botanical Garden was published in 2001.



Barbara was an academic who didn't confine her work to the herbarium; a gardener who actually grew the ferns she wrote about. Her garden, many years in the making, was her research library. The hands-on experience informed her work and made her an in-demand speaker for professional meetings and for amateur groups. It was a fabulous garden that was both a pleasure and a privilege to visit. Barbara was a good friend who shared her knowledge, expertise, and plants from her garden. We will miss her generosity and kindness.

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WEBMASTER: Stephen McDaniel, 1716 Piermont Ave., Hacienda Heights, CA 91745. webmaster@amerfernsoc.org

OUTREACH COORDINATOR: Tom Stuart, PO Box 517, Croton Falls, NY 10519. tstuart@westnet.com

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FIDDLEHEAD FORUM: Joan Nester-Hudson, Box 2116, Department of Biological Sciences, Sam Houston State University, Huntsville TX 77341-2116 (jhudson@shsu.edu) and David Schwartz, 9715 Chirtsey Way, Bakersfield, CA 93312-5617 (xericferns@aol.com)

The Editors of FIDDLEHEAD FORUM welcome contributions from members and friends, including miscellaneous notes, and reviews of books on ferns. Articles may be submitted electronically by e-mail, on disk (PC compatible) or typed.

Regular membership in the American Fern Society is on a calendar-year basis and includes access to field trips and the spore exchange. Regular members receive the *Fiddlehead Forum*, but not the American Fern Journal, for \$15 (to U.S.A., Canada, and Mexico) Regular members in other countries receive the *Fiddlehead Forum* for \$22. Individuals interested in regular or journal membership should contact the membership secretary.

AFS HOME PAGE

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She is survived by her husband, Takashi, two children, Carol (George Brooks) and Jon (Madeleine Takii), a grandson, Daniel, a sister, Sylvia Louie, and a brother, Curtis Joe (Virginia Shing), and numerous nieces and nephews. Services will be private.

Family requests that donations be made to The Organization for Tropical Studies, Box 90630, Duke University, Durham, NC 27708-0630, "OTS in Memory of Barbara Hoshizaki."

Submitted by Janet Keyes.



Barbara and Takashi outside their home in 2011.

Photo by Darla Harris

From Joan: Darla Harris, President of the Texas Gulf Coast Fern Society, has written a beautiful "In Memoriam" about Barbara in their June 2011 newsletter at www.tgcfersoc.org/Newsletter.

Organization for Tropical Studies Specialty Course in Costa Rica: TROPICAL FERNS and LYCOPHYTES — more information on page 28

Vermont is still the Fern-Lover's Paradise

by Arthur V. Gilman

One hundred years ago, Vermonter Harold G. Rugg,¹ for whom *Osmunda x ruggii* is named, published an article in the American Fern Journal entitled "Vermont, the Fern-Lover's Paradise."² In it, he reviewed many exciting fern discoveries of the previous decade, including that of male fern, *Dryopteris filix-mas*, at its first known eastern US locale,³ of the extremely rare, and previously unknown *Asplenium ruta-muraria x trichomanes*,⁴ and of the rare and previously unknown wood-fern hybrid, *Dryopteris carthusiana x marginalis*.⁵ He also cited his own travels to various well-known fern locales such as Mt. Mansfield, the Lake Willoughby area, and Quechee Gorge. Now, a century on, it seems fitting to give an update on the state of affairs. Much of Vermont pteridology through the intervening century has been written up in the Journal⁶ and is too lengthy to recap in detail. For this reason, this article primarily addresses recent developments.

Perhaps the biggest story of the 20th century was the discovery of the Green Mountain maidenhair, *Adiantum viridimontanum* C. A. Paris (Fig. 1). It began with the discovery of the western maidenhair on serpentine bedrock in northern Vermont in 1922 by Mrs. Frances Jolley. Its nature was studied in the 1980s by Cathy Paris while a student at the University of Vermont. Using a combination of cytological and isozymic data, she and Michael Windham showed that the majority of the Vermont serpentine maidenheads were allotetraploids, originating as a hybrid lineage from *A. pedatum* L. (widespread in Vermont forests) and *A. pedatum* var. *aleuticum* Rupr.⁷ (Fig. 2). As a result, this new, fertile tetraploid species was named *A. viridimontanum* and the western maidenhair (which is actually the rarest of the three) was raised to species rank. While not endemic (it occurs also in Quebec and in Maine), Green Mountain maidenhair has already become an emblem of Vermont as a Fern Lover's Paradise.

The Barrington Laboratory at UVM continues to be the local center of scientific investigation. Recent and ongoing projects involve several Vermont taxa:

- *Asplenium trichomanes* L. — Graduate student Beth Howard found that the Vermont populations of tet-



Fig. 1. *Adiantum viridimontanum*, a serpentine specialist in northern Vermont.

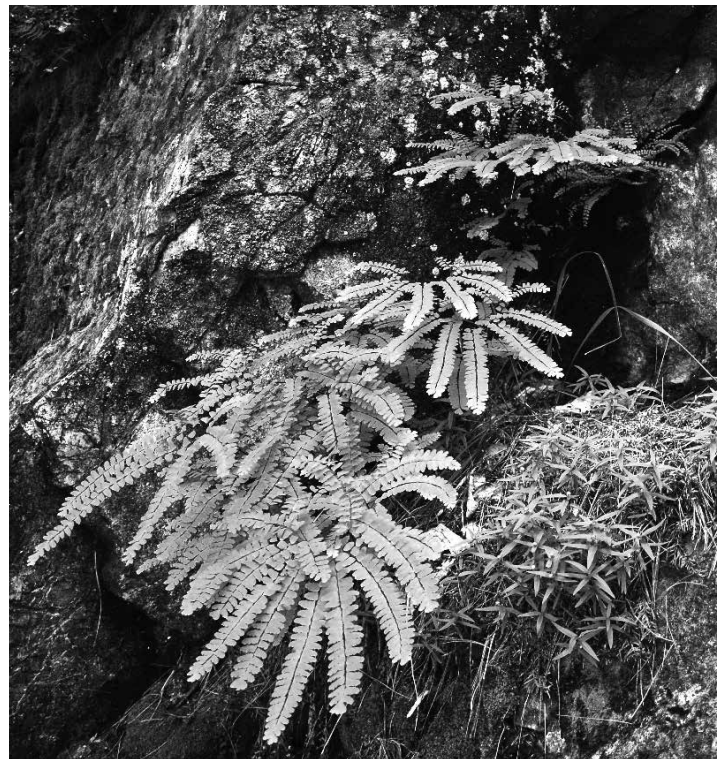


Fig. 2. *Adiantum aleuticum*, same habitat as *A. viridimontanum*, but rarer.

raploid *Asplenium trichomanes* ssp. *quadrivalens* D.E. Meyer are of allopolyploid origin, with the common diploid ssp. *trichomanes* as one progenitor.⁸ The other progenitor was not identified and may be an unknown species, or perhaps another diploid subspecies of *A. trichomanes* such as the European ssp. *inexpectans* Lovis. Whatever the outcome, it has been shown that an autopolyploid origin of ssp. *quadrivalens* is unlikely.

- *Cystopteris* Bernh. — A cryptic new hybrid was documented by undergraduate Michael Paler, between the eastern North American slender fragile fern (*C. tenuis* (Michx.) Desv.) which is abundant in Vermont, and the widespread, but locally restricted common fragile fern (*C. fragilis* (L.) Bernh.). Since these two tetraploid species share a genome, they are often difficult to separate, and the presence of their morphologically intermediate hybrid makes them even more challenging.⁹

- *Dryopteris campyloptera* (Kunze) Clarkson — Recently, graduate student Erin Sigel studied this tetraploid species (abundant on the Green Mountains) in relation to others, hoping to elucidate its origin. Chloroplast DNA data indicate its maternal progenitor is *D. intermedia* (L.) A. Gray, as has been conjectured. Its paternal progenitor has been hypothesized to be *D. expansa* (C. Presl) Fraser-Jenkins & Jermy.

- *Matteuccia struthiopteris* (L.) Todaro — This fern is a special-interest plant in Vermont where “fiddleheading” is a popular spring tradition. Undergraduates Jacqueline Maisonpierre and Dan Koenmeann have just completed a study of genetic variation in the fiddlehead fern. They discovered that among northeastern North American populations, genetic diversity is greatest among plants from western Vermont but decreases north and east as far as the Gaspé Peninsula. This pattern is consistent with other work on northeast North American plants, leading us to postulate a Mississippi Valley refugium for the New World populations in the Pleistocene.

- *Phegopteris connectilis* (Michx.) Watt — A study of tetraploid plants found in Vermont was undertaken¹⁰ by undergraduate Heather Driscoll, who demonstrated that at least our tetraploids are not of a hybrid origin involving *P. hexagonoptera* (Michx.) Fée as had been conjectured by Mulligan, Cinq-Mars and Cody.¹¹ It appears instead that *P. connectilis* has diploids (Japan),

triploids (throughout the northern continents), and tetraploids (at least eastern North America).

- *Polypodium* L. — Since the recognition of diploid *P. appalachianum*, its habitat preferences and local range vis-à-vis tetraploid *P. virginianum* L. is being studied, as is the presence and frequency of their cryptic hybrid, *P. x incognitum* Cusick. A number of students have sought to provide insight into the morphological boundaries between the hybrid and its parents. Currently, undergraduate Kelsey Cook is using flow cytometry to study this group.

- *Polystichum braunii* (Spenner) Fée. — This circumboreal tetraploid forms a fairly common hybrid with *P. acrostichoides*, *P. x potteri* Barrington, and hybridizes in Austria with *P. lonchitis* to form *P. x eberlei* D.E. Meyer, but whether it is of hybrid origin itself is unknown. Graduate student Stacy Jorgensen is currently doing the investigation of this problem with a worldwide dataset¹² being assembled for the species as well as its genus.

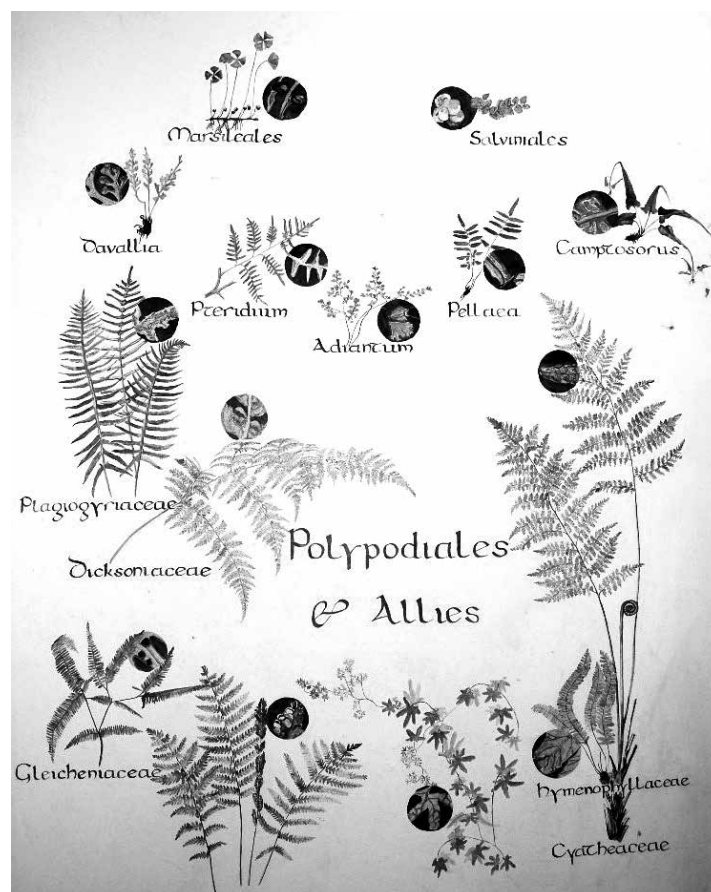


Fig. 3. Mural of Fern Diversity at the Pringle Herbarium, University of Vermont by Sherry Frasier.

Field work and floristics have been equally exciting, with several discoveries since the publication of the last Flora of Vermont in 1969.¹³ In addition to the new items mentioned above, some interesting ‘finds’ include:

- *Asplenium montanum* Willd. — An Appalachian species of ledges, found in the southwestern corner of the state by Jerry Jenkins in 1975. This is the most northerly population of the species.

- *Botrychium ascendens* W. H. Wagner — Described by Herb Wagner in 1986, and found by Mike Rosenthal, at a disturbed old limestone quarry in southwestern Vermont in 2007, growing with *Botrychium campestre*. It has a primarily western North American distribution with scattered eastern occurrences, of which the Vermont population is the most southerly. The nearest other known locales are in Minnesota and the Mingan Islands in the eastern Gulf of St. Lawrence.

- *Botrychium campestre* W. H. Wagner & Farrar — Found also by Mike Rosenthal growing with *B. ascen-*



Fig. 4. *Botrychium campestre* W. H. Wagner and Farrar. Photo by Mike Rosenthal.

dens in a mixed population in southwestern Vermont in 2007. This species (Fig. 4) was described only in 1986 and has other populations in eastern North America but the closest one is in central New York.

- *Botrychium rugulosum* W. H. Wagner — Herb Wagner described this in 1982, citing as paratypes a number of old Vermont collections previously identified as *B. multifidum*. Today it appears to be very rare, limited to sandy soils in the Burlington area.

- *Crepidomanes intricatum* (Farrar) Ebihara & Weakley — One of the most exciting discoveries of the twentieth century was the presence of sporophyte-less plants of a new filmy fern in sheltered rock crevices and overhangs throughout most of the northeastern US. In 1981, Don Farrar located four sites in Vermont,¹⁴ mostly in deep valleys in the Green Mountains, but to date no additional sites have been located.

- *Cystopteris laurentiana* (Weatherby) Blasdel — The cryptic nature of our fragile ferns is emphasized by the fact that this species — first described in 1926 — was not found in Vermont until 1983. Dave Barrington and Chris Haufler collected it at Smuggler’s Notch, one of the best known fern locales in the state.

- *Diphasiastrum digitatum* x *sabinifolium* — The search for hybrids, both in lycophytes and in ferns, is never-ending and there always seems to be a new possibility, such as this one from an abandoned pasture in the mountains of eastern Vermont.

- *Dryopteris* x *correllii* — A collection made by Donovan and Helen Correll in 1939 of an otherwise unknown woodfern hybrid, *D. carthusiana* x *goldiana* was identified by Herb Wagner and, at last, named in 2001 (posthumously for both Dr. Wagner and the Corrells).¹⁵

- *Gymnocarpium* x *brittonianum* (Sarvela) Pryer & Haufler — In a similar vein, Kathleen Pryer elucidated the oak-ferns and annotated a number of specimens as this hybrid between our common (tetraploid) *G. dryopteris* (L.) Newman and western (diploid) *G. disjunctum* (Rupr.) Ching. It turns out to be not rare in the state, apparently reproducing by unreduced spores.

• *Lygodium palmatum* (Bernh.) Sw. — We have experienced one significant loss, however. Climbing fern was first reported in the Journal by Rugg himself in 1951¹⁶ and its only station became well known to local botanists. Unfortunately, it was extirpated ca. 1999 by a combination of factors including, apparently, brush from a powerline being piled on top of it.

But even beyond laboratory work and field work, ferns play a fuller role in our society. They are popular edibles (as noted, *Matteuccia struthiopteris*), garden plants, and art subjects. Fiddleheads are gathered for personal use and sold in season at most markets; in past years many were sold to a canning company in Maine but in 2011 demand for fresh was so great that none were canned.¹⁷ Indeed, high demand has even led to posting



Fig. 5. Pickled Fiddleheads.

of lands to protect owner's rights to the harvest. Recipes from various Vermont restaurants for dishes featuring fiddleheads can easily be found on-line. Pickled fiddleheads (at premium prices) are usually available in local markets as well.



Fig. 6. Statue titled “Fiddleheads” by artist Jim Sardonis at the Norwich Public Library.

Vermont is home to many famous public statues — none more popular than those by local artist Jim Sardonis (his “Reverence” aka “The Whales’ Tails,” installed near Interstate 89 in Burlington is a regional favorite). For the Norwich Public Library, he sculpted a bench and statue, installed in 1999, titled “Fiddleheads” with an inscription from Emerson that reads, “If we can touch the imagination, we serve...”

References in literature recently seem to be less frequent than a hundred years ago when ferns appealed so powerfully to Victorian sentiment. Part-time Brattleboro resident Rudyard Kipling described *Lycopodium* in a winter scene in 1920:¹⁸

“The mosses and lichens, green, sulphur and amber, stud the copper floor of needles, where the feathery ground-pine runs aimlessly to and fro along the ground, spelling out broken words or hal-forgotten charms.”

Twentieth century poets took ferns for their subjects (or as metaphors). Robert Frost, a longtime resident of Vermont, wrote, in “A Servant to Servant”¹⁹

“I see it’s a fair, pretty sheet of water,
Our Willoughby! How did you hear of it?
I expect, though, everyone’s heard of it.
In a book about ferns? Listen to that!”

True enough, Willoughby is a famous fern locale. But Frost sometimes had a different take on things, mentioning ferns in “Leaves Compared with Flowers”:²⁰

“Petals I may have once pursued,
Leaves are all my darker mood.”

And, a prominent local poet from Calais, Vermont, Sylvia H. Bliss, in a cycle of nature poems,²¹ wrote a short poem entitled “Ferns,” the first lines of which are:

“The ferns beside the path spread broad green
perfect fronds, and as I passed
Promised to bear the burden of my life.”

In visual arts, pride of place goes to Elfriede Abbe of Manchester Center. A well-known, award-winning botanical illustrator,²² she wrote, illustrated, printed, and published “The Fern Herbal” in her own studio press.²³ The illustrations are woodcuts. Limited to an edition of 150, originals of this fine book are quite pricey but, fortunately, Cornell University Press also published an edition (1985), making it widely available. Other great botanical artists are in residence as well, and they sometimes feature ferns or allies in their work, including (but hardly limited to):

Bobbi Angell of Marlboro (drawings, etchings, Fig. 7),
Maggie Lake (Vermont Botanical) of Putney (giclee
prints)

Lois Jackson of Corinth (watercolors, pen-and-ink,
colored pencil).

Images of these artists fine work can be easily seen by searching for their web presences.

Being surrounded on all sides by ferns (and sometimes having to weed them out of a garden), Vermont does not have a strong ferns-in-horticulture tradition, with uses often limited to a few native species at the



Fig. 7. *Matteuccia* fiddleheads. Bobbi Angell; used by permission.

margins or in foundation plantings; or sometimes the dwarfier species in rock gardens. Personally, I use rusty woodsia (*Woodsia ilvensis*) as a drought-tolerant edging plant along the top of a stone retaining wall, and I have a number of *Dryopteris* in a woodland garden. Don Avery of Cady’s Falls Nursery in Morrisville has an extensive collection of both rock- and woodland-ferns, but finds that they are not “best-sellers” in his business.

The old-time fern haunts known to Rugg and the botanists of his day are still supplying fern enthusiasts with rewarding field trips. Mount Mansfield, Smuggler's Notch, Lake Willoughby, and others still have the species known then, while Miss Woolson's and Miss Slosson's fern hunting grounds in Pittsford and Brandon do as well. Male fern is now known from a number of other sites, although still rare, and hybrid woodferns can be found with some experience. Other rewarding localities visited by current-day botanists include the serpentines in northern Vermont (on private property), Allis State

Park in Brookfield, Williamstown "Gulf" in Williamstown, Emerald Lake State Park in Dorset and Groton State Forest in Groton. But the impression that those are the only places is incorrect — ferns really are ubiquitous in Vermont, and it is often possible to find 20 or more species in one locality. A fern-lover's paradise, there is no need to travel far to see them in quantity and variety.

The following list comprises 96 species and one additional subspecies; there are also some 40 hybrids known from the state. The sequence is modified slightly from Christenhusz et al. (2011).²⁵



Fig. 8. Lake Willoughby, looking south through the "notch."²⁴ On the left is Mt. Pisgah with its famous "Garden of Eden" — discovered in 1845 by botanist Alphonso Wood and home to many ferns, including wall-rue (*Asplenium ruta-muraria*), smooth rock-brake (*Pellaea glabella*), and smooth woodsia (*Woodsia glabella*). On the right, across 400-foot-deep Lake Willoughby is Mt. Hor, steeper and more difficult to access, historical home of green spleenwort (*Asplenium viride*).

Lycophytes and Ferns of Vermont

LYCOPHYTES

LYCOPODIACEAE

- Dendrolycopodium dendroideum* (Michx.) A. Haines
- Dendrolycopodium hickeyi* (W. H. Wagner, Beitel & R. C. Moran) A. Haines
- Dendrolycopodium obscurum* (L.) A. Haines
- Diphasiastrum complanatum* (L.) Holub
- Diphasiastrum digitatum* (Dill.) Holub
- Diphasiastrum tristachyum* (Pursh) Holub
- Huperzia appressa* (Desv.) Á. Löve & D. Löve
- Huperzia lucidula* (Michx.) Trevis.
- Huperzia selago* (L.) Bernh.ex Schrank & Mart.
- Lycopodiella appressa* (Chapman) Cranfill
- Lycopodiella inundata* (L.) Holub
- Lycopodium clavatum* L.
- Lycopodium lagopus* (Laest. ex C. Hart.) G. Zinserl ex Kuzen.
- Spinulum annotinum* (L.) A. Haines
- Spinulum canadense* (Nessel) A. Haines

ISOETACEAE

- Isoetes echinospora* Durieu
- Isoetes engelmannii* A. Braun
- Isoetes lacustris* L.
- Isoetes riparia* Engelm.
- Isoetes tuckermanii* A. Braun

SELAGINELLACEAE

- Selaginella apoda* (L.) C. Morren
- Selaginella rupestris* (L.) Spring

POLYPODIOPSIDA

OPHIOGLOSSACEAE

- Botrychium angustisegmentum* (Pease & A. H. Moore) Fernald
- Botrychium ascendens* W.H. Wagner
- Botrychium campestre* W.H. Wagner & Farrar
- Botrychium dissectum* Spreng.
- Botrychium lunaria* (L.) Sw.
- Botrychium matricariifolium* A. Br.
- Botrychium multifidum* (S.G. Gmelin) Rupr.
- Botrychium oneidense* (Gilbert) House
- Botrychium rugulosum* W.H. Wagner
- Botrychium simplex* E. Hitchc.
- Botrychium tenebrosum* A.A. Eaton
- Botrychium virginianum* (L.) Sw.
- Ophioglossum pusillum* Raf.

EQUISETACEAE

- Equisetum arvense* L.
- Equisetum fluviatile* L.
- Equisetum hyemale* L. ssp. *affine* (Engelm.) Calder & Roy L. Taylor
- Equisetum palustre* L.
- Equisetum pratense* Ehrh.

Equisetum scirpoides Michx.
Equisetum sylvaticum L.
Equisetum variegatum Schleich. ex F. Weber & D. Mohr

OSMUNDACEAE

Osmunda claytoniana L.
Osmunda regalis L. var. *spectabilis* (Willd.) A. Gray
Osmundastrum cinnamomeum (L.) C. Presl

HYMENOPHYLLACEAE

Crepidomanes intricatum (Farrar) Ebihara & Weakley

LYGODIACEAE

Lygodium palmatum (Bernh.) Sw.

PTERIDACEAE

Adiantum aleuticum (Rupr.) C. A. Paris
Adiantum pedatum L.
Adiantum viridimontanum C. A. Paris
Cryptogramma stelleri (S.G. Gmelin) Prantl
Pellaea atropurpurea (L.) Link
Pellaea glabella Mett. ex Kuhn

DENNSTAEDTIACEAE

Dennstaedtia punctilobula (Michx.) T. Moore
Pteridium aquilinum L. var. *latiusculum* (Desv.) Underw.

DRYOPTERIDACEAE

Dryopteris campyloptera (Kunze) Clarkson
Dryopteris carthusiana (Villars) H.P. Fuchs
Dryopteris clintoniana (D.C. Eaton) Dowell
Dryopteris cristata (L.) A. Gray
Dryopteris filix-mas (L.) Schott ssp. *brittoniana* C. Fraser-Jenkins
Dryopteris fragrans (L.) Schott
Dryopteris goldiana (Hooker) A. Gray
Dryopteris intermedia (L.) A. Gray
Dryopteris marginalis (L.) A. Gray
Polystichum acrostichoides (Michx.) Schott
Polystichum braunii (Spenner) Fée

POLYPODIACEAE

Polypodium appalachianum Hauffler & Windham
Polypodium virginianum L.

CYSTOPTERIDACEAE

Cystopteris bulbifera (L.) Bernh.
Cystopteris fragilis (L.) Bernh.
Cystopteris laurentiana (Weatherby) Blasdell
Cystopteris tenuis (Michx.) Desv.
Gymnocarpium dryopteris (L.) Newman
Gymnocarpium jessoense (Koidz.) Koidz. ssp. *parvulum*

ASPLENIACEAE

Asplenium montanum Willd.
Asplenium platyneuron (L.) B.S.P.
Asplenium rhizophyllum L.
Asplenium ruta-muraria L.
Asplenium trichomanes L. ssp. *trichomanes*
Asplenium trichomanes L. ssp. *quadrivalens* D.E. Meyer
Asplenium viride Huds.

DIPLAZIOPSIDACEAE

Homalosorus pycnocarpus (Spreng.) Pic.-Serm.

THELYPTERIDACEAE

Parathelypteris noveboracensis (L.) Ching

Parathelypteris simulata (Davenp.) Holttum

Phegopteris connectilis (Michx.) Watt

Phegopteris hexagonoptera (Michx.) Fée

Thelypteris palustris L. var. *pubescens* (G. Lawson) Fernald

BLECHNACEAE

Woodwardia virginica L. Sm.

WOODSIACEAE

Woodsia alpina (Bolton) S.F. Gray

Woodsia glabella R. Br.

Woodsia ilvensis (L.) R. Br.

Woodsia obtusa (Spreng.) Torrey

ONOCLACEAE

Matteuccia struthiopteris (L.) Todaro var. *pensylvanica* (Willd.) C.V. Morton

Onoclea sensibilis L.

ATHYRIACEAE

Athyrium filix-femina (L.) Roth var. *angustum* (Willd.) G. Laws.

Deparia acrostichoides (Sw.) M. Kato

Acknowledgements: Thanks to Dave Barrington for providing much material; to Michael Sundue for suggestions and recent nomenclature; to Mike Rosenthal and Don Avery for photos; to the Norwich Public Library for use of the photo of J. Sardonis's "Fiddleheads"; to Bobbi Angell for permission to use her line drawing of *Matteuccia*. The photo of Lake Willoughby is from Wikimedia Commons.

References

¹ H. G. Rugg, 1883-1957. Professor and Associate Librarian, Dartmouth College; Pres. Vt. Botanical Club; V.P. Amer. Fern Soc.; amateur botanist and prolific collector of Vt. historical papers and imprints; correspondent of Robert Frost. Obit: AFJ 47: 49-51.

² The American Fern Journal, 1912, 2(3): 83-92.

³ At Hartland, VT, by Nancy M. Darling, local educator and historian, President of the Hartland Nature Club.

⁴ At Pittsford, VT by G. A. Woolson, local teacher, author of *Ferns and How to Grow Them* (Doubleday, Page & Company, NY, 1910). Now known as *A. x clermontae* Syme, an exceedingly rare hybrid known from only one other site in the US.

⁵ At Pittsford, VT by Margaret Slosson, fern morphologist and author of *How Ferns Grow* (Henry Holt & Company, NY 1906), named by her as *D. x pittsfordensis*.

⁶ For example, AFS field trips in Vermont were made in 1930, 1952, 1953, and 1955; and AFS Fern Forays in 1963 and 1987.

⁷ Paris, C. A. and M. H. Windham. 1988. A biosystematic investigation of the *Adiantum* complex in eastern North America. *Syst. Bot.* 13: 240-255.

⁸ Howard, B. A., C. A. Paris, and D. S. Barrington. 1994. Electrophoretic evidence for allopolyploidy in the *Asplenium trichomanes* complex in eastern North America. *Amer. J. Bot.* 81: 130.

⁹ Paler, M. and D. S. Barrington. 1995. The hybrid *Cystopteris fragilis* × *tenuis* (Dryopteridaceae) and the relationship between its tetraploid progenitors. *Syst. Bot.* 20: 528-545.

¹⁰ Driscoll, H., D. S. Barrington and A. V. Gilman. 2003. A re-examination of the apogamous tetraploid *Phegopteris* (Thelypteridaceae) from northeastern North America. *Rhodora* 105: 309-321.

¹¹ Mulligan, G. A., L. Cinq-Mars and W. J. Cody. 1972. Natural interspecific hybridization between sexual and apogamous species of the beech fern genus *Phegopteris* Fee. *Canad. J. Bot.* 50(6): 1295-1300.

¹² See more at www.uvm.edu/~plantbio/barrington

¹³ Seymour, F. C. 1969. *The Flora of Vermont*, 4th ed. Vt. State Agr. Exp. Sta. Bull. 660: 1-393.

¹⁴ Farrar, D. R., J. C. Parks and B. McAlpin. 1983. The fern genera *Vittaria* and *Trichomanes* in the northeastern United States. *Rhodora* 85: 92.

¹⁵ Wagner, W. H., Jr. and A. V. Gilman. 2002. *Dryopteris* × *correllii* hyb. nov. (*Dryopteris carthusiana* × *goldiana*), a rare woodfern hybrid from Vermont. *Amer. Fern J.* 91: 9-12.

¹⁶ Rugg, H. G. 1951. The climbing fern in Vermont. *Amer. Fern J.* 41: 116-117.

¹⁷ Belle of Maine, Facebook, 7 July 2011



¹⁸ Kipling, "Leaves from a Winter Note-book," from "Letters of Travel," reprinted in Peach, A. W. and H. G. Rugg [yes, the same]. 1932. Vermont Prose, A Miscellany. Stephen Daye Press. Brattleboro.

¹⁹ From "North of Boston," 1914.

²⁰ From "A Further Range," 1936.

²¹ 1933. Sea Level. Driftwind Press, East Montpelier, Vermont. 90 pp. Miss Bliss also found a station for male fern, and sent it to Rugg for confirmation. See American Fern Journal 27(1): 27. 1927. For more on Miss Bliss, see Davis, F. 1986. The Bird of Utica: Life, Thought, and Art of Sylvia H. Bliss. Adamant Press. Adamant, VT.

²² See, e.g. Clausen's "Sedum of North America," Cornell University Press. Ithaca; also of botanical interest, Miss Abbe is sister to Ernst Abbe (1905-2000), Professor of Botany at the University of Minnesota.

²³ The Press of Elfriede Abbe, Manchester Center, VT, 1981.

²⁴ Image credit: Wikimedia Commons

²⁵ Christenhusz, M. J. M., X.-C. Zhang, and H. Schneider. 2011. A linear sequence of extant families of lycophytes and ferns. *Phytotaxa* 19: 7-54.

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