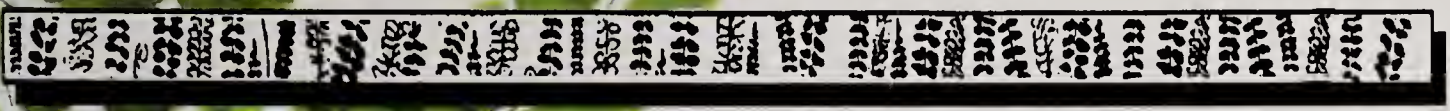




**Hardy Fern Foundation  
Quarterly**



**Spring 2008**

## THE HARDY FERN FOUNDATION

P.O. Box 3797

Federal Way, WA 98063-3797

Web site: [www.hardyferns.org](http://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 Stephen Austin Arboretum, Nacogdoches, Texas, 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, 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. 2 Editor-Sue Olsen

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## The Spore Exchange Needs You!

Please send your spores to our Spore Exchange Director:

Katie Burki  
501 S. 54th St.  
Tacoma, WA 98408

## President's message

This has been one of the busiest winters I can remember. I can hardly believe it is behind us and I am surrounded by the typical lush rush of spring. It will not be long before fresh new fronds are popping up all over. The flower and garden shows seem like a distant memory. Our display at the Northwest Flower & Garden Show featured a lushly planted fern table with a set of matching planted fern chairs. Thanks to Pat Riehl, Michelle Bundy and Jo Laskowski for arranging this fantastic display and a gracious thank you to all of the volunteers who spent time spreading the word of the HFF at the show. Always up for a good plant show, I had the pleasure of attending the Philadelphia Flower & Garden Show on opening day, March 2, and saw the award winning display of the Delaware Valley Fern & Wildflower Society. This fine group has a long tradition of winning best in show for educational displays and this year was no exception. It featured a lovely fern patio display with an array of tropical and hardy ferns. I even had a bad case of plant lust after seeing a spectacular specimen of *Pyrrosia longifolia*! Pyrrosias, also known as felt ferns, are among of my favorite ferns and I will have to track down the owner of this fine specimen and beg a division of this choice fern.

If you have ever wondered if your woodsias should be up and growing already, be sure to read Tom Stuart's frond emergence study. Get out your notebooks and start recording! Members are encouraged to record their observations to be added to Tom's work. Your information helps to provide clues as to how our weather effects the growth of ferns and should enrich the reports provided by Tom as well as the earlier published (2002/2003) emergence observations gathered by Ralph Archer.

While back east I wish I had a little more time to travel around. Growing up in the Mid-Atlantic I am always interested in the plants and gardens of this area. I am looking forward to reading Gregg Tepper's article on the ferns in the woodland at Mount Cuba, a well known haven for the best native plants of the east coast. Once you are finished with this you can prepare for a little trip to the southwest with the second installment of the HFF Texas tour.

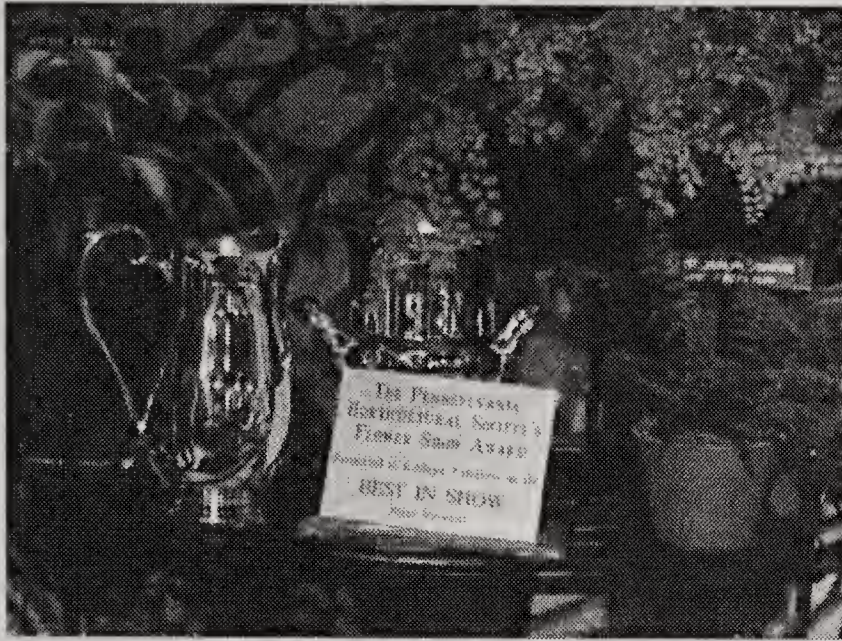
Make sure to mark your calendar for the HFF Fern Fest June 6th and 7th. Any members who can make the Fern Fest and annual meeting will be in for a treat Friday night June 6th. Martin Rickard, author of the well known fern reference *The Plantfinder's Guide to Garden Ferns*, will be speaking on Ferns and Stumperies for Cool Temperate Gardens. There will also be a huge selection of hardy ferns and companion plants for sale before his lecture. Check out our website [www.hardyferns.org](http://www.hardyferns.org) for more information. Martin will also be giving a very limited class on building stumperies, a nearly lost Victorian style of fern gardening on June 10th. If you are interested please register with Pat Riehl early as it will likely sell out quickly. Class information can be found in this issue.

Washington and northwest members and visitors may also wish to attend the grand opening of the newly planted and greatly expanded Bellevue Botanical Garden fern and rhododendron glen. The opening will be held at the garden on Mother's Day May 10th from 1:00-4:00. Plan to spend a little time as the garden should look great at that time of the year!

*All the best,*

Richie Steffen, Prez of HFF





Richie Steffen and John Scott at the Delaware Valley Fern and Wildflower Society at the Philadelphia Flower Show.

## **Hardy Fern Foundation Perry Creek Field Trip Saturday, August 2, 2008**

The hike (2 miles in each direction) leads to Perry Creek Falls where along the route close to 30 species, (depending on whether the deer have been browsing on the botrychiums) of ferns and lycophytes grow in varied habitats. It is the richest fern area in Washington State. The date was chosen so as to dovetail with the American Fern Society's late July annual meeting in Vancouver, British Columbia and all are welcome to participate. For further information and to indicate an interest, please contact Michelle Bundy at [thebundys5@comcast.net](mailto:thebundys5@comcast.net) by July 1.



# *Onoclea sensibilis*

## Sensitive Fern - Bead Fern

James Horrocks

Salt Lake City, Utah

The genus *Onoclea* is represented by a single world-wide species, its closest relative being *Matteuccia*, the Ostrich fern. *Onoclea* is from the Greek *onos*, meaning “vessel” and *kleiein* meaning “to close” in reference to the modified pinnales of the fertile fronds that actually roll up around several sori as a protective covering. The species name *sensibilis* refers to the sterile fronds which turn yellow and wilt with the first frost. Durand comments: “That trait, however, could be applied, with equal appropriateness to a score or two of other fern species.” New England folk observations also attribute “sensitive” to the fact that the sterile fronds of this fern wilt quickly after being picked, but here again, that can be true of other deciduous ferns. Rickard notes that “late spring frosts do not seem to be damaging”. Foster, however, tells us that the sterile leaves can turn brown on a very cold spring night. Focusing on the fertile fronds or “bead-sticks” as they are called, bead fern seems more appropriate as a common name. For identification purposes the fertile bead sticks certainly last longer, often being present the following season as the new spring growth emerges, a trait shared by *Matteuccia*. *Onoclea sensibilis* is also sometimes called oak fern or oak-leaved fern and in some very old reference, Clute found this fern called by the medieval Dragon’s Bridges.



The circumpolar, extremely cold-hardy species is quite common in eastern North America, growing in abundance almost anywhere that a terrestrial fern can grow. It inhabits swamps, marshes, river banks, and damp woods in sub acid soil. Its range in the far north is from Labrador and Nova Scotia to Manitoba, southward throughout New England to Florida, across the south and westward to Colorado, Nebraska, the Dakotas, and scatteringly to Wyoming. In Great Britain and Europe it has escaped and naturalized there but is not native. An ever so slightly different variant of the species “var. *interrupta*” is found in Asia occurring in colder regions of Japan, Korea, Manchuria, and eastern Russia. There is also a form with fronds tinged in red in spring. They gradually turn green, but the stipe remains red for most of the growing season. A rare dwarf form “*nana*” is also in cultivation but it is referred to as difficult. Grounds makes a further interesting observation about the species:

“Curiously enough, even the smallest mature plants, growing in situations where they receive little moisture and produce barren fronds only 2 or 3 inches high, will still produce perfect fertile fronds in miniature.” One final curiosity: Plants that have been seriously injured will produce new fronds that are occasionally intermediate between sterile and fertile.

*Onoclea sensibilis* is a “living fossil”. Fossilized remains of this very same species have been found in Paleocene strata of North America, Japan, easternmost Russia, and the United Kingdom (Rothswell and Stockey 1991). These remains are “based upon whole plants with rooted rhizomes, sterile and fertile fronds, sori, sporangia and spores... considered identical to the modern species in all morphological characteristics... As such, they represent a striking well-documented example of evolutionary stasis.” (1) This is curious indeed as we often think of ferns as being somewhat variable over time. A similar situation exists with a score of other extant fern families. The oldest Osmundaceae and Gleicheniaceae, for example, are found in Permian strata. Also of interest, “isolated osmundaceous sporangia and spores are common in Mesozoic rocks and are typically identical with extant forms.” (2)

Sterile fronds of *Onoclea sensibilis* are often confused with those of *Woodwardia areolata* with which it often grows. However, the pinnae of *O. sensibilis* are opposite each other, whereas, in *W. areolata*, they alternate. Also, the margins of *O. sensibilis* are smooth and wavy rather than minutely toothed as in *W. areolata*. The fertile fronds of the two species are by comparison very different. The thin fertile pinnae of *W. areolata* are long and narrow with the chain-like rows of sori appearing along the midrib. They can hardly be confused with the bead-sticks of *O. sensibilis*.

**Description:** The reddish-brown to brown rhizomes are about the thickness of a lead pencil, creeping and branching near the soil surface, although often in wet places, they are found right at the surface. Scattered fronds are produced continuously throughout the summer. The fronds are strongly dimorphic. The stipes of the sterile fronds can be as long as the frond itself, sometimes longer and are pale to yellowish green, except in the rare red stemmed form. They are smooth and slightly enlarged at the base where they are brown or reddish-brown in color and clothed in lanceolate, light brown scales. The sterile frond is composed of from 5 to 14 pairs of opposite pinnae that are attached to the rachis and joined together by wings which widen toward the apex. The frond outline is ovate-lanceate to deltate. The thin deciduous fronds are 1 to 3 feet in length, rarely more, and 8 to nearly 24 inches wide in particularly large specimens. The fronds are obtuse to truncate at the base and for the most part narrowed obtusely to an acute tip at the apex. The network venation is rather unique among ferns, the veins anastomosing to form long polygonal areolae. The lower pinnae are entire with wavy or rippled margins. The upper pinnae are pinnatifid and nearing the apex they are decurrent. The bipinnate fertile fronds are about one half the length of their sterile counterparts, the thick pinnae much reduced, the pinules curling around several sori to form green bead-like clusters which turn dark brown at maturity. The cup-like indusia are minute and hidden by the modified underrolled pinules which form the segments. As in *Matteuccia*, the spores are green and short-lived and

*Continued on page 43*



## Early Emergence

Reporting and ruminating on the time frame for annually recurring events in nature, phenology, has long been the province of amateur observers. Recently, due to the sensitivity of the timing of many natural events, for example insect flight, bud burst, or crozier extension, phenology has evoked ecologists' interest as a tool for detection of global warming.

The phenology of ferns is little mentioned. Even the most detailed descriptive accounts say relatively little about the progression from bud to unfurling crozier to frond to leaf senescence. Try to find a single book on ferns that includes **phenology** in either the index or the glossary. That stands in contrast to our own interest and experience in observing ferns. Are we not just as entranced by the first fiddleheads as by the mature plant? Do we not respond to the onset of yellowing of the maiden fern just as much as to the crimsoning of the maple? Exactly. So let's take a look at April's important events. I'm reporting from zone 6.

*Cystopteris* has the reputation for early emergence, but the *Woodsia* clan is more precocious in my garden. Particularly, *W. polystichoides* and *W. intermedia* are in motion the first days of April. These two species, so similar in appearance, are often mislabeled. Immature plants are near impossible to distinguish, but in adulthood you can just count the pinnae: more than twenty for *polystichoides*, less than that for *intermedia*. A little later, mid-month, comes *W. obtusa*, one of mine having been supplied as a *Cystopteris*. It's native here, but not particularly abundant. *W. scopulina*, *pseudopolystichoides*, and later still *ilvensis* all extend their fronds before the end of the month. I failed to take note of *Woodsia subcordata* but it seems likely to be in the early April count as it was well along at the end of the first week in May.

*Cystopteris fragilis* is an early April starter, if not matching the earliest *Woodsia*, still far ahead of the pack. Several clones all start at once. *C. protrusa* doesn't lag by much. *C. bulbifera*, quite clearly preferring calcareous rocks, clocks in about the 20th with red stipes, a near rival of *Athyrium* 'Lady in Red' but fading all too soon.

Most members of the wood fern family, the Dryopteridaceae, wait for May here, but April comers exist: first were the Asians *Dryopteris lacera* and *D. stewartii* mid-month. Though deciduous, they are late to go down, lasting into December and the teens. *D. lacera* is unique in its top-most fertile pinnae senescing and withering by summer, giving it a shabby appearance for a few days, but not enough to cross off your list. *D. stewartii* from the Himalayas is one of the bolder wood ferns, and sports a very shaggy coat of stipe scales, particularly striking at emergence.

*D. carthusiana* is the only northeastern native pushing up before May. How do you separate *D. carthusiana* from the other spinulose wood ferns when none of the distinguishing characteristics are yet visible? Why, you put a label on it when you can.

*Polystichum* has several early risers. *P. retrosopalaceum* and *P. makinoi* seem to be first, mid-month, both exhibiting a choreographic capability to thrust all the fronds up in unison. The two northeastern natives, *P. acrostichoides* and *P. braunii* follow soon, starting about the beginning of the fourth week of April. The Christmas fern is the most common fern here with hundreds of individuals, some older ones comprised of many crowns. (Another characteristic the books don't note is the frequency of crown branching.) *P.*



*acrostichoides* also has the longest span of emergence, running nearly three weeks. Unquestionably, this duration owes something to the number of plants; perhaps you can expand the time frame of other species from your own garden.

*Cryptogramma acrostichoides* begins unraveling mid-month. I grow this on a rocky berm in full sun. The fear is of hot summers, because its provenance is high latitudes or altitudes. Tried in a shadier (i.e., cooler) position, the parsley fern seems to fail. The sterile fronds are rated evergreen, but last year's have thoroughly died back by April. I see no fertile fronds in the first flush, and a dozen books do not tell me whether they are normally later or signaling displeasure this year. At season's end, October, I still had no fertile fronds and no answer to the question. Of course, most descriptions are based upon herbarium sheets where phenology is a foreign concept. *Cc. crispa* and *stelleri* are untested here.

The only horsetail here is *Equisetum arvense*, but the first activity in the third week displays the odd pink-tan fertile spikes followed a few days later by the much more abundant sterile ones. Is there any *Equisetum* earlier than *arvense*? If so, let me know; I must have it.

*Onoclea sensibilis* has all those fertile fronds left over from last year and some of them still give off a puff of smoke when bumped in early April. The first rise of the sterile fronds begins mid-month, and they look initially so unlike the sensitive fern I need the adjacent fertile ones to refresh my memory of what it is.

*Matteuccia struthiopteris* follows *Onoclea* here by a few days for the first movers, many days for the stragglers. Its expansion rate is notable. I see the ostrich fern in the market and taste it at dinner before I see it in the garden, so I know somewhere it's even earlier. John Mickel observes the younger plants out the starting gate first; I haven't seen that, but maybe all my plants are too young. *Matteuccia orientalis* here waits for May.

Do you accept the name *Osmunda spectabilis*? Or do you prefer *O. regalis* ssp. *spectabilis*? The first cited name was assigned in 1810 by Carl Ludwig Willdenow, two years before his death. A Berlin botanist, and one of the first phytogeographers, Willdenow introduced the idea that climate could influence plant characters. Presumably he would have regarded *Osmunda spectabilis* characters as a product of differing climatic conditions in North America. In support of a different species, this plant emerges before *O. regalis* or the other two North Americans, *Oo. cinnamomea* and *claytonia*, all May emergers.

Phegopteris, the beech ferns, have but one early ariser, *P. connectilis*, not so long ago known as *Thelypteris phegopteris*. (I am tickled when a species becomes a genus or vice versa. The most wondrous is *Asplenium scolopendrium* which actually started life in 1753 as *Asplenium scolopendrium* L., then was revealed as *Scolopendrium phyllitis* in 1799 followed by revision to *Phyllitis scolopendrium* in 1844. These kinds of changes show that taxonomists will travel to the ends of the earth to amuse us. But, I digress.) The early fronds of the northern beech fern have an appealing softness. *P. hexagonoptera* shakes off slumber near Mothers' Day while *P. decursive-pinnata* sleeps even later.

April's last week stages an explosion of adiantums. One can see crosiers of *Aa. pedatum*, *aleuticum*, *japonicum*, and *venustum* although not every plant. (Ed.'s note *A venustum* emerges in mid-March in the greater Seattle area, several weeks earlier than any other

*Continued on page 32*



## Early Emergence *continued from pg. 31*

adiantum.) Those in containers seem delayed. S. Olsen in **Encyclopedia of Garden Ferns** reports *A. aleuticum* as somewhat later than *pedatum*, but when I first saw *A. pedatum*, I could also find at least one example of each of the others expanding too. It's a shame the first three of these species exhibit no differences in emergence times, as they are very difficult to distinguish on morphological grounds. Color is some help: *A. japonicum* is bronzy, even orange under some conditions, but in any case much more intense a hue not to mention long-lasting, about three to four weeks as opposed to a few days of reddish coloration of the expanding crosiers of *A. pedatum*. It seems to me that the orangeness was much more pronounced on new acquisitions, which argues that conditions are important. They are growing here in full shade with very acidic soil (blueberries love it). The bronzy fronds continue emerging – with lessening bronziness – through May, June, even into July; once you've distinguished *japonicum* this way, you can be confident of identity, at least for three months.

*Thelypteris*, at least my natives *T. noveboracensis* and *T. palustris*, are at best only visible at the surface in April, but the Asian *Thelypteris beddomei* (*Parathelypteris beddomei* in the **Flora of China**) reaches upwards earlier. This species should be better known. An analog of the New York fern, the blade tapers to both ends, and the long running rhizome forms clusters of fronds in the very same manner as *T. noveboracensis*. What it has over the latter are a neater, crisper habit and a longer season, both at the beginning and particularly at the end where the golden fronds last into December. Yes, it shares the aggressiveness of the New Yorker, but if you will consider any maiden fern, this is the one. Provenance may be important to temperate growers as, in addition to Japan, China and Korea, it is also found all across southern Asia from India to the Philippines.

Towards the end of April the northern lady fern, *Athyrium angustatum*, shoots up accompanied by the southern lady fern, *A. asplenoides*. Notably absent from this activist flock is the northwestern lady fern, *A. cyclosorum*; absent only a few days, but those days push it to May. Confession: I only have one *cyclosorum*, and it is misleading to draw statistical conclusions from a sample of one. What about *A. filix-femina*? Mixed results. The grossly misnamed cultivar 'Minutissimum' comes up along with the earlier *Athyrium*, but other variants lay low.

*Polypodium* shouldn't be in this list according to some books. As noted at the outset, emergence is seldom covered, but it is in the case of the polypodies because the temperate members of the genus are often late to flush. C.N. Page in *Ferns of Britain and Ireland* reports *P. vulgare* at the tail end of April with *P. interjectum* in June. S. Olsen says of *P. glycyrrhiza* "it is summer dormant with new fronds emerging mid-summer onwards." However, surveying *Pp. appalachianum* (not sure but some of this is *virginianum*), *vulgare*, *interjectum*, *glycyrrhiza*, and *hesperium*, I find all clumps of each species put up a few to many fronds in the last week of April or shortly thereafter. Shall we call this the primary flush or the secondary flush? (Ed... *P. glycyrrhiza* is summer dormant in the wild as well as in cultivation in the northwest. Is this deviation peculiar to some aspect of east coast conditions?? Let us know. ) Only *Polypodium calirhiza* fails to make this early appearance and saves itself for September.



That completes the April extravaganza here. Unmentioned above are genera having later May emergers, *Arachniodes*, *Asplenium*, *Blechnum*, *Cheilanthes*, *Cyrtomium*, *Dennstaedtia*, *Deparia*, *Diplazium*, *Gymnocarpium*, *Lygodium*, and *Woodwardia* followed by June risers *Marsilea* and *Pyrrosia* (only *P. hastata* having survived a winter here). I have not had a chance to try *Aspidotis* yet and will never try *Pteridium*.

What's up when in your garden? Some plants initiate growth in response to length of day; those should not differ much with those listed here, at least if you are somewhere near latitude 41°N. Others emerge in response to soil temperature; such ferns may be uniformly shifted forward or backward compared to this report. I'd appreciate hearing about emergence in your garden.

Footnote to phenological fernophiles: Two sources, both about the northern European flora, do touch on the subject. **Scandinavian Ferns**, the most sumptuous of fern books, has many drawings by Kirsten Tind of crozier emergence and expansion. And Page's **Ferns of Britain and Ireland** has a diagrammatic calendar indicating emergence, development, spore maturity, and senescence of every fern discussed. For all this neither book appears to use the word **phenology**.

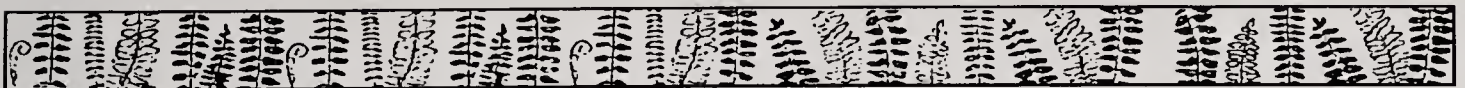
Tom Stuart, [tstuart@westnet.com](mailto:tstuart@westnet.com)

(Editor's note – see Vol. 12 (1): 10-17, 20-27 and Vol. 13 (1): 8-20 for earlier articles on comparative emergence information.)



## Summer Fern Course In Maine

The Humboldt Field Research Institute, located near Steuben, Maine, will offer a fern course, *Taxonomy and Biology of Ferns and Lycophytes*, from 18-22 August 2008. The course will be taught by Robbin Moran, Curator of Ferns at the New York Botanical Garden. It will emphasize the identification, phylogeny, and ecology of local ferns and lycophytes. Lectures will be in the morning and field trips in the afternoon. For more information, visit the following web site: <http://www.eaglehill.us> You can also contact the Station Director, Joerg-Henner Lotze, Humboldt Field Research Institute, PO Box 9, 59 Eagle Hill Road, Steuben, ME 04680-0009 USA Phone: 207-546-2821, FAX: 207-546-3042; [office@eaglehill.us](mailto:office@eaglehill.us)



# Ferns of Mt. Cuba Center

Greenville, DE

Mt. Cuba Center, Inc., the former home of Mr. and Mrs. Lammot du Pont Copeland, is renowned for its vast collection of native Piedmont flora displayed in a naturalistic style and set in the rolling hills of northern Delaware. In the collection there is also a sizable compilation of native hardy ferns. A tour in late May yields to the fern enthusiast an impressive assortment including adiantums, athyriums, dryopteris, including several rare hybrids, cystopteris, osmundas and woodwardias. Impressive, too, are the large masses of many of the fern species such as *Adiantum capillus-veneris* and *Polystichum acrostichoides* and the numerous companion plantings featuring hundreds of the Piedmont's most garden-worthy plants.

A typical tour begins with a leisurely stroll down the shady Woods Path which features the Christmas fern, maidenhair fern, and various cystopteris in abundance. In late April, one can see the newly emerging fronds of *Osmunda claytoniana* interspersed with Woodland Phlox and Sessile-leaved Bellwort. Many of the dryopteris are also represented such as *Dryopteris goldiana*, *D. intermedia* and *D. marginalis*, as well as several hybrids such as *Dryopteris x leedsii*, *Dryopteris campyloptera x intermedia*, and the newly acquired *Dryopteris x separabilis*. A unique, cold-hardy form of *Adiantum capillus-veneris* from Michigan as well as an earlier emerging form of the southern maidenhair are among the various fern selections available. *Diplazium pycnocarpon* is featured growing successfully in heavier, moister soil as well as lighter, dryer soil to show the fern's adaptability in the wild. Several of the cystopteris are also shown this way.

On a side path one can see *Cystopteris tenuis*, *Woodsia appalachiana* and *Woodsia obtusa* in a rich woods setting along side *Dryopteris celsa*, *Pleopeltis polypodioides* and *Dryopteris clintoniana*. Featured on another side path are *Botrychium virginianum*, *Asplenium x ebenoides* and *Polypodium virginianum*.

As the visitor moves on down the West Slope to the Pond Area, *Adiantum pedatum* and *Adiantum capillus-veneris* grow in profusion near *Dryopteris goldiana* and *D. cristata*. Here and there are masses of *Phegopteris hexagonoptera* and *Polystichum acrostichoides* growing contentedly on the gentle incline.

Once at the Pond, more unique ferns await such as *Dryopteris x bootii* and *Dryopteris x triploidea* as well as the moisture-loving *Onoclea sensibilis*, *Matteuccia struthiopteris*, *Woodwardia virginica*, and *Thelypteris palustris*. The visitor will also see the vigorous *Dryopteris x australis* growing collectively with *Dryopteris ludoviciana* and *Osmunda regalis* var. *spectabilis*.

As the visitor walks from the Ponds to the Dogwood Path along the Meadow, various plantings of *Athyrium filix-femina* subsp. *angustum* forma *rubellum* 'Lady in Red' show off their brightly-colored red stipes. Other ferns featured here are *Thelypteris noveboracensis*, *Asplenium platyneuron* and *Osmunda cinnamomea*. Once at the top of the Dogwood Path, just before completing the tour, one will see *Woodwardia areolata* growing near sizable masses of *Phegopteris hexagonoptera* and *Dennstaedtia punctilobula*.



As a gardener, I am regularly impressed and charmed by the feeling of lushness the ferns provide to the garden. Since my section of the garden features plants that would be authentic to an upland woods setting, most of the flowering plants finish in mid-May. It is at this time, when little else is in flower, that I truly admire the native ferns for their invaluable offering in leaf shape, habit and variations in the color green. For added textural effect, the ferns are indispensable. When others are sad to see the ephemeral colors fade, I am just looking forward to enjoying a season of basking in a sea of green.

Ferns not only provide the gardener with interesting leaf patterns and various shades of green but they are also among the easiest of plants to site, establish and maintain. The dryopteris, with their invaluable indifference to soil pH and many soil types, fill areas that could prove challenging to most flowering plants. And what better plant to grow near, or on for that matter, a rotting log than the tried and true *Dryopteris celsa*?

When the mid-summer heat is on full force, I take this opportunity to “refresh” certain ferns in our landscape. Athyriums, cystopteris, dennstaedtiads and thelypteris are most effective for fall display when cut to the ground in mid-August to grow fresh, new leaves in September, while the osmundas and dryopteris are their showiest,. From their long-lasting display to their effective combination with flowering plants in every part of the landscape, I consider our collection of native ferns one the most integral parts of our garden.

If you love ferns like I do, you will certainly enjoy the naturalistic setting and large collection of Piedmont native plants Mt. Cuba Center has to offer, as well as the various classes and specialty lectures offered throughout the year. Mt. Cuba Center offers two-hour docent-led tours from early April to mid-June, Wednesday evening tours throughout the summer, and tours from early September until early November. All tours are by prior arrangement. For information and to arrange a tour, please call **302-239-4244** from 8:30 AM until 4:00 PM Monday through Friday.

Gregg Tepper, *Woods Path Gardener and Fern Enthusiast*



*Dennstaedtia punctilobula* with  
*Rhododendron maximum*.  
Photo by Gregg Tepper.



## Texas tour Part 2

Day 8, 10th October-Westcave Preserve and Austin

Don Naylor

Day 8 of the Ferns of the Southwest tour began with a 40 mile drive from Austin to Westcave Preserve in the Texas Hill country. The Preserve demonstrates a unique ecological diversity with rock outcrops enclosing a woodland canyon. The Preserve is on the Pedernales River. Limestone aquifers create pockets of spring water that provide moisture for abundant plant life within the Preserve. This area is subject to severe flooding. The worst in recent times was in 1970 when the river reached a height of 70 feet above flood stage.

Two ecosystems include a grassland area with 45 plant species and a sheltered limestone canyon that includes rare plants with numerous bald cypress trees. One cypress is estimated to be 400 years old. The canyon is home to nine species of ferns with larger clumps as you descend into the canyon along just one path. The area is ecologically sensitive, and while visited by large numbers of school children it is carefully protected.



*Adiantum capillus-veneris* at the Westcave Preserve

Rock ferns were common in the Preserve. The Preserve listed nine ferns including: *Adiantum capillus-veneris*, *Asplenium resiliens*, *Cheilanthes alabamensis*, *Cheilanthes horridula*, *Astrolepis integerrima*, *Argyrochosma dealbata*, *Pellaea atropurpurea*, *Pellaea ovata* and *Thelypteris kunthii*. *C. horridula* and *A. integerrima* were the two not observed. Additional sightings included *Anemia mexicana* recently reestablished from a close by reserve and *Equisetum hyemale* 'Affine.'

At the bottom of the canyon was a forty-foot waterfall with a small cave behind it. Spring water from the waterfall formed deposits of "tufa" on top of travertine rock. Ferns were scattered about along with displays of moss referred to only as "common rock" moss. Ferns growing in a tropical like environment included large clumps of *Thelypteris kunthii* on "mini-islands" in the stream, while numerous *A. capillus-veneris* were basking on rock outcrops in the stream. Nine unidentified lichens were observed on one piece of limestone



rock in the Preserve. There were pockets of quiet water as well as rapidly flowing water that created two mini ecosystems.

Behind the waterfall was a shallow cave formed by erosion of the soft limestone. Thirty-four year old stalactites and stalagmites have been reforming and have re-grown just a few inches. Vandals had damaged the columns that had grown together before the area became a Preserve.

There were sightings of *Agkistrodon piscivorus* (cotton mouth snake, water moccasin) at the bottom of the canyon. Two were playful in a water pocket while a second pair enjoyed soaking up rays of dappled sunlight.

The group returned to Austin to lunch at the Whole Foods Market.

Tour participants were given the choice of five activities in the afternoon. They included visiting the Capital Complex, The Bob Bullock Museum of Texas History, the Umlauf Sculpture Garden, The Blanton Museum of Fine Art, or local nurseries. This writer visited two nurseries, the Natural Gardner, and the Great Outdoors Nursery. Both nurseries carried a wide selection of native plants but few ferns. John Dromgoole's Natural Gardner is well known for blended garden soils and conditioners. Dromgoole's had six popular fern species while Outdoors carried 3-4 types.

For this writer, the most memorable part of the tour was the visit to two garden homes. The group was invited to the home of Scott Stewart, a retired Dell executive for refreshments before dinner. The Texas-style home was perched near the edge of a limestone outcrop. It featured a swimming pool and water garden that provided wonderful vistas of a wooded area and downtown Austin. One side of the house featured a water garden with large boulders brought in and built up to the edge of an outcrop. Scott used a wide variety of plants purchased largely from the Great Outdoors Nursery. Plants included *Asplenium bulbiferum*, *Cyrtomium falcatum*, and *Cheilanthes alabamensis* among others.

Our last visit for the day was to the home and garden of Laura and Cater Joseph. The southern antebellum style home was set on a large lot down the street from Scott's. An international chef served up a wide selection of Lebanese food enjoyed in the garden. The beautifully landscaped home featured large live oak trees, with numerous large *Platynerium* hanging baskets hanging about. Laura has collected seventeen of the eighteen known *Platynerium* species and many species were observed in several display areas around the grounds. Laura's *Platynerium* collection includes:

*P. alcicorne*, *andinum*, *bifurcatum*, *coronarium*, *elephantotis*, *ellisii*, *grande*, *holttumii-madagascariense*, *ridleyi*, *stemaria*, *superbum*, *veitchii*, *wallichii*, *wandae*, and *willinckii*.

A few other ferns Laura displayed were: *Arachniodes simplicior*, *Asplenium bulbiferum*, *Cyrtomium falcatum*, *Cheilanthes alabamensis*, *Davallia*, *Lygodium japonicum*, *Nephrolepis* sp, and *Woodwardia*, among others.

Darkness prevented touring the garden but a re-visit was scheduled for the next morning before leaving for San Antonio. After dessert, Ron Miller, a volunteer from Zilker Garden, gave a demonstration on dividing a *Nephrolepis* while Dr. Steven Reynolds demonstrated the proper mounting of a *Platynerium* on a cedar board.

*Continued on page 38*

## Texas Tour Part 2 *continued from pg. 37*

Day 9, 11th October – San Antonio and the Alamo

Pat Acock

After leaving The Embassy Hotel, Austin, we drove the short distance to the home of our host of the night before to see her ferns in daylight. Laura has a most magnificent collection of ferns growing in her garden, which only really need protecting on those few days in the year when there is a sharp frost or ice-storm. The rest of the year the problem is watering regularly the hanging baskets and ground. The hanging baskets are huge and are hung from branches high up in the trees on long metal wires. The baskets contained an array of stenochlaenas and *Nephrolepis* cultivars with species such as *Nephrolepis biserrata*. Smaller baskets contained *Polypodium formosanum* and *Phymatosorus diversifolius*. On a large number of boards Laura had a really fine range of platyceriums of varying ages and sizes. On one small board she had a fine hanging *Ophioglossum*. In one pot was one of my favorite local ferns growing to incredible size, *Astrolepis sinuata*.

All too soon we were off to San Antonio where we were met at the Botanic Gardens by Paul Cox who had been there since its beginnings. Paul gave us a quick tour of the main features and history before we were left to roam and seek out the ferns. The best ferns were in the dedicated house and the Exhibit Room. Paul had told us not to expect too much of the Fern Grotto but apart from some sun damage to the tree ferns when the power failed, preventing the misting and air circulation, there was quite a laudable collection of tropical ferns. These included *Cibotium schiedei*, *Angiopteris evecta*, *Diplazium esculentum*, *Cyathea* and *Diplazium proliferum* as well as a few different davallias and aglaomorphas. While on our own we visited the Alamo followed by a British Pub for lunch where the girls were in traditional British dress. Walking back to the hotel we saw plantings of *Nephrolepis biserrata*, *N. cordifolia*, *Cyrtomium falcatum*, *Dryopteris erythrosora* and *Thelypteris kunthii*, which is both the most common fern planted and naturalized in the area.

Day 10, 12th October – San Antonia to Big Bend National Park

Pat Acock

We set out early from San Antonio for the long journey westward on Highway 10. En route at a lunch stop just east of the junction with highway 307 we found the trees were a staging post for Monarch Butterflies on their migration to Mexico. There were hundreds fluttering around the deciduous trees and resting in the branches. We also found a pecan nut tree with the majority of the nuts perfect to supplement the lunch. A little earlier than scheduled we made the visitor center at Big Bend National Park. Upon our arrival at the Chisos Lodge we met naturalist Petei Guth our leader for the next two days She agreed to take us for a short walk above our chalets before our evening meal. Here we were reminded of the characters of *Pellaea atropurpurea*, *Astrolepis sinuata* and discussed whether the *Cheilanthes eatonii* on the trail were all the same plant or whether we had another *Cheilanthes*. We also saw *Pellaea cordifolia* for the first time. We then descended for a very pleasant dinner all together in the restaurant.



## Day 11, 13th October- Big Bend National Park

Pat Acock

Early next morning we were taken by Petei not more than 100yd. from our chalets and we saw the delightful *Bommeria hispida* along with *Cheilanthes eatonii*, *C. bonariensis*, *Pellaea atropurpurea*, *P. intermedia* and *Astrolepis sinuata*.

We drove a little way to one of the Big Bend Trails, the Lost Mine Trail. Here on our very hasty walk we saw all the previous ferns but had to return all too soon as we were to meet 2 rangers in 4 wheeled vehicles at the head of another trail leading to Cat Tail Falls to save us a little of the walk.

This was to turn out to be my favorite part of the tour. It was an incredibly hot day and we were encouraged to take an extra bottle of water. The terrain was marvelous. The shrubby plants and cacti all had lots of space around them because of the lack of rainfall, a semi desert. After half a mile we came across a wooded area with evergreen oaks along the banks of a stream. I thought that we would see ferns here but we did not. However climbing back into the arid area it was not long before we came to a rocky bluff and saw our first treasure *Astrolepis cochisensis*. Then came a patch of *Selaginella arizonica*.

Descending towards the river below in a deeply cut channel the rocky bank to our left now started to reveal more and more gems *Astrolepis intergerrima*, *Cheilanthes eatonii*, *Astrolepis sinuata* and although I have seen it in a pot from time to time to see *Notholaena standleyi* growing naturally in a patch is simply magical. At the waterfall we saw *Adiantum capillus-veneris* and behind some large rocks close by *Cheilanthes alabamensis*. On the way back we added *Cheilanthes bonariensis* and *Notholaena aliena*. Klaus also saw *Notholaena aschenborniana* off the trail on the way back. This was a truly splendid day and gave us a close up view of the Trans Pecos terrain we had been passing through for long periods of the day before.

To break the journey onward Naud took us to a wild-west place.

## Day 12, 14th October- Guide Camp and Nature Trail in Fort Davis

Jack Schieber

We started the day at the Mitre Peak Girl Scout Camp named for the almost perfectly conical peak located near the camp. Here we traveled up a stream bed, mostly dry, nestled in a narrow gorge. The geologic formations in this area are commonly volcanic extrusions, often columnar and very striking in appearance. And of course, weathering has its way over the millennia so that our path had to find its way among a mass of boulders fallen from the heights above. The walk was worth it for the beauty of the place alone.

I am from eastern U.S. so the ferns we've been seeing on this trip are almost invariably new to me. I had never even heard of *Bommeria hispida* let alone seen it. We saw *Cheilanthes bonariensis*, *C. wrightii*, *C. tomentosa*, *C. eatonii*, *C. lindheimeri* and of the somewhat related genera, *Astrolepis sinuata*, *Pellaea wrightiana* and *Notholaena standleyi*. I was mostly flummoxed in my observations and in my defense I quote from Flora of North America: "*Cheilanthes* is by far the largest and most diverse genus of xeric-adapted ferns.

*Continued on page 40*



## Texas Tour Part 2 *continued from pg. 39*

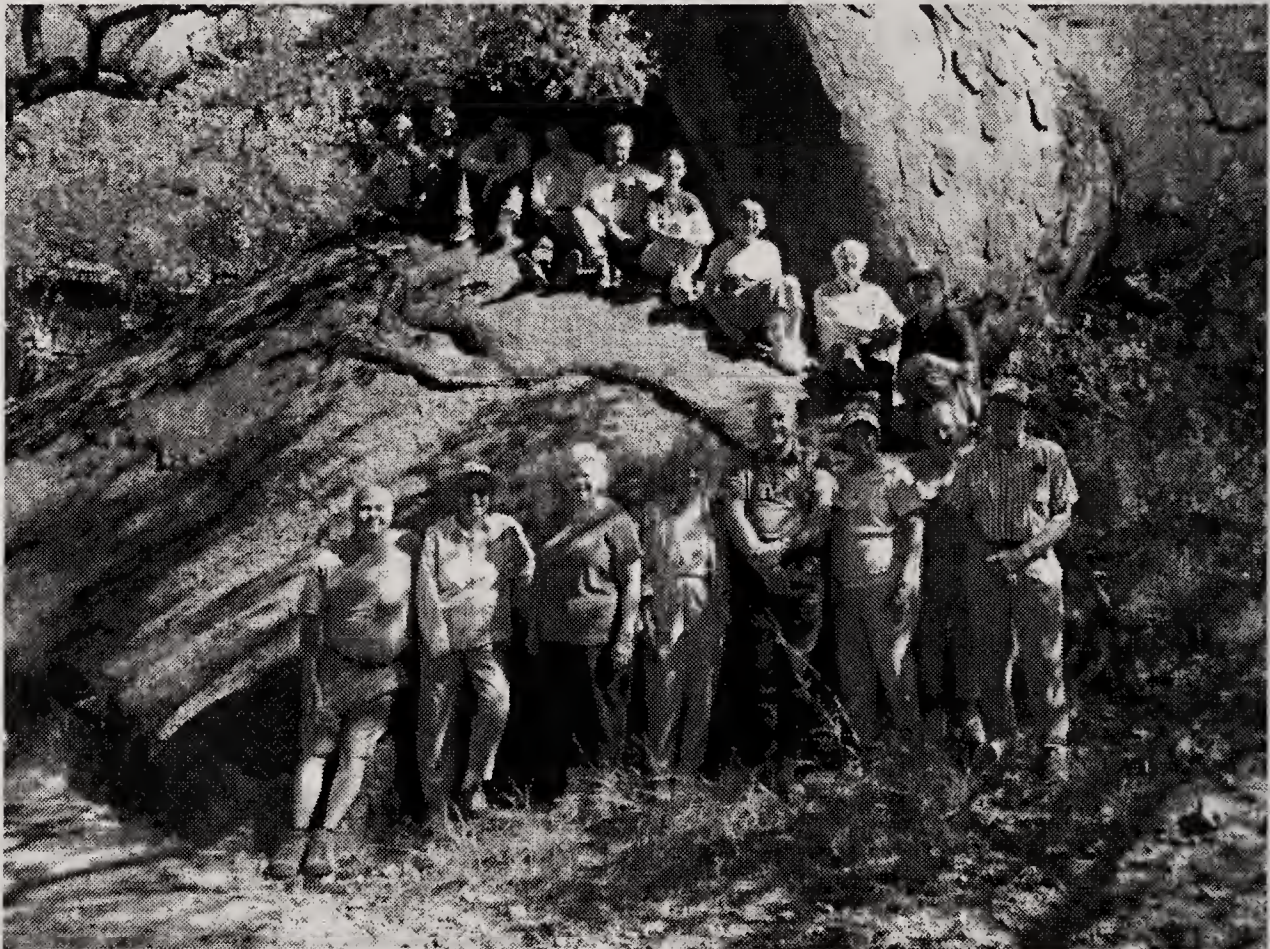
In its classic circumscription, the genus has been notoriously difficult to distinguish from other cheilanthoid genera, especially *Notholaena* and *Pellaea* ——”

I've always thought of selaginellas as growing in mossy, somewhat protected places — after all, we do call them Spike-mosses. Here we saw *Selaginella peruviana* and *S. rupicola* growing on exposed hillsides of rock and they seemed luxuriant in their desiccation. When I took a moment to merely see rather than to study, they were indeed beautiful. I too often forget to step back and relax a moment and simply see — and to hear without listening.

A highlight for me was a headland at the end of our walk where a rock wall overhung a pool. Here southern maidenhair grew in huge colonies from the roof of the overhang and from every nook and cranny. I know this fern well as one of the favorites in my garden so there was no need to study. It was so lovely seeing it growing where it wanted to be.

In the afternoon we visited Fort Davis. Fort Davis National Historic Site is a part of the National Park System. The Fort was active from 1854 until 1891 where the troops stationed at the Fort protected settlers, wagon trains and mail coaches, primarily from raids by the Indians who were still resisting the incursions of the white man. Our focus was a nature trail that climbed about 300 feet in elevation for more than a mile with many boulders, switchbacks and here and there, ferns tucked in the crevices.

Petei Guth, our guide, had provided a checklist of 20 ferns with a note that we would not see all because they are in secluded areas. We saw ferns all along but many were dried up almost to the point of being unidentifiable. *Cheilanthes villosa* was the only new one although there was some opinion that we might have seen *C. feei* as well.





**Day 13, 15th October-Pecos to Dallas  
Shanti Claycamp**

After spending the night in the little town of Pecos, we again loaded the bus and were ready to embark upon the final leg of our journey back to Dallas. Driving east toward Odessa, Texas is flat with only a few trees. Interspaced with the low Mesquite trees were the many 'nodding donkeys' pumping up the rich West Texas crude oil that has sustained that part of the state. After about an hour on the road we stopped at the Monahan Sand Dunes State Park. Naud told us that he had heard of a *Cheilanthes* fern growing at the top of some of the sand dunes. His daughter Galen met us at the park and had already scoped out the area for this fern. Climbing up a steep sand dune in the area Galen indicated, Klaus suddenly exclaimed "That's Impossible!". We huddled around the *Astrolepis sinuata* he had found, everyone vying for a look at this fern. Then Klaus again spoke, "It must be in a pot...". As Alan reached down and pulled the pot from the sand, we all turned to look at Naud, who was snickering on the sidelines, watching all of this drama unfold. He had pulled a fast one with his daughter as his accomplice. After we all had a good laugh, we continued on into the park where the big dunes were. The bravest of our group climbed these mountainous dunes in order to come whooshing back down on a small plastic disk. We all had great fun. Martin even slid down on his stomach, face first! As we continued to drive east on highway 20 the landscape slowly changed from low Mesquite trees to lush oak forests, indicating a change in rainfall from 15in. to almost 40in. We ate a quick lunch in Abilene at a Cracker Barrel restaurant where we sampled Texas cooking. The real treat came that evening at our farewell dinner. Everyone checked back into the hotel and we met at Adelmo's, an incredible Italian restaurant not too far from Naud and Wim's house. The food was excellent, but the company was even better. We ate heartily and shared stories from our trip and our lives. Near the end Martin gave a rousing speech recapping some of the best parts of the trip and thanking Naud for the superb job he did in planning the tour. Naud was presented with a memorable glass and two of Martin's books and Wim with a colorful flower basket. It was a wonderful end to a very memorable trip, Ferns of the Southwest.

**Clockwise from upper left,**  
Joy Neal, Martin Rickard,  
John Acock, Pat Acock,  
Klaus Mehltreter,  
Shanti Claycamp,  
Wim Burnett, Naud Burnett,  
Don Naylor, Jack Schieber,  
Rose Marie Schieber,  
Margaret Scott, Alan Ogden,  
Sue Olsen, Pat Riehl,  
Jennifer Ide, John Scott.



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**Friday, June 6th**

Plant Sale 1:00 - 6:30 p.m.

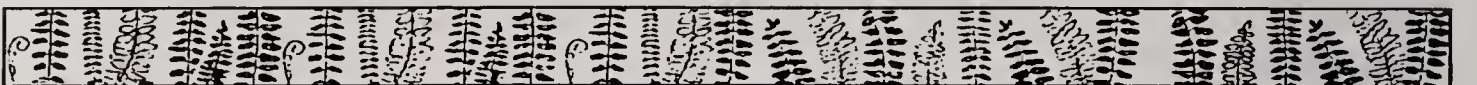
Lecture - 7:30 p.m. "Ferns and Stumperies for Cool, Temperate Gardens"  
by Martin Rickard

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11:00 - Fern Q&A with Martin Rickard

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## ***Onoclea sensibilis* continued from pg. 29**

are dispersed in midwinter. The fertile bead-sticks can remain erect well into the second season.

**Culture:** This species is certainly an easy to grow plant in the garden, but great care should be taken as it is an aggressive spreader. It is happy in various soil types as long as it is kept moist but is probably at its best in deep soil rich in leafmold and with adequate mulch. If you can grow ostrich ferns (and I think you can) you should be successful with this fern as well. The rhizomes should be planted just below the surface and in a shaded area. It can take some sun if it has ample moisture and the humidity is fairly high. The “bead-sticks” (that’s bead-sticks — not bread-sticks) are quite popular in flower arrangements after they have dropped spore. All in all, *O sensibilis* is an attractive albeit coarse fern for large areas where it can spread. It can also be attempted in containers.

(1) *Pteridology in Perspective* — Proceedings of the Holttum Memorial Pteridophyte Symposium, Kew 1995, Whitstable Litho Ltd, Whitstable, Kent

(2) *Paleobotany*, Thomas N. Taylor 1981 McGraw-Hill Inc, U.S.A.

*A Field Manual of the Ferns and Fern Allies of the United States and Canada*, David B. Lellinger, 1985, Smithsonian Institute Press, Washington, D.C.

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*Ferns*, Roger Grounds, 1974, Pelham Books Ltd. London

*Ferns To Know and Grow*, F. Gordon Foster, 1984, Timber Press, Portland

*Field Book of Common Ferns*, Herbert Durand 1949, G.P. Putnam’s Sons, New York

*The Fern Guide*, Edgar T. Wherry 1961, Double Day, New York

*The Plantfinder’s Guide to Garden Ferns*, Martin Rickard, 2000, Timber Press Inc., Portland

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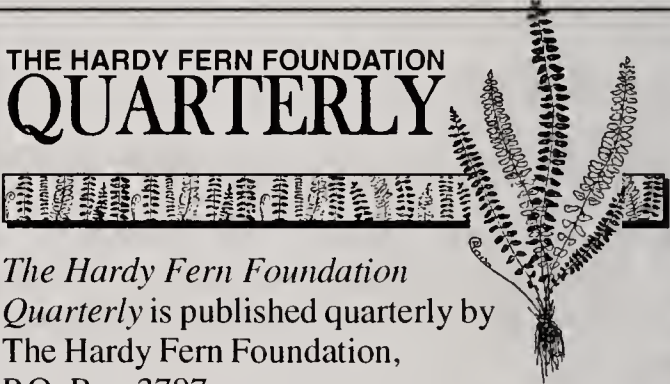
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Pre-registration is required. Please contact Pat Riehl at 206 323-2161 or [pwriehl@seanet.com](mailto:pwriehl@seanet.com).

**Bellevue Botanical Garden Open House**

Celebrate Mother's Day at the Bellevue Botanical Garden, 12001 Main St. in Bellevue, WA from 1:00-4:00PM on May 10. This will be an excellent opportunity to explore and study the HFF planting of some 750 ferns in the new rhododendron glen. We'll have board members there to help you enjoy your tour.

**THE HARDY FERN FOUNDATION  
QUARTERLY**



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Articles, photos, fern and gardening questions, letters to the editor, and other contributions are welcomed!

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