



**Hardy Fern Foundation
Quarterly**



Winter 2013

THE HARDY FERN FOUNDATION

P.O. Box 3797

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Web site: www.hardyfernfoundation.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.

Affiliate fern gardens are at the Bainbridge Island Library, Bainbridge Island, Washington; Bellevue Botanical Garden, Bellevue, Washington; Birmingham Botanical Gardens, Birmingham, Alabama; Coastal Maine Botanical Garden, Boothbay, Maine; Dallas Arboretum, Dallas, Texas; Denver Botanic Gardens, Denver, Colorado; Georgia Perimeter College Garden, Decatur, Georgia; Inniswood Metro Gardens, Columbus, Ohio; Lakewold, Tacoma, Washington; Lotusland, Santa Barbara, California; Rotary Gardens, Janesville, Wisconsin; Strybing Arboretum, San Francisco, California; University of California Berkeley Botanical Garden, Berkeley, California; and Whitehall Historic Home and Garden, Louisville, Kentucky.

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

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"Pteridotrivia"

According to reports from ~2007/08 only one state in the continental US did not (yet) have a population of Pteridium aquilinum (bracken). Which state?

Visit our homepage, www.hardyferns.org to find out.

President's Message

Best Wishes for 2013.

Hopefully 2013 weather will stay on a more normal even keel than the dichotomous 2012. The weather in the Northwest this past year was both one of the wettest and the driest. We had a wet winter and spring followed by no trace of precipitation for 48 straight days from late July to mid-September, and then a nice wet fall starting in mid October. The dry period did make it a challenge in providing enough moisture in order for plants to survive let alone thrive. Winter so far has been a bit mild and the ferns in my garden look surprisingly good considering their turbulent year. The mountains all around are bedecked in a generous froth of white, quite exhilarating during any clear moment.

I would first like to thank Dr. Meredith Smith for his generous donation to the Hardy Fern Endowment Fund. It is most appreciated. Meredith "Buz" has been a long time serving board member who has seen the beginning and growth of the Hardy Fern Foundation through these past twenty years. Thank you Buz for your support, camaraderie, and generosity.

We had a nice gathering for the now annual Fern Fall Social held at the Center for Urban Horticulture at the Univ. of WA. Vice-President, Ritchie Steffen gave a very informed demonstration on putting together a fern table. It was masterfully done using a 2 ft. by 2 ft. stone paver as a base, some natural pieces of wood, soil, and a uniquely 'braided' moss rope to hold the base together and then a number of ferns with interesting companion plants that provided nice contrast and form. Thank you Kathryn Crosby for the winning the high bid on the beautiful finished product. It was nice to get together and meet and better know fellow fern enthusiast and members.

The board has been very involved in a number of fronts this past year. A renewed effort is led by Pat Riehl, to make our major fundraiser, the Fern Festival, into a better event. Numerous good ideas have come up that I believe will make this incredible event and sale more than just the most extensive fern sale in the U.S

Rick Peterson, Lyman Black and Nancy Strahle are renovating the accounting and financial systems for the HFF which will benefit the long term operation of the organization, no small task.

Kathryn Crosby has come up with the great idea of an annual poster that will commemorate ferns and the HFF. Kathryn and Arlen Hill will have the fun of looking at and choosing some great pictures. New fern photos are continually being added to the HFF web-site and they are beautiful, so check it out.

Jane Whiteley is leading an effort to increase membership and to make HFF more accessible to members and fern enthusiasts. Study groups were one good suggestion and to have HFF a presence at more garden and plants related events. I will be leading a fern class and study group at the Bainbridge Library for six sessions this Feb., March and April. The board has been active and will be giving a concerted effort this coming

year in pursuing a strategy of fundraising which includes grant writing to help finance the educational and research programs that HFF undertakes and the operation of the organization itself.

The Northwest Flower and Garden Show starts in February and the HFF will again be present putting up and staffing the educational booth. Contact Michelle Bundy at 253-838-4646 if you would like to volunteer in staffing the booth.

This January, HFF will add a another fern bed at the Graham Visitor Center at the University of Washington Botanic Garden that is located next to the Fern Display Garden in the Signature Bed that flanks the west side of the center. It will be a natural looking display invoking a bit of the temperate rain forest. We are quite happy to be asked to do this landscape project and excited to let the creative juices flow in installing the feature. I will let you know how this turns out in the next message.

Happy New Year,

John van den Meerendonk

Fachgruppe Farne The Fern Group in Germany

Sabine Nittritz

Eutin, Germany



Since 2008 I am the leader of the Fachgruppe Farne - Fern-group - in the German Perennial Society. In the society are more special groups like Hosta, Iris, Lilies etc. I started with 30 members. Nowadays we have 75 members.

Once a year we celebrate an annual meeting in varying cities in Germany, the Netherlands and next year we are in France. It is an opportunity for lively discussions, visiting fern gardens and/or natural habitats.

The highlight during our meetings is our plant-exchange. In advance of the annual meeting a list of ferns, spores and accompanying plants (both on offer and being searched for) is distributed among the members and other interested folks to enhance the exchange of plants and seeds.

In 2011 we had 340 positions on the lists. 2012 we had 170 mostly ferns.

We have worldwide connections to other ferns-societies and fern-lovers: The BPS, Hardy Fern Foundation, the South African Society, the Swiss Fern Friends, (Schweizerische Vereinigung der Farnfreunde), the Netherlands Fern Society,

(Nederlandse Varenvereniging), Ralf Knapp in Taiwan and Dr. Helmut Perner in China.

Our members are from Germany, France, Austria, Hungaria and Poland.

Because the members come from all over Germany our meeting starts on Friday and ends on Sunday. So we have enough time to look, talk and listen. About 40 people come together at the meetings.

If you like to see some pictures from our meetings, please look at:
www.gds-staudenfreunde.de Fachgruppe Farne

We have many very interesting gardens - even fern-gardens - in Germany. Unfortunately not all owners are so kind to open their gardens for 40! plant lovers. They will invite small groups of people, and so I have some difficulties to find gardens for our annual meeting.

But I am sure that I will gather an interesting program for our meeting in 2014.

British Pteridological Society Excursion to Germany and Austria, 5-14 July, 2012

Yvonne Golding

Buxton, England

This exciting excursion was organised by Patrick Acock in the UK and Rolf Thiemann our leader in Germany and Austria. Those from the UK arrived via Salzburg which is a very fine city on the banks of the Salzach River and is well worth extending your trip to explore. Salzburg is famous for being the birthplace of Mozart and also has some lovely gardens and some ancient city walls with prolific ferns, mostly *Asplenium*, but more of these later. I'll divide the report up between Germany and Austria. There were overlaps in flora but each had its own characteristic fern flora which was a reflection of the different topography and geology. Please forgive me if I also wax lyrical about the wonderful alpine flowers and my exciting amphibious encounter.

Germany 5-9th July

Our base in Germany was the picturesque village of Königssee where we were made very welcome at the Gasthof Bergheimat which had fine balconies with views over the mountains. A gentle walk on our first day was around the villages of Ramsau, the Mickelsteinweg and Taubensee. Here we walked through pine forest with some mixed woodlands, taking in a waterfall with lush-looking ferns but too far out of reach and finally, out into alpine meadows. The ferns we saw would be similar to what we might find

on a day out in the UK: *Asplenium adiantum-nigrum*; *A. scolopendrium*; *A. trichomanes*; *Cystopteris fragilis*; *Dryopteris affinis*; *D. dilatata*; and *D. filix-mas*, though we were surprised to find both oak ferns (*Gymnocarpium dryopteris* and *robertianum*) growing together in close proximity. An explanation is that although the underlying geology is limestone, which favours *G. robertianum*, deep leaf litter built up in pockets between the rocks forming a rich acid substrate allowing *G. dryopteris* to flourish. The exception was *Dryopteris remota* which is now extinct in the UK (I think!) apart from in our gardens! This species is a fertile derivative of the hybrid between *D. affinis* and *D. expansa*.

On the day we travelled to the highest point of our trip the weather was gloomy and wet. At 1837m the Eagle's Nest above Berchtesgaden is more famous as Hitler's holiday retreat than for its flora and fauna. Luckily we were taken to the top by bus! On arrival most of the tourists headed straight for the house or the restaurant but we rushed out onto the mountain where we were able to immerse ourselves in the ferns and wonderful alpine flowers. We were not distracted by the spectacular views as there weren't any! All the more reason to concentrate on what was at our feet, as we took a very long and slow walk down the north side of the mountain. But I was hugely distracted by finding a beautiful, jet black salamander who was very well-behaved and even allowed me to pick him up and have his photo taken. (I think he was cold and enjoyed the warmth of my hand). This was my first ever salamander encounter in the wild! On the limestone mountain we found many common ferns we were likely to find back home in Derbyshire, adding *Asplenium viride* and not so common ones like *Cystopteris montana*, which only grows in remote and inaccessible locations in Scotland and *C. alpina* which might have grown in Britain in the past. (see photo page 17) An exception was *Dryopteris villarii* which was very common near the top of the mountain. This does not occur in Britain though it is very similar to our *Dryopteris submontana*. Other familiar ferns included *Polystichum aculeatum* and *P. lonchitis* and, yes, the romantic hybrid *P x illyricum* which I have been privileged to see before growing in remote N.W. Scotland. (see photo page 17) This is the perfect hybrid, being obviously mid way in terms of morphology between the two parents.

Again we found acid-loving species on this limestone mountain: *Huperzia selago*; *Lycopodium annotinum*; *Gymnocarpium dryopteris*; *Oreopteris limbosperma*, *Phegopteris connectilis* and one plant of *Athyrium distentifolium* found by Paul Ripley. The same theory must apply. But I cannot leave the mountain without also telling you about the flowers. Every turn of the path revealed another treasure; highlights for me were the lovely yellow faces of *Viola biflora*; the pink-flowered *Rhododendron hirsutum* spilling over the rocky ledges; the delicate blue bells of *Clematis alpina* scrambling over the woody shrubs; a stunning large blue gentian; a patch of luminous yellow *Trollius europeus*; fluffy white *Polygonatum verticillatum* with tall stately *Anemone narcissiflora* growing behind shone out in the mist and gloom of the mountainside. I had better stop there as I'm supposed to be talking ferns!

A boat ride down picturesque Lake Königssee the next day was very welcome after our exertions of the day before. The lake is 8km long and 200m at its deepest point, set in dramatic glacial scenery. On our route the Captain entertained us by playing a flugelhorn

to demonstrate the echo. After letting off passengers at the old pilgrimage chapel of St. Bartholomew, we carried on to the south end of the lake and walked to the end of the valley, past the small lower lake where the water was a beautiful turquoise reflecting the mountains all around. We didn't see any new ferns but it was impossible not to stop and admire *Cystopteris montana* which was very common. I saw some very nice flies and yes we had good coffee and kuchen by the lakeside while waiting for the boat to take us back and of course Paul Ripley went swimming. Later that day Rolf took us to a wood not far from the Eagle's Nest, where he showed us *Cystopteris sudetica*. After a lot of searching (like finding a needle in a haystack comes to mind) just a single plant was found – apparently the population varies from year to year but is always small. We were elated at finding it as the woodland floor was covered with other small, similar-looking, triangular-fronded ferns such as *Gymnocarpium* species and *Cystopteris montana*. The wood also supported a most dramatic stand of beautiful martagon lilies which we only know from home as garden flowers.

Back on dry land again the next day we searched for ferns on the limestone cliffs below St. Pankraz church at Karlstein, near Bad Reichenfall. This revealed the small but distinctive *Asplenium seelosii* growing with other limestone ferns, including two subspecies of *Asplenium trichomanes* – *hastatum* and *quadrivalens*. This helped me to sort out the ferns on the city walls of Salzburg as both grew there. The area was also an important and interesting archaeological site where Paleolithic tools and fine-looking hand axes were found. There looked to be some good information boards; if only I could read German.

Our next stop took us to the small village of Weißbach. By a path on the banks of a river was the largest stand of *Equisetum variegatum* in Germany, though Rolf told us that the colony was much reduced since tree clearance had taken place. Also here were *E. arvense*, *Dryopteris carthusiana*, *D. dilatata* and *Athyrium filix-femina*.

We then drove to the Rauschberg Mountain (1671m) whose name means a rock containing lead. As we sat for coffee looking at the mountain (in the rain) with awe I was delighted to see it had a chair lift but disappointed to find out that we were not going to use it! There were several paths to take up the mountain but we chose the quickest which for me was one of the most hairy walks of the whole trip as we picked our way across the boulder field on narrow paths. We passed the usual limestone ferns and surprisingly bracken which was not common at all in those parts. Our goal was to find *Asplenium fissum* which we found sprawling up the treacherous scree slopes. Luckily we got down in one piece and had to take more coffee and kuchen to recover but there was more drama (and ferns) to come in Austria.

Austria 10th-14th July

From our base in Germany we headed around 250 km eastwards to Kraubath in Austria where we were fed very well at the Gasthof Neumann. The area was dominated by a serpentine hill (910 m) which needed to be explored so on our first day we drove to the bottom of the hill and hiked up the northern side. The terrain here is between the African

and European plates and is largely serpentine with nickel, chromium and platinum deposits which had largely been extracted in the 19th century. So how did the flora reflect the geology? Well, strangely I should say, as the ultra-basic hill was covered in heather! But maybe not so surprising as the hill was mostly fir plantation which our path led us through with the usual woodland ferns plus the pretty *Selaginella helvetica*. However, it was the rocky outcrops which yielded the most interesting ferns, namely: *A. cunefolium*; *A. adulterinum* and *Asplenium x poscharskyanum* (the hybrid between *A. adulterinum* and *A. viride*) the last two of which were challenging for some of us to distinguish. Near the top we searched for *Paragymnopteris* (= *Notholaena*) *marantae* but with no success so we left that for another day.

On day two we drove around the other side of the hill. The plan was to walk up the southern side of the hill and down the other side, ferrying people back to the car park. So we scrambled up the 60° slope of the southern side and found the grey green fronds of the elusive *Notholaena* with some excellent colonies of *Asplenium cunefolium* growing with the rare endemic *Sempervivum pittonii*. That's when it all went pear-shaped when a member of our party fell headlong down the slope and had to be airlifted to hospital by helicopter. Luckily he survived this fall with painful but not life threatening injuries. If that wasn't enough some of us (me included) got horribly lost on the mountain with only intermittent phone signal. We walked off the mountain in completely the wrong direction but miraculously we managed to walk back to Kraubeth and our hotel even though we didn't know where we were going! My consolation was seeing wild blue lupins; curious colourless toothworts; helleborines and stunning yellow mulleins with pink fluffy stamens and oh yes a fantastic stand of *Equisetum sylvaticum*; I was delirious by then!

For me the rest of the trip was punctuated with hospital visits but mostly we were able to catch up with the others and visit some lowland sites which had quite a different feel to the high mountainous areas in Germany. In fact at times I could have been at home in Derbyshire, with wooded valleys and limestone gorges cut through by rivers, although Lassnitz Nature Reserve near Deutschlandsberg, not far from the Slovenian border presented a very different habitat from those we had seen recently. The underlying geology was granitic schist and gneiss and the atmosphere was cool and damp, ideal for polystichums and their hybrids. Here we found *P. setiferum* (probably the largest colony in Central Europe) and *P. braunii* (photo above) with their hybrid *P. x wirtgenii*. There were also a few plants of *P. aculeatum* and its hybrid with *P. setiferum*, *P. x bicknelli*. The other outstanding feature of the area was a large swathe of *Equisetum hyemale* growing along the river bank; the largest stand I had ever seen.



Polystichum braunii

Photo courtesy of Rémy Prelli

In the afternoon we drove north to Mixnitz to walk through the Nature Reserve along a tributary of the Mur River. Here the highlight was a 30m high limestone cliff, with scattered examples of limestone ferns growing in dryish crevices. Rémy found several plants of *Asplenium lepidum*. (see photo page 17) We were also able to add another *A. trichomanes* subspecies, *inexpectans* to our repertoire together with a whole suite of probable *Asplenium* hybrids. By this time we were confused but the next day clarified this situation, for some!

On our last day we explored the limestone rocks of the Adlitzgraben, a gorge near Schottwien about 80km north-east of Kraubath. At an altitude of about 600m, the vegetation of the slopes comprised a mixed forest of beech, fir and sycamore. We followed a path along the gorge on foot seeing an abundance of *Asplenium trichomanes* with the subspecies *quadrivalens*, *hastatum*, *inexpectans* and *pachyrachis* growing together with no doubt all the associated intraspecific hybrids – challenging!! Also notable were several beautiful specimens of *Asplenium lepidum* which far surpassed those we had seen the previous day.

After a meal taken in a local gasthaus, we travelled towards the south-east and into a Bavarian village. Here on old walls surrounding a charming cemetery, Rolf showed us one of the rarest ferns in Europe - *Asplenium x clermontae*. This hybrid is the result of a cross between *A. ruta-muraria* and *A. trichomanes* subsp *quadrivalens*. It is extremely rare in spite of the frequent coexistence of the parents. Rolf explained that this *Asplenium* had been known a long time from this site, that the plants had at times been more numerous, and that the individuals we saw were probably the descendents of the original plants (Thiemann & Bennert, 2009). Unusually the hybrid produces viable spores which give it a small chance of reproducing though this ability remains extremely limited. Being in the presence of half the European population of this exceptional hybrid was quite a privilege; the other plants are in England (Northumberland) and in France (in the north of the Alps). The rest of the population is in the USA! (Pers. Comm. Rémy Prelli).

That evening around the dinner table we presented our leaders with gifts and said goodbye to our companions. We are particularly grateful to Rolf Thiemann and his wife Angelika who conceived and planned the trip.

Participants were Pat Acock; Barry Colville; Roland Ennos; Roger Golding; Yvonne Golding; Heidi and Peter Kreis; Bridget Laue; Annie and Rémy Prelli; Martin Rickard; Lindsey and Paul Ripley; Paul Sharp; Gill and Bryan Smith; Avril and David Walkinshaw.

Yvonne Golding. November 2012.

Thiemann, R & Bennert H.W. 2009. Erstfund von *Asplenium x clermontae* (= *A. ruta-muraria* x *A. trichomanes*) in Bayern. *Berichte der Bayerischen Botanischen Gesellschaft* 79: 89-96

Ferns of Alabama
J.W. Short and D.D. Spaulding
Univ. of Alabama Press, 2012

Tom Stuart

Croton Falls, NY



Asplenium tutwilerae,
illus. Marion Montgomery

This is a first rate field guide. An emphasis on plain English is notably successful.

Nearly every description is accompanied by diagnostic drawings – the endemic Tutwiler’s Spleenwort shown at right. Almost all species are illustrated with a photograph or a herbarium specimen, sometimes more than one. Every range account sits alongside a county distribution map. The descriptive language and the keys are accessible to fern enthusiasts; if a term is unfamiliar, the glossary will resolve the problem. In short the individual species accounts are a template to follow.

The first chapter discusses the reproduction and morphology of ferns. I found the text clear and unexceptionable. But this was done without a single illustration (likewise the glossary). Is this a publisher’s penny pinching?

A fourteen-page chapter on the geography of Alabama is accompanied by a map produced by the Geologic Survey of Alabama. This provides background to making sense of the distribution maps, and another feather in their caps for covering this subject beautifully.

One of the more etymologically interesting regions is the Black Belt. My definition before reading Short and Spaulding was quite different (see wikipedia), as yours may be:

This is a soft type of limestone that is almost snow white in color. The region was given the name Black Belt because Native Americans once burned off large areas in order to maintain a grassland habitat for bison. The burning caused the soil to be black.

The resulting heavy clay is depauperate in ferns, but where the clay cover is thin an exception is the limestone adder’s tongue, *Ophioglossum engelmannii*, found in abundance.

Two keys are provided. The first is the author’s own. It is divided into a key to the genera and a key for each genus. With one exception I found it clear and remarkably free of ambiguity. The exception leaves four genera stranded due to a typo. A helpful addition, given the order of species presentation would have been pointers from the keys to the species; as it is, one must find the entry via the index.

The other key is based upon volume 2 of Flora of North America (1993), snipped out, language simplified, pasted together. Here is a tripartite key: families first, genera next

and species last. The problem for non-professionals is that the families do not accord with similarities we observe. Take for example the largest family, the wood ferns. In the pre-1993 world, the dominant taxonomic view raised one or two characters (best observed under magnification) to high priest status in delineating families. You don't have to be a botanist to find it odd to have the sensitive fern and the Christmas fern residing in the same family. (Perhaps it is easier if you are NOT a botanist.) After the molecular biology revolution, the dirty word taxonomists use to describe the 1993 wood fern family is *polyphyletic*; they don't say odd. So the key is unnatural. When species or genera pop up at different positions of the tree – yes, they do, dismemberment reinforces the artificiality. Still, who knows, it may lead you to the goal; aren't two keys better than one?

Choosing a non-controversial naming scheme is beyond imagining. The main choice here for scientific nomenclature is “traditional” names, specifically those of David Lellinger's 1985 *A Field Manual of the Ferns and Fern Allies of the United States and Canada*, but of course with exceptions. There is no attempt at being comprehensive with synonyms, but most will find it adequate. Likewise with common names.

The order of presentation left me cold. I could find nothing without resorting to the index.

The contents ... are arranged in the same order as are the contents of Lellinger's book. This arrangement puts related genera ... near to each other, and the order is supposed to reflect the evolutionary relationships of the plant, with most “primitive” species being listed first and most “advanced” ones last. This is a traditional way to arrange species.... Many people will use this book to identify something they have found by flipping through the book and comparing a specimen to the illustrations. Having similar subjects near each other facilitates this process.

One problem with these justifications is that **evolutionary relationships** have undergone substantial revision since 1985. If Lellinger were writing today, would his scheme be the same? Another justification – **similar subjects near each other** – is dubiously accomplished. For example, the ferns that appear as gametophytes aren't notably similar to their neighbors. Nor does *Equisetum* look anything like *Isoetes* or *Botrychium*. Is *Onoclea* easier to find between *Asplenium* and *Deparia*? Most of us know the alphabet; it would have been a stronger aid.

The index is confined to common and scientific names. Geologic areas, in particular, would have been a helpful addition. If one is foraging in a particular county (most of which encompass only one or two geologic areas) it would be handy to have a list of ferns ranked by frequency of occurrence. The geographic chapter provides some data, but this is mainly an exercise for the reader.

An award of merit to the authors is deserved for having the courage to place a maiden fern on the cover. Every fern fancier in Alabama should have this guide. And if you don't live in the Heart of Dixie, get it so you can compare your field guide with a good one.

Growing Ferns from Spores

Carolyn Doherty

Puyallup, WA

Growing ferns from spores sometimes seems almost magical. We all know ferns do not flower and, therefore, do not produce seeds, but many of us know very little about how ferns actually reproduce.

Ferns have a life cycle that is very different from that of flowering plants. Mature ferns produce spore on the undersides of their fertile fronds in clusters called sori. In the Northwest spores usually ripen between late May and October depending on the species. They may be green, yellow, brown or black.

The sori or spore cases are often covered with a membrane called an indusium. When this starts to pull away, it is the optimal time to pick the frond to harvest the dust-like spore.

When I pick the fronds, I rinse them under the faucet, and dry them with paper towels. I then lay them between two sheets of white paper sori-side down. If the spores are indeed ripe, they will drop overnight leaving a beautiful pattern on the paper. Other debris, called chaff, also drops. The spore is usually a slightly different color and texture, and clings to the paper more, so a careful tapping can encourage the chaff to come away and fall off the paper. This may take a little practice, so should be attempted at first with spore that is not too valuable.

When the spore has been cleaned by this method, they are ready to sow or store. Viability ranges from 2 days to 130 years or more. Green spore (Osmundas) is viable for a very short time, only 2 months at the most, possibly a little longer in the freezer. Blechnums have a shorter than average viability also so should not be stored very long. I store spore folded up in little paper packets carefully labeled and dated in the refrigerator.

Sowing spore begins with preparing the soil and containers. There are a variety of methods mentioned in the literature, but all stress careful sanitation. I use small clear deli containers about 6" by 8" with clear attached lids and no air holes. I dip them in a solution of ten parts to one part water to bleach to sterilize them. The soil I use is a good quality peat based seed starter mix combined with either vermiculite or fine sand at about a 3 or 4 to 1 ratio. This gets thoroughly dampened (but not to the point of being soaked), then heated in the microwave in a Corning Ware dish with a lid for 5 or 6 minutes until steamy. I try to get it to a temperature of about 160 degrees to kill rogue spores, etc. that could contaminate the spores.

When cooled this soil is placed in the containers about one inch deep. Dusting the spores evenly on top of this surface can be difficult because they are truly just like dust. I have been water-sowing them with good results. In a clean salt shaker, I place 2 or 3 ounces of distilled or boiled water. Tap water may contain algae contaminants. To the water I add one drop of dish soap to break the surface tension and the tiniest amount of spores. A quarter teaspoon probably contains enough spore to sow 50 containers.

One thing I learned recently is that sowing too heavily actually produces poorer results. When the prothalli that grow from these spores are overcrowded, they produce only male offspring and consequently very few sporelings will grow. So – less is better when sowing spores!

After shaking the spores in the salt shaker over the soil surface, I close the lid tightly, label the container with the species, sowing date, and any other information I want to remember. I do this by placing a strip of blue painters tape on the front of the container, but regular plant labels also work.

These containers then go on my laundry room counter under grow lights for 14 hours a day. The temperature in the room is 70 degrees or a little more. I have read that 77 degrees is optimal and should be gradually reduced as they grow.

Time varies by species, but, in general, a green haze will appear on the soil in about 2 or 3 weeks. Some species may take considerably longer, so don't give up. This green haze will grow into prothalli, the next stage of fern reproduction. These prothalli are small heart-shaped structures that resemble some liverworts. A single egg develops on the top surface of each prothallia and the sperm develop on the underside. At this time they should be misted liberally because water is essential in the fertilization process. Then, after a period of time baby ferns or "sporelings" will begin to appear like magic.

During this whole process the container should be regularly monitored to make sure it does not dry out or have mold appear. I have not had very many problems with mold, but if it starts to look dark and slimy, it may be too late to prevent or correct it. For this reason, I put a very dilute solution of Physan in my spray bottle (1/8th teaspoon Physan to 8 cups water) and mist all my containers with this. After prothalli appear half-strength liquid fertilizer may also be applied.

I usually let the sporelings continue to grow in the deli container until they nearly touch the lid, but if they seem overly crowded, they can be transplanted sooner.

Using the same soil and a clean 10" by 20" solid tray (no drainage holes) and sterilizing everything again, I lift and plant clumps about 3/4" to 1" in size about one inch apart making sure they have good contact with the soil underneath. One 6" by 8" deli container can yield enough clumps to fill a black tray and eventually result in close to 100 new ferns.

These I dampen carefully with a mister, cover with a clear plastic dome, and place back under the lights to continue growing. I check on them regularly, applying half-strength fertilizer. When they touch the dome they can be hardened off slowly by removing the dome a little longer each day and then easing them to a cooler place with less direct light.

At this stage, I transplant the clumps (containing more than one plant) into 4 inch pots using a bark-based potting mix. These plants can go into a greenhouse and, finally, when the weather is good, moved outdoors. While growing in the 4" pots, I feed them granular, time-release fertilizer and keep them well watered until they grow big enough to plant out into the garden. This may take as much as another year.

Growing ferns from spores takes some patience, but it can be done by anyone and is very rewarding.

“I Wonder as I Wander...”

Jo Laskowski, with apologies to Annie Morgan, who never got them from John Jacob Niles

Seattle, WA

Saturday, July 28 2012, the day of the Hardy Fern Foundation hike. Six of us met in the parking lot of a trailhead on the southeast side of Mount Rainier in Washington state. I had been a hiker and backpacker growing up, but had not spent much time around Rainier. This would be fun.

The area we were in is called Ohanapecosh—ō HAN ăh pēē kăwsh. Kids remember the name by thinking “Oh, Hannah—by gosh!” The word is a muddling of the name of a Taidnapam Indian site, said to mean clear stream, or deep blue, or deep blue holes, or standing at the edge. The river in question is the Ohanapecosh, and it originates from the—guess what?—Ohanapecosh glacier. Over the length of its course it drops some 4,800 ft. (1,463 m.), churning over occasional waterfalls. One of those falls, and the inhabitants on an island created by the river, were our destinations.

To the Grove of the Patriarchs then! We absolutely ambled. A lot of people on the trail. A cohort of Japanese tourists, equipped with walking poles, no-nonsense shoes, efficient manners. Family groups. The conveniently short and unbelievably level trails make for easy access, and this is a popular place. We were looking for *Adiantum aleuticum*, *Blechnum spicant*, *Polystichum andersonii*, *Gymnocarpium disjunctum*, *Cystopteris fragilis*, *Pteridium aquilinum*, and *Polypodium hesperium*. If we found it, field ID on the *Polypodium* would be tricky because it so closely resembles one of its parents, *P. amorphum*.

The Ohanapecosh River splits into channels when it's in a broad bottomland known as the Cedars. (see photo page 16) The island formed between two of the channels is home to the Grove, and reached by a suspension bridge. We moved through a stand of stunning western red cedars (*Thuja plicata*) on the stroll to the bridge. Just a few minutes into the cedars, I paused on the trail to give way to returning folks. When I glanced upslope I caught the rich smell of decay, and the complex perfume from inches and inches of needle litter warmed by the sun. The edges of everything were softening, as bark, moss, rock slowly morph into each other. Abruptly, for the briefest second, boundaries dissolved. I saw connections between everything. The earth was breathing. It was visceral, and a little alarming. Someone brushed past me, releasing me, propelling me into movement. I positively floated along, hyper-aware. I hoped I'd be able to talk coherently. Bark on a fallen Doug fir (*Pseudotsuga menziesii*) had sloughed off. I looked at the signs of Armillaria, aptly named shoe-string rot. We stopped to devour our trail snacks, and



Photo courtesy of
Jo Laskowski

mosquitoes did the same to us.

At the suspension bridge we waited to cross the span one at a time. Suspension bridges are notoriously prone to energy wave amplification. The bounce, or energy wave, sloshes back and forth between the supporting towers, getting taller and taller. It can be terror-provoking, walking a bucking span while the cable you're desperately trying to choke to death jumps in and out of your grip. The bridge looked new, made of shiny metal and suspended from thick cables. I idly wondered why it had been replaced.

On the island we were on a wooden boardwalk. The pressure of so many human feet over tree roots, over a long period of time, has caused irreversible damage to the great redwoods of northern California—in our desire to touch them we have loved them to death. But I was pleased. The Patriarchs in the Grove had been protected. The cedars and Douglas firs here are IMMENSE. Neck-cracking heights. Mind-bending girths. A thousand years old. Their presence weighs hugely, and silence seems appropriate. I would want to be there when one of them came down, to be a part of something so epic. As we trailed out of the Grove I saw mushrooms sprouting at the base of one tree.

In 1913 a lodge was built on the hot springs that feed into the Ohanapecosh. It was established on what was then national forest land. It was not until 1960 that it was dismantled, long after the area had become national park land with a somewhat different agenda. Today the same site is occupied by a campground, so humans have a long history in this area.

Our physical footprints smash the channels in the soil that conduct precious water and air to tree roots. Compaction, like starvation, is stressful. I was dismayed to find out that the boardwalk in the Grove was only twelve years old. The root system(s) of the Patriarchs hadn't been protected for long at all. I was saddened by the predictable failures to come. The mushrooms I saw on the tree are an indicator of internal decay.

Fungi are well known for the damage they cause to the wood of trees, a breakdown of the cellular components that literally hold trees up. Ironically, the boardwalk was finally built to protect the tree roots from compaction due to human foot traffic. In November 2006 there was a "rain event" here. Eighteen inches of rain in thirty-six hours. The debris-laden flood ripped away the suspension bridge and knocked the boardwalk off its foundations. The giant trees were buried to a depth of four feet in silt. Ouch.

We doubled back and picked up the trail to Silver Falls, which lies downriver of the Grove. The Cascade Range, of which Mount Rainier is a part, is a young range. You see that here, in the jumble and tumble of gigantic rock. Even though gently draped in greenery, it looks so raw that you think everything must be growing out of solid rock, that soil hasn't had time yet to even form. The trail follows close by the river, and as it slots through a narrow canyon the water does acrobatics. Sunlight refracts through incessant, silvery spray, and the air shimmies with rainbows. At the second bridge of the day, a robust, rustic wooden structure, someone remarked on a white pine sapling. Where had this renegade come from, alone among all the Doug firs, red cedars, western hemlocks?

The flood is a probable source for the outlier. Farther upriver, white pine is common. Cones—some with trees still attached—get snatched up by the madness in the flood, then flung high onto banks when the water picks up yet more speed and ferocity at Silver Falls. Five or six years later, and you'd have a sapling about the size we saw.

The wooden bridge was also destroyed in the '06 flood, and portions of the trail leading to it obliterated. The trail was re-routed, a new bridge built, incorporating some salvaged wood. Things weather fast around here. There was nothing in the appearance of the trail or the log bridge that gave even a hint of their young age. Downriver a tree trunk was wedged high up between the canyon walls, silent testimony to the terrific volume of water that had sluiced through here. I clambered down the rocks to take pictures closer to the river. On huge, flat slabs I could see channels left by a glacier debriding the underlying rocks as it flowed over them, grinding grinding grinding. Rainbows danced. *Adiantum aleuticum* bobbed on the canyon wall in the breeze and spray. Why Doug fir and red cedar and hemlock? Why the particular ferns we came to see, and the perennials and scattered shrubs we saw as well? Spray patted my face, and I climbed up and joined the others to go back.

Plants grow where the soil chemistry meets their needs. Elevation and rainfall and temperature influence the chemical reactions. The soil in Ohanapecosh derives from rock that was melted, folded, eroded, extruded, intruded. Volcanism and tectonic plate creep stirred the pot well in the Pacific Northwest, and continue to do so.

In the days after the hike I was despondent about the Patriarchs, whose death will be hastened by human agency. The feeling overshadowed everything else about the hike that had been enjoyable. And I was stuck on this article, dumped by my fickle muse. One night a sentence in a book I was reading thumped me upside the head: "Through tightly coupled feedback processes information on the chemistry reserves stored in humic acid feeds back into the above ground plant communities, indicating what plants should grow in what combination in what ecosystem and what kind of chemistries they should produce to keep the soil healthy."¹

It was an iteration—in words instead of the eerie, heightened awareness I felt on the hike—of the big picture, the endless cycle, the mediation and melding of countless interactions. The Patriarchs were part of it—how could that be sorrowful? My angst vaporized. The hike had been FABulous. We saw all of ferns we hoped to see, mostly by everyone else, but hey, my muse was back.

Reference:¹ Keith, Lierre, 2009, *The Vegetarian Myth*, Flashpoint Press, Crescent City, CA.

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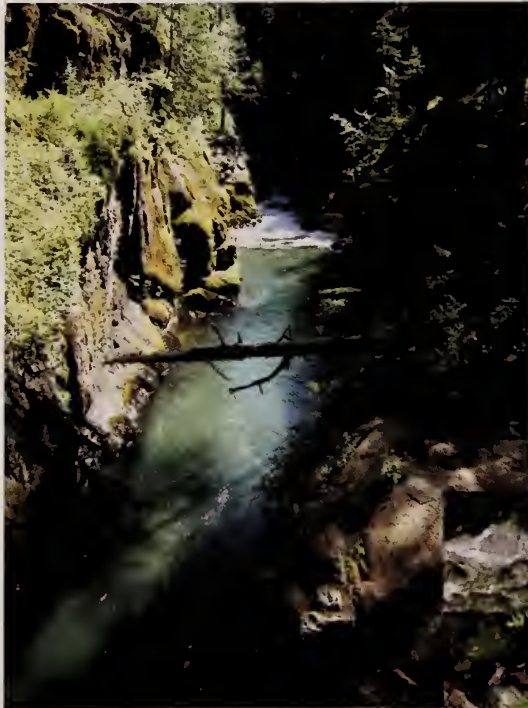


*Polystichum
retroso-paleaceum*

Photo left courtesy of
Jerry Hudgens

Selaginella tamariscina

Photo right courtesy of
Jerry Hudgens



Ohanapecosh River

Photo left courtesy of
Jo Laskowski

*Asplenium
trichomanes*

Photo right courtesy of
Ralph Archer





Polystichum
x illyricum

Photo left courtesy of
Rémy Prelli

Asplenium lepidum

Photo right courtesy of
Rémy Prelli



Cystopteris montana

Photo left courtesy of
Rémy Prelli

Paragymnopteris
marantae

Photo right courtesy of
Rémy Prelli



The Ferns and Fern Relatives at Fern Dell

Jerry Hudgens

Churchville, MD

Fern Dell is the 4.5-acre woodland garden of Jerry and Joan Hudgens located several miles inland from the head of the Chesapeake Bay. The original ~2.5-acre south-facing hillside lot was purchased as a home site in 1966, and an adjoining lot of ~2.0 acres, which did not pass a perk test and which is largely a wetland with bog-like conditions, was added several years later. The back boundary of the property is a pristine stream. Altogether, the property provides a wonderful variety of indigenous trees, shrubs and wildflowers as well as many thousands of ferns and fern relatives, and it provides a virtually limitless number of sites for adding more of the same.

After my (Jerry's) initial attempts to grow lawn grass and vegetables failed miserably, I decided to go with the flow and try to grow plants adapted to shade conditions. Little did I know that I was a latent collector or that the expression of this trait would develop into an obsession! My collections began with hundreds of rhododendrons and evergreen azaleas along with several miscellaneous wildflowers and bulbs. Later collection categories include trilliums, arisaemas, asarums, hellebores, native plants of *all* sorts, native deciduous azaleas and many of their hybrids, pachysandras, liriopes, kalmias, viburnums, magnolias, hostas; the list goes on to include almost all hardy shade-tolerant native and exotic plants. It was only relatively recently that I settled on ferns and fern relatives as my specialty collection category. Since so deciding, I have attempted to collect and grow all that will survive this location and my sometimes-brutal gardening skills.

It is the fern collection at Fern Dell that is the subject of this article. Since I have been preparing the Index of Articles and the Index of Ferns for this journal (on the HFF website), I have had the pleasure of reviewing several articles describing the collections of many public gardens which provide the lists of ferns they grow so others will have better knowledge about which ferns grow well in their area. My own collection has grown to the point where I am having difficulty finding new ferns to add and now have to try those listed as marginally or not hardy for this recently designated Zone 7a area. According to those who keep track of historic averages (since 1950), our coldest month is January with an *average* low of 22 degrees F (~-6 degrees C) and our hottest month is July with an *average* high of 88 degrees F (~31 degrees C). Ten-year averages would no doubt be higher for both the lows and highs. Our extreme weather events can come from winter-frigid Canada to the semi-tropical Gulf of Mexico and unpredictably at times from the Atlantic Ocean to our east. Our historic low of -10 degrees F (~-23.3 degrees C) came in 1979 and our historic high of 109 degrees F (~42.8 degrees C) came in 1988. Monthly precipitation averages between 3 and 5 in. (~7.5 and 12.5 cm), but our summers usually bring us periods of drought lasting up to several weeks; those droughts can be broken by remnants of hurricanes which can bring us over 12 in. (~30.5 cm) of rain in a day or so. While our historic average snowfall for January is nearly 7 in. (~17.5 cm),

the “Blizzard of 1996” and the days following brought us 28 in. (~71 cm) and much deeper drifts in less than a week keeping most people home without power for days! The entire winter of 2011-2012, on the other hand, brought less than 1 in. (~2.5 cm) of snow. For us, that winter was the mildest recorded. Most typically winter precipitation is in the form of a mix of snow, rain and freezing rain which can leave wet snow trapped beneath a crust of ice (a very large colony of *Selaginella uncinata* was reduced to a few remnants by such a combination). What is most typical of our weather, however, is its unpredictability. I believe that these perhaps unique weather conditions and the size and diversity of my fern collection can now serve the same “proving ground” function for this area as the public gardens have done for other areas.

The listing that follows contains ferns inventoried in the gardens in 2011-12 and only those that survived one or more winters here, therefore the many ferns planted in 2012 are not considered. Lost ferns are often replaced to be tried again, and new ferns are added each year. It is unfortunate, but the limitations of both my record keeping and space here make impossible a listing of all the ferns tried and lost for whatever reasons. Additionally, the recent mild winters experienced here have probably resulted in a longer list than what is likely to exist if, or rather when, we experience a very harsh winter. Modest winter protection and length of time in the ground may buffer such an effect, however. *And---*serendipity is my friend.

A few words of explanation regarding the format of the list are offered. The botanic names are listed, followed by the names of cultivars and forms. Within the brackets are listed the approximate numbers of each species, cultivar or form. Some introduced plants have formed colonies of three or more discernable plants; an asterisk follows their numbers and those for colony-forming indigenous species. Within the parentheses for all non-indigenous plants is the year of introduction for the longest surviving plant of that type. The names given to all the ferns always begin as those provided by the nursery or other source of the plant. As I learn more about each of the ferns, those names are corrected as necessary or are brought more into line with recent convention. Many visitors have, over the years, provided me with usually quite tactful and helpful suggestions about the information provided on my plant labels.

I find that one of the great joys of gardening is being able to share my gardens with others who share an interest in the plants I grow. Joan and I generally have hundreds of garden visitors every year. Unfortunately, relatively few of those visitors are fern enthusiasts. If you are a fern enthusiast and want to visit, please contact us to arrange a time. If your traveling companion does not share your passion for ferns, tell them that there are (almost) always plenty of blooming plants, from the magnolias to azaleas, to hellebores, to the ground-hugging asarums, to see at Fern Dell.

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Ferns and Fern Relatives at Fern Dell

Jerry Hudgens - Fern Dell, Churchville, MD

Botanic (& Cv./Form) Name [No. plants/*colonies (Yr. Oldest Introduced) or (Indigenous)]

Adiantum aleuticum [1 ('07)]

Cvs.: 'Imbricatum' [2 ('06)]; 'Subpumilum' [1 ('10)]

Adiantum xbanksianum [1 ('11)]

Adiantum capillus-veneris

Cvs./forms: 'Fan Dance' [1 ('11)]; Michigan Form [2 ('09)];

'Scintilla' [3 ('10)]; Virginia Form [1* ('04)]

Adiantum hispidulum [3 ('06)]

Adiantum lorentzii 'Salta Splendor' [1 ('07)]

Adiantum xmairisii [4 ('08)]

Adiantum pedatum [Indig., several*]

Cvs.: 'Eco Aurora Borealis' [1* ('04)]; 'Miss Sharples' [2* ('05)]

Adiantum sp., variegated [1 ('11)]

Adiantum thalictroides 'Argentine Lace' [2 ('06)]

Adiantum xtracyi [1 ('11)]

Adiantum venustum [~5* ('04)]

Adiantum viridimontanum [1 ('05)]

Arachniodes aristata 'Okoze' [2 ('10)]

Arachniodes cavalerii [1 ('05)]

Arachniodes chinense [2 ('07)]

Arachniodes davalliaeformis [2 ('08)]

Arachniodes miqueliana [1* ('04)]

Arachniodes simplicior [4* ('99)]

Arachniodes standishii [2* ('05)]

Asplenium bradleyi [1 ('10)]

Asplenium platyneuron [Indig., several]

Asplenium prolongatum [1 ('09)]

Asplenium trichomanes [~6 ('99)]

Cv.: 'Incisum' [3 ('07)]

Asplenosorus ebenoides [2 ('06)]

Athyrium 'Branford Beauty' [1 ('05)]

Athyrium 'Branford Rambler' [1* ('07)]

Athyrium clivicola [1 ('05)]

Athyrium cyclosorum [3 ('06)]

Athyrium filix-femina ssp. *angustum* 'Lady in Red' [1 ('04)]

Athyrium filix-femina [Indig., many*; too variable to identify ssp. or hyb.]

Cvs./form: 'Corymbiferum' [1 ('05)]; 'Cristatum' [2 ('07)];

'Cristatum (Slender Type)' [1 ('05)]; 'Cruciato-cristatum' [1 ('05)];

'Cruciatum' [1 ('05)]; 'Dre's Dagger' [1 ('04)];



Adiantum aleuticum 'Subpumilum'
Photo courtesy of Jerry Hudgens

Dwarf Form [1 ('07)]; 'Encourage' [1 ('05)];
 'Fancy Fronds Strain' [2 ('04)]; 'Frizelliae' [3 ('01)];
 'Grandiceps' [1 ('06)]; 'Minutissimum' [4 ('09)];
 'Plumosum Axminster' [1 ('05)]; 'Rostiel' [1 ('06)];
 'Vernoniae' [1 ('06)]; 'Vernoniae Cristatum' [2 ('06)];
 'Victoriae' [4 ('02)]
Athyrium 'Ghost' [2 ('03)]
Athyrium 'Godzilla' [1 ('09)]
Athyrium mackinnonii [1 ('07)]
Athyrium niponicum
 Cvs./form: 'Apple Court' [2* ('04)]; 'Burgundy Lace' [1 ('03)];
 'Eco Dwarf' [1* ('05)]; 'LSS Montpelier' [1 ('11)];
 'Ocean's Fury' [1 ('09)]; 'Pictum' [6* ('83)];
 'Regal Red' [1 ('08)]; 'Silver Falls' [1 ('03)];
 'Ursula's Red' [1* ('97)]; Variegated [2 ('10)]
Athyrium otophorum [3 ('91)]
Athyrium otophorum var. *okanum* [1 ('05)]
Athyrium petersenii [1* ('05)]
Athyrium vidalii [1 ('05)]
Blechnum australe [1 ('11)]
Blechnum chilense [2 ('07)]
Blechnum niponicum [2 ('00)]
Blechnum penna-marina [1* ('06)]
 Cvs./forms: 'Cristatum' [3 ('06)]; 'Shishi' [1* ('04)]
Blechnum spicant [2 ('01)]; Cv.: 'Redwoods Giant' [1 ('11)]
Botrychium dissectum [Indig., many of quite variable form]
Botrychium multifidum [Indig., several]
Botrychium virginianum [Indig., numerous]
Camptosorus rhizophyllus [3* ('01)] (See photo page 23)
Cheilanthes argentea [1 ('10)]
Cheilanthes lanosa [7 ('00)]
Cheilanthes lindheimeri [1 ('10)]
Coniogramme gracilis [1 ('11)]
Coniogramme intermedia var. *intermedia* [1 ('11)]
Coniogramme intermedia 'Shishi' [2 ('11)]
Coniogramme intermedia 'Yoroi Mushi' [2 ('10)]
Coniogramme japonica 'Johnson Form' [1 ('11)]
Coniogramme japonica 'Variegata' [1 ('11)]
Coniogramme omeiensis
 Cvs.: 'Eco Herringbone' [1* ('07)]; 'Variegata' [2 ('06)]
Coniogramme sp. 'Ping Wu' [3 ('09)]
Cyrtomium caryotideum [4 ('07)]
Cyrtomium falcatum [1 ('10)]
 Cvs.: 'Butterfieldii' [2 ('09)]; 'Maritimum' [3 ('05)];
 'Plasticity' [1 ('11)]; 'Shishi' [1 ('08)]
Cyrtomium falcatum x *Cyrtomium caryotideum* [1 ('06)]

Cyrtomium fortunei [1* ('97)]
 Cvs.: var. #A1LA-001 (Avent) [1 ('07)];
 var. #HH-03CH127 (Avent) [1 ('07)]; var. *clivicola* [2 ('05)];
 'Ice Follies' [3 ('09)]; var. *intermedium* [2 ('04)];
 Narrow Form [1('05)]
Cyrtomium lonchitoides [2 ('05)]; Cv.: 'Eco Sentinel' [1 ('09)]
Cyrtomium macrophyllum [3 ('04)]
Cyrtomium sp. [2 ('07)]
Cyrtomium tukusicola [2 ('05)]
Cystopteris bulbifera [1* ('01)]
Cystopteris fragilis [1* ('99)]
Cystopteris protrusa [2 ('04)]
Cystopteris tennesseensis [1* ('04)]
Dennstaedtia punctilobula [Indig., few*]
Dennstaedtia wilfordii [1* ('05)]
Deparia acrostichoides [Indig., numerous*]
Deparia conilii [1* ('05)]
Deparia japonica [2* ('06)]
Deparia okuboana [3 ('11)]
Deparia pseudoconilii [2* ('08)]
Deparia pycnosora [3 ('11)]
Diplazium pycnocarpon [2* ('00)]
Diplazium sp. 'Eco Ming Charm' [1* ('04)]
Diplazium wichurae [1 ('10)]
Dryopteris affinis [2* ('01)]
 Cvs./form: 'Cambrensis Insubrica' [2 ('09)]; "Crested" [1 ('10)];
 'Crispa' [1 ('05)]; 'Crispa Barnes' [1 ('04)];
 'Crispa Cristata Angustata' [1 ('11)]; 'Crispa Gracilis' [4 ('04)];
 'Cristata Angustata' [2 ('00)]; 'Cristata the King' [4 ('99)];
 'Insubrica' [1 ('11)]; 'Penderi' [2 ('97)];
 'Polydactyla Dadds' [1 ('05)]; 'Revolvens' [1 ('05)]
Dryopteris xaustralis [4* ('00)]
Dryopteris bissetiana [2 ('04)]
Dryopteris blanfordii [2 ('05)]
Dryopteris xboottii [2 ('05)]
Dryopteris campyloptera [2 ('05)]
Dryopteris carthusiana [Indig., several]
Dryopteris caucasica [2 ('05)]
Dryopteris celsa [2* ('97)]
Dryopteris cristata [Indig., several]
Dryopteris championii [1 ('02)]
Dryopteris clintoniana [2* ('04)]
Dryopteris xcomplexa [2 ('04)]
 Cvs.: 'Robust' [1 ('05)]; 'Rumpelstiltskin' [2 ('05)];
 'Stableri' [4 ('04)]; 'Stableri Crisped' [1 ('06)]
Dryopteris conjugata [1 ('08)]

Dryopteris crassirhizoma [2 ('03)]
Dryopteris crispifolia [1 ('07)]
Dryopteris cycadina [1 ('97)]
Dryopteris cystolepidota [3 ('04)]
Dryopteris decipiens [1 ('05)]; Cv.: 'China Lacquer' [1 ('05)]
Dryopteris dickinsii 'Crispa' [2 ('06)]
Dryopteris dilatata Cvs.: 'Crispa Whiteside' [1 ('04)];
 'Grandiceps' [1 ('06)]; 'Jimmy Dyce' [1 ('00)];
 'Lepidota Cristata' [1 ('00)]; 'Recurvata' [2 ('95)]
Dryopteris erythrosora [1* ('00)]; Cvs./form: 'Brilliance' [1 ('04)];
 var. *prolifera* [1 ('05)]; 'Purpurella' [1 ('04)]
Dryopteris expansa [4 ('05)]; Form: var. *willeana* [2 ('08)]
Dryopteris filix-mas Cvs.: 'Barnesii' [2 ('99)];
 'Crispa Cristata' [1 ('06)]; 'Crispatissima' [3 ('04)];
 'Cristata' [2 ('05)]; 'Cristata Jackson' [1 ('05)];
 'Cristata Martindale' [1 ('05)]; 'Fluctuosa Cristata' [2 ('10)];
 'Furcans' [1 ('97)]; 'Grandiceps' [1 ('00)];
 'Grandiceps Wills' [1 ('05)]; 'Linearis' [1 ('11)];
 'Linearis Congesta' [2 ('07)]; 'Linearis Polydactyla' [3 ('95)];
 'Parsley' [1 ('05)]
Dryopteris formosana [1 ('04)]
Dryopteris fuscipes [1 ('08)]
Dryopteris goldiana [2 ('98)]
Dryopteris hondoensis [1* ('00)]
Dryopteris indusiata [1 ('05)]
Dryopteris intermedia [Indig., few; 1* ('04)]
Dryopteris 'JJDry' [1 ('06)]
Dryopteris kashmiriana [1 ('07)]
Dryopteris koidzumiana [2 ('09)]
Dryopteris lacera [1 ('04)]
Dryopteris laeta [1 ('05)]
Dryopteris xleedsii [1 ('10)]
Dryopteris lepidopoda [2 ('04)]
Dryopteris marginalis [2 ('97)]
Dryopteris monticola [1 ('09)]
Dryopteris muenchii [1 ('08)]
Dryopteris namegatae [5 ('07)]
Dryopteris neorosthornii [1 ('04)]
Dryopteris xneo-wherryi [1 ('08)]
Dryopteris odontoloma [3 ('07)]
Dryopteris oreades [2 ('05)]
Dryopteris polylepis [3 ('05)]
Dryopteris pseudofilix-mas [1* ('02)]
Dryopteris pulcherrima [2 ('10)]
Dryopteris purpurella [1 ('06)]
Dryopteris pycnopteroides [1 ('04)]



Camptosorus rhizophyllus
 Photo courtesy of Jerry Hudgens

Dryopteris ramosa [1 ('09)]
Dryopteris remota [2 ('04)]
Dryopteris saxifraga [2 ('05)]
Dryopteris scottii [4 ('06)]
Dryopteris xseparabilis [3 ('06)]
Dryopteris sieboldii [3 ('03)]
Dryopteris stenolepis [1 ('07)]
Dryopteris stewartii [3 ('96)]
Dryopteris sublacera [1 ('97)]
Dryopteris tokyoensis [2 ('04)]
Dryopteris uniformis 'Cristata' [3 ('04)]
Dryopteris varia [1 ('08)]
Dryopteris villarii [1 ('04)]
Dryopteris wallichiana [2 ('02)];
Forms: var. *nepalensis* 'Molten Lava' [1 ('04)];
Orange-fronded Form [1 ('07)]
Dryopteris xanthomelas [1 ('11)]
Dryopteris yigongensis [1 ('06)]
Gymnocarpium disjunctum [3* ('06)]
Gymnocarpium dryopteris [1* ('06)]; Cv.: 'Plumosum' [3 ('04)]
Gymnocarpium oyamense [1* ('10)]
Huperzia lucidula [Indig., few*]
Leptogramma himalaica [1 ('07)]
Lycopodium obscurum [Indig., few*]
Lygodium japonicum [1 ('10)]
Lygodium palmatum [1 ('04)]
Matteuccia orientalis [3* ('05)]
Matteuccia struthiopteris [3* ('92)]
Cvs.: 'Jumbo' [1* ('05)]; 'The King' [1* ('07)]
Microlepia strigosa 'Shishi' [4 ('10)]
Onoclea sensibilis [Indig., many*]
Onychium japonicum 'Sichuan Lace' [2* ('11)]; 'Yunnan Fancy' [1 ('11)]
Osmunda cinnamomea [Indig., many*]
Osmunda claytoniana [Indig., few*]
Osmunda japonica [2 ('06)]
Osmunda regalis Cvs./form: 'Cristata' [3 ('97)]; 'Decomposita' [2 ('07)];
var. *regalis* 'Purpurascens' [1 ('00)]; 'Undulatifolia' [2 ('06)];
var. *spectabilis* [Indig., several*]
Pellaea atropurpurea [4 ('06)]
Phegopteris connectilis [2* ('05)]
Phegopteris hexagonoptera [Indig., numerous*]
Phyllitis scolopendrium [3 ('97)]; Cvs./forms: var. *americanum* [2 ('00)];
'Angustatum' [3 ('02)]; 'Crispa' [1 ('04)]; 'Cristata' [1 ('01)];
f. *furcata* [1 ('05)]; 'Kaye's Lacerate' [2 ('04)];
'Marginata' [1 ('10)]; 'Undulata' [3 ('06)]
Polypodium calirhiza 'Sarah Lyman' [1 ('11)]

Polypodium glycyrrhiza [3 ('04)]; Cv.: 'Longicaudatum' [1 ('10)]
Polypodium interjectum [2 ('05)]
Polypodium xmantoniae 'Cornubiense' [2 ('07)]
Polypodium polypodioides [1 ('07)]
Polypodium virginianum [3 ('06)]
Polypodium vulgare Cvs.: 'Bifidum' [1* ('04)];
 'Bifidum Multifidum' [2 ('05)]; 'O Shishi' [2 ('10)];
 'Pulcherrimum' [1 ('05)]; 'Ramosum' [1 ('04)];
 'Uulong Island' [1* ('04)]
Polystichum acrostichoides [Indig., numerous*, many variable forms]
 Cvs./forms: Detached Ear Form [1 ('07)];
 Highly Crisped Form [1 ('08)]; 'LSS Hurricane Watch' [1 ('06)];
 'Multifidum' [2 ('04)]
Polystichum aculeatum [1 ('05)]; Cv.: 'Cristatum' [2 ('08)]
Polystichum altum [1 ('05)]
Polystichum andersonii [2 ('10)]
Polystichum bissectum [1 ('07)]
Polystichum braunii [3 ('99)]
Polystichum dracomontanum [2 ('10)]
Polystichum xdycei [2 ('05)]
Polystichum lepidocaulon [1 ('11)]
Polystichum makinoi [4 ('04)]
Polystichum munitum [2 ('04)]
Polystichum neolobatum [4 ('06)]
Polystichum ovato-paleaceum [1 ('05)]
Polystichum polyblepharum [3 ('91)]
Polystichum pseudo-makinoi [1 ('07)]
Polystichum retroso-paleaceum [2 ('04)] - (see photo page 16)
Polystichum rigens [2 ('10)]
Polystichum setiferum [1 ('97)]; Cvs./Forms: 'Bevis' [2 ('07)];
 'Congestum' [1 ('11)]; 'Congestum Cristatum' [1 ('03)];
 'Cristato-pinnulum' [1 ('05)]; "Cultivar" [1 ('11)];
 'Dahlem' [2 ('05)]; 'Divisilobum' [2 ('04)];
 'Divisilobum Cristatum' [1 ('07)];
 'Divisilobum Type Mossy Mama' [1 ('05)];
 'Fairy's Feather' [1 ('11)]; 'Herrenhausen' [2 ('09)];
 'Plumoso-multilobum' [1 ('04)]; 'Plumosum' [1 ('07)];
 'Proliferum Wollaston' [2 ('05)]; 'Rotundatum Cristatum' [3 ('07)];
Polystichum sp. (Spiny Holly Fern) [2 ('05)]
Polystichum squarrosum [1 ('04)]
Polystichum subulatum [2 ('07)]
Polystichum tagawanum [2 ('07)]
Polystichum tripterum [1 ('04)]
Polystichum tsus-simense [1 ('07)]; Cv./Form: var. *mayebarae* [2 ('09)]
Polystichum wilsonii [1 ('10)]
Polystichum xiphophyllum [2 ('04)]

Prosaptia contigua [1 ('07)]
Pteridium aquilinum [1 ('00)]
Pteris sp. [1 ('10)]
Pyrrosia hastata [1 ('04)]
Pyrrosia lingua Cvs.: 'Eco Bold Crest' [1 ('09)];
 'Eco Variegated' [1 ('09)]; 'Futuba Shishi' [2 ('11)];
 'Hiryu' [3 ('11)]; 'Ogon Nishiki' [3 ('11)];
 'Tuchiba Koryu' [2 ('11)]
Selaginella apoda [Indig., numerous*]
Selaginella borealis [1 ('10)]
Selaginella braunii [1* ('93)]
Selaginella caulescens [1* ('00)]
Selaginella involvens [1 ('04)]
Selaginella kraussiana [1 ('07)]
Selaginella moellendorffii [1* ('01)]
Selaginella mutica [1 ('09)]
Selaginella pallescens [2* ('00)]
Selaginella peruviana [1 ('10)]
Selaginella rupicola [1 ('11)]
Selaginella sanguinolenta var. *compressa* [2 ('04)]
Selaginella scopulorum [1 ('10)]
Selaginella sp. #1 [1 ('10)]
Selaginella sp. #2 [1 ('11)]
Selaginella stauntoniana [4* ('04)]
Selaginella tamariscina [1 ('09)] - (see photo page 16)
Selaginella uncinata [1* ('97)]
Selaginella wallacei [2 ('11)]
Stenogramma pozoi [3* ('07)]
Thelypteris acuminata [1* ('03)]
Thelypteris beddomei [1* ('05)]
Thelypteris decursive-pinnata [3* ('00)]
Thelypteris kunthii [1 ('04)]
Thelypteris normalis var. *lindheimeri* 'Weekend at Boerne' [1 ('09)]
Thelypteris noveboracensis [Indig., numerous*]
Thelypteris palustris [1* ('99)]; Cv.: 'Cristata' [2 ('07)]
Thelypteris torresiana [2 ('04)]; Cv.: 'Eco Maiden Lace' [1 ('06)]
Woodsia ilvensis [3 ('09)]
Woodsia intermedia [1 ('04)]
Woodsia obtusa [3 ('06)]
Woodsia polystichoides 'Kamchatka' [3 ('07)]
Woodsia pseudopolystichoides [1 ('10)]
Woodsia scopulina [2 ('07)]
Woodsia subcordata [1 ('05)]
Woodwardia areolata [2* ('99)]
Woodwardia virginica [1 ('07)]

The Woodland Garden at Creasey Mahan Nature Preserve

Ralph C. Archer ~ Louisville, KY

In August 2010, a woodland flower and fern garden was started at the Creasey Mahan Nature Preserve in Goshen, KY near Louisville, KY. The major criterion for the garden design was that the vast majority of the plants would be native to the local area. Over the next eight months, approximately two acres were cleared of undergrowth and scrub trees. Most of the area was covered with cardboard and then wood chips.

Planting started in the spring of 2011 and has continued in spring and autumn since then. The area planted covers approximately two-thirds of an acre and features displays of ferns, wildflowers, shrubs and trees. Two beds of mostly exotic ferns and flowering garden plants separate the native plant woodland display from a picnic area. A third bed, running along a fence line, contains exotic ferns in a wooded portion, as well as a variety of exotic flowering shrubs and trees. A line of shrubs was planted to screen the fence and a maintenance building from the garden area.

Over 1300 ferns have been planted. They consist of 12 genera, 65 species and include over 110 taxa. Twenty of the fern species are eastern North American ferns native to this area. More than 75 species of wildflowers and 15 species of flowering trees and shrubs have been planted.

As suitable fern, wildflower and woody plant species become available, they are added

to the exotic garden and natural display areas. More than 50 native canopy trees were planted the first fall to provide replacements for existing first growth tree cover. In addition, 10 shagbark hickory trees have been planted in a sunny area at the north end of the garden. A dozen redbud and native dogwood were planted this past year as well as additional canopy trees and a variety of shrubs.

The major activity this past summer and early fall was the completion of a re-circulating water feature. It simulates a hillside spring feeding a stream lined with rock leading to a pond. Two bridges were installed across the stream. The rock areas along the stream



Creasey Mahan Woods - March 4, 2011
Photo courtesy of Ralph Archer

are being planted with a combination of *Adiantum pedatum* and *Asplenium trichomanes*. (see photo page 16)

A bog was installed next to the pond, fed by another artificial spring. The initial bog fern planting is primarily *Osmunda* species, *Woodwardia areolata*, *Dryopteris x australis* and *D. celsa* as well as a variety of flowering plants including *Asclepias incarnata*, *Camassia scilloides*, *Chamaelirium luteum*, *Chelone glabra*, *Liatris spicata*, *Lobelia cardinalis* and *L. siphilitica*.

A hoop house and raised plant beds were constructed. A number of plants including a group of *Cyrtomium* species were grown to maturity and most have been moved to the garden. The planned use is to propagate additional plants over the next few years. The completed woodland garden will cover about one and a half acres. The remainder will be planted with small trees and wild flowers preferring sun. When the trees mature, it will be planted with woodland plants. In the remaining, unplanted woodland area, we plan to use a variety of native wildflowers along with locally native ferns. This area will feature mass plantings of such plants as foam flower, bloodroot, trillium and Virginia bluebells along with masses of ferns.



Creasey Mahan Woods - August, 2011
Photo courtesy of Ralph Archer

Creasey Mahan Nature Preserve is open to the public from sunup to sundown. For further information on the garden and to schedule individual or group tours, contact the author at ralpharcher@outlook.com or (502) 220 8698 or Tavia Cathcart Brown, Executive Director at the Nature Preserve:

Creasey Mahan Nature Preserve
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Goshen, KY 40026
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SPORE EXCHANGE LIST ~ 2013

All Hardy Fern Foundation members have unlimited access to our spore exchange and can choose from a wide variety of ferns. We offer something for everyone, whether you are an expert or just a beginner!

To Order: Please print your selections in alphabetical order. Include 50 cents for each fern requested, postage and a self-addressed bubble envelope (do not attach the postage to the envelope). or—the new option is that orders may instead include \$1.25 for a padded mailer and/or \$1.50 for postage inside the U.S. or \$2.50 for international postage. Please make checks payable to Carolyn Doherty/HFF Spore Exchange Director. We will no longer request or accept international postage coupons. Please include your email address. If you are ordering more than a half dozen packages, send additional postage up to one dollars' worth. Please list a first and second choice. Some items are limited, so order early for best selection. If both choices are unavailable, would you like to donate the additional money to the foundation, or hold it for another order? If neither is indicated, we will consider it a donation to our endowment fund. Orders will be sent within a month of post mark date.

<u>Genus, species, variety/cultivar</u>	<u>Year</u>	<u>Donor</u>
<i>Adiantum aleuticum</i>	2011	Doherty
<i>Adiantum aleuticum</i> 'Subpumilum'	'07, '10, '11	Jeddeloh and RSF
<i>Adiantum thalictroides</i>	'09	EMBG
<i>Arachniodes davalliaeformis</i>	'10	S. Olsen
<i>Arachniodes simplicior</i>	'11	Steffen
<i>Arachniodes simplicior</i> 'Variegata'	'11	RSF
<i>Asplenium trichomanes</i>	'12	RSF
<i>Athyrium filix-femina</i> 'Frizelliae'	'11	RSF
<i>Athyrium niponicum</i> 'Pictum'	'11	RSF
<i>Athyrium otophorum</i>	'11	Jeddeloh and Doherty
<i>Athyrium vidalii</i>	'09	EMBG
<i>Athyrium</i> spec. yokoscense?	'12	Gassner
<i>Athyrium</i> spec. narrow-red stemmed	'12	Gassner
<i>Blechnum chilense</i> 'Red Form'	'09	RSF
<i>Blechnum niponicum</i>	'11	RSF
<i>Blechnum novae-zelandiae</i>	'11	EMBG
<i>Blechnum penna-marina</i>	'12	RSF

<i>Blechnum spicant</i>	'11	RSF
<i>Blechnum spicant</i> "Rickard's Serrate"	'10, '11	RSF and Duryee
<i>Cheilanthes lanosa</i>	'10	Peachey
<i>Cryptogramma</i> sp	'11	Duryee
<i>Cyrtomium fortunei</i>	'10	Peachey
<i>Cyrtomium lonchitoides</i>	'11	RSF
<i>Cyrtomium macrophyllum</i>	'11	RSF
<i>Cyrtomium macrophyllum</i> var. <i>tukusicola</i>	'10, '11	RSF
<i>Dryopteris aemula</i>	'12	Gassner
<i>Dryopteris arguta</i>	'07	RAS
<i>Dryopteris bissetiana</i>	'11	RSF
<i>Dryopteris borrieri</i> 'Polydactyla Dadds'	'12	Hendricks
<i>Dryopteris carthusiana</i> 'Cristata'	'09, '11	EMBG and Carl
<i>Dryopteris championii</i>	'12	RSF
<i>Dryopteris clintoniana</i>	'11, '12	Carl and Gassner
<i>Dryopteris corleyi</i>	'12	Gassner
<i>Dryopteris crassirhizoma</i>	'11	RSF
<i>Dryopteris decipiens</i>	'10	RSF
<i>Dryopteris dickinsii</i> 'Incisa'	'12	Gassner
<i>Dryopteris erythrosora</i>	'11	Riehl and RSF
<i>Dryopteris expansa</i>	'12	Perasso
<i>Dryopteris expansa</i> var. <i>willeana</i>	'12	Gassner
<i>Dryopteris hondoensis</i>	'09	EMBG
<i>Dryopteris intermedia</i>	'11	Rickard
<i>Dryopteris ludoviciana</i>	'05	???
<i>Dryopteris marginalis</i>	'08, '11	RSF
<i>Dryopteris muenchii</i>	'12	Gassner
<i>Dryopteris namegatae</i>	'05	RSF
<i>Dryopteris sacrosancta</i>	'05, '11	RSF
<i>Dryopteris polylepis</i>	'12	S. Olsen
<i>Dryopteris sieboldii</i>	'10	RSF

<i>Dryopteris sublacera</i>	'05, '11	RSF
<i>Dryopteris tokyoensis</i>	'08	???
<i>Dryopteris wallichiana</i>	'11	Duryee
<i>Lygodium japonicum</i>	'03	Briegel
<i>Matteuccia struthiopteris</i>	'11	Carl
<i>Osmunda cinnamomea</i>	'12	Duryee
<i>Osmunda japonica</i>	'12	Gottlieb
<i>Osmunda regalis</i> 'Purpurascens'	'12	Duryee
<i>Osmunda regalis</i> var. <i>regalis</i>	'12	S. Olsen UK
<i>Phyllitis scolopendrium</i>	'11	Doherty
<i>Phyllitis scolopendrium</i> var. <i>Americanum</i>	'07	Avery, Gottlieb
<i>Phyllitis scolopendrium</i> "Crested"	'11	EMBG
<i>Phyllitis scolopendrium</i> 'Saw Blade'	'11	Doherty
<i>Polypodium glycyrrhiza</i>	'10, '11	Doherty
<i>Polypodium interjectum</i>	'10	RSF
<i>Polypodium vulgare</i> Ex. NE Turkey	'09	RAS
<i>Polypodium vulgare</i> 'Bifidum'	'11	EMBG
<i>Polypodium vulgare</i> 'Cornubiense'	'12	RSF
<i>Polystichum acrostichoides</i>	???	???
<i>Polystichum aculeatum</i>	'05	RSF
<i>Polystichum braunii</i>	'07	Peachey, '11 J. Taylor
<i>Polystichum californicum</i>	'05	RSF
<i>Polystichum imbricans</i>	'07	RAS
<i>Polystichum imbricans</i> 'Ramosum'	??	???
<i>Polystichum lonchitis</i> Scotland wc	'10	S. Olsen
<i>Polystichum makinoi</i>	'10	Peachey
<i>Polystichum microchlamys</i>	'12	Hendricks
<i>Polystichum munitum</i>	'11	Doherty
<i>Polystichum neolobatum</i>	'11	RSF
<i>Polystichum retroso-paleaceum</i>	'10	RSF
<i>Polystichum scopulinum</i>	'12	Duryee

<i>Polystichum setiferum</i> 'Lineare'	'12	S. Olsen
<i>Polystichum squarrosum</i>	'12	Gassner
<i>Polystichum tsus-simense</i>	'11	RSF
<i>Polystichum wilsonii</i>	'12	Gassner
<i>Polystichum xiphophyllum</i>	'07, '08	RSF
<i>Pteris cretica</i> 'Albo-lineata', (tender)	'11	Doherty
<i>Thelypteris limbosperma</i>	'12	Gassner
<i>Thelypteris palustris</i>	'11	Baxter
<i>Thelypteris simulata</i>	'11	Carl
<i>Woodsia fragilis</i>	'11	RSF
<i>Woodsia intermedia</i>	'11	RSF
<i>Woodsia obtusa</i>	'11	Carl

*WC denotes wild collected

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