



Hardy Fern Foundation
Quarterly



Fall 2012

THE HARDY FERN FOUNDATION

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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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Volume 22
ISSN 154-5517

No. 4

Editor- Sue Olsen



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President's Message ~ Fall 2012

Greetings. I take over from Pat Kennar as president for this term with a bit of apprehension but also with a sense of pride in the Hardy Fern Foundation as an organization from where it has come from its inception in 1989 to its greater and ongoing role today in the greater horticultural community. That role is clearly stated in the first sentence on the inside front cover of this and every Quarterly that HFF publishes. That single sentence encompasses quite a bit of effort, planning, organization and commitment. This mission statement guides us into the many endeavors that HFF undertakes.

The increased role undertaken by HFF and the financial climate of the past four years has made it more financially challenging for HFF, as well as for every horticultural organization and botanical institution, to continue its function and achieve their stated goals. This year the HFF board has made a renewed commitment to explore and undertake a multiple approach to increase funding and to be more efficient in maintaining the many endeavors that HFF undertakes. I will keep our members informed on how we approach this all important matter.

HFF has been involved in numerous projects in the past few years and HFF takes pride in having achieved them. The installation of the Fern Stumpery at our host botanical garden, the Rhododendron Species Botanical Garden, is truly a marvel to behold. With the initial installation in 2009, and with the subsequent and ongoing plantings, the garden has been blanketed with an incredible array of fern species and varieties, and has made this one of the most unique garden installations in the world. And it will only get better over time. HFF has been committed in providing ferns to area botanical gardens in their own renovations and expansions. Notable is our recent involvement with the Bellevue Botanical Garden and their new Ravine Garden. The University of Washington Botanical Gardens' ambitious Pacific Rim Garden Expansion will soon need ferns in the Chilean Garden. HFF has provided ferns in the ongoing installation of the new Seattle Chinese Botanical Garden which is the only Sichuan styled garden outside of China. As Pat Kennar stated in his last President's message, "HFF continues to have a strong presence in Seattle and the Puget Sound Area".

I would like to thank a number of long time HFF board members who have been key in the Hardy Fern Foundation. A number of years ago when HFF was a little recognized plant organization and struggled with recognition, the board was trying to see if we could get a fern display garden established somewhere in the area. If the display garden could be set in a renowned botanical garden that would certainly be a bonus. Pat Kennar undertook this mission and with his persistent effort, Randall Hitchin, then curator at the Washington Park Arboretum (now the UW Botanical Garden) told him about the Signature Bed, which was a raised bed, situated directly in front of the Visitor's Center, approximately 60 ft. by 8 ft., where various plant organizations could put in a one year display that would highlight their plant(s) of interest. It was the breakthrough HFF was desperately looking for. After a design review and approval, the installation and plantings (encompassing 60 fern sps. and varieties) occurred that fall. The display garden was an instant hit and has become an established feature now nearing its ninth year. Pat

has also been instrumental as an HFF liaison to the Bellevue Botanical Garden. His advocacy for HFF has made for a wonderful relationship between HFF and BBG. He is often seen giving out information on HFF to BBG members and visitors. Pat also has just completed his 2nd. tenure as President of HFF. His thoughtful and pleasant nature has always made it a pleasure to be around him.

Shortly after Lyman Black joined the HFF board, he took over the duties of Treasurer from retiring board member Jack Doctor. That was eleven years ago. I have always felt that the hardest and most time consuming job for a board officer is the Treasurer's position, and I believe this to be quite true in this organization. Lyman, through his steadfast and thorough record keeping and decision making, has kept HFF on an even keel and kept us clear on where we stand financially as an organization. Lyman has overseen the endowment fund with its investments along with the recent change of financial institutions in this challenging economic time. Lyman is gradually handing over the financial reins to Rick Peterson for a smooth and helpful transition. Lyman has also taken upon himself to maintain HFF's first public fern display garden at the aforementioned Signature Bed at the UW Botanical Garden. I recently asked Randall Hitchin, now with UW Arboretum Foundation, how come HFF has been allowed to keep the Fern Garden there for so long, in what was to be only a one year display. He said because it is so well cared for and always looks so good. Their garden staff needs to spend little time with it and it is popular with visitors. I have had the pleasure these past eleven years to drive down to HFF board meetings in Federal Way from Bainbridge Island with Lyman when he stays on the island and we car pool together. Our discussions have run the gamut on whatever crosses our minds. I have learned much, but mostly, through example, on how to be a true gentleman.

Dr. Meredith "Buz" Smith has been on the HFF Board for as long as I can remember and that is fifteen or more years ago. Buz has stayed in the background, but has always been committed and supportive to HFF and to the programs and projects that it sponsors. His experience with philanthropies was and is valuable in his participation on finance committees. His support with the Bellevue Botanical Garden and its relationship with HFF has been most helpful. His quiet manner belies the behind the scenes support that HFF receives. He always receives you with welcome smile that makes you feel that you are special.

I am finishing this message over the Labor Day weekend. It has been a marvelous weekend with clear sunny skies in the afternoon and temps in the mid-seventies. We are now into our forty-second day without measureable precipitation and the forecast is for clear skies for this coming week. I have been moving the sprinklers around the yard. The first six and a half months of the year were wet and cool and I have never seen the ferns and plants look so good in the 28 years I have been in the Northwest. But this is the dichotomy of our temperate Mediterranean climate. I feel a chill in the air in the early morning and I have my wood shed full. Autumn rains will soon be upon us and I look forward to planting a few new ferns in the garden. Check out the ever improving HFF web-site. We are getting more hits than ever.

Happy Fern Gardening, John van den Meerendonk.

The University of California Botanical Garden at Berkeley Fern Collections

Holly Forbes, Curator

Berkeley, CA

We are very pleased to be accepted as an affiliate garden of the Hardy Fern Foundation and look forward to participating in programs.

Since its founding in 1890, the University of California Botanical Garden at Berkeley has acquired plants from as broad a range of taxonomic diversity as possible. From its beginnings as a teaching collection of California native plants, the Garden has expanded to represent a world-wide flora in support of botanical research.

The Garden represents a worldwide collection of over 12,000 different kinds of plants distributed among nine major geographic areas (Southern African, Asian, Australasian, New World Desert, South American, Mediterranean, East North American, Mexican/Central American, Californian), greenhouse collections of tropical or arid plants, and several ethnobotanical collections (Chinese Medicinal Herb Garden, Crops of the World, etc.). Ferns are placed in their appropriate geographic settings and in greenhouses, where some are so happy they appear in various pots and bench margins without invitation.

Ferns are an important component throughout the collections. Several collectors and knowledgeable volunteers (including Dr. Alan Smith and the late Iris Gaddis) have made important contributions to the fern holdings. Hardy and tropical ferns are regularly acquired for research and display. Over 500 fern accessions representing 360 taxa in 100 genera in 25 families are currently in the collection. About 65% of the collection is grown out of doors. Garden staff are growing everything from filmy ferns to tree ferns.

Dr. Alan Smith, author of *Tropical Ferns of Mexico* and all around fern expert, is actively involved in curating the ferns and regularly makes species determinations. Over 59% of the fern collection has one or more vouchers at the UC Herbarium on campus, and Dr. Smith is their fern curator. The major taxonomic reference we use is Smith, A. R., K. M. Pryer, E. Schuettpelz, P. Korall, H. Schneider, and P. G. Wolf. 2006. A classification for extant pteridophytes. *Taxon* 55: 705--731. Though now retired, Dr. Smith is still quite active in fern research and many accessions were donated from his field research.



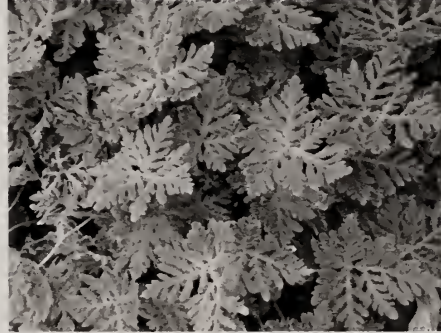
Astrolepis sinuata

Photo courtesy of
Sue Olsen

The majority of the fern collection is of documented wild origin (84%), which has made it invaluable for various research projects. Over 18 research papers by various authors have been published to date, which included sampling of ferns from the Garden,

and these requests for samples continue. Most recently, over 50 fern accessions were sampled and supplied to Dr. Libing Zhang at the Missouri Botanical Garden for his research on the evolution of relationships between genera in the Dryopteridaceae and Pteridaceae. Research paper references are posted on the Garden's web site. UC Berkeley graduate student Ruth Kirkpatrick received her PhD for her dissertation project, "Phylogenetic analysis and desiccation tolerance of the homosporous fern genus *Pellaea* Link (Pteridaceae) and relatives" in 2008. She acknowledged support from the Garden (both for specimens and for growing space) and donated many collections of *Pellaea* and other xerophytic ferns to the Garden at the conclusion of her research.

Of the current 519 accessions, just under half are in warm greenhouses, 20% are of temperate Asian origin, and 10% are of temperate Mexican/Central American origin. Xerophytic ferns make up 10% and the rest are distributed in the other major geographic collections.



Bommeria hispida

Photo courtesy of Richie Steffen

The Garden contains a significant collection of xerophytic ferns from California, the deserts of the New World, and from South Africa. These are in the genera *Aspidotis*, *Astrolepis*, *Bommeria*, *Notholaena*, *Cheilanthes*, *Mildella* and *Pellaea*. Several of these are featured in photos in Sue Olsen's 2007 Encyclopedia of Garden Ferns. (see photos page 80 and 81)) We intend to expand this collection of dry-growing ferns as material becomes available. Sean Hogan, currently the owner of Cistus Nursery in Portland, OR, and Martin Grantham, now on staff at San Francisco State University, were instrumental in establishing these dry-growing ferns at the Garden.

Martin was on staff in 1997 and created the xerophytic fern planting/display in a concrete trough designed and installed by Garden staff. This planter was filled with a soil mix of 30% fir bark compost, 30% coarse sand, 20% three-eighths inch granite gravel, 10% expanded shale, and 10% fine river sand. An automatic irrigation system keeps the soil moisture level at optimum. We have found that these plants are tolerant of summer watering and many are cold hardy at our site. Support for the initial xerophytic fern display was from individual donors, the California Horticultural Society and the Western Chapter of the American Rock Garden Society.

Support for the fern collection includes a current grant from the Saratoga Horticultural Research Endowment to support a xerophytic fern propagation program, for both the collection and for the horticultural trade. These ferns have great horticultural potential for the California landscape, especially for Mediterranean-climate and desert-growing areas. We have added staff support and equipment to conduct this program. We are excited to make these lovely ferns more broadly available in the near future.

Another focus of collection development is that of rare California species. Several California taxa are rare though not officially listed on government endangered species

lists. We want to represent and interpret these in the collection to promote their conservation.

We're excited to announce that an extensive collection of *Lycopodium*, *Lycopodiella*, *Huperzia*, *Palenhaea*, *Selaginella*, and other primitive fern relatives were recently donated to the collection by in-coming UC Berkeley graduate student Jeff Benca. Jeff has been growing and propagating these fascinating plants at the University of Washington in Seattle for several years. Jeff spent days taking cuttings and un-potting specimens in preparation for driving them from Seattle to Berkeley. This prep work was essential for passing agricultural inspection at the California state border. Upon arrival, Jeff assisted Garden staff for many days sticking the cuttings and re-potting the plants. Campus public relations picked up on Jeff's enthusiasm and featured him on their "Persons of Interest" series at <http://newscenter.berkeley.edu/2012/09/04/primitive-plant-geeks-heart-belongs-to-lycopods> or tiny url: <http://tinyurl.com/91p2url>.

The Garden's application to join the North American Plant Collections Consortium (NAPCC) as a collection holder of ferns and fern relatives was reviewed in late June 2012 and approved for inclusion in August. This is a joint program of the US Department of Agriculture's Agricultural Research Service and the American Public Gardens Association (APGA). Consortium recognition requires a high standard of collection management and support for the conservation of germplasm in garden collections. The Garden has three other collections in the NAPCC (magnolias, oaks, and cycads). Associate Director Chris Carmichael chairs the national APGA committee for this program. He and I made presentations about the NAPCC program for a panel at the national meeting of the APGA in June. Please see the program web site for more information: <http://publicgardens.org/content/what-napcc>

Near term goals for the fern collection include expanding taxonomic diversity, especially of Californian native species, completing vouchering, creating a photographic archive, increasing programming for the public on fern propagation and biodiversity, and linking with other gardens to back up the collection off-site and perhaps to create a multi-site NAPCC fern collection.

The UC Botanical Garden is open every day except the first Tuesday of each month and some major winter holidays. Please see our web site for more information, <http://botanicalgarden.berkeley.edu>.



Woodwardia areolata
Netted chain fern
Narrow-leaved chain fern

James R. Horrocks

Salt Lake City, Utah

The chain ferns of the genus *Woodwardia*, comprising some 14 species and a few hybrids are part of the Blechnaceae family which also includes the deer ferns, *Blechnum* with about 220 species, the rasp ferns, *Doodia* with 12 species, the Hawaiian *Sadleria* with 6 species, and the genus *Stenochlaena*, also with 6 species. *Woodwardia* is named after the eighteenth century British botanist Thomas Woodward. The name “chain” fern refers to the imbedded linear sori that superficially resemble sausage links. *Woodwardia areolata* gets its species name from the netted veins and alludes to the space between the veins in reticulate venation. This species is smaller than its giant cousins *W. fimbriata* from far western North America and *W. radicans* of southern Europe, posing a more modest height of 1 to 2 feet. Usually this fern grows close to the coast in eastern Canada and the United States, ranging from Nova Scotia to Florida and across to Texas. It is much rarer inland, scattered in the eastern states from Missouri to Michigan, always in swampy areas. Acidic bogs and moist marshy wooded areas are to its liking. It tolerates intensely acid conditions and even considerable sunshine. It is found growing close to oaks and near coniferous trees, especially pines. This species is extremely cold-tolerant, found in Zone 3 but ranging into Zone 9, proving its climatic adaptability. It differs from other cultivated woodwardias in that the sterile and fertile fronds are quite dimorphic. In springtime and early summer, *Woodwardia areolata* may be confused with *Onoclea sensibilis*, the sensitive fern, but the latter has pinnae with wavy edges that are not toothed on the margins. The fertile fronds of the latter, when they appear are very different from *W. areolata*, consisting of contracted pinnules that enclose the spore cases in small round receptacles. In contrast, the fertile fronds of the netted chain fern, though contracted, are open, displaying the chain-link sori.



Woodwardia areolata

Photo courtesy of Sue Olsen

Description: The blackish rhizome is slender and long-creeping, just below the surface, criss-crossing to form a dense colony. The rhizome sends up fronds at irregular intervals, the fiddle-heads appearing in late spring, densely covered with light brown scales. The stipes are nearly equal to the rest of the frond in length and bear pale brown scales that become more separated as the frond expands. The fronds, both sterile and fertile are a reddish-brown or even pinkish when young, later turning a deeper semi-glossy green. The network of veins, mentioned earlier, can be most appreciated by studying them with a magnifying glass, the well-defined elongated spaces or areoles between the veins aligning along the midrib. Smaller areoles spread outward toward the edge of the

pinnae. Sterile pinnae are attached to the rachis by conjoined wings whereas the fertile fronds are attached with a narrow stalk. In considering the dimorphism between sterile and fertile fronds, of interest is a quote from Lellinger; "The fertile-sterile dimorphism in this species is often incomplete, resulting in laminae that are fertile at the apex and sterile at the base." The sterile fronds are ovate-lanceolate to oblong, pinnate at the base but pinnatifid above due to the connecting wing attachments. The pinnae are oblong to narrowly elliptic and somewhat undulate, tapering to a point at the apex and bearing small sharp serrations on the margins that point toward the apex. The fertile fronds are oblong and fully pinnate, the linear pinnae displaying two rows of elongated sori, one on each side of the midvein. The sori are rather inconspicuous when young and as they mature they swell, forming elongated expanded links in a chain. An elongate protective indusium is attached, being free on the midrib side.

Culture: *Woodwardia areolata* is a deciduous fern but the fronds can persist into late autumn if no hard frosts occur. This species can spread, therefore, it should be planted in a large area and perhaps away from more delicate plants that may be overwhelmed. It is very cold hardy to Zone 3 and is at its best in boggy, marshy ground, the soil acidic. With adequate moisture it can tolerate considerable sun. It is possible to grow it in the woodland garden if the soil is always kept damp although the plants will be smaller and not as spreading. Although rather coarse in appearance, it is still quite attractive in mass plantings. (see photo page 81)

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The new 2012 HFF shirts have arrived!

Buy yours at www.hardyferns.org

Click on the "shop" page

The Tree Fern Protection System at Attadale Gardens Scotland

Geoff Stephenson

Attadale Gardens, Scotland

After catastrophic losses with tree ferns freezing to death throughout the British Isles during the last two winters (2010-2011) we have developed this system for protecting ours here at Attadale. (*....Editor's note.....an absolutely beautiful garden....*)

For someone with just one or two tree ferns this method is a cost effective way of protecting your investment in tree ferns that cost upwards of £20.00 a foot here in the UK. Of course now that we have had the last two winters being the worst in living memory it will never happen again for years, or will it?

Below is described the materials and procedures we have employed. (*All photos courtesy of Geoff Stephenson*)

1. Begin with 1 inch to 2 inch square wooden stakes six inches shorter than the height of the plant.

I have used 4 wooden stakes per trunk with the purpose being to give an air gap around the trunk under the insulation. As you can see in the photo Frances and Brian are spacing them equally around the trunk to be kept in position by elastic bungee cords. The stakes are 6 inches shorter than the tree fern as I don't want them to rot against the ground, hopefully they will last years. An air gap is a well proven insulation method in its own standing and in this case it serves multi purposes.



2. Heating cable.

These cables come in various lengths and can also be cut to length by an electrician. Ours are 8 meters with a power consumption of 117 watts. In the photo left you can see the built in thermostat which switches on when the temperature falls below 3°C and switches off at 13°C. This temperature range is not adjustable and is not how I want it to be so we shall switch on and off manually when required.

Ultimately I want to introduce a master thermostat which will switch on around -4°C or -2°C and off again at +2°C or +4°C; these temperatures roughly mimic an average winter range that the plants have sailed through here in Attadale in the past without great protection.

We have already been down to minus 5°C this year but were not tempted to switch on the heating cables knowing the bubble wrap protection was sufficient as the cold spell was only to be of short duration, so we relied on the very substantial bubble protection which you will see below. I am very conscious that I do not want to pamper the tree ferns when spring is approaching and start the fronds into growth too soon as we get very late hard frosts in some years. We have an 8 foot *Dicksonia* in our fern house which starts to unfurl its fronds weeks before the outside group (when they were living!).

Our fern house is given minimum heat during winter and only when low temperatures are forecasted to be longer term. It might be a good time to explain that the lengths we have gone to here protecting the ferns are so we can have a life and safely go away for a week or two. The situation that killed our plants, although they were protected, along with others throughout the country was temperatures of between minus 1°C and minus 15°C for several weeks along with wet. We have had this temperature range many times before but never for such an extended period.

3. Wrapping the heating cable.

The heated cable as you can see has been wrapped around the trunk and over the



stakes 8" from the top in a spiral fashion so they do not overlap. When switched on the gentle heat rises up to the crown of the plant under the insulation and can dissipate through the

top protection. A little condensation forms that the trunk will appreciate and as there is an air gap this regulates itself. The crown is the main area of required protection.

Through trial we believe the best position for the orange thermostat is

to be in the crown. This was determined by several different set ups with the cable in different positions. In addition this year I formed a round ball of chicken wire to an apple size and placed this in the crown. I did this around the beginning of autumn and falling leaves were caught there and formed a further natural carpet of protection for the coming winter weather. The wire ball gives another insulation air gap and keeps frozen sodden layers of debris lying in the crown. Simple but effective.



4. Wrapping with horticultural bubble wrap.



We have allowed for the bubble wrap to go around the trunk twice and held in position with pegs. We tried tying the wrap with cord but found that it closed the air gap off around the trunk.

5. Putting the crown protection on.

Here you can see Brian layering the bubble wrap through the fronds in a systematic way. These are easily cut 4 inch wide strips 1 meter long and we have used 20 per plant which gives 8 inches of ventilated bubble protection when finished. You will notice that Brian is deliberately using his hand as a spacer ensuring there is a 5 inch air gap maintained between the crown of the plant and the bubble wrap. They are then tied on loosely when finished.



Photo left, the last strip going on.

6. Tying the top protection.

Job completed.

By trial and error we have found that the above method of wrapping the cable around the trunk suits our situation best.

continued on pg. 82



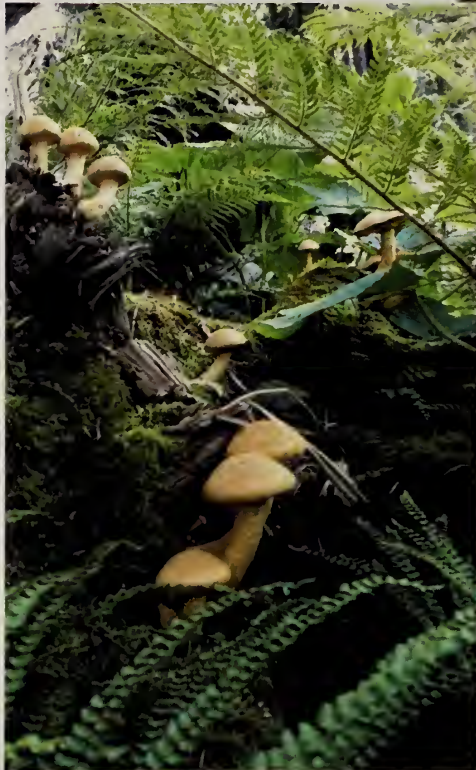


*Elaphoglossum
drakensbergense*

Photo left courtesy of
Tim Pyner

*Mildella
intramarginalis*

Photo right courtesy of
Holly Forbes at UCBG



**Fall mushrooms in the HFF
Stumpery at the Rhododendron
Species Garden**

Photo above courtesy of
Michelle Bundy

Mohria rigida

Photo below courtesy of Tim Pyner





Llavea cordifolia

University of
California Botanical
Garden at Berkeley

Photo left courtesy of
Holly Forbes

Cyathea dregei
South Africa

Photo right courtesy of
Tim Pyner



Cheilanthes lindheimeri

Photo left courtesy of Sue Olsen

Woodwardia areolata

Photo right courtesy of
Sue Olsen



The warming cables have been tried on three different ways:

1. Through the fronds at the top
2. Spirally from the bottom to the top.
3. The method shown above. We decided on this method after monitoring temperatures in the crown against ambient temperatures during cold spells using all three ways. Of course it is all a matter of trial and error but we have kept the following aims and principals to the fore:

- Lots of bubble protection with good ventilation air gaps around the whole plant and especially in the crown.
- Easy to water the trunk through the top with a hose if needed.
- Easy to remove the top protection during extended mild spells and replace when exceptional freezing conditions are forecast.
- To keep the crown dry and protected from consistently long term periods of wet and freezing.
- Only to have the cable switched on during exceptionally cold and extended conditions.
- Simple and quick to put on taking 10 minutes maximum with two people.



Photo left showing frozen snow on top of the insulation and not in the crown of the plant.

Photo below during the trial period



I am sure we will be tweaking the system further in the future, but to do this we need a winter of the likes of 2010 and 2011. Typically after the doomsday forecast in Britain for another big freeze in 2011/2012, it never happened! The last major factor in this system is a control thermostat with a range as described above. This

will negate the need for manual attention and give peace of mind and convenience.

(...*This has now been installed....Ed...*)Temperature variants between the inside of the bubble wrap and the outside ambient temperature are being recorded and the results are very positive, making me believe that we are doing more good than harm... if any harm at all. The experiment will take a further step next winter when I will be putting a less hardy tree fern type from our fern house outside. The fern house is getting too full I will keep you informed good or bad!

South Africa conclusion

Pat Riehl

Vashon Island, WA

Day 7. February 24, 2012

Trooped over to Jolanda's and Alan's room to pick up breakfast. They were amazing. After getting back last night they sat and put breakfast parcels together for us. Almost felt guilty as I tore into my bag of goodies.

Jennifer and I managed to make something one could call tea but it left a lot to be desired. I think it was the preparer, me! Sat outside our room to finish breakfast. The rooms were a little strange, I think they were intended to mimic huts but they had seen better days unfortunately. It was only for one night and there was a shower, so it was not too bad. Jolanda said at one time the accommodations were very nice but they must take a lot of up keep because of high demand. One problem we had was finding our "hut" in the dark the night before. They all looked alike and were placed in a circle around a central courtyard. I think I managed to walk the entire circle before finding our "hut".

Today we left Kruger headed for Sudwala Lodge. But first we had a long drive through the park again. We got a little off the approved roads which meant moving large obstacles, in other words a few had to get out of the vans to move and then replace the barriers. After doing that we went around a corner and came upon a leopard! Beautiful animal. It was clear he owned the world and it leisurely strolled across the road, but not before crouching near Alan's and Jolanda's car. Lunch perhaps? Great picture taking opportunity though and then he went on his way.

Another funny thing, as we were driving in the park we came across a large flock of guinea hens and they would not move over - sort of like slow drivers in the fast lane. They just kept running in front of us and it was really funny to see all these blue headed birds running down the middle of the road. Finally they moved over and we went on our way.

We stopped at a beautiful area to look at and take pictures of the river and waterfalls. Then we went on to a botanic garden which I failed to get the name of. Obviously no ferns here since I had no notes on these stops.

Checked into Sudwala Lodge a little later than expected so we couldn't do any exploring, but we were greeted with refreshments and immediately saw a large display including a stuffed leopard welcoming us to the lodge. We had time to clean up for dinner and some took a quick swim.

Day 8, Saturday

Some of us got up to do roadside botanizing along an access road. Lots to see on the descent including *Doryopteris concolor*, *Cheilanthes viridis*, *Anemia dregeana*, *Cheilanthes hirta*,

Cheilanthes involuta with blue gray scales on the rachis and *Hypodematium crenatum*. And in the wall crevices, we found *Cheilanthes viridis* var. *glauca* and *Adiantum incisum*. There was a discussion about the differences between *Adiantum incisum* and *Ceterach capense*. I wrote the descriptions in my book for both of these but am still not sure which one I saw. Jolanda made a comment that at one time these ferns were plentiful but when they worked on the road most were lost. Too bad.

Needless to say we worked up an appetite and had a big breakfast. Then we were on the road again as today was a long day for our drivers, with a full eight hours until we reached Golden Gate Highlands Park in the Maluti mountains. We were now by the northern edge of the Drakensberg mountains. The hotel was very nice and we stayed several nights which meant laundry! I thought all the places we stayed were wonderful with Kruger being lowest on the list.

Some wanted to explore the area around the hotel but it was very warm so I opted to settle in until dinner.

Day 9, Sunday

It was a very short drive to our first hike in this area. Overall it was a moderately steep slope in mostly grass and small shrubs with ferns thrown in though as we went higher it became more steep and wild. We really had to watch where we were going because the path was very rocky. Just after starting we spotted *Asplenium platyneuron* along with *Cheilanthes quadripinnata* and *Polystichum transvaalense*. There was very little shade and it was hot so many of these ferns were small. The trail winds around and we walked along the base of cliffs that just went straight up. There were so many ferns to see and so many occasions to ask “what is that.” As usual everyone was so helpful with identifying and even spelling the names for me. It made a big difference in my enjoyment of the trip and I tried not to be a pest.

Along these winding paths as we climbed were *Asplenium adiantum-nigrum*, *Polystichum monticola*, *Asplenium aethiopicum*, *Woodsia burgessiana*, several unknown species of *Selaginella* and *Asplenium stoloniferum*. We had lunch in a canyon sitting on the rocks. There was a little trickle of a stream moving down from the closed end of the canyon. The scenery was breathtaking with these massive cliffs rising up so suddenly and just rock rubble at the base. And once one turned to look at where we had been it was hard to believe we had actually climbed that high. The main road seemed a long way below.

After lunch we moved on and saw more of the above mentioned ferns along with *Asplenium trichomanes*, *Adiantum capillus-veneris* and *Asplenium monanthes*. Then it started to rain! We were lucky in that it was toward the end of the hike so I don't think anyone felt they had missed anything. Actually it felt good. It wasn't a hard rain and we did get wet but it was so hot we dried pretty quickly.

We took a drive in the afternoon to a place called the “Vultures Restaurant”. No vultures and no bones except on the sign saying “Vultures Restaurant”! This part of the park is meant to conserve the cape vulture in Southern Africa and create breeding pairs. I had

expected to see piles of bones and birds everywhere. What we got was a panoramic view of the valley and the ground carpeted in black orchids. The orchid was like an *Epipactis*, small flowers on a stalk with strappy leaves. There were also sundews and flowers that looked like pink heather. Actually there were all sorts of wild flowers and I couldn't name a one.

Back to the lodge and dinner. The dinner as it has been in other places was served buffet style and was very good.

Day 10, Monday

We headed back to the same area as yesterday but up a different trail. This was a long hike but rewarding. Our goal was an area at the base of a cliff where a number of polystichums had produced hybrids. Like a bee gathering nectar I flitted from one person to another trying to understand who did what to whom. Everyone had a different opinion so it seemed hopeless to a novice like me. *Polystichum dracomontanum* is found only in this area of the Drakensberg range and in this same area were also *Polystichum sinense* and *Polystichum monticola* so the issue seemed to be were there hybrids between any of the three. The new book *Ferns of South Africa* describes the minutiae differences between the three which makes perfect sense until you are out in the field looking at them and then it is a muddle. For me anyway.

In the afternoon the group split up; some went shopping and some did more ferning. I must admit I went shopping! Jolanda took us to a small village to wander around. I have no idea of the name of the village. There wasn't much to buy but it was good to see the village and wander through some of the shops. There were some interesting art galleries and a place to get an ice cream.

Day 11, Tuesday

Our destination was the hotel Orin Mont-Aux-Sources in the Royal Natal National Park. It was always interesting getting into and out of these national parks; they were gated and heads were counted, papers shuffled and maybe entrance fees charged. And most of the areas we were in were national parks so it happened frequently. One gate we went through was being repaired and one workman was working on the ceiling but in order to make the job easier he had constructed stilts out of pieces of wood and somehow strapped them to his legs. That would never pass in the US.

Our first stop followed a hot, dusty, bone jarring drive up to a lookout for Sentinel Peak. Sentinel Peak car park is at 2,500 meters or 8,200 ft. above sea level. For most hikers and this is a major hiking area, it is the way to reach the top of Amphitheater's Mont-Aux-Sources at 3,254 meters or 11,000 ft. We were able to walk along a paved path and see down into the valley below. Just beautiful. Along the walkway were white scabiosa, campanula, more ground orchids and ferns, including lots of *Mohria*. (see photo page 80)

The idea was to walk down the road and botanize as we went. I finally discovered that *Mohria* was dimorphic. We also saw *Asplenium trichomanes*, *Cheilanthes eckloniana*,

Asplenium adiantum-nigrum, and fertile fronds of *Elaphoglossum drakensbergense* tucked into crevices along with *Mohria nudiuscula* and *Blechnum australe*. (see photo page 80) There was one *Woodsia* in this area. As anyone who has traveled with this group knows this took a lot of time as we all spread out going down the road. One unusual plant was a parasitic lily in bloom. Only the flower stalk was visible with three very large white flowers. The flowers were borne on a brown stalk, which produces no chlorophyll so it depends on plants around it for food.

Finally, hot and tired we made our way to the hotel which was situated in a beautiful setting. The view from the open lobby area and patio looked into a distant valley and mountains. From this vantage point the following night we watched a serious thunder and lightning storm come our way.

Before dinner some used the swimming pool to cool off. It didn't last long as dinner again was buffet style, served in a miserably hot dining room. We all decided the next night we were eating on the patio.

Day 12, Wednesday, February 29

After breakfast in the sweltering dining room we picked up prepared lunches and headed out for the day. Lunches are a distant memory as they should be. What we would get was always a surprise and at least half of it we never ate.

After a brief car ride we ended up at the start of the day's hikes. We were in the Royal Natal National Park and the day's hikes were on Look Out and Gudu trails. This whole area is under the Amphitheatre, a semicircular wall of very high mountains that come straight out of the ground. From a distance there seems no slope up to them. There are no words to describe the scenery. It's beyond beautiful. It is all open plain, very few trees for shade and it was hot. We were also at 10,000 feet elevation which explained the breathlessness in climbing. The brochure said this was an easy hike. They lied! It could have been the altitude though. We walked through a *Protea* forest and scattered everywhere were *Cyathea dregei* just out there in the open - I think just to spite us northerners who can't grow it! (see photo page 81) One odd thing - we were passed coming up as they were going down by a group of three men and one woman carrying guns. Looking for poachers maybe? This would be heaven to someone who loved wild flowers; for fern lovers it was wonderful. We passed by *Blechnum attenuatum*, *Dryopteris inaequalis*, *Polystichum pungens* and *Polystichum monticola* - all this after having reached a shaded treed part of the climb. Here was a little waterfall and lots of us used our hats to pour cool water on our heads. There were all sorts of the ground orchids we had become accustomed to seeing, *Ecomis*, *Streptocarpus* and *Begonia sandersonii*.



Blechnum attenuatum

Photo courtesy of Tim Pyner

Getting deeper into this forest we saw *Asplenium monanthes*, *Polystichum transvaalense* and in deep shade one log that had *Asplenium varians*, *A. rutifolium* and *A. aethiopicum*. We also came along patches of *Adiantum poiretii* var. *sulfureum*. Even I could identify this one with yellow sori on the underside of the frond. The hike ended at a stream where there was another large log and boulders that had *Asplenium rutifolium* and an unknown polypodium.

The afternoon was spent on another trail, Gudu Falls I think. Only a very few made it up to the falls while the rest of us moved on back into open grass and underbrush. Here were *Agapanthus*, *Scaboisa* and what looked like yellow Yarrow with black and yellow beetles crawling on them. Grace Acock and I had made the mistake of waiting for the group who had climbed up to the falls because “it would only take 15 minutes and they would be back”. Well we waited quite some time and no one came so we decided we would follow the trail to get to the rest going down only to discover we didn’t know which trail. So we waited some more and finally saw the group in the far distance which gave us a heading and we followed. We were very happy to be on the right trail though I almost sent us in the wrong direction. Luckily Grace was paying attention or we might still be there!

Part of the group who didn’t want to do a major hike took a small hike, maybe a mile, that ended at a wonderful waterfall and grotto. Except for the guys who went to the falls everyone was there when we arrived. All of them were sitting in the shade, feet dangling in the cold water. We soon joined them.

Everyone stayed for some time and we were watched over by a baboon whose water we were enjoying. She stayed high up in the trees and watched us. Finally we gave it back to the baboon and headed to the vans, but not before Ian and Jane got some very close pictures as she came down on the ground near them to reclaim her territory. My, what big teeth she had!

Day13, Thursday Devil’s Hoek

After breakfast we headed back to the same general area but this time to an area called Devil’s Hoek. This whole area was a hiker’s paradise. We were in the middle of the Amphitheater so called because of the sheer cliffs that formed a semicircle around the valley we were hiking in.

This area was similar to yesterday’s: open grassy plains, higher up scrubby trees and some shade. In the open areas were more *Cyathea dregei* along with *Agapanthus*, *Kniphofia*, *Leucojum* and *Leonotis leonurus*. One major fern in this open area mixed in the grass and among the rocks was *Mohria*. I wouldn’t even begin to weed out the species (excuse the pun) there were so many. We all decided Tim was going to drive himself crazy trying to identify them all. The only one I identified



Cyathea dregei

Photo courtesy of Tim Pyner

was *Mohria nudiuscula* and only because I asked. After that it wasn't worth my asking or anyone trying to answer. I could at least identify it as *Mohria*. Near the *Mohria* were *Asplenium monanthes* and *Polystichum luctuosum*. At a waterfall was a wonderful *Asplenium adiantum-nigrum*.

Along the trail in the shade among weeds was a large patch of *Asplenium stoloniferum*. Alan and Jolanda said this fern was hard to cultivate which is why they did not have it in their collection. Too bad as it was very nice. Fronds are quite long like *Asplenium trichomanes* but instead of clumping it had a long rhizome which makes for large colonies. It preferred soil over rock and needed a fair amount of moisture but did shrivel if left too dry only to spring back after a rain. Can you tell I liked this little fern?

A treat on the trail was a cave just a bit off the trail that had rock paintings. The scenes are of men hunting animals all painted in red. Alan said they were about 800 years old. On the opposite side of the valley from us were baboons moving around. One could see them but other than their movements it wasn't clear what they were doing. This whole hike was a wild flower paradise: *Begonia sandersonia*, *Streptocarpus*, *Gladiola* like flowers spikes, *Watsonia* and so many more. We enjoyed a nice flat surface walk on the way back to the vans with gathering storm clouds overhead.

Day 14, Friday, Durban

On the road again but not before taking another look at the Amphitheater. Our first stop in Durban was at Makarenga Lodge for lunch. This seemed very much like a private club and after two weeks traveling I felt a little grubby sitting down for lunch. The entrance to the building had a beautiful waterfall and plantings of tree ferns and other ferns. You'll notice I stopped trying to ID ferns here, though after lunch we had time to wander through the beautiful gardens which surrounded the Lodge. Tree ferns everywhere: *Dicksonia squarrosa* and *Cyathea dealbata*, along with *Woodwardia radicans* and on it goes. Orchids filled the trees. *Heliconia* species and anthuriums were just a few of the exotic plants all beautifully maintained in this amazing garden.

They also had the largest collection of Shona Art in South Africa. These Zimbabwean sculptors of the 1950's and 60's for the most part were first generation artists and had no history of carving. Also displayed were leading contemporary sculptors such as Dominic Benhura. The sculptures ranged from realism to abstract. There was even a marble statue of David discretely tucked away in one corner.

After a quick trip to the gift shop which was largely of the food gifts variety we headed out for Durban Botanic Garden. On the way we saw the Indian Ocean and lots of traffic. Somehow we got separated from Alan and Jolanda and one van - lost actually but after a little consultation and asking directions we made it to the Botanic Gardens. Honestly at this point I was done so though the nesting pelicans were interesting and the area of tropical ferns was the same I along with a few others spent our time watching the monkeys cavort through the trees. It was just too hot.

Our last night's dinner was on our own as we had had the group dinner while at Orion

Mont-Aux-Sources. Most everyone separated into groups and headed across the street to a huge shopping mall. This mall was a shopping entertainment center with all sorts of activities from skate boarding to water slides, mountain climbing, body surfing and for the younger kids small wheeled stuffed lions, zebras and giraffes to ride.

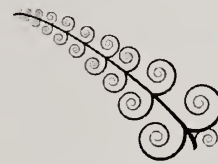
One thing about these trips, there is never much shopping so packing for home isn't usually a problem and that was true this time as well. The biggest problem was the South African fern book and at this point I would gladly have left it! I even found a paperback copy at the Durban airport. But having hauled this tome for two weeks I wasn't about to leave it so in the backpack it went for the trip home. It looks like it had a hard trip and it did! I had also read about having one's luggage wrapped so while I waited for my plane I decided to try it. I had been watching other travelers having it done and it seemed as if just about anything could be plastic wrapped. After having it done I wondered if I would still find it sealed when I reached Seattle. To my surprise it was!

I won't talk about The Airline who gave my upgraded seat away and put me in economy coach because this was an amazing trip. I can't thank Alan and Jolanda enough for all the time and care they took to make sure we saw everything we could possibly see and to Jennifer for organizing and all the hundreds of other things she did to make this trip so wonderful. I roomed with her so I know the hours she spent making this trip happen. And finally to everyone on this trip who made it so memorable for me in spite of my questions and lack of knowledge. It was a trip of a life time. I am so happy I went.

Welcome New Members!



Phyllis T Atkinson
Allison Chang
Sue Dickinson
Russell Gaines
Donald Henley
Joan Mervyn-Smith
Beverly van Hartesvelt
Margaret Walker



The American Fern Society's 2012 foray 7 July 2012

George Yatskievych

Missouri Botanical Garden

St. Louis, MO

In conjunction with the Botany 2012 Conference in Columbus Ohio, on 7 July about 32 members of the American Fern Society gathered for a pteridophyte foray to the Hocking Hills in southern Ohio. With temperatures in the sun reaching about 106°F and the prospect of riding in a school bus designed for grade-schoolers and lacking air-conditioning, this was going to be a very interesting trip indeed.

Our four leaders, Warren Hauk, John Knouse, Steve McKee, and Paul Knoop, first took us to Crane Hollow, located southwest of Logan in Hocking County, where we met the preserve director, Heather Stehle. This privately owned and managed site is a designated state nature preserve and includes more than 1,900 acres, much of it a deep system of ravines that cut through the Blackhand sandstone, creating lush hollows bounded by tall, protected sandstone cliffs. The short walk from the bus on a path mowed through an old field took one's breath away because of the sun and heat, but the view of the lush canyon below us was breathtaking in a very different way. Wending our way along an easy path to the bottom, the group proceeded to begin cataloging ferns. In addition to the common woodland ferns, such as ebony spleenwort (*Asplenium platyneuron*), northern maidenhair (*Adiantum pedatum*), and Christmas fern (*Polystichum acrostichoides*), we soon



Polystichum acrostichoides

Photo courtesy of Sue Olsen

ran into some of the more habitat-restricted species, such as the marginal, spinulose, and evergreen wood ferns (*Dryopteris marginalis*, *Dryopteris carthusiana*, and *Dryopteris intermedia*, respectively) and hay-scented fern (*Dennstaedtia punctilobula*). We also observed the interesting Lloyd's clubmoss (*Huperzia porophila*), which forms compact clumps on shaded sandstone ledges. Our path led us up the side of a steep-walled side drainage ending in a large, bowl-shaped bluff that in wetter times has a running waterfall. It was here that most of the unusual plants were to be found. In short order, Eddie Watkins had located patches of both of the region's independently reproducing gametophyte species, *Trichomanes intricatum* and *Vittaria appalachiana*. These two don't make sporophytes and instead propagate vegetatively via microscopic gemmae. Also in abundance were

numerous plants of the lobed spleenwort (*Asplenium pinnatifidum*), somewhat fewer plants of the maidenhair spleenwort (*Asplenium trichomanes*), large colonies of bulblet fern (*Cystopteris bulbifera*), and, as we returned, the mountain spleenwort (*Asplenium montanum*) and Appalachian polypody (*Polypodium appalachianum*). In all, we managed to see more than 20 fern and lycophyte species at this site.

The exit walk back through the old field was short but grueling. Our reward was a visit to the home of Jane Ann Ellis, who, along with her husband, had the vision to protect this beautiful land as a nature preserve. She welcomed us with a large supply of iced tea and lemonade to cool off with. Spirits were high as we departed for our next stop.

We next traveled to Conkle's Hollow, a state-owned nature preserve that protects an even taller ravine. There we paused in the shade of a picnic shelter for lunch and further rehydration. Then, we followed a trail downhill to another sandstone canyon system. In places this gorge has cliffs more than 200 feet tall and is less than 100 feet wide. The entrance path passes through an area with a series of steps extending steeply downward through a narrow slot barely wide enough in places to walk through. When we reached the bottom of the ravine, Warren Hauk showed us one of the highlights of the day, a tiny fern called the narrow triangle moonwort (*Botrychium lanceolatum* subsp. *angustipinnatum*), far disjunct southward from its usual haunts. It took a while to spot the first couple of plants, but then it became apparent that within a small area this population was relatively large. The sandstone ledges along the bluffs held many of the same ferns that we had observed during the morning, with often thick beds of silvery glade fern (*Deparia acrostichoides*), lady fern (*Athyrium filix-femina*), and various wood ferns (*Dryopteris* species). The walk out of the drainage involved yet another long series of steep, old rock steps.

Our time was growing short, but we made one more brief stop, to property owned by Steve McKee right along a road, where a sandstone bluff with a small, recessed overhang harbored several fern species, including the filmy fern (*Trichomanes boschianum*) which was growing on the roof of the overhang in very dim light.

By the end of the afternoon, everyone was sweaty, tired, and elated at our fern-finds. We had seen nearly all of the 40-some fern and lycophyte species reported to grow in the Hocking Hills, as well as some of the spectacular scenery for which this part of Ohio is famous. Even the prospect of wedging into those narrow bus seats designed for elementary school students couldn't dampen our spirits.



Botrychium lanceolatum
subsp. *angustipinnatum*

Photo courtesy of George Yatskievych

Go Ahead and Get Your Hands Dirty!!!!

Sue Olsen

Bellevue, WA

As many of us know working in the garden, in addition to bringing immense satisfaction, is good for our physical and emotional health. Recently, however, scientists have “unearthed” an explanation for our mental well-being. Studies at Sage College in New York confirm earlier studies at Bristol University in England and University College, London that identify a soil* borne bacteria, *Mycobacterium vaccae* as responsible. The bacteria encourage our gut and brains to produce the “happy hormone” serotonin which is an active anti-depressant. (Low levels of serotonin cause all sorts of problems including bad moods.) So get out there and get your hands in the soil. Just leave the gloves behind....you’ll be happier for it.



*The researchers call it dirt but having once heard an American Rock Garden Society specialist proclaim that “soil is in the garden and dirt is at the side of the road” I prefer... to call it soil.

Now is the time to collect fresh fern spore!

Help us add to our HFF fern spore bank. If you would like to contribute, please send cleaned spore to:

*Carolyn Doherty
HFF Spore Exchange Director
1905 43rd ST SE
Puyallup, WA 98372*

Or e-mail her at fernspores@hotmail.com.

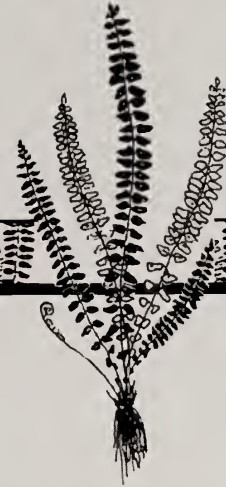
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Visit our homepage at www.hardyferns.org to find out!

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*The Hardy Fern
Foundation Quarterly*
is published quarterly
by the

Hardy Fern Foundation
P.O. Box 3797
Federal Way, WA
98063-3797

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

*Please send your
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