

Hardy Fern Foundation
Quarterly



Fall 2020

THE HARDY FERN FOUNDATION

P.O. Box 3797
Federal Way, WA 98063-3797
Web site: www.hardyferns.org

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

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

Affiliate fern gardens are at the

Bainbridge Island Library, Bainbridge Island, Washington;
Bellevue Botanical Garden, Bellevue, Washington;
Birmingham Botanical Gardens, Birmingham, Alabama;
Cornell Botanic Gardens, Ithaca, New York;
Dallas Arboretum, Dallas, Texas;
Denver Botanic Gardens, Denver, Colorado;
Dixon Gallery and Gardens, Memphis, Tennessee;
Ganna Walska Lotusland, Santa Barbara, California;
Georgia State University Perimeter College Native Plant Botanical Garden, Decatur, Georgia;
Inniswood Metro Gardens, Columbus, Ohio;
Lakewold, Lakewood, Washington;
Lewis Ginter Botanical Garden, Richmond, Virginia;
Powell Gardens, Kingsville, Missouri; **NEW 2020!**
Rotary Gardens, Janesville, Wisconsin;
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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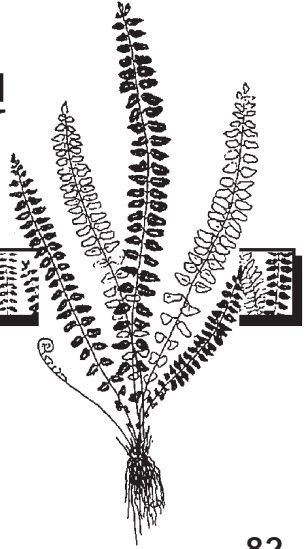
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Don't Miss the Annual Meeting and Social
October 24, 11:00 - 1:00 PM Pacific Time

Daniel Mount will be sharing his experiences on Ferning in Japan.

President's Message

As summer comes to an end and I no longer feel like a hose is just an extension of my hand, I welcome our Pacific Northwest autumn rains. The fires and smoke from September have left an indelible mark on our gardens in the west. If you were not being smoked out of the garden, you were worried about friends being caught in the blazes and often both at the same time. My heart goes out to anyone affected by this.

Soon, we will have the opportunity to meet, but just virtually, for our online Fall Social and Annual Meeting. We are working out the final details for this event, but you should receive an email soon about how to register to attend this event that is free to members. Garden designer, writer and HFF board member Daniel Mount will be presenting a lecture titled Ferning in Japan. Daniel will share his experiences and thoughts on some of his recent travels to this interesting and fern-diverse country. Daniel's thoughtful presentation will bring attention to not only the plants, but also the culture of this interesting country and should be a treat for us all. You can read more about him on his website <http://www.mountgardens.com>.

I am also happy to introduce our newest addition to the Affiliate Gardens program, Powell Gardens of Kingsville, Missouri. Located near Kansas City this 175-acre Garden's mission is "to be an experience that embraces the Midwest's spirit of place and inspires an appreciation for the importance of plants and to celebrate the four seasons." The two-acre Woodland and Stream Garden is home to most of the Garden's fern collection and a recent addition of planted logs, featuring ferns and tropicals, was installed this year. We are excited to have Powell Gardens as part of our program and we will be interested to see how our ferns perform at this midwest location. Gardens like this are an essential part of our learning about this unique group of plants. You can learn more about Powell Gardens on our website at <https://hardyferns.org/affiliated-gardens> and at <https://powellgardens.org>.

I look forward to our Fall Social in October and hope to see you (virtually at least!) there!

All the best,

Richie

Richie Steffen
HFF President

Looking Forward to
"Seeing"
You at the Annual Meeting
and Social.

Fossil Grove – Ancient Forest and a Future Fernery

**Andy MacGregor (member, British Pteridological Society)
Glasgow, Scotland**

In a hidden corner of an urban park in Scotland is one of the last and best remnants of an ancient pteridophyte forest. Fossil Grove, in Glasgow's Victoria Park, is a cluster of 300-million-year-old Carboniferous tree stumps uncovered by excavations in the late 1800s and shortly thereafter protected *in situ* by a small building. Strictly speaking, the fossils are casts of the trunk bases and roots of *Lepidodendron* scale trees, often referred to as 'tree horsetails' although their nearest living relatives are the scale ferns (*Selaginella*) and quillworts.

Fossil Grove is one of the oldest and best-preserved fossil forests in the world, and as such is legally protected as a Site of Special Scientific Interest. Its discovery in 1887, during landscaping of an old roadstone quarry in the newly-established Victoria Park, excited great interest at the time. The swift decision to conserve it within a new building plausibly owes much to the peculiar but wholly understandable enthusiasm for all things fern-related that swept Victorian Britain (and North America to some extent) during the mid-to-late 19th century – the famous *pteridomania* or fern-fever.

Glasgow was arguably at the epicentre of global pteridomania at that time, being the main urban centre on the western seaboard of Scotland where the mild, wet climate is especially fern-friendly and where so many of our horticultural 'monstrosities' were first discovered in the wild. The 1880s also saw the creation of a tree fern collection in Glasgow's magnificent Kibble Palace greenhouse, a few miles up the road from Fossil Grove. (Following complete restoration in 2006, the Kibble Palace remains one of the city's glories, and now houses the National Collection of tree ferns.)

At Fossil Grove, concerns over the condition of the protective building have motivated recent efforts by public agencies and the dedicated Fossil Grove Trust to undertake repairs and enhancements that will improve the care of the fossils. A future vision for the site is likely to include the design of a new building better geared to conserving and showcasing this natural wonder.

In the meantime, the site's pteridophyte interest is no longer confined within four walls as petrified stumps of long-dead trees. In 2017 a local community group the Friends of Victoria Park (hereafter 'the Friends'), led by Richard East, came up with a vision to complement the Fossil Grove by creating an outdoor fernery in the former quarry located immediately behind the building.

The Victorians artfully landscaped this quarry to create an area of intimate crags and rock passages that would provide a fashionably picturesque setting for the Fossil Grove. However, what was once a well-tended and horticulturally pleasing area of landscaping has in recent years become decidedly unkempt for want of resources and manpower. The Friends' mission has been to return it to its former glory – and indeed to make it better than ever, by filling it with ferns!



BEFORE RENOVATION



BEFORE RENOVATION



BEFORE RENOVATION

Richard contacted the British Pteridological Society at an early stage to get advice on species choice and help with planning and planting. Through a series of community events the site was cleared of unwanted vegetation, soils improved, a pond restored, and an initial planting event in June 2019 saw over 600 hardy ferns and horsetails given a new home. BPS members donated many ferns but for a project of this scale most had to be purchased from commercial nurseries. As ferns are not cheap, the Friends have been most grateful for additional funding from Glasgow's Incorporation of Gardeners and the Glasgow West Area Partnership, a fund of Glasgow City Council.

Inevitably, a project of this sort in a popular urban park presents certain challenges: some ferns from the first round of planting were lost to vandalism or under the feet and wheels of pedestrians and cyclists for whom paths are a needless restriction. On top of that, Glasgow's fern-friendly climate exceeded itself in early

2020, with a long spell of very wet weather flooding part of the site and forcing visitors to divert through planted beds.

Despite the further challenges presented by the coronavirus lockdown, the group has been able to continue work over summer 2020, with socially-distanced volunteers comprehensively weeding the site in June and completing a second major planting event in July during which 500 ferns were brought in to fill remaining gaps. Another 400 ferns are due to be planted in autumn 2020, and further supplementary planting will likely be required for a few years yet, after which the ferns should be well established and need less intensive care.

As the project comes to fruition (sporulation?) the Friends plan to publicise it with a website and leaflet explaining the vision and recording the species layout. In the long term, we hope the outdoor fernery will provide a beautiful living counterpoint to the ancient pteridophyte marvel of Fossil Grove, and so help to spread an appreciation of Glasgow's wonderfully fern-laced heritage. 🌿

Photos courtesy of Richard East



2019 PLANTING



2019 PLANTING



2019 PLANTING

The Bainbridge Island Library Fern Display Garden - Twenty Years and Counting

John van den Meerendonk

Photographs by David Gibson



BAINBRIDGE ISLAND LIBRARY

In February of 1999, the groundbreaking of the Fern Display garden began. But this story actually begins in 1996 with the complete reconstruction of the Bainbridge Library, which doubled its former size and provided a new modern library for the community. Bainbridge Island is unique in that the Bainbridge Island Community owns the Library building and grounds and is supported by volunteers and donations and is part of the Kitsap Regional Library System. Construction of the new library began in September of 1996 and it opened on July 6th, 1997. The library's interior is decorated by beautiful art work, through a coordinated effort with donations from many community artists.

The library's beauty is now complimented by three unique gardens that surround the building. The installation of the Haiku Japanese Garden on the south side of the library building began in the spring of 1997. All the materials, the plants, the planning and outsourced inputs of this garden were a gift of the Bainbridge Island Japanese American community as a gesture of appreciation to the Bainbridge Island community and to honor their ancestors. The installation of the garden was done by community volunteers of which I was one of many. It was a wonderful community experience with as many as 50 volunteers showing up each day to create the garden. I was in charge of the installation of the extensive natural sandstone paving that traverses the space, cutting each piece to fit as a mosaic and supervising the installation. It is a beautiful garden with large stone placements, sculptured trees and

plants, pond and waterfall, setting the stage for the fourteen Haiku poems spread throughout the garden. This garden was completed in time for the grand opening.

In 1998, renown garden writer, guru and Bainbridge resident, Ann Lovejoy lamented the sorry state of the library grounds other than the beautiful Haiku Garden on one side of the building. She began recruiting garden volunteers into a group called the Friday Tidys, to install and maintain the mixed perennial beds that now encompass the library's main entrance, and the entire south side of the library surrounding the main parking area. Ten years later the library doubled the south side parking area and Ann and the garden volunteers extended the mixed perennial borders around that area. All the plants were donated by volunteers and local nurseries. Today the Mixed Perennial Garden is a riot of texture, form and color that dazzles the eye and soothes the soul throughout the year. The Friday Tidys work every Friday morning, adding to, editing and maintaining this much loved garden and assisting in the maintenance of the Haiku and Fern Display Gardens.

The entire east side of the library grounds was a neglected, no man's land of weeds, blackberry and brambles. It was a real sore spot between the library building and the adjacent Safeway grocery store. This side of the library also served as the lower level entrance to the Children's Library. The area encompassed a space approximately 400 feet long and 50 to 70 feet wide. I was asked by the library staff and board what could be done with this space. Towering above the space are large Douglas Firs providing shade. With the shade provided by the tall firs, I was able to see the potential for a fern garden. I was serving on the HFF board and knew that with my affiliation with HFF, I could realize this vision. Fellow HFF board members and Bainbridge Island residents, Anne Holt and Jack Doctor, provided whole-hearted assistance and support. We first petitioned the HFF board's support for this endeavor



OSMUNDA

which we enthusiastically received. With a preliminary plan, we then went to the B.I. Library board of directors to present a proposal to establish a fern display garden. We received their permission to move ahead, for anything would be an improvement for this area.

Beginning in February of 1999, with volunteers and my company's landscape installation crew, the weeds, brambles and brush were cleared, chipped up and returned to the earth. Over the next few months my company installed the structure of the garden. First, we re-routed the existing bio-swale that receives storm water from the large south parking area, into a more meandering natural looking stream enhanced with bolder placements. We found out in our research that many fern species work wonderfully in removing pollutants from storm runoff. Paths were established, two bridges installed, construction of steps and rock walls flanking the entrance to the Children's Library, small water feature, irrigation installation, soil preparation, planting of select trees and shrubs, and finally the design and construction of the rustic Gazebo that sits in the heart of the garden. Later that spring, on a Saturday, 500 ferns representing 50 species and varieties, were planted by volunteers from the community and members from the Hardy Fern Foundation. Most of the ferns were donated by HFF and HFF members and from Sundquist Nursery from Poulsbo that specializes in growing ferns.

In 2000, the Bainbridge Island Library won first place as the most beautiful landscaped library in the U.S. sponsored by the Friends of the Libraries, U.S.A. and Storey Book Publishing.

It is hard to believe that twenty years have passed since the first fern plantings. The fern collection has waned and grown through the years. The first fifteen years were difficult because of time consideration due to my involvement with my landscape design and build company. Basic maintenance was about all we barely had time for. The last few years, with the assistance of fellow HFF board member and B.I. resident Dave Gibson, the garden has been improving. Now retired, I also have more time to improve the growing conditions and to add to the fern collection. A beautifully grown mature fern species is a sight to behold and there are some beauties in the garden. Dave has 200 plus fern species and varieties in his personal garden which is a motivation for me. There are approximately 80 fern species and varieties now present and Dave and I have plans to significantly add to this collection and to make this a world renown fern display garden. Future plant labeling and continuing education are the next integral part of the ongoing plans. There is space for growth. Happy fern gardening. 🌿

Editor's Note: This was just the first of many HFF gardens created by John. He designed and installed our original planting at the Washington Park Arboretum Signature Bed in 2003 and an addition in 2012, the Fern Glen at the Bellevue Botanical Garden in 2008 with an upgrade in 2019 and our pride and joy the stumpery at the Rhododendron Species Botanical Garden in 2009! Thank you John.



FERNS IN AUTUMN



JOSH AND LOUISE VISITING THE LIBRARY FROM ALABAMA

Welcome New Members

Janet Bobo	Caitlin Maraist
Amanda Carter	Thomas Masinter
Christopher Dunn; Cornell Botanic Garden	Mary Masu
Elizabeth Crossfield	Mary McCheyne
Michael Elder	Lynn McIntyre
Marco Ferrarini	Langdon Miller
Erin Gayton	Marsha Miller
Daniel Green, Jr.	Leslie Morris-Smith
Alan & Julie Guenther	Wendy Murray
Jess Hagenah	Sue Nevler & Steve Gattis
Carol Hartley	Ann Odell
Justin Henderson	Sashi Raghupathy
William C. Hibler	Lori Robertson
Tom Hobson	Adam Romero
Linda Holman	Lars Rosengreen
John Hubbard	Kelsey Sapp
Laura Hudson	Melissa Sherrow
John Hurley	Alice Skeim
Phillip Imel	George Soule & Maurice Horn
Joan Kalthorn	John Steel
Todd Kelley & Christina Hanson	Frank Stowell
Brenden Kenny	Jane von Trapp
Jon Knight	Jan Ole Westerhus
Michael Libertini	Linda Williams
Loretta Lopez	

Fern Findings from the Georgia State University / Perimeter College Native Plant Botanical Garden –

Part 2: The Exotic Ferns

**Rick Barnes
Tucker, GA**

Sometime around the mid-1990's, George Sanko and his ever-transient army of garden student workers and volunteers were slashing through the tangle of Chinese Privet, Japanese Honeysuckle, and Poison Ivy – an international consortium of invasive plants – when they made a surprising discovery. There, in the middle of the underbrush being removed to expand the college's budding native plant garden was a huge pile of beautiful natural boulders. A gardener's dream come true! "Fern Mountain," as George would eventually name it, is pictured here as it was in Part 1 of this article, published in the Fall 2019 issue of the HFF quarterly. The day of that discovery was likely when a seed (perhaps I should use the term spore) planted in Sanko's mind started to grow into what would become the "Ferns of the World" over the next 20 years.



FERN MOUNTAIN

That catalytic event was all that was needed to motivate the Teacher-turned-Gardener to strive to develop the largest collection of native and exotic pteridophytes in the southeastern US, possibly even the world. The garden likely hit its apex in terms of numbers of fern taxa about 2015, when the conservative estimate placed the total at 390. Of course, it is one thing to plant ferns in your garden, and quite another to

have them all grow and thrive. Many of the ferns introduced into the GSU/PC Native Garden have done extremely well - one species at least has done too well in the mind of this writer. And many others that were trialed in the garden languished and became compost for the next generation. In Part 1 of this article, the focus was on the best native ferns of Georgia and surrounding states in terms of potential success in the garden and aesthetic appeal. Part 2 will focus on the best of the exotic ferns that Sanko introduced to the Ferns of the World Garden. As was similarly confessed in Part 1, what has been selected as the best of the exotics for our region is arguable: these are a selection of ferns that have performed well in our garden, are at least fairly available at reasonable prices in the trade, and have fantastic ornamental merit as well. With a few exceptions, most of the exotics are deciduous here: in a colder winter, we would wish that all of them were!



PYRROSIA LINGUA

The Felt Ferns (*Pyrrosia* sp.). Following the excellent treatise on *Pyrrosia* that appeared in the Spring 2020 issue of the Quarterly, I thought that the Felt Ferns would be a great place to start, though of all the ferns discussed here, these are probably the most difficult to obtain, and then at considerable expense. One of the many great points of information in Ben van Wierst's article is confirmed in our Garden: Felt Ferns thrive in good light. Most of the upland at GSU/PC is under pine shade, considerably brighter light than that of deciduous trees. However, we have also had good response in the larger areas of dappled shade. We have labelled the ferns as we received them from the nurseries, and by that reference have *P. lingua*, *P. lingua* 'Ogon Nishiki' and *P. polydactyla*, although I am seeing the possibility of some confusion in studying the diagram of the fronds of *P. hastata* vs. *P. polydactyla*. Another point to note from the van Wierst article is the penchant of *P. lingua* for trying to run up trees and rocks!

Autumn Fern (*Dryopteris erythrosora*). This is certainly THE staple fern of the Georgia Garden. And why not - evergreen, tough, adaptable to sun or shade, easy to grow. It can take flood or famine with equal fortitude. There is fear, however, that its apogamous nature will lead to the demise of its reputation: I have already seen it escaping cultivation on stream banks and elsewhere outside of anyone's garden.



DRYOPTERIS ERYTHROSORA

Siebold's Wood Fern (*Dryopteris sieboldii*). This fern is a real stand-out in our garden with its large frond size, coarse texture, and somewhat lighter green color than many of the other ferns surrounding it. This one takes a while to make a statement in the garden, but once established catches the eye wherever it appears. Perhaps the drier pine shade of the GSU/PC Garden, and as well as our hot summer temperatures contribute to the performance of this wood fern.

Namegatae Wood Fern (*Dryopteris namegatae*). This was one of the ferns donated to the garden for trial by the HFF in 2018, though we already knew it to be a strong performer in our garden. This is another relatively coarse textured fern, though much finer than Siebold's. Its performance is likely enhanced with thorough soil preparation, and moisture must be supplemented during drier periods. Fortunately, our garden and most of Georgia has been adequately hydrated by Mother Nature during the past 2 years, and this fern has consequently performed well.

Bamboo Fern (*Coniogramme japonica*). So unique in both texture and growth habit from so many of the other fern genera, both native and cultivated. Open and spreading in habit, combined with its coarse texture, Bamboo Fern makes a bold statement in our garden. A related species, *Coniogramme intermedia* 'Yoroi Musha' turned out to be a definite showstopper when the British Pteridological Society and Hardy Fern Foundation visited the GSU/PC Garden in 2011. Shorter internodes render this a much denser plant; pinnate-pinnatifid fronds sport sawtooth pinnae with acuminate tips. A coarse, bold, and slightly more compact form for the garden, I'm happy to say this exotic still thrives in our garden 9 years later!

Japanese Painted Fern (*Athyrium niponicum* 'Pictum'). A colorful harbinger of spring with glowing shades of pink, sliver, and green, this fern has long been a popular gardening fern in our region. While the following may or may not be true in other areas of the country, it has been my observation that the vivid colors of the fronds of spring tend to fade and grow muddy as the season progresses. Similar observation has been noted with many of the red-leaved varieties of Japanese Maple (*Acer palmatum*) which I attribute to the high heat and humidity of the Southeast, a



CONIOGRAMME INTERMEDIA 'YOROI MUSA'

speculative and unsubstantiated theory. 'Regal Red' is a popular variety that may hold frond color better, and the hybrid 'Ghost' is more subdued and therefore has a more consistent appearance through the season.

Japanese Beech Fern (*Phegopteris decursive-pinnata*). So different from our stately native Broad Beech Fern (*Phegopteris hexagonoptera*), the Japanese Beech Fern was already a shown to be winner in our garden even before we received additional clones to grow in our Ferns of the World Garden in 2018. A hardy and rapid spreader, the relatively narrow, upright fronds provide interesting lower masses among taller-growing ferns or shrubs. Lots of moisture is a must and these perform best here in strong dappled light or even sun that is a bit stronger.

Upside-Down Fern (*Arachniodes standishii*): Always a great performer as well as a great conversation piece in the garden, Upside Down Fern has graced us now for well over a decade. Arching, spreading fronds form a dense display over the short, creeping rhizomes. The scans here show the unusual similarity in appearance between the upper and lower frond surfaces. This fern never fails to garner interest and grows easily in the GSU/PC Garden.

Shiny Bristle Fern (*Arachniodes davalliaeformis*). The common name couldn't be more descriptive: the fronds are rich deep green with textures that defy definition, pinna with thorny points on the margins. Though the thought of bristles might scare you off - know that this fern is a distinctive winner in our garden. The frond is widest at the base with backward pointing bottom pinna characteristic of many in the genus. The frond then tapers sharply to the apex. The species name is descriptive as well, likening fronds of the fern to the tropical Rabbit's Foot Fern (*Davallia sp.*) though lacking the fuzzy rhizomes!

East India Holly Fern (*Arachniodes simplicior*). Failure to mention this fern would be to omit an exotic that has been around the southeastern garden for a long time.



ARACHNIODES STANDISHII-UNDER-SIDE SCAN



ARACHNIODES STANDISHII-TOPSIDE SCAN

However, East India Holly is arguably the lesser performer of the three species of *Arachniodes* discussed here. That shiny frond with the medial variegation on the rachis and pinnules will undoubtedly ensure its continued popularity.

Tassel Fern (*Polystichum polyblepharum*). Touted as evergreen, and definitely so in mild winters and protected gardens, Tassel can really look beaten up after a harsh winter. We have not had many of those in the last decade: as result some of the ferns in our garden have become quite bodacious! Even if the winters take a toll on the foliage, the plants still show great hardiness. The rosette form and rich, dark green fronds render them garden-worthy enough, but nothing will stop you in your tracks faster than those fat, furry crosiers as they swell and unfurl in spring!

Ribbon Fern (*Lepisorus bicolor*). I hardly believed this to be a fern at all until I finally saw sporangia on the back side. Ribbon Fern is sub-tropical in origin but thrives in our temperate location. It creeps and crawls wherever its rhizomes will take it - through the soil, on rocks, even up trees! In a container, it will be directed by the confines of the pot and circle the warm outside edge. The strappy, upright to arching 8-12" fronds offer a stark contrast to other ferns and garden plants. Ribbon Fern has shown hardiness at GSU /PC for nearly 15 years.

Deer Fern (*Blechnum spicant*). While considered a native fern in our garden by the broad definition of the word as we have used it in the past (i.e.- North American Native plants), this fern is so far removed from its native habitat here that I consider it an exotic. Having seen Deer Fern in a much more favorable setting at Mount Rainier National Park, its performance in Georgia pales by comparison. One that perhaps does a bit better here is the Japanese version, *Blechnum niponicum*. Far diminished from some of the strong garden performers mentioned elsewhere here, both Deer Ferns are perennial and offer a rare southeastern glimpse of this interesting genus in a garden setting.

Japanese Claw Fern (*Onychium japonicum*). George Sanko, in describing this fern, complained that he just could not find a “happy place” for it in our garden: ‘it grows well in any location, but then the mass dies off in the middle, leaving disjointed clumps.’ While this may be true, it has massed enough over the past few years to make it more than just worth mentioning. And there seems to be agreement, both in George’s description and in the literature, that a finer texture is rarely achieved in all of ferndom.



ONYCHIUM JAPONICUM

Common Polypody, Ullong Island Form (*Polypodium vulgare* ‘Ullong Island’). Interesting that both articles on the ferns of the GSU/PC Native Plant Botanical Garden would crescendo with a fern from this interesting genus. In the earlier article on the Georgia Native ferns, Resurrection Fern (*P. polypodioides*) was described as a common epiphyte that defies cultivation. How ironic that we would have to travel all the way to an exotic Korean island to find a member of this group that would weather the rigors of the southern garden, but this fern certainly measures up. As with all our successes with fern gardening, both native and exotic, we have learned that good drainage is as essential as adequate moisture and light, and especially so when cultivating a *Polypodium* in soil. Adding this plant to the taxa of the garden has allowed the display of yet another most interesting genus of fern.

The drainage requirement of *Polypodium vulgare* makes a perfect transition toward the conclusion of this article by sharing a secret of the success we have had in growing ferns at the GSU/PC Garden - a place that I describe as one of flood and drought, and one that George Sanko described as a place of sex and violence! While the challenges of our garden are many, the one that rises above the rest is SOIL. Located in the alluvial flood plain of Doolittle Creek, the natural media of the garden is clay overlaid with periodic deposits of silt when the creek floods. Flooding is frequent: as mentioned in Part 1, flooding is nearly an annual event. Alluvium overtop of a predominant clay soil can only mean one thing - lousy drainage! Tightly packed soil particles lead to poor water penetration and movement downward, and by

association low oxygen levels as the water remains in the reduced pore space, unable to pull in oxygen behind it as it drains. Georgia gardeners have struggled with this condition since the dawn of time, and have tried many techniques to counteract its effects: double-digging; addition of sand, gravel (Georgia has a copious supply of granite) and compost; creation of planting mounds and berms. All of these have various measures of success. Sometime in the 1990's a local Georgia product came along that arguably provides the most workable solution to the problems associated with clay soil - Permatil. This material is produced by Itsaul Natural, a subsidiary of Saul Nurseries, Inc. We do not represent nor benefit from our discussion here of their product, suffice it to say that the GSU/PC Native Garden has purchased and



PERMATIL

incorporated tons of the stuff into the native planting media of the Garden. Permatil is a slate product heated to 2000 degrees F. This process causes the rock to expand, increasing the surface area and creating small pores in the resulting 5/16" uniform particles. The rock is porous and low in absorption but high in cation exchange capacity - making nutrients readily available to plant roots. Its affect of improving drainage in clay soils, and thus the performance of plants, is noticeable. Moreover, the amendment is relatively permanent (hence the name Permatil) - once the material has been incorporated into the soil, it remains and does not decompose as would, say, an application of compost. A bonus benefit is that it effectively serves as a barrier for voles. Perhaps there are similarly wonderful soil amending products available in other regions for the correction of adverse soil conditions, and I'm certain that the freight cost in transporting Permatil to other regions would be prohibitive, but I am including the web site information (itsaulnatural.com) in the event there is interest in knowing more or possibly obtaining the product.

As a final note, I would be remiss if I did not mention something about Covid-19. As our garden is a laboratory extension of the Decatur, Georgia campus of Georgia State University / Perimeter College, the facility has been essentially closed to programs, plant sales, and functions associated with the college since mid-March. As a result of the summer spikes in the pandemic in Georgia over the summer, plans to re-open the campuses in the fall have been modified to facilitate a combination of on-line, blended, and limited (25%) on-campus classroom participation. As of this writing, we have received no updates regarding resumption of garden programs or plant sales. 🌿

Photos courtesy of Rick Barnes

Fern collections at Powell Gardens

Brent Tucker

We at Powell Gardens are honored to be the most recent addition to the Hardy Fern Foundation Affiliate Gardens. As a young 34-year-old botanical garden, we embrace our sense of place being amongst our Missouri native prairies.

Powell Gardens, “Kansas City’s Botanical Garden”, sits about 30 minutes east of Kansas City in Kingsville, Missouri on over 900 acres with 175 acres open to the public. Powell Gardens features six main display gardens: Perennial Garden, David T. Beals III Woodland & Stream Garden, Marlese Lowe Gourley Island Garden, Visitor Center Landscape, Children’s Garden, and Heartland Harvest Garden. In addition, we have a beautiful Fountain Garden, nationally recognized magnolia collection, and three-mile-long Byron Schutz Nature Trail.

Our rural setting gives visitors the opportunity to leave the city behind and enjoy the sight and sounds of nature. The Gardens play a vital role in the community as a space for release, rejuvenation, and the celebration of the fleeting nature of nature itself.

Our Perennial Garden and the David T. Beals III Woodland & Stream Garden are our oldest display gardens. While it is mainly open with a sunny exposure, the Perennial Garden, there are several shaded beds that host many varieties of plants including hosta, toad lilies, numerous native shade plants, and of course ferns. In the 2.5 acre Woodland & Stream Garden under a canopy of black walnut, several species of oaks, hackberry, sycamores and pawpaw trees you’ll find extensive plantings of azalea, hosta, and ferns along with a variety of native shade plants.

Below is a list of fern species found in these two areas:

Perennial Garden

Athyrium ‘Ghost’, Athyrium filix-femina, Athyrium niponicum ‘Burgundy Lace’, Athyrium niponicum ‘Pictum’, Athyrium niponicum ‘Silver Falls’, Cyrtomium fortunei, Dryopteris erythrosora, Dryopteris goldiana, Dryopteris x australis, Osmunda regalis

Woodland & Stream

Adiantum pedatum, Athyrium Branford Beauty, Athyrium ‘Ghost’, Athyrium ‘Godzilla’, Athyrium ‘Wildwood Twist’, Athyrium filix femina, Athyrium angustum f. rubellum ‘Lady in Red’, Athyrium niponicum ‘Pictum’, Athyrium niponicum ‘Burgundy

Lace', *Athyrium niponicum* 'Applecourt', *Athyrium niponicum* 'Silver Falls', *Athyrium otophorum* 'Okatum', *Dryopteris atrata*, *Dryopteris carthusiana*, *Dryopteris championii*, *Dryopteris erythrosora* 'Brilliance', *Dryopteris filix-mas*, *Dryopteris x australis*,



CYRTOMIUM SP. CHENGDU, CHINA - RAINY LATE SUMMER MORNING IN THE VISITOR CENTER LANDSCAPE

Osmundastrum cinnamomeum, *Osmunda regalis* 'Purpurascens', *Polystichum acrostichoides*, *Polystichum setiferum*

In recent years, ferns have been added to several areas within the Visitor Center Landscape. On the north side of the Visitor Center under a 30-year-old white oak is a three-year-old planting of *Athyrium niponicum* 'Pictum Regal Red', *Dryopteris purpurella*, and an unidentified species of *Cyrtomium* from Chengdu, China along with various heuchera varieties. Nearby, beneath a grouping of black walnut and hackberry trees are *Athyrium* 'Godzilla' and *Athyrium angustum* f. *rubellum* 'Lady in Red', and another planting of the unidentified species of *Cyrtomium* Chengdu, China. All are filling in nicely despite the rigors of being planted underneath a black walnut. In this grouping we had also planted several *Dryopteris sieboldii* that were spore grown, but only one survives. Perhaps this particular plant is a bit more cold tolerant for our area, but we plan to sow some of its spore to grow on.

On the south side of the Visitor Center is our new shaded Stumpery Garden. This is multi-year renovation began with one bed renovated last year and the second this year. The 2020 addition is by far the largest, running several hundred feet and will be completed next year with plantings of ferns and other shade perennials. Most of the ferns planted in the Stumpery Garden were grown from spore gleaned from the American Fern Society and the British Pteridological Society. Below is a list of ferns recently planted in this area:

Planted 2019

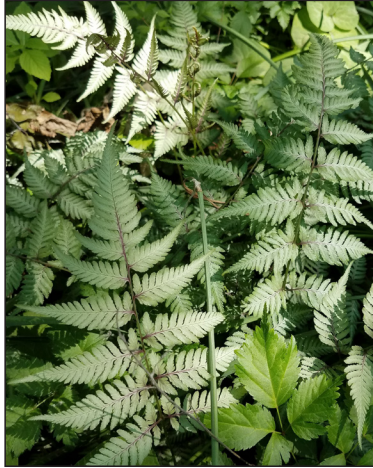
Asplenium scolopendrium 'crinata', *Athyrium niponicum* 'Pearly White', *Athyrium niponicum* 'Pictum Regal Red', *Athyrium otophorum* 'Okatum', *Asplenium venustum*, *Dryopteris erythrosora* 'Brilliance', *Dryopteris championii*, *Dryopteris goldiana*, *Dryopteris x australis*, *Dryopteris purpurella*, *Osmunda regalis*, *Osmundastrum cinnamomeum*, *Polystichum setiferum*

Planted 2020

Dryopteris nipponensis, *Dryopteris sublacera*, *Dryopteris ramosa*, *Dryopteris sieboldii*, *Cyrtomium lonchitoides* - AFS source, *Cyrtomium lonchitoides* - BPS source, *Cyrtomium macrophyllum*, *Cyrtomium caryotideum*, *Athyrium* species #1 Zhejiang, China - AFS source, *Osmunda claytoniana*, *Polystichum luctuosum*, *Polystichum xiphophyllum*.

Becoming an HFF Affiliate Garden is an exciting new venture for Powell Gardens, and we look forward to sharing our observations moving forward. 🌿

Photos courtesy of Brent Tucker



ATHYRIUM NIPONICUM 'PICTUM PEARLY WHITE' - STUMPERY GARDEN SPRING 2020



CYRTOMIUM LONCHITOIDES (AFS SOURCE) - WHIMSICALLY PLANTED IN STUMP AT THE WOOD-LAND STREAM GARDEN.



STUMPERY PHASE 1 - PRIOR TO PLANTING



PHASE 2 - PLANTED WITH (L) *CYRTOMIUM LONCHITOIDES* (AFS SOURCE), (CENTER MID-GROUND) *CYRTOMIUM MACROPHYLLUM*, (CENTER FOREGROUND) *POLYSTICHUM LUCTUOSUM*, (CENTER BACK) *DRYOPTERIS PURPURELLA*,

Ferns of Aotearoa

Kyra Matin
Seattle, WA

Dedicated readers may have noticed this is our second New Zealand fern related article of 2020. New Zealand is just really cool, okay?

The first article, written by Mark Leichty for the 2020 Winter Issue, details some highlights of a talk given by HFF president Richie Steffen about a trip he took to New Zealand in January of 2019. Funnily enough I only just missed Richie, as I went down there in February of that year. I've since become a bit obsessed with New Zealand so wanted to share about my experience and delve deeper into a few NZ native ferns, some of which might just be well suited to PNW gardens.

I don't mean to brag, but I've actually been to New Zealand twice! I first spent four months there in 2017 on a Working Holiday Visa travelling and working at a vineyard and winery (if you're under 30 and reading this, the working holiday visa is well worth a google). After gallivanting in New Zealand and a bit of Asia, I "got serious" and moved to Seattle to start the Master of Environmental Horticulture graduate program at the University of Washington. Honestly, I didn't think I'd get a chance to go back to New Zealand, but, to my delight, two years after my first visit I found myself back on the South Island working on my graduate project and living and studying at the Dunedin Botanic Garden.



THIS SHOT IS OF THE NEW ZEALAND NATIVE SECTION AT THE DUNEDIN BOTANIC GARDEN, WHICH IS LOCATED ON SOUTH EASTERN PART OF THE SOUTH ISLAND OF NEW ZEALAND. NOTE THE TREE FERN TOP BURSTING OUT OF THE OTHER GREENERY, LOOMING LARGE OVER THE SEEMINGLY MINIATURE BENCH IN THE CENTER LEFT.

How I managed to swing another trip to New Zealand as part of a master's project remains a mystery to me. My work focused on evaluating themes and contributing research, as well as actual plant material, for the continued development of the Pacific

Connections Ecogeographic New Zealand Forest at the Washington Park Arboretum. A mouthful, I know. Can you guess how many times my final dissertation said New Zealand? I'll tell you- it was 229 times. In addition to writing that paper, I collected wild, native seed to be grown and planted in the New Zealand display gardens (unfortunately spore wasn't on our import permits). I also did a work study with the Dunedin Botanic Garden and got to live there and work with the staff for three months. This was absolutely key in hooking me up with amazingly knowledgeable and kind plant friends. There is no better resource than passionate people and the Kiwis truly know how to get out there and 'get among it'-- a major shout out to Kate Caldwell and John Steel, as well as some University of Otago grad students who let me tag along on their field work trip. Now, the ferns...

Okay, the ferns are great, but don't get me started on the native conifers! Or the odd and thrilling dracophyllums, which are perhaps the funkier ericaceous plant I've ever seen, with species ranging in size from highly compact cushion forming mats, to wack-a-do Dr. Suess trees. There are also some teeny tiny species of gunneras native to New Zealand, one of which I think may be my plant soul mate. Anyways, that is a discussion for another article. While the gunnera may be small, the fern species range in size from quite diminutive hymenophyllums to large, or rather tall, tree ferns.

In the grand scheme of things, it's safe to say New Zealand has more native fern species than your average mostly temperate to subtropical island. According to the New Zealand Department of Conservation, there are 200 species of native ferns-- so less than Japan but more than England. About 80 of those native species are endemic, found only in New Zealand. The flora of New Zealand has a high degree of endemism in general, but there are actually less endemic ferns compared to the seed plants. The family with the most fern species is Hymenophyllaceae, the filmy ferns, followed by Blechnaceae. Being warmer and wetter, the North Island is slightly fernier in appearance and species richness, but in fact the South Island has more endemic species. Regardless of how many native species there are, ferns are a strikingly prominent and delightful part of the New Zealand vegetation.

While New Zealand has a mostly maritime climate and is generally warmer and wetter than most of the PNW, there are some geographic features (mountains, latitude, and proximity to the ocean) on the South Island that create semi similar climactic conditions to the PNW. It is a little tricky to find the sweet spot for cold hardy ferns, as the coldest part of New Zealand is also the driest, so not that favorable to your typical moisture loving fern (although there are endemic rock ferns in this region). However, species that grow at some elevation on the South Island are accustomed to both cold and moisture, and thus show some promise for growing in the PNW. Many of these are also endemic. Although I feel all 200 New Zealand native ferns deserve your attention, I'm going to devote the rest of this article to listing some of my favorites! If you missed it be sure to check out Mark's winter 2020 article to read about some of his.

There are often multiple Māori names for these plants. When possible I used the names associated with Ngāi Tahu which is the principle Iwi of the South Island. The Latin names are also provided.

KioKio *Blechnum novae-zelandiae* (*Parablechnum novae-zelandiae*)

KioKio grows throughout New Zealand, dominating moist areas. Its fronds have a nice reddish coloring when they emerge. As you can see, it can get fairly large. The

first photo is of a botany professor descending into a wet patch on his way to obtain a sample of a conifer. Along a moist roadside ditch is a common habitat for this fern. The second photo is extra exciting to me- it's a little fern grown from spore that Richie collected. I recently graduated them into 4inch pots and they seem to be thriving! There is a beautiful planting of kiokio at the Miller Garden, planted interspersed with variegated lily of the valley and saxifraga to a very pleasing effect. You can see photos of this in the HFF fern database.



KIOKIO



KIOKIO

Turukio- *Blechnum discolor* (*Lomaria discolor*)

This is one of my favorites, I think because of the silvery undersides and weird crinkle. It is found throughout New Zealand and is common around Dunedin. It grows to be around 1 by 1 meter and can develop a short trunk! There is one growing in a somewhat sheltered spot at the Miller Garden that I had the pleasure of catching in its unfurling stage this year. We currently have spore and a few little plants of this species in the HFF hoop- we will see how they come on and hopefully make them available one day.



BLECHNUM DISCOLOR

Pūpui *Polystichum vestitum*

I am particularly interested in trying to grow this one- I have never seen it in America. This fern grows in wet colder forests of New Zealand, often in exposed spots. Its range extends to coastal and alpine areas on the South Island but is confined to the alpine on the North Island. Both photos were taken in Mt Aspiring national park at some elevation while I was on a hike that led to the base of Rob Roy Glacier. I did this hike by myself and drove my little rental car through several small streams until I reached a deep one and decided to get out and walk to the trail head.

Tapuwae kotuku *Sticherus cunninghami*

This fern is not suited to cultivation and wouldn't be hardy for us but is nevertheless a Kiwi Classic. It is endemic and grows on both the North and South Islands. The Māori name is tapuwae kōtuku, which is also a weaving pattern. In the photo below



POLYSTICHUM VESTITUM

it is growing in a wet silver beech forest, where it can form the dominant groundcover layer. It's also commonly found growing in drier open areas, on banks and cliffs and along the roadside. This picture was taken near Haast Pass, on the way to the west coast of the South Island. 🌿

Photos courtesy of Kyra Marin



STICHERUS CUNNINGHAMI



A FERNY FOREST MURAL PAINTED ON A WALL NEAR THE UNIVERSITY OF OTAGO BOTANY BUILDINGS IN DUNEDIN, NEW ZEALAND.