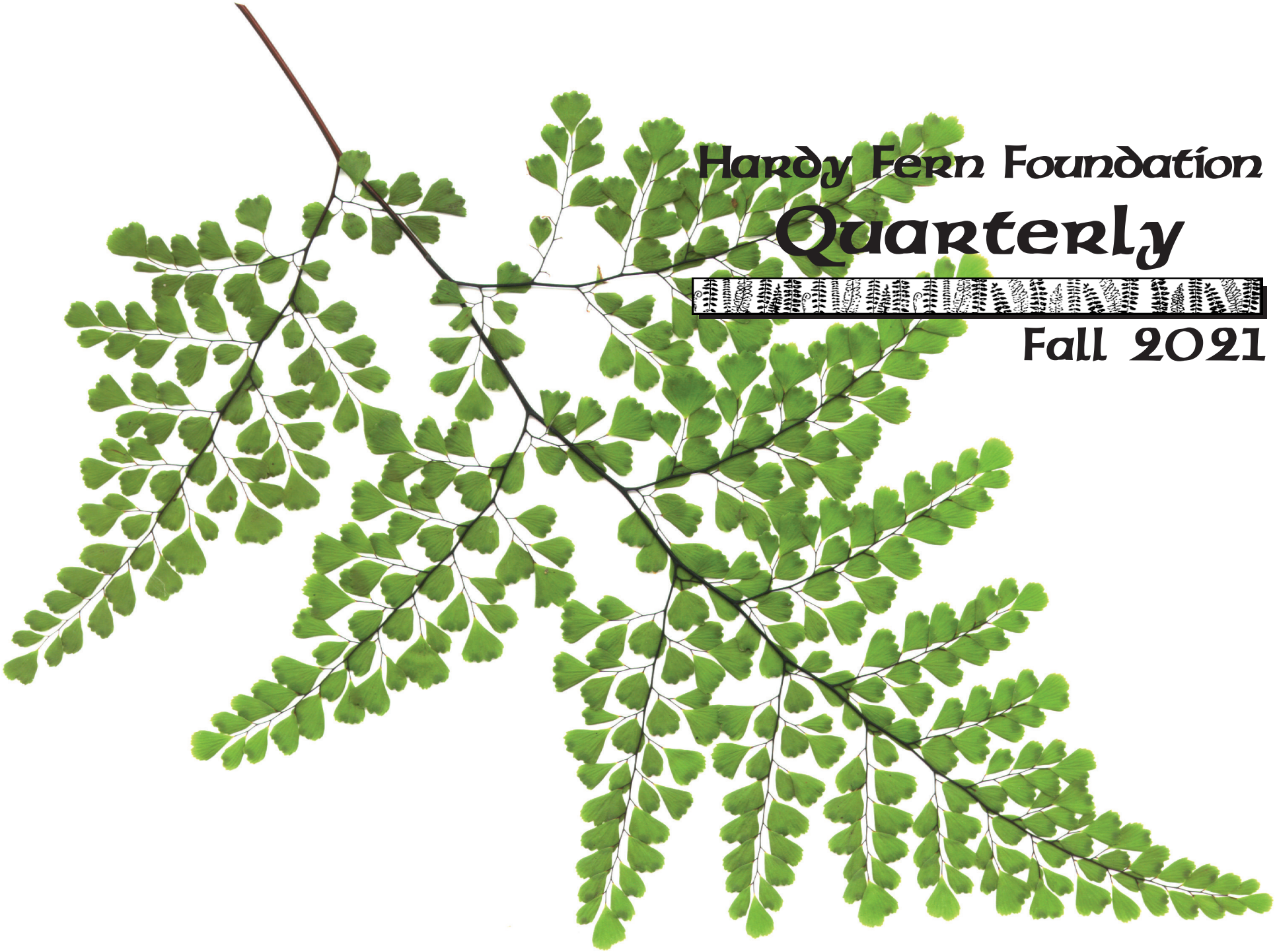


Hardy Fern Foundation Quarterly

Fall 2021

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

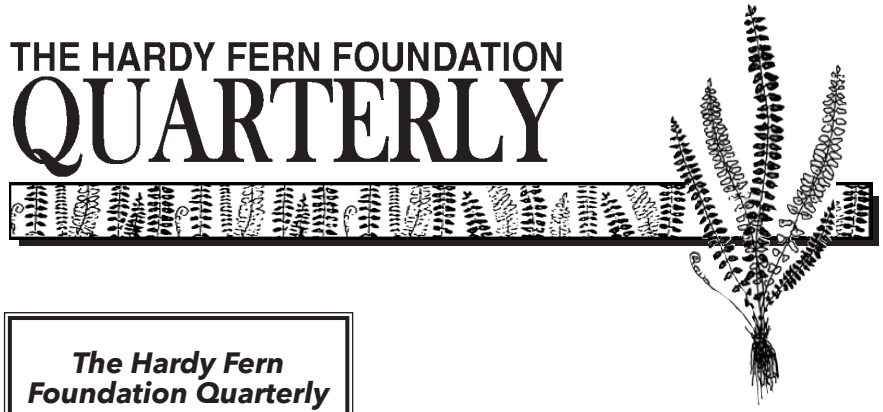
Bainbridge Island Library, Bainbridge Island, Washington;
Bartlett Arboretum & Gardens in Stamford, Connecticut;
Bellevue Botanical Garden, Bellevue, Washington;
Birmingham Botanical Gardens, Birmingham, Alabama;
Cornell Botanic Gardens, Ithaca, New York;
Dallas Arboretum, Dallas, Texas;
Denver Botanic 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;
Heronswood, Kingston, Washington; ***NEW 2021!***
Inniswood Metro Gardens, Columbus, Ohio;
Lakewold, Lakewood, Washington;
Lewis Ginter Botanical Garden, Richmond, Virginia;
Powell Gardens, Kingsville, Missouri;
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

HARDY FERN FOUNDATION QUARTERLY

THE HARDY FERN FOUNDATION QUARTERLY



The Hardy Fern Foundation Quarterly
is published quarterly
by the

Hardy Fern Foundation
P.O. Box 3797
Federal Way, WA
98063-3797
253-838-4646 ext. 111

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

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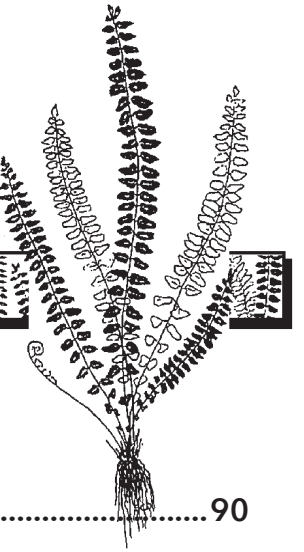
THE HARDY FERN FOUNDATION
QUARTERLY
Volume 31 No. 4 Editor- Sue Olsen
ISSN 1542-5517



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President's Message 2021

HFF Quarterly – Fall Issue

Unfortunately, this President's Message starts out with a somber note. Patricia (Pat) Riehl, a long-serving board member of the Hardy Fern Foundation, passed away in late July. Pat was a tremendous supporter of the HFF and had a deep passion for gardening, particularly with ferns. She had an insatiable appetite for new and unusual ferns and was quick to find the charm and joy of *Pyrrosia*, filmy ferns, *Blechnum* and *Polystichum*. Those who were fortunately enough to tour her garden were amazed at the enormous stumpery she had developed with the assistance of her husband Walt. I will greatly miss Pat's sense of humor, her wonderful joyful laugh and her thoughtful work on our board.

Pat was able to join the board this summer in approving and welcoming Heronswood as our newest affiliate garden. This exceptional jewel of a botanical garden is the former home of contemporary plant explorer and nurseryman, Dan Hinkley. The current director of the institution, Patrick McMillan, joined Dan in touring the HFF board through the garden in mid-August. We were excited to see so many ferns displayed in beautiful surroundings as well as several unusual species from Dan's many trips over the years. Of special interest is their new the xʷəwʷəs shəyí ('new life') Renaissance Garden, dedicated to the history of Heronswood's owners the Port Gamble S'klallam Tribe as well as ferns from around the world. If you are visiting the Kitsap Peninsula in Washington State, be sure to add this beautiful garden to your "must see" list.

I hope that many of you have been enjoying the webinar series we have been running this fall. These educational programs are not only entertaining, but they provide essential funds that support the goals of the HFF. Starting in November, we will again partner with the British Pteridological Society (BPS) to run a series of monthly lectures free to both our memberships. These were popular events last winter, and I am excited to revisit them with the BPS this fall. This series of free lectures is our way of saying thank you for your support. Watch for emails and check our website for more details of the speakers and program dates.

All the best wishes for this autumn. I hope the frost is late and the winter is mild for us all!

All the best,

Richie

Richie Steffen
HFF President

Summer Social & Visit to Heronswood Botanical Garden

John van den Meerendonk
Bainbridge Island, WA
Photos by Dave Gibson and Ryoko Mosley

From left to right: Patrick and Waynna McMillan, Alanna Matteson(Intern), John Van Den Meerendonk, Dave and Lori Gibson, Chuck Ogburn, Kathryn Crosby, Richie Steffen, Jerry Crosby, Bob and Linda Pyles, Rebecca Hazen, Dennis Beatty, Sue Olsen, Dan Hinkley.

On Saturday, August 14th, HFF board members and their guests were able to meet for a get together and visit to Heronswood Botanical Garden in Kingston, WA. Covid protocols were observed, and this was the first time many of us have seen each other in over a year and a half, with all meetings having become Zoom, and gatherings kept to a minimum.

Heronswood is the Hardy Fern Foundation's latest addition to the HFF Affiliate Garden Program. The Affiliate Garden Program plays a very important role in the HFF Mission Statement – "The Hardy Fern Foundation was established to introduce and test the world's temperate ferns for hardiness and ornamental value and to build comprehensive collections for public display, information and education".

HFF now has seventeen affiliated garden members located throughout North America. These botanical gardens are in essence test gardens providing specific information such as hardiness, garden worthiness under climate variability, ease of cultivation, specific needs, culture, etc. New species and introductions are thus evaluated as well as commonly acquired ferns, to see how they thrive or not in many varying locations and conditions. It is always amazing to me to see what the top fern

selections are for the varying regions throughout the continent. The variability is amazing.

Gardeners and botanical garden enthusiasts from the PNW region are familiar with Heronswood Botanical Garden, a plant lover's gem. It is a life's work of traveling and collecting around the world many times over by consummate plantsman Daniel

J. Hinkley and the work of landscape architect Robert Jones to build Heronswood to purpose and fame. Today Dan is Director Emeritus and Patrick McMillan is the Director and Ross Bayton is Assistant Director. Things are happening at the garden. The newly emerging Renaissance Garden opened this year and an ambitious Traveler's Garden is under construction (see accompanying articles on Heronswood). All three of these gentlemen are the most amazing and learned of plantspeople and wonderful teachers. The varied educational program is popular with numerous presentations. The Botanical Garden is owned and operated by the Port Gamble S'Klallam Tribe, a godsend insuring the perpetuity of this wonderful botanical garden.

The day began at my home on Bainbridge Island as the gathering point, with a late morning brunch. It was nice to see fellow board members and guests, catching up on news. Dave and Lori Gibson provided an assortment of delicious cold dishes, accompanied with fruit salad by yours truly. After brunch and a quick walk through my garden of my haphazard collection of mostly ferns, we were off to Heronswood.

We were greeted warmly by both Dan Hinkley and Patrick McMillan. At the entry area and parking area is a newly installed rockery/slab/sub-alpine rockery with little seen ferns and other gems from the Cascade's, Siskiyou's, and Rocky mountains. It is so nice to be able see *Polystichum lonchitis* attempted here, near sea level, saving us a hike into the high country. *Pellaea*, *Astrolepis*, *Cheilanthes,* (*Myriopteris*) *Bommeria, Ceterach (Asplenium*), a little of each you will find here. On to the newly emerging Renaissance Garden. This brain child of Dan Hinkley's, represents both S'Klallam culture and history and an ancient botanical spirit. Relics of the 150 years of the tribe's logging history in the forests and the sawmill across the water on Gamble Bay are scattered throughout the garden. Old stumps and logs represent ancestral spirits. The emerging lush growth, a good part of it in ferns, represents the new emerging life. This garden holds 125 fern species and varieties of the approximately 225 various ferns found throughout the garden. About 50 species are planted in large drifts that really make a statement. Drifts of *Athyrium niponicum* 'Pictum' cultivars interplanted with like drifts of Trillium species are stunning. This mostly shady garden is loaded with various species of Arisaema, Paris, Trillium, Hydrangea and Ginger relatives, etc. and etc. Other treasures linger in this magical forest (see accompanying article on the Renaissance Garden by Dave Gibson).

The gardens continue as we headed south through the well-established shade garden which holds a large part of the collection of 9000 species in the ground found throughout the entire garden. Further south, botanical gems surround the older home. A large perennial garden lies to the east. A spectacular explosion of color, both foliar and floral, greets the visitor to the potager garden just west of the home. Heronswood Garden is growing. Future plans call for the addition of a Visitor and Educational Center. New collections and plantings are to come (see Director Patrick McMillan's accompanying article on Heronswood Botanical Garden).

As the afternoon waned, our once thought insatiable botanical thirst was filling to the bursting point. Our heads spinning from the names of numerous incredible plants, many unknown to us, names scratched down to be later researched, learned,

hopefully remembered and maybe acquired. Heronswood will be a valuable addition to HFF's Affiliate Garden Program. Their commitment to teaching and introducing new plants into horticulture lies in stride with HFF's role in introducing new ferns to the garden world. Their impressive collection of ferns rivals many botanical gardens. Ferns are being added constantly. A number of Dan's fern collections are yet to be identified, generating some real fun in trying to figure out who they are. Maybe a new fern species! That would be exciting.❧

A special Thank You to Dan and Patrick for spending their time with us.

Heronswood Garden

Patrick McMillan
Director of Heronswood
Kingston, Washington

Heronswood Garden enjoys a long legacy as a place for the cultivation and propagation of choice plants from around the world. Our vibrant collection is heavy with wild-collected accessions grown from seeds, spores or cuttings. The garden was established in concert with Heronswood Nursery in 1987 by Daniel Hinkley and Robert Jones. It was to fulfill Dan's lifelong dream of owning and operating a nursery that would be a center for the introduction of new and exciting species. Created as a place where propagation material could be grown and evaluated, observing the features of the thousands of plants that Dan retrieved from his myriad travels, it was also Dan and Robert's private garden and residence. The property was sold in 2000

and unfortunately under the new management, closed and left virtually untended from 2008-2012. In 2012, the Port Gamble S'Klallam Tribe purchased Heronswood at auction and has spent an enormous amount of energy and investment restoring the garden to its former splendor, while also developing it for the future.

Heronswood is now a public garden, open Wednesday-Sunday 10:00 AM – 3:00 PM, from April 1 – October 24. It is also open on Saturday and Sunday during the winter season. The 15-acre property is located within the sword fern-carpeted rain shadow forests of Kingston, Washington, towards the northern tip of the Kitsap Peninsula. The site includes a world-renowned woodland garden, sunny formal gardens and rock garden and one of its newest features, a 1-acre stumpery known as the Renaissance Garden. Dedicated to showcasing ferns from around the world, the Renaissance Garden includes hardy ferns from five continents, nestled within an array of massive stumps, with a supporting cast of woodland plants such as hydrangeas, trilliums and hardy gingers. The Renaissance Garden collection includes 32 fern genera in 15 families, a total of 145 different species and cultivars.

Our management of Heronswood focuses on preserving the collection and creating world-class garden design, whilst embracing the idea that gardens are meant to celebrate and support diversity. Every inch of space at Heronswood is occupied by plant life. Our collections are planted in a natural style with an emphasis on promoting biodiversity through gardening and reducing the use of pesticides. One of Heronswood's most unique aspects is its connection to the Port Gamble S'Klallam Tribe. The culture and traditions of the tribe are intermingled throughout the garden. S'Klallam names for each exhibit are highlighted on our signage and tribal history and culture are emphasized in two of our most recent additions, the Renaissance Garden and the S'Klallam Connections Garden.

The Renaissance Garden pays tribute to the resilience and vibrancy of life and features a massive display of old-growth stumps within a second-growth forest. The logging industry is an intrinsic part of the history of Kitsap County and the Port Gamble S'Klallam Tribe. Tribal members provided much of the workforce for the nearby Port Gamble Mill and would canoe across Port Gamble Bay every day to go to work at the mill or in the timber camps. The Renaissance Garden is filled with period-appropriate artifacts that take the visitor into an abandoned logging camp that has been reclaimed with the lush vibrancy of life.

The S'Klallam Connections Garden is a natural community garden and is under construction at present. Dedicated to lower elevation habitats of the Kitsap and Olympic peninsulas, it recreates the home of the S'Klallam people. This exhibit is being designed and interpreted by our S'Klallam staff and the wider tribal community, so they can share the connections between the tribe and the natural biodiversity of this region. It is located at the southern end of another large, new exhibit, the Traveler's Garden. Both are natural community gardens, designed to incorporate rock type, soil type, hydrology and ecosystem processes of actual natural communities with plantings that are arranged in associations and in densities that may be observed in wild settings. When visitors walk through such gardens, they are transported into

wild habitats, the natural homes of many of our cherished horticultural plants. A visitor to the Traveler's Garden can follow in the footsteps of plant collectors, such as Heronswood founder Dan Hinkley, as they explore the world searching for the best new plants. The Traveler's Garden features three landscapes, each representing a different geographical region. We have chosen to create a slice of Cascadia, a Valdivian (Chilean) rainforest, and a Vietnamese mountain. All three display a diverse array of plants suitable for growing in the Pacific Northwest and all three have been sampled in the past by Heronswood plant collectors. These exhibits are much more than regional collections of plants; rather, they are planted in natural associations and attempt to duplicate the forests, meadows and wetlands of each of the areas highlighted.

One of the prime motivations of Heronswood is pursuing the introduction and development of excellent horticultural material that will allow gardeners to adapt to a changing climate. Temperatures this June reached near or above 100 degrees F, resulting in greatly reduced soil moisture and burned foliage in many places. Plants that are ideal candidates for adapting our gardens to climate change are those that come from regions of the world that regularly tolerate both excessive moisture and excessive drought, as well as cool to cold winters. Our climate has been creeping closer to that found farther south in Oregon and California and many of our new accessions hail from these areas. We are also experimenting with introductions from the Chihuahuan Desert ecoregion (northern Mexico, west Texas, New Mexico and southeastern Arizona). These introductions are being incorporated into our dryland landscapes and include many ferns.

Dryland ferns have become a major focus at Heronswood and our collection includes species of *Aspidotis, Astrolepis, Bommeria, Cryptogramma, Myriopteris, Pellaea, Pentagramma* and *Woodsia*. These ferns have a reputation for being difficult in cultivation, but the inclusion of crevice gardens within our rock garden exhibit has allowed us to refine microhabitat preferences for these ferns and experiment with placement, moisture requirements and adaptability of a myriad of ferns from throughout the American West.

Dryland ferns may not be appropriate for all gardens or gardeners, but they are of interest because of their educational merit and interest to enthusiasts as well as the conservation value of such collections. Every corner of the world is changing and during these times of change, many species are experiencing declining populations. The care provided by botanical gardens can help to safeguard such populations in ex-situ collections and may provide the only viable representatives of these unique plants in the future. We are excited to be expanding and growing at Heronswood and thrilled to be the newest affiliate garden for the Hardy Fern Foundation. ❧

Heronswood Renaissance Garden Part 2

David Gibson
Bainbridge Island, WA
Photos by Dave Gibson

Trail Leading to Renaissance Garden

Wow! A lot has changed in our lives and our gardens since we first introduced you to the new Renaissance Garden being installed at Heronswood. The last year and half have been a struggle for many of us with the ever-changing rules of Covid. For the most part nurseries stayed open as an essential business. Botanical gardens closed for visitors for a period of time and a few are still closed. When Heronswood opened for the season this year so did the new garden section called the Renaissance Garden.

Heronswood has also seen many changes in the last year including a new director Patrick McMillan Ph.D. Patrick, hired in October of 2020, has a vast knowledge of ferns with the experience of being an ecologist, naturalist, botanist, horticulturalist, teacher and the host of the award-winning television show "Expeditions with Patrick McMillan" on PBS, and now available on Amazon Prime.

A major contributor to Heronswood, more since his recent retirement, is volunteer guru and HFF board member John van den Meerendonk. John has played a huge role in the creation and building of the new Renaissance Garden. John has a vast knowledge in garden design, from his years of owning and running his own garden design company, and experience in building stumperies. John doesn't sit on his laurels. Once the Renaissance Garden was established, he eagerly moved on to help carve out another new garden section, the new Traveler's Garden.

On entering the Renaissance Garden from the main parking area you walk past an

old canoe that was donated by Senior Gardener Duane West. It is from a tribe on Vancouver Island, Canada. Turn right at a signage board that gives a brief description of the history and relationship between the S'Kallam tribe and the Port Gamble lumber mill. The trail leads you through mature native ferns from the Pacific Northwest dotted with rhododendrons, lilies, and hydrangeas for seasonal color.

As you walk along the trail that wraps around a pond harboring native Mallard ducks, the stumpery with its towering old stumps comes into view. The stumps give you an impression that they are rooted in place and have always been there. When in fact, they were all hauled in to the garden. Further on, on your left, is an enormous 27-foot fern table packed with an assortment of smaller ferns and companion plants. Near the fern table is an old upright piano topped with a planting of *Dryopteris dickinsii*. The garden has many historical items, like this piano, placed about that are reminiscent of the time logging was a major economic industry in the area.

27ft Fern Table

With a mild winter and a warm summer the new plants have had a chance to put down roots and new growth is now filling in the beds to make a beautiful tapestry of color and textures. Mass plantings include ferns like *Adiantum tracyi, Dryopteris erythrosora*, *Athyrium niponicum* 'Pictums', *Dryopteris celsa*, *D. filix-mas*, *D. affinis* 'Cristata', D. *cycadina* and so many more.

A fern that I was first introduced to in the Renaissance Garden, located across from the fern table, is *Pteris wallichiana*. It is a slowly spreading fern that makes a tidy patch on woody underground upright rhizomes. Dark brown stipes are two-thirds of the

Pteris wallichiana

Unnamed Arachniodes sp.

entire frond length with dark brown scales at the base. At the highest point of the stipe the fronds branch out in three directions. The two outside branches fork again and the middle doesn't fork but grows the longest. Fronds are twice pinnate and

the pinnules are lobed but not cut to the midrib. Sori are born along the edge of the pinnules that are protected by a false indusia.

Another fern that has sparked my interest is an unnamed *Arachniodes*. The spore was collected from Taiwan in 2012, by Dan Hinkley and is located in front of the bed with the old piano. This evergreen slowly spreading fern has dark green 32-inch fronds with a silvery sheen with a slight purple tint. The grooved dark green stipe is about half the frond's length with large hairs at the base diminishing in size and density as you move up the stipe. The fronds are tri-pinnate. The peltate shaped sori are located along the outer edge of the pinnae. This fern is in production and hopefully soon will be available to the public.

As a board member of the Hardy Fern Foundation and a fern collector I couldn't be happier that Heronswood is our newest affiliate garden. It will bring a wealth of information and a place to study ferns. With the new Renaissance Garden open and more plants added all the time it's a plant collectors dream.

Heronswood also has added more open days this year so there is no reason to miss this botanical garden the next time you visit the Puget Sound area. For more up to date information on what's going on at Heronswood visit **https://heronswoodgarden.org.** ❧

The garden also has many Dicksonia antarctica.

Old piano with Dryopteris dickinsii planting.

Welcome New Members

Deborah Andrews	Jennifer Kennard
Loree Bohl, Danger Garden	Omie Kerr
Ellen Burr	Susan Lundman
Joseph Clark	Elizabeth McCoy
Robin Dearling	Nan McKay
Toni Doane	Patrick McMillan, Heronswood Botanical Garden
Sarah Dunn	Michelle Olivier
John Evans	Lori Paulson, Artigiana Graphic Design
Jerry Fritz	Dina Russell, PlantShare LLC
Barbie Gaskill	Susan Ryan
Paul Gonzenbach	César Uchima, Casaflora
Marie Grant	Jan Wanzer
Kaeling Gurr	Bruce Ward
Alan Huth	Leslie Whitehouse
Chance Justbe, happenstantials	Darryl Wisner, Celadon Horticulture

Ferns of Heronswood

Photos by Dave Gibson

Arachniodes sp sori

Parablechnum cordatum

Asplenium scolopendrium

Dryopteris erythrosora

Polystichum munitum sori

Woodwardia unigemmata

Polystichum imbricans

Heronswood Fern List

Adiantum aleuticum
Adiantum aleuticum 'Subpumilum'
Adiantum hispidulum
Adiantum hispidulum 'Mount Haleakala'
Adiantum pedatum
Adiantum raddianum 'Fragrantissimum'
Adiantum sp.
Adiantum venustum
Adiantum x mariesii
Adiantum x tracyi
Anchistea virginica
Arachniodes davalliaeformis
Arachniodes simplicior
Arachniodes simplicior 'Variegata'
Arachniodes sp.
Asplenium scolopendrium 'Angustatum'
Asplenium scolopendrium 'Crispum'
Asplenium scolopendrium 'Cristatum'
Asplenium scolopendrium 'Furcatum'
Asplenium scolopendrium 'Kaye's Lacerated'
Asplenium scolopendrium 'Laceratum'
Asplenium scolopendrium Cristatum Group
Asplenium sp.
Asplenium sp. aff. sarelii
Asplenium trichomanes
Asplenium trichomanes 'Cristatum'
Asplenium x ebenoides
Astrolepis sinuata
Astrolepis sinuata 'Jo Levy'
Athyrium 'Branford Beauty'
Athyrium 'Branford Rambler'
Athyrium 'Ghost'
Athyrium filix- femina 'Cruciato Cristatum'
Athyrium filix- femina 'Frizelliae'
Athyrium filix- femina 'Minutissimum'
Athyrium filix- femina 'Vernoniae Cristatum'
Athyrium filix- femina 'Victoria Sporling'
Athyrium filix- femina 'Victoriae'
Athyrium filix- femina Fancy Fronds Strain
Athyrium filix- femina subsp. angustum f. rubellum 'Lady in Red'
Athyrium niponicum
Athyrium niponicum 'Godzilla'
Athyrium niponicum 'Joy Ride'
Athyrium niponicum 'Pictum'
Athyrium niponicum 'Thrill Seeker'
Athyrium niponicum 'Wildwood Twist'
Athyrium otophorum
Athyrium otophorum 'Limelight'
Athyrium sheareri
Athyrium vidalii
Austroblechnum microphyllum
Austroblechnum penna-marina
Austroblechnum penna-marina subsp. penna- marina Large Form
Blechnum sp.
Cheilanthes lanosa 'Mighty Tidy'
Colysis elliptica 'Crispa-Variegata'
Coniogramme emeiensis 'Golden Zebra'
Coniogramme intermedia

Coniogramme intermedia 'Nishiki'
Coniogramme intermedia 'Shishi'
Coniogramme japonica
Coniogramme japonica 'Variegata'
Coniogramme sp.
Cyrtomium falcatum 'Rochfordianum'
Cyrtomium fortunei
Cyrtomium fortunei var. clivicola
Cyrtomium fortunei var. intermedia
Cyrtomium japonicum
Cyrtomium sp.
Deparia coreana
Dicksonia antarctica
Dicksonia antarctica Heronswood sporeling
Dicksonia squarrosa
Dryopteris affinis 'Angustata Crispa'
Dryopteris affinis 'Crispa Gracilis'
Dryopteris affinis 'Crispa Barnes'
Dryopteris affinis 'Cristata Angustata'
Dryopteris affinis 'Cristata'
Dryopteris affinis 'Polydactyla Dadds' (?)
Dryopteris affinis 'Polydactyla Mapplebeck'
Dryopteris atrata
Dryopteris australis
Dryopteris bissetiana
Dryopteris celsa
Dryopteris championii
Dryopteris clintoniana
Dryopteris complexa
Dryopteris crassirhizoma
Dryopteris cycadina
Dryopteris cystolepidota
Dryopteris dickinsii
Dryopteris dilatata 'Recurvata'
Dryopteris dilitata 'Jimmy Dyce'
Dryopteris erythrosora
Dryopteris erythrosora 'Brilliance'
Dryopteris filix-mas
Dryopteris filix-mas 'Grandiceps Wills'
Dryopteris filix-mas 'Grandiceps'
Dryopteris filix-mas 'Linearis Polydactyla'
Dryopteris filix-mas 'Parsley'
Dryopteris filix-mas 'Undulata Robusta'
Dryopteris filix-mas Cristata Group
Dryopteris formosana
Dryopteris goldiana
Dryopteris intermedia
Dryopteris lepidopoda
Dryopteris ludoviciana
Dryopteris marginalis
Dryopteris nipponica
Dryopteris pacifica
Dryopteris polylepis
Dryopteris pseudofilix-mas
Dryopteris pulcherrima
Dryopteris remota
Dryopteris sacrosancta
Dryopteris sieboldii
Dryopteris sp.
Dryopteris sublacera

Dryopteris tokyoensis
Dryopteris uniformis 'Cristata'
Dryopteris varia
Dryopteris wallichiana
Dryopteris wallichiana - orange-croziered form
Dryopteris wallichiana 'Molten Lava'
Dryopteris x complexa 'Stableri'
Dryopteris x complexa 'Stableri' crisped
Dryopteris yigongensis
Dryopteris yuratae
Lemmaphyllum microphyllum
Lepisorus sp.
Lomaria nuda
Microlepia strigosa 'MacFaddeniae'
Microsorum brachylepis 'Datun'
Myriopteris gracillima
Myriopteris wootonii
Neolepisorus sp.
Oceanopteris cartilaginea
Onoclea orientalis
Onoclea sensibilis
Onoclea struthiopteris
Onychium japonicum 'Sichuan Lace'
Osmunda japonica
Osmundastrum cinnamomeum
Parablechnum cordatum
Parablechnum minus
Parablechnum wattsii
Pellaea bridgesii
Pellaea viridis 'Tiffendell'
Phegopteris decursive-pinnata
Phymatopteris sp. Phymatopteris sp.
Pleopeltis lepidopteris 'Morro dos Conventos'
Polypodium californicum 'Sarah Lyman'
Polypodium cambricum 'Richard Kayse'
Polypodium glycyrrhiza
Polypodium interjectum
Polypodium scouleri
Polypodium virginianum
Polypodium vulgare
Polypodium vulgare 'Bifidomultifidum'
Polypodium vulgare 'Hornet'
Polypodium vulgare Ulleung Island
Polypodium x mantoniae
Polystichum acrostichoides
Polystichum aculeatum
Polystichum andersonii
Polystichum braunii
Polystichum luctuosum
Polystichum makinoi
Polystichum mayebarae
Polystichum munitum 'Sword Play'
Polystichum munitum 'Wordplay'
Polystichum munitum Crispum Group
Polystichum neolobatum
Polystichum neolobatum Alpine Form
Polystichum omeiense
Polystichum polyblepharum
Polystichum retrosopaleaceum
Polystichum setiferum

Polystichum setiferum ‘Bevis’
Polystichum setiferum ‘Congestum’
Polystichum setiferum ‘Divisilobum River Green’
Polystichum setiferum ‘Divisilobum Vivian Green’
Polystichum setiferum ‘Herrenhausen’
Polystichum setiferum ‘Plumosomultilobum Denseum’
Polystichum setiferum ‘Plumosum Bevis’
Polystichum setiferum ‘Proliferum Wollastonii’
Polystichum setiferum ‘Tripinnatum’
Polystichum setiferum cv.
Polystichum setiferum Divisilobum Group
Polystichum sp.
Polystichum sp. aff. neolobatum
Polystichum sp. aff. wallichianum
Polystichum sp. Polystichum sp.
Polystichum tripteron
Polystichum tsus- simense
Polystichum tsus- simense var. mayebarae
Polystichum wallichianum
Polystichum x dycei
Polystichum xiphophyllum
Pronephrium penangianum
Pteris macilenta
Pteris sp. aff. cretica
Pteris sp. aff. nervosa
Pteris wallichiana
Pyrrosia lingua ‘Eboshi’
Pyrrosia lingua ‘Futaba Shishi’
Pyrrosia lingua ‘Hiryu’
Pyrrosia lingua ‘Ogon Nishiki’
Pyrrosia lingua ‘Tachiba Koryu’
Pyrrosia sp. aff. lingua
Selaginella apoda
Selaginella braunii
Selaginella densa var. scopulina
Selaginella helvetica
Selaginella kraussiana ‘Aurea’
Selaginella kraussiana ‘Brownii’
Selaginella kraussiana ‘Gold Tips’
Selaginella martensii ‘Frosty’
Selaginella moellendorffii
Selaginella oregana
Selaginella tamariscina ‘Beni Kujaku’
Selaginella tamariscina ‘Golden Sprite’
Selaginella tamariscina ‘Snow Top’
Selaginella uncinata
Selaginella wallacei
Spicantopsis nipponica
Struthiopteris spicant
Struthiopteris spicant ‘Crispum’
Thelypteris sp.
Thelypteris sp. Woodsia obtusa
Woodwardia fimbriata
Woodwardia japonica
Woodwardia orientalis var. formosana
Woodwardia sp. aff. orientalis
Woodwardia spinulosa
Woodwardia unigemmata

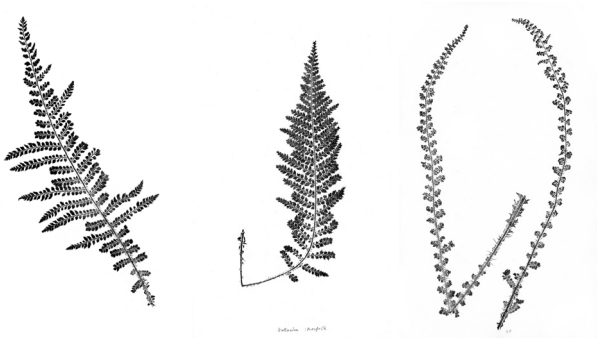
Polystichum setiferum ‘Grandidens’

Julian Reed
Kent, England

This is an old variety going back at least to 1859 and it is one, that the species guys I suspect will love to hate. We will start off with some history and then some more on modern developments.

Picture from T Moore’s *Nature Printed Ferns 1859*

Thomas Moore describes it – A very graceful variety. The fronds are of moderate size, narrowly but irregularly lanceolate, the pinnae being of various lengths, though less dipaurporated (missing bits) than interruptum or dissimile.



Here are some of the Jones nature prints from about the 1870s plus the image of Druery.

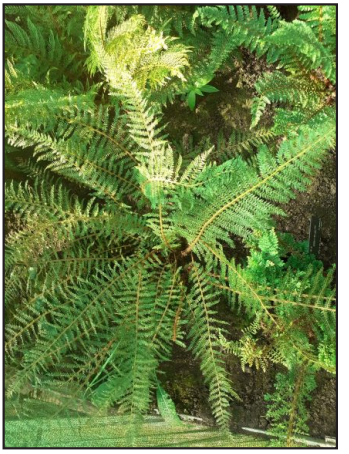
Grandidens Trucatum *Grandidens wills* *Grandidens Wollaston* image from Druery

Jimmy Dyce’s *Polystichum Book Special Publication 7* edited by Martin Rickard and Robert Sykes 2005. There is also an image in Martin Rickard’s book *The Plant Finder’s Guide to Ferns* dated 2000.

‘Grandidens is a compromise of similar forms, which can be found in both this species and the lady fern. This will be a very unusual grouping, but it is justified because of the remarkable similarity of this type of variation in both species. It has been found repeatedly in the wild in a variety of forms as well as in cultivation in spore sowings. It does not usually grow to a very large size, although specimens can be found reaching

up to 2ft (60cm) in height. The pinnules are wide and rounded, deeply and irregularly lacerated and bristly and usually very depauperate.

So where is all this technical stuff going? Well, many years ago I got a plant that fits



NIGEL

Mr Moore's description from Nigel Rowland of Longacre Plants at Charlton Musgrove Somerset but under another name.

It is quite graceful and has irregular length pinnae and is also reminiscent of the drawing of flabellipinnulum from Reginald Kaye's *Hardy Ferns* but from the BPS Gazettes it implies this plant does not exist anymore so where did Reg get it from? The plant is similar but safer at present to call it Grandidens group.

Image from Reginald Kaye
P.s Flabellipinnulum Reginald Kaye

Now that was the story if I had written this a few years ago, looking on the internet and in the Royal Horticultural Societie's website and in their Plant Finder there are no suppliers of this fern and I have never seen it offered. We had a cultivar meeting September this year and James Bowyer told me he got it from Martin Rickard in the 1990s . BUT a few years ago, from some soil from George Whitwell's Garden who was the first Secretary of the BPS and died in 1924 some spores grew and one of them is this variety that most would put under Grandidens group and Moore might put under Interruptum

P. s. Grandidens (ex Whitwell)

Also, from another batch came 6 more of varied shapes and habits that show a lot of promise (one has now been given to someone for safe keeping. They say if you give a plant away you never lose it.

So far the sporelings all seem to be of a dwarf habit when you compare them to the *P.s*, 'Congestum Cristatum' from the same batch. Below on the left you can see what I mean.

This fascinating experiment of a soil sample produced a number of other *Polystichum setiferum* cultivars Divisilobum, Cristato-gracile, Cristatum and maybe a Latipes and others still too young to be sure of. All from spores that had been sitting in the soil for about 100 years the only other cultivar to come up was a crested Hartstongue.

So if one of your ferns should die it could be worth your putting some unsterilised soil from next to it in a container and water with sterilised water and you never know you might get plenty of replacements! ❧

Musings of a Fernatic

Joan Eiger Gottlieb
Wakefield, Rhode Island

Life with a passion for pteridophytes (ferns and allied plants) is not easy. Employment possibilities are paltry. The circle of like-minded friends is small. On a trail, hikers stare pityingly or draw "looney emojis" in the air as you aim a magnifier at fronds. On the plus side, there is the private pleasure of having an unusual interest, and, as with any passion, it is good for one's mental health. Lately I've been pondering how my "out-of-the-mainstream" interest in ferns and their "allied" sisters of the Silurian (380 million years ago) got started and flourished.

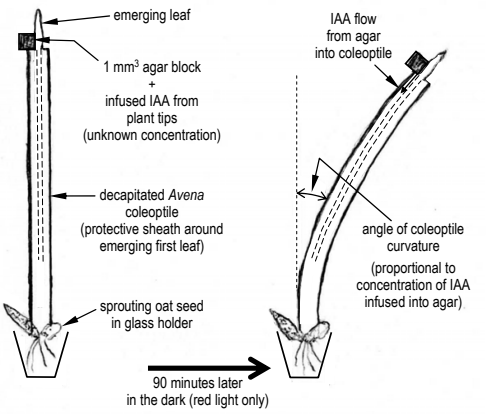
C.C.N.Y. (City College of New York - now C.U.N.Y.) - early fifties - an inspiring botany professor (Dr. Joseph Copeland) introduced the Field Botany class to the Pine Barrens of southern New Jersey where a tiny gem - *Schizaea pusilla* (curly grass fern) - grows inconspicuously on the hummocks (elevated root systems) of eastern white cedar (*Chamaecyparis thyoides*). How could anyone NOT succumb to the pixie charm of this rare bog dweller. Its green, shoestring leaves spiral like a relaxed Slinky toy. In late summer a crown of green, fading to auburn, blade-less, fertile fronds, topped with fan-like sporangial pinnae appears. It was irresistible eye candy (see photo).

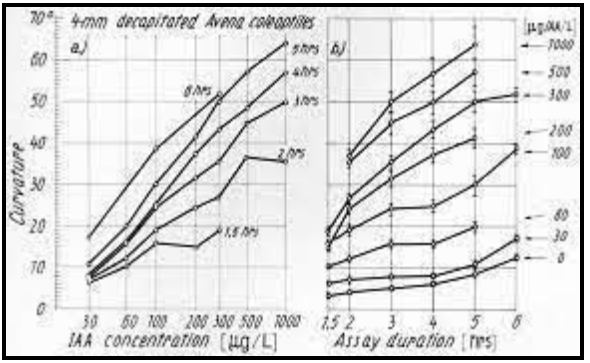
Schizaea pusilla (curly grass fern)

Nearby, in a higher and somewhat drier part of the bog, Dr. C. pointed out spreading colonies of two lycopods ("fern allies") - *Lycopodiella alopecuroides* (foxtail club «moss») *and L. appressa* (southern bog club "moss"). There was a third clump that did not entirely resemble the other two in size range or horizontal stem growth. It was my final college year, and I was doing a senior honors project - a comparative study of plant vascular systems. Small samples of the shoot, root, and strobilus from all three club "mosses" were thus preserved for microscope examination. It was soon obvious that the outlier colony had intermediary vascular anatomy in all three of its parts. In the field I had also noted that it had both the fully prostrate and partly arching horizontal growth patterns of *L. appressa* and *L. alopecuroides,* respectively. It was evidence for the first hybrid (of several more in the genus to be described by others), and I named it *Lycopodiella Xcopelandii (Lycopodium* at the time). I was forever hooked on this ancient assemblage of plants.

Harvard University - Graduate School, Biology Department - mid-fifties - two thesis advisers (Drs. Ralph Wetmore and Taylor Steeves) introduced me to the potential of plant growth hormones - auxins, kinens, gibberellins - for developmental research, particularly in ferns, which are hardy and fast growing in tissue culture. Botanists were eager to find answers to the refractory issue of how embryonic/meristematic cells with identical genomes control their differentiation and maturation into tissues as diverse as xylem, phloem, photosynthetic, storage, and more. It was a heady time for biology. The double helix structure of DNA had recently been "crystallized" by Francis Crick, Maurice Wilkins, Rosalind Franklin, and James Watson (then doing a visiting scholar stint just down the hall from my office/lab). The Nobel Prize would soon be awarded for their work. Dr. Kenneth Thimann (on the floor above me in the Biology Building), had isolated IAA (3- indole-acetic acid), a natural growth hormone in plants, and Dr. Frits Went of the Missouri Botanical Garden had devised the *Avena* (oat) bioassay for measuring its concentration. A bioassay is the use of a sensitive organism›s measurable growth response to determine the concentration of molecules that occur at microgram levels - too small to be obtained by other means. Charles Darwin - yes, THAT Charles Darwin - noticed how quickly oat seedlings bent toward light on a windowsill. With absolutely no other evidence, he hypothesized that a «growth hormone» produced in the «meristem» tip of the oat shoot was «redistributed» in uni-directional light to the "dark" side, stimulating "faster growth" on that side, and resulting in a "curvature toward the light." It took 100 years for science to catch up with this "out-of-genius" hypothesis and prove it to be completely correct. Now, dark-grown, straight, IAA-sensitive oat seedlings can be used in *Avena* tests in which unknown amounts of IAA from plants are diffused into tiny agar (pure gelatin) blocks and applied to one side of decapitated oat seedlings. Proportional growth curvatures from multiple seedlings are then measured and averaged. A similar bioassay is used to determine Vitamin B12 levels in blood samples using the growth rate of B12-sensitive algae) (see diagram of an *Avena* test).

A bioassay is often the only way to measure the minuscule concentrations of hormones, vitamins, etc. in living tissues. I used the *Avena* test in part of my PhD





Hand-drawn graphs showing the coleoptile curvature angle vs. a) IAA concentration and b) assay duration. From: Kaldewey, Harald, Jawahar Lal Wakhloo, Alfred Weis, and Helga Jung. "The *Avena* Geo-Curvature Test: A Quick and Simple Bioassay for Auxins." *Planta* 84, no. 1 (1969): 1-10. http://www.jstor.org/stable/23367530

thesis work to study differences in hormone levels regulating cell elongation of the long (spreading) vs. short (leaf bearing) shoots of bracken fern rhizomes. I had become interested in bracken (*Pteridium aquilinum)* back in my senior year of college (see above) because of its unusual vascular system. Understanding and controlling this often-weedy fern was also of broader interest because of its toxicity to grazing cattle, particularly in Europe. Regulated use of plant hormones is vital in horticulture and agriculture to stimulate growth of cuttings and formation of roots, or to inhibit growth as in dwarfing, weed killing, and bud formation, depending on the type of hormone and the concentration used. Hormone use is not always positive or benign in society - think Vietnam War (1955-1975), when a «rainbow» of herbicides, the best known of which - Agent Orange - a mixture of two synthetic plant growth

hormones, 2,4-D (dichloro-phenoxy acetic acid) and 2,4,5-T (trichloro-phenoxy acetic acid) was used to defoliate tree cover and food crops in enemy territory. It was later implicated (controversially) in higher rates of diabetes, Parkinson's, and several types of cancers in exposed soldiers and civilians.

Finished with formal education, I went on to do research and teaching at the University of Pittsburgh and then to full time teaching at a new high school in our neighborhood. I was in charge of the Advanced Placement program in Biology for seniors and the National Science Foundation sponsored Biological Sciences Curriculum Study (BSCS) project for freshmen. In the school greenhouse there was always an assortment of ferns as well as other plants needed for student experiments. For obvious reasons a microscope session observing large, motile sperms swimming out of male hormone (antheridiogen) -treated fern gametophytes was very popular with students. So, I injected much more exciting botany into double lab periods, thinking this might be their last formal exposure to the field I loved so much. I am still in touch (e-mail is great) with many of those students (even one who moved to Australia), and I became a grateful patient of others who went on to the medical (including gynecology!) and dental professions.

In 1985 I joined Dr. John Mickel (New York Botanical Garden) on an incredible fern foray to Trinidad/Tobago where over 400 species of pteridophytes can be found on two tiny islands, and dozens grow right along the driveway to the Asa Wright Conservation Center in the hills of Trinidad, where we were housed for most of the trip. This was also where I met and formed a lifetime friendship with Sue Olsen, author, photographer, fern grower par excellence, and editor of the "HFF Quarterly." In the Aripo Savannas Environmentally Sensitive Area (ESA) another species of curly grass fern – *Schizaea (Actinostachys) pennula* - was thriving on hardpan clay soil. It was tropical fern nirvana.

Thus emboldened by great field experiences, in 1988 I signed up for a week-long series of meetings and research reports in Beijing followed by two weeks of fern-enhanced field trips, including a cruise on the Li River in karst country (limestone outcrops seen in many Chinese paintings), a surprise visit to the panda reserve near Chengdu in southwestern China, and a gondola ride to a high elevation Himalayan Mountains lookout (a joint venture project with Japan - "don't be scared!"). All this was in the company of the iconic Dr. Warren (Herb) Wagner (University of Michigan) and many other expert botanists from all over the planet. Shorter, stateside, summer forays sponsored by the Northeast Chapter of the American Botanical Society and others to fern hot spots from Maine to Ohio, Michigan, and most states in between, further increased my field sense and familiarity with regional fern floras. With apologies to bird watchers, my "life list" of ferns grew exponentially.

My pteridophyte horizons were broadened even more, and my taxonomic learning curve stretched to its limits, during four study group trips led by Dr. Alan R. Smith (University of California Herbarium, Berkeley). He is a world class specialist in

neotropical ferns, and I am privileged that he is an ongoing friend. Costa Rica (1999) was the first of these remarkable excursions, and the great diversity of life in the tropics became abundantly apparent once again as we struggled to remember a torrent of new plant names. In the paramo (high elevation in the tropics) the amazing fern genus *Jamesonia,* with its narrow, curly-q pinnae on sturdy stipes was a favorite fern find. In the Ecuadorian Andes and Galapagos (2001) we conquered elevational changes from sea level to 11,000+ feet and saw a spectacular Andean "quillwort" (a large, robust *Isoetes* - another fern «ally») growing vigorously in wet grassland. The entire high elevation flora was surreal, with super-sized, ground hugging alpine flowers and red-hued lycopod clumps of *Huperzia* (*Phlegmariurus) crassus* dotting paramo soil.

On the North Island of New Zealand (2006) I fulfilled a long obsession with finding *Tmesipteris* (fork fern) in the wild when Dr. Smith led us to sites for at least three species. Along with *Psilotum,* the two genera make up the «whisk/fork fern» family of fern «allies.» Seeing so many fork ferns dangling from the fibrous bark of tree ferns (mainly *Dicksonia antarctica*) - unforgettable! In Hawai'i (2010) - last of the four adventures with Dr. Smith - we had the opportunity to compare the flora on the westernmost (and oldest island - Kaua'i - 6 million years) with that on the easternmost (and youngest isle - Hawai'i or Big Island - 800,000 years). It came full circle for me when, in the Alaka'i Swamp Wilderness (Kaua'i), we found a show-stopping third species of curly grass fern - *Schizaea robusta*. On the Big Island, with arranged permission (especially from the "earth goddess" with group prayer at one site), we entered two Nature Conservancy preserves to see protected remnants of the pre-development Hawai'ian flora, including a young, epiphytic *Ophioglossum (Ophioderma) pendula,* filmy ferns, tree ferns, and many other pteridological treasures. These natural areas were enclosed by miles of fencing and kept clear of large, introduced mammals (pigs, goats, cattle, etc.). Staying at a CCC (Civilian Conservation Corps) camp on Kaua'i was a discomforting reminder of the United States role in World War II. Watching the red glow of volcanic fumes at sunset on Kilauea Volcano (southern Big Island) was a spectacular treat. Hearing the swish of huge tree fern fronds against our motel room windows - Shangri-la!

There is no adequate way to express appreciation to the professionals, graduate student assistants, and so many others who have satisfied and shaped my long love affair with the special plants grouped as pteridophytes. I thank them for their patience, their friendship, and their willingness to include my late husband Milton and me on these adventures and priceless experiences. Special thanks go to my adult children, Erik and Sara Gottlieb, for their willing and expert computer help with this article. I am indebted to Dr. Alan R. Smith for updating taxonomic changes and for other helpful edits. My detailed reports on most of the trips mentioned in these musings appeared over many decades in previous issues of the "HFF Quarterly." ❧

Inniswood Metro Gardens

Gloria Reed
Columbus, Ohio

The winter of 2020-2021 was more mild than usual. We had a good snow cover during the cold temperatures. Fortunately, the ferns seem to reflect this and were ready for evaluation earlier than usual. Most are very healthy and even lush. Early this spring there were a number of late hard frosts but since our ferns are not early risers there was no damage. Fern growth compared to our last evaluation was sometimes less but I think it was because this evaluation recorded growth two months earlier than the last evaluation. I expect the ferns to continue to produce more growth in the next two months. Our new irrigation system has made conditions more favorable for our ferns. Hopefully we will have more successes in the future.

Cyrtomium macrophyllums grown from spores purchased from the HFF

Young Cyrtomium macrophyllum over-wintered in garden

Dryopteris erythrosora grown from spores purchased from the HFF

Inniswood Fern Evaluation July 2021

Plant	Planted	Rate	Loc/# of Plants	Height	Comments
Adiantum x tracyi	2016	1	R / 1		Died 2020, perhaps not able to tolerate winter conditions
Adiantum aleuticum 'Subpumilum'	2017	1	SE /		Died 2018
Arachniodes standishii	2016	5	SE /4	16"	the unusual bright green pattern of the fronds always attracks attention
	2003				Lush foilage forming large clump of 36"fronds
Cyrtomium fortunei	2003	5	C/1	20"	large clump, deep green narrow fronds with some new growth
Dryopteris affinis'Polydactyla Dadds'		5	C/5	23"	growing well, medium green fronds with lots of spores, multi- forked tips nice contrast to other ferns nearby
Athyrium vidalii	2018	5	NE / 3	16"	lush fern with lots of new growth
Dryopteris x australis	2000, 2005	5	SE, NE/ clump	40-44"	4' wide robust clump, sturdy shiny deep green fronds, one of our largest ferns
Dryopteris bissetiana	1999, 2010	4	N / 1	16"	light green erect fronds clump wider than tall
Dryopteris clintoniana	2002	5	N/ 3	24"	very attractive, medium green fronds, lush growth
Dryopteris crassirhizoma	2008	5	S / 1	17"	taller than last year,very attractive medium green fronds
Dryopteris filix-mas 'Cristata Martindale'	2016	4	S / 2	24"	much taller than last year, crested tips are very attractive, seems happy
Dryopteris koidzumiana	2012	5	N / 1	7"	very small, not thriving, not sure why
Dryopteris lacera 'Affinity'	1999	4	S / 1	19"	broad leathery fronds, lots of new growth
Dryopteris namegatae	2018	5	S/ 3		couldn't find
Dryopteris polylepis	1999		S/ 1		Died 2020
Dryopteris pseudo-filix-mas	1996, 1997	4	SE / 1	30"	beautiful leathery dark green fronds, up-right form
Dryopteris pycnopteroides		5	N/1	14"	taller than last year,very attractive medium green fronds
Dryopteris filix-mas 'Parsley'	2014	2	SE / 2	9"	small, not doing well
Gymnocarpium oyamense	2007	1	N/0		Always late to come up, site too dry Died 2018
Osmunda regalis 'Cristata'		1	NE / 1		Died 2020
Osmunda regalis 'Decomposita'	2013	1	NE/1	10"	tiny, may not get enough light
Phegopteris decurive-pinnata	2018	1	0		Died 2019
Phyllitis scolopendrium	1995	5	R / 3	16"	thriving, full of spores, the shinny green fronds are a real asset to the Rockery
Phyllitis scolopendrium 'Angustifolum'		5	R / 2	15"	Attractive variety of green fronds 15"
Polystichum aculeatum	2008, 2010	1	0		Died 2018
Polystichum makinoi	2016	1	S / 0		Died 2018
Polystichum microchlamys	2016	1	S / 0		Died 2018
Polystichum setiferum'Bevis'	2008	1	0		Died 2018
Polystichum setiferum'Bevis'	2018	5	SE / 3	13"	lush growth, lots of bright new growth, very attactive
Polystichum 'Divisilobum'	2011	1	0		Died2018
Cyrtomium macrophyllum	2019	4	C/9	10"	from HFF spores, one successfully over-wintered in garden, 8 grown in greenhouse, beautiful young ferns

Location: S South Bed, SE South East Bed, NE North East Bed, R Rockery, N North Bed, C Center Bed
Rating System: 1 Did not survive, 2 Poor performance, 3 Good performance, 4 Attractive but not thriving, 5 Best performance

Pat Riehl

April 7, 1948 - July 25, 2021

It brings me great sorrow to convey that one of our long-serving board members, Patricia (Pat) Riehl, passed away on July 25, 2021. Pat was a good friend and had a great passion for ferns and for the Hardy Fern Foundation. Serving on our board since 2006, Pat held the offices of Secretary, Corresponding Secretary and as the chair of the Education Committee for several years. She also had a beautiful garden on Vashon Island with a spectacular Victorian stumpery garden that she and her husband Walt generously opened to the Hardy Fern Foundation on several occasions.

Pat's Vashon Island Victorian Stumpery

Annual Meeting and Lecture

Fall is on its way and that means our annual meeting is just around the corner. This year, the event will be in two parts, both held through Zoom. Our meeting will begin at **11:00am (PDT) on Saturday, October 23rd** with our board member's reports on the past year, followed by a wonderful showcase of fern frond slides. At **1:00pm (PDT) on the same day (October, 23rd)**, we will have a free guest lecture from the **Curator of Living Collections at Ganna Walska Lotusland, Paul Mills.**

Join Curator of Living Collections, Paul Mills, for a virtual tour of one of the most interesting and spectacular gardens in the country. Mr. Mills will share the enchanting story of this garden that was built by the eccentric Ganna Walska. Get a glimpse of the architectural succulent gardens and world class cycad collection, as well as the marvelous ferns that made this one of the Hardy Fern Foundation's Affiliate Gardens.

Paul Mills started his public garden career at Lotusland in 1995 as a cactus and succulent specialist. Promoted to the Curator of Living Collections in 2017, he now oversees the spectacular plant collections of this special garden, including their growing fern collection.

This will be a Zoom presentation. Watch your mail for registration information or refer back to the announcements on September 19th.

We Wish to Thank Our Donors for Their Generous Support Over the Past Year

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