



Hardy Fern Foundation
Quarterly



Winter 2019

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; Coastal Maine Botanical Garden, Boothbay, Maine; Dallas Arboretum, Dallas, Texas; Denver Botanic Gardens, Denver, Colorado; Dixon Gallery and Gardens, Memphis, Tennessee; Georgia State University Perimeter College Native Plant Botanical Garden, Decatur, Georgia; Inniswood Metro Gardens, Columbus, Ohio; Lakewold, Tacoma, Washington; Lotusland, Santa Barbara, California; Rotary Gardens, Janesville, Wisconsin; and Whitehall Historic Home and Garden, Louisville, Kentucky.

Hardy Fern Foundation members participate in a spore exchange, receive a quarterly newsletter and have first access to ferns as they are ready for distribution.

Cover design by Willanna Bradner

HARDY FERN FOUNDATION QUARTERLY

**THE HARDY FERN FOUNDATION
QUARTERLY**

Volume 29

No. 1

Editor- Sue Olsen

ISSN 1542-5517



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*****Visit our new website for access to our
2019 Spore Exchange List*****

President's Message

Typically, I would be wrapped in multiple layers of clothes and rain gear working on winter projects trying my best to stay warm and dry; but, this year I will be spending most of January in New Zealand. As I write this in the airport waiting for my flight, my head is filled with thoughts of the incredible ferns I saw on my last visit to the South Island in 2008. One of the most memorable moments was driving over Haast Pass on a winding, narrow road, then turning a sharp corner to see a long bank filled with the fresh salmon-red fronds of *Blechnum novae-zelandiae* producing a spectacular show. This beautiful fern is difficult if not impossible to grow in much of the US, but the cool mild climate in the Pacific Northwest allows this fern to survive if protected from the harshest cold weather. I will be arriving in the height of summer in the Southern Hemisphere, but most of New Zealand has an ocean-moderated cool summer with temperatures rarely reaching the high 80's F (low 30's C). On this trip I will be spending time on both North and South Islands and I hope to see a wide range of horticultural treasures. Perhaps with a little luck, a source of spore can be established to allow for a full range of New Zealand's spectacular ferns to be trialed in some of our gentler temperate climates.

On my return to Seattle I will be looking forward to celebrating the 30th anniversary of the HFF over the next year. The HFF board is excited about several possible events that have popped up and we are looking forward to making it a year we can all remember! We are planning events now, so keep an eye on the new website for updates and listing (www.hardyferns.org).

A much-appreciated thank you goes out to the many generous contributors to our end of the year contribution campaign. This was one of the best years yet and will go a long way to support the work of the HFF. Each year I am part of the HFF I am amazed by what I learn about these ancient and diverse plants and enjoy meeting and seeing the support our organization receives from like minded friends.

I hope everyone has a mild winter and your spring fronds unfurl without frost!

All the best,

Richie Steffen - HFF President

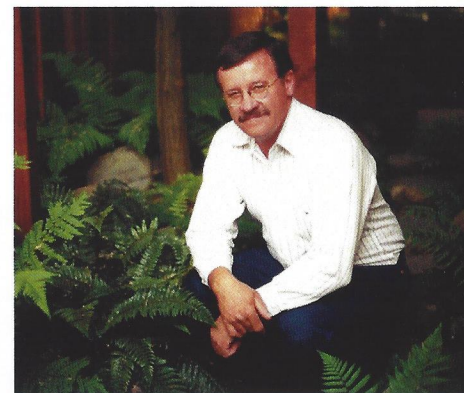
**A warm welcome to our newest Affiliate Garden!
The Dixon Gallery and Gardens in Memphis, Tennessee**

DIXON
GALLERY & GARDENS

James R. Horrocks 1947 – 2018

Sue Olsen

Bellevue, WA



I am very sorry to report that Jim Horrocks, our faithful contributor and devoted knowledgeable fern friend, passed away on Oct. 21, 2018. Jim was one of our original Hardy Fern Foundation members and he kindly and innocently offered to write an article, *Fern Cultivation in Northern Utah*, for our very first Newsletter published in the fall of 1990. This kind offer brought enthusiasm from our readers and led to a remarkable sharing of knowledge via his descriptive quarterly fern articles published for some 28 years. Mind you that's well over 100 original and informative contributions for which we are extremely grateful. Even in his last days he was still busy mentally planning a new review, this time on fern fossils. I'm sure we would have enjoyed it.

Jim's love of ferns began when he was 14 and was fascinated by his grandmother's Boston fern, "I thought it was the neatest plant, the way it rolled out its fronds. I was just fascinated and then I found out there are ones you can grow outside." The rest is history. He started growing them in 1963 and over the years became an expert at both growing from spores and acquiring them from around the world. In time he had one of the largest collections, if not the largest, in the state of Utah. He was a man with a mission who by creating a customized microclimate faced and conquered the challenges presented by living in the state reputed to be the second driest in the nation, with extreme summer heat, freezing winters and alkaline soil. During this time Jim trialed over 200 ferns and successfully established over 80 in his garden. He found evergreens to be the best choices and was especially fond of polystichums and dryopteris. He also was studiously devoted to establishing their correct ID and was an expert at distinguishing the finer points required for accurate identification. Jim shared and exchanged knowledge with friends worldwide, as well as in lectures to local interest groups and as we know and appreciate with our Hardy Fern Foundation readers. And while we won't have any new columns the HFF board has decided to rerun his entire series so we can continue to learn from and enjoy his expertise. They will begin in our spring issue. Meanwhile, I'm personally very thankful for our years of friendship and sharing and will greatly miss him. Thank you Jim.

He is survived by his wife, Susan and sons Jaben and Aaron. We send out most sincere condolences

Memorials - Joan and Milton Gottlieb and Sue Olsen

Mysterious Shield Ferns

Wolfram Gassner

Sievershutzen, Germany

Part one

In an earlier HFF Quarterly (Vol. 28, No. 1, pgs 3-5) Mr. J. Horrocks wrote about an outstanding *Polystichum* hybrid, probably *P. andersonii* x *setigerum*. I would like to contribute some information about this fern.

First I want to record that I appreciate the articles of Mr. Horrocks very much – they always are thought provoking, correct, detailed and well investigated.

Here is my story on this ‚mysterious‘ hybrid:

Nearly 15 years ago I saw a magnificent and extraordinary tall *Polystichum* in Mr. Kohout's garden in Eastern Germany. He told me, that this is the cross between *P. andersonii* and *setigerum* and one of the best bigger ferns for dryish situations and root competition of woody plants. I was allowed to take some bulbils, which developed in same positioning and number as in *P. andersonii*. I raised the plants. In my garden they also grew to be the tallest shield ferns of all with fronds about or even a little longer than 3 feet – in this I agree with the statement of Mr. Horrocks, and with the unpleasant fact, that this fern comes up very early in spring (only a little later than *P. andersonii* and *P. setigerum*) and therefore often is injured by late frosts.

But after some years doubts came up in me about the correct identification or naming of this fern:

Why is it so drought tolerant although its suspected parents both are native in cool-moist surroundings and – logical – also in the garden requires much more humidity than the hybrid? Why are the fronds so much bigger than those of *P. andersonii*, although the other parent *P. setigerum* is clearly smaller?

Why is the frond more matte than in both parents, especially than in the more shiny *P. setigerum*?

Why is the texture of the leaf clearly softer and thinner than those of the parents (the hybrid is soft like *P. setiferum* whereas *P. andersonii* is a little bit firmer and *P. setigerum*



more so, like *P. aculeatum* or *P. tagawanum*?

Why are the fronds double pinnate whereas the ones of *P. andersonii* and *setigerum* are only pinnate-pinnatifid?

Why are the pinnules approximately as narrow as in *P. andersonii* (length-width-ratio) and not broader like in *P. setigerum* (the latter showing the typical width of pinnules from one of its parents *P. braunii*)?

It is to be expected that a hybrid stands in all characteristics approximately in the middle between the two parents. Therefore the mysterious hybrid should show (in sequence of the questions above):

- 1) Need for coolness and humidity
- 2) Leaves smaller or at the most as long as in *P. andersonii*
- 3) Fronds at least as glossy as in *P. andersonii* or even more
- 4) Leaf texture somewhat firmer as in *P. andersonii*
- 5) Leaves only pinnate-pinnatifid
- 6) Pinnules wider than in *P. andersonii*, showing the influence of *P. braunii*

All this led me to the conclusion that there must be a misnomer and the hybrid is not *P. andersonii* x *setigerum* but *P. andersonii* x *setiferum*! And as to confirm my theory accidentally, years later I got bulbils from Mr. R. Thiemann as *P. andersonii* x *setiferum*. Growing up these plants developed into ferns identical to the ones of Mr. Kohout.

So two main questions remain:

First – what are the parents of this hybrid (*P. andersonii* and *P. setiferum* as I suppose)?
Second – what is the other hybrid which Mr. Horrocks cultivates? He wrote, ... asked me if in my garden *Polystichum andersonii* x *setigerum* and *P. andersonii* x *setiferum* are the same plants. ... I assured him they are NOT the same fern. Not by a long shot!“

A comparative description of these two hybrids together with clear photographs, would be very desirable. And perhaps someone could send some bulbils of the true *P. andersonii* x *setigerum* – or, even better, of both hybrids – to Berndt Peters for comparison?

Part two

There are three more mysterious shield ferns in my garden – and those in many other fern gardens, too.

The first one:

Nearly forty years ago – I was still an adolescent – I received spores of *Polystichum mohrioides* from a collection. The original should have been collected on the Falkland Islands. I raised several plants, which are rather fast growing. (photo top page 6)
This fern is rather small, not much bigger than one foot. Characteristics are:

Rhizome short, occasionally branching, petiole very short, fronds upright, deltoid-lanceolate, broadest at or near the base, dark green, leathery, two-pinnate, pinnules small (the biggest ones 0,5 x 1 cm), strongly auricled, minutely dentate, short acuminate with a prominent seta at the tip, close together, partly overlapping, sori in the upper part of the leaf. This fern emerges rather (too!) early in spring, needs much moisture, likes a lot of light (here in Northern Germany best in full sun) and is not reliably hardy (I guess it would be so in zone 7 and 8, probably it dislikes a too warm climate).



When the first specimens matured I propagated this fern and gave it to other fern lovers and Botanical Gardens until several years later I recognized that it never can be *P. mohrioides*. Therefore this fern is circulating in many if not in all gardens under its wrong name.

But what is it? It is so different from all other well-known polystichums with its upright appearance, its triangular-lanceolate fronds and its requirements to the site. Because in propagation types with branched pinnae or capitate frond tips very rarely occur, some fern collectors thought it to be a cultivar of the wide spread and variable *P. setiferum*. But the early emerging in spring, the need of mulch and moisture, the susceptibility to root competition and the restricted hardiness speak against this theory.

If anyone has information on this fern, I would be very glad to hear about it (you can send me an e-mail to wolfram.gassner@web.de).

The second one:

It is a medium-sized fern (about two feet) obviously of the *Polystichum braunii* complex. (photo right) It is said to have been collected by the late Mr. Foerster of Eastern Germany many decades ago in Czechoslovakia – whether in nature or from culture is not known. It is similar to *P. braunii* and has the same very (too!) early emerging in spring with many big silvery scales. The differences with *P. braunii* are: Fronds only pinnate-pinnatifid (only



at the base of big pinnae nearly double-pinnate), pinnae and pinnules longer acuminate (not as obtuse as in *P. braunii*), leaves not forming such a neat shuttlecock because the leaves are not straight but more or less curved and – a very significant difference – the rhizome sometimes forms multiple crowns. This never occurs in *P. braunii*.

For a while I thought this fern could be *P. microchlamys* and gave propagations away under this name together with a big “?” behind. Unfortunately some propagators – private as well as commercial ones – left out this “?”. So until present – long after I announced that this unknown fern is not *P. microchlamys* – this species is circulating under this wrong name, not only in Germany but probably in the Netherlands, Great Britain and the USA – and probably in further countries.

Therefore my same wish as for the preceding mysterious species: If anyone has useful information or even the correct name of this fern, please tell it in the next HFF Quarterly or send an e-mail to wolfram.gassner@web.de.

The third one:

Because I do not want to tax your patience I will make it short:

This *Polystichum* was collected in China by Mr. Kohout. It is small (about one foot) and has flat, dark green, pinnate-pinnatisect fronds (the depth of incise is variable: less than half in smaller plants to nearly to midrib in big ones). (photo above)



Different names have been suggested (by me and by other fernists): *P. monotis*, *P. otophorum*, *P. xiphophyllum*, *P. xiphophyllum* small type.

For some years I favoured *P. otophorum*. But after several years some luxuriating specimens developed to *P. xiphophyllum*, while the others stayed *P. otophorum*.

The photographs show the bigger types.

What is it?

And those *Polystichums* are not the only mysterious ferns in my garden ...



Polystichum Cultivars: Variation in the British Shield Ferns

British Pteridological Society Special
publication No. 7

By J.W. Dyce, Edited and expanded by
Robert Sykes and Martin Rickard

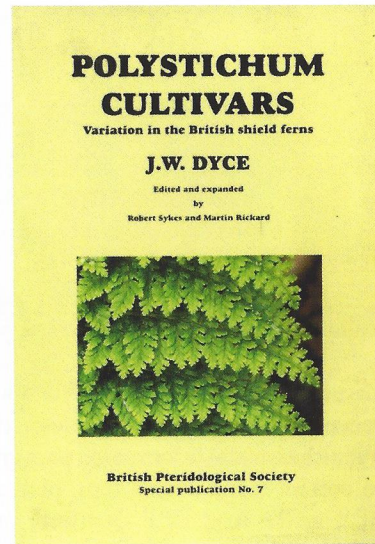
Second Edition 2017

Reviewed by Richie Steffen

When the first edition of this publication was issued in 2005 I was excited to receive my copy. At that time, my interest in understanding and identifying fern cultivars was growing rapidly. As a fern enthusiast living in the United States, in-depth information on older cultivars was not easy to come by. This was evident from the list of books the author recommended as helpful on the subject. Of the eight books recommended, 6 were issued prior to 1911 with the remaining two, Reginald Kaye's *Hardy Ferns* (1968) and Martin Rickard's *The Plant Finder's Guide to Hardy Ferns* (2000), being out of print. BPS publication No. 7 represents an up-to-date, affordable handbook that includes current nomenclature practices and tackles a complex subject in a methodical way.

The original text was penned by the beloved Jimmy W. Dyce. Only partially finished at the time of his death, it was then reviewed and edited by two knowledgeable and accomplished fern experts, Robert Sykes and Martin Rickard. The resulting work addresses the variations of the three native *Polystichum* of the United Kingdom, *P. lonchitis*, *P. aculeatum* and, most importantly, *P. setiferum*. Most of the publication is devoted to a classification framework for the enormous variation of *Polystichum setiferum*. Developing this framework was no easy task. Various descriptor names, most Latinized, have been given since the 1800's with many different Latin terms describing similar characteristics. This is further complicated by the fact that many early cultivars no longer exist along with a multitude of synonyms.

To simplify the subject priority was given to historically significant cultivars, exceptional cultivars and cultivars that still exist in gardens. Taking this into account most cultivars surprisingly fit under the three main divisions: Variation in Shape of Skeleton of Frond, Variation in Shape or Dissection of Pinnules and Other Variations. Within these three sections related cultivars are divided into groups. Since many older cultivars with Latinized names have been produced by spore at some point in their history, there is typically some variation within a given cultivar. In plainer terms, not all *Polystichum setiferum* 'Divisilobum' look alike. Modern plant nomenclature has dealt with this



variation within a cultivar by creating a "group" designation which aligns plants that share a unifying similar trait. This publication adopts this rule and creates and defines over 30 cultivar groups for *P. setiferum*.

The text for the second edition has remained unchanged from the first addition, except for the addition of 16 pages of color photos providing images of 50 different ferns. These are helpfully arranged in the same order as the entries in the text making cross referencing easier. Most photos focus on a frond highlighting its unique characteristics. Also included are images providing a glimpse of a few new cultivars that are still quite rare.

This book is a must for any serious collector of ferns but should not be overlooked by the average fern fancier. I have found it useful and regularly take it off the shelf as a handy reference. Although this book may not cover all possibilities, it will cover what you would likely come across in most gardens.

Thank you to everyone who contributed to our Annual Appeal!

Aikins, Brian	Lyke, Mark
Baer, Christine	McCune, Amy
Berk, Bonnie	Michimoto, Lindsay
Bundy, Michelle	Neff, Lee
Burnett, Naud	Ogburn, Chuck
Campbell, Forrest & René	Olsen, Sue
Crosby, Kathryn & Jerry	Pancratz, Leslie & Michael Hayman
Dixon Gallery & Gdns	Pyles, Linda & Bob
Doherty, Carolyn & Jerry	Riehl, Pat
Egan, Susie	Scroggins, Tom
Farinelli, Sara	Steffen, Gary & Jean
Graves, Greg	Steffens, Richie & Rick Peterson
Haffner, Sue	Strahle, Nancy
Hicks, Mike	Thompson, Diane & Paul
Johnston, Sarah	van den Meerendonk, John
Kurath, Gael	Williams, Roz Horder
Lambert, Donna	Wilson, Debbi

CLASSIFICATION OF FERN VARIATION IN BRITAIN

J. W. DYCE

46 Sedley Rise, Loughton, Essex

Very early in my life with ferns their very many beautiful variations started to become a major interest but their vast numbers and complexity were rather daunting to my beginner's mind. I quickly decided I had to sort things out and I welcomed the little book by E J Lowe, *British Ferns and Where Found*, which contains a very good classification system. However, it is not concise nor is it tabulated, something which my tidy mind demanded, but it was something on which to build and my first efforts towards my own table owe much to this book. In 1963 I published an elementary system for *Polystichum setiferum* in the *British Fern Gazette*, Vol. 9 part 4. This was used in modified form by Reginald Kaye in his book *Hardy Ferns*. Over the years, as my knowledge of variation increased, my table gradually evolved to cover all types of variation in the British ferns, and I am fairly satisfied now that it is comprehensive enough for all practical purposes. Over the years several fern growers have made helpful suggestions and, in particular, I would like to mention Clive Jermy whose suggestions were revolutionary but most valid and I hastened to incorporate them in this final result.

DIVISION A. VARIATION IN (SHAPE OF) SKELETON OF FROND

GROUP 1. CRISTATUM — Repeated terminal division or crestring.

- (a) *Capitatum* — at frond apex only.
- (b) *Cristatum* — at pinnae tips, with or without apical crestring.
- (c) *Percristatum* — at pinnae tips and at pinnule tips, with or without apical crestring.

GROUP 2. RAMOSUM — Major skeleton division

- (a) *Ramosum* — main leaf stalk (stipe and/or rachis) divides once or repeatedly.
- (b) *Cruciatum* — secondary leaf stalks (pinnae) divide one or more times at junctions with main stalk.
- (c) *Brachiatum* — basal pinnae elongate to form separate fronds.

GROUP 3. OTHER SKELETON CHANGES

- (a) *Angustatum* — pinnae greatly reduced in length with consequent narrowing of frond.
- (b) *Deltatum* — pinnae elongated progressively towards the frond base to create deltoid shape.
- (c) *Parvum* — frond normal in shape but greatly reduced in size.
- (d) *Congestum* — spacing between pinnae and between pinnules greatly reduced causing overlapping of leafy parts, often combined with brittleness.
- (e) *Revolvens* or *Reflexum* — pinnae and/or pinnules reflexed to give tubular appearance to frond and/or pinnae.
- (f) *Depauperatum* — pinnae and/or pinnules reduced, irregular or missing.

DIVISION B. VARIATIONS IN DEGREE AND FORM OF DISSECTION OF FROND BLADE OR PARTS THEREOF.

GROUP 1. DISSECTUM — Margins incised or indented.

- (a) *Dentatum* — pinnae or pinnules with shallow regular teeth.
 1. *Crenatum* — with rounded teeth.
 2. *Serratum* — with pointed saw-like teeth.
- (b) *Setigerum* — pinnules indented deeply into narrow segments with pointed teeth or bristles.

(c) *Laciniatum* — frond, pinnae or pinnules torn deeply into narrow irregular pointed lobes.

(d) *Incisum* — pinnae or pinnules deeply and regularly indented.

GROUP 2. DECOMPOSITUM — Pinnule sub-division into pinnule-like parts.

- (a) *Plumosum* — pinnules large and divided one or more times giving feathery appearance; with some exceptions sori absent or very scanty.
- (b) *Tripinnatum* — pinnules enlarged and divided into distinct pinnulets, or merely lobed — throughout whole frond.
- (c) *Subtripinnatum* — pinnules enlarged and divided into distinct pinnulets, or merely lobed — restricted to parts of frond.

GROUP 3. DIVISUM — Divided; restricted to *Polystichum setiferum*.

- (a) *Multilobum* — pinnules greatly enlarged, very divided, final segments wide and foliose; texture soft, *not glossy*.
 1. *Multilobum* — divided up to three or more times.
 2. *Plumoso-multilobum* — even more enlarged and divided, final segments pinnule-shaped, densely massed and overlapping, building up into a frond thickness of one inch or more.
- (b) *Acutilobum* — pinnules narrow, undivided or sharply serrate, very pointed; basal lobes distinct, completely or almost separate, narrow, sharply pointed; texture hard, glossy.
- (c) *Divisilobum* — pinnules greatly enlarged, very divided, final segments very narrow.
 1. *Divisilobum* — divided up to three or more times, final segments elongated and pointed, texture hard to semi-soft, glossy.
 2. *Plumoso-divisilobum* — even more enlarged and divided, final segments tend to be slightly wider and softer, semi-glossy; pinnae wide and very overlapping but not dense, preserving an open appearance.
- (d) *Pulcherrimum* — lower pinnules and rarely the upper ones greatly extended, slender, sickle-shaped, deeply divided; points run out into slender twisted threads capable of producing prothalli; texture soft.
- (e) *Conspicuilobum* — pinnules round, undivided; basal lobes separate and distinct, very round, texture soft.

GROUP 4. FOLIOSUM — Leafy.

- (a) *Foliosum* — pinnules wide and leafy, not divided, often overlapping.
- (b) *Rotundatum* — pinnules broad and rounded.

DIVISION C. OTHER VARIATIONS

GROUP 1. RUGOSUM — Blade surfaces leathery and uneven, restricted to *Asplenium scolopendrium*

- (a) *Marginatum* — fleshy ridges on under and/or upper frond surfaces, parallel to midrib, usually marginal; often combined with *Muricatum*.
- (b) *Muricatum* — frond surfaces rough and leathery, covered with short hard excrescences.

GROUP 2. OTHER PINNULE CHARACTERS.

- (a) *Crispatum* — pinnules twisted or crisped.
- (b) *Linearum* — pinnules very narrow and undivided.
- (c) *Variegatum* — changes in colour.

Companions

Jo Laskowski ~ Seattle, WA

Ferns are very companionable plants. Susie Egan knows this. She's heavily invested in the genus *Trillium*. You know this because she owns and runs Cottage Lake Gardens with her husband, Kevin. On this two-acre property north of Seattle, WA you can find most all of the described *Trillium*



species of the world. *Trilliums* are quickly recognized by most people by the distinctive foliage, a whorl of three bracts. In function and appearance, *Trillium* bracts resembles leaves so much that the term “leaves” is widely used to describe them. Each bract is usually widest in the middle, crisply pointed at the tip—a “drip tip,” and deeply veined. It may be blotchily mottled with light and dark greens, streaked with greenish-silver, or solidly green. Flowers, mimicking the foliage, present as three-petaled and three-sepaled, the petals in shades of white, pink, red, purple, yellow, or green. In the Pacific Northwest we're blessed with *Trillium ovatum*, a white-petaled beauty that the author is fortunate to have found growing on her property. It's one of just a few species that grow in the western United States, the majority of the North American species being found in the southeastern and eastern United States.

Under Douglas fir and conifer canopies in the Pacific Northwest, needle duff composts into soil with pHs running about 6.5 – 7.0. Winter and spring rains are abundant. It's well-suited for *Trilliums*, herbaceous perennials that bloom in the spring and go dormant in the summer. Under threat in many of their historic growing areas in the United States, it's fortunate that Susie has ardently sought them out and assembled them, and that she collects, sells, and propagates their seed, and lectures widely. That she gets seed is worthy of comment—some *Trilliums* are pollinated by flies, others by bees or wasps. After the vagaries of pollination, she then needs to get to the seed before the ants do. These would be the ants that abscond with the seed because of its *elaiosome* (ēl EYE ēh sōm), an appendage attached to the seed and filled with yummy and nutrient-rich fats, tempting and vital to industrious little ants. (see photo above) Thus, the challenge of getting good dispersal of their future progeny is neatly solved by *Trilliums*. The phenomenon of seed dispersal by ants is called *myrmecochory* (MĒRE mēh cō CŌRE ee—I know, I know), and is used by other spring-blooming perennials such as the bleeding heart, *Dicentra*.

At the annual HFF Fall Social on October 20th, 2018, Susie Egan came and talked to the gathered ferners and their guests. At the most well-attended Social to date, she presented “*Creating a Woodland Fantasy: Combining Fantastic Ferns with Great Plants for a Fabulous Effect*,” and showed images of some of the plants she combines with her *Trilliums* at Cottage Lake. These are plants that have met the requirements—low-growing, colorful, easy to maintain, hardy. Plants that have been proven to make worthy combinations over the twenty years that Cottage Lake Garden has been around.

Nothing to detract from the *Trilliums*, which are long-lived but not very competitive, and are slow to develop and spread from the rhizomatous root. So, no thuggish companions here. *Trilliums* largely grow between 1 – 1½ feet tall, so perennials that flop and obscure are out.

Some of the things that work well with *Trilliums*?

Adiantum venustum

With its jet-black stem and limey-green foliage, Himalayan maidenhair seem to light up the *Trilliums* from beneath. This is an evergreen groundcover fern, advancing sedately on short-creeping rhizomes. It tops out between 6 – 12 inches high, with an indefinite spread. It is easily contained (or propagated) by lifting patches of it and re-planting. Susie uses it a lot in her garden beds.

Asarum spp

The foliage of the wild gingers is shiny and dark green or sensually sheened with silver, a good foil for light reflection in understory settings.

Athyrium niponicum and cultivars

Japanese painted ferns are deciduous and slow-spreading, forming small colonies. The shades of silvers, grays, pinks, dusty greens, and purples to be found in the varieties complement the dusky shades of the *Trillium* bracts well. The colorful new fronds emerge over a period of time for extended interest, and the spent foliage is easy to clean up at season's end.

Dicentra spp

Of course, there would be the beautifully cut foliage of the bleeding heart.

Heuchera spp and cultivars

Heucheras are familiar perennials, planted these days primarily for their foliage—and boy, have the hybridizers indulged us! They've given us leaves of deep purple, dark chocolate, orange, deep red, silvery-gray, chartreuse, deep burgundy, green, and plum, that are variously garnished with silver veins, purple veins, green veins, marbling, bronzing, or sheen. A quick trim and the occasional “re-seating” keep *Heucheras* looking their best. As *Heucheras* grow, their above-ground stems elongate, and the exposed stem can eventually appear tatty—time to dig it up, deepen the hole it came out of, then drop it back in and re-plant. New roots emerge from the stem in the ground, anchoring it in and refreshing its appearance.

Hosta spp and cultivars

Hostas are low-maintenance, space-filling perennials that offer such an amazing range of color and texture in their leaves. No more the green palette of years ago. Leaf color now ranges from dark green to steely blue, chartreuse and creamy white. Many cultivars have variegated foliage that displays two, or even three, different color combinations. The leaves may be wonderfully rumpled, ridged, or wavy.

Over all, that perfect kind of high light shade is provided by the judiciously limbed-up Doug firs that dot the property. Japanese maples and other ornamental trees appreciate that light, and happily grow and provide structure in the beds, too.

Backdrop to Susie's talk was the Fern Frond Display, which has become a staple feature of this potluck event. Dozens of fresh fronds were on display, one frond to a vase. From the small frond of a *Cheilanthes* to the gigantic six-foot frond of the *Woodwardia unigemmata*, it's boggling to realize the number of ferns that can be grown in our neck of the woods. Not only does the display astonish, it's a great teaching tool. And don't laugh—some of us would even like to get the display set up by genus!

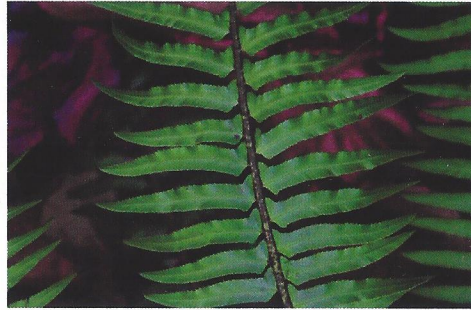
Over another amazing potluck, members and guests met each other, chatted fern, got copies of books signed by the on-site authors (Richie Steffen and Sue Olsen, *The Plant Lover's Guide to Ferns*). Turns out that ferns and people are very companionable, too.

The European Offspring of *Polystichum munitum*

Rolf Thieman

Altena, Germany

The Northwest American fern species *Polystichum munitum* (Kaulf.) C.Presl (Western sword fern) is widespread in European fern garden culture. Therefore it is not surprising that this fern escaped out of culture and has been found in the wild in European regions with a similar climate as in the Northwest regions of the US and in Western Canada. Especially in Britain it is spotted in nature. One place is now also known in Northwest Germany. In this way *P. munitum* (photo above) got the chance to get in contact with some *Polystichum* species native in Europe, especially in Western Europe the widespread *P. setiferum* (Forssk.) Woynar and *P. aculeatum* (L.) Roth. Both possible hybrids with this species and *P. munitum* have been found in Britain, with *P. setiferum* = *P. x lesliei* and with *P. aculeatum* = *P. x arendsii*.



Polystichum x lesliei Rumsey & Acock 2001

The first report of *P. munitum* in natural places in Britain was 1981 from Hascombe in Surrey by Dr. A.C. Leslie. Later this and other reports of existing sword ferns in Britain's nature were seen as doubtful. Perhaps this was the reason that Dr. Leslie visited the locality again. On this occasion he found not only that the population of *P. munitum* had increased in the meantime but also



this hybrid which was later named after him. In 2001 a second plant of this hybrid was found in Cornwall. At both localities *P. setiferum* was present. (photo bottom page 14)

P. x lesliei is intermediate between its parents which is not surprising because both parent species are diploid and therefore genetical equivalents. The fronds of the hybrid are narrower and darker green as in *P. setiferum* but less leathery than the fronds of *P. munitum*. The pinnules are not stalked but more or less adnate to the costa. The photo shows a section of a frond with nearly full stalked pinnules. (photo right, artificial made by author)



Polystichum x arendsii Christ 1906

The first record of this hybrid was made a century ago by the nurseryman Georg Arens in Wuppertal (Germany). Some years ago it was found also in an old garden in Britain where it probably arose naturally. Martin Rickard discovered it there and reported it in *Pteridologist* 2014. The parent *P. munitum* is diploid and the other parent *P. aculeatum* is tetraploid. The hybrid therefore is triploid and as many triploids it shows great hybrid vigour and is a magnificent plant for the garden. The hybrid resembles *P. x lesliei* in some details especially in the degree of division of the pinnae. The foliage is dark green and more leathery because both parents share this attribute. (photo above, artificial made by author)



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A Wonderland of Ferns: Sharing a Piece of Land with Twenty-four Native Species

Michael Heim

Hayward, WI

It's funny what direction life can take you. Sometimes it's the most seemingly innocuous things which end up having a major transformative effect. In my case ferns, of all things, were the catalyst. They changed both my professional path and the choice of where I would choose to sink down roots so to speak and spend the rest of my life. Ferns fascinated me from an early age, meaning both from my childhood years and from their great antiquity in geologic time. Books on prehistoric life inevitably portrayed early reptiles, giant amphibians, and drone-size dragonflies cavorting in lush ferns. If that alone wasn't enough to evoke a lost world, a friend who worked for the Field Museum in Chicago would frequently take my family on fossil-collecting expeditions. There we would find exquisitely-preserved ferns from the Coal Age, which ranged in complexity from single pinnules to entire fronds.

Often my family took an annual vacation in either Colorado or Florida, where I immersed myself in the exotic (to me) natural world. Thus when suddenly one year my parents decided to instead vacation in northern Wisconsin, I subjected them to a long, whining complaint. I assumed, incorrectly as it turned out, that it would be a monotonous wasteland of dense pine forest with little to intrigue a budding young naturalist. Little did I realize that at the first resort we stayed at, I would immediately fall in love with the region. Both the land and the waters teemed with an incredible diversity of life forms, many of which I had only read about. Within the next few years my family purchased some property and eventually a larger adjoining piece which we made our permanent abode. What mesmerized me the most about this northwoods property were the streams and swamps with their lush stands of ferns and lycophytes...my lost world come to life!

Situated in the midst of a kettle moraine, the rugged topography and soils vary tremendously, often within only a short distance. Also, being located within an ecotone, where the boreal forest from the north mingles with the eastern deciduous forest contributes in no small way to the remarkable biodiversity. Looking at trees for instance, there are 31 wild native species found growing on this 65 acre property. No wonder then that 24 wild native fern species occur here (31 if you include horsetails). Horticulturally, the availability of various microsites for planting, access to spore exchanges, and taking the time to go on collecting trips has allowed me to introduce and test many other additional species of ferns (see article in the Spring 2018 issue).

So then which fern species favor which locations? Well, let's start with the least hospitable environments, the dry sandy woods on narrow ridges or having a southerly aspect. Altho great for lowbush blueberries, these sites are too dry for most ferns to get

established. The one exception in our region is the bracken (*Pteridium aquilinum*), a robust triangular-bladed fern with Napoleonic tendencies. Single individuals (genets) of this rhizomatous ruffian cover huge areas of forest, some perhaps having sprouted at an animal burrow over a millennium ago. This makes these our largest ferns by far in both area and volume. Bracken rhizomes can go 10 feet (3 m) underground, making the plant catastrophe-proof. The stiff umbrella-like fronds help protect the soil and smaller more delicate plants from storms. Local Ojibwe Indian people and others harvest the fiddleheads in spring. I can attest that the soup is tasty, having a natural salt and pepper flavor. However, and this is a *big* however, the plant contains several different toxins and is quite dangerous to eat. People first became aware of the extent of its toxicity when pathologists found a correlation between long-term consumption of the crosiers and stomach cancer in Japan, where it also grows. If grazed by cattle or goats, the carcinogen passes into the milk. In some parts of the world bracken is utilized as a packing material for fruits, vegetables, and even fish because of its reputation at inhibiting rot and mildew. The Scots formerly burned the green foliage to produce a ersatz soap from the ashes.

It is in relatively dry sheltered woods with more organic matter in the soil that our tallest fern can be found. This is the interrupted fern (*Osmunda claytoniana*), (photo right) a lush shoulder-high beauty creating a scene reminiscent of the Coal Age. With good reason, as identical fossils have been found in Antarctica, dating from the Triassic over 200 million years ago. At the time Antarctica was part of the supercontinent Pangaea. Thus interrupted fern is a real survivor, as unimaginably ancient as the ginkgo tree.



Even more ancient are the grape ferns (*Botrychium* spp.). (photo below) They may even be remnants of primitive progymnosperm stock, as evidenced by their pitted tracheids, secondary xylem, and vascular cambium-like tissue. Over the years I have discovered five species growing on the property. They range in size from the extremely inconspicuous dwarf grape fern (*B. simplex*) to the rattlesnake fern (*B. virginianum*). The latter has vanished in recent years, as have several other plant species, due to the ravenous eating habits of a bloated deer population, to which it is especially sensitive. However, this genus is notorious for disappearing from a location and reappearing several decades later, so one can only hope. Generally these ferns do not appear fussy in regards to soil moisture conditions; some even thrive in a dry sandy lawn.



Mid to lower slopes with a northerly aspect and valley flats harbor our greatest diversity of fern species. There the indirect sunlight, cool conditions, and shelter from wind keeps evapotranspiration rates low, aiding the reproductive cycle of spore plants. Spinulose wood fern (*Dryopteris carthusiana*), evergreen wood fern (*D. intermedia*) and their hybrid thrive throughout this area. Evergreen wood fern has gorgeous lacy fronds which were once harvested as florist greens, so as to add as an accent to flower arrangements. This cottage industry has now been superseded by the mass importation of fronds from the tropics. Similar to the wood ferns, but with fronds not quite so tough nor as elegant is the lady fern (*Athyrium filix-femina angustum*). It can be found in abundance throughout the woods except in the most dry and exposed sites. I find lady fern to be not much of a lady and more of a pernicious weed, coming up wherever it is unwanted, whether it be in spore jars or in the garden. The more refined maidenhair fern (*Adiantum pedatum*) forms small patches in the most sheltered pockets. (photo above) The tough, shiny black leafstalks or stipes were once used by the Ojibwe to weave small baskets. The knowledge of this craft has sadly been lost in our region, but is still practiced with great skill by tribes in the Pacific Northwest. Bartenders may be familiar with capillaire syrup. It's an infusion of maidenhair fern fronds and orange-flower water which is used in cocktails.



Near streams, seeps, and swamps are found those ferns which relish a steady and copious supply of water. Here one finds the narrow, ladder-like crested wood fern (*D. cristata*) as well as the taller Boott's wood fern (*D. X boottii*), a natural hybrid between spinulose and crested wood ferns. Occasional marginal wood fern (*D. marginalis*) and state threatened Braun's holly fern (*Polystichum braunii*) grace the rocky shore along the creek; sadly, the former may now have been extirpated by deer browsing. In years gone by this species had been utilized as an antihelminthic or worm medicine. Oak fern (*Gymnocarpium dryopteris*) and long beech fern (*Phegopteris connectilis*) are often found growing together on cool moist banks or at the seep. They are beautiful delicate-looking ferns. Evergreen patches of rock polypody (*Polypodium virginianum*) cover boulders and the mossy bases of tree trunks, but always near water. The rhizomes of this species



were once made into a commercial cough syrup, reputedly being highly effective against whooping cough. Similar to interrupted fern, but quite different in the appearance of its reproductive structures is the large cinnamon fern (*Osmundastrum cinnamomeum*). It forms extensive genets on the seepage area, creating a Carboniferous-like swamp. One might expect an alligator-sized amphibian to lunge out, if only in the imagination. At 180 million years, it is almost as old as interrupted fern, since Jurassic fossils of this species have been found in western North America and Sweden.

In wet areas with more light and nutrient-rich soil, sensitive fern (*Onoclea sensibilis*) and ostrich fern (*Matteuccia struthiopteris*) occur. Exceptionally attractive are the bead-like sporophylls of the former. They last throughout the winter and add a nice touch to dried arrangements. Sensitive fern lived alongside *T. rex* during the Cretaceous about 66 million years ago. Its relative ostrich fern has perhaps the most lovely and symmetrical growth form of any of our ferns. Both of these ferns thrive in most gardens (sometimes a bit too much!), as they enjoy the soil conditions typically found in urban and suburban gardens.

One of the more unique habitats on the property is a sunny sphagnum bog perched halfway up the side of a slope above the creek valley. Marsh fern (*Thelypteris palustris*), which also thrives with sensitive fern along the creek, forms a widespread genet there. Other common species in this bog are crested wood fern and cinnamon fern. Deep within an alder swamp draining a different bog are several large clumps of royal fern (*Osmunda regalis* var. *spectabilis*). Its coarse foliage, somewhat reminiscent of certain leguminous trees, is totally unlike that of our other ferns. Its stems protrude about half a foot out of the muck, making a short trunk. This species grew 45 million years ago in a dawn redwood swamp on Axel Heiberg Island in the Canadian high arctic. But it is much, much older than that. Similar ferns, albeit with a taller trunk, were common during the late Paleozoic. (photo right)



So those are some of the beautiful wild ferns which surround me here in this neck of the northwoods. Even tho the landscape itself is very young, having only been formed at the close of the last glacial period roughly 12,500 years ago, some of the plants that recolonized it are very ancient indeed. That is part of what makes ferns so fascinating. I mentioned that they had an effect on the path of my professional career. If it wouldn't have been for my early exposure to fossil ferns, I may never have ended up as a college professor teaching the subjects that I love the most, namely botany and geology. Thus I cannot underestimate their importance in my life.

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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,
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