

Hardy Fern Foundation NEWSLETTER

Editor Sue Olsen ■ VOLUME 5 NUMBER 3 ■ SUMMER 1995



President's Message

Sylvia Duryee

Now to catch our breath again after the 25th Fern Festival held on June 2nd and 3rd. A beautiful day began the festivities. A tour of our main display and testing site at the Rhododendron Species Botanic Garden was enjoyed. We all appreciated the beautiful condition of the whole garden. We have Steve Hootman to thank for our responsibilities here and also for the development of fern growing in the hoophouse.

A large varied display of hardy and indoor ferns along with hostas and other companion plants greeted those coming to our annual meeting at the Center for Urban Horticulture. This was followed by complete coverage of our Northwest ferns by Ed Alverson. His educational presentation was accented with excellent photographic examples in detail and on site. Thanks Ed.

Now that most of our ferns are up and doing their best it may be a good time for each of us to do an evaluation in our own gardens. Each garden has its own hardiness zones and mini climates so information from our members is of interest to us all. What you compile re: heat, cold, humidity, drought and drowning tolerance would help give a better cross the country picture of fern hardiness. This information will be passed on to the membership. Send your data and comments to our editor, Sue Olsen

Our annual meeting included the unveiling of our first poster showing the sites and hardiness zones of our 11 satellite gardens. This good looking and informative display was prepared by John van den Meerendonk and will be hung with many others at Kew this summer at Pteridophytes '95, and will, of course, be used in future displays.

Have a good summer.

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Preparing and Maintaining a Herbarium for Personal Use

David B. Lellinger

A herbarium is a permanent collection of pressed, dried plant specimens. The purpose of a herbarium is to provide a record of plants seen in the wild or under culti-

vation. Well pressed and carefully labeled herbarium specimens are a potent form of botanical information. No description or photograph can substitute adequately for having actual material of the plant at hand. Descriptions and photographs, however, are useful supplements to herbarium specimens, especially when they describe or illustrate information that is lost in a pressed specimen, such as coloration or 3-dimensional structure. A correctly identified herbarium is a most important tool for making identifications. Even when using published monographs and Floras, matching an unknown specimen against a known one is the only sure way to check the identification.

Once dried, herbarium specimens are permanent, so long as they are protected from insects, fire, and moisture. Of course, they do lose their green color over the years, but all the characters of structure remain. The oldest herbarium specimens still extant date from about 1550, and twenty herbaria are known to antedate the year 1600.

Fern specimens are collected by uprooting small plants or by pulling or cutting larger fronds from the rhizome. Generally, a rhizome or a piece of one should be collected because the rhizome shape, size, orientation, and its scales or hairs are important taxonomic characters. When the plant is rare or the rhizome large, as it is in the tree ferns, the rhizome orientation (erect, ascending, creeping) and the size (diameter excluding or including scales and hairs) should be noted for the

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Book Review

FLORA OF NORTH AMERICA NORTH OF MEXICO, edited by the Flora of North America Editorial Committee. Volume 2, Pteridophytes and Gymnosperms. 1993. Oxford University Press, New York. xvi, 475 pp., hardcover. ISBN 0-19-508242-7. \$75.00 + postage.

The aim of this massive, multi-institutional project is to compile information on the description and determination of the vascular plants and bryophytes of North America (including Greenland, but excluding Mexico) in 14 printed volumes, as well as to make this information available in nontraditional formats, particularly as various computerized databases (some available on the Internet). Such lofty goals are made possible by the cooperation of large numbers of botanists from throughout the region working through an editorial committee chaired by the convening editor, Nancy Morin, at the Flora's operational center at the Missouri Botanical Garden. The present volume is the first one to include actual plant families, the first volume having been filled with introductory chapters that serve as a textbook on plant life of the continent.

It may seem a bit immodest for one of the contributors to this volume to be reviewing it, but the pteridophyte portion of "FNA" involved the expertise of so many professional pteridologists that there aren't many others left from whom to solicit reviews! Fifty-five authors contributed portions of the text, most of which deal with the about 425 native and introduced ferns and fern-allies, and many additional pteridologists contributed technical reviews for the treatments.

Users of this book are in store for a treat and for numerous surprises. Perhaps the biggest advantage to the volume is the "big picture" that it presents. For many

of the genera, this is the first time that information from all of the disparate, technical reports on various species in different parts of the region has been compiled comprehensively for the continent. Information on the modern classification of *Botrychium*, for example, has never before been synthesized into a single summary.

The book is organized into a set of dichotomous keys, followed by a technical description for each taxon, a summary of habitats and elevational range, a tiny shaded range map (big enough for the reader to correlate with climate zones), and a written list of the states and provinces of occurrence. Brief discussions amplify the distinctions between some of the taxa. Some of the difficult hybrid/polyploid complexes are further summarized with diagrams, and about 1/3 of the species (at least one per genus) are illustrated with line drawings. An extensive bibliography completes the volume.

The biggest surprises in store for the user may be the large number of unfamiliar names of species. More so than in many other plant groups, the ferns have been a hotbed of taxonomic research during the past few decades. Many of these recently published studies have not been made available in the floristic literature prior to this volume. For example, readers may be surprised to see the traditional *Lycopodium* dismembered into seven separate genera, or to find that the largest family in the flora, Pteridaceae (not Adiantaceae) contains no fewer than thirteen genera. Readers with a serious interest in fern taxonomy will find much food for thought and a wealth of information in the literature cited.

Three other books probably should be among those on the bookshelf next to the present volume. Those who want an explanation of the higher classification of pteridophytes and a summary of the structural and other details of these plants

will want Volume 1 of the Flora of North America series, which includes a fine introductory chapter on pteridophytes by Warren H. Wagner, Jr. and Alan R. Smith. Unfortunately, those who want even minimal information on the cultivation of native ferns also will need to look elsewhere, particularly at David Lellinger's (1985) "A Field Manual of the Ferns and Fern-Allies of the United States and Canada" and the more recent "Ferns for American Gardens" by John T. Mickel (1994).

From the standpoint of identification and taxonomy, the *Flora of North America* is sure to provide a benchmark for all future studies. As such, it is and will be an indispensable reference for anyone interested in ferns, now and for many years to come.

George Yatskievych,
Missouri Botanical Garden

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

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Blechnum Spicant

Hard Fern - Deer Fern

James R. Horrocks
Salt Lake City, Utah

The name *Blechnum* is derived from the Greek "Blechnon", the name used in Greek literature for a fern. *Spicant* is from the Latin "spika" -head of grain as wheat, hence a spike in reference to the vertical fertile fronds.

Originally called the Hard Fern in Europe, it has been known in western North America as the Deer Fern. It is a quaintly elegant plant, native to most of the northern land masses, particularly the British Isles and Europe, being well established in northern Great Britain and Norway. It is also native to western North America from Alaska to British Columbia, Washington State, Oregon, northern Idaho and northern California, being most abundant along the coast. It has been reported from northeast Asia as well. It thrives wherever rainfall and humidity are adequate, growing only in acidic soil as it is a fanatical lime-hater. It favors moist woods, particularly among rocks and along streambanks. In the wild, it is not likely to be confused with other species and certainly not with the Western Sword Fern, *Polystichum munitum*, which grows abundantly enough to make any comparison quite easy. In the garden, the Deer Fern might be confused with other *Blechnums*, especially Japanese species such as *B. nipponicum*.

According to Kaye there are several varieties of *B. spicant* including "cristatum" which is obviously crested, "imbricatum" with pinnae so close together that they overlap, and "anomalum" which sports only fertile fronds that are intermediate between the fertile and sterile fronds of the type. Rush mentions "crispo-

minutissimum", a remarkably dwarf congested form, also "Rickard's Serrate", with handsome toothy pinnae margins and "Rush's bipinnatum", a twice-divided form that is quite striking.

Description: The rhizome is short-creeping, ascending with the fronds appearing in clusters. Being dimorphic, this fern produces two types of fronds. The sterile ones are from 12 to 24 inches long and from two to three inches wide. They are once-pinnate, the leathery pinnae closely set like a comb with rather wide teeth.



Sterile foliage, *Blechnum spicant*.
Photo by Sue Olsen.

The fronds are a glossy green, linear lanceolate, and tend to spread outward, the lower ones being nearly horizontal. The fertile fronds are longer than the sterile and are held stiffly erect. The pinnae are linear and rather narrower than the sterile, with the sori clustered in

a continuous line on each side of the midrib. The indusia are at first whitish, then gradually turning brown.

Culture: Best grown in shade in a cool, moist site. It prefers an acid soil rich in organic matter. It is intolerant of alkaline soils, hence, any watering should be done with rainwater or lime-free water. It may respond to acidifying fertilizers, but care must be taken not to burn the roots with too strong a solution. This fern is very cold-hardy. The soil should be well mulched so that it is kept cool and

moist. For those gardens that can meet its growing requirements, the Deer Fern can be a charming and welcome addition.

References:

A Field Manual of the Ferns and Fern Allies of the United States and Canada, 1985, David B. Lellinger, Smithsonian Institution Press, Washington, D.C.

Hardy Ferns, 1968, Reginald Kaye, Faber and Faber Limited, London.

Ferns to Know and Grow, 1984, F. Gordon Foster, Timber Press, Portland, OR.

A Guide to Hardy Ferns, 1984, Richard Rush, British Pteridological Society, London.



Preparing & Maintaining a Herbarium for Personal Use continued from page 25 specimen label, and some scales taken and put in a small packet.

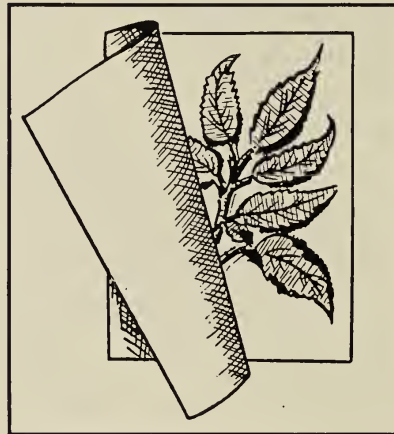
Wide fronds may have the pinnae on one side of the rachis cut off near the pinna bases, or the pinnae may be folded under. Be sure that both sides of the laminae are visible, especially the side with the sori. When the fronds are longer than a herbarium sheet, the lamina may be folded over on itself, taking care not to obscure its base or apex. Larger laminae, as in the tree ferns, may be cut and put on two or more sheets, or just the apex, a middle portion, and the base with its stipe pressed.

To press an occasional specimen, just put it between several sheets of newsprint and remove it to different newsprint daily until the specimen is dry. Keep weight on the newsprint so that the fronds dry flat and without excessive curl. If the specimen is entirely thin, it may be pressed in a telephone book, again removing it to fresh pages daily.

If you intend to make many collections, a plant press makes the job easy. Press ends 18" long by 12" wide can be nailed together from four strips of lattice (hickory or oak preferred, but pine will do) in each direction. Blotters can be made from unasphalted builder's felt (underlayment), which comes in rolls 3' wide. The roll can be cut with a hand saw into 1' segments, then each segment unrolled and cut with scissors into blotters 16" long. Corrugates can be made from single-faced corrugated cardboard obtainable at paper and box suppliers. The flutes in the corrugate must run the short way so that air can be convected through the press when it is lying on its side. Canvas luggage straps that are infinitely adjustable (not belts with eyelets) will serve to keep the press tightly closed. All the foregoing items can also be purchased, including permanent aluminum

corrugates that do not deteriorate with use, as cardboard ones do.

The specimen to be pressed is placed in a single fold of newsprint (tabloid size or half of a regular sheet). The collection number or notes about the collection are written on the margin of the newsprint, or the notes may be kept in a bound collection book. To load the press, lay out the press straps with a press end on top, long rails down. Put a corrugate and a blotter down, then the specimen in newsprint, and finally another blotter. Repeat as necessary. Finish with a corrugate and



Specimen arranged in fold of paper. Manual for Tropical Herbaria, Utrecht, Netherlands, 1965.

the other press end, long rails up, to keep the rails in compression so that the press ends will not break apart as the press is tightened.

Drying is accomplished by moisture moving from the plant specimen into the surrounding materials. If no blotters are used, the newsprint or telephone book pages must be changed at least daily or the plant may mold. If a press is used without corrugates, the blotters, too, must be changed and dried in the sun or in an oven. If corrugates are used, the press is set on its side and warm air passed through it, usually by convection. (In desert cli-

mates, tying the press to the roof rack of a car will do; just make sure the flutes of the corrugates are oriented in the same direction as the car so that air can blow through.) Otherwise, one or two 40- or 60-watt bulbs will produce enough heat to dry a press about 1' high. The press must be held at least 1' above the bulb to avoid burning it, and a cloth or plastic shroud must extend around and below the press so that the warm air is forced to flow upward through the press. When traveling, I use a collapsible frame made of aluminum angle stock to support the press and its shroud, but at home two small boards placed between two chairs will work as well. After the press has been running for a few hours and the plants have wilted, the straps should be tightened. Every 24 hours, dry specimens should be removed and the press again tightened.

In an informal, unmounted collection, data can just be written on the margins of the newsprint. Otherwise, a collection needs proper labels, usually 4-1/4" wide by 2-3/4" high (2 columns of 4 from a single sheet of 8-1/2" by 11" paper). All specimens should have the name of the plant (at least the genus, if the species or cultivated variety is not known), the place of collection (including state, county, and locality details), notes about features of the plant that are not obvious from the specimen itself (perhaps rhizome diameter and orientation, frond length or shape, or pinna orientation), collector's name and number (usually an infinite series starting with number 1), and collection date. Specimens collected from cultivation should have place of collection and origin stated (for example, "Cultivated by Marcy Smith in her garden at 410 Front St., Clarksville, Bloodworth Co., Kentucky, originally from Japan").

It is very important to record information about the origin of the plant. Especially

in large genera, it is difficult for taxonomists to identify the species if the country or region of origin is unknown. If you do not know the origin of the material, try to find out, and add what you can to the label (for example, "Said to have originated in temperate eastern Asia").

In formal herbaria, specimens are affixed to heavy weight 100% rag paper 11-1/2" x 16-1/2" with mounting plastic, water-soluble yellow "carpenter's" glue, gummed linen straps, or with pins. In an informal collection for personal use, it is possible to maintain the specimens in newsprint or in a better grade of thin, non-acidic paper that folds to herbarium specimen size. A formal, typewritten label should be prepared. The label is included in the newsprint with unmounted specimens, but affixed to the lower right corner of mounted specimens.

In order to organize a herbarium and to protect the specimens from damage during handling, mounted and even unmounted specimens in newsprint are kept in folded genus covers and sometimes also in species covers. These are usually 12" by 16-5/8" in size. The genus covers are quite heavy, about 100 lb. per 1000 sheets; the species covers are about half as heavy. The covers make it easy to group like specimens together and to remove and replace the specimens in boxes or cabinet shelves without damage.

Fortunately, fire is seldom a threat to herbarium specimens. But a large fire is always devastating, for even specimens kept in metal cabinets are likely to suffer charred labels. Chipboard boxes with lids may be used to store specimens on open shelving, and the boxes may be placed in a plastic bag for water resistance. A cabinet of any material with a closely fitted door is likely to deter a flood, so long as the cabinet is not submerged. Some people have small herbar-

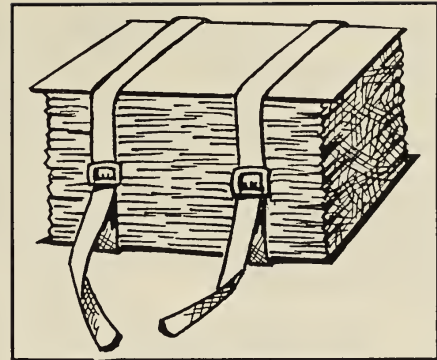
ium-style air-tight cabinets made of wood. The pigeon holes for the specimens are usually 6" high, 12-1/2" wide, and 17" deep. A removable door that latches with window hardware can be made to compress a continuous gasket around the face of the cabinet.

Constantly air-conditioned space provides the best protection against insect damage. The various anobeid and dermestid beetles that consume herbarium specimens (especially

spores, pollen, and seeds) cannot go through their life cycles at temperatures under 65-75°F and relative humidities under 45-60%, especially when both factors are at the low end of these ranges. Because of hazards to human health, para-dichlorobenze, naphthalene (moth balls), dichlorvos, and other insect deterrents are no longer recommended.

Disinfection of specimens can be done by briefly microwaving them or by freezing them at 0°F for three days. Specimens should always be disinfected before being placed in a collection. Newly collected specimens commonly have minute insects of various kinds feeding on them that may not be killed in the drying process. Specimens removed from the herbarium for study may also become contaminated. If storage conditions are less than ideal, it is a good idea to microwave or freeze the entire collection from time to time.

A herbarium is its own information storage and retrieval system. Small collections are easiest filed alphabetically by genus and species, and even some large herbaria are arranged that way. Most large collections, however, are arranged taxonomically by family and genus and alphabetically by species. This has the advantage of placing related genera close together, which is important mostly to taxonomists who do many identifica-



Ventilated plant press.
Manual for Tropical Herbaria, Utrecht, Netherlands, 1965.

tions by comparing specimens to be identified with those that were previously identified and filed in taxonomic order.

Because many of the biological supply houses do not welcome small orders from individuals, it is often difficult to find sources for herbarium materials. However, Pacific Papers, P. O. Box 606, Cotati, CA 94931, will accept an order of any size. They will send you a price list of herbarium supplies on request. You may call them at 1-800-676-1151 or fax them at 1-707-824-9106.

Making a personal herbarium is an excellent way of documenting your own living fern collection, as well as ferns you have seen in other gardens and in nature. (Ask permission and be judicious in taking specimens!) If you have a large garden or greenhouse collection and are prone to losing labels or having them switched, a herbarium will backstop your memory and save you much frustration when a label is lost or a plant mislabeled.

Dr. Lellinger received his undergraduate degree from the University of Illinois and his PhD in botany from the University of Michigan. He is the Curator of Ferns at the Smithsonian Institution's National Museum of Natural History, Department of Botany. He is also a past president of the American Fern Society and author of *A Field Manual of the Ferns and Fern-Allies of the United States and Canada*, 1985.

The Pleasures and Perils of Pteridophilia

Susan MacQueen - Freeport, NY

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L-R. Jim Montgomery, John Mickel on Cloudy day number one. Photo by the late Jim Horne.

The American Fern Society field trips which preceded last August's annual meeting in Knoxville again attest to the never-say-die spirit of true fern fanatics. Our host and guide, A. Murray Evans, an avowed off-trail hiker of Olympic caliber, had no doubt been preparing himself for such a foray since his trailworn, heavy-duty hiking boots came off the shelf.

In three day of vigorous ferning, from mountain top to river bottom, Murray exposed participants to the rich diversity of southeastern ferns and their allies and tested the mettle of the staunchest ferners. Neither daunted by the terrain we were to cover (e.g., off-trail down a steep rocky wooded slope) or the gear required for our fern offensives (swamp stomping footwear, rain gear, insect repellent), thirty fernophiles from as far away as Japan squeezed into two vans at 8:15 each morning, ready for the day's delights and challenges.

On a cloudy Day 1, we drove northeast about three hours through occasional heavy rain to Carver's Gap, up about 6,000 feet in the Roan Mountain Highlands on the North Carolina border. In a blanket of wet cloud, we explored the high elevation rough and slippery area known as "Round Bald". Swirling mists obscured all but the vibrant reds, blues, and yellows of our rain ponchos and proximate clumps of native rhododendrons, and made it impossible to appreciate the spectacular vistas for which the Roan Highlands are noted.

With no other distractions to tempt us, and given the low cloud cover and uneven terrain, we all kept our eyes glued to the ground looking for the day's promised "pteridophytes of note". Among the ankle-deep grasses we saw colonies of the fern ally I grew up calling "Running Pine", and some of its relatives. Lest you doubt, the nomenclatural virus plaguing pteridology was alive and well in the Appalachians. The miniature "pine tree" once known as *Lycopodium digitatum* is now included in the *Diphasiastrum* genus.

Other finds included the Southern Lady Fern *Athyrium filix-femina*, var. *asplenioides* which, Murray explained, differs from its northern relative by being widest at the bottom of the blade rather than in the middle, and a rare quillwort, *Isoetes carolinianum*, which was thriving in a boggy patch of Roan mountain-side.

My favorite discovery of the day was the tenacious *Polypodium appalachianum* recently split off from *P. virginianum*. This sturdy, gray-green rock climber was clinging effortlessly to the downslope side of a kneehigh chunk of granite we discovered amidst a mini-forest of *Dryopteris campyloptera* and *D. intermedia*. If your eyes glaze over as mine do at the mention of *Dryopteris*, it may help you to know that *D. intermedia* is evergreen, has tiny glands on the blade,

and the lowest pinnule on either side of the rachis is generally shorter than its neighbor. In *D. campyloptera*, these same pinnules are longer than the others and all the lowest pinnules are 3 - 5 times longer than the upper pinnules on the same lowest pinnae.

Stopping alongside the road leaving Roan, we saw more polypodies and isolated plants of *Dryopteris marginalis* scattered across the rockface, surrounded by chartreuse bursts of the dainty, white-flowered, native *Heuchera*, Coral Bells.

The sun shone for the Day 2 trip to an area just over the North Carolina border in Great Smoky Mountains National Park southeast of Knoxville. The first stop featured bottomland swamp forest and a rocky ascending trail alongside Big Creek which culminated in *Dryopteris goldiana* for those whose heart rates could meet the uphill challenge of a vigorous walk in 90 degree heat and humidity.

The dense, moist, green-on-green forested areas boasted extensive colonies of *Camptosorus rhizophyllus*, Walking Fern, scrambling in dark-green profusion on the tree trunks and rock surfaces and its less rampant *Asplenium* relatives, *A. platyneuron* and *A. trichomanes*. Diminutive mauve orchids and other native plants alongside the trail were a field botanist's delight, softened intermittently by feathery, soft-green stands of the deceptively delicate-looking *Adiantum pedatum* Northern Maidenhair.

I also saw *Botrychium* for the first time, including the more common Rattlesnake Fern *B. virginianum* and its lacier cousins of the *B. dissectum* group. In a pocket sphagnum bog along the Cataloochee River, we saw more quillworts, *Botrychium*, and *Dryopteris* parents and their hybrids, i.e., *D. cristata*, *D. intermedia*, and offspring *D. cristata* X *intermedia*.

On a sunny, somewhat less humid Day 3, we assembled outside the Presidential

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Dobbins Dr. Edward B.	(205)551-0250	102 Toll Gate Circle	Huntsville	AL	35801
Docter, MD Jack M		1730 Bean's Bight Road NE	Bainbridge Is.	WA	98110
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Durst Marye Gay	(301)948-6426	5030 Riggs Rd	Laytonsville	MD	20882-1810
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Eberhart David	206-851-6156	9125 N. Harborview Dr.	Gig Harbor	WA	98335
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Palmer Daniel	(808)946-6084	1975 Judd Hillside	Honolulu	HI	96822
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Parker Jean B	(406)273-6412	Box 335	Lolo	MT	59847
Parsons Louise H.	503-758-1340	1915 S.E. Stone St.	Corvallis	OR	97333
Peck Dee	(610)344-0540	1223 Princeton Lane	West Chester	PA	19380
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Pirzio-Biroli Jan		4204 West Mercer Way	Mercer Island	WA	98040
Platt John W S	(503)292-8982	4550 SW Humphrey Blvd	Portland	OR	97221
Plummer William A	(607)962-2640	10 Fox Lane East	Painted Post	NY	14870
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Price Tina	815-942-6821	6285 W. Indian Trail RD.	Verona	IL	60479
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Radebaugh Ray	(303)665-3814	335 Gorham CT	Louisville	CO	80027
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Ruskin Norman		1301 S.E. 2nd Ct.. # 3	Ft. Lauderdale	FL	33301
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Santa Rosa Tropicals					

Complex within the University's extensive, redbricked campus for what turned out to be another challenging day. Before setting out, Murray shared with us the restless night he had spent finalizing an agenda that would have included five stops within the Cumberland Mountains and Plateau areas southwest of Knoxville.

Facing the limitations of travel time and an evening AFS Board meeting for some of the group, we put our heads together and selected a site that would provide the broadest array of the Appalachian Asplenium Complex. We pointed the caravan towards the drier western portion of Tennessee spurned by those living in the greener half of the State east of the Cumberlands. Three hours later, we bumped our way into Prentice Cooper State Forest.

We soon learned that state forests are not as "user friendly" as parklands: trails are rougher and the going tougher. Undaunted, we climbed over waist-high fallen logs (oh, for long legs!), and braced each cautious step down, down, down a steep, muddy, rocky cut, and then huffed and puffed our way up to the sandstone ledges and almost inaccessible crevices of massive rock faces where our fern quests resided. The most picturesque feature of that trek was no doubt the gyrations we fern fanatics went through to see these miniature Aspleniums and their hybrids, usually just out of arm's reach. This involved holding on to the nearest rock projection or tree limb just long enough to snap a photo. But scramble, we did!

Our finds included *Asplenium montanum*, which reminds me of Wall Rue; *A. pinnatifidum* which looks somewhat like a lobed, gray-green version of its Walking Fern parent; and *A. bradleyi*, a hybrid of *A. platyneuron* and *P. montanum*. Those of us who had enough steam left to climb to the top of a prominent cliff at the end of trail were able to also capture a breathtaking glimpse of the hazy blue

Tennessee River thousands of feet below us and just visible through the heavy canopy of trees.

On the previous two days, our forays usually began on an uphill climb, and I remember thinking as I slipped my way down the steep track at Prentice Cooper that we would end by having to climb back up. Although it took some of us longer than others (yours truly), there were no casualties, and I really did enjoy the incongruity of seeing such tiny, delicate ferns so comfortably at home among such large, forbidding rocks.

We next made a brief stop not far from the road to see the rare climbing Hartford Fern, *Lygodium palmatum*. To reach the lightly wooded, creekside area where it flourished, we had to cross an open, sunny, somewhat swampy area filled with a lovely tangerine colored native orchid which had first dazzled us in its colorful profusion on a hillside in the Great Smoky. From here, half the group who needed to get back early left in one of the vans, and Murray invited the rest of us to see the extremely rare "hybrid-of-a-hybrid" *Asplenium kentuckiensis*.

Until this experience, I had not realized what a sacred trust and awesome responsibility being the curator of such a rarity entails. After seeing what we went through to view this fern, I also cannot imagine how anyone discovered its location in the first place! I learned, too, that there are significant challenges facing those invited to see such rarities! Trust me: think long and hard before accepting a similar invitation! First, we passed around a rusty, dull-edged pocket knife Murray keeps for these occasions in order to complete the blood oath of secrecy. The terrain we covered was rocky, rough, wet, and slippery, and particularly difficult as we were tied to one another and led in by Murray backwards and blindfolded. I understand the secret location of this prize was conferred upon Murray in a moonlight ceremony held one dark, sum-

mery midnight in a ferny glade on Round Bald two decades ago and the secret has been safe ever since.

After negotiating a roaring body of water as broad as the Mighty Mississippi, scrunching low under the thorniest rhododendrons I have ever met, and more ups and downs than my poor knees had left in them, we came upon a broad, flat-topped boulder entirely covered in "rockcap", *Polypodium appalachianum*. A halo of golden light surrounded the holy fernplace, and the wind through the trees chorused in angelic tones. After the obligatory bow at the shrine, we each in turn clung precipitously to the mother boulder and "scootched" around on tippy-toes until we could see the object of all this effort. All you could hear were the indrawn breaths of the awed supplicants and the rapidfire click-click-clicks of everyone's cameras.

Unfortunately, Murray wouldn't let us touch the holy rarity, but glassy-eyed and smiling, we stumbled back over the maze-like way we came knowing our lives would be forever changed and that generations from now our great-great fernchildren would boast in hushed tones of what we had seen on that holy, ferny rock so long ago.

The three days of intense ferning culminated in the AFS luncheon which was held on the first day of the AIBS meetings. This is the true ferner's opportunity to "put a good face on it", when you hope your street duds and all those long hot baths and deep heat will fool everyone into thinking every bone in your body doesn't ache.

So many renowned fern experts in one small gathering was as rich a dish as any sumptuous dessert. With them we ended yet another rigorous, good-spirited, fern-rich chapter in the life of an intrepid ferner.

Satellite Profile - Harry P. Leu Gardens

The 57 acre Harry P. Leu Gardens in Orlando, Florida have recently joined the Hardy Fern Foundation as a satellite garden site. The gardens are located at 1920 North Forest Avenue in Orlando. They're open from 9 a.m. to 5 p.m. daily (except Christmas). Admission is \$3.00 for adults and \$1.00 for children 6 to 16. For additional information call (407) 246-2620. The following articles were provided for the HFF readership by Robert E. Bowden, Executive Director.



A Leisurely Day at Leu Gardens

When most people visit Orlando, the last thing they do is relax. Rather than unwinding amid placid lakes and moss-draped trees, they streak from theme park to theme park like hummingbirds among flowers. But if you want a change from the breakneck pace, there is one place in this bustling city where you can literally stop to smell the roses - Leu Gardens.

Leu Gardens began as the estate of Harry P. Leu, a successful Orlando businessman, who purchased the property in 1936. Leu and his wife, Mary Jane, spent much of the next 25 years collecting plants from around the world to build fabulous gardens. In 1961, Leu donated his estate to the city of Orlando to be developed as a municipal botanical garden. Today, in the words of Executive Director Janel Alford, "Leu Gardens gives visitors an opportunity to see the true beauty of Orlando."

"Orlando originally was famous for its natural beauty," Alford explains. "Many winter tourists came here for our beautiful lakes and scenery. But with all the attractions Orlando has developed, sometimes the natural beauty is overlooked." Fortunately, with its green, rolling hills, blue water, avenues of giant camphors, and thousands of blossoms, there's no eluding the natural splendor of Leu Gardens.

According to Alford, the gardens' main mission is "to teach people about the kinds of plants that will grow successfully in Central Florida." To that end, the gardens include a native plant collection, as well as collections of azaleas, orchids, palms and cycads, cacti and succulents, aquatic plants, flowering trees, annuals, and perennials. The camellia collection, composed of more than 2,000 plants in 50 species, ranks among the largest in the world. Mary Jane's Rose Garden (the rose was Mrs. Leu's favorite flower) contains more than 1,000 plants in 75 varieties.

Approximately 60,000 people visited Leu Gardens last year. Many of them took part in one or more of the 30 gardening classes and workshops taught throughout the year by the gardens' staff and plant experts from the community. The 1992 schedule featured adult education classes on growing daylilies, orchids, grapes, camellias, and wildflowers. There are also courses geared toward children.

If you're visiting Central Florida and find your heartbeat racing, a leisurely day at Leu Gardens may be the perfect tonic. Steve Bender, *Southern Living* 8/92.

History of Leu House & Gardens

Originally a part of the Mizell farm, the property on which Leu Gardens is located was deeded to Angeline and David Mizell, under the Homestead Act of 1862. There is reason to believe, however, that the land was under cultivation and a Mizell cabin existed on the property well before this date.

After serving in the Civil War, David Mizell became an early sheriff of Orange County. He was ambushed and murdered in 1870, and buried near the family cabin. The Mizell Family Cemetery, located in the Gardens, contains 36 marked and unmarked graves of family members.

John Thomas Mizell, son of David and Angeline, erected the first portion of the house, a two-story frame structure containing five rooms in 1888. Angeline subsequently sold, or gave to her children, other sections of her property.

In 1902, Duncan Clarkston Pell of New York purchased several parcels, eventually putting together most of the current

acreage. Pell made additions to the farm house and planted an orange grove on the property.

John H. Woodward became the third owner in 1906, completing the structure as it stands today, for his family's use as a winter home. After Mrs. Woodward's death in 1928, the estate went into a trust and was rented out until 1936, when it was purchased by its final owner, Harry P. Leu.

Mr. Leu was a native of Orlando, who became a very successful local industrial supplies businessman and promoter of the Central Florida area.

Over a period of 25 years, Harry Leu and his wife, Mary Jane, developed their estate into a local showplace, featuring camellias, azaleas, and towering, moss-hung oaks. They travelled extensively, collecting plants from many parts of the world.

In 1961, Mr. and Mrs. Leu deeded 40 acres of their estate, for a token sum, to the City of Orlando, to be maintained as a botanical garden. An additional 7 acres were deeded later.

The house was opened to the public in 1980. It was redecorated, furnished and a volunteer tour guide system began under terms of a lease by the Orange County Historical Society. The City took over management of the museum and in 1985, a strong volunteer and acquisition program began.

City of Orlando

*Harry P. Leu Gardens
Leu House Museum
1920 North Forest Avenue,
Orlando, Florida 32803
Telephone 407-246-2620
FAX 407-246-2849*



*Leu Garden.
Gazebo in the
rose garden.*

Hardy Fern Foundation 1995 Plant Distribution

The following plants are available to members. They are \$4.00 each plus shipping and you will be billed at the time of shipping. Orders should be received by Sept. 1 and will be shipped in mid-Sept. Send your order to Steve Hootman, c/o The Rhododendron Species Botanical Garden, P.O. Box 3798, Federal Way, WA 98063-3798.

ASPLENium TRICHOMANES - Low evergreen, 8" bead like pinnae, Zone 2 - 9

ATHYRIUM OTOPHORUM - Matte lime colored fronds, deciduous, 2', Zone 5 - 9

CYRTOMIUM MACROPHYLLUM - Large leaf holly fern, semi-evergreen, 2', Zone 6 - 10

DRYOPTERIS MARGINALIS - Easy arching evergreen, 2', Zone 2 - 8

DRYOPTERIS SACROSANCTA - New Japanese introduction, frosty young foliage, 2', Zone 7-9

DRYOPTERIS WALLICHIANA - Tall striking evergreen, variable winter hardiness, Zone 6 - 9

PHYLLITIS SCOLOPENDRIUM 'KAYE'S LACERATE' - 6" wavy-margined evergreen, Zone 5-10

POLYSTICHUM BRAUNII - Popular tall evergreen 2'+, Zone 4 - 9

POLYSTICHUM POLYBLEPHARUM - Shiny foliage, evergreen 18", Zone 6 - 10

POLYSTICHUM TSUS-SIMENSE - Dark green evergreen, dainty, Zone 6 - 10

THELYPTERIS DECURSIVE-PINNATA - Deciduous, creeps about, 2', Zone 4 - 9

Book Review

BRITISH FERNS AND WHERE FOUND (in the Young Collector's series) by E J Lowe, Swan Sonnenschein & CO London 1890, 167 pp. 47 illustrations, 120 x 182 mm. Second edition 1891. Third edition 1908. There was possibly a fourth issue in about 1947/8, but dated 1908.

It is hard to know for sure but I think this little book is probably the most commonly used fern book I own. It is an absolute mine of information but unfortunately very scarce even in Britain, so goodness knows what chance anyone has of finding it in the U.S.! When available it is not an expensive book, there are only 47 small line drawings and no coloured plates. It looks a boring book to a bookseller, but boring it certainly is not to a lover of fern cultivars.

One thousand eight hundred and sixty one cultivars of British fern are listed, although a few foreigners do creep in! Each fern is described briefly, and the date of discovery and finder's/raiser's name given, where known. Synonymous names are included where relevant. These are important as they are often old names superseded by Lowe's preferred newly concocted name. Apparently Lowe put this book together in six weeks. If this is true then surely it must be simply an extract from his own index. This work could not have been researched in six weeks. Another extraordinary fact about the book is its title 'British Ferns and Where Found' with no mention of cultivars in the title which make up over 90% of the book! Also the choice of series in which it was published is very strange as it was for the 'Young Collector'. I can well imagine a young collector throwing it straight in the bin!

The book appears to have been issued 4 times. First published in 1890 it was slightly modified in the second edition of

1891 by having an Errata, Addendum and Corrigenda added. The third edition which appeared in 1908 was apparently again slightly different. The errata mentioned in the 1891 issue were incorporated in the text. Finally an advertisement in the British Fern Gazette in 1948 states that George Allen & Unwin released a fourth issue. Certainly my '1908' dated copy is stamped "London: George Allen & Unwin Ltd." on the front cover suggesting it is this issue, presumably spare 1908 copies were re-released without changing the date. It would be interesting to find a '1908' dated copy without the George Allen & Unwin overstamp. Copies I have seen of this last type differ from the first two editions by the replacement of pages 11 and 12, on classification of British cultivars, by an irrelevant title page blank on the reverse! Maybe these missing pages were only in the 1947 issue?

The introductory pages are brief, but the classification of the cultivars is a valuable early attempt. This scheme was later adapted by Reg Kaye and Jimmy Dyce and published in Reg Kaye's Hardy Ferns (1968). Jimmy has since published a further revision in the Pteridologist 1, 154. (1987).

Lowe was not very selective in deciding which cultivars to include - it seems anything and everything made it! Today we would consider quite a few of them as indistinct or not worth growing. Later Druery, in British Ferns and their Varieties (1910), tried to cut out some of Lowe's less worthwhile cultivars, but dare I say I do not think even he was 100% successful!

In a review such as this a discussion of the meat of the book in any depth is impossible. Highlights for me include a branched form of *Hymenophyllum wilsonii* on Dartmoor, thirteen cultivars of *Trichomanes speciosum*, 32 of *Adiantum capillus-verenis*, 16 of

Pteridium aquilinum and 83 of *Blechnum spicant* - how many of these are still in cultivation? Several of the spleenworts have good lists, of interest here is how Lowe and others spotted *Asplenium trichomanes* subsp. *pachyrachis* as something distinct and beautiful about 100 years before it was finally recognized as a botanical subspecies (Lowe's names were 'Trogyense', 'Velum', and 'Subequale').

The Lady Ferns are mind boggling with 296 cultivars listed. Many of these are the well loved classics but obscure names abound - how about "Foecundulosissimum" - described as "dwarf densely crested and crests covered with bulbils"?! Of perhaps more interest are the Harts Tongues - 445 of them! My favourites, 'Crispum', number 57 without including a further 26 'Undulatum'! The next large group is *Polystichum setiferum* - 366 listed. What a pity we do not have illustrations of all these. Fortunately Lowe was a close friend of Colonel A M Jones, as a result 82 of the cultivars listed here were pictured in the wonderful Jones Nature Prints.

Oreopteris limbosperma, as *Nephrodium montana*, is credited with 77 cultivars. Amazing when only one or two are in existence today, variety hunters get hunting! As a footnote to this section Lowe added that "The name only of half of these varieties are known to the author" a clear reference to the obscurity of these cultivars even in Lowe's day.

The Male Ferns are well covered, including 6 cultivars of *Dryopteris aemula*, none of which were now known in cultivation, until a crested form was recently rediscovered in Ireland by Alison Paul. You cannot doubt the keen eye of the Victorians, even back in 1890 Lowe distinguished *D. expansa* from *D. dilatata* - giving 23 cultivars of the former (as *Nephrodium spinulosum* var *alpinum*), although there is a risk some of these

might be misplaced. His 'Plumosum' found on Ben Nevis (Scotland's highest mountain, 4406 feet high) was probably correct - it sounds a beauty.

Towards the end of the book come the polypods. Included here at the time was the Oak Fern (as *Polypodium dryopteris*). It is fascinating to realize that for once we have an edge over the Victorians! Lowe gives no cultivars while of course today we have the beautiful 'Plumosum' found early in the twentieth century in the English Lake District. The true polypody is well covered and as National Collection holder I have long poured over this section. Today we appear to have about 20 of the 74 cultivars listed, but in time it should be possible to match more living plants to Lowe's descriptions.

My copy of the 1908 edition (or is it 1947?) has an interesting history. It was given to W B Cranfield by Percy Greenfield in November 1947. Six months later Cranfield died and Greenfield received it back. Eventually Greenfield passed it on to Jimmy Dyce, who in turn gave it to me in 1992. The names Cranfield, Greenfield and Dyce are three of the most significant in the British fern world during the twentieth century and fortunately they have left their mark - particularly Greenfield. The copy is annotated and scraps of paper inserted. Most notable is the marking throughout the book of all the ferns included in the Jones Nature Prints.

In conclusion this is an incredible book of immense value to growers of cultivars of British ferns. It is perhaps not easy to use but it is packed with information not available elsewhere.

*Martin Rickard
Worcestershire, England*

Martin Rickard is a Vice-President of the British Pteridological Society and was formerly the Editor of their publication Pteridologist.

Is It Art Or Science?

By Don Keller

Reprinted from The South Florida Fern Society Bulletin: 3/94

Whenever I hear the old saw about a green thumb, I recoil. While enjoying moderate horticultural success, the only thing I have in my thumb is arthritis — aggravated by spending so much time in swamps and by lifting heavy pots. Raising plants successfully requires not a green thumb but a green brain.

Everything you always wanted to know about being green is down in black and white. This is the short answer to the title question.

Art is the talent involved in creating a display and I envy those who have developed this talent. Ferns are undoubtedly the most artistic of all plants. Most are very symmetrical, airy and aesthetically pleasing. Ferns are a preferred plant for providing backdrops at almost every plant show — particularly orchid shows. The fact that ferns produce no flowers is a big plus here since flowers, other than the subject of the show, are a no-no.

Another seeming art is the talent for finding ferns in the wild. I have two friends who have developed this skill to uncanny levels. At first, I thought they were using ESP — or maybe they could smell them. Finally I realized that there wasn't anything ethereal about it. They simply had a lot of smarts about the preferred habitat of the species being sought and didn't waste time looking in all the wrong places. Their green brains were functioning as high computers while mine was clacking like an abacus.

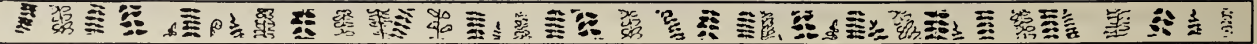
This same sort of data collection and processing is required if one would be a really successful fern grower. Neither

luck, art nor ESP has anything to do with it. Few fern species are adaptable to the laissez-faire, weekend style of horticulture. Ferns are a full-time avocation requiring the use of special knowledge and principles. By comparison, raising the two most popular house plants — orchids and bromeliads — is a piece of cake. I have several specimens of these latter plants that have survived for 20 years on benign neglect.

Many fern species have such narrow tolerance of temperature, humidity and pH factor — plus little understood symbiotic relationships with fungi and/or bacteria — that raising them successfully is virtually impossible and they usually end up as compost. Acid loving species, when watered with Dade County water, react as if they were sprayed with herbicide.

To summarize, forget all the hocus-pocus. Playing music for, or talking to your plants won't work. (I know people who have talked plants to death). Read everything you can get your hands on and then recreate as closely as possible the conditions your various and individual plants require for optimal growth. This will involve using specific potting mediums, equipment and techniques to suit the more finicky specimens. You may have to set up various micro-climates inside your shadehouse: providing more or less light or humidity, use terrariums, gravel trays, spagnum, limestone rocks or gravel, slabs of oak bark, fern bark or cypress, shredded cypress mulch, frequent spraying of the gravel under the benches, using acid base water soluble fertilizer on some species and provide protection from the cold, dry winter winds.

Get the proper match of species-to-required parameters and you and your ferns will be happy. Forget the green thumb and develop a green brain.



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