

Hardy Fern Foundation NEWSLETTER

Editor Sue Olsen • VOLUME 6 NUMBER 1 • WINTER 1996



Dryopteris Wallichiana

James R. Horrocks
Salt Lake City, Utah

Named for Wallich who first described it, this fern is now recognized for the most part as a widespread and rather variable species which includes *D. parallelogramma*, *D. patentissima*, and *D. paleacea*, the latter being the original species name. It is native to India, the Himalayas, southern China, and throughout much of southeast Asia, being rare in Japan. It is also native to South and Central America, parts of Africa (Rhodesia) and Madagascar. Being twice pinnate, it is very similar to a score of other species in its genus. Kaye notes that it is similar to *D. affinis* of the British Isles. However, upon close inspection, it can be noted that the pinnules of *D. wallichiana* are rectangular in shape, that is, with more or less square edges. It is quite similar to *D. lepidopoda* but is distinguished from it by its narrower frond base and shorter stipe with scales that are both wide and narrow. In *D. lepidopoda*, the stipe is longer and all of the scales are narrow. Unfortunately, some specimens are intermediate and are therefore difficult to identify. *D. wallichiana* is a denizen of mid and upper-level forest zones, growing on the ground, usually under trees.

Description: The rootstock seldom if ever branches but forms a crown from which the fronds arise in a strong flush of bright green. The crown may even form a low trunk. The croziers are hairy-black or reddish and are, as Rush puts it, "charmingly sinister". The stipe is up to a quarter the length of the frond and rather thick with numerous lanceolate and narrowly lanceolate scales which are quite dense, becoming very narrow fur-

President's Message

Sylvia Duryee

We hope you all have had a wonderful holiday season and have had a rest too: just like our ferns! Now we need to look at our progress as the Hardy Fern Foundation. Good beginnings are seen in our satellite and display gardens. These help to fulfill part of our purpose in existing. We began with education as our basic premise. These gardens certainly create an opportunity for the public to meet many new ferns in an appropriate habitat. Remember too our newsletter. This represents a first class collection of information regarding ferns - how to grow, sources, problems and solutions. This material reaches our members only by our editor's efforts. The newsletter is also possible only if you respond to our editor Sue Olsen's and your HFF board's request for material, questions, information, problems - know that your inquiries are gratefully received and considered for publication. As you look back through the issues you realize how much information has been made available.

You will be interested to know that there will be a new display garden in Quebec, Canada. Also in time we will be developing a fern garden at the Bellevue Botanical Garden. This newest project is still embryonic but has much interest. Formal meetings are underway with Tom Kuykendall, director. The HFF committee includes Dr. Meredith Smith, John Putnam, Janet Dalby, Harry Olsen and John van den Meerendonk.

The Hardy Fern Foundation will be sponsoring a booth at the Northwest Flower Show again this year in partnership with the Rhododendron Species Botanical Garden. This should create a delightful scene. Please pay us a visit and volunteer a little time if you can. Janet Dalby (206) 454-3447 is co-ordinating the volunteer schedule. The dates are Feb. 6th through the 11th. (Remember the volunteers get free entry to the show.)

Enjoy your respite during the inclement weather, but remember that this is a good time to start a new batch of spore. Look at your spore exchange list and send Wayne Baxter an order.

ther up, especially on the rachis. The scales may vary in color from very dark or black to mid-brown or even paler, but with a dark base. The effect is rather striking between the dark scales and the new light green pinnae. As the frond matures it gradually becomes a bit darker green, but the contrast is still noticeable. The fronds are bipinnate and more or less narrowly lanceolate, being up to 14 inches wide and 4 to 4½ feet high in the largest specimens. The pinnae bear
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On the Pteridophyte Trail in Britain

Sue Olsen - Bellevue, WA

A POST POST-CONFERENCE TOUR

Having enjoyed an escorted fern trip to Devon and Cornwall my husband Harry and I were delighted to use our timeshare trades to extend our exploration of the English and Scottish countryside - the gardens, castles and festooned mortared walls beckoned and we were ready. We left the BPS tour in Cornwall and chose to extend our stay in that fern rich area. Trengwainton Gardens was the first stop on our itinerary and we were greeted by robust polystichums surrounded by really lush woodwardias. The fern trail passed under a canopy of rhododendrons in full flower with peach colored blossoms ready to frame the photographer's view of the resident tree ferns (*Dicksonia antarctica* once again). The background plantings were the ever present hydrangias which were to be the dominant "color" feature and favored plant to be seen during our travels. We really enjoyed the garden. However not every garden is worthy of a detour, which we were to learn after we threaded our way through some very narrow lanes (that were to pass as "roads") in order to tour Glendurgan. It was one of the rare disappointments in all the visits we made to National Trust properties. The main reason to visit the garden is to enjoy a well maintained maze which was generating a good measure of enthusiasm and youthful squeals when we were there.

Our brief glimpse of *Asplenium marinum* at Kynance Cove (see part 1) was a teaser and we were anxious to see if we could find it in other sites - preferably in more profusion. To this end we drove around the southern tip of Cornwall through quaint towns with matching names such as Mousehole. Once on the Atlantic side the coastal walk beckoned and we were duly rewarded - first with views of beautiful ocean beaches and even more importantly with colonies of the elusive *marinum* shining at us from rocky crevices at Logan Rock. Further along we passed Land's End a must to be

avoided tourist attraction and followed along to St. Ives which appeared on the map to be a small coastal village. Well it was coastal all right and maybe even somewhat small, but seemingly everyone in Southern England had come to the beach. (It was a nice day!) We drove along astonished and almost failed to notice that on the wall across the street from the teeming

crowds were some very healthy clusters of the asplenium and they were there in profusion. We indeed had our photo op.

Heading up to central England we detoured on the scenic route through Dartmoor National Park and stopped at Castle Drogo. Nothing in our literature indicated that we'd find ferns, but to me it was absolutely the best public garden of the summer tour. It was now early August and the extensive beautifully designed perennial gardens were alive with color. AND they were surrounded by a wall that was packed solid with lush aspleniums, dryopteris, ceterach and phyllitis. (Chalk off another roll of film.) They were beautifully framed by the flowers. Let's hope that no one ever, ever decides to "clean up the wall". In other parts of the garden phyllitis was used extensively and to good effect as a ground cover. I would guess that there were no strawberry root weevils around as these were in perfect condition.

We made two other short stops en route - one at Westonbirt Arboretum so Harry could take a break from ferns and tour their Japanese maple collection. This was not to be as the drought and resulting fire danger had forced the closure of that portion of the arboretum. (We returned later in the week, by appointment and the director not only allowed us to visit, but provided us with a computer print-out of what we could expect to find.) Our second stop was at the magnificent Tintern Abbey where we fondly remembered seeing quantities of *Asplenium trichomanes* in 1991. The abbey is being restored and unfortunately the asplenium population was greatly reduced. It is still worth a visit



Town of Fern. Photo by Harry Olsen.

for its beauty even if every last fern is removed. (Let's hope not.)

We had a most enjoyable week in the Cotswold's where we visited friends and toured their wonderful gardens. Martin Rickard has moved since our last visit and is now on a 29 acre estate with a huge manor to match. He and his wife Hazel have spent months clearing the property (which has five lakes and unlimited potential) and moving plant material from their old garden. As the grounds were totally overgrown this has been a back breaking job. However, they have reached the point where there is satisfaction in admiring the progress. Martin holds the national collection of polypodiums which had recently been planted and were already looking well established and handsome in their new growth. He also has Christopher Fraser-Jenkins' national collection of dryopteris on the property and they were doing quite well as was the first major landscaping site. A number of hoopouses are in place giving them much more space for their well stocked nursery (which we did our best to support) and really they are well on their way. We look forward to seeing their progress as the years pass and the garden and nursery expand.

It was pouring down rain when we visited Rita and Ray Coughlin's garden in 1991. This time like every other day of the summer it was sunny and warm just like Rita and Ray. If there were to be such a thing as a national collection of cultivars, it would have to be at the Coughlin's. I've never seen so many forms of athyrium, polystichum, and dryopteris, in particular. They were garnished with crests,

dwarfed, plumose and cruciate etc. etc. and all lovingly tended. Mind you they had beautiful plantings of the standards as well. It was a pleasure to visit (and learn)!

We had never been to Clive and Doreen Brotherton's but had certainly heard wonders about their dryland fern collection. Nothing we heard prepared us for the remarkable assemblage of cheilanthes, aspleniums, notholaenas, pellaeas etc. that is in their alpine garden and greenhouse. It is always exciting to see plants that we've never seen before, but here were plants we'd never heard of before - in numbers and extraordinary good health. Clive has obviously done his homework to successfully meet the needs of these demanding and handsome members of the world of ferns. What a visit and what an education.

We were glad to have the opportunity to at last visit Matt Busby and see his garden. Once again we were in the midst of a national collection - this time osmundas. I forgot to ask how many different ones were there, but if it is an osmunda Matt has it including a handsome specimen of *O. regalis* 'Depauperata' that Martin had rescued from an encroaching road grader in Ireland. Good eyesight does wonders! Matt also took us down the road to the university where he teaches for a tour of their greenhouses. There are some magnificent ferns including some especially vigorous and rare maidenhairs. Again we hope to return someday.

We left England for a week in Scotland where we were deep in castle country and aside from whole hillsides swamped with bracken not particularly ferny territory. However, we were not to go without as we did stop at Branklyn Gardens in Perth where they have a good collection of native and foreign ferns (as well as hydrangias)! However, there is always a caveat, and on our map we spotted a town named Fern and nothing must do but to pay a visit. This was not easy. Fern really IS a small town and once off the main roads the street signs and destination indicators are standards for minimalism. Fortunately a bemused local spotted us studying our map at an

intersection and headed us toward Fern. Also fortunately the town was so labelled and we have the pictures to prove it!

Our last week was in England's "Lake Country". Here we returned to Sizergh Castle which had so impressed us in 1991. By now the summer drought was really obvious and the gardens were suffering however still beautiful. This is the place to see phyllitis (yes a national collection) and its many cultivars and huge clumps of *Osmunda regalis*. (The garden is so large that the five foot tall osmundas are in scale in their rock garden.)

Holehird Gardens in Winderemere were



Asplenium marinum. Photo by Harry Olsen.

not too far away and here again we enjoyed the vistas and colors of an incredibly beautiful perennial garden. All of this is maintained by the local horticultural society incidentally. The garden contains a national collection of polystichums which were newly planted and donated by the Kaye's. It also contains a national collection of hydrangeas and if you fancy hydrangias these folks wrote the book.....quite literally.

We spent some time with Dominic Kaye who now manages his late grandfather Reg's fern and alpine nursery. He has expanded the propagation area extensively and has exciting plans for restoring the garden. They have some really unique phyllitis cultivars in production, many of

which are being propagated vegetatively. Like Martin he has a challenging project and we wish him well.

Our last stop of note was at Seathwaite where we were headed for a hike in England's "mountains" not particularly expecting anything exceptional in the way of ferns. Wrong! We were definitely in the proper habitat for *Cryptogramma crispa* and I mean really in the the habitat. We hiked up (and up) and every crevice sun or shade had a resident cryptogramma. Some of the most beautiful were growing in the company of the native heather so this was acid to neutral soil. The spore was also abundant and we hope to have some progeny for testing in a year or two. This trail and numerous others were off a "road" that goes over England's highest mountain pass. Harry couldn't resist and the trip was in a word "memorable". The road was one and one half little cars wide and snaked up and then down on a 30% grade. It gave new meaning to hairpin turns especially backing up to a wide spot for oncoming traffic. My right leg was exhausted from pressing on the brake and - I wasn't even driving!!!!!!

Hope you've enjoyed the tour. We obviously did.



*Hardy
Fern
Foundation*

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

Please send your submissions to Sue Olsen, 2003 128th Ave SE, Bellevue, WA, 98005.

Newsletter:

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The 1995 Spore Exchange Addendum

Well it appears that the membership listened when we said that more members should get growing because the Exchange has been absolutely swamped with orders since the fall list came out. In fact many ferns have been completely sold out. Prepare for this by asking for substitutes and be patient.

Apparently I left out some of the definitions in my **Growth habits Key** so here we go again.

1	Rare	R	Rocky Soil
2	New	J	Epiphytic
3	Few Spores	K	Terrestrial
A	Alkaline Soil	B	Tree Fern
Z	Acid Soil	C	Climber
D	Dry Soil	G	Spreading
N	Normal Dampness	E	Easy 2 grow
W	Wet Soil	Q	Hard 2 grow
L	Soil Specific	T	Part sun
F	Aquatic	U	Bright sun
P	Edible	H	Hi Humidity
X	Poisonous	S	Shade
M	Slow Growing	O	Evergreen
\$	Green Spore	Y	Dimorphic
\$\$\$	Green spore with Donor	I	Pendulous

The other listings are:

Zone which lists the most northern zone that a fern has been reported to grow. If its zone is unknown, I put 99.

Size the largest size the fern will grow under ideal conditions.

GROWth habits the key above is (hopefully) self-explanatory.

Coll. Site is where the fern was collected in the wild (this will also be noted on the lower left corner of the spore packet).

ORIGIN is the ferns natural habitat.

Donor lists the donors of the various spores. It is listed with the year the spore was donated beginning with the most recent; then the donor number. There is a space between successive years. If you want spore from a particular donor or collection site you must specify which one.

We all must consider that with everyone ordering a lot of ferns this year, we are going to need lots of donations to replenish the list for next year. We all need to get out there collecting. We could also use some more volunteers that have access to ferns that have green spores, and the fern allies. I would love to get

these on the list. Members should contact me if they want to help get them on the list.

Some highlights to the list are Hypolepis Repans, a large fast growing fern. On the opposite end is little Woodsia alpina, a Northern European fern that grows in the high Arctic. And some oldies but goodies are back, Cheilanthes argentea and Asplenium pinnatifidum are two.

To order: Please print your selections clearly in alphabetical order using the botanical name. Include 25 cents for each fern requested (check payable to the Hardy Fern Foundation) and a self-addressed stamped envelope. No charge for requests from overseas, but please enclose an International Postal Return Coupon (two if it is a big order). Maximum order is 25 packets per year.

Mail Requests to:
Wayne "Bubba" Baxter
307 Riverdale Cir.
Stephenson, VA 22656
540-667-0139
wbaxter@crosslink.net

Wire me anytime!!

DONOR LIST

Aikins	Brian	1
Minne	Claire	2
Baxter	Wayne	3
Born*	Wendy	4
Burkman	Mrs Alice J.	5
Davis	Anna Maria.	6
Duryee	Sylvia & Phil	7
Duthie	Leslie	8
Dwyer	Patrick	9
Entz	Sue&Hermn	10
Gaddis	Ins	11
Gassner	Wolfram	12
Goudy	Chris	13
Green	Eldred	14
Haines	Greg	15
Hall	Neil	16
Hankerson	Marguente	17
Hanover	Kenneth	18
Hatfield	Leslie	19
Horder	Jocelyn	20
Horrocks	JR	21
Hoshizaki	Barbara Joe	22
Huntley	Guy	23
Jermy Hon.	Clive	24
Jones	Judith	25
Kasper	Harold Dr.	26
Knoblock	Dr. Irving	27
Krukeberg	Mareen	28
Lake	Robert W.	29
Leake	Donald	30
Lindsay	Stuart	31
Makela	Lynn	32
Mascitelli	John&Margo	33
Mickel	Dr. John T.	34
Muller	Mary	35
Olsen	Sue	36
Parris	Barbara S.	37
Pettkus	Karola M.	38

Pfeiffer	Ken	39
Putnam	John&Grace	40
Rickard	Martin	41
Rugh	Jim	42
Saiki	Yasuhisa	43
Sanfers	Kevin W.	44
Seibert	PhDrZdenek	45
Sjo	John & Irma	48
Thomson	William	49
Timm	Fred&Conni	50
Turney	Samuel	52
Turney	Dr. T.W.	53
VandeMoes	Dr. Cor	54
Vandermaast	Mrs. Sandra	55
Visentin	Suzette	56
Vulcz	Les	57
Wakeman	Bruce	58
Weeks	Elmo	59
Kaye	Reginald	60
Adkins	John	62
Agostinelli	Don	63
Atterbury	Diane & Ken	64
Boyles	Roger	65
Byer	Dorothy	66
Cava	Edmund	67
Clause	Eileen	68
Concannon	Michael	69
Denkewitz	Lothar	70
Drife	Don & Joyce	71
Ehlers	Joachim	72
Game	John	73
Gamiin	Robert	74
Kluge	Johan	75
Graber	Jean	76
Gustin	Laura	77
Hallman	Edward	78
Hughes	David	80

Kato	Yoshio	81
Kawabata	Shuzo	82
Knouse	John	83
Kuheana	Halyna Mrss	84
Lamb	Dorothy	85
Lellinger	Dr. David B.	86
Marley	John & Judy	87
Miyazaki	Hiroki	88
Moscetti	Pamela	89
Sauls	Craig	90
Sheffield	Dr.Elizabeth	91
Skula	Frank Mrs	93
Sonter	Val	94
Straney	Dr. David	95
Sullivan	Judith	96
Thompson	John	97
Wingard	Christian	98
Young	Dr Bruce	99
Baird	Marge	100
NimmoSmit	Margaret	101
Hirsch	E. MD	102
Pillar	Richard	103
Laughland	Bryan J.	105
White	Barry	106
Edney	Beverly	107
Guiles	Catherine	108
Bates	Phyllis P.	109
Halley	Bob	110
HFF		111
AFS/NYBG		112
Burnett	Naud	113
Punter	J. C.	114
Gould	Gretchen	115
Osonio	Rufina	116
Feely	Joan	117
Farrar	Dr. Donald	117
Thorut	Chanin	118

Link	Elva C.	119
Birkrem	Dr Alf	120
Sasashi	Mrs Hiroko	122
Feuerstein	Betsy	123
Garrett	Michael	124
HFFLakewol		125
Ney	Jason	126
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Rollins	James A.	128
HEIM	MICHAEL	129
Barton	Loyd & Vera	130
Muller	Robert	131
Constantino	Sandra	134
Tavemier	Wim	135
Batten	D.J.	136
Farden	Cynthia	138
Schieber	Jack	139
Smith	Alan	140
Perry	Jesse	142
Reed Jr	Wally	143
Lundberg	Jean	144
Mandeville	Sue	146
Hinde	Dr. Howard	147
Tonsing	Mary Ellen	148
Quattrochi	Judy	149
Nielson	Jens Henrik	150
Fairbourne	Marlena	151
Huge	Mogens	152
Hammerber	Owen	153
Nash	Brian E.	155
McGill	Peggy	156
Coppins	Stephen	157
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Sherlock	Nancy	159
Hoskova	Stanislava	160
Sliger	Dean	161
Yansura	Daniel	162
Herrington	Ann	163

HFF	GENUS	SPECIES	CVR	COM. NAME	PK	Z	SIZE	GRO	COLL.SITE	ORIG	DONOR
1	Alsophila	australis		Rough Tree Fern	2	7	120	BWUEZ		Aus	95/9
2	Arachniodes	standishii			6	6		TNK		Jp	95/70
3	Asplenium	adiantum-nigrum	adiantum-nigrum	Black spleenwort	50	6	14	RANT	Hawaii, Switz	Eur NA Af	95/9
4	Asplenium	pinnatifidum		lobed spleenwort	5	5	5	ZNSK		E USA	95/8
5	Athyrium	filix-femina	Victornae	Queen of Green Victorian Lady	8	3	48	ZNTKEC		N HEM	95/141, 156
6	Athyrium 2	filix-femina	Asplenioides	Lady Fern Green Stemmed Lady	2	3	48	ZNTKEV	N Va, SW Mich	N HEM	95/9
7	Athyrium 2	filix-femina	Setigerum cnstatum	lady fern	1	3	48	ZNTKEV		N HEM	95/41
8	Blechnum	spicant	Crispum	Crested Deer fern ladder fern	6	5	24	ZESWY		N Hem	95/36
9	Blechnum	spicant	Rickard's serrate	rich serrate deer fern ladder	6	5	24	ZESWY		N Hem	95/36 93/38, 97
10	Camptosorus	rhizophyllus		Walking Fern	5	4	6	NTAOK		E NAm	95/8 93/18, 120
11	Ceterach 2	officinatum	bifurcatum	Rusty-back'dm Scaly Spleenwort	2	5	6	ADU		India, Af, Eur	95/61
12	Cheilanthes	argentea		silver cloak fern	4	4	6	DUZK		Nasia, Siberia	95/150
13	Cyrtomium 2	Lonchitiforme			3	7	12				95/150
14	Cystopteris	alpina	Regia		5	5	12		Denmark	Eur	95/150 93/12
15	Dryopteris	stewartii			40	7	48	K	Denmark		95/12 94/45
16	Dryopteris 2	filix-mas	CrispaCristata	Male Fern	60	3	48	ZSNVE		N Hem	95/2
17	Dryopteris 2	filix-mas	Polydactyla Dadd's	Male fern	7	4	48	ZSNOK		N Hem	95/135
18	Dryopteris 2	filix-mas	Strabem ?	Male Fern	60	3	48	ZSNVE		N Hem	95/2
19	Dryopteris 2	pseudo-mas	The King ?	see d. affins	6	4	24	NSOK			95/2 94/148
20	Dryopteris 2	sichotensis			10	5	48	EKN		Easia	95/148
21	Dryopteris 2	Villani	Submontana		4	5			PiruBausko Bulg	Eur	95/61
22	Equisetum 2	Arvense			2	3	16	KWGU		NAm	95/9
23	Equisetum 2	Sylvaticum			5	3	16	KWUG		NAm	95/9
24	Hypolepis 2	Repens		Bramble Fern	5	7	60	GS		FiaC&SamWindie	95/158
25	Pentagramma	triangulans		goldback fern	10	6	10	UDRK		N.A	95/146, 170
26	Phyllitis 2	scolopendrium	Crenata		10	4	24	ARNSK		N.Hem	95/150
27	Phyllitis 2	scolopendrium	Muricatum		3	4	24	ARNSK		N.Hem	95/2
28	Polypodium 2	Mandianum			8	5					95/166
29	Polystichum	aculeatum	Acutilobum	Hard Shield Fern	30	4	30	EASRG	Denmark	Eur, N India	95/150
30	Polystichum	setiferum	Cristatum	Soft Shield Fern	2	5	40	TNK		Europe	95/41
31	Polystichum 2	Adiantiform			6	5					95/166
32	Polystichum 2	setiferum	coronatum	Soft Shield Fern	1	5	40	TNKE		Europe	95/41
33	Polystichum 2	setiferum	Cruciatum group	Soft Shield Fern	1	5	40	TNKE		Europe	95/41
34	Polystichum 2	setiferum	Grandidens	Soft Shield Fern	1	5	40	TNKE		Europe	95/41
35	Polystichum 2	setiferum	Hirondelliodes	Soft Shield Fern	1	5	40	TNKE		Europe	95/41
36	Polystichum 2	setiferum	Percnstatum Ramosum	Soft Shield Fern	1	5	40	TNKE		Europe	95/41
37	Woodsia 2	Alpina			2	4			Denmark	NEur	95/150
38	Woodwardia	virginica		Virginia Chain Fern	8	3	24	WZUGO		E N.Am	95/9, 166, 92/113



Dryopteris Wallichiana
continued from page 1

numerous, highly regular rectangular pinules which are squarely truncate or truncate with rounded corners, and bearing acute teeth. The sori are in two rows, one on each side of the center of the pinnae. The indusium is thick and as it turns brown, it lifts up somewhat and shrivels slightly, but remains persistent. The spores are mostly fully formed but with a lesser amount somewhat abortive. This fern is a diploid apomict for those interested in its cytology.

Culture: This fern seems to adapt to temperate climates quite well and is perfectly hardy, requiring a cool, shady spot. It is at home under large trees and may even appreciate the proximity of a large rock. The fronds form a shuttlecock, though they often droop slightly. There is a splendid photograph of this species in Reginald Kaye's book, *Hardy Ferns*. *Dryopteris wallichiana* is a handsome plant and makes a noticeable addition to any garden.

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Dryopteris wallichiana

The Great Fernists

Christopher Fraser-Jenkins (1948)

by Martin Rickard

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"The Fern World"

San Diego Fern Society

In normal circumstances it would seem rather premature to be writing biographical notes on someone as young as 45! In Christopher's case, however, there is already far too much to say in a short note!

Christopher was born on 17th April 1948 at Newcastle House, Bridgend, Glamorgan, South Wales, where he grew up. During his youth he was immersed in the horticultural environment created by his father, Charles Derek Fraser-Jenkins, at Bridgend, and by his grandfather, Admiral Walker-Heneage-Vivian, who lived at Clyne Castle near Swansea, also in South Wales. Not surprisingly, he could not resist all this pressure and from a very early age became involved in various natural history studies. He started to collect ferns in 1957 - at the age of nine! While at school at Radley College (1961 - 1966) he edited the natural history magazine and was secretary of their Natural History Society. He joined the British Pteridological Society in 1966. Jimmy Dyce claims apocryphally to remember him at BPS meetings in short trousers!

He had, and still has, many other interests. These included at one time being a Master of Hounds, hunting with beagles, the manager and sound engineer of a pop music group, later turning to Buddhist philosophy as well as helping to educate street-children in Kathmandu. He is also quite a political character. His visits to see us here are always enlivened with political argument. We may not agree very often, but we do agree to differ very amicably!

At university at Leicester, he did a degree in biology (1967-1970) and a PhD on the '*Dryopteris villarii* aggregate and related ferns.' He unfortunately never finished the PhD largely due to financial pressures obliging him to take a job as biology teacher at Charterhouse School, where

he worked for two happy years as assistant to Oleg Polunin, the great Himalayan plantsman. In 1974, he moved on to Radley College as Biology master.

While at Radley in June 1976, during one long weekend half term break Christopher decided to collect ferns in Northern Spain. He arranged with a colleague to cover for him on Friday afternoon while he caught a flight to Santander, hired a car, and collected in the Oviedo district of North Spain working down into mid-Portugal. He caught a flight back on the tuesday night from Lisbon just in time to teach at Radley the next morning after a sleepless night (was the lesson half in Spanish?!). His trip resulted in the discovery of a completely new European *Dryopteris* hybrid (now called *D. x fraser-jenkinsii*) and many new records. This type of brinkmanship was common as the urge to hunt ferns became ever stronger and finally reached a head late in the 1976 summer holidays when Christopher mistimed his return from the Caucasus. He drove back via Rumania and Basel only to breeze into College unwittingly a day late! This caused quite a few problems. Soon after Christopher decided that he had not enough time for ferns and teaching. Ferns won!

Earlier, in 1971, Christopher mounted an expedition to the Russian Caucasus where he was able to bring back living material of an unknown fern he had first collected in 1968 in Turkey. This he demonstrated to be *Dryopteris caucasica*, a diploid, the missing ancestor of *Dryopteris filix-mas*. This discovery created quite a stir in the world of pteridology and led to Christopher meeting Professor Tadeus Reichstein of Basel in Switzerland. Over the subsequent two decades Christopher and Professor Reichstein have worked together on the systematic evaluation of complex groups of ferns (mainly *Asplenium*, *Dryopteris* and *Polystichum*, leading to innumerable fern hunting trips for Christopher to all corners of the world. Every trip seems to have been full of incident and I never tire of hearing Christopher's stories, amusing, sad, or scientifically stimulating.

Over the years since 1966 Christopher has been abroad more often than he's

been at home. Some trips are quite short while other have kept him away for almost a year. Apart from a three year period when he had a fellowship to work on Himalayan ferns at the British Museum (Natural History), he has been unemployed since leaving Radley in 1976. Of course his world travel has been expensive. Initially his trips were largely funded by himself, but as his own reserves ran low Christopher became skillful at locating suitable funding organizations all across Europe. Since about 1976 he has frequently worked in close co-operation with Prof. Reichstein and received the Professor's financial support. Notable grants were received from The Royal Society, the National Museum of Wales, Helsinki University, and many others. But, perhaps worthy of note here is a grant from the Greenfield Fund of The British Pteridological Society.

His overseas trips are far too numerous to mention here in full. In summary, he has collected throughout most of Europe, Macronesia, and across Asia to Japan, concentrating on India, Pakistan, and Nepal. Less often, he has visited some of the islands in the Indian Ocean (e.g. Madagascar, Mauritius and Reunion), as well as West Africa, usually in the quest for an endemic *Dryopteris*. Recently he has spent quite a lot of time in North America, particularly Chiapas, Oaxaca, and Chihuahua in Mexico: and the rich endemic flora of Hawaii has not escaped his attentions. While abroad he doesn't spend all his time collecting. He has to know where to go and what he might find. This involves meeting many local botanists, learning of their interests and searching through local herbaria, identifying and listing material.

All these expeditions have a target, often, for him, a *Dryopteris*. However, when sponsored by Prof. Reichstein, he is often hunting *Asplenium*s. Recently in the western Himalaya he was hunting two very rare *Asplenium* species, *Asplenium nesii* and *A. iscardense*. He had spent several days climbing up and down rugged terrain. Exhausted from the fruitless search, he sat on a roadside rock, looked underneath the rock and there it was, one of the most elusive species! He is not always successful, however, and in 1992

he was very disappointed when he failed to find a particular *Asplenium* in Mexico for Professor Reichstein, albeit one that had only ever been found once before, more than 100 years ago! Sometimes the target of a visit may prove elusive but invariably there is a compensation. For example, quite by chance in 1981 in North Spain, he "bumped into" a new species - *Dryopteris corleyi* (named after his mentor Hugh Corley). I can just imagine his amazement and delight at being confronted by a stand of a strikingly different new species. It must have been one of the highlights of his life! I have since seen this handsome species in Spain and can confirm what an attractive species it is.

His travels are not all pleasure. In the late 1980's he was in Mexico and wanted to explore near a certain village. He asked a local how long it would take to get to the village on foot, for there was no road. The answer was up to two hours. Christopher knew the local Indians tended to be rather inaccurate with their estimates of time and therefore allowed four hours. In any event, it took him all day. Unprepared, he had no overnight equipment, so he asked in the village for shelter from torrential rain. He was soaked to the skin, shivering and desperate. The only help offered was a waterlogged patch under a tree, of course hopelessly inadequate. Goodness knows what would have happened had the village school teacher not appeared and taken pity on him and offered him the floor of a shed. All this just for a fern! (*Ed. note....I hope he found it!*) At other times his eccentric pursuit of ferns and difficulty with local languages has survived all sorts of problems, including being shot at for target practice in Eastern Turkey, interrogated in the formerly communist Georgia, and joining armed tribal bandits for a fern hunt in the Northwest frontier! Happily, he has ended up without any periods behind bars, except for the more refreshing kind! As I say - all this for a fern!

So what has all this travel achieved? Speaking as a gardener, I think his most significant contribution must be the enormous number of species he has introduced into cultivation by importing plants or spores. My collection would be very much smaller were it not for Christopher

and there are several other gardens in England that have benefitted from his collecting. Richard Rush's superb book *Hardy Ferns* would have been much the poorer without Christopher's plant imports and his enthusiastic support and discussion. In addition, he has sent spores to the British Pteridological spore exchange, either directly or indirectly, to the benefit of the wider fern growing community throughout the world. He is extremely generous with plant material but has nevertheless managed to build up a magnificent collection of ferns at Bridgend, predominantly *Dryopteris*. He holds the National Collection of *Dryopteris* for the National Council for the Conservation of Plants and Gardens (NCCPG). This includes something in the order of 172 different taxa in 1989 and by now the collection is quite possible around 200. Plants collected have frequently been used for scientific research, notably by Dr. Mary Gibby at the Chelsea Physic Garden who has done a lot of cytological and innovative isozyme work on Christopher's collection. Many collections have been used for a comprehensive program of phytochemical analysis by Dr. C. J. Widen in Finland and Professor E. Wollenweber in Germany, and of course, the living collections are of great reference value.

In addition, he has had a long, informed connection with many pteridologists in South Asia and China, helping to introduce and maintain high standards of study and research and to integrate Himalayan work with that of surrounding areas. Recently he was awarded the Gold Medal of the Indian Pteridological Society for his painstaking monographic studies of *Dryopteris* and *Polystichum*

The plants and spores collected are, however, largely incidental compared with the herbarium material. By 1993 Christopher had collected about 18,000 different herbarium specimens, most with several duplicates. All this work has inevitably led to a great deal of published material. By 1993 Christopher had published more than 60 papers, mostly taxonomic, and helped with many more. Christopher is red hot on nomenclatural matters, having published over 100 new names and combinations. These new names broadly break down into new subspecies, new

hybrids, and, of course, new species. I have already mentioned *Dryopteris caucasica* (published in 1973 with Hugh Corley) and *D. corleyi*. A selection of other new species are *D. tyrrhena* (1975 with Prof. Reichstein), *D. stewartii* (1979), *D. ardechensis* (1981), *D. nigropaleacea* (1982), *Asplenium aitchisonii* (1982 with Prof. Reichstein), *Dryopteris reichsteinii* (1986), *D. caroli-hopei* (1986), *Polystichum mehrae* (1986 with Dr. S. P. Khullar), *Asplenium tadei* (1987 with Jacob Schneller), and many others. He has also written *Dryopteris* in Hegi's 'Flora of Central Europe' and in the new 'Flora Europea' and revised the nomenclature of the Scaly Male Fern (*Dryopteris affinis*), dividing it into subspecies. His recent work has been on the ferns for 'Flora Iranica' and 'The Flora of Pakistan' and he is currently studying ferns in Nepal and Sri Lanka.

On the debit side, Christopher has also been responsible for several name changes. This is a policy not likely to endear him to the amateur naturalist, however justified the name change may be! Examples of note to British botanists are *Dryopteris affinis* for *D. borrieri* and *Dryopteris expansa* for *D. assimilis*. He also has some of the most indecipherable handwriting in modern botany, combined with a horror of typewriters and computers, which is a pretty unbeatable combination of circumstances!

From the above it is clear that Christopher has an outstanding talent for everything pteridological and his actions have greatly enriched the fern world. His interests span the entire world of ferns, from the highest academic levels to the pure pleasure of fern growing.

He is never happier than when he is parked half way up the Himalaya with ferns and a curry in sight - and his trusty old camper van as his home. Long may his fern collecting trips continue, and when he returns to England we will always look forward to his visits when we can enjoy the company of a very good friend.

*Martin Rickard England
(June 1993)*

A monograph of *Dryopteris* (Pteridophyta: Dryopteridaceae) in the Indian subcontinent Christopher R. Fraser-Jenkins; Bulletin of the British Museum (Natural History), Botany series Vol. 18 No. 5; Cromwell Road, London SW7 5BD, England; 1989.

Many of the ferns that are being introduced to cultivation today are the product of the extensive explorations and research of Christopher Fraser-Jenkins (see related article). In this extremely useful monograph he describes 57 of these species. In addition to the descriptions there are very clear illustrations. The entries provide extensive documented synonymy, followed by the plant description, notations on cytology, ecology, and range in that order. Finally there are notes which reference closely related species and their differences as well as other observations such as historical problems with identification pertinent to the particular species. Much of this information cannot be found in any other reference. As a grower I have found the book extremely useful. (Access to a glossary helps too!!) His key to the species is being published here with permission from the British Museum and we hope that you too will find it useful. *Sue Olsen*

Subgenus 1. *Dryopteris*

Bullate scales absent, fronds not imparipinnate, segments usually symmetrical and without auricles at the acroscopic base; pinnulet arrangement catadromous.

Section 1. *Hirtipedes*

Fronds once pinnate, lanceolate to narrowly lanceolate, pinnae lobed to only half their depth or less except at the very base of the lowest few pinnae; stipe and rachis scales mostly narrow and dark.

- 1a Sori entirely exindusiate even when young 1. *D. scottii* (p. 330)
- 1b At least some sori with indusia (though in old specimens where many have dropped off, careful search may have to be made with a lens) 2
- 2a(1b) Sori marginal or submarginal, veins slightly darkened and impressed into the lamina 5. *D. dickinsii* (p. 337)
- 2b Sori near the costa or distributed throughout the pinna, veins neither darkened nor impressed 3
- 3a(2b) Stipe scales all narrow and \pm uniform (very slightly widening to the base) 4
- 3b Stipe bearing mixed narrow and wider lanceolate scales 6
- 4a(3a) Pinnae shallowly lobed or \pm unlobed, lobes, if present, closely juxtaposed 4. *D. stenolepis* (p. 336)
- 4b Pinnae lobed to half their depth and more deeply at the bases of the lower few pinnae, lobes becoming slightly separated at least at their apices 5
- 5a(4b) Stipe and rachis bearing somewhat scattered, black, \pm adpressed scales, lobe edges and teeth hard and stiff 6. *D. lunanensis* (p. 339)
- 5b Stipe and rachis densely clothed with mid- or grey-brown, spreading scales, lobe edges and teeth \pm lax 7. *D. conjugata* (p. 341)
- 6a(3b) Stipe base bearing slightly wider lanceolate scales than the upper stipe, pinnae \pm narrow and slightly crowded, sori bearing minute, vestigial indusia 3. *D. darjeelingensis* (p. 335)
- 6b Stipe base bearing markedly wider ovate-lanceolate scales than the upper stipe, pinnae \pm wide and well spaced, sori bearing normal-sized indusia 2. *D. hirtipes* (p. 332)

Section 2. *Fibrillosae*

Stipe and rachis usually \pm densely scaly, scales predominantly narrow, \pm brown or black; fronds once pinnate, a second time deeply pinnatifid, or becoming twice pinnate below, lanceolate to narrowly lanceolate; lamina \pm coriaceous and somewhat glossy above; pinna-lobes or pinnules parallel-sided and \pm rectangular, with truncate or rounded-truncate apices.

- 1a Stipe scales abruptly lanceolate, partly deciduous 12. *D. acuto-dentata* (p. 350)
- 1b Stipe scales mostly, or all, narrowly lanceolate, persistent 2
- 2a(1b) Stipe and rachis scales predominantly brown, at least on the rachis (though varying in shade) 3
- 2b Stipe and rachis scales all black or dark blackish-brown 7
- 3a(2a) Pinna-lobes or pinnules small (c. 7 \times 2.5 mm), lamina slightly glossy above, bearing somewhat numerous, hair-like fibrillae 10. *D. redactopinnata* (p. 346)
- 3b Pinna-lobes or pinnules large (c. 8–13 \times 4–5 mm), lamina considerably glossy above, bearing very few, if any, hair-like fibrillae 4
- 4a(3b) Pinna-lobes or pinnules in the lower part of the frond lobed up to about half their width on each side, the lower basiscopic ones well developed and longer than those above 17. *D. khullarii* (p. 362)
- 4b Pinna-lobes or pinnules not, or only very slightly, lobed. the lower basiscopic ones not more developed, or only very slightly longer than those above 5
- 5a(4b) Pinnae not, or only very slightly, tapered below so that the base of the lamina is widely truncate; scales all markedly linear (though gradually becoming slightly wider at the stipe base) 13. *D. lepidopoda* (p. 352)
- 5b Pinnae tapered below so that the base of the lamina is narrow or slightly truncate; stipe-base scales lanceolate but not markedly linear, those above narrower 6
- 6a(5b) Lowest pinnae slightly developed on their basiscopic side, pinna-lobes in the mid-upper pinnae joined at their bases by a somewhat wide wing of tissue, their apices rounded-truncate or slightly obtusely pointed 15. *D. madrasensis* (p. 359)
- 6b Lowest pinnae not at all developed on their basiscopic side, pinna-lobes in the mid-upper pinnae joined at their bases only by a very narrow wing of tissue, their apices truncate or truncate with rounded corners 14. *D. wallichiana* (p. 354)

7a(2b)	Upper stipe and rachis bearing only scattered scales	16. <i>D. sledgei</i> (p. 361)
7b	Upper stipe and rachis densely scaly	8
8a(7b)	Pinna-lobes or pinnules small (c. 5–10 × 2–3 mm), lamina slightly glossy above, bearing somewhat numerous, hair-like fibrillae	9
8b	Pinna-lobes or pinnules somewhat large (c. 8–13 × 4–5 mm), lamina considerably glossy above, bearing very few, if any, fibrillae	10
9a(8a)	Lamina markedly narrowly tapered below, stipe short	8. <i>D. pulcherrima</i> (p. 342)
9b	Lamina not, or only slightly, tapered below, stipe long	11. <i>D. yigongensis</i> (p. 348)
10a(8b)	Pinna-lobes or pinnules in the lower part of the frond lobed up to about half their depth on each side, the lower basicopic ones well developed and longer than those above	17. <i>D. khullarii</i> (p. 362)
10b	Pinna-lobes or pinnules not, or only very slightly, lobed, the lower basicopic ones not developed, or only very slightly longer than those above	11
11a(10b)	Pinnae not, or only very slightly, shorter below so that the base of the lamina is widely truncate; scales all markedly linear (though gradually becoming slightly wider at the stipe base)	13. <i>D. lepidopoda</i> (p. 352)
11b	Pinnae shorter below so that the base of the lamina is narrow or only slightly truncate; stipe-base scales lanceolate or somewhat widely lanceolate, those above considerably narrower	12
12a(11b)	Stipe and rachis scales castaneous-black, most of those on the rachis short, lanceolate and somewhat scattered	9. <i>D. neorosthornii</i> (p. 345)
12b	Stipe and rachis scales not castaneous-black, those on the rachis long, linear and dense ...	13
13a(12b)	Lowest pinnae slightly developed on their basicopic side, pinna-lobes in the mid-upper pinnae joined at their bases by a somewhat wide wing of tissue, their apices rounded-truncate or slightly obtusely pointed	15. <i>D. madrasensis</i> (p. 359)
13b	Lowest pinnae not at all developed on their basicopic side, pinna-lobes in the mid-upper pinnae joined at their bases only by a very narrow wing of tissue, their apices truncate or truncate with rounded corners	14. <i>D. wallichiana</i> (p. 354)

Section 3. *Pandae*

Fronds once pinnate to a second time pinnatifid, or twice pinnate, lanceolate to narrowly lanceolate; stipe bearing somewhat scattered, usually pale and lanceolate, or ovate-lanceolate scales, rachis usually ± devoid of scales, or bearing only scattered scales; lamina pale green, somewhat succulent-herbaceous in texture; pinna-lobes or pinnules usually with wide, obtuse, or ± rounded-truncate apices. Indusia usually large, spores usually large and somewhat reddish-brown.

1a	Pinnae lobed only to approximately half their depth, or a little more at the base of the lowest pinna	2
1b	Pinnae deeply pinnatifid or pinnate	4
2a(1a)	Lower rachis and upper stipe bearing ± dark, linear-lanceolate scales	21. <i>D. woodsii</i> (p. 368)
2b	Lower rachis and upper stipe ± devoid of scales	3
3a(2b)	Pinna-lobes truncate; sori very large (2–2.5 mm diam.) and close to the pinna midrib	18. <i>D. bonatiana</i> (p. 363)
3b	Pinna-lobes mostly rounded, or rounded-truncate, except in the upper pinnae, where rounded; sori medium-sized (1.5–2 mm diam.), spreading slightly up the pinna-lobes	19. <i>D. panda</i> (p. 365)
4a(1b)	Lamina somewhat crispaceous, with long-acute, ± stiff teeth, lowest pinnae the largest and their lowest basicopic pinnules developed and usually curved towards the pinna-apex	24. <i>D. nobilis</i> (p. 374)
4b	Lamina slightly succulent-herbaceous with ± obtuse, herbaceous teeth or crenations, lowest pinnae not the longest and their lowest basicopic pinnules usually shorter than the next and not developed or curved	5
5a(4b)	Scales on the upper stipe and lower rachis mostly dark; pinna-lobes or pinnules with the sori ± widely spaced and submarginal	21. <i>D. woodsii</i> (p. 368)
5b	Scales on the upper stipe and lower rachis pale, or mid-brown; pinna-lobes or pinnules with crowded sori ± near the pinnule midrib	6
6a(5b)	Stipe-base scales predominantly mid-brown; indusia not all completely enclosing the sorus; ripe spores irregular and admixed with abortive spores	20. <i>D. himachalensis</i> (p. 367)
6b	Stipe-base scales predominantly pale; indusia all completely enclosing the sorus; ripe spores regular	7
7a(6b)	Stipe as long as the lamina, lamina compact, ovate-lanceolate (S. India)	22. <i>D. austro-indica</i> (p. 370)
7b	Stipe shorter than the lamina, lamina compact or lax, lanceolate (Himalaya)	23. <i>D. chrysocoma</i> (p. 371)

Section 4. *Dryopteris*

Fronds twice pinnate, usually lanceolate; stipe bearing mostly lanceolate, or ovate-lanceolate, scales; lamina mid- or pale green, herbaceous; pinnules mostly ± adnate or widely attached to the costae, unlobed, or ± shallowly lobed, usually with rounded or pointed apices, not usually markedly parallel-sided (unlike section *Fibrillosae*). Indusia ± small.

1a	Lamina bearing numerous scattered fibrillae, stipe and rachis ± densely scaly	28. <i>D. barbiger</i> (p. 380)
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- 1b Lamina ± without fibrillae, upper stipe bearing ± scattered scales, rachis with few or no scales 2
- 2a(1b) Frond large (c. 60–100 cm long), lower stipe somewhat densely scaly with mixed lanceolate and narrow scales; pinnule teeth ± shortly acute 25. *D. filix-mas* (p. 375)
- 2b Frond small (c. 10–35 cm long), stipe bearing scattered ovate-lanceolate scales; pinnule teeth long and markedly aristate 3
- 3a(2b) Lamina ovate-lanceolate, thin, densely glandular mainly on the axes, segments with long splayed-out teeth 27. *D. alpestris* (p. 380)
- 3b Lamina elongated triangular-lanceolate, ± thick, bearing ± scattered glands, segments with short, unsplayed teeth 26. *D. serrato-dentata* (p. 377)

Section 5. Remotae

Intermediate between sections *Fibrillosae* and *Marginatae*; fronds twice pinnate, somewhat narrowly lanceolate, or narrowly triangular-lanceolate, with a truncate base; stipe long, stipe and rachis densely scaly with dark scales, those on the stipe being markedly ovate-lanceolate, becoming narrower above and mixed with fibrillae; pinnules shallowly lobed and ± parallel-sided, usually becoming developed and deeply lobed below, lobes rectangular; lamina herbaceous. Indusia small, somewhat thick. A single species in the Indian subcontinent 29. *D. blanfordii* (p. 386)

Section 6. Pallidae

Fronds twice-pinnate, often a third time pinnatifid, elongated triangular-lanceolate; stipe long, bearing ovate-lanceolate scales at the base, which often become very scattered, or ± absent, on the rachis; lamina somewhat crispaceous-herbaceous and often slightly glaucous above, pinnules with rounded or pointed apices and usually ± rectangular side-lobes, lower pinnules on each pinna stalked. Indusia small or large.

- 1a Scales towards the base of the stipe mostly, or all, very dark castaneous or blackish 2
- 1b Scales towards the base of the stipe mostly, or all, brown 6
- 2a(1a) Upper stipe and rachis ± densely scaly (though scales partly deciduous on drying); indusia large and thick 30. *D. sublacera* (p. 389)
- 2b Upper stipe and rachis with few or no scales, indusia small and not markedly thick 3
- 3a(2b) Pinnules with markedly cordate and bi-auriculate bases, sori submarginal (S. India only) 31. *D. odontoloma* (p. 391)
- 3b Pinnules with non-cordate, or only very slightly cordate, non-auriculate bases, sori near the centre, or medial (N. and S. India) 4
- 4a(3b) Mid-stipe scales brown, basal pinnules markedly longer than those above on the same pinna; pinnae foliose 34. *D. stewartii* (p. 398)
- 4b Mid-stipe scales blackish, basal pinnules slightly but not markedly longer than those above on the same pinna; pinnae not foliose 5
- 5a(4b) Lamina mid-green above, pinnules with wide, markedly rectangular lobes when lobes present, pinnule-apices wide, rounded, or rounded-truncate, except for those on the lowest pinnae in well-developed plants, which are pointed 32. *D. juxtaposita* (p. 393)
- 5b Lamina blue-green above, pinnules with ± narrow, rounded-truncate lobes, pinnule-apices narrow, rounded or pointed 33. *D. nigropaleacea* (p. 396)
- 6a(1b) Pinnules with markedly cordate and bi-auriculate bases; sori submarginal, indusia not markedly large (up to c. 1 mm diam.) 31. *D. odontoloma* (p. 391)
- 6b Pinnules with non-cordate, or very slightly cordate, and non-auriculate bases; sori not submarginal, indusia markedly large (c. 1.2–1.7 mm diam.) and taller 7
- 7a(6b) Scales matt with markedly minutely-fimbriate or minutely-toothed edges, lamina not glossy above, pinnules slightly sloping to a rounded or obtusely-pointed apex 30. *D. sublacera* (p. 389)
- 7b Scales glossy with edges bearing only a few, or no, fimbriations, lamina somewhat glossy above, pinnules not sloping to their rounded, or rounded-truncate, apices 8
- 8a(7b) Lamina pale green, pinnules few per pinna, markedly wide, with markedly rounded-truncate apices, pinnule-teeth ± few and somewhat short 35. *D. lachoogensis* (p. 400)
- 8b Lamina dark green, pinnules many per pinna, not markedly wide, with rounded apices, pinnule-teeth many and long 36. *D. fructuosa* (p. 402)

Section 7. Splendentes

Fronds twice pinnate, often becoming a third time deeply pinnatifid, lanceolate; stipe long; pinnules narrowly attached except in the upper parts of the pinnae, markedly asymmetrical at their bases, the lobes on their basiscopic sides being narrower and more obliquely inserted than those on their acroscopic sides, but pinnules not, or hardly, auriculate at their acroscopic bases.

- 1a Stipe and lower rachis glossy black, bearing scattered, small, adpressed, lanceolate, matt, brown scales; pinnules bearing wide contiguous lobes 37. *D. splendens* (p. 405)
- 1b Stipe and lower rachis pale green (reddish towards stipe-base), bearing somewhat dense, large, spreading, ovate or ovate-lanceolate, glossy black scales; pinnules bearing very narrow, well-separated lobes 38. *D. sikkimensis* (p. 407)

Section 8. Marginatae

Fronds large, bipinnate or more usually tripinnate, occasionally becoming a fourth time pinnate, usually widely triangular-lanceolate; stipe long, bearing scales at the base which become very small and scattered, or absent further up; pinnules usually narrowly attached to the costae, symmetrical, ultimate lobes somewhat distant, teeth without hair-points; lamina herbaceous. Indusia usually thin. Spores without minute spinules.

1a	Fronds markedly dimorphic, fertile ones markedly compact and with very crowded sori 39. <i>D. cochleata</i> (p. 408)	
1b	Fronds non-dimorphic, fertile ones not compact and sori not markedly crowded	2
2a(1b)	Lamina lanceolate and usually slightly narrowed at the base	3
2b	Lamina widely triangular-lanceolate, widest at the base	4
3a(2a)	Fronds arising together from the rhizome apices, pinnules ranging from \pm unlobed to pinnatifid, patent	40. <i>D. pteridiiformis</i> (p. 412)
3b	Fronds arising from the rhizome at intervals, pinnules pinnate, markedly upright 41. <i>D. angustifrons</i> (p. 413)	
4a(2b)	Pinnules mostly lobed or pinnatifid, becoming pinnate only near the base of the lamina; indusia persistent, somewhat thick, becoming reddish-brown 42. <i>D. subimpressa</i> (p. 415)	
4b	Pinnules mostly pinnate throughout the lamina; indusia thin, \pm fugacious, becoming pale- to mid-brown	5
5a(4b)	Lamina finely dissected, ultimate segments narrow and markedly acutely pointed, with markedly long-acute teeth	46. <i>D. ramosa</i> (p. 425)
5b	Lamina coarsely dissected, ultimate segments wide, rectangular, rounded or obtusely pointed, with \pm short-acute teeth	6
6a(5b)	Pinnae and pinnules closely sessile so that the pinnules or pinnulets are markedly closely juxtaposed to the rachis or pinna-costae respectively; pinnules with caudate, \pm unlobed apices (S. India and Sri Lanka)	43. <i>D. approximata</i> (p. 419)
6b	Pinnae and pinnules shortly stalked and not closely sessile; pinnules without caudate, unlobed apices (Himalaya)	7
7a(6b)	Lamina markedly smooth on the upper surface, ultimate segments mostly \pm rectangular (but can be pointed in the lower parts of the lamina), with \pm insignificant teeth; stipe-base scales glossy and exserted (E. Himalaya only)	44. <i>D. marginata</i> (p. 420)
7b	Lamina matt, with impressed veins on the upper surface, ultimate segments pointed, with marked teeth; stipe-base scales matt and adpressed (W. and E. Himalaya) 45. <i>D. caroli-hopei</i> (p. 422)	

Subgenus 2. *Erythrovariae* (Sections *Erythrovariae* and *Variae*)

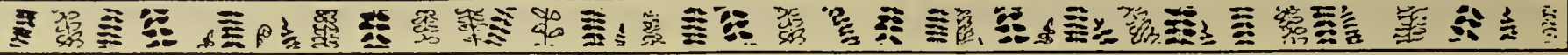
Stipe-scales mostly confined to the base of the stipe (except in *D. varia*), stiff and narrow; fronds not imparipinnate, segments symmetrical or asymmetrical, bearing small, bullate, or sack-like scales on the pinnule midribs and tips of the pinna-costae on the under surface (except in *D. assamensis*, and only weakly bullate ones present in *D. varia*); pinnulet arrangement catadromous; species confined to the E. Himalaya.

1a	Fronde lanceolate or \pm linear-lanceolate, pinnules markedly rectangular though often slightly narrowed to their bases, bullate scales absent	47. <i>D. assamensis</i> (p. 428)
1b	Fronde widely triangular-lanceolate or deltate, pinnules not markedly rectangular, bullate scales present (though only weakly bullate in <i>D. varia</i>)	2
2a(1b)	Upper stipe glabrous, lowest basicopic pinnule on the lowest pinna not markedly longer than those above, pinnule-apices not caudate, rounded	48. <i>D. subtriangularis</i> (p. 430)
2b	Upper stipe bearing many small scales, lowest basicopic pinnule on the lowest pinna markedly the longest, pinnule apices caudate and acutely pointed	49. <i>D. varia</i> (p. 432)

Subgenus 3. *Nephrocystis* (Sections *Purpurascetes* and *Nephrocystis*)

Stipe-scales mostly confined to the stipe-base, either very narrowly linear, or lanceolate to ovate; fronds not imparipinnate, triangular-lanceolate, segments markedly asymmetrical and sloping and usually bearing a \pm rounded auricle at their acroscopic base; pinnulet arrangement at the base of the frond anadromous or catadromous; lamina markedly smooth.

1a	Scales confined to a tuft of long, very narrowly linear ones at the very base of the stipe, with minute ones appearing almost like pubescence on the rachis, particularly where the pinna-costae join it	50. <i>D. pulvinulifera</i> (p. 434)
1b	Scales ovate or lanceolate, extending slightly up the lower stipe; rachis \pm glabrous	2
2a(1b)	Rachis \pm straight, pinnae not deflexed	3
2b	Rachis markedly zig-zagged, pinnae backward-deflexed	8
3a(2a)	Scales ovate and bicolorous with a darker central area	4
3b	Scales lanceolate and concolorous	5
4a(3a)	Fronde coarsely dissect and segments large, stipe pale or green	52. <i>D. sparsa</i> (p. 438)
4b	Fronde somewhat finely dissect and segments small, stipe reddish-purple 53. <i>D. yoroi</i> (p. 442)	
5a(3b)	Scales very dark brown or blackish, ultimate segments markedly rounded 51. <i>D. hasseltii</i> (p. 436)	
5b	Scales pale- to somewhat russet-brown, ultimate segments \pm lanceolate	6
6a(5b)	Pinnae markedly linear and mostly opposite, pinnae and pinnules markedly closely sessile, basal pinnules opposite	55. <i>D. sri-lankensis</i> (p. 451)
6b	Pinnae \pm narrowly triangular-lanceolate, becoming alternate in the middle of the frond, pinnae and at least the lower pinnules with short stalks and not markedly sessile, pinnules alternate	7
7a(6b)	Segments markedly obtuse and large (c. 12 \times 25 mm)	56. <i>D. macrochlamys</i> (p. 453)
7b	Segments \pm pointed, not markedly obtuse or large (c. 7 \times 15 mm) 54. <i>D. deparioides</i> (p. 445)	
8a(2b)	Lamina up to four times pinnate, stiff, all segments crowded	56. <i>D. macrochlamys</i> (p. 453)
8b	Lamina up to five times pinnate, lax, all segments well-spaced	57. <i>D. diffracta</i> (p. 456)



Calendar

We have been asked to announce some very special events:

March 9 & 10, 1996, University of California, Berkeley. The Friends of the Jepson Herbarium will present A Fern Workshop Intensive, Pteridaceae with Dr. Alan Smith. "This family comprises most of the so-called 'desert ferns'....(which) have a tendency to grow in xeric and/or rocky habitats....living material of *Cheilanthes*, *Notholaena*, *Pellaea*, *Argyrochosma* and *Astrolepis*" will be studied along with assorted other genera. "Identification of genera and species with much of the time spent using keys (to be provided), will be the primary focus." Cost - \$125.00 members; \$145.00 non-members. For information and registration packet call the Jepson Herbarium (510) 643-7008 or send a check to Friends of the Jepson Herbarium, 1001 Valley Life Science Building, Berkeley, CA 94720-2465. *Editor's note: My husband and I visited this garden several years ago. It presents an outstanding collection of dryland ferns. We're so enthusiastic about it that we have signed up for the class!*

April 13, 1996; 9:00 AM-3:00 PM, Rhododendron Species Botanical Garden Annual Plant Sale. The sale will be at the west entry parking lot adjacent to the garden at Weyerhaeuser Corporate Headquarters. It is one of the best and largest sales in the northwest and will feature an extensive offering of rhododendrons and azaleas, trees, alpine, natives, select Japanese maple cultivars, heathers, hostas and other perennials, bonsai, dwarf conifers and, of course, ferns. There will be free admission to the garden during this special event. Call (206) 838-4646 for more information.

August '96 Seattle - HFF Tour and Reception for AFS/AIBS

August 2-4, 1996 AIBS pre-conference tours; August 5-8, AIBS and American Fern Society annual meetings, Seattle. The Friday and Saturday pre-conference tours will feature field trips to ferny habitats in the Cascade mountains (tentatively the Snow Lake Trail, the Cle Elum River and Asahel Curtis Nature Trail) and will be led by Ed Alverson and Dr. Arthur Kruckeberg. The Sunday field trip is being arranged by your Hardy Fern Foundation. Participants will travel to the Rhododendron Species Botanical Garden at Weyerhaeuser Corporate Headquarters in Federal Way, WA. This beautiful 25 acre garden houses the Hardy Fern Foundation's main display and test garden of over 100 different ferns and cultivars in a landscaped setting among rhododendrons, mature conifers and other collections. Visitors will see extensive plantings of dryopteris, polystichum, athyrium and other hardy material. Bonsai enthusiasts will also find one of the country's foremost displays on the campus. Box lunches will be served at the home of Barbara Carman where, weather permitting, guests can enjoy a spectacular view of Mt. Rainier. The afternoon tour will feature a trip to Lakewold Gardens on Gravelly Lake in Tacoma. This ten acre garden has a comprehensive collection of many types of plants from rock garden specimens to deciduous and evergreen trees from around the world. There is a special HFF display garden in addition to the many ferns that are a part of the landscape. The final stop of the day will be at the home and nursery (Foliage Gardens) of Sue and Harry Olsen. This small garden contains Sue's collection of 200 plus native and exotic ferns as well as Harry's collection of Japanese maple cultivars. Light refreshments will be served.

The AIBS has informed us that it is not necessary to register for the conference in order to attend the field trips, however, preference will be given to registrants. For further information write to Donna Haegele, American Institute of Biological Sciences, 730 11th St., N.W., Washington, D.C. 20001-4521. Telephone (202) 628-1500 ext. 254.

The Hardy Fern Foundation will also host a reception for our members, members of the American Fern Society and interested others on Monday evening, August 5, at 7:30 p.m. in the Conference Room at the University of Washington Faculty Club. HFF board member and Rhododendron Species Botanical Garden Curator, Steve Hootman will show slides and discuss his recent botanical trip to the interior mountainous regions of China. The expedition discovered a number of new to science plant species and saw many unusual ferns. You are all invited, but reservations are requested and can be sent to Ruth Hofmann, 8949 Woodbank Dr., N.E., Bainbridge Island, WA 98110.

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